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Foreword

This Manual is developed to provide service and maintenance technicians and management persons at LIFAN service centers with the information about the structures, working principles and technical parameters of LFX50 series so as to facilitate their vehicle inspections, fault diagnosis, disassembly and installation, and adjustment, service and maintenance.

This Manual contains three volumes: Volume I, Volume II and Volume III (wiring diagrams), so as to meet different needs of readers.

This Manual features combination of texts and illustrations, understandable descriptions and a number of service and maintenance tips, so as to shorten working hours and improve working efficiency.

It is of great importance to keep following points in mind when using this Manual:

1. Read this Manual carefully before performing inspection, fault diagnosis, disassembly and installation, and adjustment, service and maintenance, and conduct such operations in accordance with the requirements specified in the Manual. Also, pay attention to the instruction contained in "WARNING", "NOTICE" and "HINT" texts.
2. This Manual applies to LFX50 series. It describes the entire array of options and equipment available for a specific model. As a result, this Manual may contain accessories and equipment unavailable for some vehicles.
3. Any unauthorized modification and addition of equipment, in particular the systems relating to driving safety such as electronic devices, braking and steering components, are strictly prohibited to prevent vehicle damage and accidents.
4. Purchase genuine parts and accessories tested and approved by LIFAN from LIFAN service centers.
5. LIFAN shall not be held responsible, liable and accountable for accidents or any other direct or indirect losses arising from the violation against the No. 3 and No. 4 instructions mentioned above.
6. The contents contained in this Manual may differ from the actual LFX50 products improved with the technical progress. LIFAN shall reserve the right to update its vehicle design without prior notice. Therefore, LIFAN will revise the contents contained in this Manual at the time of republication without prior notice. LIFAN shall not be held directly or indirectly responsible, liable and accountable for any loss of users arising therefrom.

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Overview

How to use this manual 01-1
General information.....01-1
On-vehicle inspection.....01-1
Inspection.....01-1
Preparation.....01-1
Maintenance procedures.....01-1
Terms definition.....01-3
"Warning", "notice" and "hint".....01-3
International system of units (SI).....01-4
Index.....01-4
Abbreviations.....01-4
DTC list.....01-4
How to eliminate the fault.....01-5
Inspection and repair of fuse.....01-5
How to handle intermittent fault.....01-6
How to handle previous fault.....01-8
Precautions before repair.....01-9
Safety protection system.....01-9
Engine oil.....01-9
Electrical system maintenance.....01-10
Vehicle cleaning.....01-10
Application of preservative and primer.....01-10
Maintenance guide.....01-11
Maintenance HINTS.....01-11
Vehicle lifting.....01-15
Vehicle identification.....01-16
Vehicle identification number.....01-16
Specifications for complete vehicle ..01-18
Specifications for complete vehicle.....01-18
Standard bolt torque.....01-23
Tightening torque for common thread specification.....01-23

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HOW TO USE THIS MANUAL

GENERAL INFORMATION

1. This Manual focuses on the first procedure “Diagnosis” (see fault diagnosis in each chapter), the second procedure “Replacement, maintenance and commissioning”, and the third procedure “Final inspection”.
2. This Manual analyzes and explains the maintenance respectively from system description (in theory), fault diagnosis (finding problems) and maintenance guide (troubleshooting).
   - System description: it includes preparations, service data, precautions, system description, principle explanation, components and on-vehicle inspection, etc. This Manual features description and explanation of faults on the basis of theory about system and from the perspective of complete system, provides theoretical guide for maintenance, and analyzes and solves problems from the perspective of complete system.
   - Fault diagnosis: it includes fault symptom list, DTC, etc. It mainly explains common and possible faults of vehicle, points out possible fault locations, and provides troubleshooting method to help quickly find out the fault causes and locations.
   - Maintenance guide: it classifies components of the system, and provides detailed and proper maintenance guide for inspection, test, removal and installation of each part to improve maintenance quality and efficiency.
3. Though the following basic operations are not specially detailed in this Manual, yet they are absolutely necessary in practical operations.
   - Use of jack
   - If necessary, clean the removed components.
   - Visual inspection
4. Each chapter of this Manual contains maintenance precautions. Read the content carefully before maintaining to avoid part damage and personal injuries due to misoperation.

ON-VEHICLE INSPECTION

"On-vehicle inspection" mainly performs inspection and adjustment of important positions related to structure, repair and service as well as other related inspection (such as looseness, clearance, cracks and damage).

INSPECTION

Using recommended tools and measuring gauges, perform related inspection and check procedures through perceptive modes. But in practical steps of repair and service, visual inspection is also required for related inspection.

PREPARATION

Recommended tools and service data required for repair are listed at the beginning of each chapter in this Manual. Well preparation before repair will improve your repair quality and efficiency.

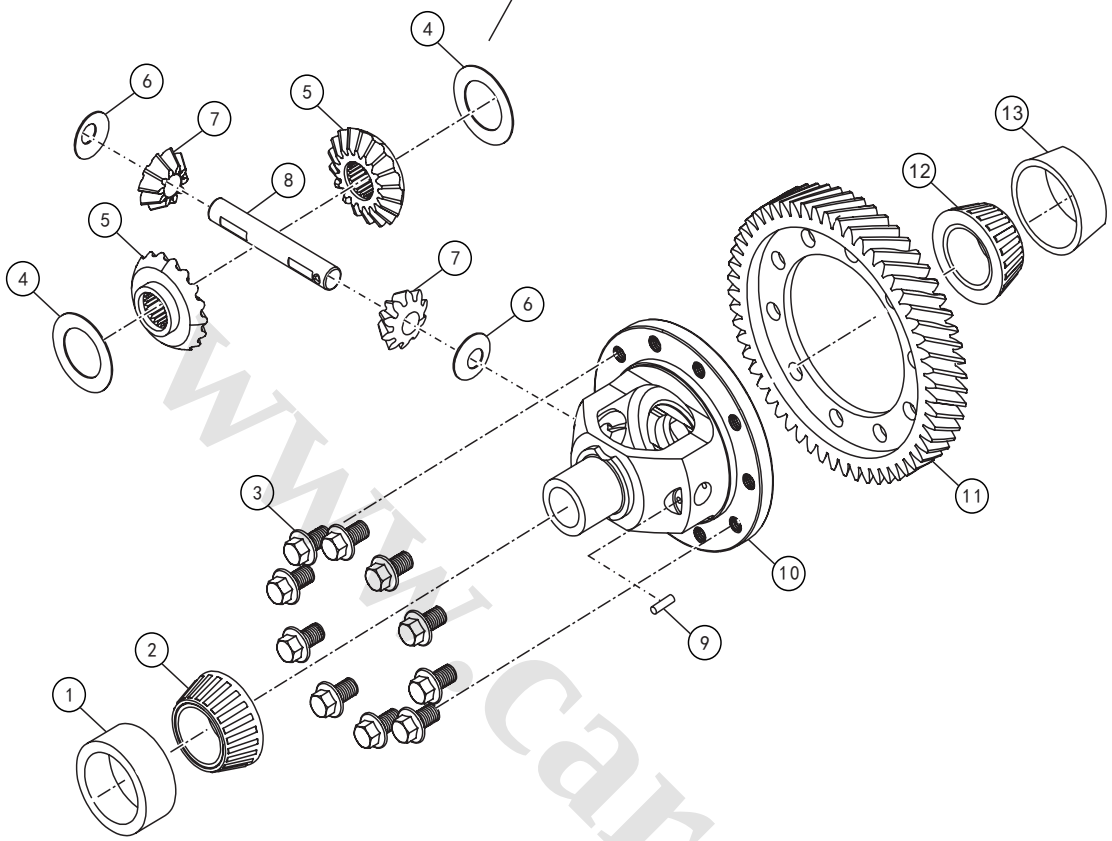
MAINTENANCE PROCEDURES

1. Components are inserted where necessary, and introductions to the system where components are serviced are made in details.
2. Components clearly describe the assembly relationship of components in the form of explosive view.

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Parts assembly relationship



1	Differential front bearing sleeve
2	Differential front bearing
3	Differential bolt
4	Axle shaft gear washer
5	Axle shaft gear
6	Planetary gear washer
7	Planetary gear

8	Planetary gear shaft
9	Planetary gear shaft elastic cylindrical pin
10	Differential housing
11	Differential ring gear
12	Differential rear bearing
13	Differential rear bearing sleeve

Part name list

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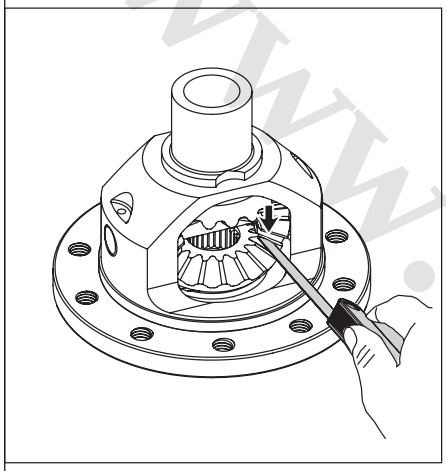
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3. If the installation procedures are reverse to the removal ones, only the important parts are described.
4. This Manual uses illustrations for the important parts and the operation parts in the working procedures, provides detailed descriptions of such components, and lists operation methods, reference data and precautions.
5. The working procedures are described in the following forms:
   - Illustrations show “What to Do” and “Where to Do”.
   - Titles of operation procedures indicate “What to Do”.
   - Operation procedures indicate “How to Finish Tasks”, and provide “Warning”, “Notice”, “Hint” and other useful information to facilitate the maintenance.

Example:

Illustration

What to do and where to do



What to do

1. **Check the gear clearance between planetary gear and axle shaft gear**

(a). Check the gear clearance between planetary gear and axle shaft gear, if the gear clearance exceeded the standard value, select appropriated space ring, and measure the gear clearance.

Standard value: 0.025 - 0.150 mm

Task finished

Notice:

Gear clearance on both sides shall be adjusted into equal.

Help info

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TERMS DEFINITION

Standard value

Indicating standard for part quality judgment or assembly inspection, or correction and adjustment value of related parts and assemblies. Use the form of range to indicate.

Limit value

Indicating part quality judgment and assembly inspection standard as well as maximum value or minimum value of parts or assemblies conforming to function performance and strength demand.

Torque

Torque (unit: N•m) mainly refers to standard value range of tightening torque. When relative torque of bolts and nuts are not provided, refer to tightening torque table for detail.

"WARNING", "NOTICE" AND "HINT"

⚠ WARNING

It is highlighted in bold type to require necessary measures applied to avoid personal injury or death.

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NOTICE

It is highlighted in bold type to stress the necessity of a certain diagnosis or maintenance procedure. Otherwise, it may result in personal injury or parts and components damage.

△ Hint

It provides additional instructions being helpful for improving work efficiency of the maintenance.

INTERNATIONAL SYSTEM OF UNITS (SI)

The“Unit”in this Manual adopts the international system of units (SI).

For example:

Torque: 30 N•m

INDEX

At the end of this Manual, index of content table is provided to facilitate the maintenance process.

ABBREVIATIONS

At the end of this Manual, abbreviation table is provided to facilitate the maintenance process.

DTC LIST

At the end of this Manual, DTC list is provided to facilitate the maintenance process.

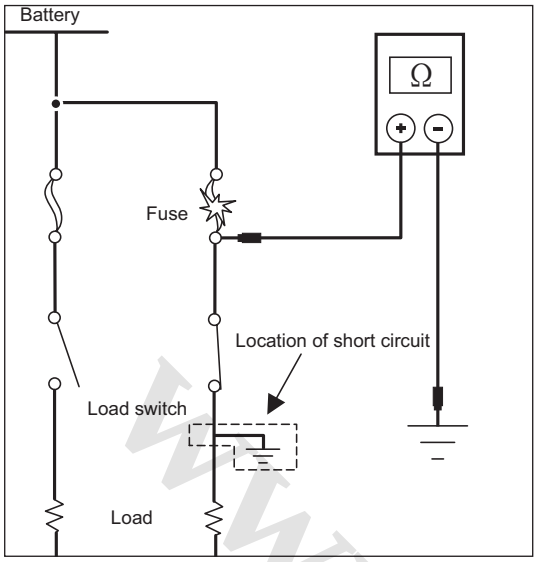
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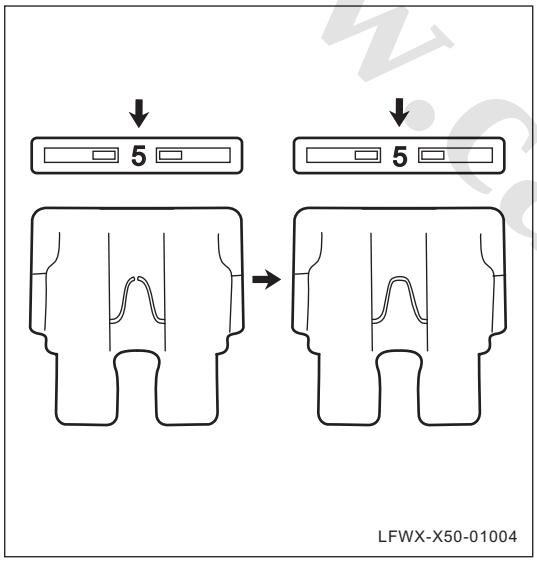
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HOW TO ELIMINATE THE FAULT

INSPECTION AND REPAIR OF FUSE





1. CHECK THE BLOWN FUSE CIRCUIT

(a) Remove the blown fuse and measure the resistance between the blown fuse loading end and the grounding. Switch off all circuit switches connected with this fuse. Under this condition, the resistance is about 0Ω and short circuit point may exist at certain part between the switch and loading. W hen the resistance is not 0Ω, it indicates there is no short circuit symptom. But over high loading transient voltage may also result in blown fuse.

Main causes for short circuit include the following.

- Outer surface of wire harness is damaged due to wear or overheating.
- There is water in connectors.
- Artificial fault, etc.

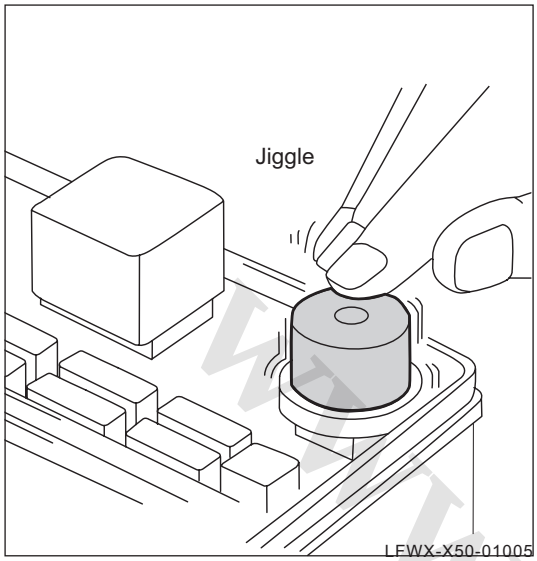
(b) When replacing a fuse, make sure that the rated current intensity of a new one is correct. It is forbidden to use a fuse with current being more than or less than rated value.

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HOW TO HANDLE INTERMITTENT FAULT

To confirm the condition of intermittent fault, ask the customer about vehicle driving condition, weather condition, fault frequency and fault symptom and then try to simulate fault symptom. Judge whether the inspected circuit is damaged or normal and confirm and eliminate the fault. For narrowing the range of the possible faults, refer to the fault symptom table of each system.



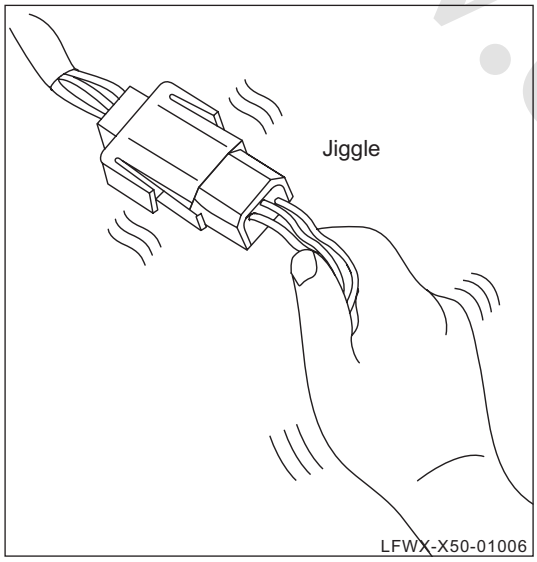
1. SHAKING METHOD

(a) Components and sensors.

Lightly shake the possible faulty sensor with your fingers, and check whether the fault appears again.

NOTICE:

Excessive force may cause the relay open-circuited.



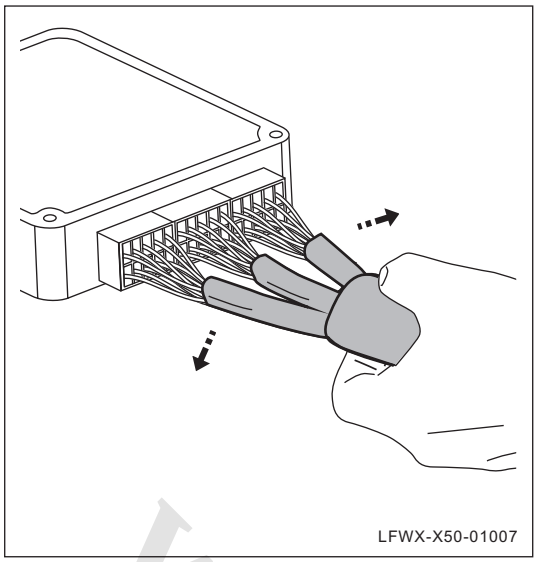
(b) Connector.

Jiggle the connector vertically and horizontally and judge whether the fault appears again.

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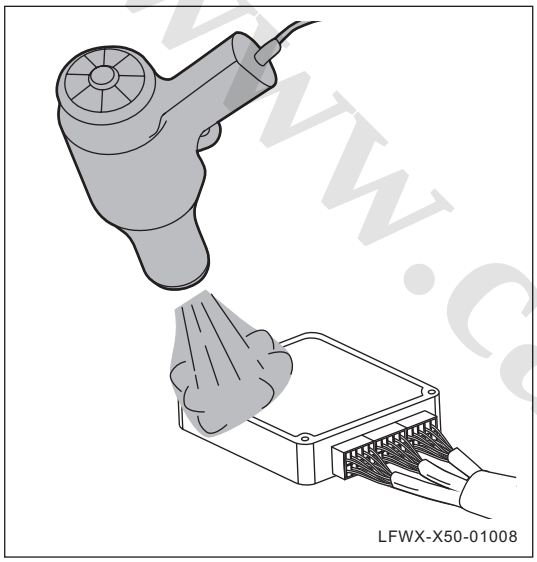
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(c) Wire harness.

Lightly shake the wire harness and connector vertically and horizontally and judge whether the fault appears again.

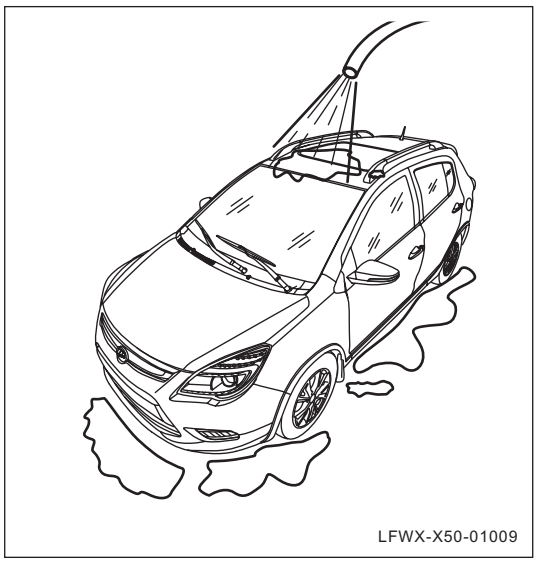

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2. HEATING METHOD

(a) Heat the location where the fault may occur with a hair dryer or equivalent, and judge whether the fault appears again.

NOTICE:

- **Do not damage parts and components structure during heating.**
- **Do not heat any ECU part and component directly.**


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3. WATER-SPRAYING METHOD

(a) Spray water onto the vehicle, and judge whether the fault appears again.

NOTICE:

- **Avoid spraying water onto the engine directly.**
- **It is forbidden to spray water onto the electrical components directly.**

△ HINT:

Water leakage may damage some electrical components. Take great care during the water-spraying test.

4. OTHERS

(a) Connect all loadings and judge whether the fault appears again.

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HOW TO HANDLE PREVIOUS FAULT

Although the fault does not appear under current condition, but it occurred before. In case of such condition, related faults may exist all the time.

When previous fault exists, perform the following inspection procedures.

(a) Confirm whether the user has replaced the fuse or disconnected the connectors.

(b) If related fuse was replaced or connector was disconnected, clear the DTC and check whether its DTC is reset. If the DTC is not reset, complete the diagnosis.

(c) In case of DTC reset, perform related DTC process. Then check wire harnesses and connectors and refer to "How to Handle Intermittent Fault' for detail.

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PRECAUTIONS BEFORE REPAIR

SAFETY PROTECTION SYSTEM

1. PRECAUTIONS FOR SRS MAINTENANCE

(a) After disconnecting the negative cable of battery, wait for at least 60s before any operation. Disconnect the battery, and the SRS system will provide sufficient voltage to airbag for deployment. Do not repair the SRS system components within 60s after disconnecting the battery cable. Otherwise the SRS system may be started and the airbag may be deployed, resulting in serious accident.

(b) When repairing or handling SRS components, read related warnings/notices carefully. Warning tag is located at the right sunvisor.

(c) Always make sure that specified special tool and measuring devices are used.

(d) Removed SRS components should be placed at clean and dry area. Place airbag module at flat surface with its inflation direction facing upward. Do not place any object on its top.

(e) Do not remove or repair SRS components (SRS control unit, airbag module and clock spring)

(f) After finsihing SRS repair, check the warning lamp for normal operation to ensure normal system function.

(g) Before handling airbag module or when handling the vehicle equipped with airbag module, make sure airbag is deployed.

2. WHEN PERFORM SRS COMPONENT OPERATION (INCLUDING INDIRECT OPERATION RELATED TO SRS), FOLLOW THE FOLLOWING STEPS

(a) When removing or installing parts, do not collide with or shake SRS components.

(b) During praying, remove the SRS control unit, airbag module, clock spring, front impact sensor and seat belt with pre-tightening function to avoid heating damage.

ENGINE OIL

1. HEALTH WARNING

(a) Contact with engine oil for a long time repeatedly will lead to skin natural oil reducing, resulting in dry, irritated and inflammed skin.

(b) Engine oil may contain potential dangerous objects that may result in skin cancer. Apply proper skin protection method and related cleaning equipment.

2. RECOMMENDED PREVENTIVE ACTIONS

(a) Avoid to contact with engine oil (especially the used engine oil) for a long time repeatedly.

(b) Wear protective clothes, including practical leak-proof gloves.

(c) Do not put rag attached with oil stain into pocket. To avoid such case, wear uniform without pocket.

(d) The uniform should be clean and stored alone.

(e) Wear goggles and mask during operation and be sure to equipped with the corresponding eye washing device.

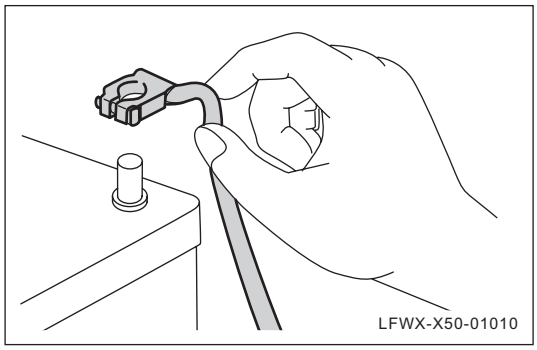
(f) Do not clean the skin with petroleum, kerosene, diesel, gasoline or solvent.

(g) In case of related skin disease, go to a doctor immediately without any delay.

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ELECTRICAL SYSTEM MAINTENANCE



Before replacing related components in electrical system or repairing electrical system, disconnect the battery negative cable to avoid short circuit.

Before disconnecting or connecting the battery negative cable, make sure that ignition switch and light switch are switched off (if above devices are not switched off, it may result in damage to semiconductor parts).

VEHICLE CLEANING

When clean the vehicle with high-pressure cleaning devices or steam cleaning devices, pay attention to the following information to avoid damage to related plastic components.

- Nozzle distance: ≥40 cm
- Pressure: ≤3900 kPa
- Temperature: ≤82°C
- Time for spray at a single point: within 30 s.

APPLICATION OF PRESERVATIVE AND PRIMER

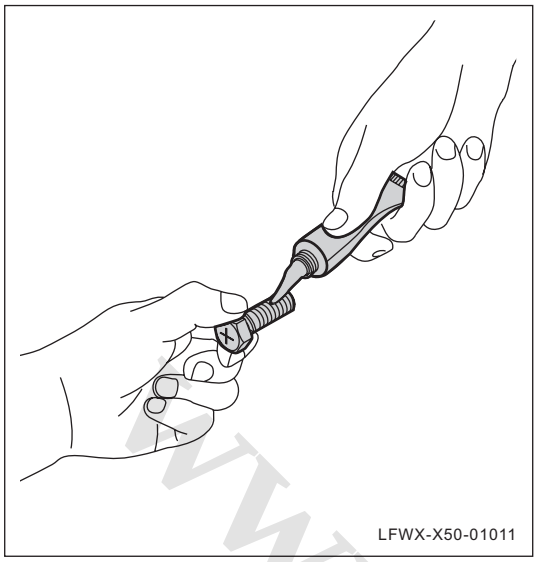
Preservative or primer falling on sensor or actuator will influence the performance of sensor or actuator. When spraying preservative and primer, cover the sensor and actuator with protective cover.

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MAINTENANCE GUIDE

MAINTENANCE HINTS


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1. PRE-COATED PARTS

(a) Pre-coated parts are bolts, nuts, etc. that are coated with a sealant at the factory.

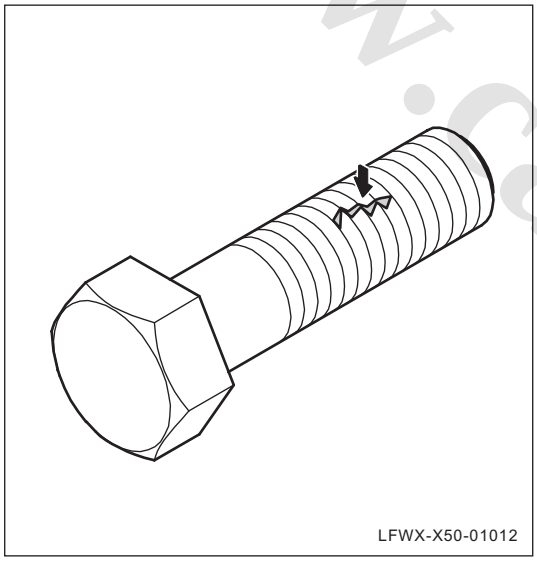
(b) If a pre-coated part is retightened, loosened or caused to move in any way, it must be recoated with the specified sealant.

(c) When reusing pre-coated parts, clean off the old sealant and dry the part with compressed air. Then apply the specified sealant to the thread of bolts and nuts.

(d) After applying the sealant, wait for a period of time until the sealant hardens.

2. WASHERS

(a) When necessary, use a sealer on gaskets to prevent leaks.


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3. BOLT, NUT, SCREW

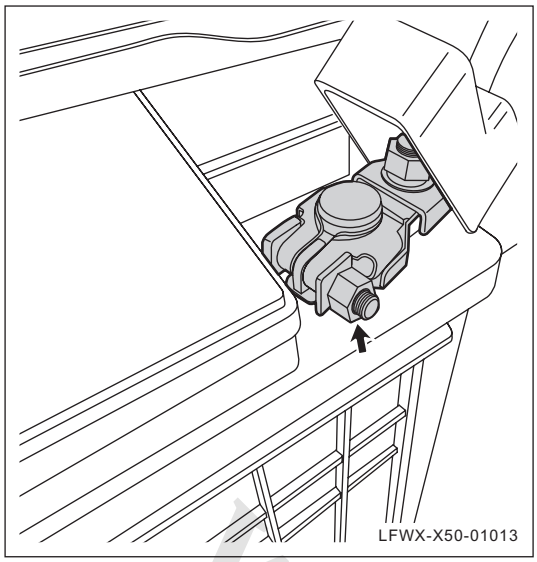
(a) Before use, check whether there are more than three damaged threads in the bolt, nut and screw. If so, replace it.

(b) Follow all specifications for the tightening torques of bolts.

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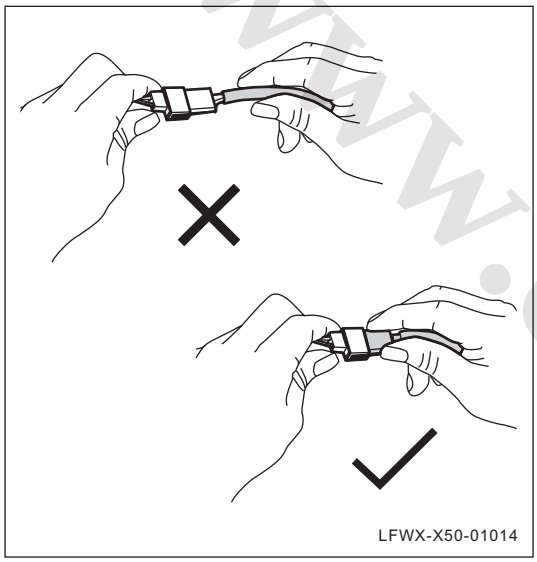
4. BATTERY

(a) Before checking or repairing on-vehicle electric equipments and circuits, disconnect the negative cable of battery.

(b) To avoid damage to the battery terminal post, unscrew the terminal post nut, and remove the cable by lifting it upwards. Do not twist or pry it.

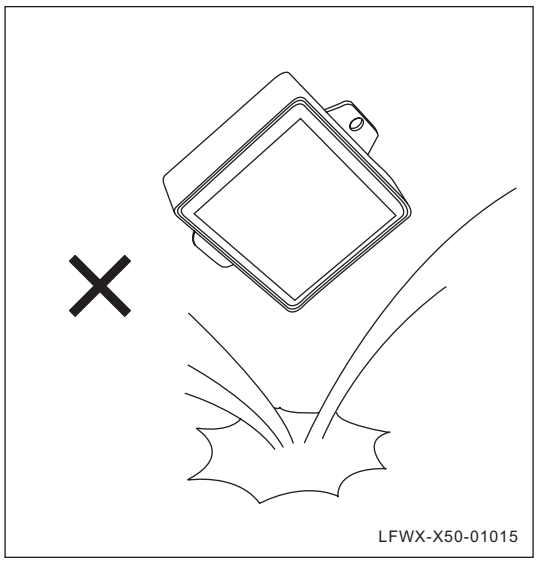
(c) Wipe the battery terminal post with a cloth. Do not ream or grind it with a file or other grinding tools.

(d) Unscrew the nut and re-install the cable terminal back to the battery terminal post, and screw the nut. Do not knock the cable terminal to the battery terminal post with a hammer.



5. ELECTRICAL COMPONENTS

(a) When unplugging any electrical connector, make sure to pull the connector body other than the wire harness.



(b) Take care not to drop any electrical component (such as sensor and relay). If any component drops to hard ground, replace it.

(c) When checking the conduction of wire connectors, make sure to carefully insert the tester probe to avoid bending of the terminal.

(d) After replacing electrical components, make sure to test their functions to ensure normal operation.

6. SNAP-FITS

(a) Be sure to use special clamp tongs to remove snap-fits. The removal and installation methods for the snap-fits used in the common body parts are shown in the following table.

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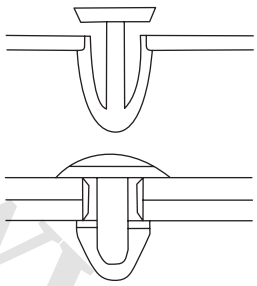
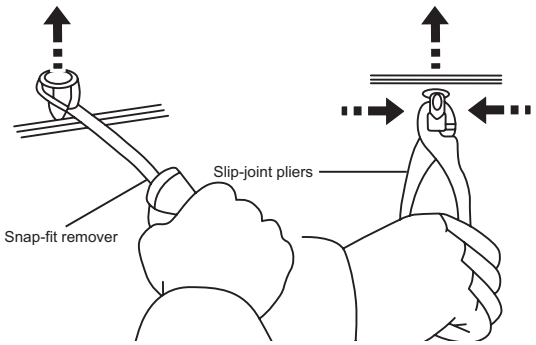
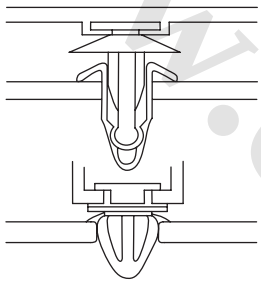
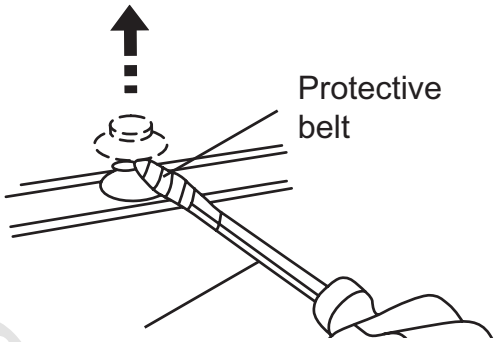
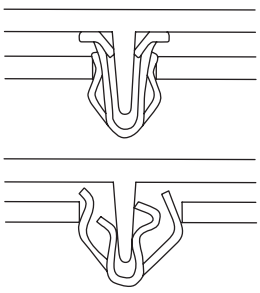
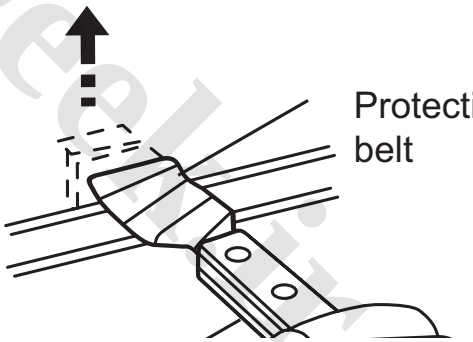
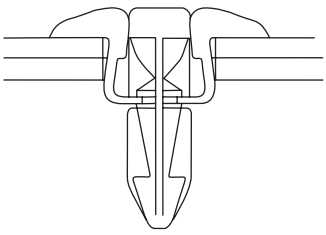
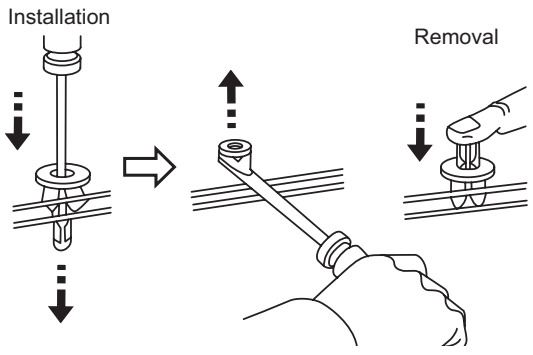
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△ HINT:

If the clamp tongs are damaged during maintenance, make sure to replace it.

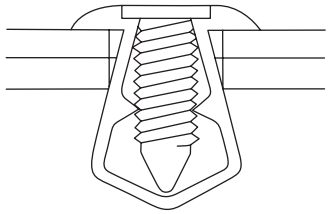
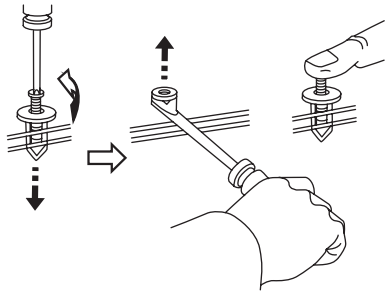
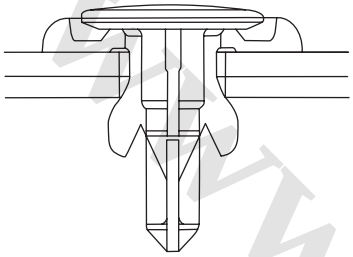
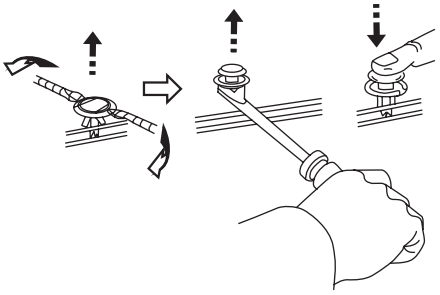
NOTICE:

- **If a snap-fit is damaged during maintenance, make sure to replace it with a new one.**
- **Make sure to replace disposable snap-fits, and do not reuse them.**

Shape (example)	Removal / installation
	
	
	
	

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Shape (example)	Removal / installation
	
	

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VEHICLE LIFTING

⚠ WARNING:

- **To avoid personal injury, make sure to use jack stands when performing any work on or beneath the vehicle that is only supported by a jack.**
- **To avoid vehicle damage, serious personal injury or fatal accident, when removing major components from the vehicle and supporting the vehicle with a lift, use the jack stands to support the vehicle at the points designated for proper lifting opposite to the components to be removed.**

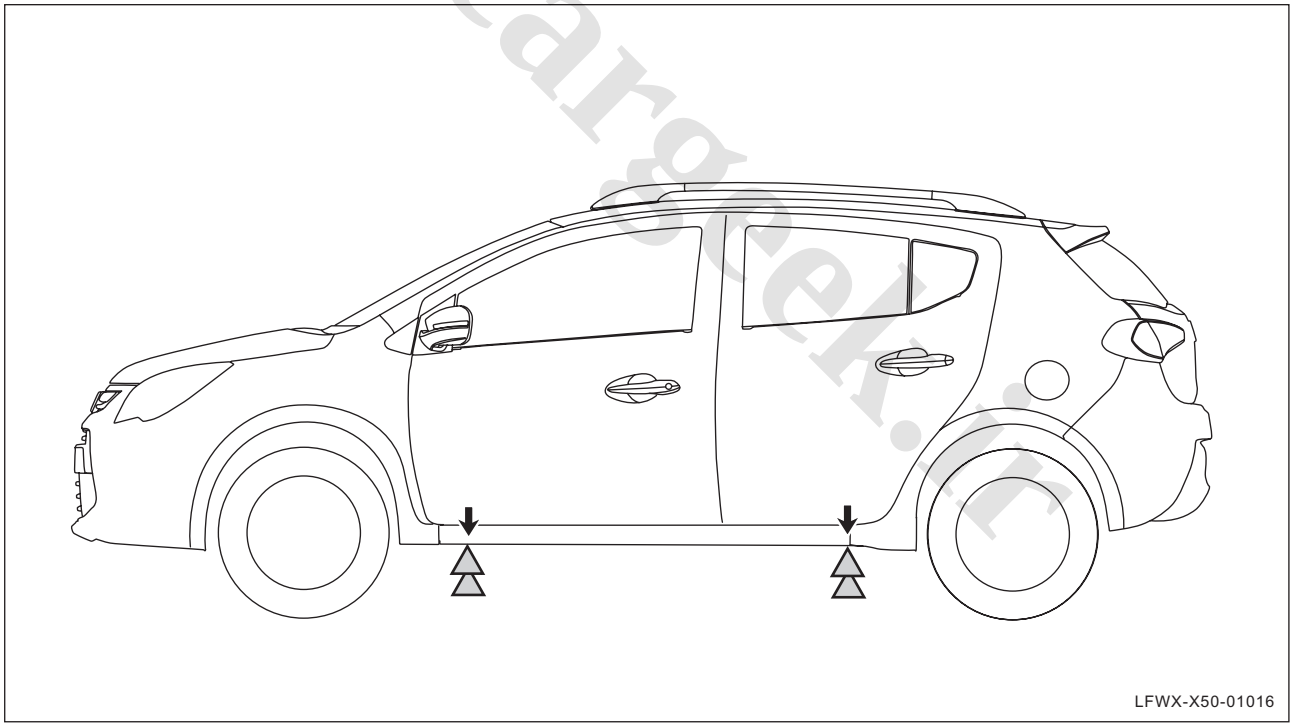
ⓘ NOTICE:

- **Make sure the vehicle is located on a clean, hard and flat ground before any lifting procedure.**
- **Make sure that all lifting devices meet the standards and are in good working conditions.**
- **Make sure that all loads on the vehicle are distributed evenly and securely.**
- **When lifting the vehicle at the front-end position, make sure that the jack or its block will not touch the body outer panel, choke plate or fender. Touching these components may damage the vehicle.**

△ HINT:

When lifting, correct support points shall be selected to lift the vehicle safely. The lifting points of Lifan X50 are listed as follows:

1. **SIDE LIFTING: THE LIFTING POINT FOR LIFTING FRAME IN THE WORKSHOP IS SHOWN IN THE FIGURE BELOW.**



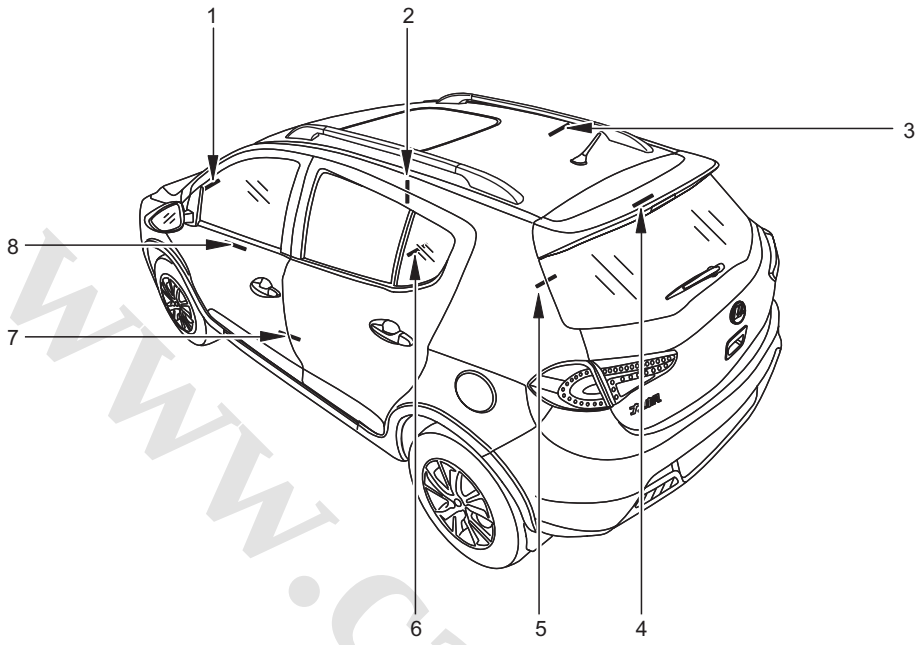
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VEHICLE IDENTIFICATION

VEHICLE IDENTIFICATION NUMBER

1. THE VEHICLE IDENTIFICATION NUMBER (VIN) IS THE LEGAL IDENTIFIER FOR YOUR CAR. IT IS USED FOR REGISTERING THE OWNERSHIP OF YOUR CAR



LFWX-X50-01017

① : This number is stamped on the top left of the dashboard.

② : This number is stamped on the downside of front right door B-pillar.

③ : This number is stamped on the right side of crossbeam of the roof.

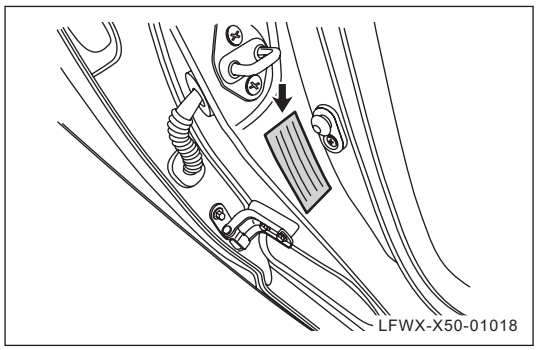
④ : This number is stamped on the metal plate on the top of tail door.

⑤ : This number is stamped on the lower right floor of rear seats.

⑥ : This number is stamped on the downside of the front passenger's seat.

⑦ : This number is stamped on the downside of left B-pillar.

⑧ : This number is stamped on the inner panel of front left door.



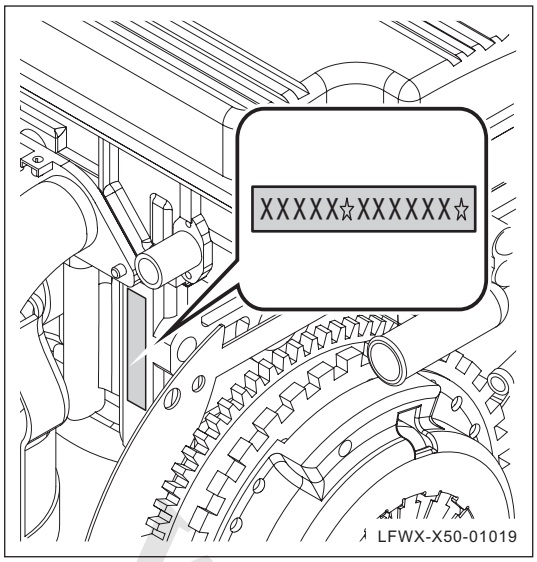
LFWX-X50-01018

2. VEHICLE NAMEPLATE

(a) The car model, number of occupants, engine model and VIN and others are marked on the manufacturer nameplate.

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3. ENGINE BLOCK NUMBER

(a) The engine block number is stamped on the engine block.

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SPECIFICATIONS FOR COMPLETE VEHICLE

SPECIFICATIONS FOR COMPLETE VEHICLE

1. BASIC PARAMETERS

Body structure type	Fully-integrated body, fully-metal-closed structure, hatchback with five-door, one-cover and five-seat
Drive type	Front transversely mounting of engine, front wheel drive
Overall dimensions	L×W×H: 4100 mm×1722 mm×1540 mm
Wheelbase	2550 mm
Front wheel track	1465 mm
Rear wheel track	1460mm
Front overhang	835 mm
Rear overhang	715 mm
Number of passengers	5 Person(s)
Passability parameters	
Approach angle	19.0° (full load); 21.0° (no load)
Departure angle	23.0° (full load); 32.2° (no load)
Minimum turning radius	4.8 m
Mass parameters	
Curb weight	1150 kg
Axle load mass (no load) (front/rear)	705 kg/445 kg
Full load mass	1525 kg
Axle load mass (full load) (front/rear)	815 kg/710 kg

2. BASIC PERFORMANCE PARAMETERS OF COMPLETE VEHICLE

Performance parameters	
Maximum speed	170 km/h
Acceleration time (0~100km)	14.7s
Maximum gradeability	≥30°

3. ENGINE PERFORMANCE PARAMETERS

1.5L VVT engine	
Model	LF479Q2-B
Type	4-cylinder in line, twin-camshaft, intake VVT
Total displacement	1498 mL
Bore × stroke	78.7 mm×77 mm
Compression ratio	10: 1
Rated power/speed	76 kw/(6000 r/min)
Maximum torque/speed	133 N•m/(3500~4500 r/min)

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Maximum net power	71 kw
Fuel supply mode	Multi-point electronic control fuel injection
Ignition sequence	1-3-4-2
Idle speed	800±50 r/min
Fuel consumption of comprehensive operation mode	6.3L/100 km

4. TYPES AND PARAMETERS OF MAIN ASSEMBLIES OF ENGINE ACCESSORIES AND CHASSIS

Exhaust system		2-stage muffler, with 1-stage 3-way catalytic converter
Air intake system		Dry air filter
Fuel supply system	Fuel tank	Plastic fuel tank, 42L, built-in electronic fuel pump
	Fuel supply control	Electronic pedal type
	Fuel evaporation	Solenoid control type
Cooling system		Water cooling, 2-stage electronic speed-setting fan
Clutch		Single plate, dry, diaphragm spring (with torsional absorbers)
Manual transmission		
Type		Mechanical 5-speed manual transmission
Gear ratio (1st)		3.182
Gear ratio (2nd)		1.895
Gear ratio (3rd)		1.250
Gear ratio (4th)		0.912
Gear ratio (5th)		0.718
Gear ratio (Reverse)		3.133
Continuously variable transmission (CVT)		
Type		CVT
CVT overall gear ratio		2.32~12.75
Reverse gear ratio		11.205
Final drive ratio		5.242
Drive shaft		
Type		One-piece driveshaft, double constant velocity type universal joint, one end is Rzeppa type, another end is telescopic spherical roller type
Final drive		
Speed ratio		4.267
Suspension		
Front suspension		Macpherson independent suspension, stabilizer bar
Rear suspension		Trailing arm torsion bar suspension
Wheel and tire		
Tire type		Tubeless radial tire
Tire specification		195/60 R15

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Tire pressures (front/rear)	230 kPa
Steering	
Steering gear type	Electric power steering
Steering gear	Energy-absorbing steering column, adjustable ordinary steering wheel, adjustment angle of 2.8 °
Four-wheel alignment	
Camber of front wheel	0.083°±0.75°
Toe-in of front wheel	1.5 mm±2 mm (no load)
Kingpin inclination	10.8° (no load)
Kingpin caster	4.43°±0.75° (no load)
Camber of rear wheel	-0.9°±0.5° (no load)
Toe-in of rear wheel	2.2 ± 3 mm (no load)
Steering angle	Inner: 38 ° / 42 ° (no load / full load); outer: 33 ° / 35.5 ° (no load / full load)
Brake system	
Structure type	Hydraulic dual pipeline X arrangement, with vacuum booster, equipped with ABS + EBD
Service brake	Front wheel is ventilated disc brake, and rear wheel is disc brake.
Parking brake	Manual mechanical cable type, rear wheel brake
A/C system	
Structure type	Evaporation compression refrigeration, water heating type
Manipulation	The whole series is equipped with electronic-control A/C, location-door and temperature-door driven by microstepping motor, new air-door driven by microstepping motor, and you can select vent position mode, heating/cooling mode, air inside/outside circulation pattern, and wind speed, temperature, etc. and adjust the components distributed on dashboard console and HVAC
Refrigerant	R134a
Compressor model	Ortega WXH-086-16

5. TYPES AND PARAMETERS OF BODY STRUCTURE

Vehicle body	
Body model	Full-integral body, hatchback with five-door, one-cover and five-seat.
Body in white (BIW)	All-metal closed structure
Door assembly	Frame-type door, four-door with anti-collision beams, clockwise opening doors, hinged; opening tail door upwards. Front and rear doors are equipped with power window regulator
Engine hood	Opening back, single-arm hinge
Front and rear bumper	Injection-modeled body

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Interiors and exteriors	
Sill trim panels	Injection-modeled body
Dashboard	Injection-modeled body, support reinforced, left-set instrument cluster
A, B, and C-pillar and door trim	Injection-modeled, front/rear door trim panel equipped with glove boxes
Windshield, door glass	Windshield glass: laminated glass Front door: hardened glass (white); rear door: hardened glass (white) Rear windshield: heated hardened glass (white)
Rearview mirror	Exterior rearview mirror: convex mirrors for both right and left sides, with electric controller Interior rearview mirrors: antiglare type
Seat	Front seat: independent seat, front and rear positions, back angle and head restraint are all adjustable, equipped with seat belt Rear seat: non-adjustable, non-individual seats, equipped with seat belts

6. STRUCTURE AND PARAMETERS OF ELECTRICAL SYSTEM

Power supply, starting and charging systems	
Circuits	Single-wire system, negative ground, voltage DC 12V
Alternator	Integrated, AC, built-in voltage regulator, 12 V/90 A
Starter	Electromagnetically operated (engine self-contained), power 1.3 kW
Electronic fan	Two-stage speed-setting, dual-fan
Battery	60 Ah maintenance free lead-acid battery
Lighting & signal system	
Front combination lamp (high-beam)	White Bulb 55 W 2 pieces
Front combination lamp (low-beam)	White Bulb 55 W 2 pieces
Front combination lamp (position lamp)	White LED 1.2 2 pieces
Front combination lamp (turn signal lamp)	Amber LED 3.5 2 pieces
Daytime running lamps	White LED 4.8 2 pieces
Turn signal lamp, side	Amber
Rear combination lamp (rear fog lamp)	Red 21W 2 units
Rear combination lamp (brake lamp)	Red LED Fixed 1.2 2 pieces LED Moving 2.7 2 pieces
Rear combination lamp (turn signal lamp)	Amber 21W 2 pcs
Rear combination lamp (rear position lamp)	Red LED Fixed 0.45 2 pieces LED Moving 0.85 2 pieces
Rear combination lamp (reverse lamp)	White Bulb 21W 2 pieces
Rear license plate lamp	White LED 2.5 2 pieces
High-mounted brake lamp	Red LED 2.1 1 piece
Front interior ceiling light	White Bulb 10W 1 piece

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Rear interior ceiling light	White Bulb 10W 1 piece
Instrument system	
Instrument cluster	Speedometer, tachometer, fuel gauge, water temperature gauge, odometer; adjustable instrument cluster lights.
Anti-theft indicator lamp	Engine fault lamp, position lamp indicator lamp, headlamp high beam indicator lamp, left turn signal indicator lamp, right turn signal indicator lamp, rear defrosting indicator lamp, airbag indicator lamp, ABS fault lamp, low oil pressure indicator lamp, charging indicator lamp, parking brake indicator lamp, brake fluid level warning indicator lamp, water temperature warning lamp, door unlock warning lamp, rear fog lamp indicator lamp, OBD indicator lamp, low fuel level indicator lamp, anti-theft indicator lamp, 120km / h overspeeding indicator lamp, tail door opening indicator lamp, automatic transmission gear indicator lamp, CVT fault indicator lamp, etc.
Auxiliary electrical system	Including wiper system, windshield washer, audio equipment, antenna, cigarette lighter, rear window defroster, electronic anti-theft system, door locks, window regulators, horns, electric sunroof, electric mirrors, reverse radar, ABS +EBD system, lighting hint, voice hint, airbags

7. FILLING FLUID MODELS AND VOLUMES

Fuel model	Unleaded gasoline, 93 # (RON) and above
Fuel tank volume	42L
Power steering oil model	ATF 220
Power steering oil volume	1 L
Brake fluid model	DOT4 Brake fluid
Brake fluid volume	0.6 L
Coolant model	LANCT 100
Coolant volume	6 L
A/C refrigerant model	R134a
A/C refrigerant volume	500g
Windshield washing fluid model	NFC-60
Windshield washing fluid volume	3 L
Transmission gear oil volume	2.2 L
Transmission gear oil model	75W/90 (≥-40℃); 80W/90 (≥-30℃); 85W/90 (≥-20℃) ; API: GL-4 grade
CVT fluid volume	5.8 L
CVT fluid model	CVTF-EX1
Oil capacity	3.2L
Engine oil specifications	API: SL-4 grade (select proper oil model according to different region)

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STANDARD BOLT TORQUE

TIGHTENING TORQUE FOR COMMON THREAD SPECIFICATION

Thread type	Thread specification	Tightening torque (N·m)		
		Grade 8.8	Grade 10.9	Grade 12.9
Coarse thread	M4	3.0	4.4	5.1
	M5	5.9	8.7	10
	M6	10	16	18
	M8	25	36	43
	M10	49	72	84
	M12	86	126	145
	M14	135	200	236
	M16	210	310	365
	M18	300	430	600
	M20	425	610	710
Fine thread	M8×1	27	39	46
	M10×1.25	52	76	90
	M12×1.25	93	135	160
	M12×1.5	89	130	155
	M14×1.5	145	215	255
	M16×1.5	226	330	390
	M18×1.5	340	485	570
	M20×1.5	475	680	790

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Mechanical System

Mechanical System of Engine 11-1
Preparation 11-1
Service data 11-5
Precautions 11-8
On-vehicle inspection 11-9
Removal of the assembly 11-13
Installation of the assembly 11-23
Diagnosis 11-32
Fault symptom table 11-32
Fault diagnosis 11-36
Drive belt 11-53
Components 11-53
Check 11-54
Replacement 11-54
Intake manifold 11-56
Components 11-56
Check 11-57
Replacement 11-58
Exhaust manifold 11-63
Components 11-63
Check 11-64
Replacement 11-65
Timing pulley mechanism 11-67
COMPONENTS 11-67
Check 11-68
Replacement 11-68
Camshaft 11-73
Components 11-73
Check 11-74
Replacement 11-76
Cylinder head 11-81
Components 11-81
Check 11-82
Replacement 11-83
Valve 11-91
Components 11-91
Check 11-92
Replacement 11-98

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Piston and connecting rod 11-108
Components 11-108
Check 11-109
Replacement 11-116
Crankshaft and flywheel 11-130
Components 11-130
Check 11-130
Replacement 11-135
Cylinder block 11-151
Components 11-151
Check 11-152
Crankshaft oil seal 11-154
Replacement 11-154

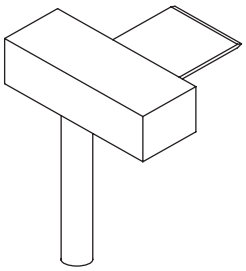
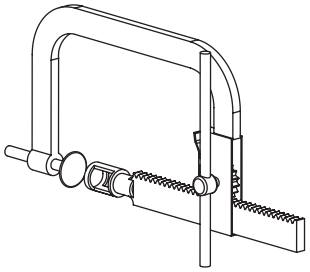
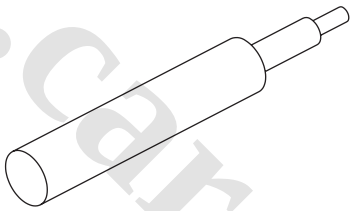
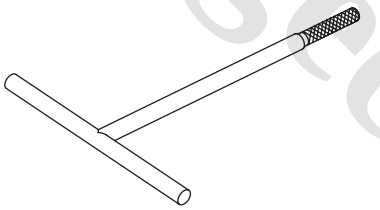
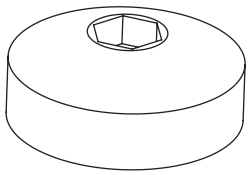
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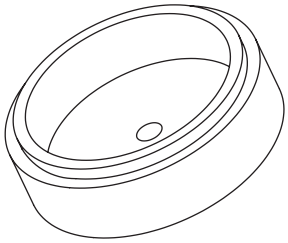
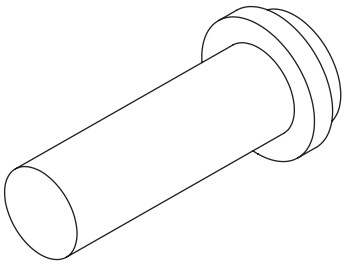
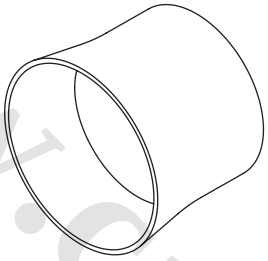
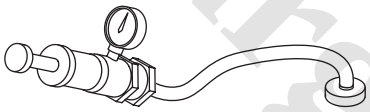
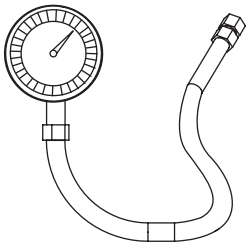
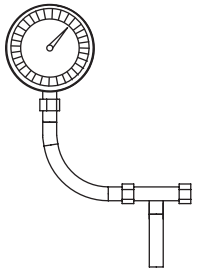
MECHANICAL SYSTEM OF ENGINE

PREPARATION

S/N	Tools	Outline diagram	Description
1	Oil pan remover		Used for removing the oil pan
2	Remover for valve cotter		Used for disassembling and assembling the valve cotter
3	Remover for valve guide		Used for removing valve guide
4	Reamer		Used for reaming valve guide
5	Oil filter remover		Used for disassembly and assembly oil filter

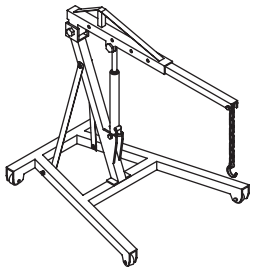
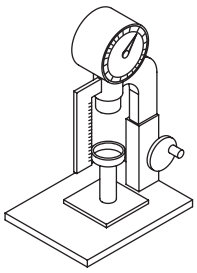
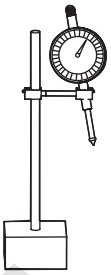
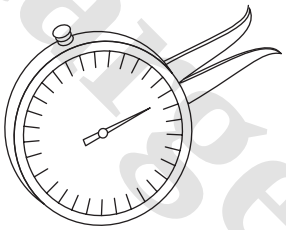
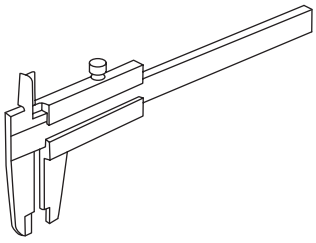
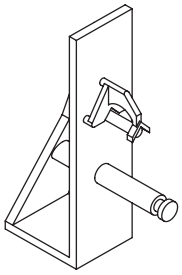
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S/N	Tools	Outline diagram	Description
6	Installation tool for front oil seal of crankshaft		Used for installing the front oil seal of crankshaft
7	Installation tool for rear oil seal of crankshaft		Used for installing the rear oil seal of crank-shaft
8	Installation tool for piston		Used for installing the pistons.
9	Cooling system pressure detector		Used for measuring the pressure of the cooling system.
10	Oil pressure gauge		Used for measuring the oil pressure
11	Cylinder-pressure gauge		Used for measuring cylinder pressure

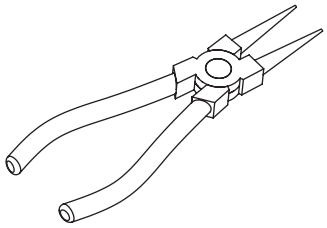
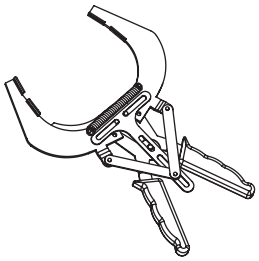
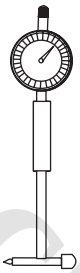
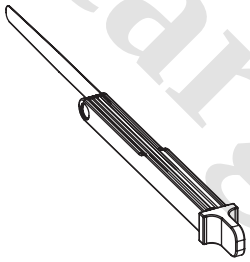
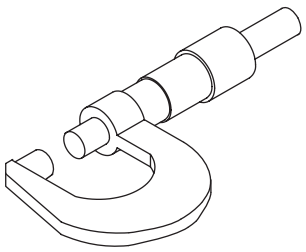
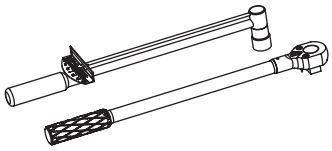
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S/N	Tools	Outline diagram	Description
12	Hanging bracket		Used for hoisting the engine
13	Spring dynamom-eter		Used for detecting the elasticity of valve spring
14	Dial indicator		Used for measuring radial run-out and clearance of parts
15	Internal micrometer		Used for measuring the internal diameter of parts
16	Dial caliper		Used for measuring the length of parts
17	Connecting-rod col-limator		Used for measuring the degree of distortion of piston-connecting-rod

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S/N	Tools	Outline diagram	Description
18	Snap ring pliers		Used for removing the snap ring
19	Piston ring expander		Used for disassembly and assembling piston ring
20	Cylinder bore gauge		Used for measuring cylinder bore
21	Feeler gauge		Used for measuring parts' clearance
22	Screw micrometer		Used for measuring diameter of parts
23	Torque wrench		Used for measuring the torques of fixing bolts and nuts.

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Cylinder pressure		Standard cylinder pressure	1.2MPa
		Minimum cylinder pressure	1.0MPa
		Maximum cylinder pressure	1.3MPa
		Maximum cylinder pressure difference	0.1MPa
Engine oil pressure		Idle speed	80 - 300kPa
		Rated speed	330 - 430kPa
Cylinder head flatness		Cylinder block joint surface	0.05mm
		Intake side	0.10mm
		Exhaust side	0.10mm
Camshaft radial run-out			0.03mm
Maximum lift of intake/exhaust camshaft		Intake camshaft	44.338 - 44.418mm
		Exhaust camshaft	43.73 - 43.81mm
Main journal diameter		No. 6 exhaust	24.955 - 24.965mm
		Others	22.949 - 22.965mm
Camshaft axial clearance		Standard axial clearance	0.03 - 0.085mm(intake) 0.35 - 0.09mm(exhaust)
		Maximum axial clearance	0.1mm
Valve spring		Free length	39±0.13mm
		Elastic force of the installation	157 - 174N(31.7mm)
Valve spring verticality		Maximum deviation	1.6mm
		Maximum deviation angle	2°
Valve edge thickness		Standard thickness	0.8 - 1.2mm
		Minimum thickness	0.5mm
Valve length	Intake valve	Standard length	86.6mm
		Minimum length	86.1mm
	Exhaust valve	Standard length	86.9mm
		Minimum length	86.4mm
Valve stem diameter		Intake valve	5.960 - 5.975mm
		Exhaust valve	5.960 - 5.975mm
Width of valve-seat contact surface		Width of intake valve-seat	1.0 - 1.4mm
		Width of exhaust valve-seat	1.0 - 1.4mm
Valve guide internal diameter			6.01 - 6.03mm
Thickness of mechanical tappet head			5.055 - 6.005mm
Valve-guide mounting-hole internal diameter			11 - 11.018mm
Valve-guide specified pressing-in capacity			8.7 - 9.1mm
Valve clearance (cold)		Intake valve	0.15 - 0.20mm
		Exhaust valve	0.25 - 0.30mm

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Oil-film clearance between valve and valve guide	Intake valve	Standard oil-film clearance	0.025 - 0.060mm
		Maximum oil-film clearance	0.08mm
	Exhaust valve	Standard oil-film clearance	0.030 - 0.065mm
		Maximum oil-film clearance	0.10mm
Piston pin mounting hole diameter			20.006 - 20.015mm
Piston pin outer diameter			20.004 - 20.013mm
Piston-connecting-rod axial clearance	Standard axial clearance		0.15 - 0.25mm
	Maximum axial clearance		0.3mm
Piston-connecting-rod oil-film clearance	Standard oil-film clearance		0.01 - 0.02mm
	Maximum oil-film clearance		0.08mm
Piston pin oil film clearance (piston pin mounting holes)	Standard oil-film clearance		0.002 - 0.011mm
	Maximum oil-film clearance		0.011mm
Connecting-rod small end hole internal diameter			20.012 - 20.021mm
Oil film clearance of piston pin (wrist pin hole)	Standard oil-film clearance		0.001 - 0.017mm
	Maximum oil-film clearance		0.017mm
Piston ring groove clearance	Top ring groove		0.04 - 0.08mm
	Second ring groove		0.03 - 0.07mm
Piston ring gap	Standard end play	Top ring:	0.25 - 0.45mm
		Second ring:	0.35 - 0.6mm
		Film loop	0.15 - 0.5·mm
	Maximum piston ring gap	Top ring:	1.05mm
		Second ring:	1.20mm
		Film loop	1.10mm
Maximum deviation of the connecting-rod			0.05mm (every 100mm length)
Connecting-rod bolt diameter	Standard diameter		7.30 - 7.40mm
	Minimum diameter		7.20mm
Maximum crankshaft radial run-out			0.03mm
Crankshaft main journal diameter			47.982 - 48.000mm
Crankshaft main journal ovality			0.02mm
Crankshaft connecting-rod journal ovality			0.02mm
Crankshaft-connecting-rod journal diameter			43.992 - 44.000mm
Crankshaft oil-film clearance	Standard oil-film clearance		0.02 - 0.04mm
	Maximum oil-film clearance		0.10mm
Cylinder block main bearing cap fixing bolt diameter	Standard diameter		8.80 - 9.00mm
	Minimum diameter		8.70mm
Top surface warping of upper cylinder block (maximum warping)			0.05mm
Cylinder block bore diameter			78.7mm
Limit error of cylinder roundness			0.05mm
Limit error of cylinder cylindricity			0.2mm
Standard cylinder oil-film clearance			0.035 - 0.055mm
Maximum cylinder oil-film clearance			0.08mm

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2. TIGHTENING TORQUE TABLE

Item		N·m
Oil pan drain plug		30
Engine left mounting fixing bolt		65 - 85
Fixing bolt of engine right mounting		65 - 85
Engine rear mounting fixing bolt		185 - 225
Alternator fixing bolt		49
A/C compressor fixing bolt		49
Battery mounting bracket fixing bolt		25
Battery link fixed nut		10
Electric throttle body fixing bolts		10 - 12
Fixing bolt of intake manifold		22 - 24
Fixing nut of exhaust manifold		32 - 34
Front exhaust pipe end fixed nut		49
Generator adjusting bolts		25
Timing belt cover fixing bolt		10
Fixing bolt for water-pump connected to water pipe		25
Dipstick fixing bolt		10
Crankshaft pulley fixing bolt		145
Fixing bolt of water pump		25
Fixing bolt of engine right mounting pedestal		72
A/C compressor belt tensioner fixing bolt		49
Cylinder head fixing nut		12
Fixing bolt of ignition coil		12
Spark plug		28
Fixing bolt of camshaft-bearing cap	Fixing bolt of camshaft-bearing cap	23
	Other bolt	23
Fuel rail fixing bolts		25
Fixing bolt of connecting rod cap		26
Cylinder block water drain bolt		23
Oil filter		25 - 30
Fixing bolt of oil strainer		10
Oil pan fixing bolt		10
Crankshaft main bearing cap fixing bolt (fastening them twice)		For the first time: 40; for the second time: 78
Flywheel baffle fixing bolt		10
Flywheel fixing bolt		88
Clutch slave cylinder fixing bolt		20 - 26
Fixing bolt of engine/transmission grounding wire		10
Intake/exhaust camshaft bearing cap fixing bolt		25
Cylinder head fixing bolt		65 - 70

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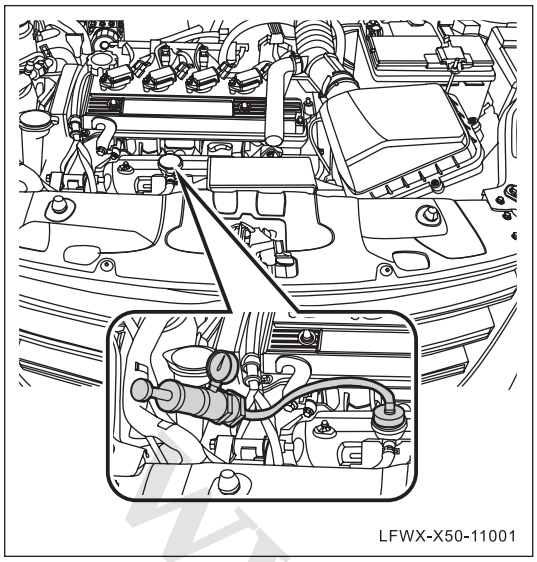
PRECAUTIONS

1. When inspecting and repairing the engine, be sure to follow the following safety measures: turn off the engine, and wait for the engine to cool; eliminate smoke and fire; ensure that all workplaces are installed fire extinguishers.
2. Before inspecting and repairing the engine, the staff must wear safety shoes, work gloves and goggles if necessary to ensure personal safety.
3. Before lifting the vehicle, be sure to check whether the lift is in good condition, whether the parking position of the vehicle is appropriate, and whether the lifting point of the lifting arm to the vehicle is adjusted appropriately. During lifting or landing the vehicle, be sure that there is no person or irrelevant items under the vehicle.
4. During repairing, special tools must be used in some disassembly procedures, for the special tools play an important role to the operation safety.
5. When using chemical products, they must be operated in strict accordance with the safe use methods provided by the supplier.
6. During repairing, perform operating according to the specifications if it is required to cut down the oil, power and release the pressure; for example, be sure to cut down the oil and release the pressure when dismantling the parts of the fuel system, and disconnect the battery negative terminal first when removing the electrical system; otherwise, it is likely to damage the vehicle and endanger personal safety.
7. Electronic ignition system will produce are high voltage of 2000V or more during operation, therefore, be sure to take insulation measures during repairing.
8. Before repairing, be sure that the vehicle has been taken appropriate protective measures, such as wearing protective sleeves for the seats, steering wheel, etc.
9. During repairing, execute a standard operation according to the steps in this Manual.
10. When disassembling the components bonded together, carry out with lead or aluminum tools if the components are of ferrous material. Disassemble them with wood or resin tools if the components are of aluminum material.
11. When performing maintenance, be sure to operate in strict accordance with the tightening torque and adjustment data specified in the service manual.
12. During repairing, be sure to replace the disposable pad, O-ring, oil seal, clamp, safety board, self-locking nut, bolt and all faulty parts and components.
13. When disassembling the engine, be sure to take good dust control measures to prevent the precision parts of the parts and components from contamination.
14. Please replace with the original parts; otherwise, it will make the engine work abnormally or even damage the engine.
15. To avoid damaging the oxygen sensor and other electrical components during dismantling, do not excessively bend the lead wire, and do not handle them roughly to avoid collision.
16. After repairing and assembling the engine, start the engine and increase the engine speed, and check engine coolants, fuel, engine oil and exhaust gas for leakage.

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ON-VEHICLE INSPECTION



1. CHECK ENGINE COOLANT

(a) Check if engine coolant leaks.

The methods as follows:

- Fill coolant into radiator assembly.
- Connect the pressure gauge of the cooling system and adjust it up to 50 - 100kPa, and then, observe whether its pressure value will drop.

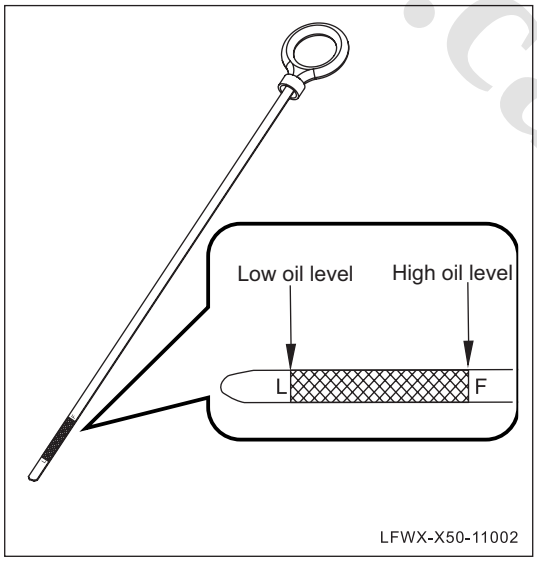
△ HINT:

- If the pressure decreases, check hose, radiator assembly and water pump for leakages.
- If there is no coolant leakage mark on the exterior of the engine, check heater core, cylinder block and head.

(b) Check coolant quality.

△ HINT:

Check the coolant for excessive rust or scale. If there is, replace the coolant.



2. CHECK ENGINE OIL

(a) Check engine oil level.

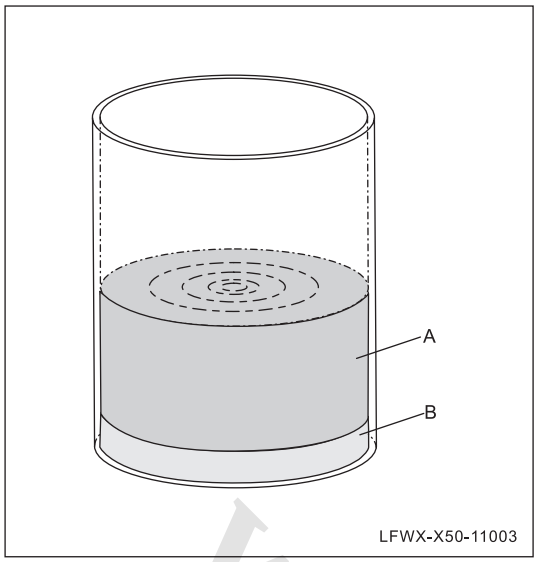
- Warm up the engine, stop it and then wait for 5 min.
- Check if the engine oil level is between the upper and lower marks of the engine oil dipstick.

△ HINT:

If the oil level below the lower mark, check the oil for leakage, and refill the oil to bring it up to the specified level.

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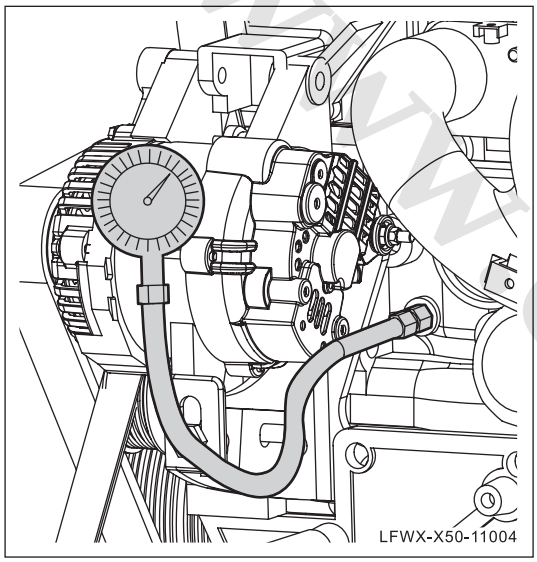
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(b) Check the oil quality.

△ HINT:

Check whether the engine oil is deteriorated, discolored or mixed with water (A: engine oil, B: water), and if any, replace the oil. The normal engine oil is transparent and relatively thick. If the engine oil becomes dark and thin, replace it.



3. INSPECT OIL PRESSURE

(a) Disconnect engine oil pressure sensor connector.

(b) Remove the engine oil pressure sensor and install the oil pressure gauge.

(c) Make the engine warm up and observe the oil gauge.

Idle engine oil pressure: 80 - 300kPa

Rated idle engine oil pressure: 330 - 430kPa

△ HINT:

If the engine oil pressure is not within the specified range, check the engine oil pump.

(d) Take down the pressure gauge, install engine oil pressure sensor and connect sensor connector.

△ HINT:

When installing the engine oil pressure sensor, coat the sensor thread with sealant.

ⓘ NOTICE:

Do not start the engine just after installing the engine oil pressure sensor. Be sure to wait for a period of time (approx. 10min) before starting the engine.

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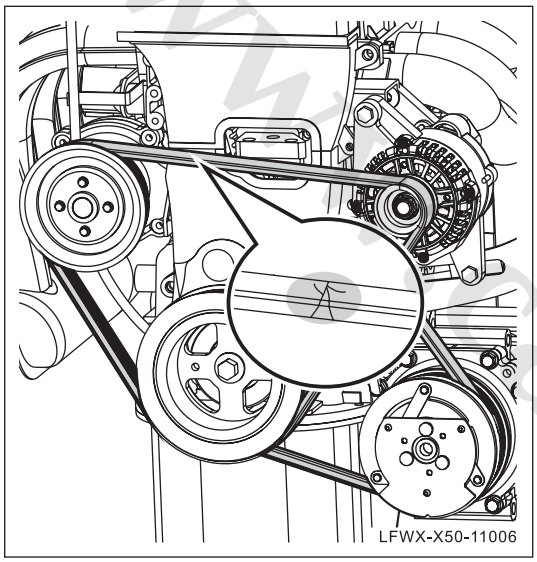


4. CHECK AIR FILTER ELEMENT.

(a) Remove the air filter upper cover.

(b) Remove the air filter element.

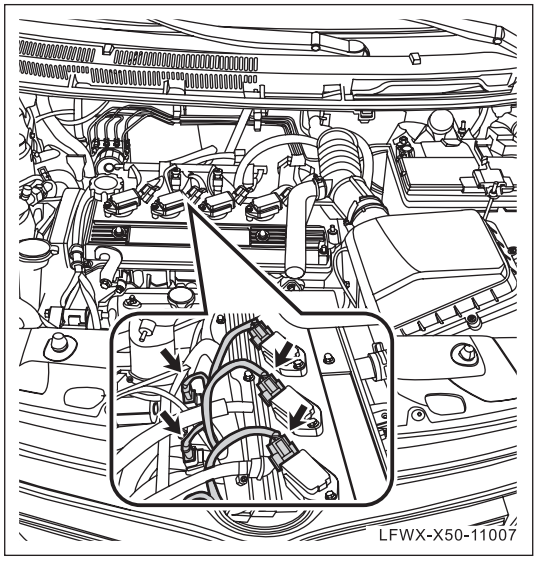
(c) Check visually the air filter element for dirty or damage. If there is any, clean or replace it.



5. CHECK DRIVE BELT

(a) Check driving belt for oil stains. If there is any, clean it.

(b) Check driving belt for aging, crack or wear. If there is any, replace it.



6. CHECK CYLINDER PRESSURE

(a) Preheat the engine and then stop it.

NOTICE:

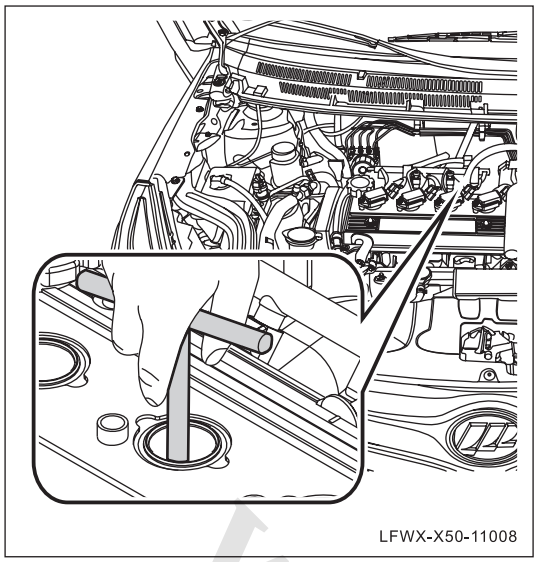
Before warming up the engine, shift the shift lever to the "Neutral" position and apply the parking brake.

(b) Pull out the fuel pump fuse, and disconnect all the ignition coil connector clips.

(c) Disconnect the connector of each fuel injector.

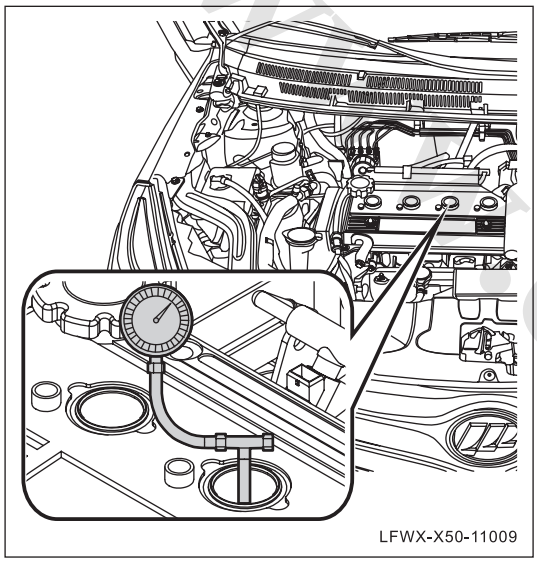
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(d) Remove the ignition coil fixing bolt, and take out all the ignition coils.

(e) Remove spark plug with sleeve and lengthening bar.



(f) Install the pressure gage into the mounting hole of the spark plug.

(g) Start the engine, depress the accelerator pedal to the lowest position, and read out the maximum value on the pressure gauge.

Standard cylinder pressure: 1.2MPa

Minimum cylinder pressure: 1.0MPa

Maximum cylinder pressure: 1.3MPa

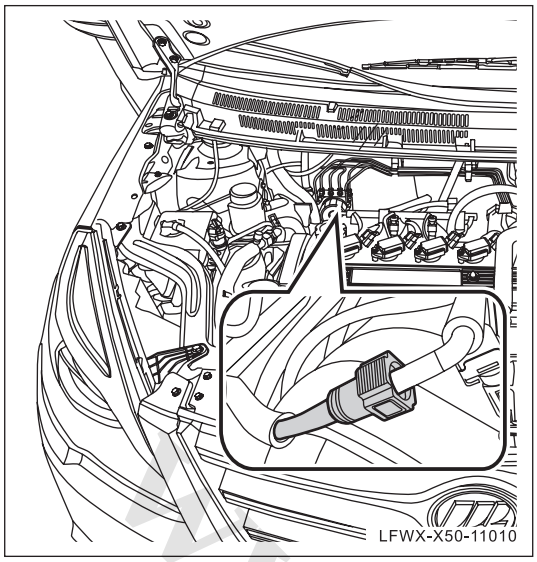
Maximum cylinder pressure difference: 0.1MPa

(h) Measure other cylinder pressure in the same manner.

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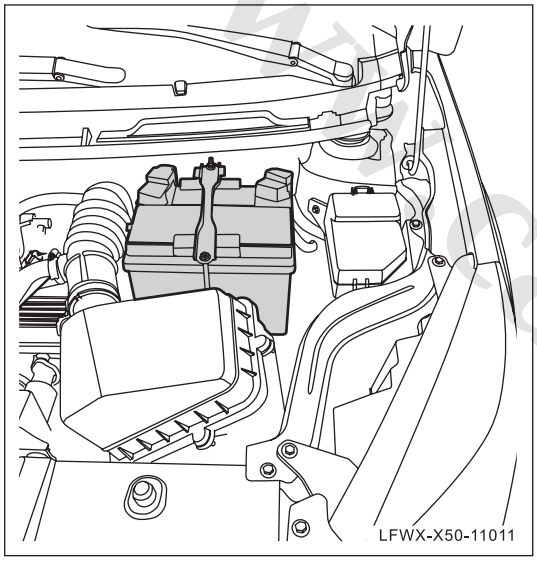
REMOVAL OF THE ASSEMBLY



1. RELEASE PRESSURE OF THE FUEL SYSTEM, AND DISCONNECT THE INLET PIPE OF THE FUEL RAIL.

△ HINT:

Wrap the oil pipe port with a clean towel to prevent oil leakage from corroding the fuel pipe.



2. REMOVE BATTERY AND ITS BRACKET

NOTICE:

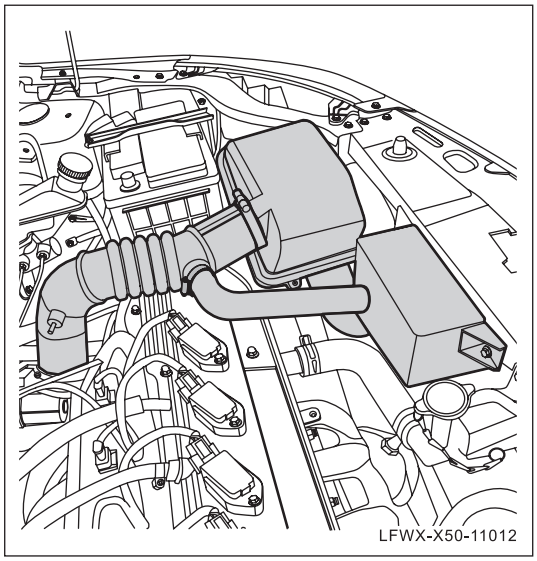
Before removal, be sure to turn off all electrical equipment. Remove the battery 5s later before removing other electrical equipment.

(a) Disconnect the connection between the battery negative and positive wires.

(b) Remove the fixing bolts of the battery pressure plate, and remove the pressure plate and connecting rod assy.

(c) Remove the battery and its bottom cover.

(d) Remove the fixing bolts of the battery bracket, and remove the battery bracket..



3. REMOVE AIR FILTER ASSEMBLY

(a) Remove the air filter fixing bolts.

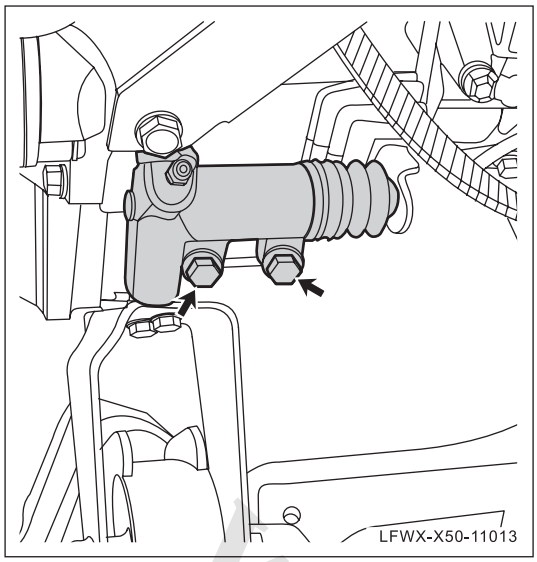
(b) Remove the air filter casing and the intake pipe of the throttle valve housing.

NOTICE:

After removing the air filter assembly, cover the throttle port with a clean plastic bag or equivalent to prevent foreign objects from entering it.

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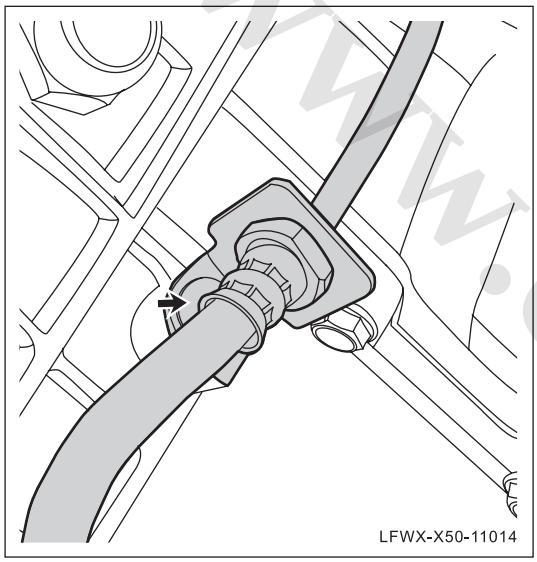


4. REMOVE CLUTCH SLAVE CYLINDER (FOR MANUAL TRANSMISSION)

(a) Remove the fixing bolts of the clutch slave cylinder and remove the clutch slave cylinder.

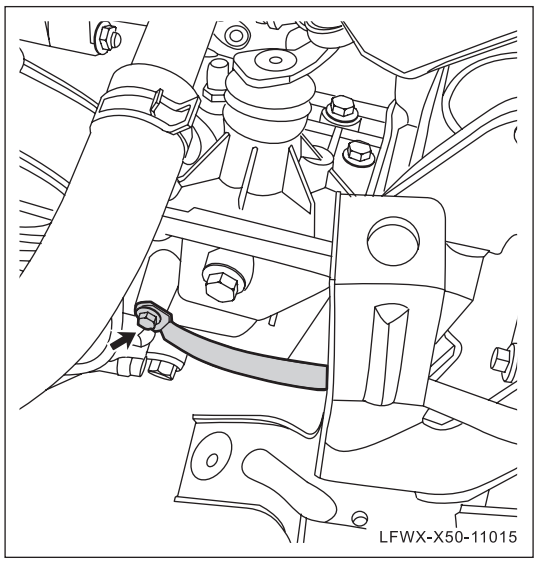
△ HINT:

After removing the clutch slave cylinder, seal the clutch oil pipe with sealing pouches.



5. REMOVE CLUTCH OIL PIPE JACK STAND ASSEMBLY (FOR MANUAL TRANSMISSION)

(a) Remove the fixing bolts of the clutch oil pipe bracket, and then remove the clutch oil pipe bracket.



6. DISCONNECT TRANSMISSION GROUND

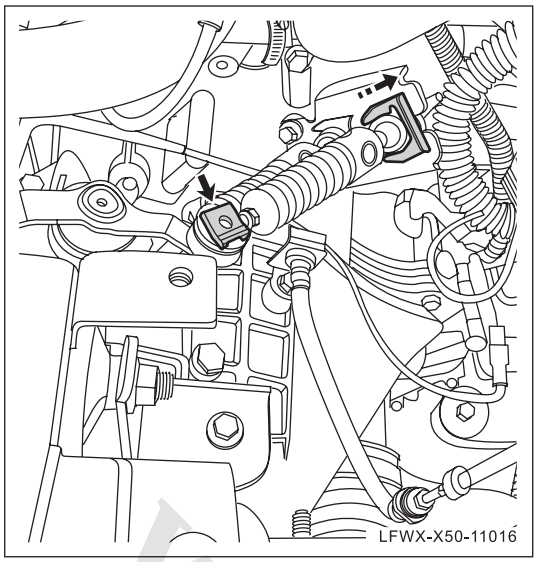
(a) Remove the fixing bolt of transmission ground, and disconnect the transmission ground wire.

7. DISCONNECT ENGINE GROUND

(a) Remove the fixing bolt of the engine ground, and disconnect the engine ground wire.

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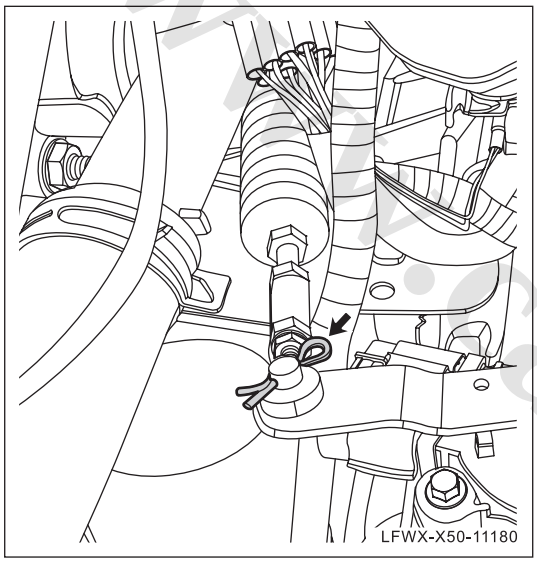


8. DISCONNECT SELECTION AND SHIFT CABLES OF THE TRANSMISSION (FOR MANUAL TRANSMISSION)

(a) Remove the fixing piece of the selector-shift cable connector.

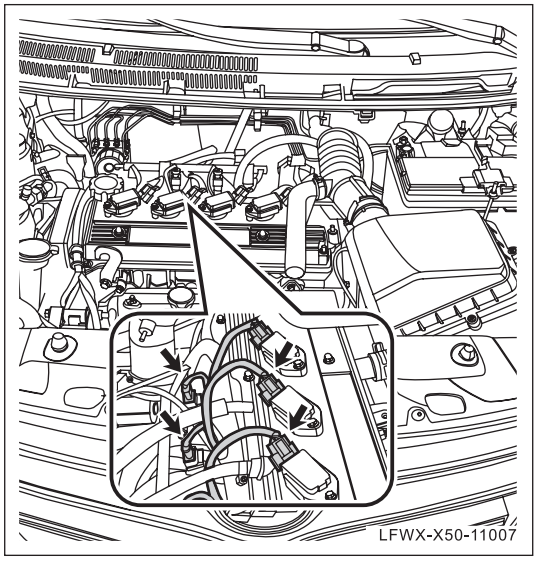
(b) Remove the positioning piece of the selector-shift cable.

(c) Disconnect the selector-shift cable.



9. DISCONNECT SHIFT CABLE OF THE TRANSMISSION (FOR AUTOMATIC TRANSMISSION)

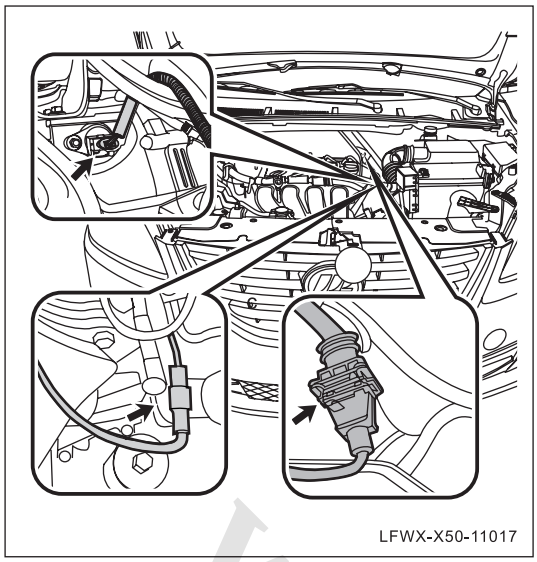
(a) Remove the elastic pin of the shift cable joint, and disconnect the shift cable.



10. DISCONNECT HIGH-VOLTAGE IGNITION COIL AND INJECTOR CONNECTOR

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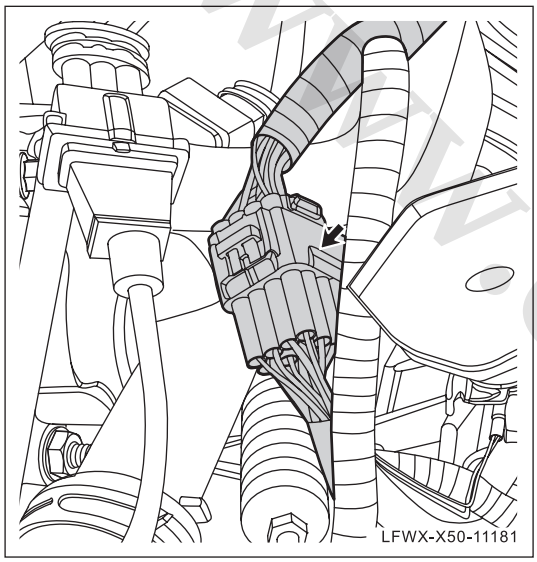
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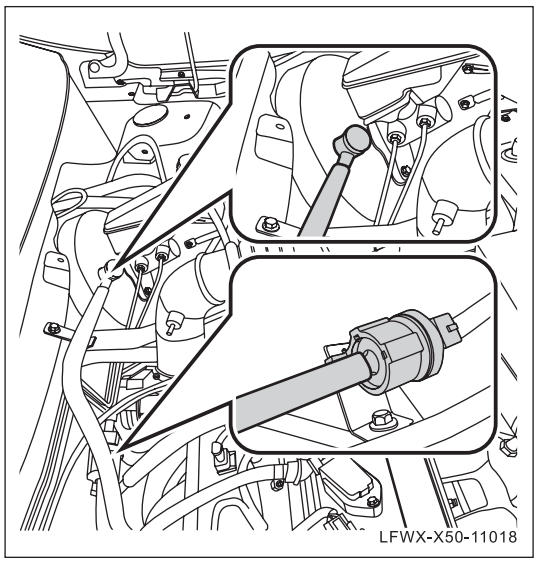
11. DISCONNECT ALL ENGINE-RELATED CONNECTORS

△ HINT:

The connectors connected to the engine include: Electrical box bus, electric throttle body position sensor, intake air temperature and pressure sensor, front oxygen sensor, rear oxygen sensor, mileage sensor, knock sensor, camshaft position sensor, VVT, air conditioning high/low-pressure pipe pressure sensor, crankshaft position sensor, engine oil pressure sensor, generator connector, A/C compressor connector, reverse light switch, canister solenoid valve, starter connector, coolant temperature sensor.



12. DISCONNECT CONNECTOR CLIP OF THE TRANSMISSION CONNECTING BUS



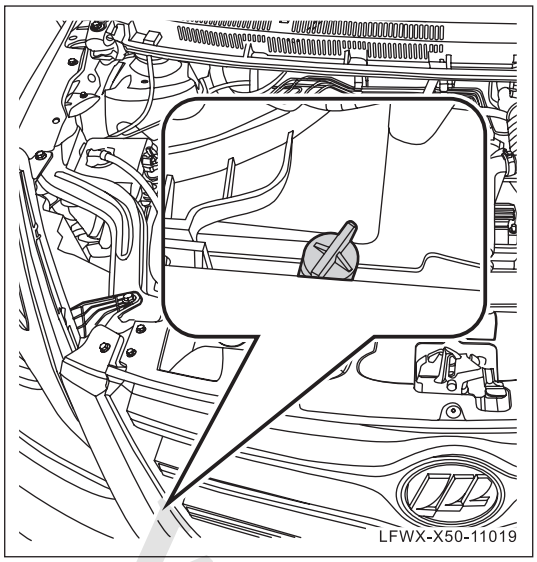
13. DISCONNECT ALL ENGINE AIR PIPES

(a) Disconnect the vacuum pipe.

(b) Disconnect the intake pipe of the canister solenoid.

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14. DRAIN ENGINE COOLANT

(a) Raise the vehicle to a certain height with the lift.

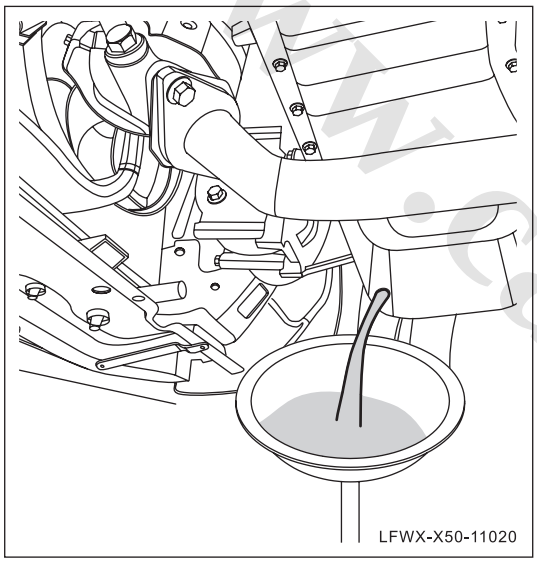
(b) Remove the water drain plug at the bottom of the radiator to drain the engine coolant into a proper container.

△ HINT:

Open the radiator cap to facilitate draining of coolant.

NOTICE:

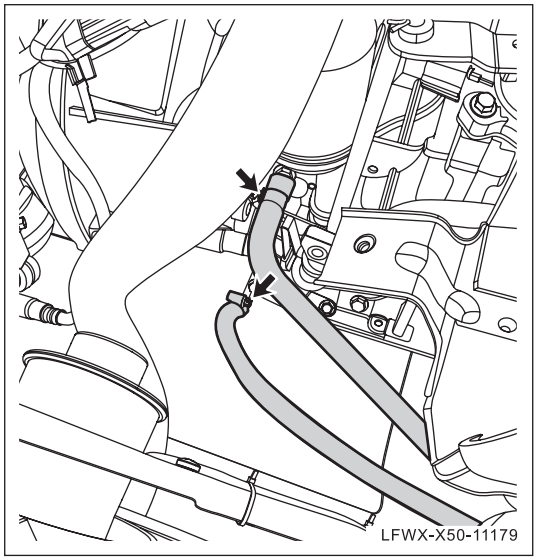
- **To avoid scalding, make the engine cool down before such operation.**
- **When opening the radiator cap, wrap the radiator cap with a thicker cloth and unscrew it slowly. Release the pressure in the radiator before opening the radiator cap fully.**
- **Do not spill the coolant on the drive belt.**



15. DRAIN ENGINE LUBRICANT AND TRANSMISSION GEAR OIL

(a) Remove the oil drain plug from the engine oil pan and drain the engine oil.

(b) Remove the transmission oil-drain plug and drain the transmission oil.

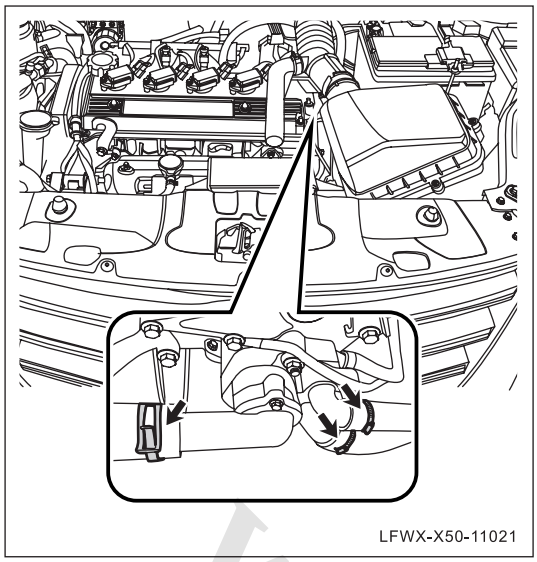


16. DISCONNECT INLET AND OUTLET COOLING OIL PIPES OF THE TRANSMISSION (FOR AUTOMATIC TRANSMISSION)

(a) Loosen the inlet and outlet oil pipe fixing clamps of the transmission, and disconnect the inlet and outlet cooling oil pipes of the transmission.

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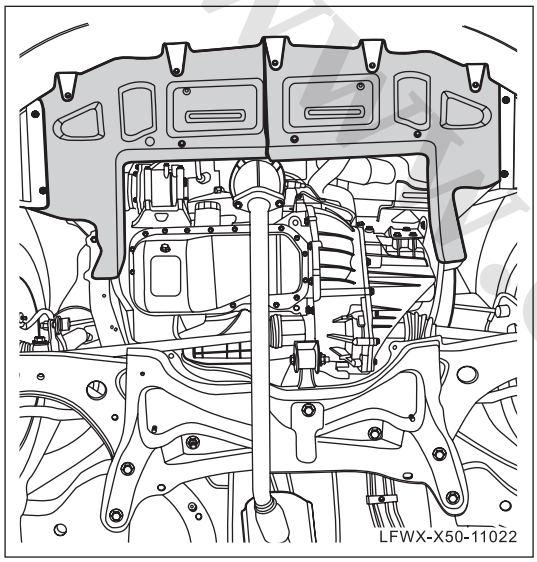
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17. DISCONNECT ALL ENGINE WATER PIPES

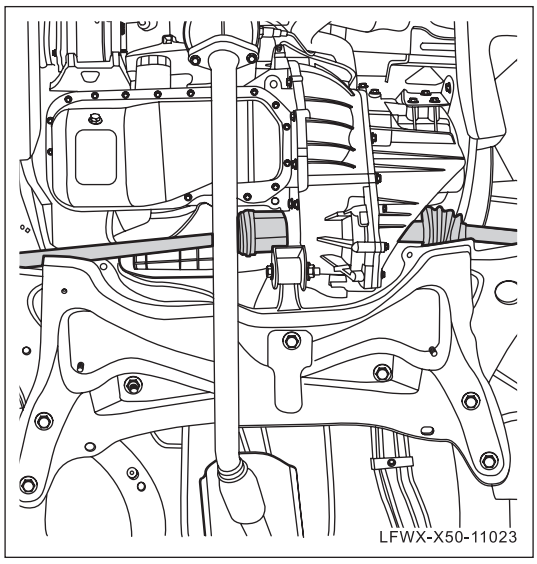
(a) Loosen the elastic clamp of the engine water inlet pipe, and disconnect the engine water inlet pipe.

(a) Loosen the elastic clamp of the engine water outlet pipe, and disconnect the engine water outlet pipe.



18. REMOVE LOWER TRIM PANEL OF THE ENGINE COMPARTMENT

(a) Remove the lower trim panel fixing screws of the engine compartment, and remove the lower panel of the engine compartment.



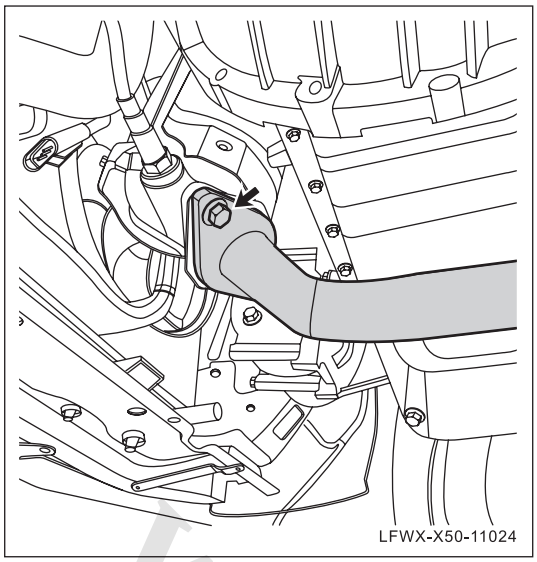
19. REMOVE DRIVE SHAFT ASSEMBLY

(a) Remove front wheels.

(b) Remove the drive shaft.

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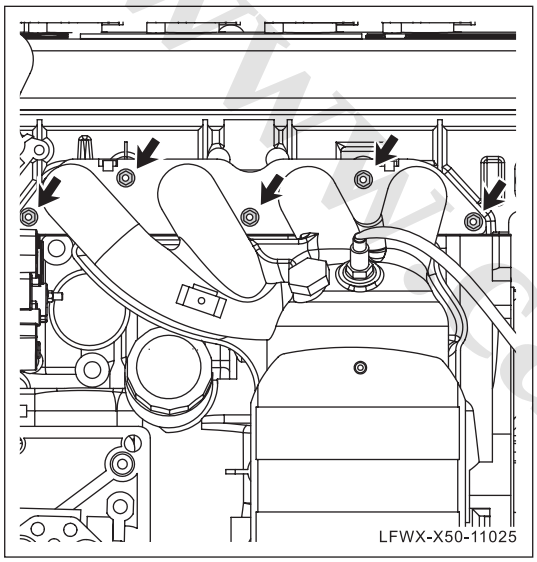
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20. REMOVE FRONT EXHAUST PIPE

(a) Disconnect the connecting bolts of the front exhaust pipe.

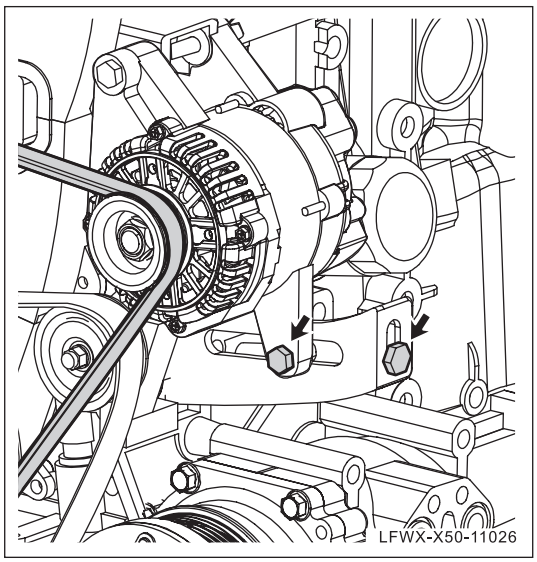
(b) Remove the front exhaust pipe.



21. REMOVE EXHAUST MANIFOLD

(a) Remove the upper heat shield of the exhaust manifold, and remove the upper heat shield of the exhaust manifold.

(b) Remove fixing nut of exhaust manifold, and remove exhaust manifold.



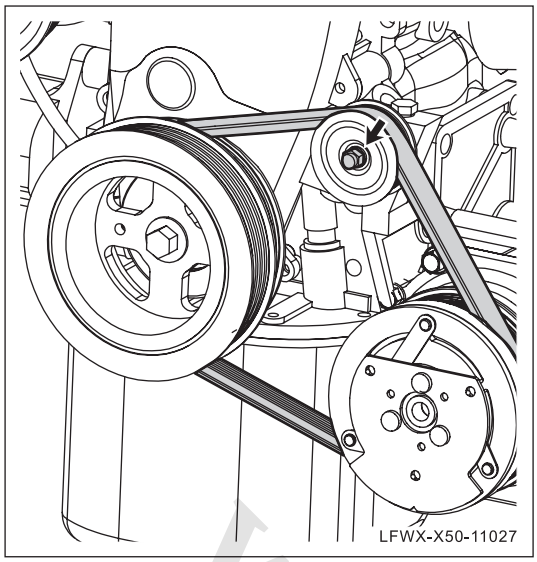
22. REMOVE DRIVE BELT

(a) Unscrew the adjusting bolts of the generator.

(b) Remove the alternator drive belt.

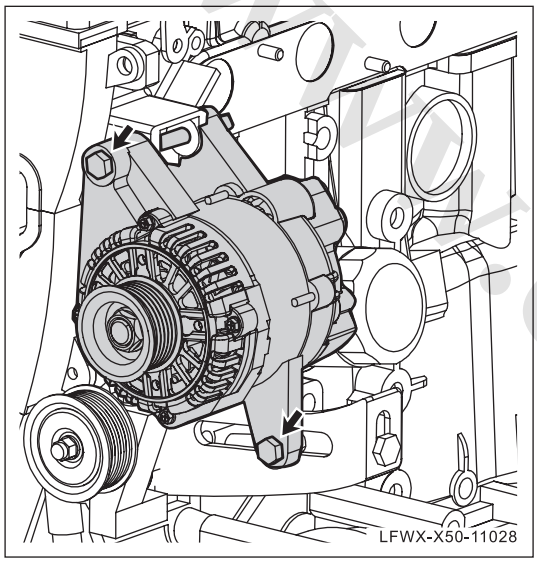
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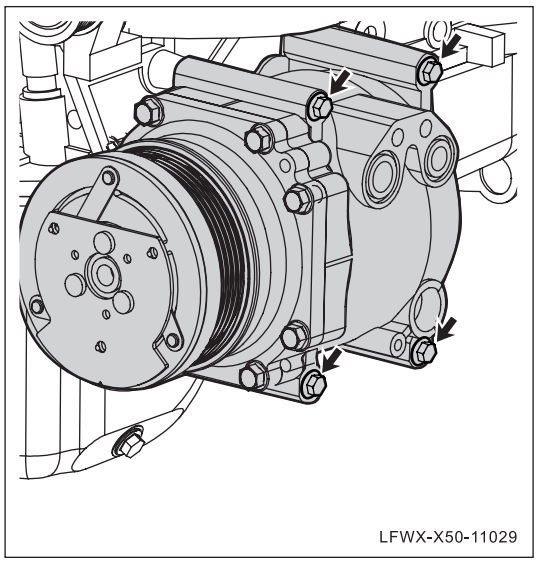
(c) Release the locking bolt of the A/C compressor drive belt tensioner.

(d) Remove the A/C compressor drive belt.



23. REMOVE ALTERNATOR

(a) Remove the generator fixing bolts, and then remove the generator.



24. REMOVE A/C COMPRESSOR

(a) Using the refrigerant recovery machine, recover the coolant in the air-conditioning system.

(b) Remove the connecting bolts between the high-pressure and low-pressure pipes and the A/C compressor. Disconnect the connections between the high-pressure and low-pressure pipes and the A/C compressor

△ HINT:

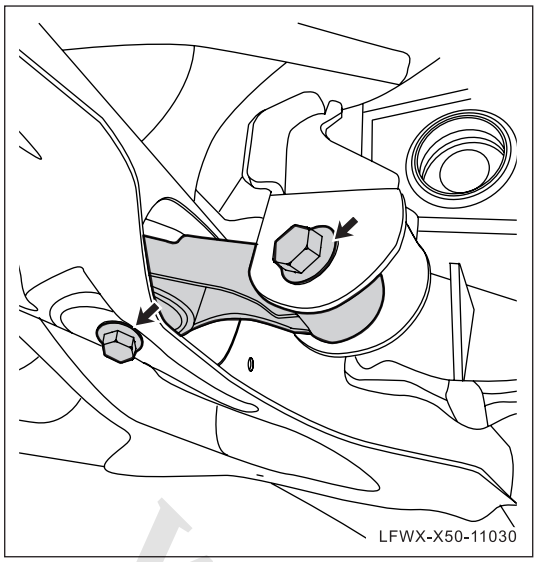
After disconnection, be sure to seal the nozzles to prevent impurities from entering them.

(c) Remove the fixing bolts of the A/C compressor.

(d) Remove the A/C compressor.

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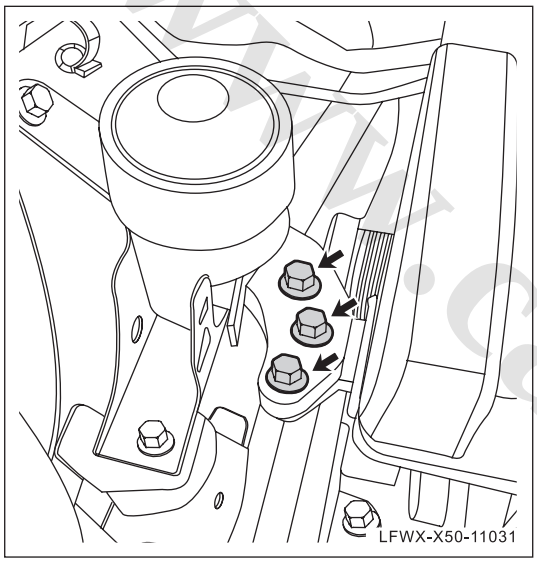


25. REMOVE ENGINE REAR MOUNTING

(a) Remove the fixing bolts of the engine rear mounting, and then remove the engine rear mounting.

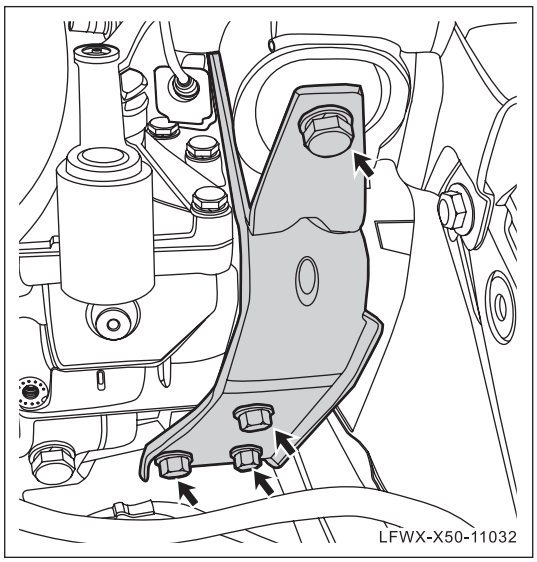
NOTICE:

- **Hoist the engine with the hoister before removing its rear overhang until the rope reaches its natural tension.**
- **To remove the engine easily, remove the rear overhang bracket together.**



26. REMOVE ENGINE RIGHT MOUNTING

(a) Remove the fixing bolts of the engine right mounting, and then remove the engine right mounting.

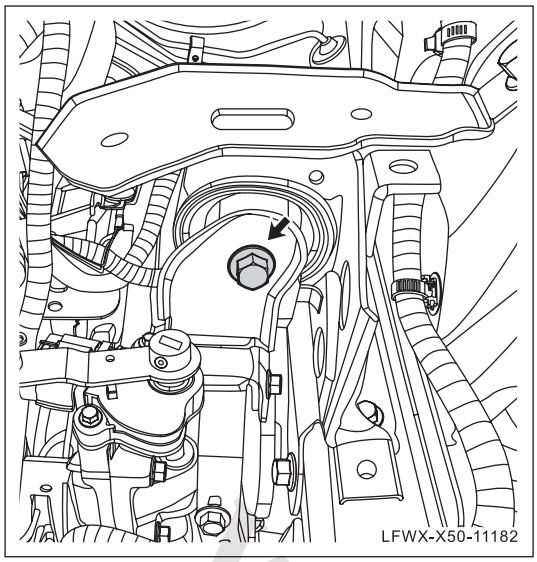


27. REMOVE ENGINE LEFT MOUNTING (FOR MANUAL TRANSMISSION)

(a) Remove the fixing bolts of the engine left mounting, and then remove the engine left mounting.

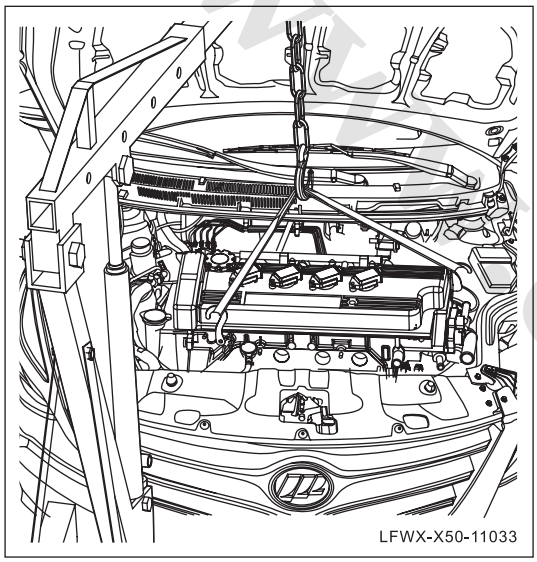
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28. REMOVE ENGINE LEFT MOUNTING (FOR AUTOMATIC TRANSMISSION)

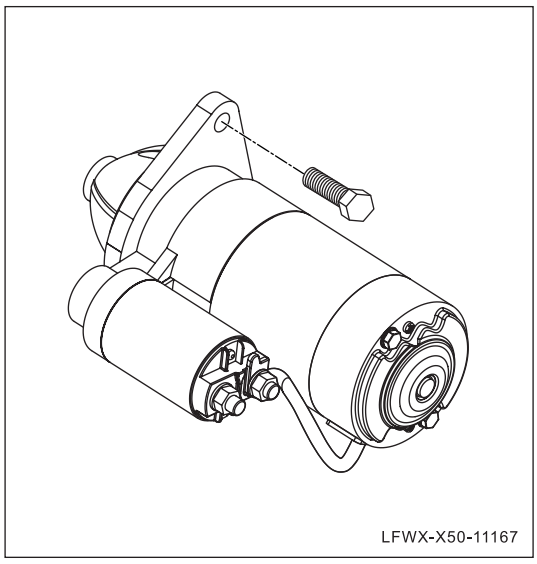
(a) Remove the fixing bolts of the engine left mounting.



29. REMOVE ENGINE WITH THE TRANSMISSION ASSEMBLY DOWNWARD

NOTICE:

- **Before lowering the engine, re-check all connectors, ground wires, oil pipes, vacuum pipe and water pipes for thorough disconnection.**
- **In the process of lowering, pay attention to the parts around the engine to avoid damage to them due to extrusion.**



30. REMOVE STARTER

(a) Remove the fixing bolts of the starter and take down the starter.

32. REMOVE TRANSMISSION ASSEMBLY

(a) Remove the fixing bolts of the observation hole cover, and remove the observation hole cover.

(b) Remove the fixing bolts of the transmission assembly, and the transmission assembly.

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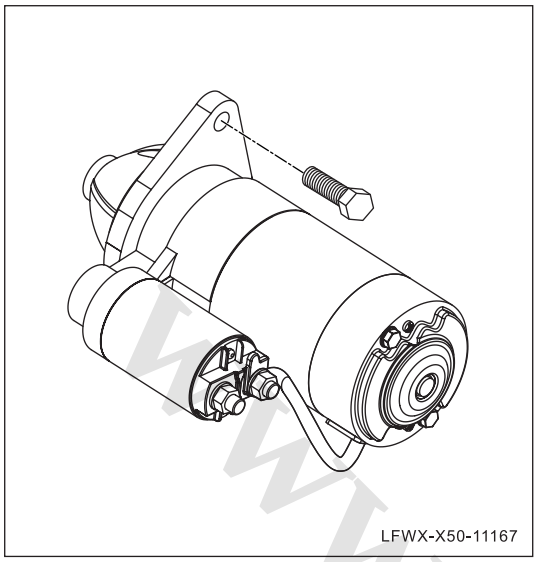
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INSTALLATION OF THE ASSEMBLY

1. INSTALL TRANSMISSION ASSEMBLY

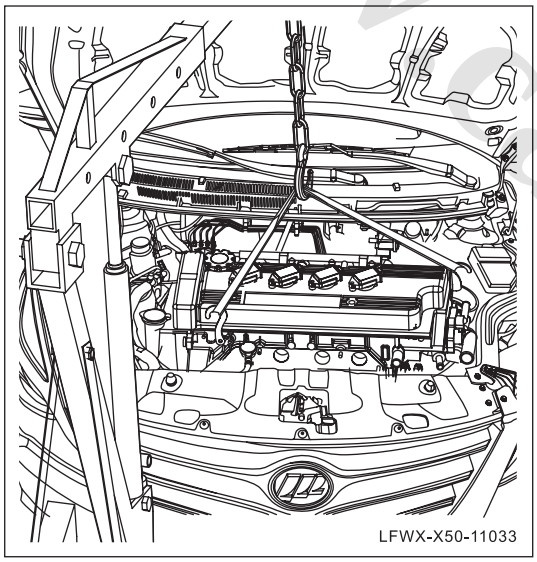
(a) Install the transmission assembly on the engine, fix the fixing bolts and then screw them up.

(b) Install the observation hole cover on the transmission, fix the fixing bolts and then screw them up.



2. INSTALLI STARTER

(a) Install the starter on the engine, fix the fixing bolts and then screw them up.



3. MOVE ENGINE WITH TRANSMISSION RIGHT BELOW THE ENGINE COMPARTMENT, AND PUT IT IN A PROPER POSITION

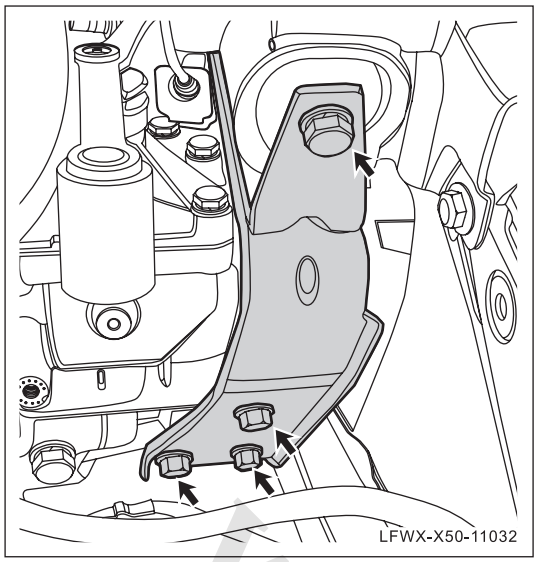
4. LIFT ENGINE WITH TRANSMISSION ASSEMBLY FROM THE ENGINE COMPARTMENT WITH LIFTING MACHINE

NOTICE:

In the process of hoisting, pay attention to the parts around the engine to avoid damage to them due to extrusion.

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5. INSTALL ENGINE LEFT MOUNTING (FOR MANUAL TRANSMISSION)

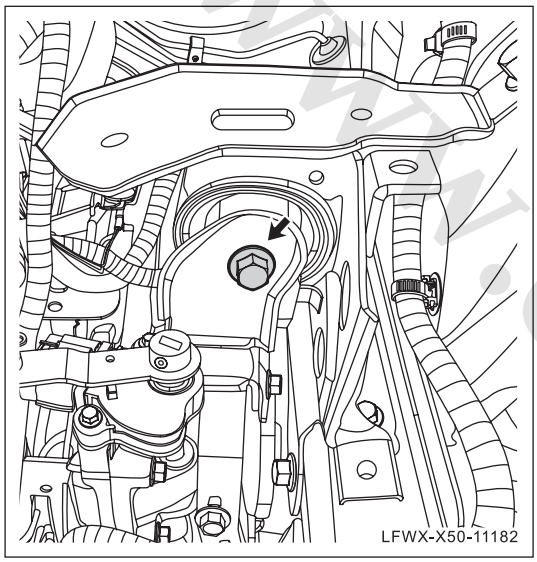
(a) Install the engine left mounting in place.

(b) Install the fixing bolts of the engine left mounting and tighten them.

Torque: 65 - 85N•m

△ HINT:

For the sake of easy installation, don't tighten the fixing bolts of left/right mounting until the installation of rear overhang has been finished.



6. INSTALL ENGINE LEFT MOUNTING (FOR AUTOMATIC TRANSMISSION)

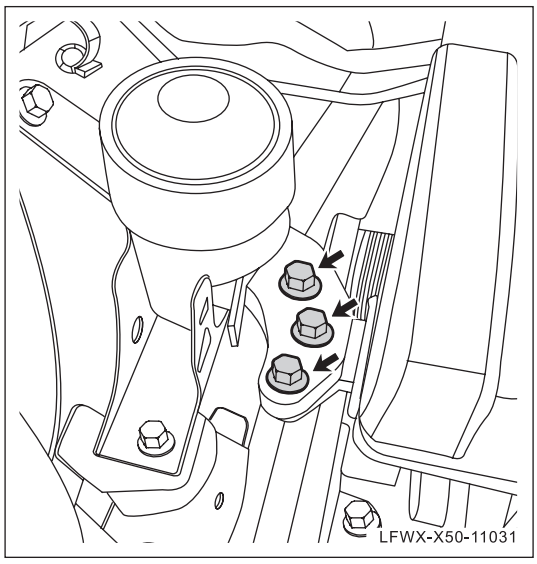
(a) Install the engine left mounting in place.

(b) Install the fixing bolts of the engine left mounting and tighten them.

Torque: 65 - 85N•m

△ HINT:

For the sake of easy installation, don't tighten the fixing bolts of left/right mounting until the installation of rear overhang has been finished.



7. INSTALL ENGINE RIGHT MOUNTING

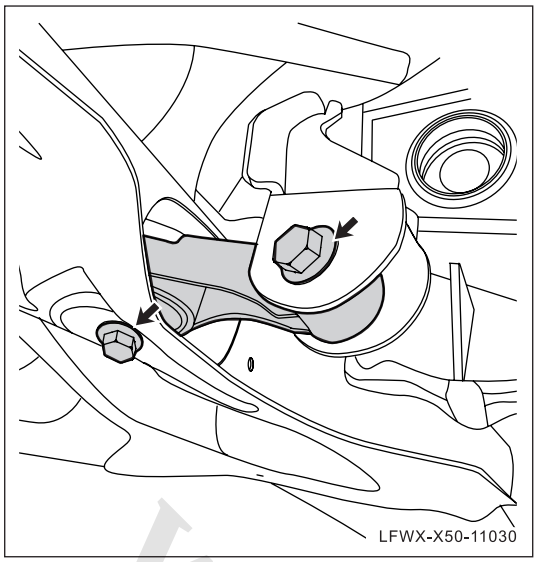
(a) Install the engine right mounting in place.

(b) Install the fixing bolts of the engine right mounting and tighten them.

Torque: 65 - 85N•m

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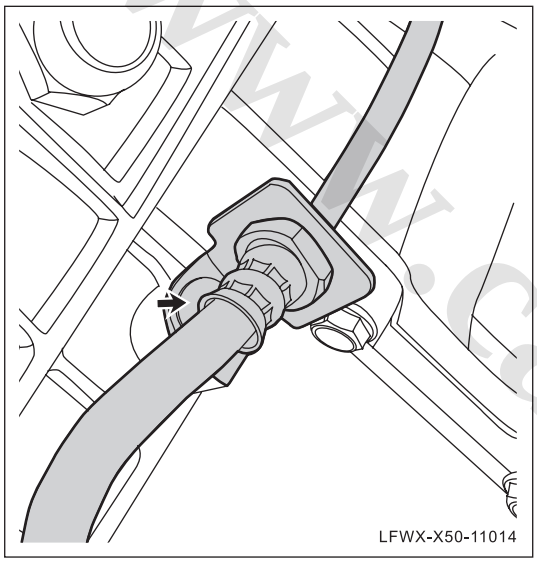


8. INSTALL ENGINE REAR MOUNTING

(a) Install engine rear mounting in place.

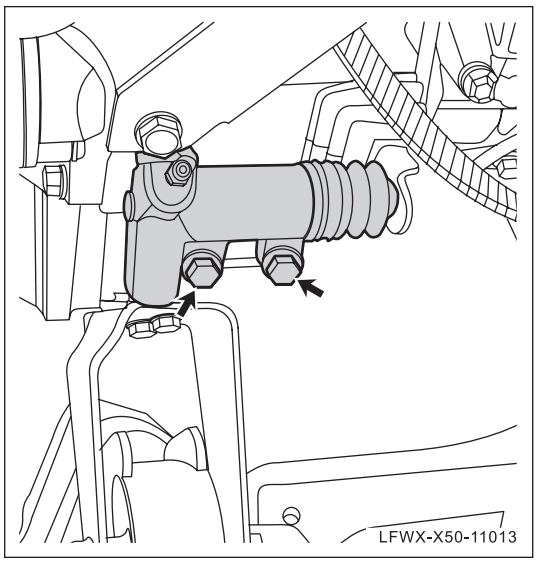
(b) Install the fixing bolts of the engine rear mounting and tighten them.

Torque: 185 - 225N•m



9. INSTALL CLUTCH OIL PIPE JACK STAND ASSEMBLY (FOR MANUAL TRANSMISSION)

(a) Install the clutch oil pipe jack stand to the installation position, fix the fixing bolts and then screw them up.



10. INSTALL CLUTCH SLAVE CYLINDER (FOR MANUAL TRANSMISSION)

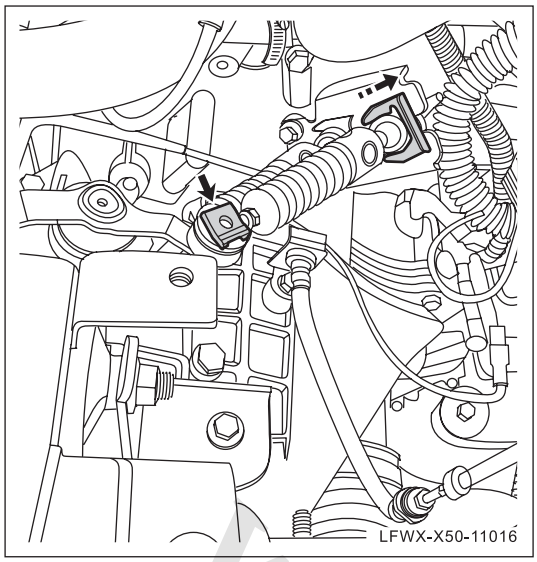
(a) Install the clutch slave cylinder in place.

(b) Install the fixing bolts of the clutch slave cylinder and tighten them.

Torque: 20 - 26N•m

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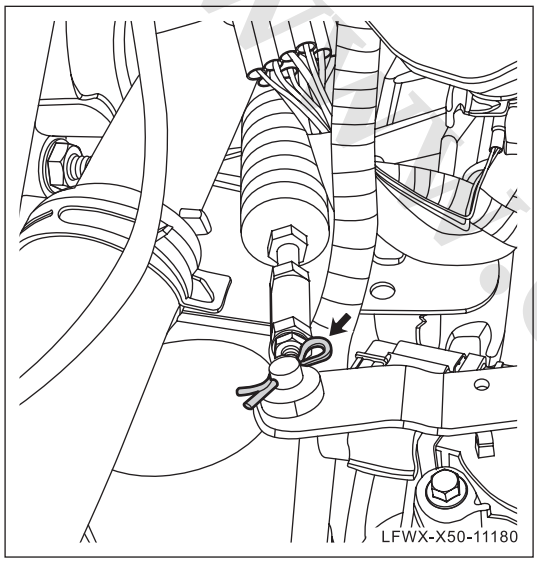
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11. CONNECT TRANSMISSION SHIFT CABLE (FOR MANUAL TRANSMISSION)

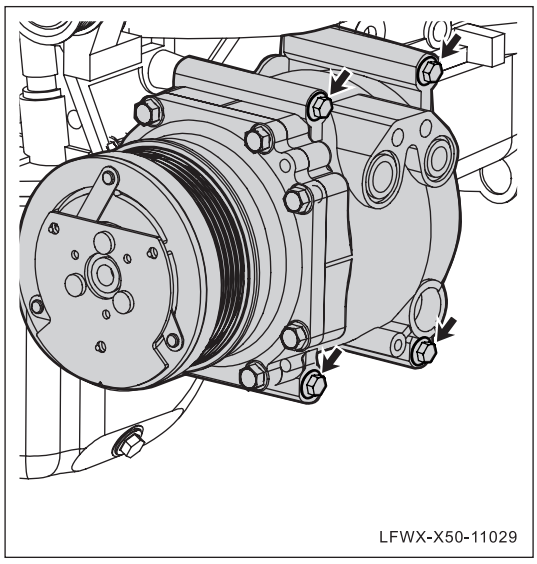
(a) Install the positioning piece of the selector and shift cable.

(b) Install the fixed piece of the selector and shift cable.



12. CONNECT TRANSMISSION SHIFT CABLE (FOR AUTOMATIC TRANSMISSION)

(a) Connect the transmission shift cable and install the elastic pin of the shift cable joint.



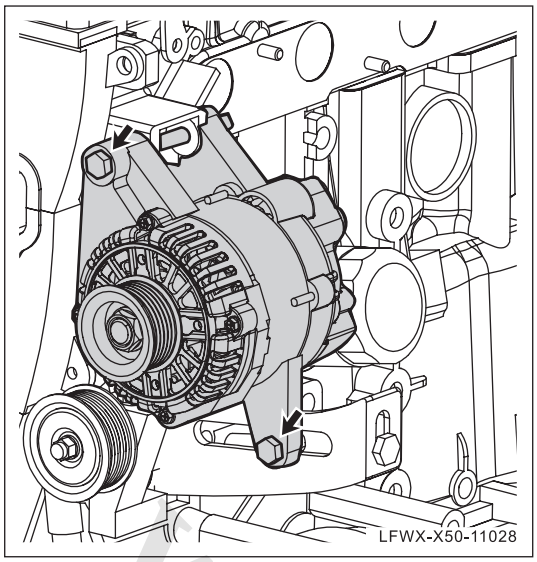
13. INSTALL A/C COMPRESSOR

(a) Install the A/C compressor on the engine, and fix the fixing bolts and then screw them up.

(b) Connect high and low pressure pipes to the A/C compressor, and fix the fixing bolts and then screw them up.

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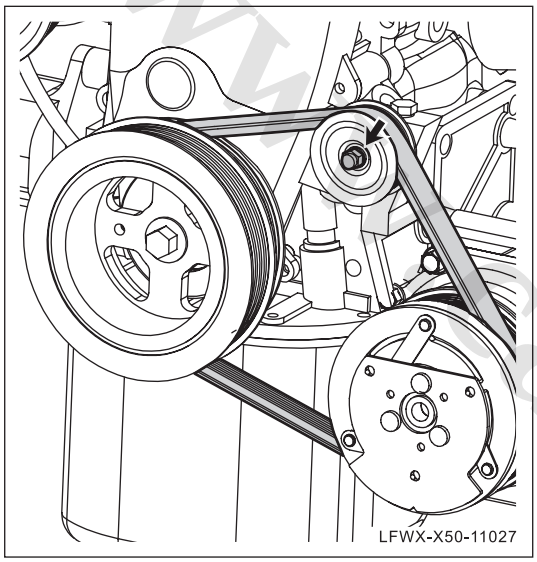


14. INSTALL GENERATOR

(a) Install the generator on the engine, and fix the fixing bolts.

△ HINT:

Do not screw the bolts up after installing the generator adjusting bolts; screw them up only after the generator belt is in stalled and adjusted.



15. INSTALL DRIVE BELT

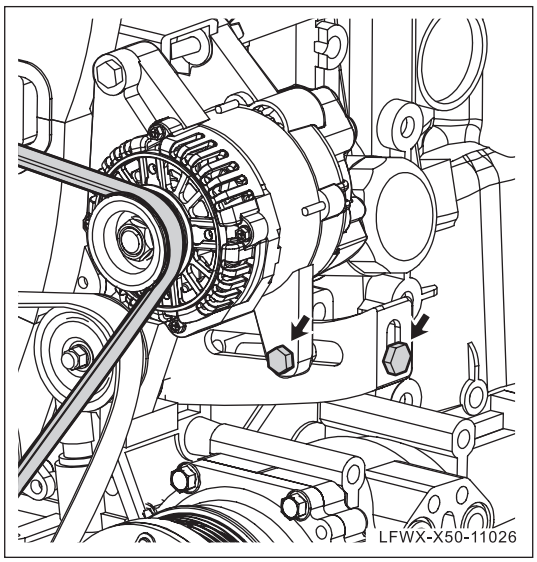
(a) Install the A/C compressor drive belt to the installation position.

(b) Adjust the drive belt tension of the A/C compressor, and screw up the drive belt tensioner locking bolts of the A/C compressor.

Torque: 49N•m

△ HINT:

Press it down with 100N force, and belt deflection is 13 - 14mm (new belt is 9 - 10 mm).



(c) Install the generator to the installation position.

(d) Adjust the generator drive belt to the required tension, and screw up the generator adjusting bolts.

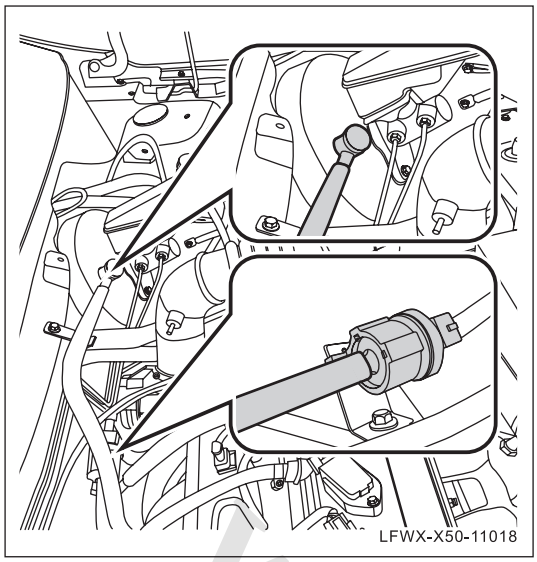
Torque: 49N•m

△ HINT:

Press it down with 100N force, and belt deflection is 13 - 14mm (new belt is 9 - 10 mm).

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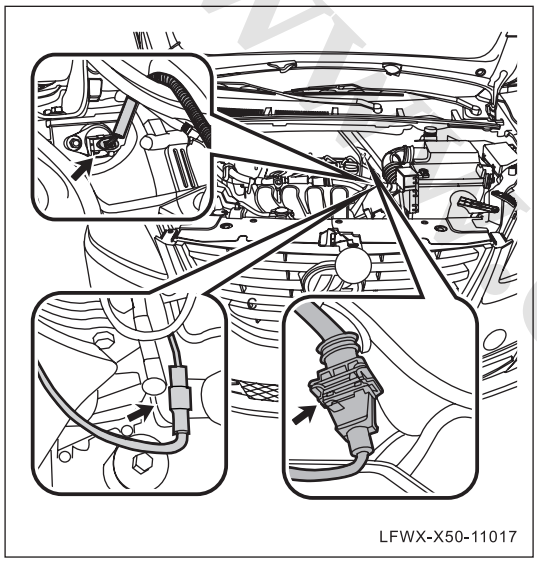
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16. CONNECT ENGINE AIR PIPES

(a) Connect the intake pipe of the canister solenoid.

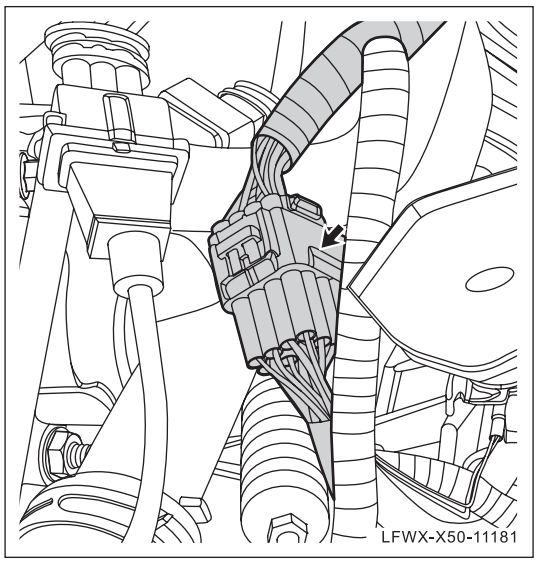
(b) Connect the vacuum pipe.



17. CONNECT ALL ENGINE-RELATED CONNECTORS

△ HINT:

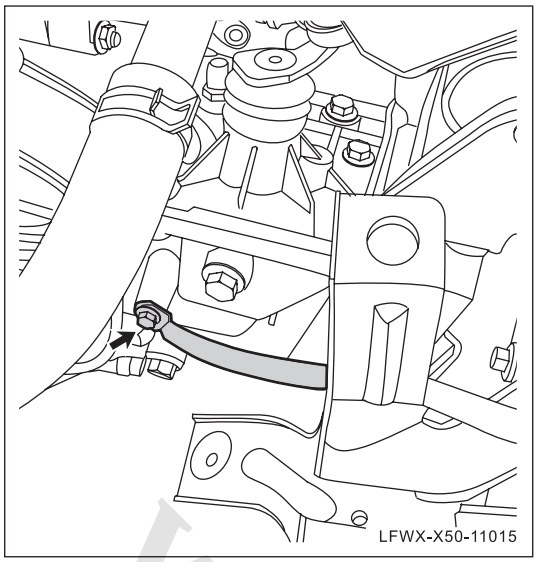
The connectors connected to the engine include: Electrical box bus, electric throttle body position sensor, intake air temperature and pressure sensor, front oxygen sensor, rear oxygen sensor, mileage sensor, knock sensor, camshaft position sensor, VVT, air conditioning high/low-pressure pipe pressure sensor, crankshaft position sensor, engine oil pressure sensor, generator connector, A/C compressor connector, reverse light switch, canister solenoid valve, starter connector, coolant temperature sensor.



18. CONNECT CONNECTOR CLIP OF THE TRANSMISSION CONNECTING BUS

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19. CONNECT TRANSMISSION GROUND WIRE

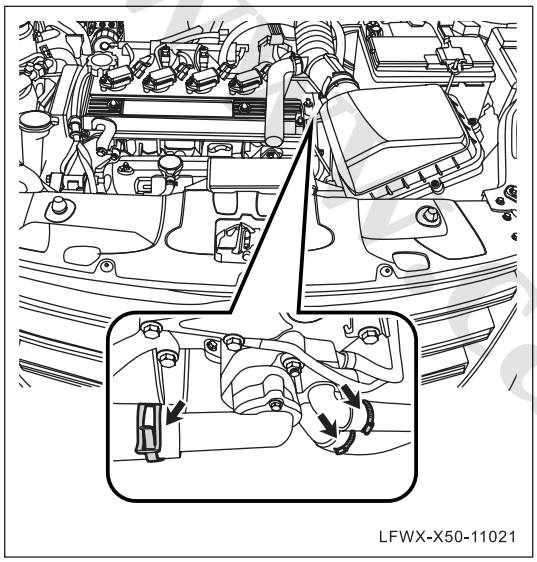
(a) Connect the transmission ground wire, fix the fixing bolts and then screw them up.

Torque: 10N•m

20. CONNECT ENGINE GROUND WIRE

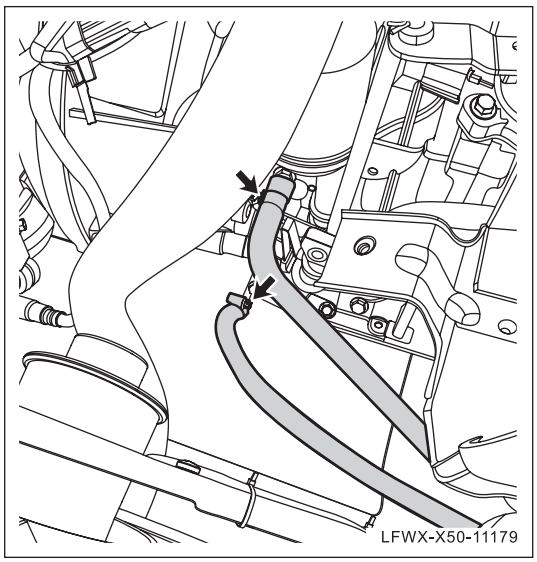
(a) Connect the engine ground wire, fix the fixing bolts and then screw them up.

Torque: 10N•m



21. CONNECT ALL THE CONNECTING WATER PIPES OF THE ENGINE

(a) Connect the engine connecting water pipe, and install the elastic clamp to the installation position.

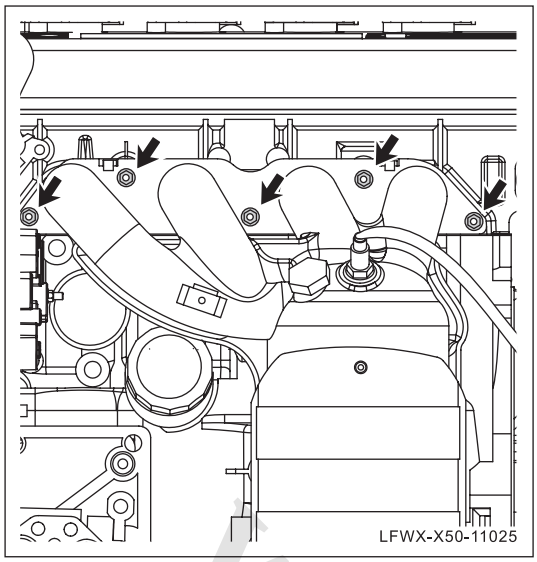


22. CONNECT INLET AND OUTLET COOLING OIL PIPES OF THE TRANSMISSION (FOR AUTOMATIC TRANSMISSION)

(a) Connect the inlet and outlet oil pipes of the transmission, install the fixing clamps to the installation position and then screw them up.

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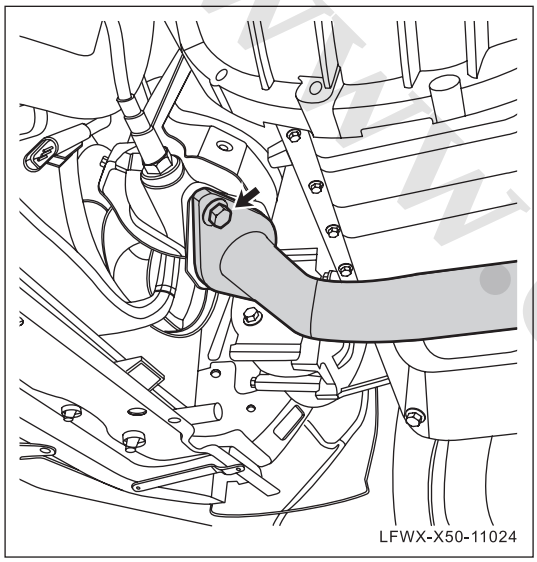


23. INSTALL EXHAUST MANIFOLD.

(a) Install the exhaust manifold to the engine, install the exhaust manifold fixing nuts and screw them up.

Torque: 32 - 34N•m

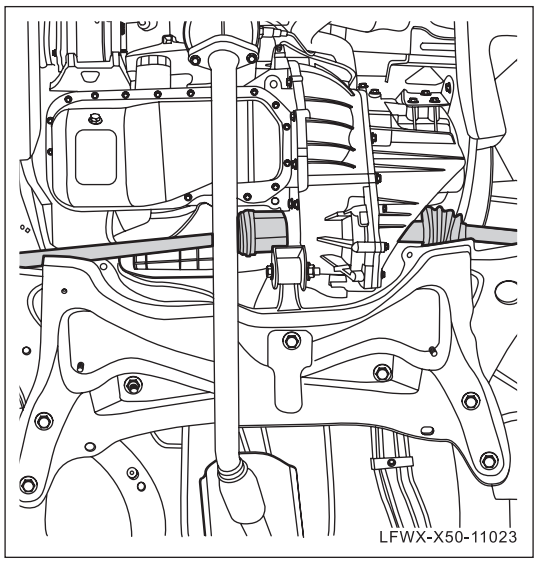
(b) Install the exhaust manifold upper heat shield, fix the fixing bolts and then screw them up.



24. INSTALL FRONT SECTION OF THE EXHAUST PIPE

(a) Install the front section of the exhaust pipe on the exhaust manifold, fix the fixing bolts and then screw them up.

Torque: 49N•m



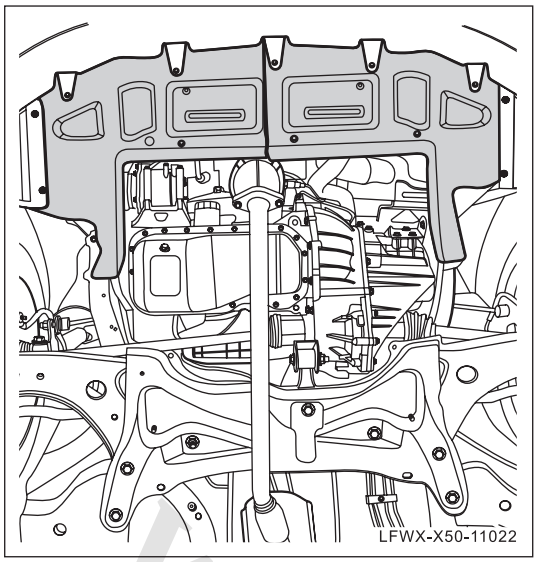
25. INSTALL FRONT DRIVE SHAFT ASSEMBLY

(a) Install the front drive shaft on the transmission.

26. INSTALL FRONT WHEELS

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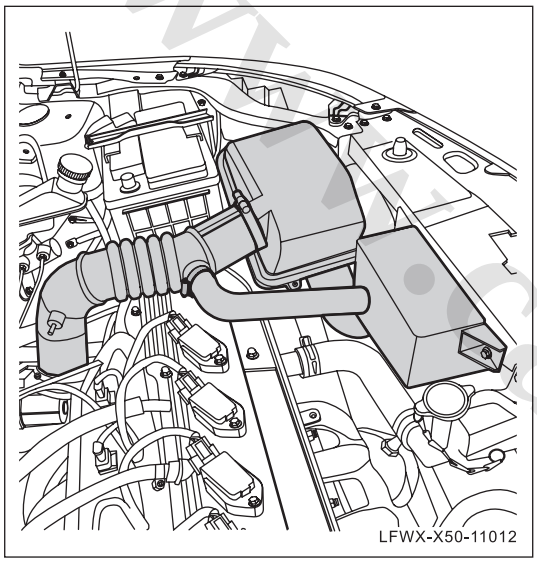
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27. INSTALL LOWER TRIM PANEL OF THE ENGINE COMPARTMENT

(a) Install the lower trim panel of the engine compartment on the bottom of the body, fix the fixing bolts and then screw them up.

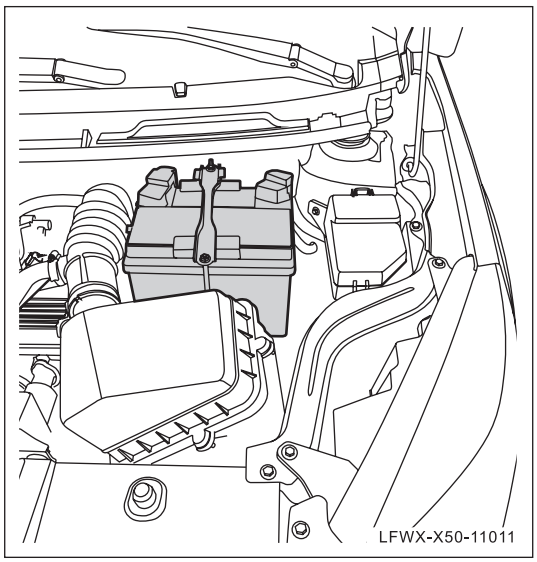
Torque: 10 N.m



28. INSTALL AIR FILTER ASSEMBLY

(a) Install the air filter housing and the air inlet pipe of the throttle body, fix the fixing bolts and then screw them up.

Torque: 10 N.m



29. INSTALL BATTERY BRACKET AND THE BATTERY ASSEMBLY

(a) Install the battery bracket on the engine compartment, fix the fixing bolts and then screw them up.

Torque: 25 N.m

(b) Install the battery bottom cover and battery.

(c) Install the battery pressure plate connecting rod assembly, and fasten the fixing nuts.

Torque: 10 N.m

(d) Connect the battery positive and negative cables.

NOTICE:

When connecting the battery cables, be sure to connect the battery positive cable before connecting the battery negative cable.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Hard to start the engine	1. Ambient temperature or body temperature (too low)	See 11-Mechanical system Diagnosis, Fault Diagnosis (1. Engine starting difficulty)
	2. Battery voltage (too low)	
	3. Starter (faulty)	
	4. Fuel tank (no fuel)	
	5. Fuel quality (poor)	
	6. Engine oil grade (incorrect selection)	
	7. Air inlet system (clogged)	
	8. Coolant temperature sensor (failed)	
	9. Throttle position sensor (faulty)	
	10. Throttle body (faulty)	
	11. Crankshaft position sensor failure	
	12. Camshaft position sensor failure	
	13. Fuel pressure (too low)	
	14. Individual or multiple fuel injectors (poor operation)	
	15. Ignition coil (faulty)	
	16. Spark plug (faulty)	
	17. Valve clearance (incorrect)	
	18. Ignition timing (incorrect)	
	19. Cylinder compression pressure (too low)	
	20. Electronic control module (faulty)	
Poor engine idling	1. Intake air system leakage	See 11-Mechanical system Diagnosis, Fault Diagnosis (2. Poor engine idling)
	2. Coolant temperature sensor (failed)	
	3. Air intake pressure temperature sensor failure	
	4. Throttle position sensor (faulty)	
	5. Throttle body (faulty)	
	6. Fuel pressure (too low)	
	7. Individual or multiple fuel injectors (poor operation)	
	8. Ignition coil (faulty)	
	9. Spark plug (faulty)	
	10. Cylinder compression pressure (too low)	
	11. Electronic control module (faulty)	

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Symptom	Suspected area	Recommended action
Poor engine acceleration	1. Fuel quality (poor)	See 11-Mechanical system Diagnosis, Fault Diagnosis (3. Poor engine acceleration)
	2. Air inlet system (clogged)	
	3. Coolant temperature sensor (failed)	
	4. Air intake pressure temperature sensor failure	
	5. Throttle position sensor (faulty)	
	6. Knock sensor (failed)	
	7. Fuel pressure (too low)	
	8. Individual or multiple fuel injectors (poor operation)	
	9. Ignition coil (faulty)	
	10. Spark plug (faulty)	
	11. Canister solenoid valve (faulty)	
	12. Ignition timing (incorrect)	
	13. Cylinder compression pressure (too low)	
	14. Catalytic converter (clogged)	
	15. Electronic control module (faulty)	
Underpowered engine	1. Fuel quality (poor)	See 11-Mechanical system Diagnosis, Fault Diagnosis (4. Insufficient engine power)
	2. Air inlet system (clogged)	
	3. Exhaust system (clogged)	
	4. Inlet and exhaust pipes (too long)	
	5. Coolant temperature sensor (failed)	
	6. Throttle position sensor (faulty)	
	7. Throttle body (faulty)	
	8. Air intake pressure temperature sensor failure	
	9. Fuel pressure (too low)	
	10. Individual or multiple fuel injectors (poor operation)	
	11. Ignition coil (faulty)	
	12. Spark plug (faulty)	
	13. Canister solenoid valve (faulty)	
	14. Ignition timing (incorrect)	
	15. Cylinder compression pressure (too low)	
	16. Electronic control module (faulty)	

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Symptom	Suspected area	Recommended action
Abnormal exhaust smoke color (black smoke)	1. Air inlet system (clogged) 2. Exhaust system (clogged) 3. Coolant temperature sensor (failed) 4. Throttle position sensor (faulty) 5. Air intake pressure temperature sensor failure 6. Oxygen sensor fault 7. Valve clearance (too large) 8. Individual or multiple fuel injectors (poor operation) 9. Ignition timing (incorrect) 10. Cylinder compression pressure (too low) 11. Electronic control module (faulty)	See 11-Mechanical System Diagnosis, Fault Diagnosis (5. Abnormal exhaust smoke (black smoke))
Abnormal exhaust smoke color (white smoke)	1. Ambient temperature or body temperature (too low) 2. Fuel quality (poor) 3. Cylinder sleeve (damaged)	See 11-Mechanical System Diagnosis, Fault Diagnosis (6. Abnormal exhaust smoke (white smoke))
Abnormal exhaust smoke color (blue smoke)	1. Engine oil grade (incorrect selection) 2. Valve, valve guide or valve seal (faulty) 3. Piston and piston ring (faulty)	See 11-Mechanical System Diagnosis, Fault Diagnosis (7. Abnormal exhaust smoke (blue smoke))
The engine oil pressure is too low (natural and gradual slow-down)	1. Engine oil pressure sensor (faulty) 2. Engine oil remaining amount (insufficient) 3. Engine oil (deteriorated) 4. Oil filter (clogged) 5. Oil strainer (clogged) 6. Oil pump or oil relief valve (faulty) 7. Main bearing bush, connecting rod bearing bush, etc. (badly worn) 8. Engine parts (too large clearance)	See 11-Mechanical system Diagnosis, Fault Diagnosis (8. Engine oil pressure is too low (natural and gradual slow-down))
The engine oil pressure is too low (sudden slow-down)	1. Engine oil pressure sensor (faulty) 2. Oil pump (failed)	See 11-Mechanical System Diagnosis, Fault Diagnosis (9. The engine oil pressure is too low (sudden slow-down))

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Symptom	Suspected area	Recommended action
High engine temperature	1. Coolant temperature sensor (failed)	See 11-Mechanical System Diagnosis, Fault Diagnosis (10. Too high engine temperature)
	2. Coolant (insufficient)	
	3. Radiator (faulty)	
	4. Fan motor (faulty)	
	5. Thermostat (faulty)	
	6. Water pump (faulty)	
	7. Ignition timing (incorrect)	
	8. Piston (excessive carbon deposition on the top)	
	9. Electronic control module (faulty)	
Engine strange noises (natural increasing strange noises)	1. Exhaust system (faulty)	See 11-Mechanical System Diagnosis, Fault Diagnosis (11. Engine strange noises (natural increasing strange noises))
	2. Valve device (faulty)	
	3. Camshaft (too large axial clearance)	
	4. Main bearing bush, connecting rod bearing bush (faulty)	
	5. Piston (faulty)	
	6. Crankshaft (too large axial clearance)	
	7. Flywheel (bolt loose or broken)	
Engine strange noises (sudden strange noises)	1. Injector (failed)	See 11-Mechanical System Diagnosis, Fault Diagnosis (12. Engine stranger noises (sudden strange noises))
	2. Piston (cylinder scoring)	

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FAULT DIAGNOSIS

1. HARD TO START THE ENGINE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine and check the engine operation conditions	Diagnosis is over	Engine starting difficulty (engine has no starting phenomenon; engine has starting phenomenon, but cannot be started)	Go to Step 1
1	Diagnose with a diagnostic scanner	Normal	Faulty	Instruction
	Read DTC with a diagnostic scanner	If there is no DTC, go to Step 2	If there is a DTC, perform troubleshooting according to the DTC	See 12 - Engine Control System, Fault Diagnosis
2	Confirming the ambient temperature	Normal	Faulty	Instruction
	Confirm the ambient temperature conditions	If the ambient temperature is normal, go to Step 3	When the ambient temperature is too low, the engine will be difficult to start	Preheat the engine
3	Check the battery	Normal	Faulty	Instruction
	Check the battery voltage	Go to Step 4	Battery voltage is too low	Charging the battery or replacing the battery (see 18-Starting Charging System Battery, Replacement)
4	Check the starter	Normal	Faulty	Instruction
	Check working conditions of starter.	Go to Step 5	1. The current of starter is insufficient 2. Starter does not work	Replacing the starter (see 18-Starting Charging System Starter, Replacement)
5	Check the fuel	Normal	Faulty	Instruction
	Check the fuel status	Go to Step 6	1. There is no fuel in the fuel tank 2. Use poor quality fuel oil	1. Fill the fuel 2. Replace the fuel
6	Check the engine oil	Normal	Faulty	Instruction
	Check the engine oil status	Go to Step 7	The engine oil grade is incorrect	Replace the engine oil (see 16 - Oil Lubrication System Engine Oil, Replacement)
7	Check the intake system	Normal	Faulty	Instruction
	Check the air inlet system	Go to Step 8	1. Air filter is clogged 2. The intake pipe is clogged	1. Clean or replace the air filter element (see 14 - Intake and Exhaust System Air Filter, Check) 2. Clean and unclog the intake pipe (see 14 - Intake and Exhaust System Intake Pipe, Check)

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Steps	Inspection Item	Inspection result		
8	Check coolant temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the coolant temperature sensor	Go to Step 9	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
9	Check throttle position sensor	Normal	Faulty	Instruction
	Check the working conditions of the throttle position sensor	Go to Step 10	The throttle position sensor is damaged	Replace the electric throttle body (see 14 - Intake and Exhaust System Electric Throttle Body, Replacement)
10	Check the throttle valve body	Normal	Faulty	Instruction
	Check the working conditions of the throttle body	Go to Step 11	The throttle body is clogged or damaged	Clean or replace the throttle body (see 14 - Intake and Exhaust System Electric Throttle Body, Replacement)
11	Inspect crankshaft position sensor.	Normal	Faulty	Instruction
	Check the working conditions of the crankshaft position sensor	Go to Step 12	Crankshaft position sensor is damaged	Replace the crankshaft position sensor (see 12 - Engine Control System CrankShaft Position Sensor, Replacement)
12	Check the camshaft position sensor	Normal	Faulty	Instruction
	Check the working conditions of the camshaft position sensor	Go to Step 13	The camshaft position sensor is damaged	Replace the camshaft position sensor (see 12 - Engine Control System Camshaft Position Sensor, Replacement)
13	Inspect Fuel Pressure	Normal	Faulty	Instruction
	Check the fuel pressure status of the fuel system	Go to Step 14	The fuel system pressure is too low	1. Check the fuel pump (see 13 - Fuel System, Fuel Pump) 2. Check the fuel filter (see 13 - Fuel System, Fuel Filter)
14	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 15	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System, Fuel Injector, Replacement)
15	Check the ignition coil	Normal	Faulty	Instruction
	Check the working conditions of the ignition coil	Go to Step 16	Ignition coil is broken	Replace the ignition coil (see 17- Ignition System, Ignition Coil, Replacement)
16	Check the spark plug	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the spark plug	Go to Step 17	1. The spark plug has grease dirt or carbon deposit 2. The spark plug is damaged	1. Clean or replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement) 2. Replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement)
17	Check the valve clearance.	Normal	Faulty	Instruction
	Check the valve clearance	Go to Step 18	The valve clearance is incorrect	Adjust the valve clearance (see 11 - Mechanical System Valve, Check)
18	Check ignition timing	Normal	Faulty	Instruction
	Check ignition timing	Go to Step 19	The ignition timing is incorrect	Adjust ignition timing
19	Check the cylinder compression pressure	Normal	Faulty	Instruction
	Check the cylinder compression pressure	Go to Step 20	Cylinder compression pressure is low	1. Check the valve clearance (see 11 - Mechanical System Valve, Check) 2. Check the piston, piston ring and cylinder 3. Check the cylinder head gasket
20	Check the engine electronic control module	Normal	Faulty	Instruction
	Check the working conditions of the engine electronic control module	Go to Step 21	Engine electronic control module is faulty	See 12 - Engine Control System Electronic Control Module (ECM), Replacement
21	Verification and check	Normal	Faulty	Instruction
	Start the engine and check the engine operation conditions	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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2. POOR ENGINE IDLING

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine and check the engine idling conditions	Diagnosis is over	The engine idling is unsteady (too high or too low)	Go to Step 1
1	Diagnose with a diagnostic scanner	Normal	Faulty	Instruction
	Read DTC with a diagnostic scanner	If there is no DTC, go to Step 2	If there is a DTC, perform troubleshooting according to the DTC	See 12 - Engine Control System, Fault Diagnosis
2	Check the intake system	Normal	Faulty	Instruction
	Check the air inlet system	Go to Step 3	1. Upper and lower covers of the air filter is not fastened closely 2. Upper or lower cover of the air filter is damaged 3. Air filter is clogged 4. The intake pipe connection is not fastened 5. The intake pipe is broken	1. Re-fasten the upper and lower covers of the air filter 2. Replace the upper or lower cover of the air filter 3. Clean or replace the air filter (see 14 - Intake and Exhaust System Air Filter, Replacement) 4. Reinstall the intake pipe 5. Replace the damaged intake pipe
3	Check coolant temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the coolant temperature sensor	Go to Step 4	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
4	Check intake pressure and temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the intake air temperature and pressure sensor	Go to Step 5	The intake air temperature and pressure sensor is damaged	Replace the intake air temperature and pressure sensor (see 14 - Intake and Exhaust System, Intake Air Temperature and Pressure Sensor, Replacement)
5	Check throttle position sensor	Normal	Faulty	Instruction
	Check the working conditions of the throttle position sensor	Go to Step 6	The throttle position sensor is damaged	Replace the electric throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
6	Check the throttle valve body	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the throttle body	Go to Step 7	The throttle body is clogged or damaged	Clean or replace the throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
7	Inspect Fuel Pressure	Normal	Faulty	Instruction
	Check the fuel pressure status of the fuel system	Go to Step 8	The fuel system pressure is too low	1. Check the fuel pump (see 13 - Fuel System Fuel Pump) 2. Check the fuel filter (see 13 - Fuel System Fuel Filter)
8	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 9	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System Fuel Injector, Replacement)
9	Check the ignition coil	Normal	Faulty	Instruction
	Check the working conditions of the ignition coil	Go to Step 10	Ignition coil is broken	Replace the ignition coil (see 17- Ignition System Ignition Coil, Replacement)
10	Check the spark plug	Normal	Faulty	Instruction
	Check the working conditions of the spark plug	Go to Step 11	1. The spark plug has grease dirt or carbon deposit 2. The spark plug is damaged	1. Clean or replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement) 2. Replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement)
11	Check the cylinder compression pressure	Normal	Faulty	Instruction
	Check the cylinder compression pressure	Go to Step 12	Cylinder compression pressure is low	1. Check the valve clearance (see 11 - Mechanical System Valve, Check) 2. Check the piston, piston ring and cylinder 3. Check the cylinder head gasket
12	Check the engine electronic control module	Normal	Faulty	Instruction
	Check the working conditions of the engine electronic control module	Go to Step 13	Engine electronic control module is faulty	See 12 - Engine Control System, Electronic Control Module (ECM), Replacement
13	Verification and check	Normal	Faulty	Instruction
	Start the engine and check the engine idling conditions	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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3. POOR ENGINE ACCELERATION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine and check the engine acceleration conditions	Diagnosis is over	Poor engine acceleration (black smoke, flashback, jitter or deflagration, etc. occurs during deceleration)	Go to Step 1
1	Diagnose with a diagnostic scanner	Normal	Faulty	Instruction
	Read DTC with a diagnostic scanner	If there is no DTC, go to Step 2	If there is a DTC, perform troubleshooting according to the DTC	See 12 - Engine Control System, Fault Diagnosis
2	Check the fuel quality	Normal	Faulty	Instruction
	Check the fuel quality status	Go to Step 3	Apply poor fuel	Replace fuel
3	Check the intake system	Normal	Faulty	Instruction
	Check the air inlet system	Go to Step 4	1. Upper and lower covers of the air filter is not fastened closely 2. Upper or lower cover of the air filter is damaged 3. Air filter is clogged 4. The intake pipe connection is not fastened 5. The intake pipe is broken	1. Re-fasten the upper and lower covers of the air filter 2. Replace the upper or lower cover of the air filter 3. Clean or replace the air filter (see 14 - Intake and Exhaust System Air Filter, Replacement) 4. Reinstall the intake pipe 5. Replace the damaged intake pipe
4	Check coolant temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the coolant temperature sensor	Go to Step 5	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
5	Check intake pressure and temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the intake air temperature and pressure sensor	Go to Step 6	The intake air temperature and pressure sensor is damaged	Replace the intake air temperature and pressure sensor (see 14 - Intake and Exhaust System, Intake Air Temperature and Pressure Sensor, Replacement)
6	Check throttle position sensor	Normal	Faulty	Instruction
	Check the working conditions of the throttle position sensor	Go to Step 7	The throttle position sensor is damaged	Replace the electric throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
7	Check the knock sensor	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the knock sensor	Go to Step 8	The knock sensor is damaged	Replace the knock sensor (see 12 - Engine control system knock sensor, replacement)
8	Inspect Fuel Pressure	Normal	Faulty	Instruction
	Check the fuel pressure status of the fuel system	Go to Step 9	The fuel system pressure is too low	1. Check the fuel pump (see 13 - Fuel System Fuel Pump) 2. Check the fuel filter (see 13 - Fuel System Fuel Filter)
9	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 10	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System, Fuel Injector, Replacement)
10	Check the ignition coil	Normal	Faulty	Instruction
	Check the working conditions of the ignition coil	Go to Step 11	Ignition coil is broken	Replace the ignition coil (see 17- Ignition System, Ignition Coil, Replacement)
11	Check the spark plug	Normal	Faulty	Instruction
	Check the working conditions of the spark plug	Go to Step 12	1. The spark plug has grease dirt or carbon deposit 2. The spark plug is damaged	1. Clean or replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement) 2. Replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement)
12	Check the canister solenoid valve	Normal	Faulty	Instruction
	Check the working conditions of the canister solenoid valve	Go to Step 13	Canister solenoid valve is damaged	Replace the canister solenoid valve (see section 13 - Fuel System, Canister Solenoid Valve, Replacement)
13	Check ignition timing	Normal	Faulty	Instruction
	Check ignition timing	Go to Step 14	The ignition timing is incorrect	Adjust ignition timing
14	Check the cylinder compression pressure	Normal	Faulty	Instruction
	Check the cylinder compression pressure	Go to Step 15	Cylinder compression pressure is low	1. Check the valve clearance (see 11 - Mechanical System Valve, Check) 2. Check the piston, piston ring and cylinder 3. Check the cylinder head gasket
15	Check the catalytic converter.	Normal	Faulty	Instruction
	Check the working conditions of the catalytic converter	Go to Step 16	Catalytic converter is clogged	Replace the catalytic converter (see section 14 - Intake and Exhaust System, Catalytic Converter, Replacement))
16	Check the engine electronic control module	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the engine electronic control module	Go to Step 17	Engine electronic control module is faulty	(See 12 - Engine Control System, Electronic Control Module (ECM), Replacement)
17	Verification and check	Normal	Faulty	Instruction
	Start the engine and check the engine idling conditions	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

4. UNDERPOWERED ENGINE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, and test the engine power on the bench	Diagnosis is over	Underpowered engine	Go to Step 1
1	Diagnose with a diagnostic scanner	Normal	Faulty	Instruction
	Read DTC with a diagnostic scanner	If there is no DTC, go to Step 2	If there is a DTC, perform troubleshooting according to the DTC	(See 12 - Engine Control System Fault Diagnosis)
2	Check the fuel	Normal	Faulty	Instruction
	Check the fuel quality status	Go to Step 3	Apply poor fuel	Replace fuel
3	Check the intake system	Normal	Faulty	Instruction
	Check the air inlet system	Go to Step 4	1. Air filter is clogged 2. The intake pipe is clogged 3. Unreasonable refit causes too long intake pipe	1. Clean or replace the air filter element (see 14 - Intake and Exhaust System, Air Filter, Check) 2. Clean and unclog the intake pipe (see 14 - Intake and Exhaust System, Intake Pipe, Check) 3. Restore the intake piping layout before leaving factory
4	Inspect the exhaust system.	Normal	Faulty	Instruction
	Check whether the exhaust system is clogged	Go to Step 5	1. Catalytic converter is clogged 2. The connecting pipe with corrugated pipe is clogged 3. The front muffler is clogged 4. The rear muffler is clogged 5. Unreasonable refit causes too long exhaust pipe	1. Replace the catalytic converter 2. Clean the connecting pipe with corrugated pipe 3. Clean and unclog the front muffler 4. Clean and unclog the rear muffler 5. Restore the exhaust piping layout before leaving factory
5	Check coolant temperature sensor	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the coolant temperature sensor	Go to Step 6	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
6	Check throttle position sensor	Normal	Faulty	Instruction
	Check the working conditions of the throttle position sensor	Go to Step 7	The throttle position sensor is damaged	Replace the electric throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
7	Check the throttle valve body	Normal	Faulty	Instruction
	Check the working conditions of the throttle body	Go to Step 8	The throttle body is clogged or damaged	Clean or replace the throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
8	Check intake pressure and temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the intake air temperature and pressure sensor	Go to Step 9	The intake air temperature and pressure sensor is damaged	Replace the intake air temperature and pressure sensor (see 14 - Intake and Exhaust System, Intake Air Temperature and Pressure Sensor, Replacement)
9	Inspect Fuel Pressure	Normal	Faulty	Instruction
	Check the fuel pressure status of the fuel system	Go to Step 10	The fuel system pressure is too low	1. Check the fuel pump (see 13 - Fuel system fuel pump) 2. Check the fuel filter (see 13 - Fuel System, Fuel Filter)
10	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 11	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System, Fuel Injector, Replacement)
11	Check the ignition coil	Normal	Faulty	Instruction
	Check the working conditions of the ignition coil	Go to Step 12	Ignition coil is broken	Replace the ignition coil (see 17- Ignition System, Ignition Coil, Replacement)
12	Check the spark plug	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the spark plug	Go to Step 13	1. The spark plug has grease dirt or carbon deposit 2. The spark plug is damaged	1. Clean or replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement) 2. Replace the spark plug (see 17 - Ignition System, Spark Plug, Replacement)
13	Check the exhaust gas recirculation (EGR)	Normal	Faulty	Instruction
	Check the working conditions of the canister solenoid valve	Go to Step 14	Canister solenoid valve is damaged	Replace the canister solenoid valve (see section 13 - Fuel System, Canister Solenoid Valve, Replacement)
14	Check ignition timing	Normal	Faulty	Instruction
	Check ignition timing	Go to Step 15	The ignition timing is incorrect	Adjust ignition timing
15	Check the cylinder compression pressure	Normal	Faulty	Instruction
	Check the cylinder compression pressure	Go to Step 16	Cylinder compression pressure is low	1. Check the valve clearance (see 11 - Mechanical System Valve, Check) 2. Check the piston, piston ring and cylinder 3. Check the cylinder head gasket
16	Check the engine electronic control module	Normal	Faulty	Instruction
	Check the working conditions of the engine electronic control module	Go to Step 17	Engine electronic control module is faulty	See 12 - Engine Control System, Electronic Control Module (ECM), Replacement
17	Verification and check	Normal	Faulty	Instruction
	Start the engine and check the engine operation conditions	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

5. ABNORMAL EXHAUST SMOKE COLOR (BLACK SMOKE)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	The exhaust smoke is black	Go to Step 1
1	Check the intake system	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the air inlet system	Go to Step 2	1. Air filter is clogged 2. The intake pipe is clogged	1. Clean or replace the air filter element (see 14 - Intake and Exhaust System Air Filter, Replacement) 2. Clean and unclog the intake pipe (see 14 - Intake and Exhaust System, Intake Pipe, Check)
2	Inspect the exhaust system.	Normal	Faulty	Instruction
	Check whether the exhaust system is clogged	Go to Step 3	1. Catalytic converter is clogged 2. The connecting pipe with corrugated pipe is clogged 3. The front muffler is clogged 4. The rear muffler is clogged	1. Replace the catalytic converter (see section 14 - intake and Exhaust System, Catalytic Converter, Replacement) 2. Clean the connecting pipe with corrugated pipe 3. Clean and unclog the front muffler 4. Clean and unclog the rear muffler
3	Check coolant temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the coolant temperature sensor	Go to Step 4	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
4	Check throttle position sensor	Normal	Faulty	Instruction
	Check the working conditions of the throttle position sensor	Go to Step 5	The throttle position sensor is damaged	Replace the electric throttle body (see 14 - Intake and Exhaust System, Electric Throttle Body, Replacement)
5	Check intake pressure and temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the intake air temperature and pressure sensor	Go to Step 6	The intake air temperature and pressure sensor is damaged	Replace the intake air temperature and pressure sensor (see 14 - Intake and Exhaust System, Intake Air Temperature and Pressure Sensor, Replacement)
6	Check oxygen sensor	Normal	Faulty	Instruction
	Check the working conditions of the oxygen sensor	Go to Step 7	Oxygen sensor is damaged	Replace the oxygen sensor (see 14 - intake and Exhaust System Oxygen Sensor, Replacement)
7	Check the valve clearance.	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the valve clearance	Go to Step 8	Valve clearance is too large	Adjust the valve clearance (see 11 - Mechanical System Valve, Check)
8	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 9	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System Fuel Injector, Replacement)
9	Check ignition timing	Normal	Faulty	Instruction
	Check ignition timing	Go to Step 10	The ignition timing is incorrect	Adjust ignition timing
10	Check the cylinder compression pressure	Normal	Faulty	Instruction
	Check the cylinder compression pressure	Go to Step 11	Cylinder compression pressure is low	1. Adjust the valve clearance (see 11 - Mechanical System Valve, Check) 2. Check and repair the piston and piston ring 3. Replace the cylinder head gasket
11	Check the engine electronic control module	Normal	Faulty	Instruction
	Check the working conditions of the engine electronic control module	Go to Step 12	Engine electronic control module is faulty	See 12 - Engine Control System, Electronic Control Module (ECM), Replacement
12	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

6. ABNORMAL EXHAUST SMOKE COLOR (WHITE SMOKE)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	The exhaust smoke is white	Go to Step 1
1	Confirming the ambient temperature	Normal	Faulty	Instruction
	Confirm the ambient temperature conditions	The ambient temperature is too low	The ambient temperature is normal	Go to Step 2
2	Check the fuel quality	Normal	Faulty	Instruction
	Check the fuel quality status	Go to Step 3	Apply poor fuel	Replace fuel
3	Check the cylinder sleeve	Normal	Faulty	Instruction
	Check the cylinder sleeve status	Go to Step 4	Cylinder sleeve has cracks	Replace the cylinder sleeve
4	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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7. ABNORMAL EXHAUST SMOKE COLOR (BLUE SMOKE)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	The exhaust smoke is blue	Go to Step 1
1	Confirm the engine oil grade	Normal	Faulty	Instruction
	Confirm whether the engine oil grade is correct	Go to Step 2	Selection of the engine oil grade is incorrect	Select the correct engine oil (see 16 - Oil Lubrication System Engine Oil, Replacement)
2	Check the valve, valve guide or valve seal	Normal	Faulty	Instruction
	Check the installation status of the valve, valve guide or valve seal	Go to Step 3	1. The valve seal is aging and failure 2. Clearance between the valve and valve guide is too large	1. Replace valve seal 2. Replace the valve or valve guide
3	Check the piston or piston ring	Normal	Faulty	Instruction
	Check the installation status of the piston or piston ring	Go to Step 4	1. Clearance between the piston ring and the piston ring groove is incorrect 2. The piston or piston ring wears badly 3. Elastic force of the piston ring does not meet the requirements	1. Replace the piston ring 2. Replace the piston and piston ring 3. Replace the piston ring
4	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the exhaust smoke color	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

8. THE ENGINE OIL PRESSURE IS TOO LOW (NATURAL SLOW-DOWN)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the engine oil pressure warning light	Diagnosis is over	The engine oil pressure warning light turns on	Go to Step 1
1	Check engine oil pressure sensor	Normal	Faulty	Instruction
	Check the working conditions of the engine oil pressure sensor	Go to Step 2	The engine oil pressure sensor is damaged	Replace the engine oil pressure sensor
2	Test the engine oil pressure	Normal	Faulty	Instruction
	Test the engine oil pressure with the engine oil pressure gauge	Diagnosis is over	The engine oil pressure is too low	Go to Step 3
3	Check the engine oil	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the engine oil status	Go to Step 4	1. The engine oil is insufficient 2. The engine oil is deteriorated	1. Fill engine oil 2. Change engine oil
4	Check oil filter	Normal	Faulty	Instruction
	Check the working conditions of the oil filter	Go to Step 5	Oil filter clogged	Replace the oil filter (see 16 - Oil Lubrication System, Oil Filter, Replacement)
5	Check the oil strainer	Normal	Faulty	Instruction
	Check the working conditions of the oil strainer	Go to Step 6	The oil strainer is clogged	Clean the oil strainer
6	Check oil pump	Normal	Faulty	Instruction
	Check the working conditions of the oil pump	Go to Step 7	1. The oil pump relief valve is faulty 2. The oil pump has mechanical fault	Replace the oil pump (see 16 - Lubrication System, Oil Pump, Replacement)
7	Check the main bearing bush and connecting rod bearing bush	Normal	Faulty	Instruction
	Check the wear status of the main bearing bush and connecting rod bearing bush	Go to Step 8	The main bearing bush or connecting rod bearing bush wears badly	Replace the main bearing bush or connecting rod bearing bush
8	Check the engine service-cycle records	Normal	Faulty	Instruction
	Check the engine service-cycle records, and confirm whether the engine needs overhaul according to the maintenance provisions	Go to Step 9	The engine needs overhaul	Overhaul the engine
9	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the engine oil pressure	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

9. THE ENGINE OIL PRESSURE IS TOO LOW (SUDDEN SLOW-DOWN)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the engine oil pressure warning light	Diagnosis is over	The engine oil pressure warning light turns on	Go to Step 1
1	Check engine oil pressure sensor	Normal	Faulty	Instruction
	Check the working conditions of the engine oil pressure sensor	Go to Step 2	The engine oil pressure sensor is damaged.	Replace the engine oil pressure sensor (see 16 - Oil lubrication System, Engine Oil Pressure Sensor, Replacement)
2	Check oil pump	Normal	Faulty	Instruction
	Check the working conditions of the oil pump	Go to Step 3	1. The oil pump relief valve is faulty 2. The oil pump has mechanical fault	Replace the oil pump (see 16 - Lubrication System, Oil Pump, Replacement)

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Steps	Inspection Item	Inspection result		
3	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the engine oil pressure	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

10. HIGH ENGINE TEMPERATURE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the water temperature warning light	Diagnosis is over	The water temperature warning light turns on	Go to Step 1
1	Check coolant temperature sensor	Normal	Faulty	Instruction
	Check the working conditions of the coolant temperature sensor	Go to Step 2	Coolant temperature sensor damaged	Replace coolant temperature sensor (see 15 - Cooling System, Coolant Temperature Sensor, Replacement)
2	Check the coolant	Normal	Faulty	Instruction
	Check the remaining status of the coolant	Go to Step 3	The coolant is insufficient	Add coolant (see 15 - Cooling System Coolant, Replacement)
3	Check the radiator	Normal	Faulty	Instruction
	Check the working conditions of radiator	Go to Step 4	The radiator is clogged or the radiator core is deformed and damaged	Clean or replace the radiator (see 15 - Cooling System, Radiator, Replacement)
4	Check the fan motor	Normal	Faulty	Instruction
	Check the working conditions of the fan motor	Go to Step 5	The fan motor is damaged	Replace the fan motor (see 15 - Cooling System, Cooling Fan, Replacement)
5	Check the thermostat	Normal	Faulty	Instruction
	Check the working conditions of the thermostat	Go to Step 5	The thermostat is faulty, and cannot fully open	Replace the thermostat (see 15 - Cooling System, Thermostat, Replacement)
6	Check the water pump	Normal	Faulty	Instruction
	Check the working conditions of the water pump	Go to Step 7	Water pump damaged	Replace the water pump (see 15 - Cooling System, Pump, Replacement)
7	Check ignition timing	Normal	Faulty	Instruction
	Check ignition timing	Go to Step 8	The ignition timing is incorrect	Adjust ignition timing
8	Check the piston	Normal	Faulty	Instruction
	Check the carbon deposit status of the piston	Go to Step 9	Excessive carbon deposition on the piston top.	Clean the piston
9	Check the engine electronic control module	Normal	Faulty	Instruction

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	Check the working conditions of the engine electronic control module	Go to Step 10	Engine electronic control module is faulty	(See 12 - Engine Control System, Electronic Control Module (ECM), Replacement)
10	Verification and check	Normal	Faulty	Instruction
	Start the engine, keep idling, and check the water temperature warning light	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

11. ENGINE STRANGE NOISES (NATURAL INCREASING STRANGE NOISES)

Steps	Inspection Item	Inspection result		
0	**Preliminary inspection**	**Normal**	**Faulty**	**Instruction**
	Start the engine and listen to the engine running sound	Diagnosis is over	Engine strange noises	Go to Step 1
1	Inspect the exhaust system.	Normal	Faulty	Instruction
	Check the working conditions of the exhaust system	Go to Step 2	1. The exhaust pipe fixing bolts are loose 2. The mounting block or hold hoop of the exhaust pipe is loose or damaged	1. Re-fasten the fixing bolt 2. Replace the damaged part
2	Check the valve device	Normal	Faulty	Instruction
	Check the working conditions of the valve device	Go to Step 3	1. The valve clearance is too small 2. The valve tappet is too dirty, stuck or wears 3. The valve spring is broken or lack of flexibility 4. The valve is stuck 5. Clearance between the valve and valve guide is too large 6. The valve sealing tape is not sealed closely 7. The camshaft flange is damaged	1. Adjust valve clearance 2. Clean or replace the valve tappet 3. Replace the valve spring 4. Replace valve 5. Replace the valve or valve guide 6. Grind the valve 7. Replace the camshaft
3	Check the camshaft	Normal	Faulty	Instruction
	Check the working conditions of the camshaft	Go to Step 4	Too large camshaft axial clearance	Adjust the camshaft axial clearance
4	Check the main bearing bush and connecting rod bearing bush	Normal	Faulty	Instruction
	Check the working conditions of the main bearing bush and connecting rod bearing bush	Go to Step 5	The main bearing bush or connecting rod bearing bush wears or is misplaced	Replace the main bearing bush or connecting rod bearing bush
5	Check the piston	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working conditions of the piston	Go to Step 6	1. Excessive carbon deposition on the top of the piston 2. Piston pin wears 3. The clearance between the piston and cylinder sleeve is too large 4. Piston ring wears or is damaged	1. Clean the carbon deposit on the top of the piston 2. Replace the piston pin 3. Replace the piston or cylinder sleeve 4. Replace the piston ring
6	Check the crankshaft	Normal	Faulty	Instruction
	Check the working conditions of the crankshaft	Go to Step 7	Crankshaft axial clearance too large	Adjust the crankshaft axial clearance
7	Check flywheel	Normal	Faulty	Instruction
	Check the working conditions of the flywheel	Go to Step 8	The flywheel bolt is loose or broken	Replace the flywheel bolt
8	Verification and check	Normal	Faulty	Instruction
	Start the engine and listen to the engine running sound	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

12. ENGINE ABNORMAL SOUND (SUDDEN STRANGE NOISES)

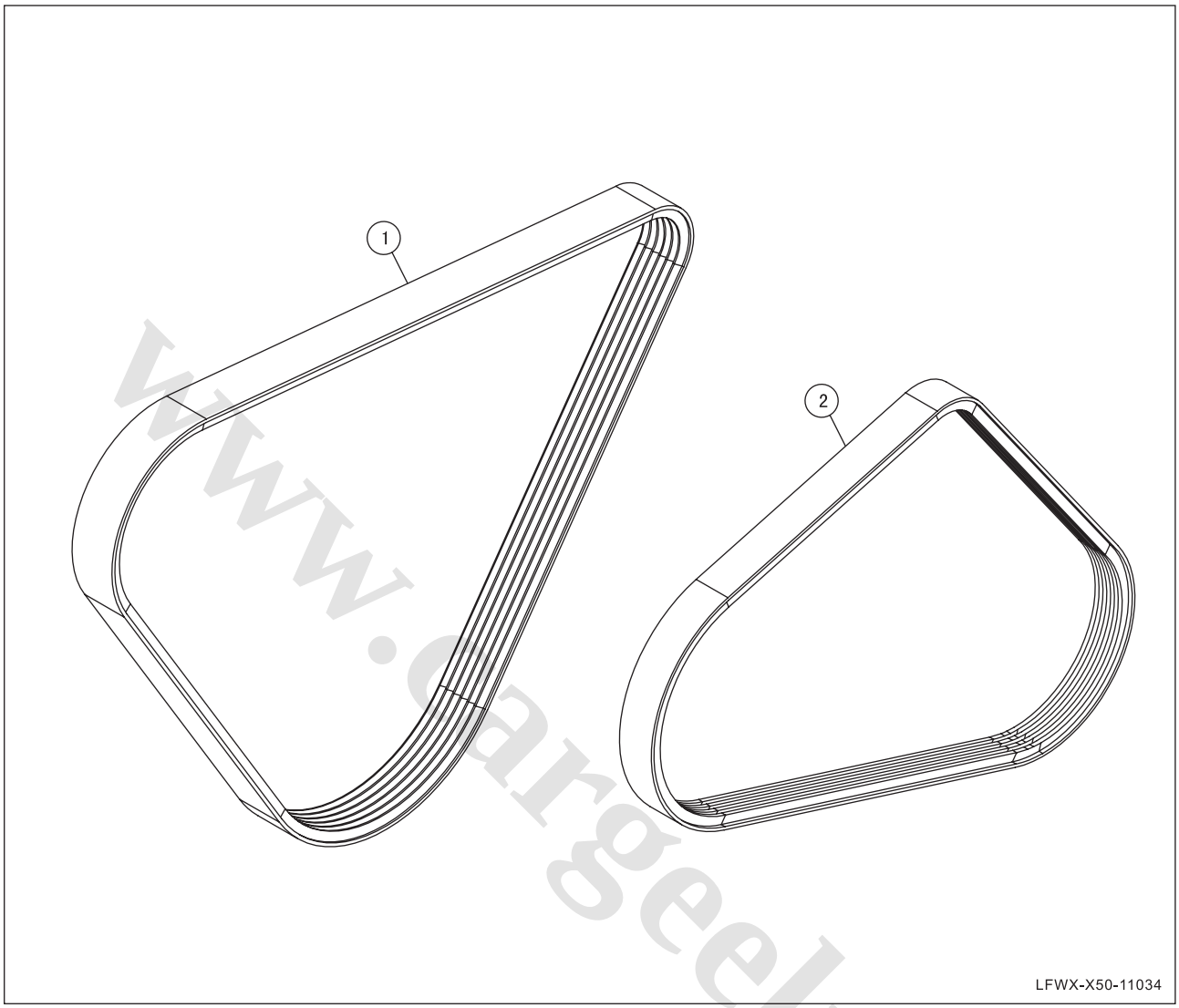
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine and listen to the engine running sound	Diagnosis is over	Engine strange noises	Go to Step 1
1	Check injector	Normal	Faulty	Instruction
	Check the working conditions of the injector	Go to Step 2	Individual or multiple fuel injectors are in poor operation	Replace the injector (see 13 - Fuel System, Fuel Injector, Replacement)
2	Check the piston	Normal	Faulty	Instruction
	Check the working conditions of the piston	Go to Step 3	Piston cylinder scoring	Replace the pistons and cylinder sleeve
3	Verification and check	Normal	Faulty	Instruction
	Start the engine and listen to the engine running sound	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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DRIVE BELT

COMPONENTS



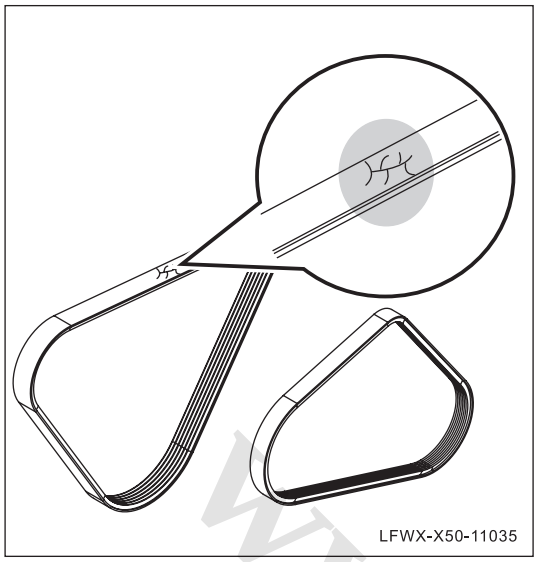
1	Alternator drive belt	2	A/C compressor drive belt

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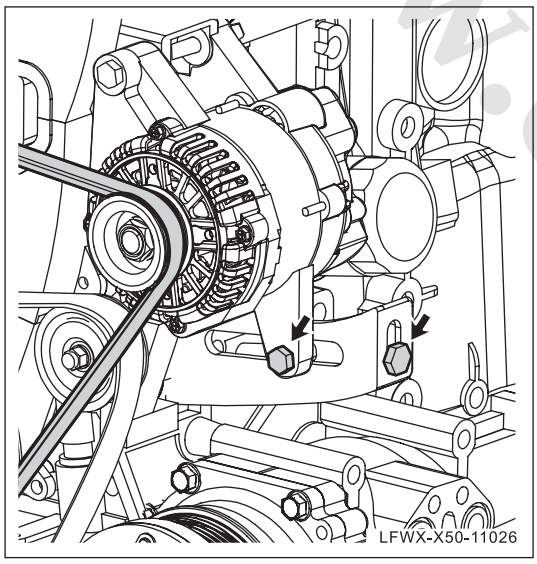
CHECK



1. CHECK DRIVE BELT

(a) Check the drive belt for aging, crack, wear or oil dirt. If there is any, repair the drive belt. If necessary, replace it.

REPLACEMENT



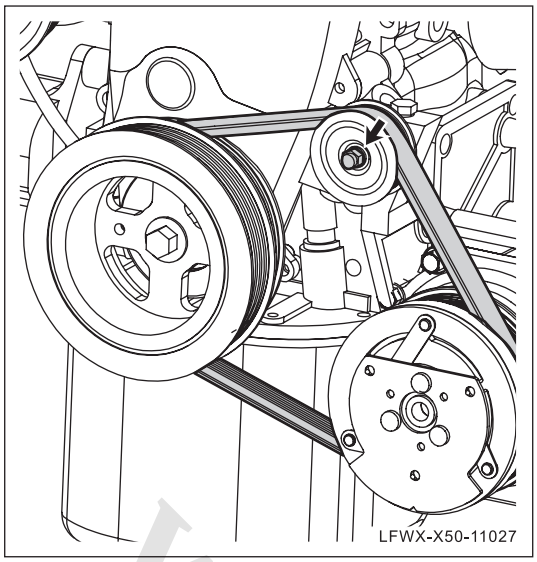
1. REMOVE DRIVE BELT

(a) Unscrew the adjusting bolts of the generator.

(b) Remove the alternator drive belt.

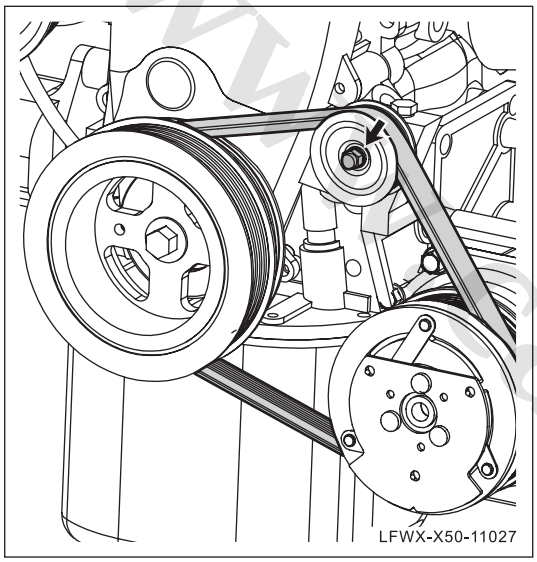
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(c) Unscrew the tensioner tightening bolts.

(d) Remove the A/C compressor drive belt.



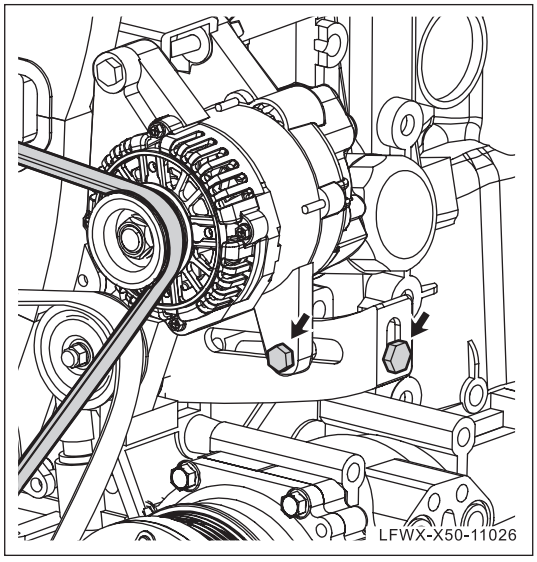
2. INSTALL DRIVE BELT

(a) Install the A/C compressor drive belt, and adjust its tensioner right up until the specified tension.

Torque: 49N•m

△ HINT:

Press it down with 100N force, and belt deflection is 13 - 14mm (new belt is 9 - 10 mm).



(b) Install the alternator drive belt, and adjust the alternator adjusting bolt to make the belt reach the specified tension.

Torque: 25N•m

△ HINT:

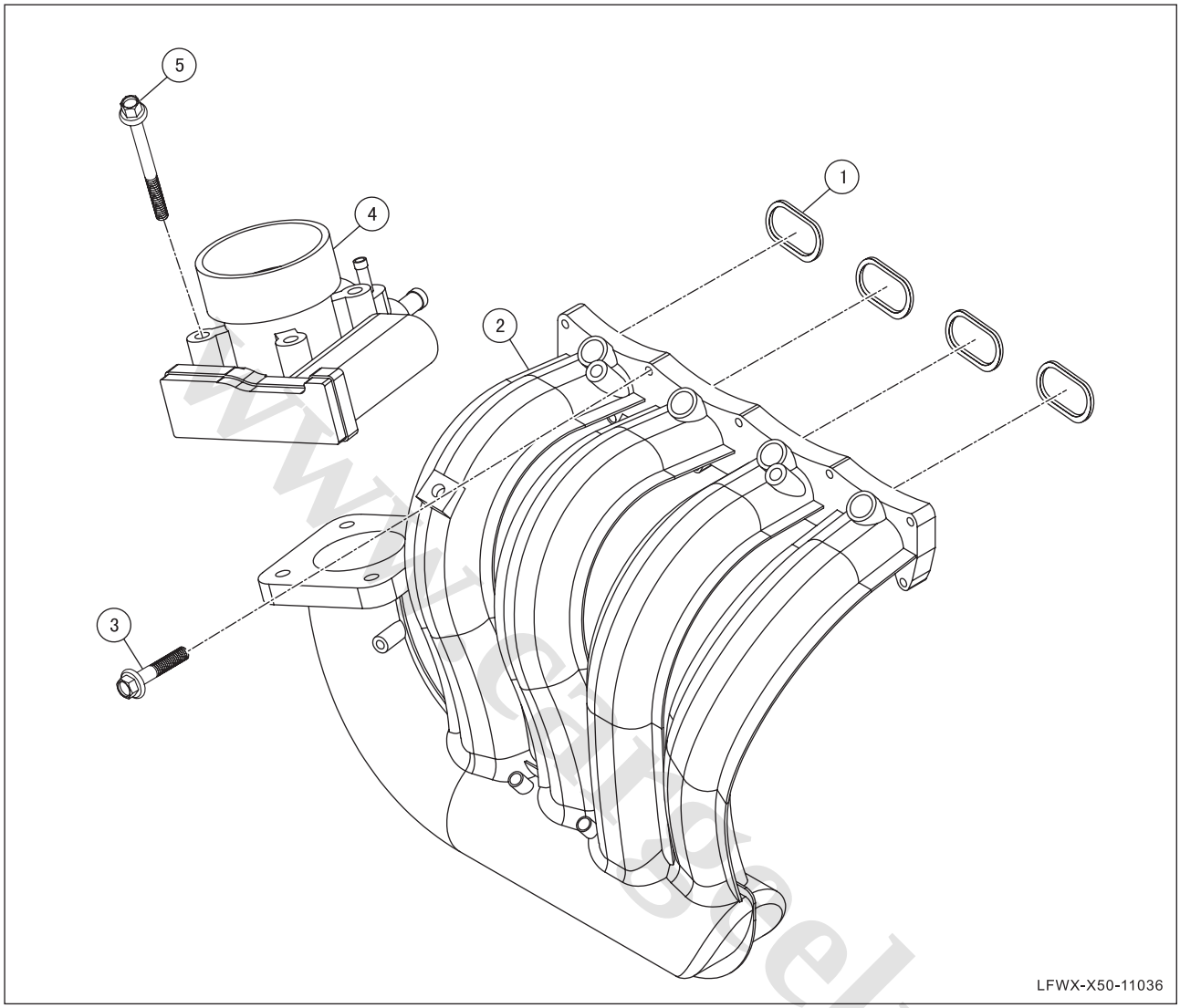
Press it down with 100N force, and belt deflection is 13 - 14mm (new belt is 9 - 10 mm).

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INTAKE MANIFOLD

COMPONENTS



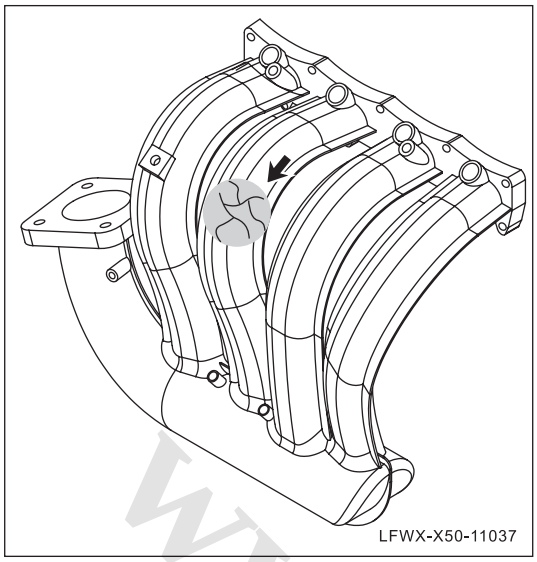
1	Rubber O-ring
2	Intake manifold assembly
3	Bolt

4	Electronic throttle valve assembly
5	Bolt

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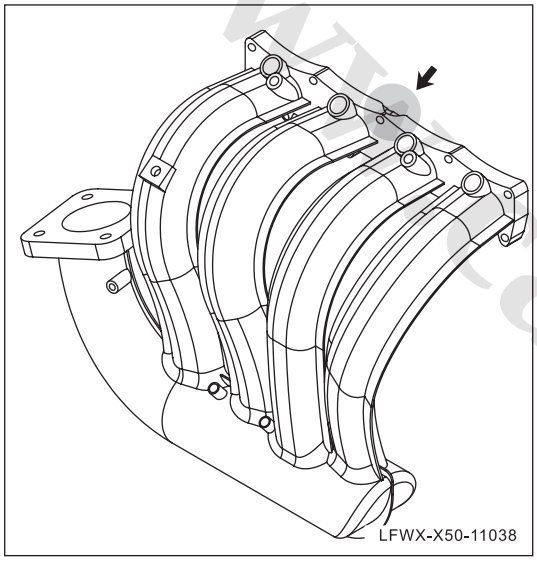
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CHECK



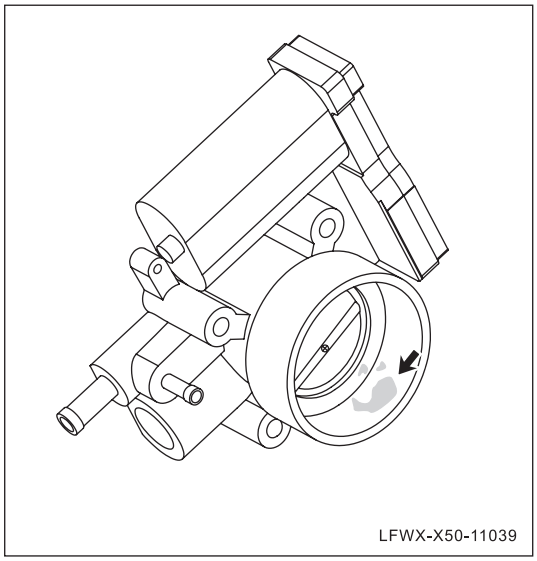
1. CHECK INTAKE MANIFOLD

(a) Check intake manifold for crack or other damage. If any, replace it.



(b) Check if the matching surface of the intake manifold has been deformed. If so, replace it.

(c) Check if the rubber O-ring of the intake manifold has been damaged. If so, replace it.



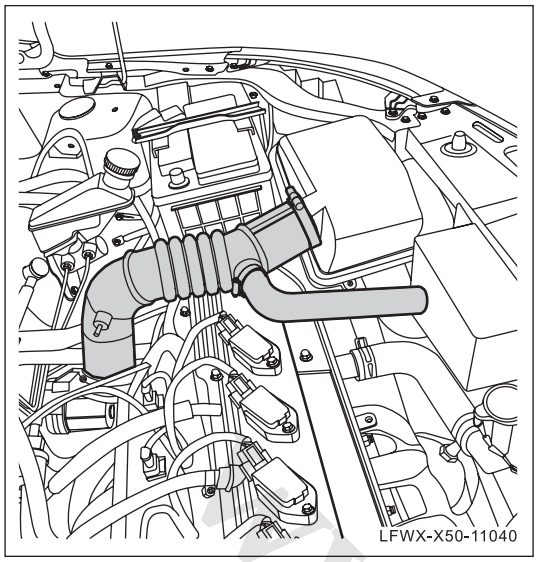
2. INSPECT THROTTLE

(a) Check the throttle body for dirt. If so, clean it.

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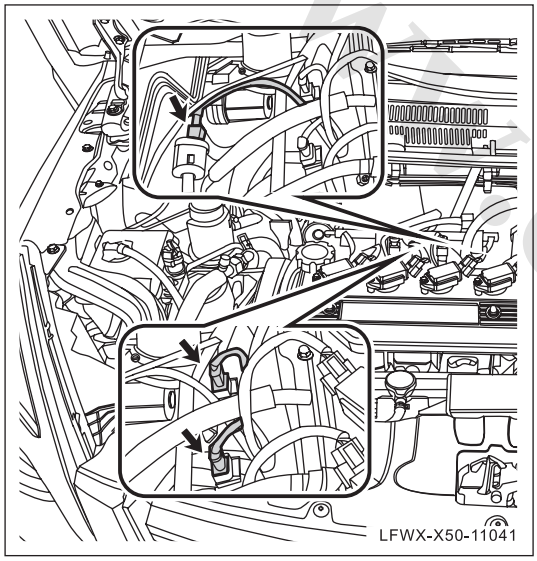
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REPLACEMENT

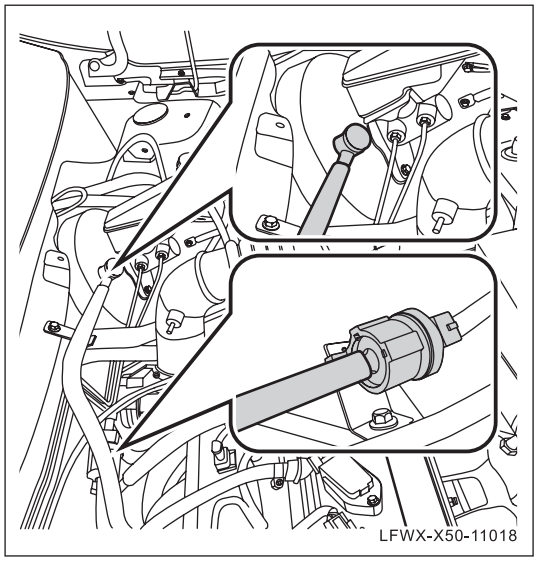


1. REMOVE INTAKE MANIFOLD

(a) Disconnect the throttle connection pipe.



(b) Disconnect the injector and canister solenoid connectors.



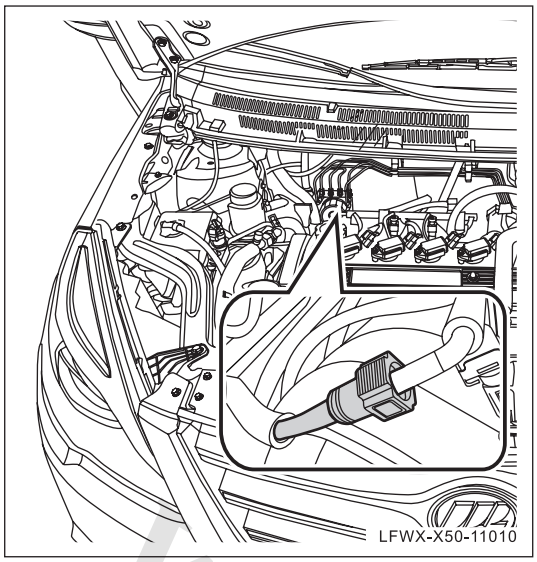
(c) Disconnect the canister solenoid connection pipe.

(d) Disconnect the vacuum booster pump connection pipe.

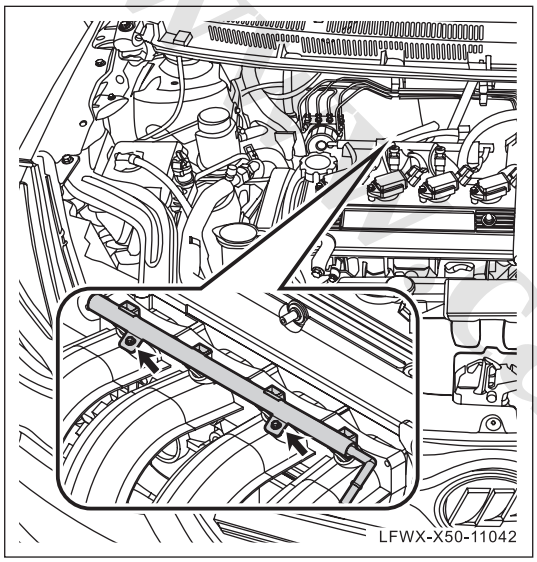
(e) Disconnect the PCV valve connection pipe.

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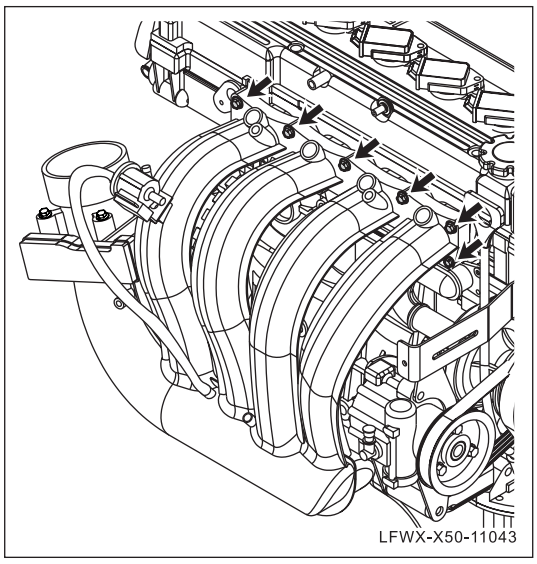


(f) Disconnect the fuel rail connection pipe.



(g) Remove the fuel rail fixing bolts, and then remove the fuel rail.

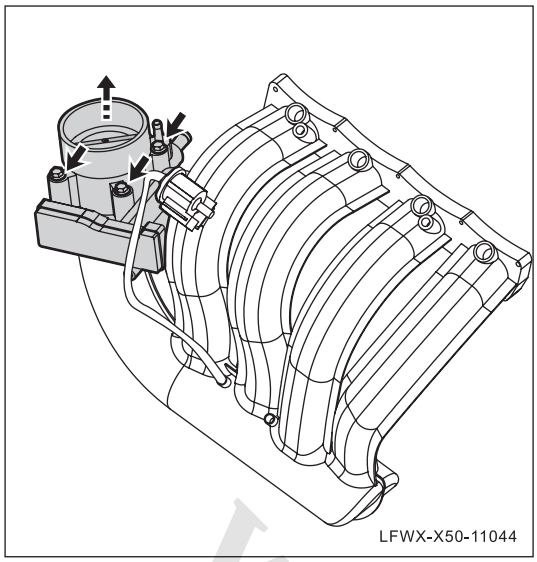
(h) Disconnect the throttle position sensor connector.



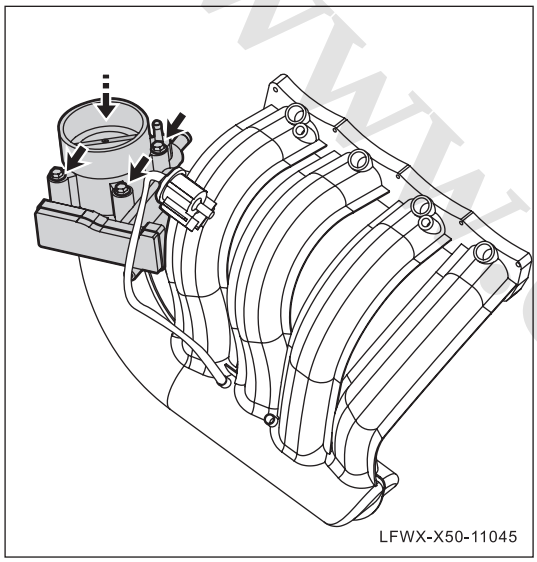
(i) Remove the intake manifold fixing bolts, and then remove the intake manifold.

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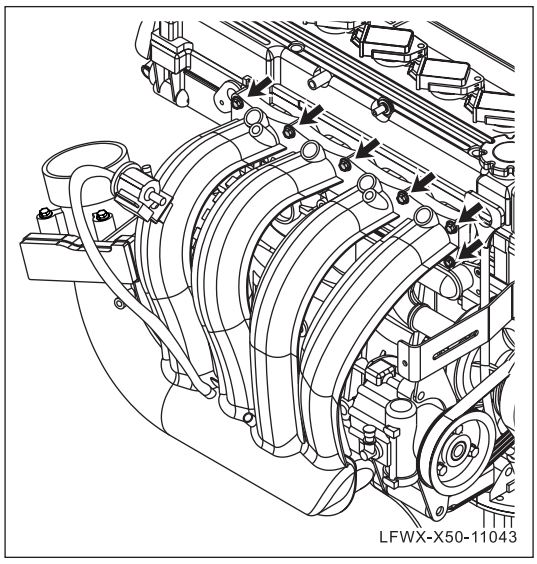
(j) Remove the throttle fixing bolts, and then remove the throttle assembly.



2. INSTALL INTAKE MANIFOLD

(a) Install the throttle assembly, and tighten the throttle fixing bolts.

Torque: 10 - 12N•m

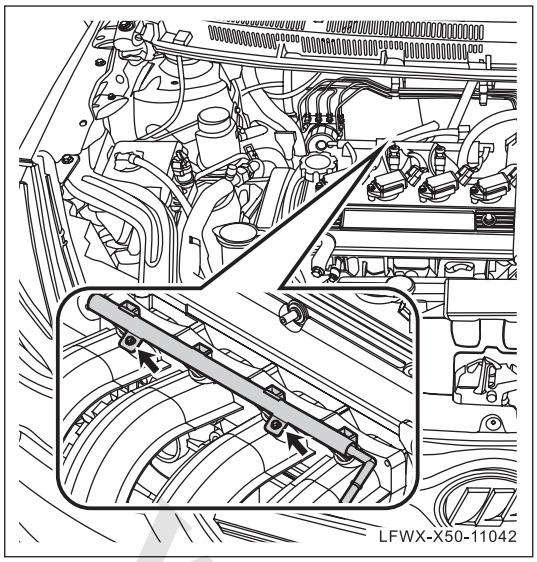


(b) Install intake manifold, and tighten intake manifold fixing bolts.

Torque: 22 - 24N•m

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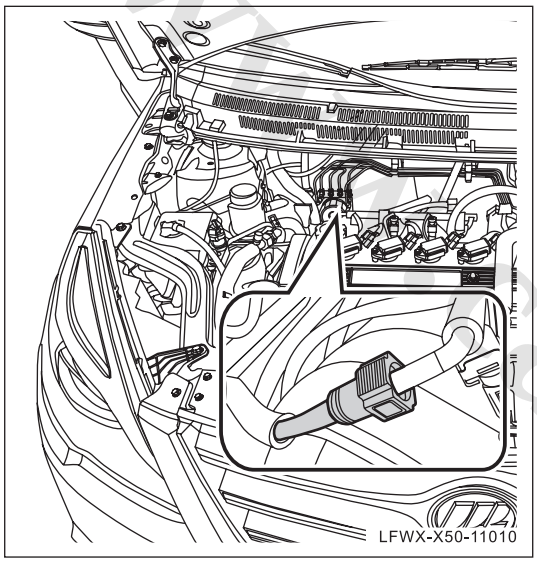
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(c) Connect the throttle position sensor connector.

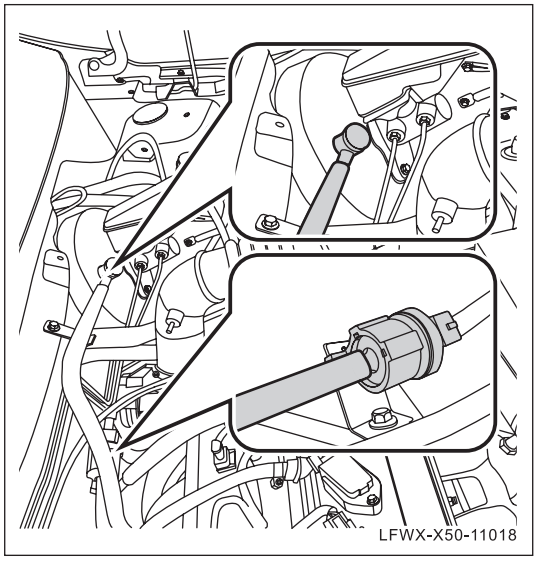
(d) Install the fuel rail, and tighten the fuel rail fixing bolts.

Torque: 25N•m



(e) Connect the fuel rail connection pipe.

(f) Connect the PCV valve connection pipe.

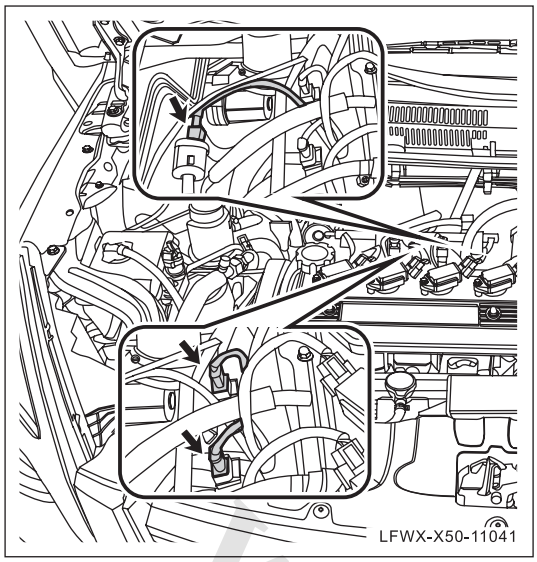


(g) Connect the vacuum booster pump connection pipe.

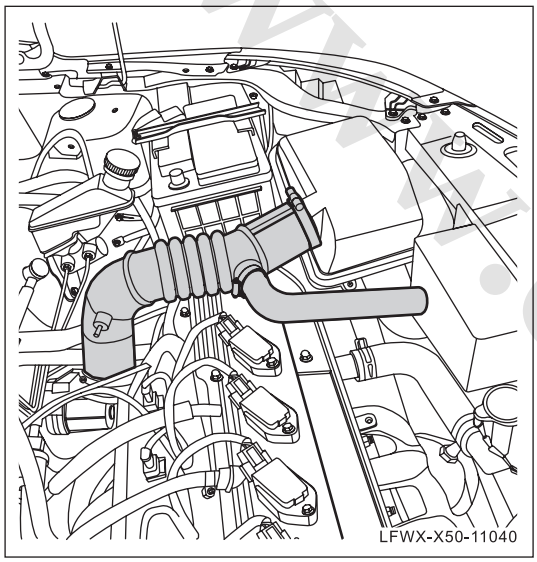
(h) Connect the canister solenoid connection pipe.

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(i) Connect the injector and canister solenoid connectors.



(j) Connect the throttle connection pipe.

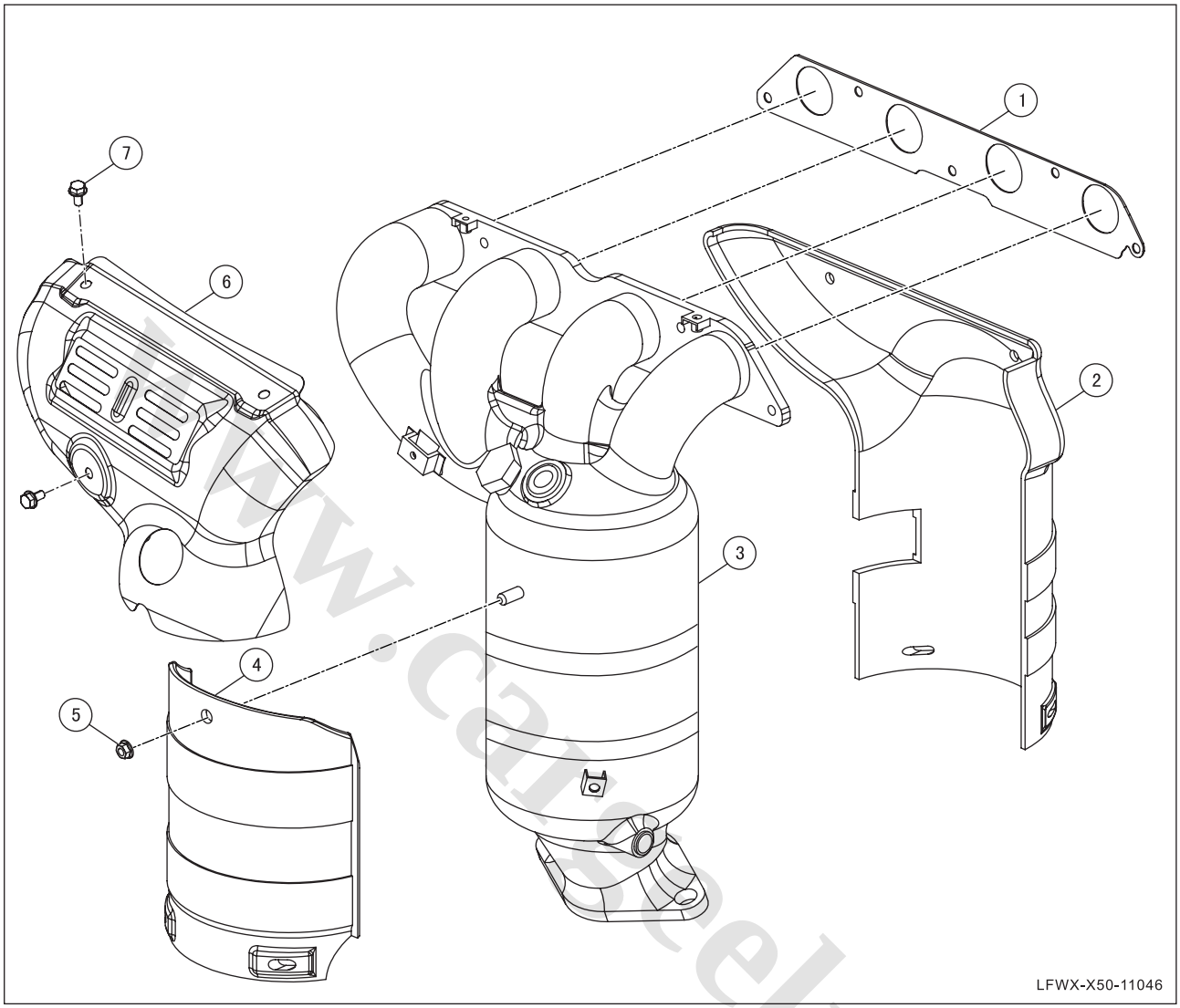
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EXHAUST MANIFOLD

COMPONENTS



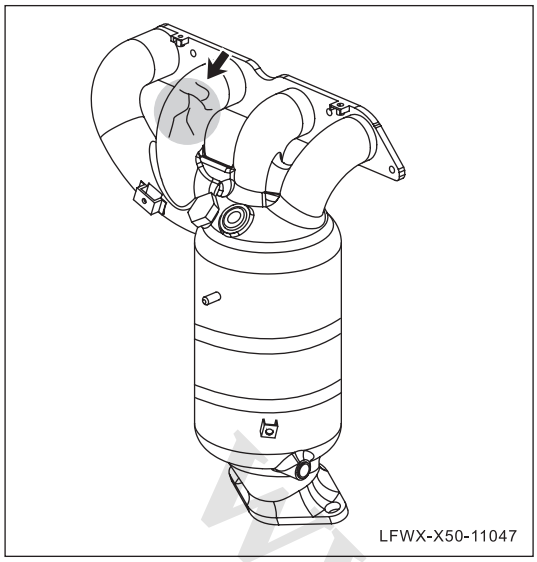
1	Exhaust manifold pad
2	Exhaust manifold rear heat shield
3	Exhaust manifold assembly
4	Exhaust manifold front heat shield

5	Nut
6	Upper heat insulator of exhaust manifold
7	Bolt

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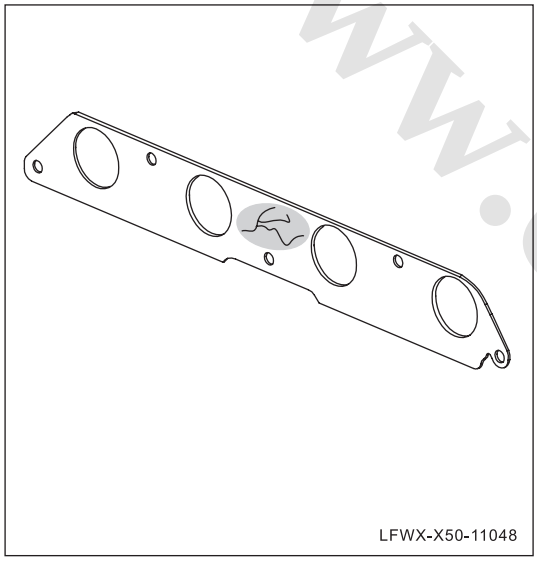
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CHECK



1. CHECK EXHAUST MANIFOLD

(a) Check exhaust manifold for crack or other damage. If any, replace it.



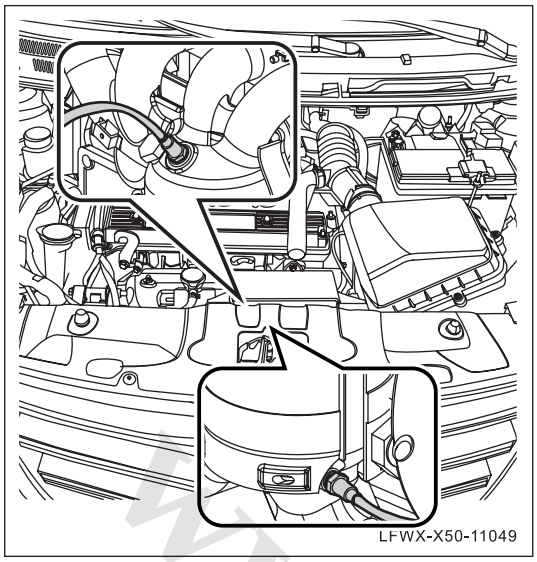
(b) Check exhaust manifold pad for crack or other damage. If any, replace it.

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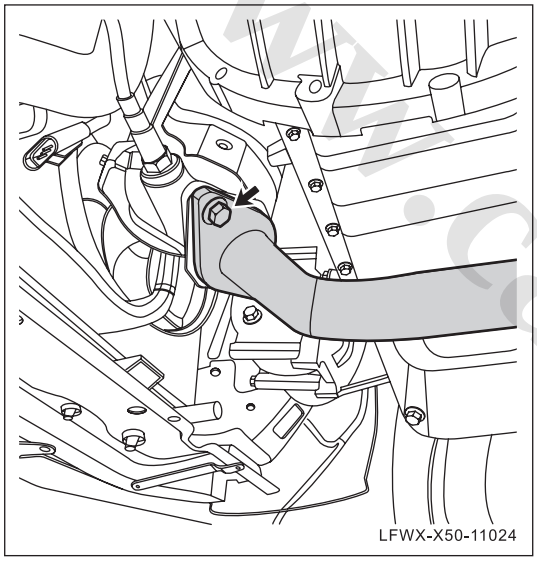
REPLACEMENT



1. REMOVE EXHAUST MANIFOLD

(a) Disconnect front oxygen sensor.

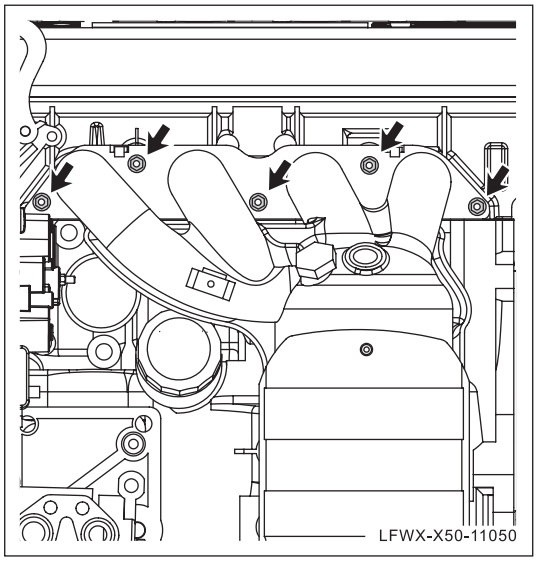
(b) Disconnect rear oxygen sensor.



(c) Disconnect the connecting bolts between the exhaust manifold and the front exhaust pipe.

△ HINT:

Use a rope to fasten the front exhaust pipe instead of removing it.

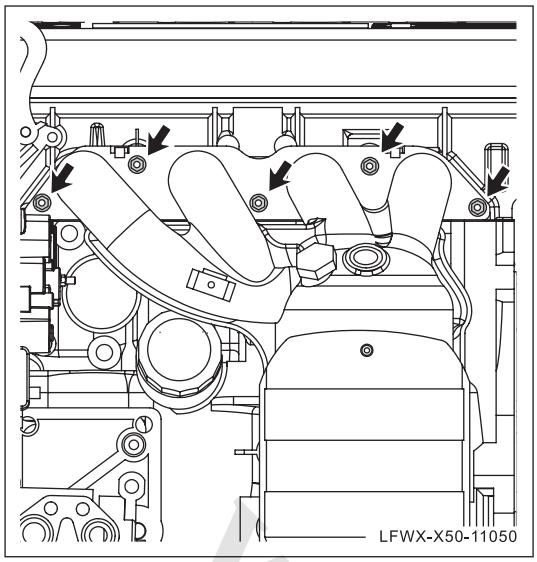


(d) Remove the upper heat shield of the exhaust manifold, and remove the upper heat shield of the exhaust manifold.

(e) Remove the fixing bolts connecting the exhaust manifold and the engine, and remove the exhaust manifold and the pad.

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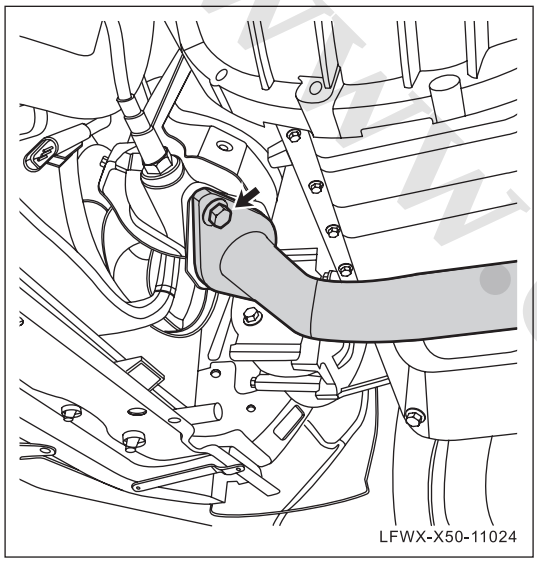
2. INSTALL EXHAUST MANIFOLD.

(a) Install exhaust manifold gasket.

(b) Install the exhaust manifold to the engine, and tighten its retaining nuts.

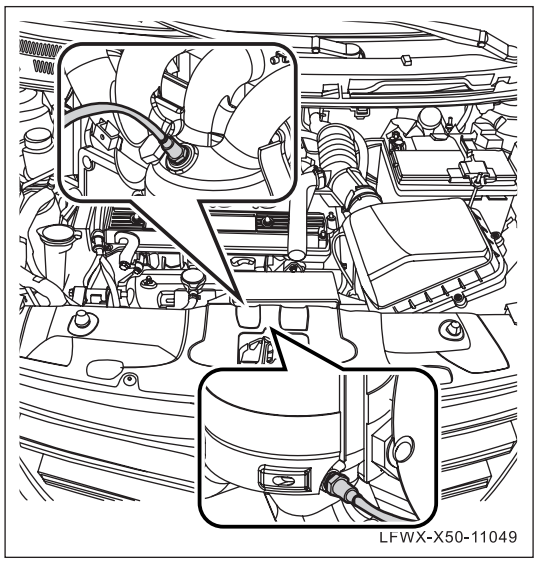
Torque: 32 - 34N•m

(c) Install the exhaust manifold upper heat shield on the exhaust manifold, fix the fixing bolts and then screw them up.



(d) Connect the exhaust manifold with the front exhaust pipe, and tighten their connecting bolts.

Torque: 49N•m



(e) Connect front oxygen sensor connector.

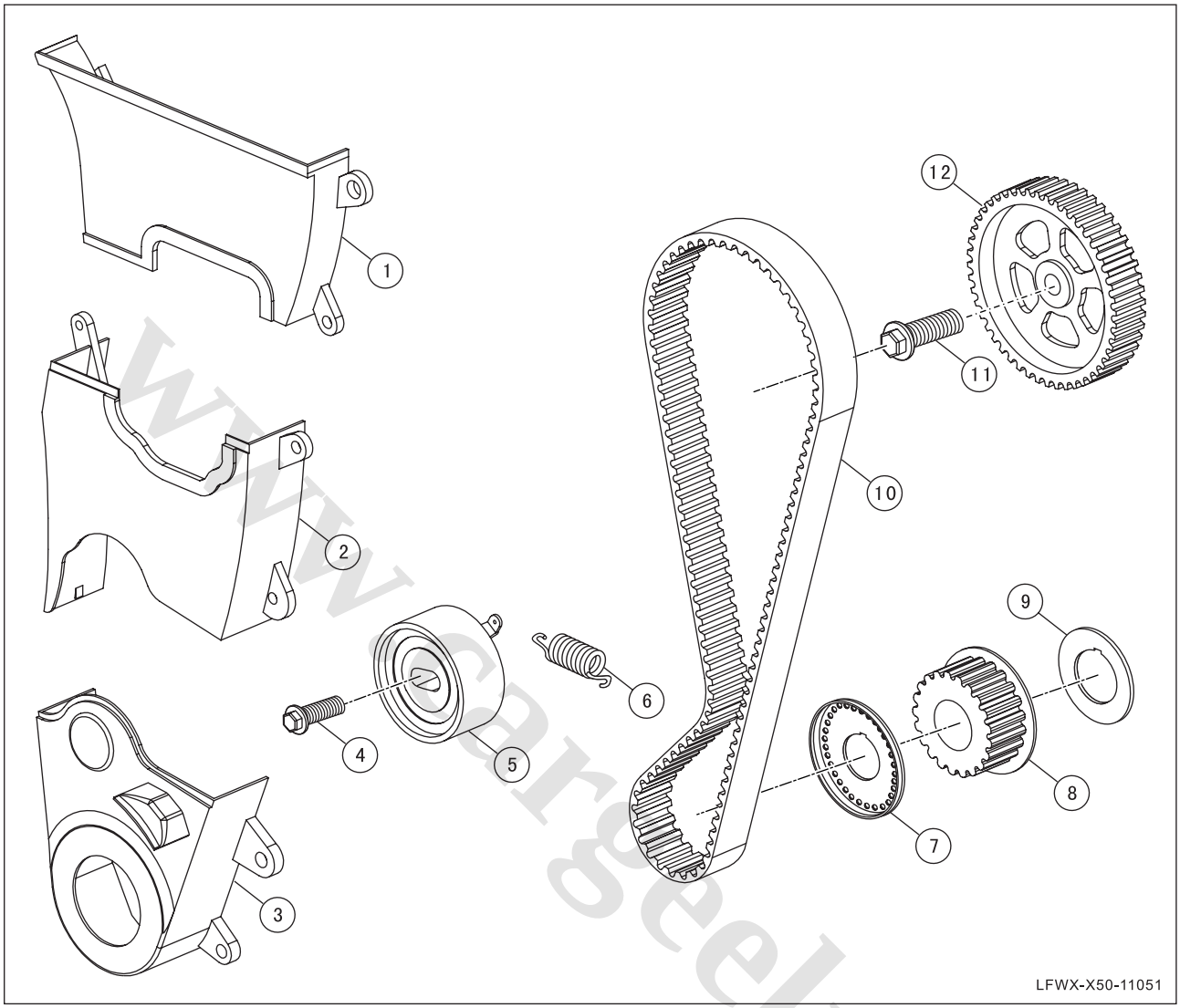
(f) Connect rear oxygen sensor connector.

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TIMING PULLEY MECHANISM

COMPONENTS



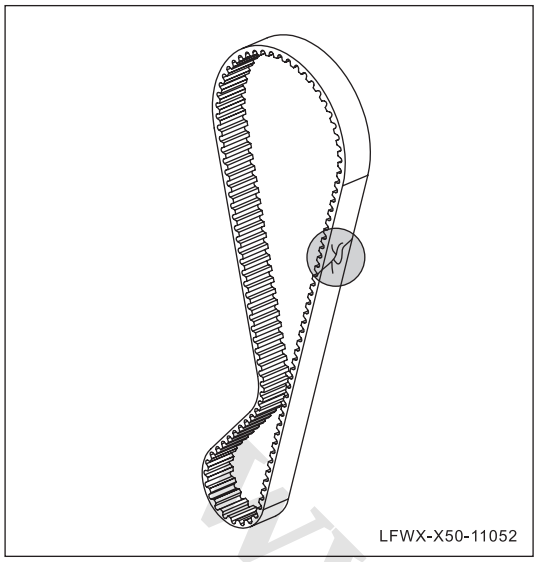
1	Timing mechanism upper cover
2	Timing mechanism intermediate cover
3	Timing mechanism lower cover
4	Bolt
5	Tensioner
6	Tension spring

7	Front catch of crankshaft timing pulley
8	Crankshaft timing pulley
9	Rear catch of crankshaft timing pulley
10	Timing belt
11	Bolt
12	Camshaft timing pulley

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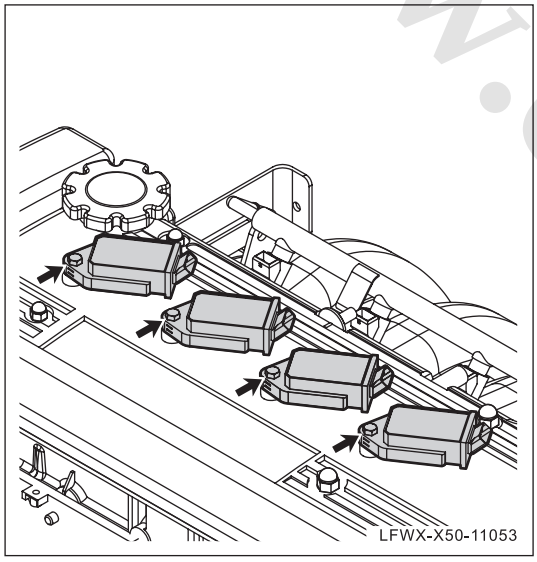
CHECK



1. CHECK TIMING BELT

(a) Check the timing belt for damage. If any, replace it.

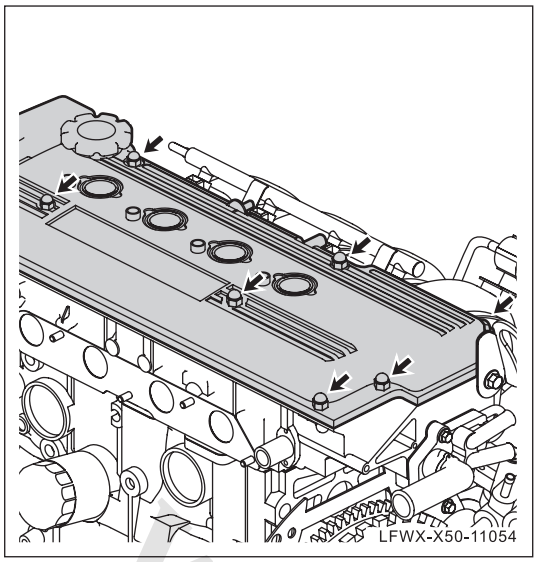
REPLACEMENT



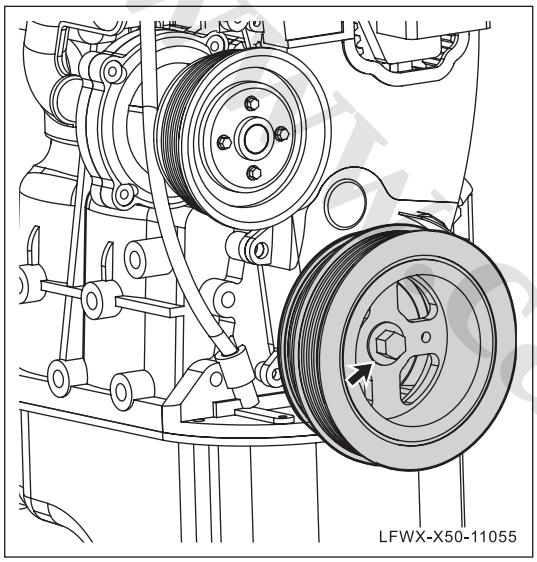
(a) Remove the engine high-voltage ignition coil and spark plug.

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(b) Remove the fixing nuts of the engine cylinder-head cover, and then remove the engine cylinder-head cover.

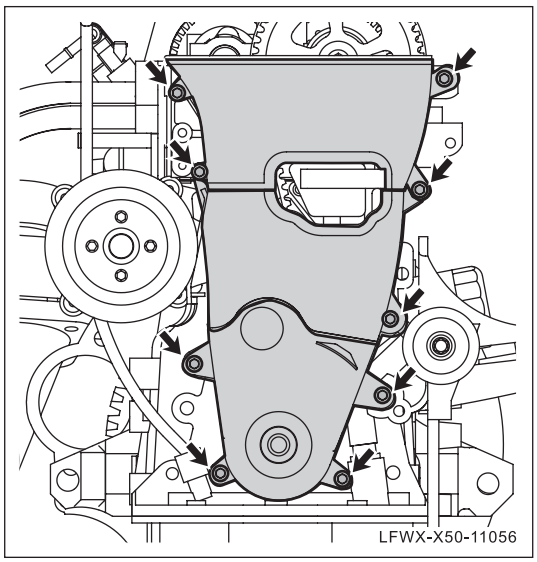


(c) Remove the fixing bolts of the engine crankshaft pulley.

(d) Remove the engine crankshaft pulley.

△ HINT:

Remove it with the puller.



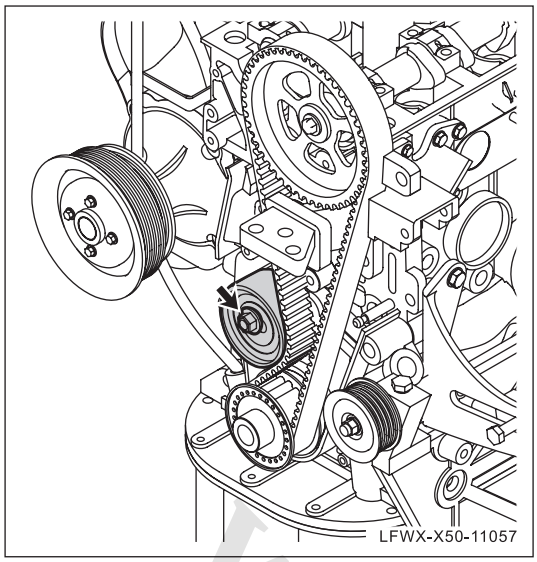
(e) Remove the fixing bolts of the timing pulley upper cover, and then remove the upper cover.

(f) Remove the fixing bolts of the timing pulley intermediate cover, and then remove the intermediate cover.

(g) Remove the fixing bolts of the timing pulley lower cover, and then remove the lower cover.

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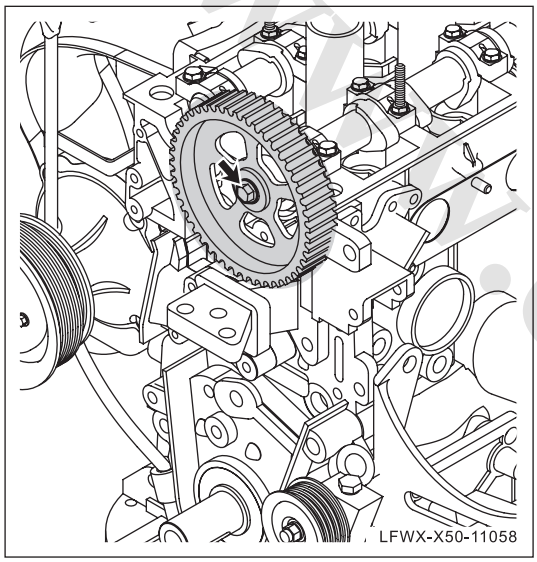


(h) Remove the fixing bolts of the timing belt tensioner, and then remove the timing belt tensioner.

NOTICE:

To prevent the rotation of camshaft or crankshaft from damaging the valve tappet or other components after removing the timing belt, be sure to rotate the crankshaft to allow all pistons to be at top dead center or bottom dead center before removing.

(i) Remove the timing belt.

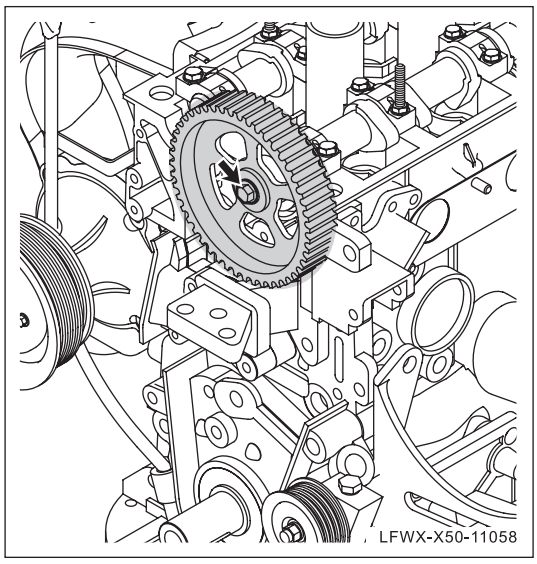


(j) Remove the crankshaft timing pulley.

(k) Remove the fixing bolts of camshaft timing pulley, and then remove the camshaft timing pulley.

△ HINT:

When removing the fixing bolts of the camshaft timing pulley, fix the hexagon position of the camshaft with an adjustable wrench.



2. INSTALL TIMING PULLEY MECHANISM

(a) Install the camshaft timing pulley and tighten its bolts.

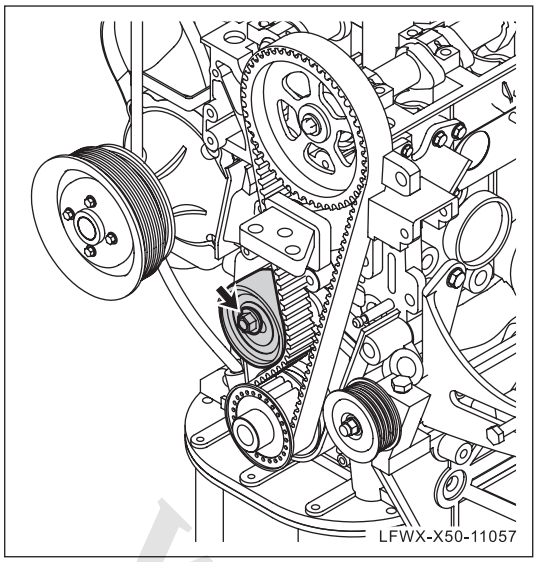
△ HINT:

When installing the fixing bolts of the camshaft timing pulley, fix the hexagon position of the camshaft with an adjustable wrench.

(b) Install the crankshaft timing pulley.

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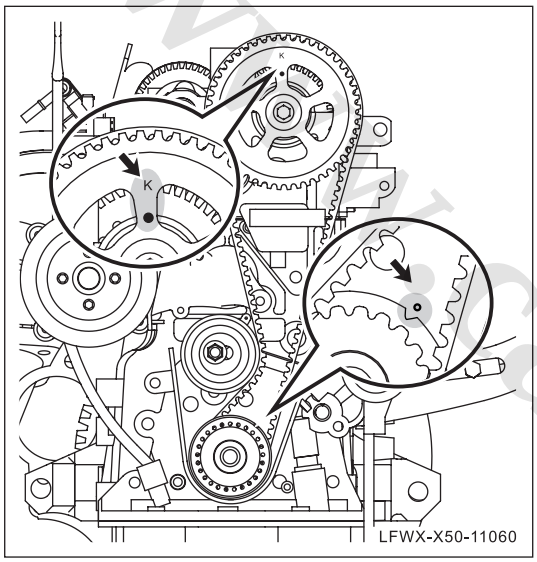
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(c) Install the timing belt tensioner.

△ HINT:

Install the timing belt tensioner, while do not fasten the fixing bolts; screw them up until the timing belt is installed properly.

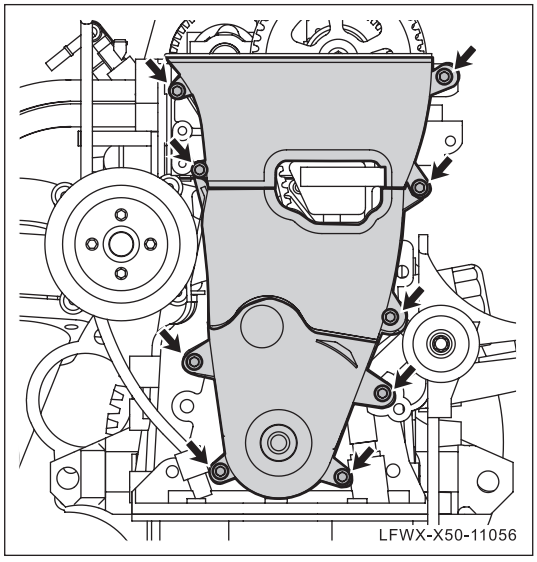


(d) Install the timing belt.

NOTICE:

- **As shown in the figure, be sure to install the timing belt according to the timing mark.**
- **The outside surface of the timing belt is marked with an arrow shape, be sure to make the arrow point to the clockwise direction when installing.**

(e) Adjust the belt tension and tighten the fixing bolts of the tensioner.



(f) Install the timing belt lower cover and tighten its bolts.

Torque: 10N•m

(g) Install the timing belt intermediate cover and tighten its bolts.

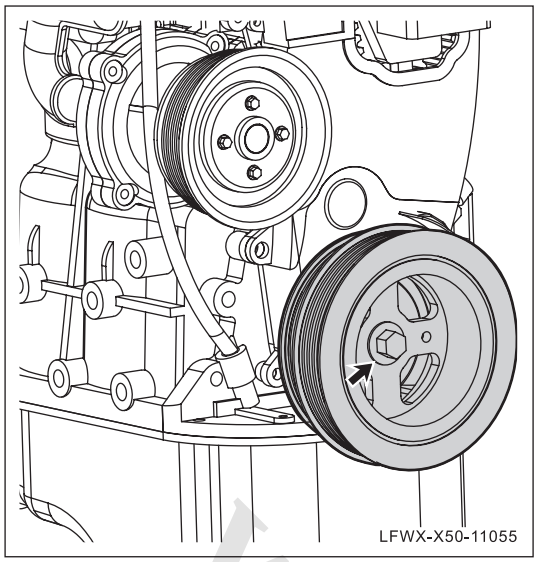
Torque: 10N•m

(h) Install the timing belt upper cover and tighten its bolts.

Torque: 10N•m

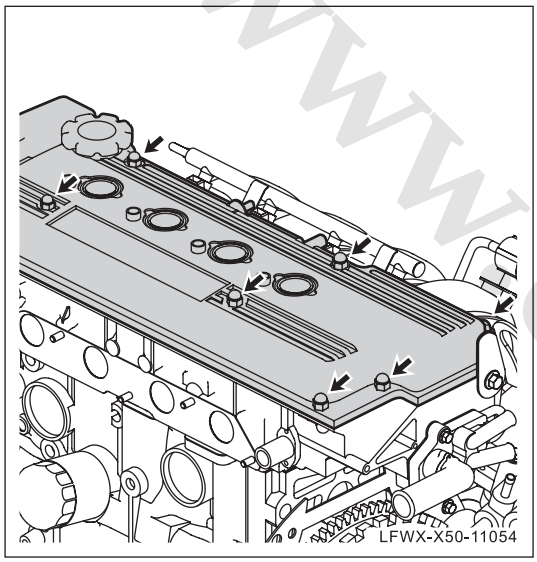
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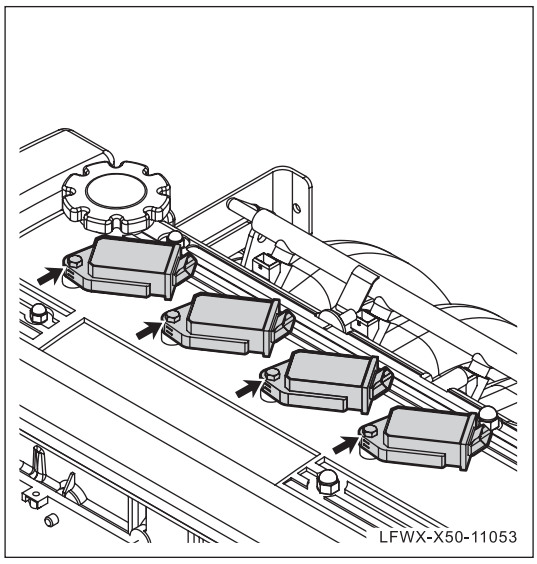
(i) Install the engine crankshaft pulley and tighten its bolts.

Torque: 145N•m



(j) Install the fixing nuts of the engine cylinder head cover and then screw them up.

Torque: 12N•m



(k) Install spark plug.

Torque: 28N•m

(l) Install the engine high-voltage ignition coil.

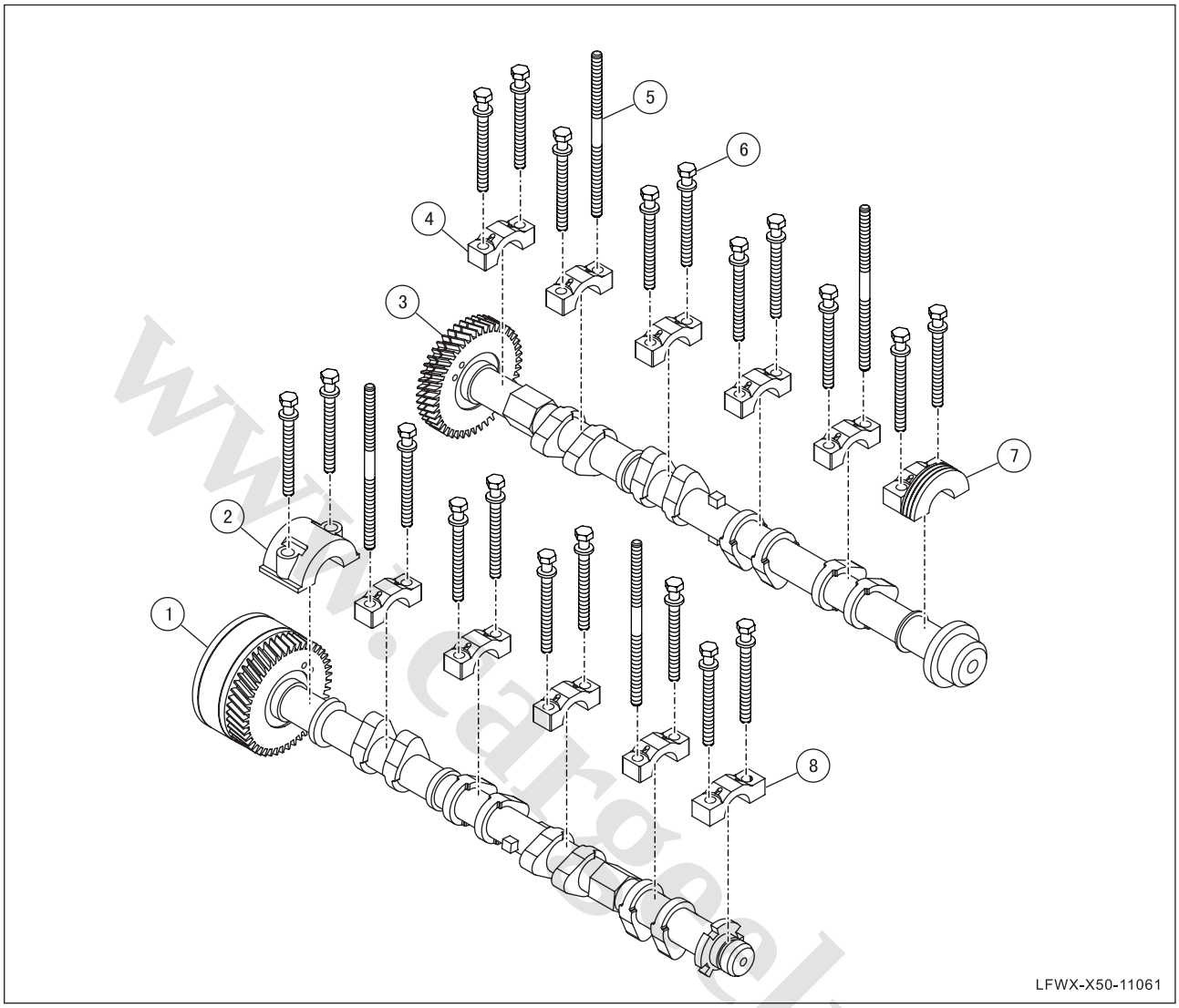
Torque: 12N•m

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CAMSHAFT

COMPONENTS

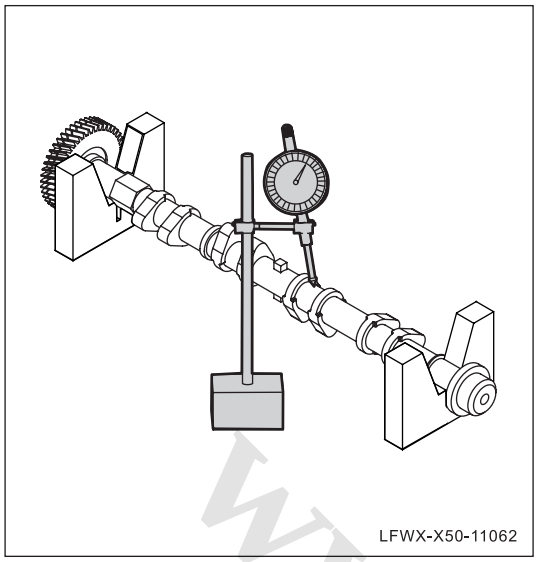


1	Intake camshaft	5	Stud bolt
2	No. 6 intake camshaft bearing cap	6	Bolt
3	Exhaust camshaft	7	No. 1 exhaust camshaft bearing cap
4	Exhaust camshaft bearing cap	8	Intake camshaft bearing cap

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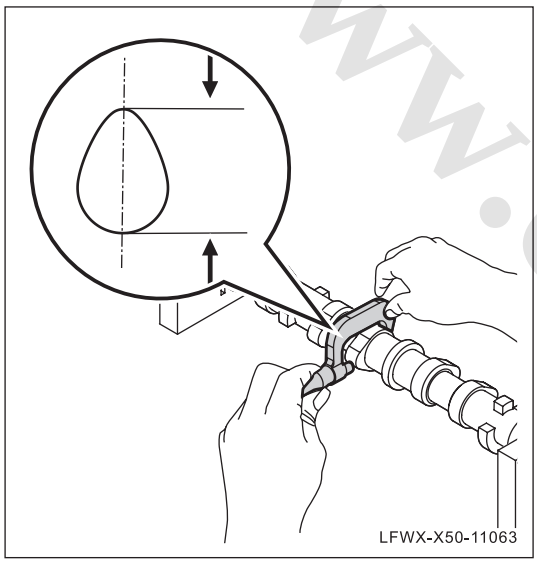
CHECK



1. CHECK CAMSHAFT RADIAL RUN-OUT

(a) Place the camshaft on a V block, measure its circumference radial run-out at intermediate journal with a dial guage. If radial run-out is larger than the maximum value, replace the camshaft.

Maximum value: 0.03mm

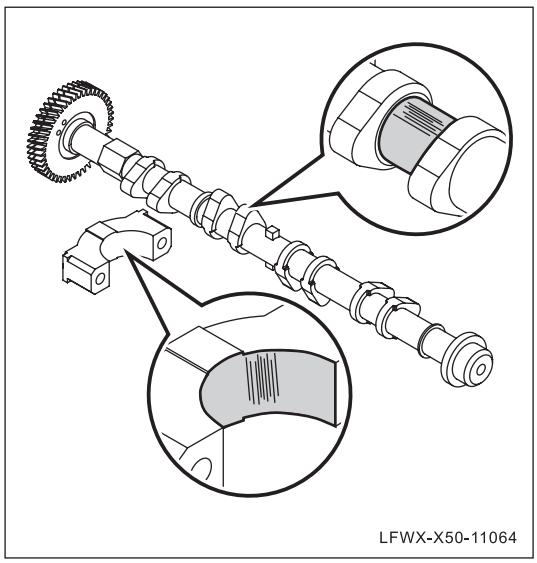


2. MEASURE MAXIMUM HEIGHT OF INTAKE/EXHAUST CAMSHAFT CAM

(a) As shown in the figure, measure the maximum height of the intake/exhaust cam with a screw micrometer If it does not conform to the specification, replace it.

Intake: 43.338 - 44.418mm

Exhaust: 43.73 - 43.81mm

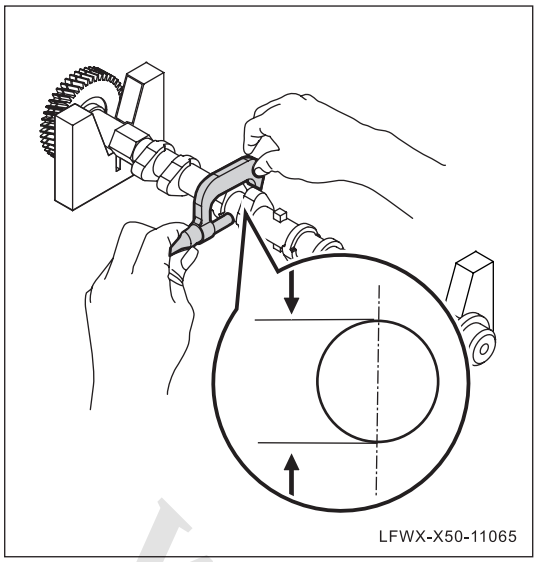


3. CHECK CAMSHAFT JOURNAL

(a) Check the camshaft journal and bearing cap for rust, wear or other damage. If any, replace it. If necessary, replace the cylinder head.

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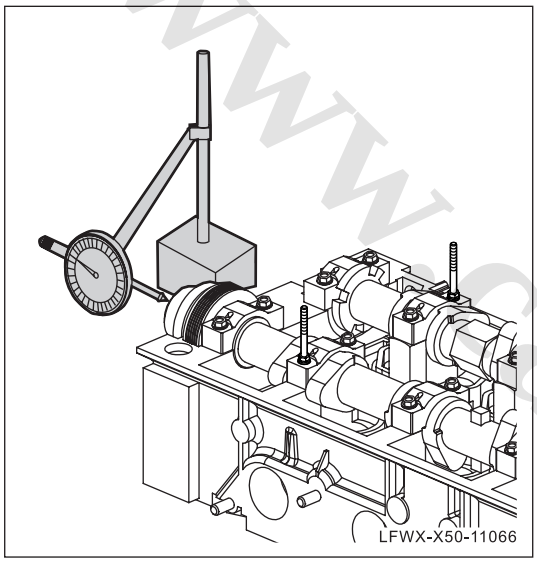
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(b) Measure the camshaft journal with a screw micrometer. If it does not conform to the specification, check oil-film clearance.

No. 6 exhaust: 24.955 - 24.965mm

Others: 22.949 - 22.965 mm



4. CHECK CAMSHAFT AXIAL CLEARANCE

(a) Install intake/exhaust camshaft on cylinder head.

(b) Make the camshaft in alternate motion, and measure the axial clearance of camshaft. If it is inconsistent with the specified value, replace the camshaft. If necessary, replace the cylinder head.

Standard axial clearance: 0.03 - 0.085mm (intake)

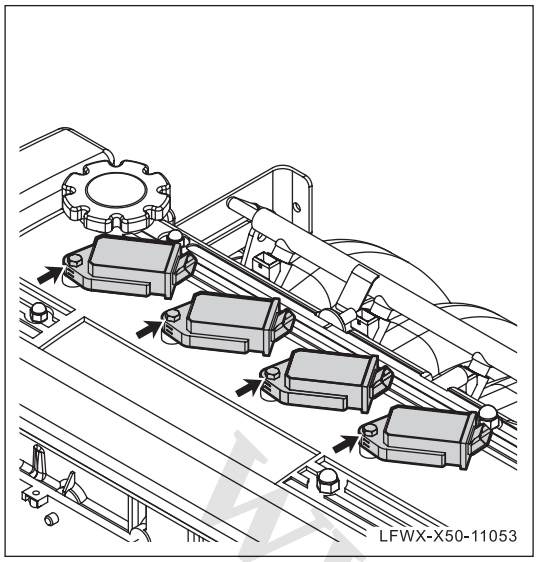
0.035 - 0.09mm (intake)

Maximum axial clearance: 0.1mm

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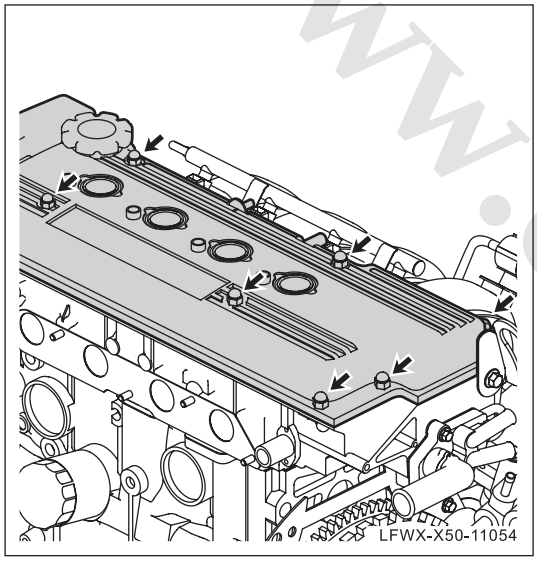
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REPLACEMENT

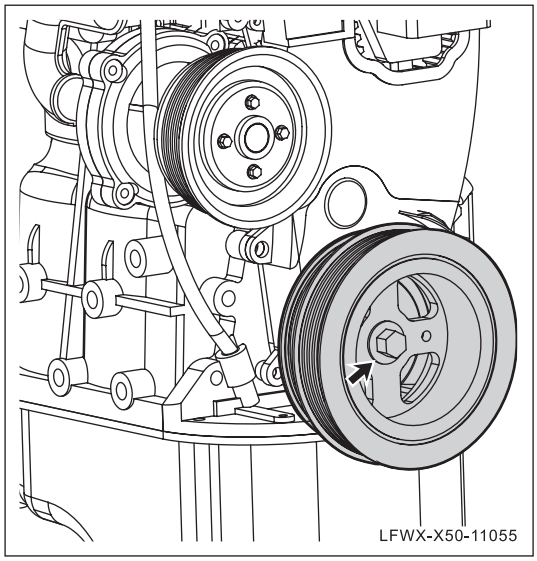


1. REMOVE CAMSHAFT ASSEMBLY

(a) Remove the engine high-voltage ignition coils and spark plugs, and then take out all the high-voltage ignition coils and spark plugs in turn.



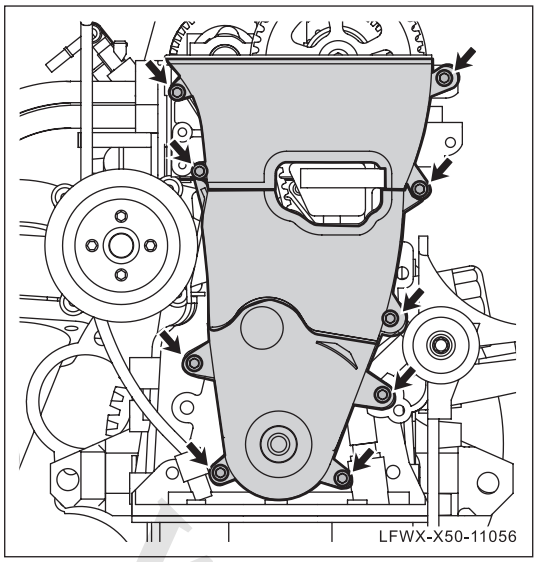
(b) Remove fixing nut of cylinder head, and remove cylinder head cover.



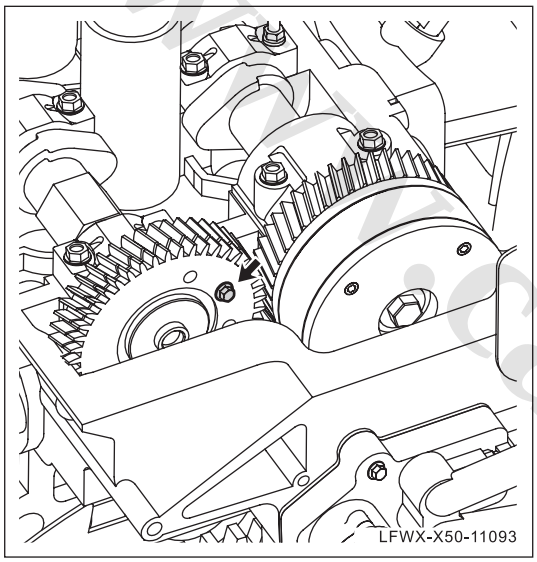
(c) Remove the fixing bolts of the crankshaft pulley, and then remove the engine crankshaft pulley.

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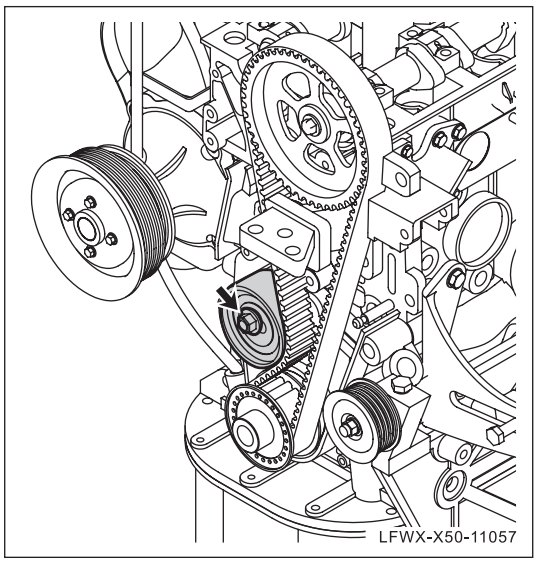
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(d) Remove the timing pulley mechanism assembly.



(e) Install an M6 bolt in the mounting hole on the end of the gap-reducing gear to prevent the gear from rotating and causing installation difficulty.



(f) Remove the fixing bolts of the intake/exhaust camshaft gland, and then remove the intake/exhaust camshaft gland.

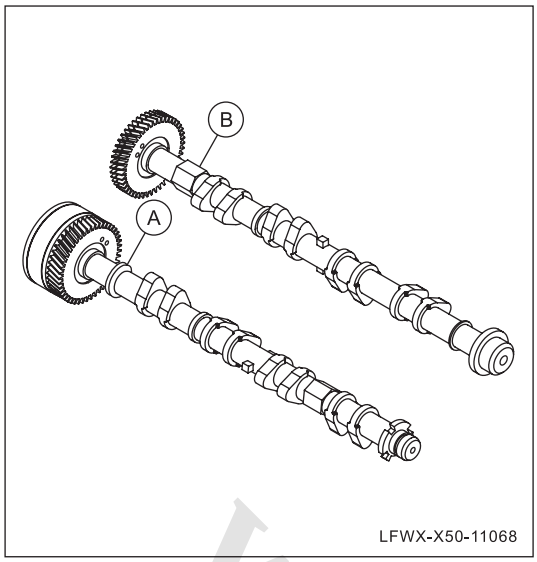
NOTICE:

- **Remove the fixing bolts of the camshaft bearing cap in pair.**
- **Put the removed camshaft bearing caps in order. Be careful to distinguish the intake/exhaust camshaft bearing caps, exhaust camshaft bearing cap.**

(g) Remove intake and exhaust camshafts.

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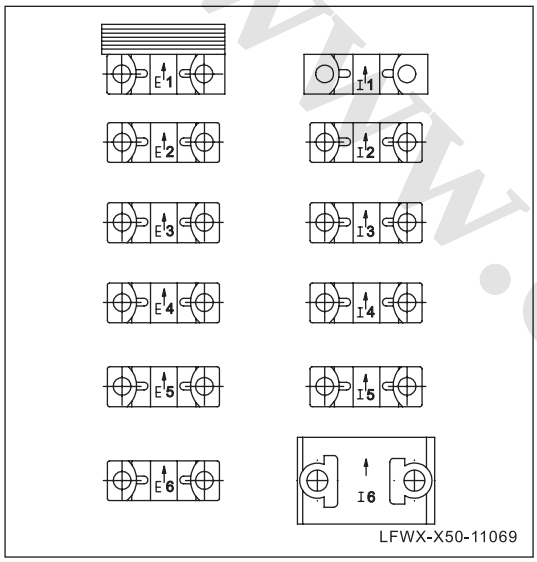


2. INSTALL CAMSHAFT ASSEMBLY

(a) Install intake and exhaust camshafts on the the cylinder head.

NOTICE:

- **Distinguish the intake/exhaust camshaft (A: Intake camshaft, B: Exhaust camshaft)**
- **Rotate the crankshaft before installing the camshaft to make the four piston-connecting-rods at the same horizontal position, so as to avoid that the valve will hit the piston when installing the camshaft.**

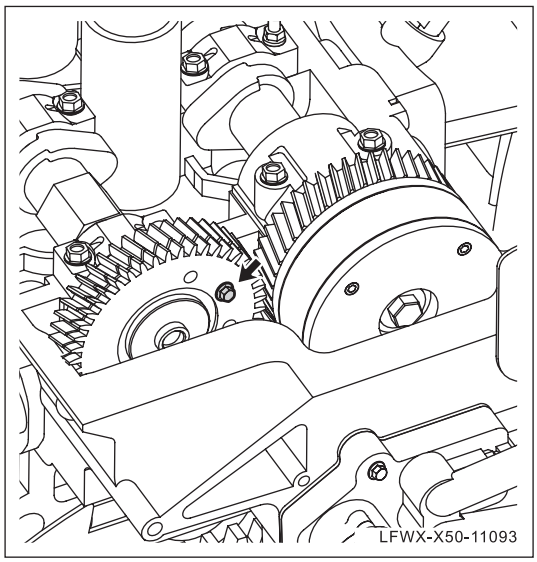


(b) Install the intake/exhaust camshaft bearing caps, and tighten their fixing bolts.

Torque: 25 N•m

NOTICE:

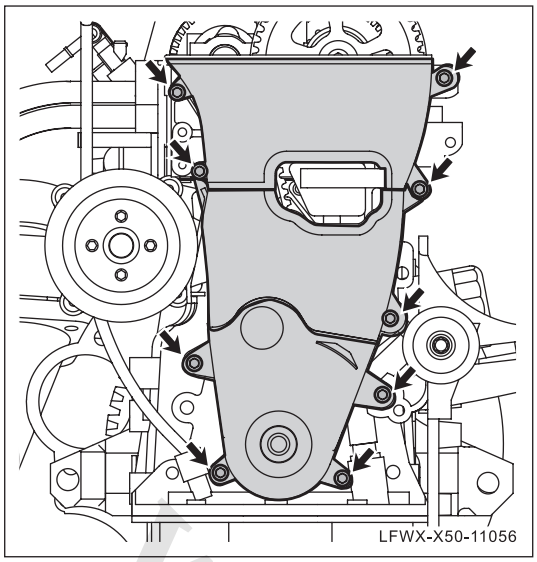
- **Be careful to distinguish the sequencing of the intake/exhaust camshaft bearing caps. Don't confuse their installation.**
- **Apply a layer of lubricant on the bearing cap and the installation position of the bearing cap.**
- **When tightening the fixing bolts of the camshaft bearing cap, be sure to tighten them several times.**
- **After tightening the bolt of the camshaft bearing caps, make sure that the camshafts will rotate smoothly without seizure.**



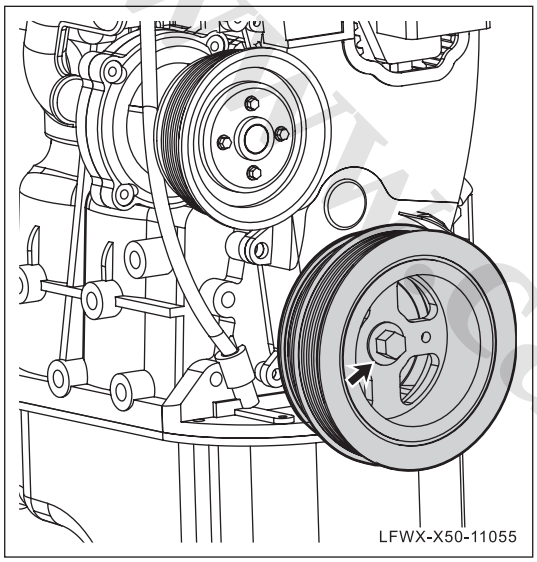
(c) Remove the fixing bolt in the mounting hole at the end of the gap-reducing gear.

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(d) Install the timing pulley mechanism assembly.

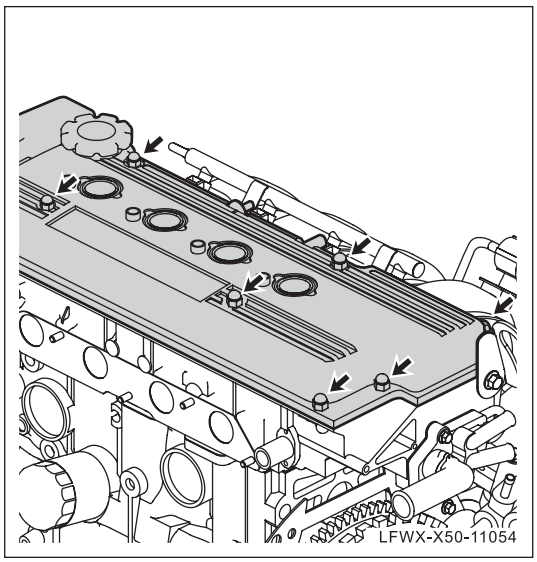


(e) Install the crankshaft pulley, and tighten its fixing bolts.

Torque: 145N•m

△ HINT:

When installing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.

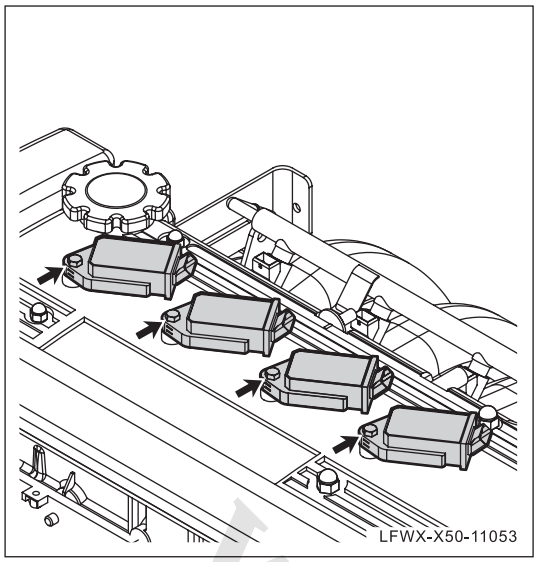


(f) Install the engine cylinder-head cover, and tighten its fixing bolts and nuts.

Torque: 12N•m

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(g) Install the spark plug and high-voltage ignition coil.

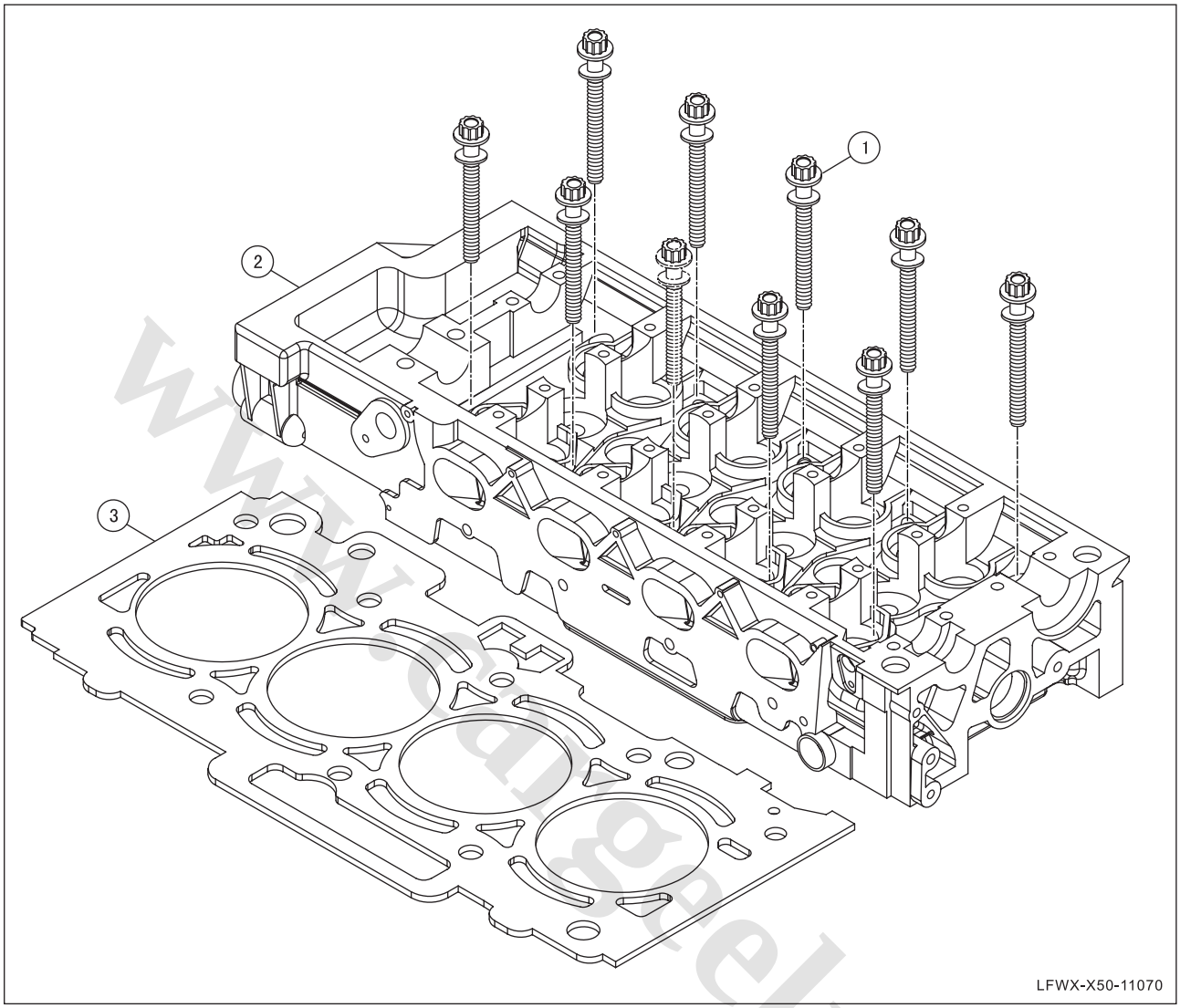
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CYLINDER HEAD

COMPONENTS



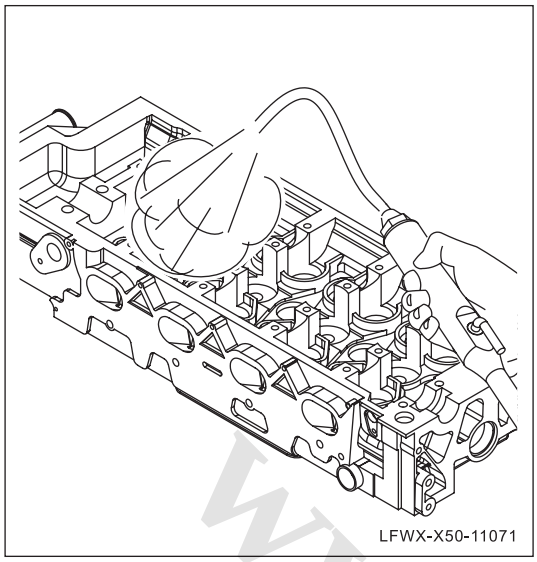
1	Cylinder head fixing bolt
2	Cylinder head assembly

3	Cylinder head gasket

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CHECK



1. CLEAN CYLINDER HEAD

(a) Clean the sealant and engine oil on the cylinder head.

(b) Clean the carbon deposits inside the cylinder head combustion chamber.

NOTICE:

Do not use any sharp tool to scrape the carbon deposits. When removing the carbon, be careful not to scrape or damage the metal surface.

(c) Use high-pressure water gun to clean the cylinder head.

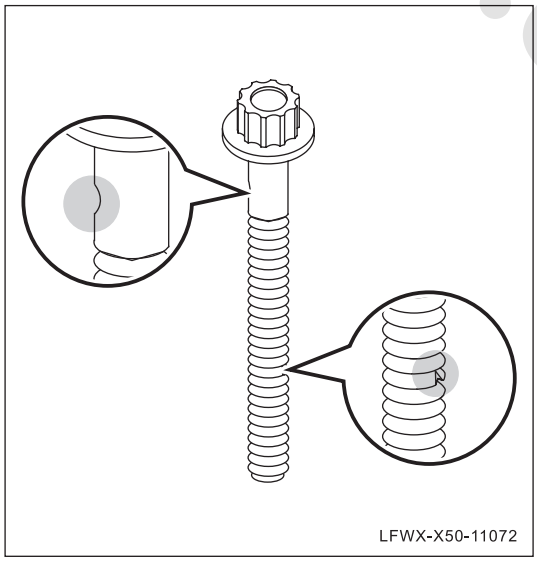
△ HINT:

Mainly means the water pipe and the fuel pipe

(d) Dry the cylinder head with compressed air.

NOTICE:

When using the compressed air, be sure to wear goggles and protective masks to prevent the flying debris or dirt from causing personal injuries.



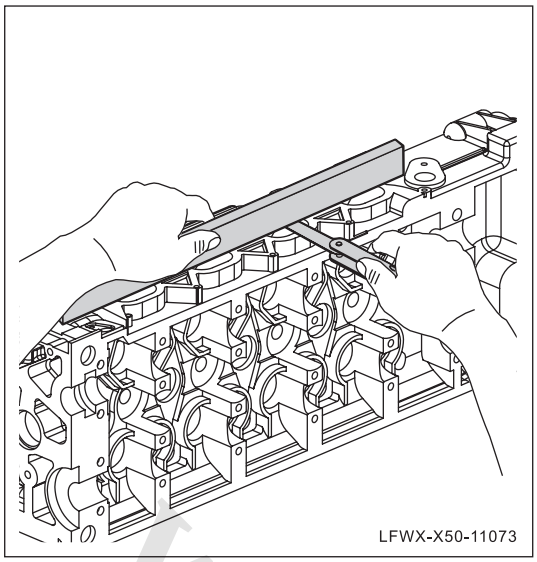
2. CHECK CYLINDER HEAD COMPONENTS

(a) Check the cylinder head fixing bolts for damage. If any, replace them.

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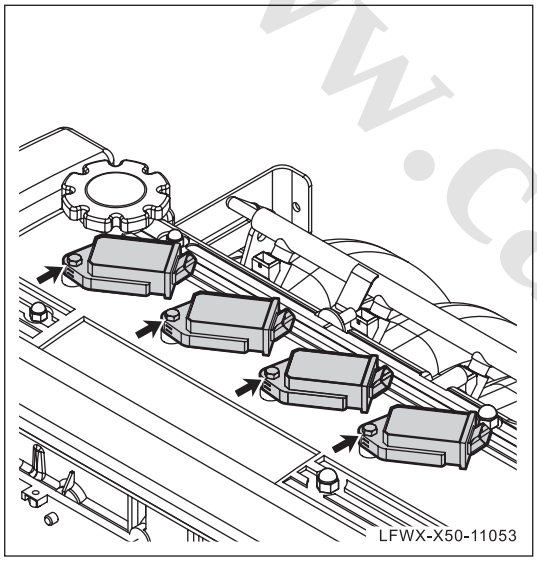
(b) Check the cylinder block interface and the intake and exhaust sides for flatness with the ruler and feeler gauge. If the flatness exceeds the maximum value, replace the cylinder head.

Intake side: 0.10mm

Exhaust side: 0.10mm

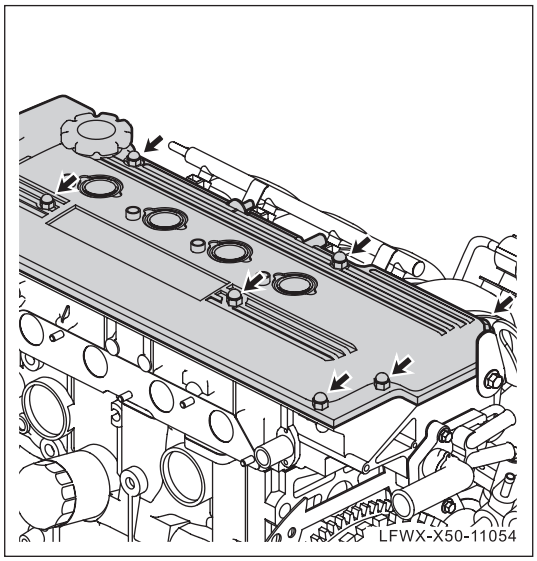
Cylinder block joint surface: 0.05mm

REPLACEMENT



1. REMOVE CYLINDER HEAD

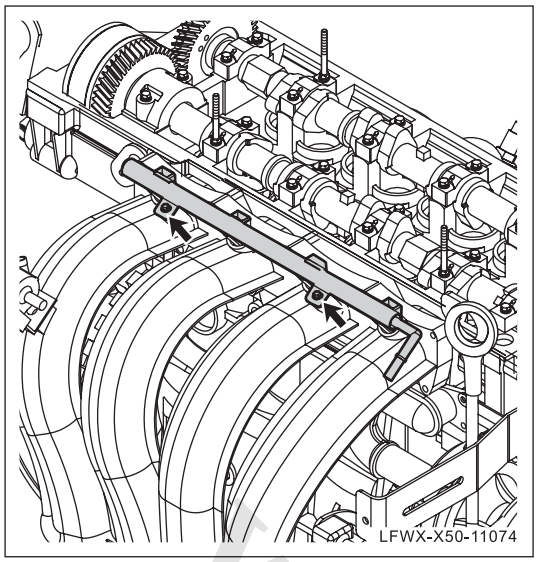
(a) Remove the high-voltage ignition coils and spark plugs.



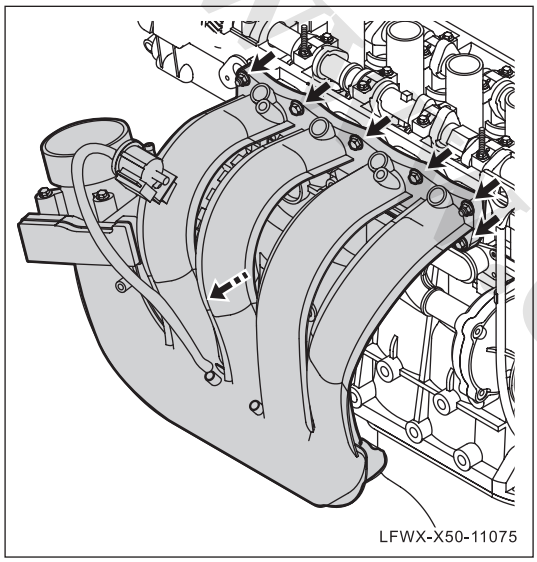
(b) Remove fixing nut of cylinder head, and remove cylinder head cover.

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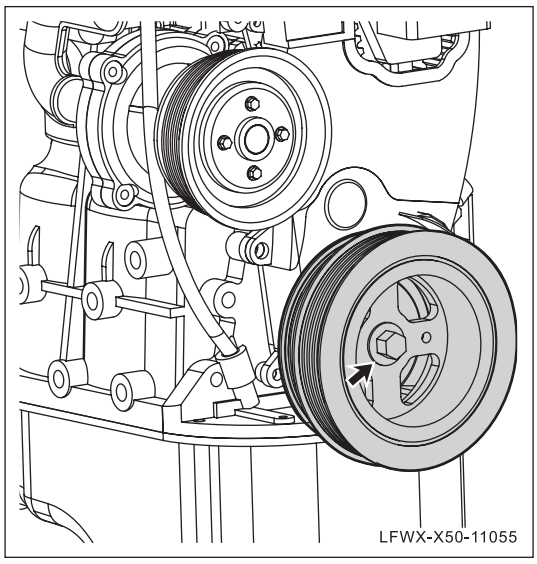
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(c) Remove the fuel rail fixing bolts, and then remove the fuel rail.



(d) Remove intake manifold assembly.



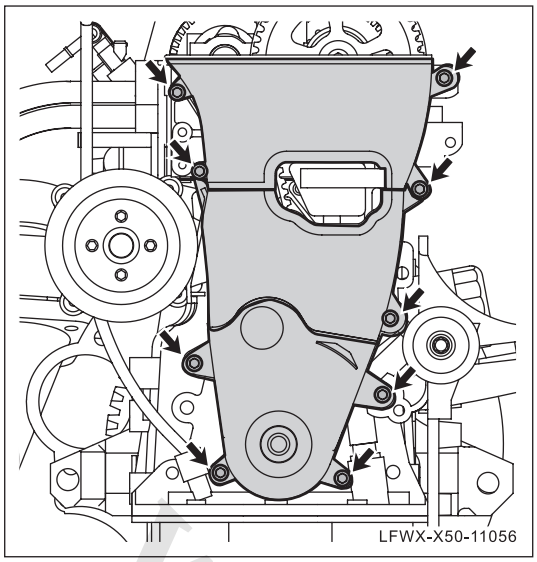
(e) Remove the crankshaft pulley.

△ HINT:

When removing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.

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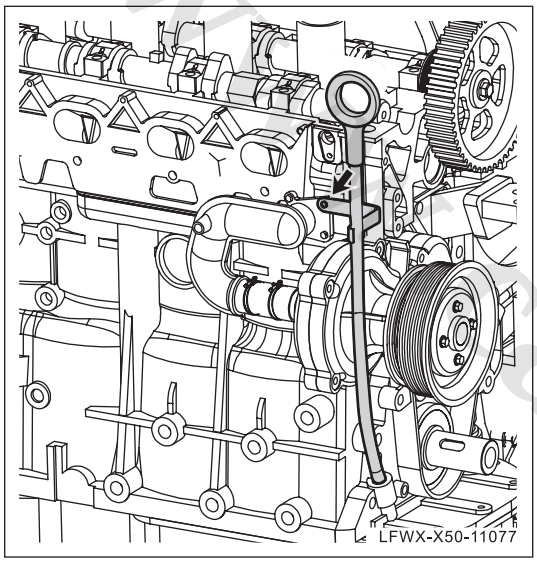
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(f) Remove the pulley timing mechanism assembly.

△ HINT:

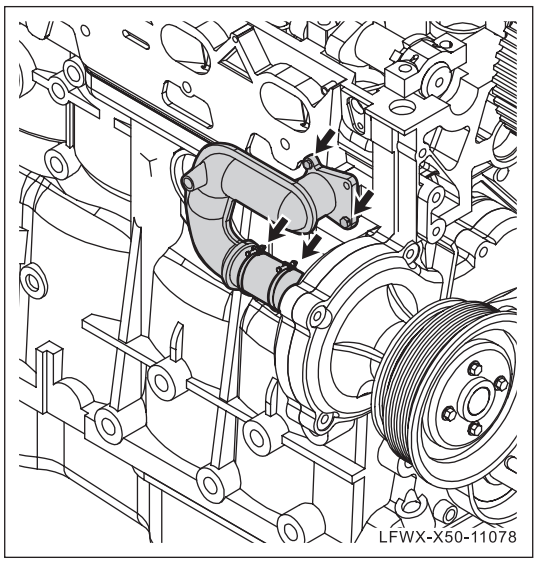
It is unnecessary to remove the camshaft pulley separately. You can remove it together with the camshaft.



(g) Remove the fixing bolt of the dipstick, and then remove the dipstick assembly.

△ HINT:

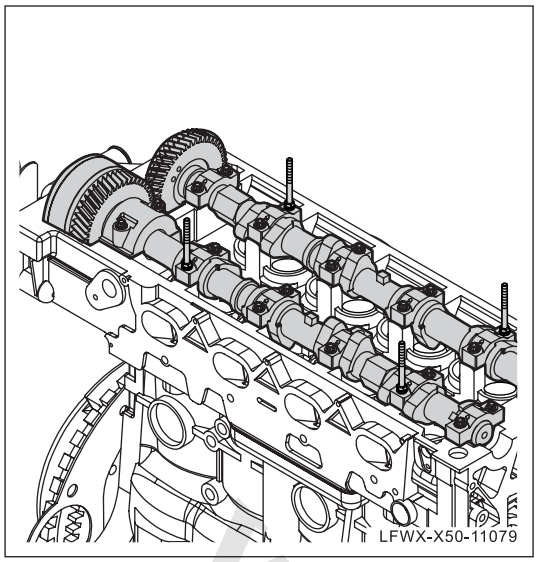
Check the seal ring of the dipstick tube, replace it if aging.



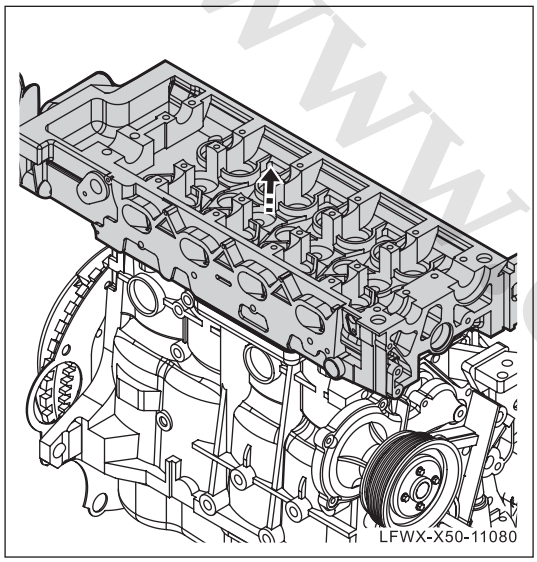
(h) Remove the connecting pipes of the water pump.

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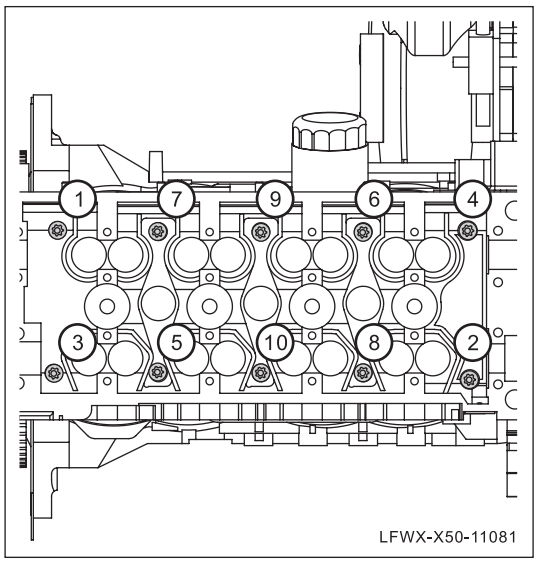
(i) Remove the intake/exhaust camshaft assembly.



(j) Remove the fixing bolts of the cylinder head, and then remove the cylinder head assembly and the cylinder head gasket.

△ HINT:

Put the removed bolts together to avoid being lost.



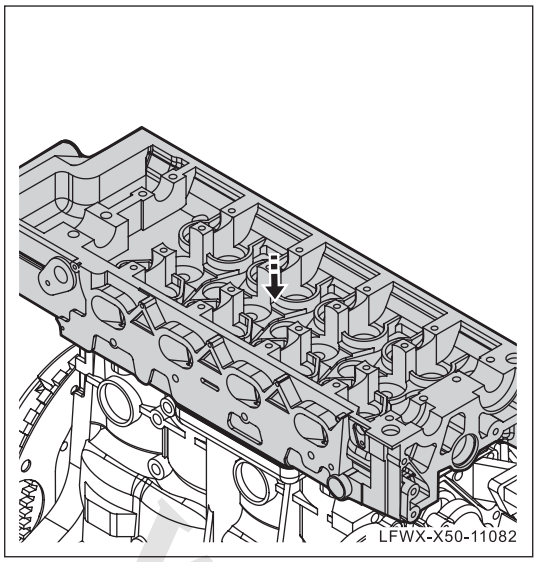
NOTICE:

When removing cylinder head bolt, unscrew and remove cylinder head bolt in order shown in the figure.

(k) Remove valve components.

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2. INSTALL CYLINDER HEAD

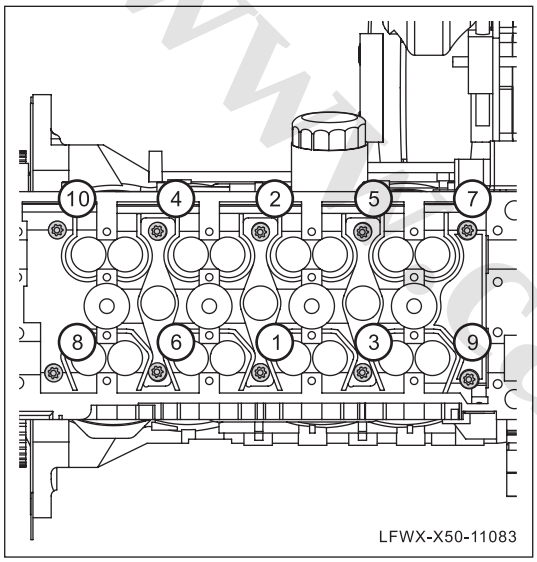
(a) Install valve components.

(b) Install the cylinder-head gasket and the cylinder-head, and tighten the fixing bolts of the cylinder-head.

Torque: 90N•m

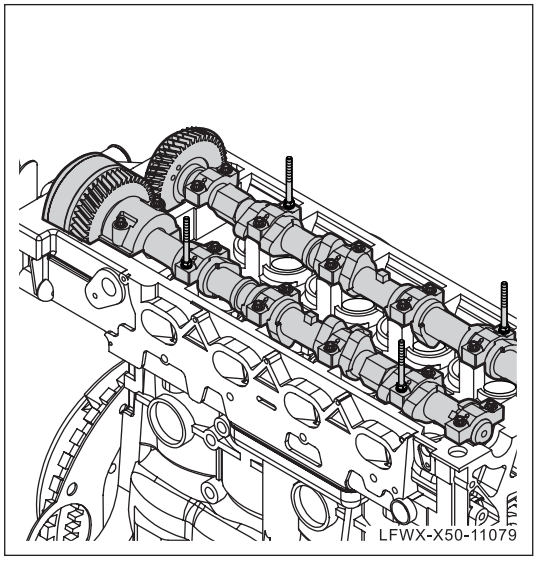
NOTICE:

- **When replacing the cylinder-head gasket with a new one, be sure to pay attention to its front and back to ensure correct installation.**
- **Apply a proper amount of clean oil onto the threads of the cylinder head fixing bolt.**



NOTICE:

When tightening the cylinder head bolt, be sure to tighten them in multiple times in the order as shown in the figure.

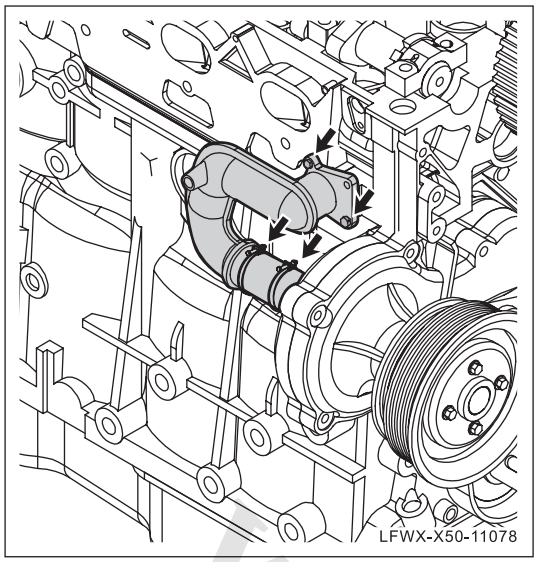


(c) Install the intake/exhaust camshaft assembly, and tighten their tightening bolts.

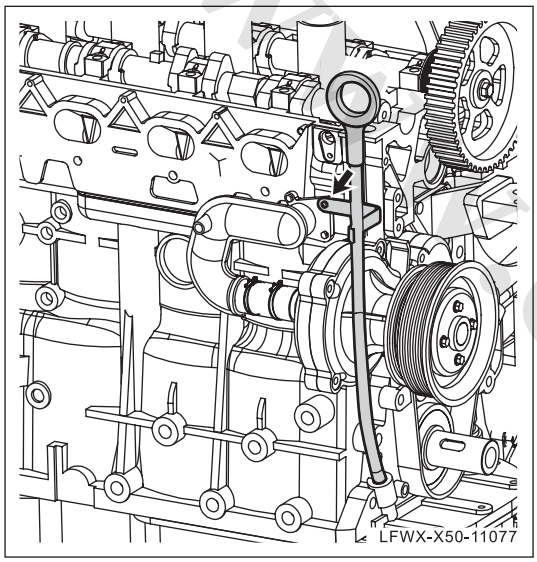
Torque: 25N•m

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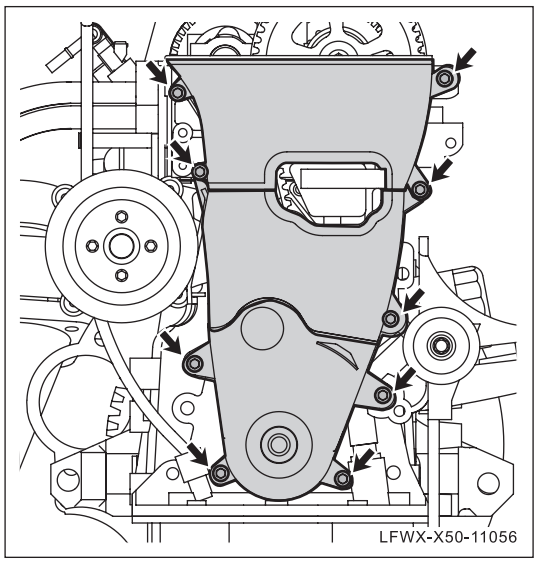
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(d) Install the connecting pipes of the water pump, and tighten their tightening bolts and clamps.



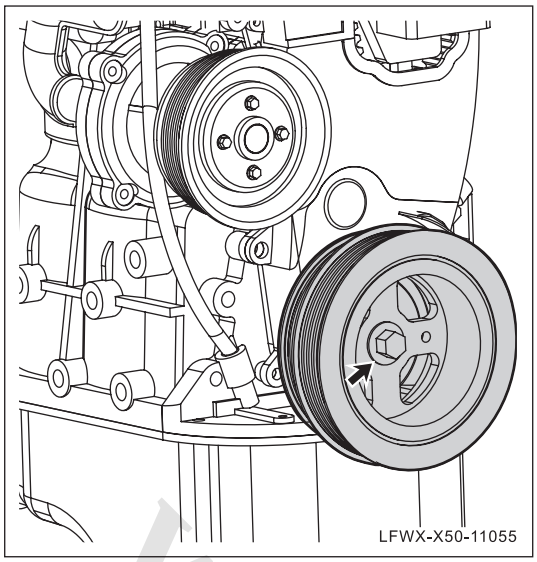
(e) Install the dipstick assembly.



(f) Install the pulley timing mechanism.

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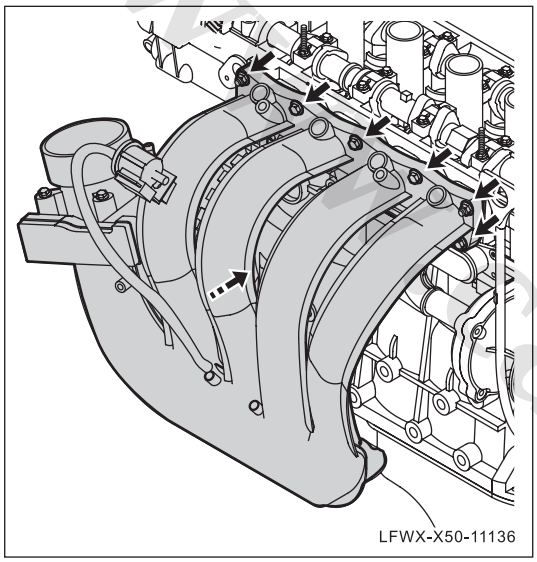


(g) Install the crankshaft pulley, and tighten its fixing bolts.

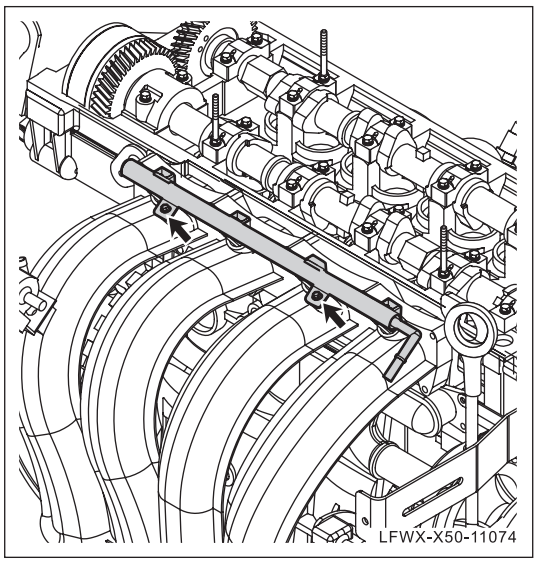
Torque: 145N•m

△ HINT:

When installing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.



(h) Install intake manifold assembly.

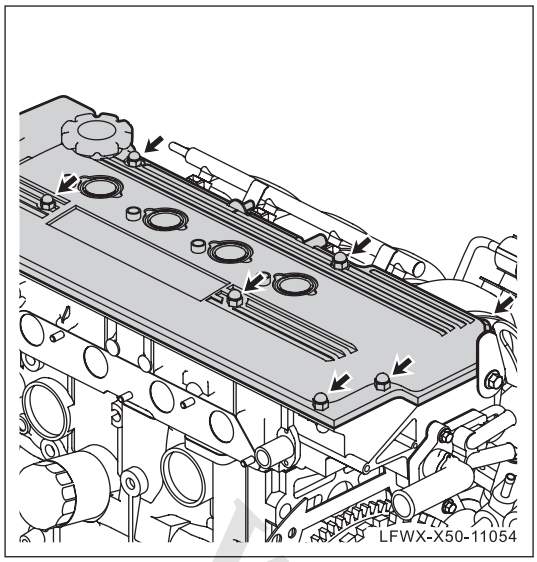


(i) Install the fuel rail, and tighten the fuel rail fixing bolts.

Torque: 25N•m

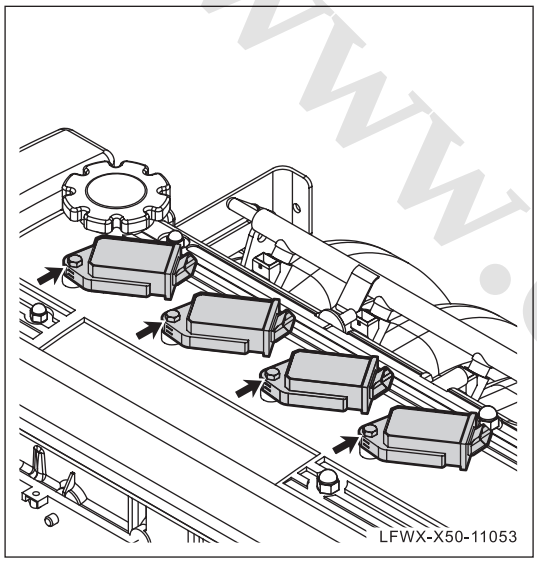
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(j) Install the cylinder head cover and tighten the fixing nuts.

Torque: 12N•m



(k) Install the spark plug and high-voltage ignition coil.

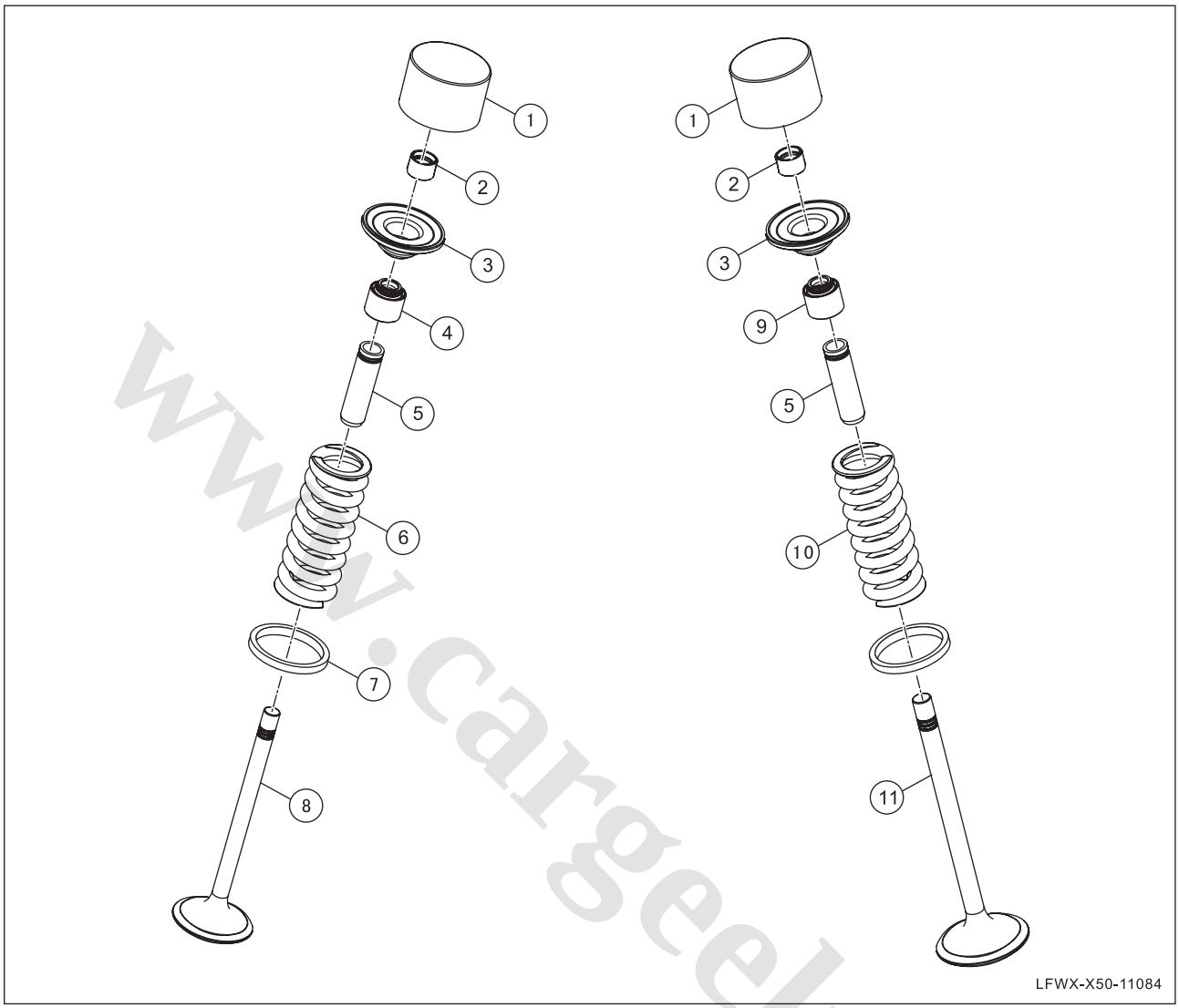
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VALVE

COMPONENTS



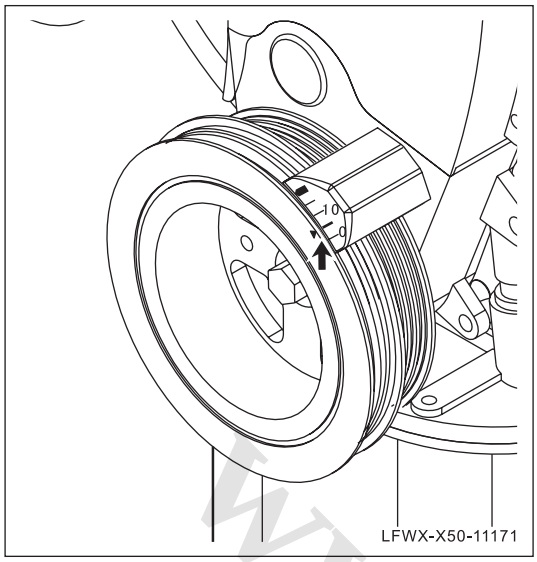
1	Mechanical tappet
2	Valve cotter
3	Valve upper seat
4	Exhaust valve oil seal
5	Valve guide
6	Exhaust Valve spring

7	Valve spring seat
8	Exhaust valve
9	Intake valve oil seal
10	Intake valve spring
11	Intake valve

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CHECK



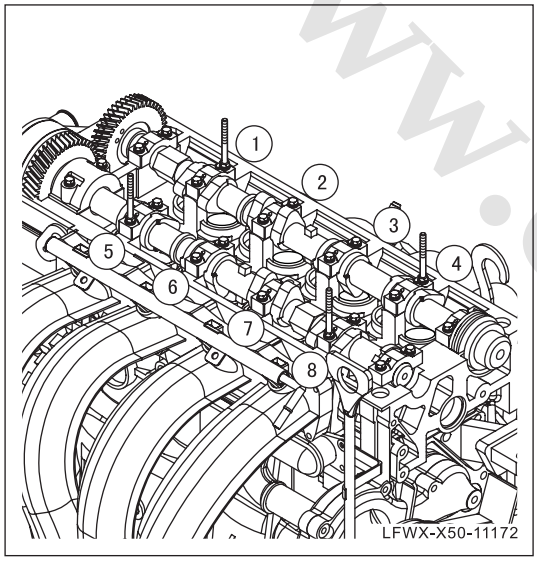
1. CHECK VALVE CLEARANCE

(a) Rotate the crankshaft pulley, and align its timing mark to the "5" mark on the pulley cover.

(b) Observe whether the intake and exhaust camshaft noses of the 4-cylinder are all at a upward or horizontal position; if so, it is the TDC of the compression stroke of the 4-cylinder.

△ HINT:

If not, rotate the crankshaft for a circle, it is the same as the TDC of the compression stroke of the 4-cylinder.



(c) Measure valve clearance of No. 1, 3, 5 and 6 valves (eight in total) with a feeler gauge and record the results.

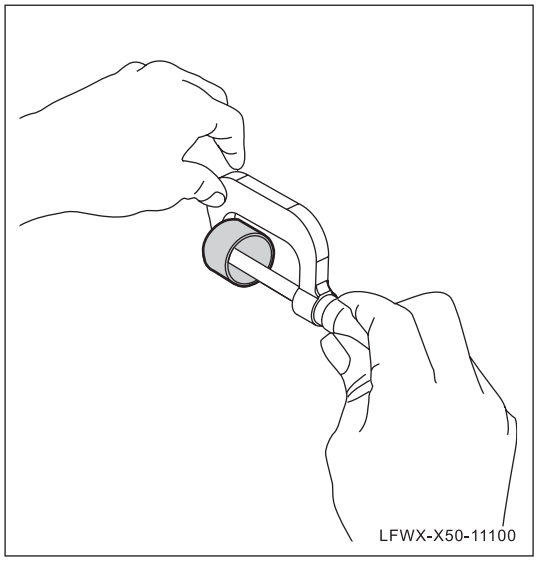
(d) Rotate the crankshaft by 360°, measure valve clearance of the other eight valves with a feeler gauge and record them.

Standard clearance of the intake valve: 0.15 - 0.20mm

Standard clearance of the exhaust valve: 0.25 - 0.30mm

△ HINT:

If the valve clearance is not in line with standard value, adjust the valve clearance.



2. ADJUST VALVE CLEARANCE

(a) Disassemble and remove the camshaft.

(b) Take out the tappet to be replaced.

(c) Measure tappet top end thickness with a screw micrometer.

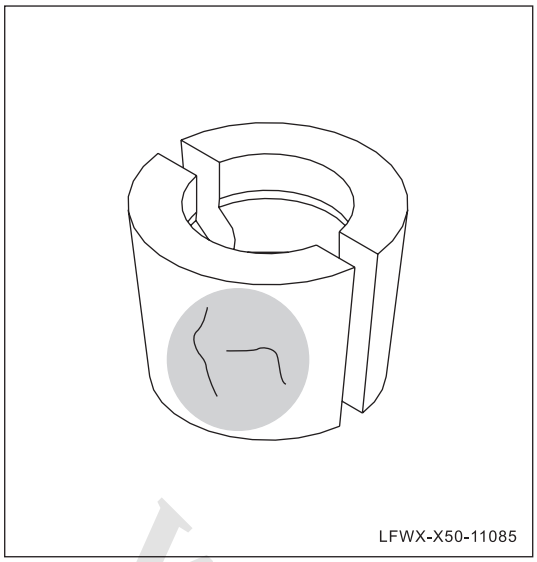
(d) Calculate new tappet top end thickness.

Calculation method:

New mechanical tappet top end thickness = measured clearance value - standard clearance value + replaced tappet top end thickness

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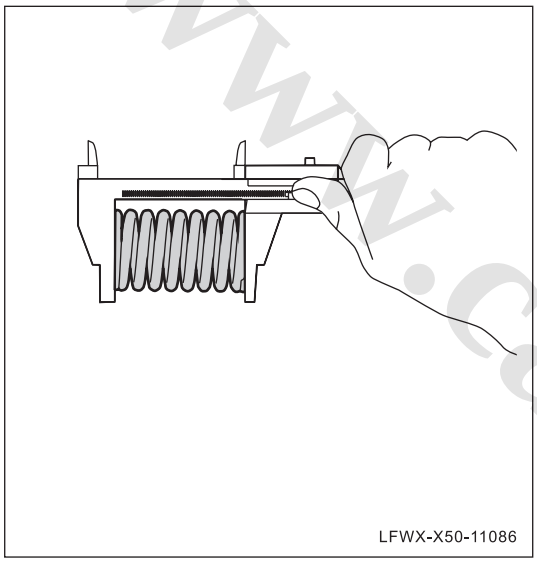
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LFWX-X50-11085

3. CHECK VALVE COMPONENTS

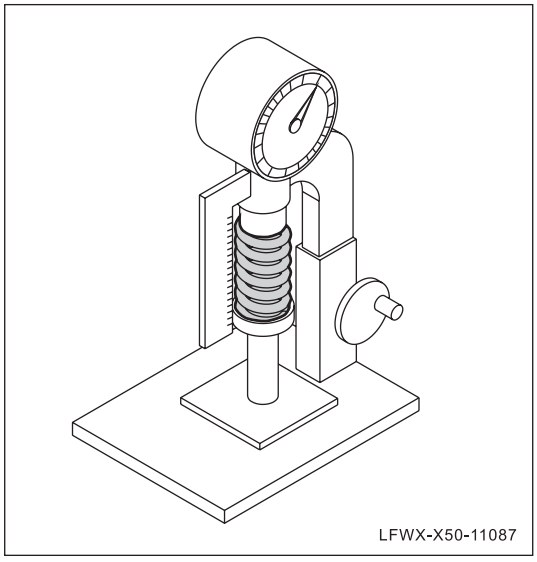
(a) Check if valve keeper is cracked or damaged. If necessary, replace it.



LFWX-X50-11086

(b) Measure the free length of valve spring with a dial caliper. If it does not conform to the specification, replace it.

Free length: 39±0.13mm



LFWX-X50-11087

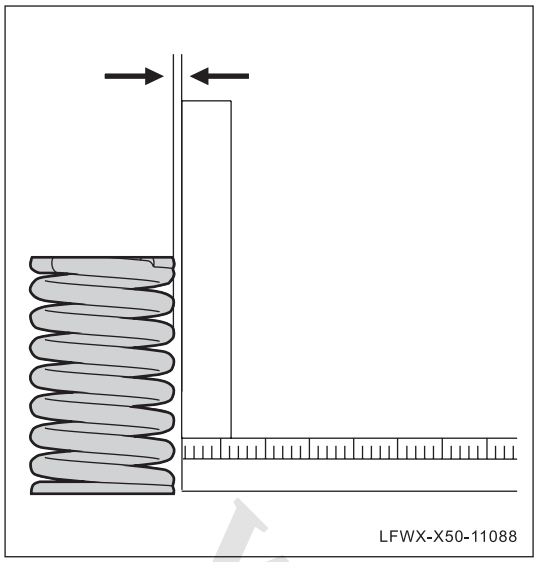
(c) Measure spring force at standard compression length with a spring-loaded thrust meter. If it does not conform to the specification, replace it.

Elastic force of the installation:

157 - 174N(31.7mm)

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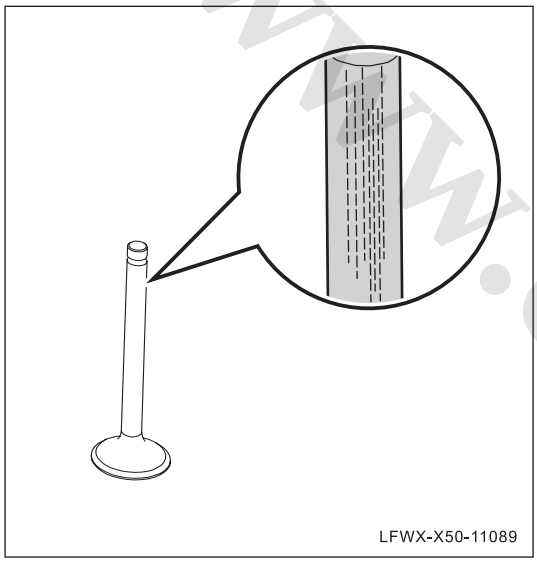
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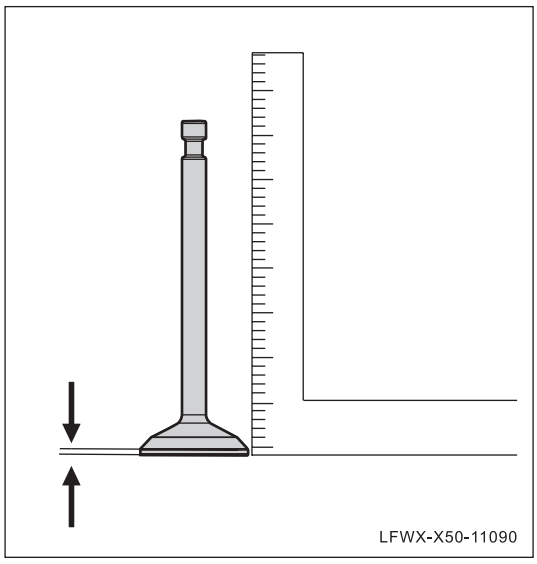
(d) Use an angle square and surface plate to measure the verticality of each spring according to the clearance between the end of valve spring and angle square. If the value exceeds specified value, replace it.

Maximum deviation: 1.6mm

Maximum deviation angle: 2°



(e).Clean all carbon deposits on the valve. Check if the working surface and valve stem of each valve are worn, burnt or deformed. If so, repair them. If necessary, replace them.



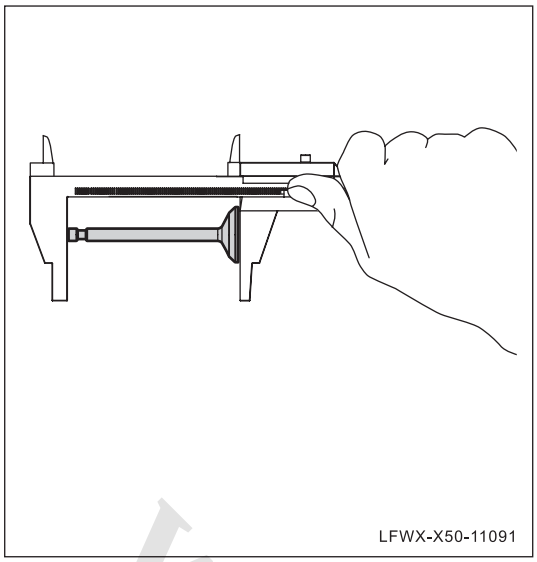
(f) Measure valve edge thickness with a try square. If the measured value is less than the minimum value, replace the valve.

Standard thickness: 0.8 - 1.2mm

Minimum thickness: 0.5mm

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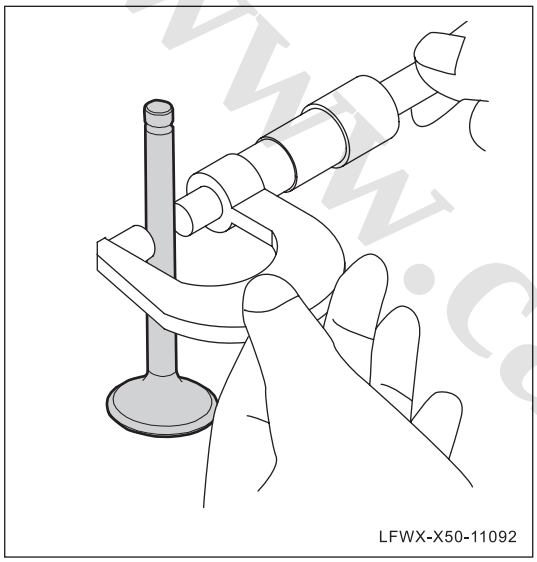
(g) Measure valve length with a dial caliper. If it does not conform to the specification, replace it.

Standard length:

Intake valve: 86.6mm Exhaust valve: 86.9mm

Minimum length:

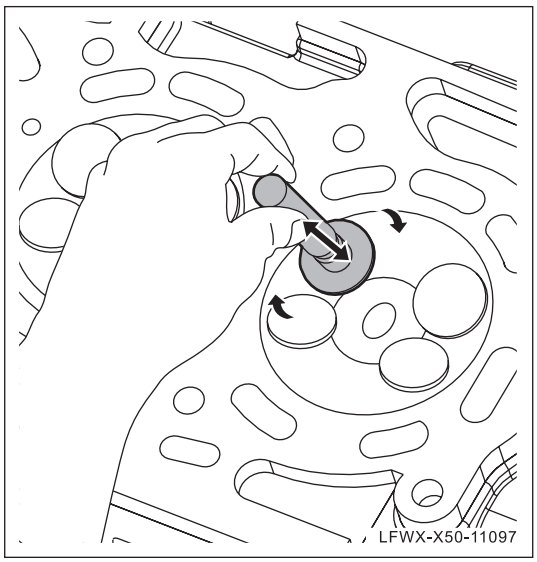
Intake valve: 86.1mm Exhaust valve: 86.4mm



(h) Measure valve stem diameter with a micrometer. If it does not conform to the specification, replace it.

Intake valve: 5.96 - 5.975mm

Exhaust valve: 5.96 - 5.975mm



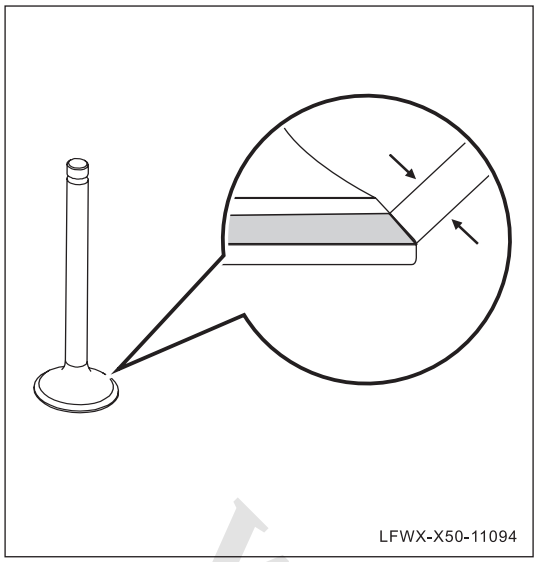
(i) Check the width of valve-seat contact.

△ HINT:

- Apply a layer of blotting membrane to valve seat and then install the valve on cylinder head.
- Rotate the valve in 1/4 turns for several times with the valve grinding tool, and then remove the valve.

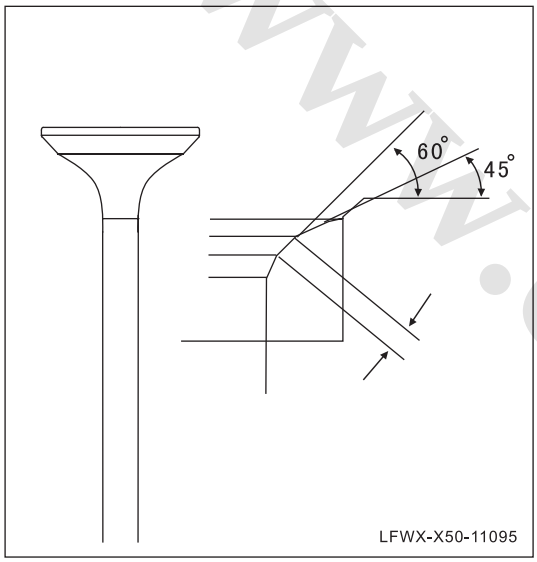
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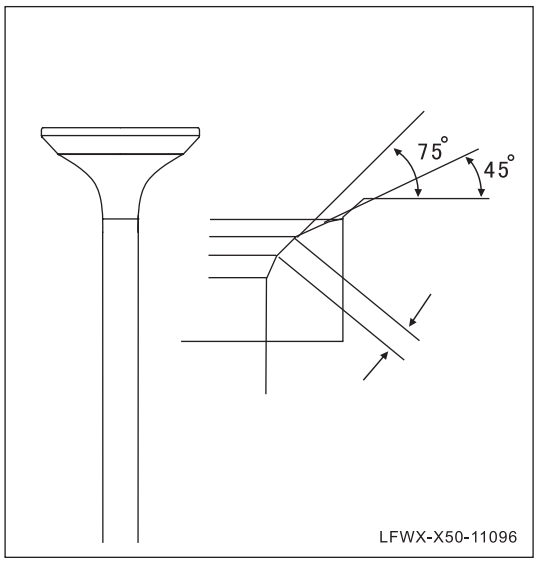
NOTICE:

- **The imprint on valve fitting surface must be continuously annular, and the annular imprint width must be within specified range. If the imprint between valve seat and valve is not uniform or the imprint width is not within the specified range, it is necessary to regrind or cut, grind or polish the valve seat.**



- **Intake valve seat: repair it twice with a valve seat reamer. Two reamers must be used for repairing: one for 15° and one for 45°. At the second time, it is a must to get the required width.**

  Width of intake valve-seat 1.0 - 1.4mm

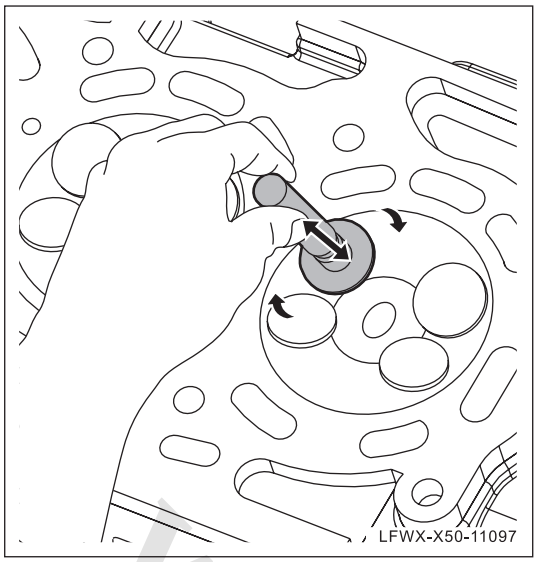


- **Exhaust valve-seat: Restoring procedures are same as the intake valve.**

  Width of exhaust valve-seat 1.0 - 1.4mm

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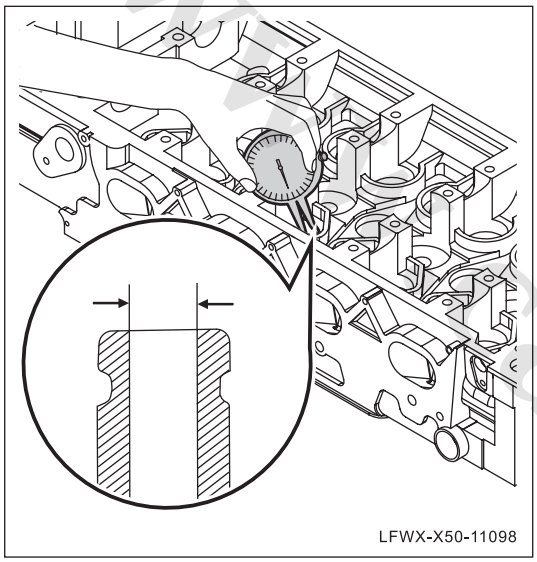


(j) Grind valve.

△ HINT:

Firstly, coat coarse paste onto the valve seat surface. Grind the valve with the special tool. And then, grind it with fine paste up until the valve and the valve seat joint 75% and more.

(k) After grinding, clean the valve and valve seat thoroughly.



(l) Measure the valve guide internal diameter with the internal micrometer.

Valve guide internal diameter: 6.01 - 6.03mm

(m) Subtract the valve stem diameter from the internal diameter of valve guide to get the oil film clearance between the valve and valve guide. If the oil clearance is more than the maximum value, replace the valve and the guide.

Standard oil clearance:

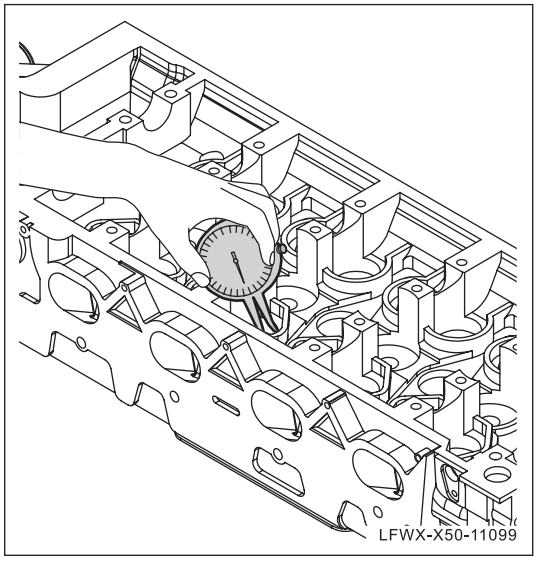
Intake valve: 0.025 - 0.06mm

Exhaust valve: 0.03 - 0.065mm

Maximum oil clearance:

Intake valve: 0.08mm

Exhaust valve: 0.10mm



(n) Measure the internal diameter of the valve-guide mounting-hole with the internal micrometer.

Internal diameter: 11 - 11.018mm

△ HINT:

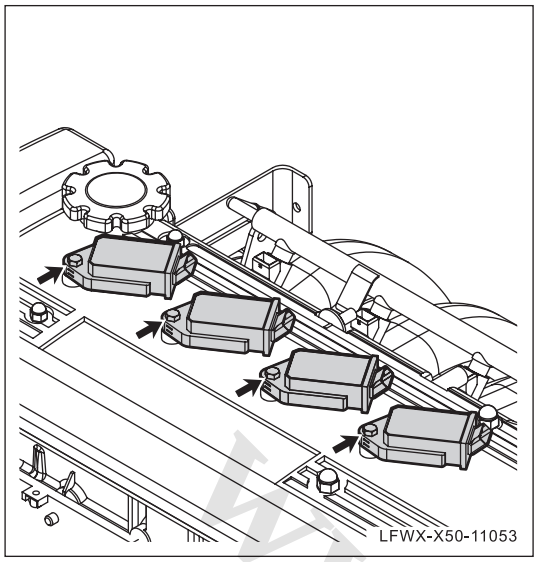
If internal diameter of mounting-hole of guide pipe is more than maximum value, the guide pipe of cylinder head should be processed to be 11.05 - 11.068mm, to facilitate installation of larger valve guide (as shown below).

Diameter of valve guide	Valve guide hole internal diameter (mm)
STD	11 - 11.018
O/S0.05	11.05-11.068

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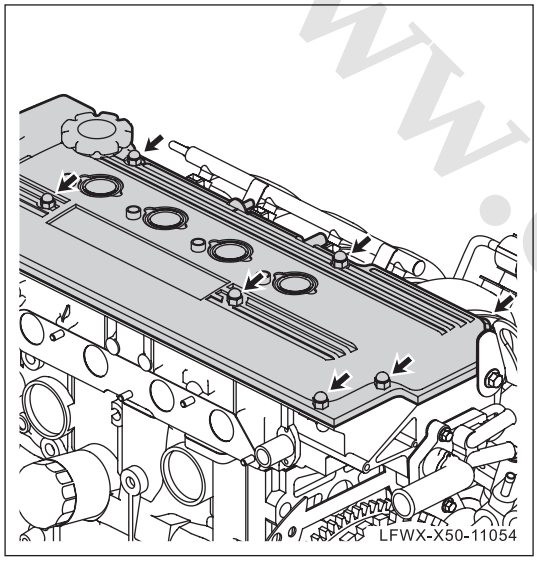
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REPLACEMENT

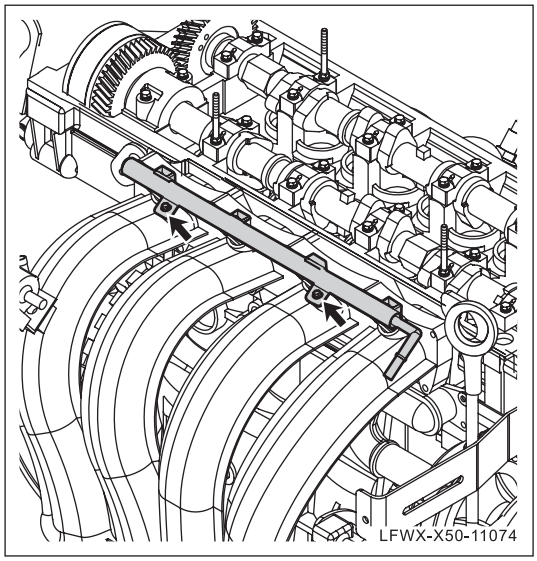


1. REMOVE VALVE COMPONENTS

(a) Remove the high-voltage ignition coils and spark plugs.



(b) Remove fixing nut of cylinder head, and remove cylinder head cover.

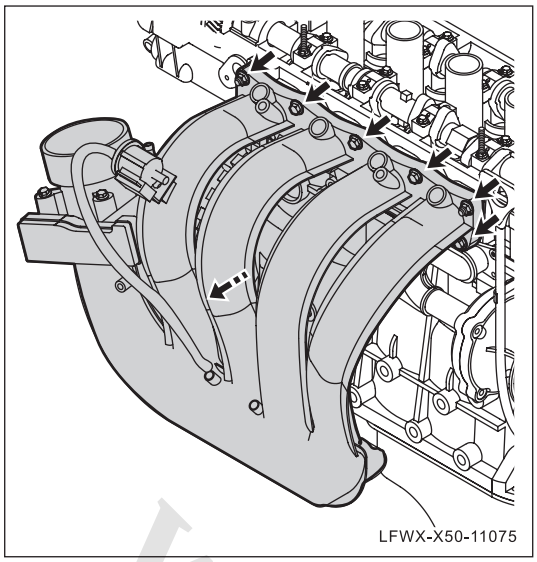


(c) Remove the fuel rail fixing bolts, and then remove the fuel rail.

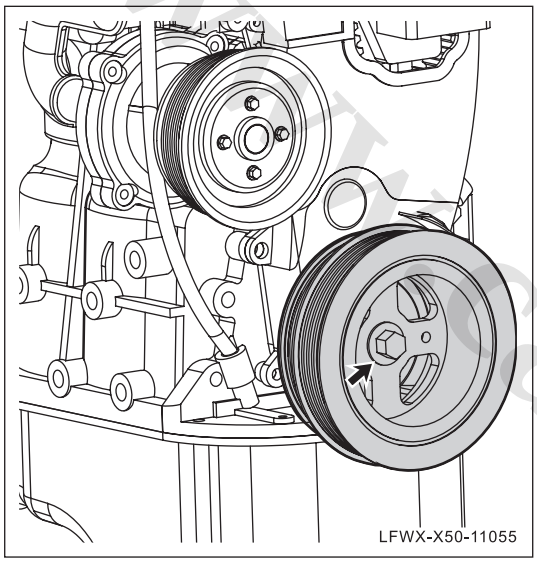
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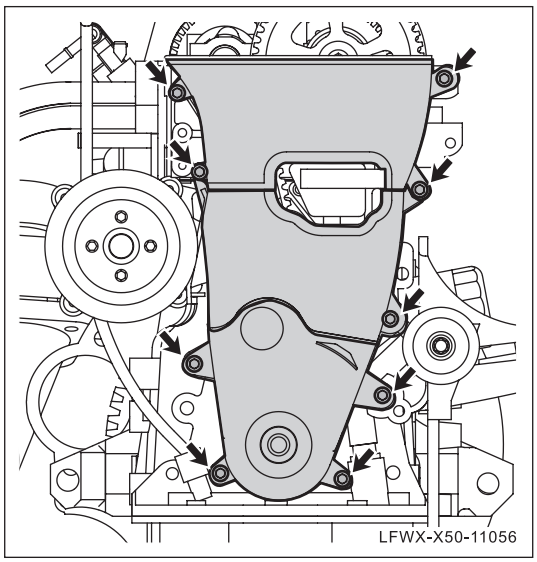
(d) Remove intake manifold assembly.



(e) Remove the fixing bolts of the crankshaft pulley, and then remove the crankshaft pulley.

△ HINT:

When removing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.



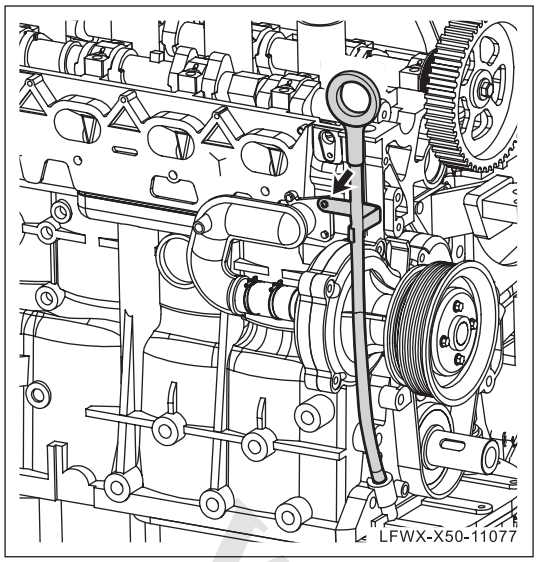
(f) Remove the pulley timing mechanism assembly.

△ HINT:

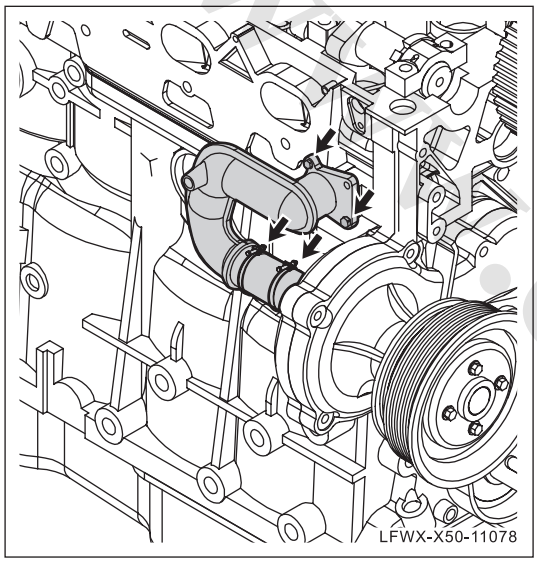
It is unnecessary to remove the camshaft pulley separately. You can remove it together with the camshaft.

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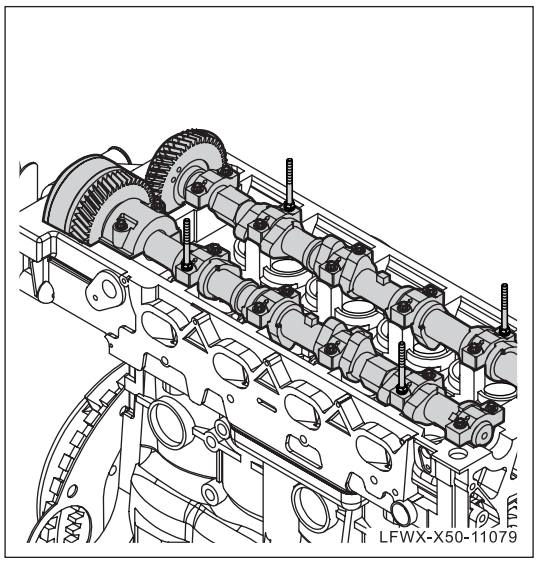
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(g) Remove the fixing bolt of the dipstick, and then remove the dipstick assembly.



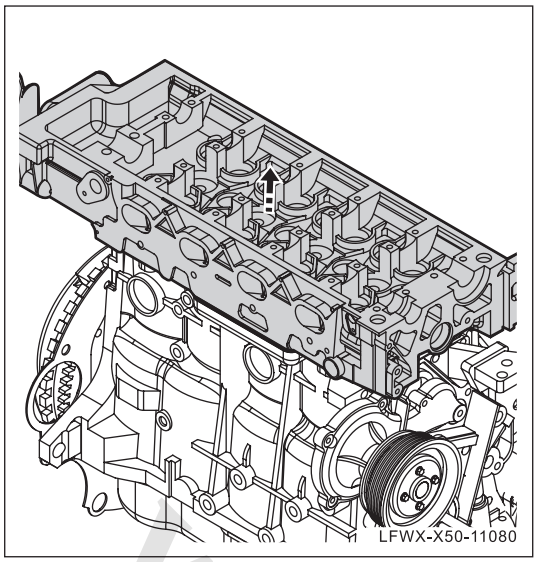
(h) Remove the connecting pipes of the water pump.



(i) Remove the intake/exhaust camshaft assembly.

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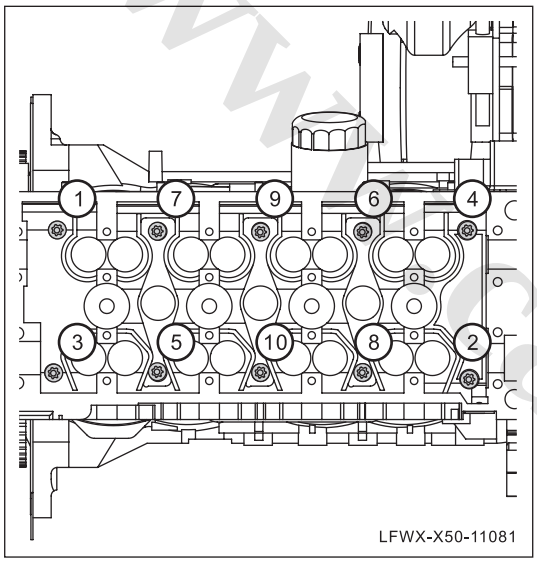
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(j) Remove the fixing bolts of the cylinder head, and then remove the cylinder head assembly and the cylinder head gasket.

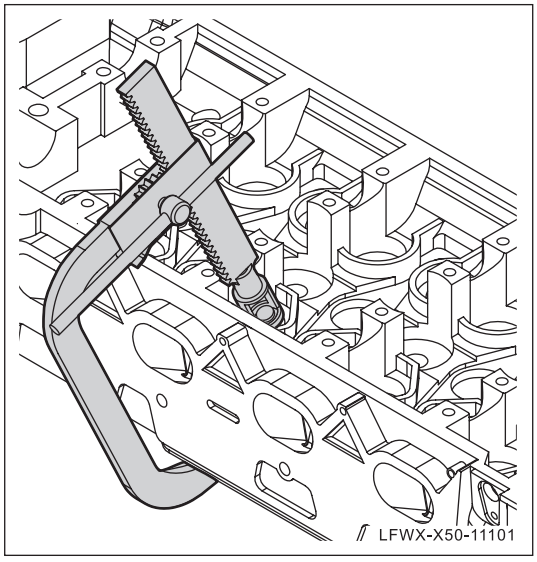
△ HINT:

Put the removed bolts together to avoid being lost.



NOTICE:

When removing cylinder head bolt, unscrew and remove cylinder head bolt in order shown in the figure.



(k) Remove valve cotter by special tool.

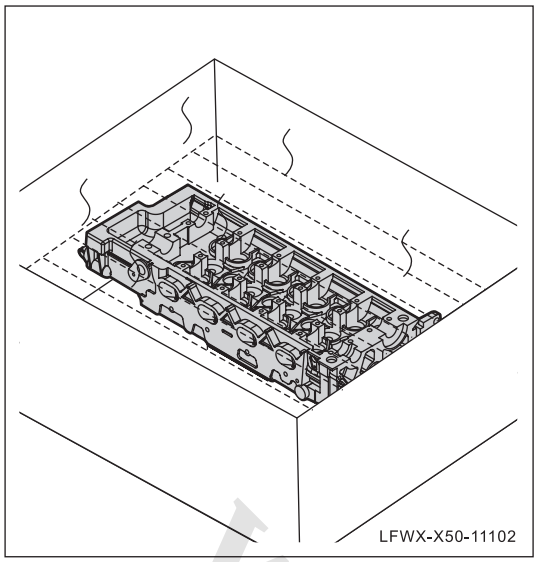
(l) Remove valve, valve retainer, valve spring and valve oil seal in turn.

NOTICE:

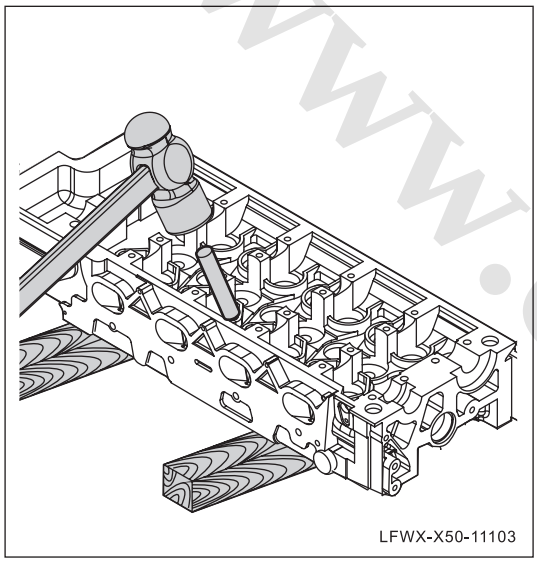
- **The intake valve oil seal is gray and the exhaust valve oil seal is black.**
- **Once the oil seal is removed, it cannot be used any longer. A new oil seal must be used for installation.**

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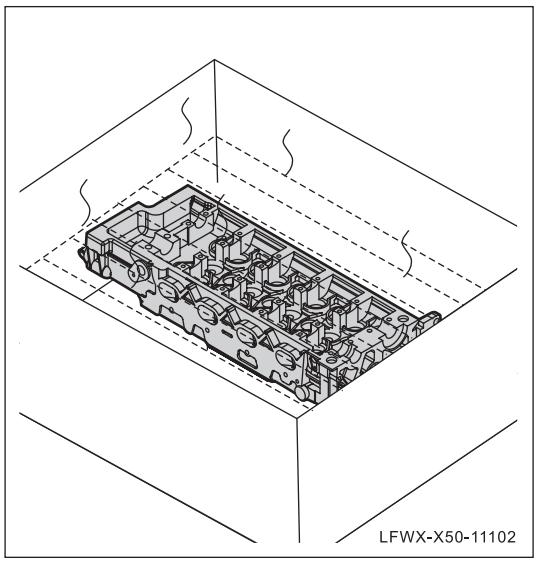
(m) Heat cylinder head to 80 - 100° C.



(n) Put cylinder head onto a wooden plate, and use special tool to take out valve guide.

NOTICE:

The valve guide cannot be used again once it's removed.



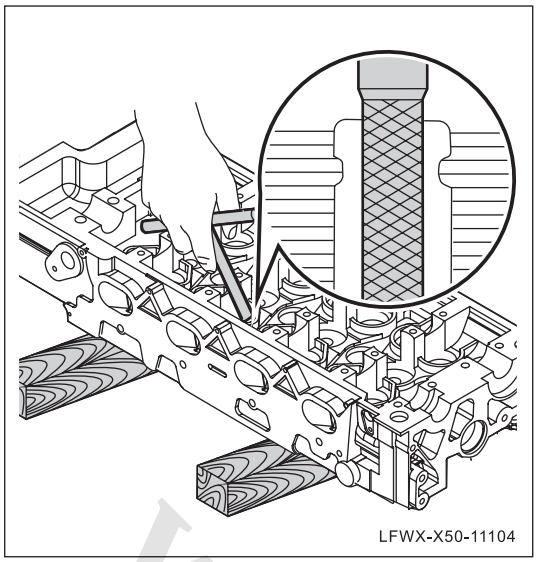
2. INSTALL VALVE COMPONENTS

(a) Heat cylinder head to 80 - 100° C.

(b) Remove cylinder head and put it on a wood plate.

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(c) Ream valve guide hole with special tool (11mm reamer) to remove burrs before installing valve guide in the cylinder head.

(d) Use special tool, and press the new valve guide in the valve guide hole with the specified pressing-in depth until the special tool contacts the cylinder head.

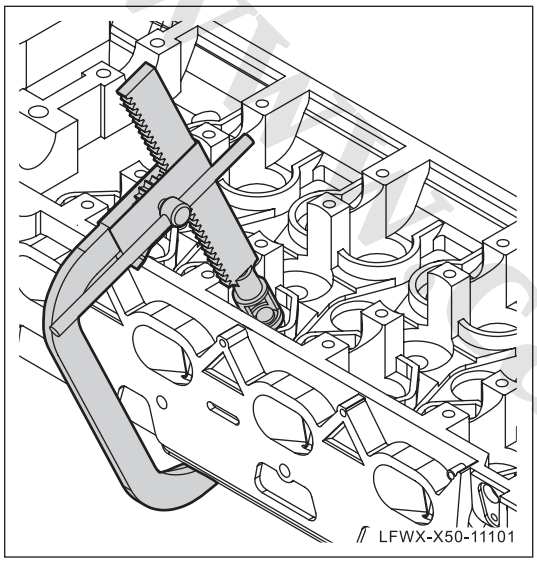
Specified pushing amount: 8.7 - 9.1mm

(e) Use special tool (5.5mm reamer) to cut valve guide hole to the specified clearance.

Standard oil clearance:

Intake valve: 0.025 - 0.060mm

Exhaust valve: 0.030 - 0.065mm

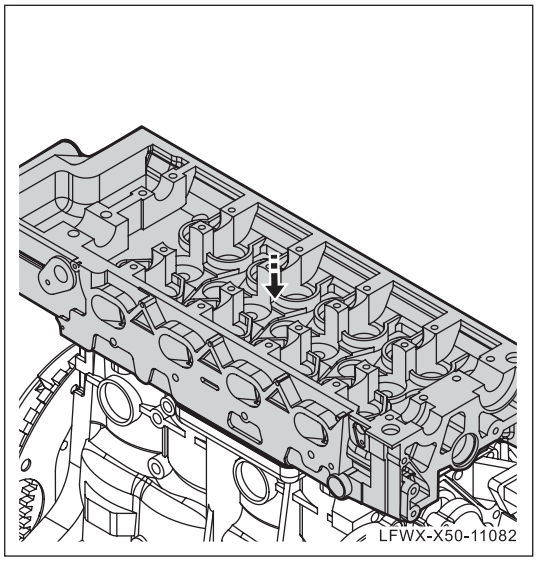


(f) Install valve, valve spring, valve oil seal and valve upper seat in turn.

(g) Install valve cotter with special tool.

NOTICE:

- **The intake valve oil seal is gray and the exhaust valve oil seal is black.**
- **Once the oil seal is removed, it cannot be used any longer. A new oil seal must be used for installation.**
- **It is forbidden to tap or strike the special tool with the hammer or other object when installing. Install the oil seal to the valve guide just by pressing the special tool by hand gently. Tapping or striking the special tool may cause damage to the oil seal.**



(h) Install the cylinder-head gasket and the cylinder-head, and tighten the fixing bolts of the cylinder-head.

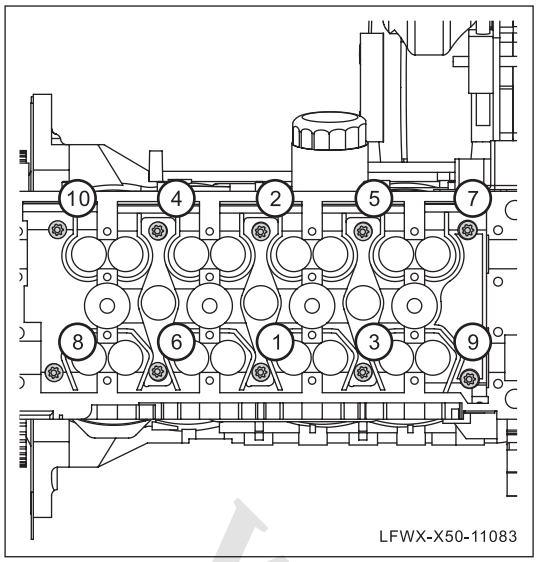
Torque: 90N•m

NOTICE:

- **When replacing the cylinder-head gasket with a new one, be sure to pay attention to its front and back to ensure correct installation.**
- **Apply a proper amount of clean oil onto the threads of the cylinder head fixing bolt.**

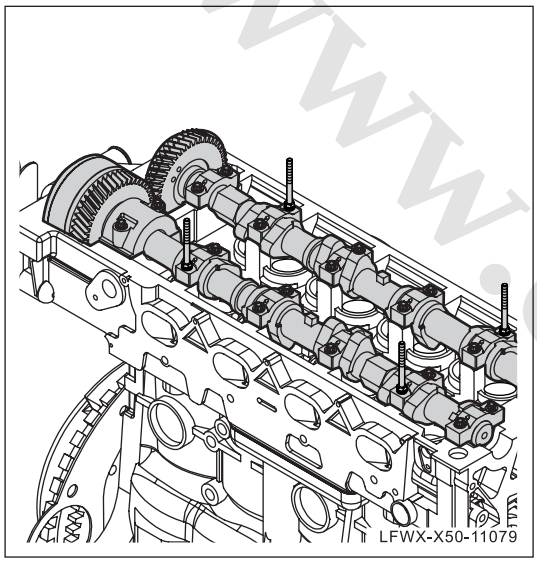
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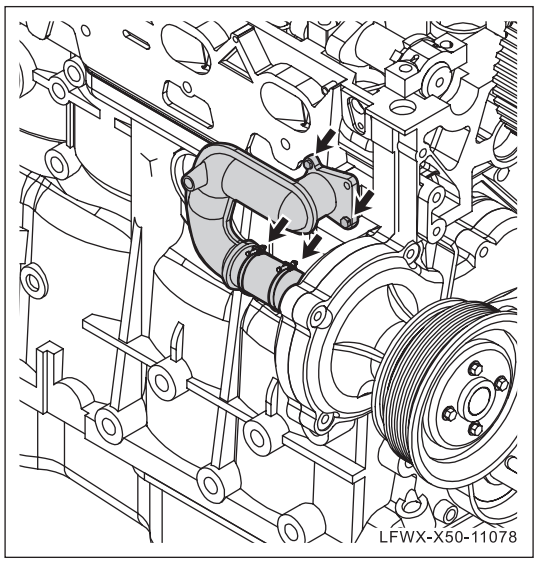
NOTICE:

When tightening the cylinder head bolt, be sure to tighten them in multiple times in the order as shown in the figure.



(i) Install the intake/exhaust camshaft assembly, and tighten their tightening bolts.

Torque: 25N•m

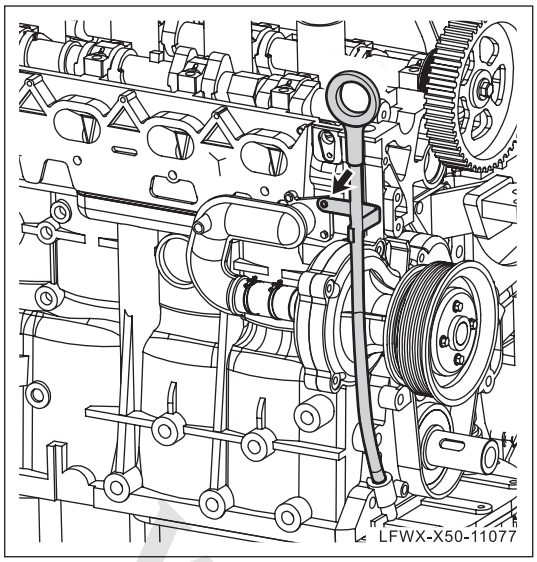


(j) Install the connecting pipes of the water pump, and tighten their tightening bolts and clamps.

Torque: 25N•m

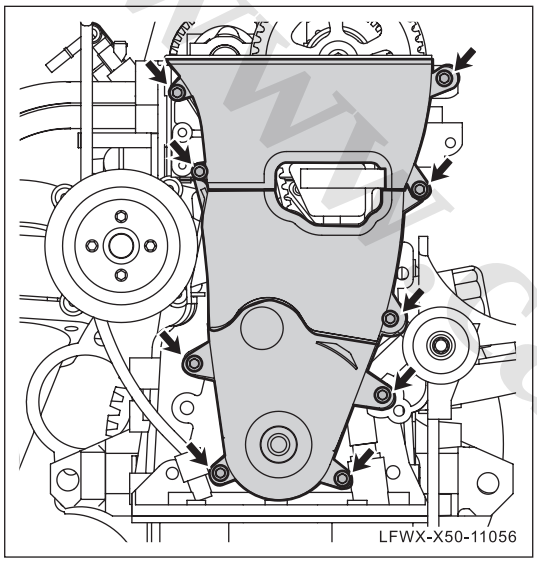
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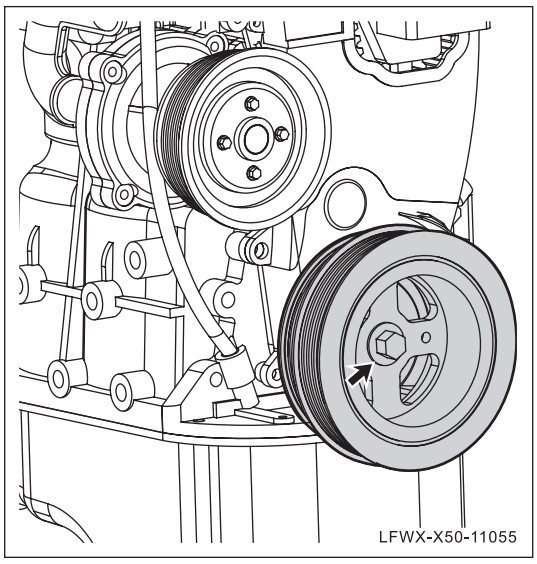


(k) Install the dipstick assembly.

Torque: 10N•m



(l) Install the pulley timing mechanism.



(m) Install the crankshaft pulley, and tighten its fixing bolts.

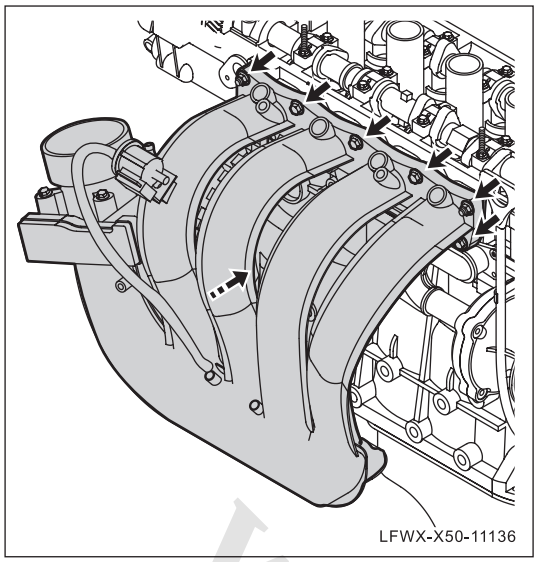
Torque: 145N•m

△ HINT:

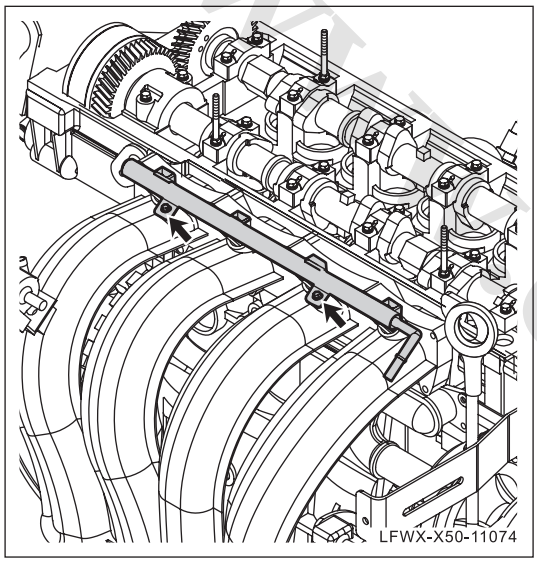
When installing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.

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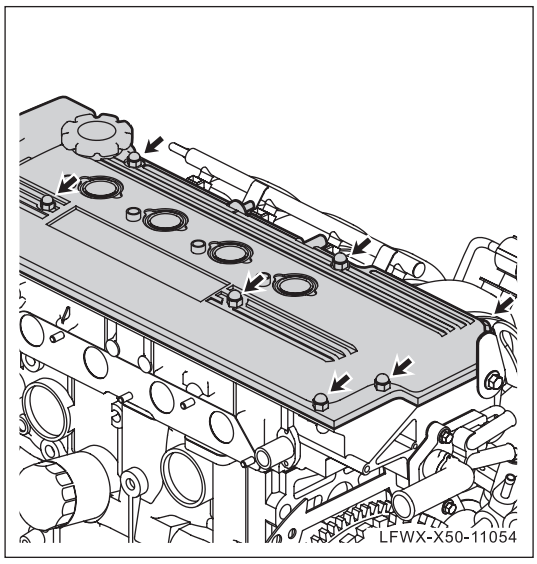


(n) Install intake manifold assembly.



(o) Install the fuel rail, and tighten the fuel rail fixing bolts.

Torque: 25N•m

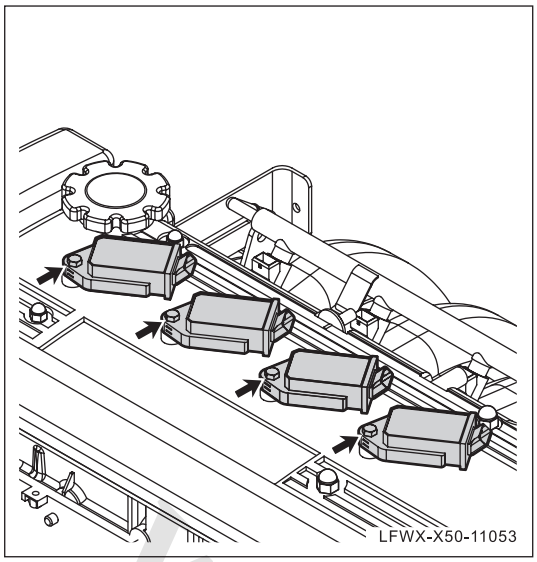


(p) Install the cylinder head cover, and tighten its tightening bolts.

Torque: 12N•m

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(q) Install the spark plugs and high-voltage ignition coils and tighten their fixing bolts.

Torque: 12N•m

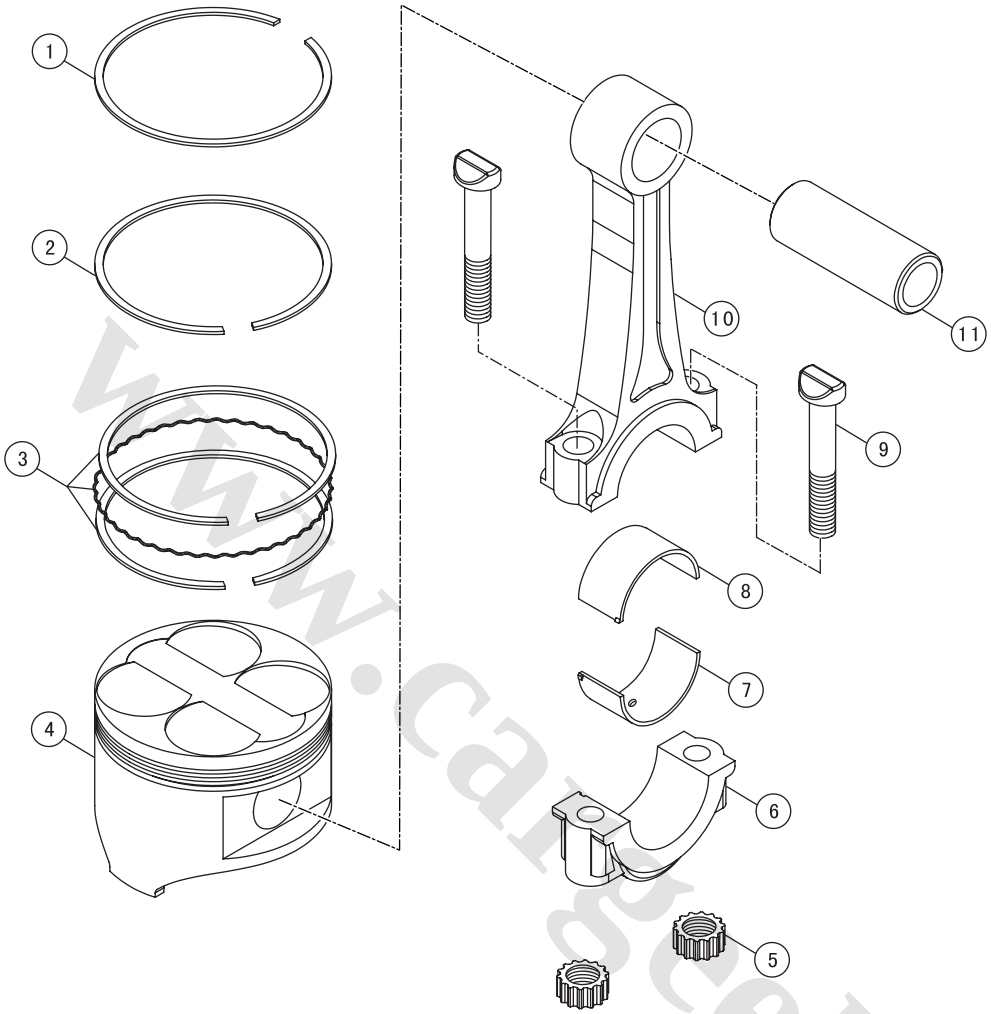
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PISTON AND CONNECTING ROD

COMPONENTS



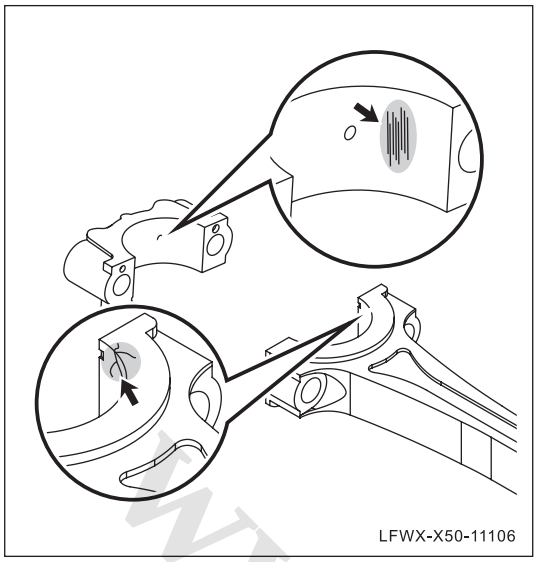
1	Piston ring I
2	Piston ring II
3	Combined oil ring
4	Piston
5	Connecting rod bolt

6	Connecting rod cap
7	Connecting rod bearing (lower)
8	Connecting rod bearing (upper)
9	Connecting rod body
10	Piston pin

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CHECK

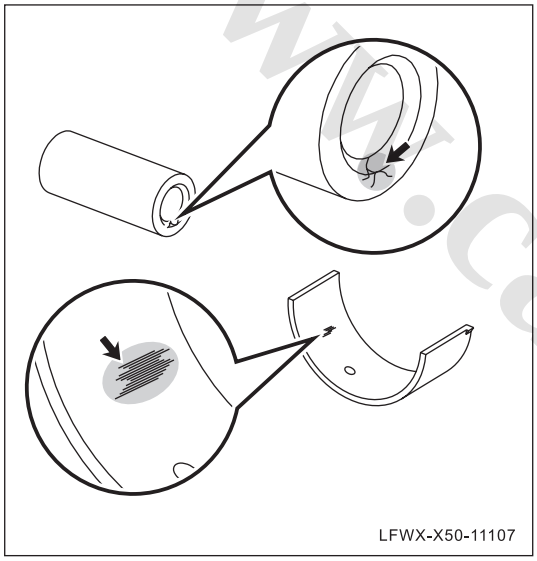


1. CHECK VISUALLY CONNECTING ROD ASSEMBLY

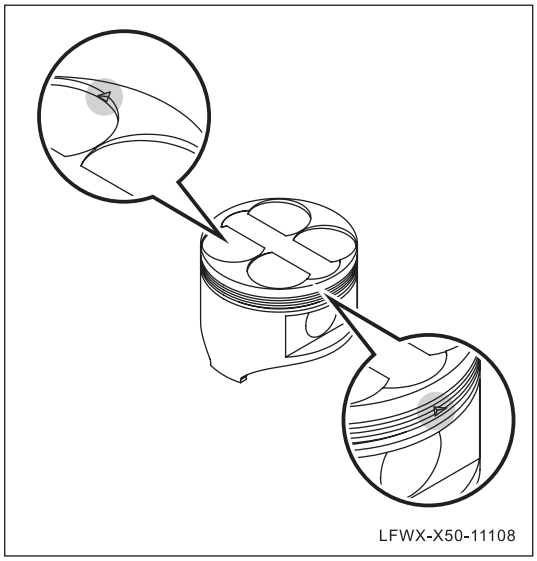
(a) Check if connecting rod and connecting rod cap are scored, cracked, burred, scratched or worn.

NOTICE:

If there is part of the connecting-rod or the connecting-rod cover is worn, be sure to replace them pairwise.



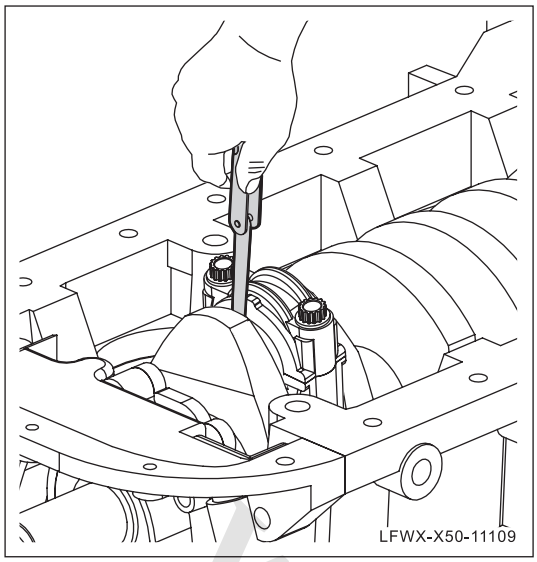
(b) Check visually if connecting rod bearing and piston pin are cracked, scored or damaged. If any, replace it.



(c) Check piston skirt, pin hole, piston head and piston groove for wear or damage. If any, replace the piston.

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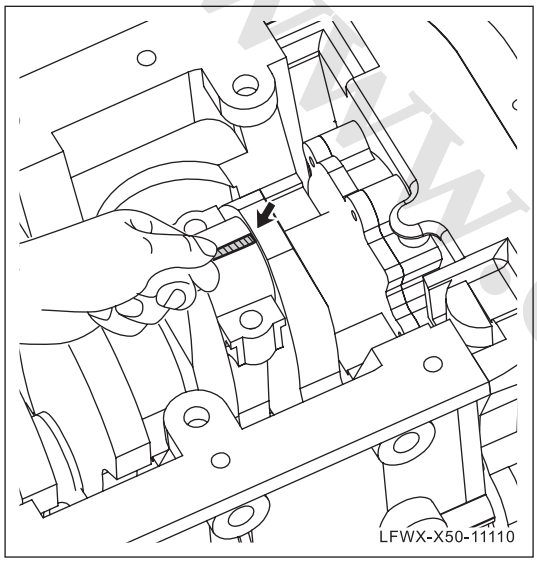


2. CHECK AXIAL CLEARANCE OF PISTON CONNECTING ROD

(a) As shown in the figure, use a feeler gauge to measure axial clearance of piston connecting rod. If the axial clearance is more than the maximum value, replace the connecting rod group.

Standard axial clearance: 0.15 - 0.25mm

Maximum axial clearance: 0.3mm



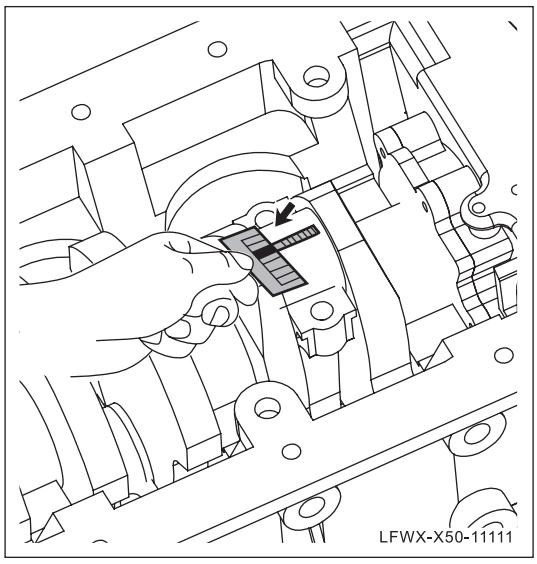
3. CHECK CONNECTING ROD OIL-FILM CLEARANCE

(a) Remove fixing bolt of connecting-rod cap, and then remove the connecting rod cap with bearing assembly.

(b) A section of plastic oil clearance gauge goes through crankshaft connecting rod journal.

(c) Install connecting rod cap and fixing bolts.

Torque: 26N•m



(d) Remove fixing bolt of connecting-rod cap, and then remove the connecting rod cap with bearing assembly.

(e) Measure the plastic oil clearance at the widest position. If the oil clearance is more than the maximum value, replace the bearing. If necessary, grind or replace the crankshaft.

Standard oil-film clearance: 0.01 - 0.02mm

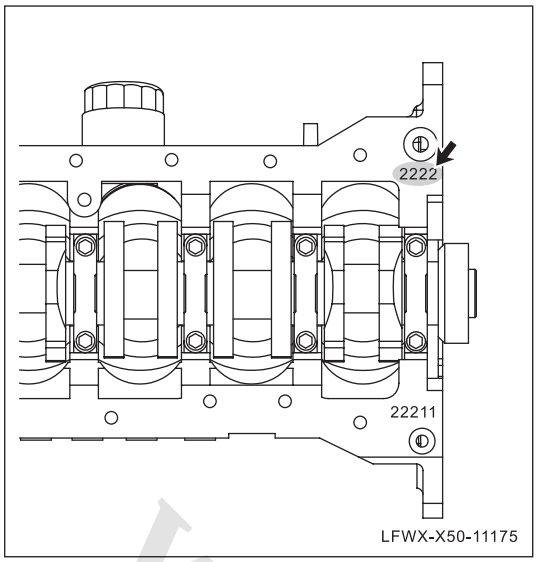
Maximum oil-film clearance: 0.08mm

NOTICE:

- **There are 5 types of connecting-rod bearing for optional according to actual condition.**
- **Matching method from the top to the 4th connecting rod bearing bush: 7-(connecting rod hole number+ connecting rod neck number) = connecting rod bearing number**

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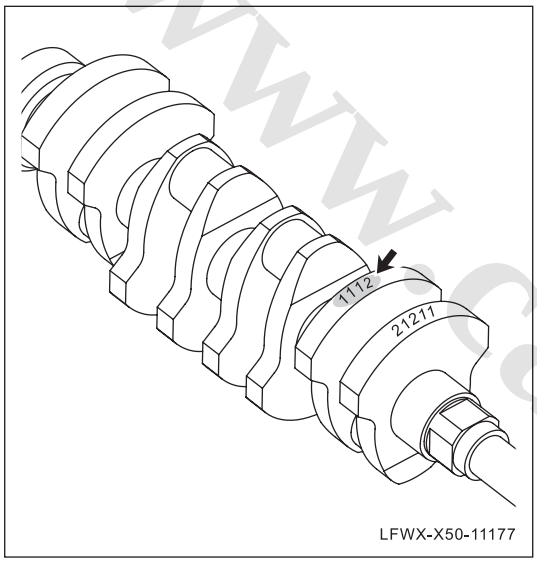


LFWX-X50-11175

The position of connecting-rod hole number is shown in the figure.

△ HINT:

The five figures of 22211 respectively represents the connecting rod hole number from 1st to 4th cylinder; they are just signals and may vary at the different engines.

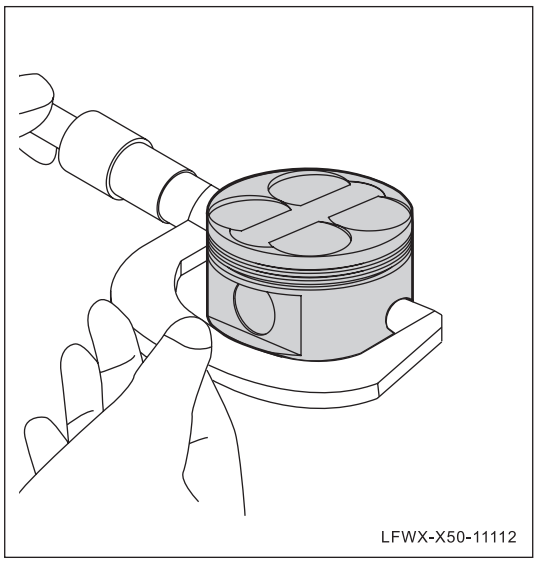


LFWX-X50-11177

The position of connecting-rod journal number is shown in the figure.

△ HINT:

The five figures of 21211 respectively represents the connecting rod neck number from 1st to 4th cylinder; they are just signals and may vary at the different engines.

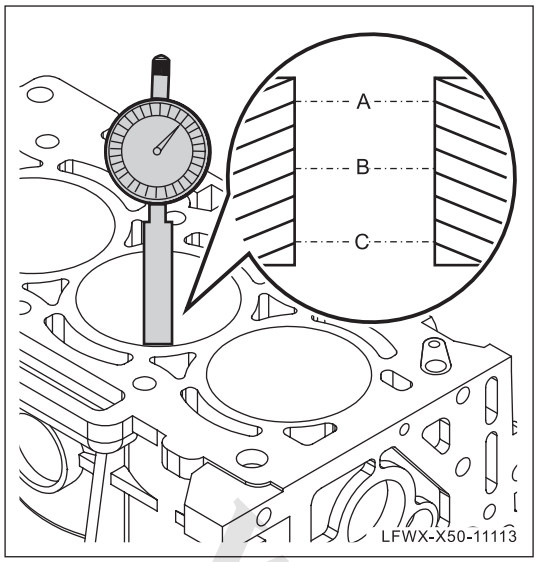

LFWX-X50-11112

4. CHECK PISTON DIAMETER

(a) Use a screw micrometer to measure piston diameter perpendicular to piston pin centerline.

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5. CHECK PISTON OIL FILM CLEARANCE

(a) Measure the diameter of the cylinder bore at the positions of A, B and C by using cylinder bore gauge.

Standard diameter: 78.7mm

△ HINT:

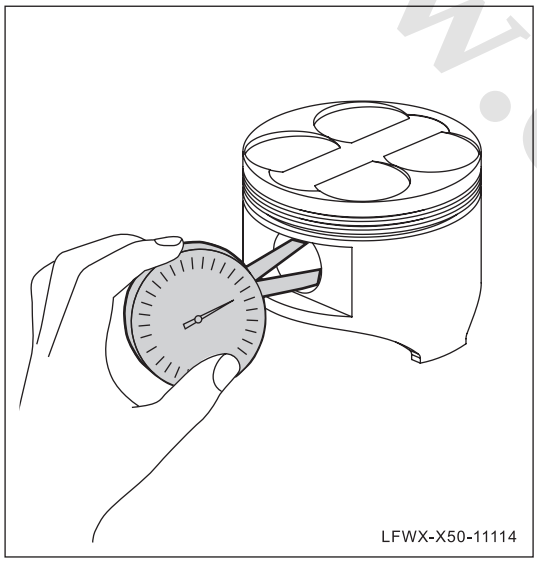
Measure once along the axial direction and the thrust direction at each position respectively.

(b) Calculate the difference between the maximum and the minimum of the 6 measured values.

NOTICE:

If the measured diameter is more than the maximum value, replace the crankshaft.

(c) Cylinder hole diameter value minus piston diameter measurement is the piston oil film clearance. If it is greater than the maximum oil film clearance, replace all 4 pistons, and take cylinder reboring. If necessary, replace cylinder block.



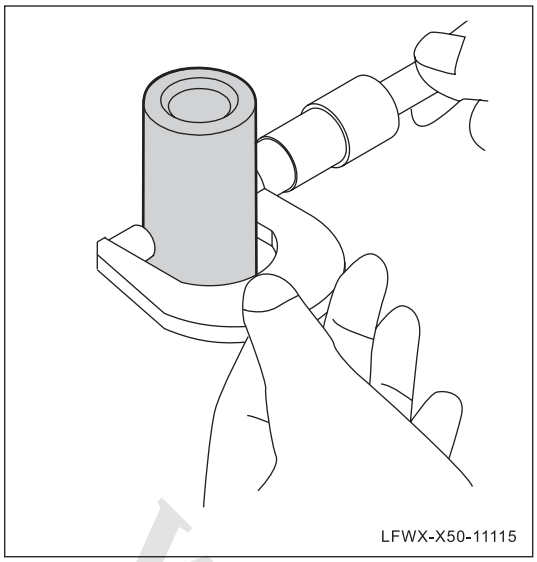
6. CHECK PISTON PIN OIL FILM CLEARANCE

(a) Measure piston pin mounting hole diameter with an internal diameter micrometer.

Piston pin hole diameter: 20.006 - 20.015mm

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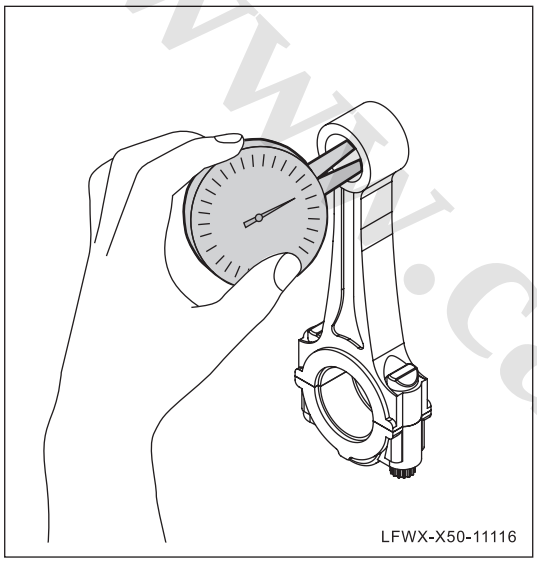
(b) Measure piston pin outer diameter with a screw micrometer.

Piston pin outer diameter: 20.004 - 20.013mm

(c) Piston pin mounting hole minus piston pin excircle diameter is piston pin oil film clearance. If it is larger than the maximum value, replace the piston pin. If necessary, replace the piston.

Standard oil-film clearance: 0.002 - 0.011mm

Maximum oil-film clearance: 0.011mm



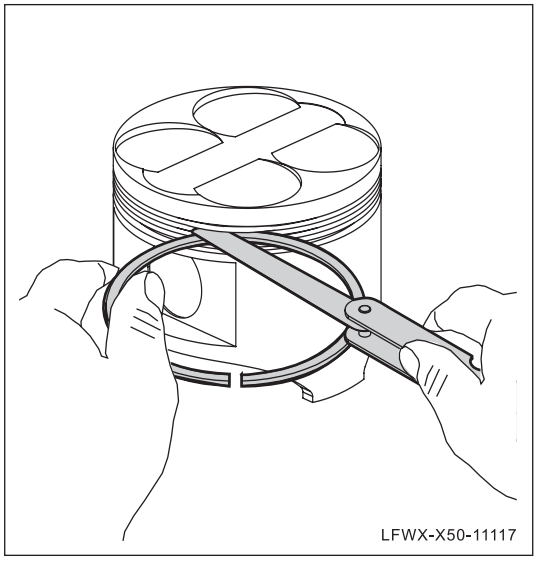
(d) Measure internal diameter of connecting rod small end hole with an internal micrometer.

Internal diameter of connecting rod small end hole: 20.012 - 20.021mm

(e) Subtract the outer diameter of the piston pin from the internal diameter of the connecting rod small end to the piston pin oil film clearance. If it is larger than the maximum value, replace the connecting rod. If necessary, replace the piston and connecting rod.

Standard oil-film clearance: 0.001 - 0.017mm

Maximum oil-film clearance: 0.017mm



7. CHECK PISTON RING GROOVE GAP

(a) Measure the gap between piston ring and wall with a gap gauge. If it exceeds the maximum value, replace the piston.

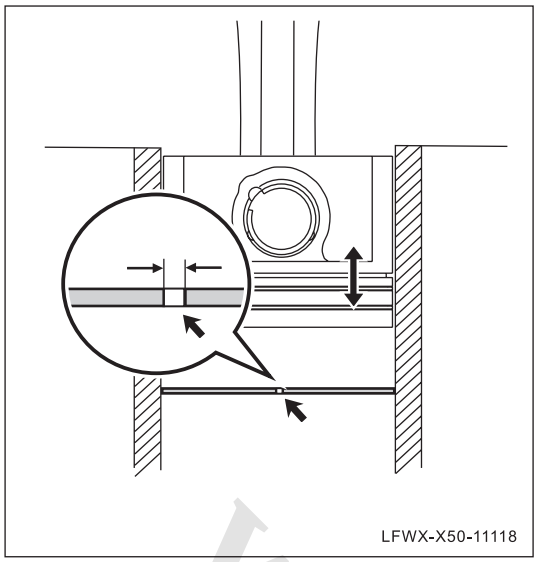
Clearance of ring groove:

Top ring groove: 0.04 - 0.08mm

Second ring groove: 0.03 - 0.07mm

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8. CHECK PISTON RING GAP

(a) Insert piston ring into cylinder hole.

(b) As shown in the figure, push the ring into the cylinder bore with the piston to make it exceed the bottom of ring stroke slightly.

(c) Measure the piston ring gap with the feeler gauge. If the opening gap is more than the maximum value, be sure to replace the piston ring.

Standard end play:

Top ring: 0.25 - 0.45mm

Second ring: 0.35 - 0.6mm

Film loop: 0.15 - 0.5mm

Maximum piston ring gap:

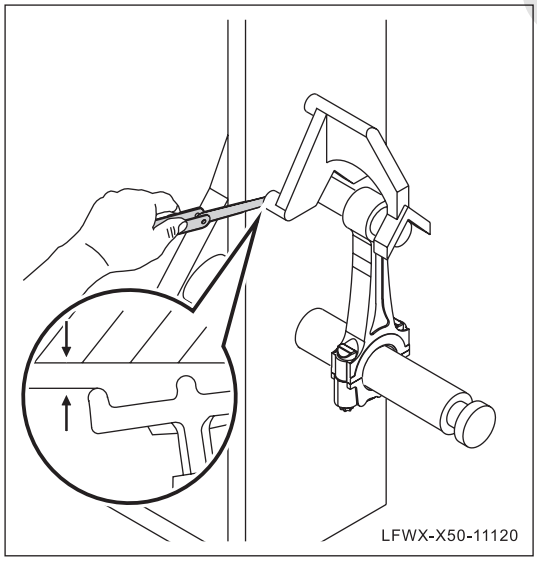
Top ring: 1.05mm

Second ring: 1.20mm

Film loop: 1.10mm

NOTICE:

If new piston ring is used, but the ring gap still exceeds the maximum value, rebore 4 cylinders or replace cylinder block.



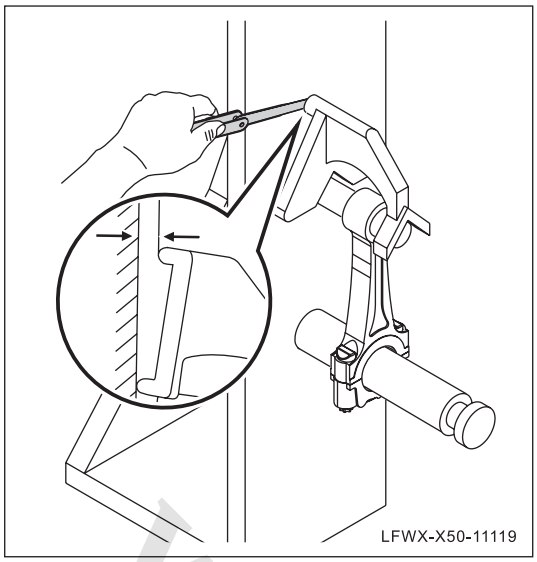
9. CHECK CONNECTING ROD

(a) As shown in the figure, check the connecting-rod distortion with the connecting-rod straightener and the feeler gauge. If the distortion is more than the maximum value, be sure to replace the connecting-rod group.

Maximum deviation: 0.05mm (every 100mm)

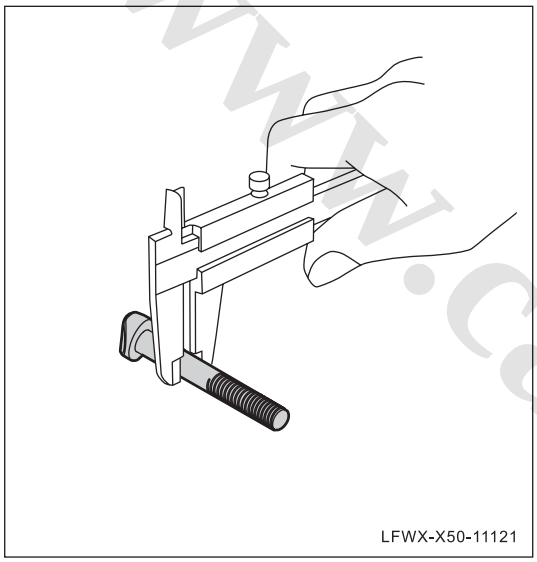
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(b) As shown in the figure, check the connecting-rod straightness with the connecting-rod straightener and the feeler gauge. If the bending is more than the maximum value, be sure to replace the connecting-rod group.

Maximum deviation angle: 0.05mm (every 100mm length)



10. CHECK CONNECTING ROD BOLT DIAMETER

(a) Measure outer diameter of the connecting rod bolt with the vernier caliper. If it is less than the minimum value, replace the whole set of connecting rod bolt and nut.

Standard diameter: 7.30 - 7.40mm

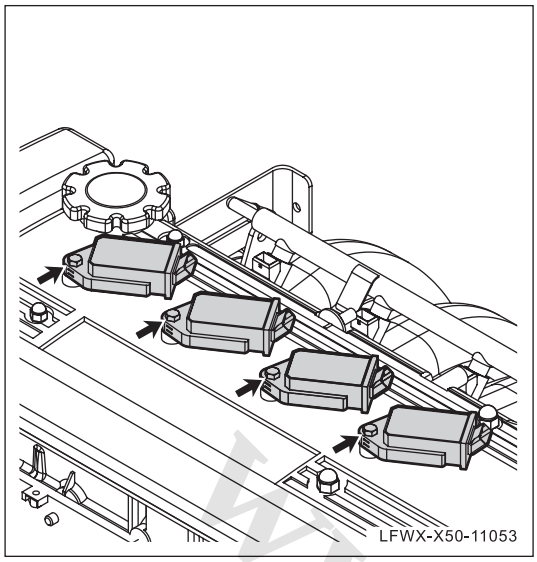
Minimum diameter: 7.20mm

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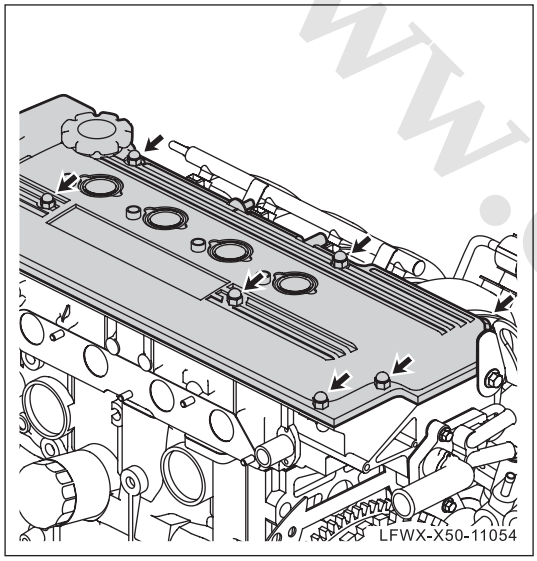
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REPLACEMENT

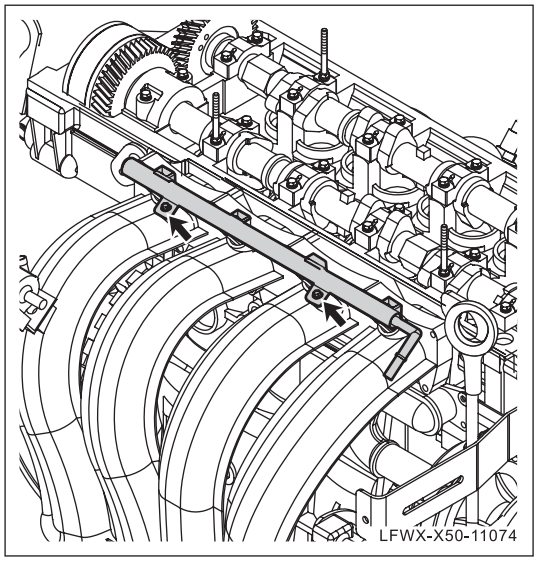


1. REMOVE ENGINE PISTON AND CONNECTING-ROD

(a) Remove the high-voltage ignition coils and spark plugs.



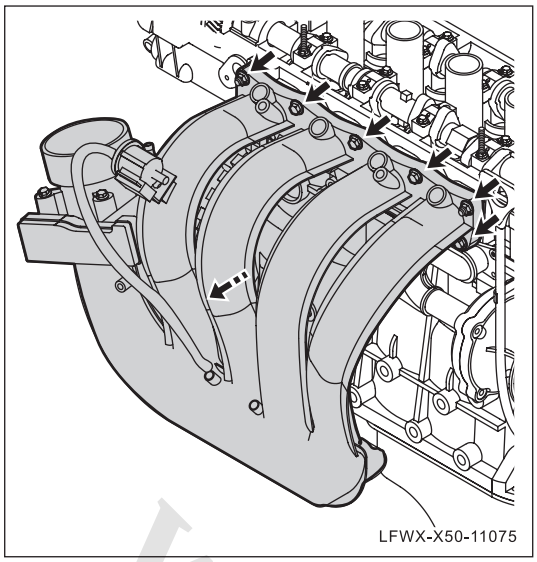
(b) Remove fixing nut of cylinder head, and remove cylinder head cover.



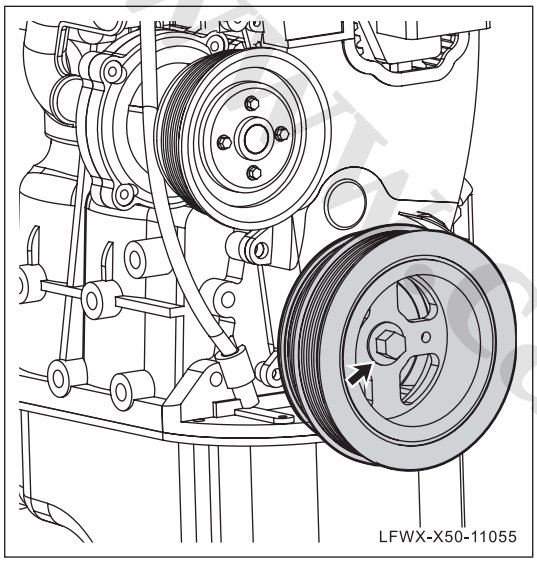
(c) Remove the fuel rail fixing bolts, and then remove the fuel rail.

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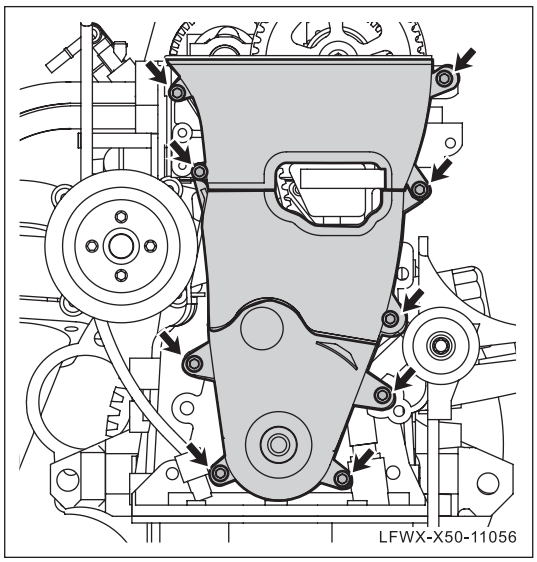
(d) Remove intake manifold assembly.



(e) Remove the crankshaft pulley.

△ HINT:

When removing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.



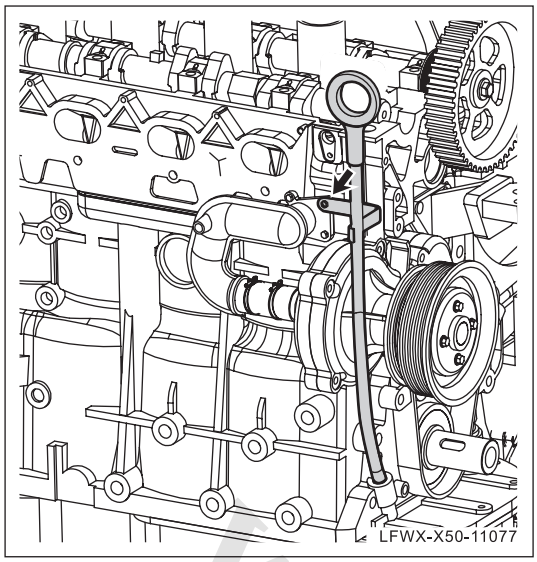
(f) Remove the pulley timing mechanism assembly.

△ HINT:

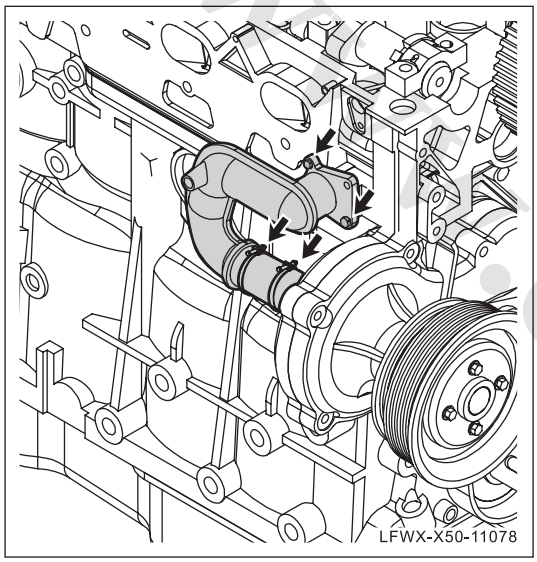
It is unnecessary to remove the camshaft pulley separately. You can remove it together with the camshaft.

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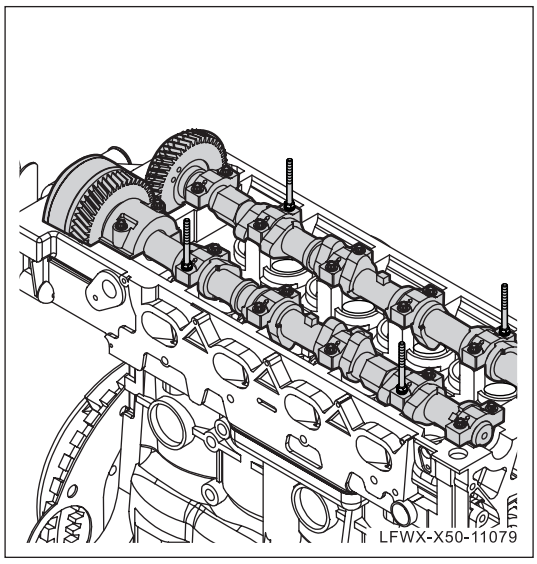
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(g) Remove the fixing bolt of the dipstick, and then remove the dipstick assembly.



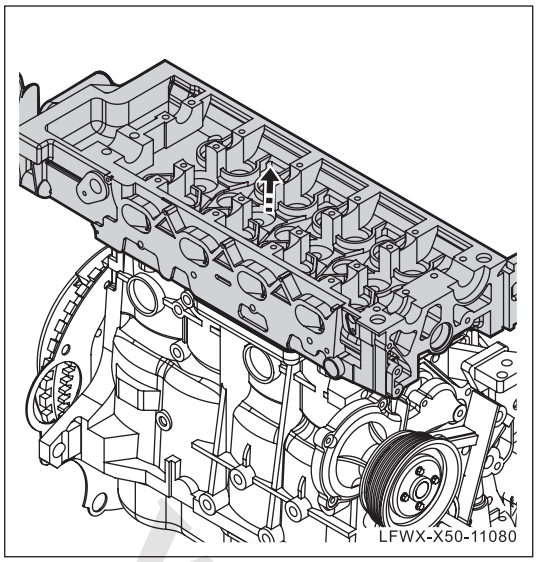
(h) Remove the connecting pipes of the water pump.



(i) Remove the intake/exhaust camshaft assembly.

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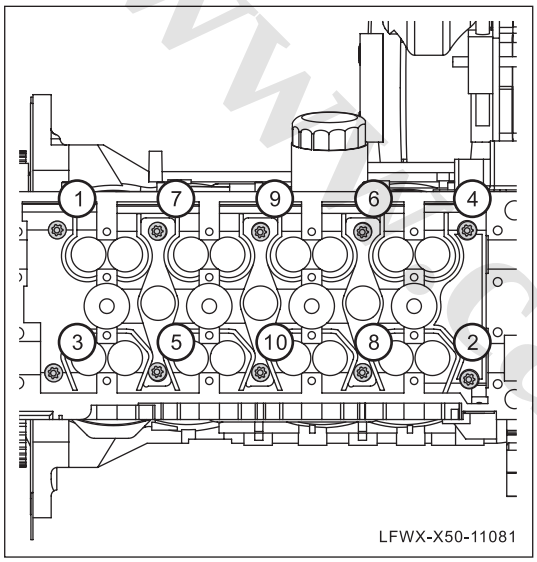
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(j) Remove the fixing bolts of the cylinder head, and then remove the cylinder head assembly and the cylinder head gasket.

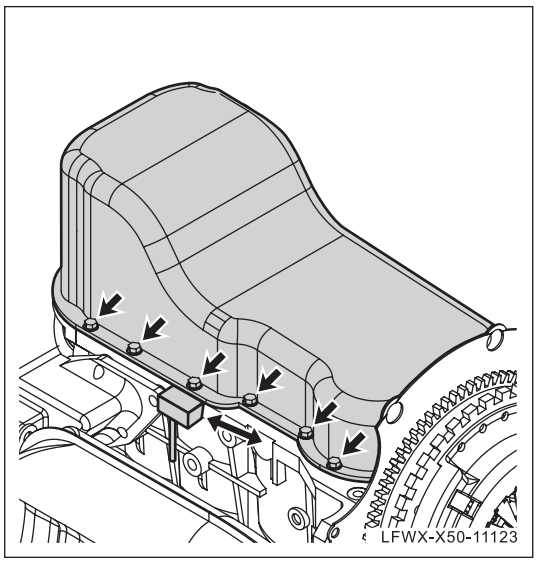
△ HINT:

Put the removed bolts together to avoid being lost.



NOTICE:

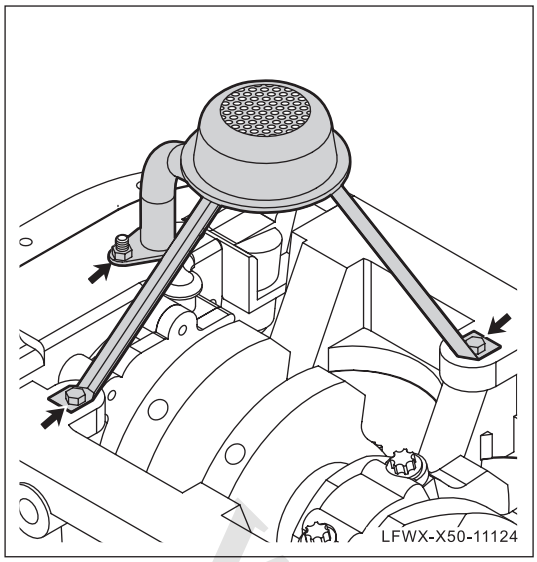
When removing cylinder head bolt, unscrew and remove cylinder head bolt in order shown in the figure.



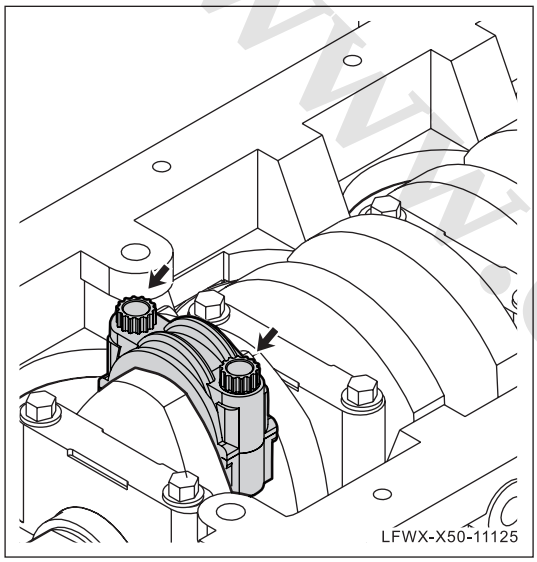
(k) Remove the fixing bolts of the oil pan, and remove the oil pan with oil pan remover.

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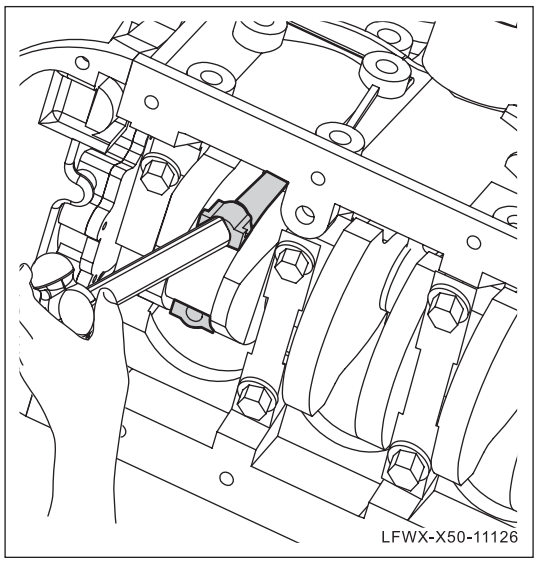
(l) Remove the oil strainer fixing bolts and nuts and take out the oil strainer.



(m) Rotate crankshaft, make pistons of No. 1 and No. 4 cylinders in lowest point (it means No. 1 and No. 4 connecting rod cap expose vertically).

(n) Remove fixing bolts of connecting rod cap, take down connecting rod cap and bearing bush.

(o) Use the same method to dismantle other connecting rod caps and bearing bushes.



(p) Push out piston assembly.

NOTICE:

To avoid damage to connecting rod end face, make sure to use wooden or rubber object instead of metallic object to push out the piston assembly.

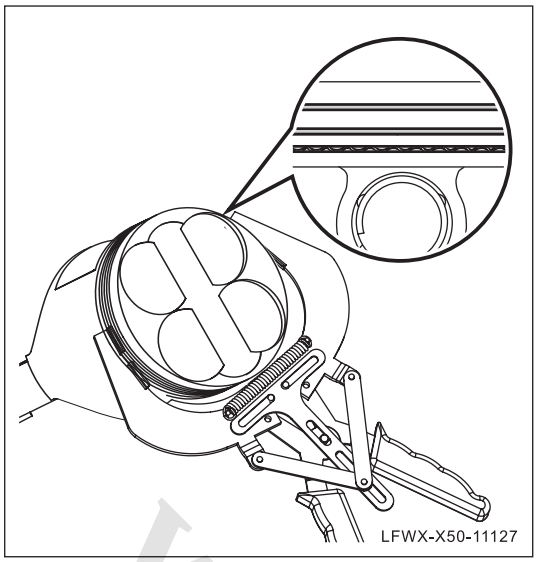
(q) Remove piston assembly from the other side.

NOTICE:

Place the piston and connecting rod components in correct sequence. Do not mix them.

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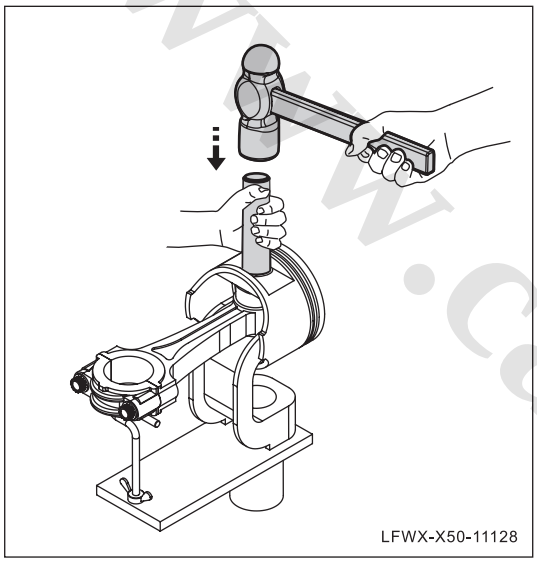


2. DISMANTLE PISTON AND CONNECTING ROD ASSEMBLY

(a) Use piston ring expander to remove top ring, second ring and combined oil ring.

NOTICE:

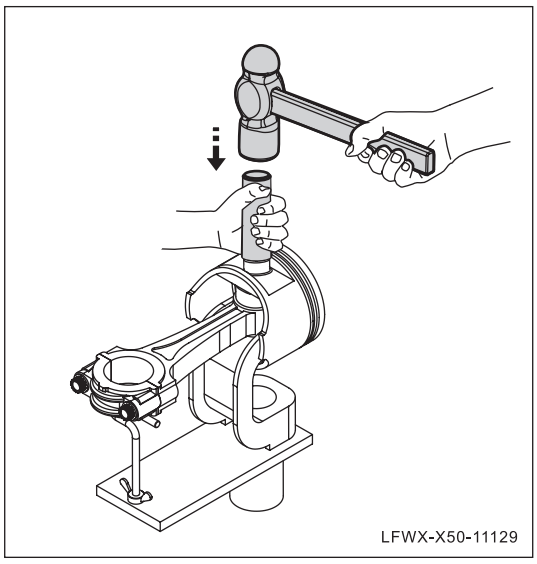
Put piston rings and combined oil ring in the correct sequence and make marks.



(b) Drive out piston pin with a punch bar.

△ HINT:

If it is difficult to obtrude the piston pin with the impact bar, you can press the piston pin with the hydraulic bench.



3. ASSEMBLE PISTON AND CONNECTING ROD ASSEMBLY

(a) Uniformly apply a layer of clean oil on piston pin.

(b) Make the connecting-rod small end align the piston pin hole, and insert the piston pin into the piston pin hole.

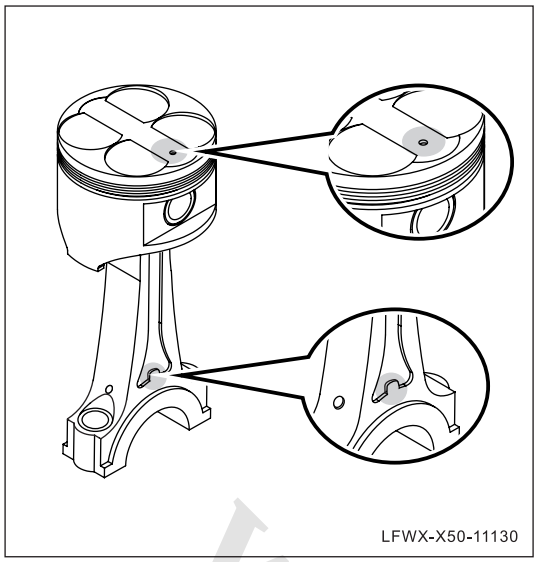
(c) Install the piston pin with the impact bar or the hydraulic bench.

△ HINT:

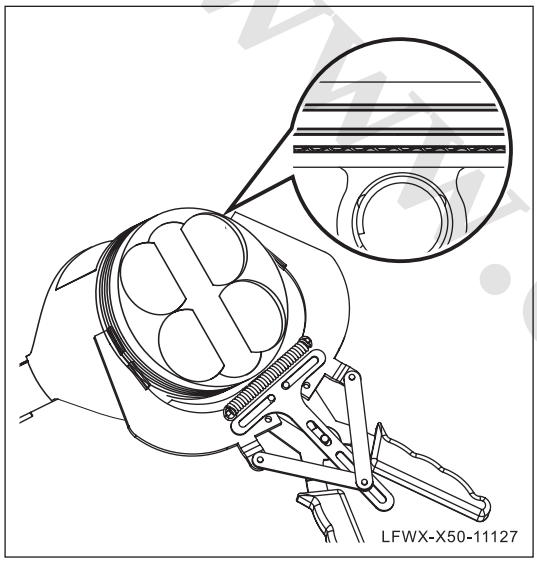
- When installing the piston pin, heat the connecting-rod to 85°C in order to install the piston pin easily. When it is necessary to take the connecting-rod with your hand, you have to wear a pair of gloves for heat insulation.

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- Take care to align the forward marks of piston and connecting rod during installation.

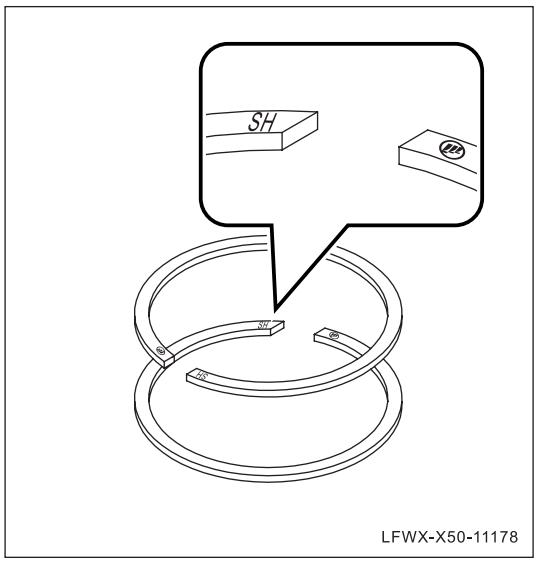


(d) Use clean oil to lubricate piston ring and piston skirt.

(e) Use piston ring expander to install the first and the second compression rings and combined oil ring.

NOTICE:

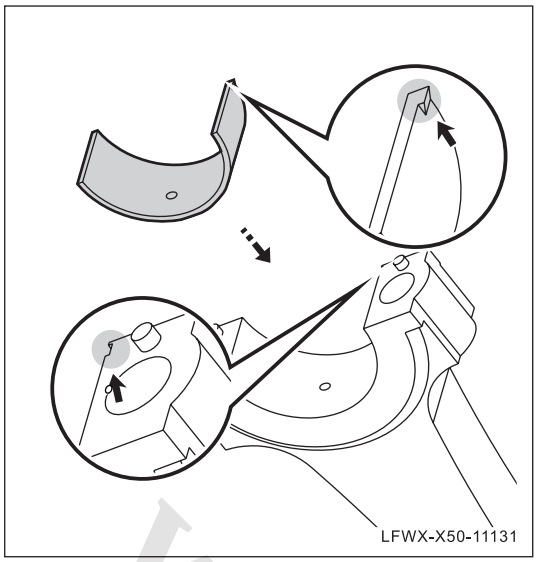
- **Install the piston rings and the combined ring properly according to the marks made at the time of removal.**



- **An "SH" mark and a "LIFAN" sign are printed on the surface of the 1st and 2nd piston rings; install them upward.**

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4. INSTALL PISTON AND CONNECTING ROD ASSEMBLY

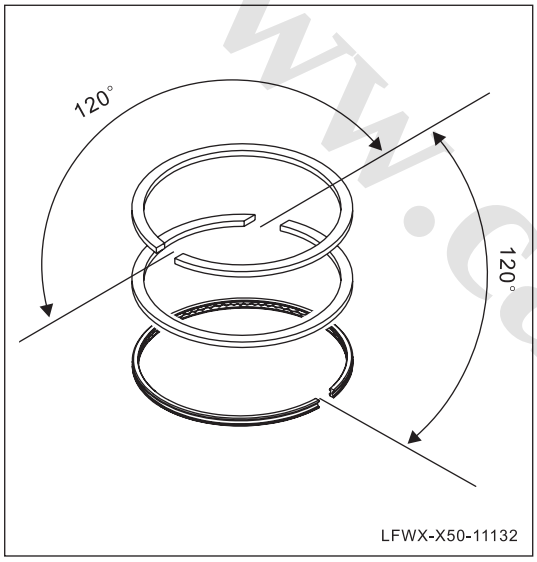
(a) Install the upper bush of the connecting rod bearing.

NOTICE:

- **Make sure that the connecting rod and the connecting rod bearing back are clean without any debris.**
- **It is forbidden to lubricate the bearing back.**
- **During installation, make sure that the positioning tongue of the bearing is in alignment with the positioning groove on the connecting rod.**

△ HINT:

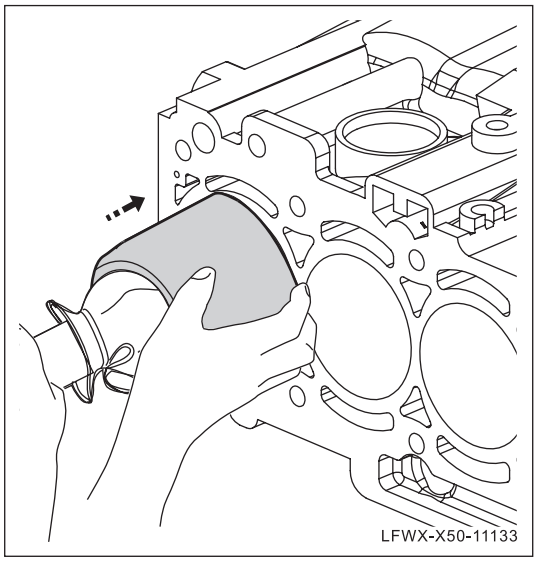
Drop clean oil onto the inside of the connecting rod bearing



(b) As shown in the left figure, rotate and adjust the position of the piston ring joint.

NOTICE:

It is forbidden to allow a piston ring joint align its piston-pin opening or other piston ring joint. Otherwise, the piston rings can not be well sealed, and pay attention to the marks and chamferings on the piston rings. And keep in mind not to install them reversely.



(c) Push the piston assembly into the cylinder with the mounting tool for piston and a wooden bar.

△ HINT:

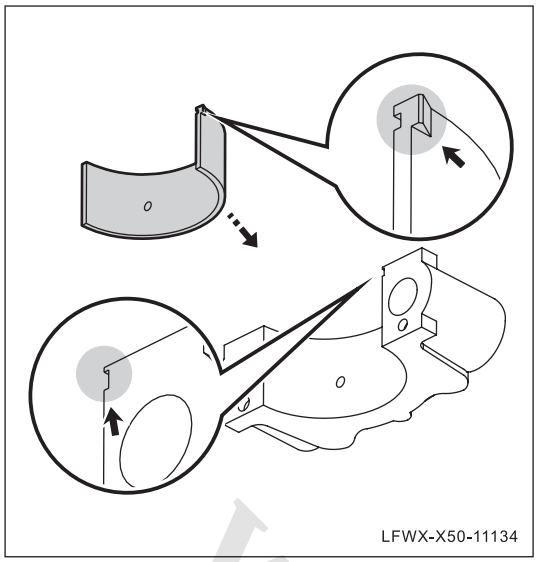
- Compress the piston ring to its working position with the piston ring compressor.
- If there is no special tool, make a ring barrel with sheet iron.
- Rotate crankshaft to make connecting rod journal to be installed locate at the bottom dead center.
- Before installation, apply a thin layer of clean oil onto the cylinder wall.

NOTICE:

Be sure to push the piston assembly with wooden or rubber material instead of metallic material.

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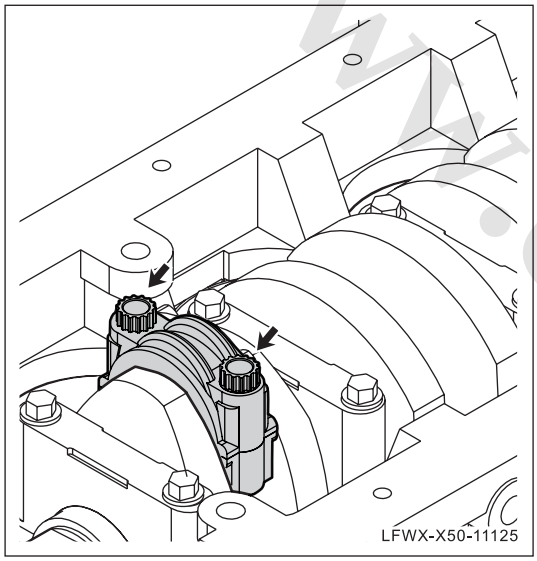
(d) Install the lower shell of the connecting rod bearing to the connecting rod cap.

NOTICE:

- **Make sure that the connecting rod end cap and the connecting rod bearing back are clean without any debris.**
- **It is forbidden to lubricate the bearing back.**
- **During installation, make sure that the positioning tongue of the bearing is in alignment with the positioning groove on the connecting rod end cap.**

△ HINT:

Use clean lubricating oil to lubricate the inside of lower bush of connecting rod bearing bush.



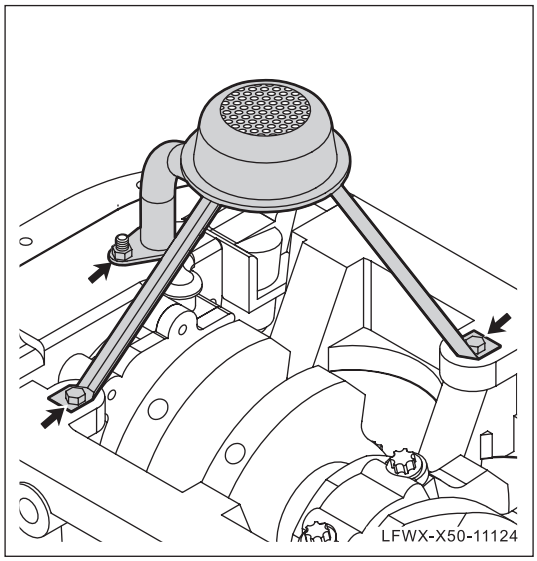
(e) Install the connecting rod cap and tighten its fixing bolts.

Torque:26N•m

NOTICE:

Make sure to install the connecting rod cap in place to make its positioning groove align the connecting-rod positioning pin for installation.

(f) Install the other connecting rod caps in the same manner.

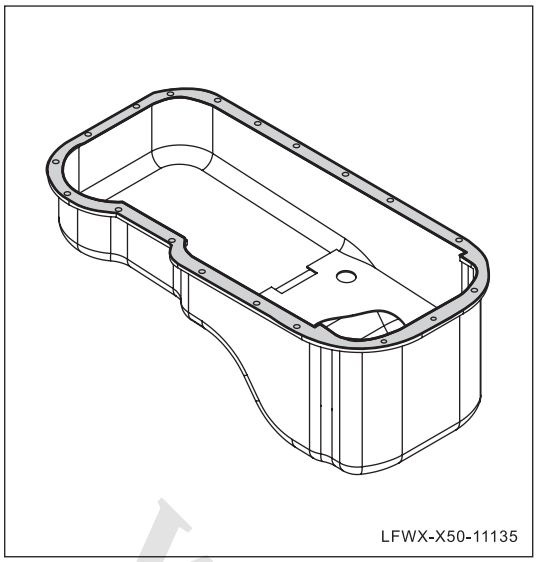


(g) Install the oil strainer in the cylinder block, and then tighten its fixing bolts.

Torque: 10N.m

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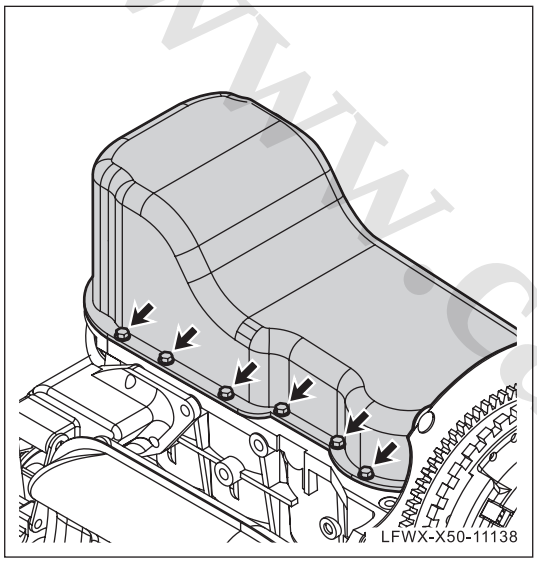
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(h) Apply sealant uniformly to the mounting surface of oil pan.

NOTICE:

When coating new sealant, be sure to clean the residual sealant completely on the cylinder block and the oil pan in advance.



(i) Install the oil pan to the cylinder block, and tighten all its fixing bolts.

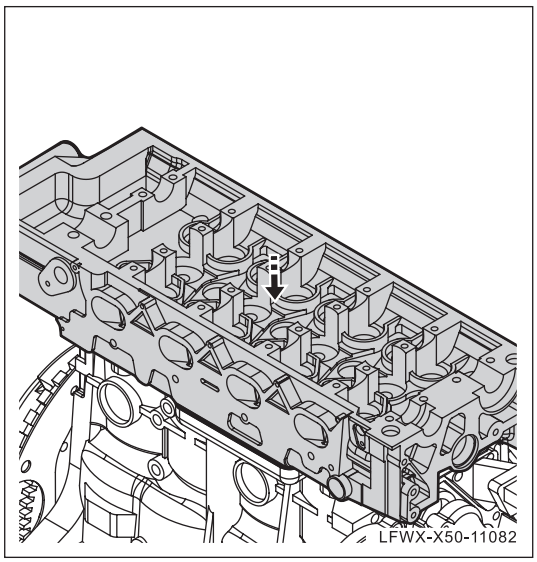
Torque: 10N•m

△ HINT:

When installing the fixing bolt of oil pan, apply clean engine oil onto the bolt threads.

NOTICE:

When tightening the bolt, start the tightening in the middle and then to both sides.



(j) Install the cylinder-head gasket and the cylinder-head, and tighten the fixing bolts of the cylinder-head.

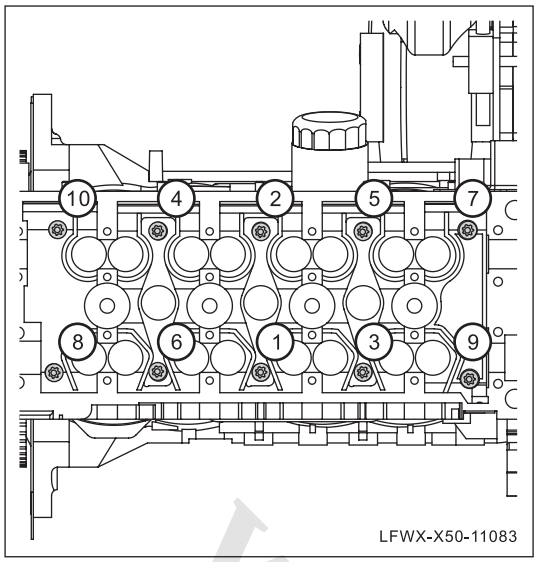
Torque: 90N•m

NOTICE:

When replacing the cylinder-head gasket with a new one, pay attention to its front and back for correct installation.

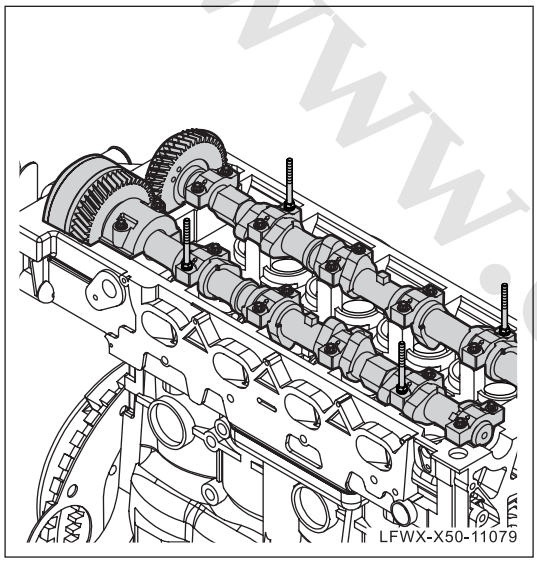
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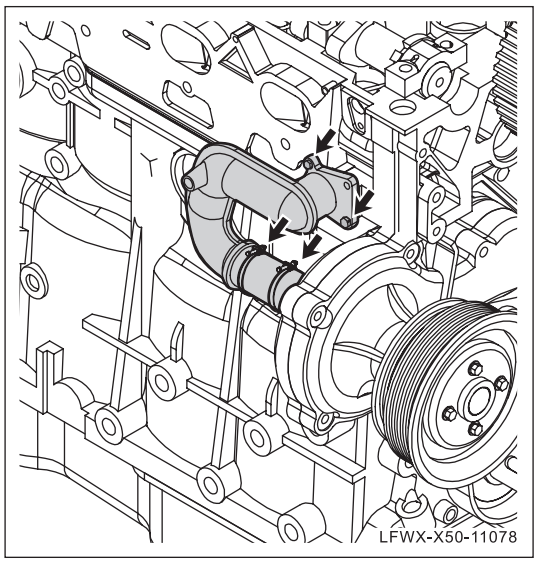
NOTICE:

- **Apply a proper amount of clean oil onto the threads of the cylinder head fixing bolt.**
- **When tightening the cylinder head bolt, be sure to tighten them in multiple times in the order as shown in the figure.**



(k) Install the intake/exhaust camshaft assembly, and tighten their tightening bolts.

Torque: 25N•m

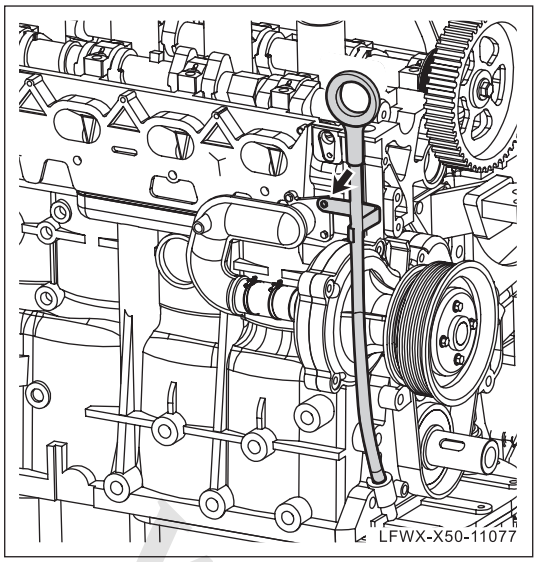


(l) Install the connecting pipes of the water pump, and tighten their tightening bolts and clamps.

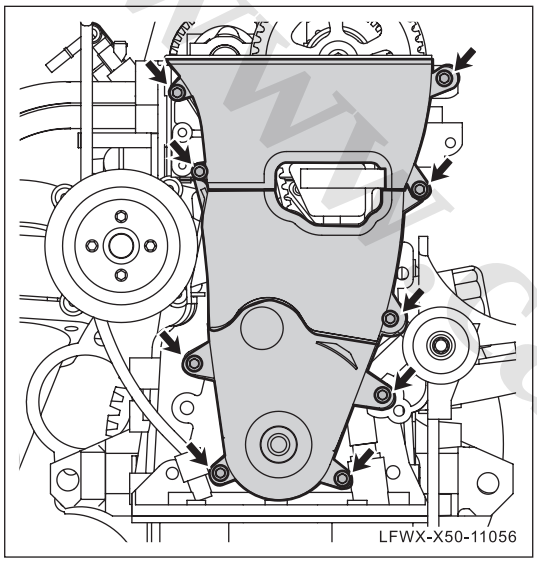
Torque: 25N•m

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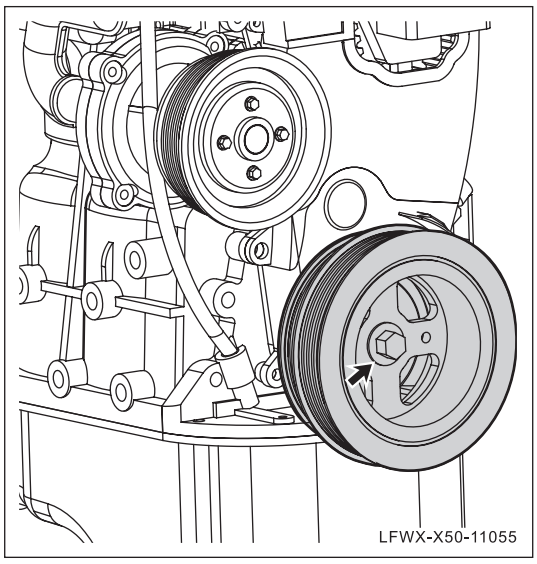
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(m) Install the dipstick assembly.



(n) Install the pulley timing mechanism.



(o) Install the crankshaft pulley, and tighten its fixing bolts.

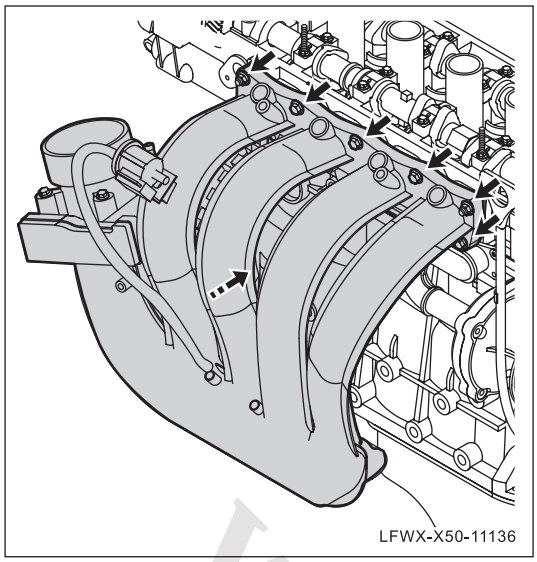
Torque: 145N•m

△ HINT:

When installing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.

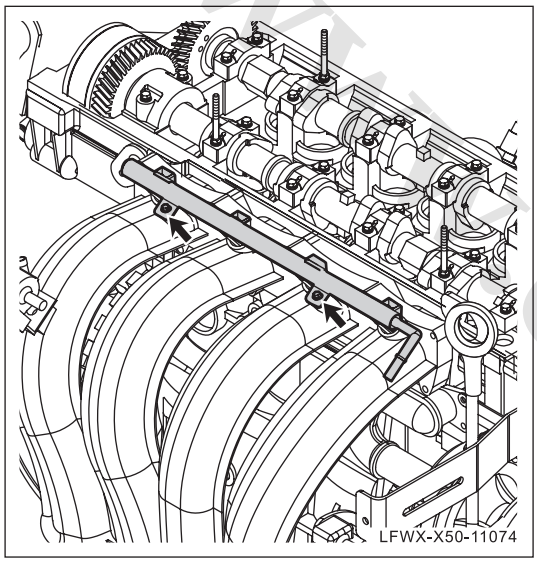
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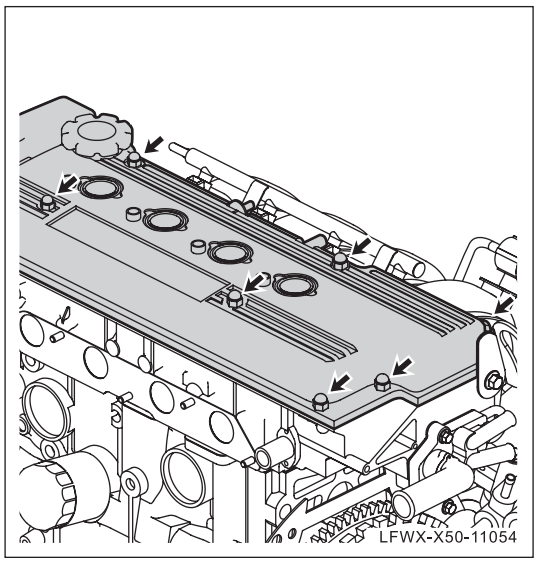
(p) Install the intake manifold assembly, fix the fixing nuts and fixing bolts and screw them up.

Torque: 23N•m



(q) Install the fuel rail, and tighten the fuel rail fixing bolts.

Torque: 25N•m

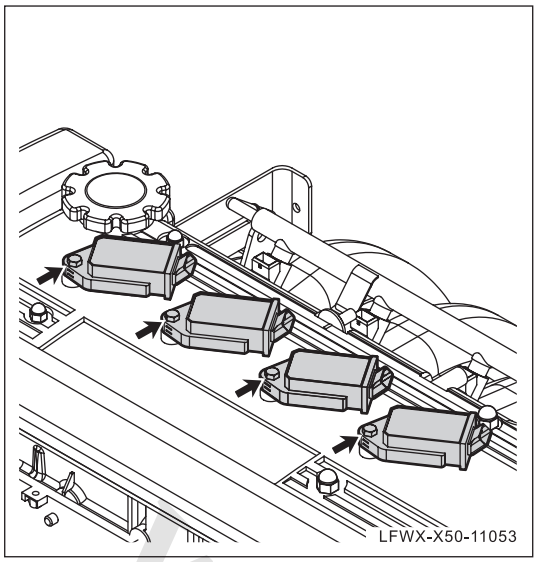


(r) Install the cylinder head cover, and tighten its tightening bolts.

Torque: 12N•m

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(s) Install the spark plug and high-voltage ignition coil.

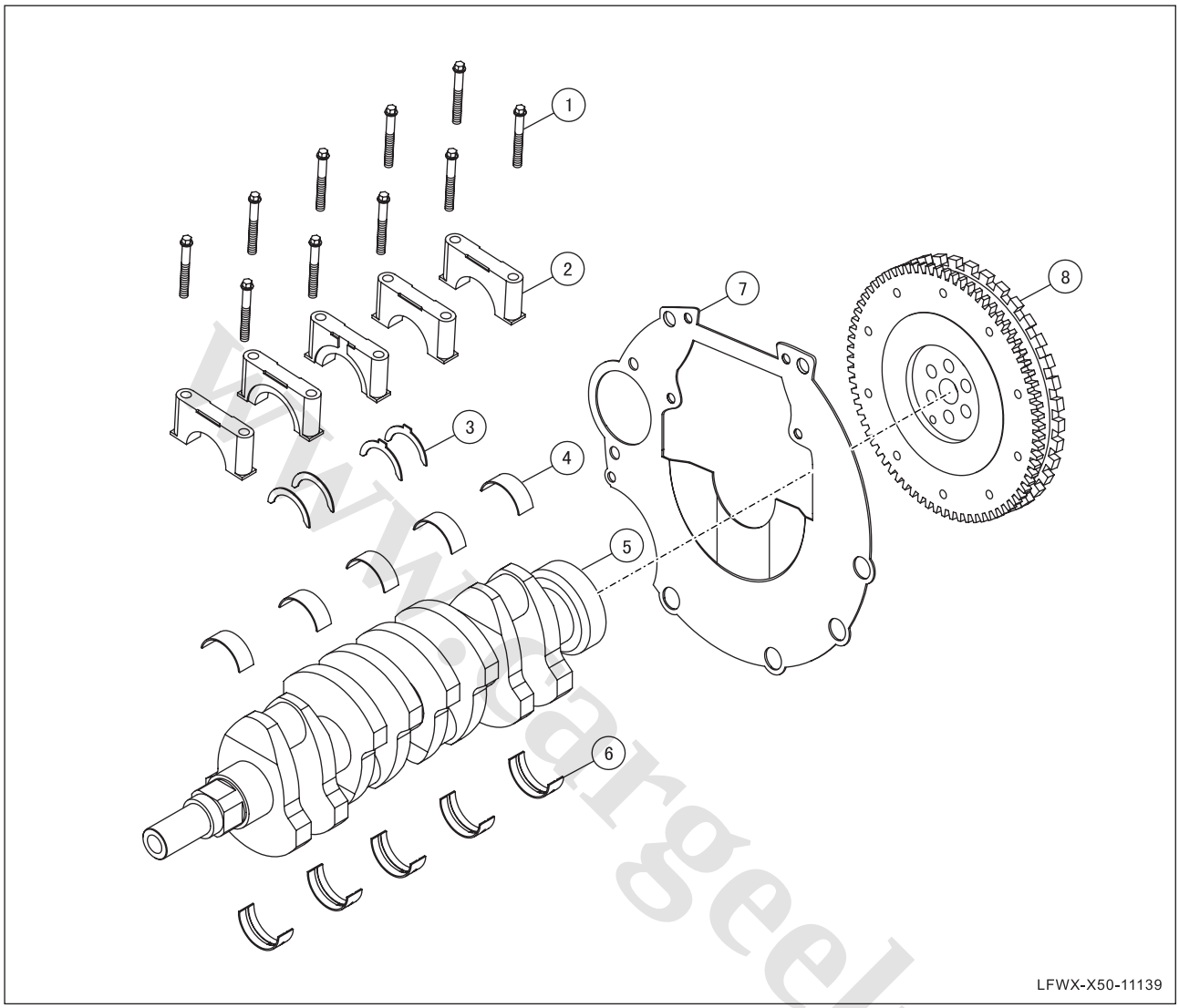
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CRANKSHAFT AND FLYWHEEL

COMPONENTS

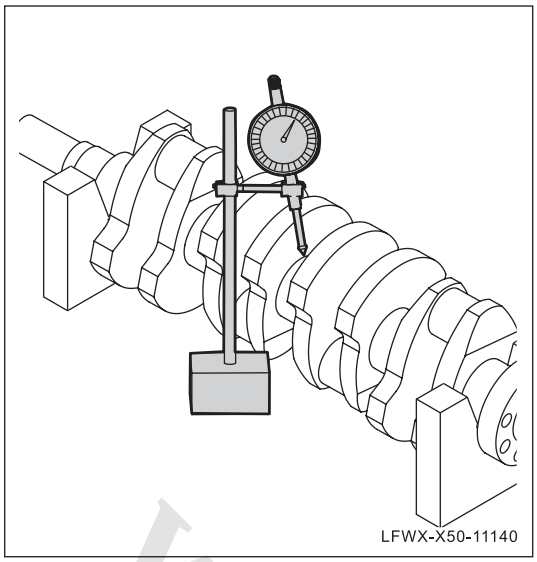


1	Bolt	5	Crankshaft
2	Crankshaft gland	6	Crankshaft bearing (upper)
3	Thrust plate	7	Flywheel baffle
4	Crankshaft bearing (lower)	8	Flywheel

CHECK

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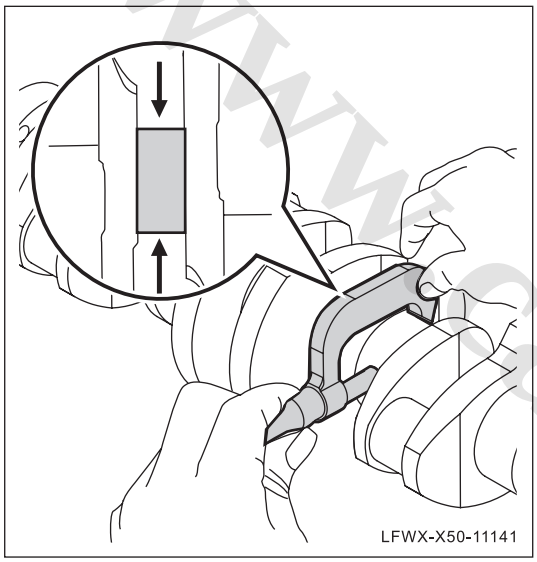


1. CHECK CRANKSHAFT RADIAL RUN-OUT

(a) Place crankshaft on V block.

(b) Measure radial run-out of intermediate journal with a micrometer gauge. If radial run-out is larger than the maximum value, replace the crankshaft.

Maximum radial run-out: 0.03mm



2. CHECK MAIN JOURNAL DIAMETER OF CRANKSHAFT

(a) Measure the diameter of each main journal with the screw micrometer. If the measured diameter is inconsistent with the specified value, be sure to check the oil-film clearance. If necessary, grind or replace the crankshaft.

Standard diameter: 47.982 - 48.000mm

△ HINT:

If the main journal or the connecting rod journal is inconsistent with the specified standard, be sure to grind the crankshaft and connecting rod journal. According to the grinding situations, select the thickened bearing of different levels.

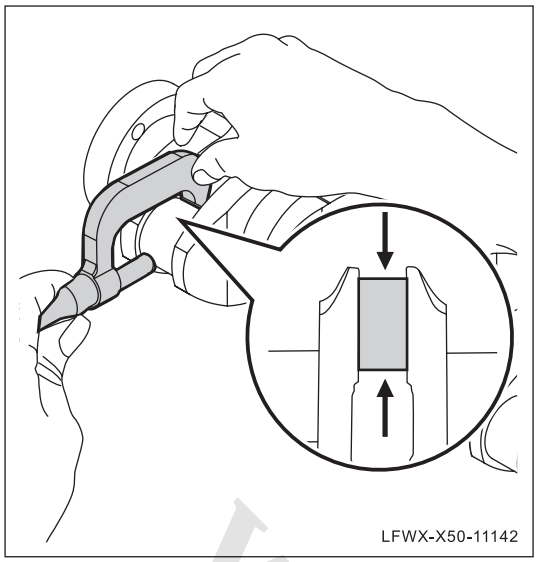
3. INSPECT CRANKSHAFT MAIN JOURNAL OVALITY

(a) As shown in the figure, check each main journal ovality. If it is greater than the maximum value, replace the crankshaft.

Maximum ellipticity: 0.02mm

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4. CHECK CONNECTING ROD JOURNAL DIAMETER OF CRANKSHAFT

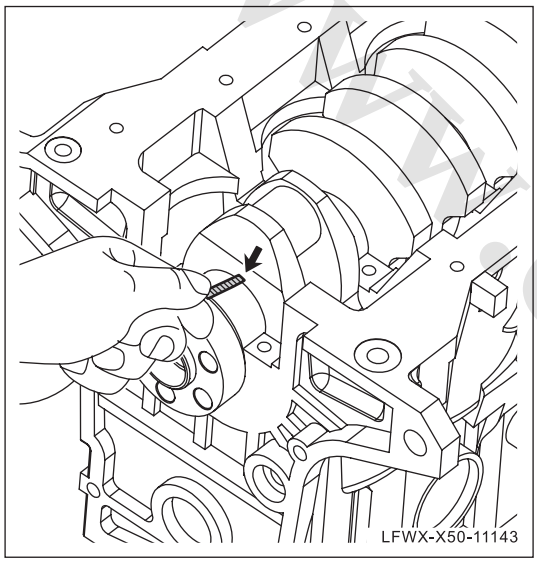
(a) Measure the diameter of each main journal with the screw micrometer. If the measured diameter is inconsistent with the specified value, be sure to check the oil-film clearance. If necessary, grind or replace the crankshaft.

Connecting rod neck diameter: 43.992 - 44.000mm

5. INSPECT CRANKSHAFT CONNECTING-ROD JOURNAL OVALITY

(a) As shown in the figure, check each connecting-rod journal ovality. If the ovality is greater than the maximum, be sure to replace the crankshaft.

Maximum ellipticity: 0.02mm



6. CHECK CRANKSHAFT OIL FILM CLEARANCE

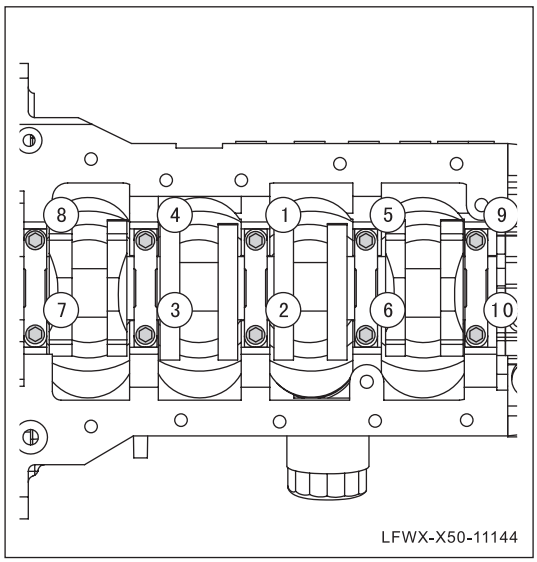
(a) Clean the crankshaft journal and all crankshaft bearing bushes thoroughly.

(b) Install the upper bush of crankshaft bearing bush in the cylinder block, and install the crankshaft in the cylinder block.

(c) A section of plastic oil clearance gauge goes through main journal of the crankshaft.

NOTICE:

Do not rotate the crankshaft.



(d) Install the lower shell of the crankshaft bearing to the crankshaft gland.

(e) Install the crankshaft bearing cap in the cylinder block, and tighten 10 tightening bolts of the main bearing cap based on the sequence shown in the figure.

Torque: For the first time 40N.m;

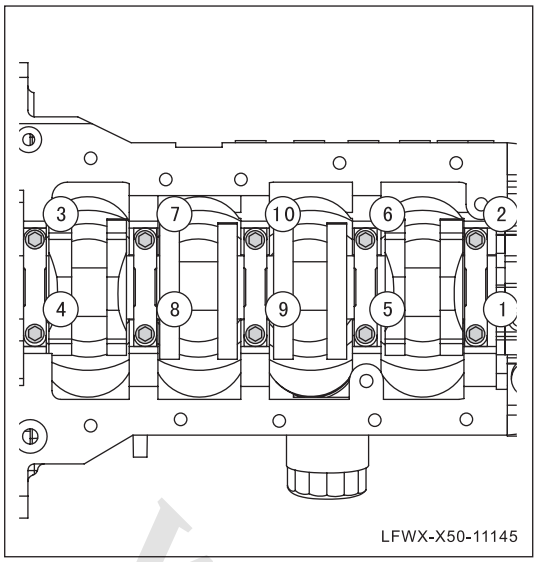
For the second time 78N•m

△ HINT:

Tighten the tightening bolt of the main bearing cap twice.

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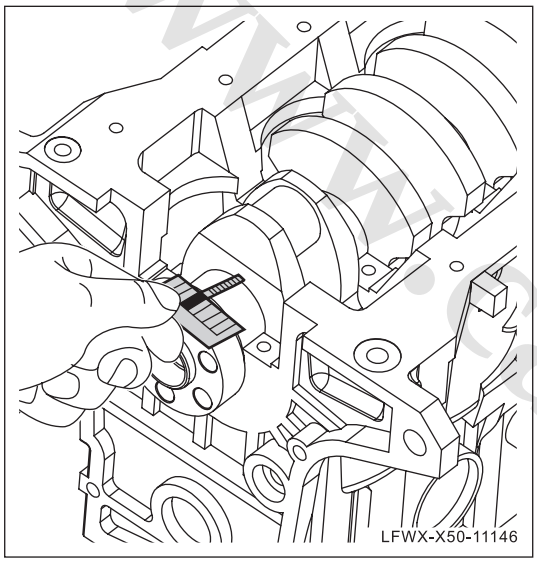
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(f) Remove the 10 tightening bolts of the main bearing cap in the order shown in the figure, and then remove the lower block of cylinder block.

△ HINT:

Tighten and loosen the bolts for several times.



(g) Measure the oil film clearance at the widest position with the plastic oil-film -clearance gauge. If the oil-film clearance is more than the maximum value, be sure to replace the bearing bushes. If necessary, grind or replace the crankshaft.

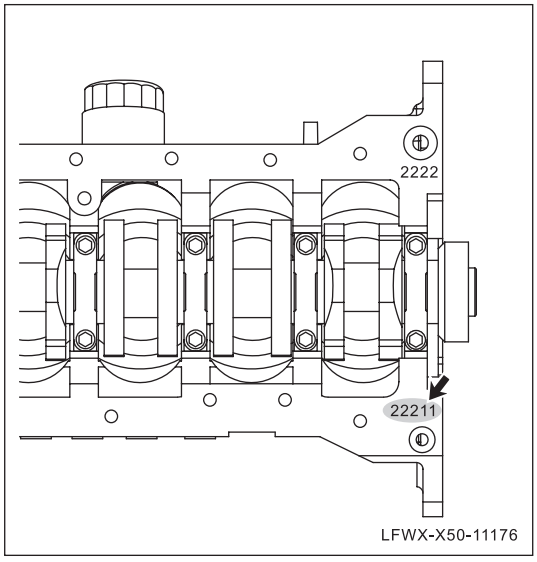
Standard oil-film clearance: 0.02 - 0.04mm

Maximum oil-film clearance: 0.10mm

NOTICE:

- **There are 5 types of main bearing bushes for optional according to actual condition.**
- **For the main bearing bushes from the 1st to the 5th: 7-(Main shaft hole number + Main journal number)= Main bearing bush number**

The position of the main shaft hole number is shown in the figure.

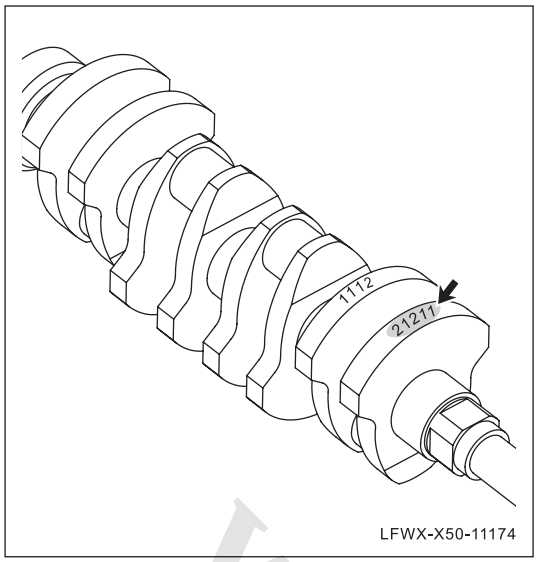


△ HINT:

Five digit "22211" represents the main shaft hole number from the 1st one to the 5th one, respectively. It is just an example. Such figure of various engines may be different.

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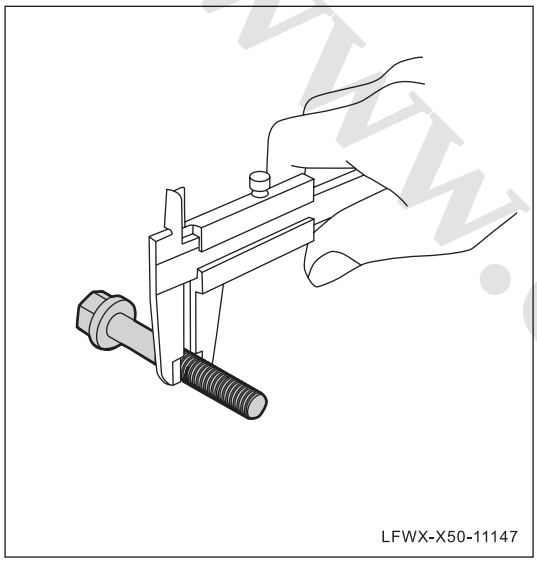
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The position of main journal number is shown in the figure.

△ HINT:

Five digit "21211" represents the main journal number from the 1st one to the 5th one, respectively. It is just an example. Such figure of various engines may be different.

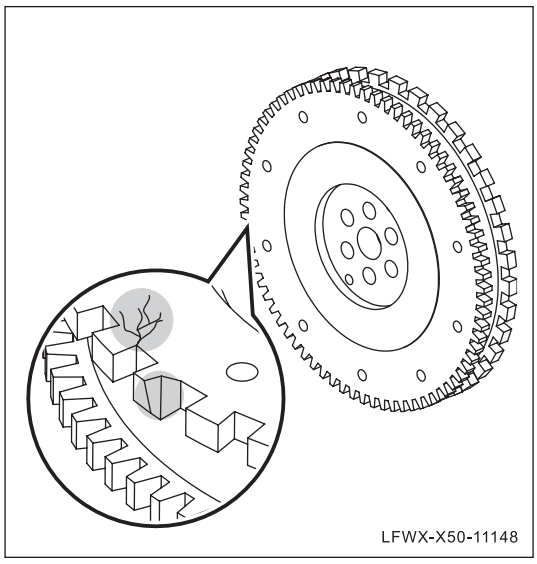


7. CHECK FIXING BOLT OF CYLINDER BLOCK MAIN BEARING CAP

(a) Using the dial caliper, measure the outer diameter of the tightening bolt of the cylinder block main bearing cap. If the outer diameter is less than the minimum value, replace the whole set of the tightening bolts.

Standard outer diameter: 8.80 - 9.00mm

Minimum outer diameter: 8.70mm



8. CHECK VISUALLY FLYWHEEL

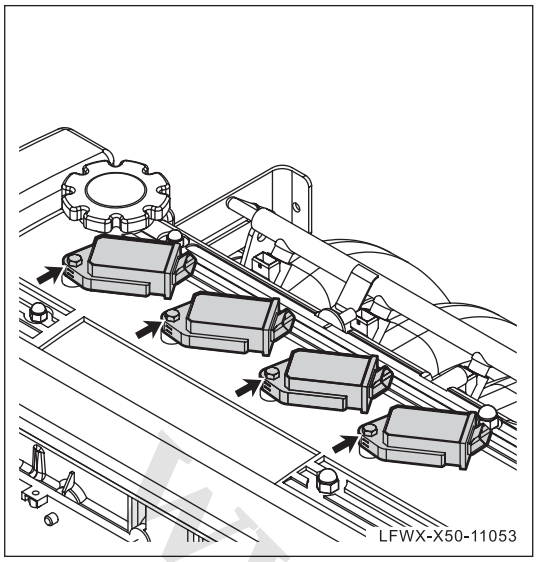
(a) Check visually the flywheel working surface for worn groove or worn ring gear. If any, repair it. If necessary, replace the flywheel.

(b) Check the flywheel teeth for wear or damage, if any, repair it. If necessary, replace the flywheel.

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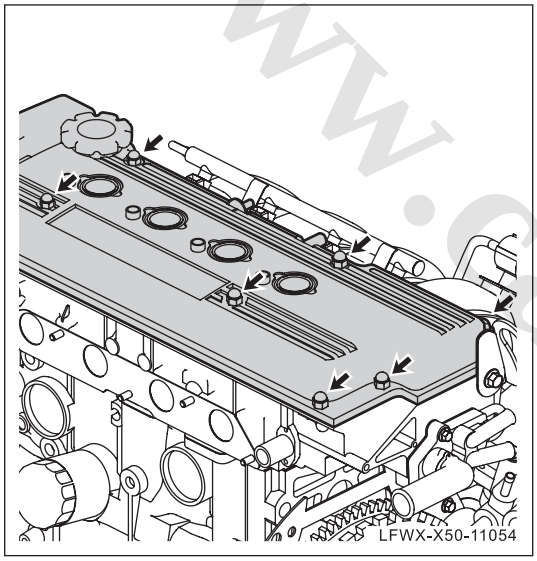
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REPLACEMENT

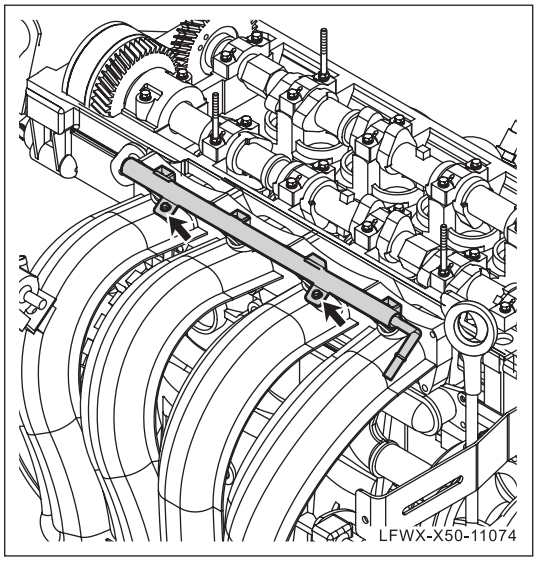


1. REMOVE ENGINE ACCESSORIES

(a) Remove the high-voltage ignition coils and spark plugs.



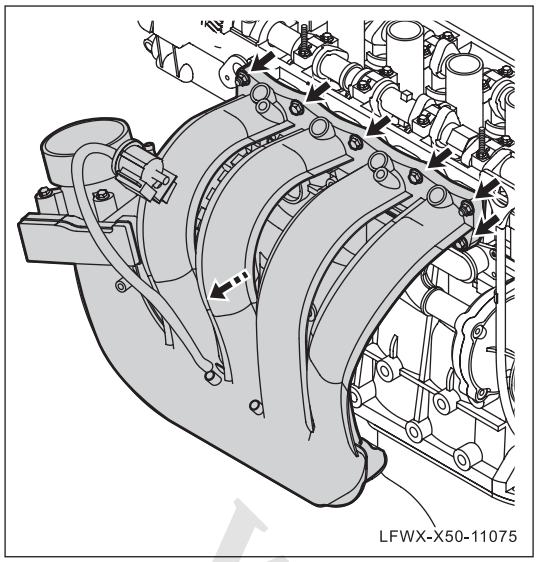
(b) Remove fixing nut of cylinder head, and remove cylinder head cover.



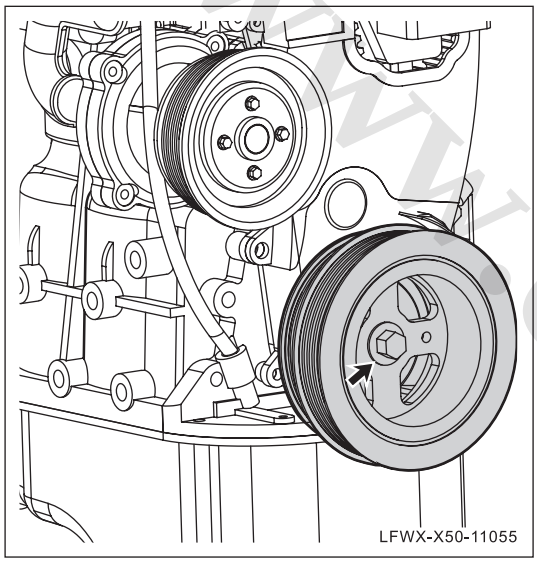
(c) Remove the fuel rail fixing bolts, and then remove the fuel rail.

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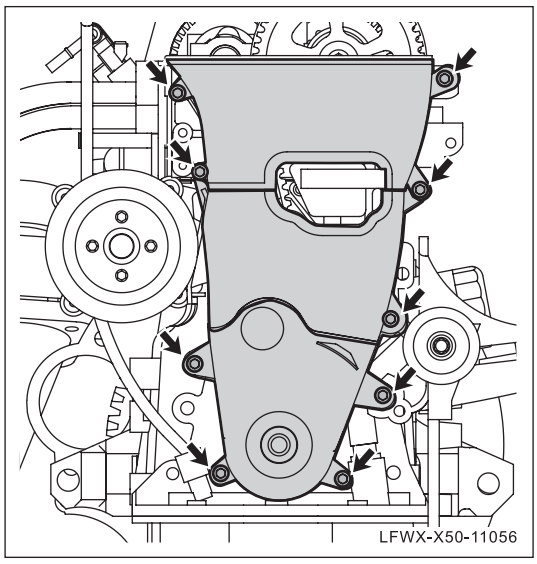
(d) Remove intake manifold assembly.



(e) Remove the crankshaft pulley.

△ HINT:

When removing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.



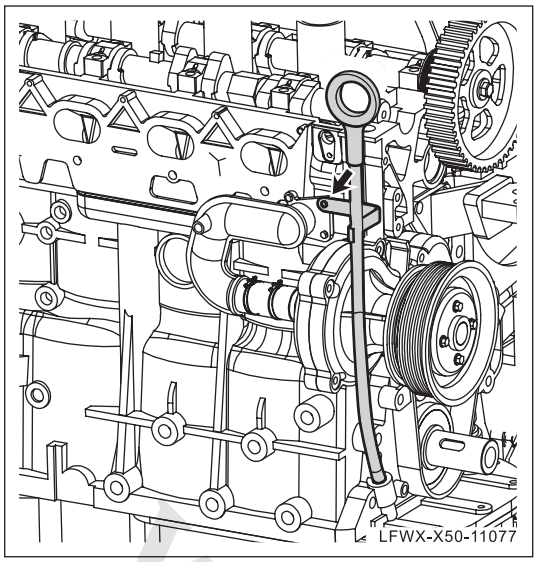
(f) Remove the pulley timing mechanism assembly.

△ HINT:

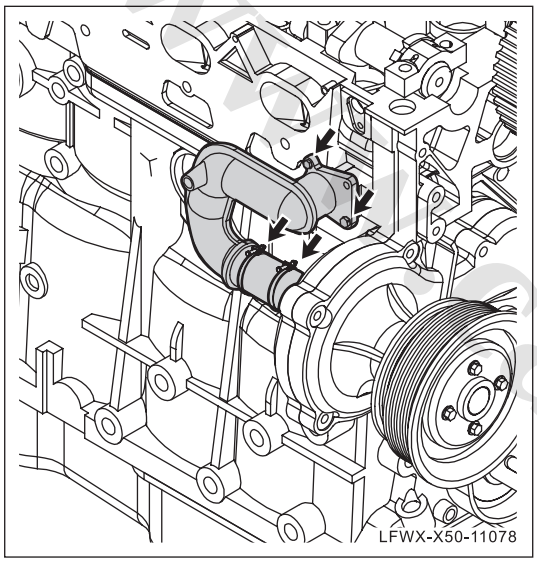
It is unnecessary to remove the camshaft pulley separately. You can remove it together with the camshaft.

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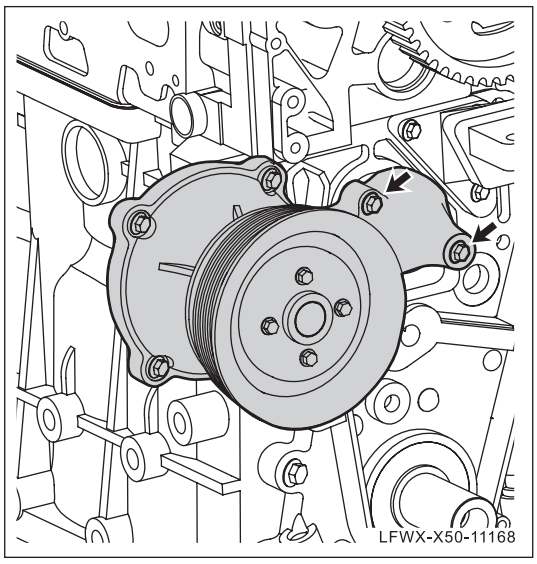
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(g) Remove the fixing bolt of the dipstick, and then remove the dipstick assembly.



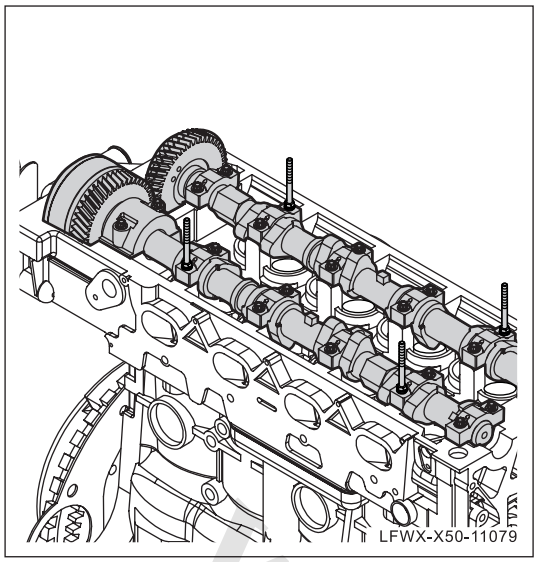
(h) Remove the connecting pipes of the water pump.



(i) Remove the water pump assembly.

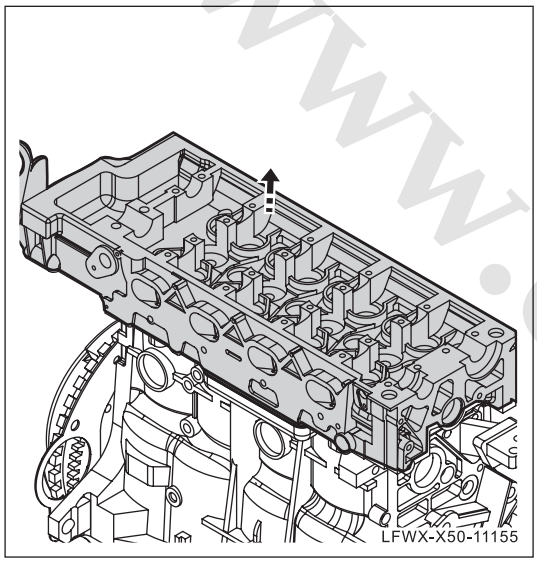
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2. REMOVE CRANKSHAFT AND FLYWHEEL

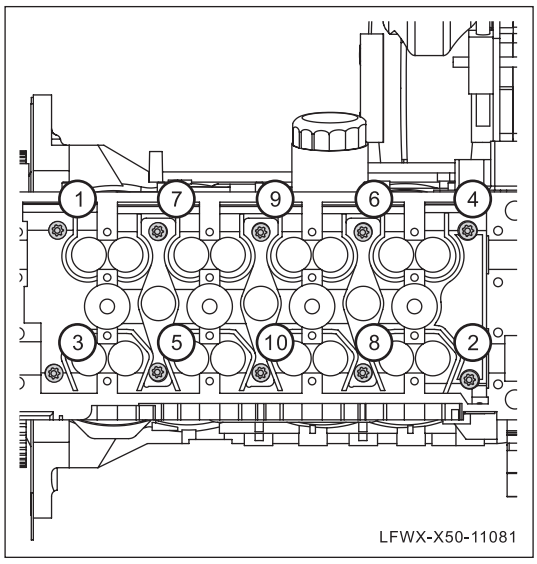
(a) Remove the intake/exhaust camshaft assembly.



(b) Remove the fixing bolts of the cylinder head, and then remove the cylinder head assembly and the cylinder head gasket.

△ HINT:

Put the removed bolts together to avoid being lost.

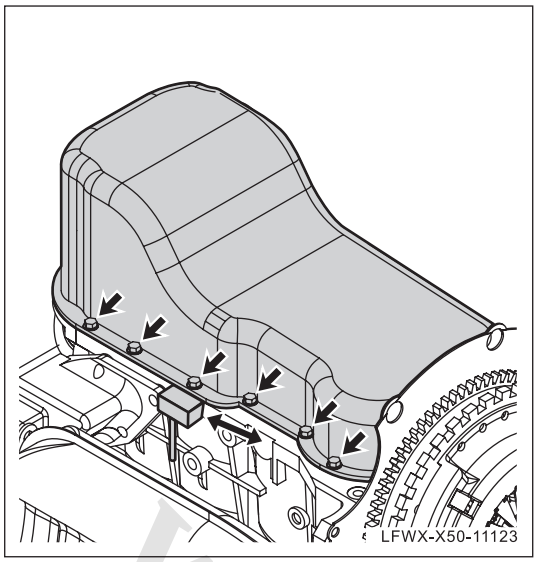


NOTICE:

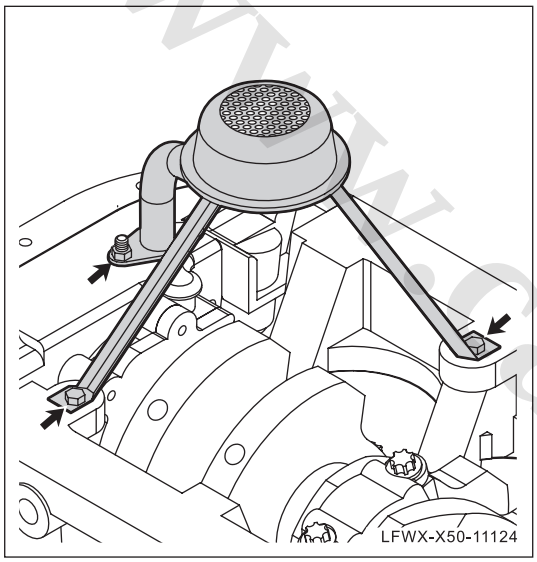
When removing cylinder head bolt, unscrew and remove cylinder head bolt in order shown in the figure.

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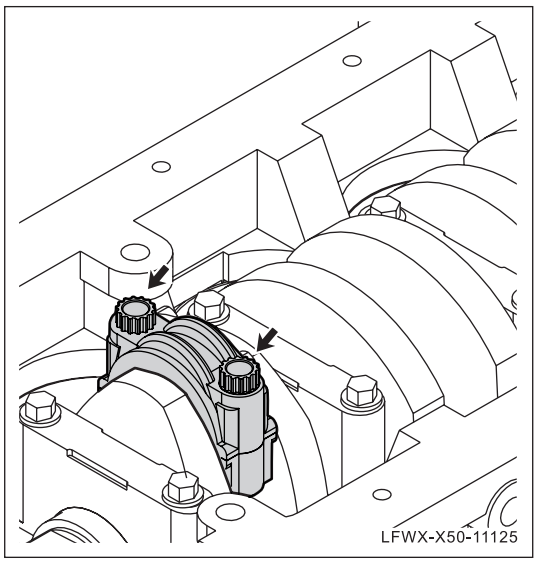
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(c) Remove the fixing bolts of the oil pan and the oil pan with the oil pan remover.



(d) Remove the fixing bolts of the oil stainer, and then remove the oil stainer.



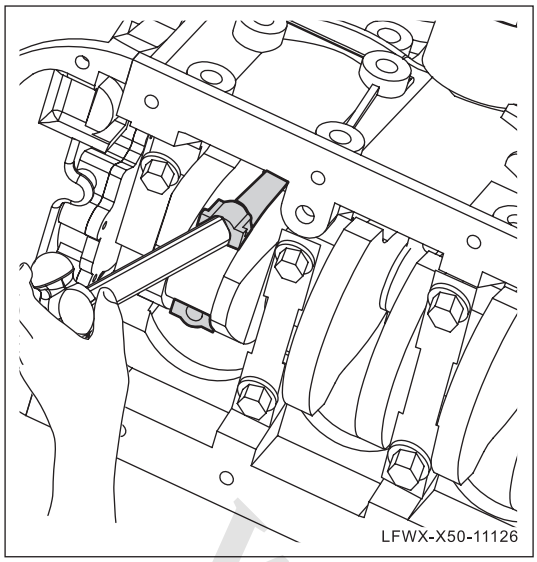
(e) Rotate crankshaft, make pistons of No. 1 and No. 4 cylinders in lowest point (it means No. 1 and No. 4 connecting rod cap expose vertically).

(f) Remove fixing bolts of connecting rod cap, take down connecting rod cap and bearing bush.

(g) Use the same method to dismantle other connecting rod caps and bearing bushes.

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(h) Push out piston assembly.

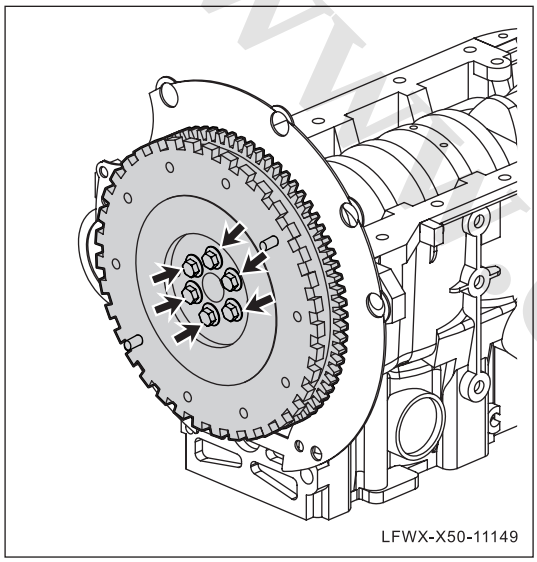
NOTICE:

To avoid damage to connecting rod end face, make sure to use wooden or rubber object instead of metallic object to push out the piston assembly.

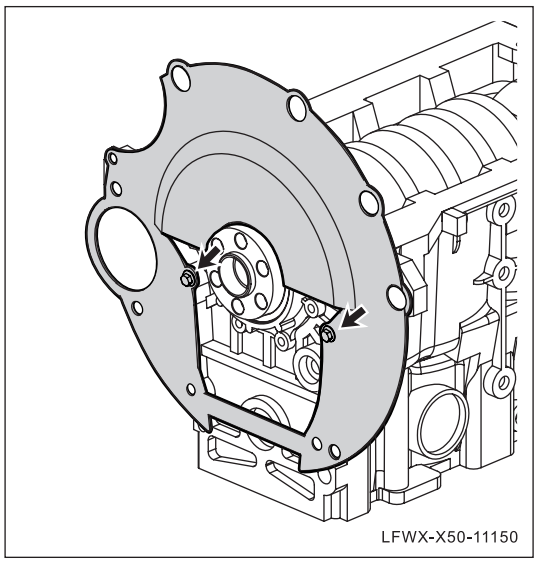
(i) Remove piston assembly from the other side.

NOTICE:

Place the piston and connecting rod components in correct sequence. Do not mix them.



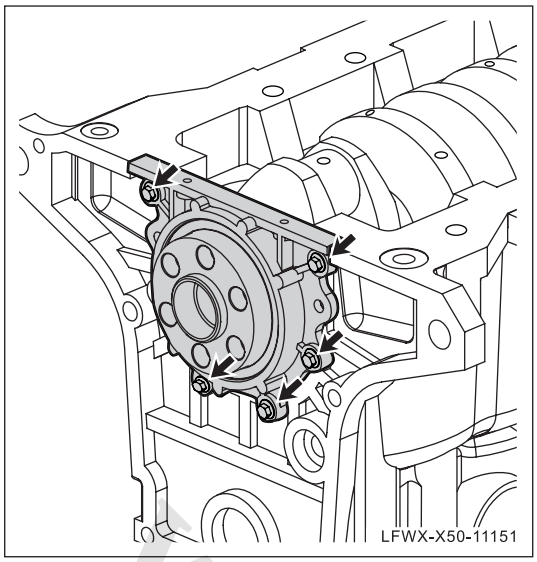
(j) Remove the flywheel fixing bolts, and then remove the flywheel assembly.



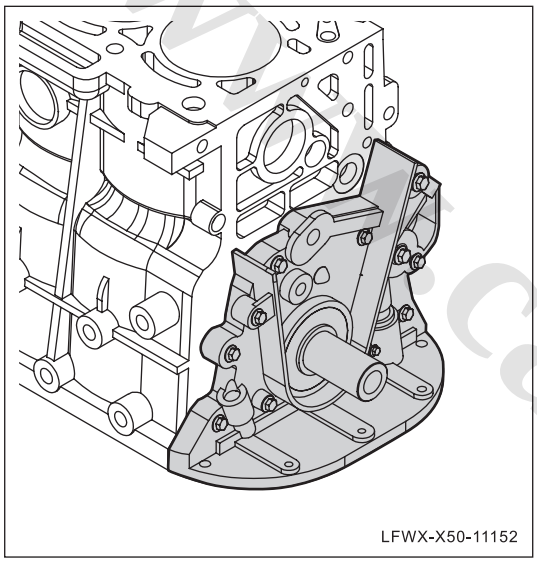
(k) Remove the fixing bolts of the flywheel baffle, and then remove the flywheel baffle.

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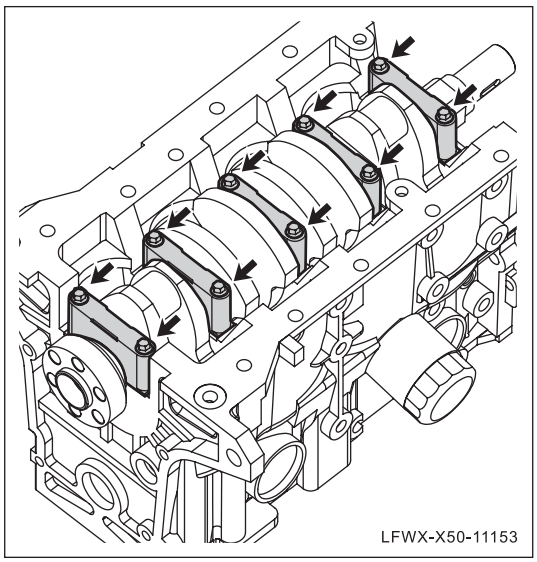
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(l) Remove the crankshaft end cap.



(m) Remove the oil pump.

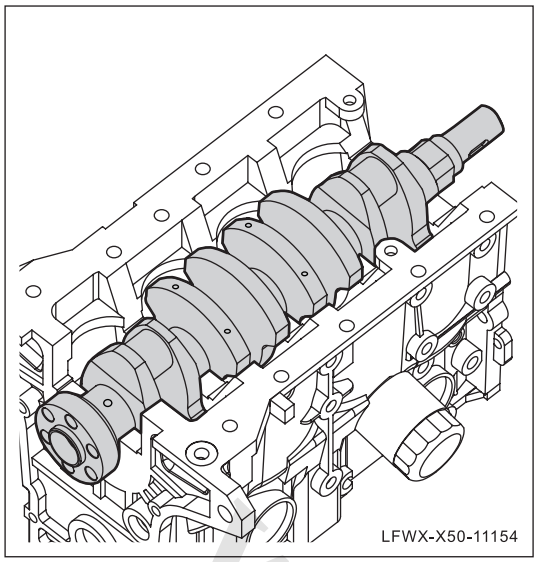


(n) Remove the crankshaft gland.

(o) Remove the thrust plate.

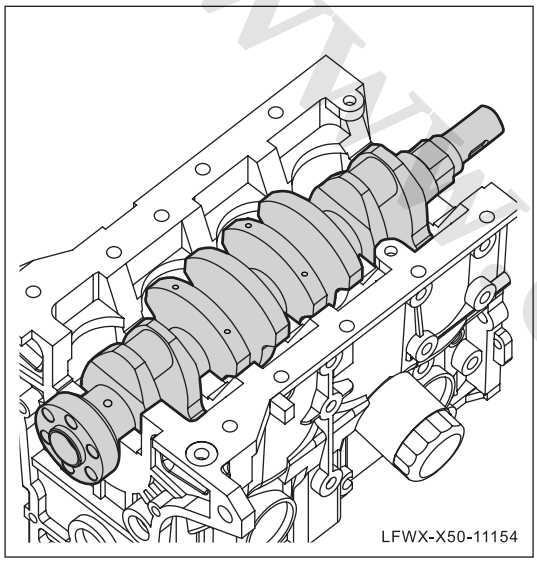
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(p) Remove the crankshaft assembly.

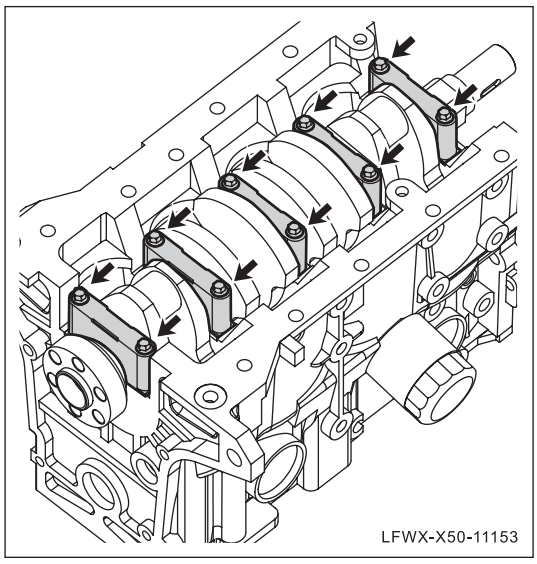
(q) Remove the lower bearing bushes of the crankshaft.



3. INSTALL CRANKSHAFT AND FLYWHEEL ASSEMBLY

(a) Install the lower bearing bushes of the crankshaft.

(b) Install the crankshaft assembly.

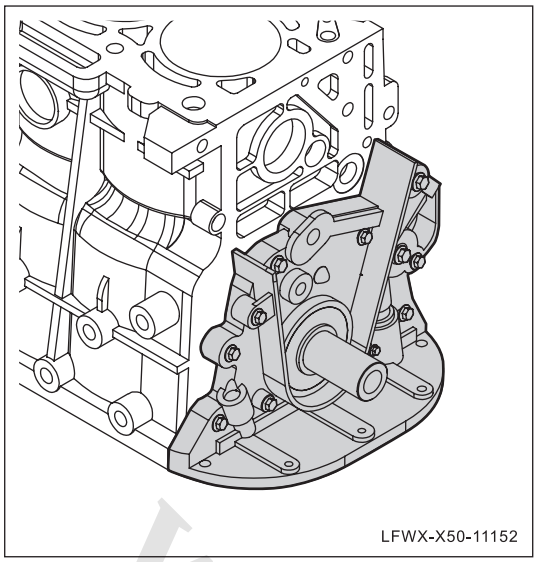


(c) Install the thrust plate.

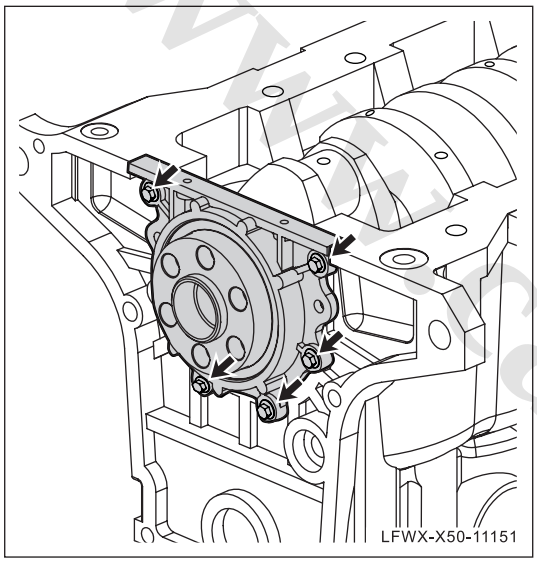
(d) Install the crankshaft gland.

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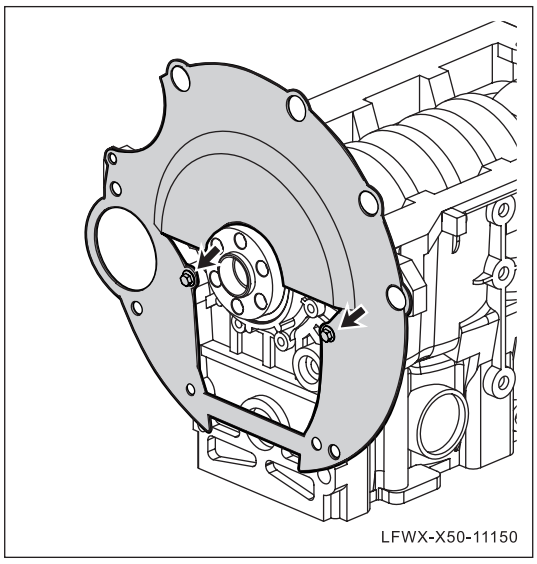
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(e) Install the oil pump assembly.



(f) Install the crankshaft end cap assembly and tighten its tightening bolts.

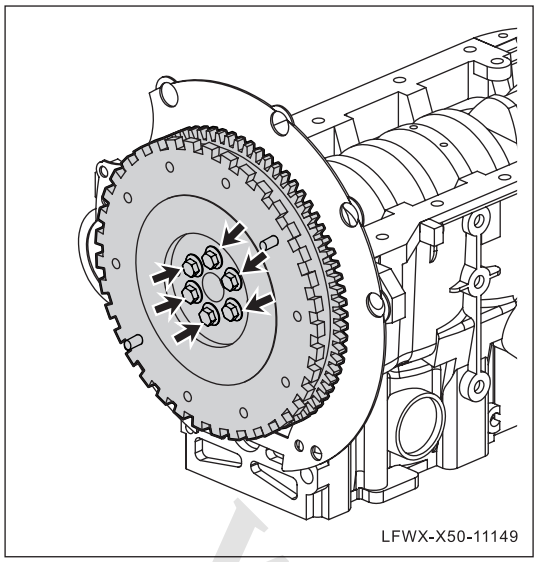


(g) Install the flywheel baffle.

Torque: 10N•m

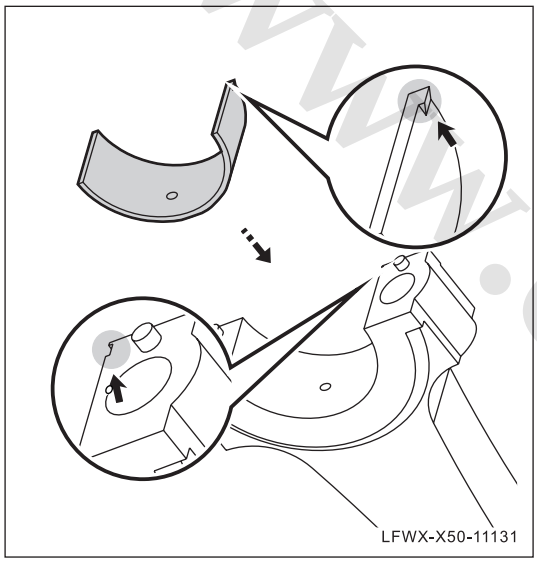
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(h) Install the flywheel assembly.

Torque: 88N•m



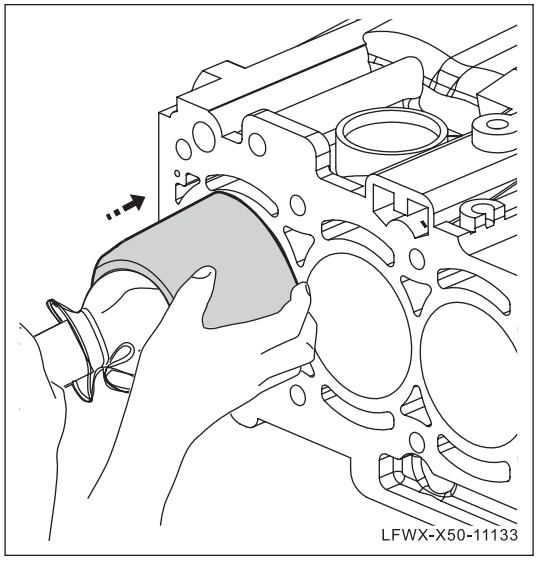
(i) Install the upper bush of the connecting rod bearing.

NOTICE:

- **Make sure that the connecting rod and the connecting rod bearing back are clean without any debris.**
- **It is forbidden to lubricate the bearing back.**
- **During installation, make sure that the positioning tongue of the bearing is in alignment with the positioning groove on the connecting rod.**

△ HINT:

Drop clean oil onto the inside of the connecting rod bearing.



(j) Compress the piston ring to its working position with the piston ring compressor.

△ HINT:

If there is no special tool, make a ring barrel with sheet iron.

(k) Rotate crankshaft to make connecting rod journal to be installed locate at the bottom dead center.

(l) Push the piston assembly into the cylinder with the mounting tool for piston and a wooden bar.

△ HINT:

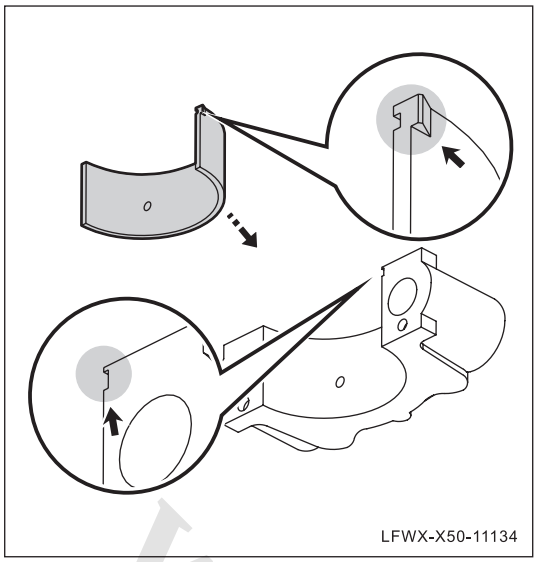
Before installation, apply a thin layer of clean oil onto the cylinder wall.

NOTICE:

Be sure to push the piston assembly with wooden or rubber material instead of metallic material.

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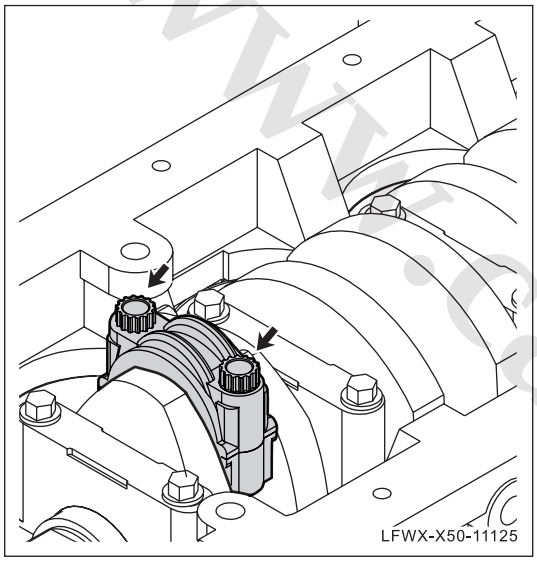


(m) Install the lower shell of the connecting rod bearing to the connecting rod cap.

NOTICE:

- **Make sure that the connecting rod end cap and the connecting rod bearing back are clean without any debris.**
- **It is forbidden to lubricate the bearing back.**
- **During installation, make sure that the positioning tongue of the bearing is in alignment with the positioning groove on the connecting rod end cap.**

(n) Use clean oil to lubricate the inside of lower bush of connecting rod bearing.



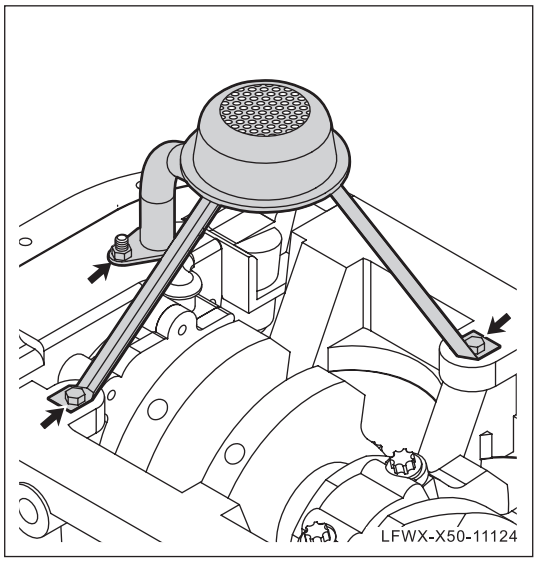
(o) Install the connecting rod cap and tighten its fixing bolts.

Torque: 26N•m

NOTICE:

Make sure to install the connecting rod cap in place to make its positioning groove in alignment with the connecting rod locating pin.

(p) Install the other connecting rod caps in the same manner.

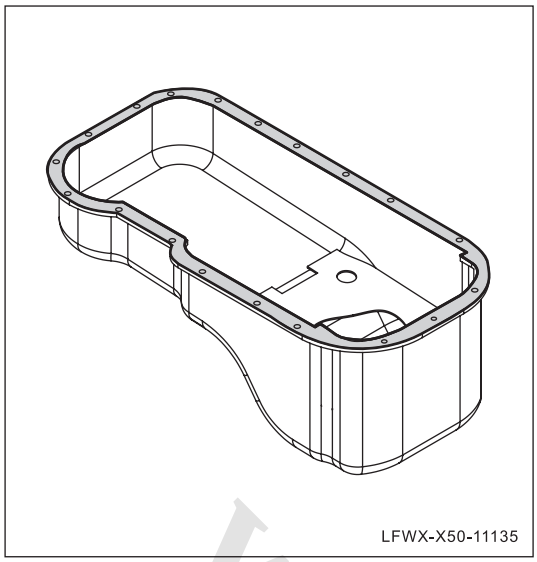


(q) Install the oil strainer in the cylinder block, and then tighten its fixing bolts.

Torque: 10N•m

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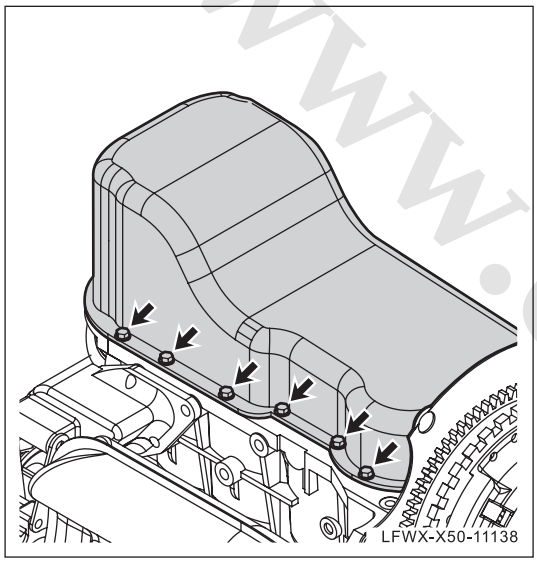
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(r) Apply sealant uniformly to the mounting surface of oil pan.

NOTICE:

When coating new sealant, be sure to clean the residual sealant completely on the cylinder block and the oil pan in advance.



(s) Install the oil pan to the cylinder block, and tighten all its fixing bolts.

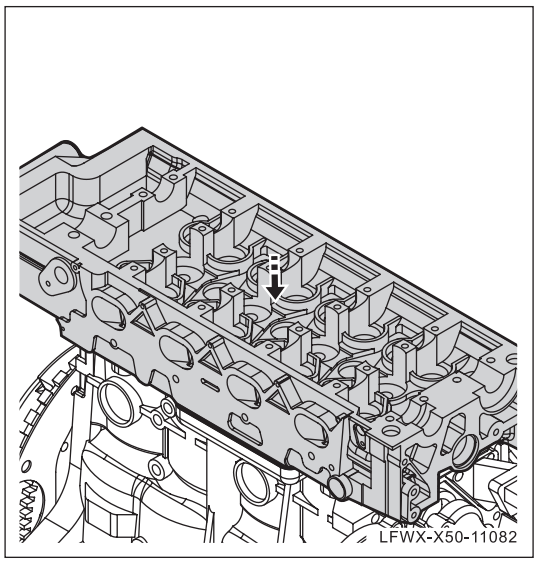
Torque: 10N•m

△ HINT:

When installing the fixing bolt of oil pan, apply clean engine oil onto the bolt threads.

NOTICE:

When tightening the bolt, start the tightening in the middle and then to both sides.



(t) Install the cylinder-head gasket and the cylinder-head, and tighten the fixing bolts of the cylinder-head.

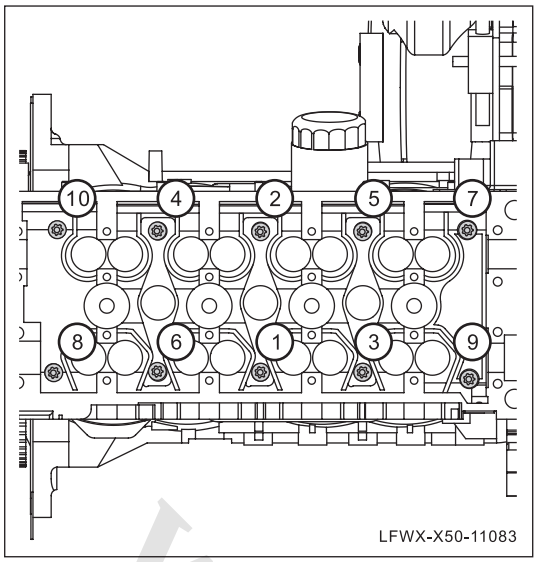
Torque: 90N•m

NOTICE:

When replacing the cylinder-head gasket with a new one, pay attention to its front and back for correct installation.

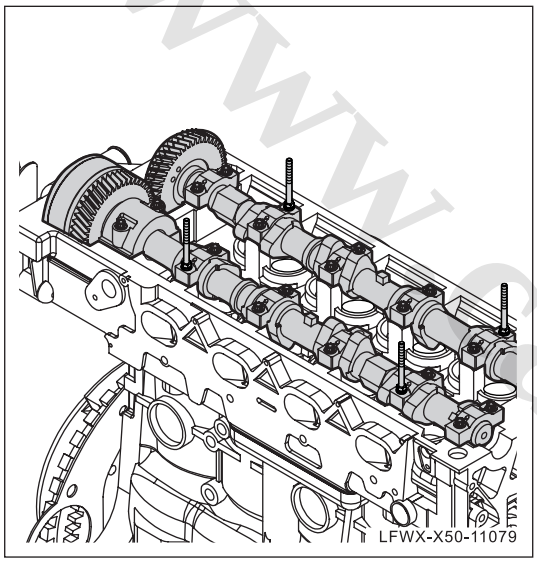
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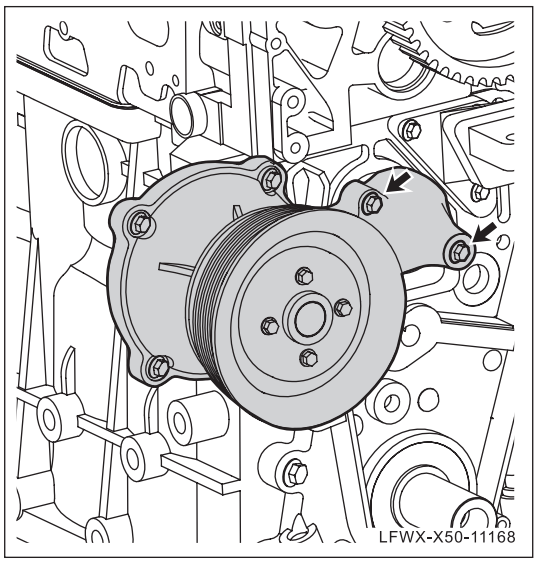
NOTICE:

- **Apply a proper amount of clean oil onto the threads of the cylinder head fixing bolt.**
- **When tightening the cylinder head bolt, be sure to tighten them in multiple times in the order as shown in the figure.**



(u) Install the intake/exhaust camshaft assembly, and tighten their tightening bolts.

Torque: 25N•m

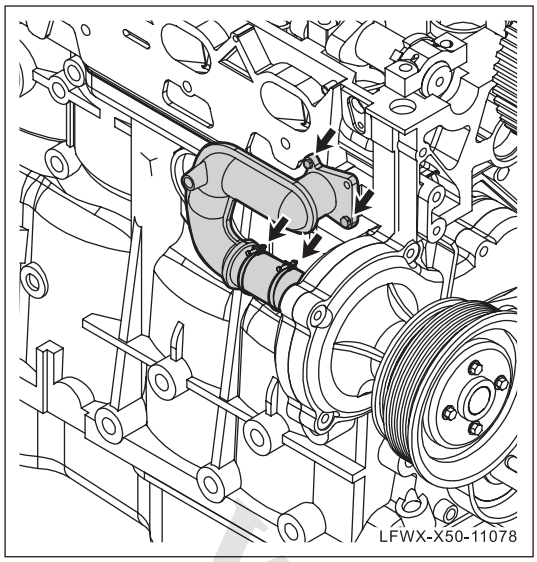


(v) Install the water pump assembly, and fix the fixing bolts and screw them up.

Torque: 25N•m

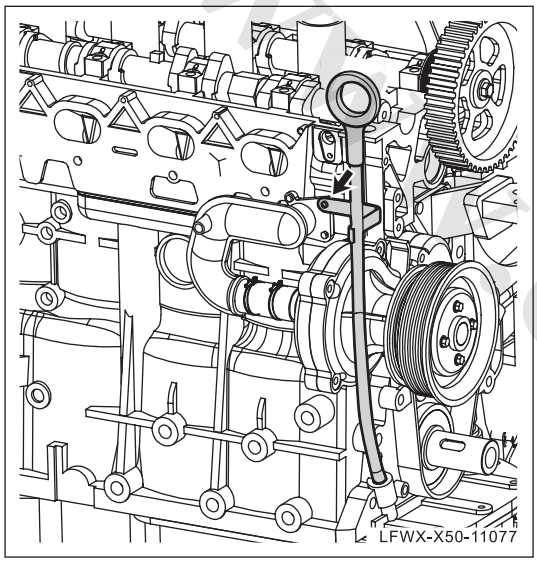
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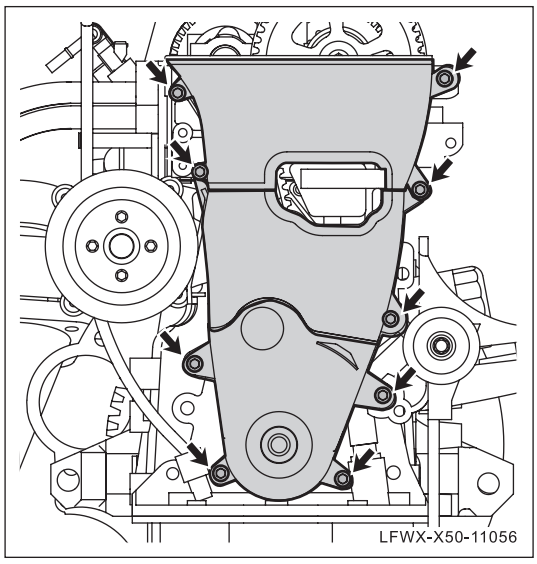


4. INSTALL ENGINE ACCESSORIES

(a) Install the connecting pipes of the water pump, and tighten their tightening bolts and clamps.



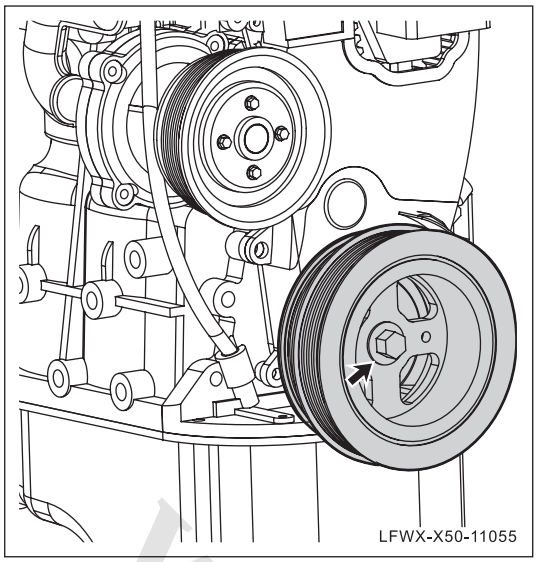
(b) Install the dipstick assembly.



(c) Install the pulley timing mechanism.

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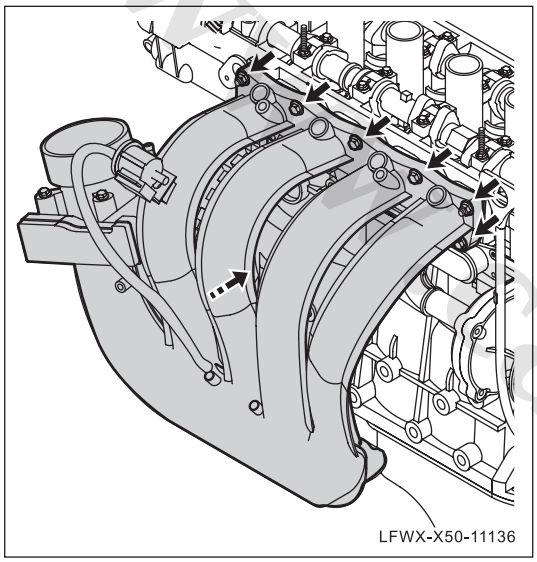


(d) Install the crankshaft pulley, and tighten its fixing bolts.

Torque: 145N•m

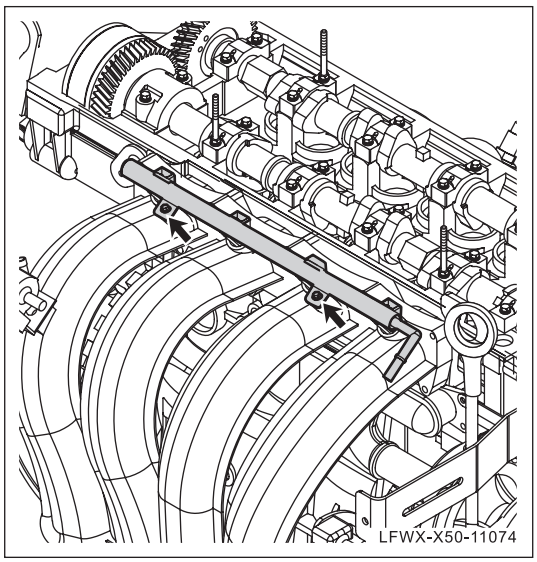
△ HINT:

When installing the crankshaft pulley, fix the flywheel with a flywheel brake to prevent the crankshaft from rotating.



(e) Install the intake manifold assembly, fix the fixing nuts and fixing bolts and screw them up.

Torque: 23N•m

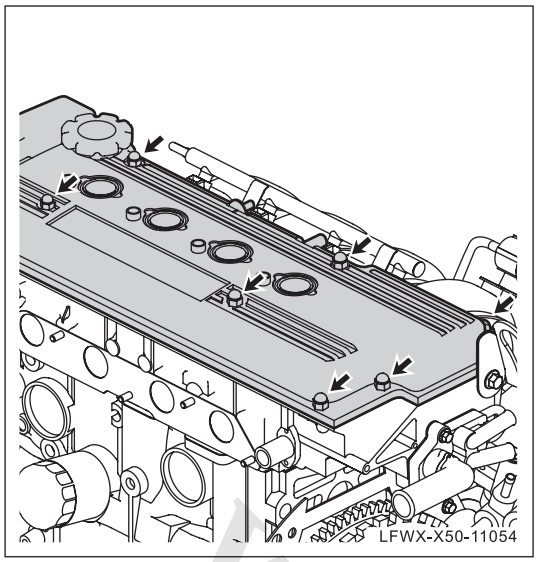


(f) Install the fuel rail, and tighten the fuel rail fixing bolts.

Torque: 25N•m

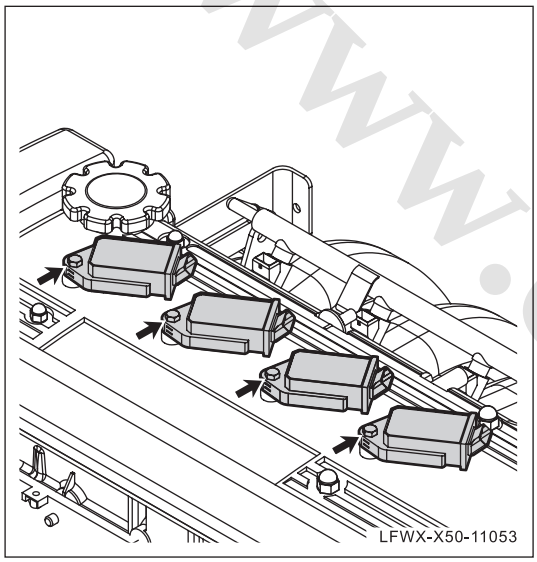
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(g) Install the cylinder head cover, and tighten its tightening bolts.

Torque: 12N•m



(h) Install the spark plug and high-voltage ignition coil.

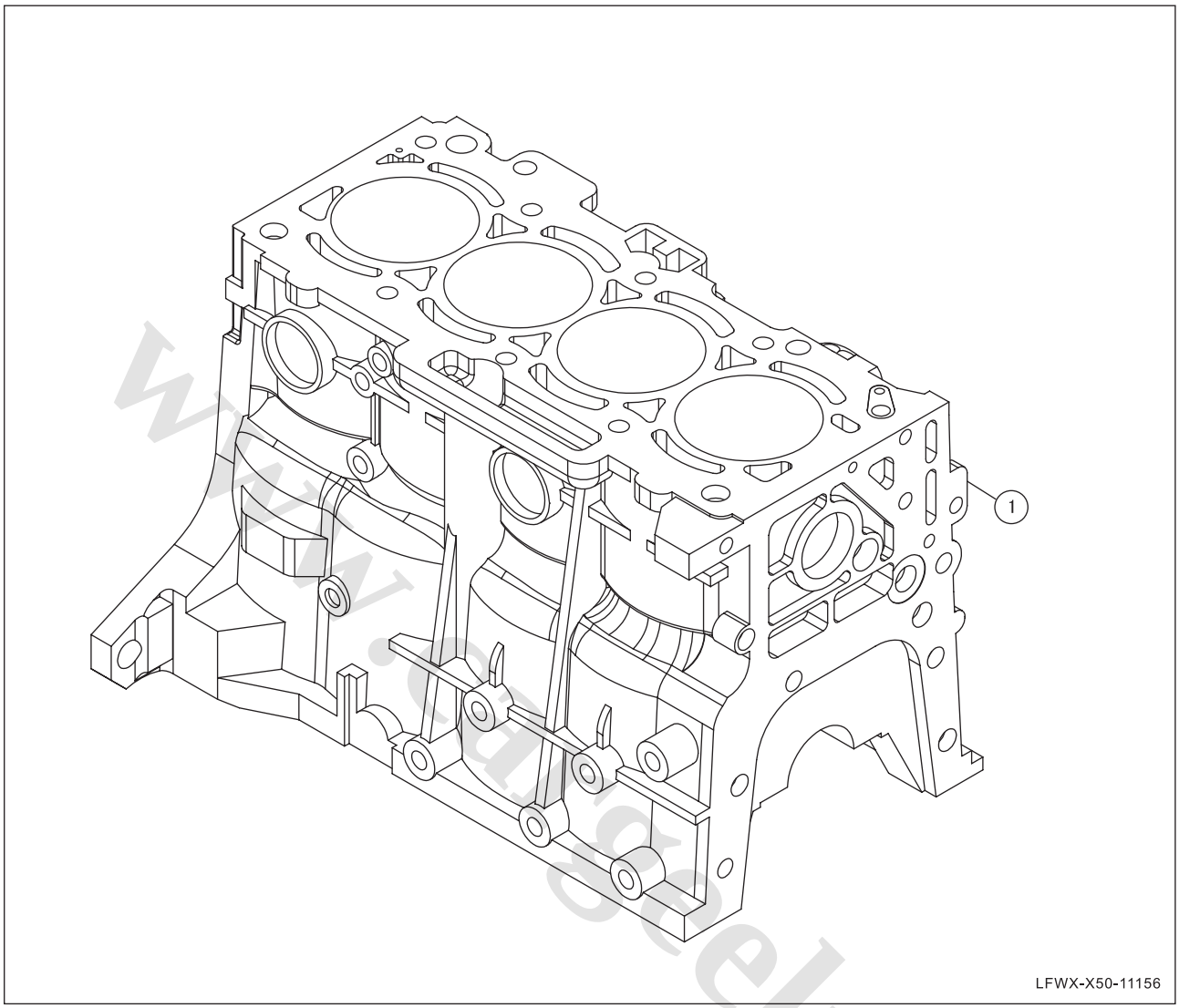
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CYLINDER BLOCK

COMPONENTS



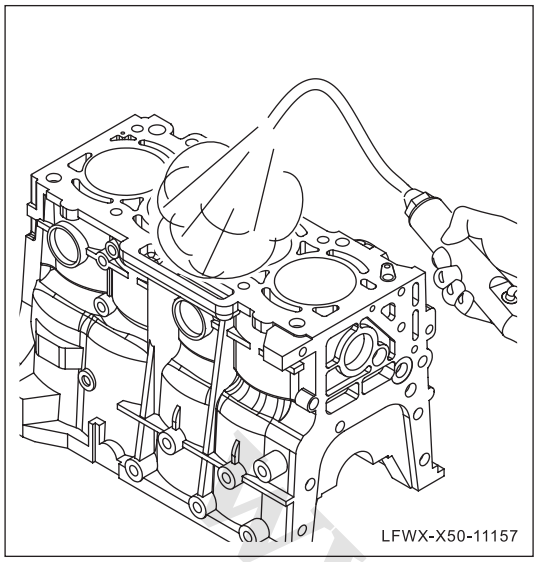
1	Cylinder block

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CHECK

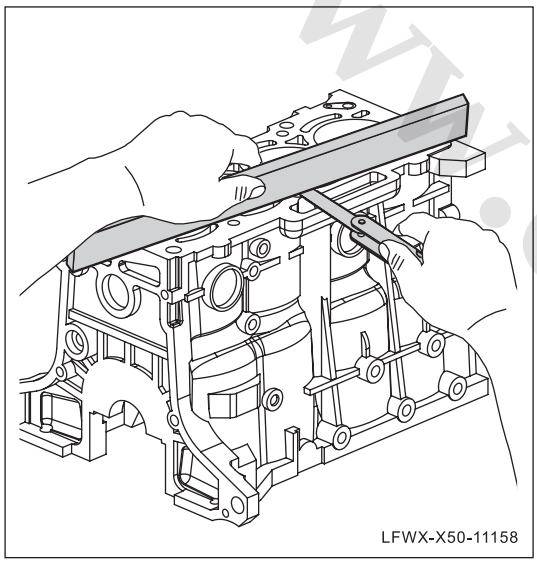


1. CHECK CYLINDER DECK FLATNESS

(a) Clean all pad materials on the cylinder block deck, and clean the cylinder block thoroughly with soft brush and solvent.

NOTICE:

When cleaning it with solvent, acid or alkaline materials, follow the manufacturer's recommendations.

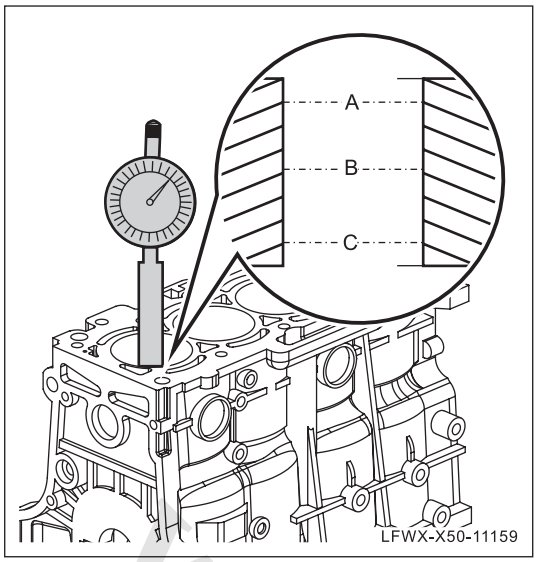


(b) Using the ruler and feeler gauge, measure the flatness of the cylinder deck. If the flatness error is more than the maximum value, replace the cylinder block.

Maximum flatness: 0.05mm

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2. INSPECT CYLINDER BLOCK BORE ROUNDNESS AND CYLINDRICITY ERRORS

(a) Measure the cylinder-bore diameter at A, B and C positions with the cylinder-bore gauge. Measure the diameter at each position several times. Subtract the measured diameters each other, and then get their average value, which is the error.

Limit error of cylinder roundness: 0.05mm

Limit error of cylinder-bore cylindricity: 0.2mm

△ HINT:

Test once in axial direction and thrust direction of each position, respectively and then calculate average value.

(b) Measured value of cylinder bore minus measured value of piston diameter is equal to piston oil-film clearance. If oil clearance is larger than the maximum value, replace four pistons and bore 4 cylinders again. If necessary, replace cylinder block.

Standard oil-film clearance: 0.035 - 0.055mm

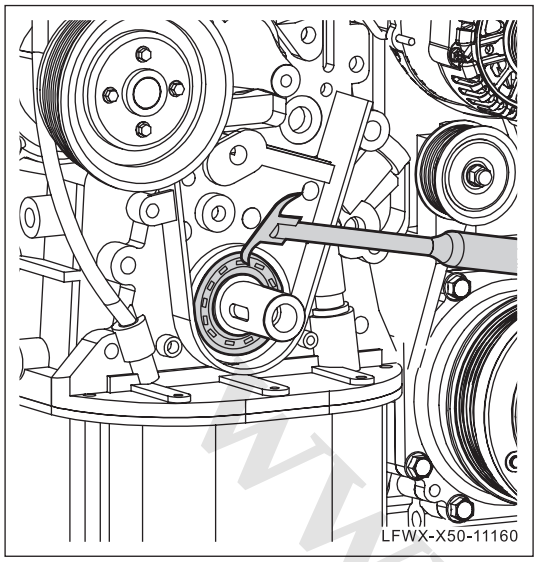
Maximum oil-film clearance: 0.08mm

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CRANKSHAFT OIL SEAL

REPLACEMENT



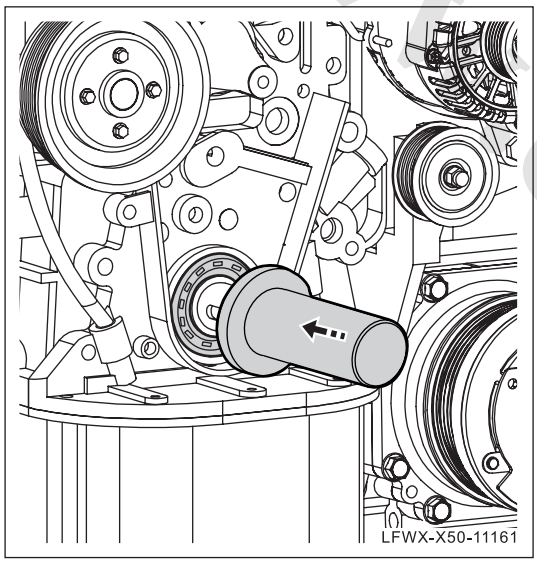
1. REMOVE CRANKSHAFT FRONT OIL SEAL

(a) Remove the timing pulley assembly.

(b) Pry out the crankshaft front oil seal with the oil seal remover.

NOTICE:

Do not reuse the removed oil seal. Replace it with a new one during installation.



2. INSTALL CRANKSHAFT FRONT OIL SEAL

(a) Install the crankshaft front oil seal with the mounting tool for oil seal.

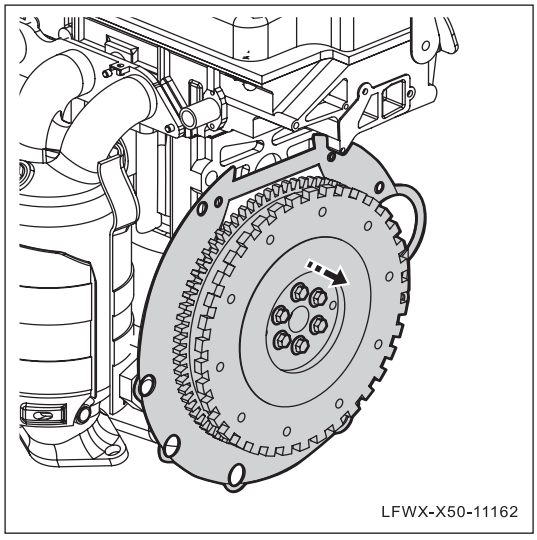
△ HINT:

Before installation, apply a layer of clean oil onto the new oil seal lip.

NOTICE:

Be sure to install the seal vertically. Do not install it obliquely.

(b) Install the front cover assembly.



3. REMOVE REAR OIL SEAL OF CRANKSHAFT

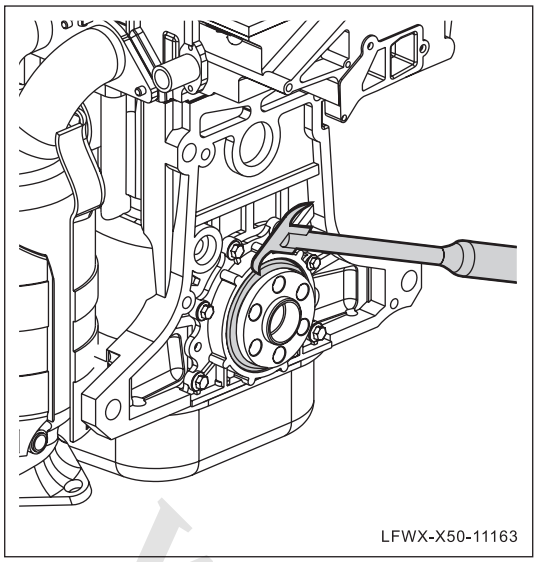
(a) Remove the flywheel with flywheel baffle assembly.

△ HINT:

When removing the flywheel assembly, to prevent the flywheel from rotating, fix the flywheel in advance.

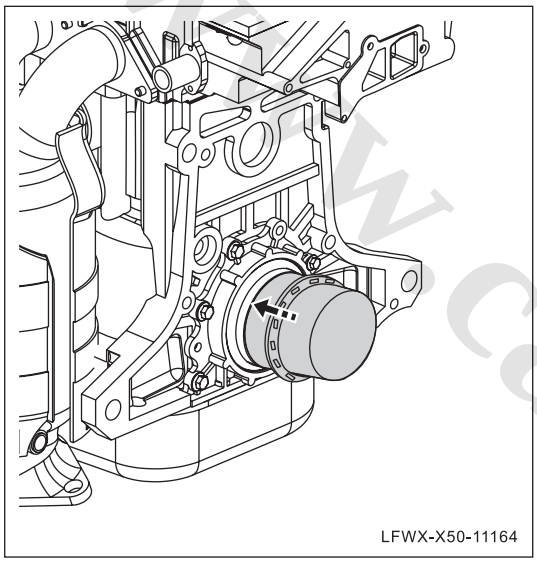
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LFWX-X50-11163

(b) Remove the crankshaft rear oil seal with the oil seal remover.



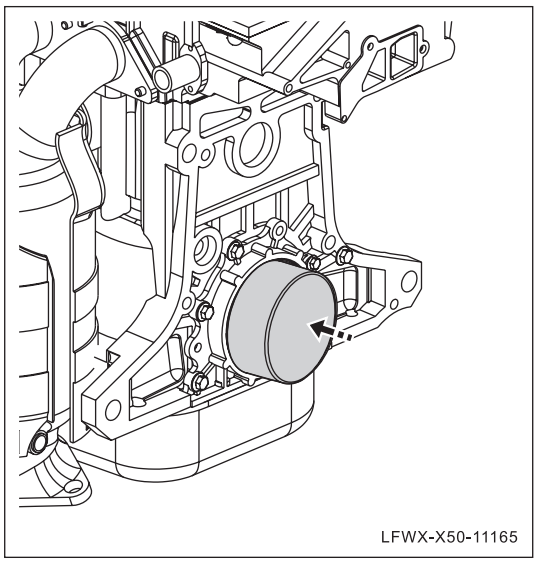
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4. INSTALL REAR OIL SEAL OF CRANKSHAFT

(a) Slide the oil seal to the crankshaft extension end with the oil seal guider.

△ HINT:

Before installation, apply a layer of clean oil onto the new oil seal lip.



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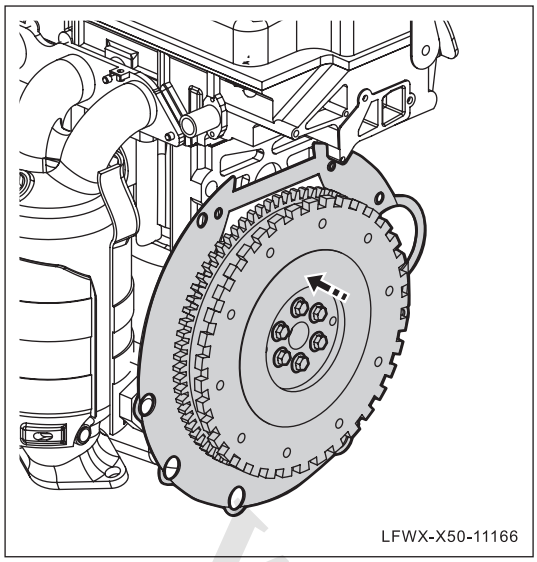
(b) Install the rear oil seal of crankshaft with the mounting tool for oil seal.

NOTICE:

Be sure to install the seal vertically. Do not install it obliquely.

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(c) Install the flywheel and the flywheel baffle, and tighten the flywheel fixing bolts.

Torque: 88N•m

NOTICE:

When installing flywheel, make the flywheel in alignment with the locating pin of the crankshaft.

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Engine Control System

Engine Control System 12-1
System description 12-1
Schematic diagram.....12-11
Terminal definition 12-12
Preparation.....12-14
Service data 12-15
Precautions 12-16
On-vehicle inspection 12-20
Diagnosis 12-30
System description 12-30
Basic check 12-32
Fault diagnosis procedure 12-33
Fault diagnosis analysis 12-34
Read and clear of DTCs.....12-35
Read data flow 12-36
Motion test.....12-42
Fault symptom table 12-43
Symptom diagnosis 12-46
DTC list.....12-59
DTC diagnosis.....12-68
Electronic control module (ECM).....12-118

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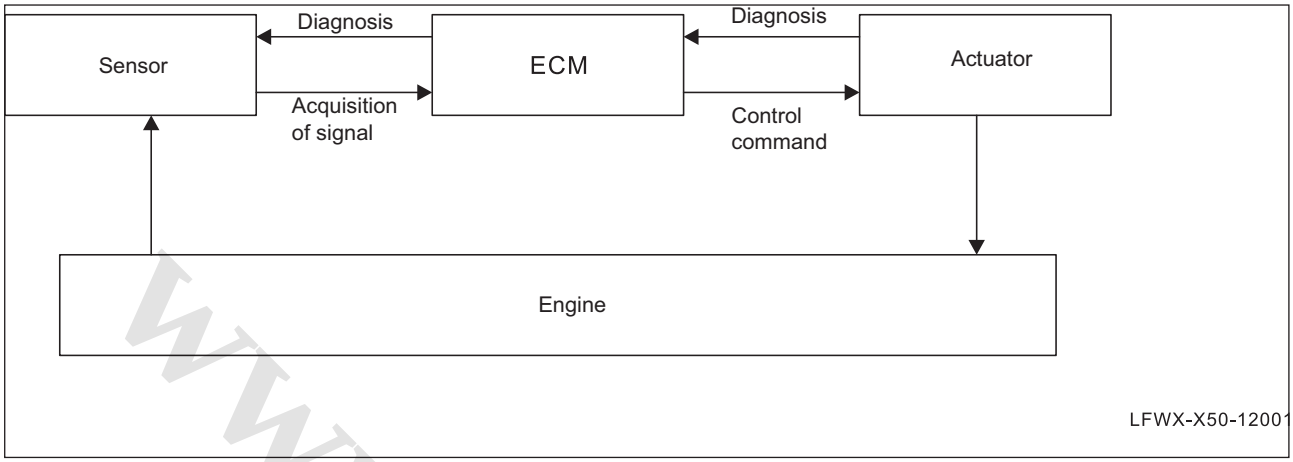
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ENGINE CONTROL SYSTEM

SYSTEM DESCRIPTION

1. ENGINE CONTROL SYSTEM INSTRUCTION

(a) System diagram.



(b) Engine control system usually consists of three parts, namely, sensors, electronic control module (ECM) and actuator. And it controls the air suction amount, injection amount and ignition advance angle when the engine is working.

(c) In the electric control system of the engine, the sensors, as the input part, are used to measure various physical signals (temperature, pressure, etc.), and convert them into the corresponding electrical signals. ECM receives the input signals from the sensor, performs computing according to the set procedures, generates the corresponding control signals and then outputs them to the power drive circuit, then the power drive circuit drives the respective actuators to perform the corresponding actions, making the engine running in accordance with the set control strategy; meanwhile the ECM fault diagnosis system monitors the various parts or the control functions in the system, and once a fault is detected and confirmed, the fault code will be stored, and " Limp home" function will be invoked; it will be resumed to work normally only when the fault is eliminated.

(d) Sensors mainly include intake pressure and temperature sensor, crankshaft position sensor, camshaft position sensor, throttle position sensor (integrated in the electronic throttle), coolant temperature sensor, knock sensor, accelerator pedal position sensor, oxygen sensor, etc.

(e) The actuator mainly consists of injector, ignition coil, throttle motor (integrated in electronic throttle), OCV, canister solenoid valve, etc.

(f) Sensors and actuator instruction:

S/N	Parts	Quantity	Function
1	Electronic Control Module (ECM)	1	Optimizing control system to be appropriate for working conditions of the engine according to signals provided by the sensor
2	Crankshaft position sensor	1	Checking engine crankshaft rotation position and speed
3	Camshaft position sensor	1	Providing the crank & camshaft position information for the ECM , i.e. to distinguish the top dead center of the compression stroke and the top dead center of the exhaust stroke of the crankshaft.
4	Intake pressure and temperature sensor	1	Inspecting engine intake air temperature, air intake and determine compression TDC
5	Electronic throttle body	1	Inspecting the throttle position and to adjust the throttle opening degree

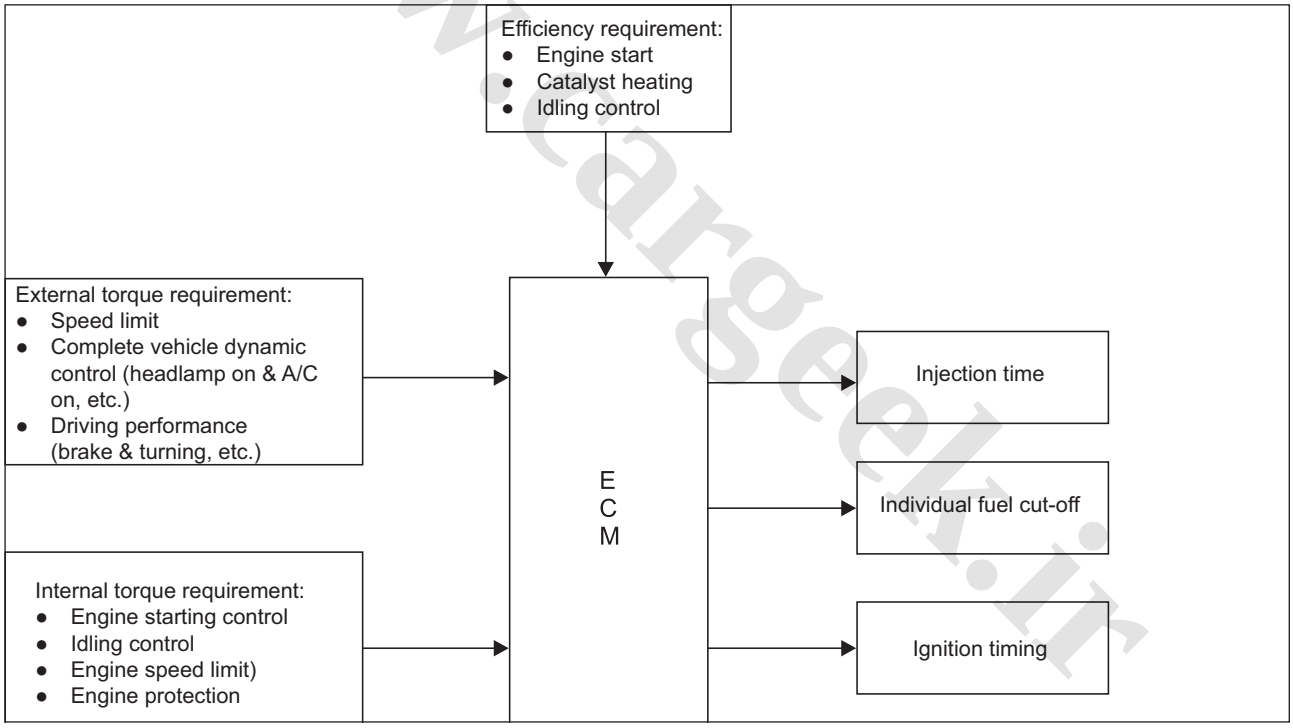
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S/N	Parts	Quantity	Function
6	Ignition coil	4	Igniting the gas mixture
7	Fuel pump	1	Delivering fuel
8	Injector	4	Injecting fuel according to ECM signals
9	Coolant temperature sensor	1	Inspecting engine coolant temperature
10	Canister solenoid valve	1	Causing the fuel vapor in the canister into the intake duct according to the ECM digital pulse square wave
11	Fuel pump	1	Delivering fuel
12	OCV	1	Controlling the engine oil flow into the camshaft position actuator.
13	Oxygen sensor	1	Inspecting oxygen concentration in exhaust gas
14	Knock sensor	1	Inspecting if the engine has knock

2. ENGINE CONTROL SYSTEM FUNCTION

(a) All the internal and external demands are defined with the torque or efficiency of the engine by adopting the control strategies based on torque. Various demands of the engine are converted to the control variables of the torque or efficiency; after processed in ECM, these control variables are converted to the engine control parameters such as injection time, ignition timing, etc.



(b) The main functions of system:

S/N	Function	S/N	Function
1	Starting control	6	Oil cut-off control for acceleration/deceleration and reverse towing
2	Idle speed control	7	Evaporative emission control
3	λ closed-loop control	8	Overvoltage protection
4	Knock control	9	A/C compressor control
5	Heating control for warm-up and three-way catalytic converter	10	Fault diagnosis and limp home

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3. SYSTEM FUNCTION INTRODUCTION

(a) Starting control.

- During starting, adopt a special calculation method to control the charging amount, fuel injection and ignition timing.
- At the initial stage of this process, the air within the intake manifold is still and the internal pressure of intake manifold is indicated as ambient atmospheric pressure. Electronic throttle opens to a certain angle, and its size is a set fixed parameter according to the starting temperature.
- The fuel injection amount changes with the engine temperature to promote the film formation of the intake manifold and the cylinder wall. Increase the enrichment of the mixture before the engine reaching to a certain speed. As soon as the engine starts, the system immediately begins to decrease the starting enrichment; starting enrichment will be canceled completely until the starting condition is finished (when the engine speed reaches 600 - 700 r/min).
- Under working conditions of starting, ignition angle is adjusted continuously and changes with the engine temperature, intake air temperature and engine speed.

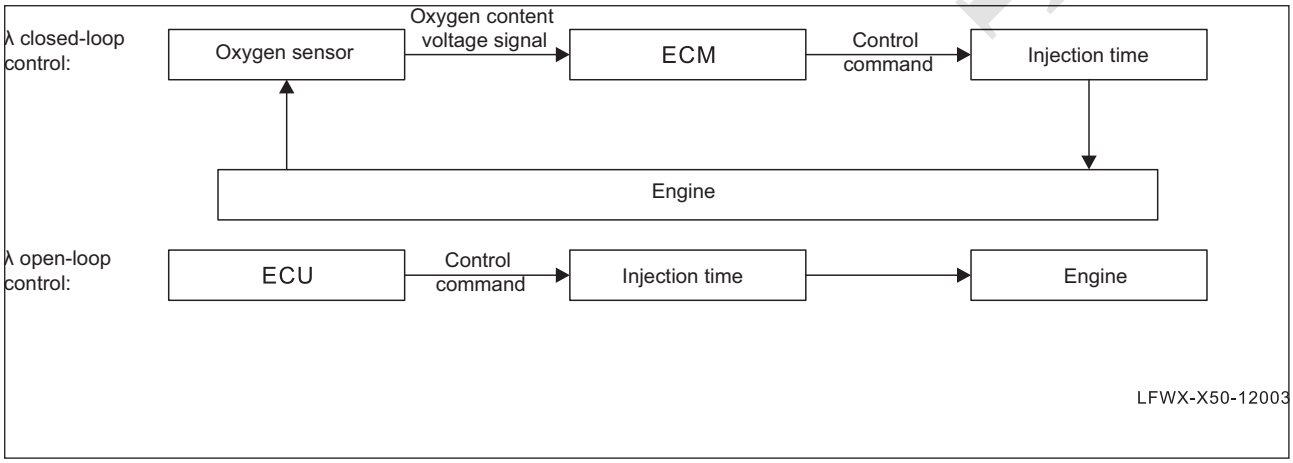
(b) Heating control for warm-up and three-way catalytic converter.

- After cold start of the engine, air filling amount, fuel injection and ignition will be adjusted to compensate for the higher torque requirements of the engine. This process continues until the engine up to a certain temperature (the engine temperature is similar to the engine coolant temperature).
- The function of three-way catalytic converter is to convert harmful gas from engine combustion into harmless gas and then discharge into the atmosphere.
- As the operating temperature of the three-way catalytic converter is above 300° C, the most important thing is to quickly heat the three-way catalytic converter during warm-up. Under this operating condition, use the exhaust gas to perform "three-way catalytic heating" with the method of moderately delaying the ignition advance angle.

(c) Idling speed control.

- Idle speed control function refers to the control of the engine speed by the system when the accelerator pedal is not depressed.
- Idle speed control includes control over stabilizing the engine speed when the vehicle driving at idle speed. It also includes the idle speed control over opening air-conditioner, power steering, opening headlamps, etc.. when increasing the load.
- The system uses a stepper motor (integrated in the electronic throttle) to automatically adjust the throttle opening, thus achieving high precision of idle speed control.

(d) λ closed-loop control.



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- Oil supply to the engine uses a closed-loop control, thus making the engine always running in an ideal condition (air-fuel ratio is not much deviated from the theoretical value). Use open-loop control when the engine is just started or required at high speed. The advantages of the closed-loop control is to reduce emissions, and improve the vehicle's dynamic performance and economy. λ indicates air-fuel ratio of the mixture, when λ =1 the theoretical air-fuel ratio is 14.7:1.
- λ closed-loop control system works equipped with front oxygen sensor. Front oxygen sensor is used to monitor the oxygen content in the exhaust gas in the side of the three-way catalytic converter, lean mixture (λ >1) produces a sensor voltage of about 110mV, and rich mixture (λ < 1) produces a sensor voltage of about 900mV. When λ = 1, the sensor voltage will have a jump. λ closed-loop control responds to the input signals (λ >1 indicates oxygen sensor voltage is below 100mV, λ<1 indicates oxygen sensor voltage is greater than 900mV) and modifies the control variables, producing a correction factor as a multiplier to correct the fuel injection duration.
- The exhaust after-treatment of the three-way catalytic converter is an effective way to reduce the concentration of the harmful substances in the exhaust gas.
- Three-way catalytic converter can reduce hydrocarbon (HC), carbon monoxide (CO) and nitrogen oxide (NO_x) up to 98% or more, and convert them into water (H_2O), carbon dioxide (CO_2) and nitrogen (N_2). However, this high efficiency is achieved only when the excess air factor is in a narrow range of near λ = 1, and the aim of λ closed-loop control is to ensure the mixture concentration within this range.

(e) Oil cut-off control for acceleration/deceleration and reverse towing.

- A portion of the fuel injected into the intake manifold will not reach the cylinder in time to participate the subsequent combustion process. Instead, it forms a layer of film on the intake manifold wall. Fuel amount stored in the oil film will increase dramatically according to the increasing of the load and extension of the injection duration.
- When the throttle opening increases, part of the injected fuel will be absorbed by the oil film. Therefore, corresponding supplementary fuel must be injected in for compensation and to prevent the mixture thinning when accelerating.
- Once the load factor decreases, the additional fuel contained in the fuel film on the intake manifold wall will be re-released. While decelerating, corresponding injection duration must be decreased.
- Reverse towing or towing operating condition refers to situation that the power provided by the engine is a negative valve in the flywheel. In this case, the friction of the engine and the rotation of the pump and crankshaft can be used to decelerate the vehicle. When the engine is in reverse towing or towing condition, fuel injection is cut off to decrease the fuel consumption and exhaust emissions, and more important, to protect the three-way catalytic converter. Once the speed drops at a specific oil recovery speed while above the idle speed, the fuel injection system will resume oil supply.
- When the injection system resume to supply oil, the system begins to provide the complementary fuel with the initial injection pulse, and rebuilds oil film on the intake manifold wall. After resuming oil injection, torque-based control system makes the engine torque increase slowly and steadily (smooth transition).

(f) Knock control.

- The system detects the characteristic vibration generated from the knocking with the shock sensor installed between the cylinder 2 and the cylinder 3 of the engine, and it is converted into the electrical signals to be transmitted to ECM for processing.
- ECM uses special calculation method to check if knock occurs during the course of each combustion cycle in each cylinder. Once knock is detected, knock closed-loop control is triggered. When knock risk is eliminated, affected cylinder will be advanced to preset ignition advance

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angle gradually.

(g) Overvoltage Protection.

When charging system has a fault which leads to high voltage, the system will go into protection state to limit engine speed in order to avoid ECM from being damaged.

(h) A/C compressor control.

- When air conditioner switch is turned on, ECM will receive signal of air conditioner request, and make preparation for adding load for air conditioner according to current engine working condition, and then switch on A/C compressor.
- ECM will control the air-conditioner to be connected or disconnected according to the self-protection needs of the air-conditioner. In order to ensure power take-off and protect the engine, the system will cut off air conditioner under some special conditions.

(i) Evaporative emission control.

- Due to the external radiation heat and the oil return heat transfer, the fuel in the oil tank will be heated to form fuel vapor.
- As limited by the evaporative emission regulations, these vapors containing a large number of HC element are not allowed directly exhausted into the atmosphere. Fuel vapor in the system is collected in the charcoal canister through a tube and entered into the engine through flushing at the appropriate time to participate in the combustion process.
- The flow of flushing air is achieved by controlling over the canister solenoid valve by ECM. This control works only in the condition of the system closed-loop controlled by λ closed-loop.

(j) Cooling fan control.

- The vehicle is equipped with the electric dual-speed engine cooling fan.
- Electric fan control function: ECM determines if it is necessary to turn on the fan according to engine coolant temperature and actual conditions for turning on air conditioner to reduce power consumption in the engine.

(k) Self-diagnosis.

- Self-diagnosis of system fault is an essential function of engine control system. When one or several parts work abnormally, the system will remind the user of necessary check and maintenance by lighting malfunction indicator lamp. When a fault occurs, the system can adopt emergency plan to control the engine so as to ensure the driver drive the vehicle to a service station.
- When one sensor and actuator are detected to be abnormal, engine malfunction indicator lamp is lit to remind the driver.
- Read RAM data related to sensor and actuator in ECM by fault diagnostic scanner. In addition, in some cases, the actuator can be forced to drive.

4. PRINCIPLE OF STARTING CONTROL

(a) After the ignition switch is turned on, the fuel pump will stop after running for about 2s.

(b) The engine starts to run, as soon as 2 effective 58X signals are detected by ECM, the fuel pump will start running.

(c) After the speed signal disappears (analog signal is susceptible to interference) for 0.8s, the fuel pump stops running.

(d) Pre-injection:

Pre-inject only once during the course of normal starting (if fuel is absorbed by carbon deposit, gas mixture becomes thinner and it is not easy to start).

(e) At the initial stage of starting:

The pressure in intake manifold is shown as ambient atmospheric pressure. The throttle valve is

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closed and the ECM appoints a fixed parameter that established according to the start-up temperature (coolant temperature).

(f) The process of starting:

Fuel injection quantity according to the engine coolant temperature varies, the ignition angle are also constantly adjust and as the engine coolant temperature, inlet temperature and engine speed varies.

(g) Starting process is over:

Engine speed of more than 800 r/min, end starting conditions.

5. FUEL INJECTION CONTROL PRINCIPLE.

(a) The ECM controls the drive time and injection timing of injectors to achieve the air mixture of best air-fuel ratio for the engine under all kinds of working conditions.

(b) In the fuel rail, fuel pressure regulator keeps injection pressure stable, the injector directly inject fuel into each cylinder of the airway. In each working circle (crankshaft rotates twice for each circle) of the engine, each cylinder injects once (injection sequence is 1-3-4-2), this injection is called sequential injection.

(c) When the engine running in a cold or heavy-duty state, to maintain good engine performance, the ECM will execute the open-loop control to provide richer gas mixture. When the engine is in the normal working state (with a small-and-medium load), the ECM will perform the closed-loop control through the feedback signal of the oxygen sensor to obtain the optimum air-fuel ratio to achieve the best purification efficiency of the three-way catalytic converter.

(d) Fuel-injection pulse width control.

Input signal	ECM	Control output
Air-fuel ratio correction	Calculate fuel injection amount	Fuel-injection pulse width
Closed-loop feedback correction		
Intake manifold pressure		
Air inflation temperature		
Air inflation efficiency		
Self-learning correction		
Power supply voltage correction		
Exhaust gas cycle		
Thickening of gas mixture for acceleration		
Deceleration and lessen fuel injection		
Decelerating and fuel cut-off.		
Injector parameters		

(e) Control signal description.

Correction item	Contents
Air-fuel ratio includes	• Air-fuel ratio for starting • Air-fuel ratio when the engine runs • Air-fuel ratio at low coolant temperature of the engine • Air-fuel ratio at normal coolant temperature of the engine • Theoretical air-fuel ratio • Stronger air-fuel ratio • Overheating protection air-fuel ratio
Closed-loop feedback correction	• Control actual air-fuel ratio by oxygen sensor feedback signal to make it be close to theoretical air-fuel ratio

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Correction item	Contents
Intake manifold pressure	• Read directly through MAP installed on intake manifold
Self-learning	• Correct slow change, such as mechanical wear, in the engine due to long time running
Power voltage	• When the battery voltage changes, voltage correction can ensure correct fuel injection amount
Thickening of gas mixture for acceleration	• When ECM detects intake manifold pressure and throttle opening value is increased, fuel injection amount is increased to improve power performance in order to avoid engine gas mixture from becoming thinner instantly.
Deceleration and lessen fuel injection	• When ECM detects intake manifold pressure and throttle valve opening value is decreased, fuel injection amount is decreased in order to avoid the engine gas mixture from becoming stronger instantly. To improve emissions and driving performance
Decelerating and fuel cut-off.	• Control to cut off the fuel when the system detects the vehicle enters into deceleration state. to reduce emission and fuel consumption • When engine speed is higher than the set value, fuel is cut off. • When ignition system has a fault, fuel is cut off.
Fuel injection parameters	• Provide relation between the engine and fuel injection amount

(f) Correction of engine gas mixture.

- When the engine is at normal working temperature, partial load control is closed-loop fuel control. Now, the system corrects fuel injection amount at real time by ECM according to voltage signal of oxygen sensor feedback so that adjusted gas mixture concentration is close to theoretical air-fuel ratio to ensure conversion efficiency of harmful gas through three-way catalytic converter reaches to optimal state and a better fuel economy.
- When the engine is within normal working temperature range, open-loop fuel control is used at full load. At the moment, to ensure the best power output of the engine, the system will control the fuel injected with a richer air-fuel ratio and increase the ignition advance angle moderately without engine knock. The system can control exhaust temperature through exhaust temperature mathematical model established when calibrating to protect the engine and three-way catalytic converter.
- The system determines full-load conditions of the engine according to signals provided by throttle position sensor. Normally, when throttle opening reaches 80% - 90%, the system will consider that the engine is in full-load state. When the driver depresses on accelerator pedal, the system will increase fuel injection amount appropriately to ensure power required by the engine when accelerating. Increased fuel injection amount is directly proportional to throttle valve opening change rate. When accelerating, ECM first delays ignition advance angle appropriately, then restore it gradually in order to avoid increased torque from impacting drive system when the engine accelerates quickly.
- When working condition of accelerating is close to full load of the engine, the system will disconnect vehicle air conditioner system temporarily to ensure power takeoff of the engine when accelerating. No matter in any condition, when engine speed exceeds maximum speed set in system, the system will cut fuel supply to resist endless increase of speed, to protect engine and prevent "vehicle flying". When speed returns to maximum speed limit specified by the system, the system will immediately recover fuel supply.

6. IGNITION CONTROL PRINCIPLE

(a) Starting.

When the engine starts, one fixed ignition advance angle is used to ignite gas in the cylinder and provide positive torque. After the engine speed increases to a certain degree, ECM calculates ignition advance angle according to input signals.

(b) Ignition advance angle control.

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Correction signal	ECM	Control output
Coolant temperature correction	Calculate ignition advance angle	Ignition advance angle
Intake air temperature correction		
Idle speed correction		
Main ignition angle		
Decelerating and fuel cut-off correction		
Accelerating correction		
Power enrichment correction		
Air conditioner correction		

(c) Main ignition advance angle.

After the engine reaches to normal value, main ignition angle when the throttle valve is opened is the minimum ignition angle at the optimal torque point. When the throttle valve is closed, ignition angle shall be decreased to obtain idle speed stability.

(d) Ignition advance angle correction.

- Acceleration correction: when the vehicle is accelerating, ECM detects knock signal, correct ignition angle until no knock occurs. In addition, it is used to reduce engine speed fluctuation caused by drive system knock.
- Power enrichment corrected: In the vicinity of the engine-performance, to obtain a better power and torque, the enriched air-fuel ratio can reach the thinnest one with the best torque value.
- Decelerating and fuel cut-off correction: when exiting deceleration and fuel cut-off, correct ignition advance angle to ensure stable transition.
- Air conditioner control correction: when the engine is idling, turn off air conditioner. Correct ignition advance angle to ensure stable transition.

7. IDLING-SPEED CONTROL PRINCIPLE

(a) Idle speed control.

According to idle speed conditions and engine load changing at idle speed, control throttle valve bypass air amount to keep idle speed optimal. According to engine coolant temperature and air conditioner load, ECM drives idle speed stepper motor to make the engine run at preset target idle speed. In addition, if turn on or turn off the air conditioner when engine runs at idle speed, idle speed stepper motor will adjust bypass air amount according to engine loading condition, to avoid unstable idle speed.

(b) Calculate target idle speed.

Input signal	ECM	Control output
Basic target idle speed	Calculate target idle speed	Target idle speed
Voltage compensation		
Vehicle speed compensation		
Headlamps compensation		
Fan compensation		
A/C compensation		
Decelerating adjustment		

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- Voltage compensation: When the voltage is less than 12 V, the system will increase target idle speed automatically to increase generated energy of the generator.
- A/C compensation: When parking vehicle at idle speed and opening air condition, to compensate power consumption of compressor, aim idle speed will increase by 150r/min.
- Headlamps compensation: With the low-beam headlamps on, in order to compensate for their power consumption, the target idling-speed will rise to about 50 r/min.
- Fan compensation: when coolant temperature is increasing, the fan is running. In order to compensate power consumption of fan running, target idle speed will be increased by 50 r/min.

(c) Idle speed control parameters:

- Idle speed air amount.
- Fuel injection amount.
- Ignition timing.

(d) Idle speed design control opportunity:

- Idle speed stability calibration.
- Accelerating working condition calibration.
- Decelerating working condition calibration.
- Decelerating and fuel cut-off.
- Engine transient state transition working condition fuel supply calibration.
- Constant speed driving calibration.
- Mechanical and electrical load increasing/decreasing calibration.

(e) Decisive factors of target idle speed:

- When the engine coolant temperature is too low, the system will provide high target idle speed to speed up warming-up process.
- When the additional loads (such as: the headlamps, air-conditioner, cooling fans and other electrical loads) are turned on, the system will increase the idling speed to compensate for the increased loads and to maintain the stability of idling-speed.

8. KNOCK CONTROL PRINCIPLE

(a) Knock sensor introduction:

Knock sensor is a vibration acceleration sensor, installed between No. 2 cylinder and No. cylinder in favor of engine knock balance. ECM determines if the engine has knock using vibration frequency signal output by the sensor and through filtering inside ECM. When knock signal is detected, ECM corrects ignition angle until no knock occurs.

(b) Knock control conditions:

- The vehicle is provided with knock sensor.
- Engine speed is larger than 800 r/min.
- MAP > 40 kPa.

(c) Knock control mode:

- Steady-state control:

  When the engine is running normally, ECM collects and analyzes noise during the course of engine combustion through knock sensor. After filtering, knock is detected. Once knock strength exceeds the limit, the system will retard ignition advance angle of the cylinder that has knock to eliminate the knock.

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- Transient control:

  In sudden acceleration or dramatical change in the engine speed, knocking easily occurs. After predicting the possibility of knock, the system will defer the ignition advance angle automatically to avoid excessive (violent) knock.

- Quick-delay of ignition advance angle:

  After detecting the knock, the system will delay the ignition advance angle quickly in accordance with different engine speed, and restore the ignition advance angle 2s - 3s later.

- Adaptability adjustment of ignition angle:

  Due to manufacturing deviation and wear caused by long term usage (belt, toothed pulley and cam affecting phase angle relation), the engine have differences or changes. If the system and engine are used initially or after ECM is charged, the engine may have knock. The system will record it. After a period of running-in, the system will generate ignition adjustment correction value (self-learning value) automatically. When the engine runs to the same working conditions, the system will adjust ignition advance angle automatically. Strong knock is forbidden. Adaptive learning of the system is continuously updated during the course of running.

9. CANISTER CONTROL VALVE CONTROL PRINCIPLE

(a) Used to control the flow of canister cleaning airflow.

Based on the engine load, engine coolant temperature, engine speed and a series of signals, duration and frequency (duty cycle) of the electrical pulse to be sent through comprehensive calculation, the ECM will control the canister solenoid. Excessively-accumulated fuel vapor in the canister can cause gasoline leak resulting in environmental pollution. Therefore, the purpose of the canister control valve is to open at the right time to allow the excessive fuel vapor in the canister to mix with air before entering into the intake pipe to participate in combustion.

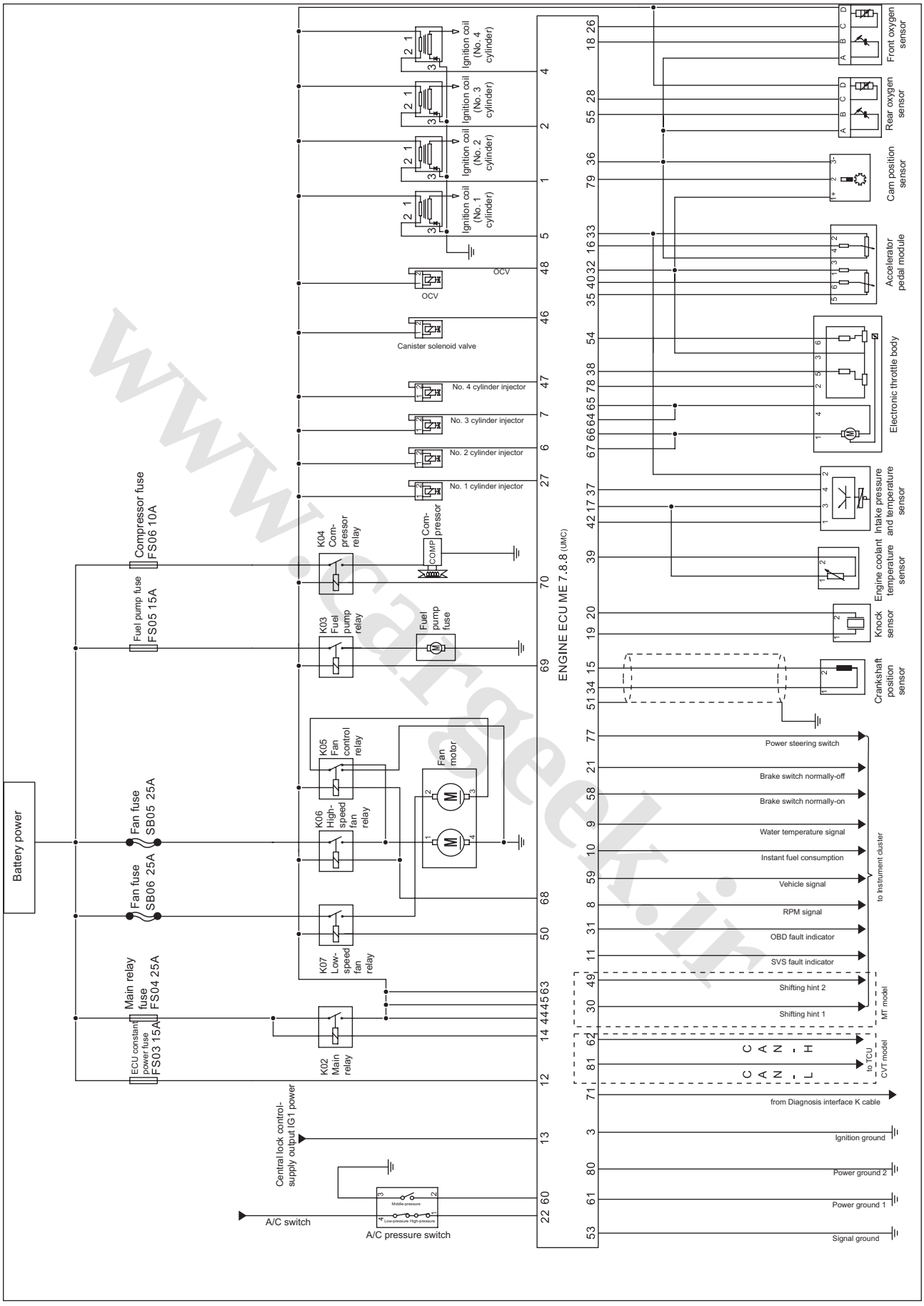
(b) Canister will not work in the following conditions:

- Within a period of time after engine cold start.
- Engine coolant temperature is too low.
- Engine idle.
- Engine load is high.
- Important sensor system faults.

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SCHEMATIC DIAGRAM

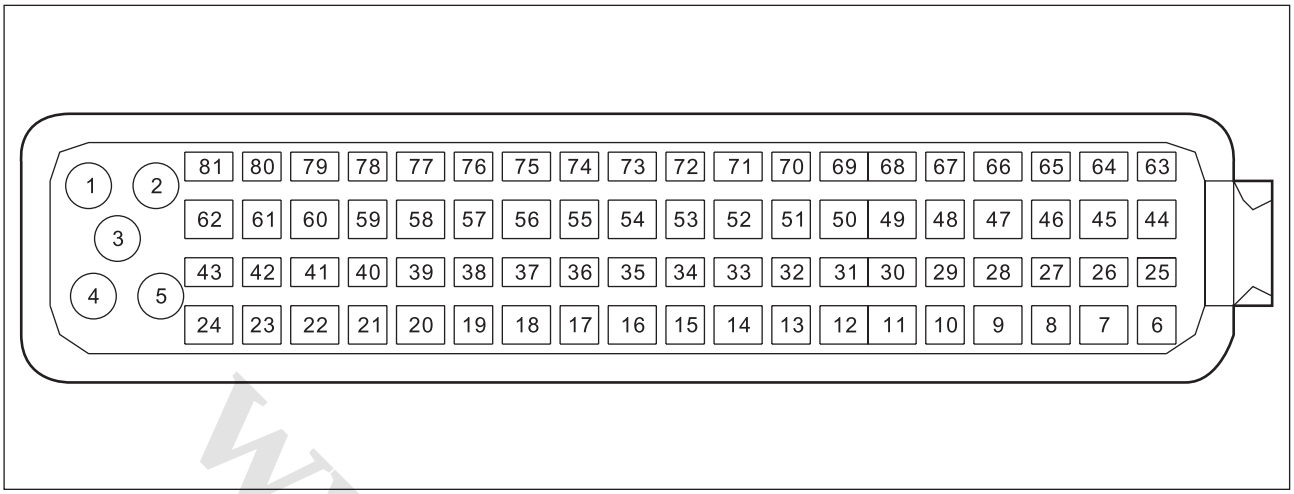


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TERMINAL DEFINITION

E01 to the engine ECM



Terminal No.	Color	Function	Terminal No.	Color	Function
1	V	No. 2 cylinder ignition coil control	42	Bl	IATS signal
2	G	No. 3 cylinder ignition coil control	43	-	-
3	B	Ignition ground	44	Bl/R	Main relay power supply
4	Br	No. 4 cylinder ignition coil control	45	Bl/R	Main relay power supply
5	R/B	No. 1 cylinder ignition coil control	46	WG	CPV control
6	Y/R	No. 2 cylinder injector control	47	GY	No. 4 cylinder injector control
7	P/Y	No. 3 cylinder injector control	48	Y/W	VVT control
8	W/B	Engine speed output	49	R/Y	Downshift hint
9	G/B	Engine coolant temperature output	50	W/B	Low speed fan control
10	P	Instantaneous fuel consumption signal	51	B	Electronic ground
11	W/Y	SVS malfunction indicator lamp	52	-	-
12	R	Battery power	53	B	Electronic ground
13	B/W	IG1 power	54	W/P	TPS signal
14	Y	Main relay control	55	Gr	Rear HO_2S signal
15	P/G	CPS low level signal	56	-	-
16	R/G	APS signal	57	-	-
17	B/Bl	Sensor ground	58	G/W	Brake switch state signal input
18	O/Y	Front HO_2S heating signal	59	V/W	Vehicle speed signal input
19	Lg/B	KS low level signal	60	G/V	A/C medium-pressure switch signal
20	Lg	KS high level signal	61	B	Power ground
21	G/Gr	Brake light switch state signal input	62	W	CAH_H
22	V/R	A/C switch signal	63	Bl/R	Main relay power supply
23	-	-	64	P	TB motor (-)
24	-	-	65	P	TB motor (-)

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Terminal No.	Color	Function	Terminal No.	Color	Function
25	-	-	66	R/G	TB motor (+)
26	B/R	Front HO_2S heating	67	R/G	TB motor (+)
27	O/B	No. 1 cylinder injector control	68	W/R	High speed fan control
28	G/R	Rear HO_2S heating	69	W/Bl	Fuel pump control
29	-	-	70	W/Y	A/C compressor control
30	R/B	Upshift hint	71	P/G	Diagnostic K-line
31	P/W	OBD fault lamp	72	-	-
32	R/B	5V DC	73	-	-
33	O/Bl	5V DC	74	-	-
34	Br	CPS high level signal	75	-	-
35	W/B	Sensor ground	76	-	-
36	V/B	Sensor ground	77	Bl/G	Power steering switch signal
37	P/B	MAPS signal	78	V	Sensor ground
38	Bl/G	TPS signal	79	Lg/W	CMPS signal
39	Br	CTS signal	80	B	Power ground
40	Gr	APS signal	81	W/B	CAH_L
41	-	-			

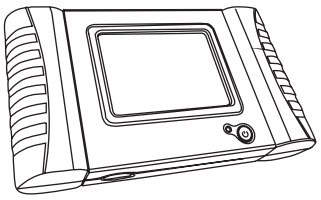
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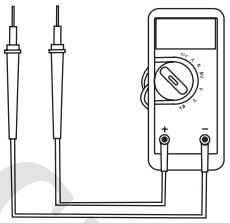
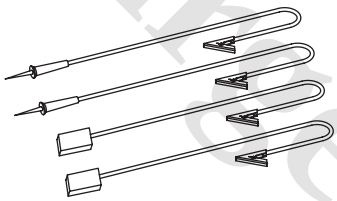
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PREPARATION

1. SPECIAL TOOL

S/N	Tools	Outline diagram	Description
1	Diagnostic scanner		Reading engine control system fault code, data flow, etc.

2. RECOMMENDED TOOLS

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Measuring voltage and resistance
2	Wire harness set		Testing circuits

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Working voltage of OCV	11 - 14 V
OCV Resistance	9.4 - 10.6 Ω
Resistance of intake air temperature sensor at 20°C	2.5 kΩ ± 5%(20° C)
Working voltage of canister control valve	8 - 16 V
Frequency of control pulse of canister solenoid	30 Hz
Resistance of the canister control valve	22 - 30 Ω
Working temperature at exhaust end of oxygen sensor	200 - 850° C
Resistance of oxygen sensor heater	7 - 11 Ω
Coil resistance of crankshaft position sensor	860 Ω
Working voltage of coolant temperature sensor	5 V
Coolant temperature sensor resistance	1.98 kΩ
Working voltage of camshaft position sensor	4.5 - 5.5 V
Low level output of camshaft position sensor	0 - 700 mV
High level output of camshaft position sensor	3.2 - 5 V
WOT max. air flow (at standard atmosphere)	67 g/s
Throttle opening (idle)	10 ± 2%
Opening range of throttle position sensor	7% - 93% opening
Working voltage of throttle position sensor	5±0.1 V
Capacitance of knock sensor	950 - 1350pF
Resistance of knock sensor	4.9 ± 20% MΩ
Pressure settings of fuel pressure regulator in returnless fuel system	350 kPa
Resistance of injector at 20°C	11 - 17 Ω
Ignition coil resistance	0.5 ± 0.05 Ω

2. TIGHTENING TORQUE TABLE

Item	N•m
ECM fixing bolts	20
Fixing bolts of intake pressure and temperature sensor	21 - 25
Fixing bolts of coolant temperature sensor	20
Fixing bolts of crankshaft position sensor	6 - 10
Fixing bolts of camshaft position sensor	6 - 10
Oxygen sensor	40 - 60
Knock sensor	15 - 25
VVT valve fixing bolt	6 - 10

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PRECAUTIONS

1. Maintenance shall be performed according to the standard diagnostic procedures.
2. When a part of the electronic fuel injection system is detected faulty, it should be wholly replaced, and disassembling operation is strictly prohibited. Otherwise it may affect the normal operation of other components.
3. Replace with the standard spare parts only, otherwise, it can not ensure a normal operation of the electronic fuel injection system.
4. Do not arbitrarily remove any parts or connectors of the electrical fuel injection system from their installed locations to avoid damage or prevent moisture, oil stain and other foreign matter from entering, affecting the normal operation of the electrical injection system.
5. When disconnect or connect the connectors, the ignition switch must be placed in "OFF" position, otherwise, it may damage the electrical components.
6. If it is required to remove the negative battery cable or ground, it is necessary to turn the ignition switch to OFF, and all electric load shall be turned off. After negative electrode grounding wire is removed for 60s, other electrical equipment can be maintained.
7. Parts in the EFI system have high reliability, and if any exception occurred on the complete vehicle or engine, firstly check if the related mechanical parts are in good condition, system connectors, wire harness and the grounding wire are in good contact.
8. Faults in system are mainly wire harness and connector faults. Normally, wire harness is broken, connector is in poor contact, connector terminal is pulled out or not inserted completely, and parts are grounding.
9. It is unusual that wire harness is broken in the middle. Normally, it is broken at the connector. Therefore, check wire harness at the sensor and connector carefully.
10. Poor contact may due to connector terminal corrosion, external dirt intruding into the terminal or contact pressure reduction between connector plug and socket. Disconnect the connector and then reconnect it. Normal contact restored. When performing fault diagnosis, check whether the wire harness and the connectors occur abnormalities; if the fault disappears after connected again, this fault belongs to poor connector contact.
11. Do not puncture the wire harness with fine needle to check electrical signal of the system.
12. When transporting and installing the sensor, to ensure that it is not damaged, it must be handled carefully, and any shock, falling may seriously affect its performance.
13. Before installing, remove the sundries on mounting surface with sealant scraper or steel brush, and confirm the sealing surface is smooth without oil stain.
14. When installing the sensor and actuator, tighten fixing bolts or nut according to specified value.
15. The oxygen sensor shall not contact with water or other liquids during removing and replacing. Maintenance of the oxygen sensor should be performed after the engine is cooled completely, otherwise, it may cause personal injury.
16. Due to high oil pressure (about 350 kPa) of the electrical injection system, all fuel pipes are used with high pressure resistant fuel pipes. Even if the engine is not running, there still remains a higher fuel pressure in the oil lines. Therefore, pay attention not to remove the oil pipes during maintenance, and when the fuel system is needed for maintenance, it should be performed pressure relief treatment before removing the oil pipes.
17. Removing the oil pipe and replacing the fuel filter should be performed by the qualified service personnel in the place with good ventilation and away from open fire. Fuel shall be kept from falling to the engine and its high-temperature exhaust pipeline during the operation.
18. Fuel pump can not be tested in a state without gasoline or in the water. At any time the positive and negative electrodes of the fuel pump can not be connected reversely.

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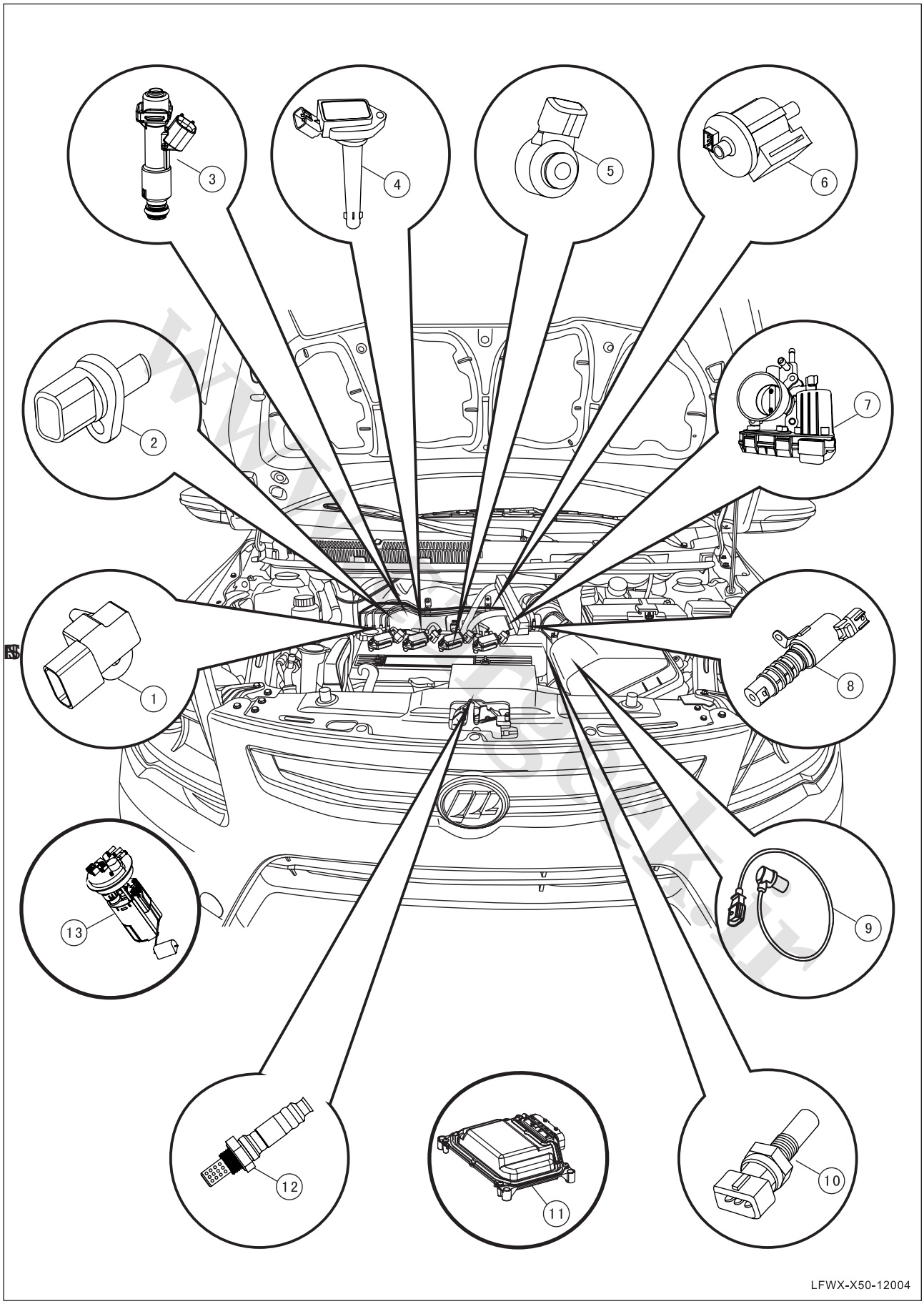
19. When checking the ignition system, spark plug flashover test is performed only when necessary, and the time should be as short as possible; otherwise, it will cause a lot of unburned gasoline to enter in the exhaust pipe and damage to the three-way catalytic converter.
20. When the battery power is low or the engine is faulty, never start the engine with the help of external force for a long time to prevent damage to the three-way catalytic converter.
21. When a vehicle equipped with electronic control engine is required to bridge power supply of any other vehicle for starting, first turn off ignition switch and all electrical loads on electronic control vehicle, then remove and install the jumper.
22. When performing arc welding on the vehicle, be sure to disconnect the positive and negative electrode cables of the battery, remove ECM if necessary, thus avoiding damage to ECM by the high voltage during arc welding.
23. When repairing the body near ECM or sensor, take care to avoid the electronic components from being damaged.
24. When installing or removing ECM, the operator should make himself ground connected; otherwise, iron build, otherwise, static electricity of the human body may cause damage to the ECM circuit.
25. Power supply system used by the vehicle is negative ground, and pay special attention not to connect the positive and negative electrodes reversely when installing the battery, so as not to damage to the electronic components.
26. When the system has a fault, the diagnostic scanner will clear fault code. If the fault still exists, fault code will always exist when reading fault codes next time until the fault is eliminated. Meanwhile, be sure to clear the fault code after completion of the maintenance.

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COMPONENTS



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1	Intake pressure and temperature sensor
2	Camshaft position sensor
3	Injector
4	Ignition coil
5	Knock sensor
6	Canister control valve
7	Electronic throttle body

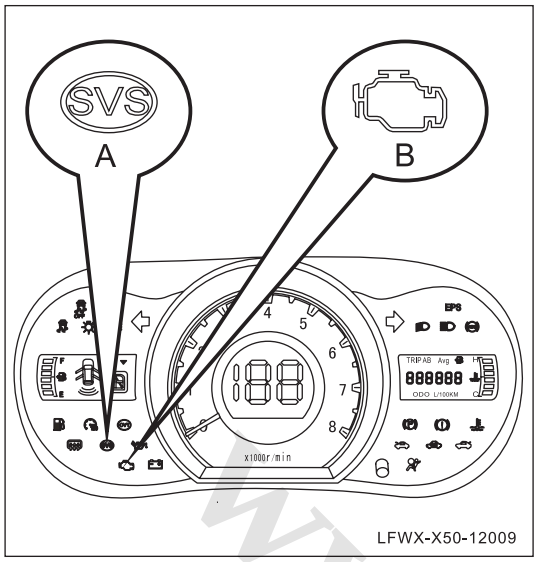
8	OCV
9	Crankshaft position sensor
10	Coolant temperature sensor
11	Electronic Control Module (ECM)
12	Oxygen sensor
13	Fuel pump

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ON-VEHICLE INSPECTION



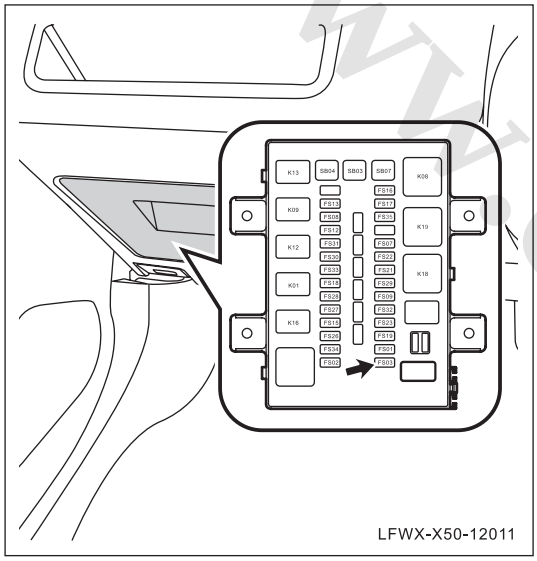
1. CHECKING THE ENGINE CONTROL SYSTEM MALFUNCTION INDICATOR LAMP

(a) When the power status shifting from "ACC" to "ON", check whether the engine malfunction indicator lamp and OBD emission indicator lamp on the instrument cluster come on.

(b) Check whether the engine control system malfunction indicator lamp goes out after starting the engine.

△ HINT:

If any inconformity occurs during checking, refer to the Fault Symptom Table.

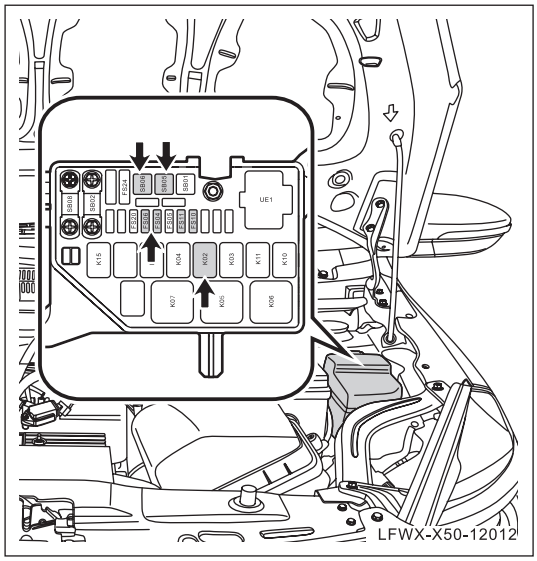


2. CHECK FUSE AND RELAY

(a) Check whether the ECU fuse FS03 of the cab central control box is blown.

△ HINT:

Replace the fuse with the same specification if it is blown.



(b) Check whether the electronic fan fuses SB05 and SB06, compressor fuse FS06, fuel pump fuse FS05 and the main relay fuse FS04 in the cab central control box are blown.

△ HINT:

Replace the fuse with the same specification if it is blown.

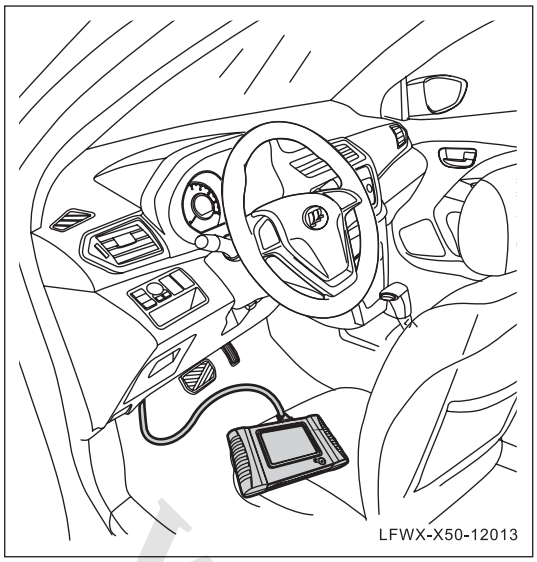
(c) Check whether the main relay K02 in the cab central control box is damaged.

△ HINT:

If the relay is damaged, replace it with the same model.

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3. CHECK INTAKE PRESSURE AND TEMPERATURE SENSOR

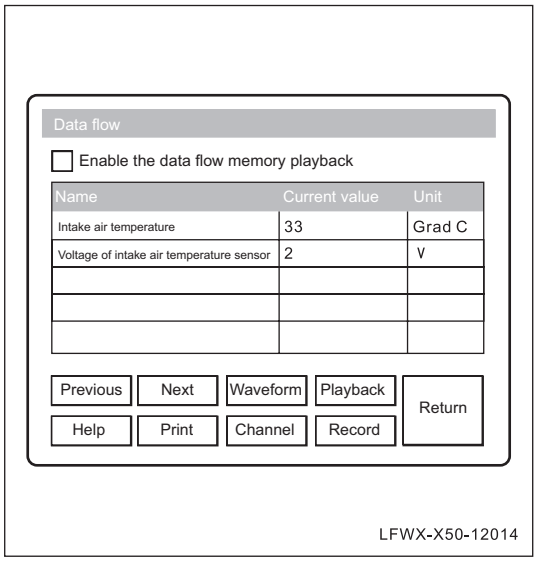
(a) Turn the ignition switch to "OFF" position.

(b) Connect the diagnostic scanner to the fault diagnosis connector on the left lower of the dashboard.

(c) Turn the ignition switch to "ON" position, and turn on the diagnostic scanner - using the latest software version.

(d) Select the "Read data flow" menu item.

Items displayed by the diagnostic scanner	Check conditions (range)		Normal value
Intake air temperature	• Ignition switch: ON • or start the engine and make it run.	Intake air temperature: - 20° C	- 20° C
		Intake air temperature: 0° C	0° C
		Intake air temperature: 20° C	20° C
		Intake air temperature: 40° C	40° C
		Intake air temperature: 80° C	80° C



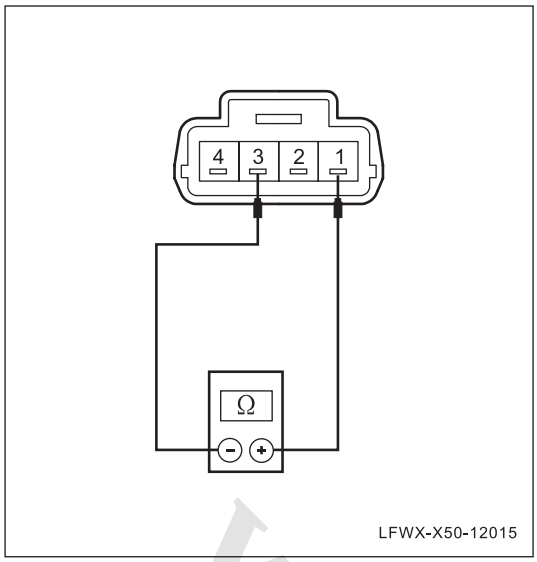
LFWX-X50-12014

Items displayed by the diagnostic scanner	Inspection conditions		Normal value
Intake air temperature sensor voltage	Ignition switch: ON	Intake air temperature: 0° C	3.2 - 3.8 V
		Intake air temperature: 20° C	2.3 - 2.9 V
		Intake air temperature: 40° C	1.5 - 2.1 V
		Intake air temperature: 80° C	0.4 - 1.0 V

(e) If the result does not comply with relevant provisions, check the intake manifold pressure/temperature sensor, wire harness or ECM.

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(f) Check the intake air temperature sensor.

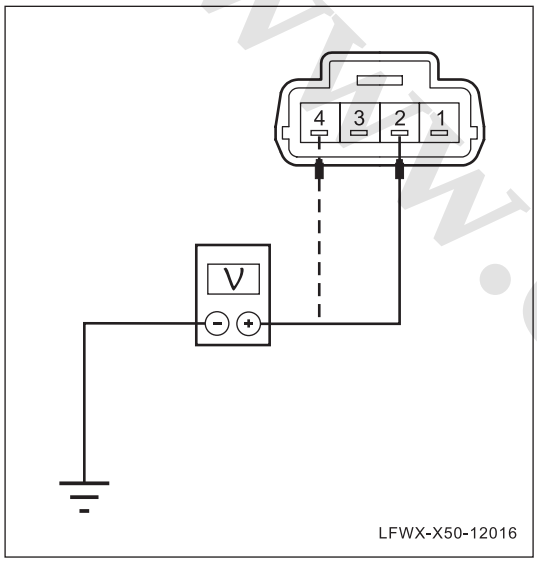
- Switch the digital multimeter to ohm position, and connect the two probes to the No. 1 and No. 3 pin of the sensor, respectively.

Rated resistance at 20° C: 2.5k Ω ± 5%

- Perform simulation blasting to the sensor with a electric blower (be careful not to get too close), and observe the changes of the sensor resistance, while the resistance value should be decreased.

△ HINT:

Be sure to disconnect the sensor connector before checking, and check the resistance on the side of the sensor with a multimeter.



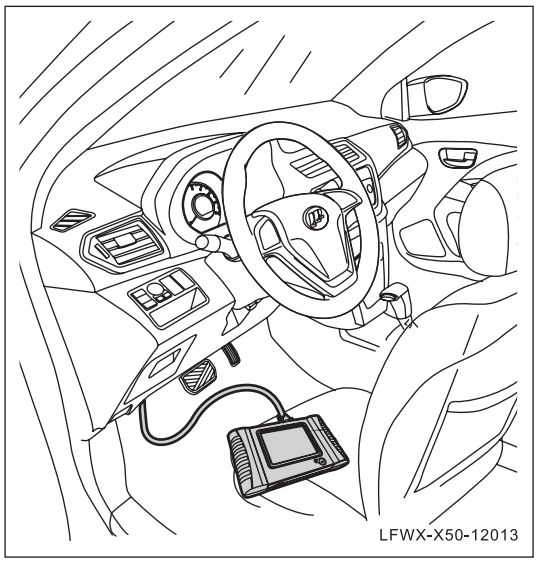
(g) Check the pressure sensor part

The digital multimeter is set to DC voltage position, and the black probe is grounded, and the red probe is connected to No. 2 and No. 4 pin respectively.

Inspection condition		Terminal	Voltage
Idle speed		2 - GND	5V
		4 - GND	1.3 V
No load	Open the throttle slowly	4 - GND	Basically does not change
	Open the throttle quickly	4 - GND	Instantly up to 4 V, then down to 1.5V

△ HINT:

If the check does not meet the requirements, replace the intake pressure and temperature sensor.



4. CHECK ELECTRONIC THROTTLE BODY

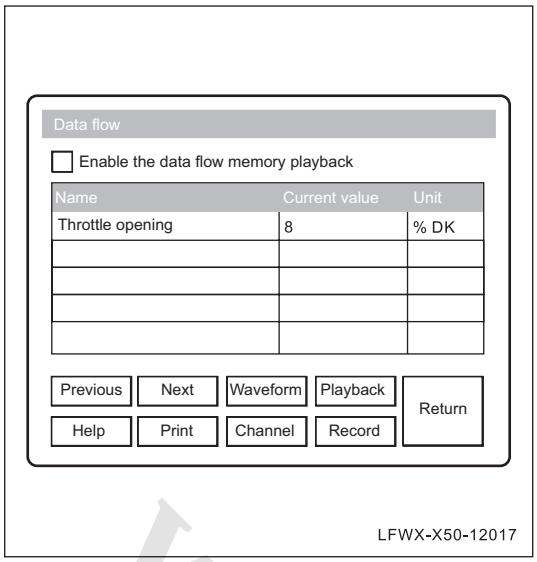
(a) Turn the ignition switch to "OFF" position.

(b) Connect diagnostic scanner to fault diagnosis connector (16-pin) on the left lower of dashboard.

(c) Turn the ignition switch to "ON" position, and turn on the diagnostic scanner - using the latest software version.

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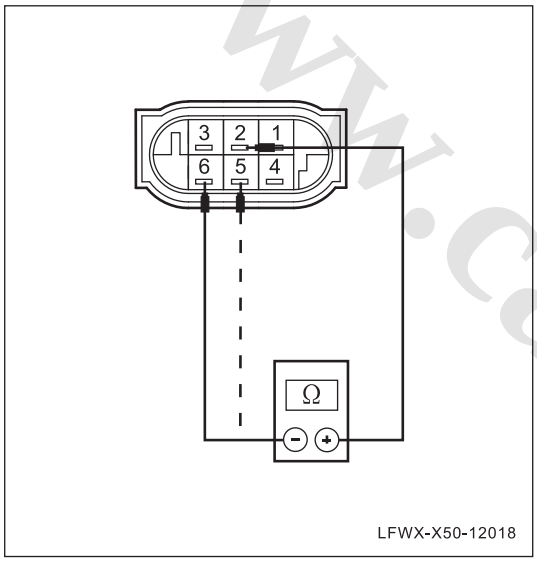


LFWX-X50-12017

(d) Select the "Read data flow" menu item.

Items displayed by the diagnostic scanner	Check conditions (range)		Normal conditions
Throttle opening	• Ignition switch: ON • Engine doesn't run	Idling position	10% ± 2
		The throttle opens gradually.	It's increased proportionally to the opening angle of the throttle.
		Fully open	93%

(e) If the signal value does not conform to the provisions or there is no signal output, check the electric throttle body, wire harness and ECM.



LFWX-X50-12018

(f) Remove the electronic throttle body.

(g) Check respectively the resistances between the No. 2 pin and the No. 5, No. 6 pins of the electronic throttle body with a digital multimeter. Toggle the valve plate by hand, and the resistance should be slowly changing, changes of the two resistances are opposite.

△ HINT:

If the resistance is beyond the standard range or the resistance changes unsteadily, replace the electronic throttle body assembly.

5. ELECTRIC THROTTLE BODY SELF-LEARNING

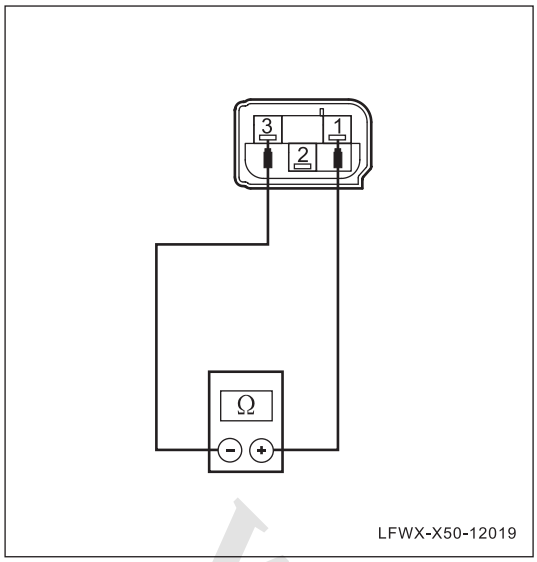
(a) Turn the ignition switch to the "ON" position.

(b) Wait for 1min or longer.

(c) Electronic throttle self-learning is completed.

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6. CHECK THE COOLANT TEMPERATURE SENSOR

(a) Dip the temperature probe of the coolant temperature sensor in hot water, and then measure the resistance between the terminal 1 and terminal 3 of the coolant temperature sensor with the digital multimeter.

(b) If the check result doesn't meet requirement, replace the coolant temperature sensor.

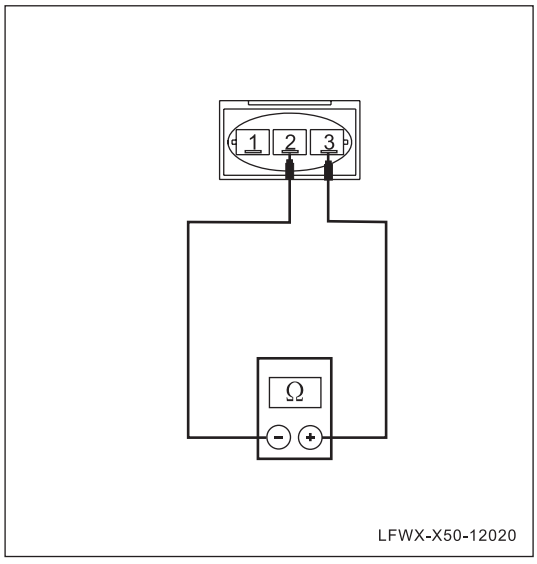
Measuring conditions	Standard resistance(kΩ)
0° C	5.1 - 6.5
20° C	2.1 - 2.7
25° C	1.9 - 2.0
40° C	0.9 - 1.3
80° C	0.26 - 0.36
100° C	0.17 - 0.2

NOTICE:

Put boiled water into the sensor working area, and do not allow the water to enter the terminal when performing simulation check. After checking, wipe off the sensor immediately.

△ HINT:

- Be sure to disconnect the sensor connector before checking, and check the resistance on the side of the sensor with a multimeter.
- If the check does not meet the requirements, replace the coolant temperature sensor.



7. Check crankshaft position sensor

(a) Disconnect the crankshaft position sensor connector.

(b) Check the resistance between the crankshaft position sensor No. 2 and No. 3 terminals.

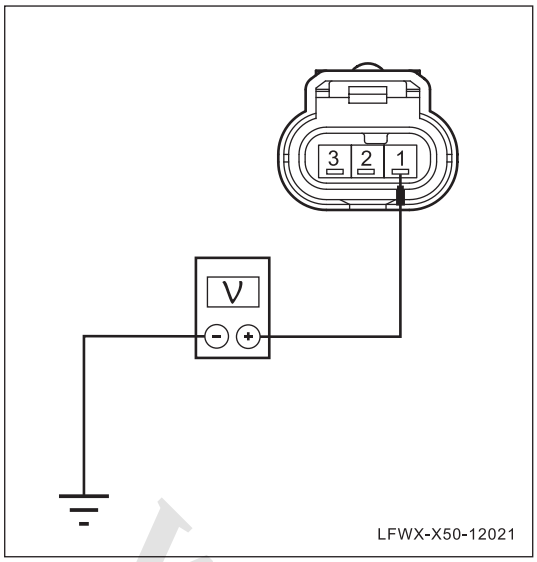
Resistance: 860Ω (20° C)

△ HINT:

If the check does not meet the requirements, replace the crankshaft position sensor.

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8. CHECK THE CAMSHAFT POSITION SENSOR

(a) Disconnect the camshaft position sensor connector.

(b) When the power supply state is in "ON", check the resistance between the No. 1 camshaft position sensor and the grounding with a digital multimeter.

Voltage: 5V

Check the resistance between No. 3 pin of the camshaft position sensor and the grounding with a digital multimeter.

Resistance: 0Ω

△ HINT:

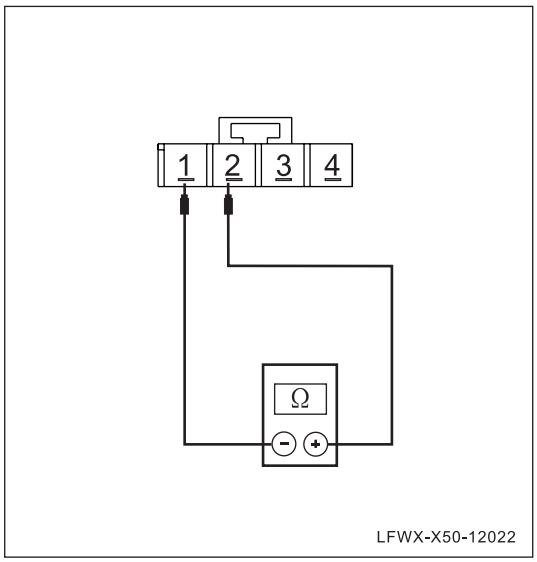
Check voltage or resistance of the camshaft position sensor on the side of the engine wire harness with a digital multimeter.

(c) Connect the camshaft position sensor connector.

(d) Connect the diagnostic scanner, and start the engine, then read the voltage of the camshaft position sensor on the diagnosis scanner and observe the waveform. The voltage waveform shall have regular continuous changes.

△ HINT:

If the check does not meet the requirements, then the camshaft position sensor is damaged. Replace the crankshaft position sensor.



9. CHECK OXYGEN SENSOR

(a) Disconnect the oxygen sensor connector.

(b) When the power supply state is in "OFF", check the resistance between the No. 3 pin and the No. 4 pin of the oxygen sensor with a digital multimeter.

Resistance: 7Ω - 11Ω (20° C)

△ HINT:

Check the resistance on the side of the sensor with a digital multimeter during checking.

(c) Connect the oxygen sensor connector.

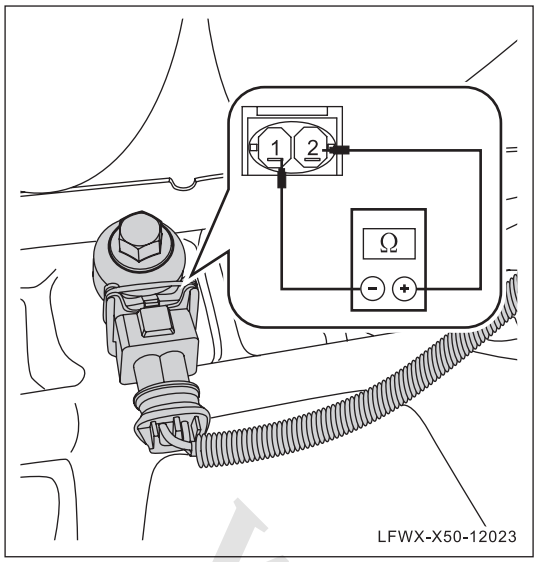
(d) Connect the diagnostic scanner, and start the engine, then read the voltage of the oxygen sensor on the diagnosis scanner. When the engine is running for over 3min, and the oxygen sensor temperature reaches 350° C or more, the oxygen sensor should change within 0.1V - 0.9V quickly; if there is no change, it indicates that the sensor is "poisoned" and fault.

△ HINT:

If the check does not meet the requirements, then the oxygen sensor is damaged. Replace the oxygen sensor.

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10. CHECK THE KNOCK SENSOR.

(a) Disconnect the knock sensor connector.

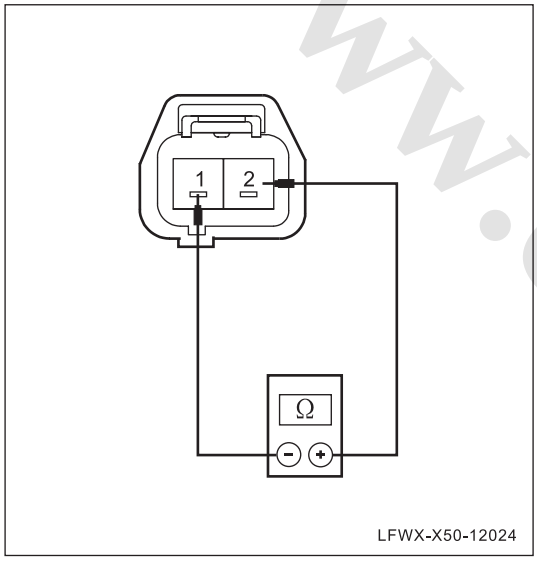
(b) Check the resistance between No. 1 pin and No. 2 pin of the knock sensor with the digital multimeter.

Resistance: >1MΩ

(c) Set the digital multimeter at millivolt position, and knock slightly near the knock sensor with a hammer, then there should be voltage signal output.

△ HINT:

- Check the voltage or resistance on the side of the sensor component with a digital multimeter during checking.
- If the check does not meet the requirements, then the knock sensor is damaged. Replace the knock sensor.



11. CHECK VVT VALVE

(a) Disconnect the negative cable of battery terminal when power is at "OFF".

NOTICE:

When disconnecting and re-connecting the negative cable of battery, the electric equipment switch shall be turned off firstly. For disconnecting the negative cable of battery, the tightening nut of negative cable shall be unscrewed completely.

(b) Disconnect the VVT valve connector.

(c) Remove the VVT valve fixing bolts, and take out the VVT valve.

(d) Check the VVT valve filter for clogging or damage. If necessary, replace it.

(e) Measure the resistance value between No. 1 and No. 2 terminals of VVT valve a the digital multimeter resistance scale.

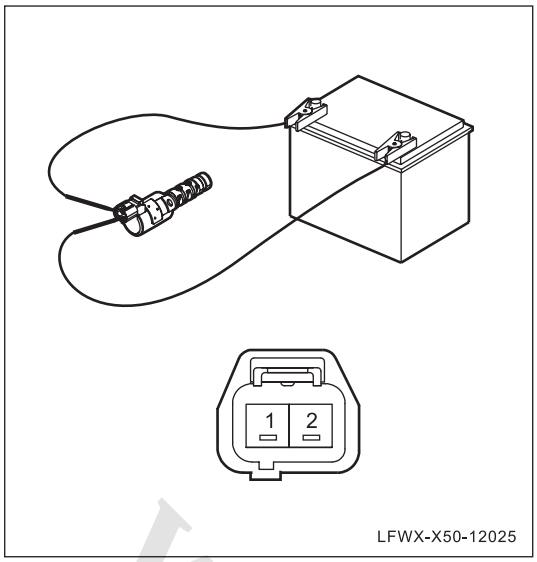
Standard resistance value: 6.9Ω - 7.9Ω(20° C)

△ HINT:

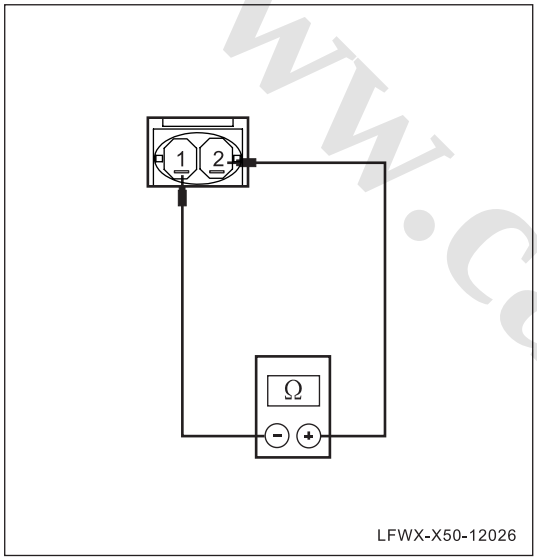
If resistance value does not conform to the specification, replace the VVT valve.

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LFWX-X50-12025



LFWX-X50-12026

(f) Connect the battery positive electrode with the No. 1 terminal of the VVT valve and the negative electrode with the No. 2 terminal of the VVT valve, then check the VVT operation.

△ HINT:

- The solenoid valve should move smoothly, without tackiness. If the solenoid valve does not move, replace the VVT valve assembly.
- A build-up of impurities can cause slight pressure leak. As pressure leak can cause the camshaft timing advance, a fault code is set accordingly.

(g) Install the VVT valve and tighten its fixing bolts.

Torque: 6 N•m - 10 N•m

(h) Connect the VVT valve connector.

(i) Connect the negative cable of battery.

12. CHECK CANISTER CONTROL VALVE

(a) Disconnect the negative cable of battery terminal when power is at "OFF".

NOTICE:

When disconnecting and re-connecting the negative cable of battery, the electric equipment switch shall be turned off firstly. For disconnecting the negative cable of battery, the tightening nut of the negative cable shall be unscrewed completely.

(b) Disconnect the connector of the canister solenoid.

(c) Check the canister control valve resistance. Switch the digital multimeter to the resistance position, connect the two probes to the No. 1 and 2 terminals of the solenoid valve respectively, and then measure the resistance between the two terminals.

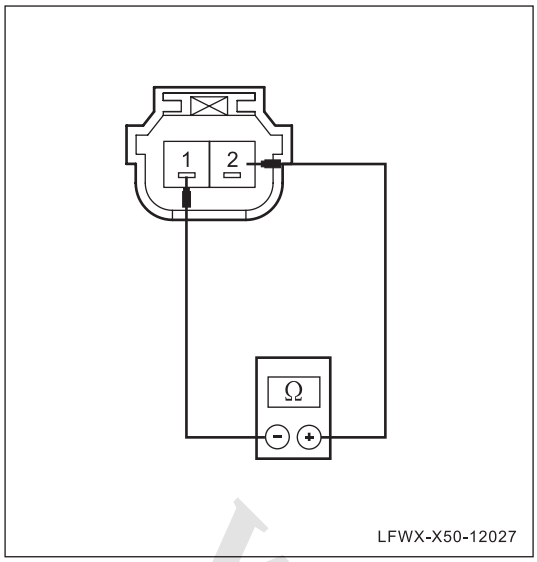
Standard resistance: 22Ω - 30Ω(20° C)

△ HINT:

If resistance value does not conform to the specification, replace the canister control valve.

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13. CHECK INJECTOR

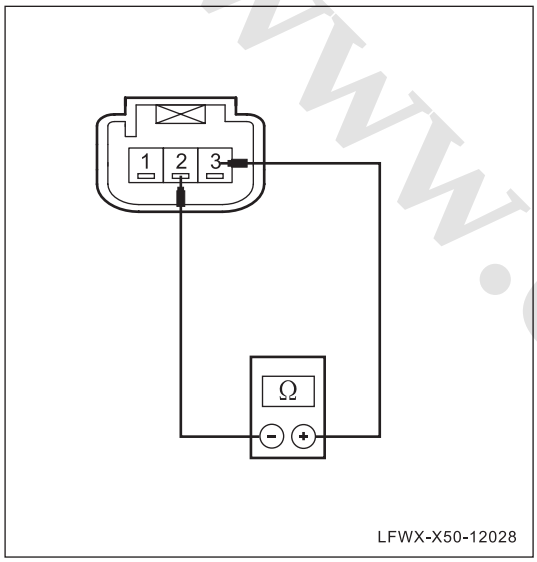
(a) When the ignition switch in "OFF" position, press the injector connector snap ring to disconnect the injector connector.

(b) Check the resistance between the No. 1 pin and No. 2 pin of the injector with a digital multimeter.

Standard resistance: 11Ω - 17Ω (20° C)

△ HINT:

If resistance value does not conform to the specification, replace the injector



14. CHECK THE IGNITION COIL

(a) Disconnect the negative cable of battery terminal when power is at "OFF".

NOTICE:

When disconnecting and re-connecting the negative cable of battery, the electric equipment switch shall be turned off firstly. For disconnecting the negative cable of battery, the tightening nut of negative cable shall be unscrewed completely.

(b) Disconnect the ignition coil connector.

(c) Check whether the ignition coil wire harness is damaged, and whether its surface has fissure.

(d) Check the resistance between the No. 1 pin and No. 2 pin of the ignition coil with a digital multimeter.

Standard resistance: 0.5 - 0.6Ω

△ HINT:

- If the resistance does not meet the requirement, then the ignition coil is damaged, replace the ignition coil.
- If the resistance meets the requirement, while the ignition system fault still exists, further diagnosis is required for the ignition coil.

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DIAGNOSIS

SYSTEM DESCRIPTION

1. OVERVIEW OF SYSTEM

The engine EFI diagnosis system refers to the on-board (OBD) system for emission control. Its role is to identify the possible fault area, and store the information in the electronic control unit memory in the form of fault code.

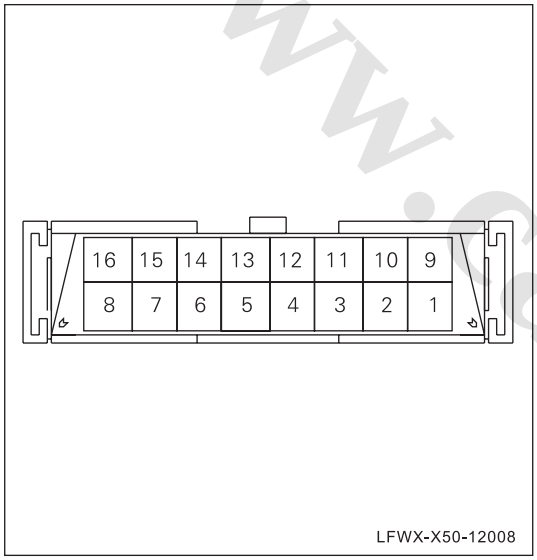
2. INFORMATION STORAGE

(a) After a fault occurs and the system confirms it, each fault is stored in electronic control module (ECM) as a separate fault code.

(b) Store fault information and engine state parameters when the fault occurs, including load value, engine speed, fuel pressure and correction, vehicle speed, coolant temperature, etc.

3. INFORMATION READING

(a) Connect a diagnostic scanner with the vehicle through diagnosis interface or a computer to read fault code and engine state parameters when the fault occurs.



(b) Diagnosis interface:

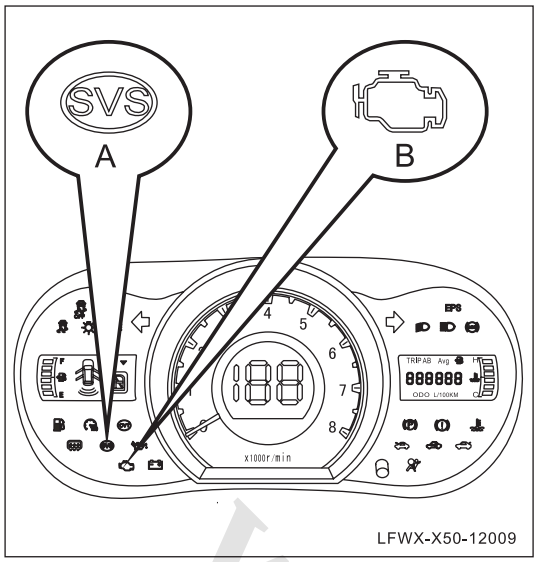
16-pin interface, located below the left lower dashboard.

(c) Diagnosis interface description:

Terminal code	Function description	Inspection of data
4	Grounding (-)	Resistance : about 1Ω or less
5	Grounding (-)	Resistance : about 1Ω or less
6	CAN_H	2.5 - 3.5V voltage
7	KW2000 communication cable	Pulse Signal
8	IG1 power	Ground voltage 9 - 14 V
14	CAN_L	1.5 - 2.5V voltage
16	Battery positive terminal (+)	Ground voltage 9 - 14 V

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4. MALFUNCTION INDICATOR LAMP

(a) Position and symbol

Instrument panel contains 2 malfunction indicator lamps: engine malfunction indicator lamp "SVS" (A), the other is OBD malfunction indicator lamp "MIL" (B). Both are controlled by ECM calibration. The difference is that OBD MIL is mandatory by national laws and regulations. When it is lit, it means there is a fault in electronic control system that deteriorates emission of complete vehicle. SVS lamp means there are other faults in electronic control system. During the course of normal running of the engine, when a fault occurs, both lamps are lit according to its respective rules.

5. LIGHTING TYPE OF MALFUNCTION INDICATOR LAMP

△ HINT:

- Before starting the engine, turn the ignition switch to "ON" and pause for about 2s, and observe whether the indicators on the instrument performs a self-test.
- The SVS and MIL lamps on the dashboard are to prompt the user whether the fault is related to the electronic control system. Their illumination will be controlled by the ECM internal calibration data.

(a) When the system has no fault.

- Turn the ignition switch to ON, and MIL is on, SVS goes out after self check.
- After starting, MIL lamp and SVS go out;
- After flameout, then MIL and SVS go out.

(b) When the system has a fault.

- Turn the ignition switch to "ON", MIL light is on all the time, and SVS light is always flashing.
- After starting the engine, if the system is faulty, MIL light and SVS light will be on all the time in accordance with their respective rules.
- All indicators will be off after stalling of the engine.

6. CLASSIFICATION OF FAULTS OCCURRED IN ENGINE ELECTRONIC CONTROL SYSTEM

(a) If the OBD malfunction indicator lamp on the instrument is on, a fault worsening the emission occurs in the engine electronic control system.

(b) If the SVS malfunction indicator lamp on the instrument is on, the electronic control system is abnormal; in this case, continuous driving may cause damage to the engine, or result in personal injury.

△ HINT:

The two faults require the user to go to the service station immediately authorized by LIFAN to have them checked with the diagnostic scanner or the special equipment with the equivalent function.

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BASIC CHECK

△ HINT:

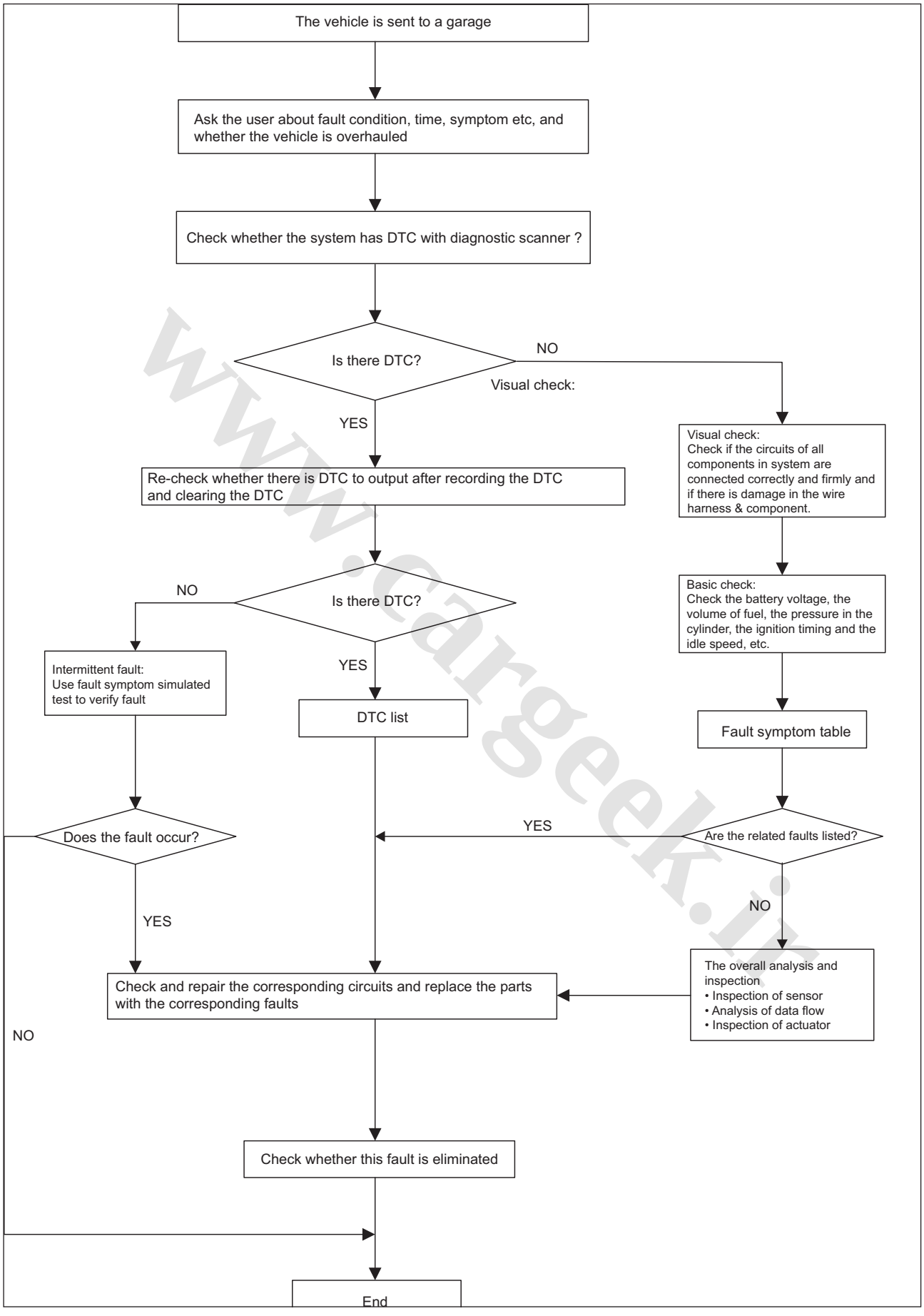
If the DTC isn't determined during inspection of DTC, all possible circuits must be considered as possible fault cause to analyze and eliminate fault. In most cases, basic check for the engine in the following table will be made to find fault location quickly and efficiently.

Steps	Inspection item		Recommended action
1	**Check the battery voltage** • The battery voltage shall be ≥ 9.6 V. Is the result normal?	YES	Go to Step 2
		NO	Charge or replace the battery
2	**Check if the engine starts** • Start the engine. Is the result normal?	YES	Go to Step 3
		NO	Go to Step 6
3	**Check the air filter** • Take out the air filter • Check if the air filter is polluted or oily excessively visually. Is the result normal?	YES	Go to Step 4
		NO	Clean or replace the air filter
4	**Check idle speed** • Start the engine. • Let the engine in idling state. Is the result normal?	YES	Go to Step 5
		NO	See 12 - Engine Control System, Fault Diagnosis, Fault Symptom Table
5	**Check ignition timing** • Use timing lamp or ignition timing tester to check ignition timing. Is the result normal?	YES	Go to Step 6
		NO	See 12 - Engine Control System, Fault Diagnosis, Fault Symptom Table
6	**Check fuel pressure** • Check fuel pressure with fuel pressure gauge. Is the result normal?	YES	Go to Step 7
		NO	See 12 - Engine Control System, Fault Diagnosis, Fault Symptom Table
7	**Check the sparks** • Remove spark plugs one by one. • Test spark plug. Is the result normal?	YES	Basic check is over
		NO	Replace the spark plug

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FAULT DIAGNOSIS PROCEDURE



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FAULT DIAGNOSIS ANALYSIS

△ HINT:

Electronic control engine has common faults: difficult to start, flameout after starting, unstable idling, idle speed too high, driving weak, accelerating poor, backfire blasting, shaking gasp, smoking and high fuel consumption. Fault reasons are very complicated. So it is very important to analyze faults carefully.

1. ANALYZING AND DETERMINING WHETHER THERE IS A FAULT IN THE ENGINE

To determine whether there is a fault in the engine, the general methods include:

- When the engine cannot start or cannot run normally after starting, or the engine runs with exhaust pipe blasting, has intake pipe backfire and obvious knock, it means the engine has a fault.
- Whether engine lamp indicator lamp of engine electronic control system is lit. If this lamp is lit, it means engine electronic control system has a fault;
- If the engine performance changes a lot in a short time, it means the engine has a fault. For example, the engine power decreases obviously and fuel consumption increases obviously.
- In case the engine performance only has a slight change, the following method can be used to test it: when the engine runs under various working conditions, check if exhaust pipe and intake pipe have abnormal noise; check if the engine has obvious shaking or metal knock, and engine speed changing.

NOTICE:

- **Step on the pedal slowly to increase engine speed gradually and check the above-mentioned phenomenon exists.**
- **If it exists, it means the engine may have a fault. It is necessary to make tests repeatedly and provide a basis to determine faults correctly.**
- **Step on accelerator pedal suddenly; check if the above-mentioned phenomenon exists and engine speed increases correctly. If any abnormal condition occurs or engine speed increase is slow, it means the engine has a fault.**
- **In both cases, if the engine has no abnormal phenomenon, release accelerator pedal and check engine idle running state : too high speed, unstable, and if the engine shakes severely.**

△ HINT:

After the completion of the above operation, if no abnormal phenomenon has been detected, it is an indication that the engine works normally. If you want to carefully inspect dynamic performance, economy and emission condition of engine, it is necessary to use inspection line or special detector to inspect and diagnose fault.

2. FAULT ANALYZING AND DETERMINING

When there is a fault in the electronically-controlled engine, first of all, observe the situation of the fault self-diagnostic indicator lamp of the engine electronic control system. If the light is lit during engine running, it means electronic control engine has a fault that can be monitored by fault self-diagnosis system. The fault normally relates to electronic control system. Now fault code stored in the computer can be called out. Then find out the fault cause according to fault codes. If the engine does have a fault while engine malfunction indicator lamp on dashboard is not illuminated with engine running, it means the engine fault is not identified by electronic control unit self-diagnosis system. Then, its should be based on fault symptoms to make a preliminary diagnose, Analyze possible fault causes based on the principle of from external to internal and from simple to complicated.

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READ AND CLEAR OF DTCS

1. DESCRIPTION

(a) The so-called fault code refers to the Auto computer self-diagnostic fault code. It is the code of the fault which has been detected by the auto computer performing performance testing on various vehicle parts before starting and during running. The code of the fault will be stored in the auto computer. For example, when water temperature sensor circuit is open, the computer will detect the sudden change of water temperature sensor interface signal or deviates from normal value. The computer will record the state. So, "reading fault code" means reading fault code information in vehicle computer and explains it correctly.

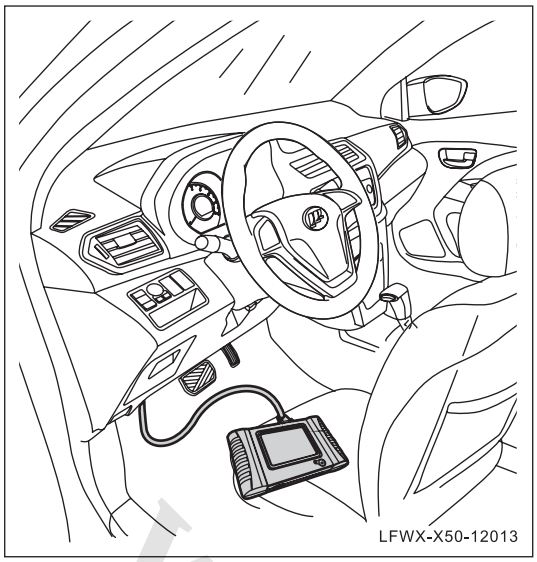
(b) Contents of fault code. Normally, fault code of the instrument indicates fault position and fault character. For example, "P0107" fault code, "intake air pressure sensor" is fault location; "low voltage or open circuit" is fault character. For some vehicles, fault characters defined in fault code are detailed, including short to ground, short to power supply, open circuit, poor contact, signal too high, signal too low, rapid change and slow change. In this way, maintenance staff can differentiate these items easily.

NOTICE:

- **Through reading DTC, possible causes and locations for most of faults can be determined correctly. Sometimes, wrong judgment may happen which will cause misleadings.**
- **In fact, DTC is only a conclusion, which does not give detailed reason of the fault. In order to determine fault location, it is necessary to make further analysis and check according to the engine fault symptom.**
- **Normally, after reading fault code, check corresponding sensor, line connector and line to find out and eliminate fault points of open circuit and short circuit. But, if the sensor sensitivity reduces due to certain reasons (although it is within the range set by ECM, it responds slowly. Output characteristic deviates), self diagnosis system cannot detect it.**
- **Although the engine really has a fault, self diagnosis system outputs normal code without any fault. In this case, it is necessary to analyze and determine the engine fault cause, and then make special test to the individual sensor to locate the fault part and eliminate the problem. For example, when engine idle speed is unstable with imbalanced running during driving and the system outputs no DTC, first it is worthy of considering that intake manifold pressure/temperature sensor has defects. because these two sensors have direct effect on basic fuel injection amount. Although no corresponding DTC is displayed, it is necessary to check them.**
- **Improper maintenance will cause wrong DTC. For example, during the course of running, if one sensor plug is pulled out for testing at random, ECM will record one DTC of the sensor.**
- **If old DTC is not cleared completely due to improper operation after repairing EFI engine, the remaining old DTC is still displayed again, which leads to confusion of maintenance staff.**
- **Before reading fault code, first execute "fault code clearing" operation.**
- **When the system has a fault, diagnostic scanner is used to clear the DTC. If the system fault is eliminated, the DTC will still appear when executing DTC operation again until the fault is eliminated.**

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2. READ AND CLEAR OF DTCS

(a) Connect V30 diagnostic scanner to the diagnostic interface.

(b) Select "Powertrain" and enter "Engine Management System".

(c) Read or clear the DTC.

READ DATA FLOW

1. DESCRIPTION

The so-called data flow refers to the electrical signals sent out by the auto computer in a continuous manner based on various operating parameters and work status of a certain system. There are many data flows. Common data flow in engine system as follows:

- Ignition advance angle
- Throttle opening
- Fuel-injection pulse width
- Coolant temperature
- Intake air temperature
- Intake manifold pressure
- Atmospheric pressure
- Fuel injection start angle
- The battery voltage.

NOTICE:

Reading the data table displayed on the diagnostic scanner, you can check the data value, including switches, sensors, actuators and other parts, without removing any part. First read data table so as to shorten diagnosis time.

2. DATA FLOW

NOTICE:

Stationary state refers to the data flow reference value without starting the engine;

Idle state refers to the data flow reference value with the engine idling and without starting the air conditioner, and the transmission gear in the neutral position.

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Item	Station-ary state	Idling	Description
Battery voltage	12.58 V	14.4 V	ECM monitors the current operating status of the charging system
Engine RPM	0U/min	771U/min	Fault diagnosis scanner displays the current actual engine speed, calculated by ECM through the input of the crankshaft position sensor
Target idle (without compensation)	0U/min	750U/min	Fault diagnosis scanner displays the actual target value of the idle speed set by ECM, indicating the idle speed by the ECM instruction. ECM compensates the various engine loads based on the engine coolant temperature sensor signal and other signals to maintain the engine at an ideal idle speed.
Target idle (with compensation)	750U/min	750U/min	
Vehicle speed	0km/h	0km/h	-
Car acceleration	0.000m/s2	0.000m/s2	-
Engine coolant temperature sensor voltage	1.17 V	1.07 V	Fault diagnosis scanner displays from -40 ° C to130° C. After the sensor is heated (internal resistance decreases), the voltage signal will be reduced, and ECM interprets the low voltage as a hot state of the engine. This signal is one of the conditions to determine whether the fuel system open the closed-loop control, and it is also an important reference signal of fuel injection time.
Engine coolant temperature	82Grad c	85Grad c	
Intake air temperature sensor voltage	2.2 V	2.2 V	The sensor voltage is the actual voltage value received by ECM, and the intake air temperature is calculated according to the program based on the received voltage signal. ECM adjusts the fuel transfer and the ignition timing with the intake air temperature sensor according to the intake air density. Intake air temperature also compares with ECT during starting to identify the starts of heating the oxygen sensor and the resistance wire and the cold start of the evaporative emission diagnosis.
Intake air temperature	30.0Grad c	30.0Grad c	
Ambient temperature	6.0Grad c	6.0Grad c	Vary according to the ambient temperatures
Engine oil temperature	66.0Grad c	66.0Grad c	Calculated by ECM according to the various operating parameters of the engine
Air intake amount	0.0kg/h	9.8kg/h	Calculated by ECM based on the intake manifold pressure signal combining with the known pressure and temperature curves
Actual intake manifold pressure sensor voltage	3.89 V	1.43 V	1. Equal to the atmospheric pressure when the engine is in stall state 2. The voltage first decreases, then increases when in rapid acceleration 3. The engine stalls after starting, and the data flow displays to close to the atmosphere pressure, the voltage close to 5V.
Actual intake manifold pressure	970hPa	410hPa	
Pedal position sensor 1 voltage	0.7 V	0.7 V	The sensor voltage is the actual voltage value received by ECM, and the accelerator pedal opening degree is calculated according to the program based on the received voltage signal.
Pedal position sensor 2 voltage	0.4 V	0.4 V	
Accelerator pedal opening degree	0.0%PED	0.0%PED	

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Item	Station-ary state	Idling	Description
Throttle potentiometer 1 voltage	0.8 V	0.6 V	Throttle potentiometer voltage is the actual measured voltage by ECM, while the opening degree is calculated according to the voltage. When the Ignition switch is in "ON" position, the electronic throttle will move automatically to the mechanical bottom dead center (BDC). The throttle opening degree will increase with increasing of the voltage, and the learning value will be larger and larger with the throttle body becoming dirty, then the zero value will shift up; the computer will perform automatic re-learning after the throttle is cleaned. Idle throttle opening degree is 10 ± 2%
Throttle potentiometer 2 voltage	4.2 V	4.4 V	
Desired throttle opening degree	2.7%DK	2.4%DK	
Throttle opening	7.1%DK	2.4%DK	
Throttle motor PWM control signal	89.1%	15.2%	ECM sends this signal to control the corresponding signals to the throttle
Counter for learning step time	11	11	-
Average fuel injection pulse width	0ms	3ms	Fault diagnosis scanner displays from 0-16ms. It indicates the connect times of each injector according to the command of the ECU in each circle of the engine. The larger the injector pulse width is, the more the fuel is injected. Fuel injector pulse width modulation (PWM) should increase with increased engine load. The engine will increase the fuel injection time if receiving a signal to increase the torque. There are many factors affecting the fuel injection time, such as water temperature sensor, intake air temperature sensor, power voltage, fuel pressure, etc.
Charging time	26ms	26ms	Time interval between connection and disconnection of the ignition coil. It produces a high voltage in the secondary after disconnecting, thus leading to a spark plug flashover
Cylinder 1 ignition advance angle	0.0Grad kW	1.5Grad kW	Current ignition advance angle of the ignition system, the ignition advance angle at the normal idle speed is 9 ° before the top dead center (TDC) of the cylinder 1, this value is only for reference during maintenance
Fuel amount flow	0.000L/h	0.618L/h	-
Knock sensor signal 1	15.6 V	0.4 V	ECM detects the amplitude and frequency of the knock sensor to control the ignition timing. Ignition timing is arranged close to the knock position to obtain the maximum torque.
Knock sensor signal 2	15.6 V	0.3 V	
No. 1 cylinder delayed ignition knock control	0.00	0.00	ECM performs calculation according to the knock sensor signal, if it detects that the engine produces a knock, control the hysteresis of the ignition advance angle
No. 2 cylinder delayed ignition knock control	0.00	0.00	
No. 3 cylinder delayed ignition knock control	0.00	0.00	
No. 4 cylinder delayed ignition knock control	0.00	0.00	
Intake valve opening degree (relative to LWOT)	28Grad kw	28Grad kw	-
Exhaust valve opening degree (relative to LWOT)	0Grad kw	0Grad kw	-
Camshaft overlap angle	-42.0Grad kw	-44.0Grad kw	-
Intake camshaft overlap factor	0.00	0.00	-

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Item	Station-ary state	Idling	Description
Exhaust camshaft overlap factor	0.0	0.0	-
Intake camshaft PWM control	5.1%	0.0%	-
Exhaust camshaft PWM control	0.0%	5.1%	-
Group 1 oxygen sensor integral value (short-term correction)	1.00	1.02	A temporary value added or deducted in the basic injection duration based on the feedback of the oxygen sensor. It is useful only in the closed-loop control, ECM increases the fuel amount through increasing the injection duration when it is a positive value, while ECM decreases the injection duration to decrease the fuel amount when it is a negative value. When this short-term value is continuously lower or higher than the theoretical value, ECM shall add or deduct this value to or from the long-term fuel correction value, thus achieving the optimal air-fuel ratio control.
Group 1 oxygen sensor voltage (sensor 1)	0.45V	0.21V	HO2S output voltage is 0.1-0.9V under normal operating condition. ECM receives this voltage signal, and measures whether the air-fuel ratio is lean or rich. If the ECM input signal voltage is less than 0.45V, air-fuel ratio is lean; if the input signal voltage is higher than 0.45V, the air-fuel ratio is rich. During closed-loop control, ECM continuously detects the HO2S output signal to decrease or increase fuel injection control PWM for correction
Group 1 oxygen sensor voltage (sensor 2)	0.45V	0.45V	The rear HO2S is installed at the back of the catalytic converter or in the rear exhaust pipe to detect the efficiency of the catalytic converter. The rear HO2S output voltage is between 0V-1V. Detect the catalytic conversion capability with the rear HO2S signal. If the catalytic conversion efficiency is good, the rear HO2S signal will be smooth. If the catalytic conversion efficiency decreases due to aging, poisonous or misfire, the rear HO2S signal will be similar to the front HO2S signal.
Group 1 oxygen sensor integral value (long-term correction)	1.00	0.99	Long term fuel correction is stored in the ECM memory; as it is a part of the calculation of the basic injection duration, it will not be deleted when the ignition switch is in "OFF". It affects the injection duration controlled by the closed-loop and the open-loop. ECM uses short-term fuel correction value to change the long-term fuel correction value. It can not respond quickly to the instantaneous change, and only changes when ECM decide to use the short-term fuel correction value to change the long-term fuel correction value. Like short-term fuel correction, when the long-term value is 0%, it indicates that the basic injection duration need not any correction. Positive percentage indicates that ECM needs to increase the fuel injection amount; while negative percentage indicates that ECM needs to decrease the fuel injection amount.
Ultimate long-term correction factor 1	0.00kPa	-0.38kPa	
Mixture addition self-learning value (small load)	0%	0%	
Model intake air temperature	31.50Grad C	37.50Grad C	-
Engine relative load	99.75%	24.75%	-
Idling torque self-learning	0%	2%	-
Desired torque correction for idle speed control	0%	-1%	-

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Item	Station-ary state	Idling	Description
Canister control valve duty ratio	0.00%	14.45%	The canister solenoid valve opening degree is controlled in the form of duty ratio, the control signal is a pulse waveform, and can be detected with an oscilloscope. This parameter displays the power-on time or duty ratio of evaporating (EVAP) canister purge solenoid valve through the command of the control module. 0% indicates there is no clean-up, while 100% indicates clean-up has been carrying out all the time.
Relative injection amount controlled by the canister	0%	0%	
Canister purge rate	0.0	0.0	Fuel evaporation gases control system prevents the overflow of the hydrocarbons (HC) from the fuel tank from entering into the atmosphere to pollute the environment. Collect the fuel vapors in the charcoal canister. ECM controls the purge control solenoid valve (EVAP), and clear the vapors collected in the charcoal canister, making the vapors enter into the engine for combustion. Be sure to compare this data flow with the actual opening degree of the solenoid valve during the actual maintenance; if any leakage occurs, be sure to know how to judge it. Note that this data flow will change from small to large only when the engine reaches the normal water temperature; it will not be opened at idle speed or in cold state.
Canister load	0	1	
Running mileage	7km	7km	-
Running time	389min	414min	-
Running time after speed fault	0min	0min	-
Running mileage after speed fault	0km	0km	-
Fault code fault number	0	0	Display the fault code and fault type code of the current system. The display is 0 under normal circumstance, indicating that the engine electronic control system is free from fault
DTC 1	0000	0000	
DTC 1 state	00	00	
DTC 2	0000	0000	
DTC 2 state	00	00	
Vehicle variant code	FFFF	FFFF	
Program state	Activate safety entry	Activate safety entry	-
Engine cooling system	-------	Cooling fan 1#	Display the state of the cooling fan 1 (high speed) and the cooling fan 2 (low speed)
Engine steady-state condition	Ignition terminal 15 opens Main relay operating	Ignition terminal 15 starts the main relay starter till up to the idle speed and engine operating temperature	Display current state of the engine
Engine dynamic condition	Throttle is at idling position	Throttle is at idling position	Display that the throttle is in "Idling" or "Full load" or "Deceleration fuel cut-off" or "Acceleration enrichment"
Emission control	-------	λ control activation	Display whether the canister solenoid valve works, open-loop or closed-loop control of the fuel

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Item	Stationary state	Idling	Description
Oxygen sensor	-------	Oxygen sensor 1 is heated and activated and oxygen sensor 2 is heated and activated	Display whether the oxygen sensor signal is strong or weal
Engine Idle Speed	Pedal position confirms idling	Pedal position confirms idling	Display the accelerator pedal position and whether the electrical load is open
Indicator SVS/MIL	Fault indicator MIL is activated	Vehicle instant repair indicator SVS is activated	Display the current SVS/MIL indicator is blinking or always on or off
Engine emergency condition	-------	-------	Display whether the throttle is faulty
A/C system	-------	-------	Display opening of the air conditioner compressor
Automatic transmission/torque request	-------	-------	-

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MOTION TEST

1. DESCRIPTION

Motion test is a type of self-learning process of the components. It does not require any part removal. It can perform testing on the components (including relays and actuators) and learn other special operations.

2. TEST ITEMS

S/N	Name	Test mode	Description
1	Engine malfunction indicator lamp (MIL)	ON/OFF	Test if engine malfunction indicator lamp works normally
2	Canister control valve	0 - 255	Starting the engine, test whether the canister solenoid is working properly.
3	Fuel pump relay	ON/OFF	Test if fuel pump relay works normally
4	Cooling fan relay # 1	ON/OFF	Test whether the low-speed fan is working properly.
5	Cooling fan relay # 2	ON/OFF	Test whether the high-speed fan is working properly.
6	Air-conditioner clutch	ON/OFF	Test if air conditioner relay works normally
7	Service vehicle soon (SVS)	ON/OFF	Test whether the SVS indicator lamp is working properly.
8	Disable the fuel injection	ON/OFF	Start the engine to perform the injector control.
9	Idle speed control	0 - 255	Control the engine to rotate to the specified speed.
10	Delayed ignition		Decrease the ignition advance angle
11	Throttle position valve		Do not start the engine, and measure whether the electronic throttle works properly
12	Reset the ECU self-learning value		Reset the electronic control system to factory settings
13	Reset the long-term fuel self-learning adjustment		Reset the fuel injection to factory settings

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FAULT SYMPTOM TABLE

△ HINT:

The causes of EFI engine fault phenomenon are various and complex. The common potential locations of the corresponding faults are listed in the following table. Following the described locations to trouble-shoot one by one can allow most problems to be solved.

Symptom	Suspected area	Recommended action
The diagnostic scanner cannot communicate with ECM	1. Diagnostic interface fuse (blown) 2. Wire harness or connector (loose, open or short circuit) 3. ECM (damaged)	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (1. The diagnostic scanner cannot communicate with ECM)
When starting, the engine does not run or run slowly	1. Battery (low voltage or damaged) 2. Starter motor (damaged) 3. Wire harness or ignition switch (loose, open or short circuit) 4. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (2. When starting, the engine does not run or run slowly)
When starting, the engine can rotate but can't start successful	1. No fuel in fuel tank 2. Fuel pump (damaged) 3. Crankshaft position sensor (damaged) 4. Ignition coil (damaged) 5. Electronic throttle body (damaged) 6. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (3. When starting, the engine can rotate but can't start successful)
Difficult start of hot engine	1. Fuel contains water 2. Fuel pump 3. Coolant temperature sensor (damaged) 4. Fuel pressure regulator vacuum tube 5. Electronic throttle valve (too much deposit or damaged) 6. Ignition coil (damaged)	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (4. Difficult start of hot engine)
Difficult start of cold engine	1. Fuel contains water 2. Fuel pump (damaged) 3. Coolant temperature sensor (damaged) 4. Injector (damaged) 5. Ignition coil (damaged) 6. Electronic throttle valve body (too much deposit or damaged) 7. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (5. Difficult start of cold engine)

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Symptom	Suspected area	Recommended action
Start normally, while the idle speed is unstable during warm-up	1. Fuel contains water 2. Coolant temperature sensor (damaged) 3. Spark plug (too much deposit or damaged) 4. Electronic throttle valve body (too much deposit or damaged) 5. Intake duct (damaged) 6. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (6. Start normally, while the idle speed is unstable during warm-up)
Speed is normal, while starting is difficult at any time	1. Fuel contains water 2. Fuel pump (damaged) 3. Coolant temperature sensor 4. Injector (damaged) 5. Ignition coil (damaged) 6. Electronic throttle valve body (too much deposit or damaged) 7. Intake duct (stuck) 8. Ignition timing (incorrect) 9. Spark plug (too much deposit or damaged) 10. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (7. Speed is normal, while starting is difficult at any time)
Start normally, while the idle speed is unstable at any time	1. Fuel contains water 2. Injector (damaged) 3. Spark plug (too much deposit or damaged) 4. Intake duct (stuck) 5. Electronic throttle valve body (too much deposit or damaged) 6. Ignition timing (incorrect) 7. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (8. Start normally, while the idle speed is unstable at any time)
Start normally, while the idle speed is unstable after warm-up	1. Fuel contains water 2. Coolant temperature sensor 3. Spark plug (too much deposit or damaged) 4. Electronic throttle valve body (too much deposit or damaged) 5. Intake duct (stuck) 6. Mechanical part of the engine	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (9. Start normally, while the idle speed is unstable after warm-up)
Start normally, while the idle speed is unstable or stalling with partial load	1. A/C system (fault) 2. Electronic throttle valve body (too much deposit or damaged) 3. Injector (damaged)	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (10. Start normally, while the idle speed is unstable or stalling with partial load)

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Symptom	Suspected area	Recommended action
Start normally, while the idle speed is too high	1. Electronic throttle valve body (too much deposit or damaged) 2. Vacuum tube (broken) 3. Coolant temperature sensor (damaged) 4. Ignition timing (incorrect)	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (11. Start normally, while the idle speed is too high)
Speed rise fault or flameout at time of acceleration	1. Fuel contains water 2. Intake air pressure sensor (damaged) 3. Spark plug (too much deposit or damaged) 4. Electronic throttle valve body (too much deposit or damaged) 5. Intake duct (stuck) 6. Injector (damaged) 7. Ignition timing (incorrect) 8. Exhaust pipe	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (12. Speed rise fault or flameout at time of acceleration)
Slow response at time of acceleration	1. Fuel contains water 2. Intake air pressure sensor 3. Spark plug (too much deposit or damaged) 4. Electronic throttle valve body (too much deposit or damaged) 5. Intake duct (stuck) 6. Injector (damaged) 7. Ignition timing (incorrect) 8. Exhaust pipe	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (13. Slow response at time of acceleration)
Weak acceleration, poor performance	1. Fuel contains water 2. Intake air pressure sensor (damaged) 3. Spark plug (too much deposit or damaged) 4. Ignition coil (damaged) 5. Electronic throttle valve body (too much deposit or damaged) 6. Intake duct (stuck) 7. Injector (damaged) 8. Ignition timing (incorrect) 9. Exhaust pipe	See 12 - Engine Control System, Diagnosis, Fault Diagnosis (14. Weak acceleration, poor performance)

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SYMPTOM DIAGNOSIS

1. THE DIAGNOSTIC SCANNER CANNOT COMMUNICATE WITH ECM

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether to enter "Engine Management System"	Diagnosis is over	The diagnostic scanner cannot communicate with ECM	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check the fuse FS18, FS19 of diagnosis interface is not blown	Go to Step 2	Fuse is blown	Replace the fuse with the same specification.
2	Check the diagnosis interface power and ground circuit	Normal	Faulty	Instruction
	• When the ignition switch is in "ON" position, check the voltage between the No. 8 and No. 16 terminals of I22 connector and the grounding **Voltage: Connect the diagnostic scanner.** • Check the resistance between No. 4 terminal of I22 and the grounding **Resistance: <2Ω**	Go to Step 3	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
3	Check the ECM power supply and grounding line	Normal	Faulty	Instruction
	• Disconnect ECM connector E01. • When the ignition switch is in "ON" position, check the voltage between the No. 12, No. 13 and No. 14 terminals of ECM connector and the grounding respectively **Voltage: Connect the diagnostic scanner.** • Check the resistance between No. 3, 53, 61 and 80 terminals of E01 and the grounding respectively **Resistance: <2Ω**	Go to Step 4	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
4	Check ECM diagnosis communication line	Normal	Faulty	Instruction
	When the ignition switch is in "ON" position, check the voltage between the No. 7 terminal of I22 connector and the grounding **Voltage: Battery voltage**	Go to Step 6	Diagnostic communication line is faulty	Go to Step 5
5	Check ECM diagnosis communication line	Normal	Faulty	Instruction
	• Disconnect ECM connector E01 • Check if there is continuity between No. 71 terminal of E01 and No. 7 of I22.	Go to Step 6	The wire harness or connector has open circuit point	Repair the circuit breaker between the interface and the ECM connector
6	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Replace ECM with the same model, and check whether the fault code can be read with the diagnosis scanner	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

2. WHEN STARTING, THE ENGINE DOES NOT RUN OR RUN SLOWLY

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When starting the engine, measure the voltage between the two binding posts of the battery with a multimeter **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Replace the battery
1	Checking the starter motor voltage	Normal	Faulty	Instruction
	The ignition switch in the start position, and measure the binding post voltage of the starter motor positive electrode with a multimeter **Voltage: approx. 9V**	Go to Step 2	The inspection voltage is out of the reasonable range	Repair or replace the fault harness
2	Check the starter motor	Normal	Faulty	Instruction
	Remove the starter motor and check whether the starter motor working condition has a short-circuit or poor lubrication stuck	Go to Step 3	Starter motor is faulty	Repair or replace the starter
3	Check lubricating oil	Normal	Faulty	Instruction
	If the fault only occurs in winter, check if the engine lubricating oil and the gearbox oil are qualified	Go to Step 4	The lubricating oil which is not qualified leads to the excessive motor resistance	Replace the lubricating oil with proper grade
4	Check the engine internal mechanical resistance	Normal	Faulty	Instruction
	Check whether no-rotation or slow rotation of starter motor is caused by too big internal mechanical resistance of engine	Find the cause out from other fault symptoms	Internal mechanical resistance of the engine is excessive	Inspect internal resistance of engine

3. WHEN STARTING, THE ENGINE CAN ROTATE BUT CAN'T START SUCCESSFUL

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 1	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
1	Checking the speed signal	Normal	Faulty	Instruction
	Connect the diagnosis scanner, and observe the data item of "Engine Speed"; start the engine and observe whether there is a speed signal output	Go to Step 2	Crankshaft position sensor circuit fault	Check and repair crankshaft position sensor line
2	Check ignition system	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Pull out the ignition coil of one of the cylinders and connect the spark plug, let the spark plug contact the engine block. Start the engine, and then check for presence of blue-white high voltage spark	Go to Step 3	Ignition system is faulty	Inspect ignition system
3	Check lubricating oil	Normal	Faulty	Instruction
	If the fault only occurs in winter, check if the engine lubricating oil and the gearbox oil are qualified	Go to Step 4	The lubricating oil which is not qualified leads to the excessive motor resistance	Replace the lubricating oil with proper grade
4	Check the cylinder pressure of the engine	Normal	Faulty	Instruction
	Check the pressure in each engine cylinder and check whether the pressure in an engine cylinder is insufficient	Go to Step 5	Insufficient pressure fault in the engine cylinder	Eliminate engine mechanical fault
5	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

4. DIFFICULT START OF HOT ENGINE

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and inspect the fuel pressure **Pressure: 350kPa**	Go to Step 1	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
1	Check ignition system	Normal	Faulty	Instruction
	Pull out the ignition coil of one of the cylinders and connect the spark plug, let the spark plug contact the engine block. Start the engine, and then inspect for presence of blue-white high voltage spark	Go to Step 2	Ignition system is faulty	Inspect ignition system
2	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine can be started successfully	Go to Step 3	Coolant temperature sensor fault	Check and repair the line or replace the temperature sensor
3	Check the fuel pressure regulator vacuum tube	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check whether the fuel pressure regulator vacuum tube is loose or leaking	Go to Step 4	Vacuum tube is faulty	Check, repair or replace the vacuum pipe
4	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 5	Fuel does not conform to the specification	Replace the fuel conforming to the specification
5	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

5. DIFFICULT START OF COLD ENGINE

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 1	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
1	Check ignition system	Normal	Faulty	Instruction
	Pull out the ignition coil of one of the cylinders and connect the spark plug, let the spark plug contact the engine block. Start the engine, and then check for presence of blue-white high voltage spark	Go to Step 2	Ignition system is faulty	Inspect ignition system
2	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine can be started successfully	Go to Step 3	Coolant temperature sensor fault	Check and repair the line or replace the temperature sensor
3	Check if the engine starts	Normal	Faulty	Instruction
	Depress the accelerator lightly and observe for easier start of the engine	Go to Step 4	There is dirt around the throttle valve and the idle airway	Clean the throttle valve and the idle airway
4	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 5	The injector is faulty	Check and repair the injector or replace it
5	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 6	Fuel does not conform to the specification	Replace the fuel conforming to the specification
6	Check the cylinder pressure of the engine	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the pressure in each engine cylinder and check whether the pressure in an engine cylinder is insufficient	Go to Step 7	Insufficient pressure fault in the engine cylinder	Eliminate engine mechanical fault
7	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

6. START NORMALLY, WHILE THE IDLE SPEED IS UNSTABLE DURING WARM-UP

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged and check the intake duct for air leakage	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 2	The spark plug is faulty	Adjust or replace the spark plug
2	Check the throttle valve	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 3	Throttle valve body carbon deposit is too much	Clean the relevant parts
3	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine runs unstably at idle speed during warm-up	Go to Step 4	Coolant temperature sensor fault	Check and repair circuit or replace sensor
4	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 5	The injector is faulty	Check and repair the injector or replace it
5	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 6	Fuel does not conform to the specification	Replace the fuel conforming to the specification
6	Check the cylinder pressure of the engine	Normal	Faulty	Instruction
	Check the pressure in each engine cylinder and observe whether the pressure difference in engine cylinder is excessive	Go to Step 7	Engine cylinder is faulty	Eliminate engine mechanical fault
7	Check the engine control unit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

7. SPEED IS NORMAL, WHILE STARTING IS DIFFICULT AT ANY TIME

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged and check the intake duct for air leakage	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check fuel pressure gauge			
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 2	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
2	Check ignition system	Normal	Faulty	Instruction
	Pull out the ignition coil of one of the cylinders and connect the spark plug, let the spark plug contact the engine block. Start the engine, and then check for presence of blue-white high voltage spark	Go to Step 3	Ignition system is faulty	Inspect ignition system
3	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 4	The spark plug is faulty	Adjust or replace the spark plug
4	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine can be started successfully	Go to Step 5	Coolant temperature sensor fault	Check and repair circuit or replace sensor
5	Check if the engine starts	Normal	Faulty	Instruction
	Depress the accelerator lightly and observe for easier start of the engine	Go to Step 6	There is dirt around the throttle valve and the idle airway	Clean the throttle valve and the idle airway
6	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 7	The injector is faulty	Replace the fuel injector
7	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 8	Fuel does not conform to the specification	Replace the fuel conforming to the specification

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Steps	Inspection item	Inspection result		
8	Check the cylinder pressure of the engine	Normal	Faulty	Instruction
	Check the pressure in each engine cylinder and check whether the pressure in an engine cylinder is insufficient	Go to Step 9	Insufficient pressure fault in the engine cylinder	Eliminate engine mechanical fault
9	Check the ignition sequence and ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition sequence and ignition timing conform to the specification	Go to Step 10	The ignition sequence or ignition timing does not conform to the specification	Check and repair ignition timing
10	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

8. START NORMALLY, WHILE THE IDLE SPEED IS UNSTABLE AT ANY TIME

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged and check the intake duct for air leakage	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check electronic throttle body	Normal	Faulty	Instruction
	Check whether the electronic throttle body is stuck	Go to Step 2	Electric throttle body is faulty	Clean or replace the electronic throttle
2	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 3	The spark plug is faulty	Adjust or replace the spark plug
3	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 4	Throttle valve body carbon deposit is too much	Clean throttle valve body carbon deposit
4	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage, blockage or over the flow tolerance	Go to Step 5	The injector is faulty	Replace the fuel injector
5	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 6	Fuel does not conform to the specification	Replace the fuel conforming to the specification
6	Check the cylinder pressure of the engine	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the pressure in each engine cylinder and observe whether the pressure difference in engine cylinder is excessive	Go to Step 7	Engine cylinder is faulty	Eliminate engine mechanical fault
7	Check the ignition sequence and ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition sequence and ignition timing conform to the specification	Go to Step 8	The ignition sequence or ignition timing does not conform to the specification	Check and repair ignition timing
8	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

9. START NORMALLY, WHILE THE IDLE SPEED IS UNSTABLE AFTER WARM-UP

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged and check the intake duct for air leakage	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 2	The spark plug is faulty	Adjust or replace the spark plug
2	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 3	Throttle valve body carbon deposit is too much	Clean throttle valve body carbon deposit
3	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine runs unstably at idle speed during warm-up	Go to Step 4	Coolant temperature sensor fault	Check and repair circuit or replace sensor
4	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage, blockage or over the flow tolerance	Go to Step 5	The injector is faulty	Replace the fuel injector
5	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 6	Fuel does not conform to the specification	Replace the fuel conforming to the specification
6	Check the cylinder pressure of the engine	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the pressure in each engine cylinder and observe whether the pressure difference in engine cylinder is excessive	Go to Step 7	Engine cylinder is faulty	Eliminate engine mechanical fault
7	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

10. START NORMALLY, WHILE THE IDLE SPEED IS UNSTABLE OR STALLING WITH PARTIAL LOAD

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged and check the intake duct for air leakage	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check the engine power	Normal	Faulty	Instruction
	Connect the diagnosis scanner, and observe the ignition advance angle, fuel injection pulse width and change of the intake quantity, and then check whether the engine power increases when opening the air-conditioner	Go to Step 2	Inspection value is not in the reasonable range	Go to Step 3
2	Checking the ECM circuit	Normal	Faulty	Instruction
	Disconnect the ECM wire harness connector and No. 57 terminal connecting line, and check whether the wire harness terminal is high level signal when opening the air-conditioner and headlamps	Go to Step 3	Detection level signal is not in the reasonable range	Repair the wire harness between ECM and the headlamps
3	Check the A/C system.	Normal	Faulty	Instruction
	Check whether the pressure of A/C system, the electromagnetic clutch of compressor, and A/C compressor are normal	Go to Step 4	A/C system is faulty	Repair the air-conditioner system
4	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage, blockage or over the flow tolerance	Go to Step 5	The injector is faulty	Replace the fuel injector
5	Check the engine control unit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

11. START NORMALLY, WHILE THE IDLE SPEED IS TOO HIGH

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check whether the electronic throttle is stuck	Go to Step 1	Electronic throttle is faulty	Adjust the electronic throttle
1	Check the intake system	Normal	Faulty	Instruction
	Check whether the intake system and the vacuum tube connecting to it is leaking	Go to Step 2	Intake system is faulty	Check and repair the intake system
2	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 3	Throttle valve body is faulty	Clean the relevant parts
3	Check coolant temperature sensor	Normal	Faulty	Instruction
	Unplug the coolant temperature sensor joint, and start the engine, then observe whether the engine is at high idle speed	Go to Step 4	Coolant temperature sensor fault	Check and repair circuit or replace sensor
4	Check the engine ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition timing conforms to the specification	Go to Step 5	The engine ignition timing does not conform to the specification	Check and repair ignition timing
5	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

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12. SPEED RISE FAULT OR FLAMEOUT AT TIME OF ACCELERATION

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check fuel pressure gauge	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 2	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
2	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 3	The spark plug is faulty	Adjust or replace the spark plug
3	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 4	Throttle valve body is faulty	Clean throttle valve body relevant component
4	Check intake pressure sensor	Normal	Faulty	Instruction
	Check if the intake pressure sensor and its line are normal	Go to Step 5	Intake pressure sensor has faulty point	Check and repair circuit or replace the sensor
5	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 6	The injector is faulty	Replace the fuel injector
6	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 7	Fuel does not conform to the specification	Replace the fuel conforming to the specification
7	Check the ignition sequence and ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition sequence and ignition timing conform to the specification	Go to Step 8	The ignition sequence or ignition timing does not conform to the specification	Check and repair ignition timing
8	Check the exhaust pipe	Normal	Faulty	Instruction
	Check if the exhaust pipe exhausts smoothly	Go to Step 9	Exhaust pipe is faulty	Repair or replace the exhaust pipe
9	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

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13. SLOW RESPONSE AT TIME OF ACCELERATION

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if air filter is clogged	Go to Step 1	Intake system is faulty	Check and repair the intake system
1	Check fuel pressure gauge	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 2	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
2	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 3	The spark plug is faulty	Adjust or replace the spark plug
3	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 4	Throttle valve body is faulty	Clean throttle valve body relevant component
4	Check intake pressure sensor	Normal	Faulty	Instruction
	Check if the intake pressure sensor and its line are normal	Go to Step 5	Intake pressure sensor has faulty point	Check and repair circuit or replace sensor
5	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 6	The injector is faulty	Replace the fuel injector
6	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 7	Fuel does not conform to the specification	Replace the fuel conforming to the specification
7	Check the ignition sequence and ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition sequence and ignition timing conform to the specification	Go to Step 8	The ignition sequence or ignition timing does not conform to the specification	Check and repair ignition timing
8	Check the exhaust pipe	Normal	Faulty	Instruction
	Check if the exhaust pipe exhausts smoothly	Go to Step 9	Exhaust pipe is faulty	Repair or replace the exhaust pipe
9	Check the engine control unit	Normal	Faulty	Instruction
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding Voltage: 9 - 13 V Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

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14. WEAK ACCELERATION, POOR PERFORMANCE

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check for presence of faults such as clutch skid, low tire pressure, braking stagnation, incorrect tire size, and incorrect four-wheel alignment	Go to Step 1	There is a mechanical fault	Repair and eliminate mechanical fault
1	Check air filter	Normal	Faulty	Instruction
	Check if air filter is clogged	Go to Step 2	Intake system is faulty	Check and repair the intake system
2	Check fuel pressure gauge	Normal	Faulty	Instruction
	Connect the fuel pressure gauge, start the engine and check the fuel pressure **Pressure: 350KPa**	Go to Step 3	The inspection pressure is out of the reasonable range	Check and repair the fuel supply system
3	Check the high-pressure fire intensity	Normal	Faulty	Instruction
	Pull out the ignition distribute wire of one of the cylinders, and connect the spark plug, leaving the spark plug electrode from the engine body for about 5 mm; start the engine, and check whether the high-pressure fire intensity is normal	Go to Step 4	High-pressure fire intensity is not in the reasonable range	Check and repair ignition system
4	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plugs of each cylinder and observe whether their models and clearance are qualified	Go to Step 5	The spark plug is faulty	Adjust or replace the spark plug
5	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether there is carbon deposit in the throttle valve body	Go to Step 6	Throttle valve body is faulty	Clean throttle valve body relevant component
6	Check intake pressure sensor	Normal	Faulty	Instruction
	Check if the intake pressure sensor and its line are normal	Go to Step 7	Intake pressure sensor has faulty point	Check and repair circuit or replace sensor
7	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check it for fuel leakage or blockage	Go to Step 8	The injector is faulty	Replace the fuel injector
8	Check the fuel	Normal	Faulty	Instruction
	Check the fuel and observe whether the fault is caused by fuel filling	Go to Step 9	Fuel does not conform to the specification	Replace the fuel conforming to the specification
9	Check the ignition sequence and ignition timing	Normal	Faulty	Instruction
	Check whether the engine ignition sequence and ignition timing conform to the specification	Go to Step 10	The ignition sequence or ignition timing does not conform to the specification	Check and repair ignition timing
10	Check the engine control unit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Disconnect the engine control unit connector, turn on the ignition switch, and check the voltage between No. 12, 13, 44, 45 & 63 terminals and the grounding **Voltage: 9 - 13 V** Check No. 3, 53, 61 & 80 terminals and the grounding for continuity	Find the cause out from other fault symptoms	The inspection voltage is out of the reasonable range or the grounding line is faulty	Check and repair the faulty line

DTC LIST

DTC	Code interpretation	Cause of fault	Recommended action
P000A	The intake VVT responds slowly.	1. Valve timing 2. VVT solenoid valve 3. Solenoid valve filter element 4. VVT actuator assembly 5. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (1. Intake VVT solenoid valve fault)
P0010	VVT intake control valve circuit is open circuit.	1. OCV 2. OCV harness 3. ECM	
P0012	When starting, the OCV is not at the default position.	1. Valve timing 2. VVT solenoid valve 3. Solenoid valve filter element 4. VVT actuator assembly 5. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (2. Intake VVT fault)
P0016	Unreasonable relative position of camshaft and crankshaft installation	1. Timing belt tensioner 2. The assembly of timing belt is faulty 3. Crankshaft pulley 4. Camshaft pulley wheel 5. VVT actuator 6. ECM	
P0030	Fault heating control circuit of upstream oxygen sensor	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (3. Front oxygen sensor heating circuit fault)
P0031	Low voltage of heating control circuit of upstream oxygen sensor	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	
P0032	High voltage of heating control circuit of upstream oxygen sensor	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	
P0053	Unreasonable heated internal resistance of upstream oxygen sensor	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	

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DTC	Code interpretation	Cause of fault	Recommended action
P0036	Fault heating control circuit of downstream oxygen sensor	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (4. Rear oxygen sensor heating circuit fault)
P0037	Low voltage of heating control circuit of downstream oxygen sensor	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	
P0038	High voltage of heating control circuit of downstream oxygen sensor	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	
P0054	Unreasonable heated internal resistance of downstream oxygen sensor	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	
P0105	No fluctuation of intake pressure sensor signal	1. Air intake pressure and temperature sensor 2. Air intake pressure temperature sensor wire harness 3. Pipe leaked or disengaged 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (5. Intake pressure sensor fault)
P0106	Unreasonable intake pressure sensor/atmospheric pressure sensor	1. Air intake pressure and temperature sensor 2. Air intake pressure temperature sensor wire harness 3. ECM	
P0107	Intake pressure sensor short circuit to ground	1. Air intake pressure and temperature sensor 2. Air intake pressure temperature sensor wire harness 3. ECM	
P0108	Intake pressure sensor short circuit to power supply	1. Air intake pressure and temperature sensor 2. Air intake pressure temperature sensor wire harness 3. ECM	
P0112	Low voltage of intake temperature sensor signal circuit	1. Intake air temperature/pressure sensor 2. Intake air temperature/pressure sensor wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (6. Intake temperature sensor fault)
P0113	High voltage of intake temperature sensor signal circuit	1. Intake air temperature/pressure sensor 2. Intake air temperature/pressure sensor wire harness 3. ECM	
P0117	Low voltage of engine coolant temperature sensor circuit	1. Coolant temperature sensor 2. Coolant temperature sensor wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (7. Coolant temperature sensor fault)
P0118	High voltage of engine coolant temperature sensor circuit	1. Coolant temperature sensor 2. Coolant temperature sensor wire harness 3. ECM	

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DTC	Code interpretation	Cause of fault	Recommended action
P0121	Unreasonable signal of electric throttle body position sensor 1	1. Electronic throttle valve	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (8. Electronic throttle signal fault)
P0122	Low voltage of signal circuit of electric throttle body position sensor 1	1. Electronic throttle valve 2. Electronic throttle body wire harness 3. ECM	
P0123	High voltage of electric throttle body position sensor 1 signal circuit	1. Electronic throttle valve 2. Electronic throttle body wire harness 3. ECM	
P0221	Unreasonable signal of electric throttle body position sensor 2	1. Electronic throttle valve	
P0222	Low voltage of signal circuit of electric throttle body position sensor 2	1. Electronic throttle valve 2. Electronic throttle body wire harness 3. ECM	
P0223	High voltage of electric throttle body position sensor 2 signal circuit	1. Electronic throttle valve 2. Electronic throttle body wire harness 3. ECM	
P0130	Unreasonable upstream oxygen sensor signal	1. Front oxygen sensor	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (9. Front oxygen sensor signal circuit fault)
P0131	Low voltage of upstream oxygen sensor signal	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	
P0132	High voltage of upstream oxygen sensor signal circuit	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	
P0133	Upstream oxygen sensor aging	1. Front oxygen sensor	
P0134	Upstream oxygen sensor circuit signal fault	1. Front oxygen sensor 2. Front oxygen sensor wire harness 3. ECM	
P0136	Unreasonable downstream oxygen sensor signal	1. Front oxygen sensor	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (10. Rear oxygen sensor signal circuit fault)
P0137	Low voltage of downstream oxygen sensor signal	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	
P0138	High voltage of downstream oxygen sensor signal circuit	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	
P0140	Downstream oxygen sensor circuit signal fault	1. Rear oxygen sensor 2. Rear oxygen sensor wire harness 3. ECM	

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DTC	Code interpretation	Cause of fault	Recommended action
P0170	Unreasonable self-learning of end of line test of air-fuel ratio closed-loop control	1. Electronic throttle valve 2. Electronic throttle body wire harness 3. Intake air temperature/pressure sensor 4. Intake air temperature/pressure sensor wire harness 5. Oxygen sensor 6. Oxygen sensor wire harness 7. Intake air system hardware 8. Fuel system pressure 9. Injector hardware 10. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (11. Too rich or lean fuel fault)
P0171	Over-thin self-learning of end of line test of air-fuel ratio closed-loop control		
P0172	Over-thick self-learning of end of line test of air-fuel ratio closed-loop control	1. Injector leaks or is blocked 2. Manifold pressure sensor 3. Water temperature sensor 4. Ignition system 5. Fuel pressure 6. Exhaust system air leakage 7. Oxygen sensor wire harness circuit is open or short 8. Oxygen sensor 9. Oxygen sensor heater 10. Relay and wire harness 11. ECM	
P0201	No. 1 cylinder injector control circuit is open	1. No. 1 cylinder injector 2. Injector wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (12. Injector fault)
P0202	No. 2 cylinder injector control circuit is open	1. No. 2 cylinder injector 2. Injector wire harness 3. ECM	
P0203	No. 3 cylinder injector control circuit is open	1. No. 3 cylinder injector 2. Injector wire harness 3. ECM	
P0204	No. 4 cylinder injector control circuit is open	1. No. 4 cylinder injector 2. Injector wire harness 3. ECM	
P0261	No. 1 cylinder injector control circuit short circuit to ground	1. No. 1 cylinder injector 2. Injector wire harness 3. ECM	
P0262	No. 1 cylinder injector control circuit short circuit to power supply		
P0264	No. 2 cylinder injector control circuit short circuit to ground	1. No. 2 cylinder injector 2. Injector wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (12. Injector fault)
P0265	No. 2 cylinder injector control circuit short circuit to ground		
P0267	No. 3 cylinder injector control circuit short circuit to ground	1. No. 3 cylinder injector 2. Injector wire harness 3. ECM	
P0268	No. 3 cylinder injector control circuit short circuit to ground		
P0270	No. 4 cylinder injector control circuit short circuit to ground	1. No. 4 cylinder injector 2. Injector wire harness 3. ECM	
P0271	No. 4 cylinder injector control circuit short circuit to ground		

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DTC	Code interpretation	Cause of fault	Recommended action
P0219	Engine speed exceeds the maximum speed limit	1. Accelerator pedal or throttle is locked at the maximum position 2. Engine speed calculation error 3. Driving operation error	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (13. Engine speed overrun fault)
P0300	Several cylinders misfiring	1. Engine wire harness 2. Injector 3. Ignition system 4. Fuel pressure 5. Intake air temperature/pressure sensor 6. Compression pressure 7. Valve mechanism timing 8. Valve clearance 9. Cylinder head 10. Vent valve pipe 11. Air intake system 12. Vacuum hose 13. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (14. Multi-cylinder misfire fault)
P0301	No. 1 cylinder misfiring	1. Inner cylinder combustion fault 2. Internal ignition system fault 3. Fuel supply system fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (15. Single cylinder misfire fault)
P0302	No. 2 cylinder misfiring		
P0303	No. 3 cylinder misfiring		
P0304	No. 4 cylinder misfiring		
P0321	Crankshaft TDC tooth missing signal fault	1. Crankshaft position sensor 2. Crankshaft position sensor wire harness 3. Flywheel	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (16. Crankshaft position sensor signal loss fault)
P0322	Speed sensor signal fault		
P0327	Low voltage of knock sensor signal circuit	1. Knock sensor 2. Knock sensor wire harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (17. Shock sensor fault)
P0328	High voltage of knock sensor signal circuit	1. Knock sensor 2. Knock sensor wire harness 3. ECM	
P0340	Improper phase sensor mounting position	1. Camshaft position sensor (CMP) 2. Camshaft position sensor wire harness 3. Incorrect position/clearance between signal wheel and sensor 4. Signal wheel mechanical fault 5. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (18. Camshaft position sensor fault)
P0341	Unreasonable phase sensor signal		
P0342	Phase sensor signal circuit short circuit to ground		
P0343	Phase sensor signal circuit short circuit to power supply		
P0420	Aging of oxygen storage capacity of three-way catalytic converter (emissions overrun)	1. Three-way catalytic converter 2. Front oxygen sensor 3. Rear oxygen sensor 4. Exhaust leakage	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (19. Emission overrun fault)

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DTC	Code interpretation	Cause of fault	Recommended action
P0444	Canister solenoid's control circuit open circuit	1. Canister control valve wire harness 2. Canister control valve 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (20. Canister control fault)
P0458	Low voltage of canister solenoid's control circuit	1. Canister control valve wire harness 2. Canister control valve 3. ECM	
P0459	High voltage of canister solenoid's control circuit	1. Canister control valve wire harness 2. Canister control valve 3. ECM	
P0480	Cooling fan relay control circuit is open (low speed)	1. Circuit is open 2. ECU hardware fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (21. Cooling fan fault)
P0481	Cooling fan relay control circuit is open (high speed)		
P0691	Low voltage of cooling fan relay control circuit (low speed)	1. Cooling fan relay (low speed) 2. Cooling fan relay (low speed) wire harness 3. ECM	
P0692	High voltage of cooling fan relay control circuit (low speed)		
P0693	Low voltage of cooling fan relay control circuit (high speed)	1. Cooling fan relay (high speed) 2. Cooling fan relay (high speed) wire harness 3. ECM	
P0694	High voltage of cooling fan relay control circuit (high speed)		
P0501	Vehicle speed sensor signal fault	1. ABS system is faulty	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (22. Speed signal fault)
		2. Instrument cluster fault	
		3. Wire harness fault	
P0506	Speed of idle control less than target value	1. Throttle is locked in a smaller opening due to stains or fault 2. Intake manifold leaks. 3. Exhaust manifold back pressure is too large. 4. Injector is blocked. 5. Fuel supply system pressure is too low.	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (23. Too low or too high idle speed fault)
P0507	Speed of idle control more than target value	1. Throttle is locked in a larger opening due to stains or fault 2. Intake air system leakage 3. Injector leaks 4. Fuel supply system pressure is too high.	
P0560	Unreasonable battery voltage signal	1. ECU pin and power supply (main relay) circuit are open 2. Battery fed or damaged 3. Engine fault 4. Generator voltage regulator fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (24. System power voltage fault)
P0562	Low battery voltage		
P0563	High battery voltage		
P0571	Brake switch signal circuit fault or correlation not synchronized	1. Wire harness or component fault 2. Brake switch circuit shorted or is open	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (25. Brake light signal unreasonable fault)

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DTC	Code interpretation	Cause of fault	Recommended action
P0602	Electronic control unit (ECU) coding fault	1. ECU fault 2. ECU internal error	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (26. ECU inside fault)
P0604	ECU RAM fault		
P0605	ECU ROM fault		
P0627	Pump relay control circuit is open	1. Open or short circuit	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (27. Pump relay fault)
		2. Fuel pump relay damaged	
		3. Fuse is blown	
		4. Wire harness or connector is loose	
		5. ECU hardware fault	
P0628	Low voltage of oil pump relay control circuit	1. Power short circuit	
		2. ECU hardware fault	
P00629	High voltage of oil pump relay control circuit	1. Open or short circuit	
		2. Fuel pump relay damaged	
		3. Fuse is blown	
		4. Wire harness or connector is loose	
		5. ECU hardware fault	
P0645	A/C compressor relay control circuit is open	1. A/C compressor relay 2. A/C compressor relay harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (28. Compressor relay fault)
P0646	Low voltage of A/C compressor relay control circuit		
P0647	High voltage of A/C compressor relay control circuit		
P0650	MIL lamp driver circuit fault	1. MIL indicator lamp line 2. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (29. MIL fault indicator lamp fault)
P070400	Unreasonable clutch pedal switch signal	1. Clutch pedal switch fault 2. Line fault 3. Engine control unit (ECU) fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (30. Clutch switch fault)

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DTC	Code interpretation	Cause of fault	Recommended action
P0606	Electric throttle body safety monitoring function fault	1. Electronic throttle valve 2. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (31. Electronic throttle fault)
P1336	Torque limit of electric throttle body safety monitoring	1. ECU fault 2. Engine target torque limiting	
P1545	Overrun of deviation between the actual position and target position of electric throttle body		
P1558	Excessive resistance of electric throttle body opening	1. Component fault	
P1559	Electric throttle body self-learning process fault	1. Component fault 2. Sporadic throttle self-learning fault	
P1564	System voltage do not meet electric throttle body self-learning conditions		
P1565	Electric throttle body lower limit position initialized self-learning fault	1. Wire harness and component fault	
P1568	Excessive resistance of electric throttle body return		
P1579	Electric throttle body self-learning conditions are dissatisfied	1. Component fault. 2. Sporadic lameness position signal unreasonable fault	
P1604	Electric throttle body gain-adjustment self-learning fault		
P1610	Error of Secret Key and SECMrity Code not programming	1. Remote key 2. Electronic key chip 3. Engine immobilizer module 4. Ignition switch internal immobilizer coil 5. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (32. Engine immobilizer fault)
P1611	Error of SECMrity Code receiving		
P1626	Anti-theft certification communication error or burglar alarm do not respond		
P1631	Anti-theft certification fault		
P1651	SVS lamp drive-circuit fault	1. SVS indicator lamp line 2. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (33. SVS fault indicator lamp fault)
P2088	VVT intake control valve circuit short circuit to ground	1. OCV 2. OCV harness 3. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (1. Intake VVT solenoid valve fault)
P2089	VVT intake control valve circuit short circuit to power supply		
P2106	Electric throttle body drive-circuit fault	1. Electronic throttle valve 2. ECM	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (34. Electronic throttle driver circuit fault)

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DTC	Code interpretation	Cause of fault	Recommended action
P2122	Low signal voltage of electronic accelerator pedal position sensor 1	1. Wire harness/component fault 2. Signal 1 circuit is short to ground or damaged 3. Signal 1 circuit power OFF	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (35. Electronic accelerator pedal fault)
P2123	High signal voltage of electronic accelerator pedal position sensor 1	1. Wire harness/component fault 2. Signal 1 circuit is short to power supply	
P2127	Low signal voltage of electronic accelerator pedal position sensor 2	1. Wire harness/component fault 2. Signal 2 circuit is short to ground or damaged 3. Signal 2 circuit power open	
P2128	High signal voltage of electronic accelerator pedal position sensor 2	1. Wire harness/component fault 2. Signal 2 circuit is short to power supply	
P2138	Unreasonable of electronic accelerator pedal position sensor signal 1	1. Wire harness or component fault. 2. Pedal signal is inconsistent	
P2177	Air-fuel ratio closed-loop control self-learning value exceeding upper limit (medium load area)	1. Internal circuit is open, broken 2. Intake, ignition or fuel injection system fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (36. Air-fuel ratio overrun or oxygen sensor aging fault)
P2178	Air-fuel ratio closed-loop control self-learning value exceeding lower limit (medium load area)		
P2187	Air-fuel ratio closed-loop control self-learning value exceeding upper limit (low load area)		
P2188	Air-fuel ratio closed-loop control self-learning value exceeding lower limit (low load area)		
P2195	Upstream oxygen sensor aging		
P2196	Upstream oxygen sensor aging		
P2270	Downstream oxygen sensor aging		
P2271	Downstream oxygen sensor aging		
U0001	CAN communication-related diagnosis	1. CAN short/open circuit to the ground or power supply 2. Wire harness loose 3. ECU fault 4. TCU fault	See 12 - Engine Control System, Diagnosis, DTC Diagnosis (37. CAN communication fault)
U0101	ECU and TCU control module communication lost		

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DTC DIAGNOSIS

1. INTAKE VVT SOLENOID VALVE FAULT

P000A - Slow response of intake VVT

P0010 - VVT intake control valve circuit is open

Description of fault code:

1. The intake camshaft position (CMP) actuator is connected to the intake camshaft and operated by the hydraulic pressure. The hydraulic pressure is provided by the oil pump in order to change the angle of the intake camshaft relative to the crankshaft position (CKP).
2. The intake VVT solenoid valve is powered by the main relay, and the ECM is grounded with the pulse width control signal. Thereby, the oil flow of the engine to the actuator of the camshaft position is controlled.
3. The engine oil pressure will drive a safety slide valve inside the camshaft position actuator mechanism fixed at the front of the camshaft to move. When the safety slide valve moving, the engine oil will be led into the camshaft position actuator to make the camshaft rotate.
4. The intake camshaft position actuator can allow the cam working angle to change 50 °maximally.
5. The intake VVT solenoid valve controls the internal ground of the solenoid valve through the Terminal 48 of the ECM harness connector E01.
6. There is a feedback circuit inside the ECM. The engine ECM determines whether the control circuit is open circuit, short circuit to ground or short circuit to voltage through monitoring the feedback signal.
7. If the engine ECM detects the voltage of the control circuit within the predefined range when the control circuit is disconnected by commands, this DTC will occur.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the ECU connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the OCV	Normal	Faulty	Instruction
	• When ignition switch is in the "OFF" position, unplug the VVT solenoid valve connector • Check the resistance value between the two terminals of the VVT solenoid valve. **Resistance: 9.4 - 10.6 Ω (20 °C)** • Remove the intake VVT solenoid valve, and check whether the intake VVT is normal	Go to Step 3	VVT solenoid valve resistance is unreasonable, VVT filter is damaged or clogged, etc.	Replace VVT solenoid valve
3	Check the VVT solenoid valve power supply wire	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the OCV connector E22, and pull out the engine compartment fuse box relay K02 • Check whether the line between the engine compartment fuse box K02 and the No. 1 terminal of E22 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Check the VVT solenoid valve power line	Normal	Faulty	Instruction
	• Disconnect the OCV connector and the ECU connector E01 • Check whether the line between the No. 1 terminal of E22 and the No. 48 terminal of E 01 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

2. INTAKE VVT FAULT

P0012 - Intake VVT is not at the default location when it starts.

P0016 - Unreasonable relative position of camshaft and crankshaft installation

Description of fault code:

1. ECU monitors the correlation of the positions between the crankshaft and the camshaft using the pulse signals of the crankshaft position sensor and the camshaft position sensor (intake side). Crankshaft variable reluctance rotor has 60 teeth, in which two of them are missing and used as reference clearance. Evenly spacing between each tooth is 6°, except for the reference clearance only, whose spacing is 12°.
2. Camshaft signal plate has 4 teeth, with two narrow and two wide. Evenly spacing of the 4 trailing edges for each tooth is 90°.
3. ECU will continuously monitor the timing position of the camshaft, and check the relative position between the camshaft and the crankshaft. If dislocation of the relative position exceeds 1 tooth, the fault code will appear. Fault causes include the camshaft position sensor itself or its circuit fault, crankshaft position sensor in itself or its circuit fault, oil contaminated, timing belt assembly, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the ECM connector, the camshaft position sensor and the crankshaft position sensor connectors are loose or damaged, whether the wire harness terminal is corroded
2	Check engine oil	Normal	Faulty	Instruction
	• Check whether viscosity and cleanliness of the engine oil are normal • Observe whether the engine oil level is within the operating range • Check whether the engine oil is replaced timely, whether it contains additives or the viscosity is correct	Go to Step 3	Oil unqualified oil or lubrication system fault	Replace the engine oil and oil filter, clean the engine lubrication system when necessary
3	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 4	The assembly of timing belt fault	Replace it with a new timing belt
4	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 5	The assembly of timing belt fault	Re-install the valve timing belt
5	Check the camshaft position sensor	Normal	Faulty	Instruction
	Check whether the O-ring of the intake camshaft position sensor is normal, whether the sensor is installed in place	Go to Step 6	O-ring is damaged and/or deformed	Replace the O-ring and clean the sensor
6	Check the camshaft position sensor signal wheel	Normal	Faulty	Instruction
	Check whether the signal wheel on the intake side camshaft position sensor is normal	Go to Step 7	Camshaft position sensor signal fault	Replace side camshaft assembly
7	Replace and check (camshaft position sensor)	Normal	Faulty	Instruction
	• Replace the intake camshaft position sensor, and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Go to Step 8	Intake camshaft position sensor fault	Replace the intake camshaft position sensor
8	Inspect crankshaft position sensor.	Normal	Faulty	Instruction
	Check whether the O-ring of the crankshaft position sensor is normal, whether the sensor is installed in place	Go to Step 9	O-ring is damaged and/or deformed	Replace the O-ring and clean the sensor
9	Check the crankshaft position sensor signal wheel	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check whether the crankshaft flywheel gear ring is deformed or damaged, whether the ring gear in itself has too thick sticky clay	Go to Step 10	Crankshaft flywheel gear ring fault	Replace the crankshaft flywheel gear ring
10	Inspect crankshaft position sensor.	Normal	Faulty	Instruction
	When the ignition switch is in "OFF" position, disconnect the crankshaft position sensor connector E14, and check whether the resistance between the No. 1 terminal of E14 and the No. 2 terminal of E14 of the two pines of the crankshaft position sensor is normal **Resistance: 860 ± 100 Ω**	Go to Step 11	Crankshaft position sensor fault	Replace the crankshaft position sensor
11	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

3. FAULT HEATING CIRCUIT OF FRONT OXYGEN SENSOR

P0030 - Upstream oxygen sensor heating control circuit fault

P0031 - Low voltage of upstream oxygen sensor heating control circuit

P0032 - High voltage of upstream oxygen sensor heating control circuit

P0053 - High voltage of heating control circuit of upstream oxygen sensor

Description of fault code:

1. Upstream heated oxygen sensor, also called front oxygen sensor, is used to correct the fuel control; the sensor compares the oxygen content in the amendment air with the oxygen content in the exhaust flow, each heated oxygen sensor has an heating component to heat the sensor.
2. ECU controls the heating control circuit of the heated oxygen sensor, thus enabling the system to better enter the closed-loop mode, making the sensor perform calculation earlier. The engine control module commands the heating element to switch on or off, so that the heated oxygen sensor is always within the range of the specified working temperature.
3. Engine control module detects the temperature by measure the heater current. If the oxygen sensor does not reach the required temperature within a set time, or the ECU is unable to maintain the set temperature, this fault code will appear.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the front oxygen connector is loose or damaged, and whether the wire harness terminal is corroded

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Steps	Inspection item	Inspection result		
2	Check the front oxygen sensor power circuit	Normal	Faulty	Instruction
	Disconnect the front oxygen sensor connector E12, when the ignition switch is in "ON", check the voltage between the No. 4 of E12 and the grounding **Voltage: 9 - 13 V**	Go to Step 4	The voltage is out of the reasonable range	Go to Step 3
3	Check the front oxygen sensor circuit	Normal	Faulty	Instruction
	• When ignition switch is in the "OFF" position, unplug the front oxygen sensor connector • Disconnect the engine control unit connector E01 and front oxygen sensor connector E12 • Check whether the line between the No. 26 terminal of E01 and the No. 3 terminal of E 12 has a short circuit or open circuit • Check whether the line between the No. 4 terminal of E12 and the engine compartment fuse box K02 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Check front oxygen sensor	Normal	Faulty	Instruction
	• When ignition switch is in the "OFF" position, unplug the front oxygen sensor connector • At room temperature, measure whether the resistance between the No. 3 pin of E12 and the No. 4 pin of E12 of the front oxygen sensor connector (component side) is normal **Resistance: 7 - 11Ω**	Go to Step 5	Front oxygen sensor fault	Replace the front oxygen sensor
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

4. HEATING CIRCUIT OF REAR OXYGEN SENSOR FAULT

P0036 - Downstream oxygen sensor heating control circuit fault

P0037 - Low voltage of downstream oxygen sensor heating control circuit

P0038 - High voltage of downstream oxygen sensor heating control circuit

P0054 - Unreasonable internal heating resistance of downstream oxygen sensor

Description of fault code:

1. Downstream oxygen sensor (namely the rear oxygen sensor) is used for monitoring the working status of the three-way catalytic converter. The sensor compares the oxygen content in ambient air with the oxygen content in exhaust flow. Each heated oxygen sensor has an internal heating element for sensor heating.

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2. The engine control module controls the heated oxygen sensor's heating control circuit. This makes the system enter into the closed-loop control mode earlier, so that ECM can calculate air-fuel ratio earlier.

3. The engine control module commands the heater to switch on or off, so that the heated oxygen sensor works within the specified working temperature range. Engine control module detects the temperature by measure the heater current.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the rear oxygen connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the rear oxygen sensor power circuit	Normal	Faulty	Instruction
	Disconnect the rear oxygen sensor connector E12, when the ignition switch is in "ON", check the voltage between the No. 4 of E13 and the grounding **Voltage: 9 - 13 V**	Go to Step 4	The voltage is out of the reasonable range	Go to Step 3
3	Check the rear oxygen sensor line	Normal	Faulty	Instruction
	• When ignition switch is in the "OFF" position, unplug the rear oxygen sensor connector • Disconnect the engine control unit connector E01 and rear oxygen sensor connector E13 • Check whether the line between the No. 28 terminal of E01 and the No. 3 terminal of E13 has a short circuit or open circuit • Check whether the line between the No. 4 terminal of E13 and the engine compartment fuse box K02 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Check rear oxygen sensor	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When ignition switch is in the "OFF" position, unplug the rear oxygen sensor connector • At room temperature, measure whether the resistance between the No. 3 pin of E13 and the No. 4 pin of E13 of the rear oxygen sensor connector (component side) is normal **Resistance: 7 - 11Ω**	Go to Step 5	Rear oxygen sensor fault	Replace the rear oxygen sensor
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

5. AIR INTAKE PRESSURE SENSOR FAULT

P0105 - Intake manifold pressure sensor signal has no change

P0106 - Unreasonable intake pressure sensor/atmospheric pressure sensor

P0107 - Intake air pressure sensor short circuit to ground

P0108 - Intake air pressure sensor short circuit to power supply

Description of fault code:

1. Intake manifold pressure sensor measures the pressure in the intake manifold.
2. ECU takes the difference (a linear relationship with the engine load) between the intake manifold pressure and the atmospheric pressure as a basis to determine the basic fuel injection amount of the injector, thus helping the engine reach the optimal air-fuel ratio under different loads.
3. If ECU detects that the intake sensor signal voltage exceeds the normal range of calibration, the fault code will appear.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the intake pressure and temperature sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check intake pressure sensor	Normal	Faulty	Instruction
	• Remove the intake pressure and temperature sensor • Check whether there is oil stain on the surface of intake pressure and temperature sensor	Go to Step 3	There is dirt on the surface of intake pressure and temperature sensor	Clean the dirt of intake pressure and temperature sensor

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Steps	Inspection item	Inspection result		
3	Read the data flow.	Normal	Faulty	Instruction
	• Connect the diagnosis scanner, and read the intake pressure sensor data flow, then confirm whether the data flow is normal • Intake pressure/output voltage **Reference 1: 20KPa/0.4 V** **Reference 2: 45KPa/1.82V** **Reference 3: 80KPa/3.24 V** **Reference 4: 115KPa/4.6**V	Go to Step 4	Air intake pressure temperature sensor fault	Replace the air intake pressure temperature sensor.
4	Check intake pressure sensor line	Normal	Faulty	Instruction
	• Disconnect the intake pressure and temperature sensor E27 and the ECU connector E01 • Check whether the lines between the No. 1 terminal and the No. 37 terminal of E27, the No. 2 terminal and the No. 33 terminal of E27, or the No. 4 terminal of E27 and the No. 17 terminal of E01 have a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

6. AIR INTAKE TEMPERATURE SENSOR FAULT

P0112 - Low voltage of intake air temperature sensor signal

P0113 - High voltage of intake air temperature sensor signal

Description of fault code:

1. The intake air temperature sensor (IATS) undertakes to detect the intake air temperature and convert the intake air temperature signal into electric signal which will then be transmitted to the engine control module (ECM), so that the ECM could correct the time for fuel injection and ignition to make the engine working in the best condition.
2. Intake air temperature sensor adopts thermistor with negative temperature coefficient (NTC). Its resistance value decreases with the temperature increasing.
3. If ECU detects that the intake air temperature sensor signal voltage is lower than the minimum or maximum value of the self-test, this fault code will appear.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the intake pressure and temperature sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the intake temperature sensor	Normal	Faulty	Instruction
	• Remove the intake pressure and temperature sensor. • Check whether there is oil stain on the surface of intake pressure and temperature sensor	Go to Step 3	There is dirt on the surface of intake pressure and temperature sensor	Clean the dirt of intake pressure and temperature sensor
3	Check the intake temperature sensor	Normal	Faulty	Instruction
	• Blow the intake pressure and temperature sensor (note that the distance can not be too close) with the heating gear of an electric blower, and observe whether the resistance between the No. 3 terminal of E27 and the No. 4 terminal of E27 of the intake pressure and temperature sensor changes, then the resistance should decrease • Temperature and the corresponding resistance value 20° C/2323 - 2690Ω 85° C/266 - 292Ω	Go to Step 4	Air intake pressure temperature sensor fault	Replace the air intake pressure temperature sensor
4	Check intake temperature sensor line	Normal	Faulty	Instruction
	• Disconnect the intake pressure and temperature sensor E27 and the ECU connector E01 • Check whether the lines between the No. 3 terminal of E27 and the No. 42 terminal of E01, or the No. 4 terminal of E27 and the No. 17 terminal of E01 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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7. COOLANT TEMPERATURE SENSOR FAULT

P0117 - Low voltage of engine coolant temperature sensor circuit

P0118 - High voltage of engine coolant temperature sensor circuit

Description of fault code:

1. The function of coolant temperature sensor (ECT) is to transfer engine coolant temperature signal into electrical signal and then sends it to engine ECM so that ECM corrects fuel injection time and ignition time to ensure the engine is in optimal working state.
2. Coolant temperature sensor adopts thermistor with negative temperature coefficient (NTC). Its resistance value decreases with the temperature increasing.
3. If ECU detects that the engine coolant temperature sensor signal is lower or higher than the self-test value, this fault code will appear. Fault causes include sensor signal circuit shorted to ground, sensor fault, ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the coolant temperature sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check coolant temperature sensor	Normal	Faulty	Instruction
	• Remove the engine coolant temperature sensor • Perform heating test to the engine coolant temperature sensor, and observe whether the change of the resistances between the No. 1 terminal of E17 and the No. 3 terminal of E17 of the two pines of the engine coolant temperature sensor decreases with increasing of the temperature • Temperature and the corresponding resistance value 25° C/1.8 - 2.1kΩ 80° C/ 0.3 - 0.32kΩ	Go to Step 3	Air intake pressure temperature sensor fault	Replace the coolant temperature sensor
3	Check coolant temperature sensor line	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the coolant temperature sensor connector E17 and the ECU connector E01 • Check whether the lines between the No. 1 terminal of E17 and the No. 17 terminal of E01, or the No. 3 terminal of E17 and the No. 39 terminal of E01 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

8. ELECTRONIC THROTTLE SIGNAL FAULT

P0121 - Unreasonable signal of electric throttle body position sensor 1

P0122 - Low voltage of signal circuit of electric throttle body position sensor 1

P0123 - High voltage of signal circuit of electric throttle body position sensor 1

P0221 - Unreasonable signal of electric throttle body position sensor 2

P0222 - Low voltage of signal circuit of electric throttle body position sensor 2

P0223 - High voltage of signal circuit of electric throttle body position sensor 2

Description of fault code:

1. In the electronic throttle control (ETC) system, the accelerator pedal position (APP) sensor transmits the accelerator pedal position to the ECU. And ECU controls the throttle valve opening by driving the throttle valve motor, and feedbacks to the ECU through the sensor signal.
2. The actual throttle position will be compared with the that determined according to the engine load. The engine control module (ECM) determines the engine load based on the signal of the intake manifold absolute pressure sensor (MAPS). A further comparison will determine whether the sensor faults and set the corresponding DTC. Fault causes include sensor signal circuit open, sensor ground circuit open, or sensor fault in itself, ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check the connector of electric throttle body control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Check electronic throttle body line	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When the ignition switch is in "OFF" position, disconnect the electronic throttle connector E19 and the ECU connector E01 • Check whether the lines between the No. 3 terminal of E19 and the No. 32 terminal of E01, the No. 5 terminal of E19 and the No. 38 terminal of E01, the No. 2 terminal of E19 and the No. 78 terminal of E01, or the No. 6 terminal of E19 and the No. 54 terminal of E01 has a short circuit or open circuit	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Check electronic throttle body	Normal	Faulty	Instruction
	• Replace the electronic throttle body and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Go to Step 4	DTC still exists	Replace the electric throttle body
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

9. FRONT OXYGEN SENOR SIGNAL CIRCUIT FAULT

P0130 - Unreasonable upstream oxygen sensor signal

P0131 - Low voltage of upstream oxygen sensor signal circuit

P0132 - High voltage of upstream oxygen sensor signal circuit

P0133 - Upstream oxygen sensor aging

P0134 - Upstream oxygen sensor signal fault

Description of fault code:

1. Check the concentration of oxygen in the exhaust gas, and send feedback signal to ECU, then the ECU controls the injection amount of the injector, thus controlling the air-fuel ratio of the mixture close to the theoretical value.
2. After the vehicle starting, the ECM will work at the open-loop mode, in which the ECM will ignore the signal voltage of the front oxygen sensor when calculating the air-fuel ratio. The control module provides approximately 450mV reference voltage to the upstream oxygen sensor. The upstream oxygen sensor will be heated to generate a voltage of 0-0.1V when the engine running. The voltage fluctuates along the reference voltage.
3. Control module once found upstream oxygen sensor voltage than set threshold voltage in closed loop mode immediately. The control module will determine the air-fuel ratio with the upstream oxygen sensor voltage. If the upstream oxygen sensor voltage is increased to above the reference voltage (tend to 1 V), the air fuel mixture is too thick. If the upstream oxygen sensor voltage decreases to below the reference voltage (tend to 0mV), the mixture is too thin. If the reaction rate of the oxygen sensor voltage fluctuation is lower than the system value, it indicates that the oxygen sensor aging.

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Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the front oxygen connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check front oxygen sensor	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Remove the front oxygen sensor, visually observe whether the front oxygen sensor has a carbon deposit, whether it turns white, blown or black	Go to Step 3	Front oxygen sensor has serious carbon deposit. Turn white	Replace the front oxygen sensor, and replace the fuel and clean the fuel tank
3	Check the front oxygen sensor circuit	Normal	Faulty	Instruction
	• Disconnect the front oxygen sensor connector E12 and engine control unit connector E01 • Check whether the lines between the No. 1 terminal of E12 and the No. 36 terminal of E01, or the No. 2 terminal of E12 and the No. 18 terminal of E01 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Replacement and check (oxygen sensor)	Normal	Faulty	Instruction
	• Replace the front oxygen sensor and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the front oxygen sensor	DTC still exists	Go to Step 5
5	Replacement and check (ECM)	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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Oxygen sensor operating temperature and the corresponding working conditions			
Temperature (° C)	260	450	595
Thick output voltage (mV)	> 800	> 800	> 750
Thin output voltage (mV)	< 200	< 200	< 150
Thin-to-thick response time (mS)	< 75	< 75	< 50
Thick-to-thin response time (mS)	< 150	< 125	< 90
Internal resistance (Ω)	< 100K		

10. REAR OXYGEN SENSOR SIGNAL CIRCUIT FAULT

P0136 - Unreasonable downstream oxygen sensor signal

P0137 - Low voltage of downstream oxygen sensor signal circuit

P0138 - High voltage of downstream oxygen sensor signal circuit

P0140 - Downstream oxygen sensor signal fault

Description of fault code:

1. Downstream oxygen sensor (namely the rear oxygen sensor) is used for monitoring the working status of the three-way catalytic converter.
2. The sensor compares the oxygen content in ambient air with the oxygen content in exhaust flow. Each heated oxygen sensor has an internal heating element for sensor heating. The engine control module controls the heated oxygen sensor's heating control circuit. This makes the system enter into the closed-loop control mode earlier, so that ECM can calculate air-fuel ratio earlier.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the rear oxygen connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check three-way catalytic converter	Normal	Faulty	Instruction
	Check whether the three-way catalytic converter is replaced within the specified time	Go to Step 3	Three-way catalytic converter fault	Replace three-way catalytic converter
3	Check rear oxygen sensor	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Remove the rear oxygen sensor, visually observe whether the rear oxygen sensor has a carbon deposit, whether it turns white, blown or black	Go to Step 4	Rear oxygen sensor has serious carbon deposit, and turns white.	Replace the rear oxygen sensor, and replace the fuel and clean the fuel tank
4	Check the rear oxygen sensor line	Normal	Faulty	Instruction
	• Disconnect the rear oxygen sensor connector E13 and engine control unit connector E01 • Check whether the lines between the No. 2 terminal of E13 and the No. 55 terminal of E01, or the No. 1 terminal of E13 and the No. 36 terminal of E01 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check (oxygen sensor)	Normal	Faulty	Instruction
	• Replace the front oxygen sensor and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the front oxygen sensor	DTC still exists	Go to Step 6
6	Replacement and check (ECM)	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

11. TOO RICH OR TOO LEAN FUEL FAULT

P0170 - Unreasonable self-learning of end of line test of air-fuel ratio closed-loop control

P0171 - Over-thin self-learning of end of line test of air-fuel ratio closed-loop control

P0172 - Over-thick self-learning of end of line test of air-fuel ratio closed-loop control

Description of fault code:

1. ECU controls the measurement system of the closed-loop air-fuel ratio, allowing the manipulation performance, fuel economy and emission control to achieve the best fit. In closed loop mode, the ECU monitors the heated oxygen sensor voltage and adjust the fuel supply according to the signal voltage.
2. Changes in fuel supply will change long-term or short-term fuel adjustment value.
3. Short-term fuel adjustment value change rapidly by responding to the signal voltage of the heated oxygen sensor. These changes will perform fine adjustment the engine fuel supply.
4. Long-term fuel adjustment value will change with the adjustment of the short-term fuel. Long-term fuel supply adjustment performs coarse adjustment, to return to the central value of the short-term fuel adjustment, and regain the control over the short-term fuel adjustment.

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5. Ideal fuel adjustment value is about 0%. Positive fuel adjustment value indicates that the ECU is adding the fuel to compensate for the too lean mixture. Negative fuel adjustment value indicates that the ECU is reducing the fuel amount to compensate for the too rich mixture.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine for road test, making the engine running under various operating conditions, then reread the fault code, and confirm whether the engine has other sensor or actuator fault code	Go to Step 2	There is other sensor or actuator fault code	Refer to the corresponding chapter according to the DTC displayed on the diagnostic scanner to eliminate the fault, and then perform the inspection described in this chapter
2	Check air filter	Normal	Faulty	Instruction
	Check if air filter is clogged	Go to Step 3	Air filter blocked	Replace the air filter assembly
3	Check the intake system pipeline	Normal	Faulty	Instruction
	Check whether the intake pipe leaks	Go to Step 4	Intake system pipe leakage fault	Repair the gas-leakage pipeline
4	Check the spark plug	Normal	Faulty	Instruction
	• Remove the spark plug • Check the spark plug gap for normal working	Go to Step 5	Spark plug clearance is too large	Replace the spark plug
5	Check the ignition coil	Normal	Faulty	Instruction
	• Remove the ignition coil and install new spark plug. • Check whether the ignition coil has flashover, and whether the spark is normal	Go to Step 6	Ignition coil fault	Replace the ignition coil
6	Check the exhaust system pipeline	Normal	Faulty	Instruction
	Check the exhaust system pipeline for leakage	Go to Step 7	Exhaust system pipe leakage fault	Repair the gas-leakage pipeline
7	Check fuel system pressure	Normal	Faulty	Instruction
	Check if fuel system pressure is normal	Go to Step 8	Fuel system fault	Maintain the fuel system
8	Check injector	Normal	Faulty	Instruction
	• Remove the injector, connect the injector to the injector detector • Check whether the injector performance is normal	Go to Step 9	Injector fault	Replace the faulty injector
9	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

12. INJECTOR FAULT

P0201 - Open circuit of No. 1 cylinder's injector control circuit

P0202 - Open circuit of No. 2 cylinder's injector control circuit

P0203 - Open circuit of No. 3 cylinder's injector control circuit

P0204 - Open circuit of No. 4 cylinder's injector control circuit

P0261 - No. 1 cylinder's injector control circuit short circuit to ground

P0262 - No. 1 cylinder's injector control circuit short circuit to power supply

P0264 - No. 2 cylinder's injector control circuit short circuit to ground

P0265 - No. 2 cylinder's injector control circuit short circuit to power supply

P0267 - No. 3 cylinder's injector control circuit short circuit to ground

P0268 - No. 3 cylinder's injector control circuit short circuit to power supply

P0270 - No. 4 cylinder's injector control circuit short circuit to ground

P0271 - No. 4 cylinder's injector control circuit short circuit to power supply

Description of fault code:

1. The operating voltage of the injector is provided the main relay controlled by ECU, and the battery voltage is supplied to all injector wire harness connectors via the main relay and supplied to the injector.
2. ECU connects the injector grounding wire through the wire harness, it is an internal grounding in ECU.
3. ECU monitors the status of each injector driver circuit, if the engine detects that the voltage corresponding to the injector driver circuit injector driver circuit command status is incorrect, set a fault diagnosis code for the cylinder injector control circuit fault.

ⓘ NOTICE:

Before carrying out this diagnosis steps, observe the data list on the fault diagnostic scanner and analyze the accuracy of the data to help quick troubleshooting.

△ HINT:

Inspection method of the No. 1 cylinder injector fault is the same with the method of the other cylinders, here it only describes No. 1 cylinder injector fault.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the injector connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check injector power supply line	Normal	Faulty	Instruction
	• Disconnect No. 1 cylinder's injector connector E28 • When the ignition switch is in "ON" position, check the voltage between the No. 2 terminal of E28 and the grounding **Voltage: 9 - 13 V**	Go to Step 3	The voltage is out of the reasonable range	Check whether the line between the engine compartment fuse box relay K02 and the No. 2 terminal of E28 has a short circuit or open circuit
3	Check injector	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect No. 1 cylinder's injector connector E28 • Measure whether the resistance between the two terminals of the injector is normal **Resistance: 11 - 17Ω**	Go to Step 4	Injector fault	Replace the fuel injector
4	Check the injector control circuit	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 • Check whether the line between the No. 27 terminal of the connector E01 and the No. 1 terminal of E 28 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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13. ENGINE SPEED OVERRUN FAULT

P0219 - Engine speed exceeds the maximum speed limit

Description of fault code:

1. Engine control unit detects that the engine speed exceeds the maximum limit.
2. Fault causes include the engine running at the wrong gear, the engine running in neutral at high speeds, the wheel slipping on wet or snowy ground at high speed.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic
2	Check the vehicle condition	Normal	Faulty	Instruction
	Confirm whether the engine runs at the wrong gear, the engine runs in neutral at high speeds, and the wheel slips on wet or snowy ground at high speed	Go to Step 3	Mis-operation fault	Clear fault code
3	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

14. MULTI-CYLINDER MISFIRE FAULT

P0300 - Several cylinders misfiring

Description of fault code:

1. Cylinder misfire is that the gas mixture can not combust normally in the cylinder due to various causes during the engine running.
2. If the ECU detects a misfire which may damage to the catalytic converter, the fault indicator will flash, then the engine should be turned off immediately.
3. When the engine running time > 60s, and coolant temperature > 70° C, and the system detects the crankshaft position sensor speed fluctuation exceeds the set value, it will trigger the fault code. This fault code indicates that several cylinders misfire or the engine control module can not determine which cylinder misfires. Fault causes include mechanical fault, fuel metering error, too high or too low fuel pressure, vapor emission system fault, ignition system fault, intake system fault, etc.

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Steps	Inspection item	Inspection result		
0	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 1	The fault is sporadic
1	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plug gap for normal working	Go to Step 2	Spark plug fault	Replace the spark plug
2	Check the ignition coil	Normal	Faulty	Instruction
	• Remove the ignition coil and install new spark plug. • Check whether the ignition coil has flashover spark is normal	Go to Step 3	Ignition coil fault	Replace the ignition coil
3	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 4	The assembly of timing belt fault	Replace it with a new timing belt
4	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 5	The assembly of timing belt fault	Re-install the valve timing belt
5	Check cylinder pressure	Normal	Faulty	Instruction
	Connect the cylinder pressure tester and check whether the cylinder pressure is normal	Go to Step 6	Cylinder pressure fault	Repair the cylinder pressure fault
6	Check fuel system pressure	Normal	Faulty	Instruction
	Start the engine, and check if engine fuel system pressure is normal	Go to Step 7	Fuel system pressure fault	Overhaul the fuel system
7	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check whether the injector is normal using the injector detector	Go to Step 8	Injector fault	Replace the fuel injector
8	Check the intake system	Normal	Faulty	Instruction
	Start the engine, and check the intake system for presence of air leakage	Go to Step 9	The air leakage fault of intake system	Repair the faulty pipeline
9	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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15. SINGLE-CYLINDER MISFIRE FAULT

P0301 - No. 1 cylinder misfiring

P0302 - No. 2 cylinder misfiring

P0303 - No. 3 cylinder misfiring

P0304 - No. 4 cylinder misfiring

Description of fault code:

1. Cylinder misfire is that the gas mixture can not combust normally in the cylinder due to various causes during the engine running. If the ECU detects a misfire which may damage to the catalytic converter, the fault indicator will flash, then the engine should be turned off immediately.
2. When the engine running time exceeds 60s, the coolant temperature > 70° C, and after ignition of a cylinder TDC, if the crankshaft rotational speed difference exceeds the calibration value, it will produce a cylinder misfire fault code.

Steps	Inspection item	Inspection result		
0	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 1	The fault is sporadic
1	Check the intake system	Normal	Faulty	Instruction
	Start the engine, and check the intake system for presence of air leakage	Go to Step 2	The air leakage fault of intake system	Repair the faulty pipeline
2	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plug gap for normal working	Go to Step 3	Spark plug fault	Replace the spark plug
3	Check the ignition coil	Normal	Faulty	Instruction
	• Remove the ignition coil and install new spark plug. • Check whether the ignition coil has flashover spark is normal	Go to Step 4	Ignition coil fault	Replace the ignition coil
4	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 5	The assembly of timing belt fault	Replace it with a new timing belt
5	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 6	The assembly of timing belt fault	Re-install the valve timing belt
6	Check cylinder pressure	Normal	Faulty	Instruction
	Connect the cylinder pressure tester and check whether the cylinder pressure is normal	Go to Step 7	Cylinder pressure fault	Repair the cylinder pressure fault
7	Check fuel system pressure	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Start the engine, and check if engine fuel system pressure is normal	Go to Step 8	Fuel system pressure fault	Overhaul the fuel system
8	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check whether the injector is normal using the injector detector	Go to Step 9	Injector fault	Replace the fuel injector
9	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

16. CRANKSHAFT POSITION SENSOR SIGNAL LOSS FAULT

P0321 - Crankshaft TDC tooth missing signal fault

P0322 - Speed sensor signal fault

Description of fault code:

1. Crankshaft position sensor informs the ECU of the current speed and position of the crankshaft. Crankshaft position sensor generates AC voltage with different amplitude and frequency. Frequency depends on the crankshaft speed. Output AC voltage depends on crankshaft position sensor. There is one fixing 58X variable reluctance rotor on crankshaft position sensor and crankshaft.
2. The engine control unit can calculate the ignition timing, fuel injection timing and knock ignition control according to the input signal of the crankshaft position sensor and the camshaft position sensor. Crankshaft position sensor is also used to detect misfire and tachometer display.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the crankshaft position sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Inspect crankshaft position sensor	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Remove the crankshaft position sensor, and measure whether the resistance between the No. 2 terminal and the No. 3 terminal of the sensor is normal **Resistance: 860 ± 100Ω**	Go to Step 3	Crankshaft position sensor fault	Replace the crankshaft position sensor
3	Check the crankshaft position sensor shield wire	Normal	Faulty	Instruction
	• Disconnect the crankshaft position sensor connector E14, and measure whether the resistance between the No. 1 terminal of E14 and the grounding is normal **Resistance: < 2Ω**	Go to Step 4	Sensor signal shield wire open circuit to ground	Repair the wire harness between the crankshaft position sensor and the grounding
4	Check crankshaft position sensor line	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 and crankshaft position sensor connector E14 • Measure whether the lines between the No. 2 terminal of E14 and the No. 34 terminal of E01, or the No. 3 terminal of E14 and the No. 15 terminal of E01 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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17. KNOCK SENSOR FAULT

P0327 - Low voltage of knock sensor signal circuit

P0328 - High voltage of knock sensor signal circuit

Description of fault code:

1. Knock sensor detects the shock when the engine speed changes. Knock sensor will express the knock in the form of voltage. The ECU will delay ignition to avoid shock when necessary. If this voltage is lower or higher than the calibration value, the fault code will appear. Fault causes include knock sensor circuit fault, knock sensor loosing, knock sensor fault in itself, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the knock sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the knock sensor	Normal	Faulty	Instruction
	• Check whether the type and torque of the shock sensor fixing bolt are correct • Disconnect the knock sensor connector E21, and measure whether the resistance between the two terminals of sensor is normal **Resistance: 4.9 ± 20%MΩ**	Go to Step 3	Knock sensor fault	Replace the bolts and tighten the knock sensor with the specified torque or replace the shock sensor
3	Check the knock sensor line	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 and knock sensor connector E21. • Measure whether the lines between the No. 1 terminal of E21 and the No. 19 terminal of E01, or the No. 2 terminal of E21 and the No. 20 terminal of E01 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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18. CAMSHAFT POSITION SENSOR FAULT

P0341 - Unreasonable phase sensor signal

P0342 - Low voltage of phase sensor signal circuit

P0343 - High voltage of phase sensor signal circuit

Description of fault code:

1. Phase sensor, also called camshaft position sensor, transmits one cylinder TDC position (relative position of the valve) of the camshaft position to the ECU in the form of voltage signal.
2. when the ECU detects that the camshaft sensor signal is abnormal in a set period of time, the fault code will appear. Fault causes include camshaft position sensor circuit, joint, or fault in itself, or ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the camshaft position sensor connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 3	The assembly of timing belt fault	Replace it with a new timing belt
3	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 4	The assembly of timing belt fault	Re-install the valve timing belt
4	Check the camshaft position sensor	Normal	Faulty	Instruction
	Check whether the O-ring of the camshaft position sensor is normal, whether the sensor is installed in place	Go to Step 5	O-ring is damaged and/or deformed	Replace the O-ring and clean the sensor
5	Check the camshaft signal wheel	Normal	Faulty	Instruction
	Check whether the camshaft signal round is normal	Go to Step 6	Camshaft signal wheel damage	Replace the camshaft assembly
6	Check the camshaft position sensor (intake side) line	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the engine control unit connector E01 and camshaft position sensor connector E03 • Check whether the lines between the No. 1 terminal of E03 and the No. 32 terminal of E01, the No. 2 terminal of E03 and the No. 79 terminal of E01, or the No. 3 terminal of E03 and the No. 36 terminal of E01 has a short circuit or open circuit	Go to Step 7	Circuit is short or open	Repair the faulty wire harness
7	Replace and check (camshaft position sensor)	Normal	Faulty	Instruction
	• Replace the camshaft position sensor, and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace camshaft position sensor	DTC still exists	Go to Step 8
8	Replacement and check (ECM)	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

19. EMISSION OVERRUN FAULT

P0420 - Aging of oxygen storage capacity of three-way catalytic converter (emissions overrun)

Description of fault code:

1. ECU monitors the conversion efficiency of the three-way catalytic converter with the two oxygen sensors (front oxygen sensor and rear oxygen sensor) installed respectively in the front and rear of the three-way catalytic converter.
2. ECU performs closed-loop control to the air-fuel ratio with the front oxygen sensor, while monitors the oxygen content of the exhaust gas without purified by the three-way catalytic converter. Rear oxygen sensor transmits the oxygen content of the gas purified by the three-way catalytic converter to the ECU via voltage signal.
3. ECU calculates whether the current three-way catalytic converter is in normal operating condition by contrasting the signals of the front and rear oxygen sensors. When the engine running time greater than 60 seconds, the coolant temperature is above 70° C, if the system detects that the rear oxygen sensor signal is lower or higher than the system value, i.e., it detects that the conversion efficiency of the three-way catalytic converter is too low, the fault indicator will be on, then set the fault code.

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Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the rear oxygen connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the exhaust pipeline	Normal	Faulty	Instruction
	Check the exhaust pipeline for leakage	Go to Step 3	Exhaust pipe leakage fault	Check the exhaust pipe fault
3	Check rear oxygen sensor	Normal	Faulty	Instruction
	Check whether the rear oxygen sensor signal is normal	Go to Step 4	Rear oxygen sensor fault	Replace the rear oxygen sensor
4	Check three-way catalytic converter	Normal	Faulty	Instruction
	Check whether the three-way catalytic converter is replaced within the specified time	Go to Step 5	Three-way catalytic converter fault	Replace three-way catalytic converter
5	Check the fuel	Normal	Faulty	Instruction
	Confirmed whether added the fuel which does not meet the engine model before, and did not replace the three-way catalytic converter	Go to Step 6	Three-way catalytic converter fault	Replace three-way catalytic converter
6	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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20. CANISTER CONTROL VALVE FAULT

P0444 - Open circuit of canister solenoid control circuit

P0458 - Low voltage of canister solenoid control circuit

P0459 - High voltage of canister solenoid control circuit

Description of fault code:

1. Vapor emission system guide the gasoline vapor in the fuel tank into the tank containing the activated carbon which can absorb the gasoline vapor. Engine will suck the gasoline vapor in the engine combustion chamber through the fresh air.
2. If the ECU detects that the canister control valve circuit of the vapor emission system has a short circuit or open circuit, the fault code will appear. Fault causes include carbon canister control valve control circuit open circuit, canister control valve control circuit open or shorted to ground, canister control valve fault in itself, ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the canister control valve connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check canister control valve	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Remove the canister control valve, and measure whether the resistance value between two pines of the solenoid valve is normal **Resistance: 22 - 30Ω(20° C)**	Go to Step 3	Canister control valve fault	Replace the canister control valve.
3	Check canister control valve power supply line	Normal	Faulty	Instruction
	• Disconnect the canister control valve connector E24 • When the ignition switch is in "ON" position, check the voltage between the No. 1 terminal of E24 and the grounding **Voltage: 9 - 13 V**	Go to Step 4	The voltage is out of the reasonable range	Check whether the line between the engine compartment fuse box relay K02 and the No. 1 terminal of E24 has a short circuit or open circuit
4	Check canister control valve control circuit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the engine control unit connector E01 and canister control valve connector E24 • Check whether the line between the No. 46 terminal of E01 and the No. 2 terminal of E24 has a short circuit or open circuit	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

21. COOLING FAN CIRCUIT FAULT

P0480 - Open circuit of cooling fan relay control circuit (low speed)

P0481 - Open circuit of cooling fan relay control circuit (high speed)

P0691 - Low voltage of cooling fan relay control circuit (low speed)

P0692 - High voltage of cooling fan relay control circuit (low speed)

P0693 - Low voltage of cooling fan relay control circuit (high speed)

P0694 - High voltage of cooling fan relay control circuit (high-speed)

Description of fault code:

1. Cooling fan high and low speed relay coil operating power is supplied by the main relay controlled by the ECU, and the ECU controls the relay through the wire harness connector. Engine control unit is provided with a driver circuit control relay coil grounding.
2. Driver circuit is equipped with a feedback circuit for the ECU, and the ECU determines whether the control circuit has a open circuit, short circuit to ground or short circuit to voltage.
3. When the engine running time is greater than 60s, and the coolant temperature is greater than 88° C ± 2 ° C, the low-speed fan will be turned on.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check the connector of engine control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Check fan relay	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Remove the engine compartment fuse box K05 (fan speed regulation), K06 (high-speed fan), and K07 (low-speed fan) relays, and check whether the relays are normal	Go to Step 3	Relay fault	Replace the faulty relay
3	Check the cooling fan control line	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Unplug the relays of K07 (low-speed fan), K06 (high-speed fan), and disconnect the ECU connector E01 • Measure whether the lines between the engine compartment fuse box K07 and the No. 50 terminal of E01, or K06 and the No. 68 terminal of E01 has a short circuit or open circuit	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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22. VEHICLE SIGNAL FAULT

P0501 - Vehicle speed sensor signal fault

Description of fault code:

1. The speed signal checked by the wheel speed sensor is sent to the ECU after processing of ABS and the instrument cluster.
2. The fault code will appear when the ECU can not receive the speed signal.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the instrument, ABS control module, or ECU connector Is loose or damaged, whether the wire harness terminal is corroded
2	Inspect speedometer.	Normal	Faulty	Instruction
	Start the engine and perform road test, and check whether the speed display on the instrument cluster is normal	Go to Step 3	Speedometer malfunction	Check the ABS control module, instrument cluster and wire harness
3	Check vehicle speed signal wire	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I03 and engine control unit connector E01 • Check if the wire harness is continuity between No. 8 terminal of I03 and No. 59 of E01.	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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23. TOO LOW OR TOO HIGH IDLE SPEED FAULT

P0506 - Speed of idle control less than target value

P0507 - Speed of idle control more than target value

Description of fault code:

1. The ECU calculates the current engine speed based on the current operating condition, and controls the opening of the throttle by controlling the electronic throttle flap drive motor to control or adjust the target idle speed, thus adapting idle speeds under different conditions.
2. If the ECU detects that the engine speed is lower or higher than the set value for a long time, the fault code will appear. Fault causes include electronic throttle control module, intake system, fuel system , ignition system, ECU, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, making the engine running under various operating conditions, then reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the electronic throttle, accelerator pedal position sensor connector are loose or damaged, whether the wire harness terminal is corroded
2	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plug gap for normal working	Go to Step 3	Spark plug fault	Replace the spark plug
3	Check the ignition coil	Normal	Faulty	Instruction
	• Remove the ignition coil and install new spark plug • Check whether the ignition coil has flashover spark is normal	Go to Step 4	Ignition coil fault	Replace the ignition coil
4	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 5	The assembly of timing belt fault	Replace it with a new timing belt
5	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 6	The assembly of timing belt fault	Re-install the valve timing belt
6	Check cylinder pressure	Normal	Faulty	Instruction
	Connect the cylinder pressure tester and check whether the cylinder pressure is normal	Go to Step 7	Cylinder pressure fault	Repair the cylinder pressure fault
7	Check fuel system pressure	Normal	Faulty	Instruction
	Start the engine, and check if engine fuel system pressure is normal	Go to Step 8	Fuel system pressure fault	Overhaul the fuel system
8	Check injector	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Remove the injector, and check whether the injector is normal using the injector detector	Go to Step 9	Injector fault	Replace the fuel injector
9	Check the intake system	Normal	Faulty	Instruction
	Start the engine, and check the intake system for presence of air leakage	Go to Step 10	The air leakage fault of intake system	Repair the faulty pipeline
10	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

24. SYSTEM SUPPLY VOLTAGE FAULT

P0560 - Unreasonable battery voltage signal

P0562 - Low system battery voltage

P0563 - High system battery voltage

Description of fault code:

1. When the ECU detects that the system voltage is continuously more than 16V or less than 9V for up to 5s, the fault code will appear. Fault causes include generator fault, voltage regulator, ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Restart the engine to perform the road test, reread the fault code, and confirm whether the engine, ABS and other control modules appear the same fault code.	If the other system occurs this fault code, go to Step 2	Other systems have no such fault code	Check whether the ECU power system line is normal, replace the ECU when necessary, and perform the fourth step
2	Check the alternator voltage output line	Normal	Faulty	Instruction
	Check whether the line between the alternator B + column and the battery is connected normally	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Read the data flow.	Normal	Faulty	Instruction
	• Clear the fault code, and connect the vehicle diagnosis scanner • Read the alternator data flow, and observe whether the generating capacity is normal under various conditions	Go to Step 4	Alternator fault	Replace the alternator

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Steps	Inspection item	Inspection result		
4	Check ECM fuse and relay	Normal	Faulty	Instruction
	Check whether the cab central control box fuse FS03, engine compartment fuse box fuse FS04, and relay K02 are in good conditions	Go to Step 5	Fuse or relay fault	Replace the fuse or relay with the same specification.
5	Check ECM power supply cord	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 • When the ignition switch is in "ON", check the voltage between the No. 12, No. 13, and No. 14 terminal of E01 and the grounding **Voltage: 9 - 13 V**	Go to Step 6	Circuit is short or open	Repair the faulty wire harness
6	Check the ECM grounding wire	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 • Check the resistance between No. 3, 53, 61 and 80 terminals of E01 and the grounding respectively. **Resistance: <2Ω**	Go to Step 7	Circuit is short or open	Repair the faulty wire harness
7	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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25. BRAKE LAMP FAULT

P0571 - Brake switch signal circuit faults or correlation not synchronized

Description of fault code:

1. The ECU confirms whether the vehicle is in decelerating state via the brake signal, and cuts off the fuel injection to reduce fuel consumption and exhaust emission via this signal, thus protecting the three-way catalytic converter.
2. If the ECU detects that the brake signal circuit voltage is lower or higher than the calibration value, the fault code will appear.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the brake switch connector is loose or damaged, whether the wire harness terminal is corroded
2	Check fuse	Normal	Faulty	Instruction
	Check whether the cab central control box fuse FS15, or FS16 is blown.	Go to Step 3	Fuse is blown	Replace the fuse with the same specification.
3	Check the brake switch	Normal	Faulty	Instruction
	When the ignition switch is in "OFF" position, check whether the brake switch is installed in place	Go to Step 4	Brake switch assembly fault	Reinstall the brake switch
4	Check the brake switch	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect the brake switch connector I19, and remove the brake switch, check whether the brake switch is normal	Go to Step 5	Brake switch fault	Replace the brake switch
5	Check the brake switch power wire	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect the brake switch connector I19 •When the ignition switch is in "ON" position, check the voltage between the No. 1 of I19, the No. 3 terminal and the grounding **Voltage: 9 - 13 V**	Go to Step 6	The voltage is out of the reasonable range	Repair the short circuit and open circuit between the brake switch and the cab central control box

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Steps	Inspection item	Inspection result		
6	Check the brake switch signal wire	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 and brake switch connector I19 • Measure whether the lines between the No. 21 terminal of E01 and the No. 2 terminal of I19, or the No. 58 terminal of E01 and the No. 4 terminal of I19 has a short circuit or open circuit	Go to Step 7	Circuit is short or open	Repair the faulty wire harness
7	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

26. ECM INSIDE FAULT

P0602 - Electronic control unit (ECU) coding fault

P0604 - ECU RAM fault

P0605 - ECU ROM fault

Description of fault code:

1. ECU fault Fault causes include ECU fault, attempting to change the module calibration, module programming error, etc. When the fault code appears, delete it and observe whether is will appear again. If it appears again soon, it indicates that the electronic module needs to be replaced in most cases.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Whether ECM connector pin is loose or corroded.
2	Check ECM power supply circuit	Normal	Faulty	Instruction
	Check whether ECM grounding and the power wire are normal	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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27. FUEL PUMP RELAY FAULT

P0627 - Open circuit of oil pump relay control circuit

P0628 - Low voltage of oil pump relay control circuit

P0629 - High voltage of oil pump relay control circuit

Description of fault code:

1. Pump relay coil operating power is supplied by the main relay controlled by ECM.
2. ECM controls the pump relay pull-in through the wire harness connector. Confirm whether the engine runs at the wrong gear, the engine runs in neutral at high speeds, and the wheel slips on wet or snowy ground at high speed

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the fuel pump relay is loose or corroded
2	Check fuse and relay	Normal	Faulty	Instruction
	Check whether the cab central control box fuse FS05 is normal	Go to Step 3	Fuse is blown	Replace the fuse with the same specification.
3	Check the fuel pump relay	Normal	Faulty	Instruction
	Unplug the fuel pump relay K03, and check whether the fuel pump relay is normal	Go to Step 4	Relay fault	Replace the fuel pump relay
4	Check the fuel pump relay power wire	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Unplug the fuel pump relay K03, and pull out the fuse FS05 • Check the line between FS05 and K03 for continuity	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Check the pump relay control line	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect ECM connector E01, and pull out the fuel pump relay • Measure whether the line between the engine compartment fuse box fuel pump relay K03 and the No. 69 terminal of E01 has a short circuit or open circuit	Go to Step 6	Circuit is short or open	Repair the faulty wire harness
6	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

28. COMPRESSOR ELECTROMAGNETIC CLUTCH FAULT

P0645 - Open circuit of A/C compressor relay control circuit

P0646 - Low voltage of A/C compressor relay control circuit

P0647 - High voltage of A/C compressor relay control circuit

Description of fault code:

1. The air-conditioner pulley is in idle running when the air-conditioner is shut down, it will drive the compressor to run only when it combines with the air-conditioner clutch (under the action of the solenoid valve). Air-conditioner clutch relay controls the separation and combination of the clutch.
2. If ECM still detects a significant current when the air-conditioner clutch relay control circuit is grounded, or can not detect current when the air-conditioner clutch relay control circuit is not grounded, the fault code will appear.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the compressor relay is loose or corroded
2	Check fuse	Normal	Faulty	Instruction
	Check whether the cab central control box fuse FS06 is normal	Go to Step 3	Fuse is blown	Replace the fuse with the same specification.
3	Check compressor relay	Normal	Faulty	Instruction
	Remove the compressor relay K04, and check whether the compressor relay is normal	Go to Step 4	Relay fault	Replace compressor relay
4	Check the compressor relay power wire	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Unplug the compressor relay K04, and pull out the fuse FS06 • Check the line between FS06 and K04 for continuity	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Check the compressor relay control line	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect ECM connector E01, and pull out the compressor relay • Measure whether the line between the engine compartment central fuse box relay K04 and the No. 70 terminal of E01 has a short circuit or open circuit	Go to Step 6	Circuit is short or open	Repair the faulty wire harness
6	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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29. MIL MALFUNCTION INDICATOR LAMP CIRCUIT FAULT

P0650 - MIL lamp driver circuit fault

Description of fault code:

1. MIL fault indicator lamp on the instrument cluster is controlled by the engine to be turned on or off. The instrument cluster supplies the power and ECM supplies low voltage level trigger signal. When the engine control system is faulty, ECM will control the indicator lamp line grounding continuity.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in the "ON" position, and check whether the other indicator lamps on instrument cluster display normally	Go to Step 1	Indicator lamp on the instrument cluster does not display normally	Repair and check the instrument cluster power supply and the grounding line or replace the instrument cluster
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the instrument and ECU connector are loose, whether the terminal is corroded
2	Check MIL indicator lamp line	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 • When the ignition switch is in "ON", check the voltage between the No. 31 terminal of E01 and the grounding **Voltage: 9 - 13 V**	Go to Step 3	Circuit is short or open	Repair the MIL indicator lamp line between the instrument cluster and ECU
3	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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30. CLUTCH SWITCH FAULT

P070400 - Unreasonable clutch pedal switch signal

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the clutch switch connector is loose or damaged, whether the wire harness terminal is corroded
2	Check the clutch switch line	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect the ECM connector E01 and the clutch pedal switch connector I20 • Measure whether the lines between the No. 2 terminal of I20 and the No. 74 terminal of E01, or the No. 1 terminal of I20 and the grounding has a short circuit or open circuit	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Check the clutch pedal switch	Normal	Faulty	Instruction
	• Disconnect the clutch switch connector I20 • When depressing the clutch switch, the line between the two terminals of the clutch should be conducted, while it should not be conducted without depressing the clutch switch	Go to Step 4	Clutch switch is damaged	Remove clutch switch
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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31. ELECTRIC THROTTLE BODY SELF-LEARNING FAULT

P0606 - Electric throttle body safety monitoring function fault

P1336 - Torque limit of electric throttle body safety monitoring

P1545 - Overrun of deviation between the actual position and target position of electric throttle body

P1558 - Excessive resistance of electric throttle body opening

P1559 - Electric throttle body self-learning process fault

P1564 - System voltage do not meet electric throttle body self-learning conditions

P1565 - Electric throttle body lower limit position initialized self-learning fault

P1568 - Excessive resistance of electric throttle body return

P1579 - Electric throttle body self-learning conditions are dissatisfied

P1604 - Electric throttle body gain-adjustment self-learning fault

Description of fault code:

1. In the electronic throttle control (ETC) system, the accelerator pedal position (APP) sensor transmits the accelerator pedal position to the throttle control module in the form of an electrical signal, as reference for the throttle actuator to control the throttle opening.
2. Throttle actuator is a stepper motor, and controls the throttle opening according to the command of the throttle control module.
3. if the desired throttle position has a greater difference to the actual throttle position under the steady state, and the throttle fails to achieve the due opening of return and starting test, the fault code may be recorded. While there may be accompanied by difficult start of the engine, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check the connector of electric throttle body for looseness, damage and check the terminal of wire harness for corrosion
2	Check the throttle valve body	Normal	Faulty	Instruction
	Check whether the throttle flap is normal, its rotation is smooth or not, and check whether the electronic throttle body is dirty	Go to Step 3	Electronic throttle controller fault or excessive carbon deposit	Clean the electronic throttle body or replace the electronic throttle controller
3	Check electronic throttle body controller	Normal	Faulty	Instruction
	• Replace the electronic throttle controller and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Go to Step 4	Electric throttle body fault	Replace the electronic throttle controller, and perform self-learning to the electronic throttle
4	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

32. ENGINE IMMOBILIZER FAULT

P1610 - Error of Secret Key and SECMrity Code not programming

P1611 - Error of SECMrity Code receiving

P1626 - Anti-theft certification communication error or burglar alarm do not respond

P1631 - Anti-theft certification fault

Description of fault code:

1. Anti-theft control module ensures to allow the vehicle to be started only when there is a special key matching the various parts.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is a sporadic fault, check whether the engine anti-theft module, ECM is loose, whether the terminal is corroded
2	Check fuse	Normal	Faulty	Instruction
	Check whether the cab central control box fuse FS01, or FS02 is normal	Go to Step 3	Fuse is blown	Replace the fuse with the same specification.
3	Check the engine anti-theft system power, and the grounding line	Normal	Faulty	Instruction
	• Disconnect the engine anti-theft module connector I10 • When the ignition switch is in "ON" position, check the voltage between the No. 1 and No. 5 terminal of I10 and the grounding **Voltage: 9 - 13 V** • When the ignition switch is in "OFF" position, check the resistance between the No. 4 terminal of I10 and the grounding **Resistance: < 2Ω**	Go to Step 4	Circuit is short or open	Repair the faulty wire harness
4	Check the engine and the ECM communication wire	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the engine anti-theft module connectors I10, and ECM E01 • Check the line between the No. 4 terminal of I10 and the No. 71 terminal of E01 for continuity	Go to Step 5	Circuit is short or open	Repair the faulty wire harness
5	Remote control match	Normal	Faulty	Instruction
	Re-match the remote control, and confirm whether the fault code and symptom exist	Go to Step 6	Remote control match fault	Re-match the remote controller
6	ECM anti-theft match	Normal	Faulty	Instruction
	Re-match the engine and the remote controller, and confirm whether the fault code and symptom exist	Go to Step 7	Match fault	Re-match the control module
7	Check anti-theft coil	Normal	Faulty	Instruction
	• Disconnect the anti-theft coil connector I23 • Check whether the resistance between the No. 1 terminal and the No. 2 terminal of I123 is normal	Go to Step 8	Anti-theft coil fault	Replace the ignition switch assembly
8	Replacement and check (engine immobilizer module)	Normal	Faulty	Instruction
	• Replace the engine immobilizer module, and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Go to Step 9	Engine immobilizer module fault	Replace the engine immobilizer module
10	Replacement and check (ECM)	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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33. SVS MALFUNCTION INDICATOR LAMP CIRCUIT FAULT

P1651 - SVS lamp driver circuit fault

Description of fault code:

1. SVS malfunction indicator lamp on the instrument cluster is controlled by the engine to turn on or off. The instrument cluster supply the power and ECM supply low voltage level trigger signal. When the engine control system is faulty, ECM will control the indicator lamp line grounding continuity.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in the "ON" position, and check whether the other indicator lamps on instrument cluster display normally	Go to Step 1	Indicator lamp on the instrument cluster does not display normally	Repair and check the instrument cluster power supply and the grounding line or replace the instrument cluster
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the instrument and ECU connectors are loose, whether the terminal is corroded
2	Check MIL indicator lamp line	Normal	Faulty	Instruction
	• Disconnect the engine control unit connector E01 • When the ignition switch is in "ON", check the voltage between the No. 11 terminal of E01 and the grounding **Voltage: 9 - 13 V**	Go to Step 3	Circuit is short or open	Repair the MIL indicator lamp line between the instrument cluster and ECU
3	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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34. ELECTRIC THROTTLE BODY DRIVE FAULT

P2106 - Electric throttle body drive-circuit fault

Description of fault code:

1. In the electronic throttle control (ETC) system, the accelerator pedal position (APP) sensor transmits the accelerator pedal position to the ECU. And ECU controls the throttle valve opening by driving the throttle valve motor, and feedbacks to the ECU through the sensor signal.
2. Fault causes include sensor signal circuit open, sensor ground circuit open, or sensor fault in itself, ECU fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check the connectors of electric throttle body control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Check electronic throttle body line	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the electronic throttle control module connector E19 and ECM connector E01 • Check whether the lines between the No. 1 terminal of E19 and the No. 66 terminal of E01, or the No. 4 terminal of E19 and the No. 64 terminal of E01 has a short circuit or open circuit	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Check electronic throttle body	Normal	Faulty	Instruction
	• Replace the electronic throttle body and perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Go to Step 4	DTC still exists	Replace the electronic throttle, and perform self-learning to the electronic throttle
4	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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35. ELECTRONIC ACCELERATOR PEDAL FAULT

P2122 - Low signal voltage of electronic accelerator pedal position sensor 1

P2123 - High signal voltage of electronic accelerator pedal position sensor 1

P2127 - Low signal voltage of electronic accelerator pedal position sensor 2

P2128 - High signal voltage of electronic accelerator pedal position sensor 2

P2138 - Unreasonable fault electronic accelerator pedal position sensor signal 1

Description of fault code:

1. In the electronic throttle control system, the electronic accelerator pedal position sensor transmits the accelerator pedal position to the throttle control module in the form of an electrical signal, as reference for the throttle actuator to control the throttle opening.
2. For the security of the system, the accelerator pedal position sensor is a provided with a dual-sensor setting, and its type is slip resistance.
3. Fault causes include electronic accelerator pedal position circuit open, electronic accelerator pedal position sensor fault in itself, ECM fault, etc.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether the accelerator pedal position sensor connector pin is loose or corroded
2	Check the accelerator pedal position sensor line	Normal	Faulty	Instruction
	• Disconnect the accelerator pedal position sensor connector E02 and engine control unit connector E01 • Measure whether the lines between respective terminals of E02 and E01 have short circuit or open circuit	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Read the data flow.	Normal	Faulty	Instruction
	• Connect the vehicle diagnosis scanner, and read the data flow • Respectively check the opening of the accelerator pedal and the opening of the electronic throttle when depressing and not depressing the accelerator pedal Hint: Electronic throttle opening should increase synchronously with the increasing of the accelerator pedal opening.	Go to Step 4	Accelerator pedal position sensor damaged	Replace the accelerator pedal position sensor
4	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Replace ECU and then perform the road test • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

36. UNREASONABLE AIR-FUEL RATIO FAULT

P2177 - Air-fuel ratio closed-loop control self-learning value exceeding upper limit (medium load area)

P2178 - Air-fuel ratio closed-loop control self-learning value exceeding lower limit (medium load area)

P2187 - Air-fuel ratio closed-loop control self-learning value exceeding lower limit (low load area)

P2188 - Air-fuel ratio closed-loop control self-learning value exceeding lower limit (low load area)

P2195 - Response delay of the upstream oxygen sensor to the lean mixture (upstream oxygen sensor aging)

P2196 - Response delay of the upstream oxygen sensor to the rich mixture (upstream oxygen sensor aging)

P2270 - Response delay of the downstream oxygen sensor to the lean mixture (downstream oxygen sensor aging)

P2271 - Response delay of the downstream oxygen sensor to the rich mixture (downstream oxygen sensor aging)

Description of fault code:

1. Fuel correction refers to ECM to control the fuel delivery by increasing or decreasing the time to the injector, which allows the engine to obtain the optimal air-fuel ratio (ration of air to fuel is 14.7:1).
2. Too rich air-fuel ratio means that the fuel delivery amount is too large, while too lean air-fuel ratio meaning that the fuel delivery amount is too small. Too lean system means that the fuel amount (relative to intake quantity) is too low.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the fault code, and confirm whether there is other sensor or actuator fault code	Go to Step 2	There is a fault code	Refer to the corresponding chapter according to the DTC displayed on the diagnostic scanner to eliminate the fault, and then perform the inspection described in this chapter
2	Check air filter	Normal	Faulty	Instruction
	Check if air filter is clogged	Go to Step 3	Air filter blocked	Replace the air filter assembly
3	Check the intake system	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Start the engine, and check the intake system for presence of air leakage	Go to Step 4	The air leakage fault of intake system	Repair the faulty pipeline
4	Check the spark plug	Normal	Faulty	Instruction
	Check the spark plug gap for normal working	Go to Step 5	Spark plug fault	Replace the spark plug
5	Check the ignition coil	Normal	Faulty	Instruction
	• Remove the ignition coil and install new spark plug • Check whether the ignition coil has flashover spark is normal	Go to Step 6	Ignition coil fault	Replace the ignition coil
6	Check timing belt	Normal	Faulty	Instruction
	Check whether the timing belt is loose, jumping over teeth, jumping out teeth or damaged	Go to Step 7	The assembly of timing belt fault	Replace it with a new timing belt
7	Check the valve timing	Normal	Faulty	Instruction
	Check whether the installation of valve timing is correct	Go to Step 8	The assembly of timing belt fault	Re-install the valve timing belt
8	Check cylinder pressure	Normal	Faulty	Instruction
	Connect the cylinder pressure tester and check whether the cylinder pressure is normal	Go to Step 9	Cylinder pressure fault	Repair the cylinder pressure fault
9	Check fuel system pressure	Normal	Faulty	Instruction
	Start the engine, and check if engine fuel system pressure is normal	Go to Step 10	Fuel system pressure fault	Overhaul the fuel system
10	Check injector	Normal	Faulty	Instruction
	Remove the injector, and check whether the injector is normal using the injector detector	Go to Step 11	Injector fault	Replace the fuel injector
11	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

37. CAN COMMUNICATION FAULT

U0001 - CAN communication-related diagnosis,

U0101 - ECU and TCU communication module lost,

Description of fault code:

1. ECM detects a communication fault of TCU. Fault causes include CAN data cable communication problem, or maybe ECM fault in itself.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 11 - 14 V**	Go to Step 1	The inspection voltage is out of the reasonable range	Charge or replace the battery
1	Read the fault code	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to Step 2	The fault is sporadic. Check whether ECM and TCM connectors are loose or damaged, whether the terminals are corroded
2	Check the CAN communication line between ECM and TCU	Normal	Faulty	Instruction
	• When the ignition switch is in "OFF" position, disconnect the negative terminal (-) of the battery • Disconnect the engine control unit connector E01 and the transmission control unit connectors U31 and U32 • Measure whether the lines between the No. 62 terminal of E01 and the No. 13 terminal of U31, or the No. 81 terminal of E01 and the No. 14 terminal of U32 has a short circuit or open circuit	Go to Step 3	Circuit is short or open	Repair the faulty wire harness
3	Replacement and check	Normal	Faulty	Instruction
	• Replace ECU and then perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

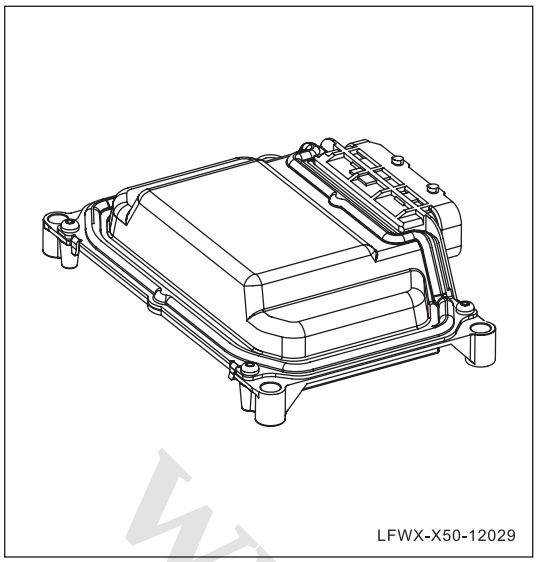
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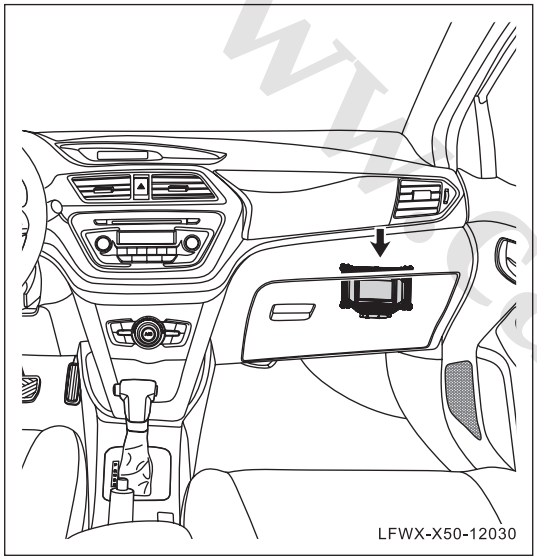
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ELECTRONIC CONTROL MODULE (ECM)

1. PARTS DRAWING



2. ECM INSTALLATION POSITION



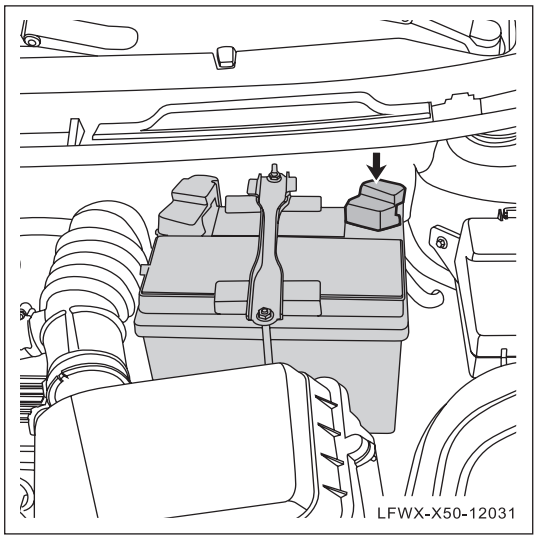
3. REPLACEMENT

(a) Turn the ignition switch to the OFF position.

(b) Disconnect negative cable of battery.

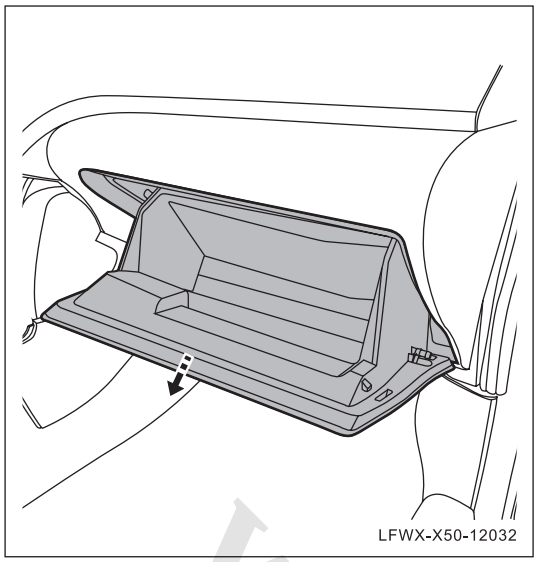
NOTICE:

When disconnecting and re-connecting the negative cable of battery, turn off the ignition switch and all illumination switches first. And loosen the tightening nut of the battery negative terminal. Don't pry up the cable terminal when performing such operation.

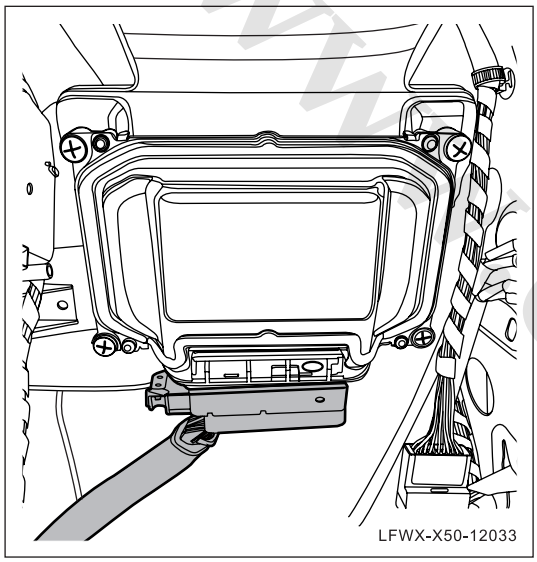


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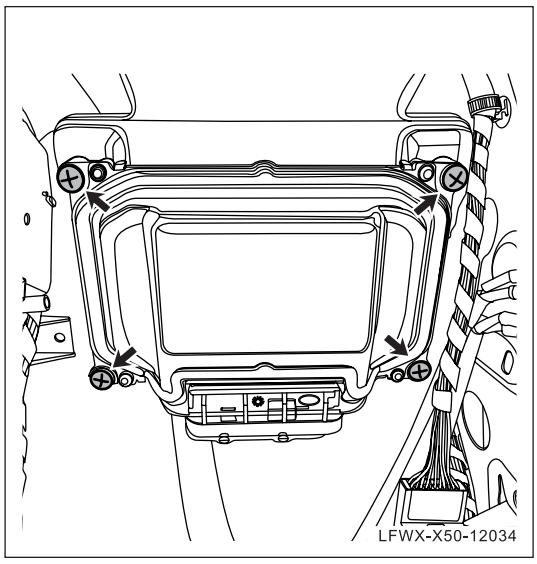
(c) Remove the glove box.



(d) Disconnect ECM connector.

NOTICE:

After disconnecting the connector, make sure the connector does not contact dirt, water and other impurities.



(e) Remove the 4 fixing bolts of the ECM.

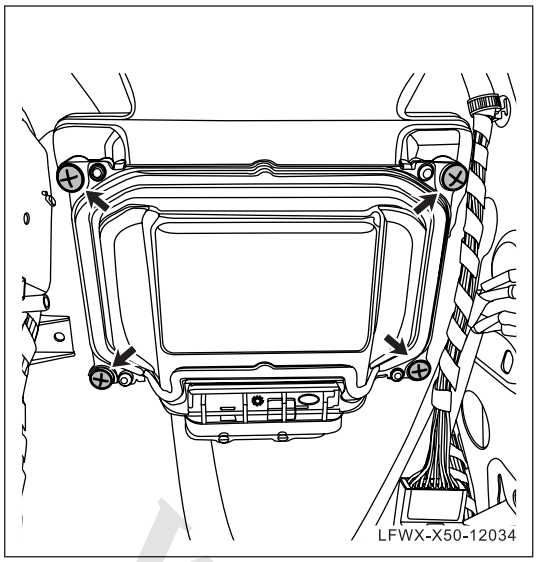
(f) Take down the ECM.

NOTICE:

After removing ECM, do not immerse it in the water. When removing ECM, handle it with care.

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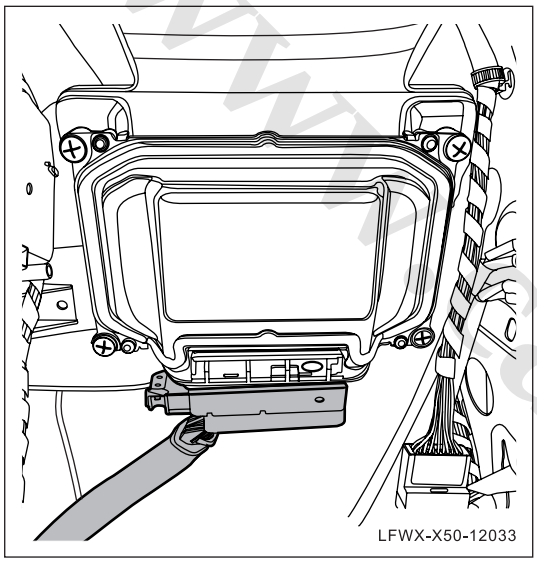


(g) Install the ECM on the bracket, and install the fixing screws and make them tightened.

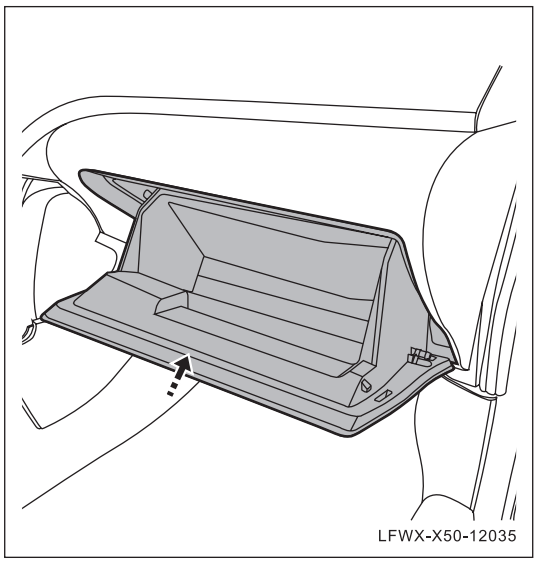
Torque: 20N•m

NOTICE:

Provide proper electrostatic protection in installation.



(h) Connect the ECM connector.



(i) Install the glove box.

(j) Connect the negative cable of battery.

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Fuel System

Fuel system.....13-1
System description.....13-1
Preparation.....13-2
Service data.....13-3
Precautions.....13-3
Components (I).....13-4
Components (II).....13-5
Components (III).....13-6
Function and fault of components.....13-7
On-vehicle inspection.....13-8
Fuel tank.....13-11
Check.....13-11
Replacement.....13-12
Fuel pump.....13-15
Inspection.....13-15
Replacement.....13-16
Fuel filter.....13-19
Check.....13-19
Replacement.....13-20
Injector.....13-22
Inspection.....13-22
Replacement.....13-22
Canister.....13-25
Replacement.....13-25
Canister solenoid valve.....13-28
Inspection.....13-28
Replacement.....13-28
Fuel pipeline.....13-29
Replacement.....13-29
Fuel level sensor.....13-30
Inspection.....13-30
Replacement.....13-30
Filling hose.....13-31
Replacement.....13-31
Fuel filler cable.....13-34
Replacement.....13-34

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FUEL SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

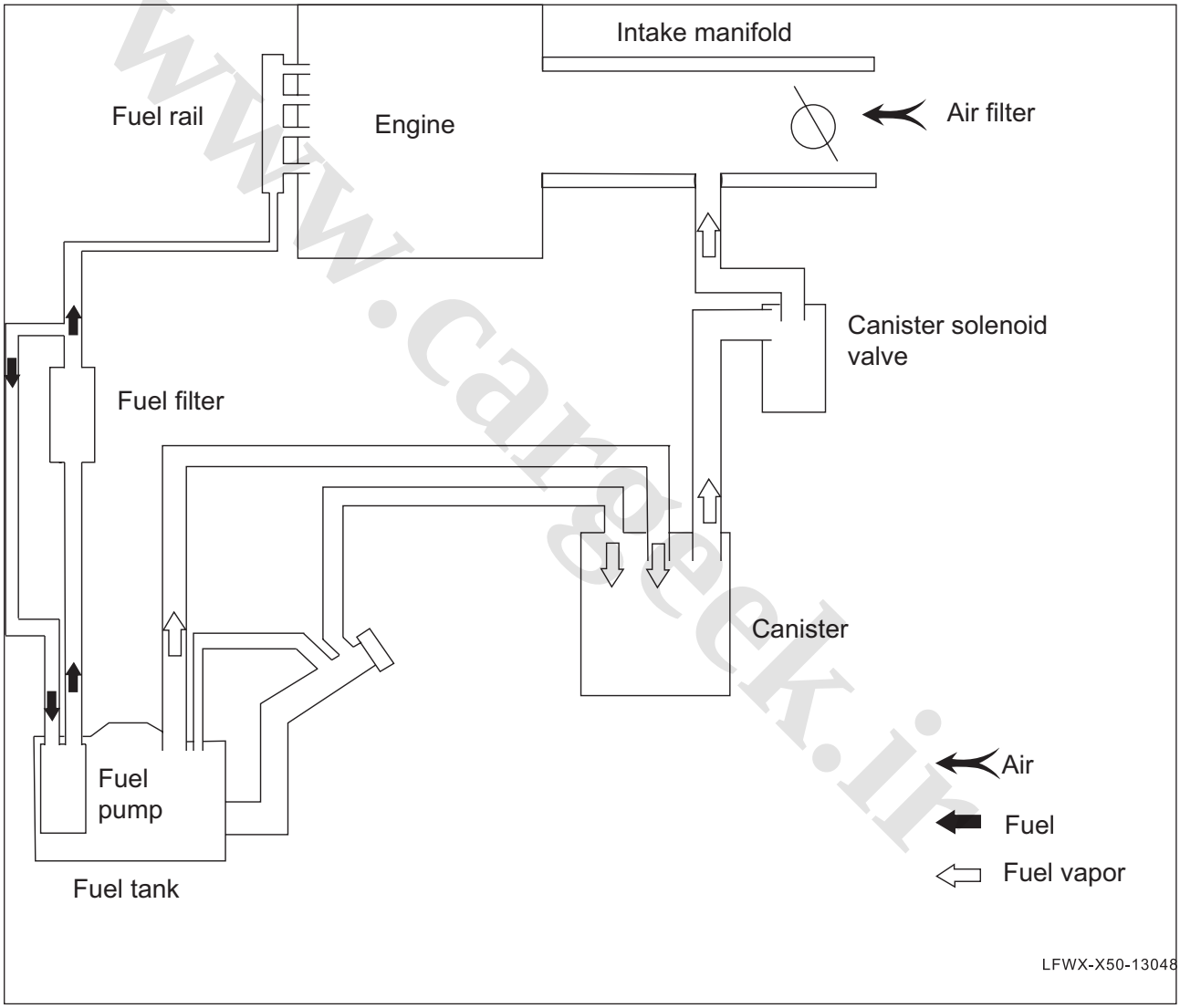
The fuel system servers the following functions:

- Store the fuel and deliver it to engine after filtered.
- Configure proper flammable air-fuel mixture timely according to the requirements for different operating condition of the engine.

2. COMPONENTS

The fuel system consists of fuel tank, fuel pump, fuel level sensor, fuel filter, fuel pipeline, etc.

3. WORKING PRINCIPLE

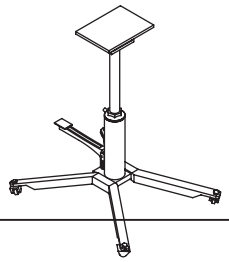
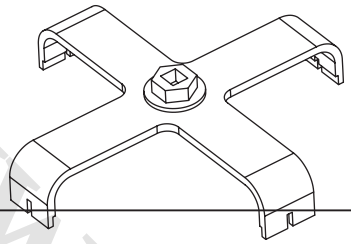
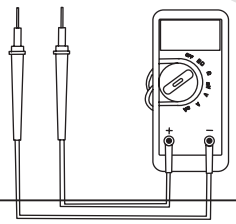


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PREPARATION

S/N	Tool	Outline diagram	Description
1	Bracket		Lifting fuel tank
2	Remover for fuel pump compression cap		Removing and installing the fuel pump compression cap
3	Fuel pressure gauge		Measuring fuel system fuel pressure
4	Digital multimeter		Measuring current, voltage and resistance value

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Fuel tank capacity	42 L
Standard value of fuel pressure	0.25~0.35 MPa
Resistance value of fuel level sensor	Without limit (the lowest position), 40.9 Ω (the highest position)

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of fuel tank assembly	20~26
Fixing bolt of fuel filter	8~12
Fixing bolt of fuel rail	20~25
Fixing bolt of canister bracket	8~12
Fixing bolt of filling hose	20~25
Fixing screw of fuel tank filler cap opener	5~6

PRECAUTIONS

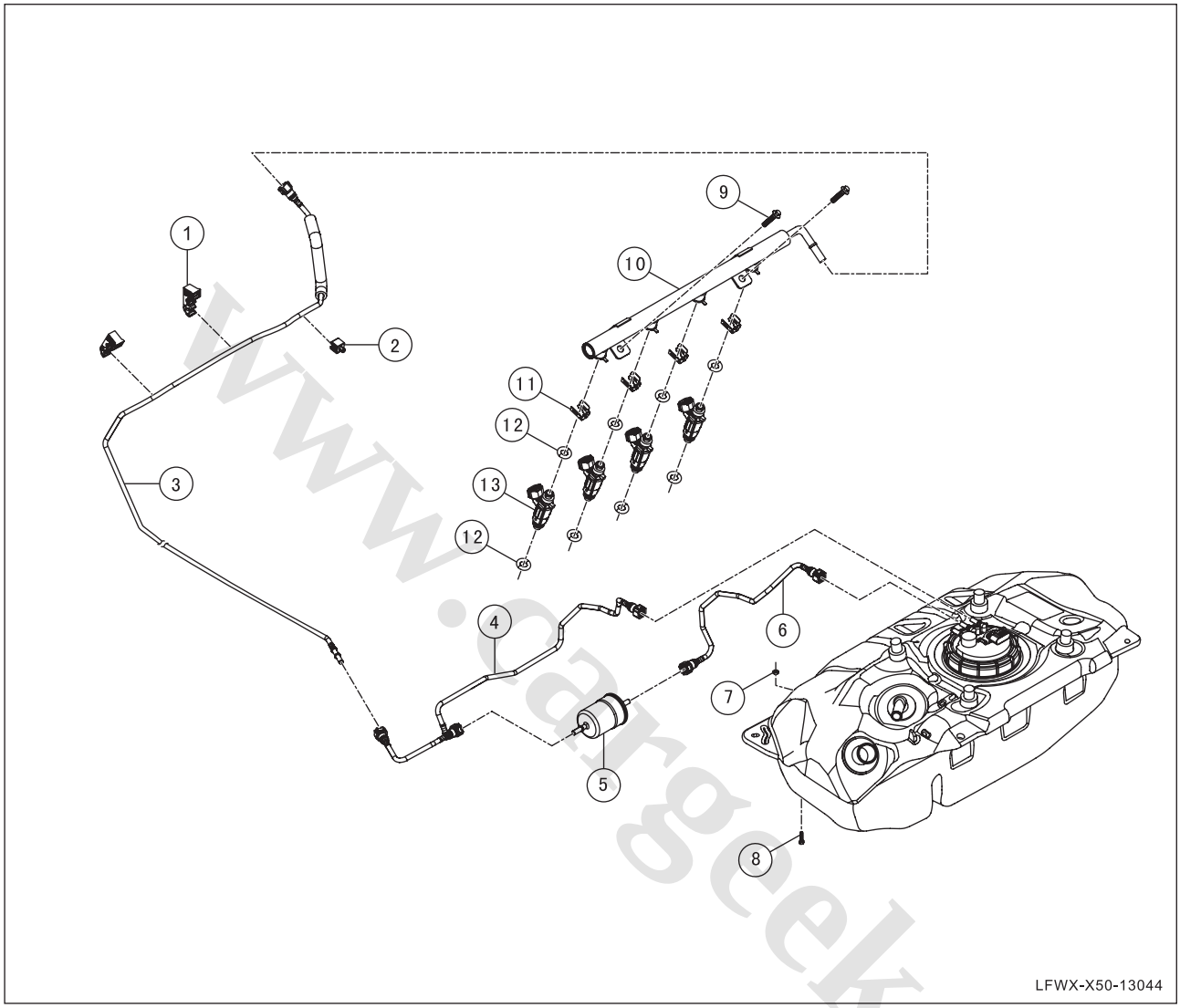
1. Whether the gasoline engine runs or not, with ignition switch ON, any component is not allowed to be plugged, such as any cable of the battery, injector, fuel pump, ignition system wire, electronic control unit (ECU) circuit, etc.
2. When fuel system is working, smoking is strictly prohibited, and avoid open flame. Keep good ventilation at maintenance site and provide proper fire protection.
3. After the engine flames out, there is still high pressure remaining in the fuel system. When dismantling any component in the fuel system, it is necessary to release fuel system pressure to prevent fuel injection from causing injury to person or catching a fire.
4. Never let any rubber or leather tool and component contact with gasoline during maintenance.
5. Clean the dust and dirt on or near fuel pipeline before disconnecting it.
6. It is necessary to seal the pipe joint to prevent foreign matters after disconnecting the fuel pipeline.
7. Replace all cracked, scratched or damaged fuel pipe during maintenance. Do not attempt to repair any fuel pipe segment.
8. Before installing the fuel system, be sure to perform air-bleeding operation as follows:
   - Wrap the fuel rail inlet pipe using a clean cloth.
   - Slowly pull out the fuel rail inlet pipe (do not remove it) to prevent fuel spilling.
   - Turn on the ignition switch to enable the fuel pump to start working.
   - Observe the fuel rail inlet pipe joint until the pipe has fuel flowing out smoothly.
   - Re-install the fuel rail inlet pipe.
9. When installing new fuel pipe, do not use hammer to strike the fuel pipe clamps directly. Otherwise, it will damage the fuel pipe and result in fuel leakage.
10. Drip a few drops of clean engine oil on fuel pipe joint when connecting fuel pipeline to ensure proper connection of fuel pipe and avoid fuel leakage (if operated properly, O-ring in socket will swell. Reinstallation can't be conducted correctly without proper lubrication).
11. Pipeline connection in the fuel system shall be reliable.

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12. In order to prevent accidental fire or explosion, fuel shall not be placed in an open container.
13. Fuel vapor is toxic. Do not breathe the fuel vapor.

COMPONENTS (I)



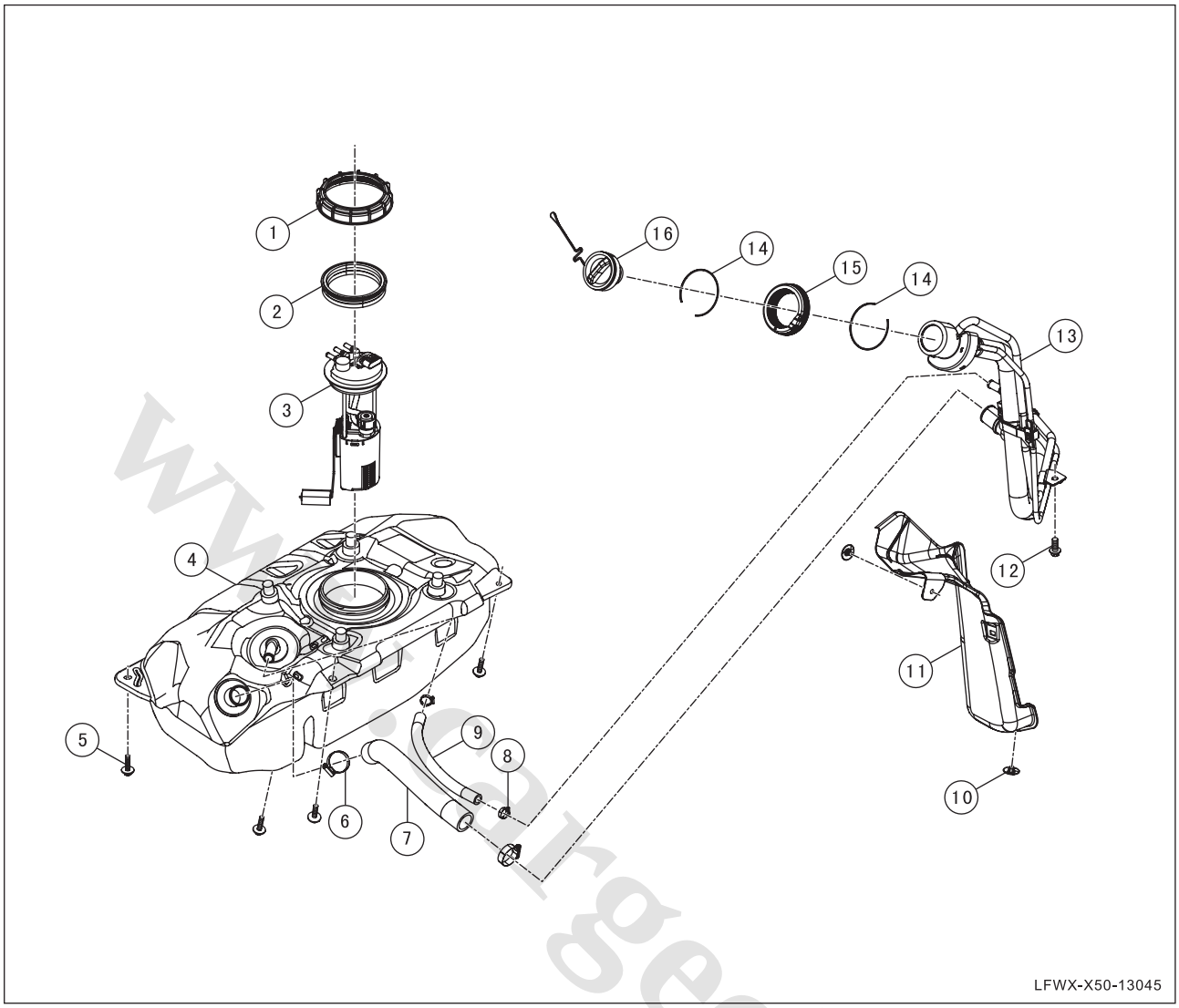
1	Three-hole clamp
2	Single-hole clamp
3	Engine inlet pipe assembly
4	Fuel filter outlet pipe
5	Fuel filter
6	Fuel filter inlet pipe
7	Nut

8	Bolt
9	Bolt
10	Fuel rail
11	Injector clamp
12	O-ring
13	Injector

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COMPONENTS (II)



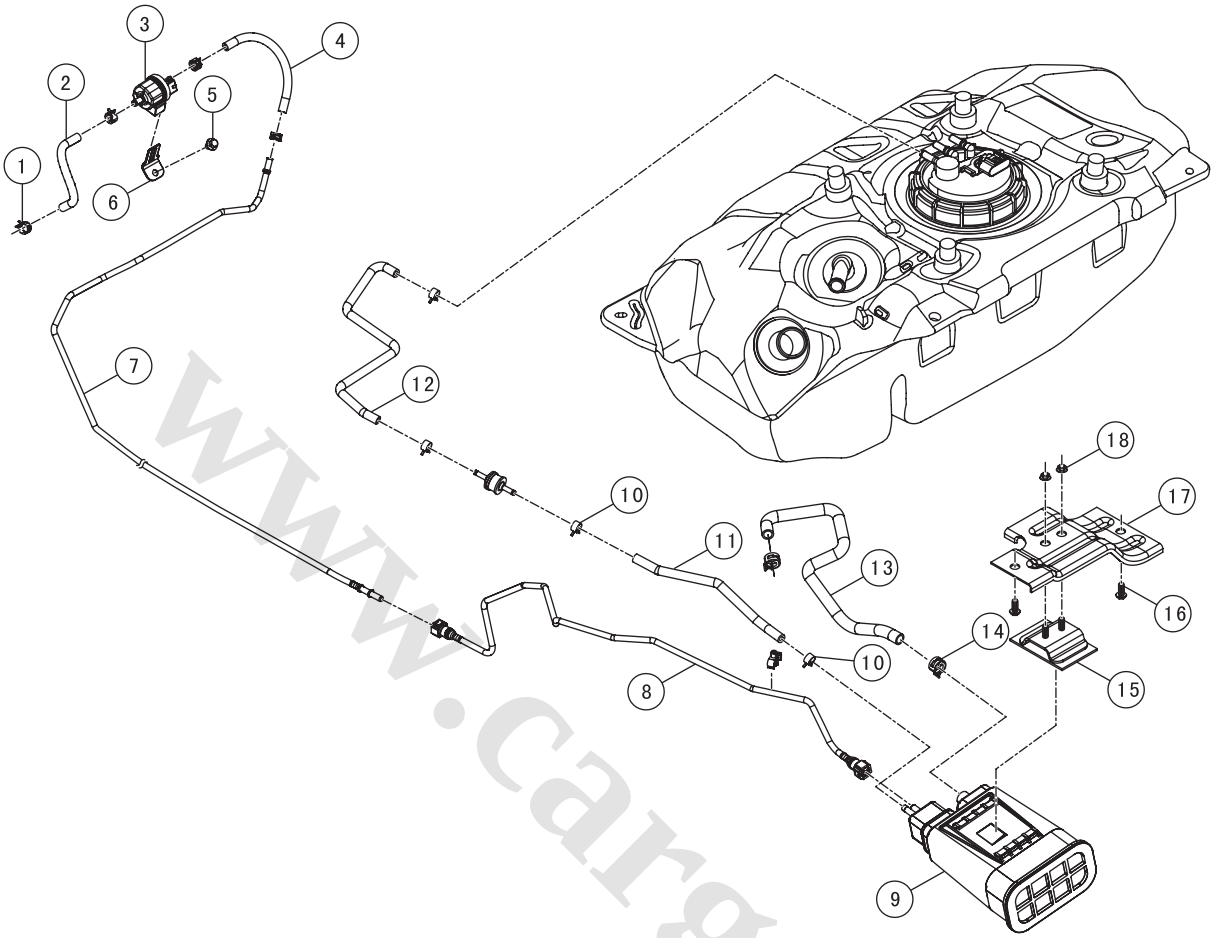
1	Fuel pump compression cap
2	Fuel pump seal ring
3	Fuel pump
4	Fuel tank
5	Bolt
6	B - type worm drive hoop
7	Fuel tank inlet hose
8	B - type worm drive hoop

9	Fuel filler air return hose
10	Mounting snap-fits of filling hose cover
11	Filling hose cover
12	Bolt
13	Filling hose subassembly
14	Fuel filler shield snap ring
15	Fuel filler shield
16	Fuel filler door

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COMPONENTS (III)



1	Spring clamp	10	Spring clamp
2	Control valve connecting pipe	11	Fuel evaporation connecting pipe
3	Canister solenoid valve	12	Fuel evaporation connecting pipe
4	Control valve connecting pipe	13	Canister vent pipe
5	Bolt	14	Spring clamp
6	Control valve bracket	15	Anti-falling bracket subassembly for canister
7	Control valve connecting pipe	16	Bolt
8	Control valve connecting pipe	17	Mounting bracket of canister
9	Canister assembly	18	Nut

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FUNCTION AND FAULT OF COMPONENTS

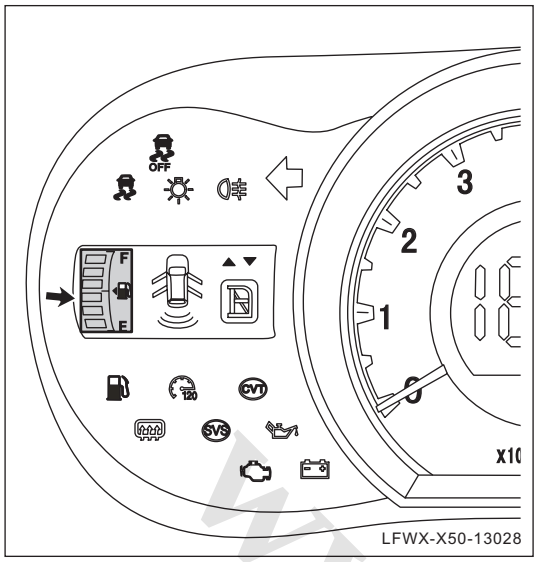
Component name	Component function	Common fault	Fault symptom
Fuel tank	Storing fuel	Fuel tank breakage	Fuel leakage and penetration of fuel tank
Fuel pump	Providing fuel with certain pressure fuel	Fuel pump does not work	Engine can not start
Fuel filter	Foreign matters and water in the filtered fuel	Filter is clogged	The start of engine is difficult
Canister	Adsorbing gasoline molecules for recycle	/	/
Fuel pipeline	Delivering fuel	Fuel pipe is broken and damaged	/
Fuel level sensor	Measuring the actual fuel level in the fuel tank	The fuel level sensor fails	The fuel level indication is incorrect

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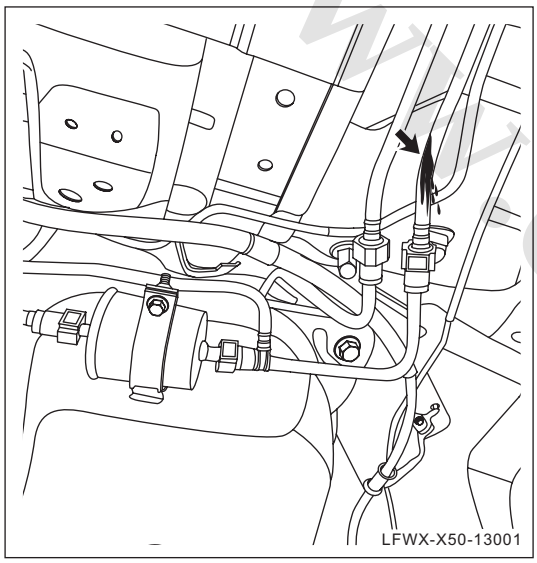
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ON-VEHICLE INSPECTION



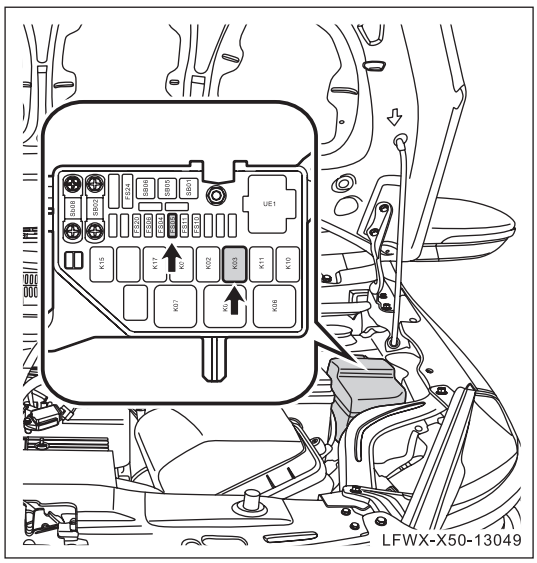
1. CHECK THE FUEL LEVEL

(a) There are six display bars within the range between F and E as showed in the figure. When the ignition switch is turned to the "ON" position, as well as the fuel level reaches the last display bar of E, the fuel warning lamp goes on and it is necessary to refill fuel.



2. CHECK THE FUEL SYSTEM FOR LEAKAGE.

(a) Check the fuel tank and fuel pipelines for leakage, and replace the fuel pipelines or fuel tank if necessary.



3. TEST THE PRESSURE OF THE FUEL SYSTEM

(a) Release the pressure of the fuel system.

- Open the engine compartment hood and pull out the fuel pump relay or fuse.
- Start the engine for twice or 3 times until the engine cannot be started again. This indicates the pressure in the fuel system has been released completely.

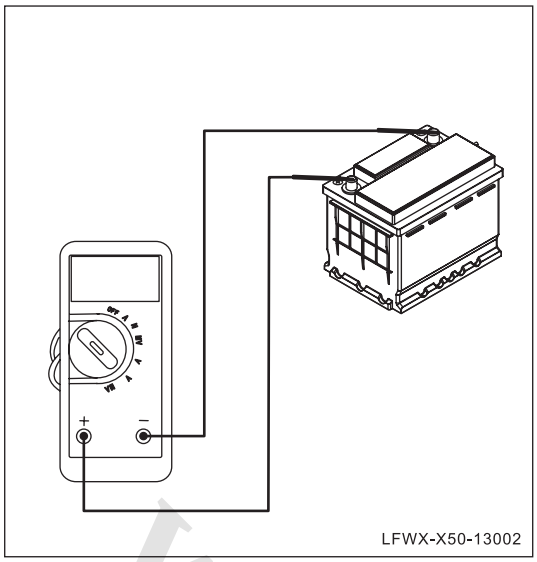
△ HINT:

The time for ignition key in the "START" position cannot exceed 5s.

- Turn off the ignition switch and install the fuel pump relay or fuse.

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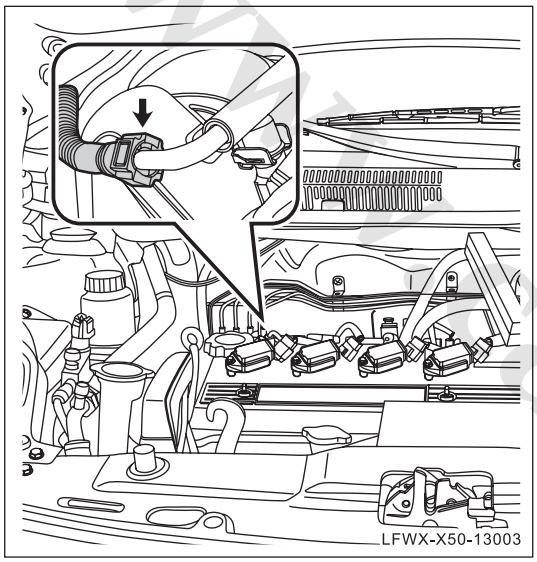
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(b) Check the battery voltage (which should be about 12V).

NOTICE:

The voltage value can affect the fuel-supply pressure of the fuel pump directly.



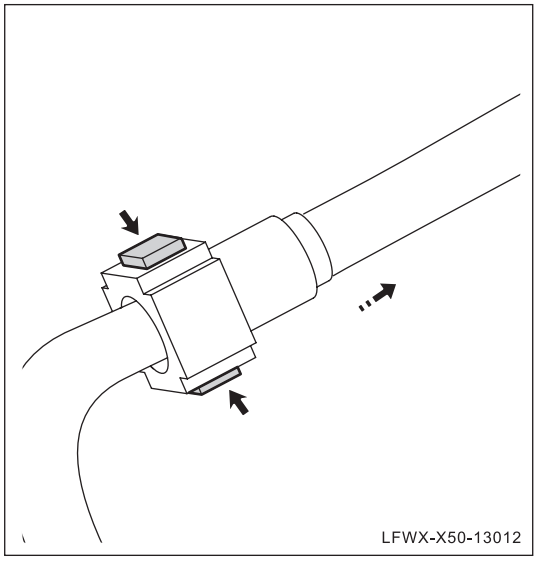
(c) Disconnect the fuel rail inlet pipe.

△ HINT:

After releasing the fuel pressure, there may be some residual fuel in the pipes. Therefore, when disconnecting fuel pipes, wrap the pipe joints with clean cloth to avoid fuel spilling.

NOTICE:

- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and component exposed to gasoline.**

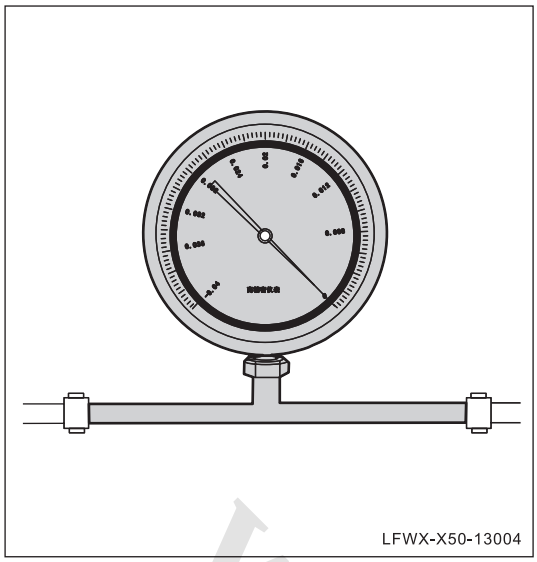


△ HINT:

As shown in the figure, pinch the projection of the fuel pipe joint and pull it outward horizontally.

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(d) Connect a special fuel pressure gauge to the fuel system.

△ HINT:

The special fuel pressure gauge should be connected as shown in the figure (schematic diagram).

(e) Start the engine and let it idle.

△ HINT:

Be sure to accumulate the fuel pressure before starting the engine. Turn the ignition switch to “ON” position for 10-15s to make the fuel pipeline be filled with sufficient fuel before starting the engine.

NOTICE:

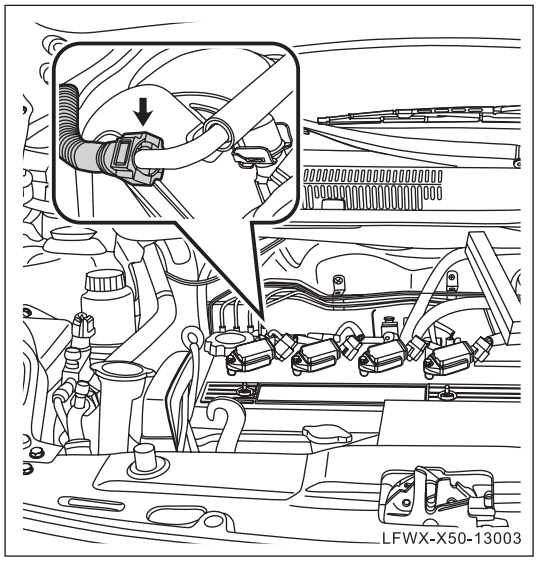
Check the connection points for fuel leak.

(f) Read the value indicated by the fuel pressure gauge. If inconsistent with the standard value, replace the fuel pump.

Standard value of fuel pressure:

(g) Turn off the ignition switch.

(h) Release the pressure of the fuel system.



(i) Remove the special fuel pressure gauge and reinstall the fuel system.

△ HINT:

When you hear a clear "click" sound, it indicates that the fuel pipe joint has been installed in place.

NOTICE:

Pull out the pipe connectors on both ends of the fuel pressure gauge and take the fuel pressure gauge out.

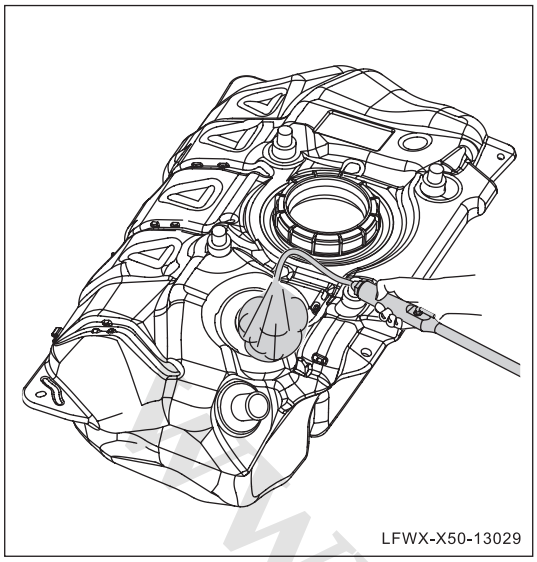
(j) After the accumulation of fuel pressure , start the engine and check whether the engine operates normally.

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FUEL TANK

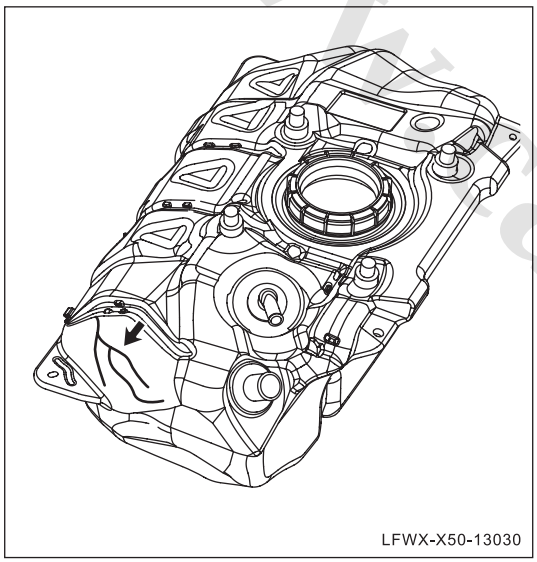
CHECK


LFWX-X50-13029

1. WASHING OF FUEL TANK

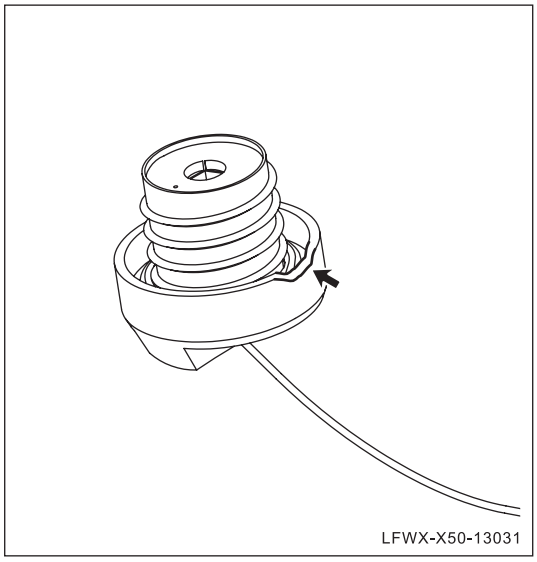
(a) Clean the fuel tank with a high-pressure water pistol.

(b) Clean and dry the fuel tank with compressed air.


LFWX-X50-13030

2. CHECK FUEL TANK

(a) Check the fuel tank for crack, breakage and other damages, and replace it if necessary.


LFWX-X50-13031

(b) Check the fuel tank filler door for crack, breakage and other damages, and replace it if necessary.

(c) Check the gasket of the fuel tank filler cap for damage. Replace it if necessary.

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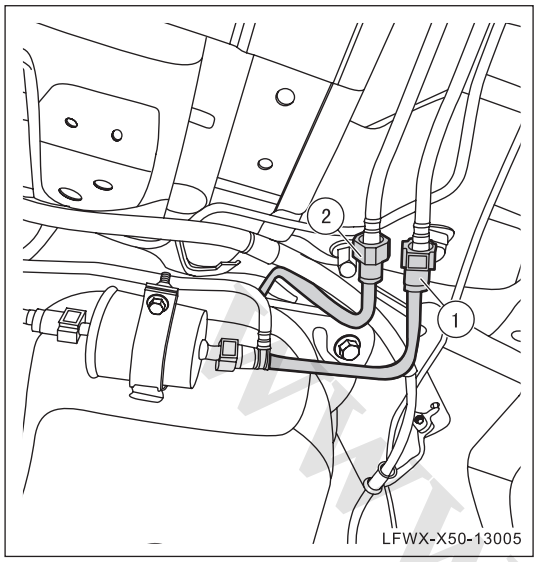
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REPLACEMENT

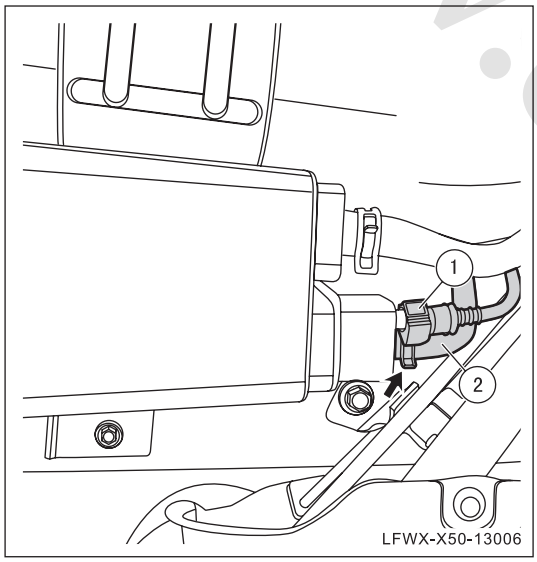
1. REMOVE FUEL TANK

(a) Remove the fuel pump. (See 13 - Fuel System, Fuel Pump, Replacement)

(b) Remove the fuel filter. (See 13 - Fuel System, Fuel Filter, Replacement)



(c) Pull out the fuel filter outlet pipe ① and the control valve connecting pipe ② from the installation position.



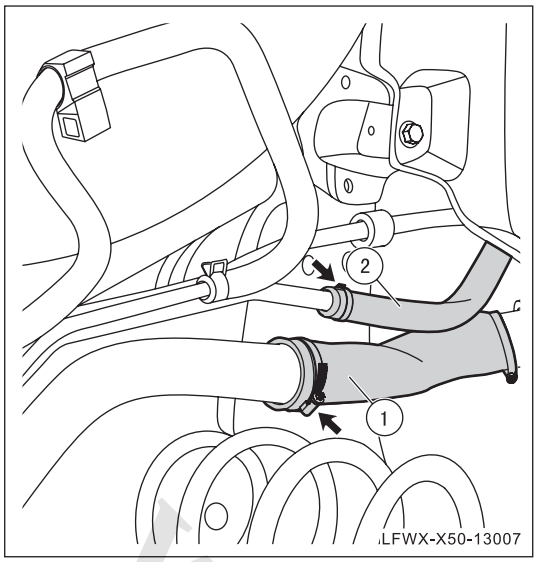
(d) Pull out the control valve connecting pipe ① from the installation position.

(e) Remove the spring clamp of fuel evaporation connecting pipe ② , and pull out fuel evaporation connecting pipe ② from the installation position.

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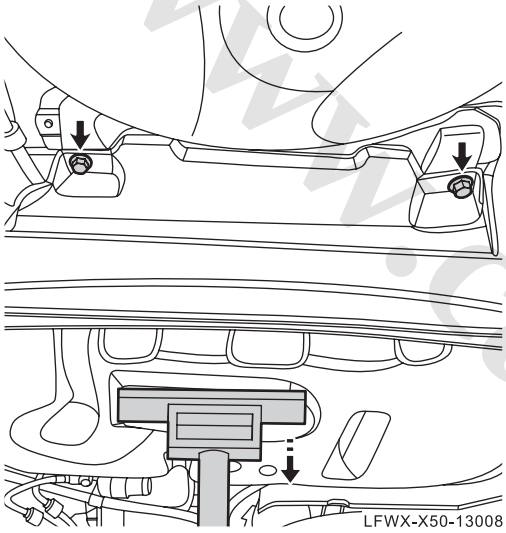
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(f) Unscrew the hoop of fuel tank inlet hose ① and pull out the inlet hose ① from the installation position.

(g) Unscrew the hoop of fuel filter air return hose ② and pull out the fuel filter air return hose ② from the installation position.



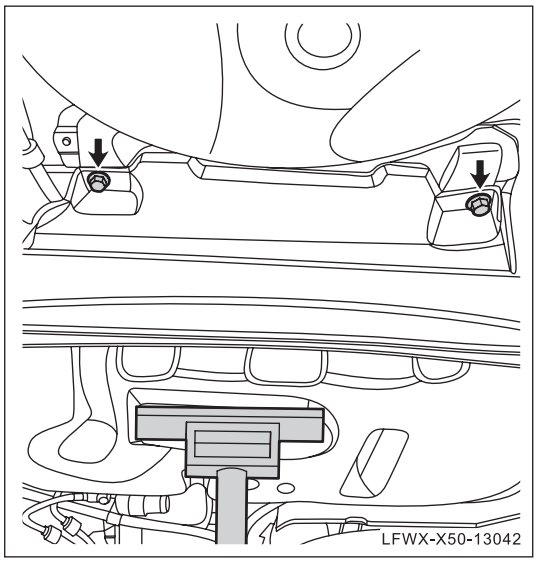
(h) Support the fuel tank with bracket.

(i) Remove fixing bolts of fuel tank.

(j) Lower the bracket slowly and take out the fuel tank.

NOTICE:

To avoid damage to the tank pipeline, be sure to check it when lowering the hydraulic bracket.



2. INSTALL FUEL TANK

(a) Lift the fuel tank slowly to the installation position with the bracket and install the fixing bolts and gaskets and tighten them.

Torque: 20 ~ 26 N•m

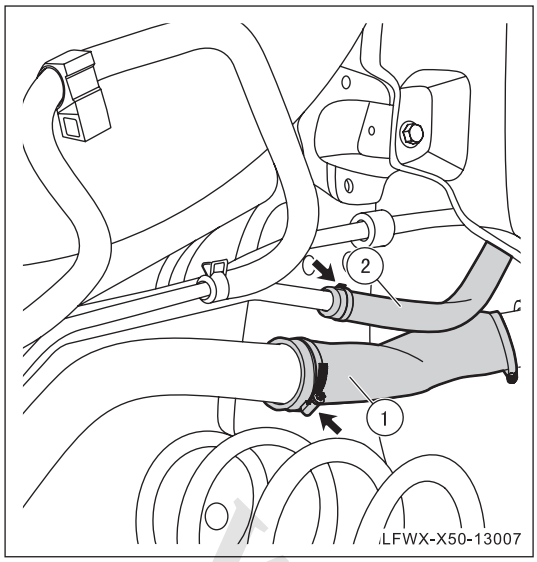
NOTICE:

To avoid damage to the tank pipeline, be sure to check it when lifting the hydraulic bracket.

(b) Lower the bracket slowly and take out the bracket.

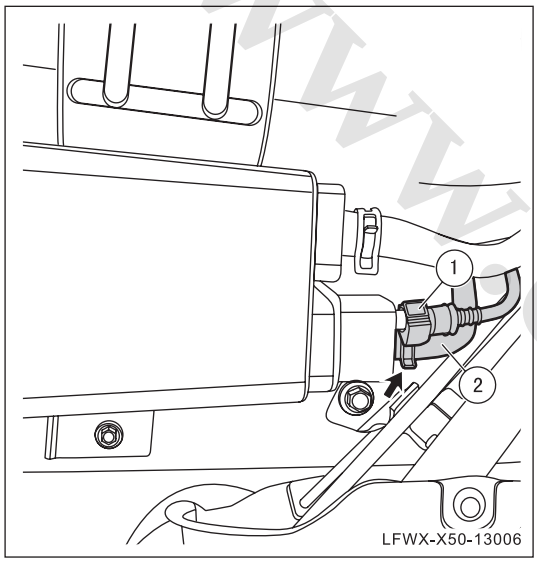
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(c) Install the fuel tank inlet hose ① and hoop onto the fuel tank, and then tighten the hoop.

(d) Install the fuel filter air return hose ② and hoop onto the filling hose assembly, and then tighten the hoop.

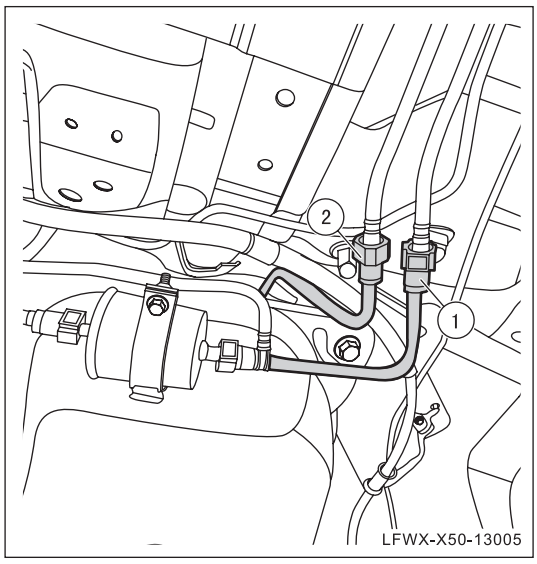


(e) Install the control valve connecting pipe ① onto the canister.

△ HINT:

During installation, when you hear a clear"click", it indicates that it is installed in place.

(f) Install the fuel evaporation connecting pipe ② and spring clamp onto the canister.



(g) Install the fuel filter outlet pipe ① and the control valve connecting pipe ② .

(h) Install the fuel filter. (Refer to 13 - Fuel System, Fuel Filter, Replacement)

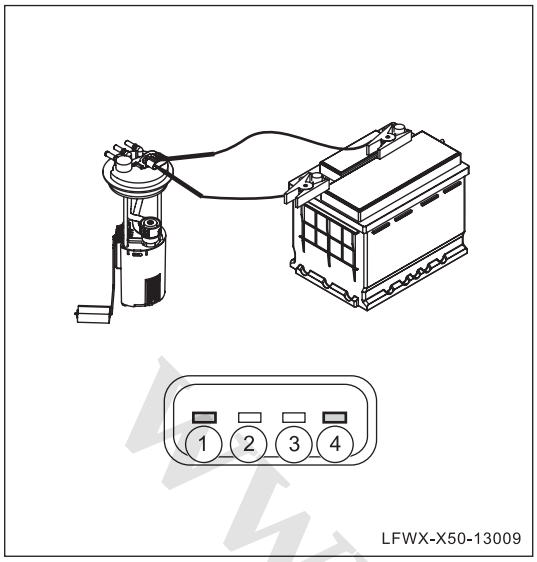
(i) Install the fuel pump. (Refer to 13 - Fuel System, Fuel Pump, Replacement)

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FUEL PUMP

INSPECTION



1. INSPECT FUEL PUMP

(a) Apply the battery voltage between the terminals ① and ④ of the fuel pump.

Check whether the fuel pump operates.

NOTICE:

The fuel pump can not run for a long time without fuel, nor run in the air with fuel, so the inspection should not last too long (≤ 10s) to prevent the motor from being burnt.

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REPLACEMENT

1. REMOVE FUEL PUMP

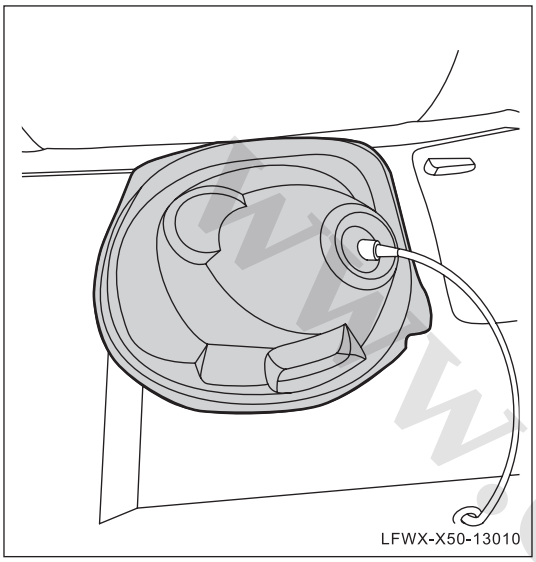
△ HINT:

Before removing the fuel pump, wrap all the seats with plastic cover to avoid fuel adherence.

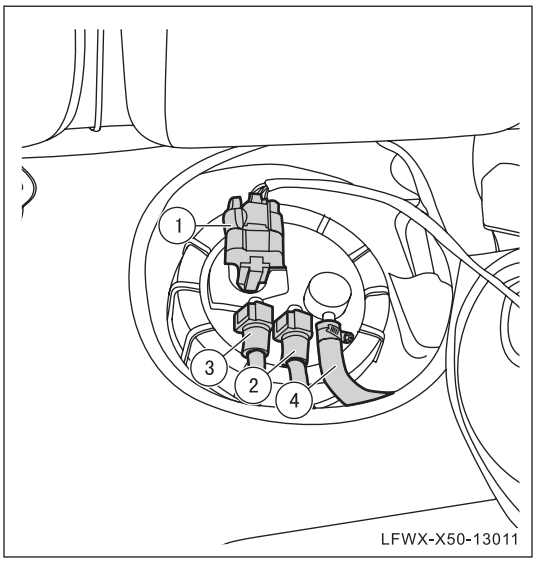
(a) Release the fuel pressure.

(b) Turn off the ignition switch.

(c) Remove the cushion assembly of rear seat. (See 84 - Seat, Rear Seat, Replacement)



(d) Pry the maintenance cover plate using a flathead screwdriver.



(e) Disconnect the fuel pump connector ① .

(f) Disconnect the fuel pump outlet pipe ② and fuel pump return pipe ③ and canister vent pipe ④ .

△ HINT:

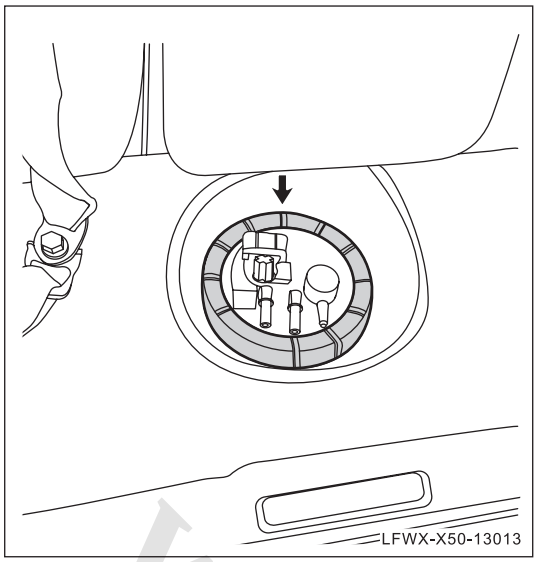
After releasing the fuel pressure, there may be some residual fuel in the pipes. Therefore, when disconnecting fuel pipes, wrap the pipe joints with clean cloth to avoid fuel spilling.

NOTICE:

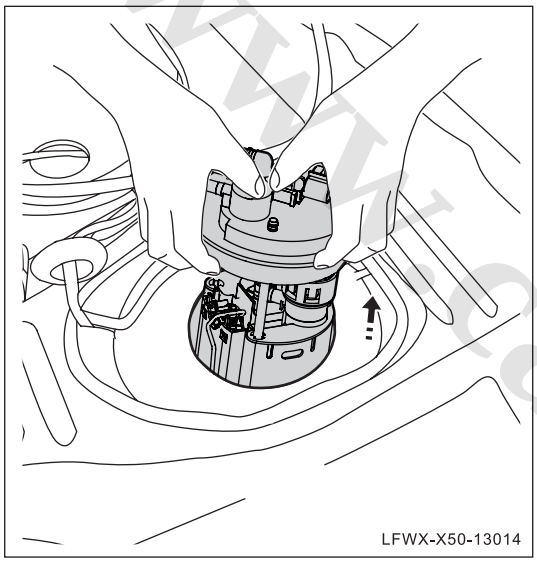
- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and component exposed to gasoline.**

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(g) Remove the fuel pump compression cap.

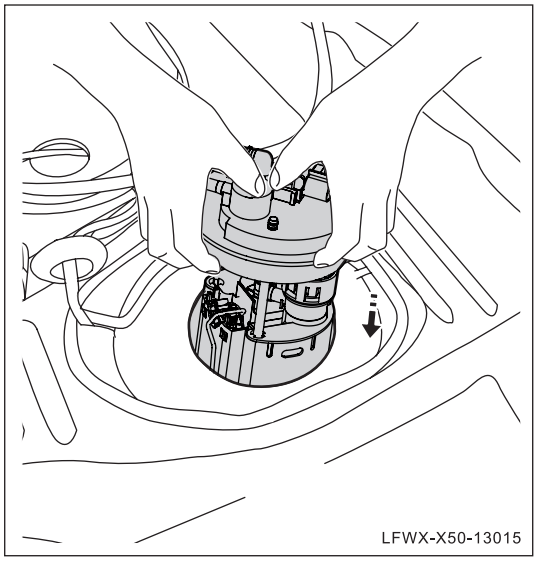


(h) Take out the fuel pump slowly and vertically. When the fuel float occurs at the outlet, tilt and take out the fuel pump.

NOTICE:

- **Do not bump the fuel float when taking out the fuel bump.**
- **Never let any rubber or leather tool and component exposed to gasoline.**

(i) Drain the fuel in fuel pump into the recovery.



2. INSTALL THE FUEL PUMP.

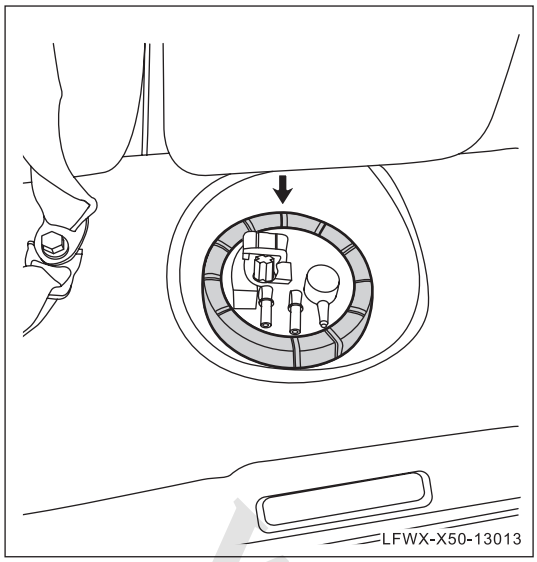
(a) Install the fuel pump into the fuel tank vertically and slowly.

NOTICE:

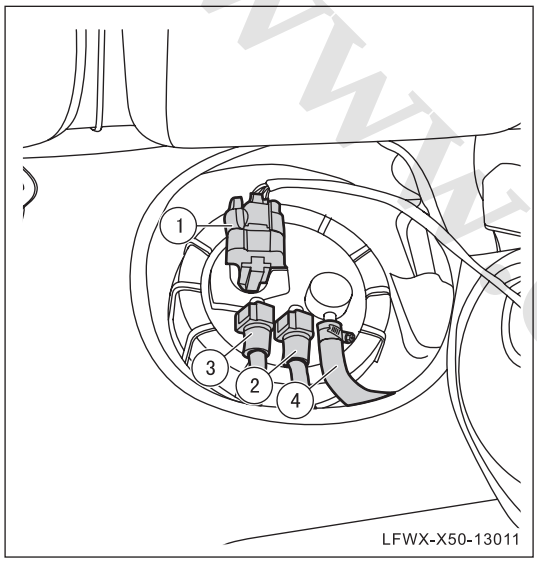
- **Put the fuel float of the fuel pump into the fuel tank slowly, and then install the fuel pump in place.**
- **Do not bump the fuel float during installation.**

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(b) Install and tighten the fuel pump compression cap.



(c) Install the fuel pump connector ① .

NOTICE:

Make sure that the connectors are connected securely and reliably after installation.

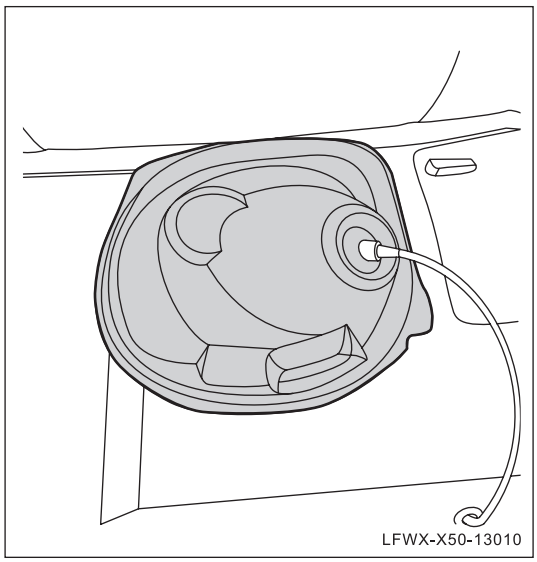
(d) Install the outlet pipe fuel pump ② , return pipe ③ and canister vent pipe ④ .

△ HINT:

When you hear a clear "click" sound, it indicates that the pipe joint has been installed in place.

NOTICE:

Don't confuse the outlet pipe ② and return pipe ③ .



(e) Apply adhesive around the inspection port of the rear floor.

△ HINT:

Remove the remaining adhesive on the inspection port completely before apply new adhesive.

(f) Install the fuel pump inspection port cap.

(g) Install rear seat cushion assembly. (See 84 - Seat, Rear Seat, Replacement)

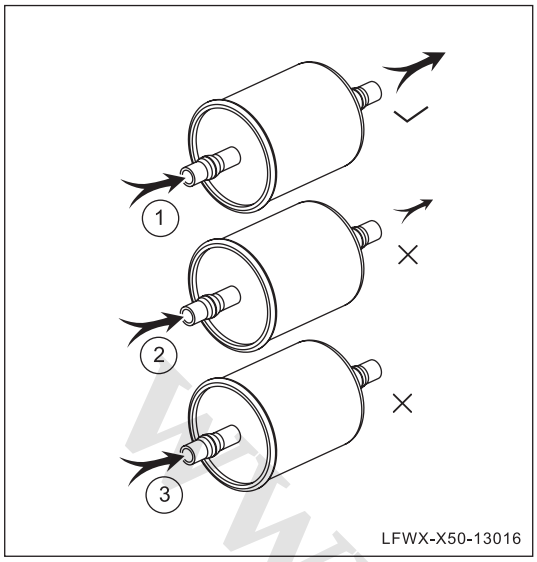
(h) After the accumulation of fuel pressure, start the engine, and then check whether the fuel pump operates normally.

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FUEL FILTER

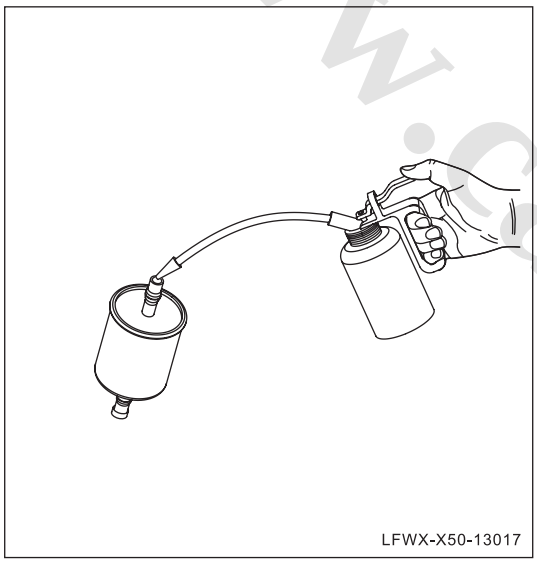
CHECK



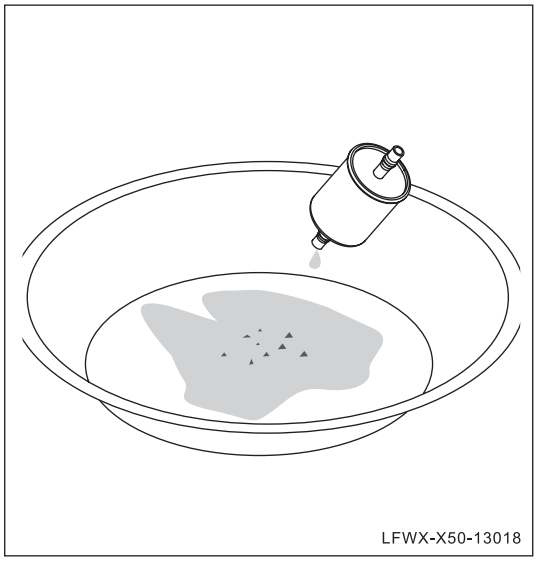
LFWX-X50-13016

1. CHECK FUEL FILTER

(a) As shown in the figure, blow air into the inlet of the fuel filter and confirm whether air comes out from the outlet. If the air comes out difficultly or no air comes out, replace the fuel filter.


LFWX-X50-13017

(b) Plug the outlet of the fuel filter, and refill the filter with clean fuel through the inlet.


LFWX-X50-13018

(c) Plug both outlet and inlet of the fuel filter, and shake the fuel filter left and right.

(d) Discharge the fuel in the fuel filter. If you find excessive impurities in the fuel or fuel discoloration, replace the fuel filter.

△ HINT:

The fuel filter shall be replaced every 15 months or 15, 000 km.

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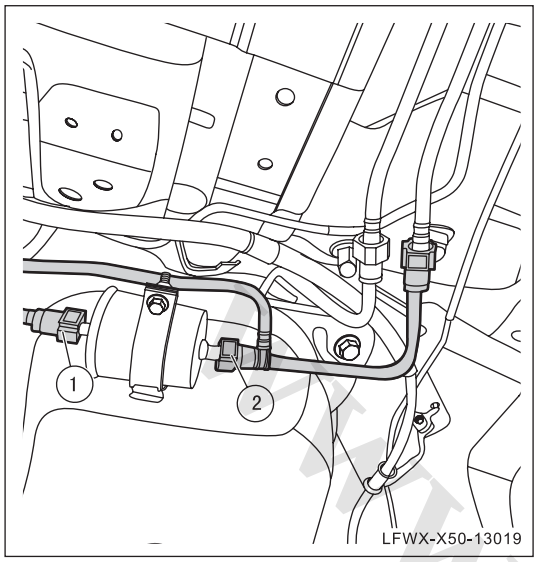
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REPLACEMENT

1. REMOVE FUEL FILTER

(a) Release the fuel pressure.

(b) Turn off the ignition switch.



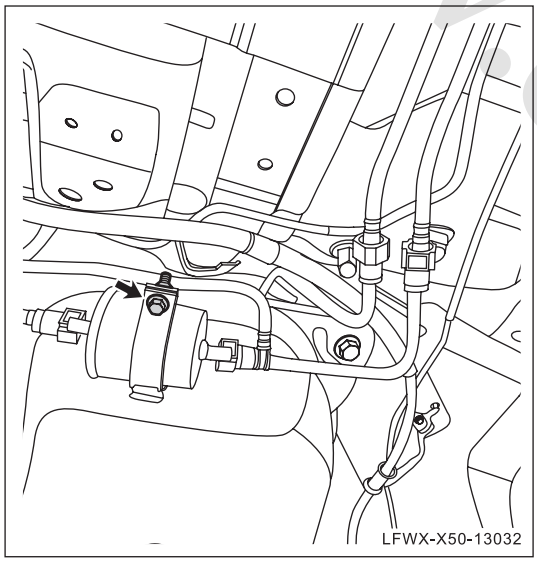
(c) Remove the fuel filter inlet pipe ① and outlet pipe ② .

△ HINT:

After releasing the fuel pressure, there may be some residual fuel in the pipes. Therefore, when disconnecting fuel pipes, wrap the pipe joints with clean cloth to avoid fuel spilling.

NOTICE:

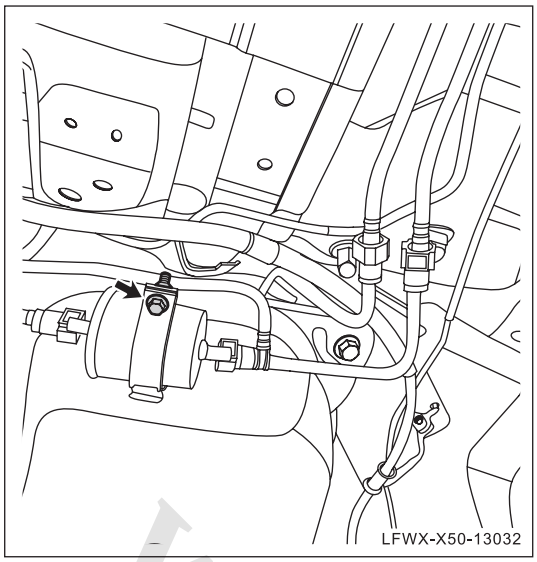
- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and component exposed to gasoline.**



(d) Remove the fixing bolts and nuts of the fuel filter bracket, and then take out the fuel filter.

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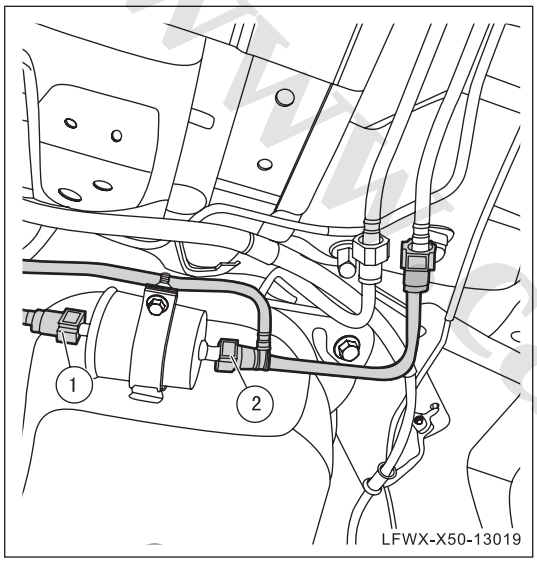
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2. INSTALL FUEL FILTER

(a) Install the fuel filter onto the bracket, and then mount & tighten the fixing bolts and nuts.

Torque: 8 ~ 12 N•m



(b) Install the fuel filter inlet pipe ① and outlet pipe ② .

△ HINT:

When you hear a clear “click” sound, it indicates that the pipe joint has been installed in place.

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INJECTOR

INSPECTION

△ HINT:

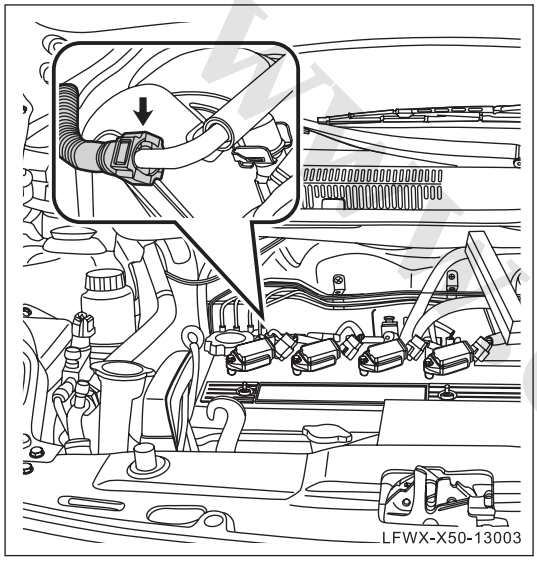
For the inspection of injector, see 12 - Engine Control System, Engine Control System, On-Vehicle Inspection.

REPLACEMENT

1. REMOVE THE INJECTOR.

(a) Release the fuel pressure.

(b) Turn off the ignition switch.



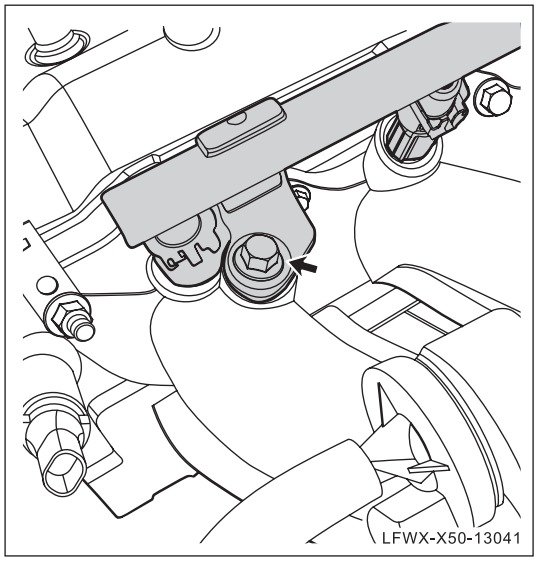
(c) Disconnect the fuel rail inlet pipe.

△ HINT:

After releasing the fuel pressure, there may be some residual fuel in the pipes. Therefore, when disconnecting fuel pipes, wrap the pipe joints with clean cloth to avoid fuel spilling.

NOTICE:

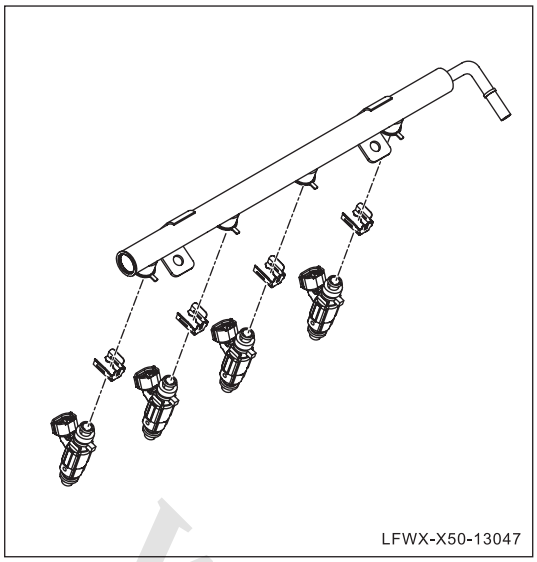
- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and component exposed to gasoline.**



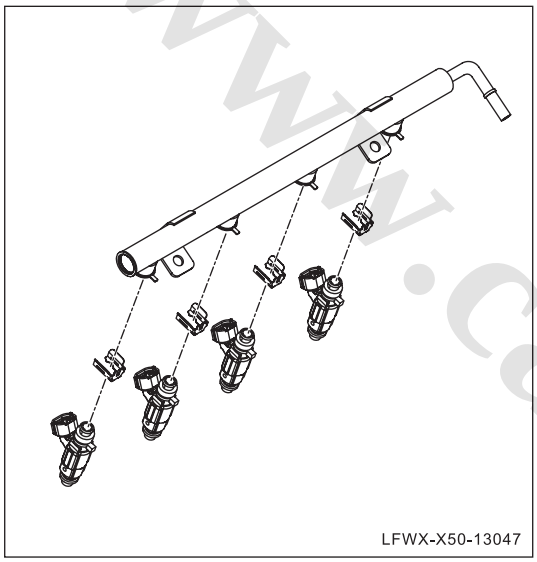
(d) Remove the fuel rail fixing bolts, and then take out the fuel rail and injector.

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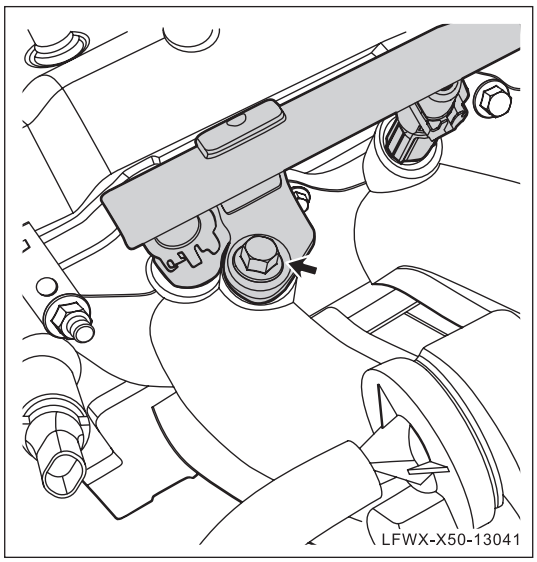


(e) Remove the snap ring of injector and take out the injector.



2. INSTALL THE INJECTOR

(a) Install the injector onto the fuel rail, and then mount the snap ring of the injector.

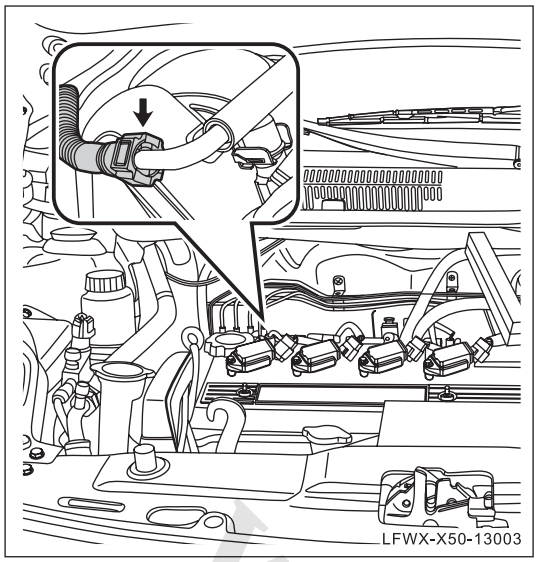


(b) Install the fuel rail onto the inlet manifold, and then mount & tighten the fixing bolts.

Torque: 20~25 N•m

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(c) Install inlet pipe of fuel rail.

(d) After the accumulation of fuel pressure, start the engine, and then check whether the injector operates normally.

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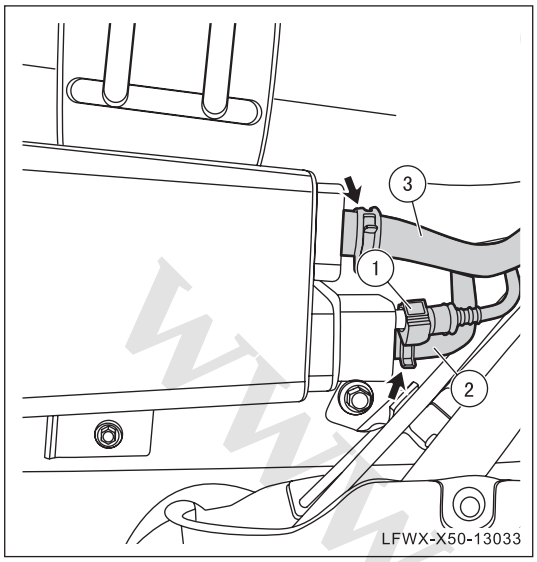
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CANISTER

REPLACEMENT

1. REMOVE THE CANISTER

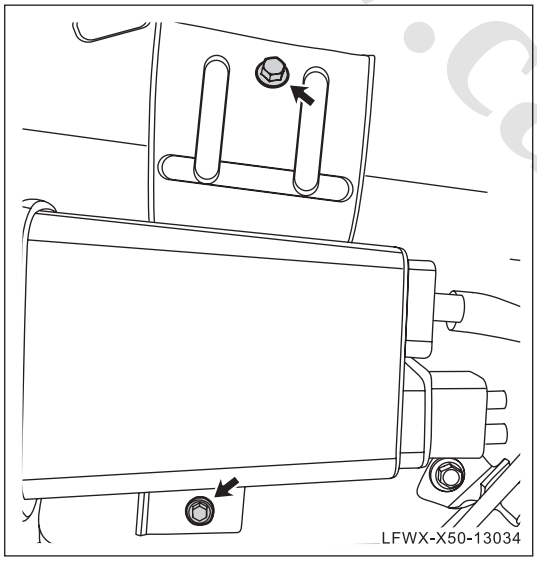
(a) Turn off the ignition switch.



(b) Pull out the control valve connecting pipe ① from the installation position.

(c) Remove the spring clamp of fuel evaporation connecting pipe ② , and pull out the fuel evaporation connecting pipe ② from the installation position.

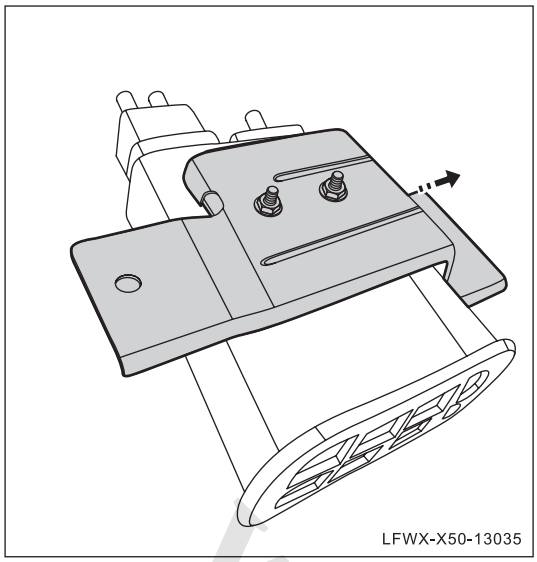
(d) Remove the spring clamp of canister vent pipe ③ , and then pull out the canister vent pipe ③ from the installation position.



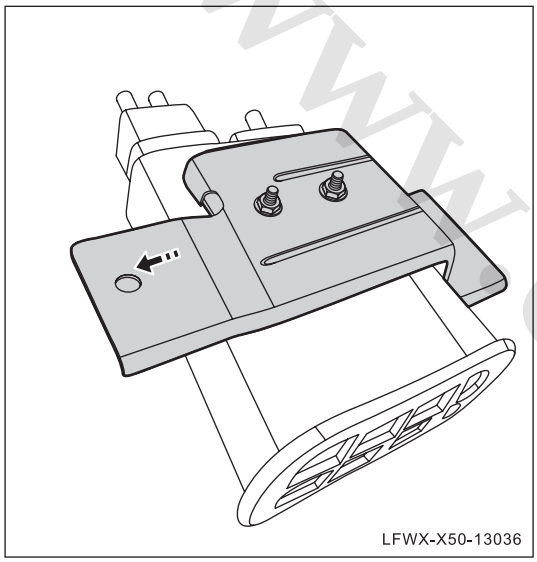
(e) Remove fixing bolts of canister bracket, and take out the canister with bracket assembly.

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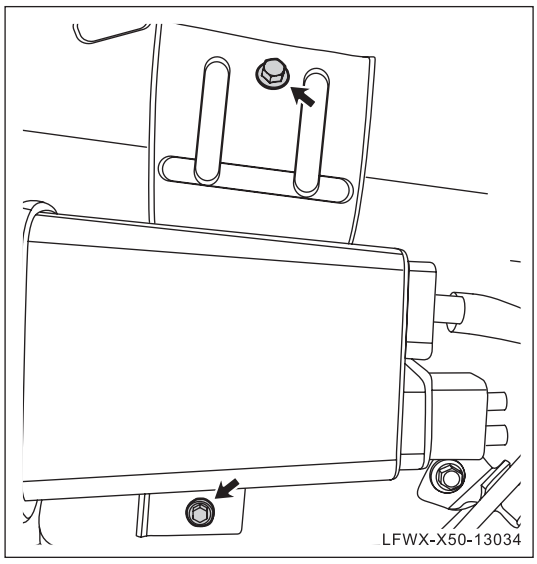


(f) Take out the canister bracket outward.



2. INSTALL THE CANISTER

(a) Install the canister bracket onto the canister.

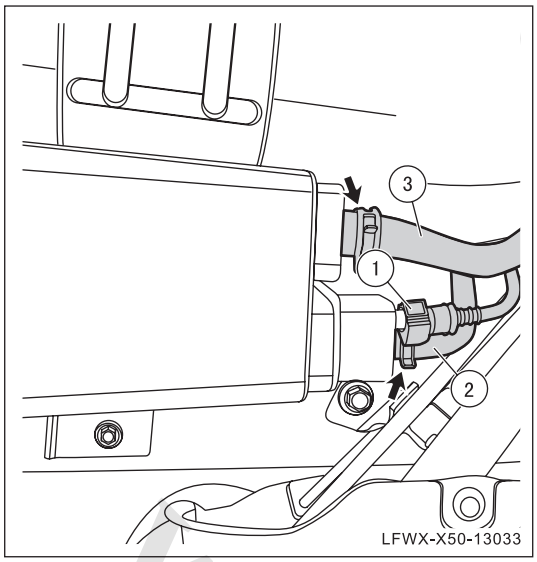


(b) Install the canister with bracket assembly in place, and then mount & tighten the fixing bolts of canister bracket.

Torque: 8~12 N•m

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(c) Install the control valve connecting pipe ① onto the canister.

△ HINT:

During installation, when you hear a clear"click", it indicates that it is installed in place.

(d) Install the fuel evaporation connecting pipe ② and spring clamp onto the canister.

(e) Install the canister vent pipe ③ and spring clamp onto the canister.

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CANISTER SOLENOID VALVE

INSPECTION

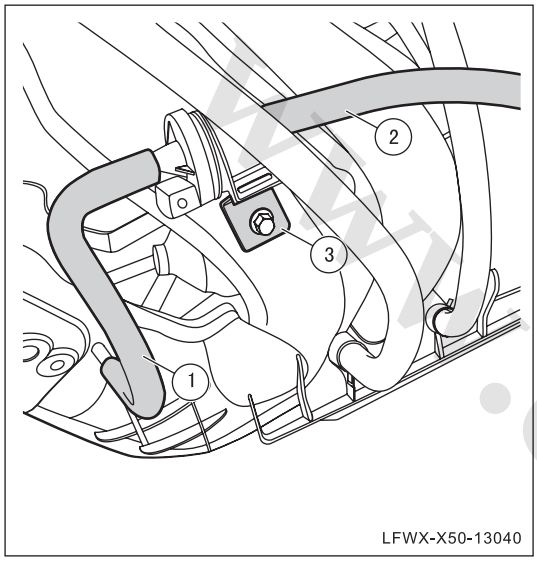
△ HINT:

For the inspection of canister solenoid valve, see 12 - Engine Control System, Engine Control System, On-Vehicle Inspection.

REPLACEMENT

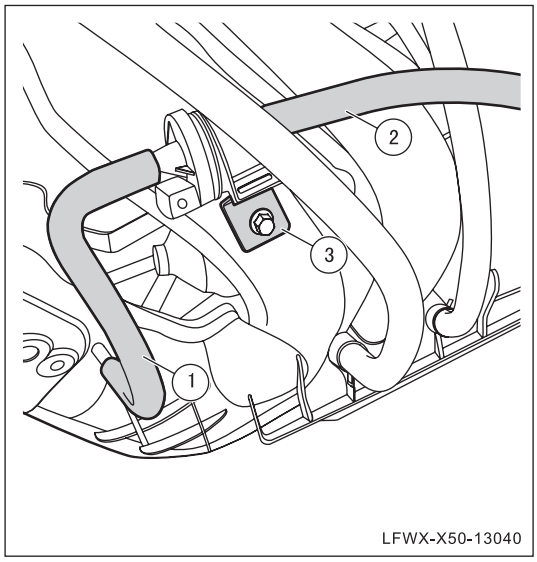
1. REMOVE CANISTER SOLENOID VALVE

(a) Turn off the ignition switch.



(b) Pull out the outlet pipe ① and inlet pipe ② of canister solenoid valve from the canister solenoid valve.

(c) Take down the canister solenoid valve from the bracket ③ .



2. INSTALL CANISTER SOLENOID VALVE

(a) Install the canister solenoid valve onto the bracket ③ .

(b) Install the outlet pipe ① and inlet pipe ② of canister solenoid valve onto the canister solenoid valve.

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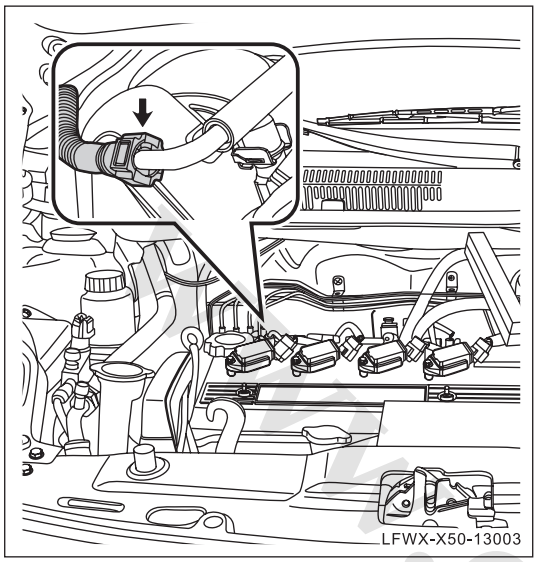
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FUEL PIPELINE

REPLACEMENT

NOTICE:

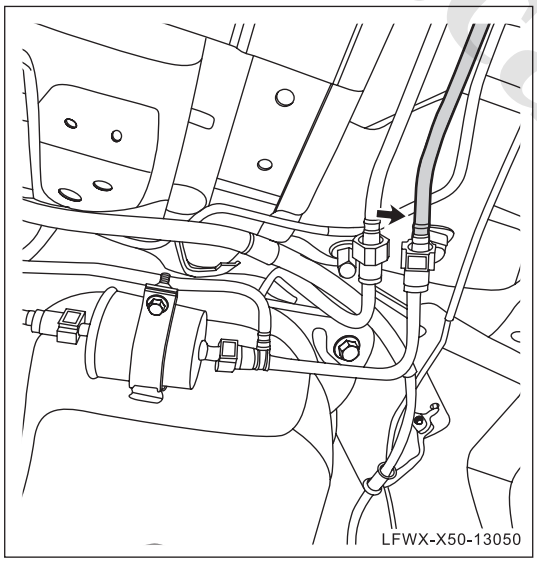
- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and component exposed to gasoline.**



1. REMOVE ENGINE INLET PIPE

(a) Release the fuel pressure.

(b) Disconnect the engine inlet pipe and fuel rail.



(c) Disconnect the engine inlet pipe and fuel filter pipe.

(d) Take the engine fuel inlet pipe out of each clamp.

(e) Take out the engine inlet pipe.

2. INSTALL THE ENGINE INLET PIPE

(a) Lay the engine inlet pipe in the installation position.

(b) Install both ends of engine inlet pipe separately onto the fuel rail and fuel filter pipe.

△ HINT:

During installation, when you hear a clear"click", it indicates that the fuel pipe is installed in place.

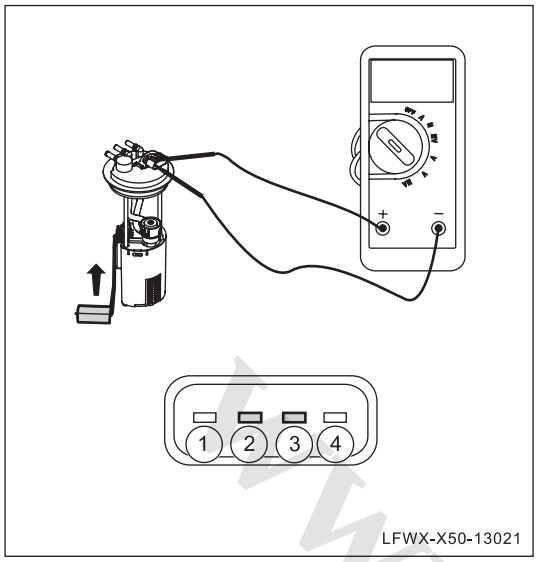
(c) Install the engine inlet pipe to each clamp.

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FUEL LEVEL SENSOR

INSPECTION



1. INSPECT THE FUEL LEVEL SENSOR

(a) Measure the fuel level sensor resistance with a "Ohm" scale of a digital multimeter.

△ HINT:

Connect the probes of the digital multimeter between the terminals ② and ③ of the fuel pump, and raise the fuel float upwards slowly from the lowest point and observe the change in the resistance.

The lowest point: without limit

The highest point: 40.9 Ω

REPLACEMENT

△ HINT:

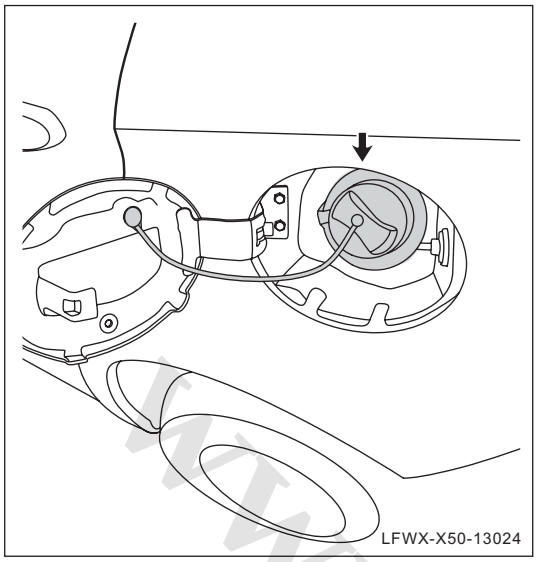
The fuel level sensor and fuel pump together make up the assembly. Replace the fuel pump assembly when the fuel level sensor or fuel pump is damaged. (See 13 - Fuel System, Fuel Pump, Replacement)

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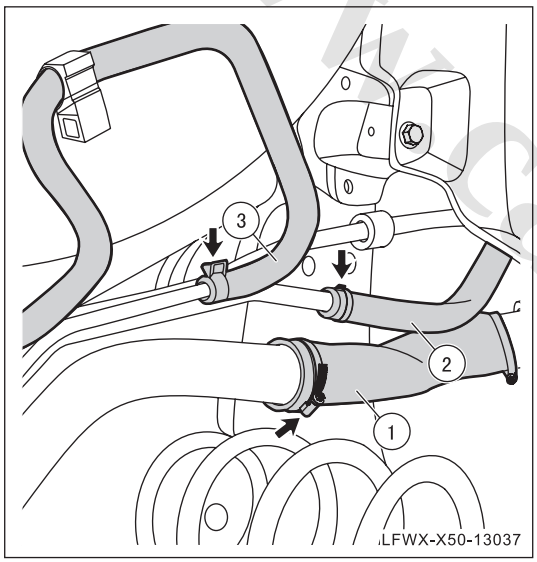
FILLING HOSE

REPLACEMENT



1. REMOVE THE FILLING HOSE

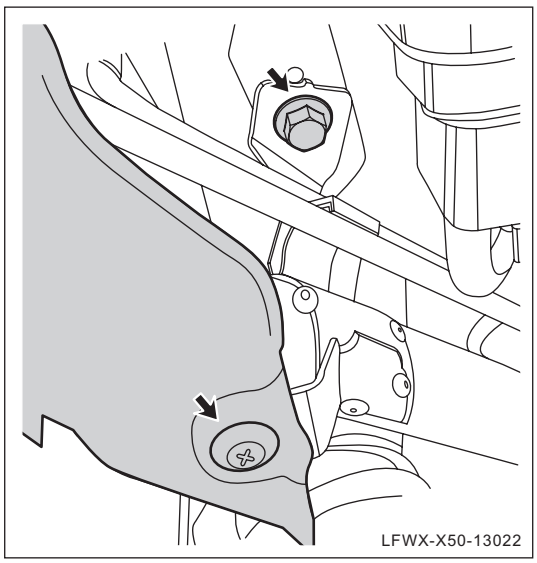
(a) Remove the fuel filler door.



(b) Unscrew the hoop of fuel tank inlet hose ① and pull out the inlet hose ① from the installation position.

(c) Unscrew the hoop of fuel filter air return hose ② and pull out the fuel filter air return hose ② from the installation position.

(d) Remove the spring clamp of canister vent pipe ③ and pull out the canister vent pipe ③ from the installation position.

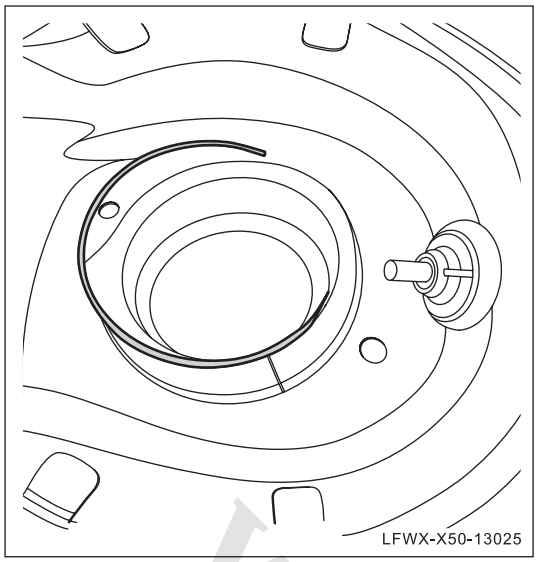


(e) Remove the snap-fit of filling hose cover and take out the filling hose cover.

(f) Remove fixing bolts of filling hose and take out the filling hose.

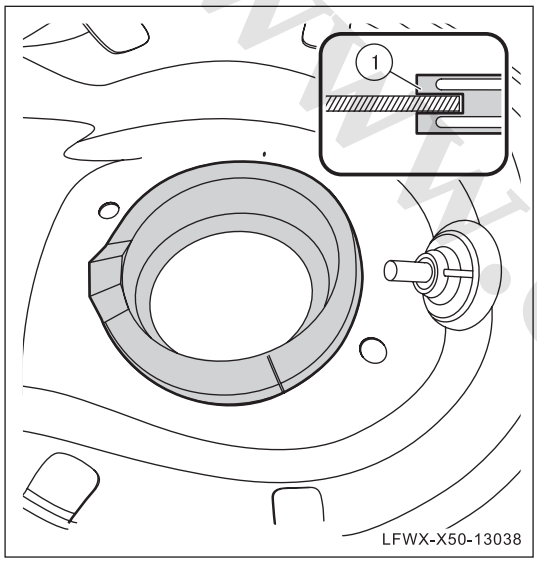
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(g) Remove the fuel filler shield snap ring.

(h) Push out the fuel filler shield inward and take out the fuel filler shield.

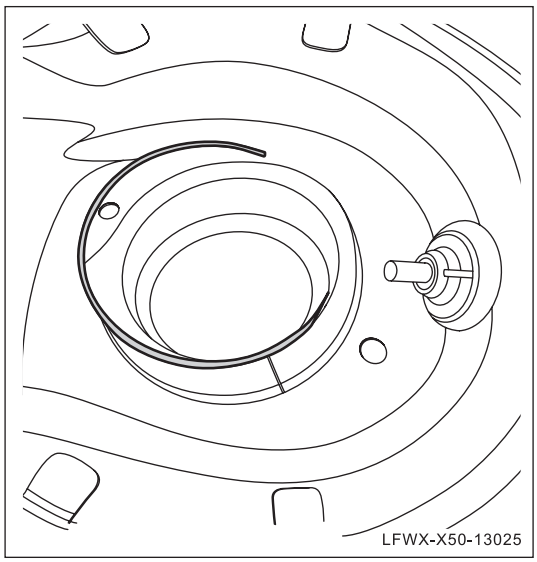


2. INSTALL THE FILLING HOSE

(a) Install the fuel filler shield on the fuel filler.

△ HINT:

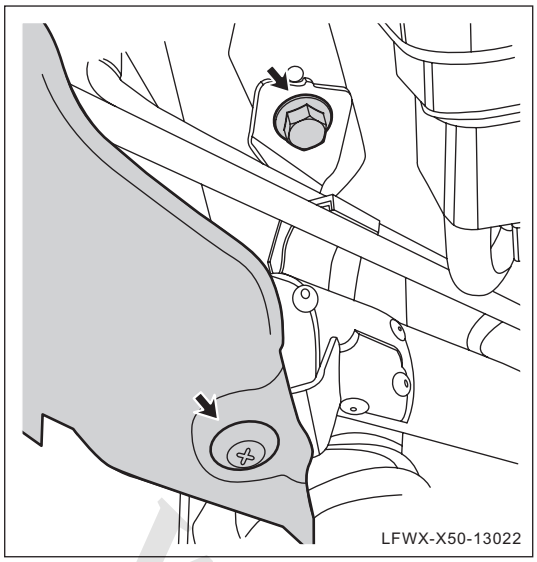
As shown in the figure, clamp the fuel filler shield part ① in the vehicle body.



(b) Install the fuel filler shield snap ring.

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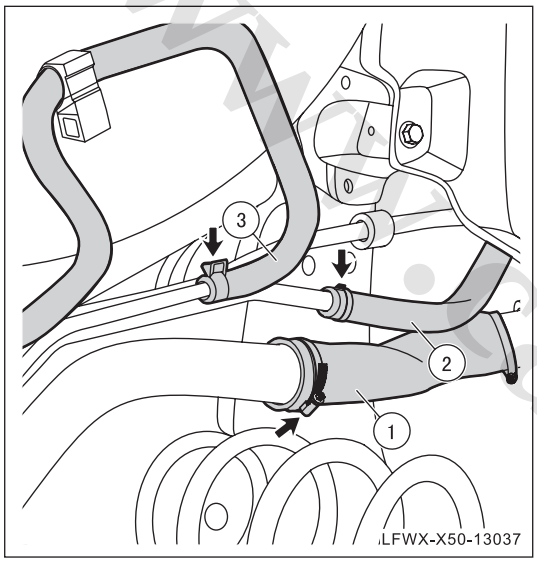
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(c) Install the filling hose in place, and then mount & tighten the fixing bolts.

Torque: 20~25 N•m

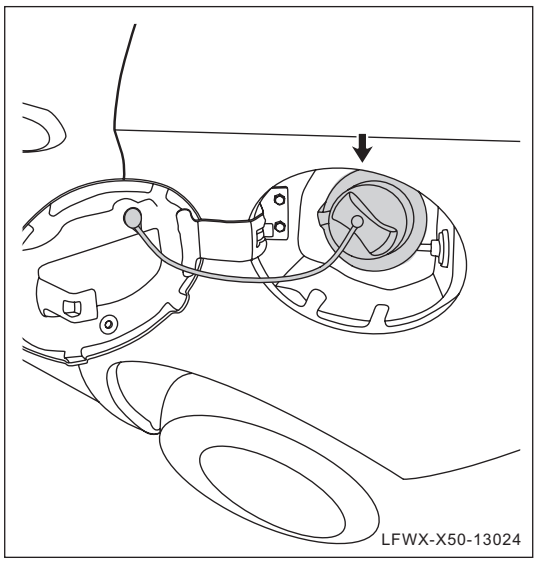
(d) Install the filling hose cover in place, and then mount the snap-fit of filling hose cover.



(e) Install the fuel tank inlet hose ① and hoop onto the filling hose, and then tighten the hoop.

(f) Install the fuel filter air return hose ② and hoop onto the filling hose, and then tighten the hoop.

(g) Install the canister vent pipe ③ and spring clamp onto the filling hose.



(h) Install fuel filler door.

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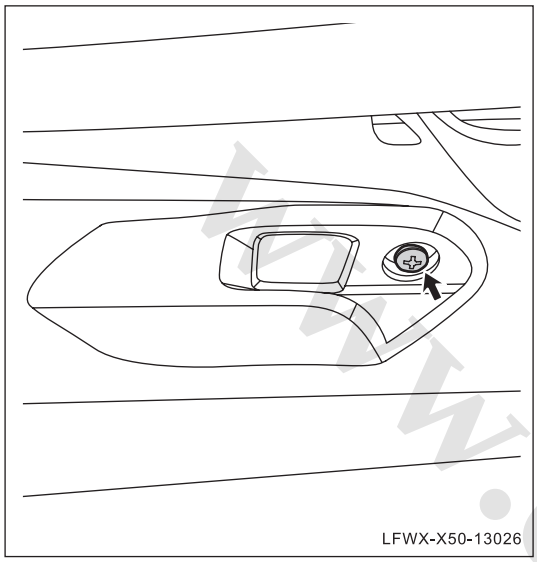
FUEL FILLER CABLE

REPLACEMENT

1. REMOVE FUEL FILLER CABLE

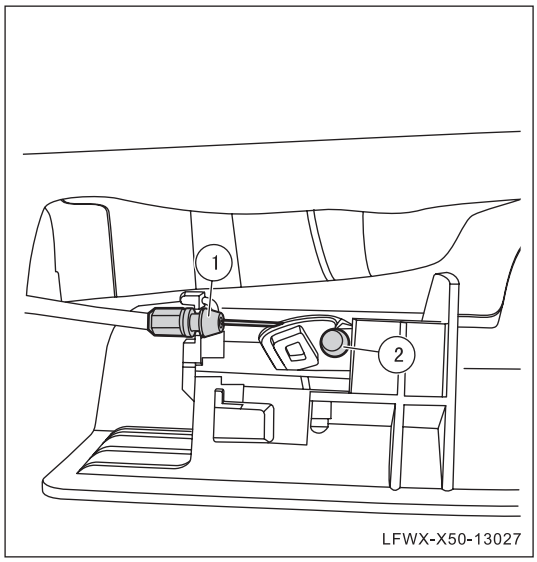
(a) Remove B pillar lower trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

(b) Remove C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)



(c) Remove the fixing screws of fuel tank filler cap opener.

(d) Take out the fuel tank filler cap opener.

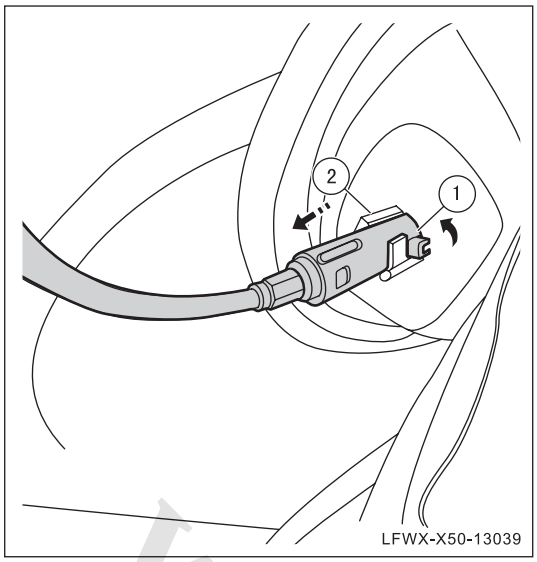


(e) Disconnect the cable and fuel tank filler cap opener.

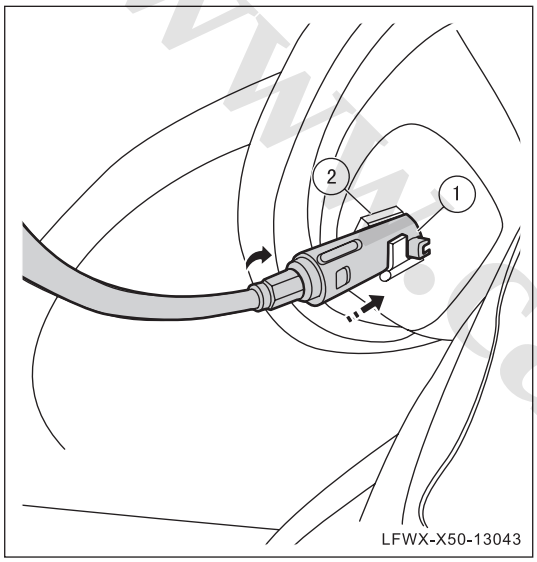
- Take the cable part ① out of the groove, then rotate the cable part ① to align with the notch of opener part ② and take out the cable.

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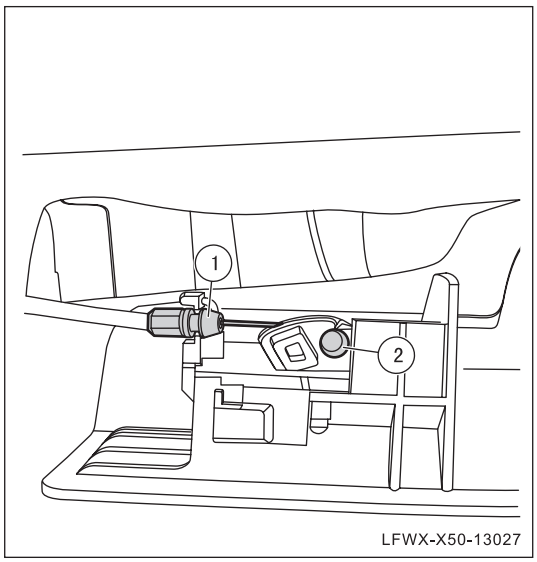


(f) Rotate the cable tongue ① to the opening of clamp ② and pull out the cable outward.



2. INSTALL THE FUEL FILLER CABLE

(a) Rotate the cable tongue ① to the opening of clamp ② and install the cable in place.

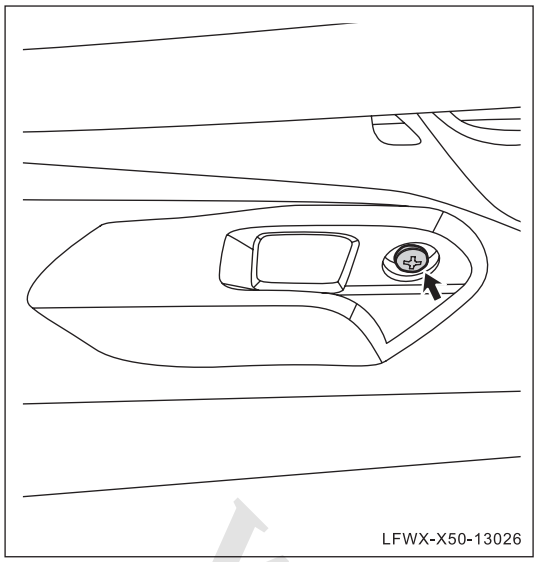


(b) Install the cable onto the fuel tank filler cap opener.

- Align the cable part ① with the notch of opener part ② , put it into the opener part ② , rotate the cable and install the cable part ① into the groove.

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(c) Install the fuel tank filler cap opener in place, and then mount & tighten the fixing screws of fuel tank filler cap opener.

Torque: 5 ~ 6 N•m

(d) Install C pillar lower panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

(e) Install B pillar lower panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

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Intake and Exhaust System

Intake and exhaust system.....14-1
System description.....14-1
Preparation.....14-2
Service data.....14-2
Precautions.....14-2
Components (I).....14-3
Components (II).....14-4
Components (III).....14-5
Components (IV).....14-6
Function and fault of components.....14-7
On-vehicle inspection.....14-8
Air filter.....14-9
Check.....14-9
Replacement.....14-10
Intake pipeline.....14-16
Check.....14-16
Replacement.....14-17
Intake manifold.....14-19
Check.....14-19
Replacement.....14-19
Electronic throttle body.....14-25
Inspection.....14-25
Replacement.....14-25
Intake pressure and temperature sensor.....14-26
Inspection.....14-26
OCV.....14-27
Inspection.....14-27
Replacement.....14-27
Catalytic converter.....14-28
Check.....14-28
Replacement.....14-29
Connecting pipe with corrugated pipe.....14-33
Check.....14-33
Replacement.....14-34
Front muffler.....14-36
Check.....14-36
Replacement.....14-36

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Rear muffler 14-39
Check 14-39
Replacement 14-39
Oxygen sensor.....14-41
Inspection 14-41
Replacement 14-41

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INTAKE AND EXHAUST SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

Function of intake system is: to provide clean and dry air to the engine and maintain the optimal engine performance by greatly reducing the engine wear.

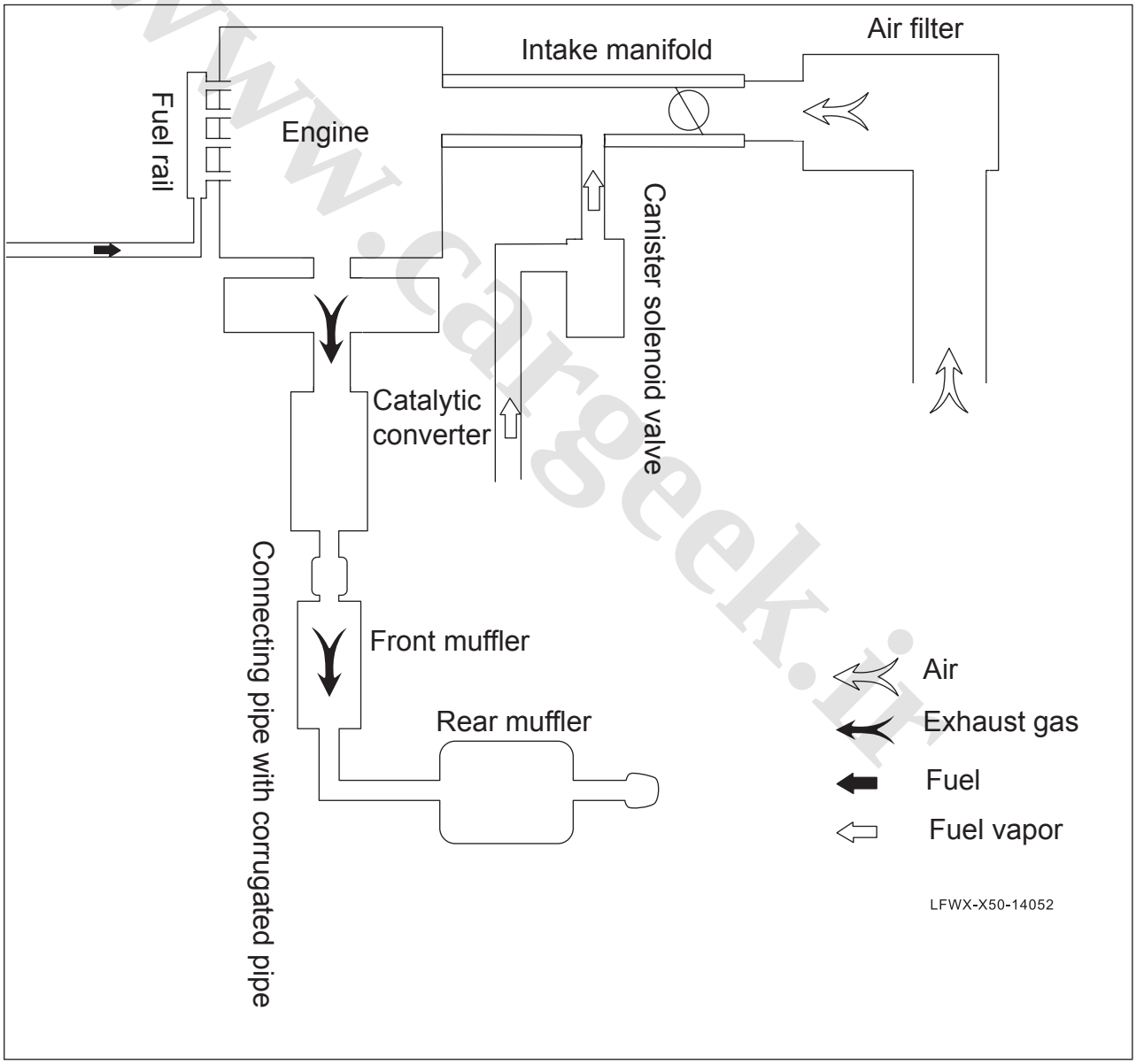
Function of exhaust system is: exhaust the the waster gas generated by engine operation and minimize the pollution and noise of the waste gas.

2. COMPONENTS

The intake system mainly consists of air filter, intake pipeline and resonant cavity, etc.

The exhaust system mainly consists of catalytic converter, connecting pipe with corrugated pipe, front muffler and rear muffler, etc.

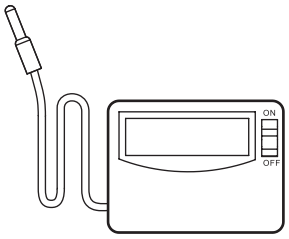
3. WORKING PRINCIPLE



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital temperature meter		Measuring exhaust temperature

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolts of air filter lower cover	8 - 12
Fixing bolts of the resonant cavity	8 - 12
Air filter upper cover	5 - 6
Electric throttle body fixing bolts	8 - 12
Fuel rail fixing bolts	20 - 25
Fixing bolts and nuts of intake manifold and bracket	20 - 25
Fixing bolts of canister solenoid valve bracket	8 - 12
Fixing bolts of intake pressure and temperature sensor	8 - 12
Fixing bolts of OCV	8 - 12
Fixing nuts of catalytic converter	20 - 25
Fixing bolts of upper heat shield of catalytic converter	8 - 12
Fixing bolts of exhaust pipe and muffler	40 - 50
Fixing bolts of connecting pipe with corrugated pipe clamp	20 - 25
Oxygen sensor	50 - 60

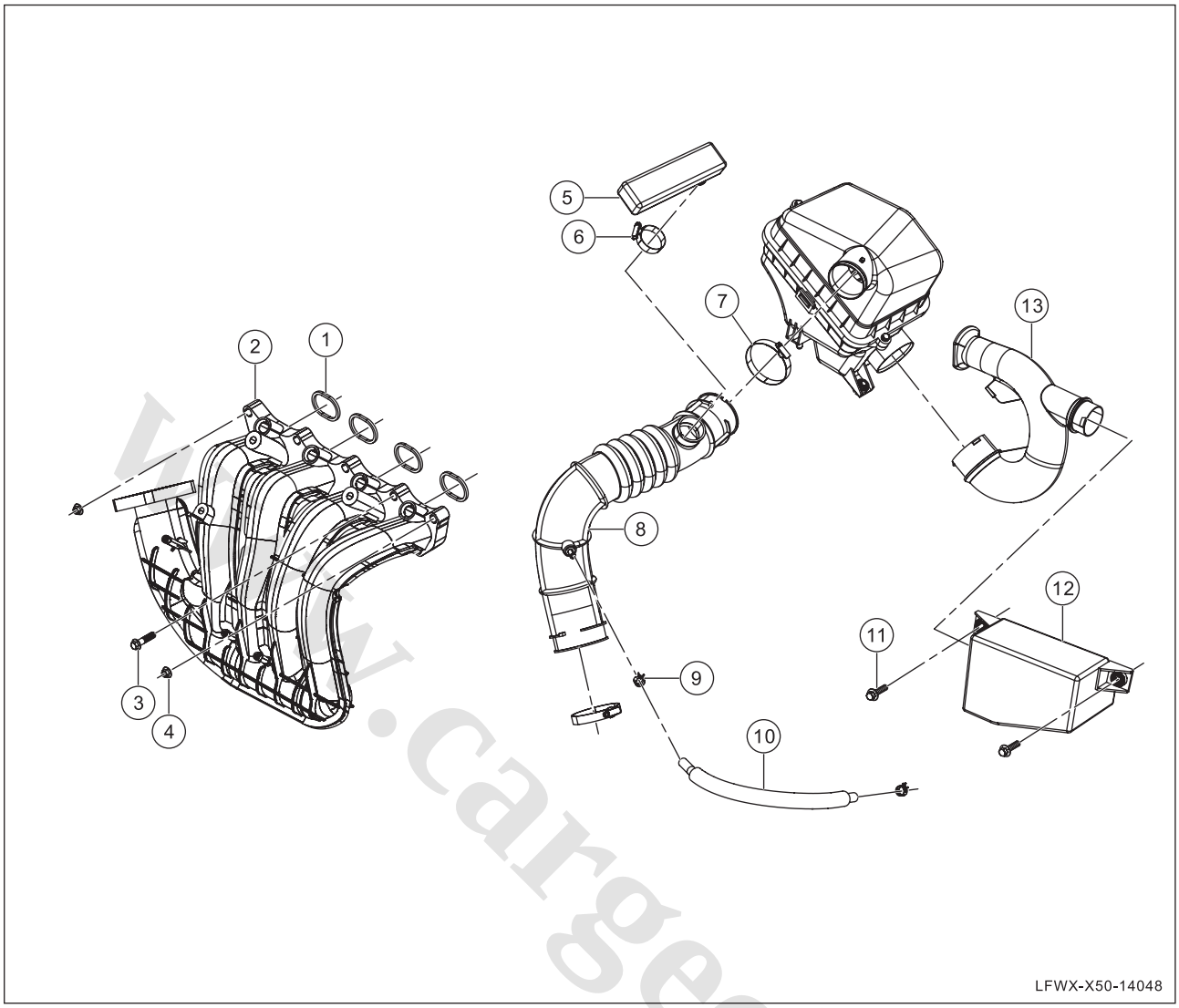
PRECAUTIONS

1. Check the tightness of the connector between the intake pipeline and air filter frequently. In the event of leakage, deal with it immediately, and tighten the connector to avoid abnormal wear.
2. Stop the vehicle at a place without wind and dust when maintaining and replacing the filter element.
3. Check the exhaust pipeline frequently. In the event of leakage, deal with it immediately, tighten the connector to avoid abnormal damage.
4. Because the exhaust system is very hot when the engine is running, operation shall be performed after the engine and the exhaust system have stopped and cooled down.

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COMPONENTS (I)



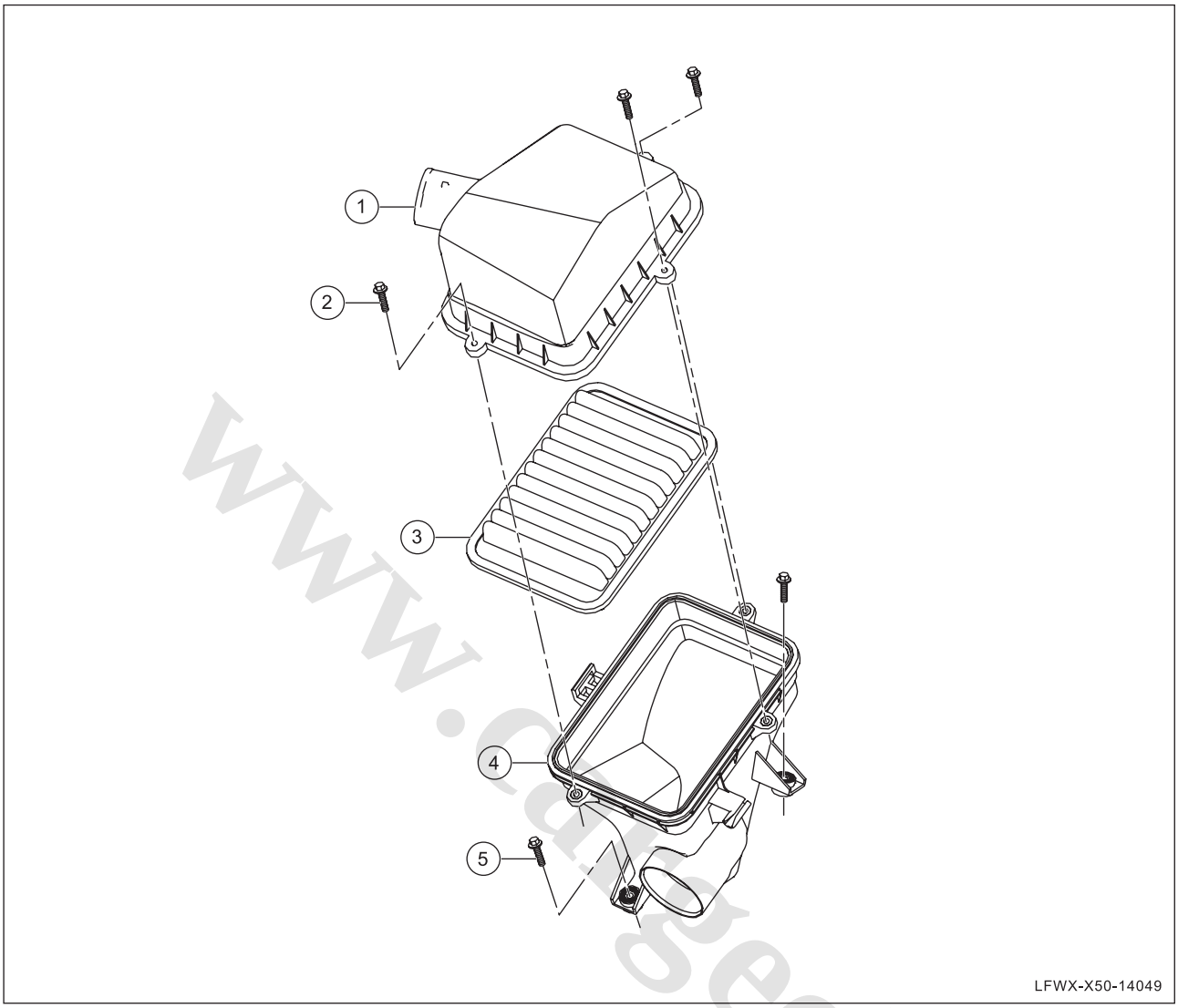
1	Intake manifold gasket
2	Intake manifold
3	Bolt
4	Nut
5	1/4 wavelength pipe
6	B-type worm drive hoop
7	B-type worm drive hoop

8	Engine intake pipe
9	Steel wire spring clamp
10	Crankcase venting pipe
11	Bolt
12	Resonant cavity
13	Intake pipe of air filter

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COMPONENTS (II)



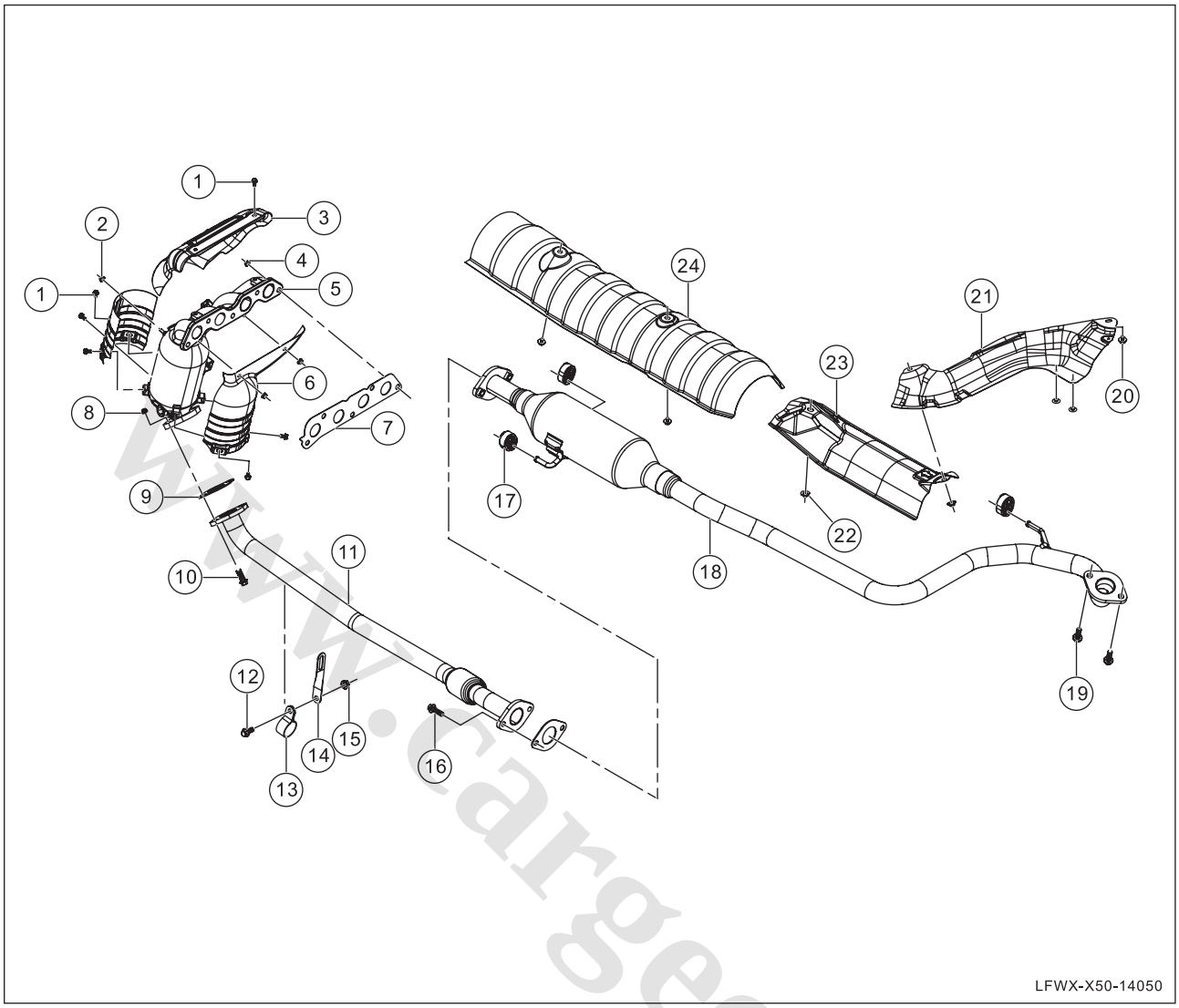
1	Air filter upper cover
2	Bolt
3	Air filter element

4	Air filter lower cover
5	Bolt

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COMPONENTS (III)



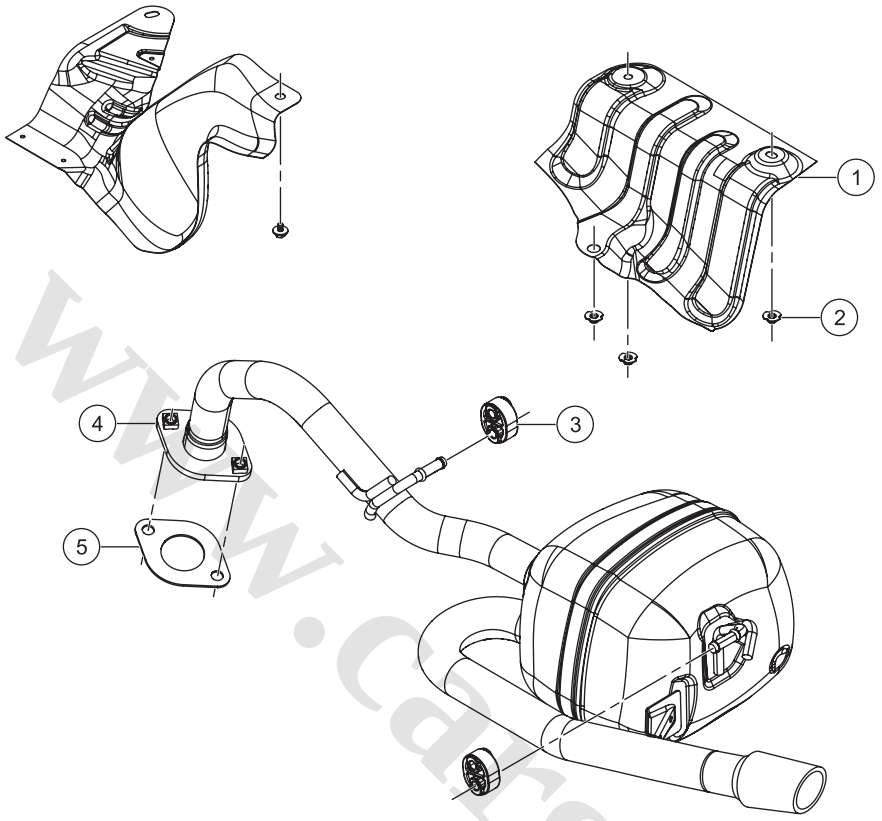
1	Bolt
2	Nut
3	Upper heat shield of catalytic converter
4	Nut
5	Catalytic converter
6	Lower heat shield of catalytic converter
7	Catalytic converter gasket
8	Nut
9	Washer
10	Bolt
11	Connecting pipe with corrugated pipe
12	Bolt

13	Pipe clamp
14	Lifting lug
15	Nut
16	Bolt
17	Muffler mounting block
18	Front muffler
19	Bolt
20	Hexagon bolt and taper spring washer assembly
21	Intermediate heat baffle II
22	Nut
23	Intermediate heat baffle I
24	Front heat baffle

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COMPONENTS (IV)



LFWX-X50-14051

1	Rear heat baffle
2	Nut
3	Muffler mounting block

4	Rear muffler
5	Washer

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FUNCTION AND FAULT OF COMPONENTS

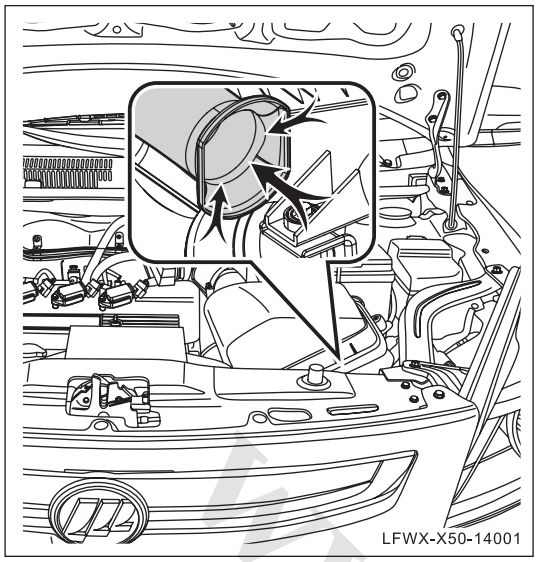
Component name	Component function	Common faults	Fault symptom
Air filter	Filtering the particles and impurities in the air	Air filter element is clogged or air filter is damaged	The start of engine is difficult Premature engine wear
Intake pipeline	Delivering air to the engine	The intake pipeline is clogged, aging or damaged	The start of engine is difficult Premature engine wear
Catalytic converter	Converting the harmful gas such as CO, HC, NOx from the tail gas to harmless CO2, water and nitrogen.	Catalytic converter does not work	Tail gas does not conform to the standard
Muffler	Reducing the exhaust noise and exhaust the waste gas of high temperature safely and effectively.	The muffler is clogged or broken.	The engine is powerless when accelerating, vibrates when idling and exhausts with high noise.

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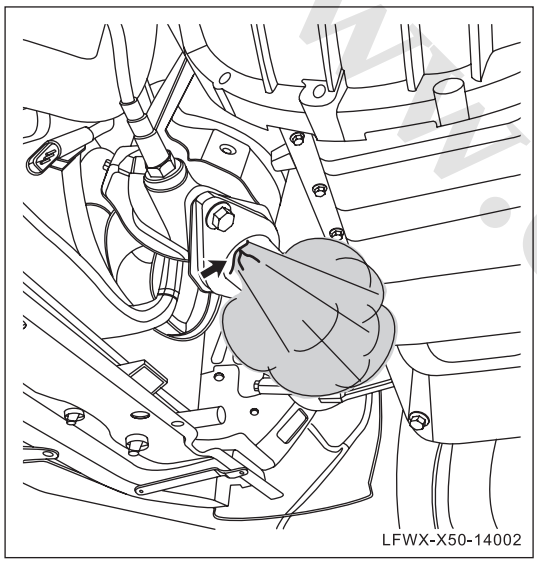
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ON-VEHICLE INSPECTION



1. INSPECTION OF INTAKE SYSTEM

(a) Start the engine and check the intake system for suction and repair the intake system in the event of no suction.



2. INSPECTION OF EXHAUST SYSTEM

(a) Start the engine and check the exhaust system components for leakage, crack welding or damage, etc. If any, repair or replace them.

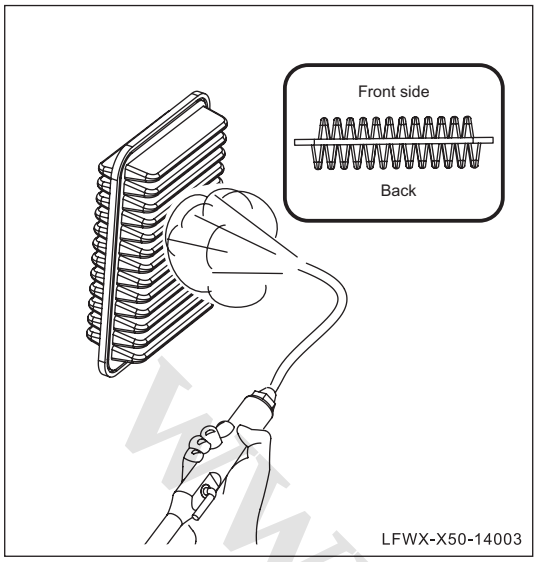
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AIR FILTER

CHECK

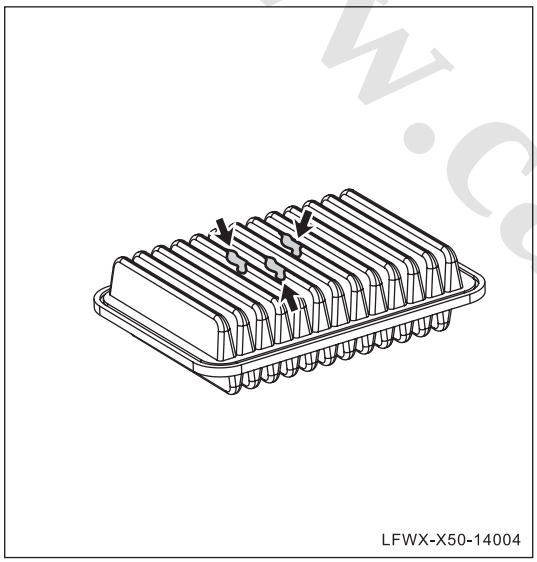


1. CLEAN AIR FILTER ELEMENT

(a) Clean the air filter element with compressed air.

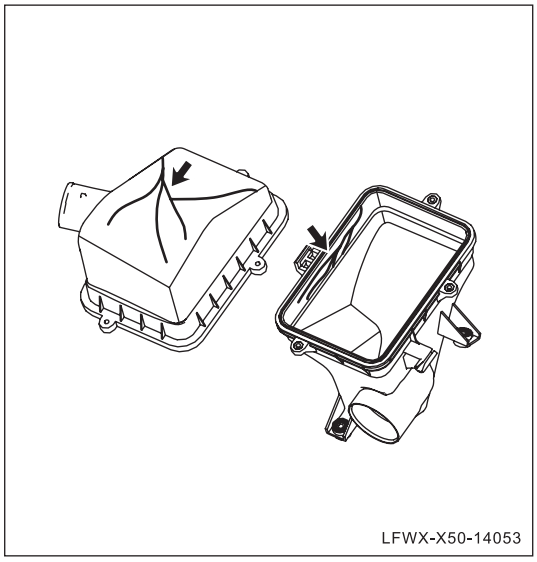
NOTICE:

Blow the compressed air into the air filter element from the back until there is no impurity in it.



2. CHECK AIR FILTER ELEMENT.

(a) Check the air filter for damage and replace it if any.



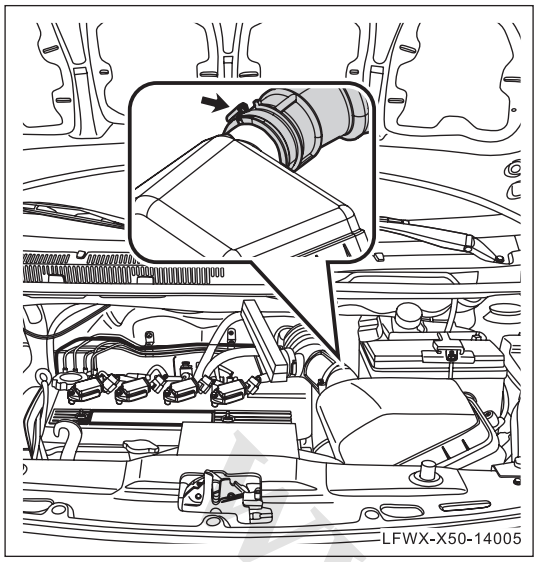
3. CHECK THE AIR FILTER COVER

(a) Check the air filter upper cover and lower covers for cracks, aging phenomenon and other damage and replace them if any.

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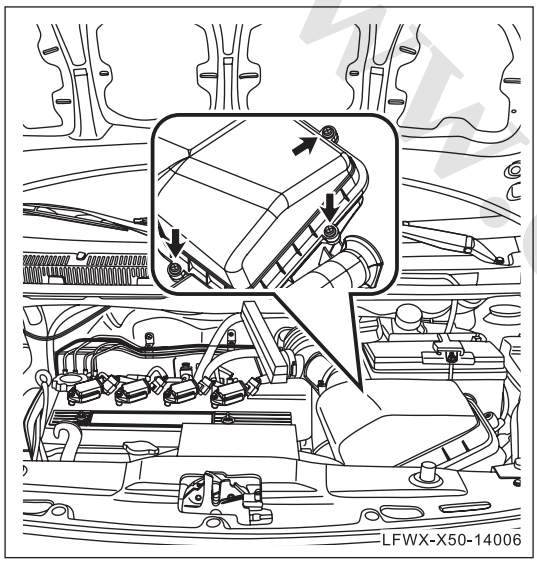
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REPLACEMENT

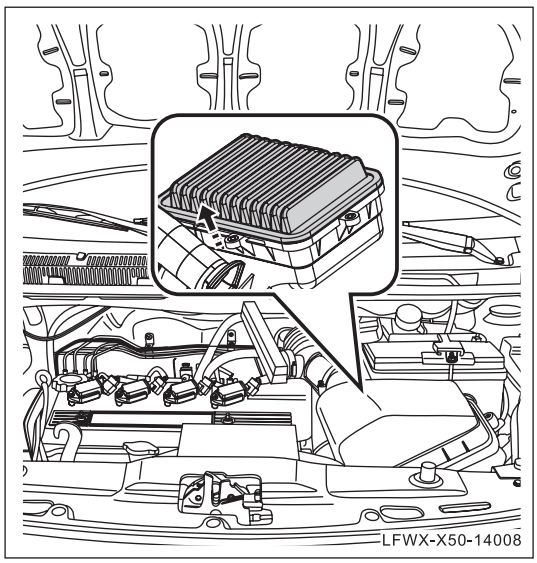


1. **REMOVE AIR FILTER.**

(a) Unscrew the engine intake pipe hoop and pull out the engine intake pipe from the installation position.



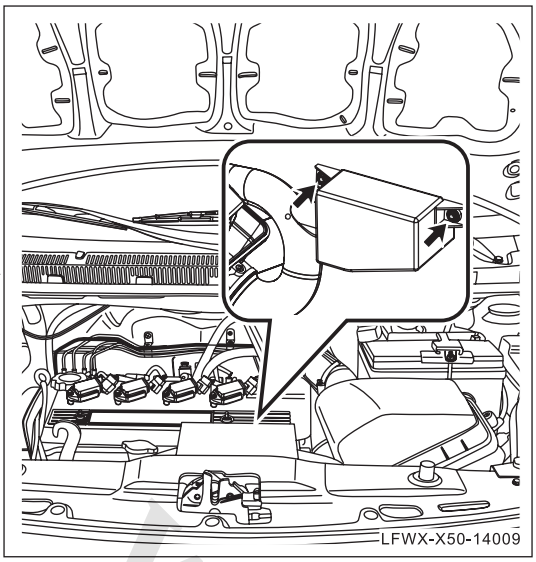
(b) Remove the fixing screw of the air filter upper cover, and take down the air filter upper cover.



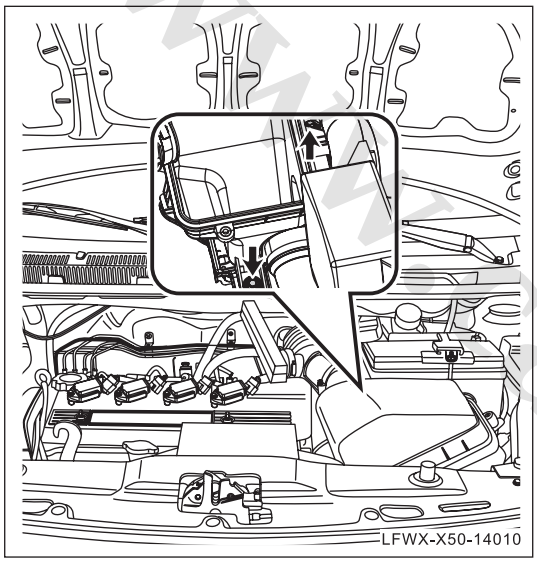
(c) Remove the air filter element.

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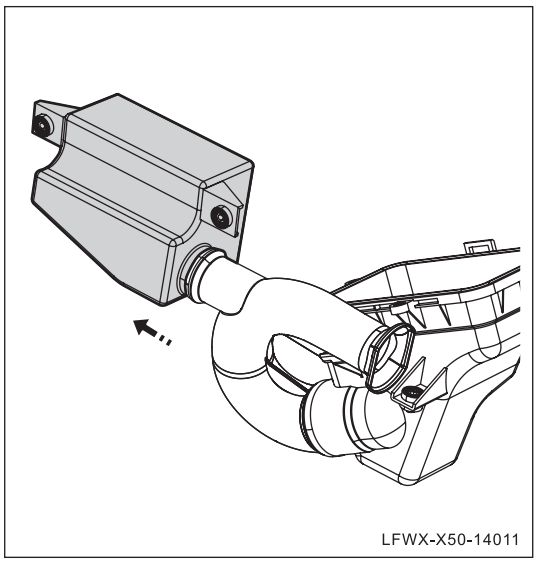
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(d) Remove the fixing bolts of the resonant cavity.



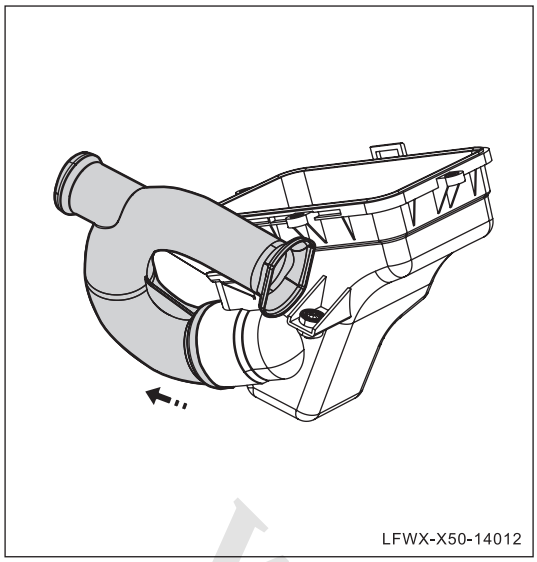
(e) Remove the fixing bolts of the air filter lower cover, and take down the air filter lower cover with resonant cavity assembly.



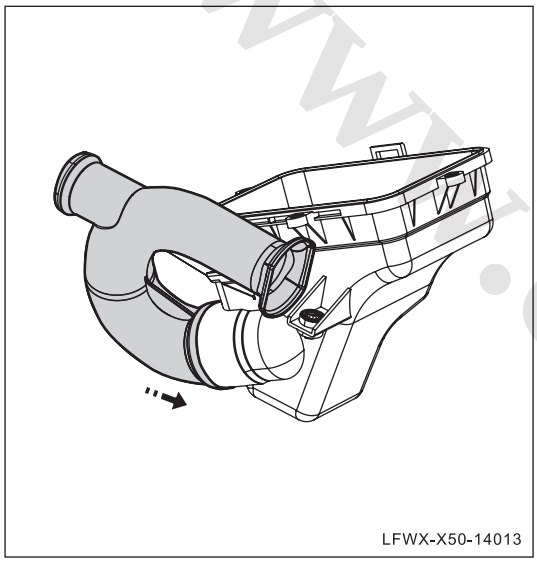
(f) Pull out the resonant cavity from the air filter intake pipe.

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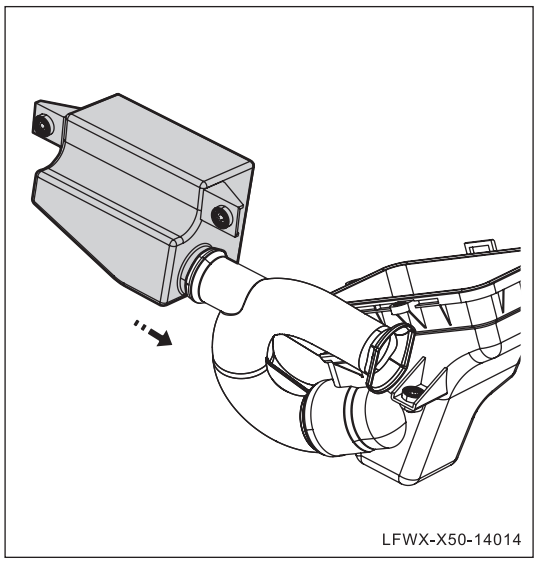


(g) Pull out the intake pipe of the air filter from the air filter lower cover.



2. INSTALLATION OF AIR FILTER

(a) Install the intake pipe of the air filter on the air filter lower cover.

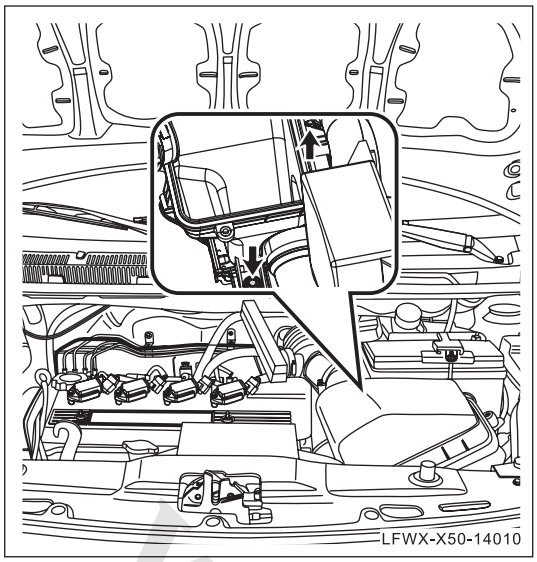


(b) Install the resonant cavity on the intake pipe of the air filter.

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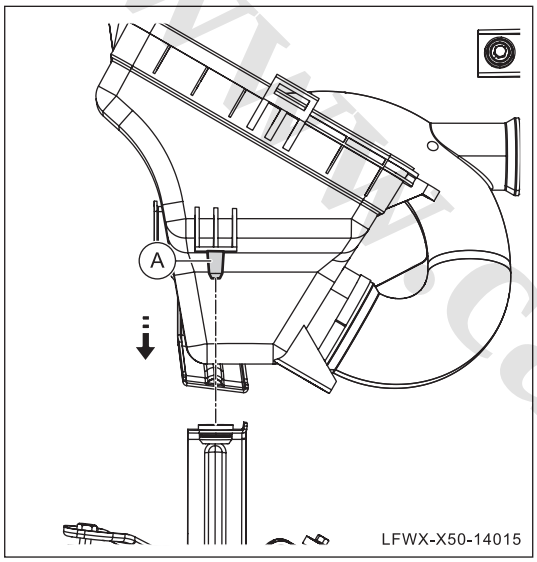
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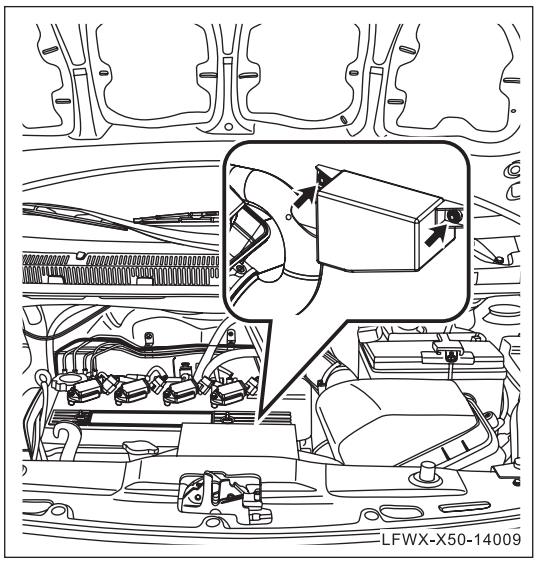
(c) Install the air filter lower cover with resonant cavity assembly to the installation position and install and tighten the fixing bolts of the air filter lower cover.

Torque: 8 - 12 N•m



△ HINT:

As shown in the figure, make sure the locating pin A of the air filter lower cover is installed aligning with the locating hole on the bracket when installing it.

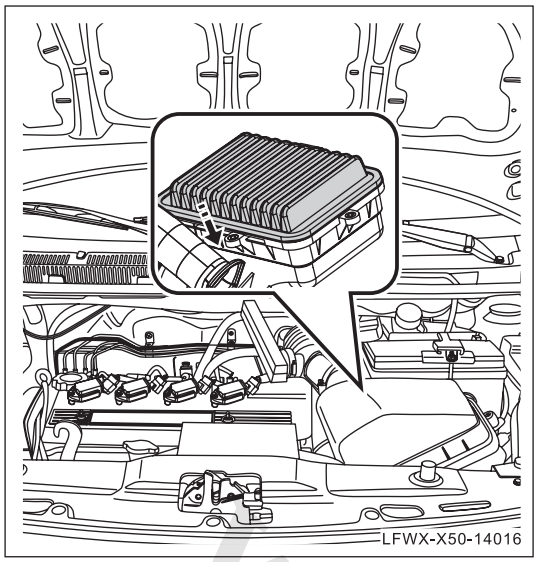


(d) Install the fixing bolts of the resonant cavity and tighten them.

Torque: 8 - 12 N•m

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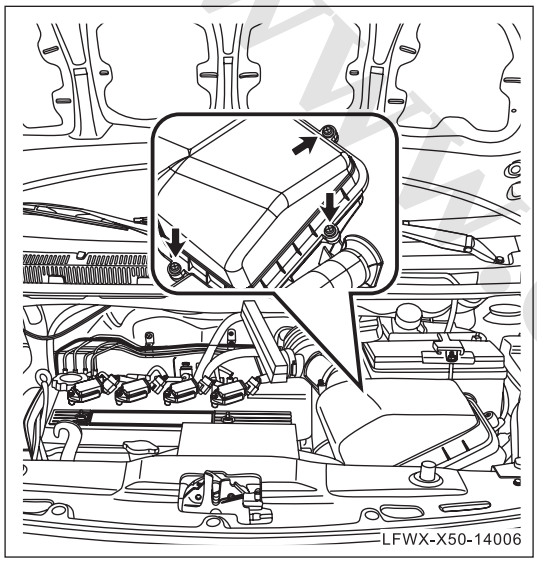
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(e) Install the air filter element.

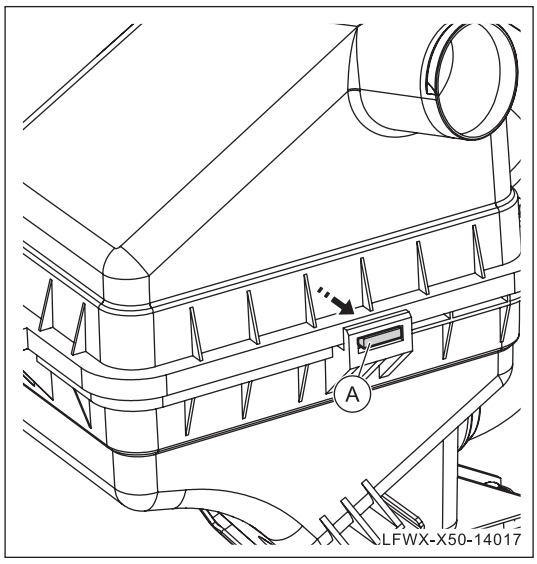
NOTICE:

Make sure the front face upward when installing the air filter element.



(f) Install the air filter upper cover on the air filter lower cover and install and tighten the fixing screw.

Torque: 5 - 6 N•m

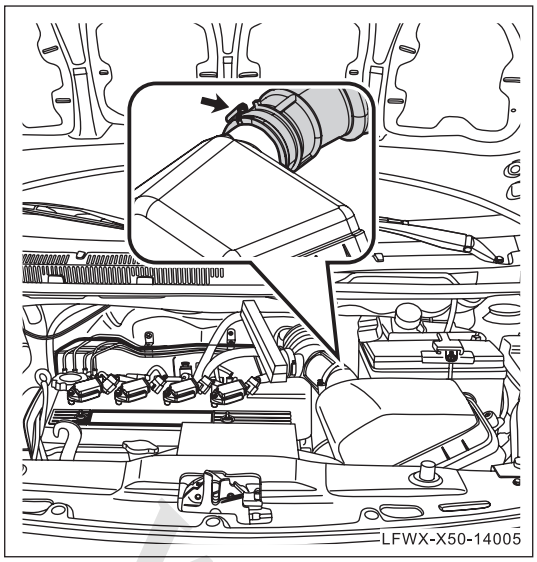


△ HINT:

As shown in the figure, when installing the air filter upper cover, install A first and then fit the air filter upper cover.

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(g) Install the intake pipe and hoop of the engine on the air filter upper cover and tighten the hoop.

(h) Start the engine to check whether the engine operates properly.

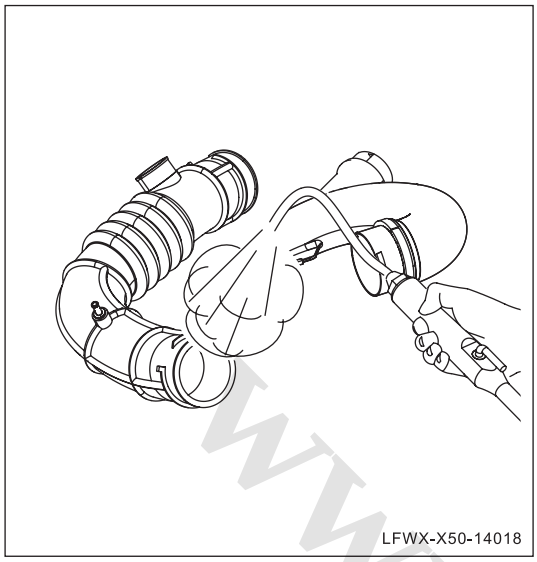
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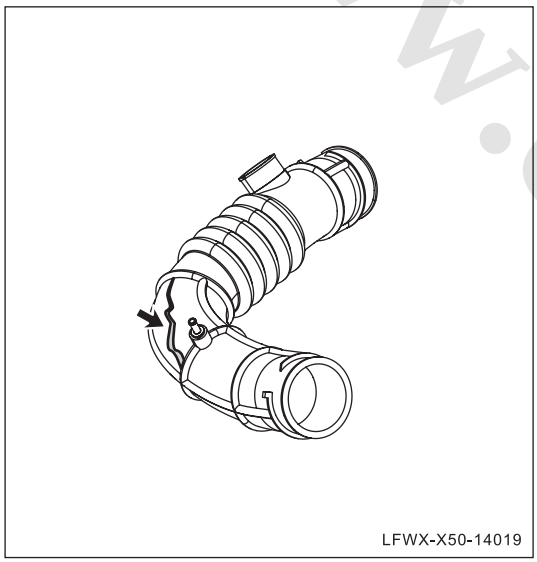
INTAKE PIPELINE

CHECK

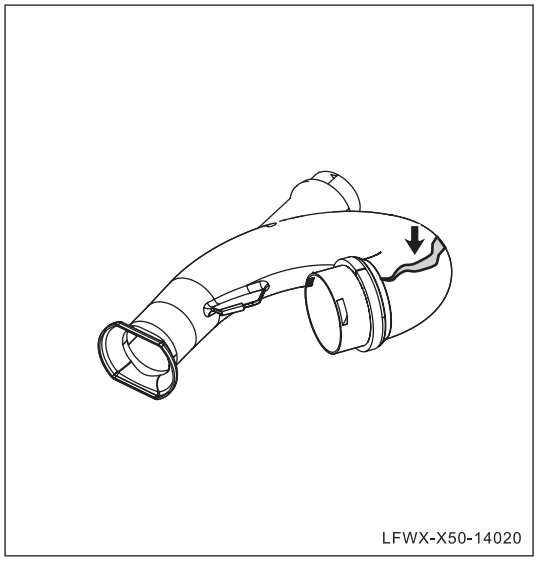

LFWX-X50-14018

1. CHECK INTAKE PIPELINE

(a) Clean the intake pipeline with compressed air.


LFWX-X50-14019

(b) Check the intake pipe of the engine for breakage, blockage and other damage and replace it if any.


LFWX-X50-14020

(c) Check the intake pipe of the air filter for breakage, blockage and other damage and replace it if any.

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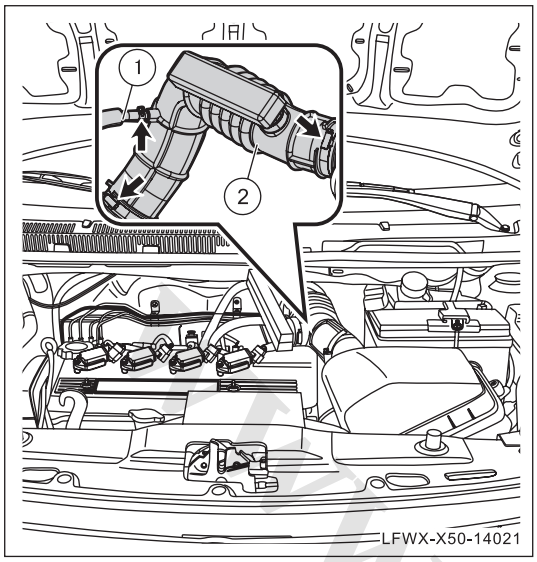
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REPLACEMENT

1. REPLACEMENT OF INTAKE PIPE OF AIR FILTER

△ HINT:

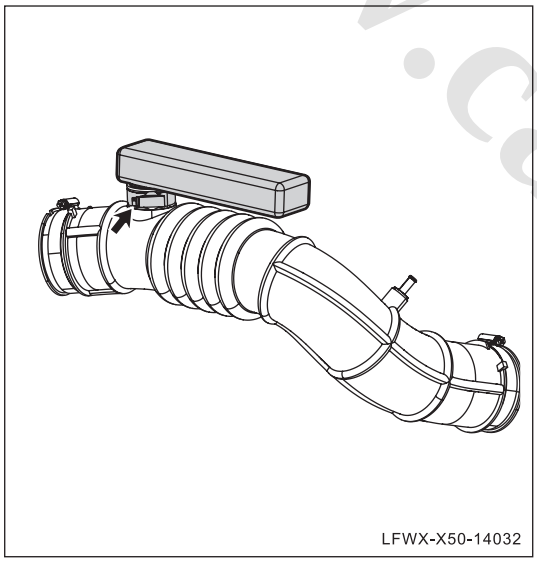
For replacement of intake pipe of air filter, see 14 - Intake/Exhaust System, Air Filter, Replacement)



2. REPLACEMENT OF INTAKE PIPE OF ENGINE

(a) Remove the spring clamp of crankcase vent pipe ① and pull out the crankcase vent pipe ① from the installation position.

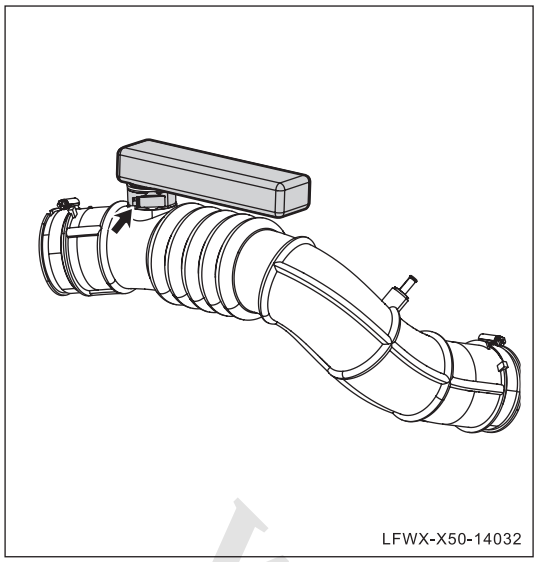
(b) Unscrew the hoops on both ends of the engine intake pipe ② and take down the engine intake pipe ② .



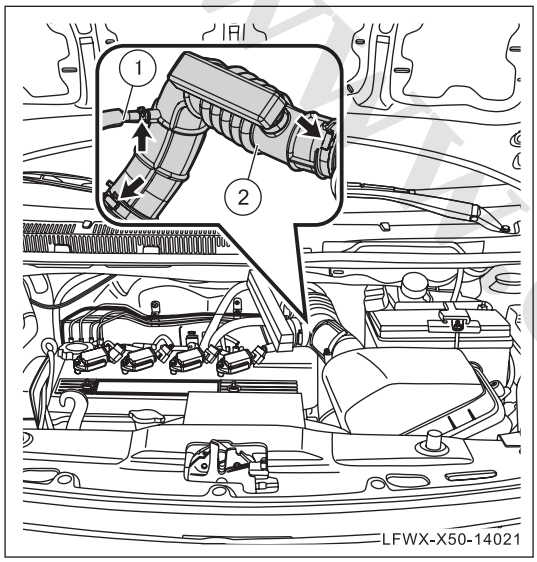
(c) Unscrew the 1/4 wavelength pipe hoop and pull it out from the installation position.

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(d) Install the 1/4 wavelength pipe and hoop on the intake pipe of engine and tighten the hoop.



(e) Install the engine intake pipe ② and hoops on both ends on the installation position and tighten the hoops on both ends.

(f) Install the crankcase vent pipe ① and spring clamp on the PCV valve.

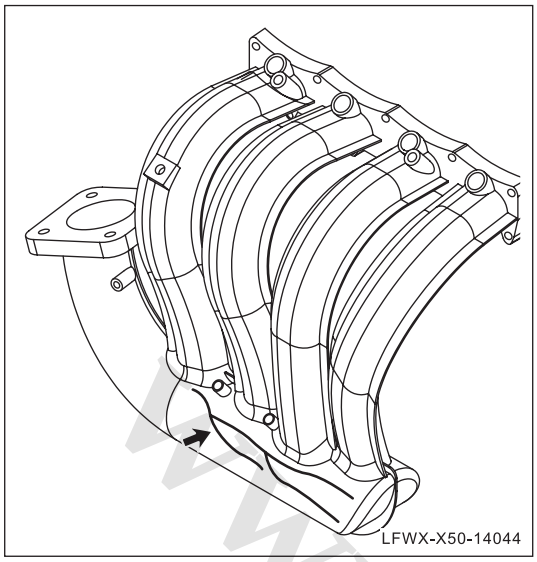
(g) Start the engine to check whether the engine operates properly.

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INTAKE MANIFOLD

CHECK



1. CHECK INTAKE MANIFOLD

(a) Check intake manifold for cracks or other damage. If any, replace it.

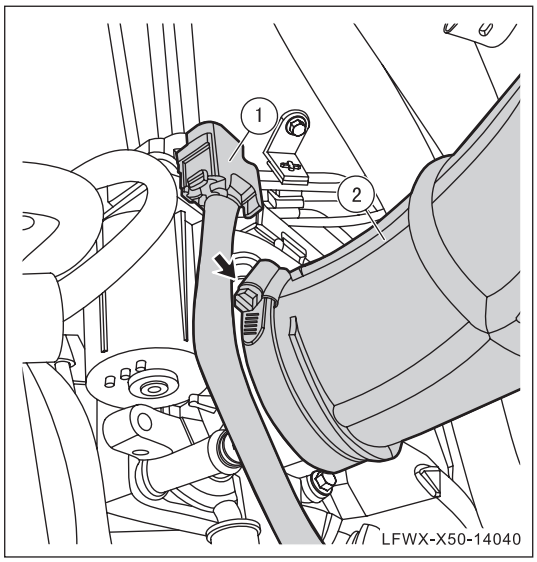
REPLACEMENT

1. REMOVAL OF INTAKE MANIFOLD

(a) Release the pressure of the fuel system. (See 13 - Fuel System, Fuel System, On-vehicle Inspection)

(b) Disconnect the negative cable of battery.

(c) Disconnect the injector connector.

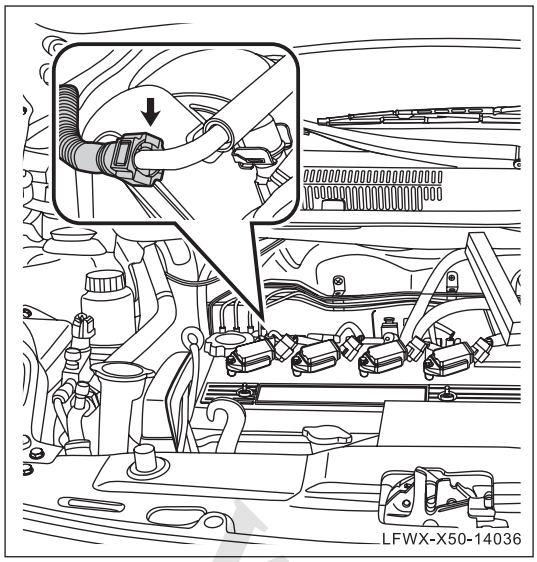


(d) Disconnect the connector ① of electronic throttle body.

(e) Unscrew the engine intake pipe ② hoop and pull out the engine intake pipe ② from the throttle body.

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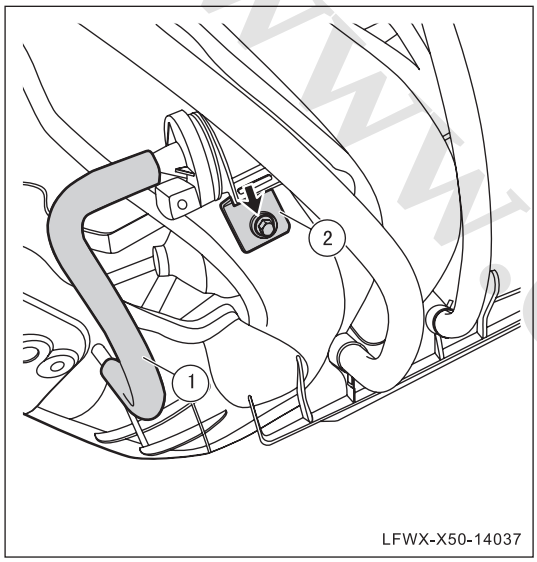
(f) Disconnect the fuel rail inlet pipe.

△ HINT:

After releasing the fuel pressure, there may be some residual fuel in the pipes. Therefore, when disconnecting fuel pipes, wrap the pipe joints with clean cloth to avoid fuel spilling.

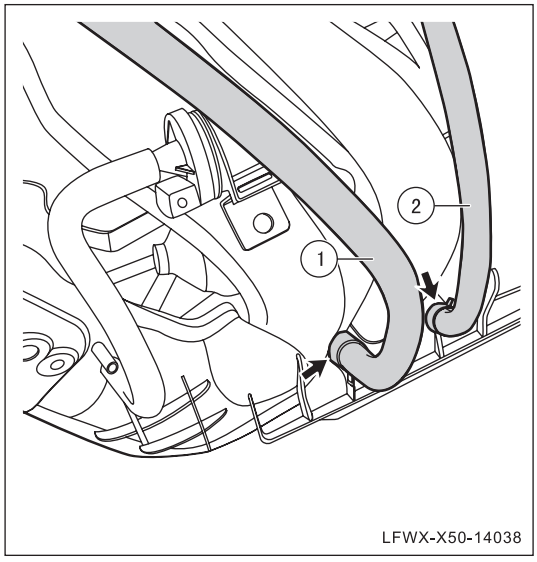
NOTICE:

- **Do not bend or distort the fuel pipe.**
- **Never let any rubber or leather tool and part exposed to gasoline.**



(g) Pull out the outlet pipe ① of canister solenoid valve from the intake manifold.

(h) Remove the fixing bolts of canister solenoid valve bracket ② .

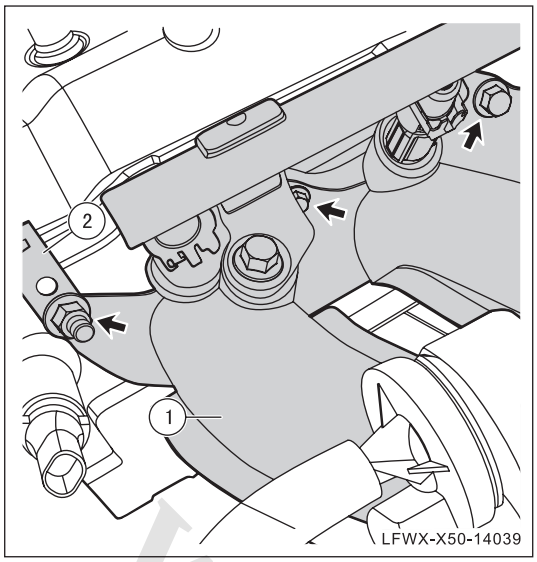


(i) Remove the spring clamp of vacuum boost hose ① and pull out the vacuum boost hose ① from the intake manifold.

(j) Unscrew the spring clamp of PCV valve vent hose and pull out the PCV valve vent hose ② from the intake manifold.

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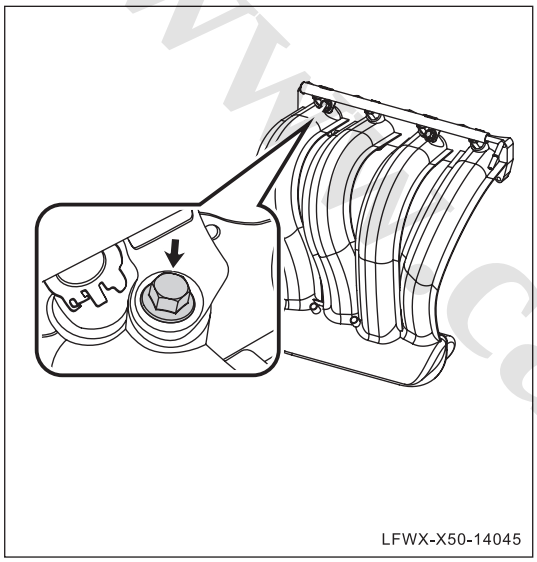
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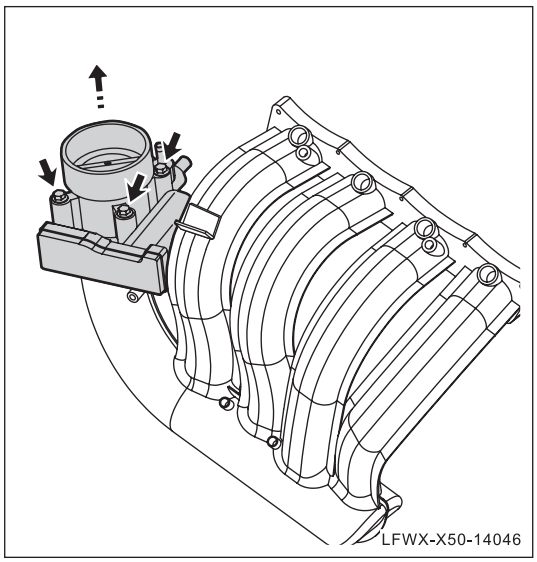
(k) Remove the fixing bolt and nut of intake manifold ① and take down the intake manifold ① and bracket ② .

△ HINT:

When removing the intake manifold, the fuel rail, injector and intake manifold can be taken down as assembly due to fuel rail and injector are installed on the intake manifold.



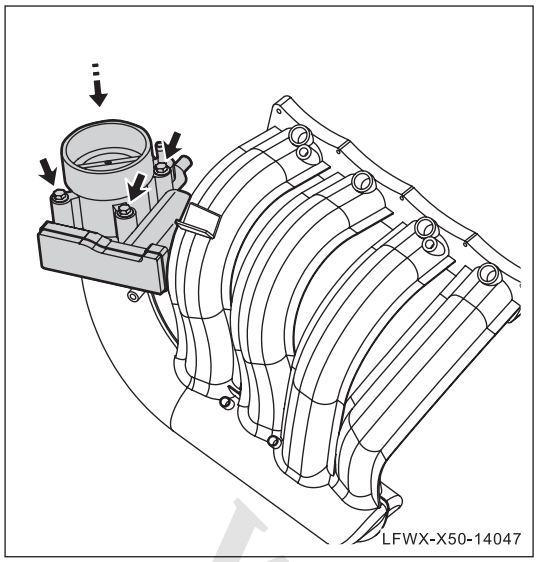
(l) Remove the fuel rail fixing bolts, and then take down the fuel rail with injector assembly.



(m) Remove the fixing bolts of electronic throttle body and take down the electronic throttle body.

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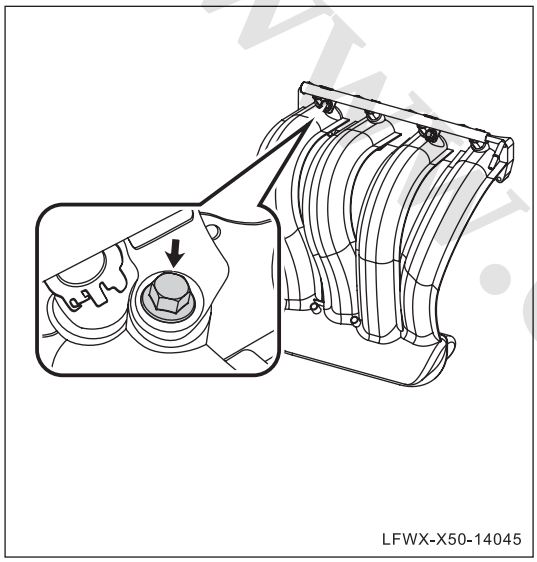
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2. INSTALLATION OF INTAKE MANIFOLD

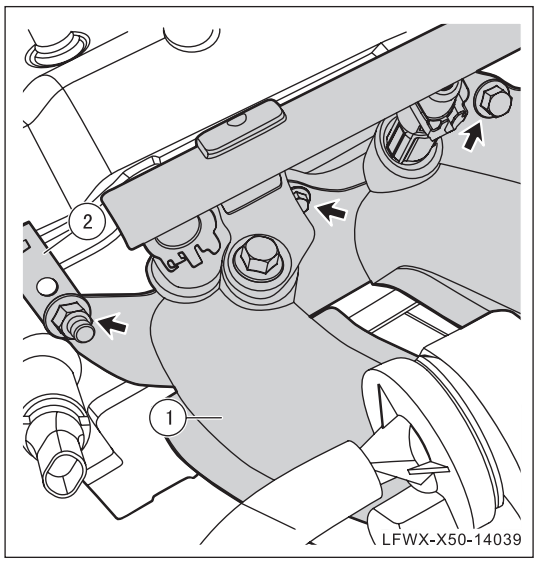
(a) Install the electronic throttle body on the intake manifold and install and tighten the fixing bolts.

Torque: 8 - 12 N•m



(b) Install the fuel rail with injector assembly on the intake manifold and install and tighten the fixing bolts.

Torque: 20 - 25 N•m

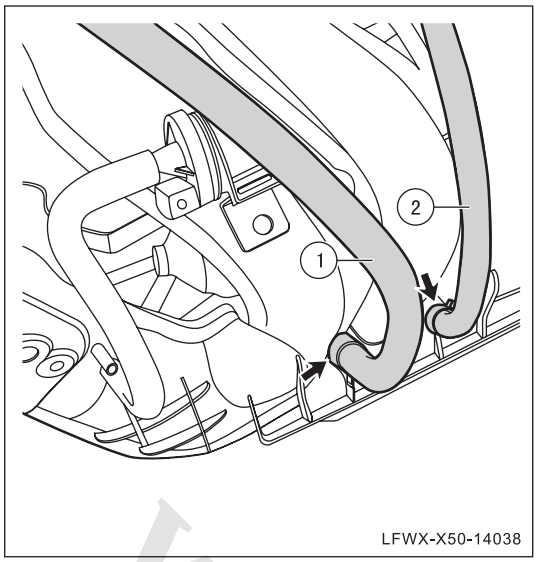


(c) Install the intake manifold ① and bracket ② on the engine and install and tighten the fixing bolts and nuts.

Torque: 20 - 25 N•m

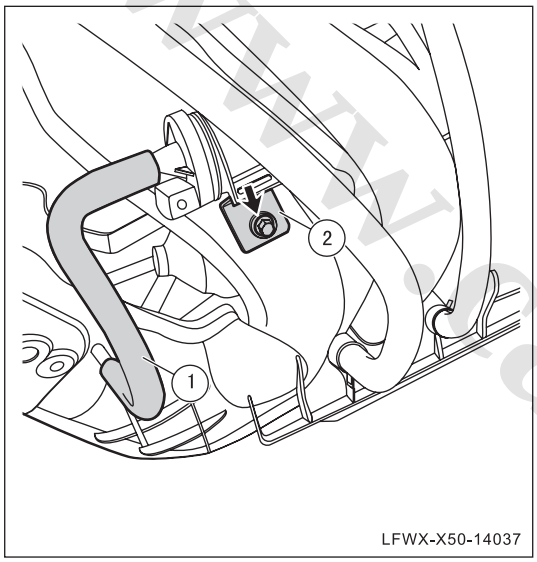
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(d) Install the vent hose ② and spring clamp of PCV valve on the intake manifold.

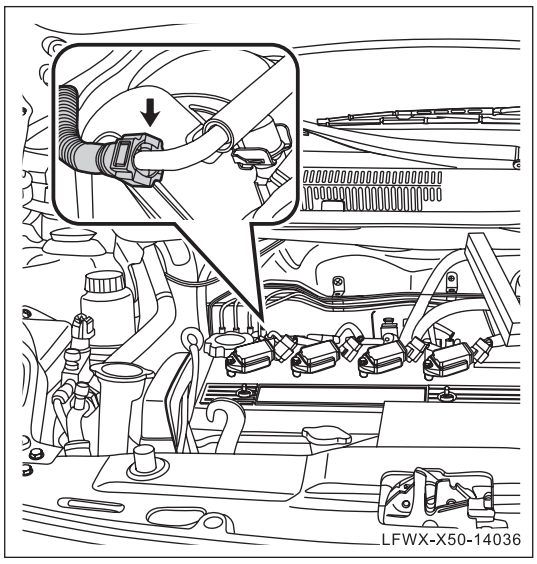
(e) Install the vacuum boost hose ① and spring clamp on the intake manifold.



(f) Install the outlet pipe ① of canister solenoid valve on the intake manifold.

(g) Align the canister solenoid valve bracket ② with the installation hole of the intake manifold and install and tighten the fixing bolts.

Torque: 8 - 12 N•m

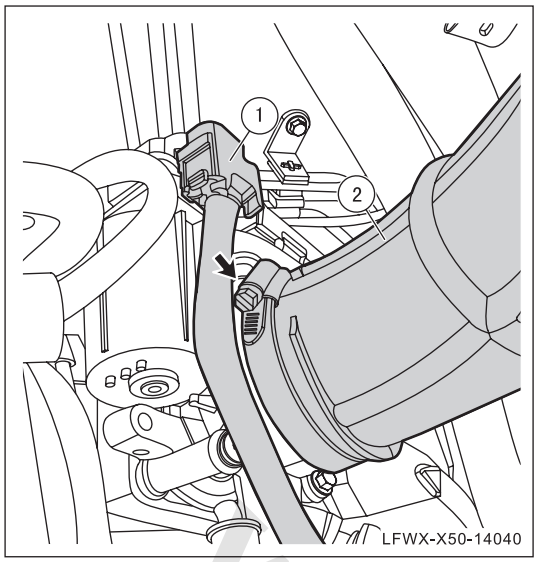


(h) Connect the fuel rail inlet pipe.

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(i) Connect electronic throttle body connector ① .

(j) Install the intake pipe ② and hoop of the engine on the throttle body and tighten the hoop.

(k) Connect injector connector.

(l) Connect the negative cable of battery.

(m) After the accumulation of fuel pressure, start the engine to check whether the engine operates properly.

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ELECTRONIC THROTTLE BODY

INSPECTION

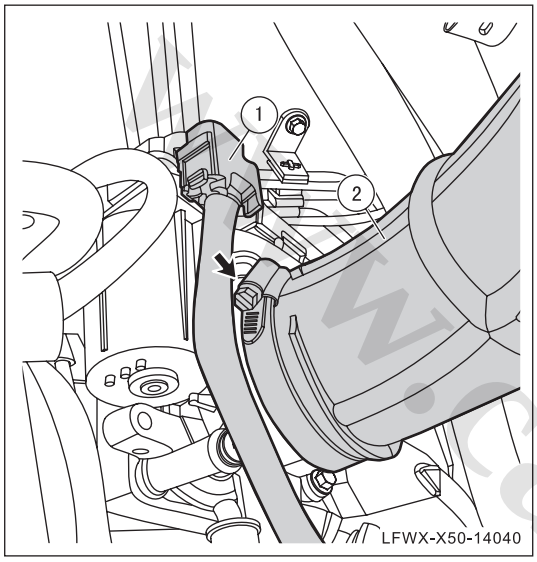
△ HINT:

For the inspection of electronic throttle body, see 12- Engine Control System, Engine Control System, On-vehicle Inspection.

REPLACEMENT

1. REMOVAL OF THE ELECTRONIC THROTTLE BODY

(a) Disconnect the negative cable of battery.



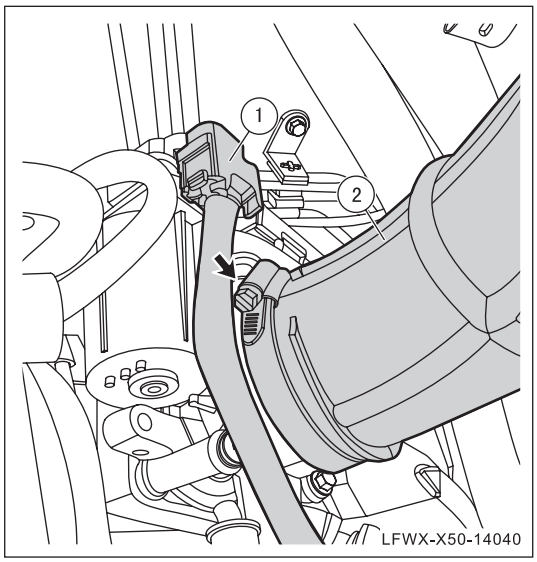
(b) Disconnect connector ① of the electronic throttle body.

(c) Unscrew engine intake pipe ② hoop and pull out the engine intake pipe ② from the throttle body.

(d) Remove the fixing bolt of the throttle body and take down the throttle body.

2. INSTALLATION OF THE ELECTRONIC THROTTLE BODY

(a) Install the electronic throttle body on the intake manifold and install and tighten the fixing bolts.



(b) Install the intake pipe ② and hoop of the engine on the electronic throttle body and tighten the hoop.

(c) Connect the electronic throttle body connector ① .

(d) Connect the negative cable of battery.

(e) Start the engine to check whether the engine operates properly.

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INTAKE PRESSURE AND TEMPERATURE SENSOR

INSPECTION

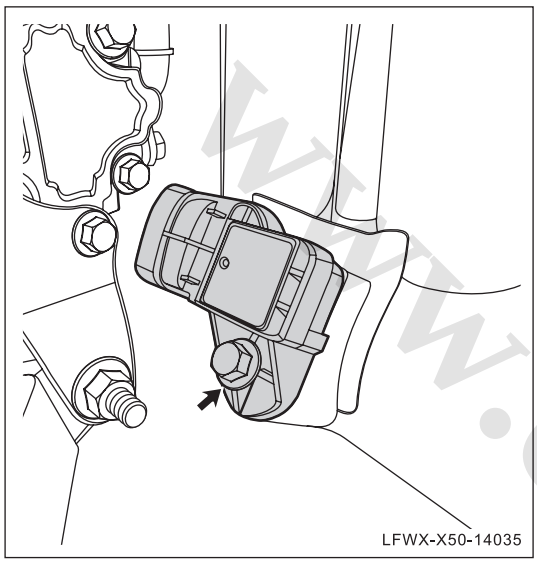
△ HINT:

For the inspection of intake pressure and temperature sensor, see 12 - Engine Control System, Engine Control System, On-vehicle Inspection.

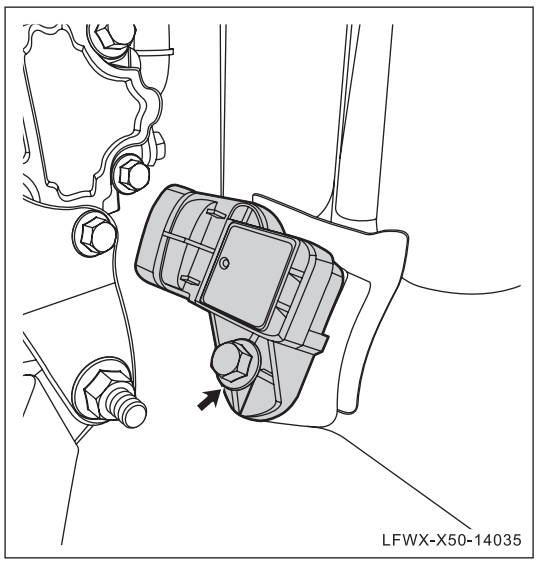
1. REMOVAL OF THE AIR INTAKE PRESSURE AND TEMPERATURE SENSOR

(a) Disconnect the negative cable of battery.

(b) Disconnect intake pressure and temperature sensor connector.



(c) Remove the fixing bolts of the intake pressure/temperature sensor, and take down the intake pressure/temperature sensor.



2. INSTALLATION OF THE INTAKE PRESSURE AND TEMPERATURE SENSOR

(a) Install the intake pressure and temperature sensor on the stabilizing cavity of the intake manifold and install and tighten the fixing bolts.

Torque: 8 - 12 N•m

(b) Connect intake pressure and temperature sensor connector.

(c) Connect the negative cable of battery.

(d) Start the engine to check whether the engine operates properly.

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OCV

INSPECTION

△ HINT:

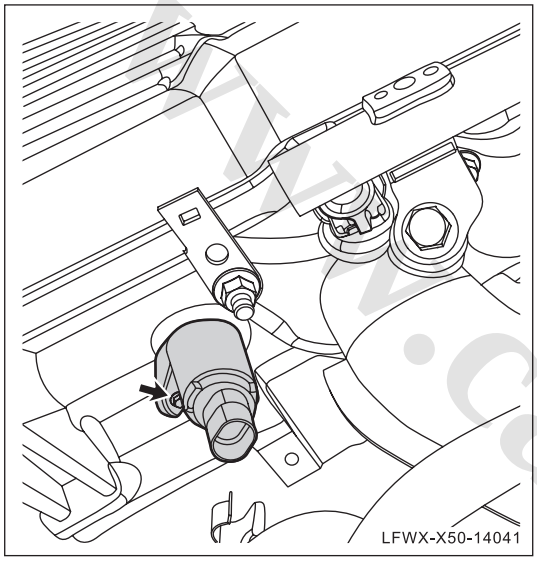
For the inspection of OCV, refer to 12- Engine Control System, Engine Control System, On-vehicle Inspection.

REPLACEMENT

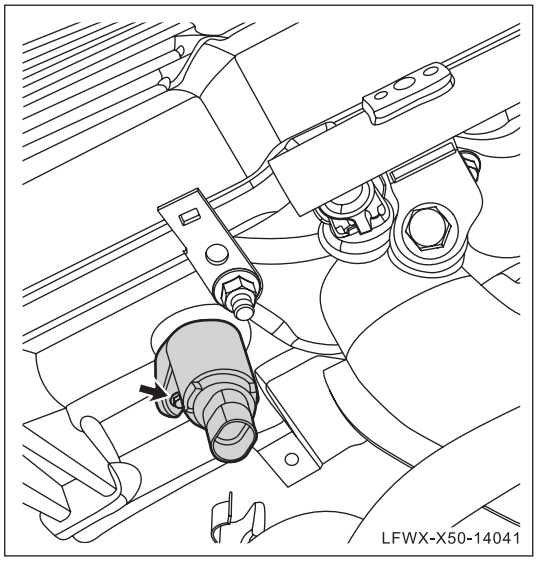
1. REMOVAL OF OCV

(a) Disconnect the negative cable of battery.

(b) Disconnect OCV connector.



(c) Remove the fixing bolt of OCV and pull out OCV.



2. INSTALLATION OF OCV

(a) Install the OCV on the installation hole of cylinder body and install and tighten the fixing bolts.

Torque: 8 - 12 N•m

(b) Connect the OCV connector.

(c) Connect the negative cable of battery.

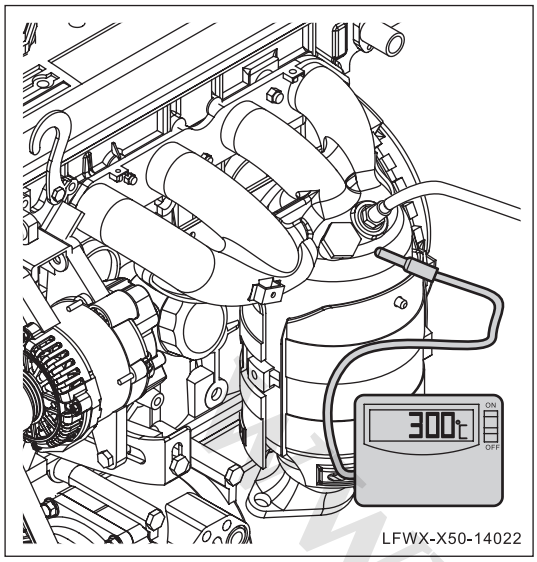
(d) Start the engine to check whether the engine operates properly.

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CATALYTIC CONVERTER

CHECK



1. CHECK THE CATALYTIC CONVERTER.

(a) Measure the intake and exhaust temperature of catalytic converter with the digital temperature meter.

△ HINT:

The temperature of the catalytic converter outlet should be at least 10%-15% higher than that of intake (generally, the temperature of catalytic converter outlet is 20%-25% higher than that of intake). If the temperature of outlet is below the above parameter, or that of intake, the catalytic converter fails or is clogged.

NOTICE:

During measurement, the sensor probe of the digital temperature meter should be placed as close to the intake or outlet of the catalytic converter as possible (within 50 mm).

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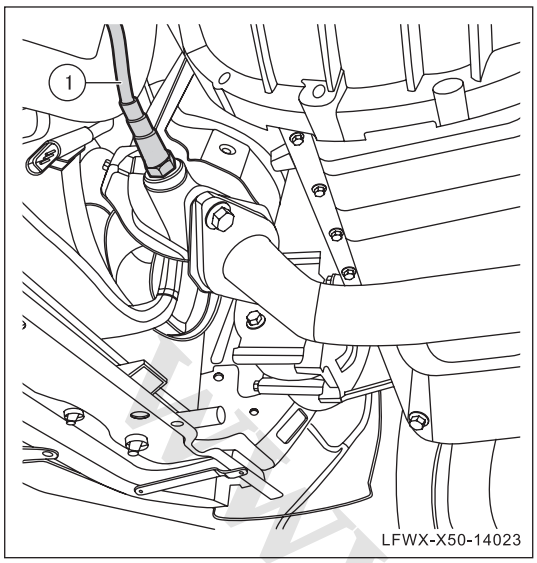
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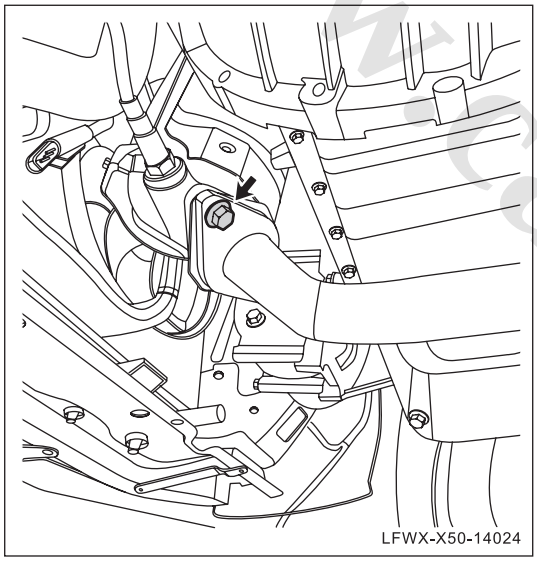
REPLACEMENT

1. REMOVAL OF CATALYTIC CONVERTER

(a) Disconnect the negative cable of battery.



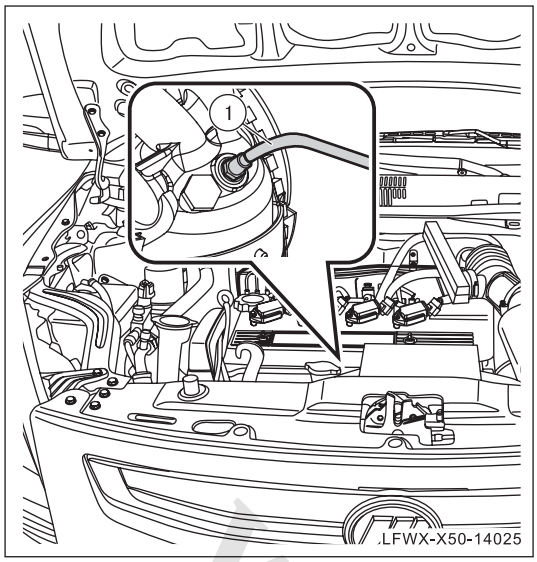
(b) Disconnect rear oxygen sensor harness ① connector.



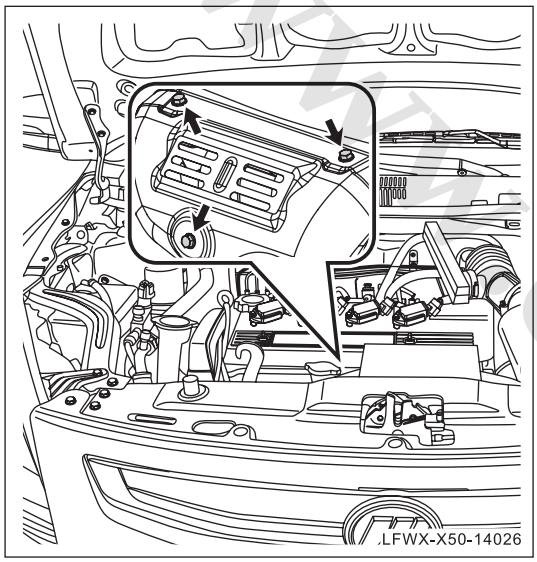
(c) Remove the fixing bolts of the connecting pipe with corrugated pipe, and take down the gasket.

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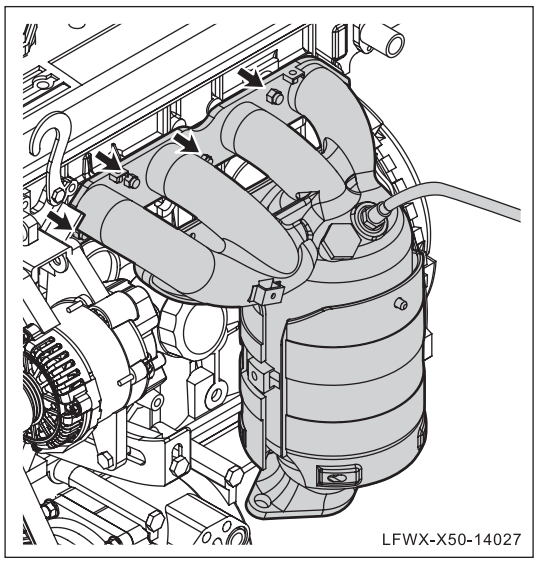
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(d) Disconnect front oxygen sensor harness ① connector.



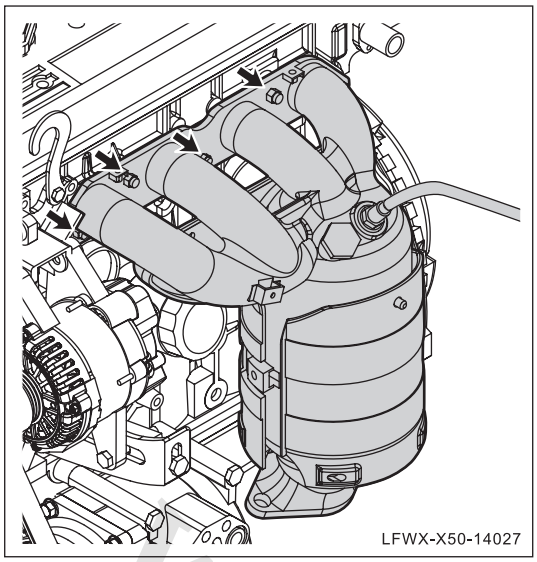
(e) Remove the fixing bolts of the catalytic converter upper heat shield, and take down the catalytic converter upper heat shield.



(f) Remove the fixing nuts of the catalytic converter, and take down the catalytic converter and gasket.

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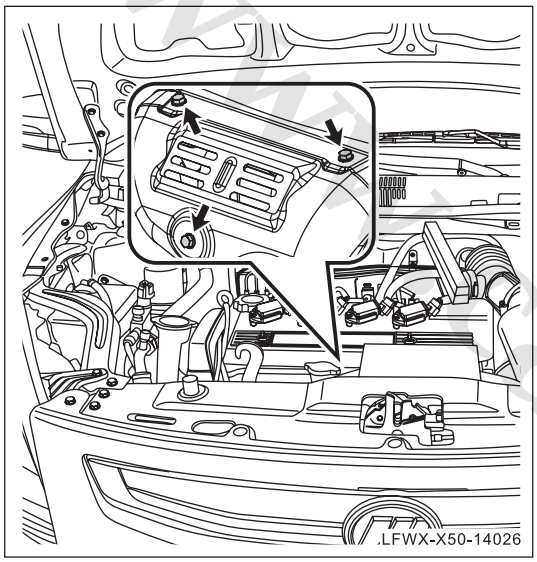
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2. INSTALLATION OF CATALYTIC CONVERTER

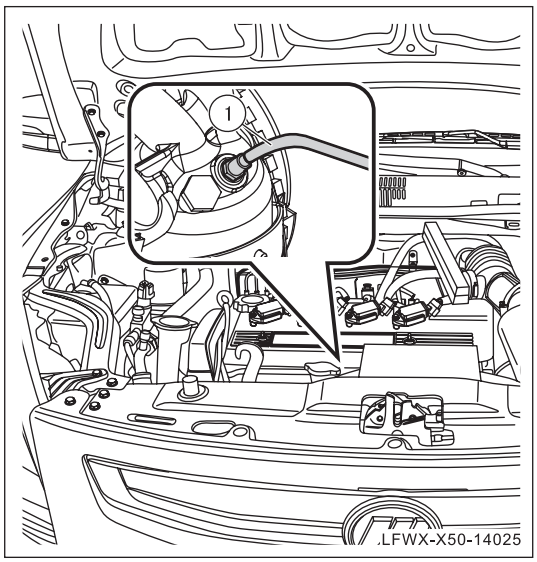
(a) Install the catalytic converter and gasket on the engine and install & tighten the fixing nuts.

Torque: 20 - 25 N•m



(b) Install the upper heat shield of catalytic converter on the catalytic converter and install & tighten the fixing bolts.

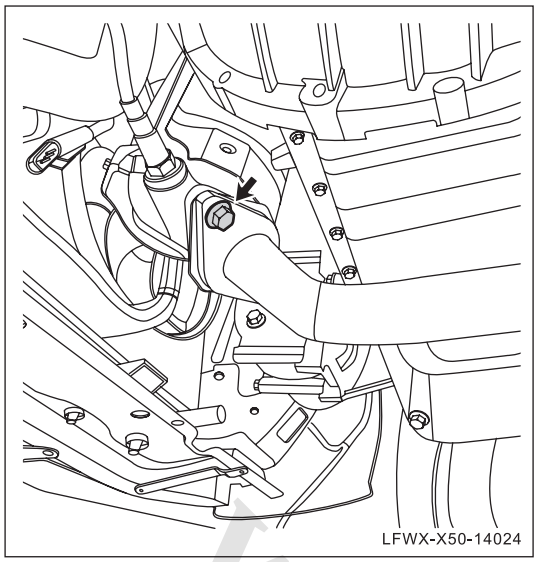
Torque: 8 - 12 N•m



(c) Connect front oxygen sensor harness ① connector.

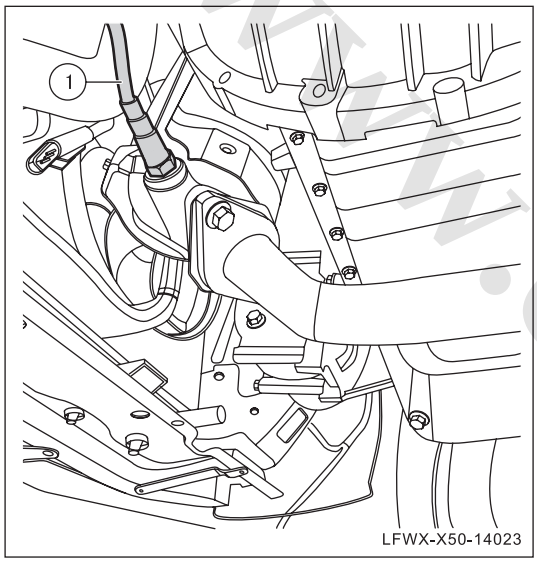
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(d) Install the connecting pipe with corrugated pipe and gasket on the catalytic converter and install & tighten the fixing bolts.

Torque: 40 - 50 N•m



(e) Connect the rear oxygen sensor harness ① connector.

(f) Connect the negative cable of battery.

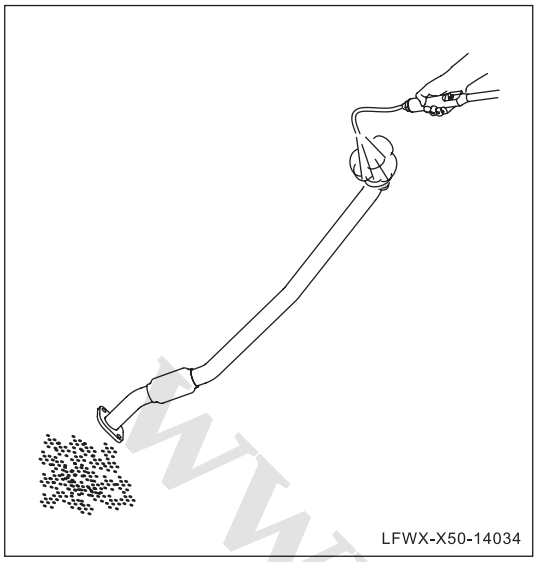
(g) Start the engine to check whether the engine operates properly.

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CONNECTING PIPE WITH CORRUGATED PIPE

CHECK



1. CHECK CONNECTING PIPE WITH CORRUGATED PIPE

(a) Blow compressed air into the intake of connecting pipe with corrugated pipe and check whether the air is blown out smoothly from the outlet and there is foreign matter blown out.

△ HINT:

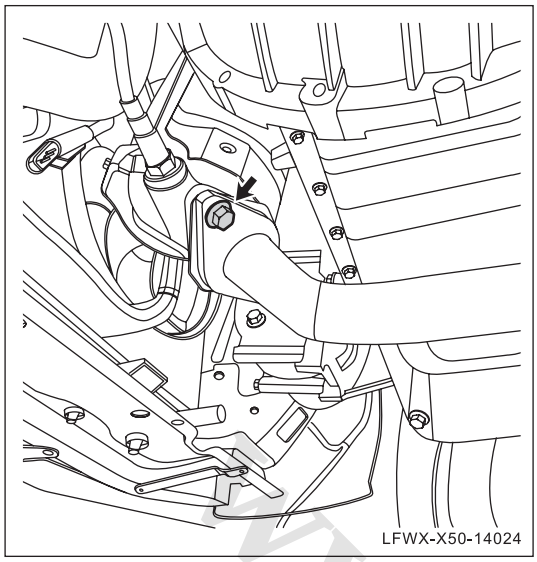
If the air is not blown out smoothly or there is foreign matter blown out, it indicates the connecting pipe with corrugated pipe is clogged. The compressed air is recommended for cleaning and dredging the inside.

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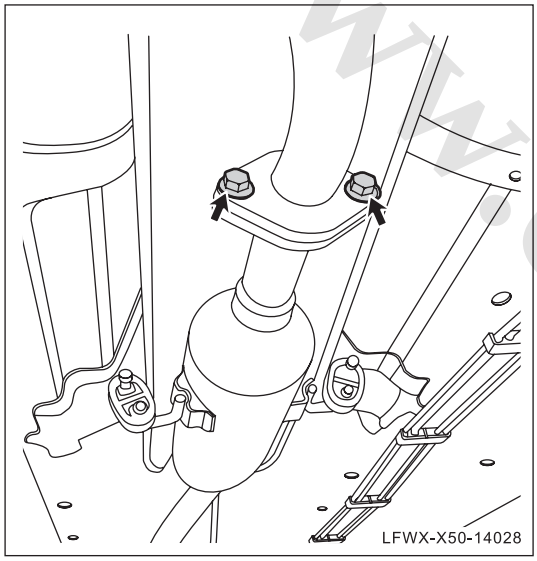
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REPLACEMENT

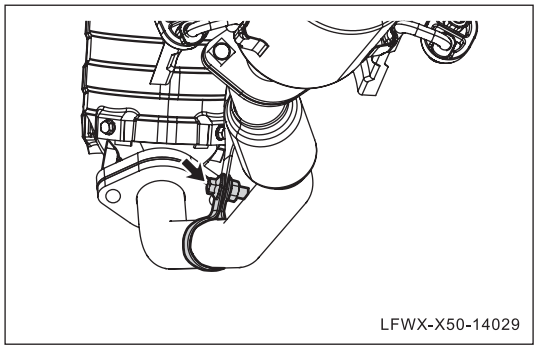


1. REMOVAL OF CONNECTING PIPE WITH CORRUGATED PIPE

(a) Remove the fixing bolts at the intake end of the connecting pipe with corrugated pipe.



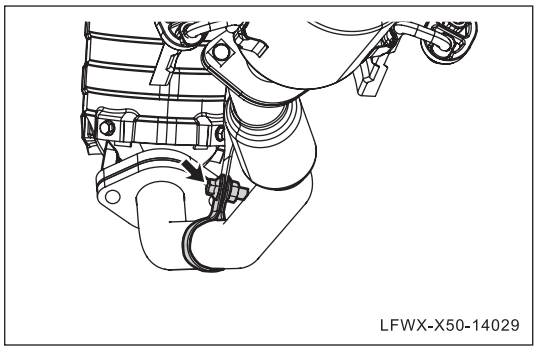
(b) Remove the fixing bolts at the outlet end of the connecting pipe with corrugated pipe.



(c) Remove the fixing bolts of the connecting pipe with corrugated pipe clamp, and take down the connecting pipe with corrugated pipe and gaskets at both ends.

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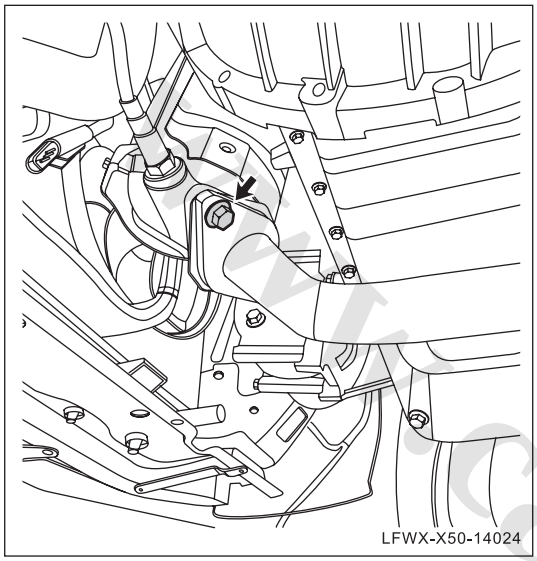
2. INSTALLATION OF CONNECTING PIPE WITH CORRUGATED PIPE

(a) Install the connecting pipe with corrugated pipe and clamp to the installation position and install the clamp fixing bolts.

Torque: 20 - 25 N•m

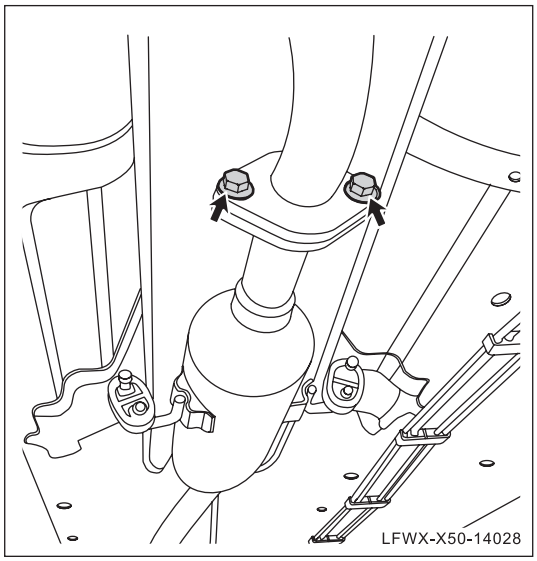
△ HINT:

Tighten the clamp fixing bolts until the fixing bolts at both ends of connecting pipe with corrugated pipe are installed.



(b) Install the gaskets on both ends of connecting pipe with corrugated pipe to the installation position and install & tighten the intake fixing bolts.

Torque: 40 - 50 N•m



(c) Install and tighten the fixing bolts at the outlet end of connecting pipe with corrugated pipe.

Torque: 40 - 50 N•m

(d) Start the engine to check whether the engine operates properly.

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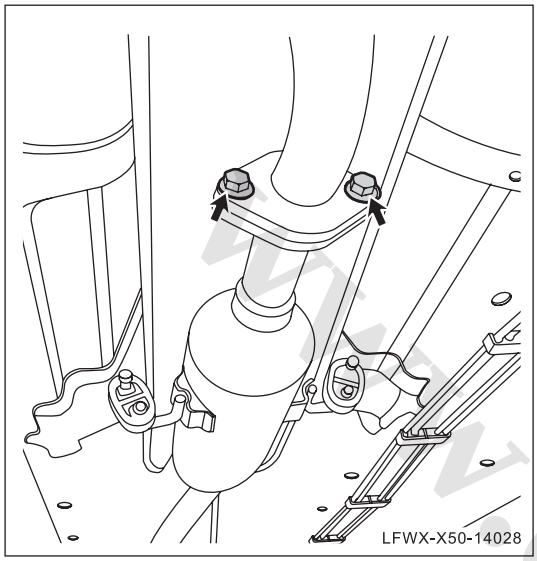
FRONT MUFFLER

CHECK

△ HINT:

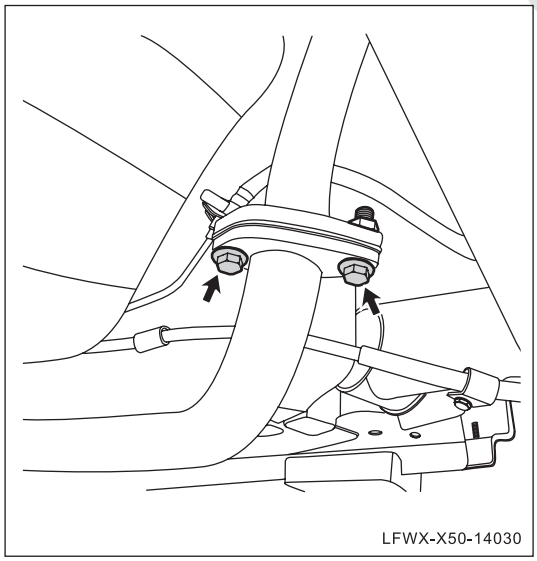
Inspection method of front muffler is the same with that of connecting pipe with corrugated pipe.

REPLACEMENT



1. REMOVAL OF FRONT MUFFLER

(a) Remove the fixing bolts at intake end of the front muffler and take down the gasket.

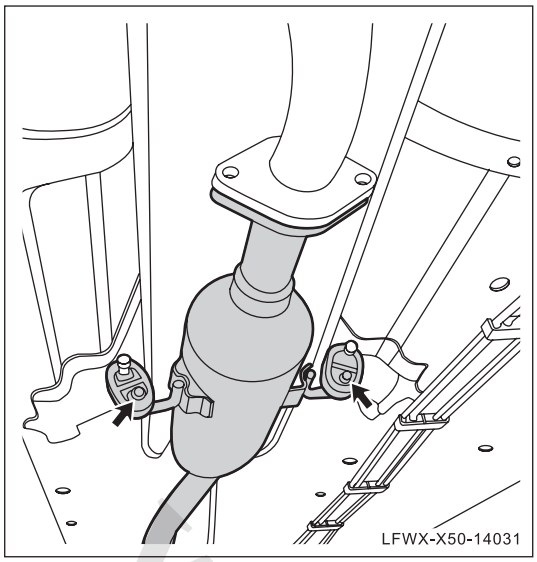


(b) Remove the fixing bolts at the outlet end of the front muffler and take down the gasket.

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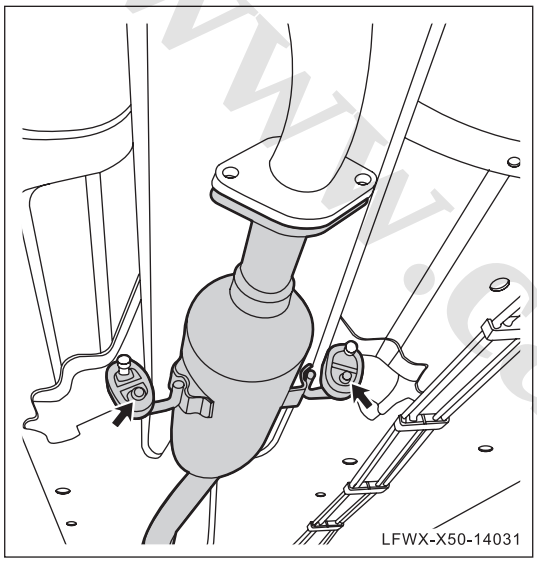
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(c) Take down the front muffler from the mounting block.

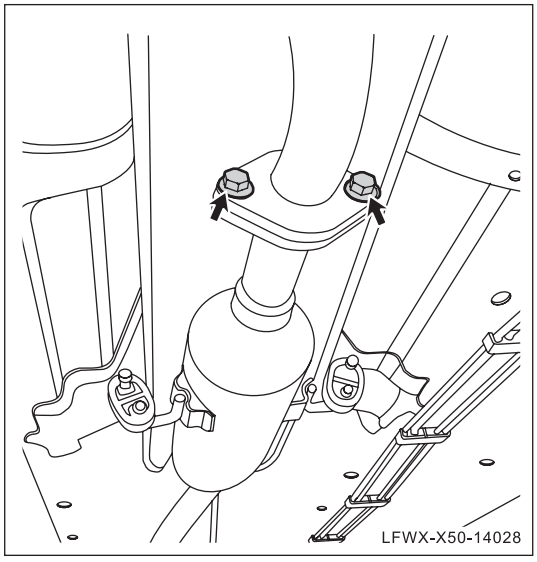
△ HINT:

The muffler hook may be difficult to take down from the mounting block. Apply a little lubricating grease on the installation hole of mounting block to facilitate removing the muffler.



2. INSTALLATION OF FRONT MUFFLER

(a) Install the front muffler on mounting block.

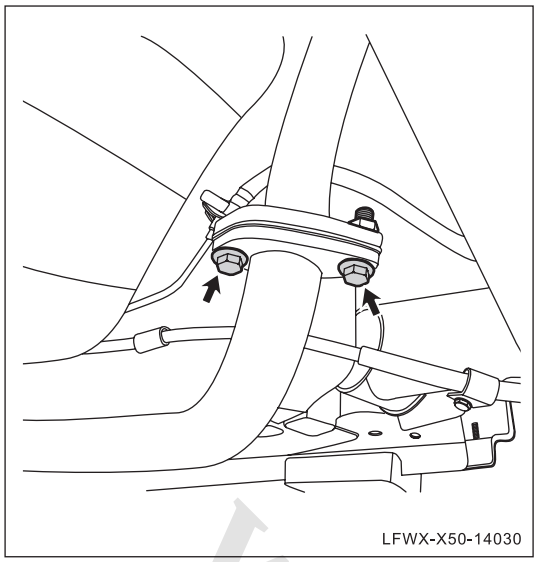


(b) Install the gasket at the intake end of the front muffler and install & tighten the fixing bolts.

Torque: 40 - 50 N•m

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(c) Install the gasket at the outlet end of the front muffler and install & tighten the fixing bolts.

Torque: 40 - 50 N•m

(d) Start the engine to check whether the exhaust is normal.

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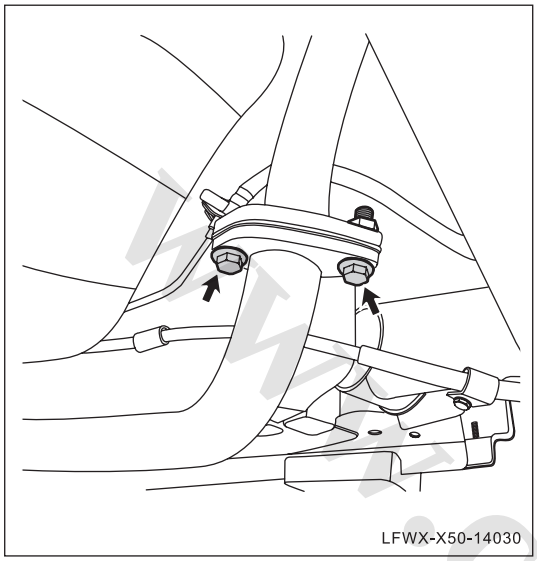
REAR MUFFLER

CHECK

△ HINT:

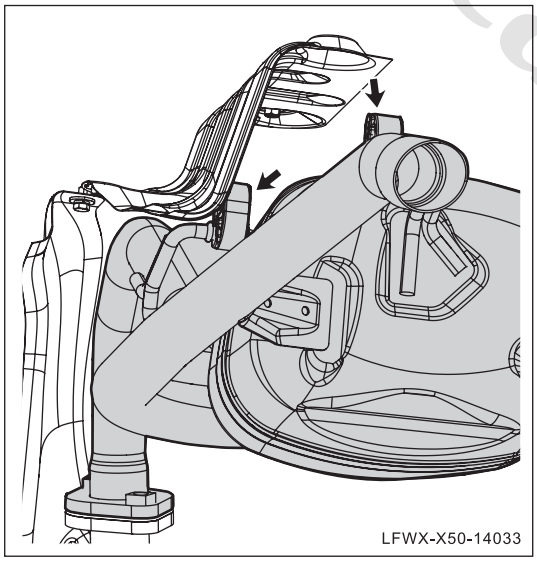
Inspection method of rear muffler is the same with that of connecting pipe with corrugated pipe.

REPLACEMENT



1. REMOVAL OF REAR MUFFLER

(a) Remove the fixing bolts at the intake end of the rear muffler and take down the gasket.



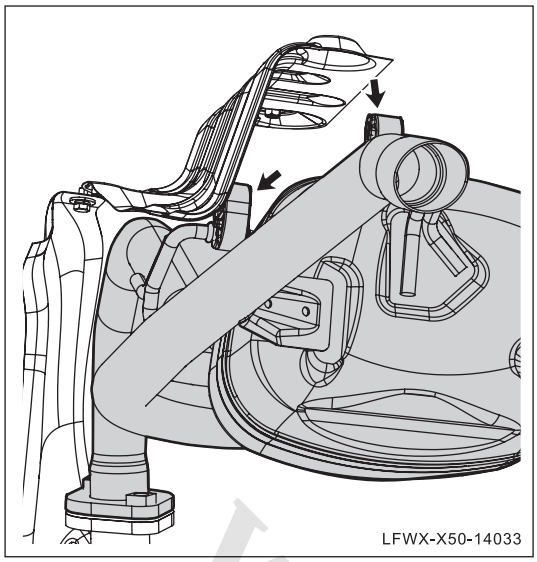
(b) Take down the rear muffler from the mounting block.

△ HINT:

The muffler hook may be difficult to take down from the mounting block. Apply a little lubricating grease on the installation hole of mounting block to facilitate removing the muffler.

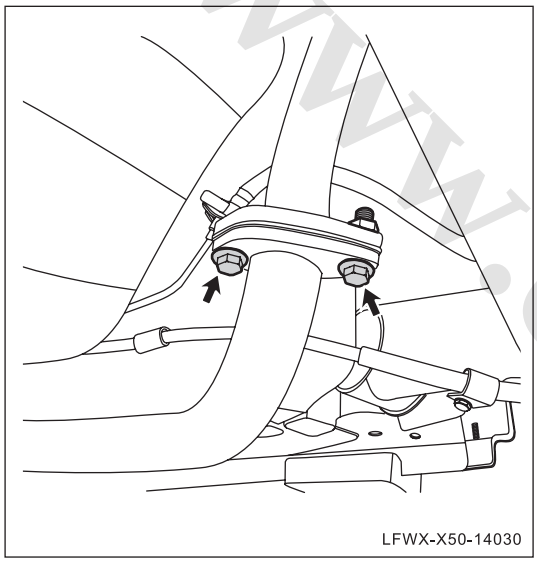
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2. INSTALLATION OF REAR MUFFLER

(a) Install the rear muffler on mounting block.



(b) Install the gasket at the intake end of the rear muffler and install & tighten the fixing bolts.

Torque: 40 - 50 N•m

(c) Start the engine to check whether the exhaust system is normal.

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OXYGEN SENSOR

INSPECTION

△ HINT:

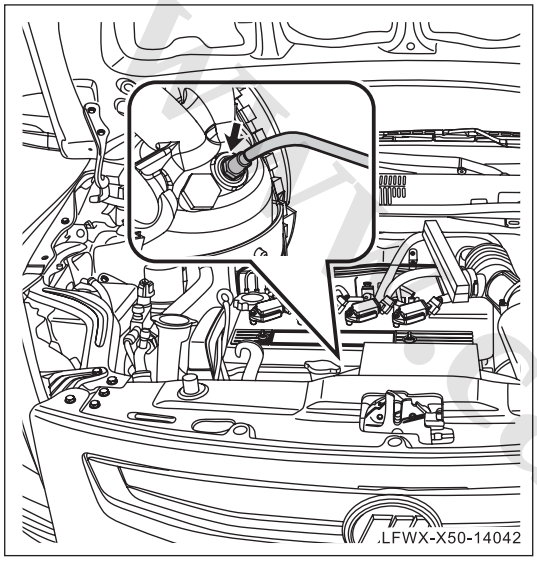
For the inspection of oxygen sensor, refer to 12- Engine Control System, Engine Control System, On-vehicle Inspection.

REPLACEMENT

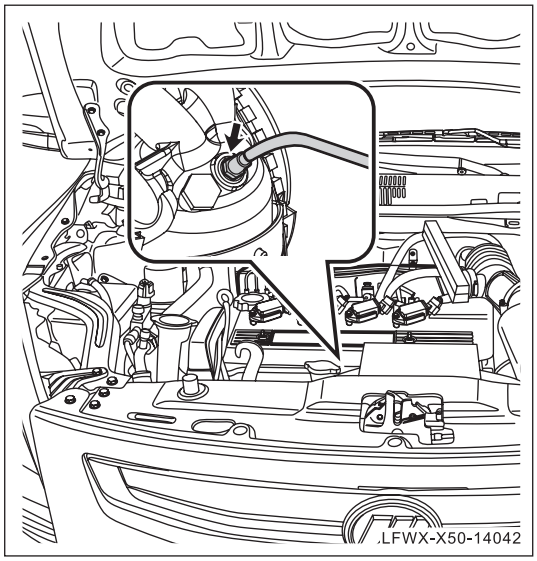
1. REMOVAL OF FRONT OXYGEN SENSOR

(a) Disconnect the negative cable of battery.

(b) Disconnect the front oxygen sensor harness connector.



(c) Remove the front oxygen sensor.



2. INSTALLATION OF FRONT OXYGEN SENSOR

(a) Install the front oxygen sensor in the installation hole on the catalytic converter.

Torque: 50 - 60 N•m

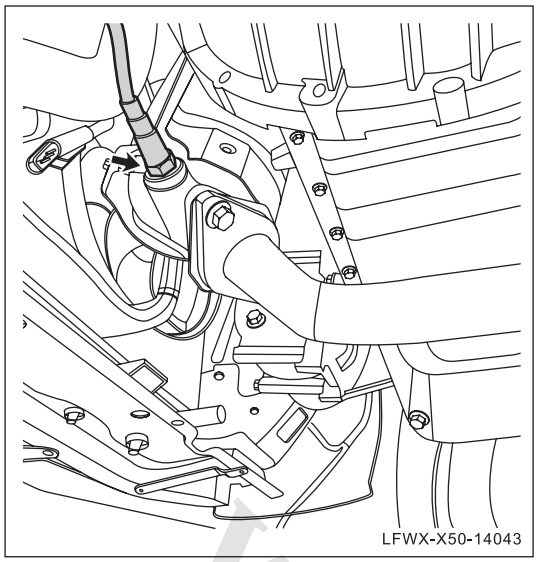
(b) Connect the front oxygen sensor harness connector.

3. REMOVAL OF THE REAR OXYGEN SENSOR.

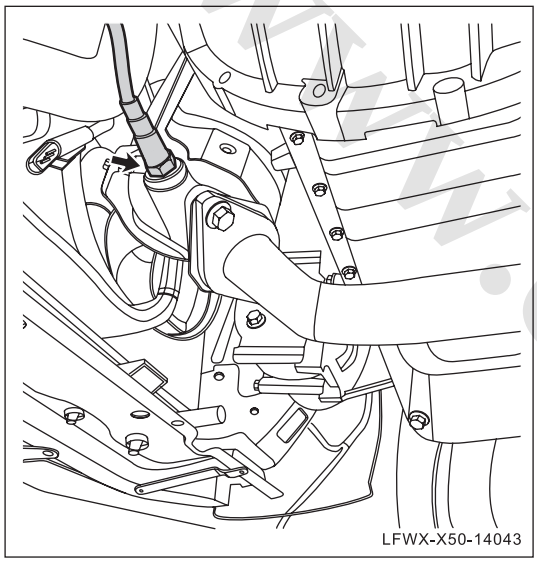
(a) Disconnect the rear oxygen sensor harness connector.

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(b) Remove the rear oxygen sensor.



4. INSTALL REAR OXYGEN SENSOR

(a) Install the rear oxygen sensor in the installation hole on the catalytic converter.

Torque: 50 - 60 N•m

(b) Connect the rear oxygen harness connector.

(c) Connect the negative cable of battery.

(d) Start the engine to check whether the engine operates properly.

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Cooling System

Cooling system.....15-1
System description.....15-1
Preparation.....15-1
Service data.....15-2
Precautions.....15-2
Components (I).....15-3
Components (II).....15-4
Function and fault of components.....15-5
On-vehicle inspection.....15-6
Coolant.....15-8
Replacement.....15-8
Radiator.....15-10
Check.....15-10
Replacement.....15-11
Coolant reservoir.....15-18
Replacement.....15-18
Cooling fan.....15-20
Check.....15-20
Replacement.....15-21
Water pump.....15-24
Check.....15-24
Replacement.....15-25
Thermostat.....15-27
Inspection.....15-27
Replacement.....15-28
Cooling line.....15-30
Replacement.....15-30
Coolant temperature sensor.....15-33
Inspection.....15-33
Replacement.....15-33

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COOLING SYSTEM

SYSTEM DESCRIPTION

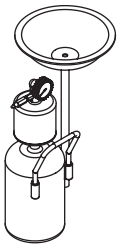
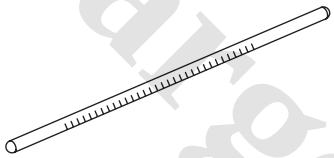
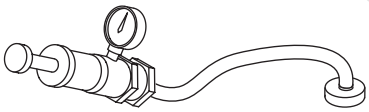
1. FUNCTION

Functions of cooling system is: to dissipate heat absorbed by heated parts in time to keep the engine operating at its most appropriate temperature. Besides, the cooling system also provides heating to the internal of the vehicle.

2. COMPONENT

The cooling system mainly consists of coolant, radiator, cooling fan, water pump, thermostat and cooling lines.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Recovery		To recover coolant
2	Temperature gauge		To measure water temperature
3	Cooling system pressure monitor		To check the cooling system and the water tank cap for leakage

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Coolant model	LANCT 100
Filling amount of coolant	6L
Temperature when the thermostat valve opens	80 - 85℃
Temperature when the thermostat valve fully opens	95℃
Lift when the thermostat valve fully opens	≥ 8 mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolts of the water tank upper crossbeam assembly	8 - 12
Fixing bolts of the resonant cavity	8 - 12
Fixing bolts of the radiator filling pipe bracket	8 - 12
Condenser fixing bolt	20 - 26
Coolant reservoir fixing bolt	8 - 12
Fixing screws of the fan motor	10 - 14
Fixing nuts of the cooling fan	20 - 26
Cooling fan shroud fixing bolt	8 - 12
Fixing bolts of front and rear housings of water pump	8 - 12
Water pump pulley fixing bolts	10 - 12
Fixing bolts of engine inlet hose	10 - 14
Coolant temperature sensor	13 - 17

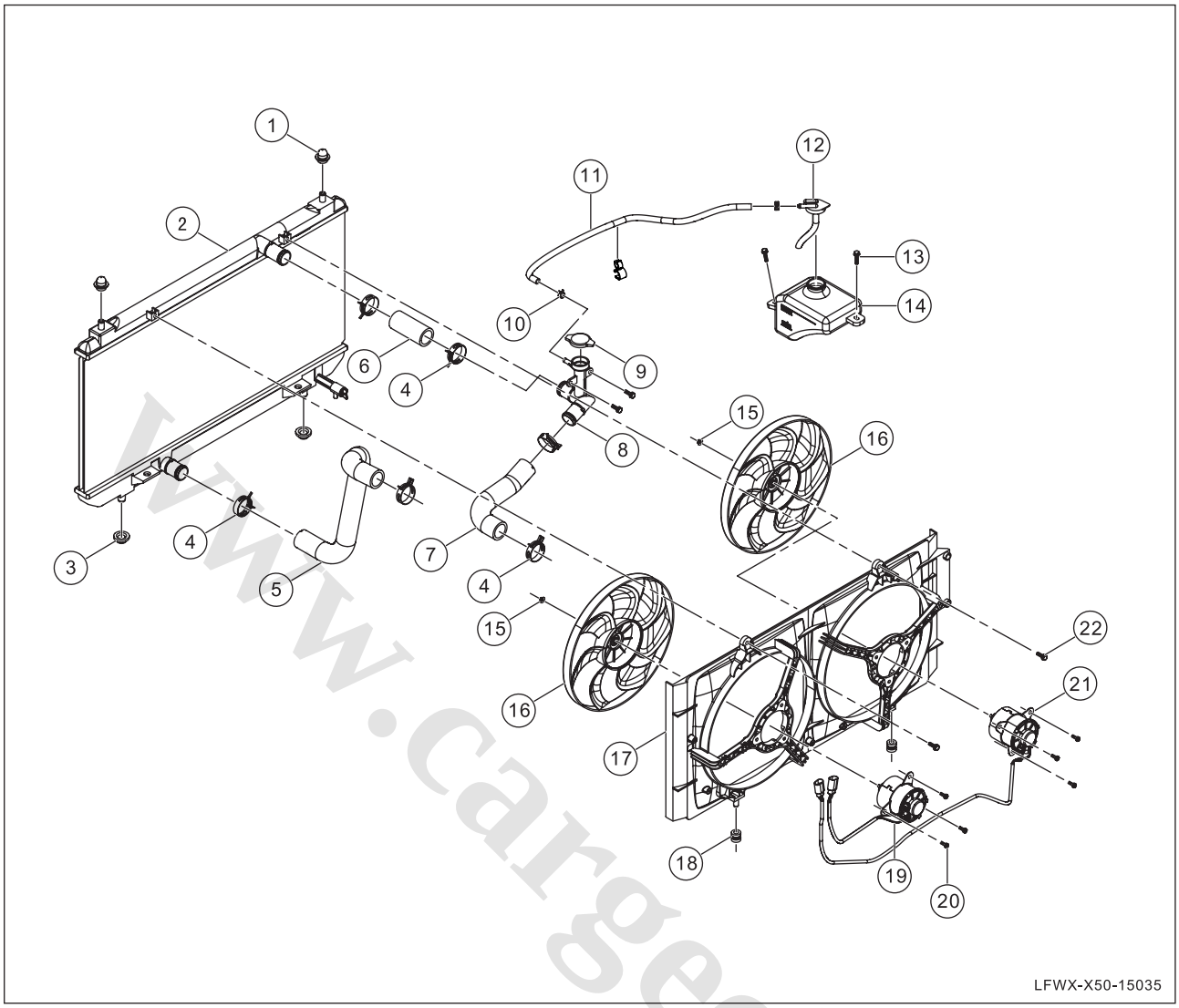
PRECAUTIONS

1. Make sure the engine are cool before performing operation on the cooling system.
2. Don't let the coolant spill onto the drive belt when performing operation.
3. When removing the radiator, be careful not to scratch or damage the radiator core.
4. Be sure to connect each hose securely and firmly and install the hose clamp in place when re-installing the cooling system.

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COMPONENTS (I)



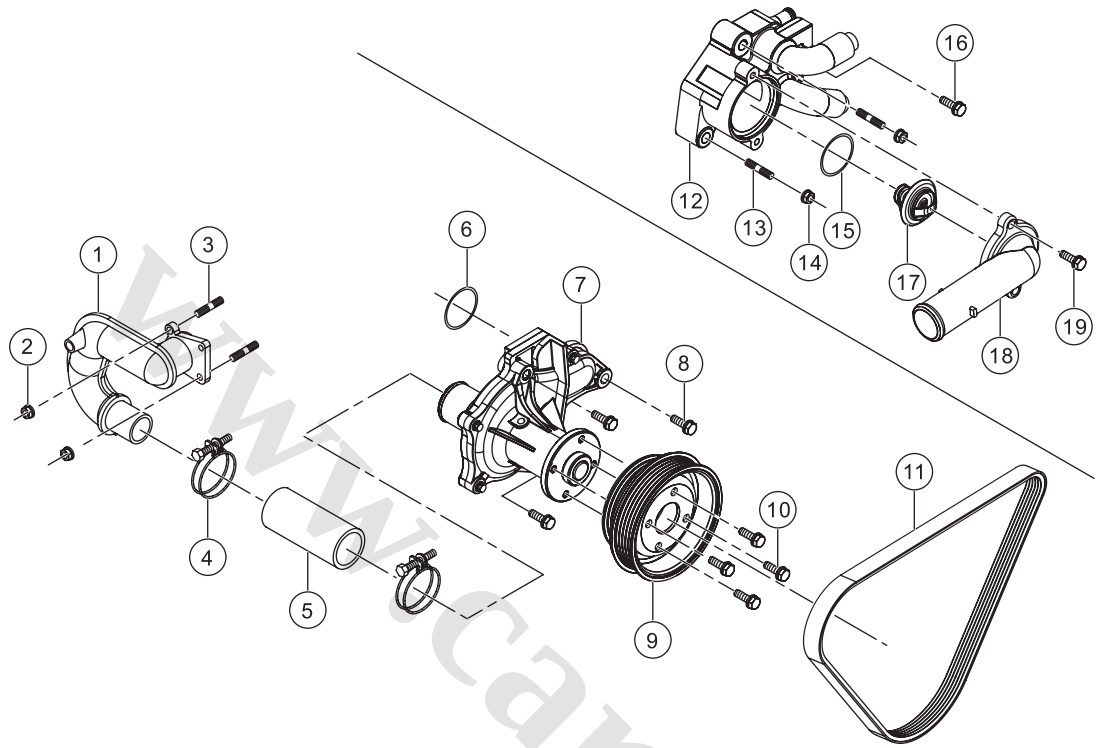
1	Radiator upper mounting
2	Radiator assembly
3	Radiator lower mounting
4	Steel belt type elastic hoop
5	Radiator outlet hose
6	Radiator inlet hose I
7	Radiator inlet hose II
8	Radiator filling pipe
9	Radiator filler cap
10	Elastic clamp
11	Overflow pipe

12	Coolant reservoir cap
13	Bolt
14	Coolant reservoir
15	Nut
16	Fan
17	Fan shroud
18	Damping block
19	Fan motor
20	Bolt
21	Fan motor
22	Bolt

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COMPONENTS (II)



LFWX-X50-15036

1	Inlet hose of water pump
2	Nut
3	Stud bolt
4	Clamp
5	Water inlet rubber hose of water pump
6	O-ring of water pump
7	Water pump
8	Bolt
9	Water pump pulley
10	Bolt

11	Belt for water pump and alternator
12	Thermostat base
13	Stud bolt
14	Nut
15	Seal ring
16	Bolt
17	Thermostat
18	Water inlet hose assembly
19	Bolt

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FUNCTION AND FAULT OF COMPONENTS

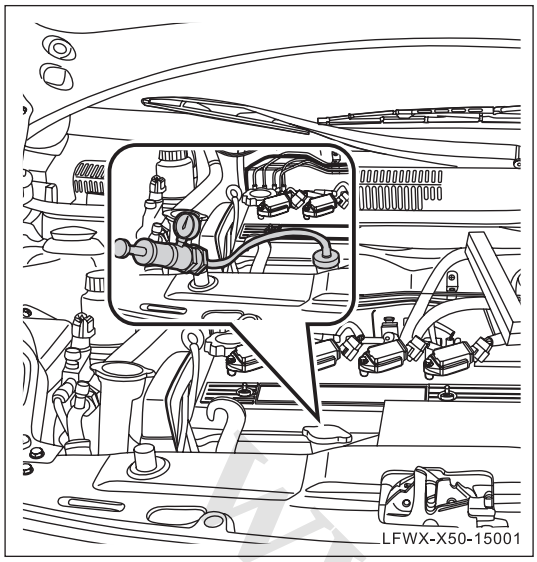
Part name	Part function	Common faults	Fault symptom
Coolant	Cool the engine components, prevent the coolant from concreting and prevent the cooling system components from rusting and overheating	/	/
Radiator	Cool the high-temprature coolant	The radiator is clogged	The engine is in the state of high temperature
Cooling fan	Improve the radiator's cooling capacity	The cooling fan does not operate	The engine is in the state of high temperature
Water pump	Apply pressure to the coolant to keep it flowing in circulation in the cooling system so as to dissipate heat quickly	The water pump impeller is damaged and the water pump leaks	The engine is in the state of high temperature
Thermostat	According to the coolant temperature, adjust the water amount going into the radiator automatically and change the circulation range of water to adjust the radiating capacity of the cooling system, so as to keep the engine operating at its most appropriate temperature	The thermostat operates abnormally	The engine is in the state of high temperature The engine is seriously worn
Cooling line	Transmit coolant	The cooling line leaks	/

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ON-VEHICLE INSPECTION



1. CHECK THE COOLANT

(a) Check the coolant for leakage.

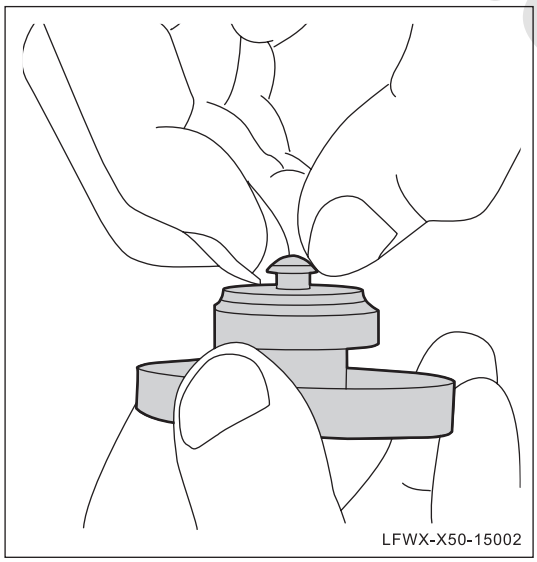
- Refill the coolant. (see 15 - Cooling System, Coolant, Replacement)
- Connect the radiator cover detector and adjust the pressure to 50-100kPa, and then observe whether the pressure value drops.

△ HINT:

- Check the cooling line, radiator and water pump for leakage if the pressure decreases.
- Check the radiator core, cylinder block and cylinder head for leakage if there are no leaking traces of coolant outside the engine.

(b) Drain a little coolant into an appropriate container.

(c) Check the drained coolant for scale, rust, impurities or discoloration (the normal coolant is aqua). Have the coolant replaced if necessary.



2. CHECK THE FILLER CAP

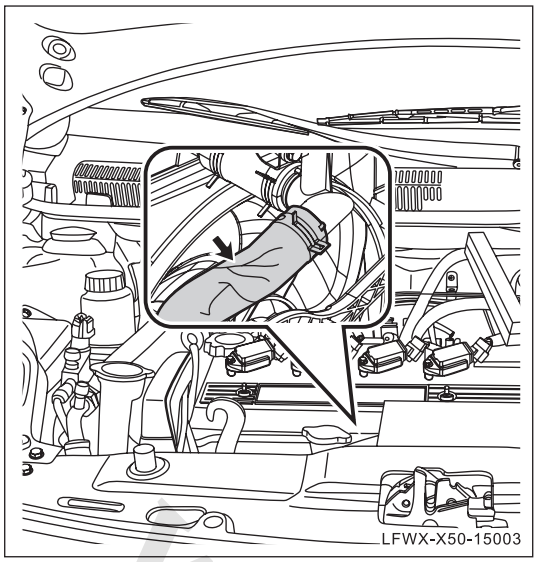
(a) Draw out the negative pressure valve and open it. After releasing its pressure, check whether the negative pressure valve can be fully closed and have it replaced if not.

NOTICE:

Check that the valve seat of the filler cap negative pressure valve is free of dirts and damage.

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3. CHECK THE COOLING LINE

(a) Check the cooling line for cracks, aging and other phenomenon and have it replaced if necessary.

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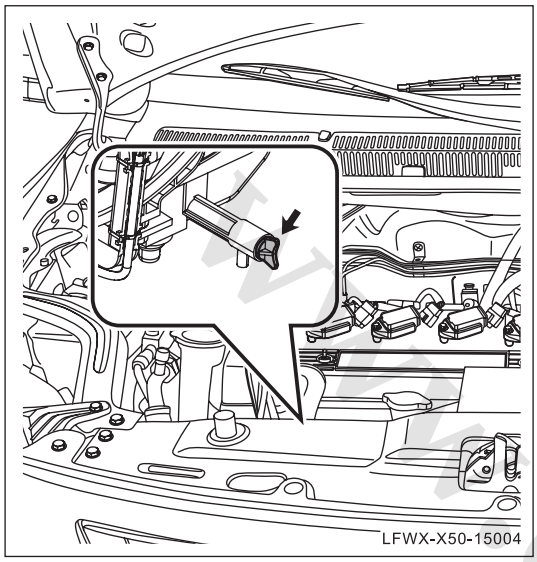
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COOLANT

REPLACEMENT

NOTICE:

- **Never start to work before the engine is cooled down completely.**
- **Cover the filler cap with a piece of thick rag and open it carefully. First release the pressure inside the radiator and then open it completely.**



1. DRAIN THE COOLANT

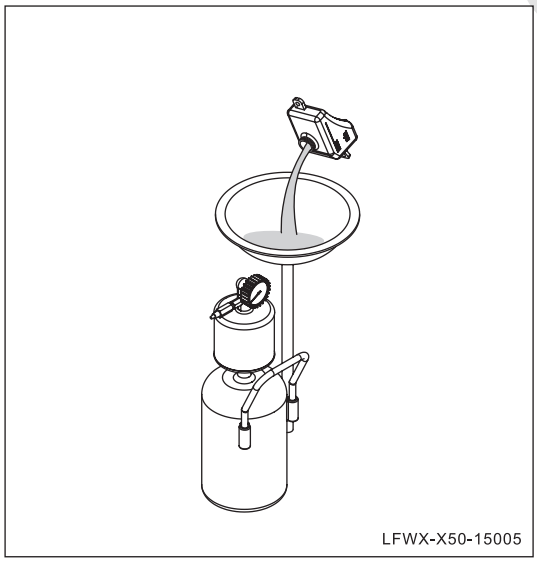
(a) Put a recovery under the drain plug of the radiator.

(b) Remove the radiator drain plug and drain the coolant into the recovery.

△ HINT:

In order to drain the coolant out quickly, open the radiator filler cap to release the pressure of the cooling system.

(c) Install the radiator drain tap.



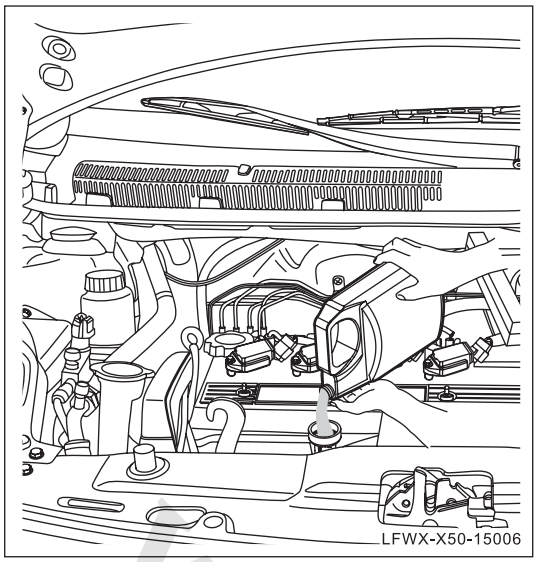
(d) Remove the coolant reservoir. (see 15 - Cooling System, Coolant Reservoir, Replacement)

(e) Pour the coolant in the coolant reservoir into the recovery.

(f) Install the coolant reservoir. (see 15 - Cooling System, Coolant Reservoir, Replacement)

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2. REFILL THE COOLANT

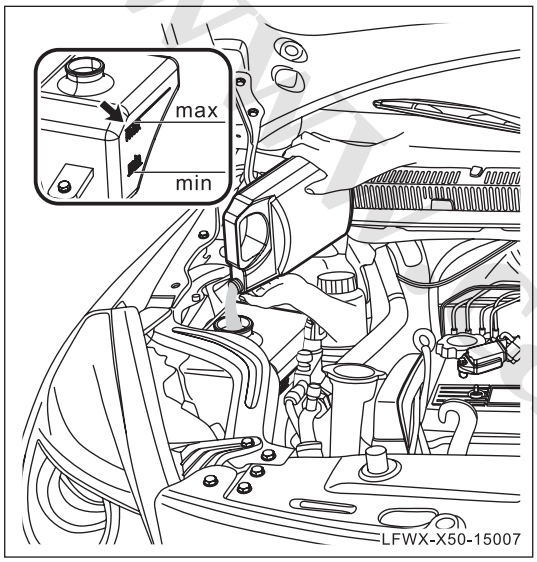
(a) Check whether the joints of each line in the cooling system are connected firmly.

(b) Open the radiator filler cap.

(c) Fill coolant into the radiator slowly until the coolant level is flush with the filler.

Coolant model: LANCT 100

Filling amount of coolant: 6L

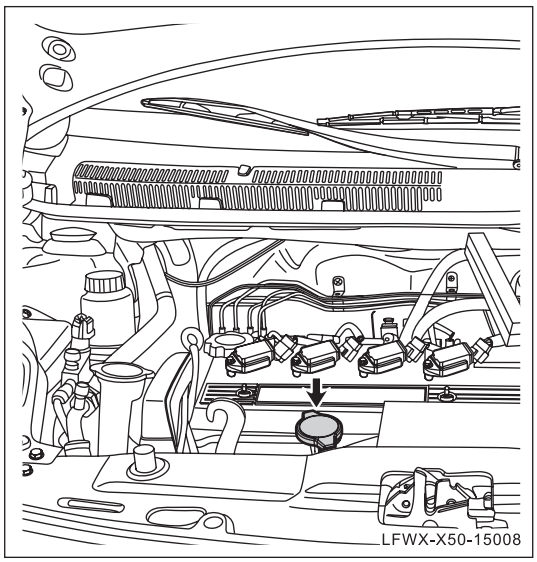


(d) Open the coolant reservoir cap.

(e) Refill coolant into the coolant reservoir slowly until the coolant level is nearly at the max mark.

(f) Install the coolant reservoir cap.

(g) Crank the engine to its operating temperature and observe the coolant level at the radiator filler. Refill coolant in time if the coolant level decreases.



(h) Install the radiator filler cap.

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RADIATOR

CHECK

1. CLEAN THE RADIATOR

(a) Open and fix the engine hood safely to avoid falling accidentally.

(b) Drain the coolant. (see 15 - Cooling System, Coolant, Replacement)

(c) Wipe off dirts carefully accumulated on the radiator with a brush and soapy water.

NOTICE:

Be sure to clean the radiator along its thread. Otherwise, the radiator core will be bent and deformed.

(d) After cleaning, rinse the radiator slowly with clean water and make sure that all the dirts have been rinsed off.

(e) Pour clean water into the radiator filler until it is full.

(f) Put a recovery under the drain plug of the radiator.

(g) Remove the drain plug and drain the water inside the radiator into the recovery.

(h) Repeat the steps from e to g until the water drained out are clean.

2. CHECK THE RADIATOR

(a) Check the radiator filler cap. (see 15 - Cooling System, Cooling System, On-vehicle Inspection)

(b) Check the radiator filler for cracks and other damage and have it replaced if necessary.

(c) Check the radiator core for deformation and have the radiator repaired or replaced if necessary.

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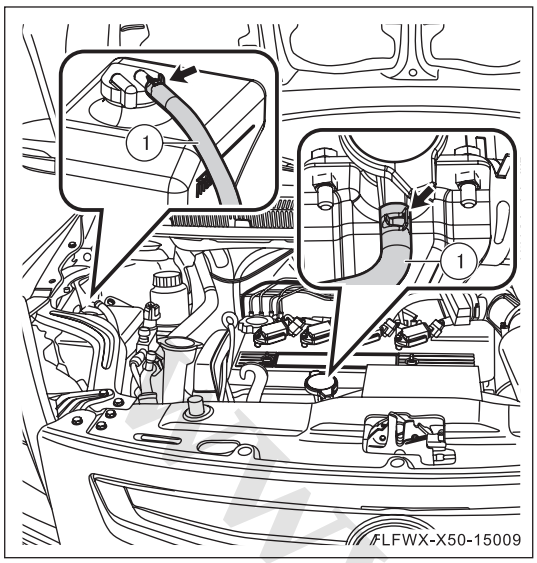
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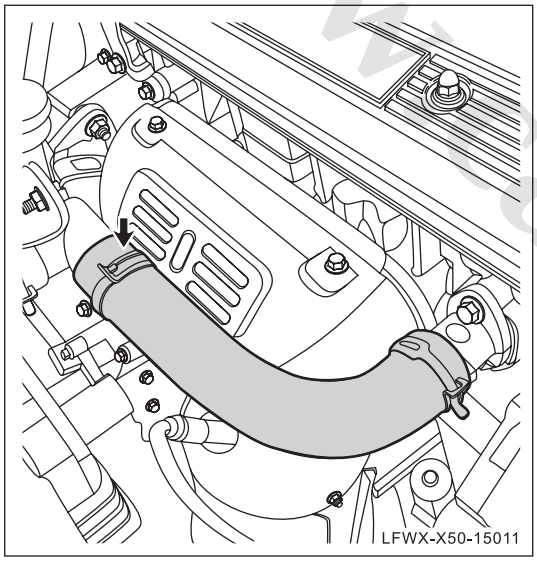
REPLACEMENT

1. REMOVE THE RADIATOR ASSEMBLY

(a) Drain the coolant. (see 15 - Cooling System, Coolant, Replacement)



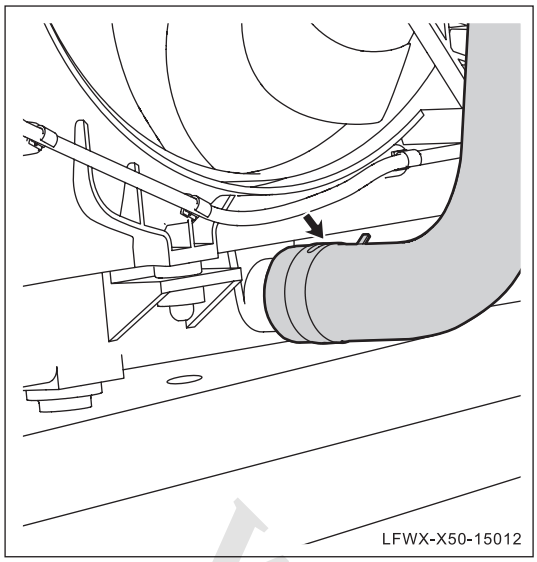
(b) Remove the elastic clamps on both ends of overflow pipe ① and take out overflow pipe ① from the pipe clamp.



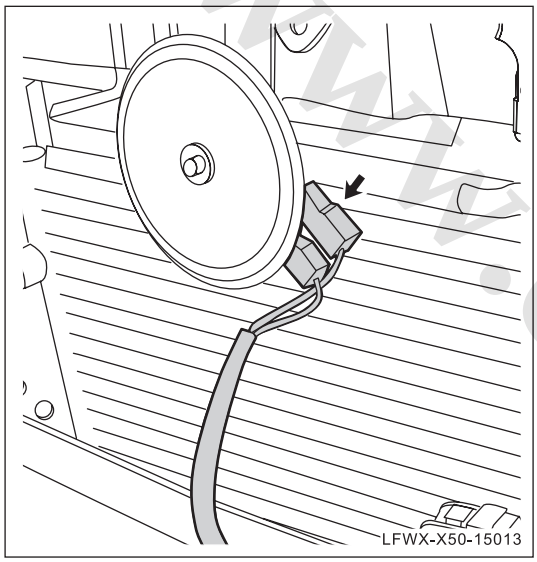
(c) Remove the elastic clamp of the radiator inlet hose and pull the inlet hose out from the installation position.

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(d) Remove the elastic clamp of the radiator outlet hose and pull the water outlet hose out from the installation position.

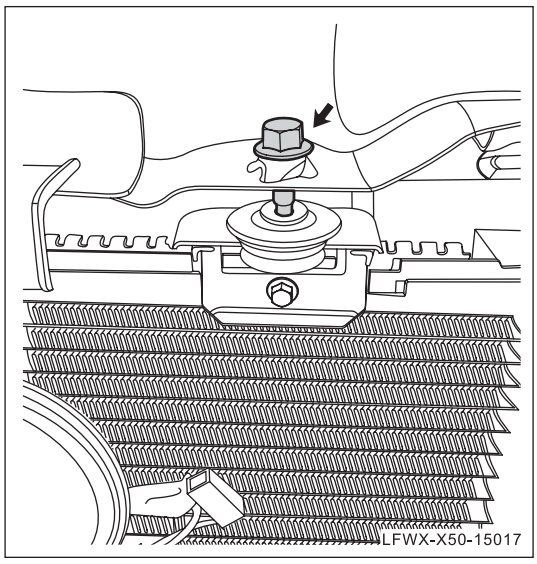


(e) Remove the front bumper assembly. (See 81 Interiors and Exteriors - Front Bumper, Replacement)

(f) Disconnect the connectors of the alt horn and bass horn.

NOTICE:

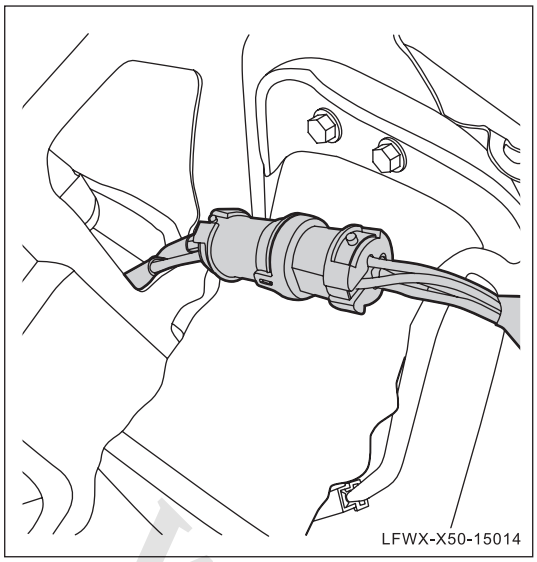
Do not pull the wire harnesses when disconnecting the connectors .



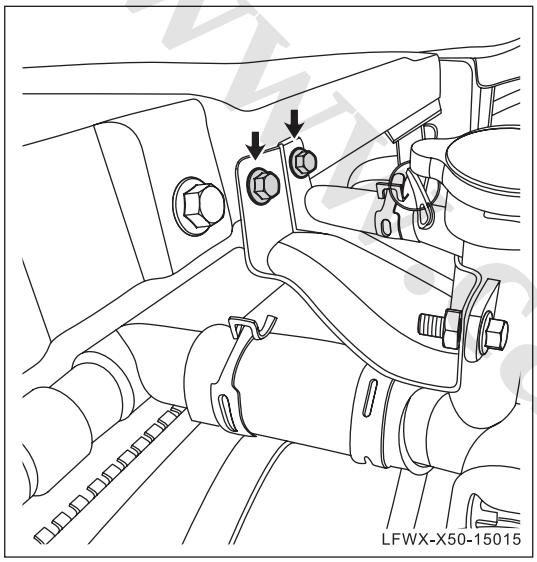
(g) Remove the condenser fixing bolts.

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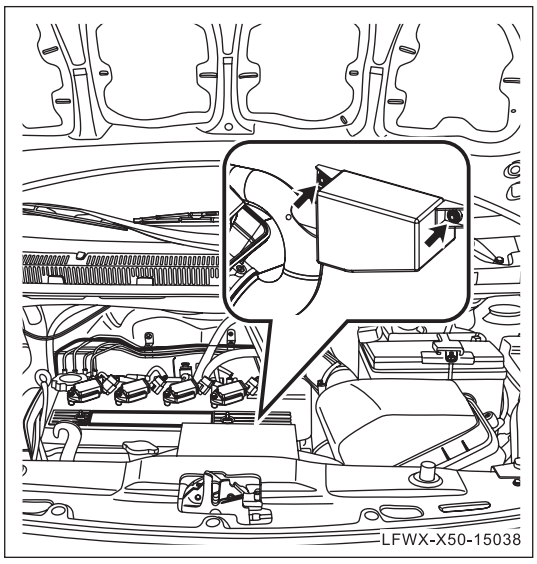
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(h) Disconnect the cooling fan connector.



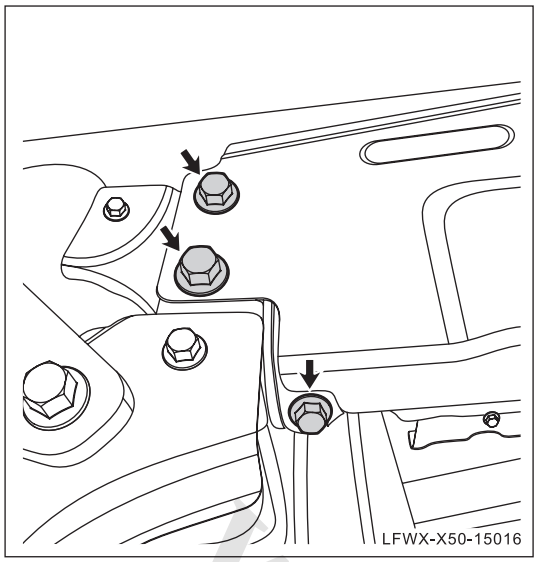
(i) Remove the fixing bolts of the radiator filling pipe bracket.



(j) Remove the fixing bolts of the resonant cavity.

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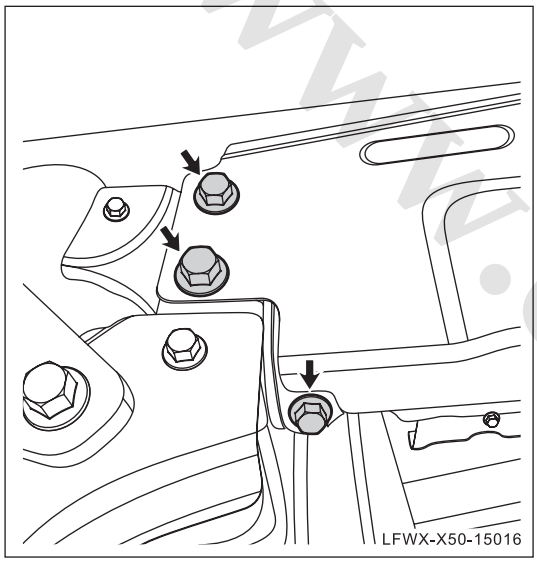


(k) Remove the fixing bolts of the water tank upper crossbeam assembly and take down the water tank upper crossbeam assembly.

(l) Remove the radiator assembly upwards slowly.

NOTICE:

Don't scratch or damage the radiator core.

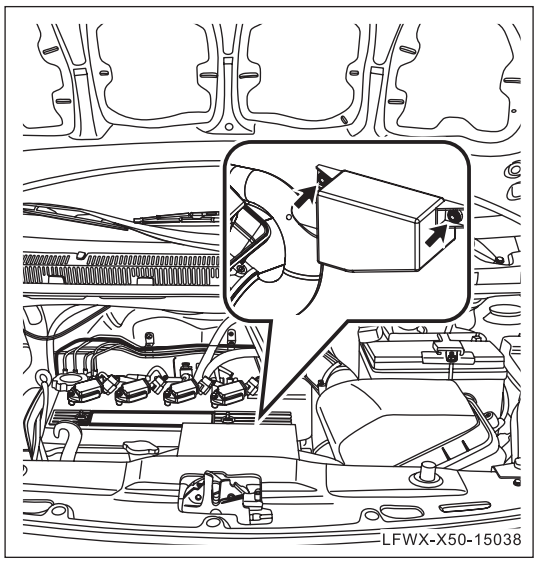


2. INSTALL THE RADIATOR ASSEMBLY

(a) Install the radiator assembly to its installation position.

(b) Install the water tank upper crossbeam assembly and mount the fixing bolts and tighten them.

Torque: 8 - 12N•m

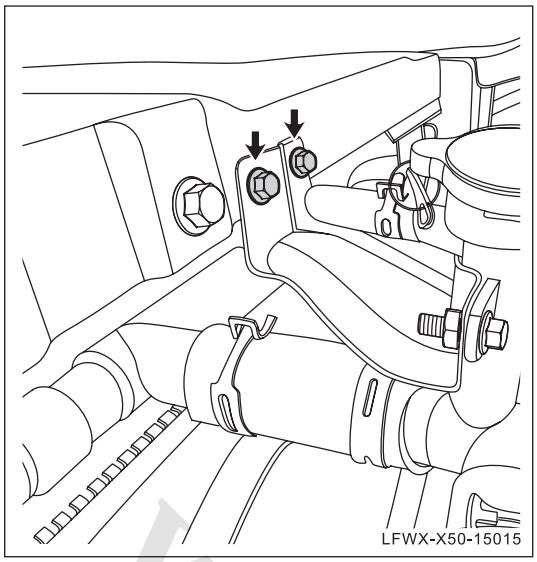


(c) Install the fixing bolts of the resonant cavity and tighten them.

Torque: 8 - 12N•m

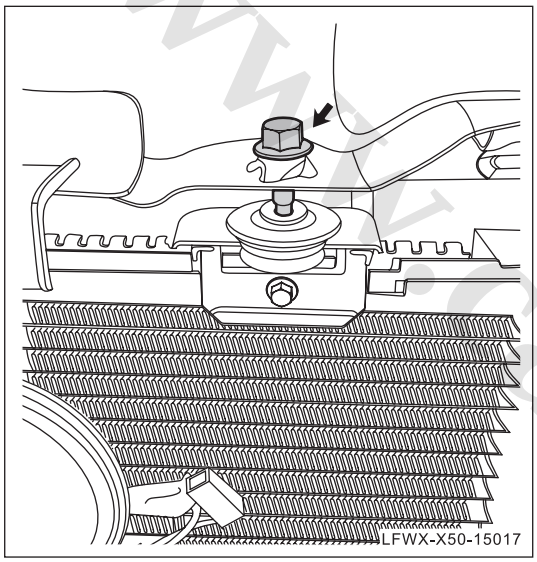
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(d) Install the fixing bolts of radiator filling pipe bracket and tighten them.

Torque: 8 - 12N•m

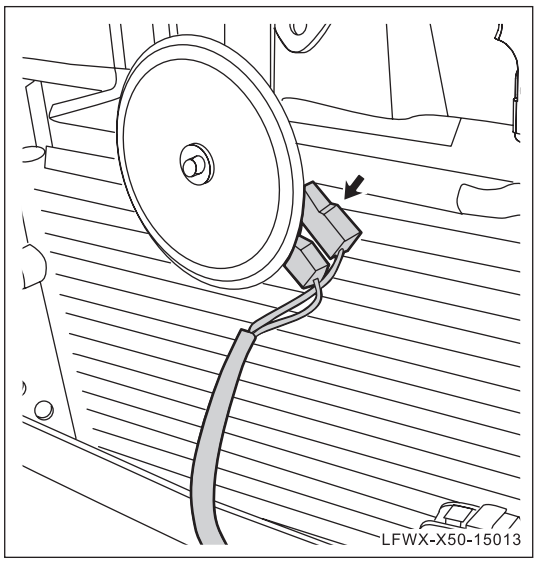


(e) Install the fixing bolts of the condenser in place.

Torque: 20 - 26N•m

△ HINT:

When installing, first align the bolt hole on the water tank upper crossbeam assembly with the one on the condenser bracket, then install the fixing bolt of condenser into the bolt hole.

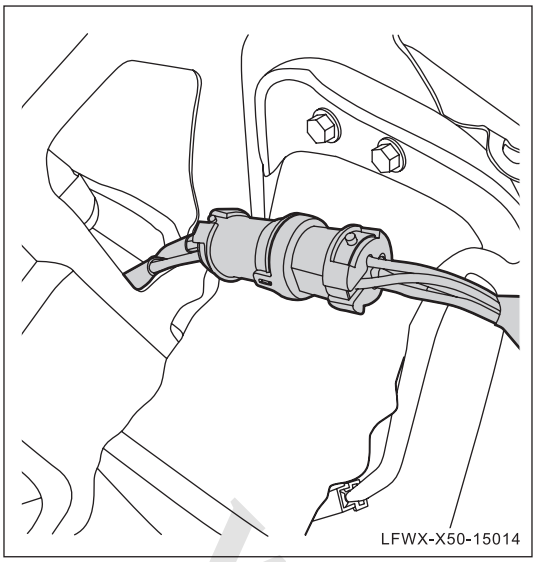


(f) Connect the connectors of the alt horn and the bass horn.

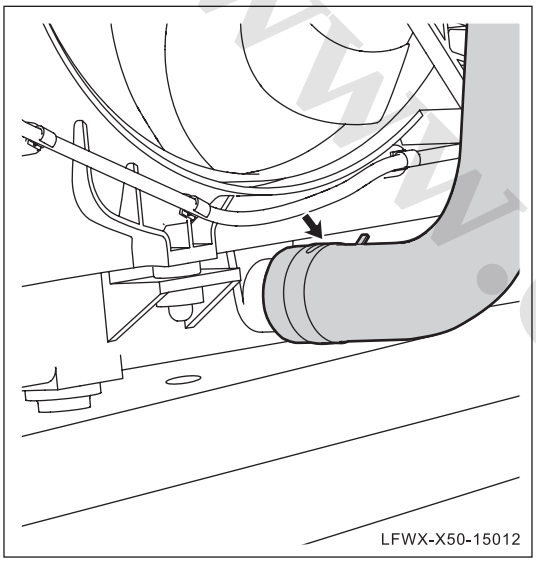
(g) Install front bumper assembly. (See 81 Interiors and Exteriors - Front Bumper, Replacement)

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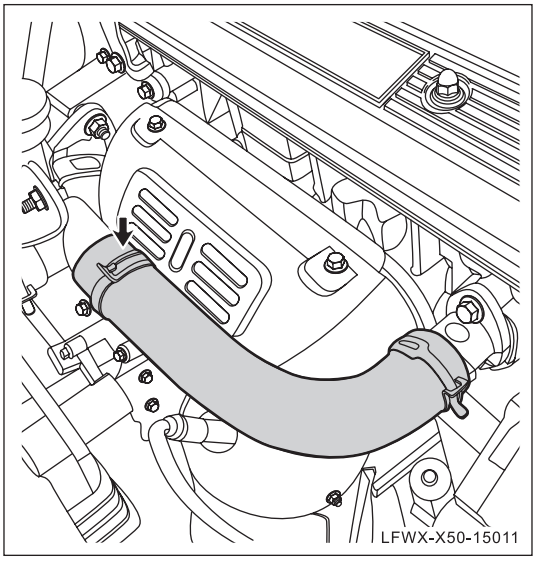
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(h) Connect the cooling fan connectors.



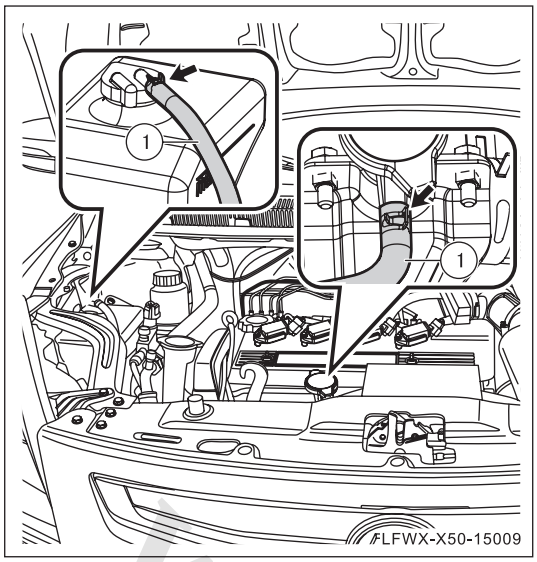
(i) Install the radiator water outlet pipe and its elastic clamp on the radiator.



(j) Install the radiator water inlet hose and its elastic clamp on the radiator.

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(k) Install overflow pipe ① and the elastic clamps on its two ends in place.

(l) Install the overflow pipe into the pipe clamp.

(m) Refill the coolant. (see 15 - Cooling System, Coolant, Replacement)

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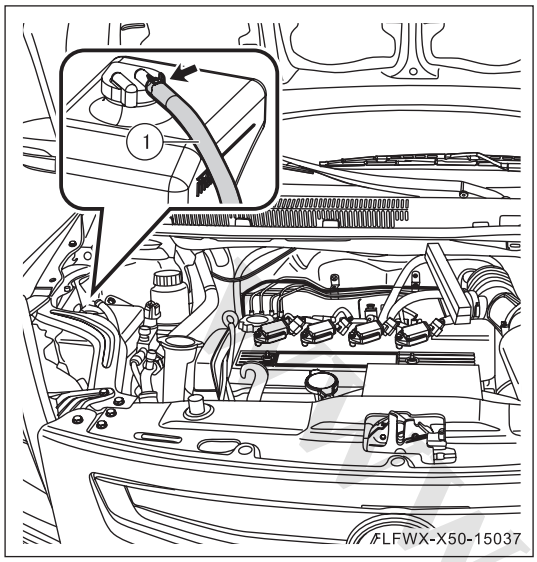
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COOLANT RESERVOIR

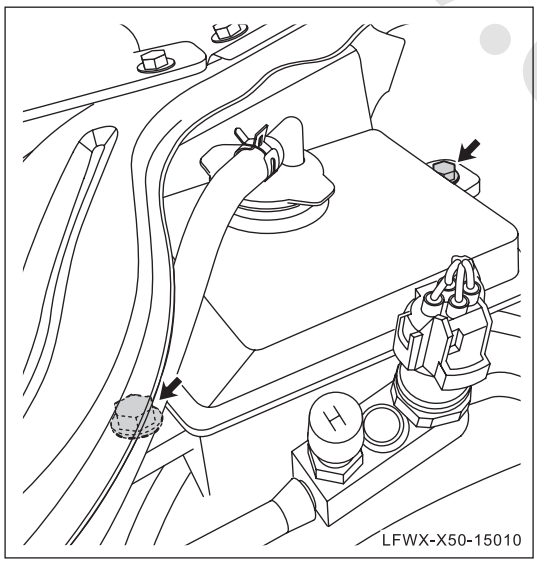
REPLACEMENT

1. REMOVE THE COOLANT RESERVOIR.

(a) Drain the coolant. (see 15 - Cooling System, Coolant, Replacement)



(b) Remove the elastic clamps of overflow pipe ① and pull overflow pipe ① out from the coolant reservoir cap.

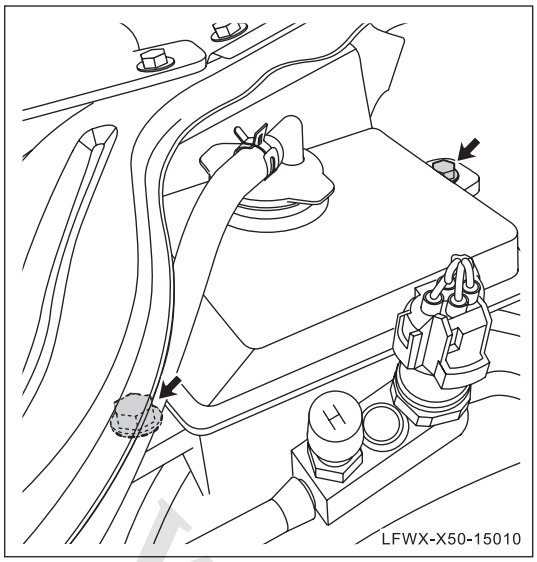


(c) Remove the fixing bolts of the coolant reservoir, and take out the reservoir.

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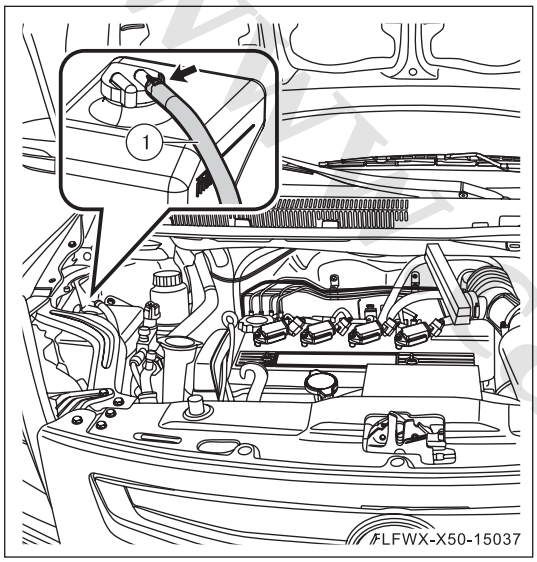
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2. INSTALL THE COOLANT RESERVOIR.

(a) Install the coolant reservoir in place, and mount & tighten the fixing bolts.

Torque: 8-12N•m



(b) Install overflow pipe ① and the elastic clamps on the coolant reservoir cap.

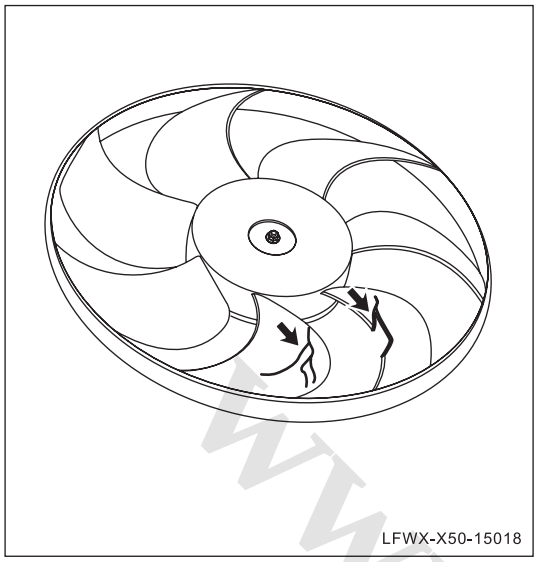
(c) Refill the coolant. (see 15 - Cooling System, Coolant, Replacement)

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COOLING FAN

CHECK



1. CHECK THE COOLING FAN

(a) Check the cooling fan for cracks and other damage and have it replaced if necessary.

2. CHECK THE FAN MOTOR

(a) Check the fan motor for stagnation and have it replaced if necessary.

△ HINT:

- Apply the battery voltage to the two terminals of the fan motor. Check the rotation of the fan motor .
- Do not rotate the fan motor for over 3s when connecting batteries to avoid damage to the fan motor.

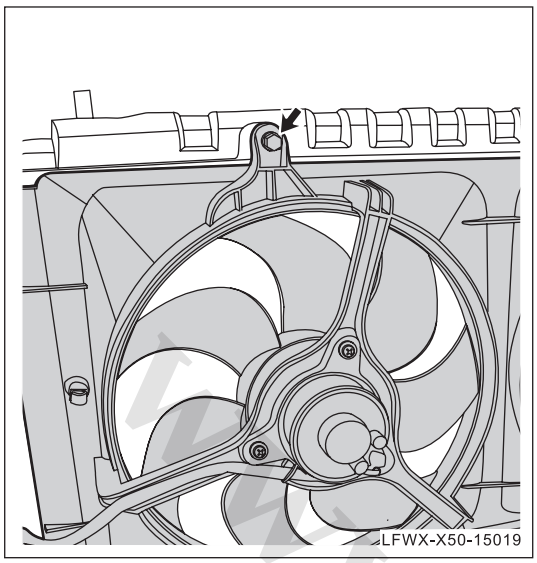
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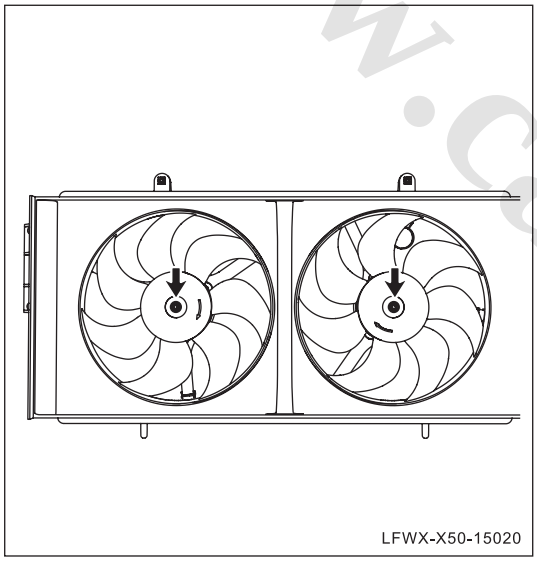
REPLACEMENT

1. REMOVE THE COOLING FAN

(a) Remove the radiator assembly. (see 15 - Cooling System, Radiator, Replacement)



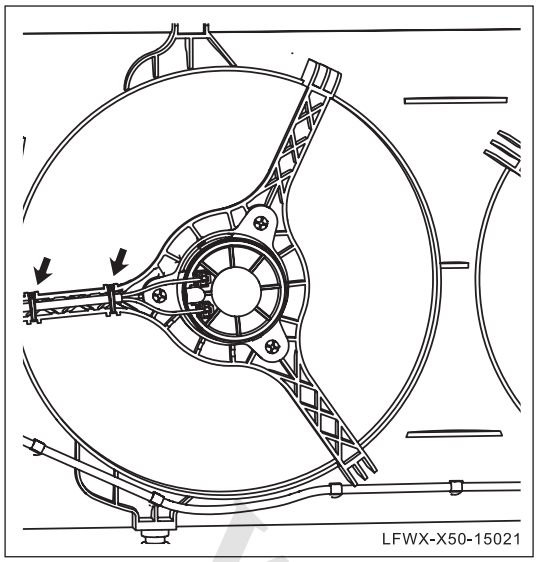
(b) Remove the fixing bolts of the cooling fan shroud and take out the cooling fan shroud with fan assembly.



(c) Remove the fixed nuts of the cooling fans and take out the two cooling fans.

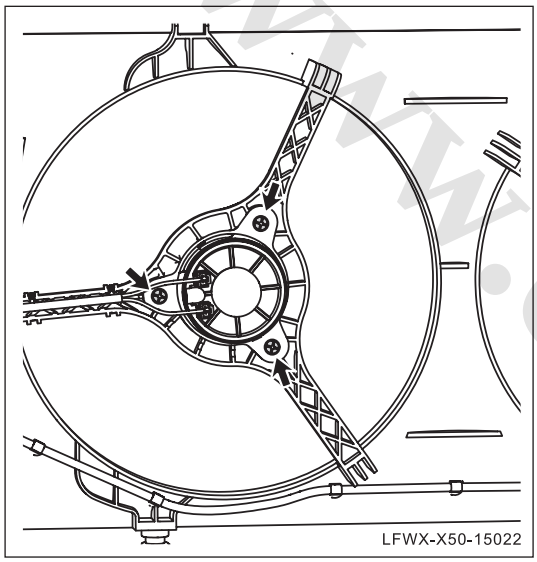
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(d) Push out the fan motor wire harness terminals from the fan motor connector from the inside out.

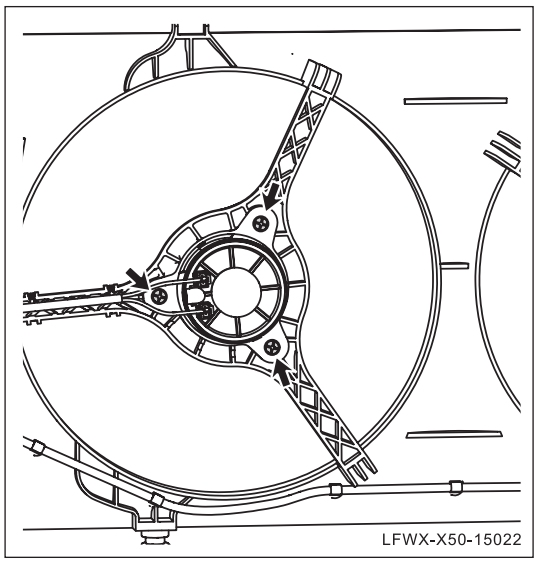
(e) Disconnect the fan motor wire harness ties.



(f) Remove the fixing screws of the fan motor. and take out the fan motor assembly.

△ HINT:

When taking down the fan motor, first take out the fan motor wire harness from the wire harness clamp, then take down the fan motor.



2. INSTALL THE COOLING FAN

(a) Install each fan motor to the cooling fan shrouds and mount & tighten the fixing screws.

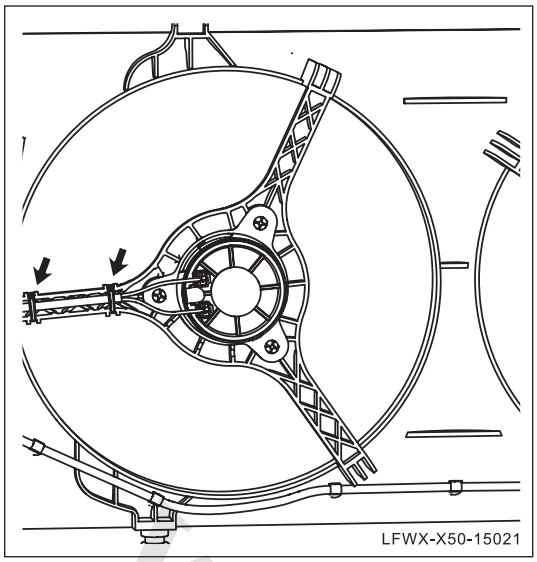
Torque: 10 - 14N•m

△ HINT:

After installing the fan motor, install the fan motor wire harness into the wire harness clamp.

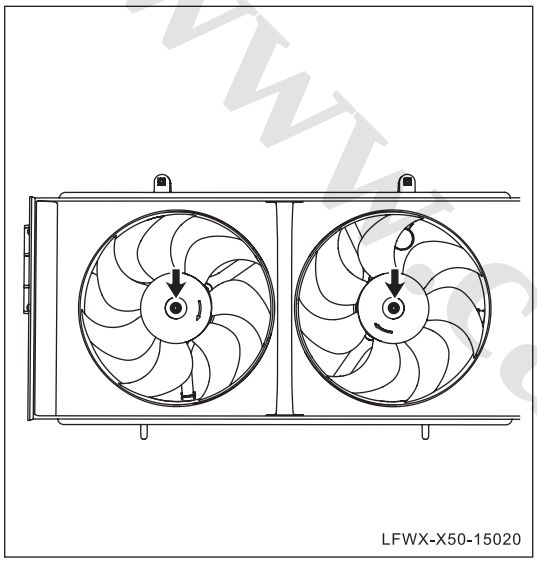
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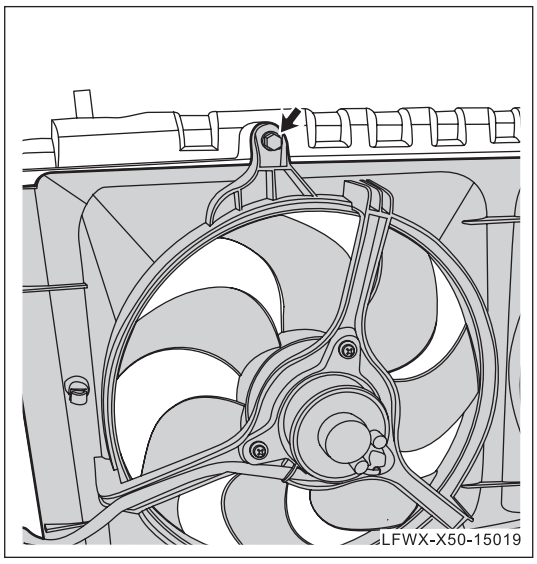
(b) Install the fan motor wire harness terminals back to the motor connectors.

(c) Fix the fan motor wire harness with ties.



(d) Install cooling fan onto its shroud, and then mount and tighten the fixing nuts.

Torque: 20 - 26N•m



(e) Install the cooling fan shroud with fan assembly on the radiator and mount & tighten the fixing bolts.

Torque: 8 - 12N•m

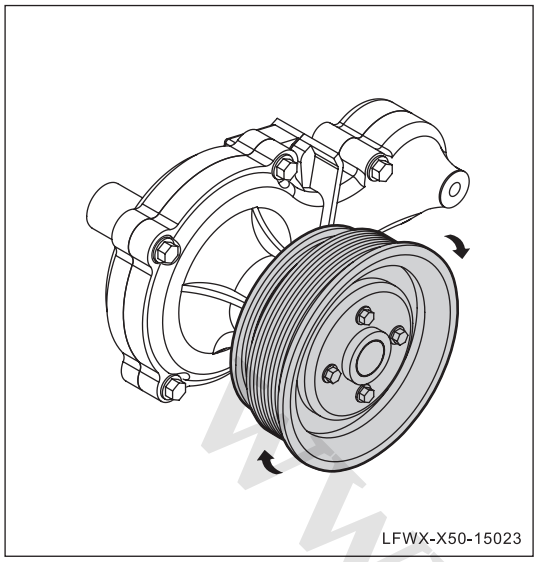
(f) Install the radiator assembly. (see 15 - Cooling System, Radiator, Replacement)

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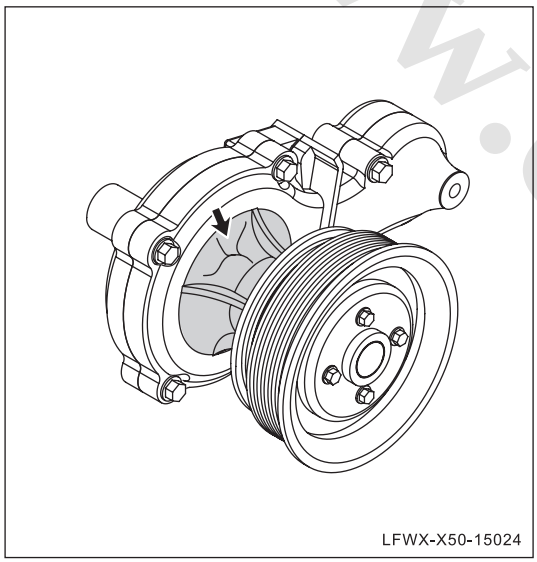
WATER PUMP

CHECK


LFWX-X50-15023

1. CHECK THE WATER PUMP

(a) Rotate the water pump pulley, check the water pump bearing operation for blockage and noise and have it repaired or replaced if necessary.


LFWX-X50-15024

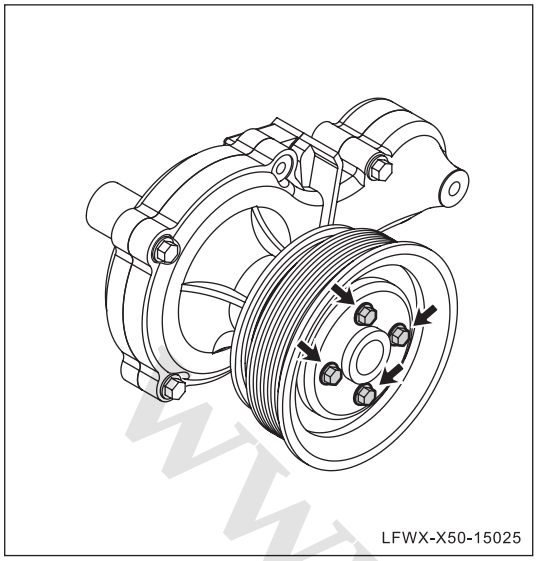
(b) Check the water pump housing for cracks and other damage and have it replaced if necessary.

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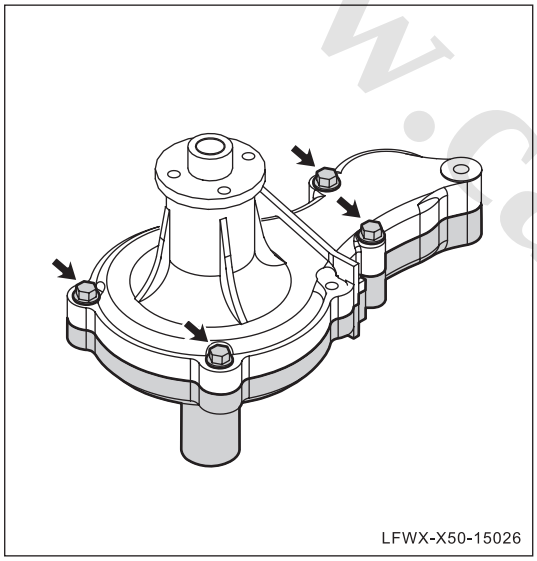
REPLACEMENT

1. REMOVE THE WATER PUMP (SEE 11- MECHANICAL SYSTEM CYLINDER HEAD, REPLACEMENT)

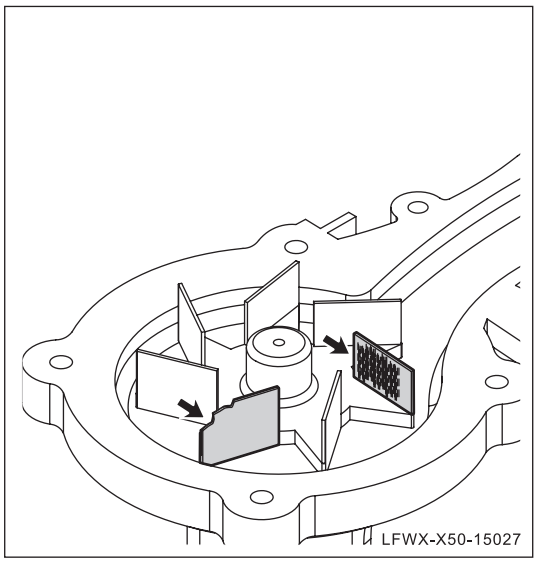


2. DISMANTLE THE WATER PUMP

(a) Remove the fixing bolts of the water pump pulley , and then take out the water pump pulley.



(b) Remove the connecting bolts of the front and rear housings of the water pump, and take down the rear housing and washer of water pump.

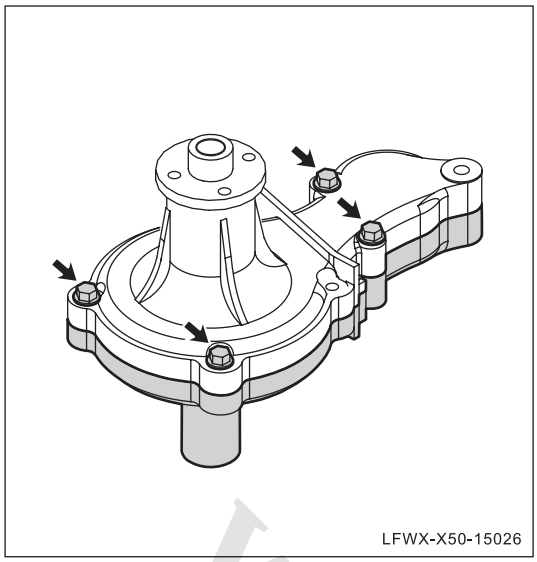


3. CHECK THE WATER PUMP IMPELLER

(a) Check the water pump impeller for corrosion and damage and have it replaced if necessary.

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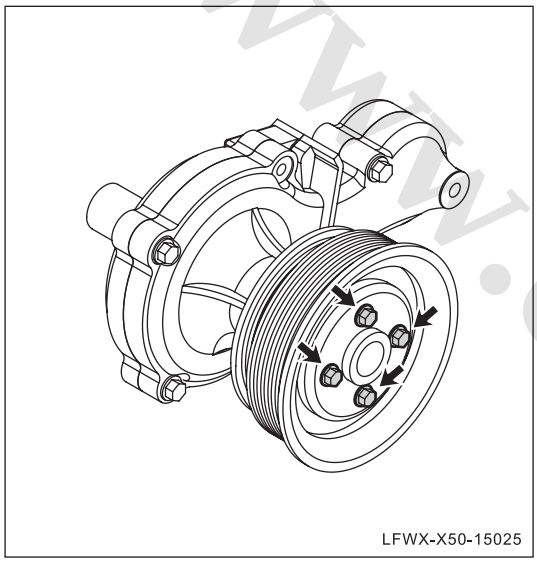
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4. RE-ASSEMBLE THE WATER PUMP

(a) Install the water pump housing washer, connect the front and the rear housing together and mount & tighten the connecting bolts.

Torque: 8-12N•m



(b) Install the water pump pulley to the water pump and mount & tighten the fixing bolts .

Torque: 10-12N•m

5. INSTALL THE WATER PUMP (SEE 11- MECHANICAL SYSTEM, CYLINDER HEAD, REPLACEMENT)

△ HINT:

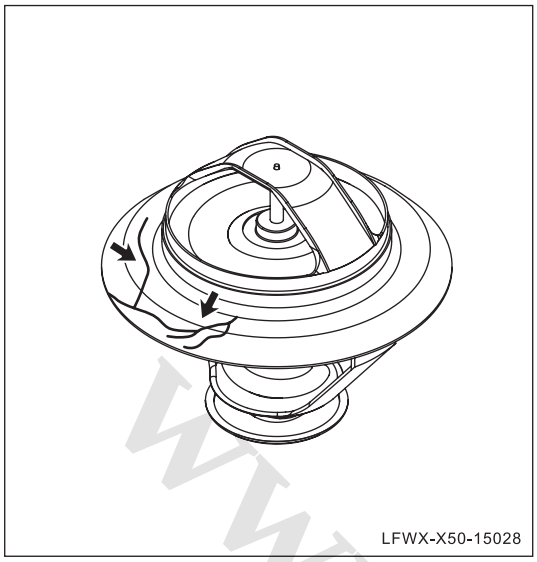
After installing the water pump, refill coolant and start the engine. Check the cooling system for leakage.

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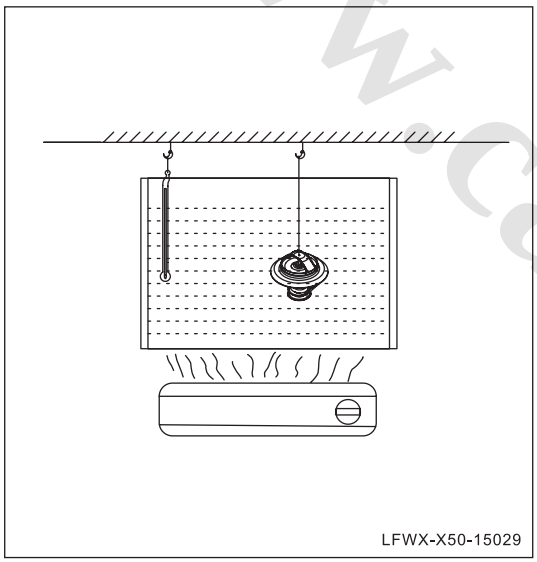
THERMOSTAT

INSPECTION



1. INSPECT THE THERMOSTAT

(a) Check the thermostat body for cracks and other damage and have it replaced if necessary.

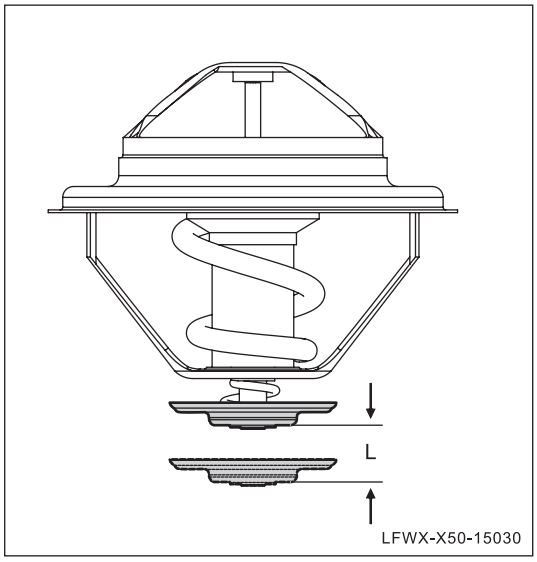


(b) Put the thermostat into a container filled with water. Heat the water gradually, and check the temperature when the thermostat valve opens.

Temperature when the thermostat valve opens: 80-85℃

△ HINT:

If the thermostat valve opening temperature is inconsistent with the specified value or the thermostat cannot open, replace the thermostat.



(c) Measure the temperature and lift when the thermostat valve fully opens.

Temperature when the thermostat valve fully opens: 95℃

Thermostat valve lift L: ≥8mm

△ HINT:

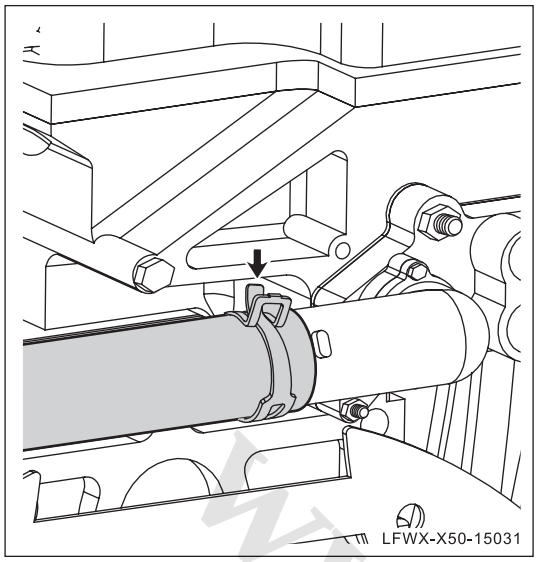
If the thermostat valve lift is inconsistent with the specified value, replace the thermostat.

(d) When the thermostat is in lower temperature (less than 40℃), check whether the valve is closed completely and have it replaced if not closed or not closed completely.

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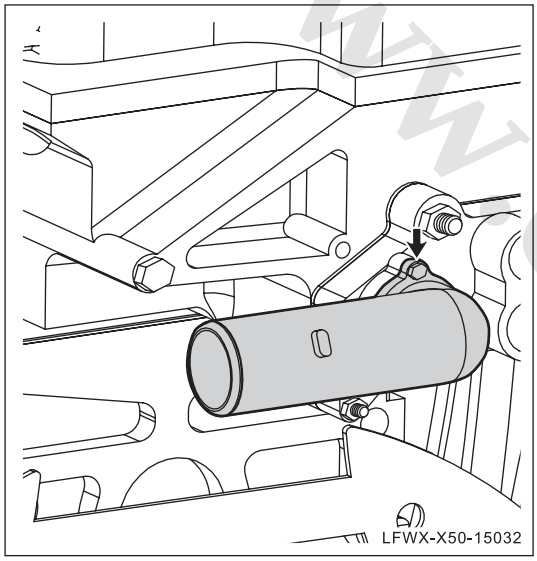
REPLACEMENT



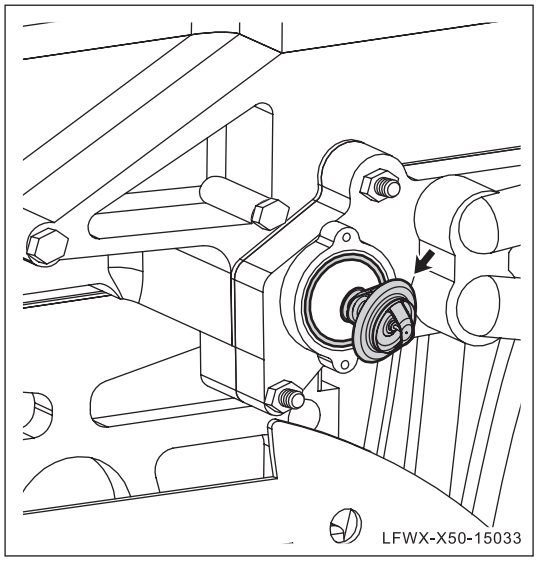
1. REMOVE THE THERMOSTAT

(a) Drain the coolant. (See 15 - Cooling System, Coolant, Replacement)

(b) Remove the water inlet rubber hose clamp of the engine and pull out the water inlet rubber hose from the installation position.



(c) Remove the fixing bolts of engine inlet hose and take out the inlet hose.



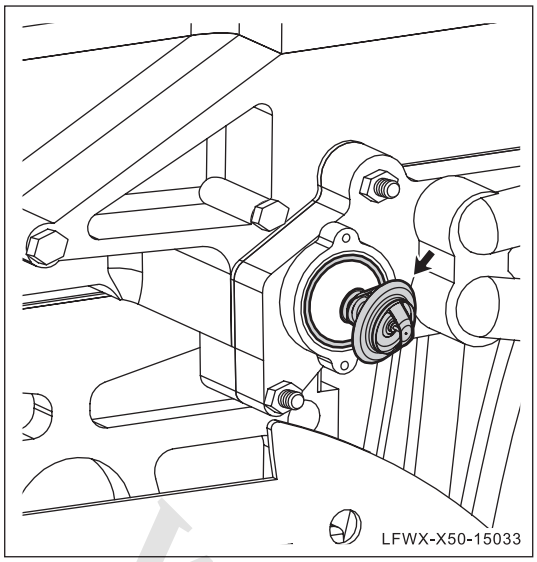
(d) Take out the thermostat and O-ring.

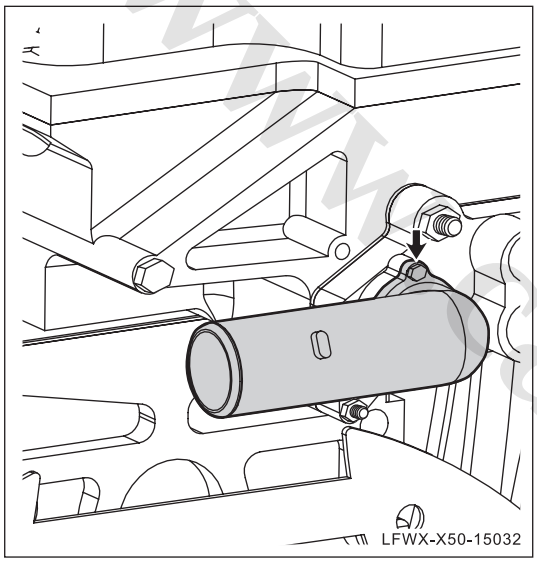
NOTICE:

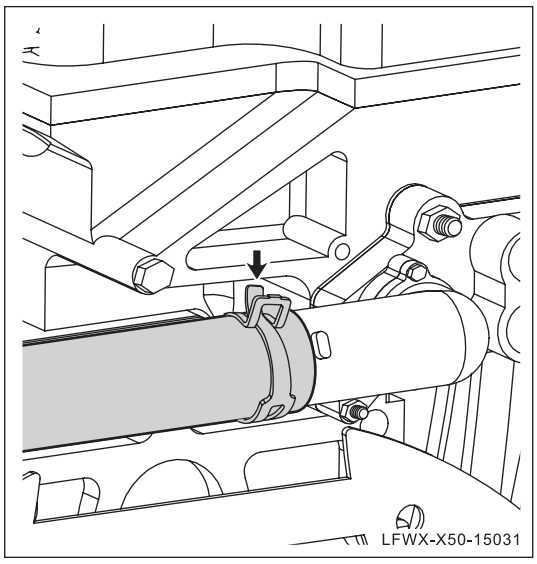
Replace the O-ring with a new one.

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2. INSTALL THE THERMOSTAT

(a) Install the thermostat and O-ring back to the engine.

(b) Install the inlet hose of the engine in place, and mount & tighten the fixing bolts.

Torque: 10-14N•m

(c) Install the water inlet rubber hose of the engine and clamp to the inlet hose.

(d) Refill the coolant. (see 15 - Cooling System, Coolant, Replacement)

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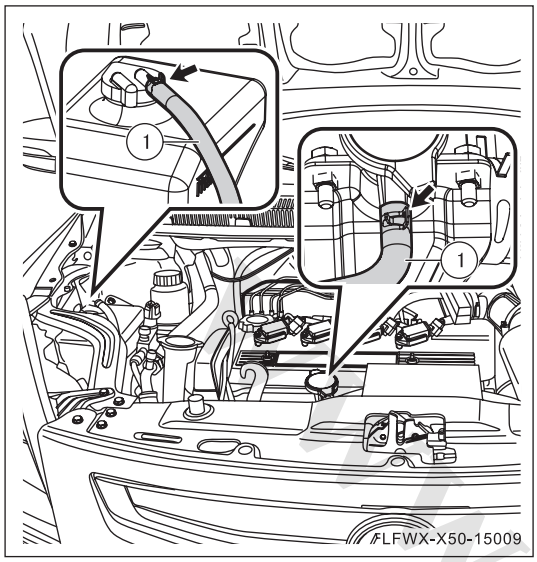
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COOLING LINE

REPLACEMENT

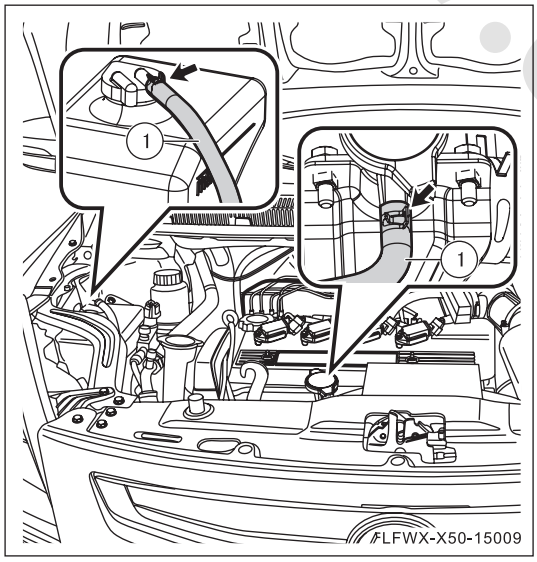
△ HINT:

Before removing the lines, first drain the coolant, and refill coolant after replacing the cooling lines.



1. REMOVE THE OVERFLOW PIPE

(a) Remove the elastic clamps on both ends of the overflow pipe and take out the overflow pipe from the pipe clamp.



2. INSTALL THE THE OVERFLOW PIPE

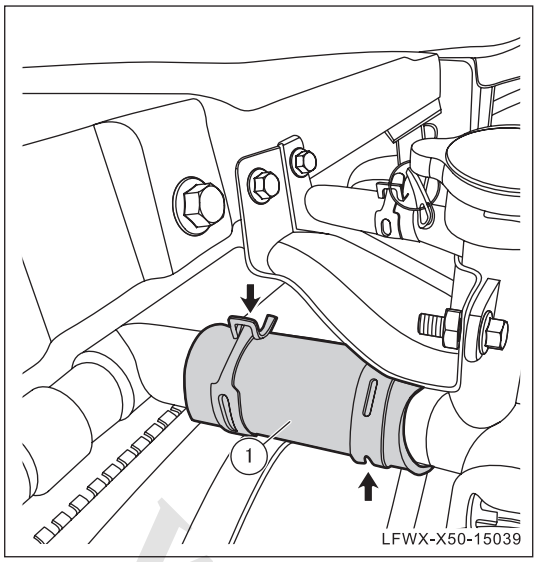
(a) Install overflow pipe and the elastic clamps on its two ends in place.

(b) Install the overflow pipe into the pipe clamp.

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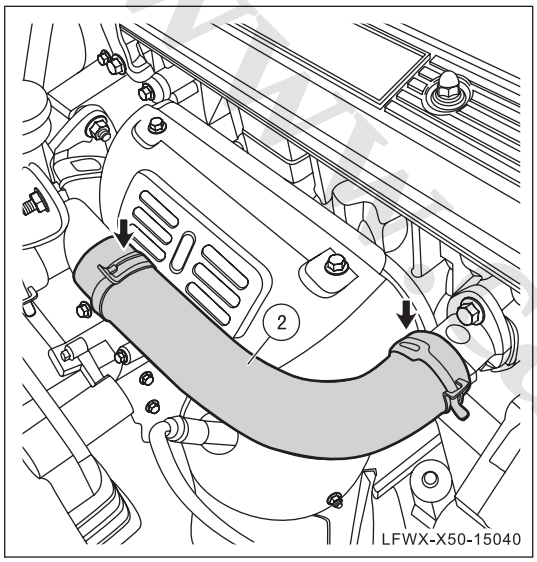
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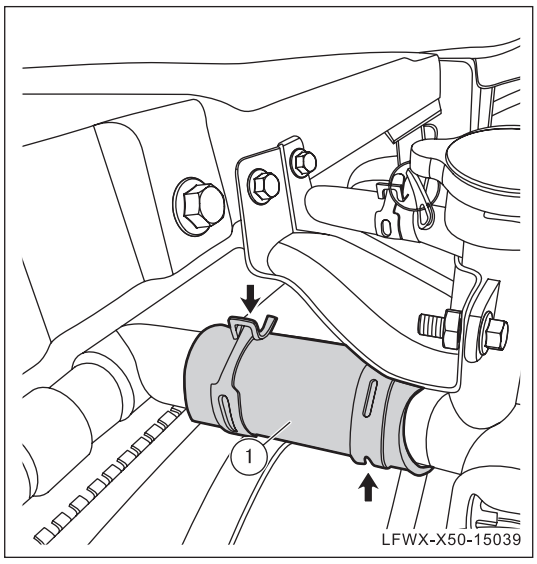


3. REMOVE THE RADIATOR INLET HOSE

(a) Remove the elastic clamps on both ends of radiator inlet hose ① and take out radiator inlet hose ① .



(b) Remove the elastic clamps on both ends of radiator inlet hose ② and take out radiator inlet hose ② .

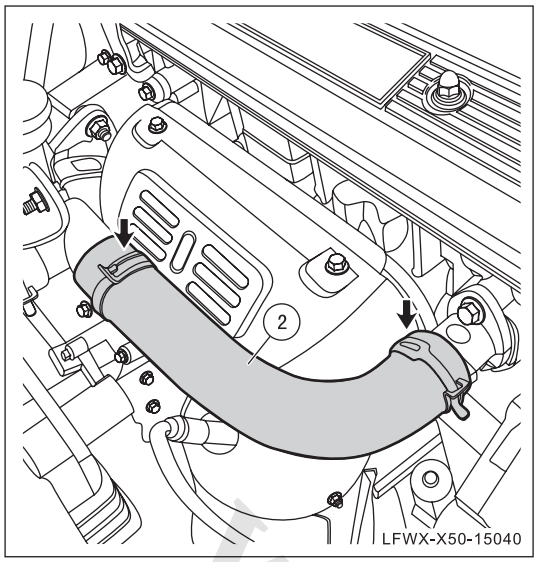


4. INSTALL THE RADIATOR INLET HOSE

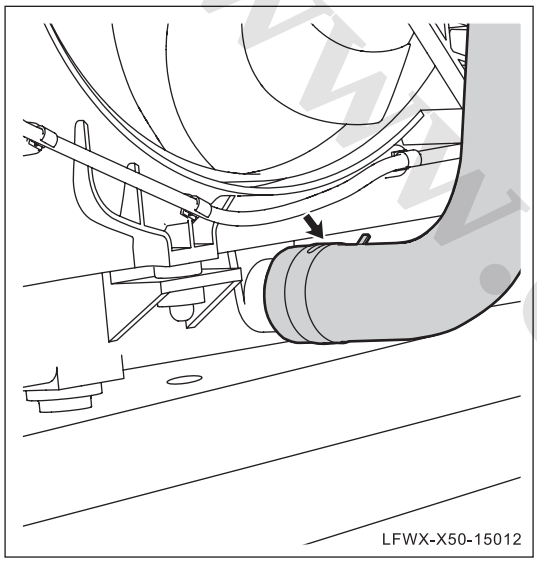
(a) Install radiator inlet hose ① and the elastic clamps on its two ends in place.

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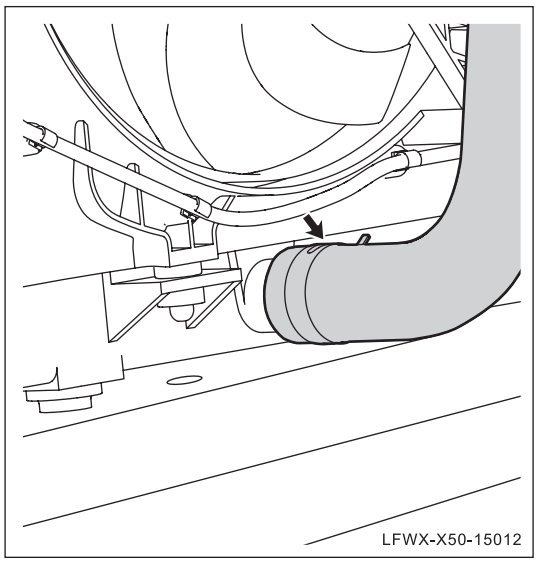


(b) Install radiator inlet hose ② and the elastic clamps on its two ends in place.



5. REMOVE THE RADIATOR OUTLET HOSE

(a) Remove the elastic clamps on both ends of the radiator outlet hose and take out radiator outlet hose.



6. INSTALL THE RADIATOR OUTLET HOSE

(a) Install the radiator outlet hose and the elastic clamps on its two ends in place.

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COOLANT TEMPERATURE SENSOR

INSPECTION

△ HINT:

For inspection of coolant temperature sensor see 12-Engine Control System, Engine Control System, On-vehicle Inspection.

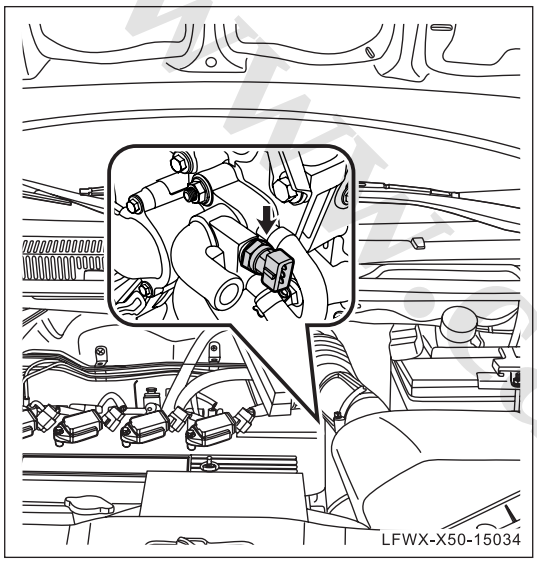
REPLACEMENT

1. REMOVE THE COOLANT TEMPERATURE SENSOR

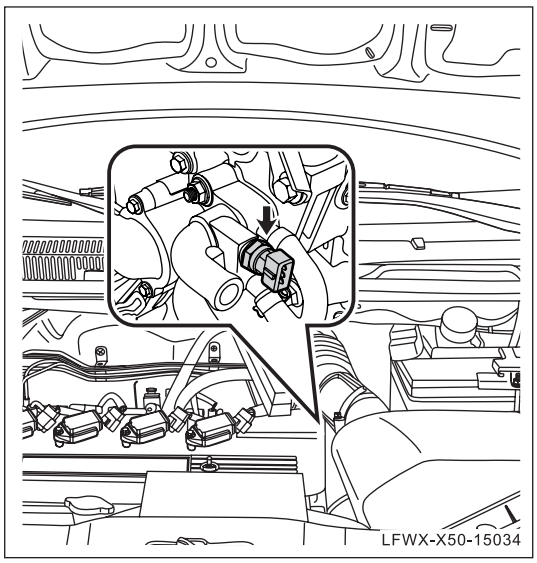
(a) Disconnect the negative cable of battery.

(b) Drain the coolant. (see 15 - Cooling System, Coolant, Replacement)

(c) Disconnect coolant temperature sensor connector.



(d) Remove the coolant temperature sensor.



2. INSTALL THE COOLANT TEMPERATURE SENSOR

(a) Apply sealant to the thread of the coolant temperature sensor.

(b) Install the coolant temperature sensor into the installation hole.

Torque: 13-17N•m

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(c) Connect the coolant temperature sensor connectors.

(d) Connect the negative cable of battery.

(e) Refill the coolant. (see 15 - Cooling System, Coolant, Replacement)

(f) Start the engine. Check the installation position of the coolant temperature sensor for leakage and have it reinstalled if necessary.

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Lubrication System

Lubrication system.....16-1
System description.....16-1
Preparation.....16-2
Service data.....16-3
Precautions.....16-4
Components.....16-5
Function and fault of components.....16-6
On-vehicle inspection.....16-7
Engine oil.....16-11
Replacement.....16-11
Oil filter.....16-13
Replacement.....16-13
Oil pan.....16-15
Replacement.....16-15
Oil pump.....16-17
Check.....16-17
Replacement.....16-19
Engine oil pressure sensor.....16-30
Inspection.....16-30
Replacement.....16-31
Oil dipstick.....16-32
Replacement.....16-32

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LUBRICATION SYSTEM

SYSTEM DESCRIPTION

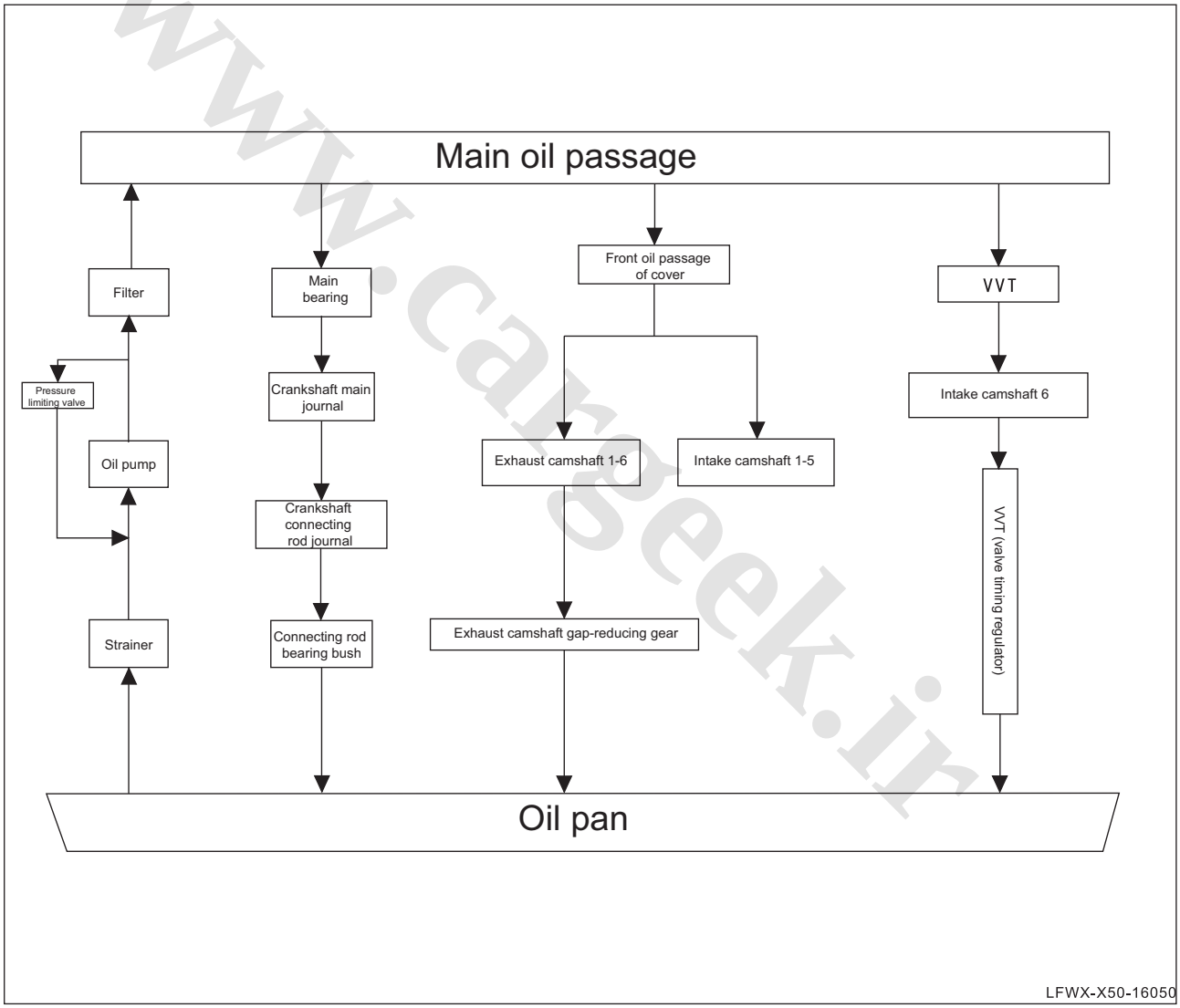
1. FUNCTION

Functions of lubrication system: when the engine is operating, the lubrication system transports clean engine oil of enough amount and proper temperature to the friction surfaces of all the driving parts incessantly and form oil film between friction surfaces to fulfill fluid friction. So as to reduce friction resistance, lower power consumption and relieve parts wear to improve reliability and durability of the engine operating.

2. COMPONENTS

The lubrication system mainly consists of oil, oil filter, oil pan, oil pump, oil pressure sensor, oil dipstick, etc.

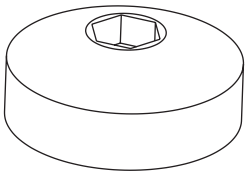
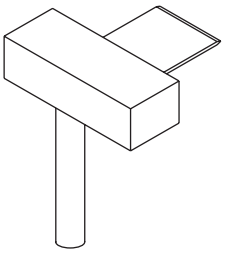
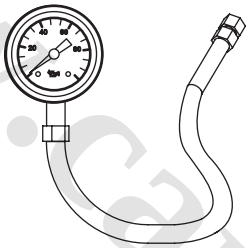
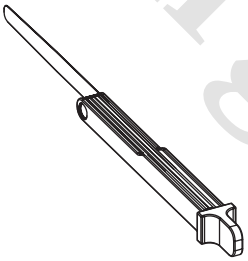
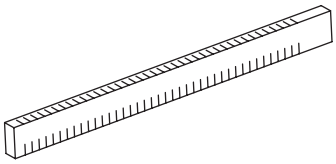
3. WORKING PRINCIPLE



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Oil filter remover		For disassembly and assembly of oil filter
2	Oil pan sealing scraper		For removing the oil pan
3	Oil pressure gauge		For detecting oil pressure
4	Feeler gauge		For measuring parts' clearance
5	High precision crossed ruler		For matching with a feeler gauge to measure the clearance between parts

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Engine oil pressure and rotation speed value at idling speed		80 - 300kPa/(748r/min)
Rated oil pressure/rated rotation speed value		330 - 430kPa/(4000r/min)
Engine oil pressure sensor current value		2 - 8mA
Oil capacity		3.2L
Tip clearance between oil pump drive rotor and driven rotor	Standard clearance value	0.06 - 0.18mm
	Limit clearance value	0.35mm
Top clearance between the rotor and the oil pump housing	Standard clearance value	0.02 - 0.07mm
	Limit clearance value	0.10mm
Clearance between the driven rotor and the oil pump housing	Standard clearance value	0.10 - 0.18mm
	Limit clearance value	0.20mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Oil drain plug	30
Fixing bolts and nuts of oil pan	10
Oil pump cap fixing screws	10
Oil pump fixing bolts	23
Oil strainer fixing bolts and nuts	10
Fixing bolts of engine oil dipstick conduit	10
Timing belt tensioner fixing bolts	22 - 25
Timing belt cover fixing bolt	10
Crankshaft pulley fixing bolt	145
Cylinder head cover fixing bolt	12
Fixing bolt of ignition coil	12
A/C compressor tensioner bracket fixing bolt	49
Alternator fixing bolt	25 (short bolts); 54 (long bolts)
A/C compressor fixing bolt	49
Engine oil pressure sensor	30 - 40

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PRECAUTIONS

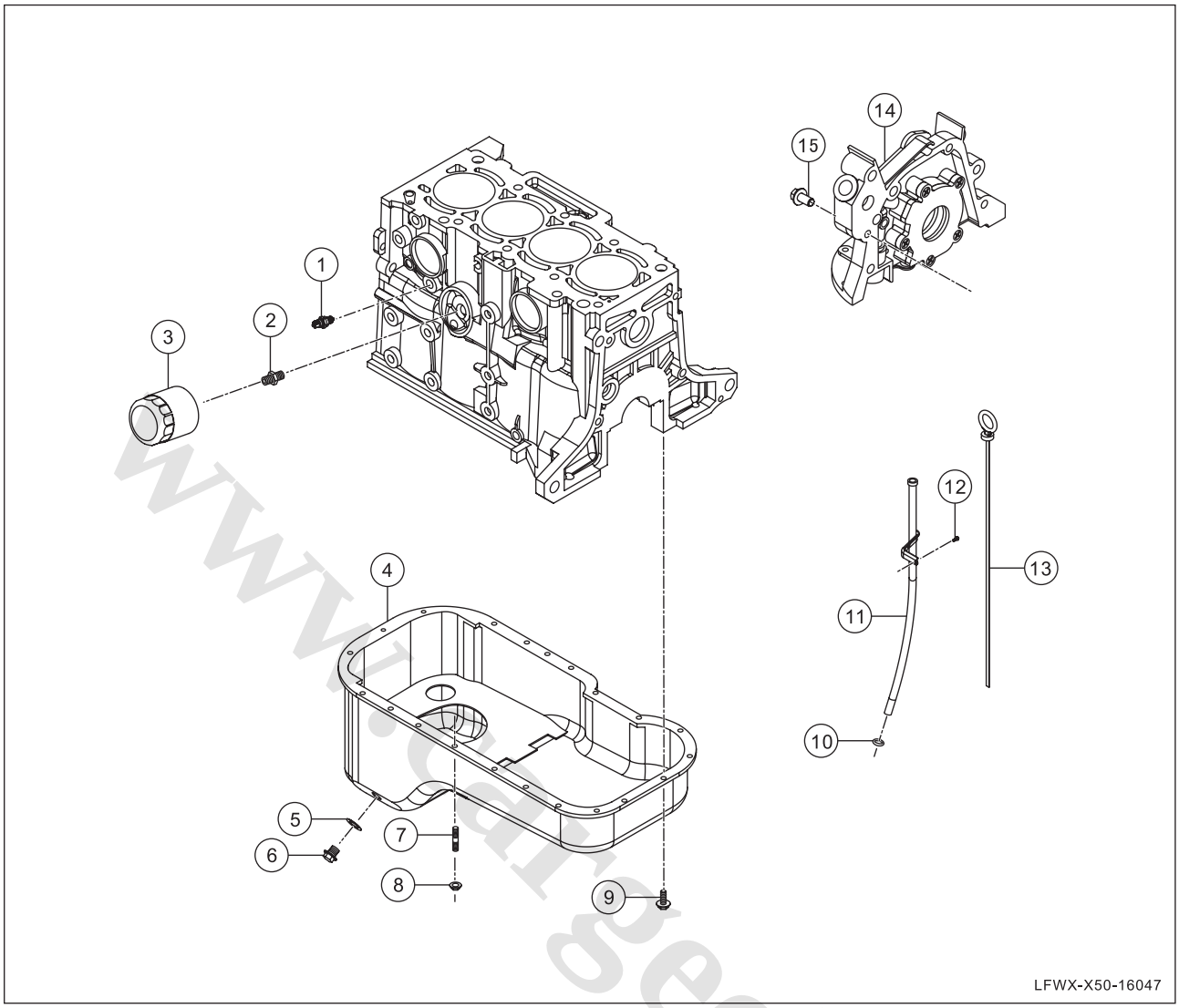
1. Wait till the engine is cooled down before operating on the lubricating system.
2. Avoid oil spilling over the drive belt when performing operation.
3. Collect and store the used oil of the engine together, and always keep the working field clean.
4. For the use of sealant, pay attention to the following points:
   - Remove the residual sealant on the installation surfaces of the oil pan and the cylinder block (including the grooves, fixing bolts and bolt installation holes of the sealant application surfaces) thoroughly with the scraper.
   - When using sealant, be sure to wipe the sealant application surfaces clean. Remove the water or other foreign objects attached to the application surfaces.
   - If there is any foreign object in the sealant, clean it completely and timely.

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COMPONENTS



1	Engine oil pressure sensor
2	Connecting pipe for oil filter
3	Oil filter assembly
4	Oil pan
5	Oil drain plug gasket
6	Oil drain plug
7	Stud bolt
8	Nut

9	Bolt
10	O-ring
11	Engine oil dipstick conduit
12	Bolt
13	Oil dipstick
14	Oil pump assembly
15	Bolt

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FUNCTION AND FAULT OF COMPONENTS

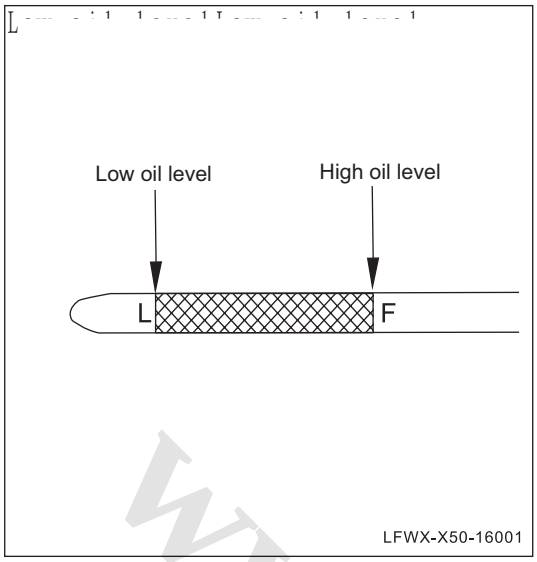
Part name	Part function	Common faults	Fault symptom
Engine oil	Lubricate, clean, cool, seal, anti-rust and absorb shock, etc.	Oil of poor quality and excessive viscosity	The start of engine is difficult
Oil filter	Filter impurities and water from oil and transport clean oil to every lubricating part	Oil filter clogged	The engine is seriously worn and even malfunctions
Oil pan	Store engine oil	The oil pan is cracked and damaged	Oil loses
Oil pump	It is used to pump the oil accumulated in the oil pan to all the parts of the engine.	The oil pump does not supply oil or supplies insufficiently	The engine is seriously worn and even mechanically malfunctions
Engine oil pressure sensor	Monitor whether the engine oil pressure is normal and send electrical signal to the alarm lamp	The engine oil pressure sensor fails	The oil pressure indication is incorrect
Oil dipstick	Inspect the oil amount in the oil pan	/	/

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ON-VEHICLE INSPECTION

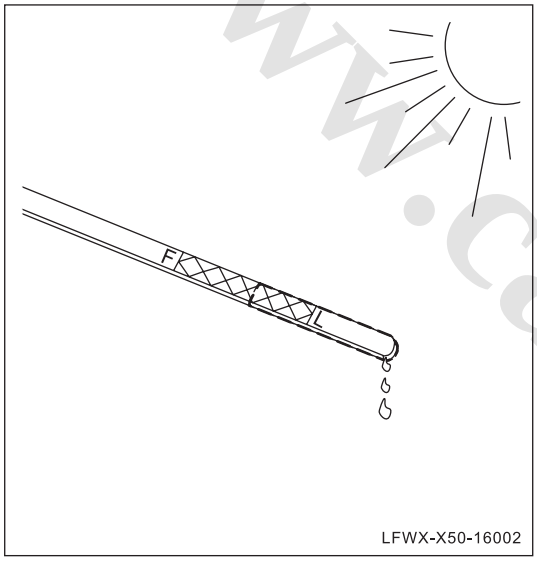


1. CHECK THE ENGINE OIL LEVEL

(a) Stop the vehicle on a level ground, wait for more than 5min and stop the engine after being heated.

(b) Check the engine oil level to check whether it is located between the two scales of the oil dipstick.

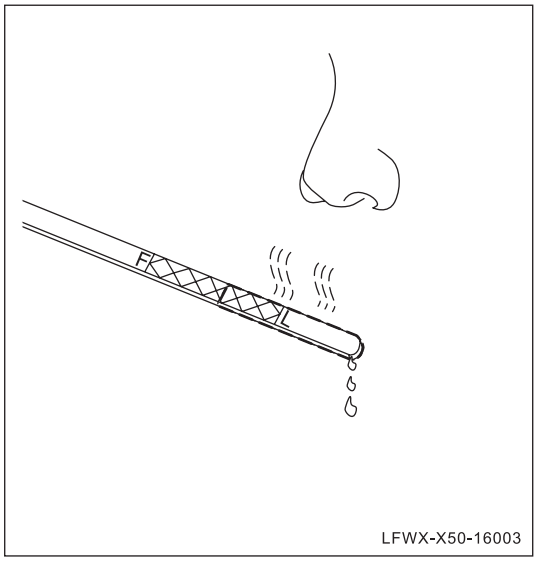
- Put a piece of rag under the end of the oil dipstick and pull out the oil dipstick.
- Wipe the oil dipstick clean and reinsert it in place.
- Pull out the oil dipstick and check the oil level.



2. CHECK THE OIL QUALITY

(a) Appearance identification.

- Pull out the oil dipstick and observe the oil towards a bright place to see whether it is clear and transparent and the oil dipstick thread is clear to see. When the oil dipstick thread cannot be seen through the oil or obvious particles can be seen on the oil, then replace the oil immediately for the oil is too dirty.



(b) Smell identification.

- Pull out the oil dipstick and smell the oil. The oil should have no special smell, only with a hint of fragrance. All the oil irritating the sense of smell largely and smelling peculiarly is deteriorated oil or oil of poor quality, replace it immediately.

△ HINT:

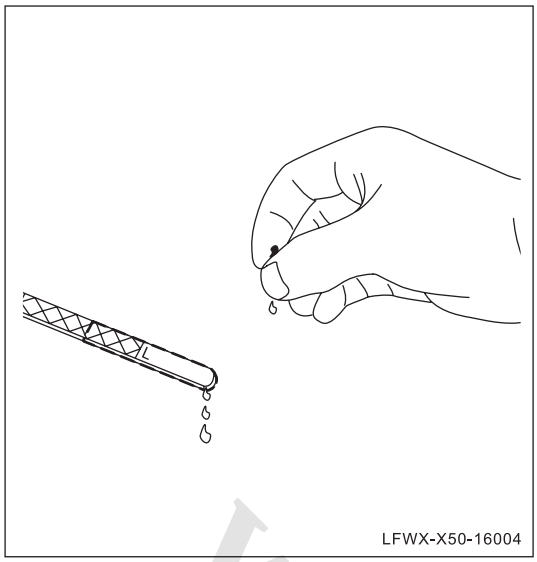
If fuel smell (stink) can be felt obviously, the engine oil is mixed with fuel. Check the reason for fuel leakage.

Notice:

When smelling the oil, keep your nose a certain distance from the oil. Just smell the oil instantly rather than last for a long time.

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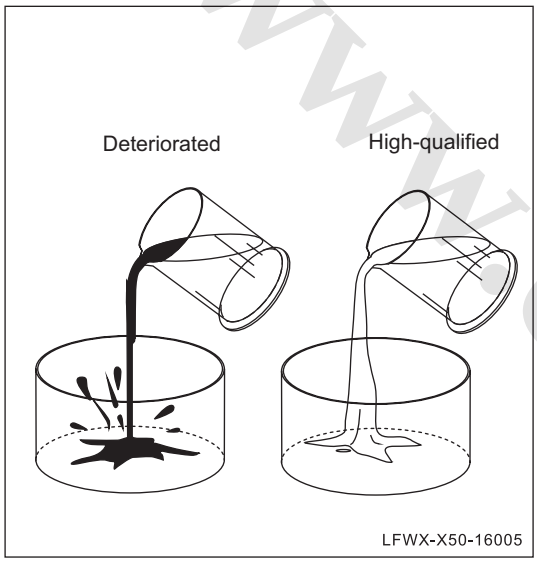

LFWX-X50-16004

(c) Rubbing identification.

- Take out some oil and rub it with fingers. When rubbing, the oil is not deteriorated and can be used continually if it is viscous and has stringing phenomenon, otherwise, it should be replaced.

Notice:

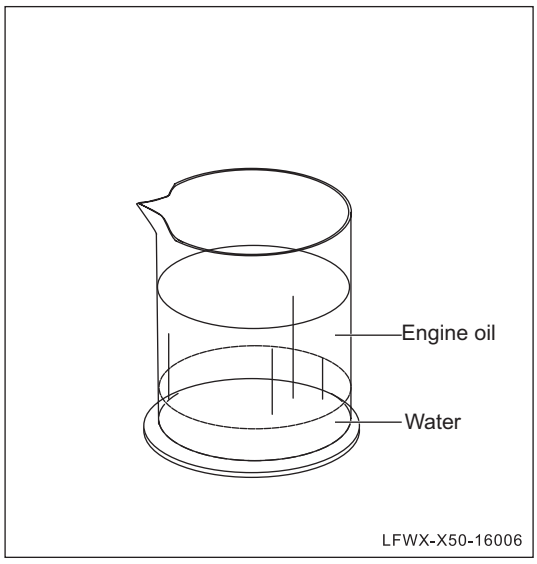
After identification, wipe off the oil on your fingers and clean your fingers immediately.



LFWX-X50-16005

(d) Pouring identification.

- Take out some oil from the oil pan and put it into a container. Pour out the oil from the container slowly and observe the gloss and viscosity of the oil. If the oil can keep long and thin evenly, the oil has no impurities and can be used continually, otherwise, it should be replaced.



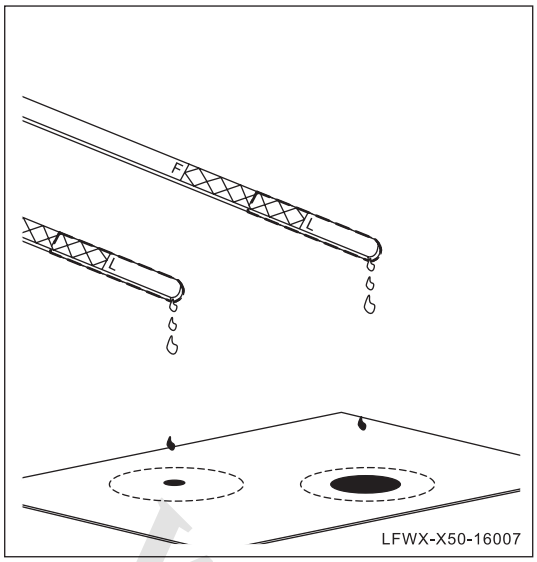
LFWX-X50-16006

△ HINT:

If obvious layers can be seen from the oil in the container and water appeared in the lower layer, the oil is mixed with water. Check the reason for having water in the oil.

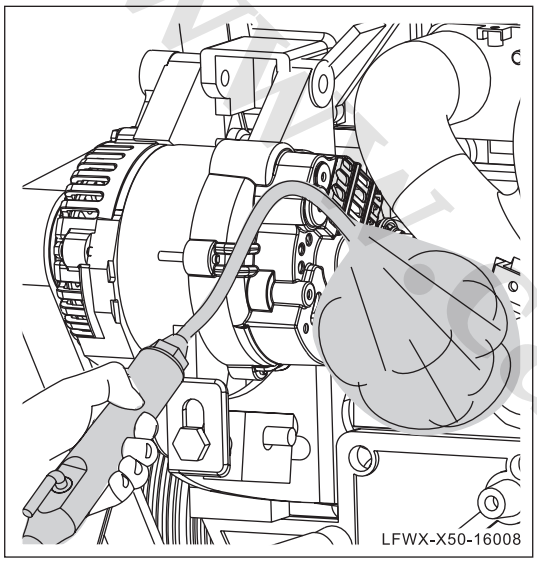
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(e) Oil drop identification.

- Put a drop of oil on a piece of white paper, if the central black point of the oil drop is very big, dark brown, even without particles and its surrounding yellow infiltration is very small, have the oil replaced for it has been deteriorated; If the the central black point is small, in light color and its surrounding yellow infiltration is very big, the oil can be used continually.



3. CHECK THE ENGINE OIL PRESSURE

(a) Clean the surfaces of the engine oil pressure sensor.

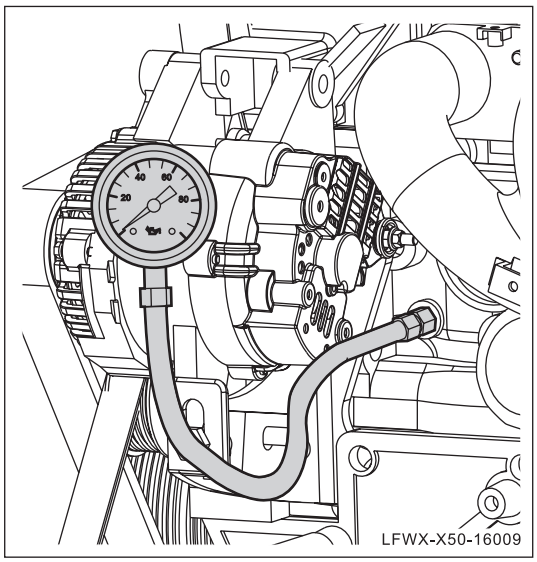
△ HINT:

Clean the connecting part of engine oil pressure sensor and the engine body with compressed air to avoid dust and other impurities going into the oil passage to pollute oil quickly

Notice:

To prevent the splashing debris from causing personal injuries, be sure to wear goggles and protective masks when using compressed air.

(b) Remove the engine oil pressure sensor. (see 16 - Lubrication System, Engine Oil Pressure Sensor, Replacement)



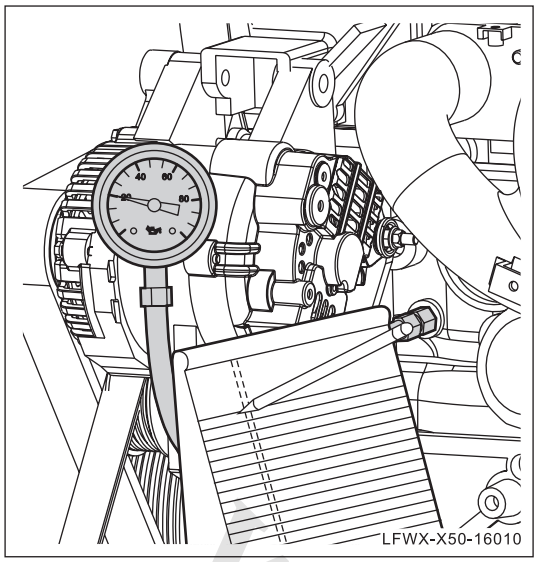
(c) Install the engine oil pressure gauge to the installation hole of the engine oil pressure sensor.

△ HINT:

The joint of the engine oil pressure gauge must be fit well with the installation hole of the engine oil pressure sensor. If not, the joint cannot be used forcefully.

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(d) Start and crank the engine until reaching its operating temperature, and observe the reading of the engine oil pressure gauge.

△ HINT:

The engine oil pressure will increase when starting the engine and return to normal value when the engine is in warm state.

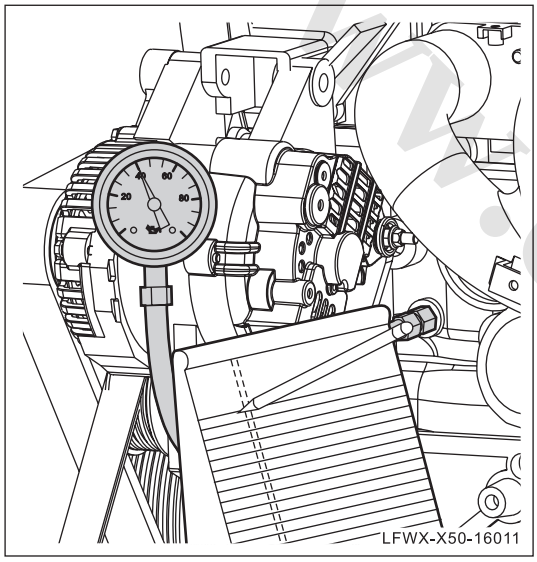
Notice:

If the engine does not generate oil pressure within 15s after being started, shut down the engine to avoid internal damage of the engine.

(e) Record the engine oil pressure when the engine idling.

Rotation speed value at idling speed: 748r/min

Engine oil pressure at idling speed: 80 - 300kPa



(f) Improve the engine rotation speed to its rated rotation speed and keep for 30s. Record the engine oil pressure when the engine rotates at its rated rotation speed .

Rated rotation speed: 4000r/min

Rated engine oil pressure: 330 - 430kPa

(g) Shut down the engine and wait until the engine cools down.

(h) Remove the engine oil pressure gauge after the engine cools down.

(i) Reinstall the engine oil pressure sensor. (see 16 - Lubrication System, Engine Oil Pressure Sensor, Replacement)

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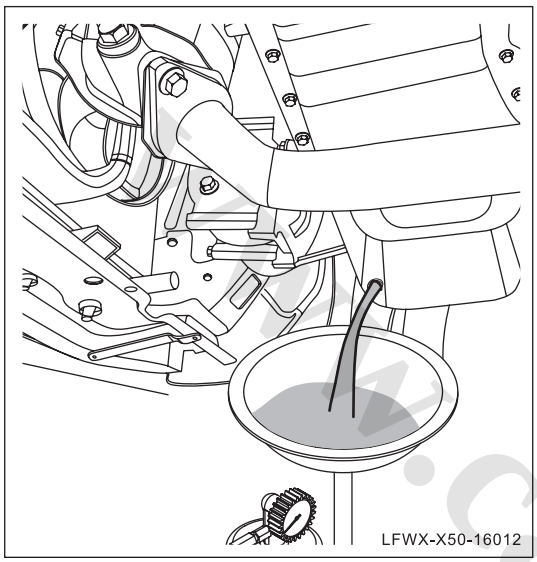
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ENGINE OIL

REPLACEMENT

Notice:

- **Never start to work before the engine has been cooled down completely.**
- **During operation, prepare a piece of cloth to clean up spilled or splashed engine oil.**
- **Never spill the engine oil onto the drive belt.**
- **Completely clean off the engine oil spilled onto the engine or vehicle.**



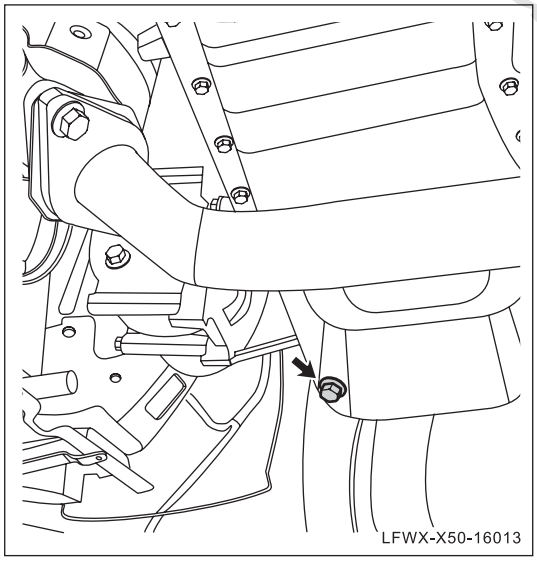
1. DRAIN OIL

(a) Put a recovery under the oil pan drain plug.

(b) Remove the oil drain plug from the oil pan and drain the engine oil into the oil recovery.

△ HINT:

When unscrewing the oil drain plug, keep your arm parallel to the ground to prevent the oil from flowing along your arm.

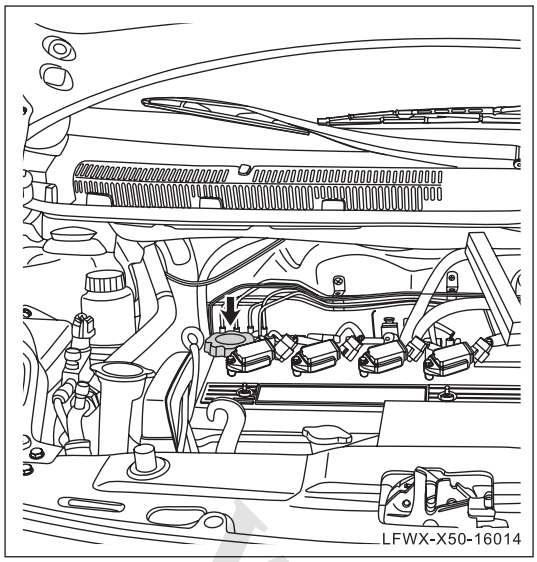


(c) Install the oil drain plug of the oil pan and the gasket.

Torque: 30 N•m

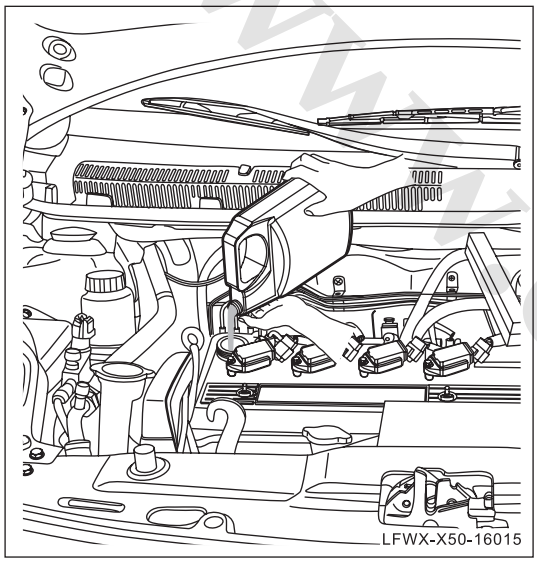
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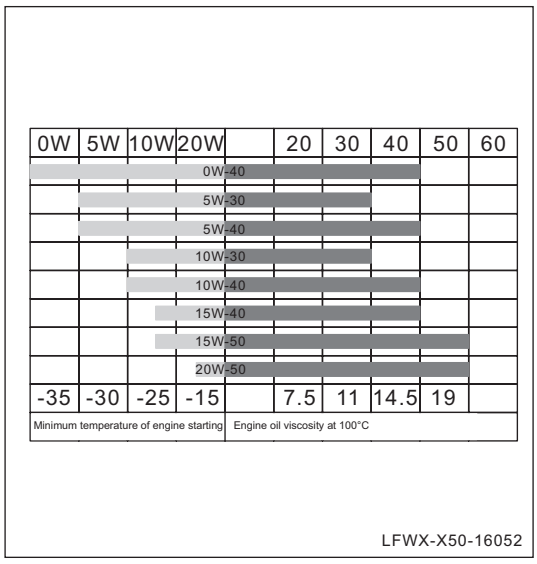
2. FILL ENGINE OIL

(a) Remove the engine oil filler cap.



(b) Fill engine oil.

Filling amount: 3.2 L



Notice:

- **Choose regular oil according to different ambient temperature (as shown in the figure)**
- **Use the oil dipstick to check whether the oil is appropriately filled.**

(c) Install and tighten the engine oil filler cap.

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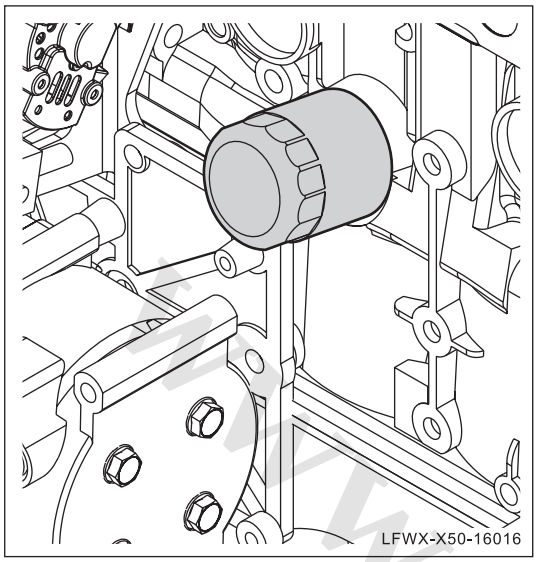
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OIL FILTER

REPLACEMENT

1. REMOVE OIL FILTER

(a) Drain engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)



(b) Remove the oil filter with the oil filter remover.



2. INSTALL OIL FILTER

(a) Clean up the foreign body on the surface of the oil filter base.

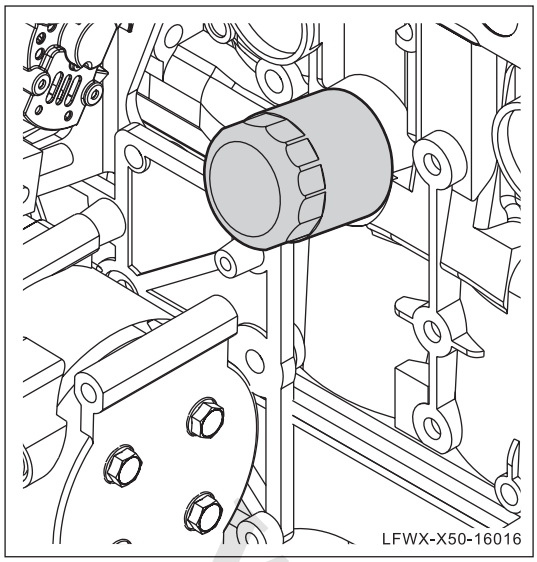
(b) Apply a layer of clean engine oil on the O-seal of the new oil filter.

Notice:

- **Apply original oil filter.**
- **Check that the O-ring has been placed flatly and stably in the slot.**

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(c) Install the oil filter with the oil filter remover.

Notice:

While installing the oil filter, first install the oil filter by hand onto the filter base, until the O-ring has completely located on the filter base, and then rotate it 3/4 to 1 circle with a special tool.

(d) Fill engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)

(e) Start the engine and check the installation position of the oil filter for leakage.

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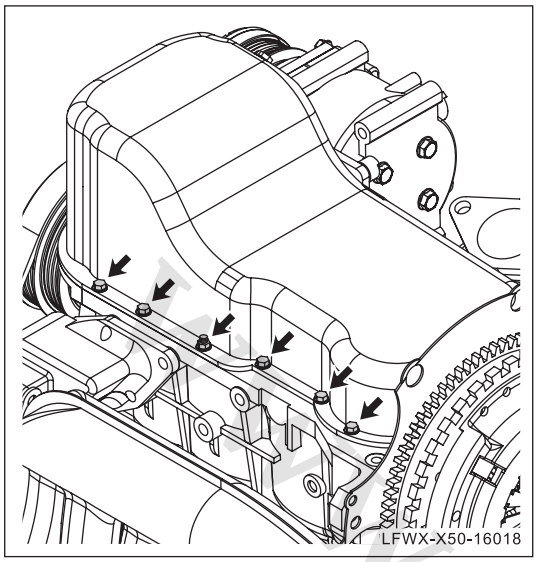
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OIL PAN

REPLACEMENT

1. REMOVE OIL PAN

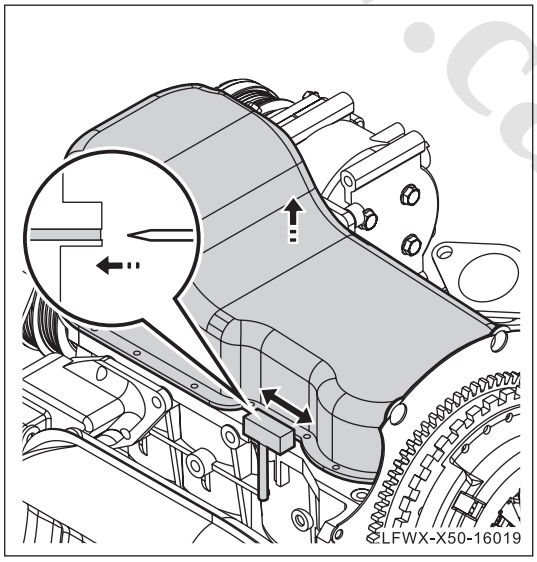
(a) Drain engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)



(b) Remove the oil pan fixing bolts and fixing nuts.

△ HINT:

When removing, operate in the sequence that the two sides first and then the middle.



(c) As shown in the figure, insert straight the oil pan sealing scraper into the installation surface between the oil pan and the cylinder block.

△ HINT:

The oil pan tends to twist when insert the oil pan sealing scraper at the first time. Insert the oil pan sealing scraper evenly to keep the scraper edge contacting perfectly with the bounding face.

(d) Tap the oil pan sealing scraper along the diagonal inclined face to keep it move horizontally.

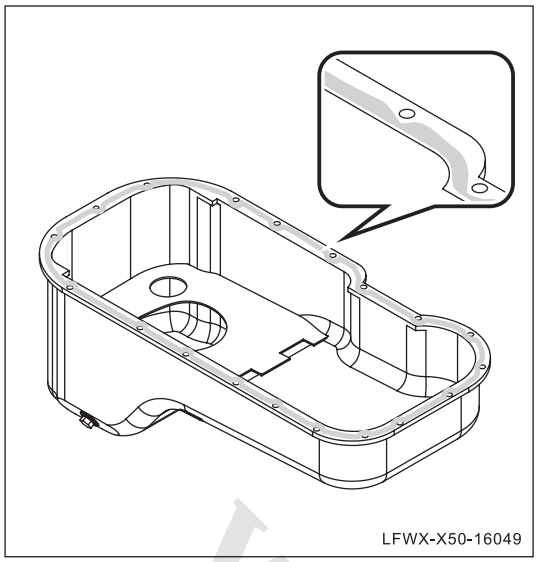
(e) Disconnect the sealing face of the oil pan and the cylinder block with a oil pan sealing scraper and take down the oil pan.

Notice:

- **When installing the oil pan sealing scraper, be sure to check the bolt installation position.**
- **When installing the oil pan sealing scraper, slide slowly along the oil pan without prying the surface to avoid damage to the oil pan installation surface causing oil leakage.**

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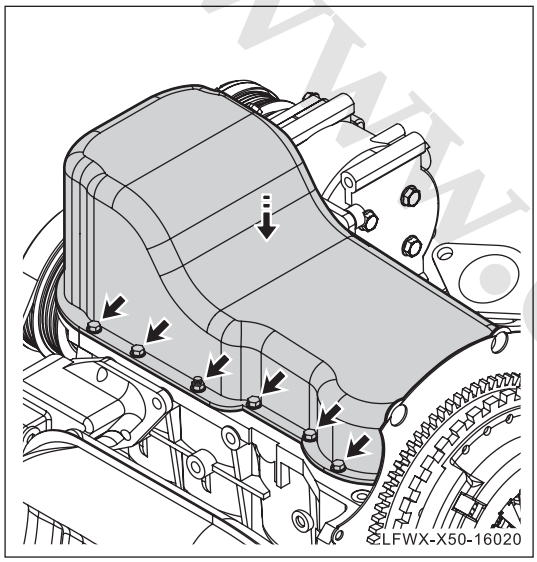


2. INSTALL OIL PAN.

(a) Apply sealant uniformly to the mounting surface of oil pan.

Notice:

When coating new sealant, be sure to clean the residual sealant completely on the cylinder block and the oil pan in advance.



(b) Install the oil pan onto the cylinder block, and mount the fixing bolts and nuts and tighten them.

Torque: 10 N•m

△ HINT:

When tightening, start the tightening in the middle and then to both sides.

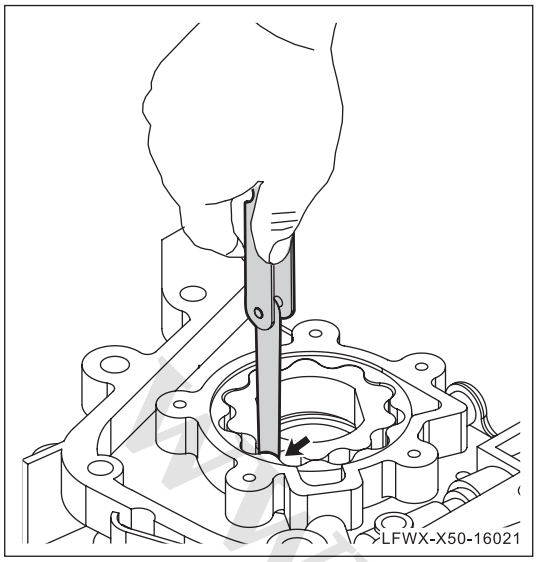
(c) Fill engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)

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OIL PUMP

CHECK

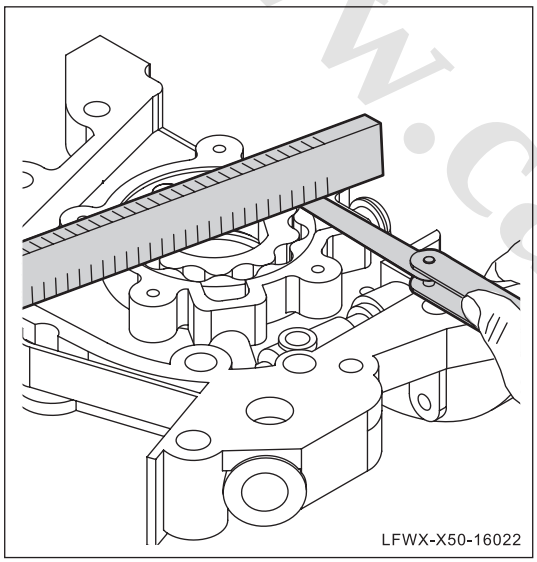


1. INSPECT OIL PUMP COMPONENTS

(a) Measure the tip clearance between the oil pump drive rotor and driven rotor with a feeler gauge. If the tip clearance exceeds the limit value, replace the oil pump.

Standard clearance value: 0.06 - 0.18mm

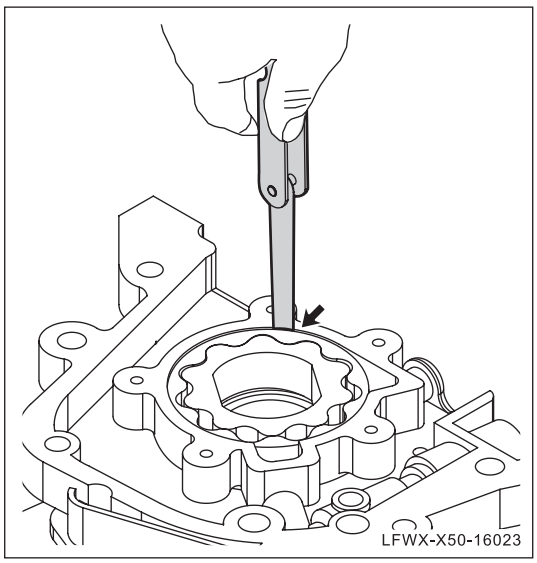
Limit clearance value: 0.35mm



(b) Measure the tip clearance between the two rotors and the oil pump housing with a feeler gauge and a high precision crossed ruler. If the clearance exceeds the limit value, replace the oil pump.

Standard clearance value: 0.02 - 0.07mm

Limit clearance value: 0.10mm



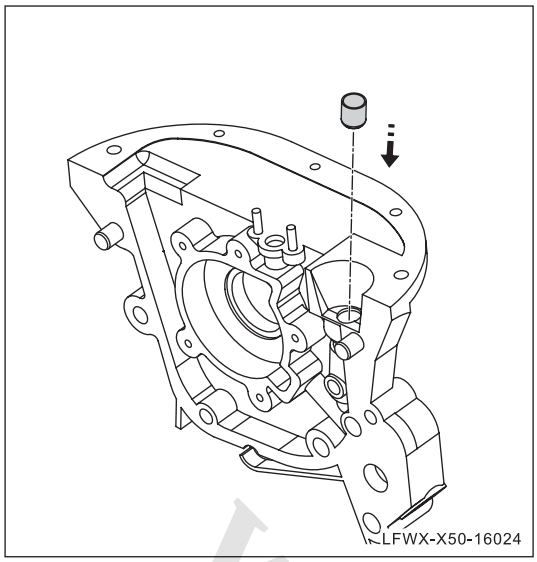
(c) Measure the tip clearance between the driven rotor and the oil pump housing with a feeler gauge. If the clearance exceeds the limit value, replace the oil pump.

Standard clearance value: 0.10 - 0.18mm

Limit clearance value: 0.20mm

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(d) Coat a layer of clean oil onto the pressure limited valve piston. Check and verify whether the piston can slide into the valve hole via its own weight. If not, replace the piston. If necessary, replace the oil pump.

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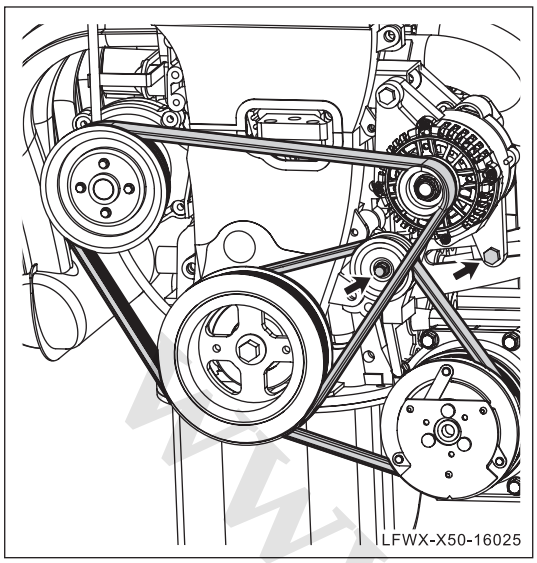
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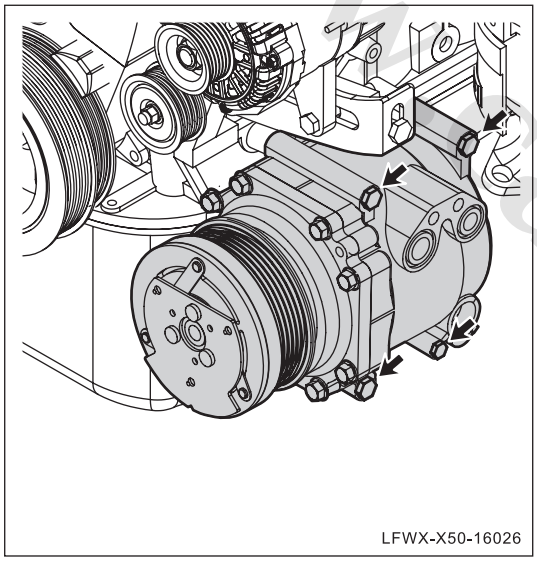
REPLACEMENT

1. REMOVE OIL PUMP

(a) Drain engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)



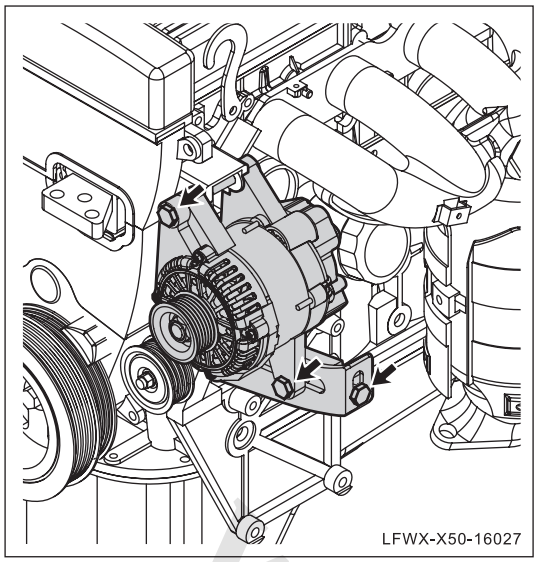
(b) Unscrew the adjusting bolts of the pulley of the alternator and A/C compressor, and remove the alternator belt and the A/C compressor belt.



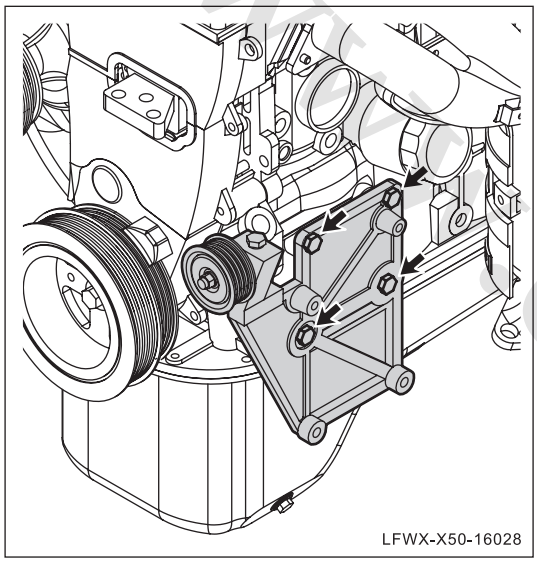
(c) Remove the A/C compressor fixing bolts and remove the A/C compressor.

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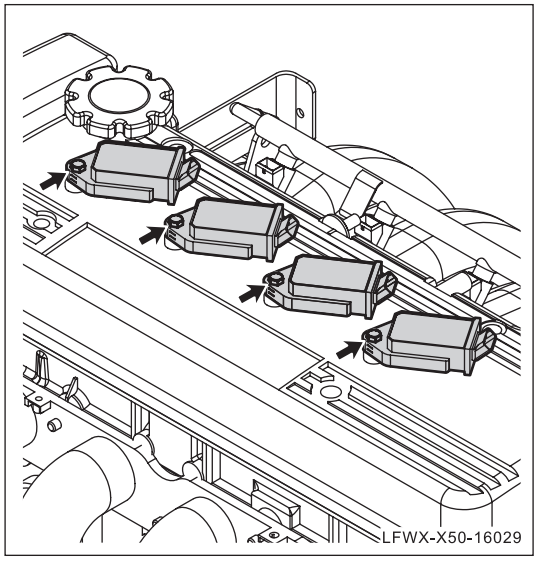
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(d) Remove the alternator with bracket assembly.



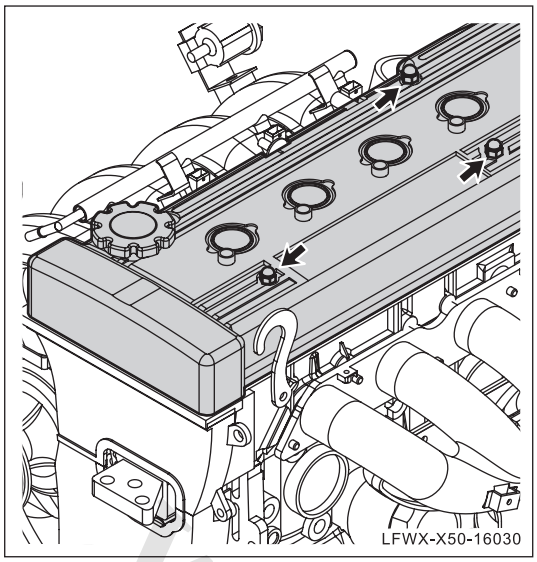
(e) Remove the A/C compressor tensioner with bracket assembly.



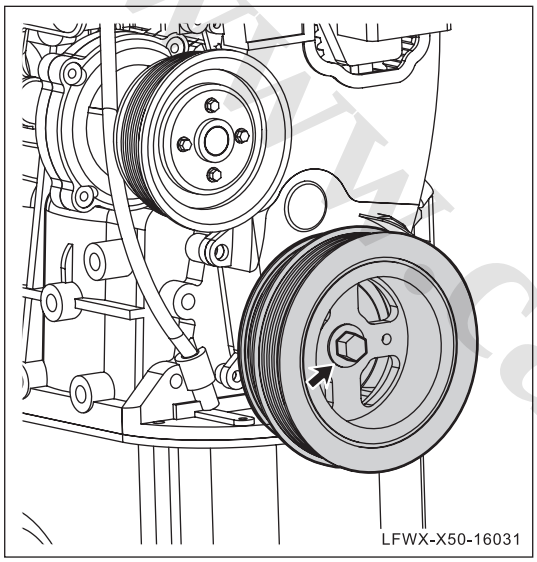
(f) Remove the fixing bolts of the ignition coil and take out the ignition coil.

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(g) Remove the fixing bolts of the cylinder-head cover and then take out the cover.

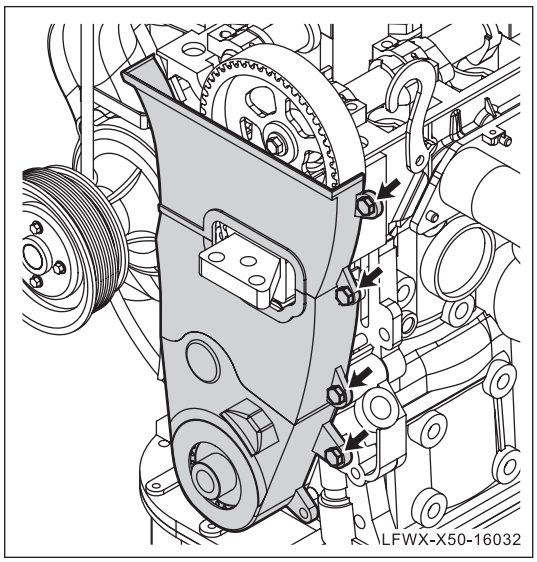


(h) Remove the fixing bolts of the crankshaft pulley.

△ HINT:

When removing the crankshaft pulley fixing bolts, to prevent the crankshaft from rotating, insert a stick between the crankshaft pulley and the timing belt cover plate in advance.

(i) Remove the crankshaft pulley and the woodruff key.



(j) Remove the fixing bolts of the timing belt cover plate and the timing belt cover plate.

△ HINT:

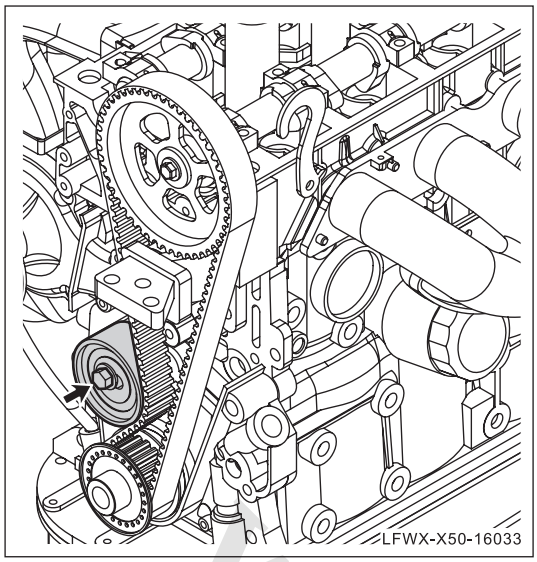
When removing the timing belt cover plate, due to the sealant, it may be uneasy to remove it. For the convenience, tap the timing belt cover plate with a rubber hammer to remove it.

Notice:

Do not tap it with an iron hammer or a hard tool.

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(k) Remove the fixing bolts of the timing tensioner and the timing tensioner and its spring.

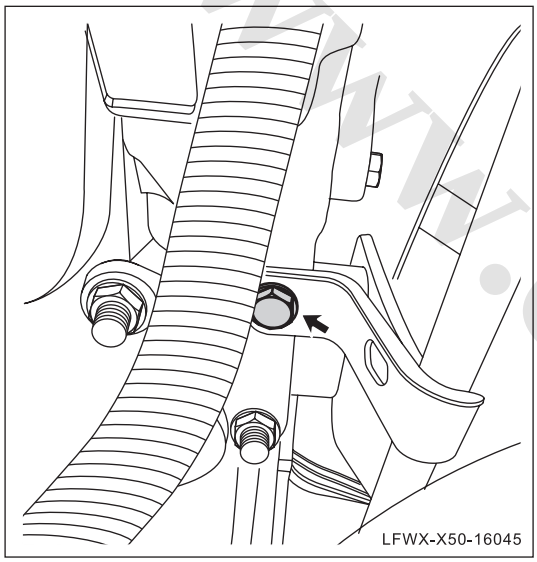
Notice:

To prevent the rotation of camshaft or crankshaft from damaging the valve tappet or other components after removing the timing belt, be sure to rotate the crankshaft to allow all pistons between the piston strokes before removing.

(l) Remove the timing belt.

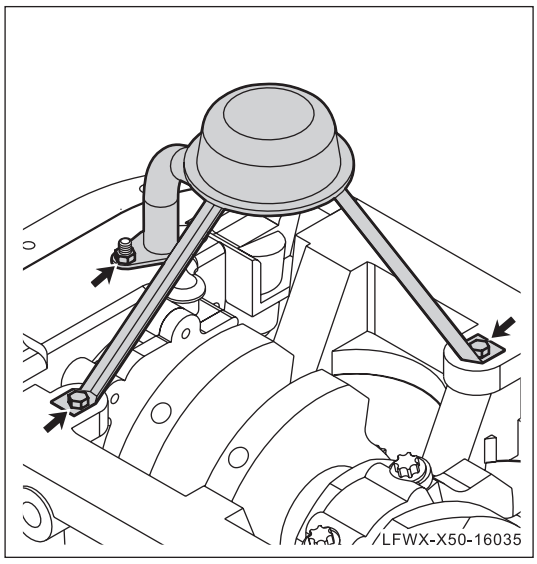
(m) Remove the crankshaft timing pulley retainer ring.

(n) Remove the crankshaft timing pulley and woodruff key.



(o) Remove the fixing bolts of the oil dipstick conduit and the oil dipstick assembly.

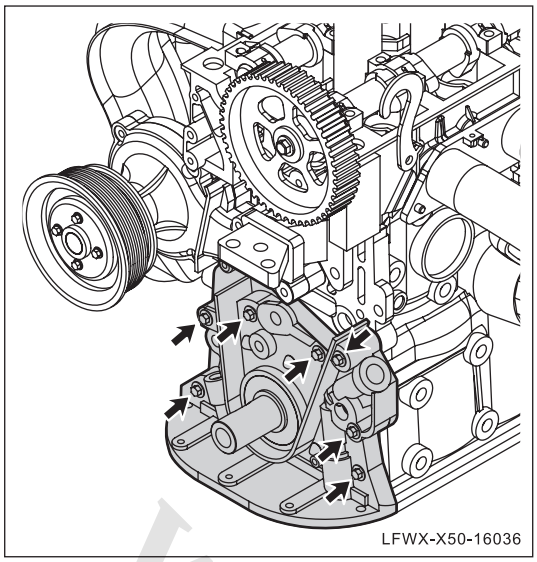
(p) Remove oil pan. (see 16 - Lubrication System, Oil Pan, Replacement)



(q) Remove the oil strainer fixing bolts and nuts and take out the oil strainer.

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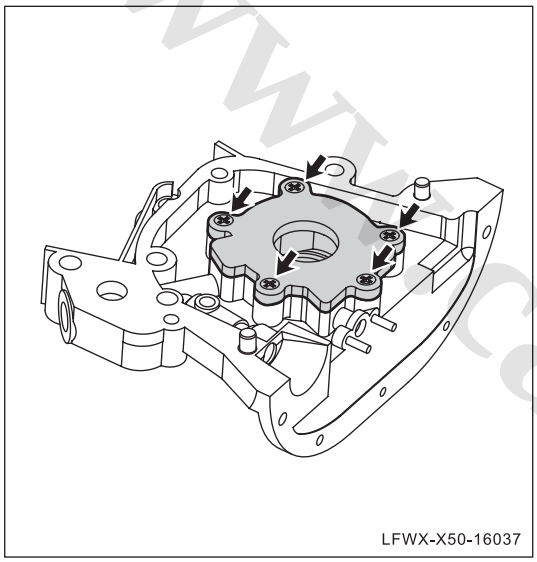
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LFWX-X50-16036

(r) Remove the oil pump fixing bolts and the oil pump and its washer.

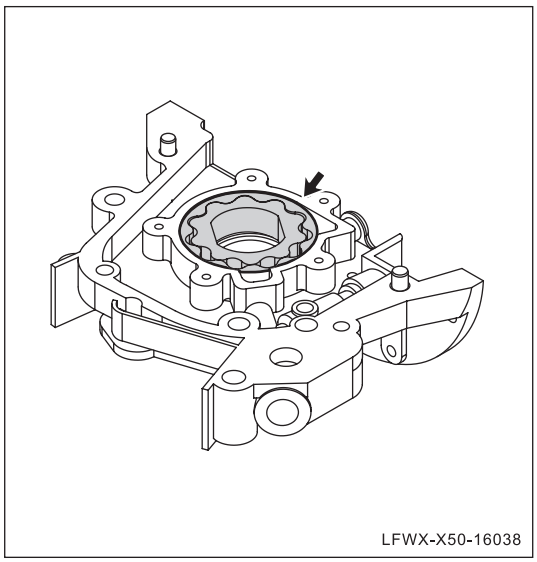
Notice:

Once the oil pump washer is removed, don't reuse it any more. Be sure to use a new one to replace it.


LFWX-X50-16037

2. DISMANTLE OIL PUMP

(a) Remove the fixing screws of the oil pump cover and the oil pump cover.


LFWX-X50-16038

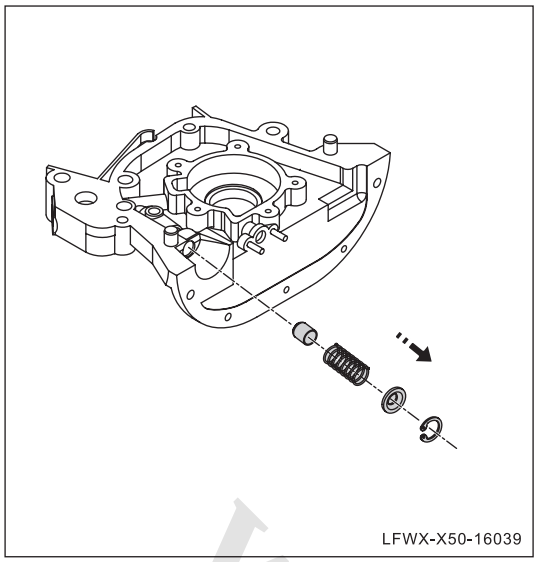
(b) Remove the oil pump drive rotor and driven rotor.

△ HINT:

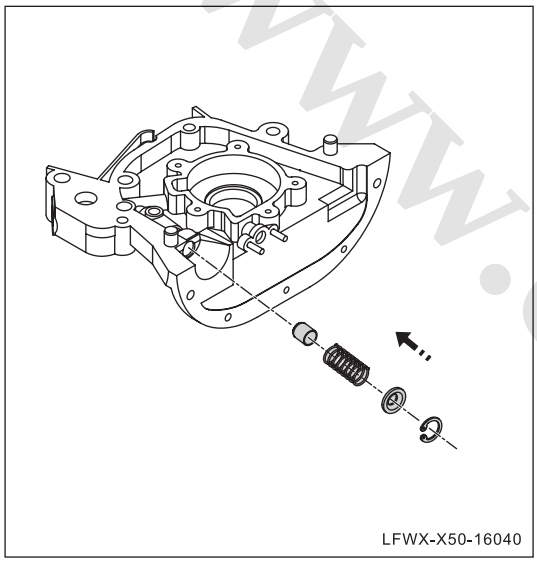
For the sake of future installation, be sure to make the assembly marks when removing the oil pump drive rotor and driven rotor.

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LFWX-X50-16039

(c) Remove the snap ring, and take down the spring seat, spring and piston.

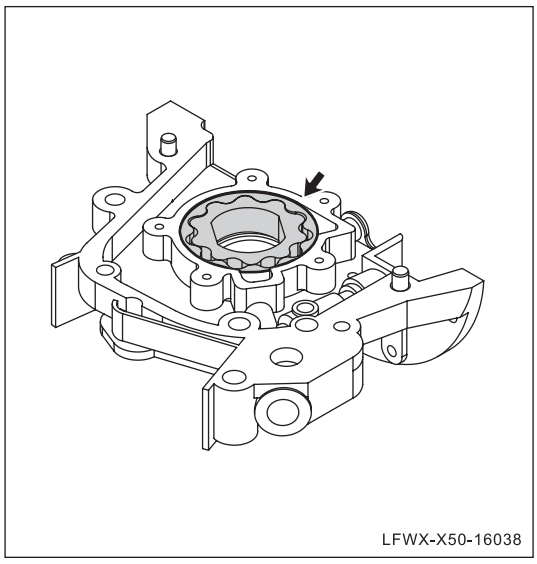

LFWX-X50-16040

3. REASSEMBLE OIL PUMP

(a) Install the piston, spring and spring seat into the installation hole.

(b) Install the snap ring into the installation hole.

- Compress the spring seat and spring with a round column (its outer diameter should be less than the inner diameter of snap ring).
- Install the snap ring to the round column and make it slide into the installation position through the round column.
- Install the snap ring with a snap ring plier.


LFWX-X50-16038

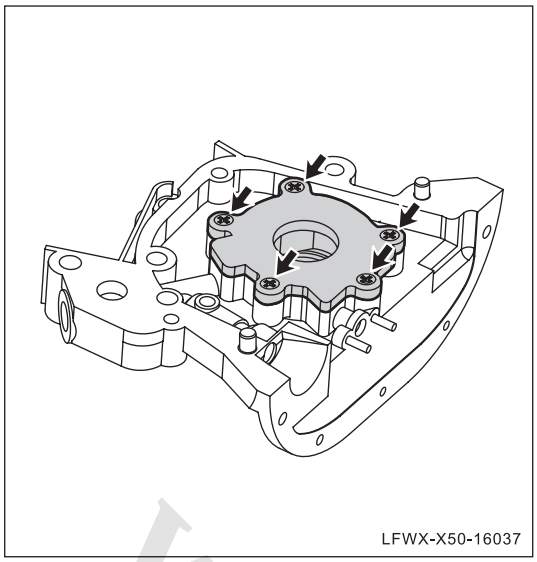
(c) Install the oil pump drive rotor and driven rotor.

△ HINT:

Install according to the marks.

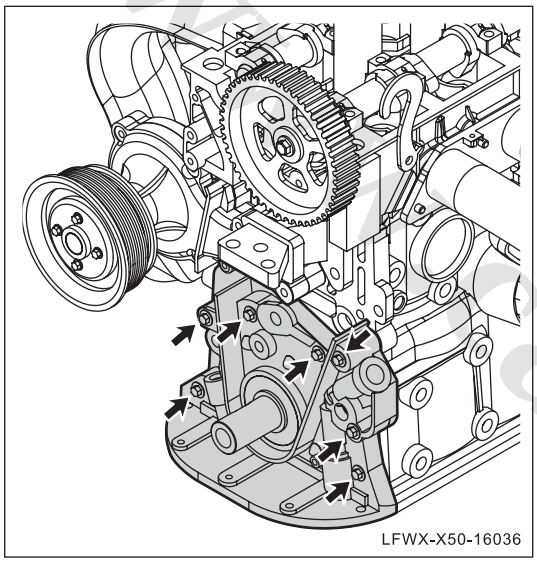
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(d) Install the oil pump cover, install the fixing screws and tighten them.

Torque: 10 N•m



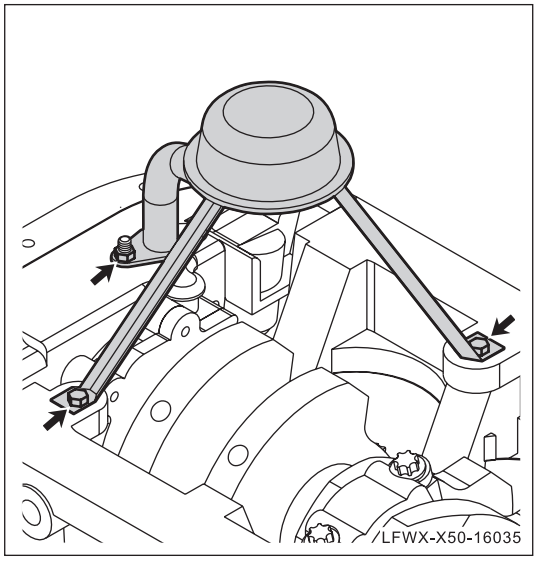
4. INSTALL OIL PUMP

(a) Install the oil pan and washer onto the cylinder block, and mount the fixing bolts and tighten them.

Torque: 23 N•m

△ HINT:

Install the locating pin of the oil pump with it aligning to the locating hole on the cylinder block.



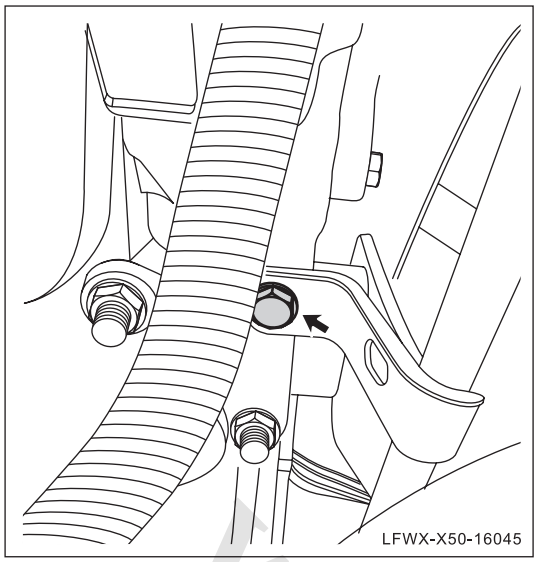
(b) Install the oil strainer onto the cylinder block, and install the fixing bolts and nuts and tighten them.

Torque: 10 N•m

(c) Install the oil pan. (see 16 - Lubrication System, Oil Pan, Replacement)

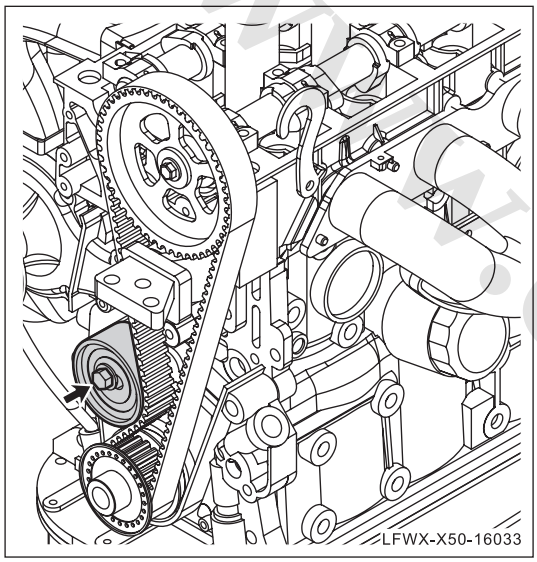
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(d) Install the oil dipstick conduit in place, and mount the fixing bolts and tighten them.

Torque: 10 N•m



(e) Install the crankshaft timing pulley and the woodruff key.

△ HINT:

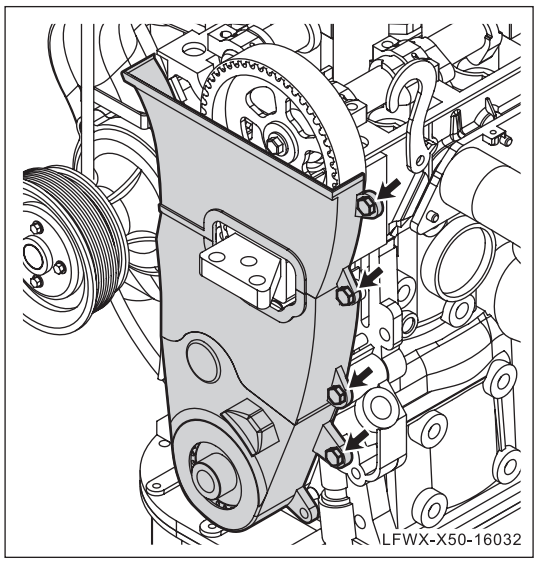
When installing the crankshaft timing pulley, be sure to align with the assembly mark.

(f) Install the crankshaft timing pulley retainer ring.

(g) Install the timing belt.

(h) Install the timing belt tensioner and spring, and mount the fixing bolts and tighten them.

Torque: 22 - 25 N.m

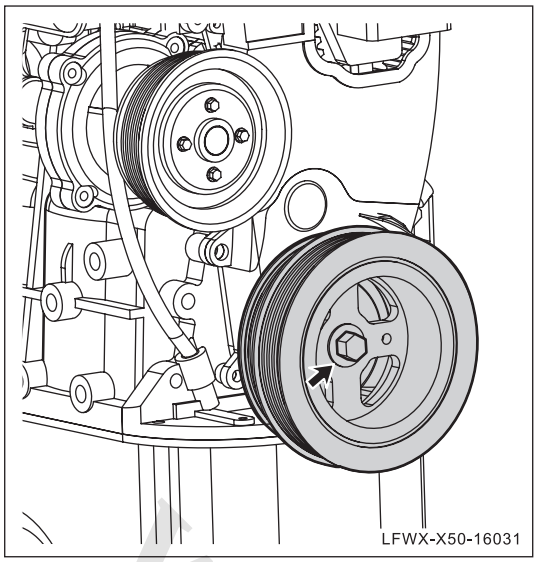


(i) Install the timing belt cover plate in place, and mount the fixing bolts and tighten them.

Torque: 10 N•m

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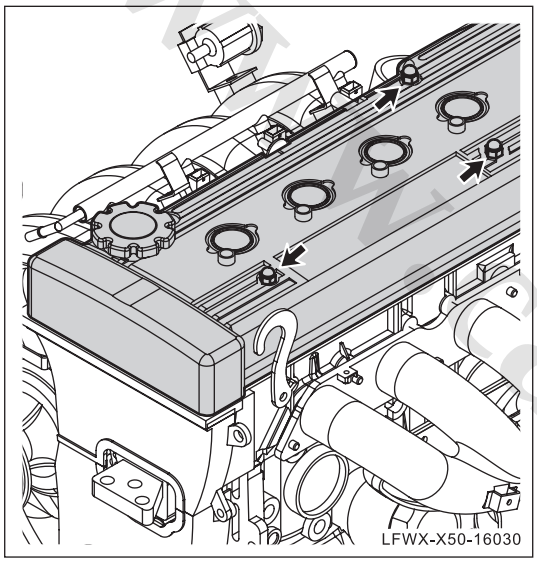


(j) Install the crankshaft pulley and the woodruff key in place, and mount the fixing bolts and tighten them.

Torque: 145 N•m

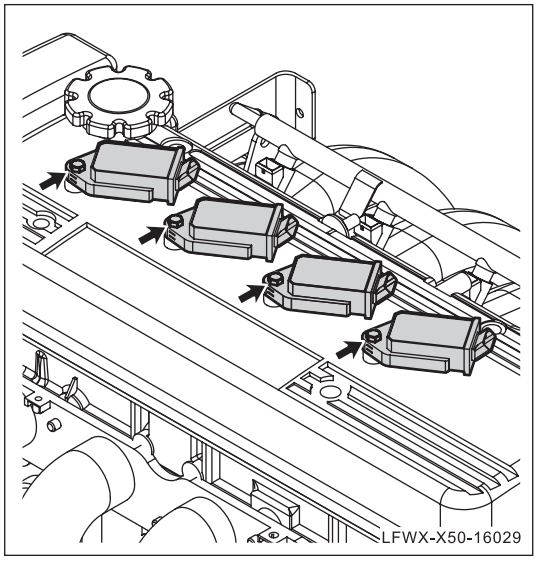
△ HINT:

When installing the crankshaft pulley fixing bolts, to prevent the crankshaft from rotating, insert a stick between the crankshaft pulley and the timing belt cover plate in advance.



(k) Install the cylinder head cover in place, and mount the fixing bolts and tighten them.

Torque: 12 N•m

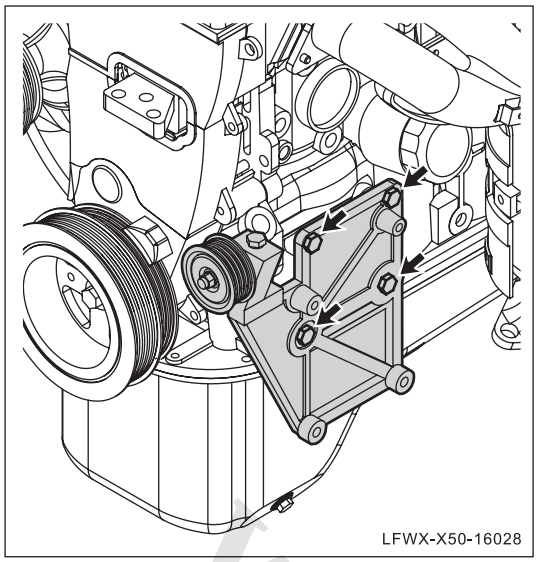


(l) Install the ignition coil onto the cylinder head cover, and mount the fixing bolts and tighten them.

Torque: 12 N•m

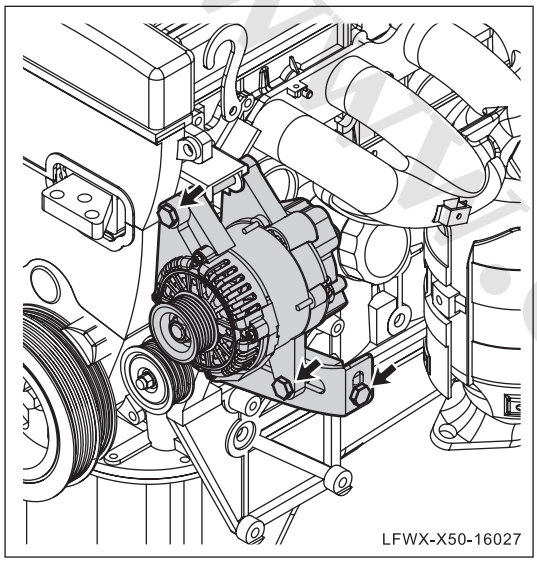
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(m) Install the A/C compressor tensioner with bracket assembly in place, and mount the fixing bolts and tighten them.

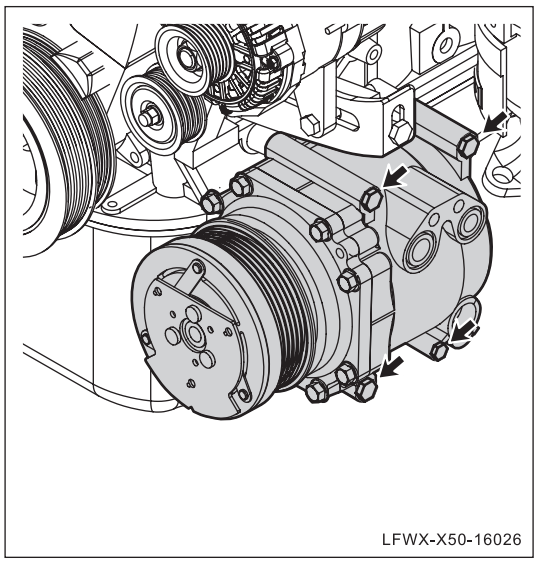
Torque: 49 N•m



(n) Install the alternator with bracket assembly in place, and mount the fixing bolts and tighten them.

Torque: 25 N•m (short bolt)

54 N•m (long bolt)

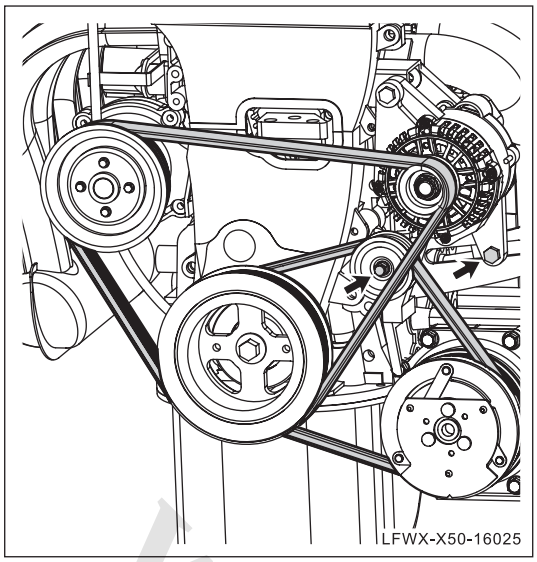


(o) Install A/C compressor to its installation position, and mount fixing bolts and tighten them.

Torque: 49 N•m

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(p) Install and adjust the alternator and A/C compressor belt.

△ HINT:

Press it down with 100N force, and belt deflection is 13 - 14mm (new belt is 9 - 10 mm).

(q) Fill engine oil. (see 16 - Lubrication System, Engine Oil, Replacement)

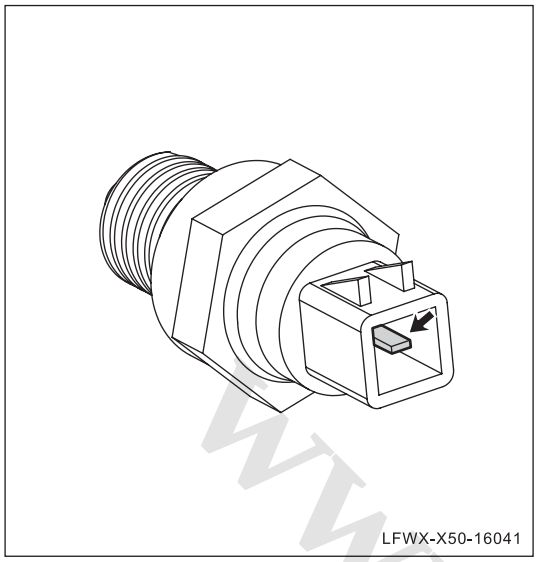
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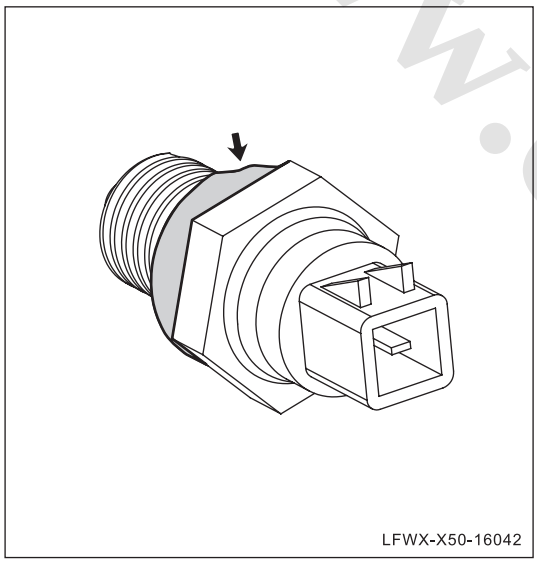
ENGINE OIL PRESSURE SENSOR

INSPECTION

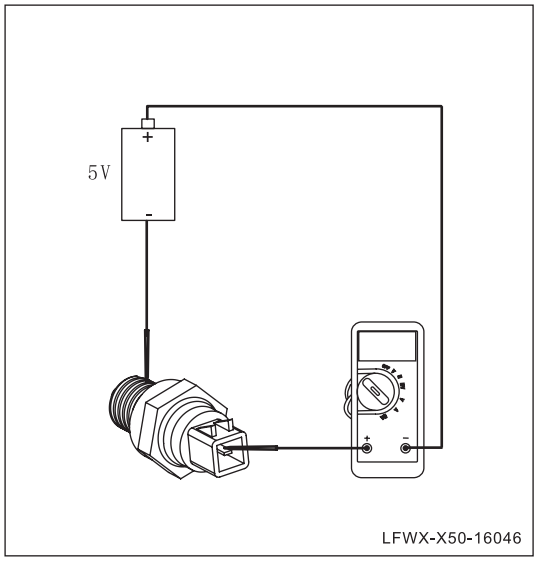


1. CHECK ENGINE OIL PRESSURE SENSOR

(a) Check the oil pressure sensor pitch for deformation and break and have it replaced if necessary.



(b) Check the oil pressure sensor metal case for serious damage and have it replaced if necessary.



2. INSPECT THE ENGINE OIL PRESSURE SENSOR

(a) Connect the DC power supply (5V±0.25V), engine oil pressure sensor and digital multimeter as shown in the figure.

△ HINT:

Switch the digital multimeter to the current position.

(b) Inspect and record the sensor current and have the engine oil pressure sensor replaced if the inspection result does not meet the requirements.

Current: 2 - 8 mA

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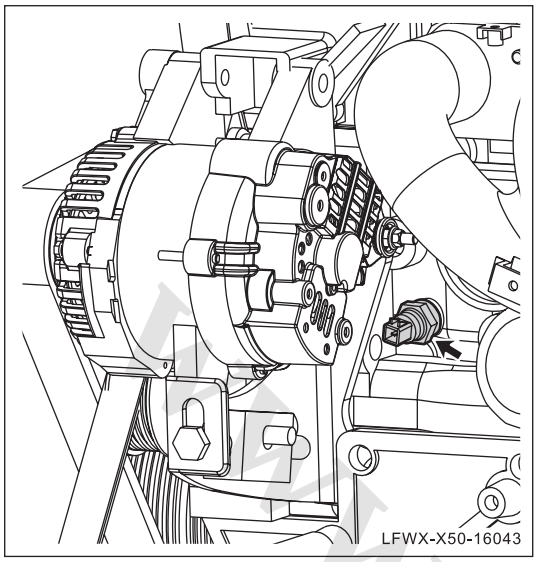
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REPLACEMENT

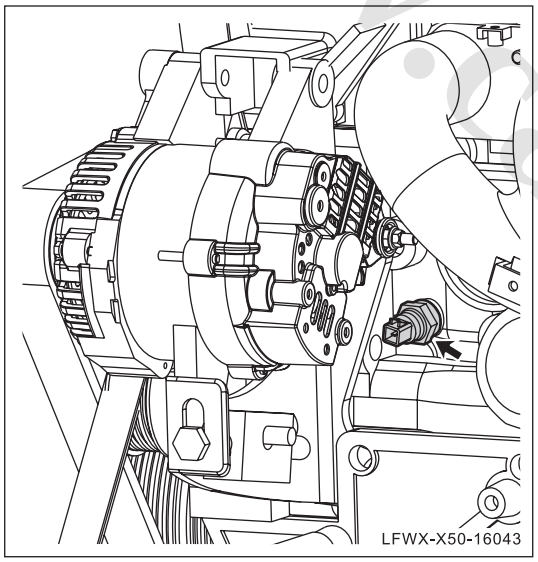
1. REMOVE ENGINE OIL PRESSURE SENSOR

(a) Disconnect the negative cable of battery.

(b) Disconnect engine oil pressure sensor connector.



(c) Remove the engine oil pressure sensor.



2. INSTALL ENGINE OIL PRESSURE SENSOR

(a) Install the engine oil pressure sensor onto the engine and tighten it.

Torque: 30 - 40 N.m

△ HINT:

Before installing, coat the engine oil pressure sensor thread with sealant.

(b) Connect the oil pressure sensor connector.

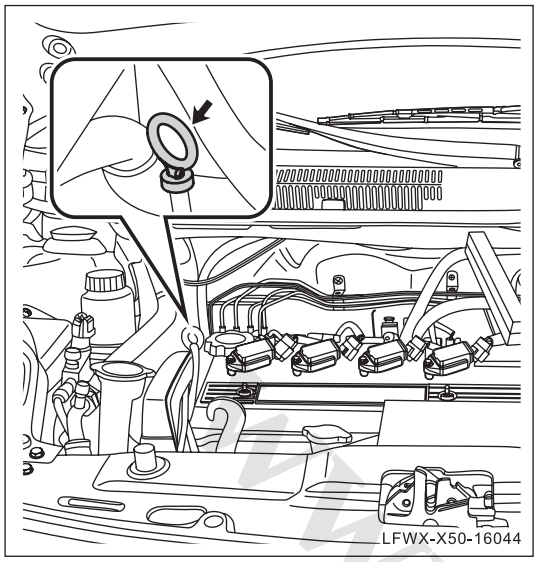
(c) Connect the negative cable of battery.

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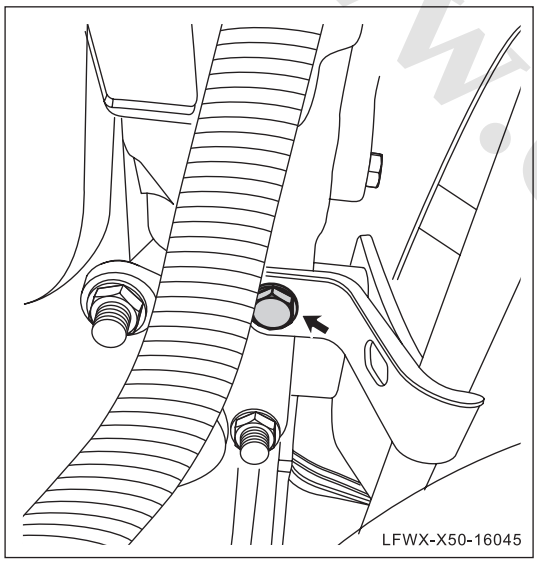
OIL DIPSTICK

REPLACEMENT



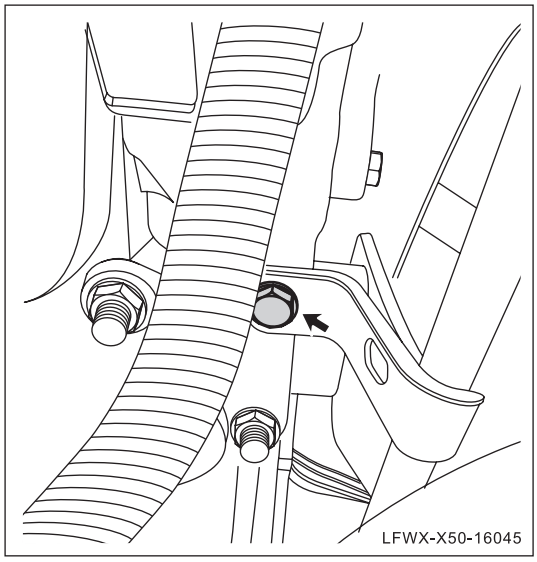
1. REMOVE OIL DIPSTICK AND ITS CONDUIT

(a) Remove the oil dipstick.



(b) Remove the fixing bolts of the engine oil dipstick-conduit and then remove engine oil dipstick conduit and O-ring.

(c) Check the engine oil dipstick O-ring for damage and have it replaced if necessary.



2. INSTALL OIL DIPSTICK AND ITS CONDUIT

(a) Install the oil dipstick conduit in place, and install the fixing bolts and tighten them.

Torque: 10 N•m

(b) Install the oil dipstick.

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Ignition System

Ignition system 17-1
System description 17-1
Preparation 17-1
Service data 17-2
Precautions 17-2
Components (I) 17-3
Components (II) 17-4
Function and fault of components 17-4
On-vehicle inspection 17-5
Ignition coil 17-6
Check 17-6
Replacement 17-7
Spark plug 17-9
Check 17-9
Replacement 17-11
Ignition switch 17-12
Replacement 17-12

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IGNITION SYSTEM

SYSTEM DESCRIPTION

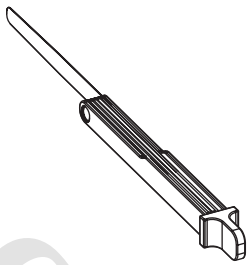
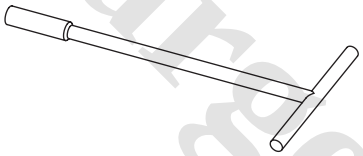
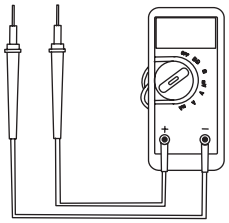
1. FUNCTION

Function of ignition system is: to transform the low voltage supplied by car power supply into high voltage, and distribute the voltage to each cylinder spark plug timely and accurately in accordance with the working sequence of engine and the time of ignition. Sparks will be generated at the gaps of cylinders, and light the flammable gas mixture.

2. COMPONENTS

The ignition system mainly consists of ignition coil and spark plug, etc.

PREPARATION

S/N	Tool	Outline diagram	Description
1	Feeler gauge		Inspecting components' clearance
2	Spark plug remover		Removing and installing the spark plug
3	Digital multimeter		Inspecting the resistance of spark plug

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Standard resistance of ignition coil	0.5±0.05 Ω
Spark plug electrode clearance	0.7~0.8 mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of ignition coil	12
Spark plug	28

PRECAUTIONS

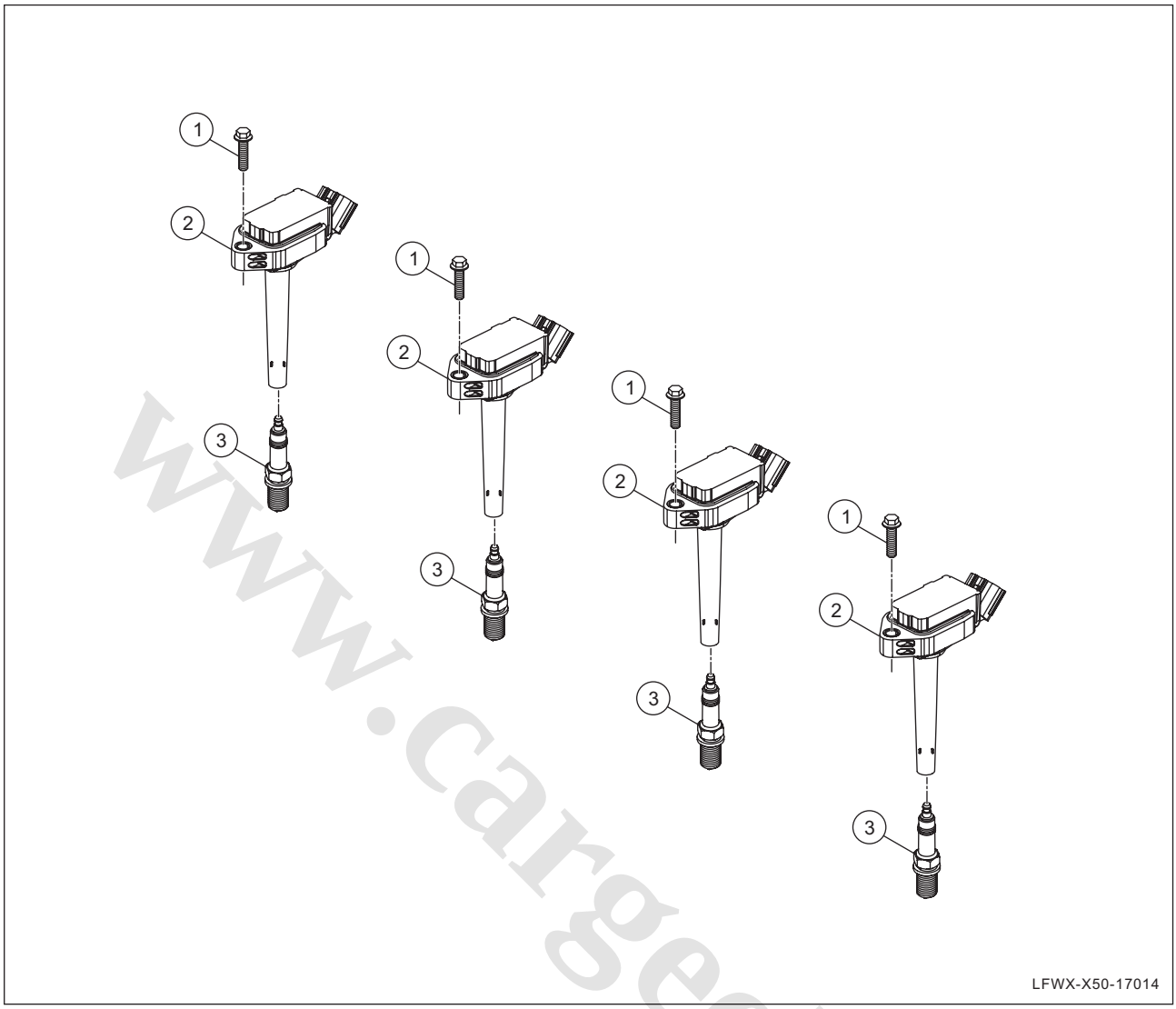
1. Avoid damaging to spark plug thread when removing spark plug.
2. Don't drop or crash the spark plug electrodes.
3. Don't exceed 2s when performing the ignition test of the spark plug grounding.

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COMPONENTS (I)



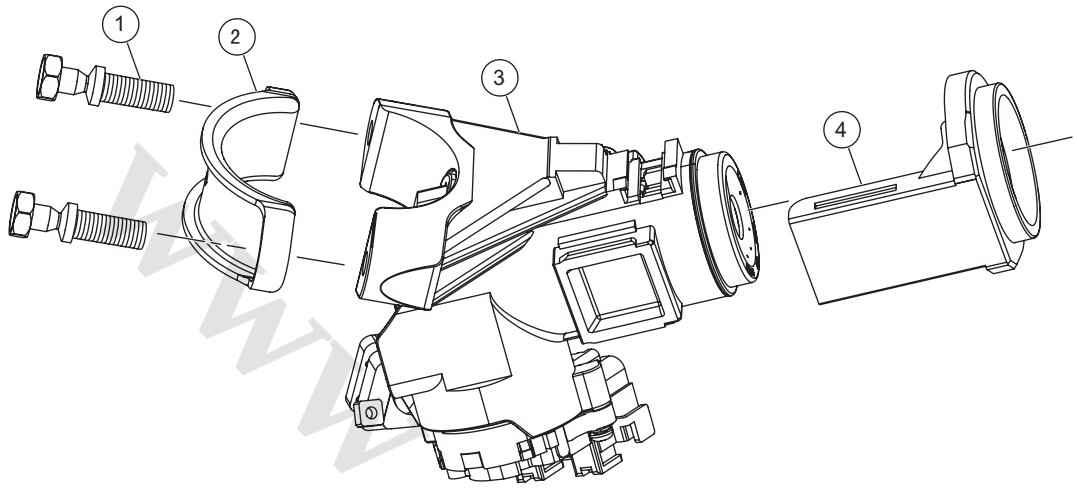
1	Bolt
2	Ignition coil

3	Spark plug

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COMPONENTS (II)



LFWX-X50-17017

1	Anti-theft bolt	3	Ignition switch lock body assembly
2	Clamp	4	Ornament

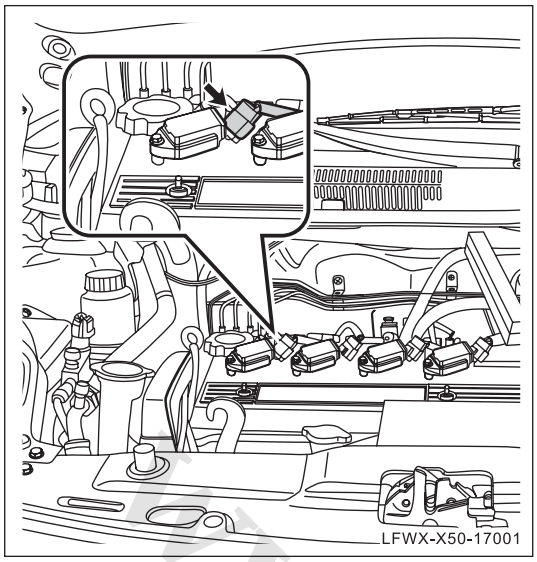
FUNCTION AND FAULT OF COMPONENTS

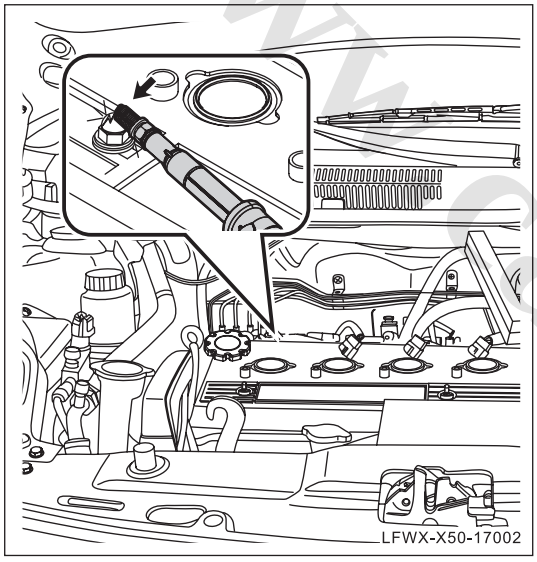
Component name	Component function	Common fault	Fault symptom
Ignition coil	Transforming the low voltage supplied by car power supply into high voltage	No output voltage, low output voltage or broken insulated enclosure, etc.	The engine cannot be started or insufficient power.
Spark plug	Leading the high voltage generated by ignition coil into the combustion chamber, and lighting the gas mixture with the spark from the electrodes.	Spark plug ceramic insulator broken, spark plug deposit and electrode damaged seriously, etc.	Bad starting, poor acceleration and ignition miss

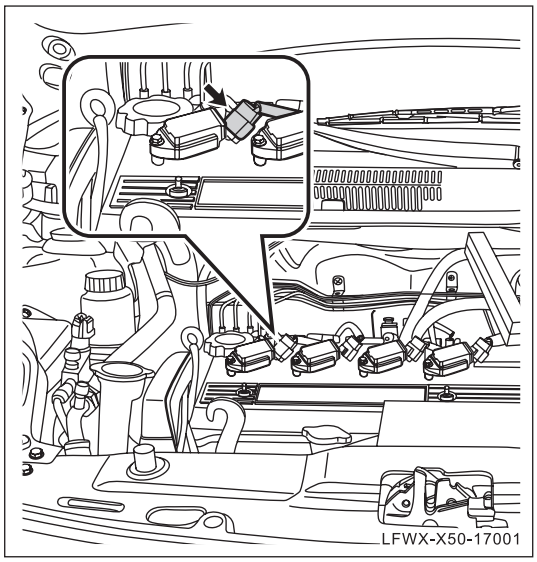
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ON-VEHICLE INSPECTION







1. CHECK WHETHER SPARK PLUG CAN WORK NORMALLY

(a) Disconnect the connector of the ignition coil of each cylinder in turn.

△ HINT:

It is recommended to disconnect the connector of fuel injector.

(b) Remove the ignition coil and spark plug of each cylinder.

△ HINT:

- Remove the ignition coil. (See 17 - Ignition System, Ignition Coil, Replacement)
- Remove the spark plug. (See 17 - Ignition System, Spark Plug, Replacement)

(c) Install the spark plug of No.1 cylinder to the ignition coil, and connect the connector of the ignition coil.

(d) Make the sparking plug grounding to check whether the spark plug can spark in the process of the engine starting.

NOTICE:

Make sure that the engine starting process will not exceed 2s.

(e) Check the spark plugs of No. 2, 3 & 4 cylinders in the same way.

(f) Install the spark plug and the ignition coil of each cylinder.

△ HINT:

- Install the spark plug (See 17 - Ignition System, Spark Plug, Replacement)
- Install the ignition coil. (See 17 - Ignition System Ignition Coil, Replacement)

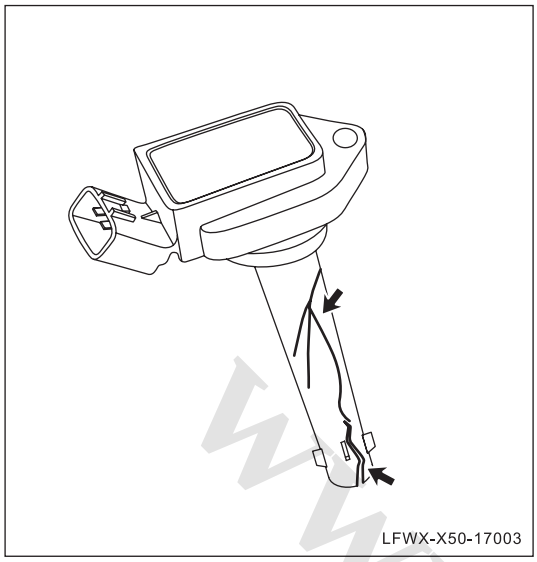
(g) Connect the connector of the ignition coil of each cylinder in turn.

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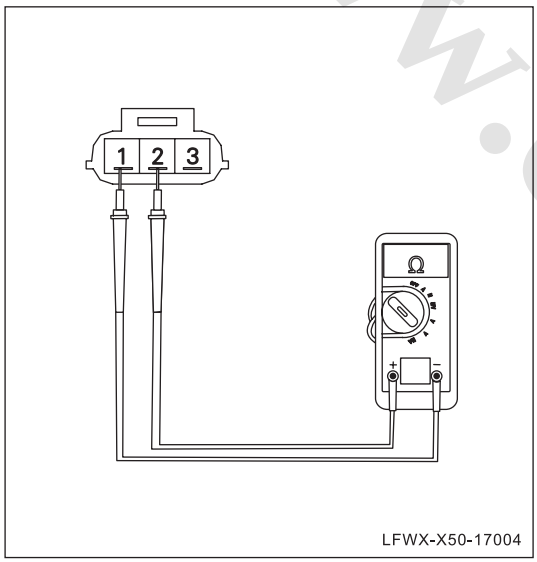
IGNITION COIL

CHECK



1. CHECK THE IGNITION COIL

(a) Check the insulating cover or shell of ignition coil for crack or damage, and replace the broken if necessary.



(b) Switch the digital multimeter to "Ω" for measuring the resistance between terminal 1 and terminal 2 of ignition coil. Replace the ignition coil if the measured value is not conforming to the regulations.

Standard resistance: 0.5±0.05 Ω

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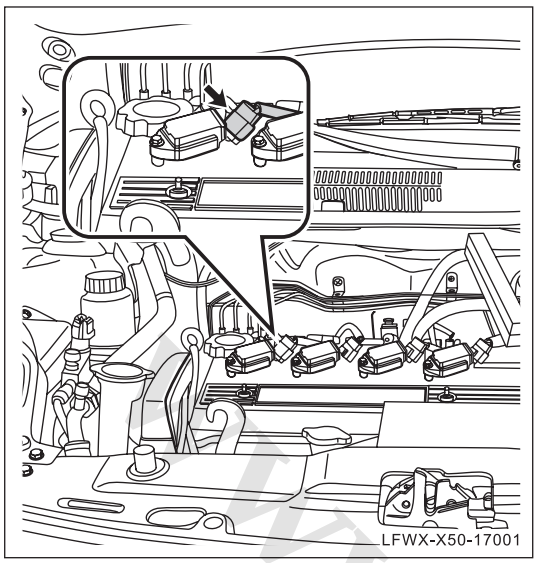
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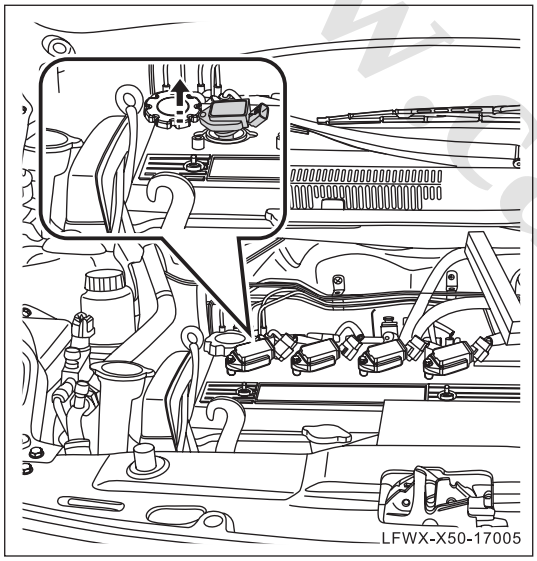
REPLACEMENT

1. REMOVE THE IGNITION COIL

(a) Turn off the ignition switch and disconnect the negative cable of battery.



(b) Disconnect the connector of the ignition coil of each cylinder in turn.



(c) Remove the fixing bolts of ignition coil of No. 1 cylinder, and pull out the ignition coil of No.1 cylinder slowly.

△ HINT:

Do not damage the rubber component of the spark plug.

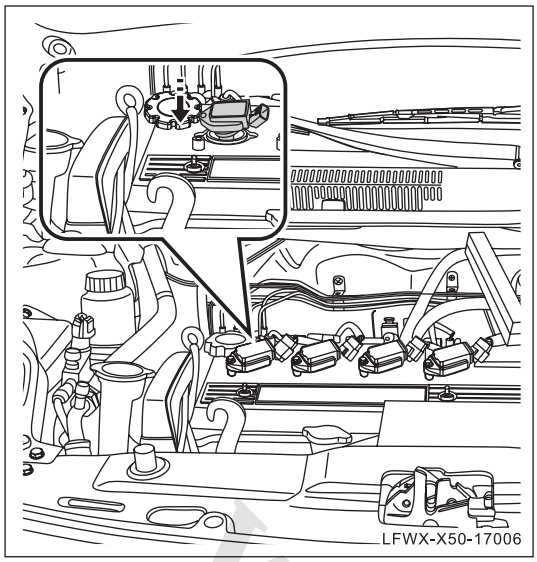
(d) Remove the ignition coils of No. 2, 3 & 4 cylinders in the same way.

△ HINT:

For the convenience of subsequent installation, put the removed ignition coils in sequence.

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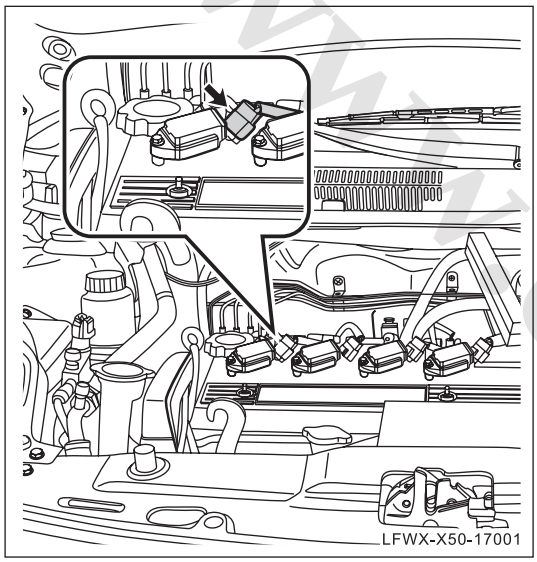


2. INSTALL THE IGNITION COIL

(a) Install the ignition coil of No. 1 cylinder in place, and then mount & tighten the fixing bolts.

Torque: 12 N•m

(b) Install the ignition coils of No. 2, 3 & 4 cylinder in the same way.



(c) Connect the connector of the ignition coil of each cylinder in turn.

(d) Connect the negative cable of battery.

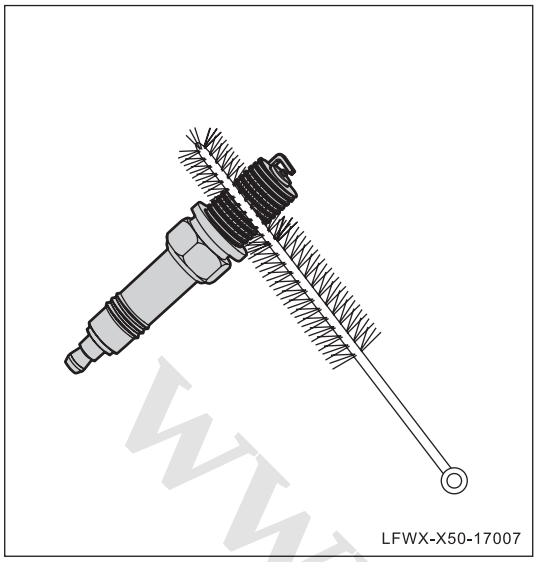
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SPARK PLUG

CHECK

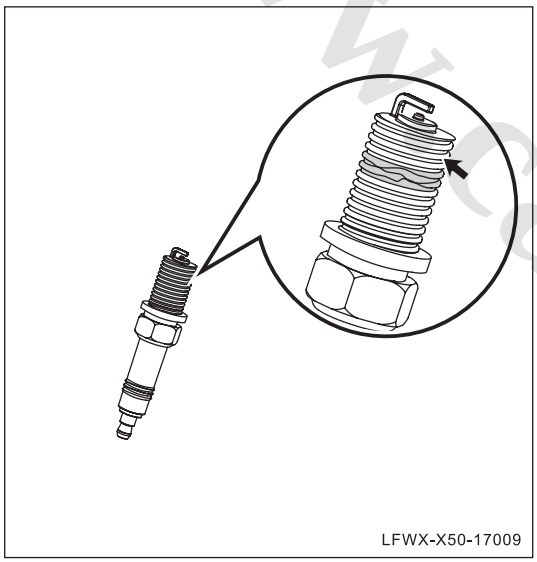

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1. Clean the spark plug

(a) Clean the spark plug with a brush.

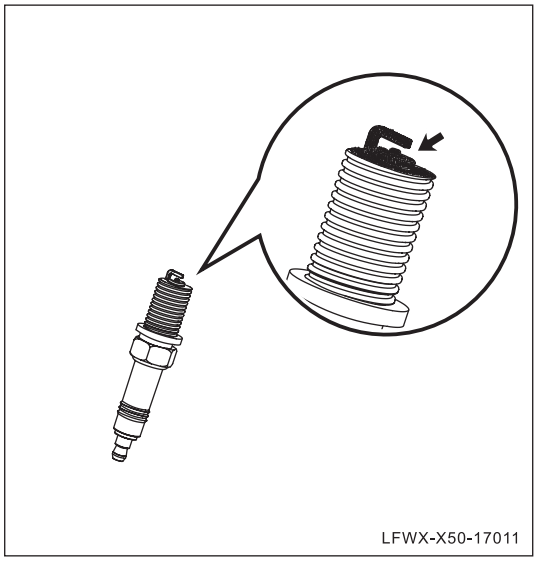
NOTICE:

Do not apply a force between electrodes, otherwise, the central electrode may be damaged.


LFWX-X50-17009

2. CHECK THE SPARK PLUG

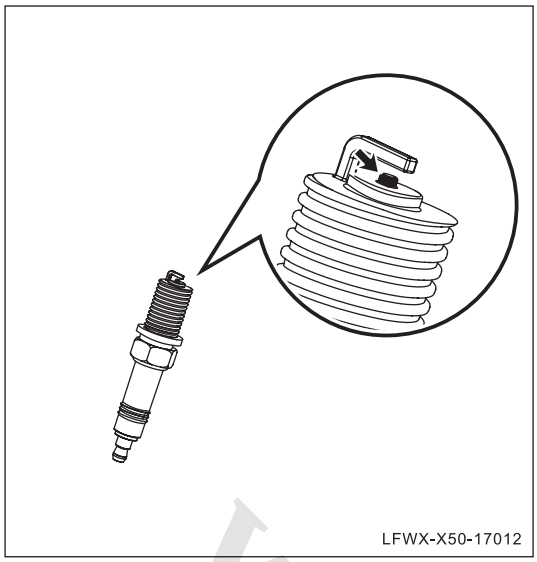
(a) Check the spark plug thread for damage, and replace it if necessary


LFWX-X50-17011

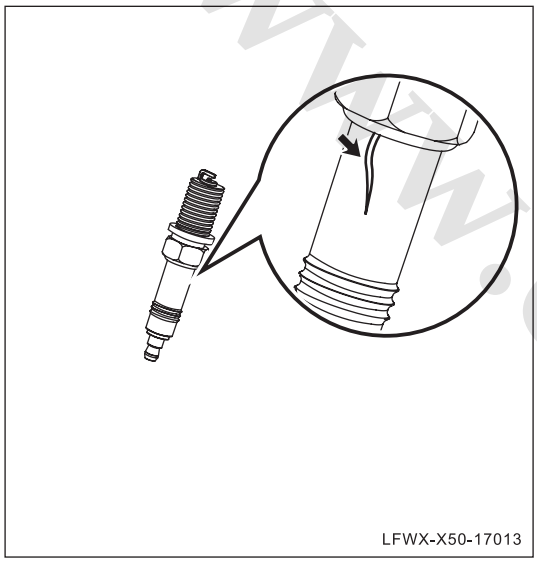
(b) Check the spark-plug electrode surroundings for deposits, and replace it if necessary.

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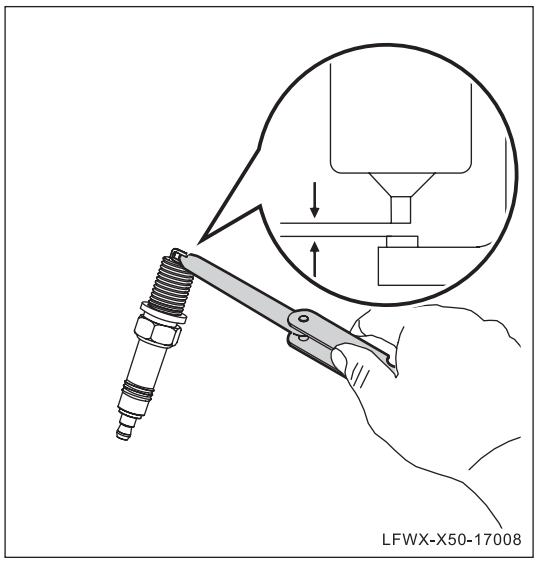
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(c) Check the spark-plug electrode for serious damage and replace it if necessary.



(d) Check the ceramic insulator of spark plug for damage and replace it if necessary.



(e) Check the spark plug electrode clearance. If the clearance exceeds the standard value, repair or replace the spark plug electrodes.

Standard value: 0.7~0.8 mm

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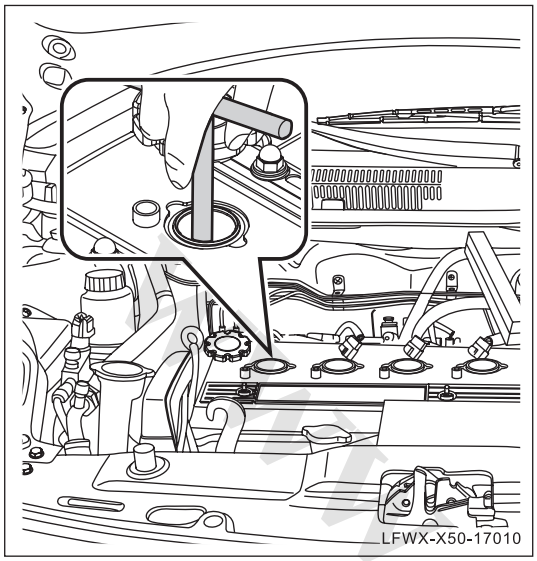
REPLACEMENT

1. REMOVE THE SPARK PLUG

(a) Turn off the ignition switch and disconnect the negative cable of battery.

(b) Clean the accessories of ignition coil using compressed air.

(c) Remove the ignition coil.

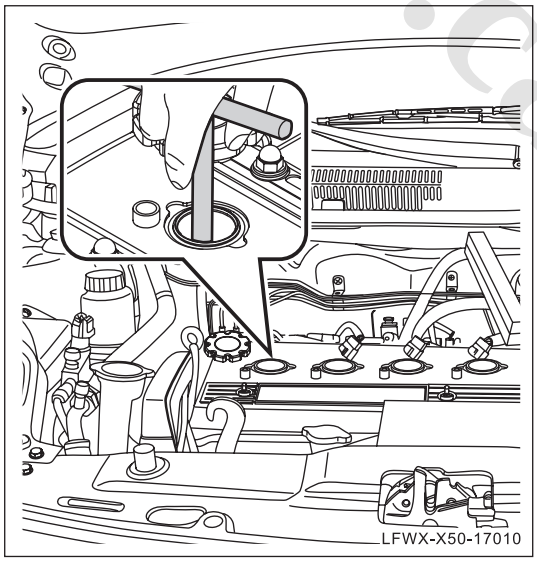


(d) Remove the spark plug of No. 1 cylinder using spark plug remover.

NOTICE:

- **Do not touch the spark plug, especially the electrode.**
- **It is recommended to seal the mounting hole of spark plug after the plug is taken out, in order to prevent the foreign matters from entering the cylinder.**

(e) Remove the spark plugs of No. 2, 3 & 4 cylinders in the same way.



2. INSTALL THE SPARK PLUG

(a) Install the spark plug of No. 1 cylinder using spark plug remover.

Torque: 28 N•m

(b) Install the spark plugs of No. 2, 3 & 4 cylinders in the same way.

(c) Install the ignition coil.

(d) Connect the negative cable of battery.

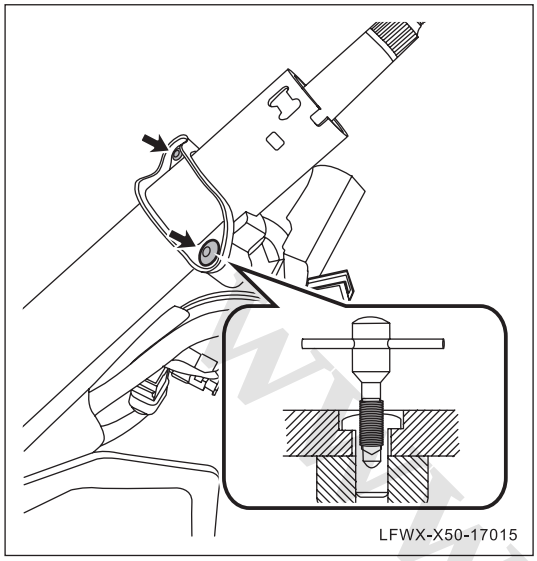
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IGNITION SWITCH

REPLACEMENT

1. REMOVE THE STEERING SHAFT (SEE 61 - ELECTRIC POWER STEERING SYSTEM, STEERING SHAFT, REPLACEMENT)



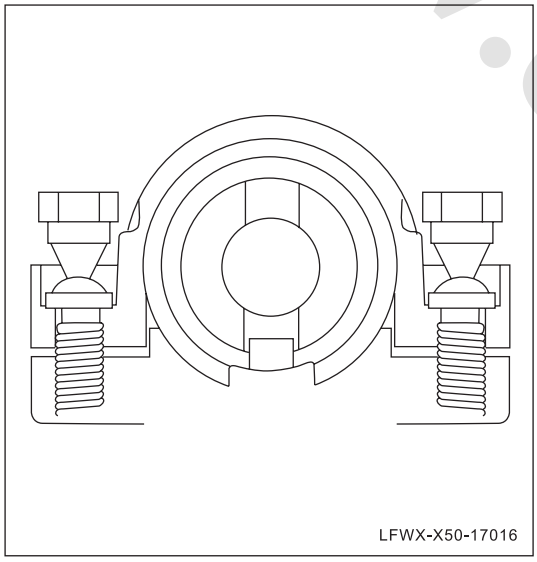
2. REMOVE THE IGNITION SWITCH ASSEMBLY.

(a) Drill hole on the ignition switch fixing bolts using an electric drill.

(b) Remove the fixing bolts of ignition switch clamp using left-hand tap, and take out the ignition switch assembly.

△ HINT:

The ignition switch fixing bolt is a kind of special bolt; replace the new ignition switch fixing bolt after removal.



3. INSTALL THE IGNITION SWITCH ASSEMBLY.

(a) Install the ignition switch and clamp.

(b) Install the fixing bolts of ignition switch and tighten them.

NOTICE:

- **Align the locking notch of steering column when installing the ignition switch, and lock the ignition switch temporarily.**
- **After the correct operation of the ignition switch, lock the special bolt until the its head is twisted off.**

4. INSTALLING THE STEERING SHAFT (SEE 61 - ELECTRIC POWER STEERING SYSTEM, STEERING SHAFT, REPLACEMENT)

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Starting and Charging Systems

Starting and charging systems 18-1
System description 18-1
Preparation 18-1
Service data 18-2
Precautions 18-3
Components (I) 18-4
Components (II) 18-5
Function and fault of components 18-6
On-vehicle inspection 18-7
Battery 18-8
Replacement 18-8
Starter 18-11
Inspection 18-11
Replacement 18-15
Alternator 18-21
Inspection 18-21
Replacement 18-23

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STARTING AND CHARGING SYSTEMS

SYSTEM DESCRIPTION

1. FUNCTION

Function of starting system is : to start engine by converting electrical energy of battery into mechanical energy with the starter.

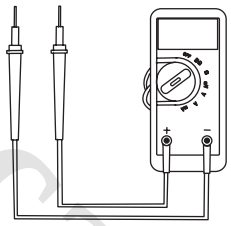
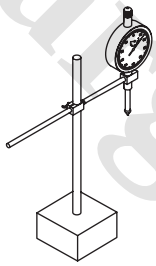
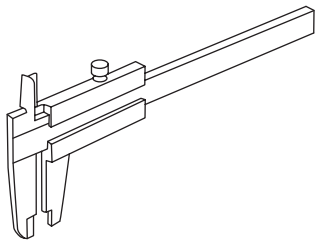
Function of charging system is: to provide the vehicle's electrical system with electrical energy by converting some mechanical energy of engine into electrical energy with the alternator.

2. COMPONENTS

Starting system consists mainly of the starter.

Charging system consists mainly of battery and alternator, etc.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Inspect the voltage, current and resistance of parts and components
2	Dial gauge		Inspect the run - out of the commutator ring gear
3	Dial caliper		Measure length or diameter of parts and components

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Battery voltage	Standard voltage	12V
Output voltage of alternator	Standard voltage	12 - 14V
Maximum ring gear run - out of commutator		0.05mm
Commutator diameter	Standard diameter	30mm
	Minimum diameter	29mm
Starter brush length	Standard length	15.5mm
	Minimum length	10mm
Alternator brush exposed length	Standard length	10.5mm
	Minimum length	1.5mm
Alternator rotor slip - ring diameter	Standard diameter	14.2 - 14.4mm
	Minimum diameter	12.8mm
Alternator rotor slip - ring resistance	Standard resistance	2.1 - 2.5Ω

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of battery bracket	20 - 25
Fixing nut of battery pressure plate	8 - 12
Fixing bolt and screw of commutator end cap	20 - 25 (bolt), 9 - 11(screw)
Fixing screw of starter magnetic switch	9 - 11
Fixing bolt of starter wire harness	20 - 25
Fixing bolt of starter assembly	80 - 86
Fixing nut of alternator pulley	110 - 120
Fixing bolt of alternator coil assembly	3 - 4
Fixing screw of alternator brush holder	3 - 4
Fixing nut of alternator rear end cap	9 - 11
Fixing screw of alternator rear end cap	5 - 6
Fixing bolt of alternator assembly	45 - 49

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PRECAUTIONS

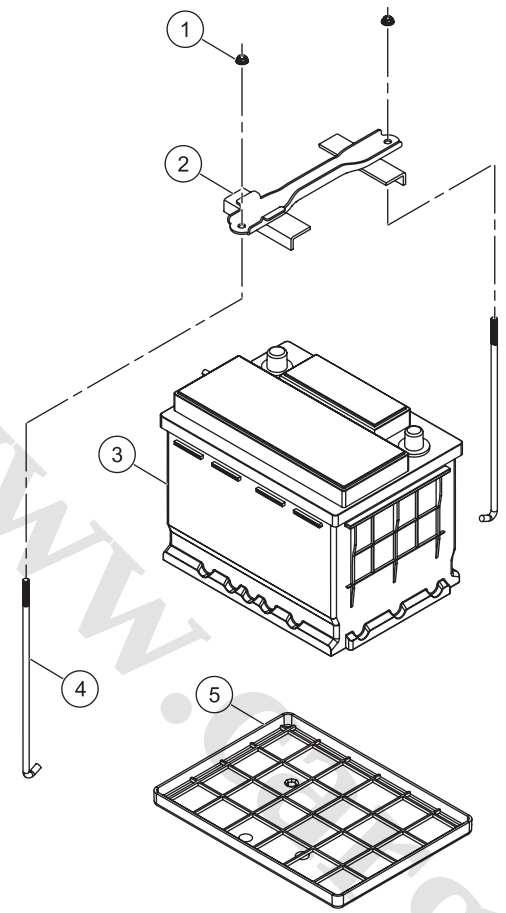
1. Do not disconnect the battery connection when the engine is running.
2. If the negative cable of battery is not loose, the connection or contact of starter power leads and body may produce sparks, when removing/installing starter on complete vehicle, which may cause personal injury and damage to electrical components. Therefore, disconnect the negative cable of battery before the above operation.
3. When checking the starting and charging system, be sure to check connectors and wire harness connections for fastness or reliability at first.
4. Do not damage the insulation sealant on the external surfaces of the coils when performing the operation of disassembling the starter or alternator.

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COMPONENTS (I)



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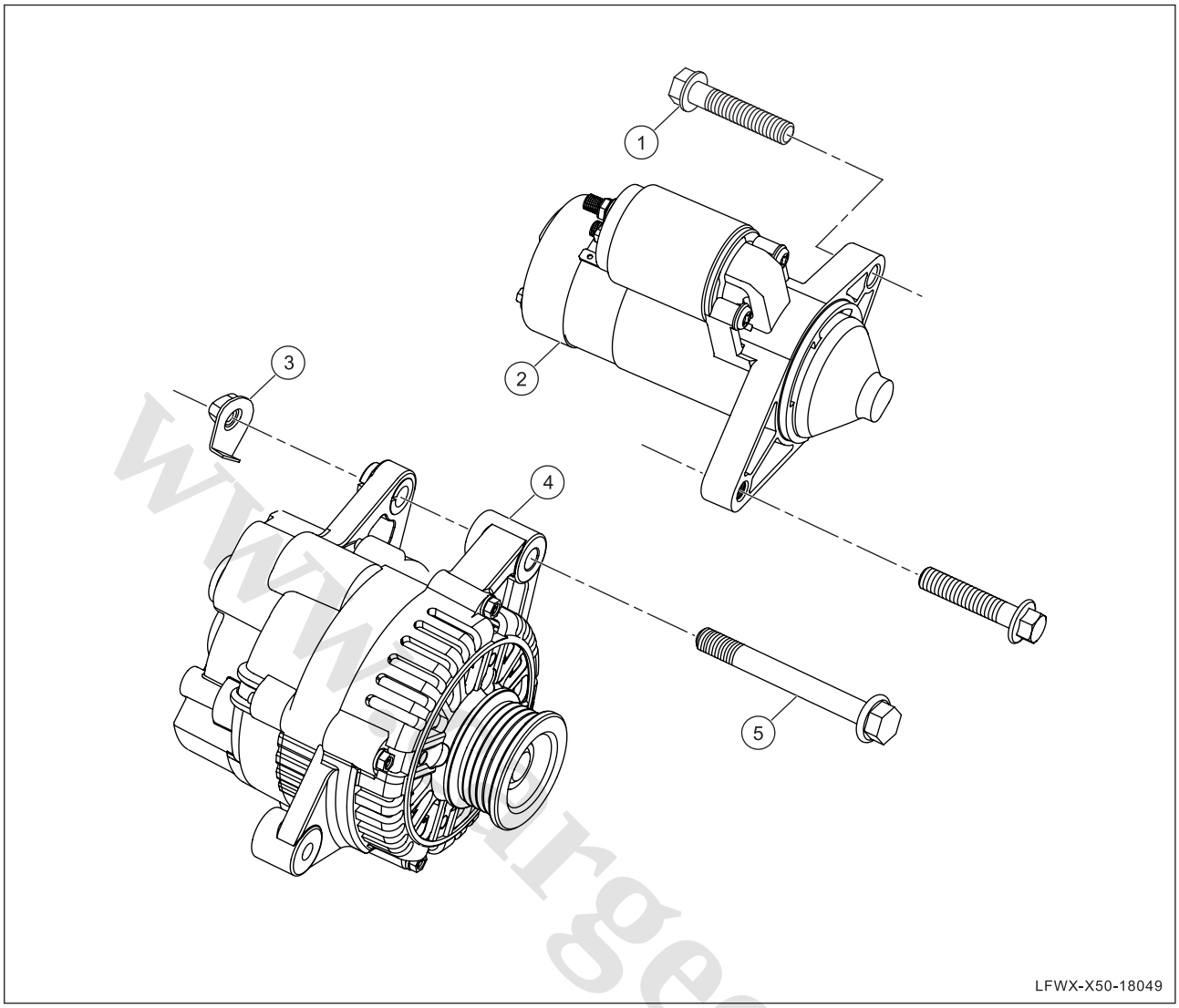
1	Nut
2	Pressure plate
3	Battery

4	Pull rod
5	Tray

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COMPONENTS (II)



1	Bolt
2	Starter
3	Nut

4	Alternator
5	Bolt

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FUNCTION AND FAULT OF COMPONENTS

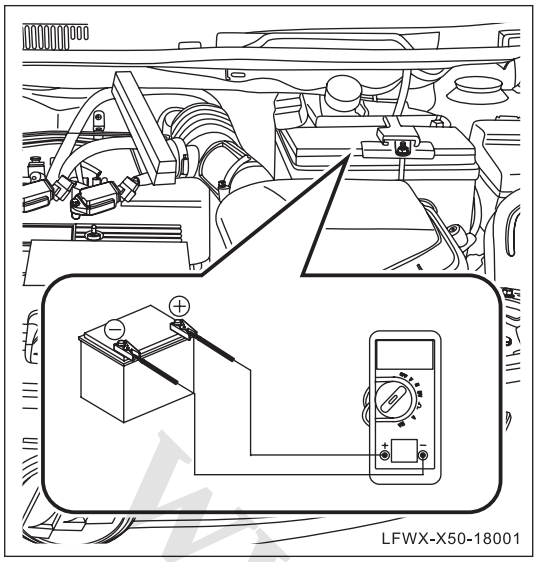
Part name	Part function	Common faults	Fault symptom
Battery	Provide electrical devices with electrical energy	The battery can not be charged Self - discharge is fast	The start of engine is difficult Electrical devices of vehicle is abnormal
Alternator	Provide electrical devices with electrical energy and charge the battery	Alternator can not be charged or the voltage is abnormal	Electrical devices of vehicle is abnormal
Starter	Rotate the crankshaft and start the engine	Starter does not run The current of starter is insufficient	The engine cannot be started

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ON - VEHICLE INSPECTION



1. CHECK THE BATTERY

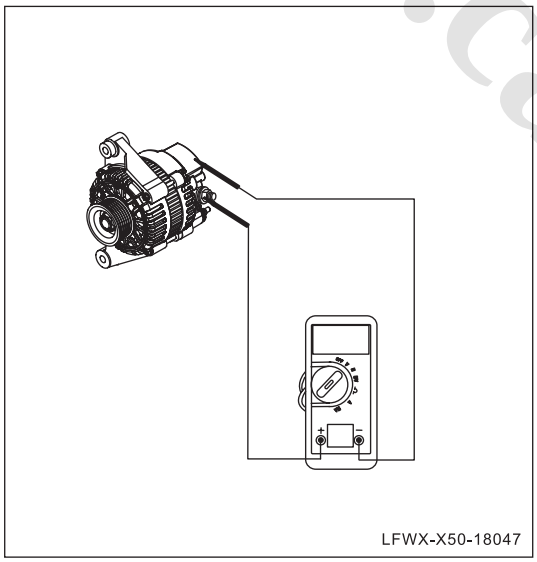
(a) Check if the battery voltage is sufficient to start the engine. If not, charge the battery or replace it.

Battery standard voltage: 12V

2. CHECK THE STARTER AND ALTERNATOR

(a) Check the connection of starter and alternator. If there is any looseness, tighten it.

(b) Connect the starting circuit (to start the engine). Check if the starter can run. If not, repair or replace it.



(c) Start the engine, and check if alternator output voltage is consistent with specified value with digital multimeter. If not, overhaul or replace it.

Standard voltage: 12 - 14V

△ HINT:

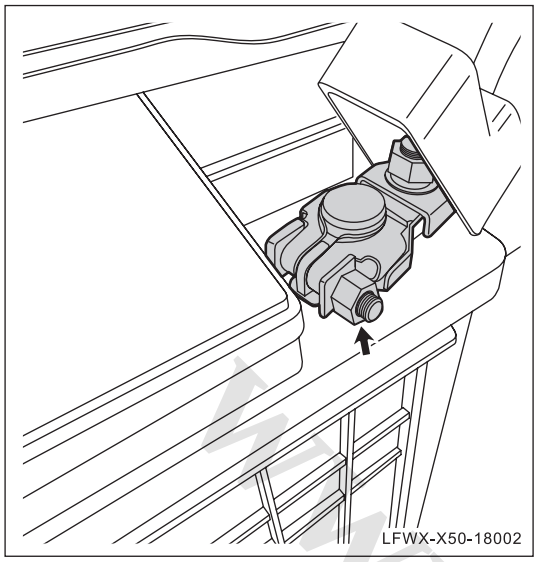
Left diagram is just schematic diagram.

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BATTERY

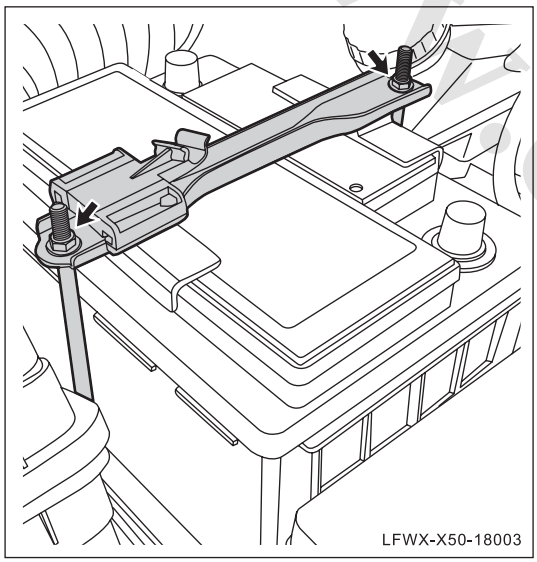
REPLACEMENT



1. REMOVE THE BATTERY

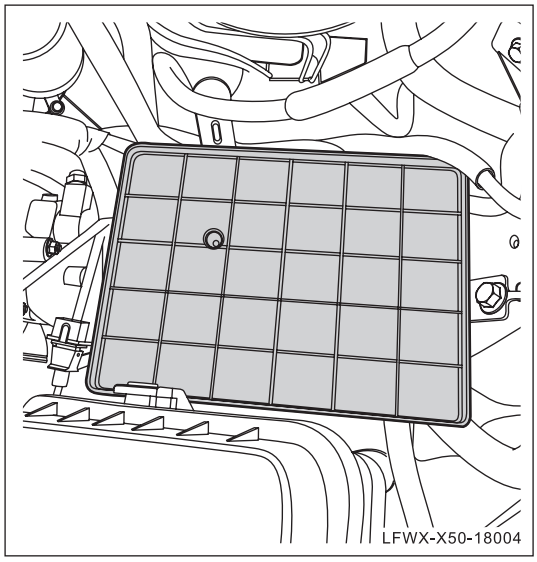
(a) Turn off the ignition switch and disconnect the negative cable of battery.

(b) Disconnect the positive cable of battery.



(c) Remove the fixing nuts of the battery pressure plate, and remove the pressure plate and pull rod of battery.

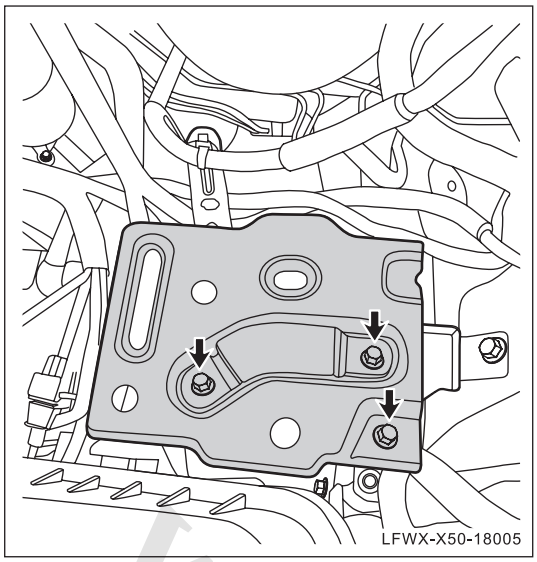
(d) Take out the battery.



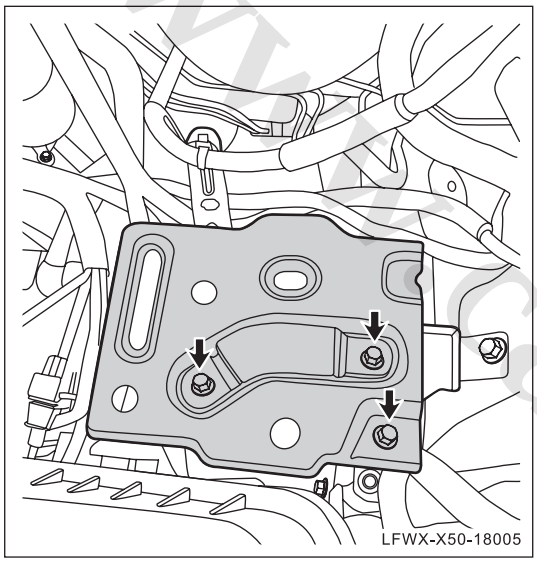
(e) Take out the battery holder.

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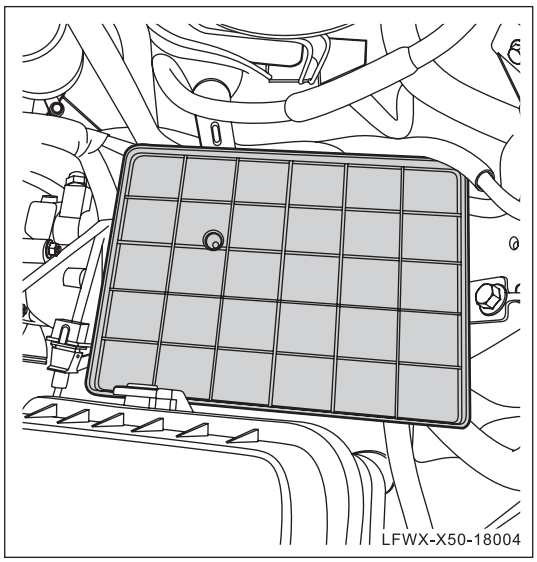
(f) Remove fixing bolt of battery bracket and remove battery bracket.



2. INSTALL THE BATTERY

(a) Install the battery bracket in place, and mount & tighten the fixing bolts.

Torque: 20 - 25 N•m



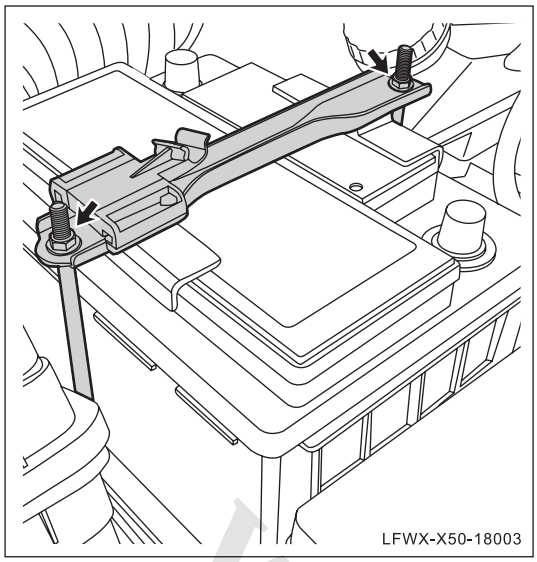
(b) Install battery holder onto battery bracket.

△ HINT:

When installing, align locating pin on battery holder with locating hole on battery bracket.

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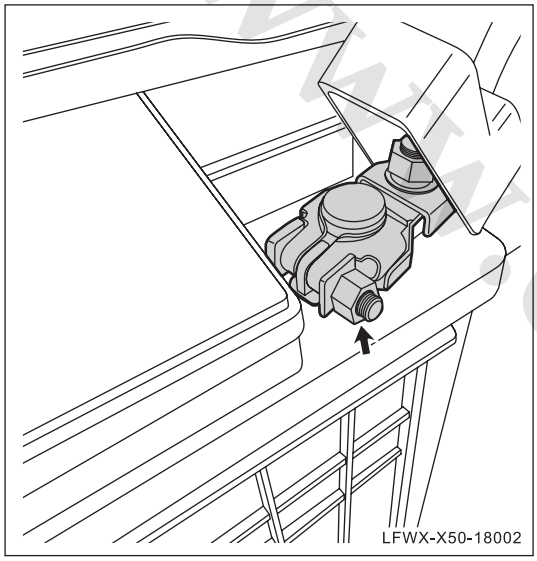
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(c) Install battery onto battery holder.

(d) Install battery pull rod and pressure plate, and mount & tighten the fixing nuts.

Torque: 8 - 12 N•m



(e) Connect the positive cable of battery.

(f) Connect the negative cable of battery.

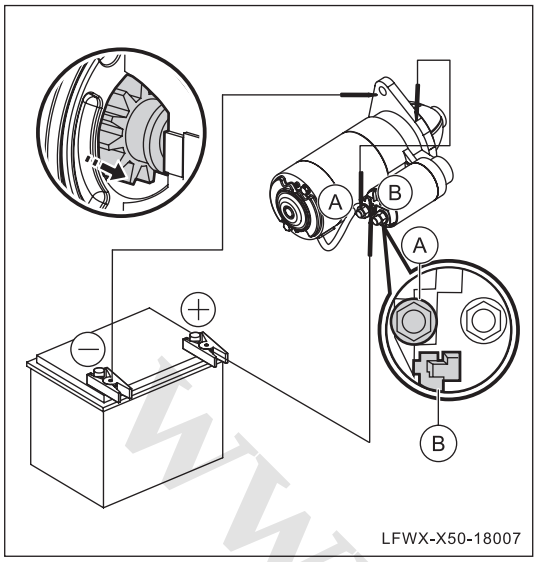
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STARTER

INSPECTION



LFWX-X50-18007

1. CHECK THE STARTER ASSEMBLY

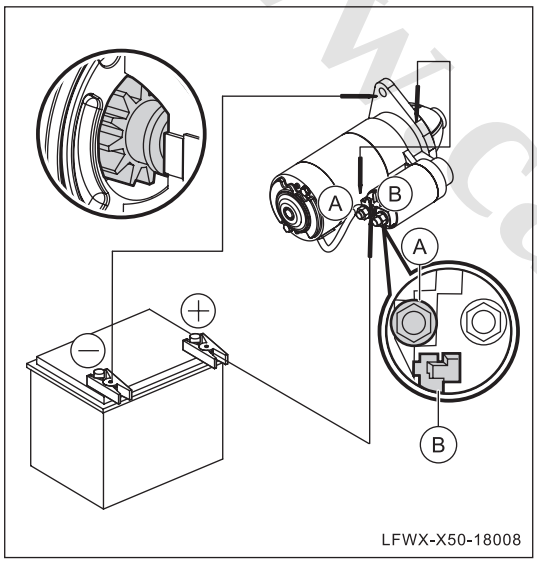
NOTICE:

Complete the following test within 3 - 5s.

(a) Connect the battery to the two terminals A and B of the starter, and check whether the clutch pinion can rotate and move outward.

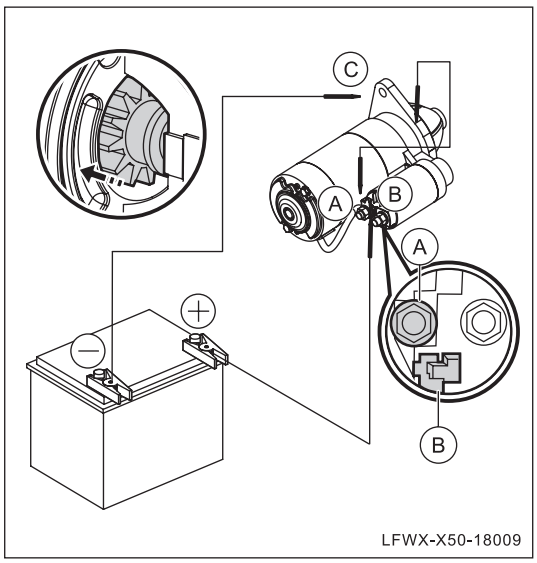
△ HINT:

If the clutch pinion cannot rotate or move outward, replace the starter.



LFWX-X50-18008

(b) Disconnect the wire harness of terminal A, and check whether the clutch pinion can stay at its original position (not move inward).

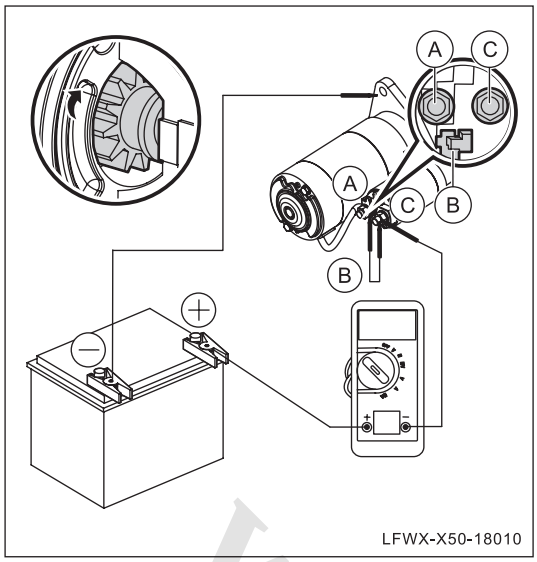


LFWX-X50-18009

(c) Disconnect the wire harness of terminal A and C, and check if the clutch pinion can return to its original position (move inward).

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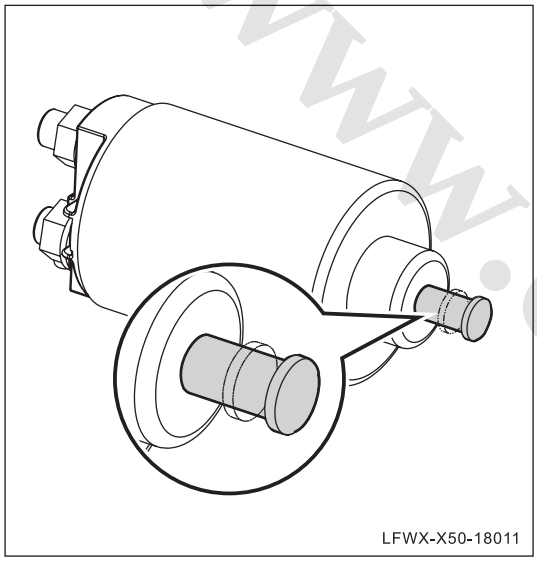
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(d) As shown in the figure, perform the no-load test on the starter, and observe and record the current value (by switching the digital multimeter to the current function).

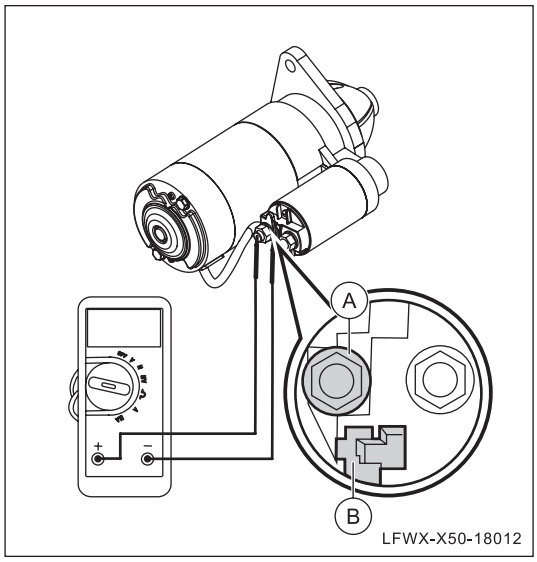
NOTICE:

When the battery voltage is 11.5V, the current value should be < 90A. Otherwise, replace the starter.



2. CHECK THE STARTER MAGNETIC SWITCH

(a) Push into the iron core, and check if the iron core can return to its original position quickly. If not, replace the magnetic switch assembly.

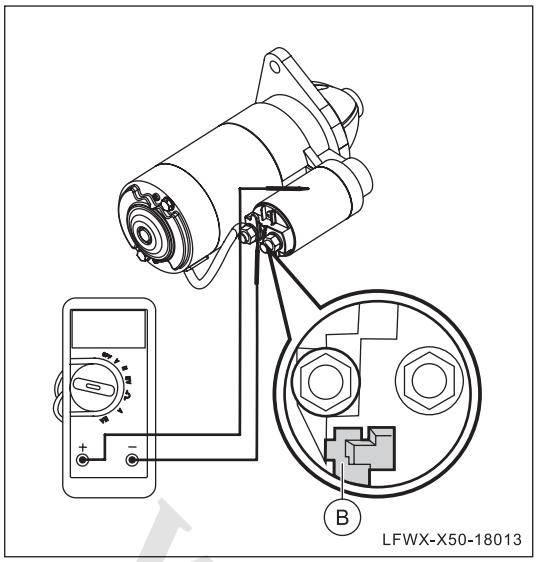


(b) Measure the resistance between the terminal A and terminal B by switching the digital multimeter to the resistance function. If the measured resistance is inconsistent with the specified value, replace the magnetic switch.

Resistance value: <1Ω

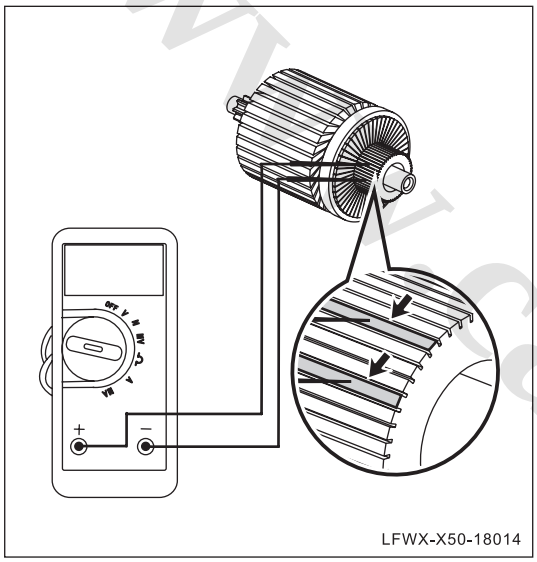
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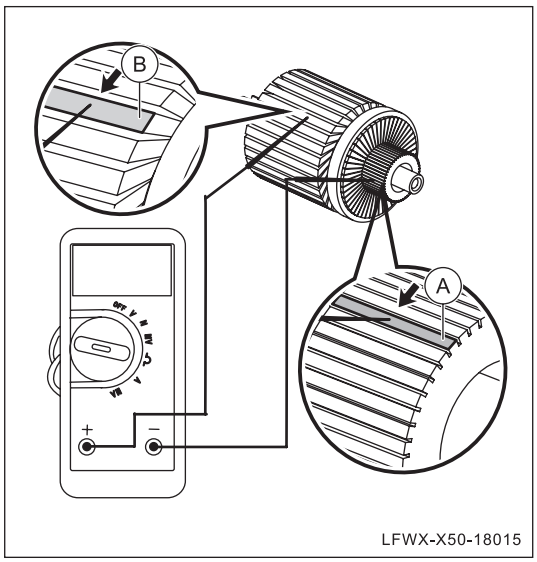
(c) Measure the resistance between the terminal B and the housing by switching the digital multimeter to the resistance function. If the measured resistance is inconsistent with the specified value, replace the magnetic switch.

Resistance value: <2Ω



3. CHECK THE ARMATURE COIL

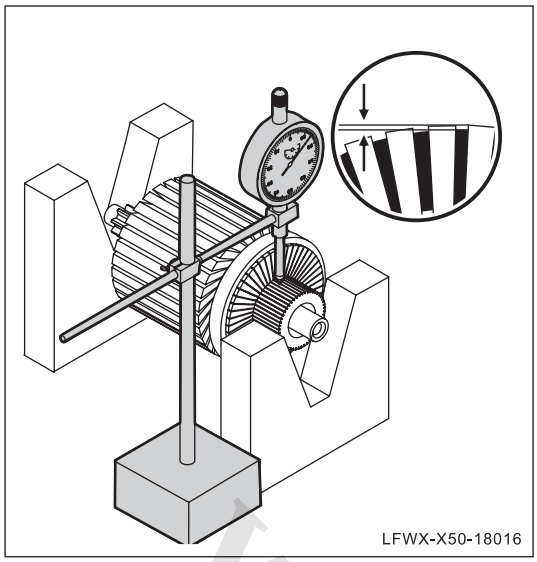
(a) Check if the circuit between any two reversing pieces has good connectivity by switching the digital multimeter to the resistance function. If not, replace the armature windings.



(b) Check if the circuit between commutator A and armature coil mandrel B is closed by switching the digital multimeter to the resistance function. If so, replace the armature windings.

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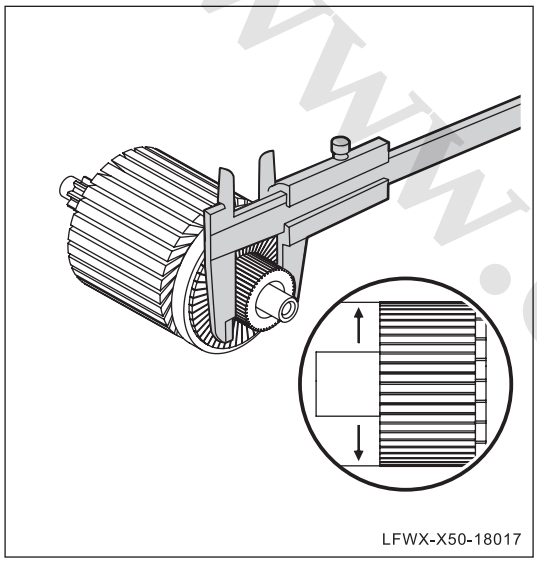


4. CHECK THE COMMUTATOR

(a) Check the surface of commutator for dirt or burning. If any, grind it with sand paper.

(b) Put the commutator on the V-shaped block, and measure the run-out of the commutator ring gear with a dial gage. If the run-out is more than the maximum value, be sure to repair the commutator ring gear. If necessary, replace it.

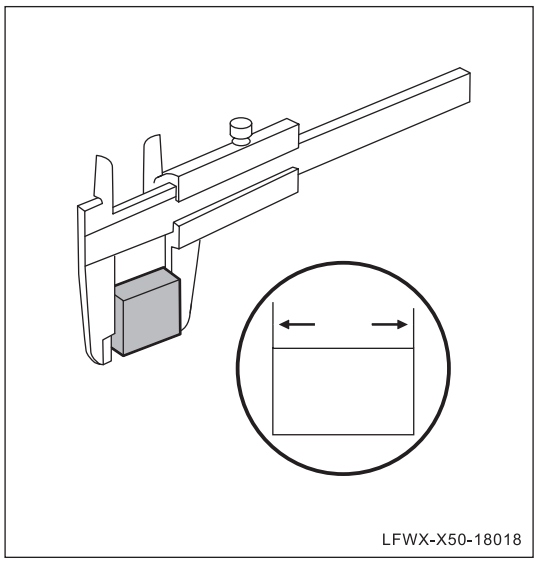
Maximum ring gear run-out: 0.05mm



(c) Measure the diameter of the commutator with a dial caliper. If the diameter is less than the minimum, replace the armature.

Standard diameter: 30mm

Minimum diameter: 29mm



5. CHECK THE STARTER BRUSH

(a) Check the length of the starter brush with a dial caliper. If the length is less than the minimum, replace the brush. If necessary, replace the brush holder and the starter magnetic yoke assembly.

Standard length: 15.5mm

Minimum length: 10mm

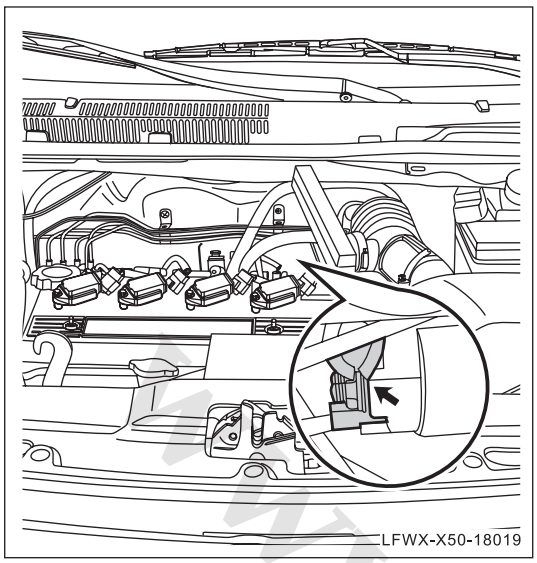
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REPLACEMENT

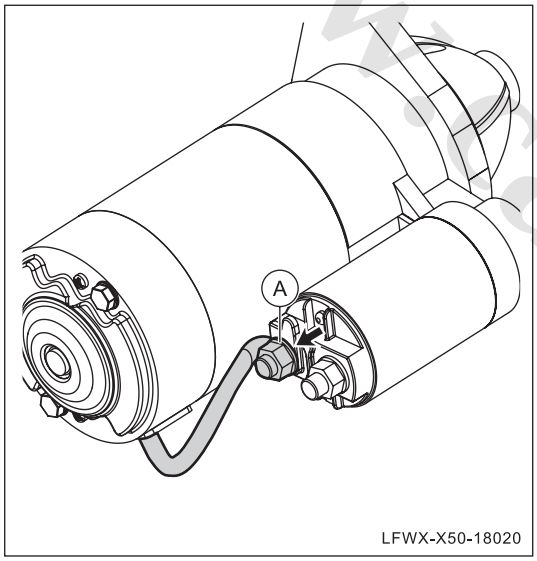
1. REMOVE THE STARTER ASSEMBLY

(a) Turn off the ignition switch and disconnect the negative cable of battery.



(b) Remove the starter power leads, and disconnect the starter connector.

(c) Remove the two fixing bolts of the starter, and then remove the starter assembly.

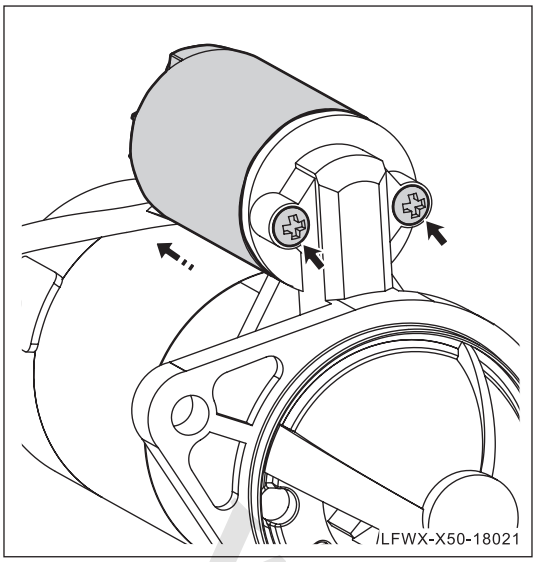


2. DISASSEMBLE THE STARTER ASSEMBLY

(a) Remove the fastening bolts of the wire harness of terminal A, and disconnect the wire harness of terminal A.

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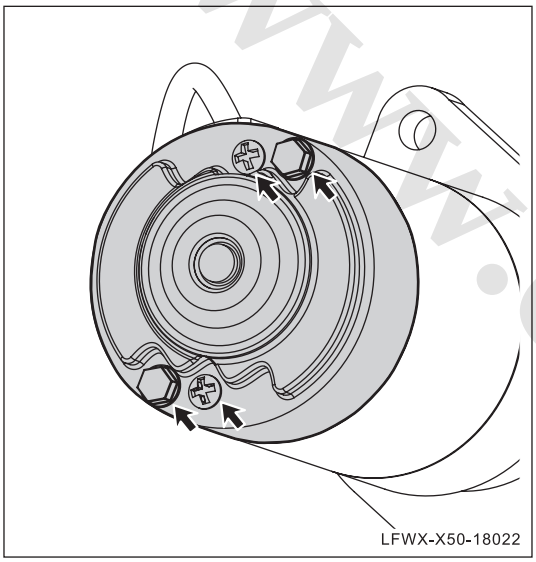
www.CarGeek.ir



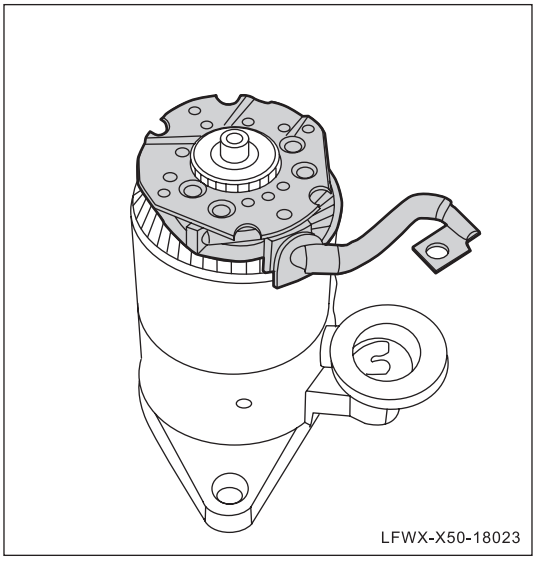
(b) Remove the two fixing screws of the starter magnetic switch, and then remove the magnetic switch.

△ HINT:

When removing the magnetic switch, be sure to raise the front of the magnetic switch firstly to make it disengage the hook, and then, remove the magnetic switch.



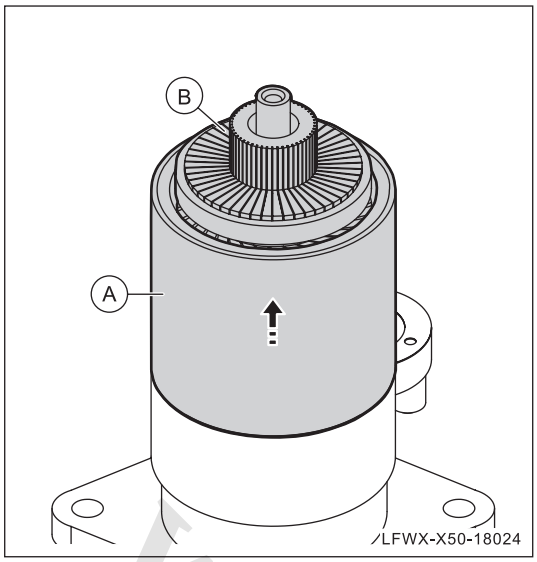
(c) Remove the fixing bolts and screws of the starter commutator end cap, and then remove the commutator end cap.



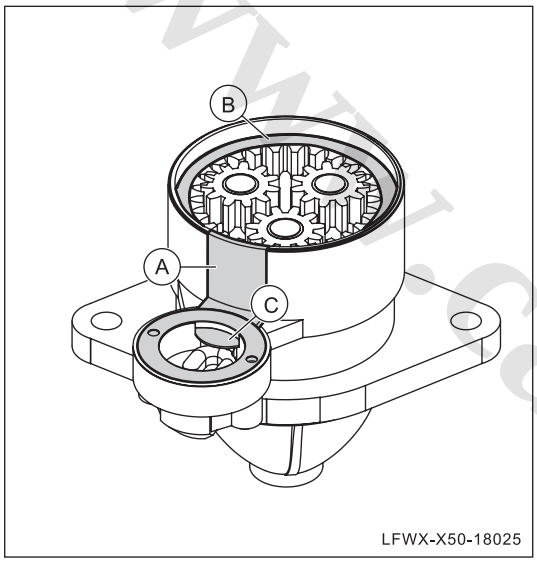
(d) Remove the starter brush holder assembly.

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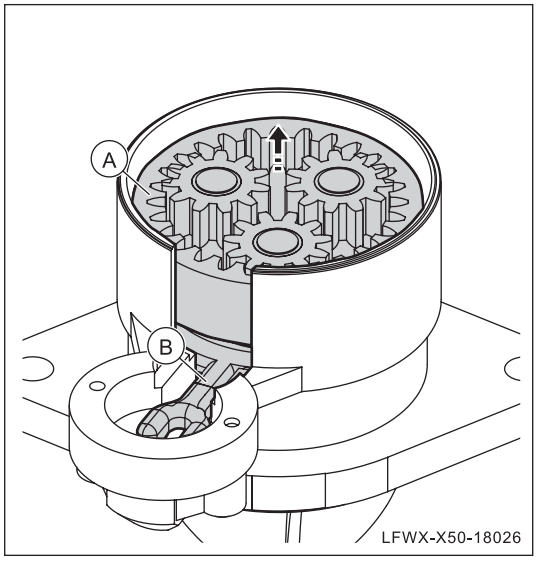
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(e) Remove the starter magnetic yoke assembly A and the armature assembly B.



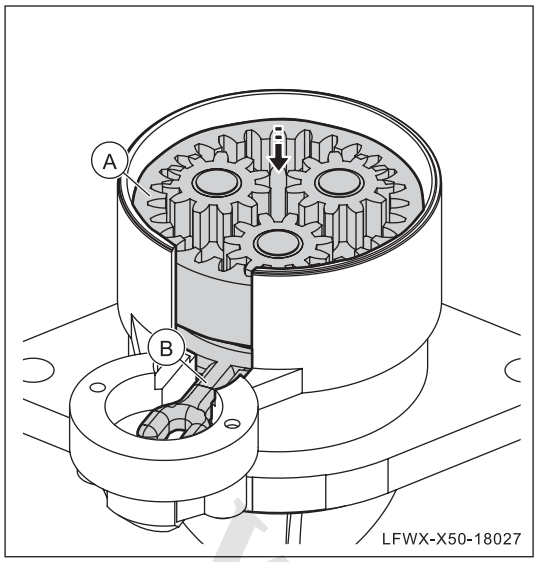
(f) Remove rubber seal A, B and shim C.



(g) Remove intermediate bearing clutch subassembly A and starter pinion drive rod B.

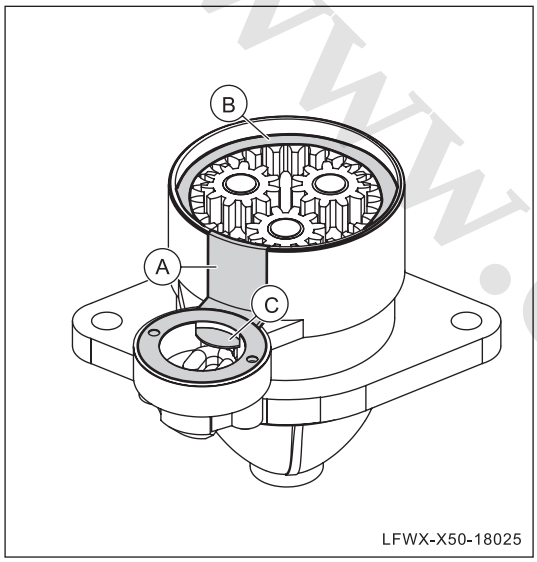
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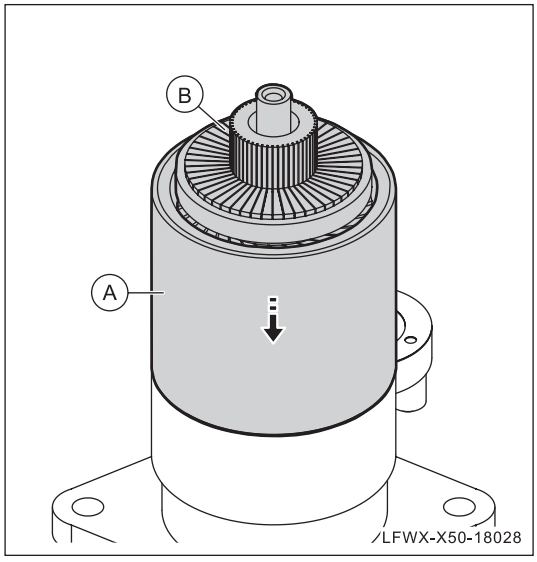


3. ASSEMBLE THE STARTER ASSEMBLY

(a) Install the starter pinion drive rod B and the intermediate bearing clutch subassembly A back to the starter drive end cap.



(b) Install shim C and rubber seal A & B.

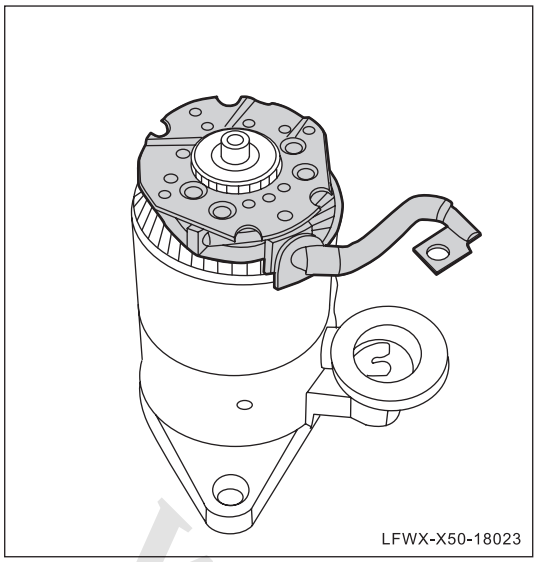


(c) Install the starter armature B into the starter magnetic yoke A.

(d) Install the starter magnetic yoke A and the armature assembly B in place.

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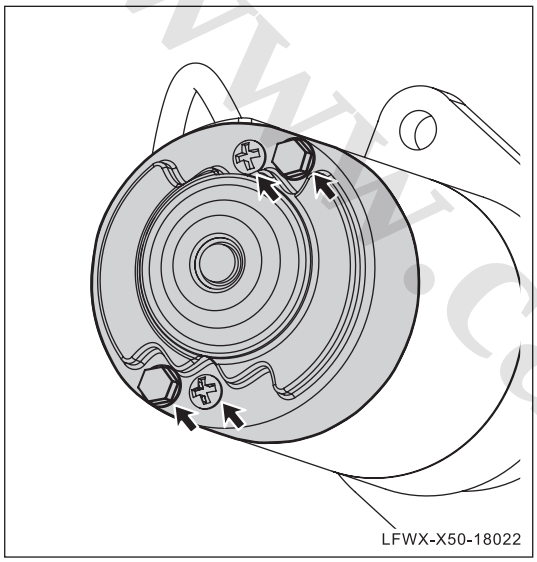
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(e) Install the starter brush holder assembly onto the starter armature.

NOTICE:

Be sure to let the wire harness rubber parts of the brush holder seat into the snap - ring groove of the starter magnetic yoke when installing.

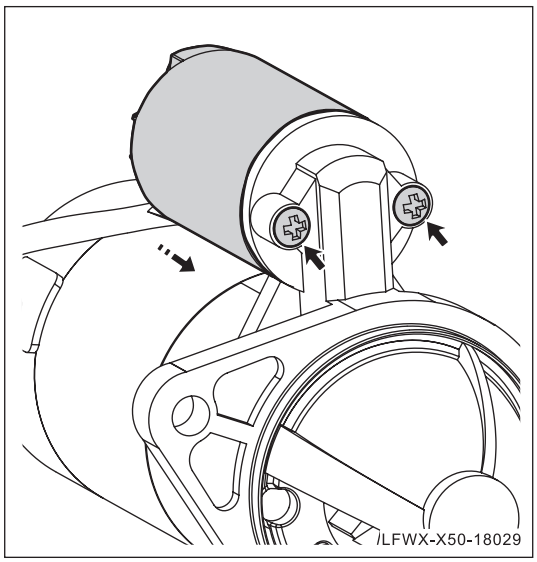


(f) Install the starter commutator end cap, and mount & tighten fixing bolts and screws.

Torque: 20 - 25 N•m (bolt), 9 - 11 N•m (screw)

NOTICE:

Be sure to let the wire harness rubber parts of the brush holder seat into the snap - ring groove of the commutator end cap.



(g) Install the starter magnetic switch, and mount & tighten fixing screws.

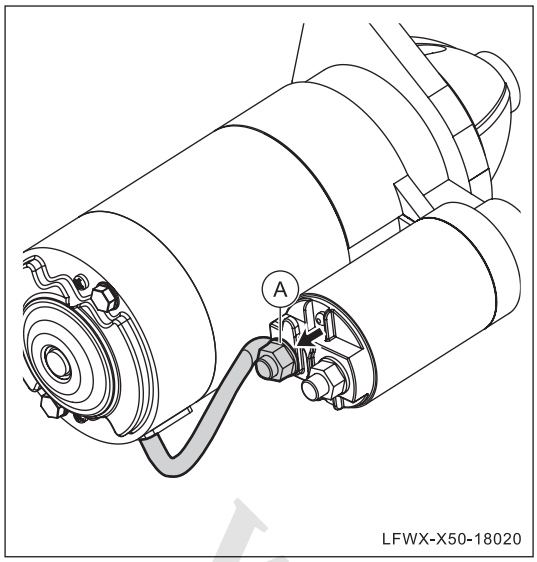
Torque: 9 - 11 N•m

NOTICE:

Be sure to make the iron core of the starter magnetic switch engage the drive rod when installing.

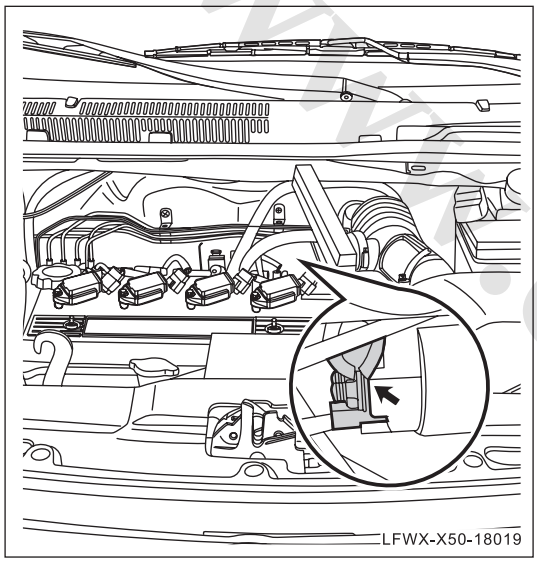
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(h) As shown in the figure, install the wire harness of terminal A and tighten its fixing bolts.

Torque: 20 - 25 N•m



4. INSTALL THE STARTER ASSEMBLY

(a) Install the starter assembly in place, and mount & tighten two fixing bolts.

Torque: 80 - 86 N•m

(b) Install the starter power leads and connector.

(c) Connect the negative cable of battery.

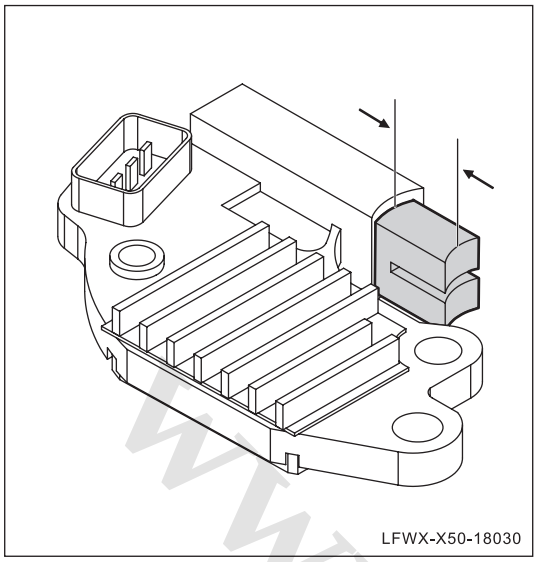
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ALTERNATOR

INSPECTION

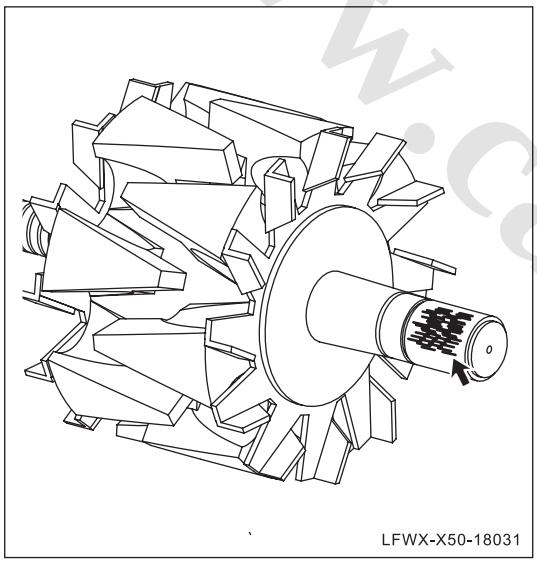


1. CHECK THE ALTERNATOR BRUSH

(a) Measure the exposed length of the alternator brush with a dial caliper. If the length is less than the minimum, replace the brush. If necessary, replace the brush holder.

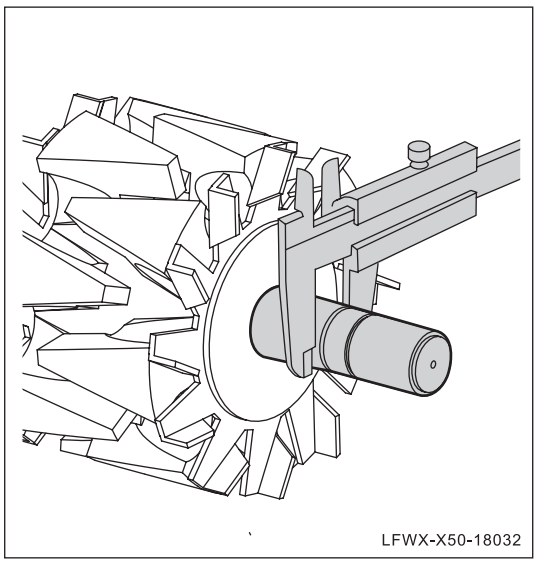
Standard exposed length: 10.5mm

Minimum exposed length: 1.5mm



2. CHECK THE ALTERNATOR ROTOR ASSEMBLY

(a) Visually check the slip-ring surface for crack or other damage, if any, replace the rotor assembly.



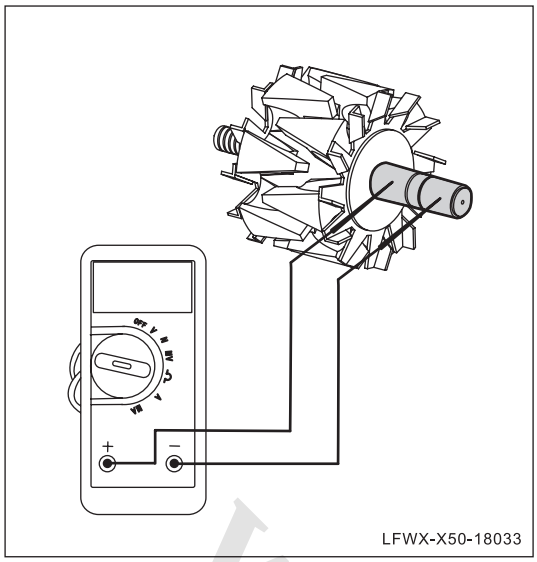
(b) Measure the slip-ring diameter with a dial caliper. If the diameter is less than the minimum, replace the rotor assembly.

Standard diameter: 14.2 - 14.4mm

Minimum diameter: 12.8mm

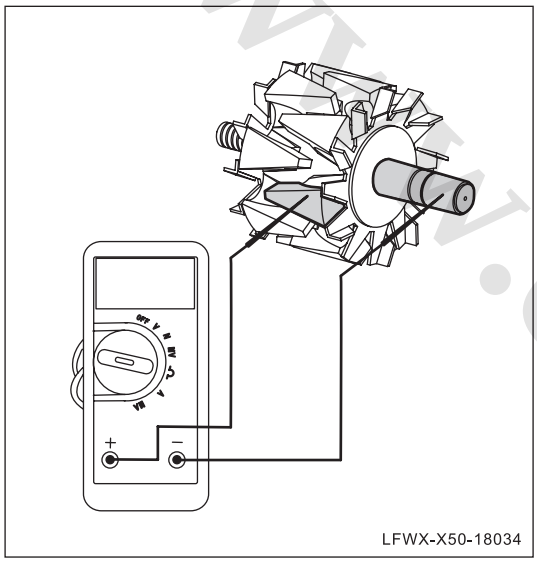
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(c) Measure the resistance between the slip-rings by switching the digital multimeter to the resistance function. If the measured resistance is inconsistent with the specified value, replace the rotor assembly.

Standard value (cold): 2.1 - 2.5Ω



(d) Check if the circuit between the slip-ring and the rotor has good connectivity by switching the digital multimeter to the resistance function. If so, replace the rotor assembly.

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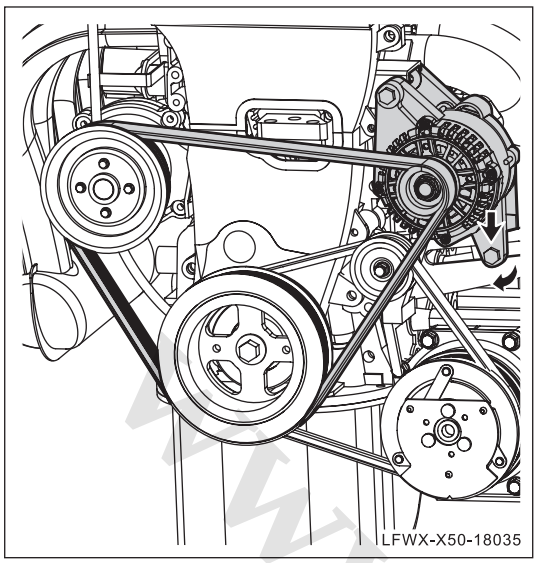
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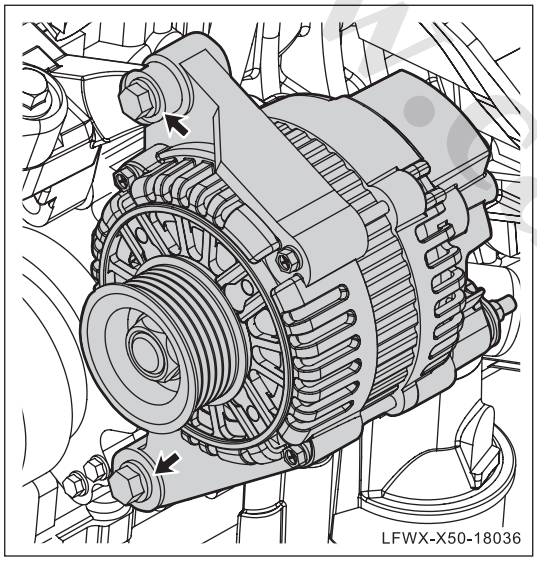
REPLACEMENT

1. REMOVE THE ALTERNATOR ASSEMBLY

(a) Turn off the ignition switch and disconnect the negative cable of battery.



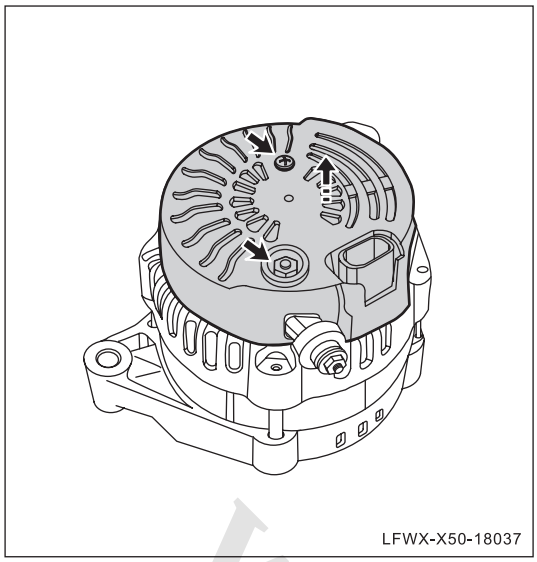
(b) Loosen the alternator adjusting bolts, release drive belt tension and then remove the alternator drive belt.



(c) Disconnect the engine connector and remove the fixing bolts of the alternator assembly and the alternator assembly.

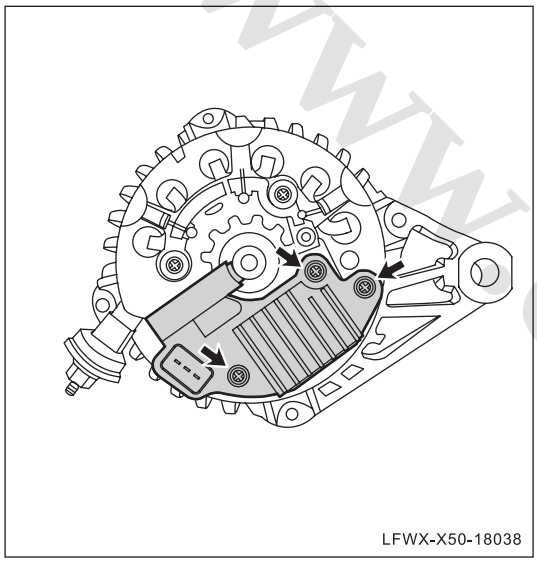
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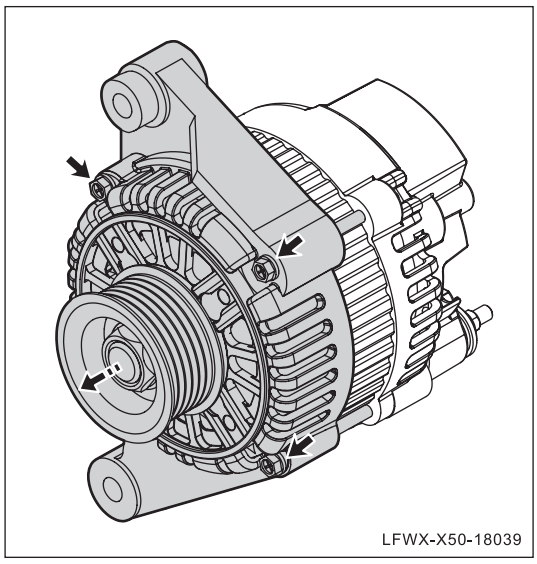

LFWX-X50-18037

2. DISASSEMBLE THE ALTERNATOR ASSEMBLY

(a) Remove the fixing nuts and screws of the alternator rear end cap, and then remove the rear end cap.


LFWX-X50-18038

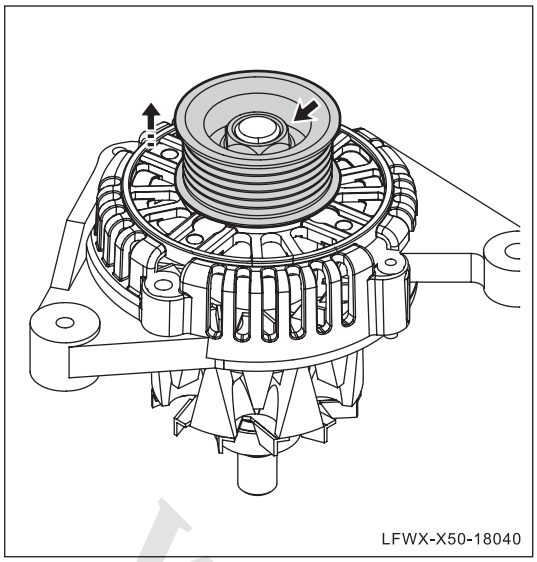
(b) Remove the fixing screws of the alternator brush holder, and then remove the alternator brush holder (with brush).


LFWX-X50-18039

(c) Remove the fixing bolts of the alternator coil assembly, and then remove the alternator coil assembly.

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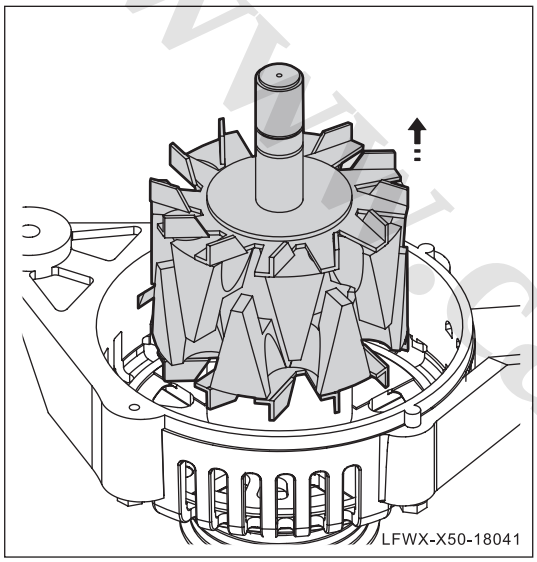
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(d) Remove the fixing nuts of the alternator pulley, and then remove the alternator pulley.

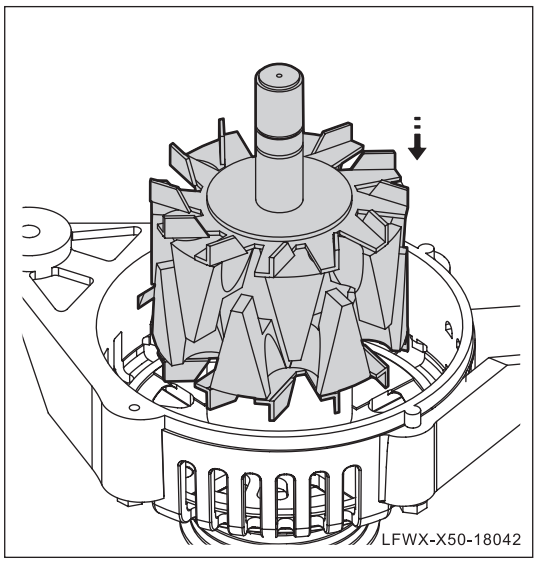
NOTICE:

In order to prevent the pulley from rotating, fix the alternator rotor shaft beforehand when removing.



(e) Remove the alternator rotor washer, rotor rear bearing cap and rotor rear bearing in turn.

(f) Remove the alternator rotor assembly.



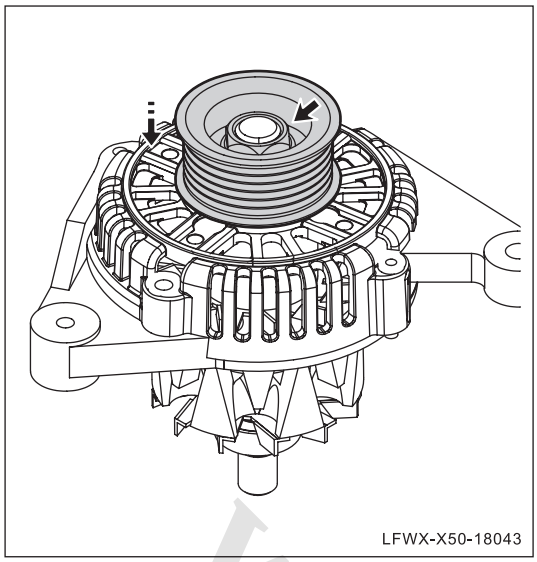
3. ASSEMBLE THE ALTERNATOR ASSEMBLY

(a) Install the alternator rotor assembly to the drive end holder (stator).

(b) Install the alternator rotor rear bearing, rear bearing cap and washer to the alternator rotor in turn.

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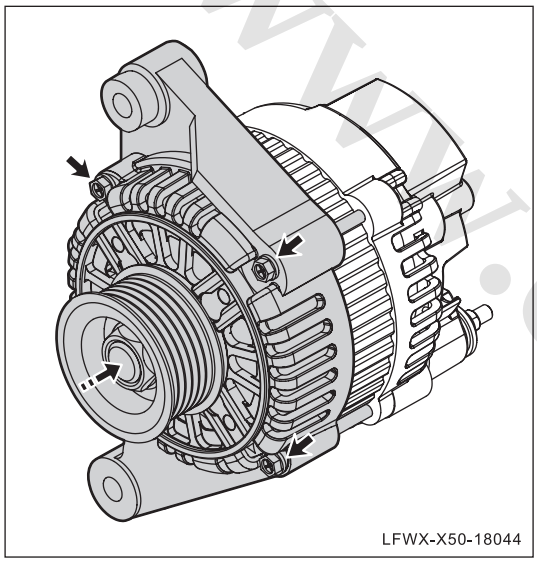

LFWX-X50-18043

(c) Install alternator pulley, and mount & tighten the fixing nuts.

Torque: 110 - 120 N•m

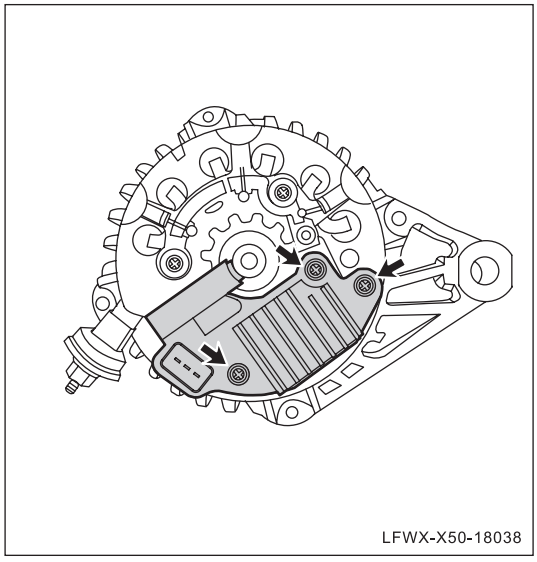
NOTICE:

In order to prevent the pulley from rotating, fix the alternator rotor shaft beforehand when installing.


LFWX-X50-18044

(d) Install the alternator coil assembly to the rectifier end holder, and mount & tighten the fixing bolts.

Torque: 3 - 4 N•m

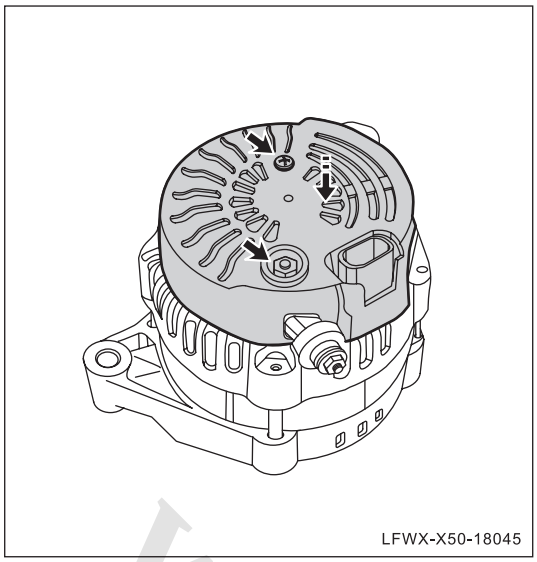

LFWX-X50-18038

(e) Install the alternator brush holder to the rectifier end holder, and mount & tighten the fixing screws.

Torque: 3 - 4 N•m

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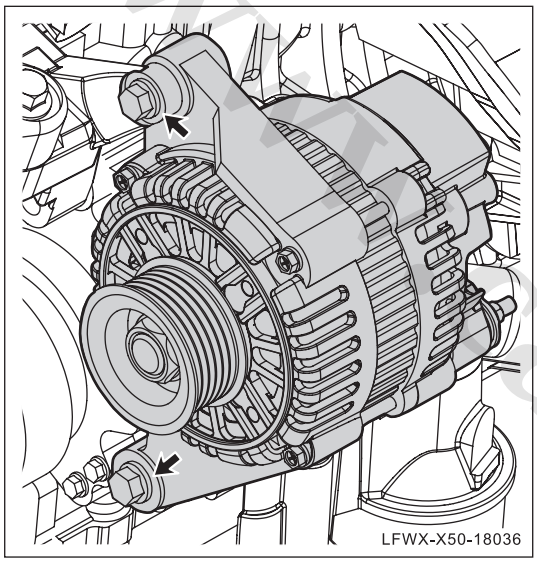
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(f) Install the alternator rear end cap, and mount & tighten fixing nuts and screws.

Nut torque: 9 - 11 N•m

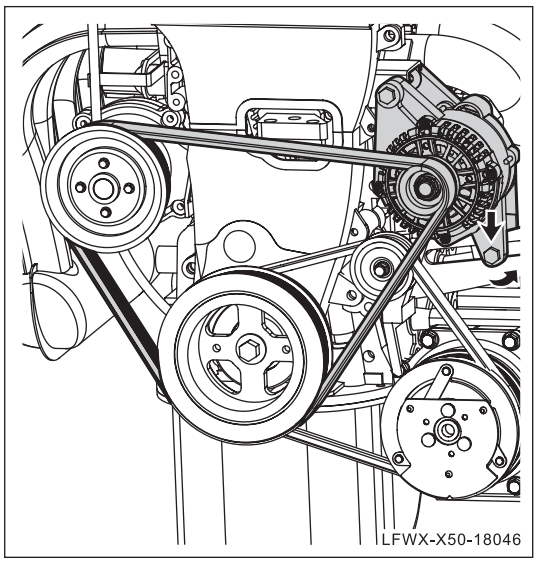
Screw torque: 5 - 6 N•m



4. INSTALL THE ALTERNATOR ASSEMBLY

(a) Install the alternator assembly in place, and mount & tighten the fixing bolts.

Torque: 45 - 49 N•m



(b) Install alternator belt and adjust the belt tension, and then connect with alternator's connector.

(c) Connect the negative cable of battery.

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Manual Transmission

Manual transmission.....21-1
Preparation.....21-1
Service data.....21-4
Precautions.....21-6
Diagnosis.....21-7
Fault symptom table.....21-7
Fault diagnosis.....21-9
Transmission control mechanism.....21-20
Components.....21-20
Replacement.....21-21
Transmission assembly.....21-26
Replacement.....21-26
Dismounting.....21-34
Overall check.....21-38
Assembling.....21-39
Input shaft assembly.....21-44
Components.....21-44
Dismantling.....21-45
Check.....21-53
Assembling.....21-56
Output shaft assembly.....21-62
Components.....21-62
Dismantling.....21-63
Check.....21-69
Assembling.....21-72
Differential assembly.....21-78
Components.....21-78
Dismantling.....21-79
Check.....21-81
Assembling.....21-82
Reverse idler gear assembly.....21-85
Components.....21-85
Check.....21-86
Replacement.....21-87
Fork shaft assembly.....21-88
Components.....21-88
Dismantling.....21-89
Assembling.....21-92

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Gear shift mechanism assembly.....21-95
Components.....21-95
Dismantling.....21-96
Assembling.....21-99
Housing assembly.....21-103
Components.....21-103
Check.....21-104
Replacement.....21-105

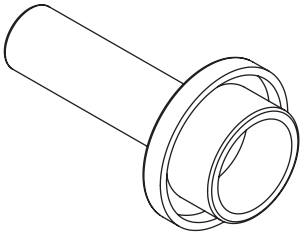
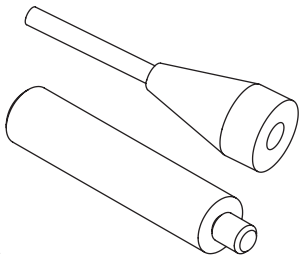
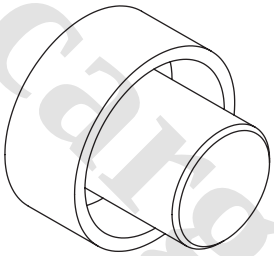
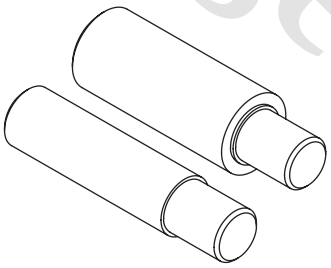
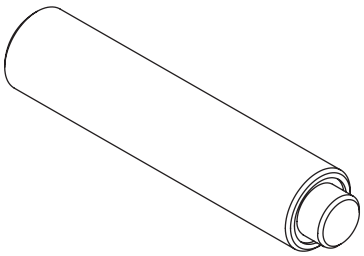
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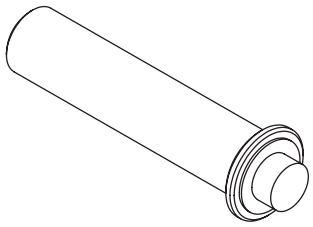
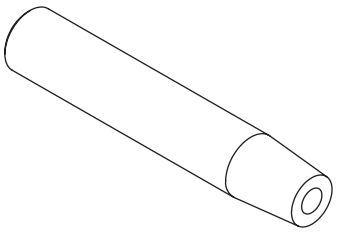
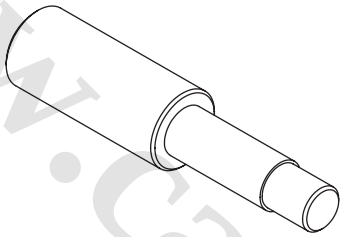
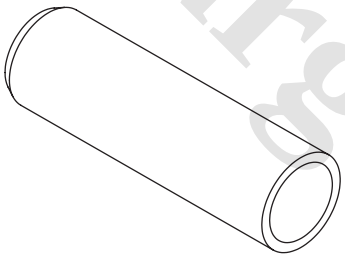
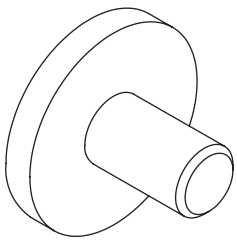
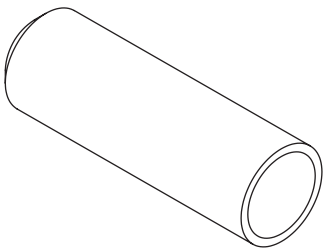
MANUAL TRANSMISSION

PREPARATION

S/N	Tools	Outline diagram	Description
1	Mounting tool for axle shaft oil seal		Used for installation of axle shaft oil seal of differential
2	Fork-shaft pin punch		Used for removal of fork-shaft pins
3	Differential bearing press-fitting tool		Used for installation of bearings
4	Remover for reverse shaft bush		Used for removal of reverse shaft bush
5	Shift-shaft oil seal press-fitting tool		Used for installation of shift-shaft oil seals

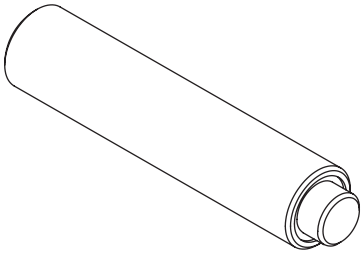
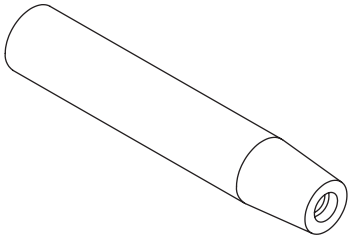
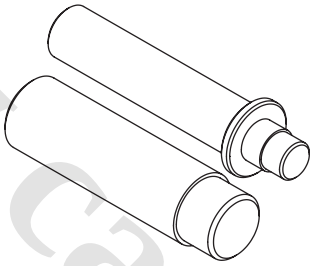
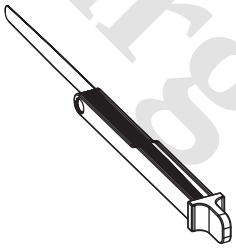
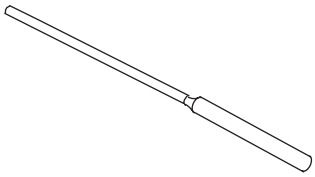
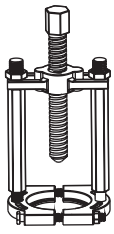
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S/N	Tools	Outline diagram	Description
6	Mounting tool for shift shaft bush		Used for installation of shift-shaft bushes
7	Mounting tool for housing position-ing-pin		Used for installation of housing positioning-pins
8	Clutch pressure plate positioning tool		Used for installation of clutch pressure plate make it be concentric with the driven plate.
9	Output shaft syn-chronizer gear-hub installing tool		Used for installation of output shaft syn-chronizer hub
10	Output shaft bear-ing press-fitting tool		Used for installation of output shaft ball-bearings
11	Input shaft front ball-bearing press-fitting tool		Used for installation of input shaft front ball-bearings

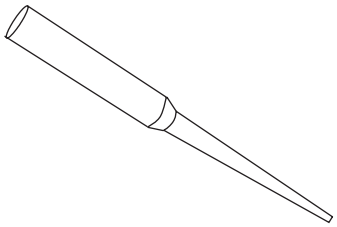
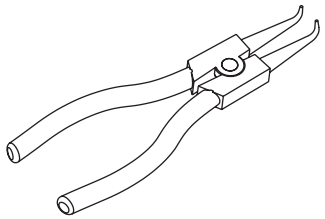
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S/N	Tools	Outline diagram	Description
12	Mounting tool for selector shaft oil seal		Used for installation of selector-shaft oil seals
13	Mounting tool for selector cover positioning-pin		Used for installation of gear-selector-cover positioning pins
14	Remover for selector shaft bush		Remove and install gear selector shaft bush
15	Feeler gauge		Used for measurement of clearance
16	Magnetic bar		Removal of interlock cam pins
17	Puller		Used for removal of bearings

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S/N	Tools	Outline diagram	Description
18	Punch		Used for removal of planetary gear shaft elastic cylindrical pins
19	Outer snap ring pliers		Used for removal and installation of snap rings

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Type		Mechanical 5-speed manual transmission	
Control mode		Manual	
Amount of oil filling of transmission gear		2.2L	
Rated input torque		120N•m	
Speed ratio	1st gear	3.182	
	2nd gear	1.895	
	3rd gear	1.250	
	4th gear	0.912	
	5th gear	0.718	
	Reverse gear	3.133	
Total ratio		4.267	
3rd gear axial clearance		0.1 - 0.35mm	
5th gear axial clearance		0.1 - 0.5mm	
Clearance between 4th gear and 5th gear		< 0.058mm	
1st gear axial clearance		0.1 - 0.35mm	
2nd gear axial clearance		0.1 - 0.35mm	
1st gear and 2nd gear radial run-out		Maximum value	0.056mm
Clearance between input shaft/output shaft synchronizer ring and each change-gear		1st gear	0.522 - 2.208 mm
		2nd gear	0.522 - 2.208 mm
		3rd gear	0.73 - 1.53 mm
		4th gear	0.77 - 1.57 mm
		5th gear	0.73 - 1.53 mm

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Input shaft radial run-out	Maximum value	0.03mm
Clearance between synchronizer gear sleeve and shift fork	Maximum value	0.35mm
Clearance between synchronizer ring back and gear end	Minimum value	0.8mm
Input shaft front bearing radial run-out	Standard value	0.01 - 0.21mm
Input shaft rear ball-bearing radial run-out	Standard value	0.01 - 0.21mm
Output shaft radial run-out	Maximum value	0.03mm
Output shaft diameter	Minimum value	30.985mm
Gear clearance between planetary gear and axle shaft gear	Standard value	0.025 - 0.150mm
Reverse idler gear bushing	Wear limit	0.2mm
Flatness of contact surface of clutch housing and transmission housing	Wear limit	0.2mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing nut of selector & gearshift cable bracket	8 - 12
Shifting support fixing bolts	22 - 28
Connecting bolts of transmission with engine	55 - 65
Transmission left mounting cluster fixing bolt	70 - 75
Connecting bolt between transmission left mounting and transmission	65 - 85
Transmission rear overhang fixing bolt	185 - 225
Transmission grounding wire fixing bolt	10
Clutch slave cylinder fixing bolt	20 - 26
Clutch slave cylinder pipe bracket fixing bolt	20 - 26
Oil drain plug	40 - 45
Oil filler plug	30 - 35
Connecting bolt between transmission housing and clutch housing	80 - 90
Fixing bolt between selector and shifting mechanism assembly	20 - 25
Differential ring gear bolt	130 - 135

PRECAUTIONS

1. Do not reuse the drained oil from manual transmission.
2. Park the vehicle on level ground before checking or replacing the manual transmission gear oil.
3. Keep the transmission is free of dust or impurity inside when removing and installing it.
4. Check and determine a proper installation position before removing or dismantling the transmission. If installation marks are required, make sure that the marks will not affect the function of marked parts.
5. As required, tighten the bolts and nuts from the center to the outside in multiple times and in the diagonally opposite manner. Unless otherwise specified.
6. Be careful not to damage the sliding surfaces and mating surfaces.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Hard to shift	1. Clutch system (the clutch cannot disengaged completely)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (1. Hard to Shift)
	2. Transmission control mechanism (stuck)	
	3. Gear shift mechanism (stuck)	
	4. Gear shift fork (worn)	
	5. Gear shift fork shaft (worn, deformed)	
	6. Self-locking device (failed)	
	7. Synchronizer (wear, broken)	
Disorder of gear	1. Interlock device (failed)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (2. Disorder of Gear)
	2. Transmission control mechanism (excessive wear of shift lever ball)	
	3. Synchronizer (spring weak & damaged)	
	4. Synchronizer ring (key slot worn)	
	5. Fork shaft, fork (deformed)	
Throw-out of gear	1. Transmission control mechanism (damaged)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (3. Throw-Out of Gear)
	2. Gear shift mechanism (failed)	
	3. Self-locking device (failed)	
	4. Synchronizer (worn, broken)	
Jumps out of gear	1. Gear (wear-out, leading to abrade into cone-shape along tooth length direction)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (4. Jumps Out of Gear)
	2. Self-locking device (failed)	
	3. Gearshift mechanism (parts deformed & loosened, making the gears not engaged completely)	
	4. Gear shaft, bearing (worn, making the straight line of engaged gear nonparallel or axial runnout)	

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Symptom	Suspected area	Recommended action
Abnormal noise only in neutral	1. Crankshaft and centerline of transmission input shaft (non-concentric)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (5. Abnormal Noise Only in Neutral)
	2. Front bearing of output shaft (wear, dirt & fluff)	
	3. Constant mesh gears of transmission (wear, excessive backlash, teeth broken)	
	4. Constant mesh gears (not replaced in pairs & poor engagement)	
	5. Bearings (loosened, damaged, gear axial clearance too big)	
	6. Fork and shift sleeve (excessive clearance)	
Abnormal noise only after gear shifted	1. Shaft (bent, deformed, loose matching between spline and sliding-gear hub)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (6. Abnormal Noise Only after Gear Shifted)
	2. Gear engagement (improper)	
	3. Bearings (loosened)	
	4. All joints of control mechanism (loosened)	
	5. Shift fork (deformed)	
	6. Fit clearance (excessive) between drive and driven bevel gear	
Abnormal noise in the transmission	1. Oil (level low)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (7. Abnormal Noise in the Transmission)
	2. Synchronizer (damaged)	
	3. Gear (wear-out, damaged & axial positioning failed)	
	4. Bearing (worn, loosened & damaged)	
Transmission heats up	1. Oil (level low)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (8. Transmission Heats Up)
	2. Bearing (assembled too tightly)	
	3. Gear clearance (too small)	
Transmission oil leaks	1. Each sealing gasket of transmission (poor airtight)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (9. Transmission Oil Leaks)
	2. Oil seal (damaged)	
	3. Tightening bolts (loosen)	
	4. Transmission housing (cracks)	
	5. Gear oil (excessive)	
	6. Oil drain bolt or air hole (clogged), transmission	
Abnormal wear of bearing in the transmission	1. Gear oil (incorrect model & dirty)	See 21 - Manual Transmission, Diagnosis, Fault Diagnosis (10. Abnormal Wear of Bearing in the Transmission)
	2. Bearing (non-Lifan parts)	
	3. Bearing (not installed in place)	

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FAULT DIAGNOSIS

1. HARD TO SHIFT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	According to the correct steps, operate the transmission control mechanism to check the shifting functions.	Diagnosis is over	Hard to shift	Go to Step 1
1	Check clutch system	Normal	Faulty	Instruction
	Check the releasing conditions of clutch system	Go to Step 2	Clutch cannot be disengaged completely	Diagnosis and troubleshooting (see 23 - Clutch, Diagnosis, Fault Diagnosis (4. Clutch Cannot Be Disengaged))
2	Check control mechanism of transmission	Normal	Faulty	Instruction
	Operate the shifting lever to check the shifting condition of transmission control mechanism	Go to Step 3	Hard to shift or be stuck	Adjust or replace transmission control mechanism (see 21 - Manual Transmission, Transmission Control Mechanism, Replacement)
3	Check gearshift mechanism	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Replacement/Disassembly), and check the operations of gearshift mechanism assembly	Go to Step 4	Gear shift mechanism stuck, component worn	Repair or replace gearshift mechanism assembly (see 21 - Manual Transmission, Transmission Assembly, Replacement/Assembly and 21 - Manual Transmission, Gearshift Mechanism Assembly, Disassembly/Assembly)
4	Check the gear shift fork and fork shaft	Normal	Faulty	Instruction
	Disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Manual Transmission Assembly, Disassembly), and check the wear condition of gear shift fork and fork shaft.	Go to Step 5	1. Gear shift fork worn 2. Gear shift fork shaft deformed & worn	Replace gear shift fork or fork shaft (see 21 - Manual Transmission, Transmission Assembly, Assembly and 21 - Manual Transmission, Fork Shaft Assembly, Disassembly/Assembly)
5	Check self-locking device	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the functions of self-locking device	Go to Step 6	Self-locking device (failed)	Replace failed parts (see 21 - Manual Transmission, Gear-shift Mechanism Assembly/Fork Shaft Assembly, Disassembly/Assembly)
6	Check the synchronizer	Normal	Faulty	Instruction
	Check the wear conditions of synchronizer and ring	Go to Step 7	Synchronizer or ring damaged	Replace synchronizer and ring (see 21 - Manual Transmission, Input Shaft Assembly/ Output Shaft Assembly, Disassembly/Assembly)
7	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

2. DISORDER OF GEAR

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	According to the correct steps, operate the transmission control mechanism to check the shifting functions.	Diagnosis is over.	Appears disorder of gear	Go to Step 1
1	Check control mechanism of transmission	Normal	Faulty	Instruction
	Operate the shifting lever to check the shifting & wear condition of transmission control mechanism	Go to Step 2	Excessive wear of shift lever ball	Replace transmission control mechanism (see 21 - Manual Transmission, Transmission Control Mechanism, Replacement)
2	Check the gear shift fork and fork shaft	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Manual Transmission Assembly, Disassembly), and check the wear condition of gear shift fork and fork shaft.	Go to Step 3	1. Gear shift fork worn 2. Gear shift fork shaft deformed & worn	Replace gear shift fork or fork shaft (see 21 - Manual Transmission, Transmission Assembly, Assembly and 21 - Manual Transmission, Fork Shaft Assembly, Disassembly/Assembly)
3	Check interlock device	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the functions of interlock device	Go to Step 4	Interlock device failed	Replace failed parts (see 21 - Manual Transmission, Gearshift Mechanism Assembly/Fork Shaft Assembly, Disassembly/Assembly)
4	Check the synchronizer	Normal	Faulty	Instruction
	Check the wear conditions of synchronizer and ring	Go to Step 5	Synchronizer or ring damaged	Replace synchronizer and ring (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

3. THROW-OUT OF GEAR

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Visual check the wear conditions of transmission control mechanism	Go to Step 1	Ball clearance of shift lever control mechanism too large	Replace transmission control mechanism (see 21 - Manual Transmission, Transmission Control Mechanism, Replacement)
1	Check gearshift mechanism	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Replacement/Disassembly), and check the operations of gearshift mechanism assembly	Go to Step 2	Gear shift mechanism stuck, component worn	Repair or replace gearshift mechanism assembly (see 21 - Manual Transmission, Transmission Assembly, Replacement/Assembly and 21 - Manual Transmission, Gearshift Mechanism Assembly, Disassembly/Assembly)
2	Check self-locking device	Normal	Faulty	Instruction
	Check the functions of self-locking device	Go to Step 3	Self-locking device (failed)	Replace failed parts (see 21 - Manual Transmission, Gearshift Mechanism Assembly/Fork Shaft Assembly, Disassembly/Assembly)
3	Check the synchronizer	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the wear conditions of synchronizer and ring	Go to Step 4	Synchronizer or ring damaged	Replace synchronizer and ring (see 21 - Manual Transmission, Input Shaft Assembly/ Output Shaft Assembly, Disassembly/Assembly)
4	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

4. JUMPS OUT OF GEAR

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	According to the correct steps, operate the transmission control mechanism to check the shifting functions.	Diagnosis is over	Jumping out	Go to Step 1
1	Check gearshift mechanism	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Replacement/Disassembly), and check the operations of gearshift mechanism assembly	Go to Step 2	Gearshift mechanism parts is deformed & loosened, made the gears cannot engaging completely	Repair or replace gearshift mechanism assembly (see 21 - Manual Transmission, Transmission Assembly, Replacement/ Assembly and 21 - Manual Transmission, Gearshift Mechanism Assembly, Disassembly/Assembly)
2	Check self-locking device	Normal	Faulty	Instruction
	Check the functions of self-locking device	Go to Step 3	Self-locking device (failed)	Replace failed parts (see 21 - Manual Transmission, Gearshift Mechanism Assembly/Fork Shaft Assembly, Disassembly/Assembly)
3	Check gear	Normal	Faulty	Instruction
	Check the wear conditions of gear in each position	Go to Step 4	Gear wears out, leading to abrade into cone-shape along tooth length direction	Replace the worn gear (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
4	Check gear shaft and bearing	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the wear conditions of each gear shaft	Go to Step 5	Gear shaft or bearing wears out, made the straight line of engaged gear nonparallel or axial runnout	Replace the worn gear shaft or bearing (see 21 - Manual Transmission, Input Shaft Assembly/ Output Shaft Assembly, Disassembly/Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

5. ABNORMAL NOISE ONLY IN NEUTRAL

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	For road test, operate the transmission control mechanism to check the abnormal noise of transmission.	Diagnosis is over	Transmission sounds abnormally only in neutral position.	Go to Step 1
1	Check the transmission	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the fundamental characteristics of transmission (see 21 - Manual Transmission, Replacement/Disassembly/Complete Check).	Go to Step 2	Fundamental characteristics of transmission is inconsistant.	Disassemble the input or output shaft assembly, and re-assemble according to the requirements (see 21 - Manual Transmission, Input Shaft Assembly/ Output Shaft Assembly, Disassembly/Assembly), and then remeasure it. Hint: Check each part for wearing after disassembled, and replace the worn part.
2	Check the gear shift fork and fork shaft	Normal	Faulty	Instruction
	Disassemble the gearshift mechanism assembly (see 21 - Manual Transmission, Manual Transmission Assembly, Disassembly), and check the wear condition of gear shift fork and fork shaft.	Go to Step 3	1. Gear shift fork worn 2. Gear shift fork shaft deformed & worn	Replace gear shift fork or fork shaft (see 21 - Manual Transmission, Transmission Assembly, Assembly and 21 - Manual Transmission, Fork Shaft Assembly, Disassembly/Assembly)
3	Check gear	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the wear conditions of gear in each position	Go to Step 4	Gear wears out, leading to abrade into cone-shape along tooth length direction	Replace the worn gear (see 21 - Manual Transmission, Input Shaft Assembly/Output shaft Assembly, Disassembly/Assembly)
4	Check gear shaft and bearing	Normal	Faulty	Instruction
	Check the wear conditions of each gear shaft	Go to Step 5	Gear shaft or bearing wears out, made the straight line of engaged gear nonparallel or axial runnout	Replace the worn gear shaft or bearing (see 21 - Manual Transmission, Input Shaft Assembly/Output shaft Assembly, Disassembly/Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

6. ABNORMAL NOISE ONLY AFTER GEAR SHIFTED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	For road test, operate the transmission control mechanism to check the abnormal noise of transmission.	Diagnosis is over	Transmission sounds abnormally only after gear shifted	Go to Step 1
1	Check control mechanism of transmission	Normal	Faulty	Instruction
	Operate the shifting lever to check the connection condition of transmission control mechanism at all joints	Go to Step 2	Connection is loosened	Adjust or replace transmission control mechanism (see 21 - Manual Transmission, Transmission Control Mechanism, Replacement)
2	Check the transmission	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the fundamental characteristics of transmission (see 21 - Manual Transmission, Replacement/Disassembly/Complete Check).	Go to Step 3	Fundamental characteristics of transmission is inconsistant.	Disassemble the input or output shaft assembly, and re-assemble according to the requirements (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly), and then re-measure it. Hint: Check each part for wearing after disassembled, and replace the worn part.

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Steps	Inspection Item	Inspection result		
3	Check differential	Normal	Faulty	Instruction
	Check fit clearance among the gears of differential	Go to Step 4	Too large fit clearance due to worn differential part	Replace worn differential part (see 21 - Manual Transmission, Differential Assembly, Disassembly/Assembly)
4	Check gear	Normal	Faulty	Instruction
	Check the wear conditions of gear in each position	Go to Step 5	Gear wears out, leading to abrade into cone-shape along tooth length direction	Replace the worn gear (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
5	Check gear shaft and bearing	Normal	Faulty	Instruction
	Check the wear conditions of each gear shaft	Go to Step 6	Gear shaft or bearing wears out, made the straight line of engaged gear nonparallel or axial runnout	Replace the worn gear shaft or bearing (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
6	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

7. ABNORMAL NOISE IN THE TRANSMISSION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	For road test, operate the transmission control mechanism to check the abnormal noise of transmission.	Diagnosis is over	Abnormal noise in the transmission	Go to Step 1
1	Check transmission gear oil	Normal	Faulty	Instruction
	Check transmission gear oil level via oil filler (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection)	Go to Step 2	Insufficient gear oil	Change gear oil (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection) Hint: If gear oil is reduced abnormally, you need to check out the reason, and generally is leaking.
2	Check the transmission	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Remove the transmission assembly, and disassemble the fundamental characteristics of transmission (see 21 - Manual Transmission, Replacement/Disassembly/Complete Check).	Go to Step 3	Fundamental characteristics of transmission is inconsistant.	Disassemble the input or output shaft assembly, and re-assemble according to the requirements (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly), and then re-measure it. Hint: Check each part for wearing after disassembled, and replace the worn part.
3	Check the synchronizer	Normal	Faulty	Instruction
	Check the wear conditions of synchronizer and ring	Go to Step 4	Synchronizer or ring damaged	Replace synchronizer and ring (see 21 - Manual Transmission, Input Shaft Assembly/Output shaft Assembly, Disassembly/Assembly)
4	Check gear	Normal	Faulty	Instruction
	Check the wear conditions of gear in each position	Go to Step 5	Gear wears out, leading to abrade into cone-shape along tooth length direction	Replace the worn gear (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
5	Check gear shaft and bearing	Normal	Faulty	Instruction
	Check the wear conditions of each gear shaft	Go to Step 6	Gear shaft or bearing wears out, made the straight line of engaged gear nonparallel or axial runnout	Replace the worn gear shaft or bearing (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
6	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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8. TRANSMISSION OVERHEATING

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check transmission gear oil level via oil filler (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection)	Go to Step 1	Insufficient gear oil	Replace gear oil (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection) Hint: If gear oil is reduced abnormally, you need to check out the reason, and generally is leaking.
1	Check the transmission	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the fundamental characteristics of transmission (see 21 - Manual Transmission, Replacement/Disassembly/Complete Check).	Go to Step 3	Fundamental characteristics of transmission is inconsistant.	Disassemble the input or output shaft assembly, and re-assemble according to the requirements (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly), and then re-measure it. Hint: Check each part for wearing after disassembled, and replace the worn part.
2	Check gear	Normal	Faulty	Instruction
	Check the wear and fitting conditions of gear in each position	Go to Step 3	Improper gear fitting or small gear clearance due to wearing	Replace the worn gear (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
3	Check the bearing	Normal	Faulty	Instruction
	Check the each bearing fitting	Go to Step 4	Tight bearing assembly	Re-assemble bearing (see 21 - Manual Transmission, Input Shaft Assembly/Output Shaft Assembly, Disassembly/Assembly)
4	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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9. OIL LEAKAGE OF TRANSMISSION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check transmission gear oil level via oil filler (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection)	Go to Step 1	Insufficient gear oil	Replace gear oil (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection) Hint: If gear oil is reduced abnormally, you need to check out the reason, and generally is leaking.
1	Check leakage	Normal	Faulty	Instruction
	Visual check for leakage around the transmission	Go to Step 2	1. Leaking mark at oil drain bolt 2. Leaking mark at transmission housing cracks 3. Leaking mark at output end of differential 4. Leaking mark at contact surface of housing	1. Replace oil drain bolt or housing 2. Replace the housing 3. Replace oil seal 4. Replace seal element
2	Check gear	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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10. ABNORMAL WEAR OF BEARING IN THE TRANSMISSION

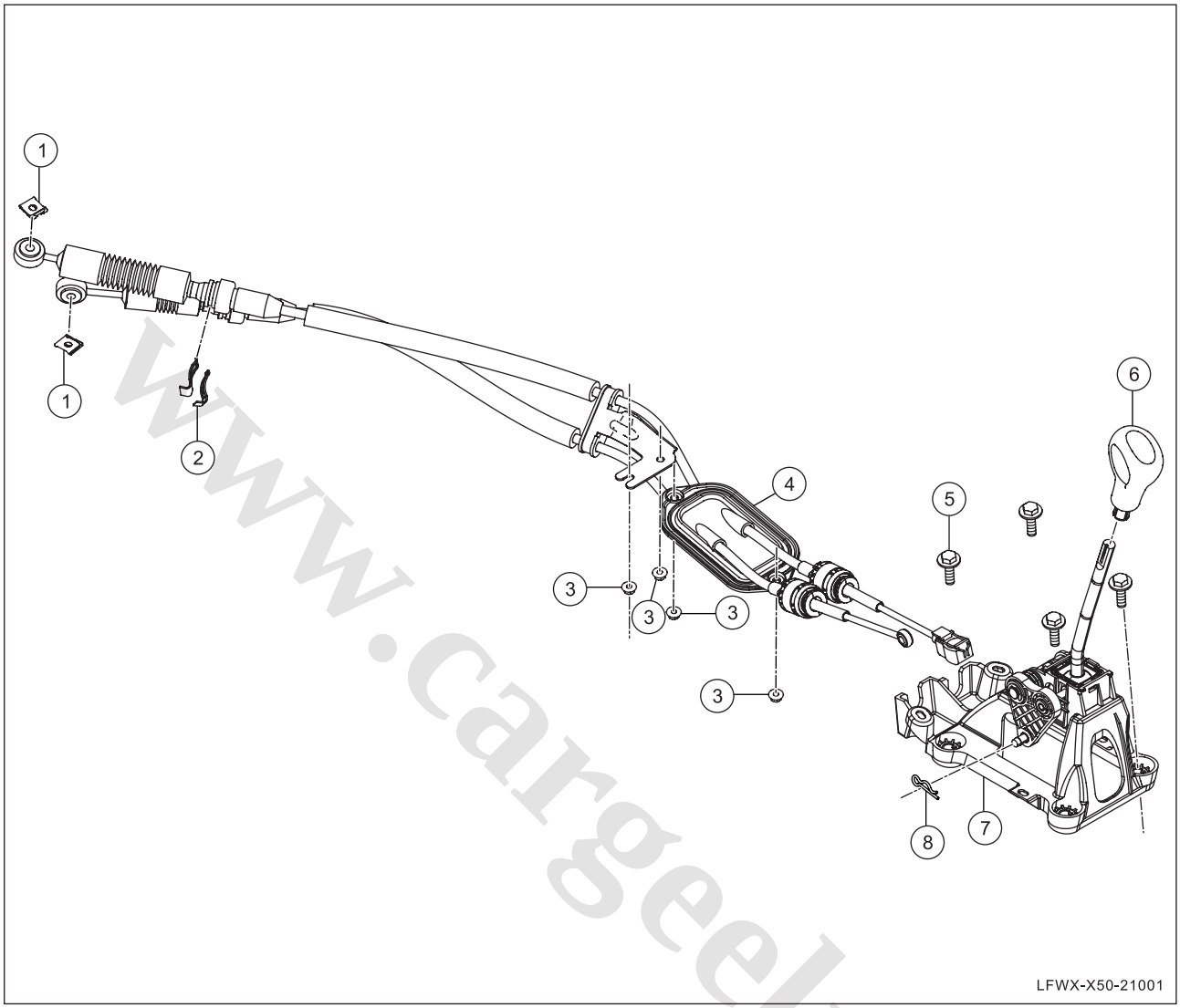
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check transmission gear oil for metal impurities	Go to Step 1	Gear oil contains metal impurities	Replace gear oil (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection)
1	Check gear oil	Normal	Faulty	Instruction
	Check gear oil for satisfying the requirements	Go to Step 2	Not specified gear oil	Replace specified gear oil (see 21 - Manual Transmission, Manual Transmission, On-Vehicle Inspection)
2	Check the transmission	Normal	Faulty	Instruction
	Remove the transmission assembly, and disassemble the fundamental characteristics of transmission (see 21 - Manual Transmission, Replacement/Disassembly/Complete Check).	Go to Step 3	Fundamental characteristics of transmission is inconsistant.	Disassemble the input or output shaft assembly, and re-assemble according to the requirements (see 21 - Manual Transmission, Input Shaft Assembly/Output shaft Assembly, Disassembly/Assembly), and then re-measure it. Hint: Check each part for wearing after disassembled, and replace the worn part.
3	Check the bearing	Normal	Faulty	Instruction
	Check the bearing for standard fittings	Go to Step 4	Not standard fittings	Replace with standard fittings
4	Check bearing installation	Normal	Faulty	Instruction
	Check installations of input & output shaft bearing	Go to Step 5	Bearing is not installed in place	Re-assemble bearing (see 21 - Manual Transmission, Input Shaft Assembly/Output shaft Assembly, Disassembly/Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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TRANSMISSION CONTROL MECHANISM

COMPONENTS



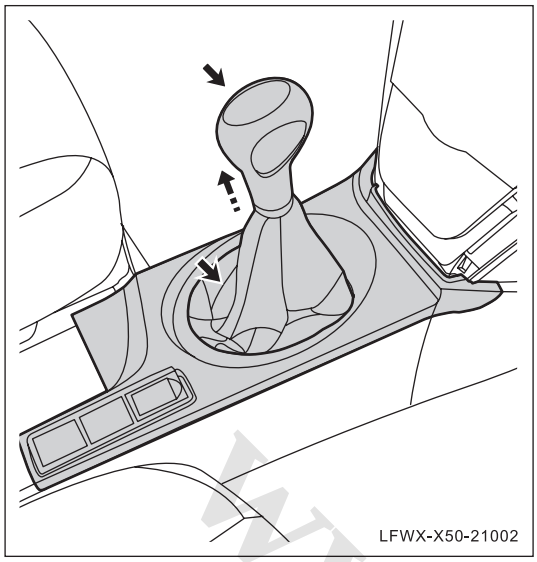
1	Fixing clamp of selector and gear shift cable
2	U-type clip
3	Hexagon flange removing scraps bolt
4	Selector and gear shift cable assembly

5	Hexagon head bolt and plain washer assembly
6	Ball knob
7	Shifter
8	Locking pin

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REPLACEMENT



1. REMOVE SHIFT LEVER KNOB

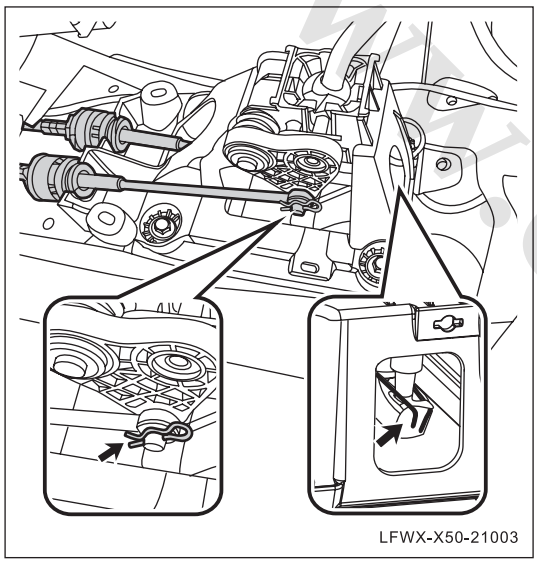
(a) Pry the gear shift lever sheath pressure plate.

(b) Pull off the shift lever knob and remove the sheath.

△ HINT:

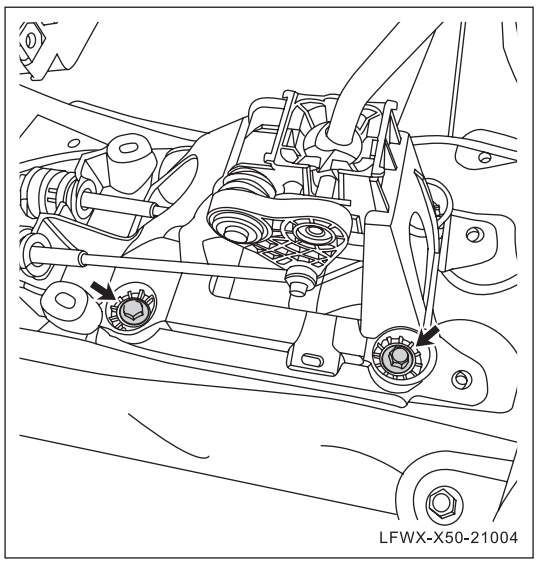
Push down the fixed bush on the shift lever sheath and remove the shift lever knob.

2. REMOVE THE CONSOLE ASSEMBLY (SEE 85 - DASHBOARD AND CONSOLE DASHBOARD, CONSOLE, REPLACEMENT)



3. REMOVE SHIFTER

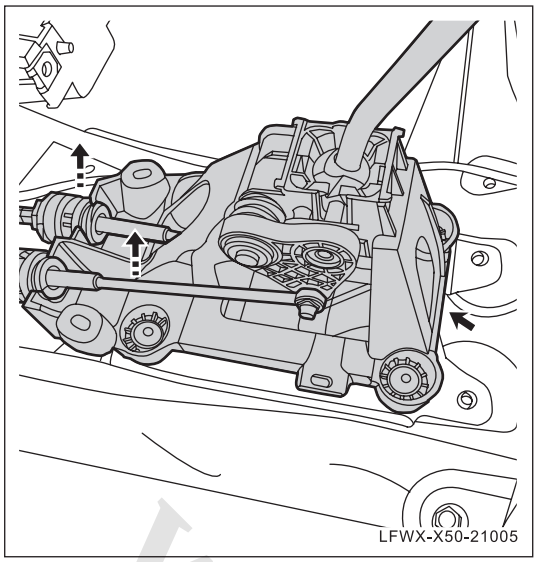
(a) Remove the fixing plate on the selector cable and the snap ring on the cable on the gear shift lever; remove the front end of the selector and gear shift cable from the selector lever and shift lever.



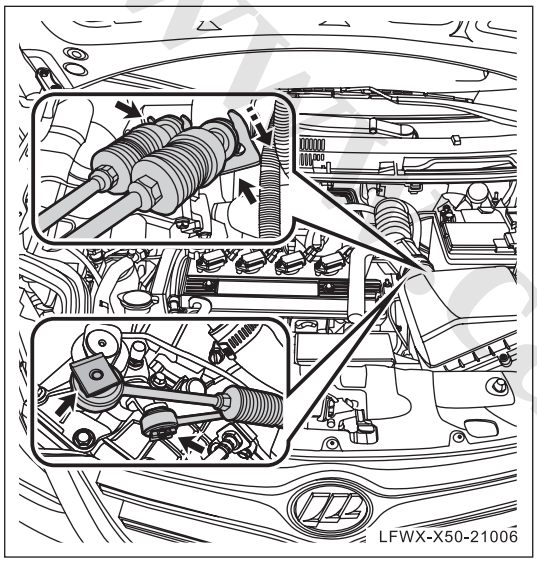
(b) Remove the gear shift bracket bolts.

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(c) Pull upward the selector and gearshift cable out of shifter, and then remove the shifter.



4. REMOVE SELECTOR AND GEARSHIFT CABLE AT TRANSMISSION END.

(a) Remove the battery with bracket assembly.

(b) Remove the air filter with bracket assembly.

(c) Remove fixing clamp and U-type clip of gear shift cable.

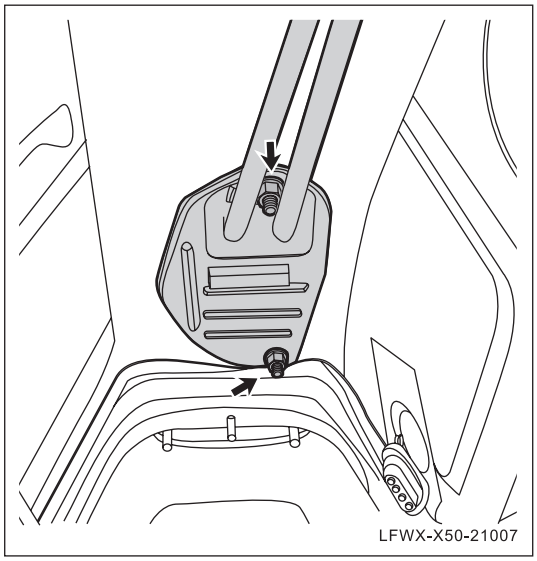
(d) Remove the gearshift cable from the selector and gearshift cable bracket of transmission.

(e) Remove fixing clamp and U-type clip of selector cable.

(f) Remove the selector cable from the selector and gearshift cable bracket of transmission.

△ HINT:

Take out the selector and gearshift cable from the bracket opening while pushing them a little backward.



5. REMOVE FIXING BOLTS OF THE SELECTOR AND GEARSHIFT CABLE ON THE CHASSIS.

(a) Lift the vehicle.

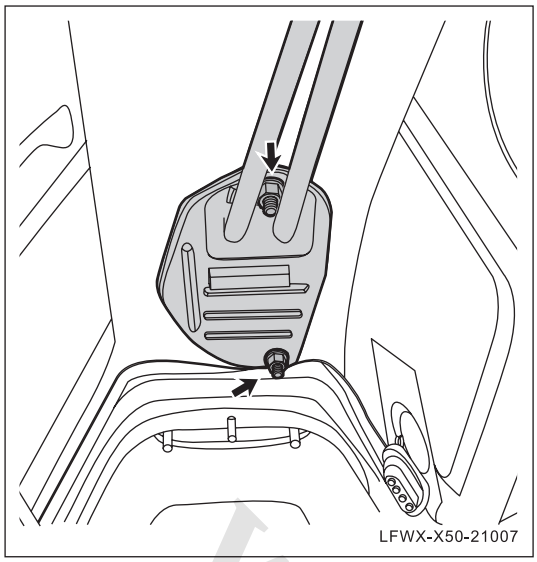
(b) Remove the exhaust pipe and the heat insulation plates.

(c) Remove the fixing nuts and fixing bracket bolts of selector and gearshift cable assembly on the vehicle body.

6. TAKE OUT SELECTOR AND GEARSHIFT CABLE

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7. INSTALL SELECTOR AND GEARSHIFT CABLE

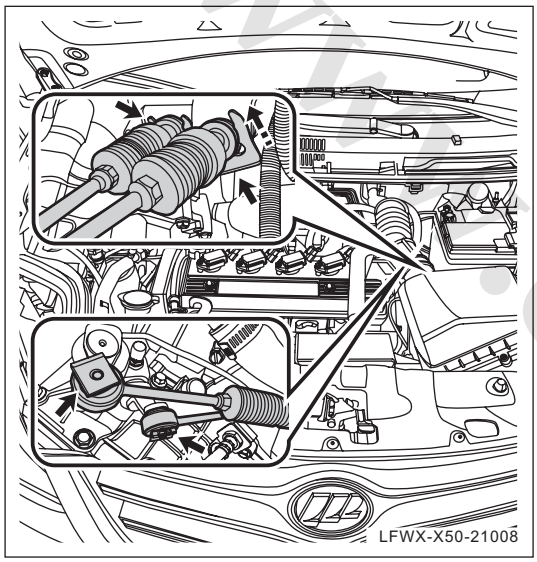
(a) Install the front end of selector and gearshift cable from the mounting hole of the vehicle body and then fasten with fixing nuts.

Torque: 8 - 12N•m

(b) Install the bracket fixing bolts of the selector and gearshift cable on the front suspension.

Torque: 8 - 12N•m

(c) Install the exhaust pipe and the heat insulation plates.



8. INSTALL SELECTOR AND GEARSHIFT CABLE AT TRANSMISSION END

(a) Install the gearshift cable from the bracket opening of selector and gearshift cable.

(b) Push the selector cable forward and expose the slot, and then install the E-type clip of the fixing cable.

(c) Install the selector cable connector onto the swing arm of the selector shaft, and then fasten it with the fixing clips.

(d) Install gearshift cable, and it is installed from the opening of selector and gearshift cable bracket.

(e) Push the gearshift cable forward and expose the slot, and then install the E-type clip of the fixing cable.

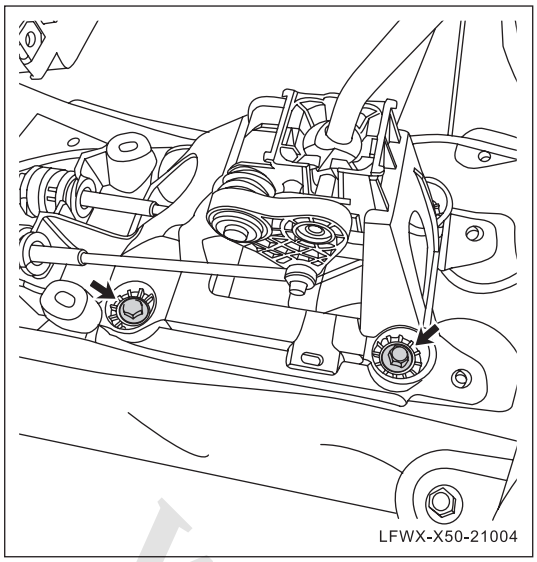
(f) Install the gearshift cable connector onto the swing arm of the gearshift shaft, and then fasten it with the fixing clips.

(g) Install the battery with bracket assembly.

(h) Install the air filter with bracket assembly.

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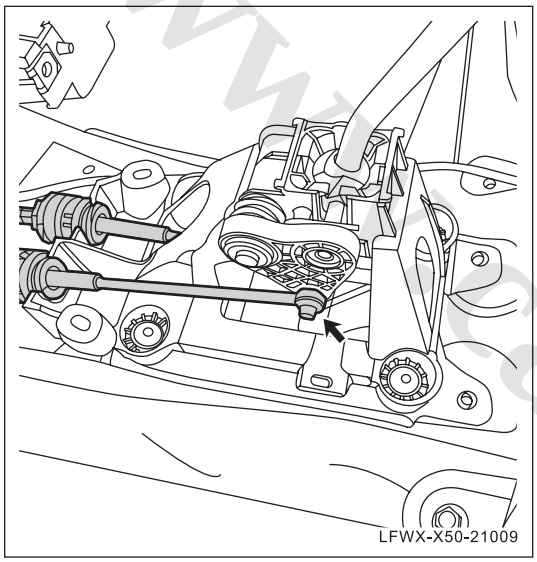
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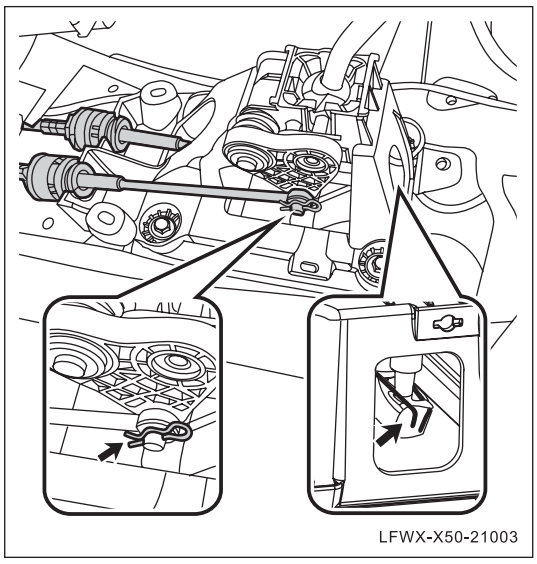
9. INSTALL GEAR SHIFT BRACKET ASSEMBLY

(a) Install gear shift bracket and fasten it by bolts.

Torque: 22 - 28N•m



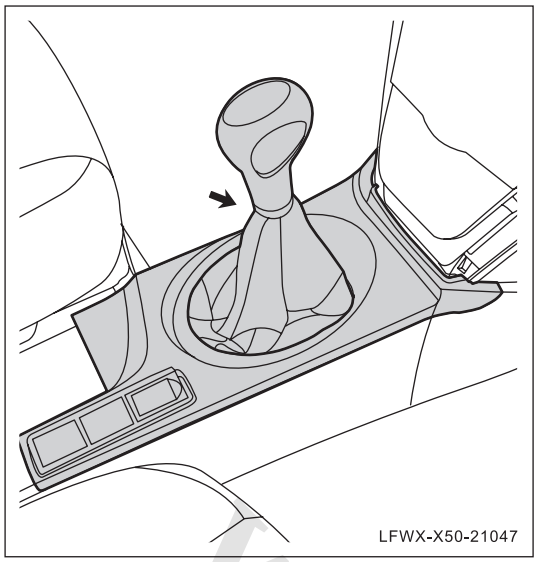
(b) Install the selector and gearshift cable in the shifter support slot



(c) Install the selector and gearshift cable onto the selector and gearshift lever.

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10. INSTALL CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)

11. INSTALL SHEATH OF THE GEAR SHIFT LEVER AND THE LEVER BALL.

(a) Install the gear shift lever sheath and the pressure plate onto the mounting position.

(b) Install the gear shift lever ball.

△ HINT:

Install the lever ball to the lowest position and pull up the fixing sheath on the shift lever bush until it engages with the lever ball.

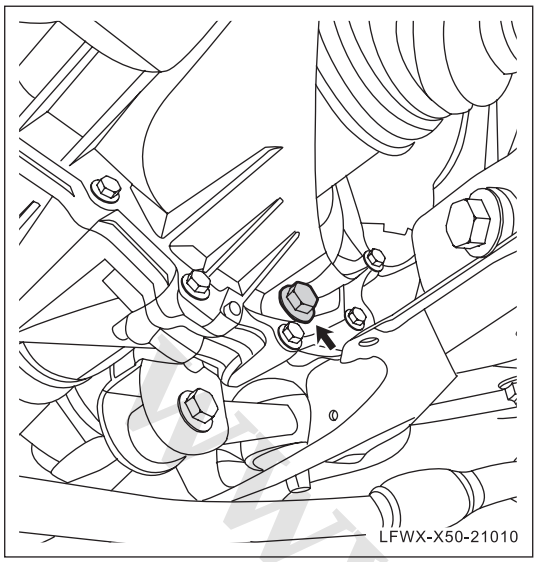
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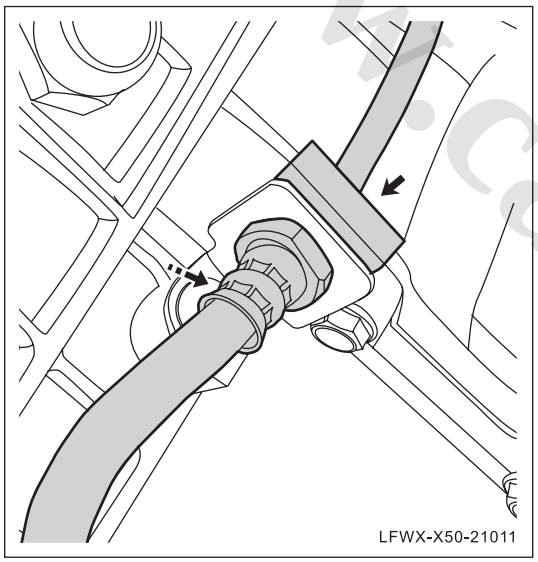
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TRANSMISSION ASSEMBLY

REPLACEMENT





1. **LIFT VEHICLE.**
2. **DRAINAGE OF TRANSMISSION OIL**

(a) Place one container under the transmission and remove the transmission oil drain plug.

NOTICE:

Transmission gear oil should be recycled.

△ HINT:

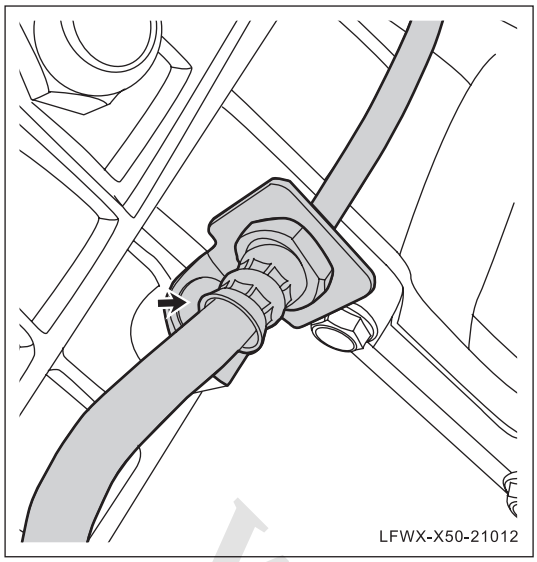
After oil is drained, install the plug back to the drain hole and fasten it to specified torque to avoid losing it or forget to tighten it, leading to oil leakage.

3. **REMOVE WHEEL DRIVE SHAFT (SEE CHAPTER 41 DRIVE SHAFT, DRIVE SHAFT, REPLACEMENT)**
4. **REMOVE BATTERY WITH BRACKET ASSEMBLY AND THE AIR FILTER WITH BRACKET ASSEMBLY**
5. **REMOVE SELECTOR AND GEARSHIFT CABLE AT TRANSMISSION END.**
6. **REMOVE CLUTCH OIL PIPES FROM THE TRANSMISSION.**

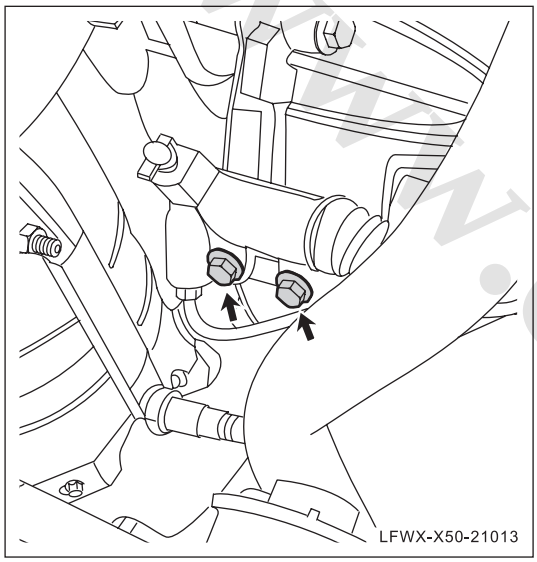
(a) Remove the locking plates of oil pipe on the bracket and push out the oil pipe connector to expose the bracket fixing bolt.

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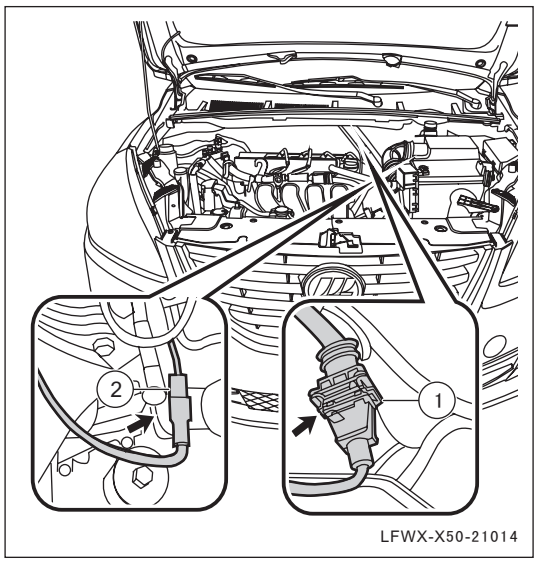
(b) Remove fixing bolts of the clutch oil pipe bracket.



(c) Remove fixing bolts of clutch slave cylinder and then detach the clutch slave cylinder from the transmission.

△ HINT:

Do not disconnect the clutch oil pipe when removing it. Otherwise hydraulic oil may leak.



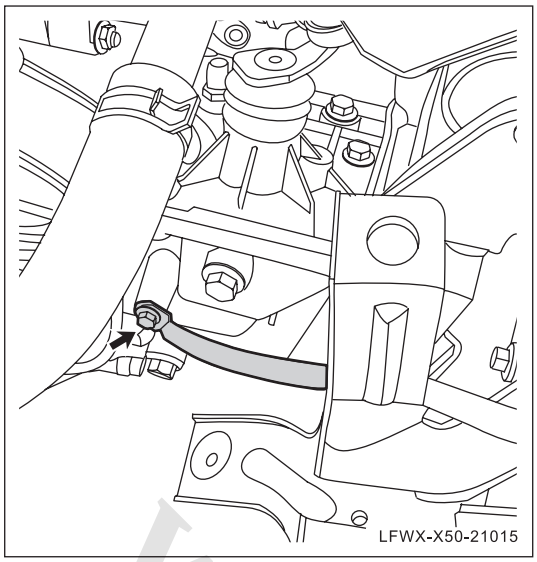
7. DISCONNECT WIRE HARNESSES OF SWITCHES AND SENSORS CONNECTING WITH THE TRANSMISSION.

(a) Press down snap ring to disconnect the engine crankshaft position sensor connector ① .

(b) Disconnect the reverse light switch wire harness connector ② .

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(c) Remove the ground cable fixing bolts connecting with the transmission.

8. DISCONNECT CONNECTION BETWEEN TRANSMISSION AND ENGINE

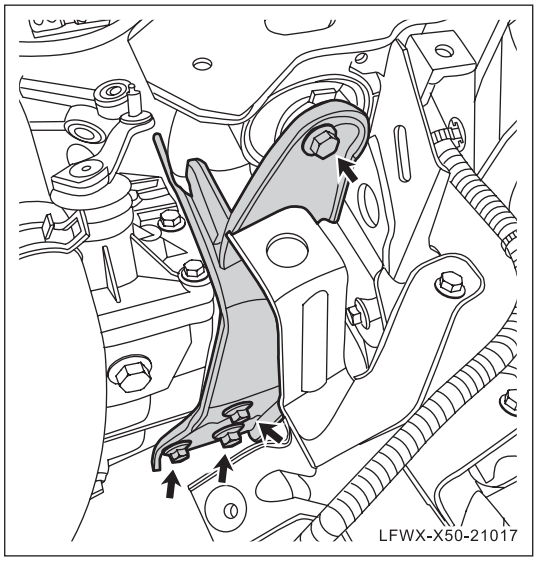
(a) Remove the connecting bolts from the engine compartment above the transmission and the engine.

(b) Remove the starter fixing bolts, and mount the starter securely onto the engine to prevent starter from falling down.

(c) Use a bracket to prop up the bottom of the engine; remove the connecting bolts from the engine compartment below the transmission and the engine.

NOTICE:

Left and right mounting of the engine and the transmission are mounted onto the transmission. In order to prevent the engine from falling down in removing the transmission, it is required to place a bracket under the engine; use a bracket to fasten the engine after the transmission connecting bolts are removed.



9. REMOVE TRANSMISSION MOUNTING AND REMOVE TRANSMISSION ASSY.

NOTICE:

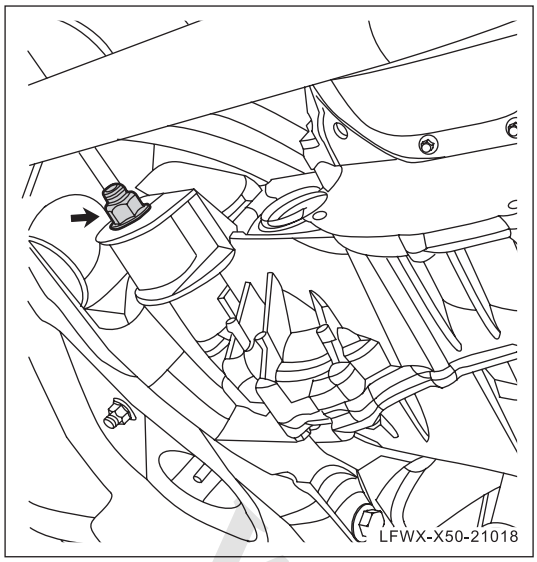
When removing the transmission mounting, a bracket should be used to prop up securely the transmission with help of an assistant so that the transmission will not fall, which may lead to unnecessary losses or injury

(a) Use a bracket to prop up the transmission and remove fixing bolts of the transmission left mounting on the transmission.

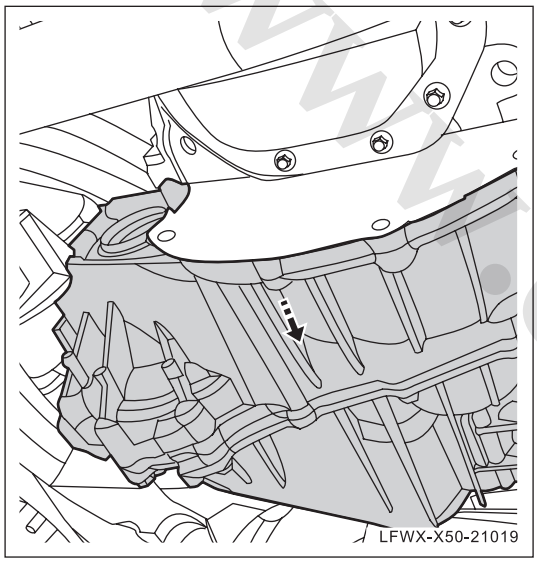
(b) Remove the fixing bolts of the left mounting and take off the lower bracket of the left mounting.

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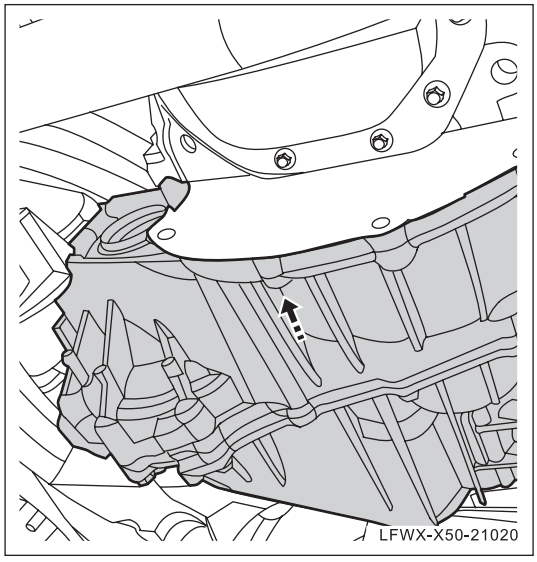


(c) Remove the rear mounting connecting bolts of the transmission and then disconnect the connection with the subframe.



(d) Tow transmission backward, to unplug transmission input shaft from clutch.

(e) Slowly lower support, and remove transmission assembly.



10 INSTALL TRANSMISSION ASSEMBLY

(a) Place the transmission assembly onto the bracket and fasten it; slowly lift up the bracket to align the transmission input shaft with the clutch driven plate spline hole, and then install it.

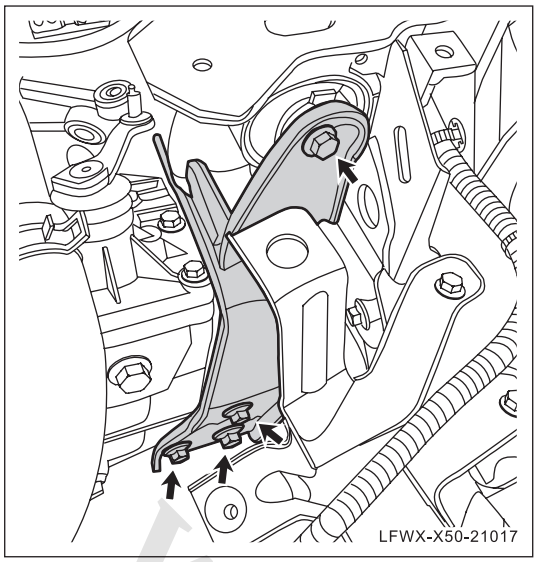
NOTICE:

When installing the transmission mounting, a bracket should be used to prop up securely the transmission with help of an assistant so that the transmission will not fall, which may lead to unnecessary losses or injury

(b) Install connecting bolts above the transmission and the engine, and then install the starter assembly.

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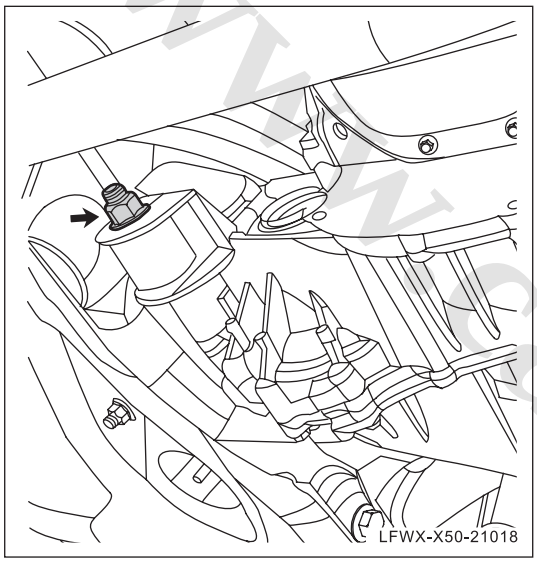
11. INSTALL TRANSMISSION MOUNTING.

(a) Install the lower bracket of the transmission left mounting and then install the fixing bolts of the left mounting subassembly.

Torque: 70 - 75N•m

(b) Adjust height of bracket and then install fixing bolts of the transmission left mounting on the transmission.

Torque: 65 - 85N•m

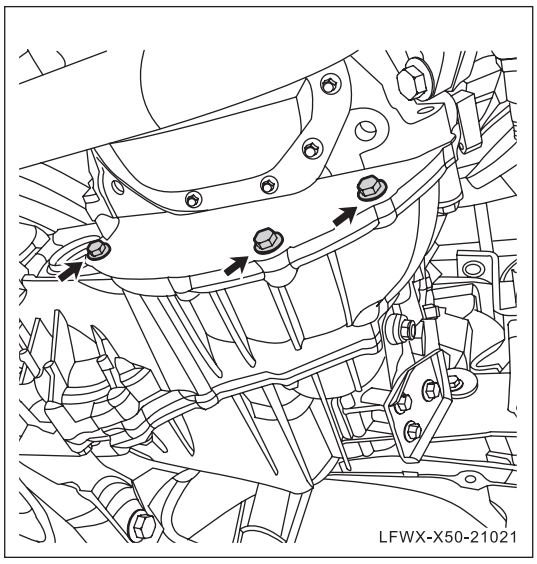


(c) Install and tighten the connecting bolts of the transmission rear mounting.

Torque: 185 - 225N•m

△ HINT:

Remove the bracket after mounting all mountings and then lower down the vehicle.

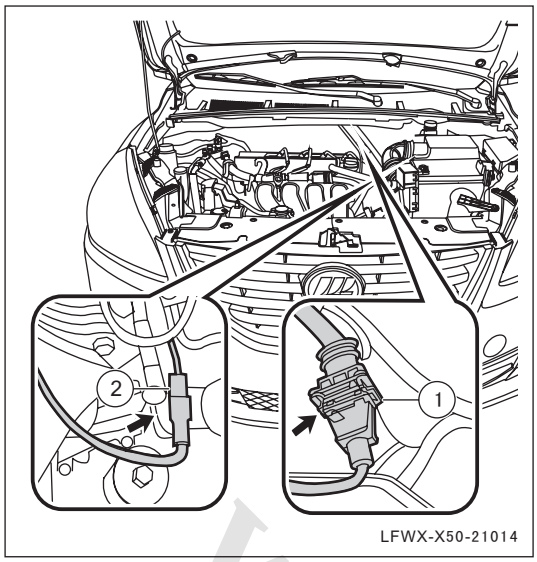


(d) Install and tighten the connecting bolts under the transmission and the engine.

Torque: 55 - 65N•m

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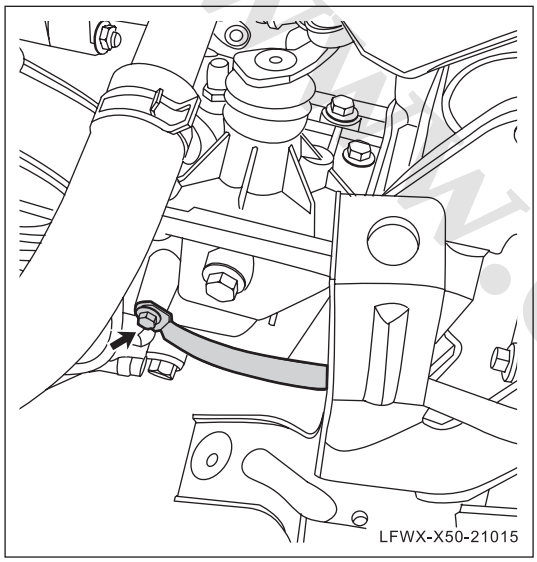
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12. INSTALL WIRE HARNESSES OF TRANSMISSION SENSORS AND SWITCHES

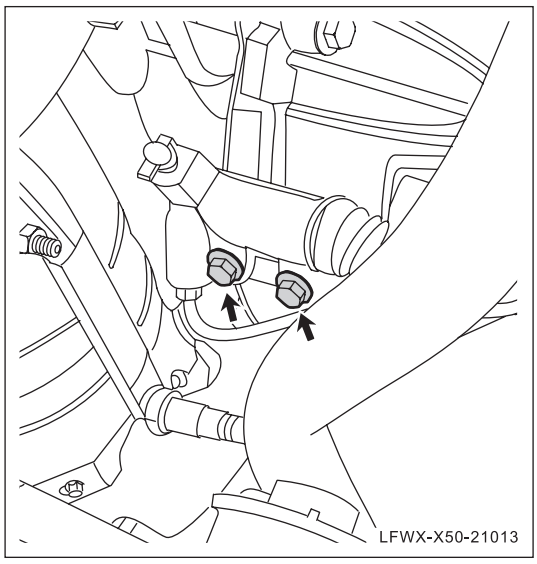
(a) Connect the engine crankshaft position sensor connector ① .

(b) Connect the reverse light switch wire harness connector ② .



(c) Install the ground cable fixing bolts connecting with the transmission.

Torque: 10N•m



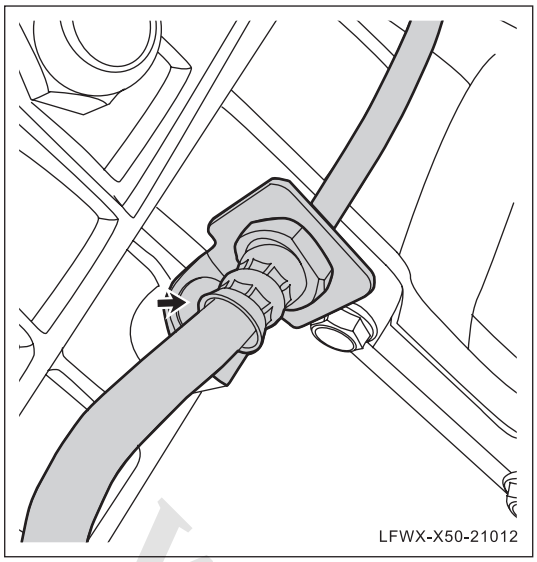
13. INSTALL CLUTCH SLAVE CYLINDER ASSEMBLY

(a) Install the clutch slave cylinder onto the transmission; ensure that the clutch push rod is mounted in the slot of the clutch fork push rod, and then mount and tighten the fixing bolts.

Torque: 20 - 26N•m

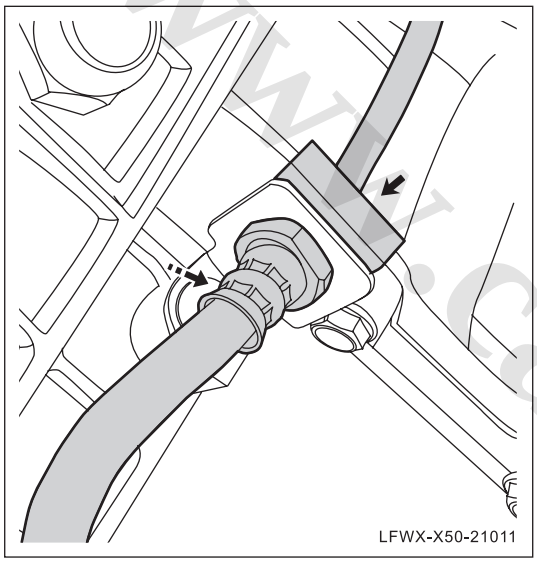
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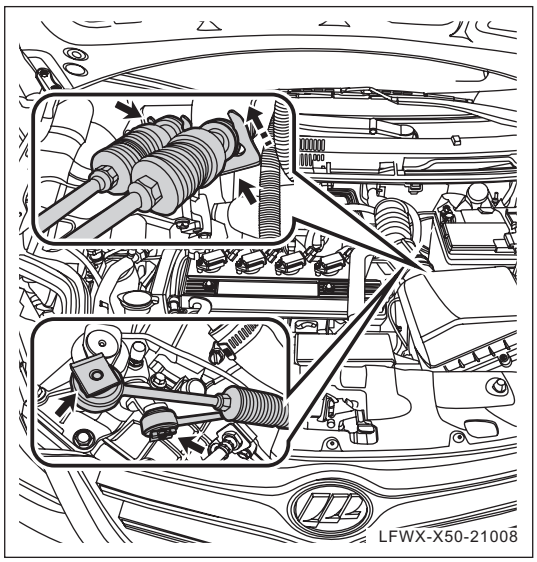


(b) Install the clutch slave cylinder oil pipe mounting bracket onto the transmission housing, and then mount and fasten fixing bolts.

Torque: 20 - 26N•m



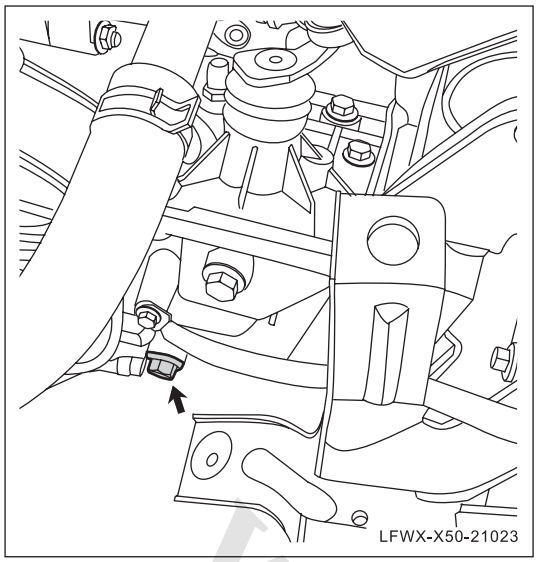
(c) Install the oil pipe fixing clips and fix securely the oil pipe onto the bracket.



14. **INSTALL WHEEL DRIVE SHAFT (SEE CHAPTER 41 DRIVE SHAFT, DRIVE SHAFT, REPLACEMENT)**
15. **INSTALL SELECTOR AND GEARSHIFT CABLE AT TRANSMISSION END**
16. **INSTALL BATTERY WITH BRACKET ASSEMBLY.**
17. **INSTALL AIR FILTER AND BRACKET ASSEMBLY**

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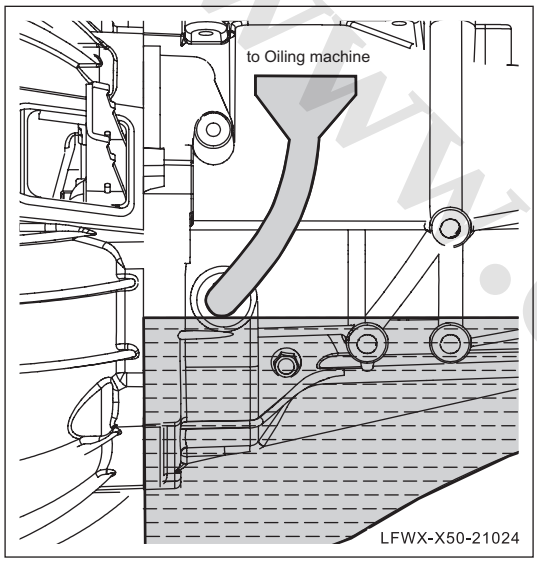
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18. ADD GEAR OIL

(a) Check if the transmission oil drain plug is securely tighten.

Torque: 40 - 45N•m



(b) Remove the transmission oil filling plug.

(c) Fill the transmission with gear oil using an oiling machine to keep the oil level flush with the oil filling bolt mount, with overflowing in the filler.

Filling amount: 2.2L

(d) Install and tighten the oil filling plug.

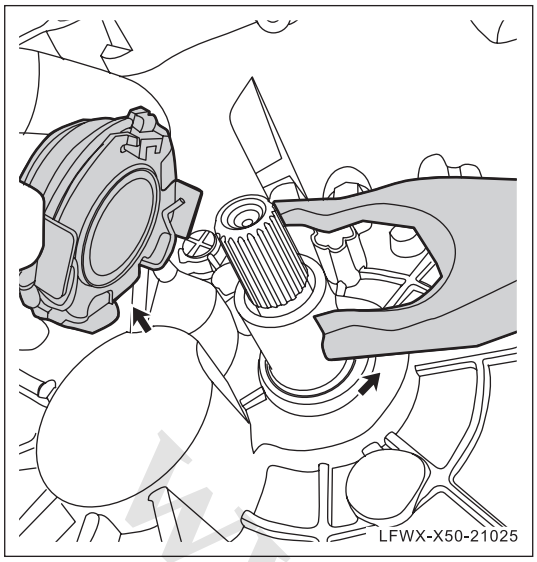
Torque: 30 - 35N•m

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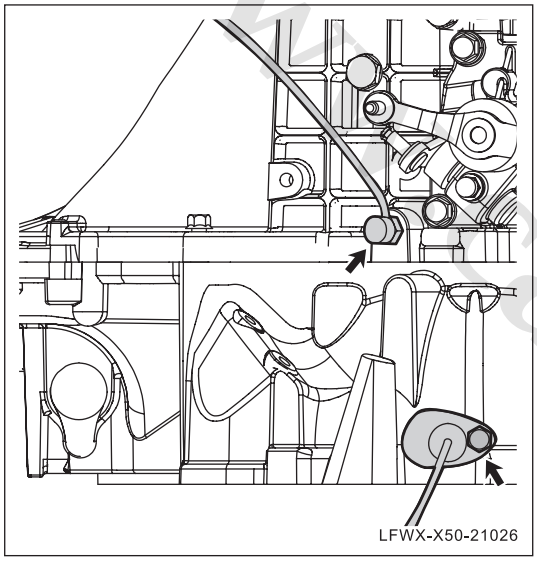
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DISMOUNTING



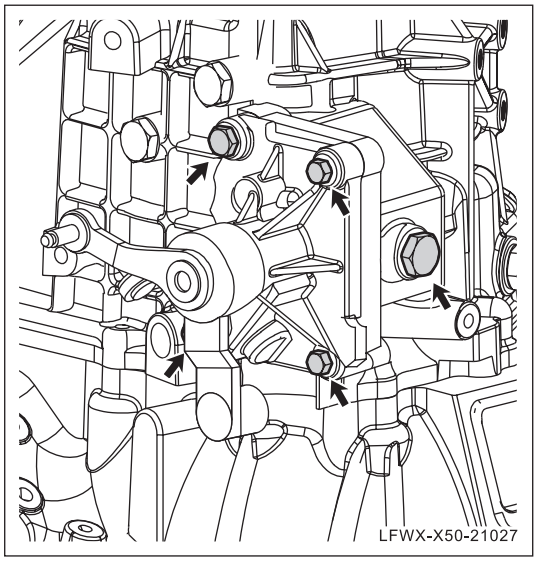
1. **REMOVE CLUTCH FORK AND RELEASE BEARING (SEE 23 - CLUTCH, CLUTCH RELEASE BEARING AND RELEASE FORK , REPLACEMENT)**



2. **REMOVE TRANSMISSION REVERSE LIGHT SWITCH AND SENSORS**

(a) Remove the transmission reverse light switch assembly.

(b) Remove fixing bolt of the engine crankshaft position sensor fixing bolt, and take off the sensor assembly.



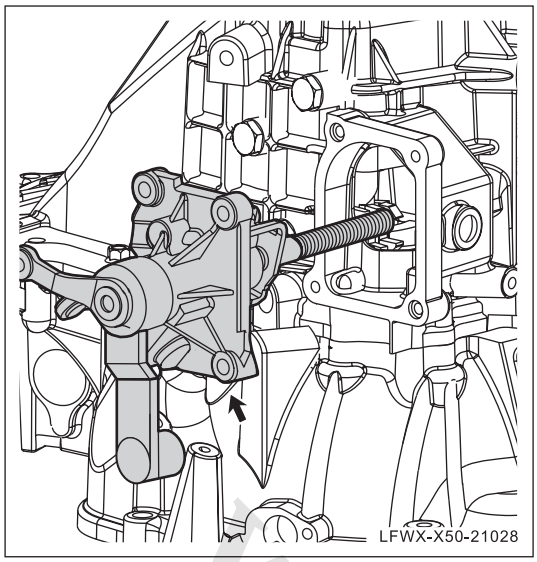
3. **REMOVE GEAR SELECTION AND SHIFTING MECHANISM ASSEMBLY OF THE TRANSMISSION**

(a) Remove positioning bolts of transmission gear shift.

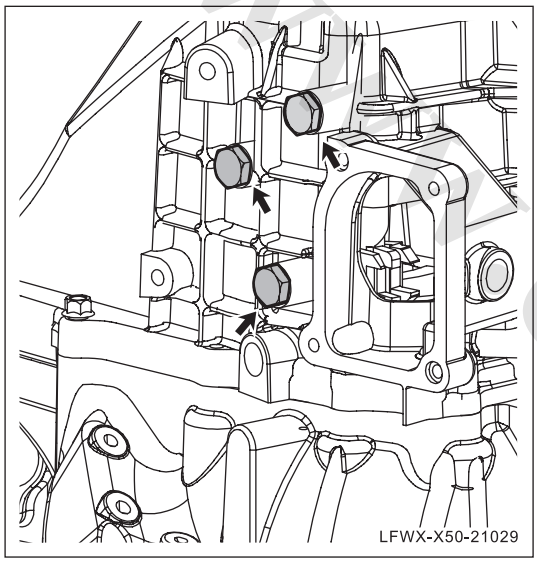
(b) Remove fixing bolts of gear selector and shift mechanism assembly.

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(c) Remove selecting and shifting assembly, and remove return spring.

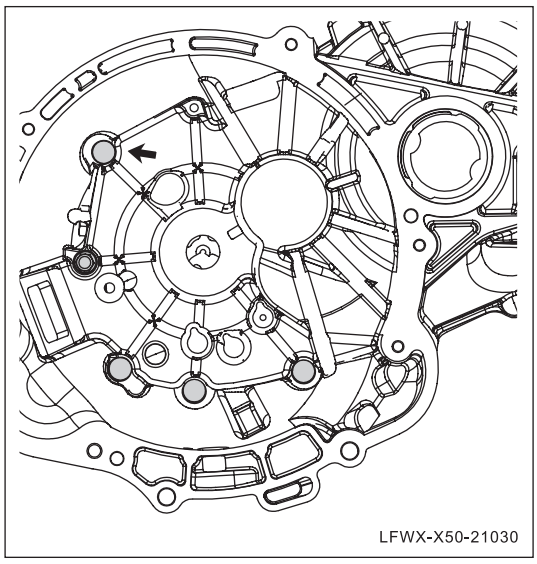


(d) Remove damping bolts of 3rd and 4th fork gears.

(e) Remove damping bolts of 1st and 2nd fork gears.

(f) Remove damping bolts of 5th fork gears.

(g) Remove the fixing bolt of the reverse shaft.

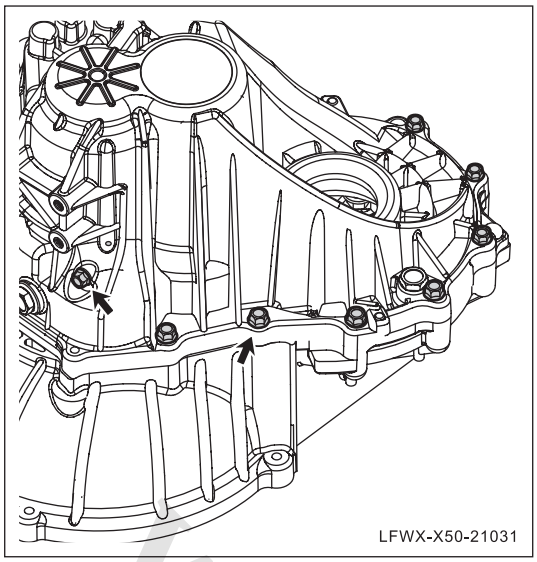


4. REMOVE TRANSMISSION HOUSING ASSEMBLY

(a) Remove connecting bolts (in the clutch housing) connecting with the transmission housing.

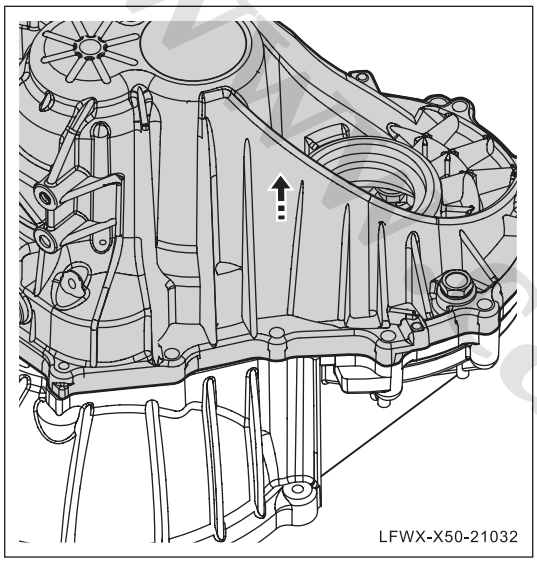
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(b) Keep the clutch housing downward and lower it down; and then remove fixing bolts of the transmission reverse idler shaft.

(c) Remove the connecting bolt connecting the transmission housing with the clutch housing.

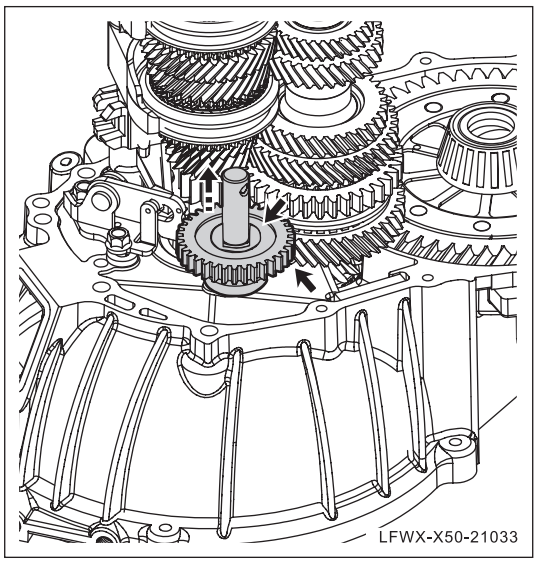


(d) Take down the transmission housing assembly.

△ HINT:

As sealant is smeared on position between the transmission housing and the clutch housing, it is not easy to remove the transmission housing. You may use a rubber hammer to knock the proper position when removing the transmission housing so that the housing becomes loose and can be easily remove.

(e) Remove the shims from the input shaft bearing.



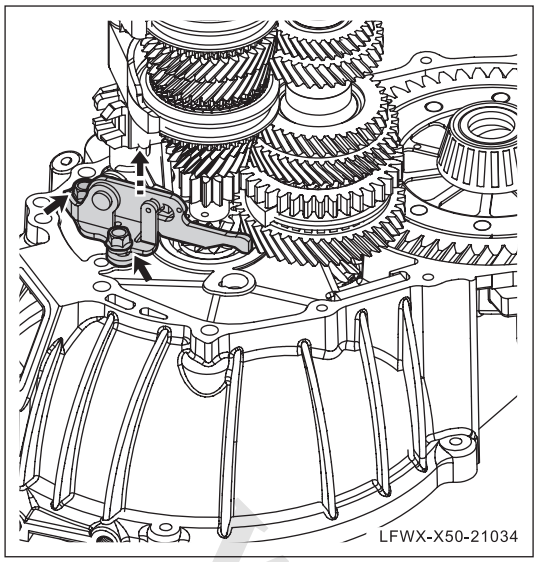
5. REMOVE REVERSE IDLER GEAR ASSEMBLY.

(a) Pull upward the reverse idler shaft out.

(b) Remove the reverse idler gear and the shims.

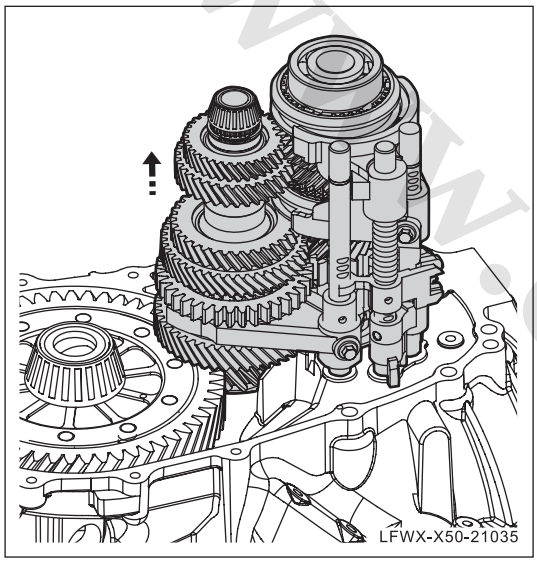
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(c) Remove fixing bolts of reverse swing arm bracket assembly.

(d) Remove the reverse swing arm bracket assembly and the reverse swing arm bracket pad.



6. REMOVE TRANSMISSION SHIFT SHAFT ASSEMBLY, INPUT SHAFT ASSEMBLY AND OUTPUT SHAFT ASSEMBLY

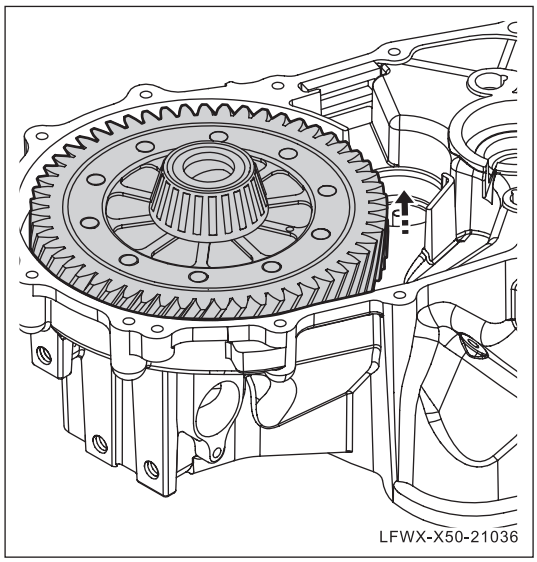
(a) Shake each assembly for easy removal of three shift shafts.

(b) Take out the transmission shift shaft, the input shaft and the output shaft together at the same time.

△ HINT:

After all assemblies of the transmission are taken out together, removal and installation become easy; during removal, two persons may work together to lift up the transmission, and then take out the transmission shift fork shaft assembly, the input shaft assembly and the output shaft assembly.

(c) Take off the transmission shift shaft assembly and detach the input shaft from the output shaft.

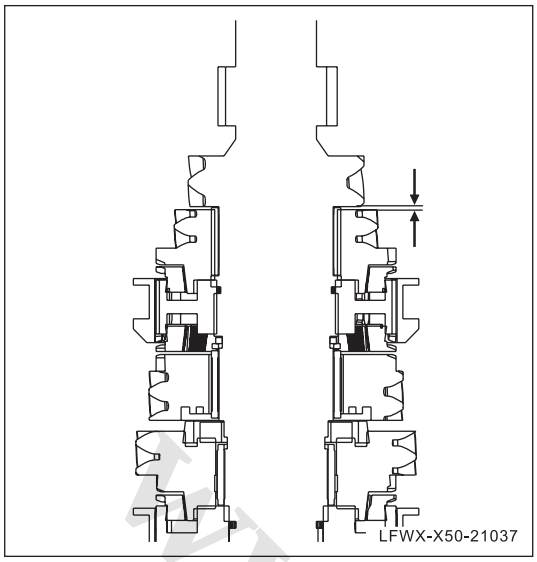


7. REMOVE DIFFERENTIAL ASSEMBLY

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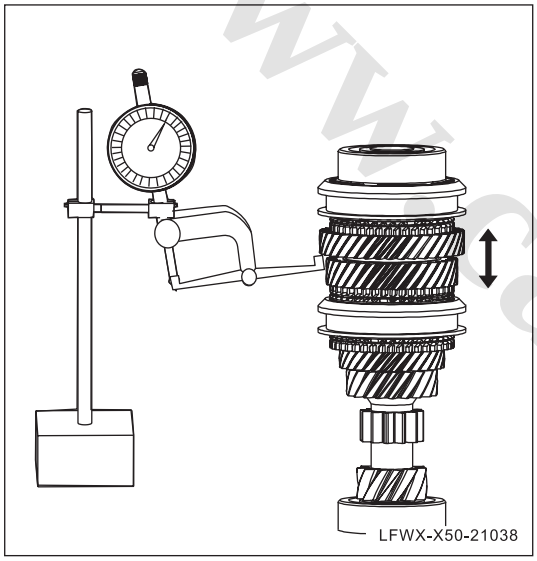
OVERALL CHECK



1. CHECK INPUT SHAFT ASSEMBLY

(a) Measure 3rd gear shaft side clearance by a feeler gauge.

Standard value: 0.1 - 0.35mm

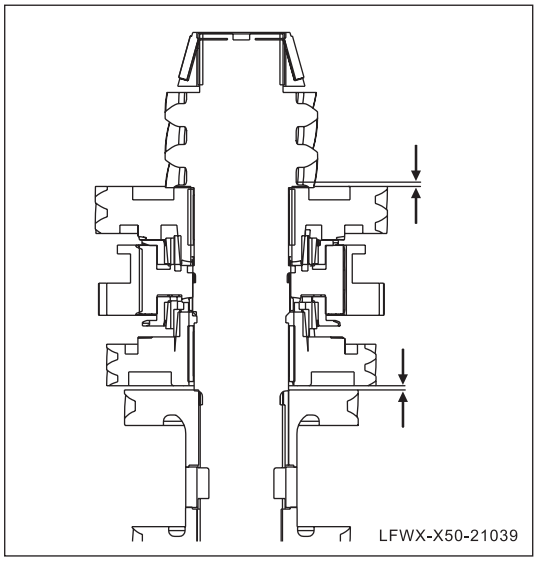


(b) Measure 5th gear axial clearance by a dial gauge.

Standard value: 0.1 - 0.5mm

(c) Measure 4th and 5th gear shaft clearance by a feeler gauge.

Standard value: <0.058mm



2. CHECK OUTPUT SHAFT ASSEMBLY

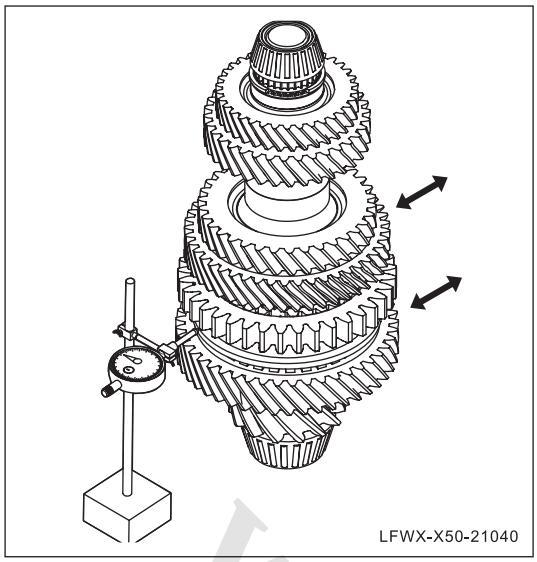
(a) Measure axial clearance of 1st gear and 2nd gear shaft of the output shaft with a feeler gauge.

1st gear: 0.1 - 0.35mm

2nd gear: 0.1 - 0.35mm

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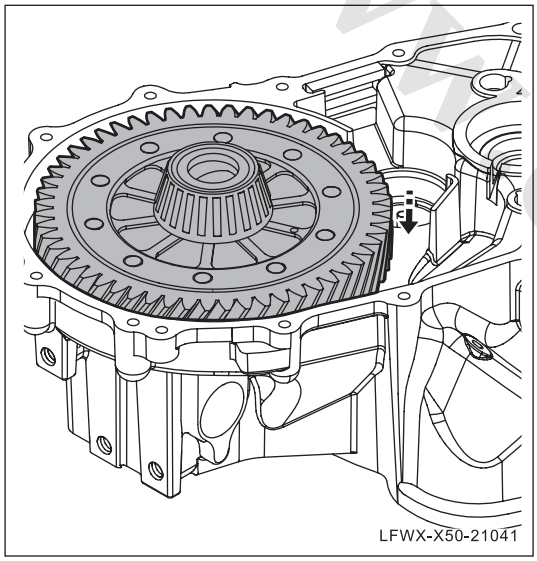
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(b) Measure radial run-out of gear in 1st gear and 2nd gear.

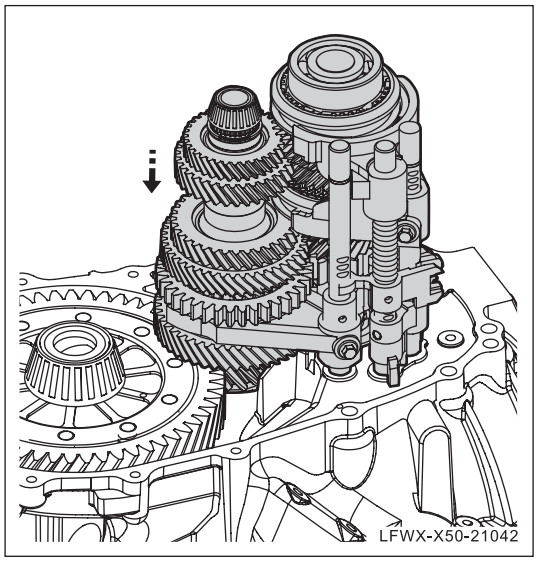
Maximum value: 0.056mm

ASSEMBLING



1. INSTALL DIFFERENTIAL ASSEMBLY

(a) Install the differential assembly into the clutch housing.



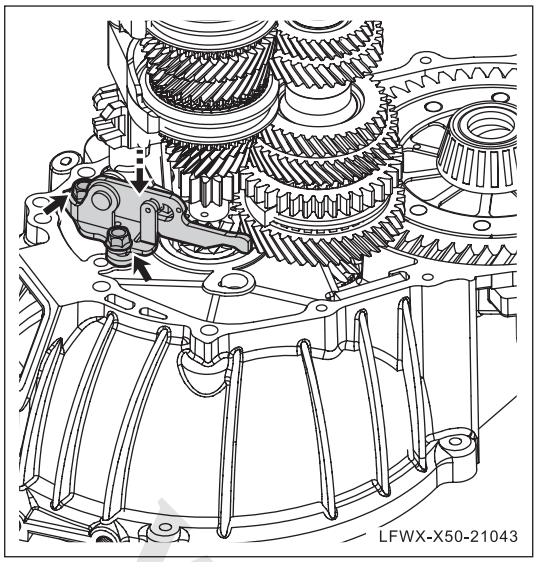
2. INSTALL TRANSMISSION SHIFT SHAFT ASSEMBLY, INPUT SHAFT ASSEMBLY AND OUTPUT SHAFT ASSEMBLY

(a) Install the input shaft onto the output shaft and then mount the transmission shift shaft assembly.

(b) Install the transmission shift shaft, the input shaft and the output shaft together at the same time onto the clutch housing.

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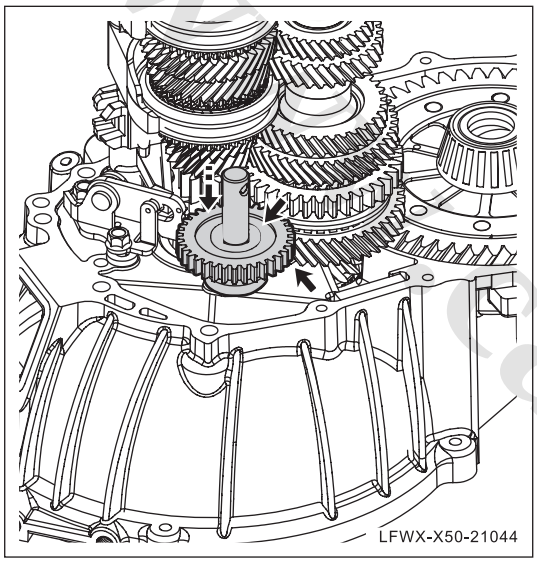
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3. INSTALL REVERSE IDLER GEAR ASSEMBLY

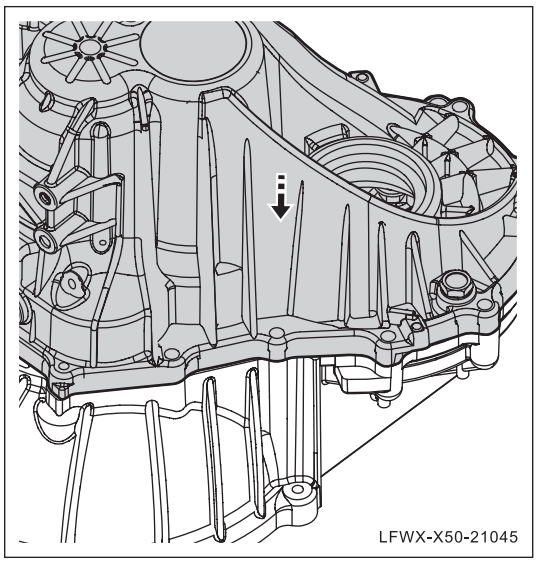
(a) Install the reverse swing arm bracket assembly and the reverse swing arm bracket pad.

(b) Install and tighten fixing bolts of reverse swing arm bracket assembly.



(c) Install the reverse idler gear and the shims.

(d) Install the reverse idler shaft.



4. INSTALL TRANSMISSION HOUSING ASSEMBLY

(a) Install the input shaft bearing gasket.

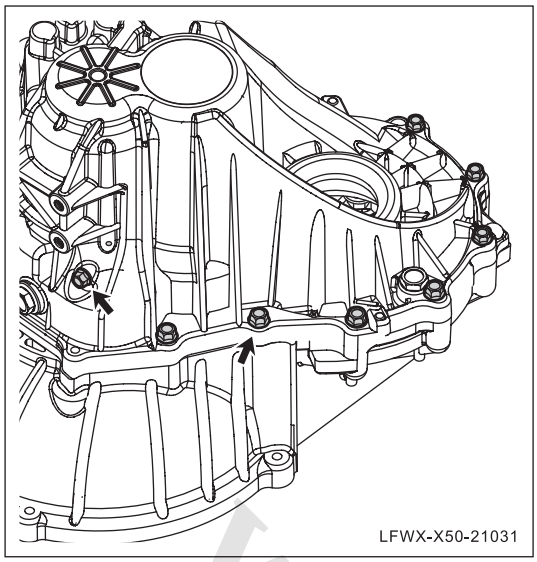
(b) Install the transmission housing assembly.

△ HINT:

Smear sealant on the contacting surface between the transmission housing and the clutch housing.

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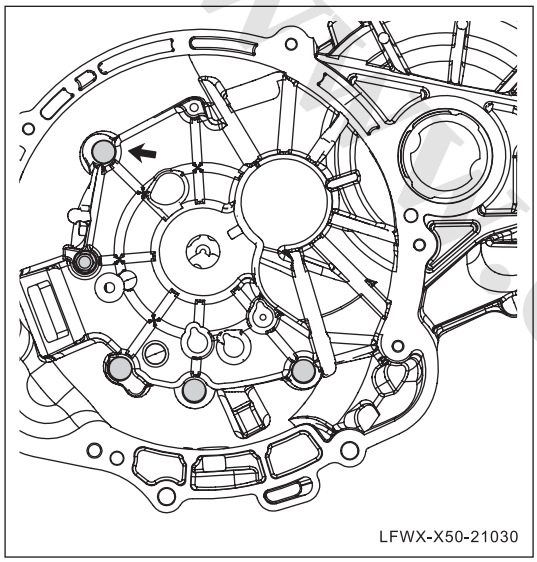
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(c) Install the fixing bolts of the transmission reverse idler shaft in the housing.

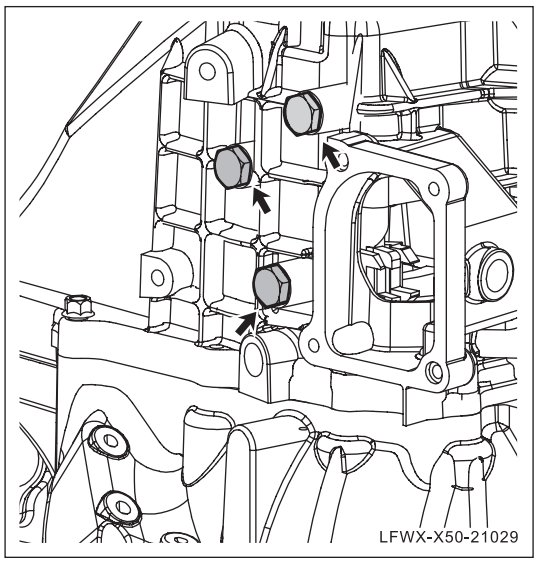
(d) Install and tighten the connecting bolt connecting the transmission housing with the clutch housing.

Torque: 80 - 90N•m



(e) Install and tighten connecting bolts (in the clutch housing) connecting with the transmission housing.

Torque: 80 - 90N•m



5. INSTALL GEAR SELECTION AND SHIFTING MECHANISM ASSEMBLY OF TRANSMISSION

(a) Install damping bolts of 3rd and 4th fork gears.

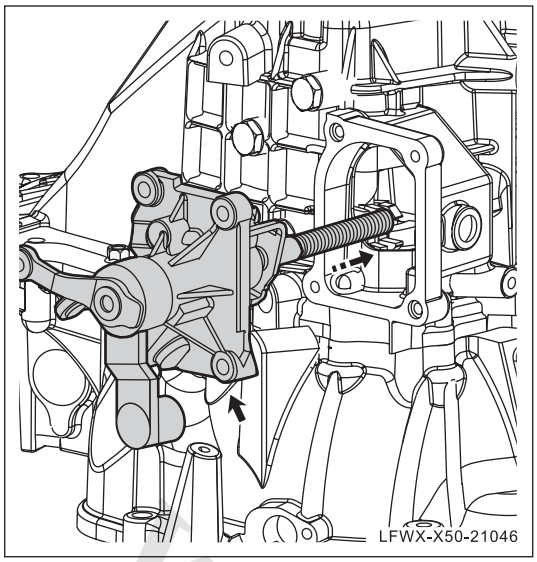
(b) Install damping bolts of 3rd and 4th fork gears.

(c) Install damping bolts of 5th fork gears.

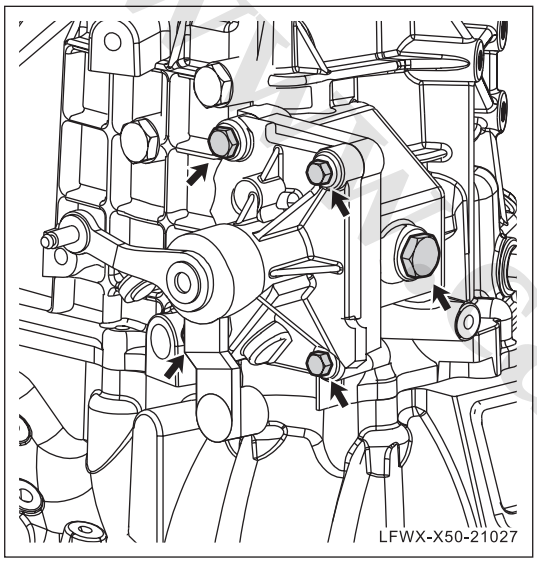
(d) Install the fixing bolt of the reverse shaft.

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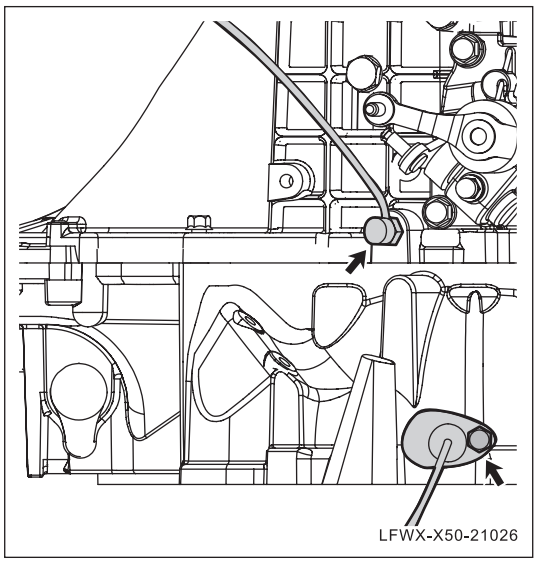
(e) Install the gear selection and shifting mechanism assembly and the return springs.



(f) Install the fixing bolts of the gear selection and shifting mechanism assembly.

Torque: 20 - 25N•m

(g) Install the transmission gear shift locating bolts.



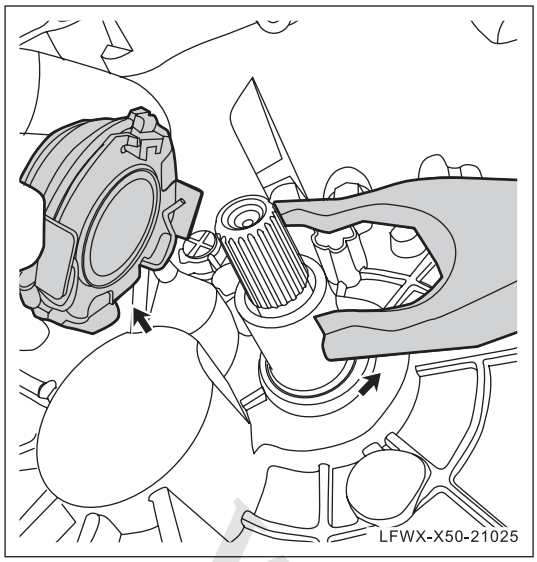
6. INSTALL THE TRANSMISSION REVERSE LIGHT SWITCH AND SENSORS

(a) Install the transmission reverse light switch assembly.

(b) Install the engine crankshaft position sensor assembly and fixing bolts.

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7. **INSTALL CLUTCH FORK AND RELEASE BEARING (SEE 23 - CLUTCH, CLUTCH RELEASE BEARING AND RELEASE FORK , REPLACEMENT)**

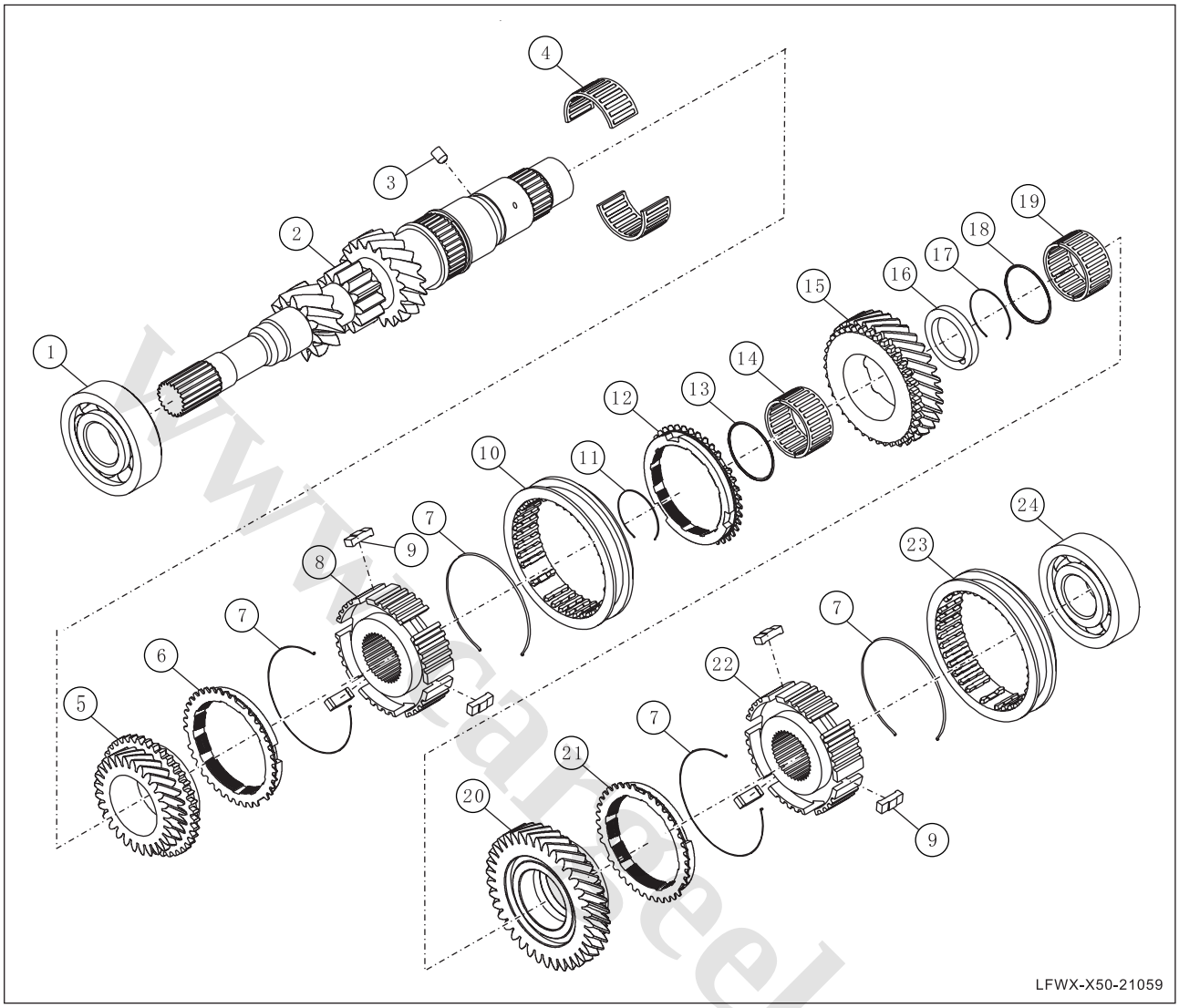
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INPUT SHAFT ASSEMBLY

COMPONENTS



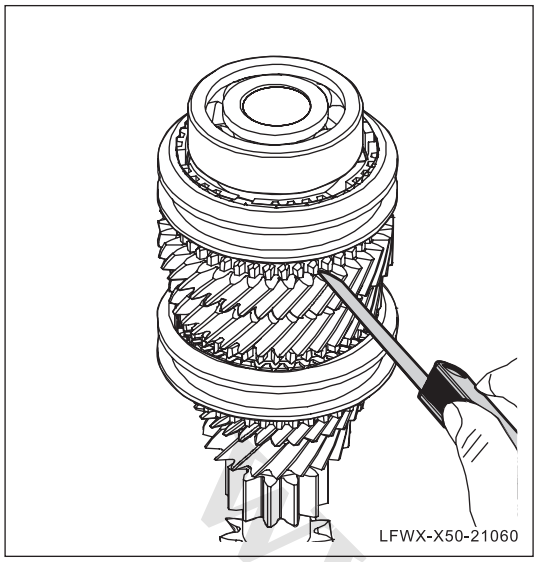
1	Input shaft bearing
2	Input shaft
3	4th-speed thrust washer interlock steel-ball
4	3rd-speed needle bearing
5	3rd-speed drive gear
6	3rd-speed synchronizer ring
7	Snap ring
8	3rd and 4th-speed synchronizer hub
9	Synchronizer slider
10	3rd and 4th-speed sliding sleeve of synchronizer
21	5th-speed synchronizer ring
22	5th-speed synchronizer hub

11	3rd and 4th-speed synchronizer snap ring
12	4th-speed synchronizer ring
13	4th-speed needle spacing ring
14	4th-speed needle bearing
15	4th-speed drive gear
16	4th-speed thrust plate
17	4th-speed thrust plate washer
18	5th-speed needle-bearing spacing ring
19	5th-speed ball bearing
20	5th-speed drive gear
23	5th-speed synchronizer sliding sleeve
24	Input shaft rear bearing

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DISMANTLING



1. PUT INPUT SHAFT ASSEMBLY UPRIGHT AND TIGHTEN IT

(a) Make the input shaft front end downward and then keep the mounting bracket upright and then fix it on the workbench.

NOTICE:

Before removal of the input shaft, always check the synchronizer ring clearance; measure clearance between the synchronizer ring and each transmission gear by a feeler gauge. Correct clearance is as follows:

1st gear: 0.522 - 2.208mm

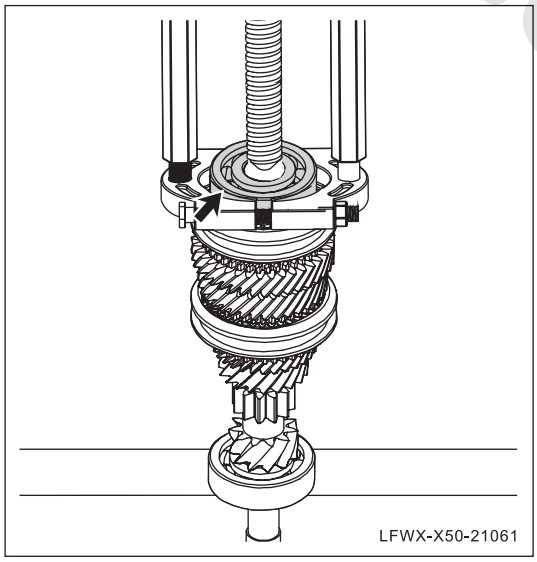
2nd gear: 0.522 - 2.208mm

3rd gear: 0.73 - 1.53mm

4th gear: 0.77 - 1.57mm

5th gear: 0.73 - 1.53mm

If clearance of one synchronizer ring is not within the corresponding parameter, you should Check if the ring is worn. Replace it when necessary.

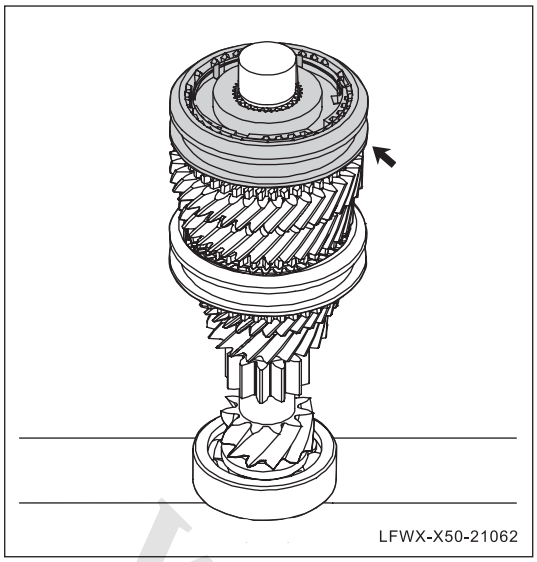


2. REMOVE INPUT SHAFT REAR BEARING

(a) Remove the input shaft rear bearing by a bearing puller.

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3. REMOVE THE 5TH-SPEED SYNCHRONIZER ASSEMBLY

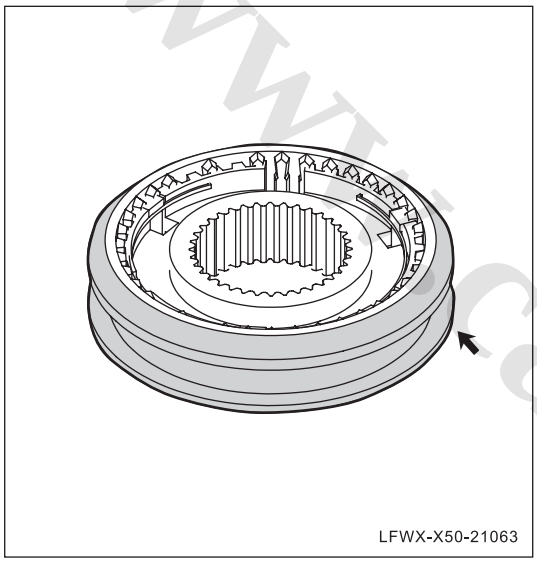
△ HINT:

You may make a mark "Upward" when removing a synchronizer for easy removal.

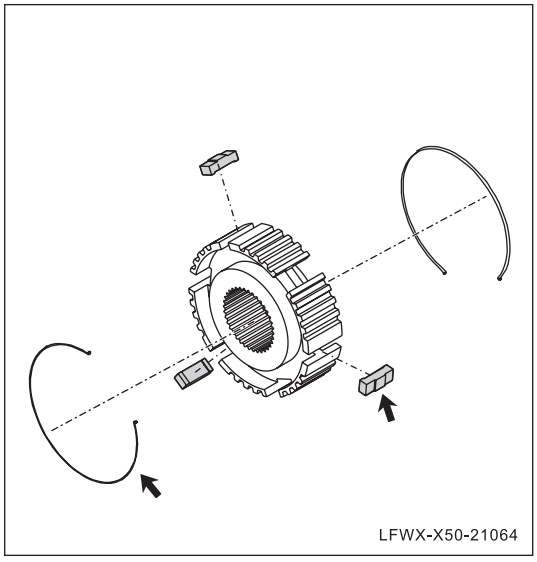
(a) Pull out the 5th-speed synchronizer completely and then remove it.

NOTICE:

In order to avoid losing the synchronizer sliding block when removing the synchronizer, you may take off the synchronizer assembly together.



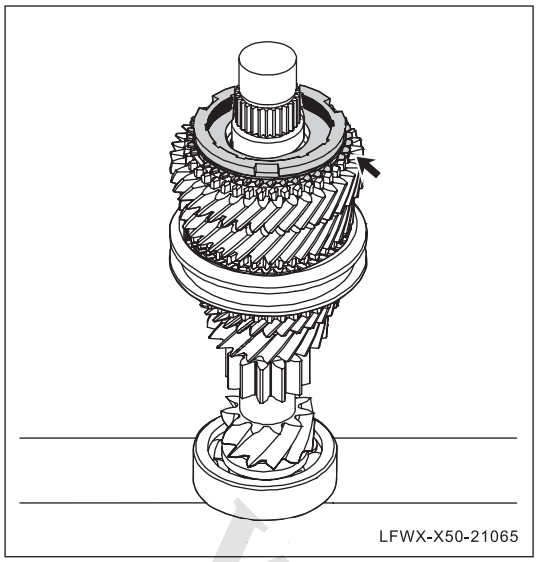
(b) Take out the sliding sleeve of 5th-speed synchronizer.



(c) Remove the 5th-speed synchronizer sliding block and the snap rings in the both sides of the synchronizer gear hub.

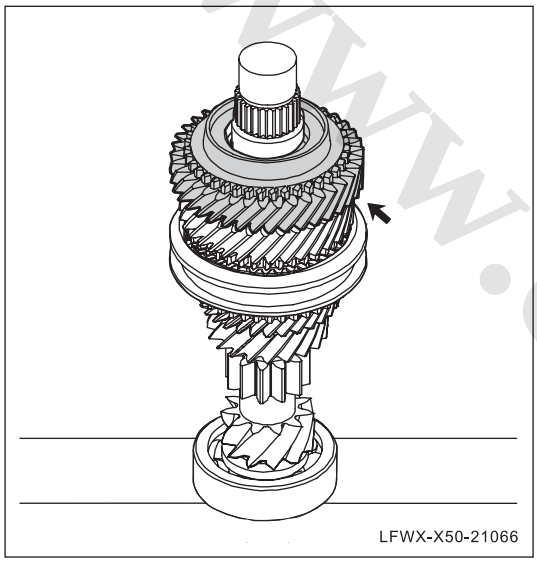
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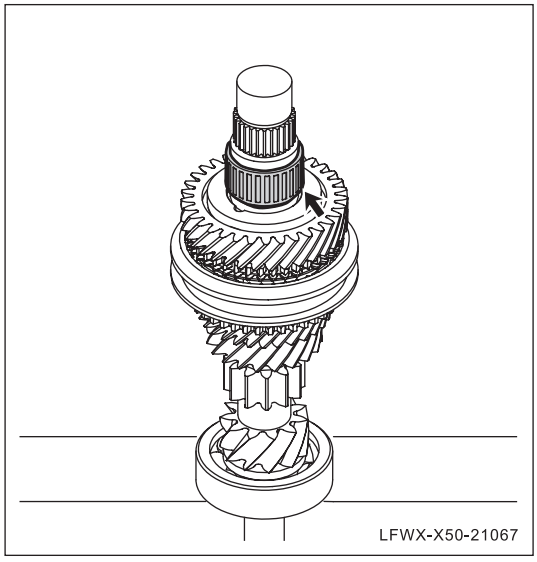


4. REMOVE THE 5TH-SPEED DRIVE GEAR ASSEMBLY

(a) Take out the 5th-speed synchronizer ring.



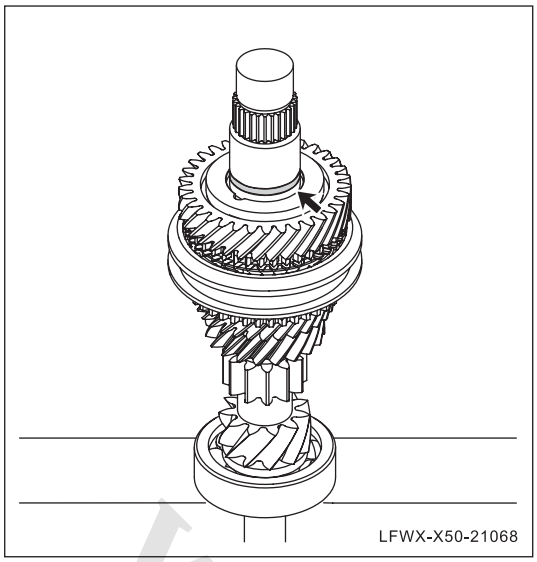
(b) Remove 5th-speed drive gear assembly.



(c) Take out the 5th-speed needle-bearing and its spacing ring.

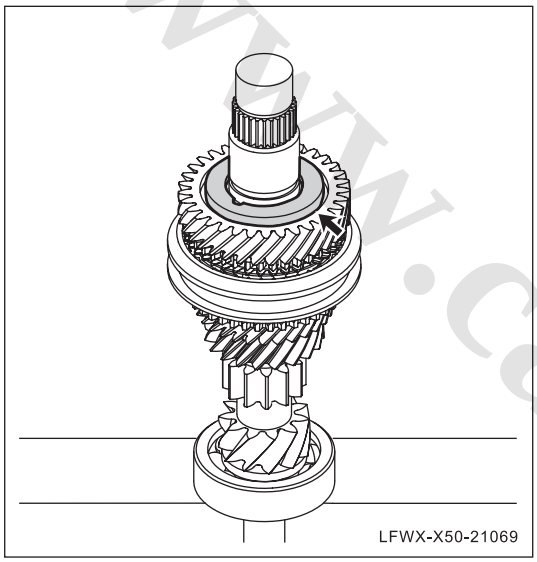
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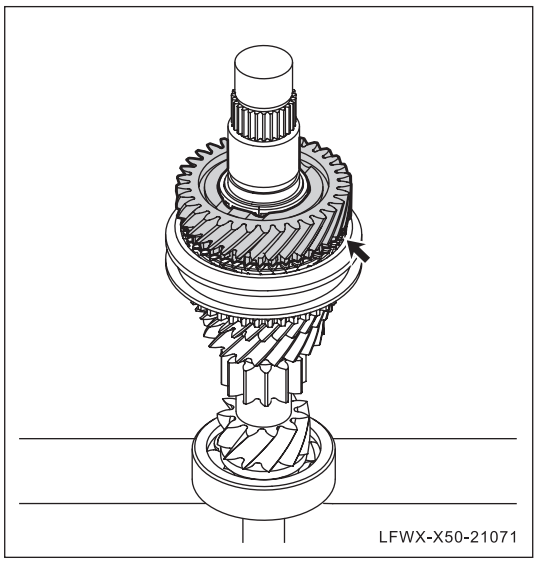


5. REMOVE 4TH-SPEED DRIVE GEAR ASSEMBLY.

(a) Remove the 4th-speed thrust plate washer.



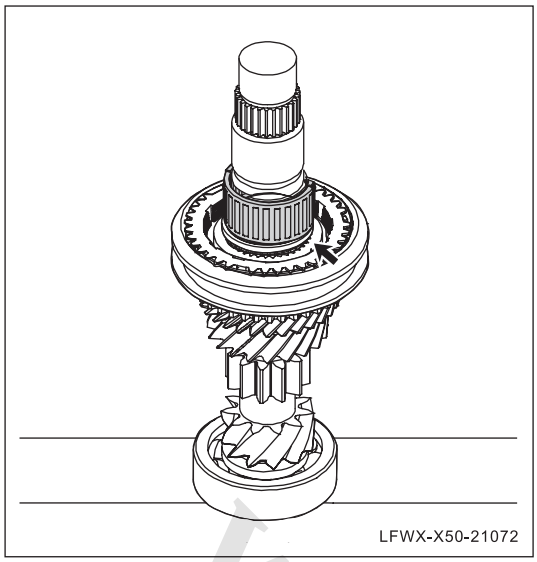
(b) Take out 4th-speed thrust plate and its interlock steel-ball.



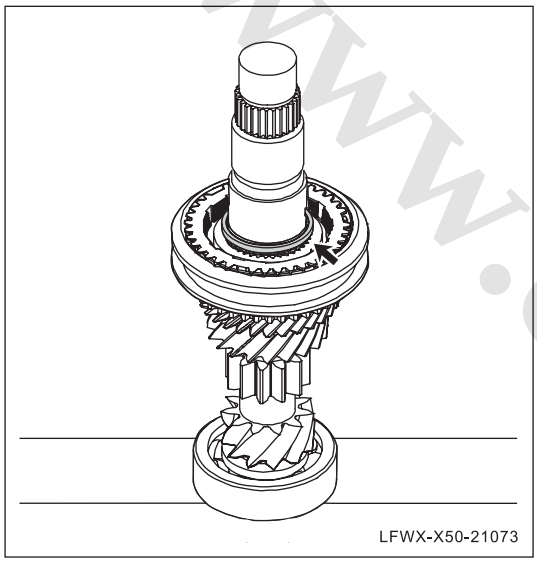
(c) Remove the 4th-speed drive gear.

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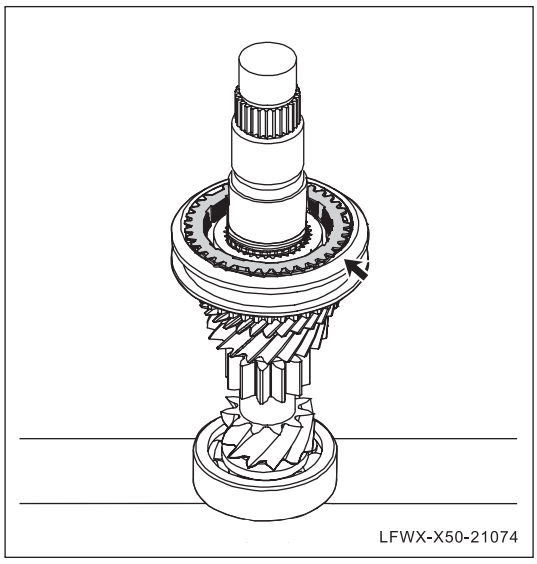
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(d) Take out the 4th-speed needle bearing.



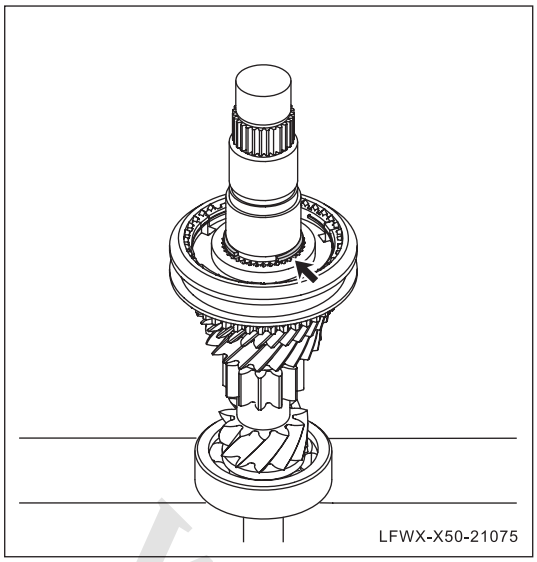
(e) Take out the 4th-speed needle spacing ring.



(f) Take out the 4th-speed synchronizer ring.

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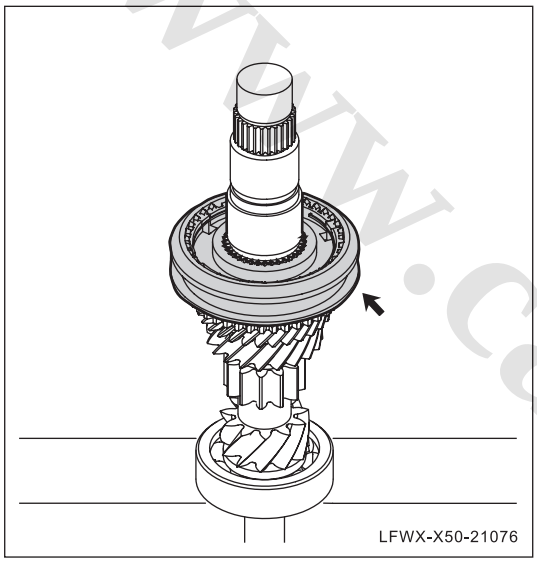


6. REMOVE THE 3RD/4TH-SPEED SYNCHRONIZER ASSEMBLY

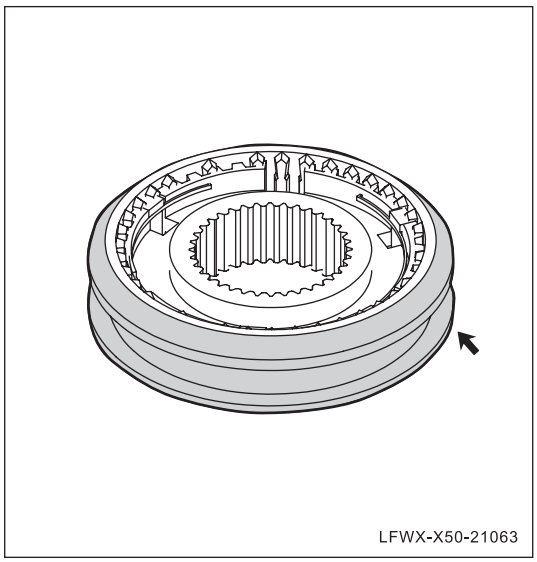
△ HINT:

You may make a mark "Upward" when removing a synchronizer for easy removal.

(a) Remove 3rd/4th-speed synchronizer snap ring.



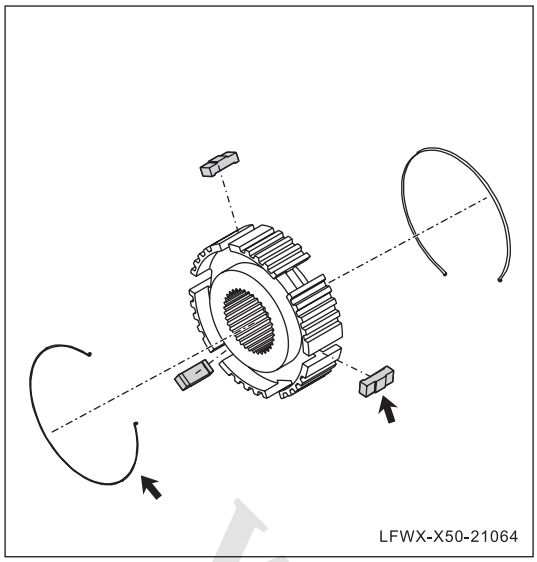
(b) Remove the 3rd/4th-speed synchronizer assembly.



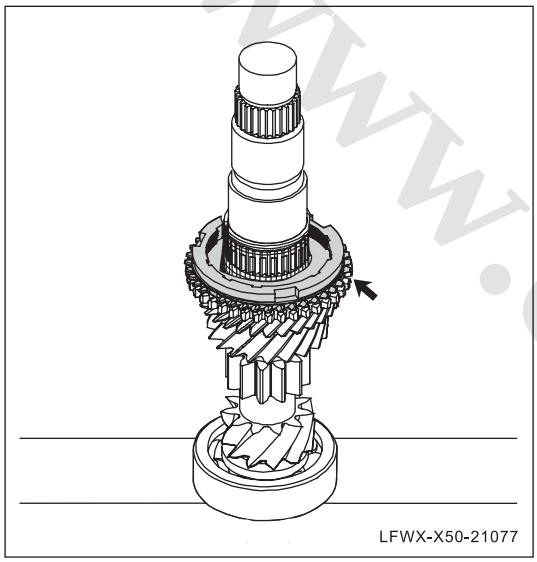
(c) Remove the 3rd/4th-speed synchronizer sliding sleeve.

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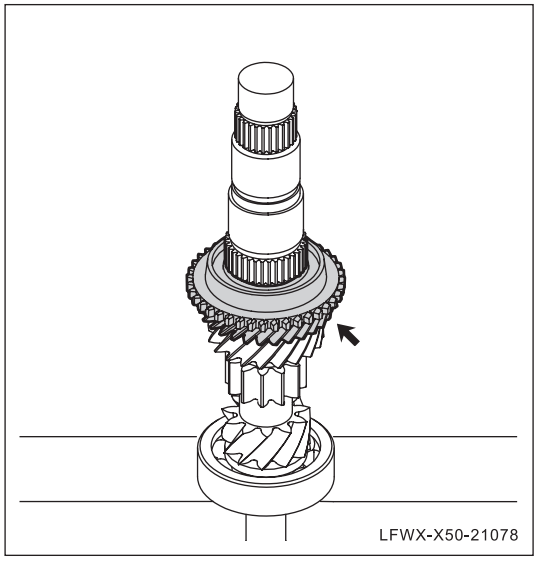
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(d) Remove the 3rd/4th-speed synchronizer sliding block and the elastic lock ring in the both sides of the synchronizer gear hub.



(e) Take out the 3rd-speed synchronizer ring.

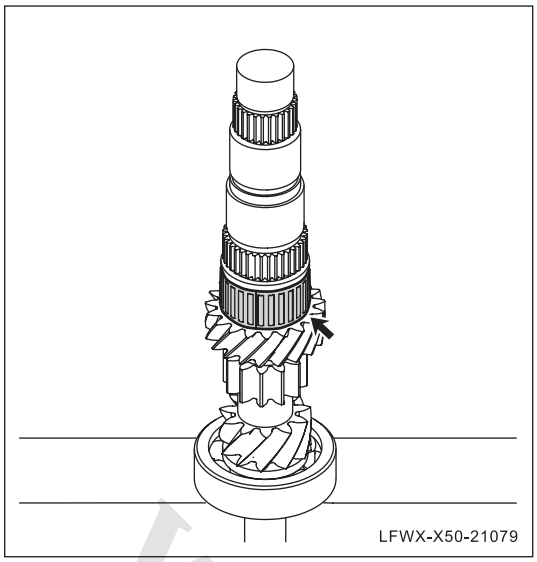


7. REMOVE THE 3RD-SPEED DRIVE GEAR ASSEMBLY

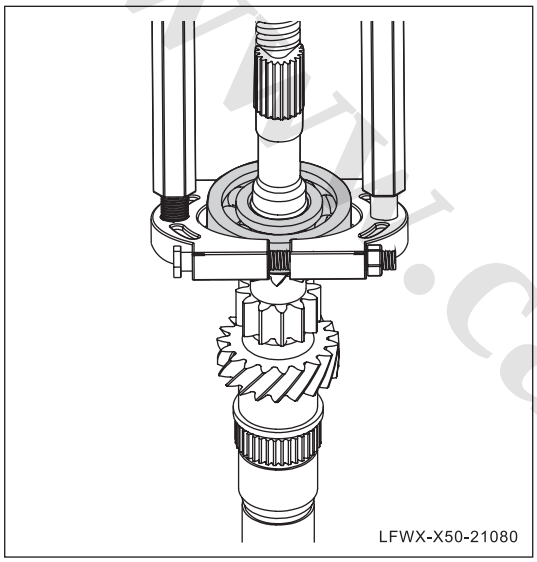
(a) Remove the 3rd-speed drive gear.

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(b) Take out the 3rd-speed needle bearing.



8. ROTATE INPUT SHAFT TO 180° AND RE-FIX IT. USE PULLER TO DISMANTLE FRONT BALL-BEARING OF INPUT SHAFT

9. CLEAN ALL PARTS

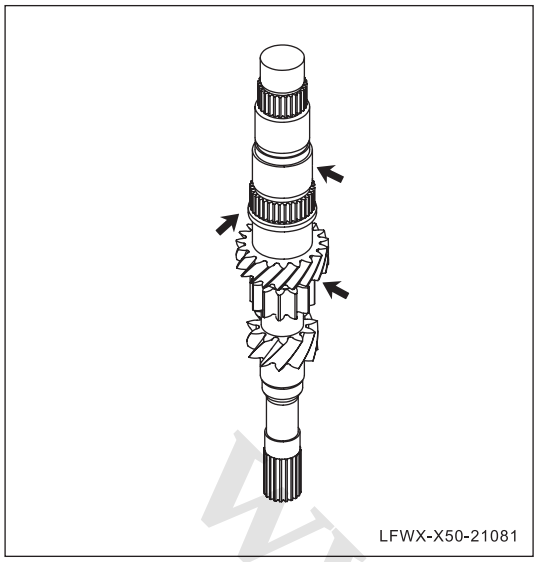
NOTICE:

Clean the gears, bearing, shafts, synchronizer and thrust pad by gear oil; dry all parts by compressed air except for bearing. Dry the bearing in the air or wipe dry with a piece of cloth.

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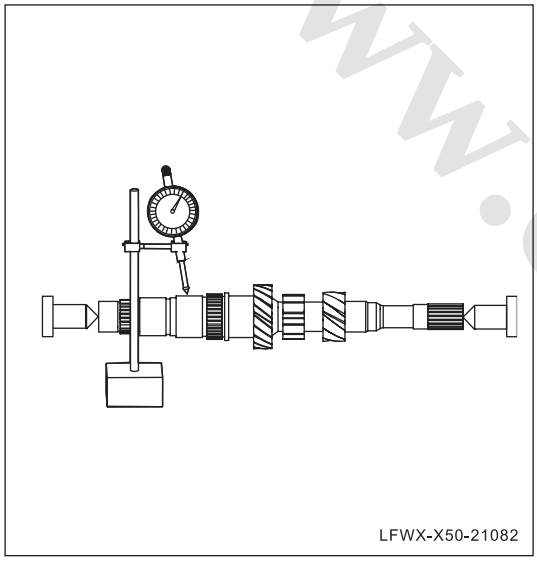
CHECK



1. CHECK INPUT SHAFT

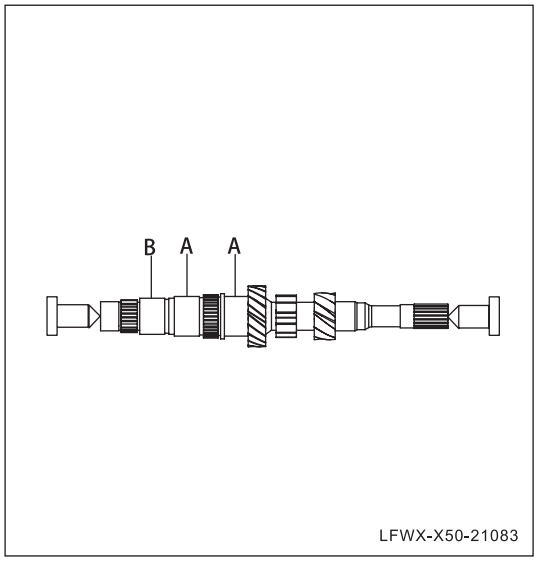
(a) Check whether input shaft has abrasion, whether bearing seat has damage, teeth of gear falls off. Replace if necessary .

(b) Check the input shaft spline for severe wear and damage. Replace the input shaft if necessary .



(c) Check input shaft radial run-out; if beyond this range, replace the input shaft.

Maximum value: 0.03mm

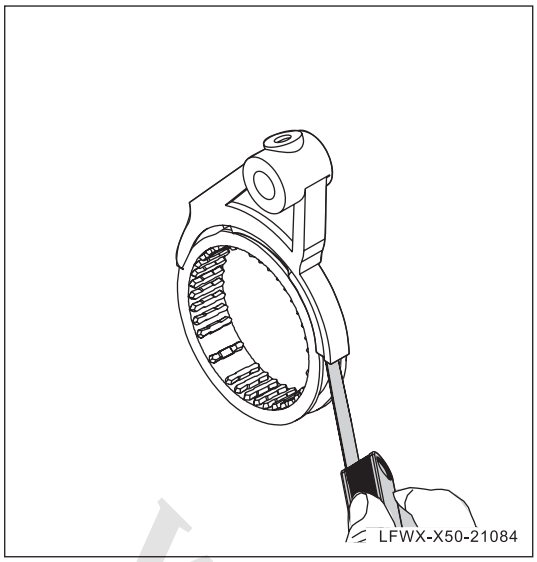


(d) Measure wear conditions of input shaft with micrometer:

Minimum diameter of surface A is 33.985mm, and that of B is 30.985mm. If it is exceeding the limit, replace the input shaft.

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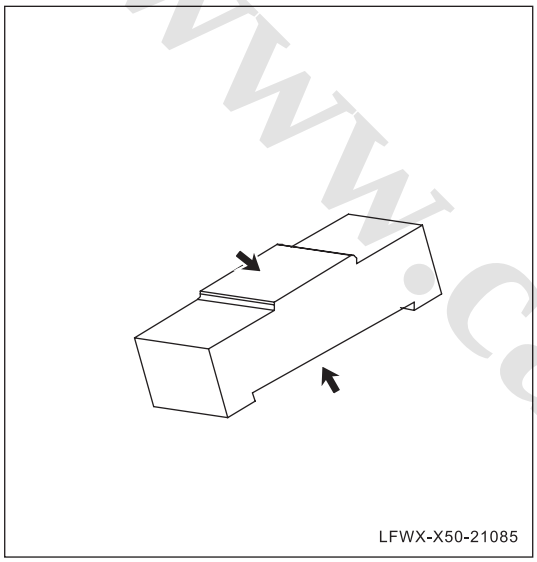
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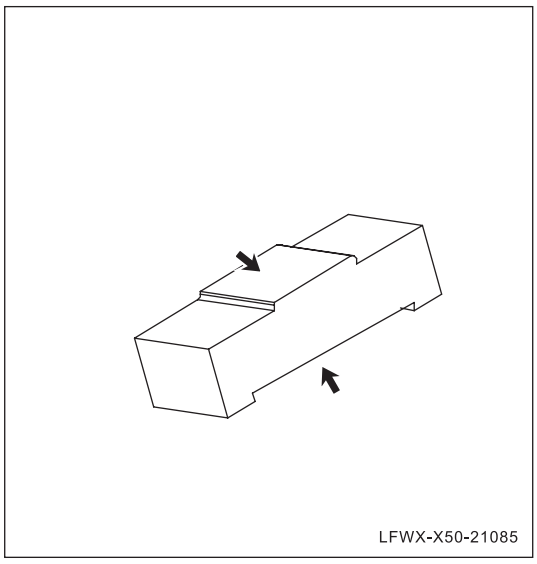
2. CHECK SYNCHRONIZER

(a) Check clearance between the gear sleeve and the gear shift fork by a feeler gauge; If beyond maximum value, replace the gear sleeve or the gear shift fork.

Maximum value: 0.35mm



(b) Check the sliding block for wear; and replace it when necessary.



(c) Assemble synchronizer sliding sleeve and gear hub, and inspect whether they are sliding smoothly without stagnation.

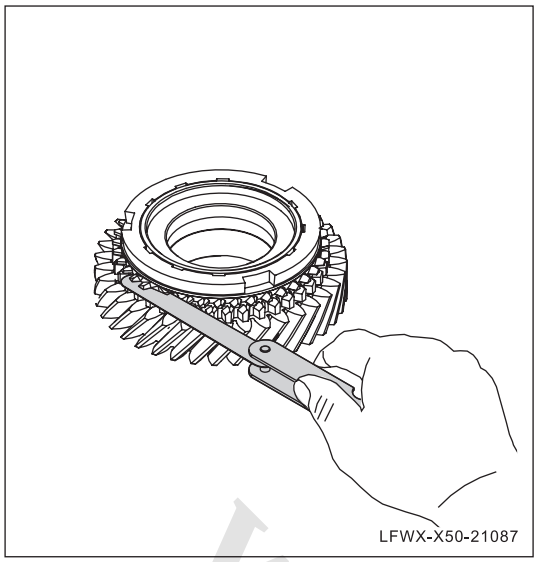
(d) Check the front and rear ends of internal surface of sliding sleeve for damage.

NOTICE:

If the synchronizing sliding sleeve or gear hub is required to be changed, both of them should be replaced.

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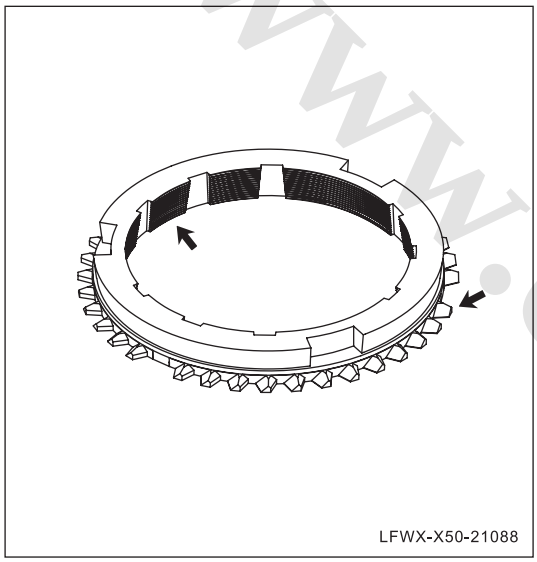
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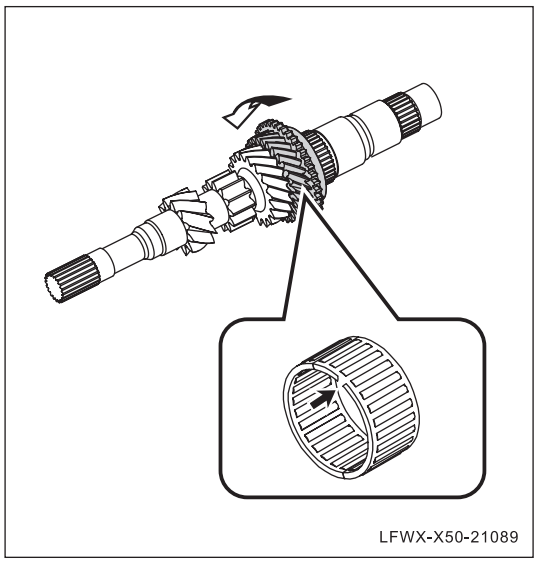
3. CHECK GEARS IN ALL SPEEDS

(a) Measure clearance between the synchronizer ring back and the gear end surface by a feeler gauge; replace the synchronizer ring if it is beyond limit value.

Minimum value 0.8mm



(b) Tooth surface of the synchronizer ring should be free of damage and other defects Internal surface of a cone should be free of damage, wear; or the thread teeth should not be broken.

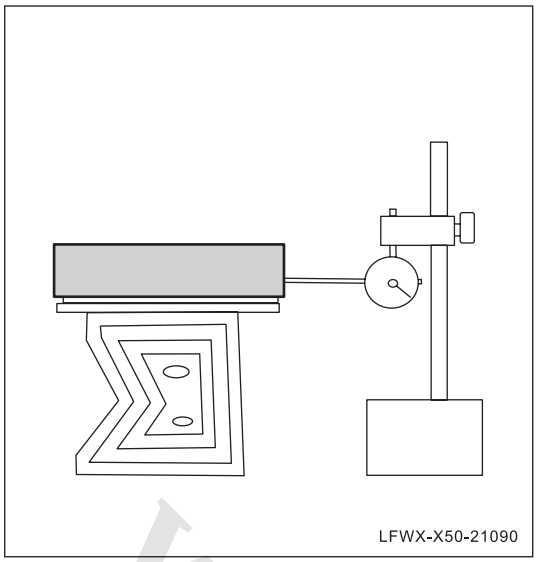


(c) Check if the needle bearings of gears in all speeds are worn or broken; Check if the needle bearing bracket is broken; replace it when necessary.

(d) When the input shaft, the sliding sleeve and the gears are rotating together, the rotation should be smooth without abnormal noise.

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4. CHECK INPUT SHAFT BEARING

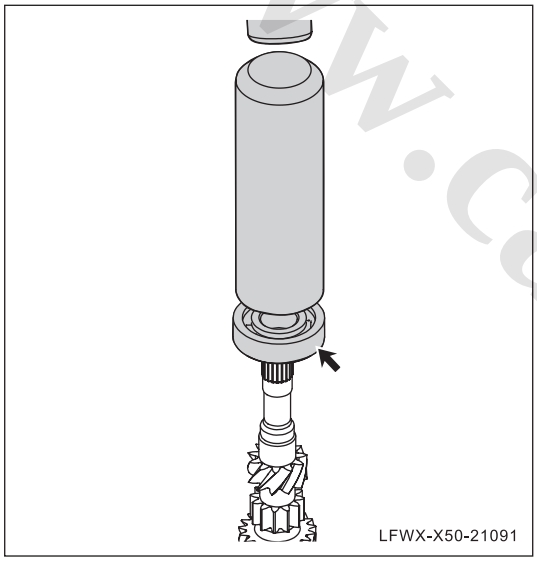
(a) Check radial run-out of the input shaft bearing.

Standard value: 0.01 - 0.21mm

(b) Check radial run-out of the input shaft rear bearing.

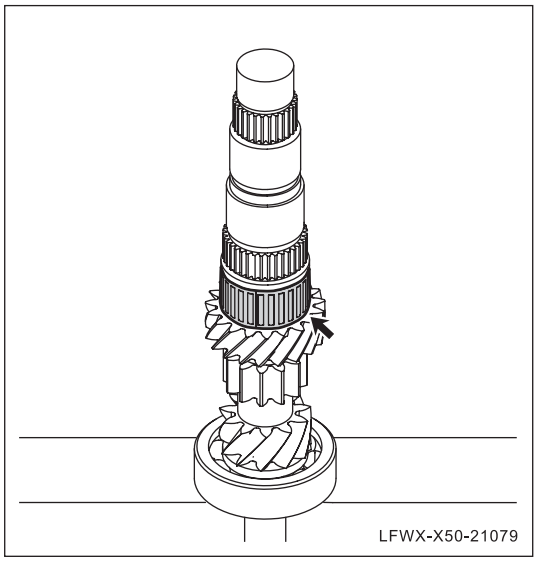
Standard value: 0.01 - 0.21mm

ASSEMBLING



1. INSTALL INPUT SHAFT BEARING

(a) Install the input shaft bearing to the correct position by a special bearing punch sleeve.



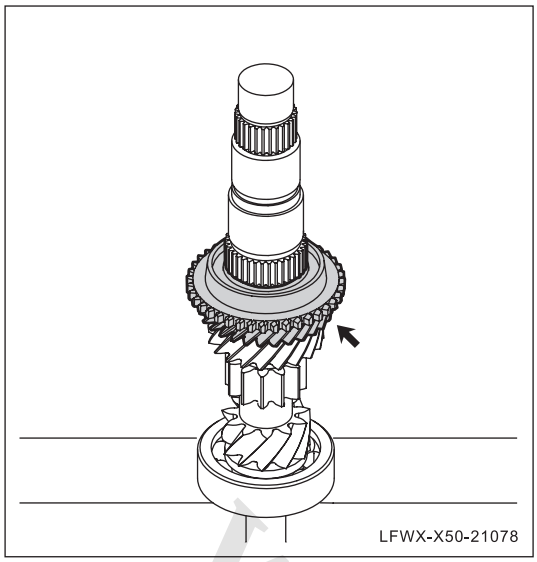
2. TURN INPUT SHAFT FOR 180° AND THEN FIX IT ON THE WORKBENCH

3. INSTALL THE 3RD-SPEED DRIVE GEAR ASSEMBLY

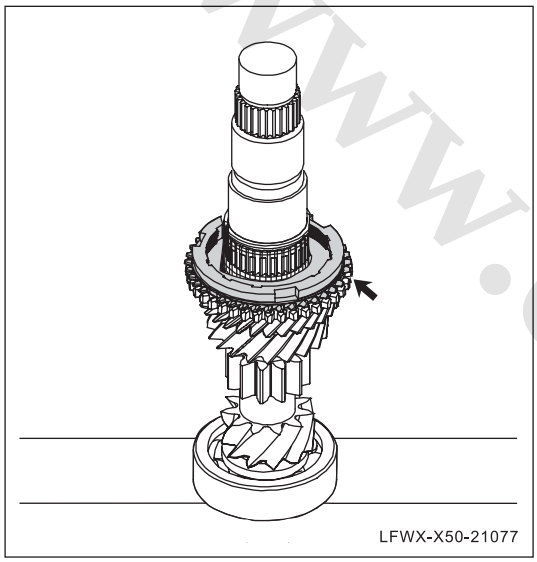
(a) Install the 3rd-speed needle bearing.

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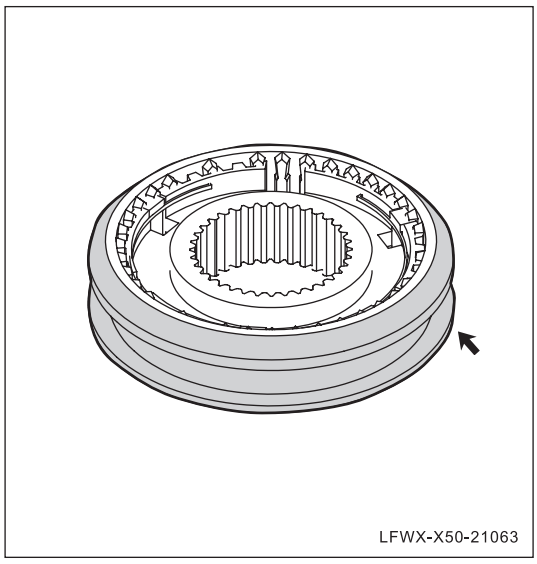
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(b) Install the 3rd-speed drive gear.



(c) Install the 3rd-speed synchronizer ring.



4. INSTALL THE 3RD/4TH-SPEED SYNCHRONIZER ASSEMBLY

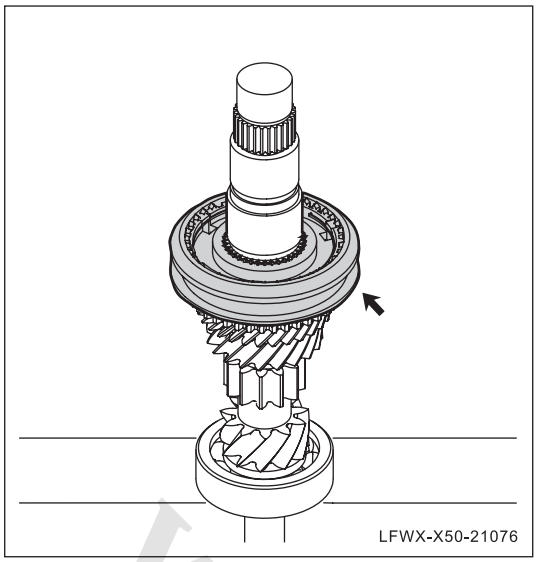
(a) Make the 3rd/4th-speed synchronizer gear hub onto the synchronizer sliding sleeve; mount the sliding blocks in three notches of the synchronizer gear hub; fix both sides with springs.

NOTICE:

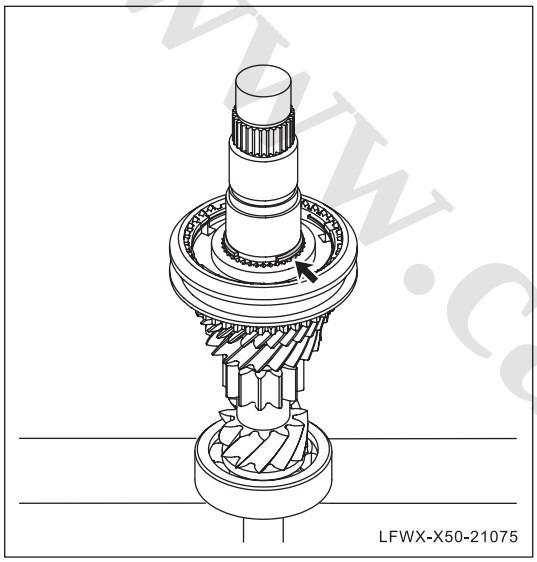
Pay attention to direction (upward) of sliding sleeve in installation.

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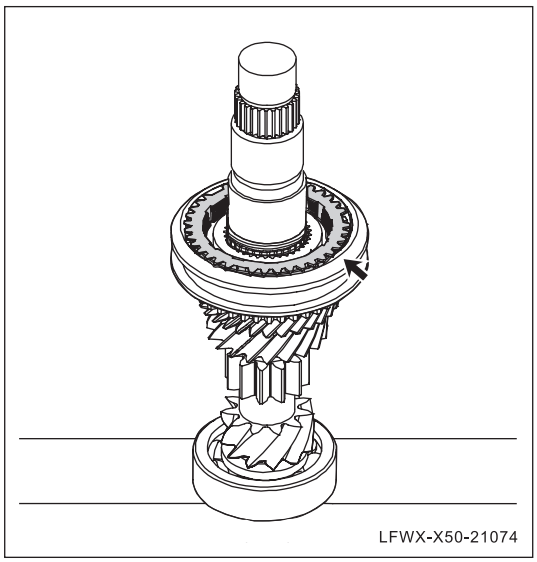
(b) According to "Upward" mark made during removal, mount the synchronizer gear hub onto the input shaft and then press it tightly.



(c) Install the 3rd/4th-speed synchronizer retainer ring.

NOTICE:

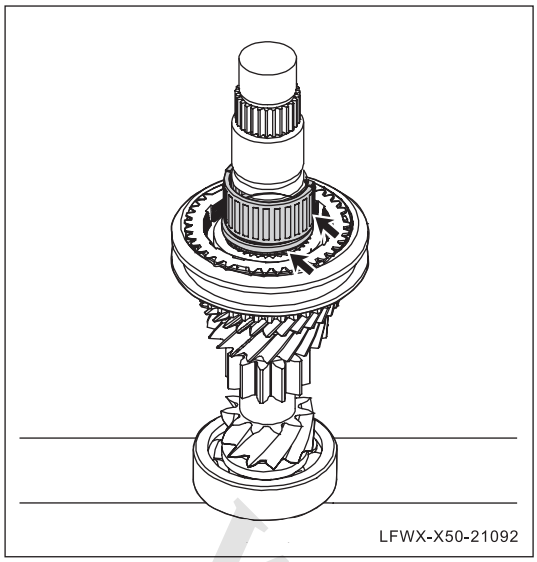
When using retainer ring of input shaft, note to choose the proper specification, and the clearance between the retainer ring and slot side should not exceeds 0.07mm.



(d) Install the 4th-speed synchronizer ring.

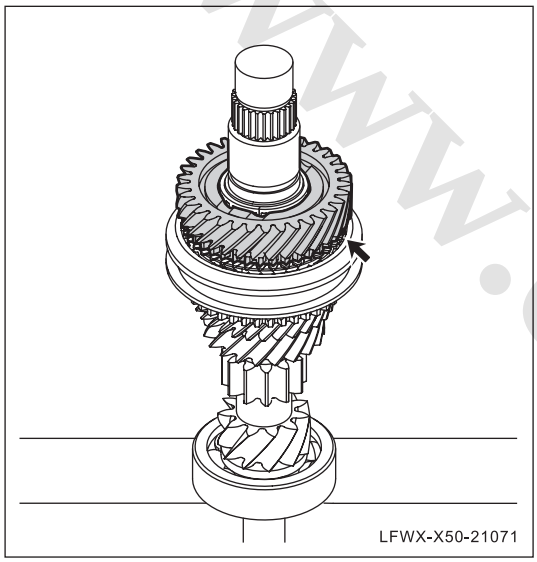
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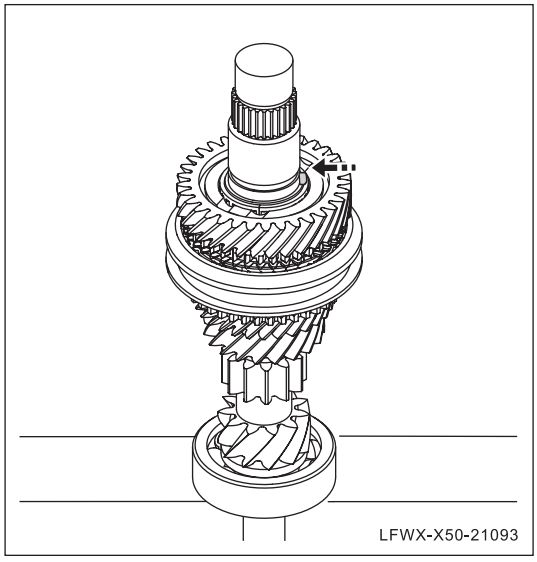


5. INSTALL THE 3RD-SPEED DRIVE GEAR ASSEMBLY

(a) Install the 4th-speed needle bearing and needle-bearing.



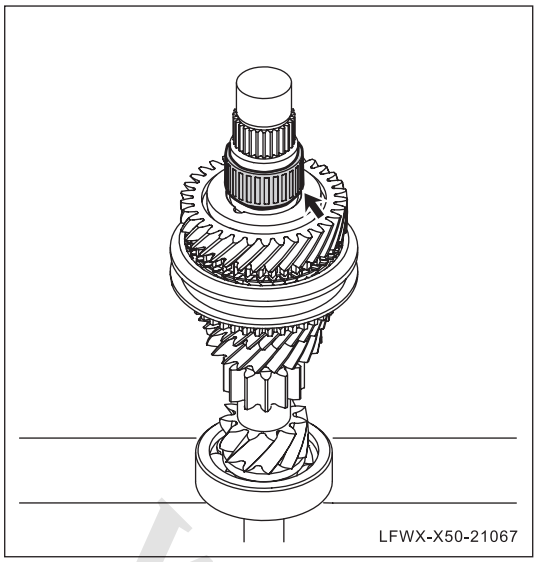
(b) Install the 4th-speed drive gear.



(c) Install the 4th-speed thrust plate and its interlock steel-ball onto input shaft.

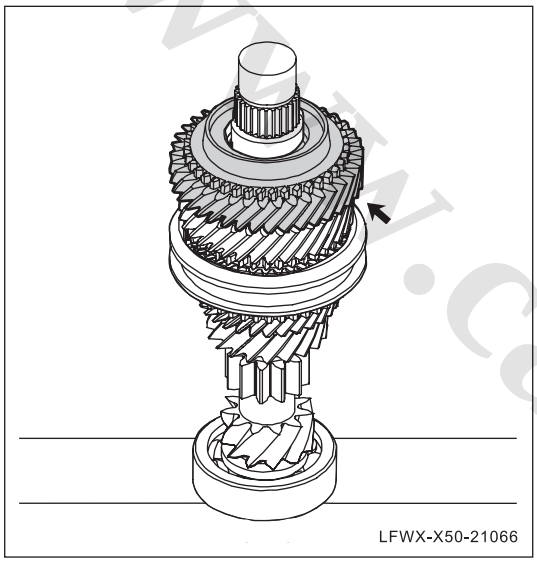
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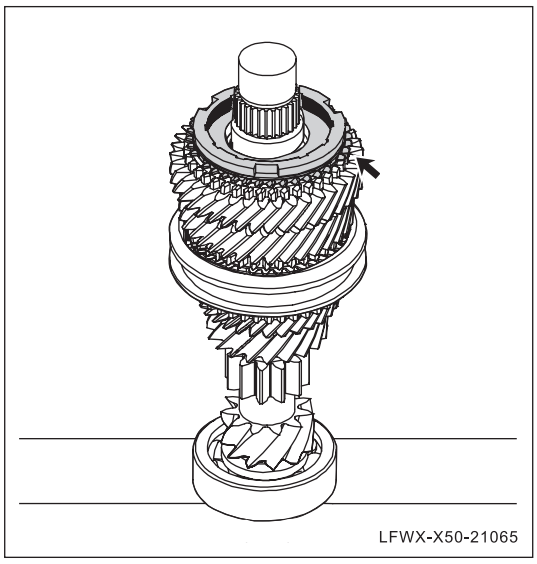


6. INSTALL THE 5TH-SPEED DRIVE GEAR ASSEMBLY

(a) Install the 5th-speed needle bearing and spacing ring.



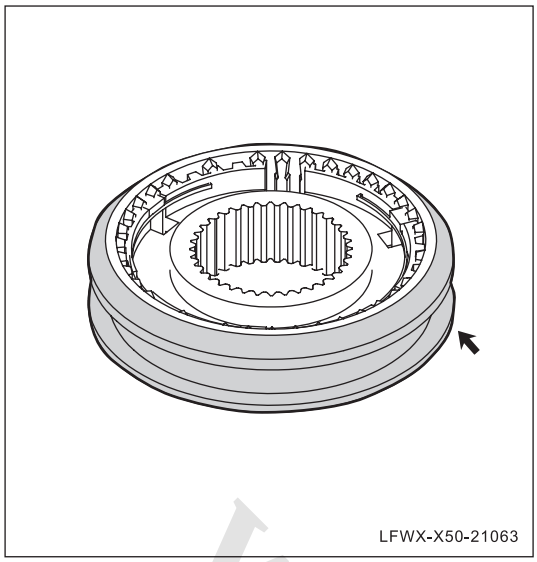
(b) Install the 5th-speed drive gear assembly.



(c) Install the 5th-speed synchronizer ring.

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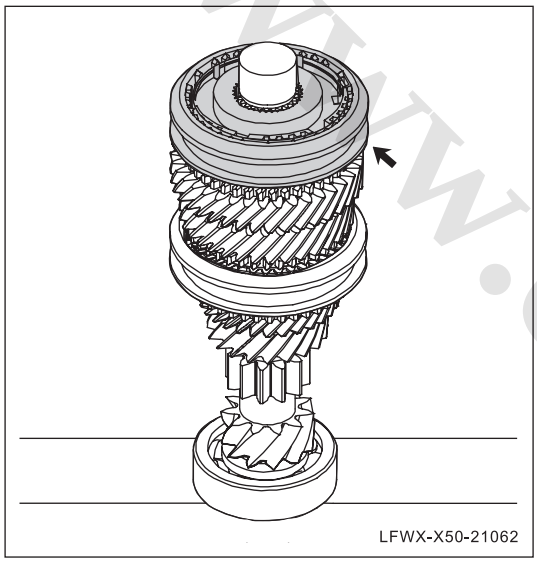

LFWX-X50-21063

7. INSTALL THE 5TH-SPEED SYNCHRONIZER ASSEMBLY

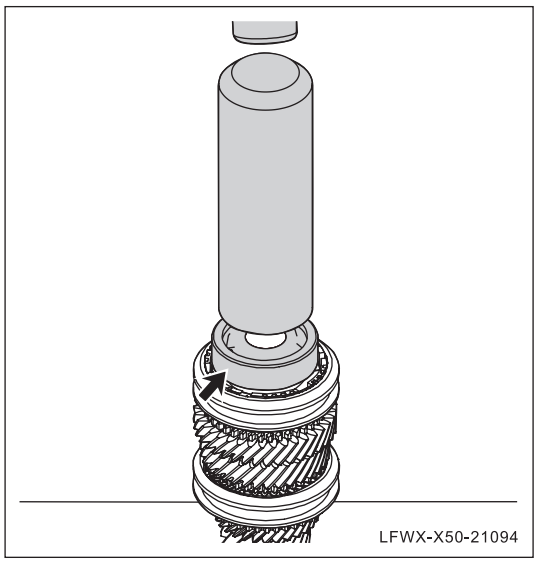
(a) Make the 5th-speed gear hub onto the synchronizer sliding sleeve; mount the sliding blocks in three notches of the synchronizer gear hub; fix both sides with springs.

NOTICE:

Pay attention to direction (upward) of sliding sleeve in installation.


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(b) According to "Upward" mark made during removal, mount the synchronizer gear hub onto the input shaft and then press it tightly.


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8. INSTALL INPUT SHAFT REAR BEARING

(a) Install the input shaft rear bearing to the correct position by a special bearing punch sleeve.

9. CHECK INSTALLATION OF THE INPUT SHAFT; MOUNT IT AGAIN UNTIL THE STANDARD REQUIREMENTS ARE SATISFIED

(a) Check clearance between gears.

(b) Check if the synchronizer may slide normally without seizure.

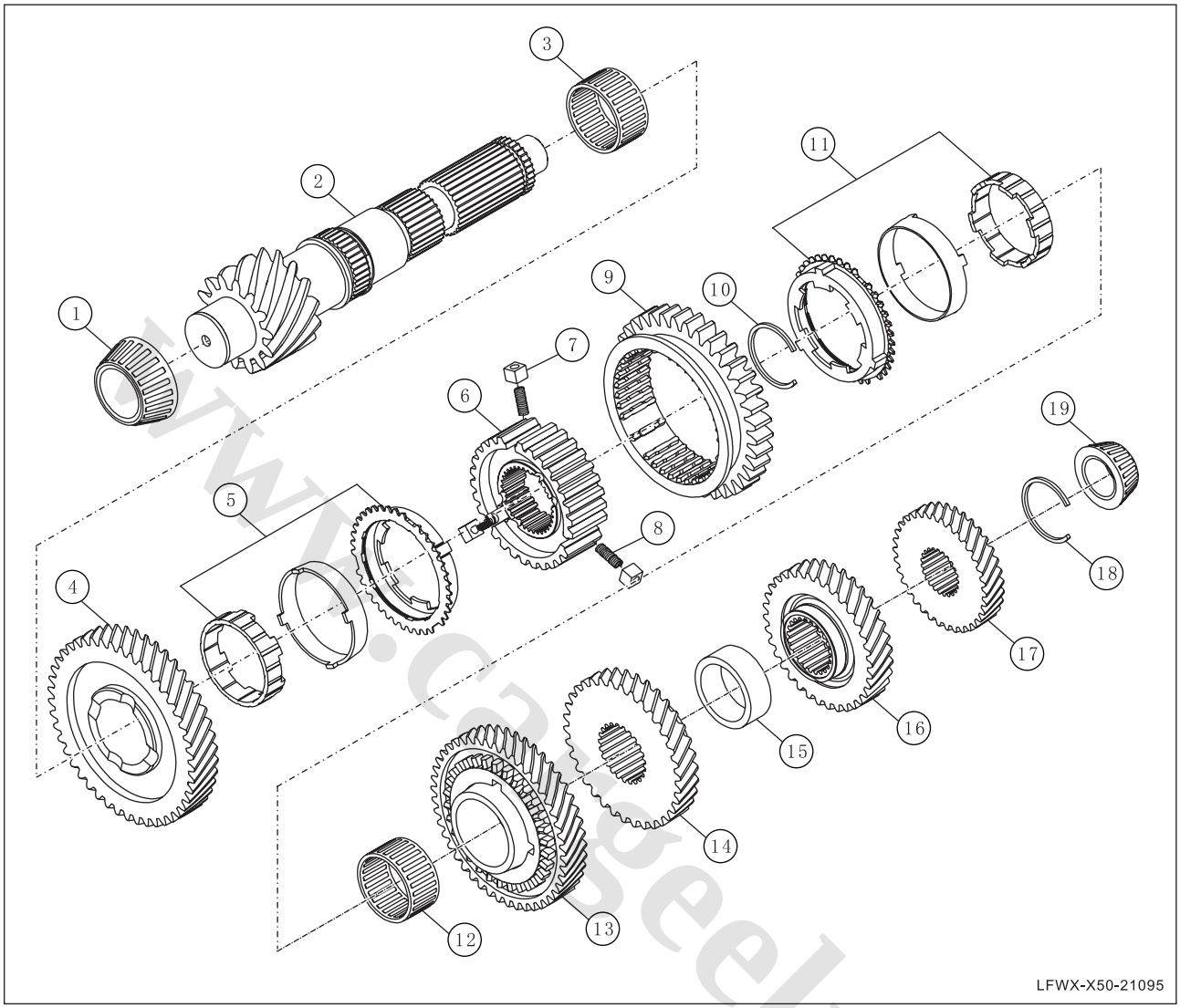
(c) Rotate gears they should be free of abnormal sound.

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OUTPUT SHAFT ASSEMBLY

COMPONENTS



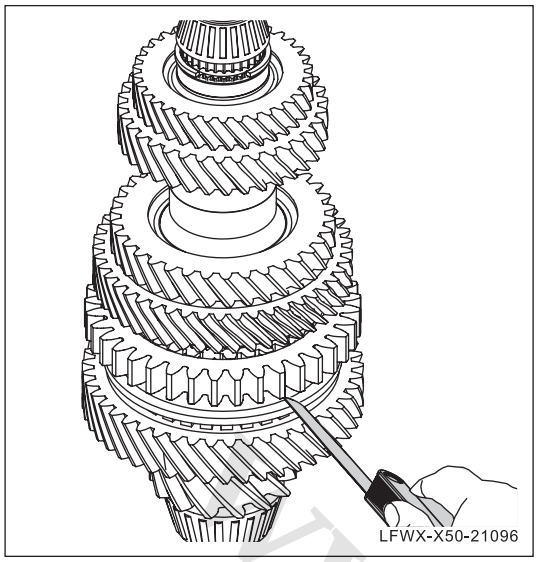
1	Output shaft front bearing
2	Output shaft
3	1st-speed needle bearing
4	1st-speed driven gear set
5	1st-speed synchronizer ring assembly
6	First/second speed synchronizer gear hub
7	Steel ball
8	Spring
9	Engagement sleeve
10	1st & 2nd-speed synchronizer retainer ring

11	2nd-speed synchronizer ring assembly
12	2nd-speed needle bearing
13	2nd-speed driven gear set
14	3rd-speed driven gear
15	3rd & 4th-speed spacing sleeve
16	4th-speed driven gear
17	5th-speed driven gear
18	4th-gear gear retainer ring
19	Output shaft rear bearing

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DISMANTLING



1. PLACE OUTPUT SHAFT ASSEMBLY UPRIGHT AND SECURELY

(a) Make the output shaft front end downward and then keep the mounting bracket upright and then fix it on the workbench.

NOTICE:

Before removal of the output shaft, always check the synchronizer ring clearance; measure clearance between the synchronizer ring and each transmission gear by a feeler gauge.

Correct clearance is as follows:

1st gear: 0.522 - 2.208 mm

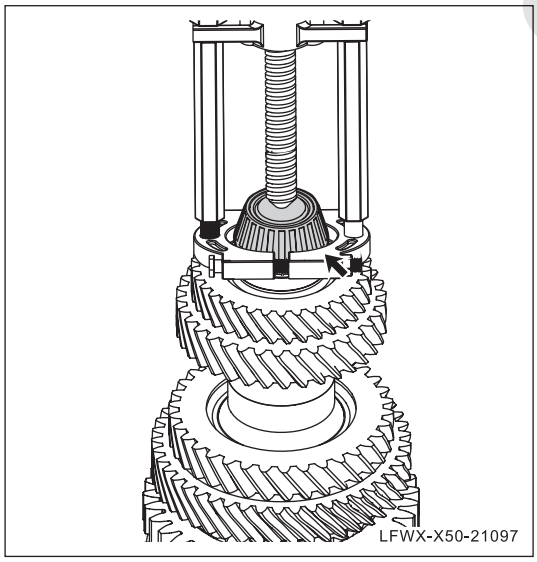
2nd gear: 0.522 - 2.208 mm

3rd gear: 0.73 - 1.53 mm

4th gear: 0.77 - 1.57 mm

5th gear: 0.73 - 1.53 mm

If the clearance of some synchronizer ring doesn't conform to the parameter, it is necessary to inspect whether it has abrasion, and replace it.



2. REMOVE OUTPUT SHAFT REAR BEARING

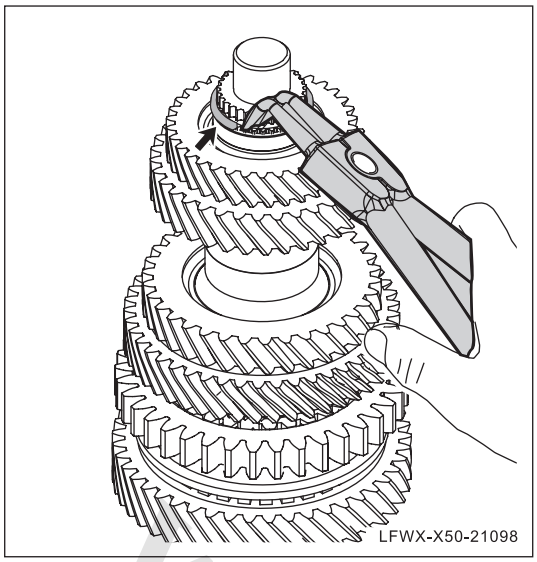
(a) Install the output shaft rear bearing by a bearing puller.

NOTICE:

The bearing puller should be installed on the rear bearing roller when removing the tapered bearing.

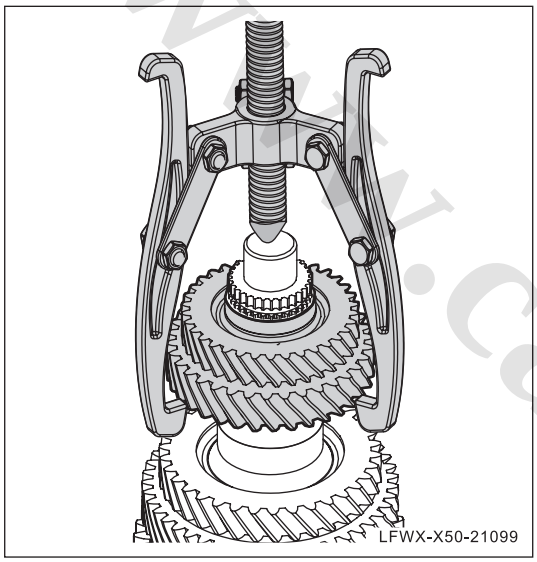
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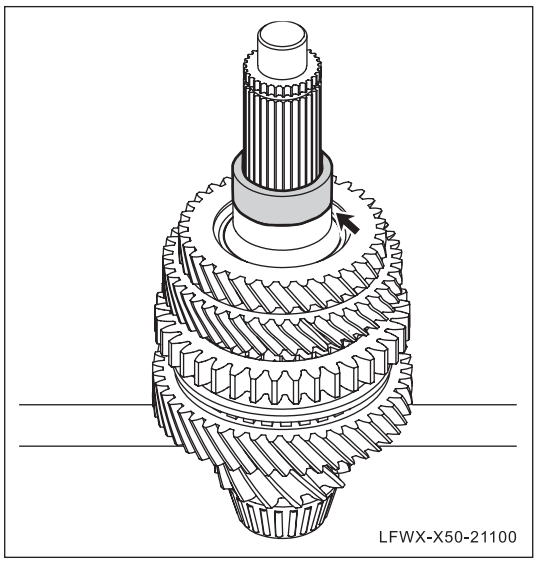


3. REMOVE THE 5TH-SPEED DRIVEN GEAR AND THE 4TH-SPEED DRIVEN GEAR

(a) Remove the 5th-speed gear retainer ring with snap-ring plier.



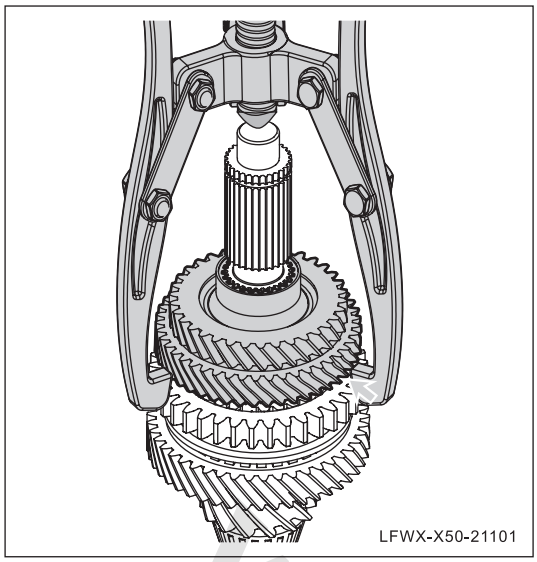
(b) Install the puller, and then pull out the 5th-speed driven gear and the 4th-speed driven gear together at the same time.



(c) Take out the 3rd/4th-speed spacing sleeve.

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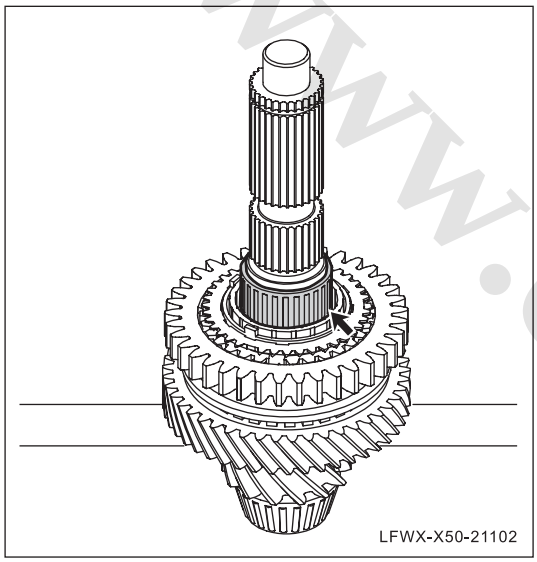
4. REMOVE THE 3RD-SPEED DRIVEN GEAR AND THE 2ND-SPEED DRIVEN GEAR ASSEMBLY

(a) Pull out the 3rd-speed driven gear and the 2nd-speed driven gear assembly together at the same time by a puller.

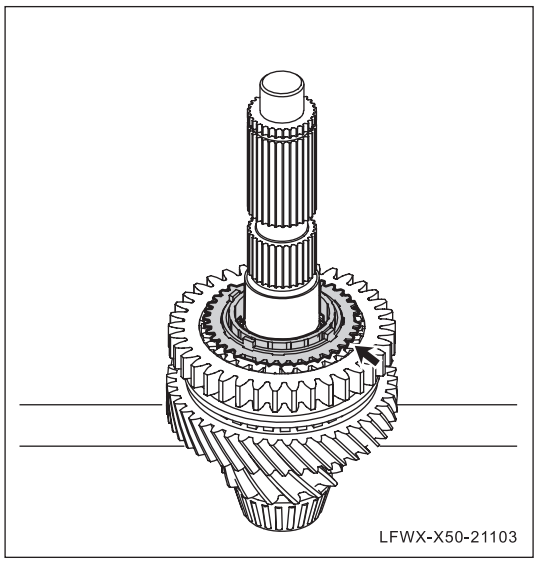
△ HINT:

When mounting the puller, set the 1st/2nd-speed synchronizer gear sleeve to the 1st-speed position for easy installation.

(b) Remove the 3rd-speed driven gear and the 2nd-speed driven gear assembly.



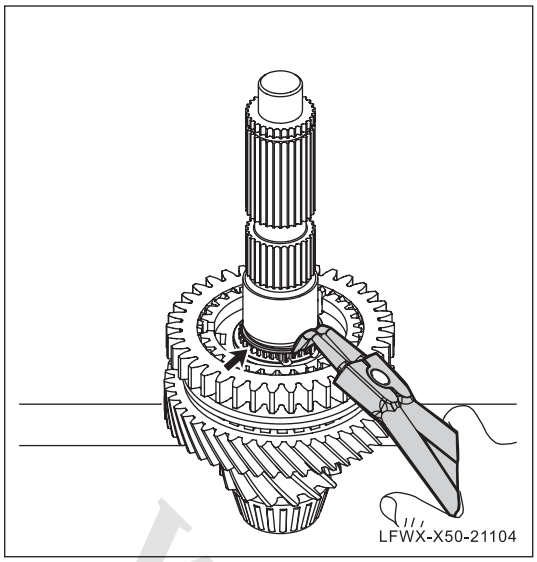
(c) Remove the 2nd-speed needle bearing.



(d) Take out the 2nd-speed synchronizer ring assembly.

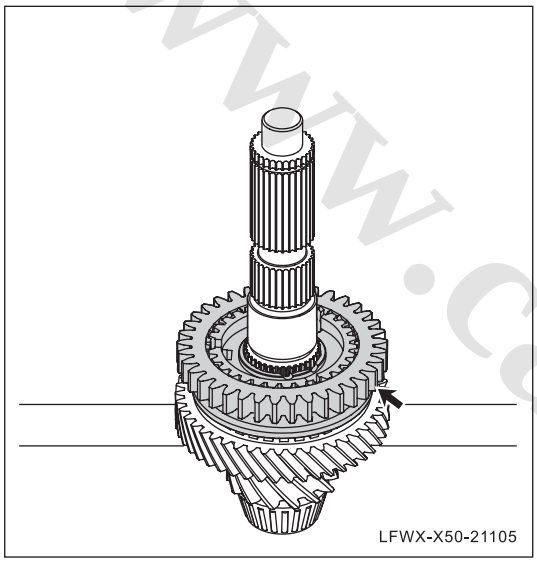
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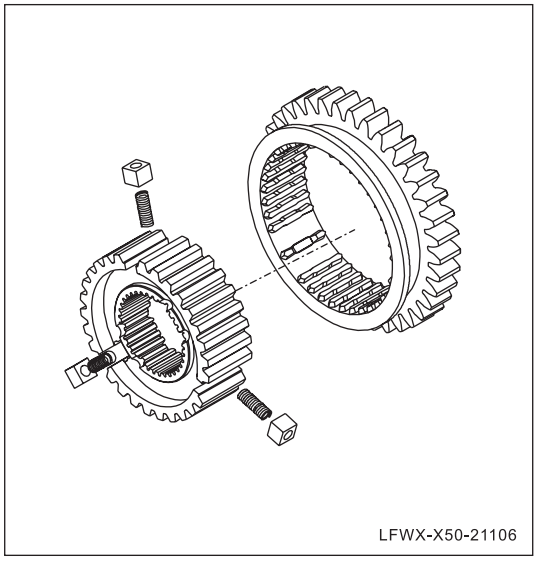


5. REMOVE THE 1ST/2ND-SPEED SYNCHRONIZER ASSEMBLY

(a) Remove the 1st/2nd-speed synchronizer retainer ring with circlip plier



(b) Make a mark "Upward" on the synchronizer assembly; remove the 1st/2nd-speed synchronizer assemblies together.



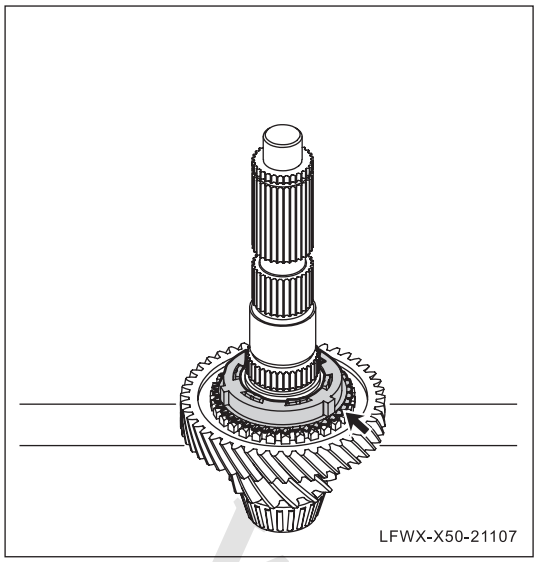
(c) Put the synchronizer onto the clean cloth and wrap it. Press the internal gear hub; carefully open the cloth and remove the spring, steel ball, gear hub and shift sleeve.

NOTICE:

Do not put the circlip onto the gear oil for cleaning as friction materials will be contaminated in doing so. Place the synchronizer parts onto the proper bracket; clean them by solution and then dry them.

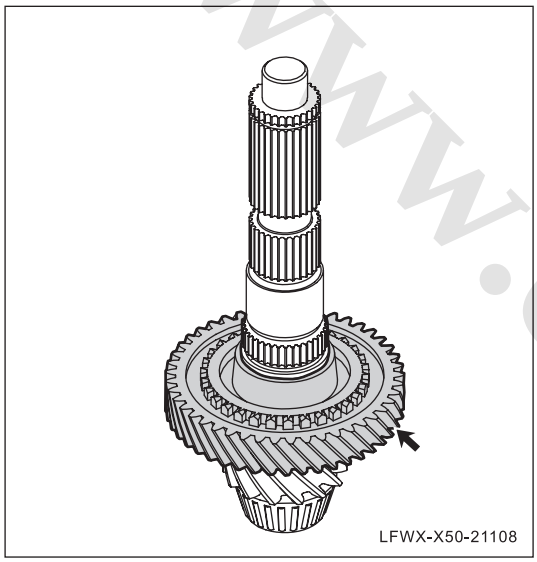
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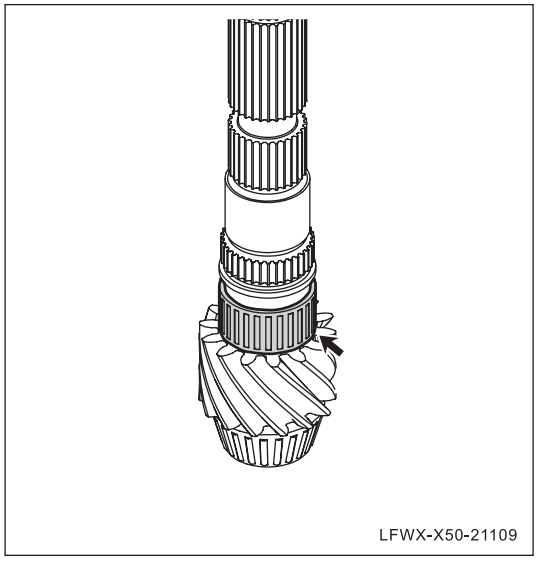


6. REMOVE THE 1ST-SPEED DRIVEN GEAR ASSEMBLY

(a) Remove the 1st-speed synchronizer ring assembly.



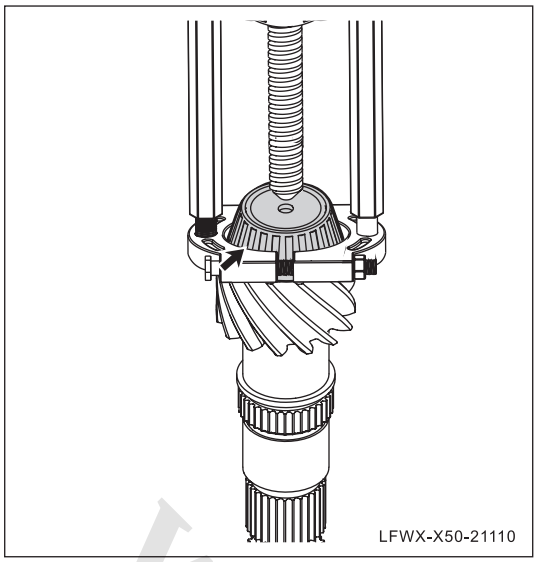
(b) Take out the1st-speed driven gear set.



(c) Take out the 1st-speed needle bearing.

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7. REMOVE OUTPUT SHAFT FRONT BEARING

(a) Rotate output shaft to 180°, and install bearing puller to dismantle front ball-bearing of output shaft.

NOTICE:

When removing the output shaft front bearing, the bearing puller should be mounted on the front bearing roller when removing the tapered bearing.

8. CLEAN ALL PARTS.

NOTICE:

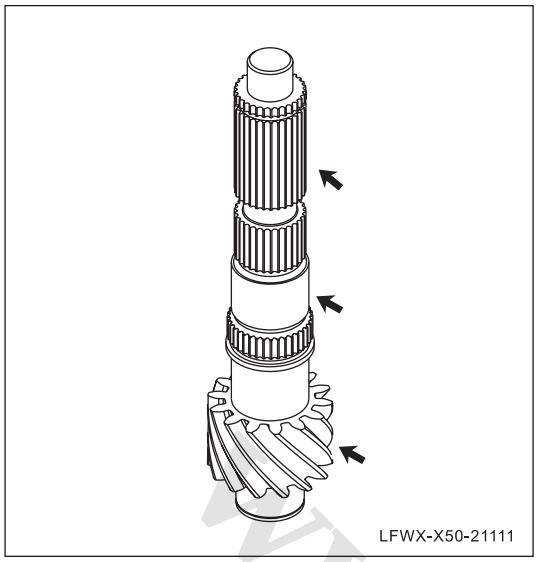
Clean the gears, bearings, shafts and synchronizer by gear oil; dry all parts by compressed air except for bearing. Dry the bearing in the air or wipe dry with a piece of cloth.

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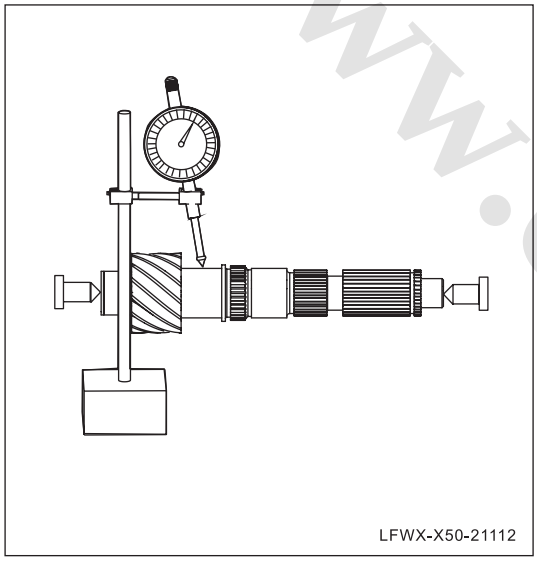
CHECK



1. CHECK OUTPUT SHAFT

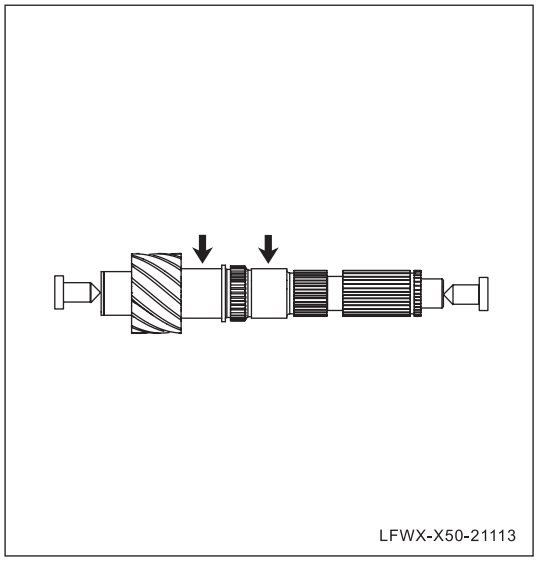
(a) Check the output shaft for wear, and the bearings for damages, and the gear pinions for peeling. Replace it as required.

(b) Check the output shaft spline for severe wear and damage. If necessary, replace the output shaft.



(c) Check output shaft radial run-out; if beyond this range, replace the output shaft.

Maximum value: 0.03mm

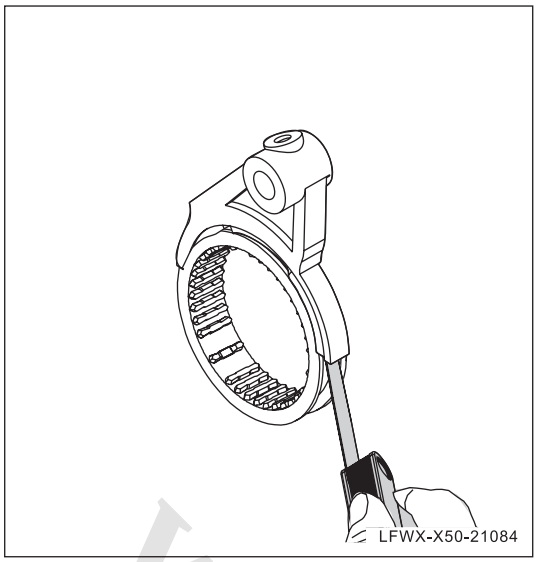


(d) Check wear degree of the output shaft by a micrometer; if beyond this range, replace the output shaft.

Minimum value: 30.985mm

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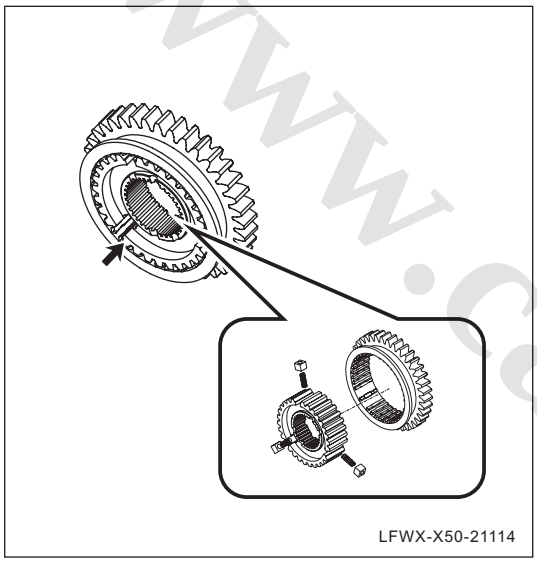
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2. CHECK SYNCHRONIZER

(a) Check clearance between the gear sleeve and the gear shift fork by a feeler gauge; If beyond maximum value, replace the gear sleeve or the gear shift fork.

Maximum value: 0.35mm



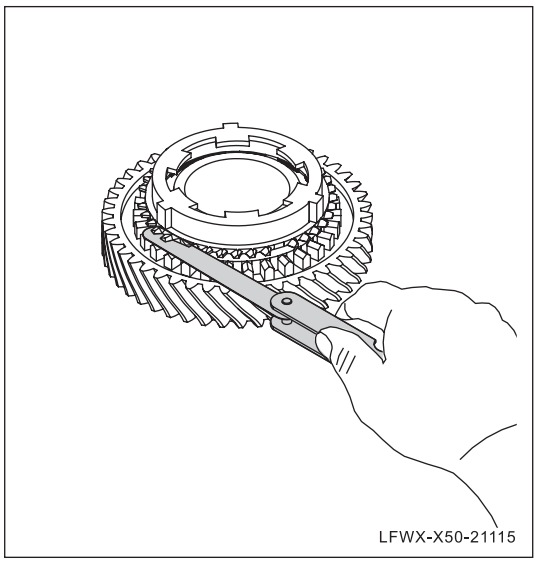
(b) Check the spring and the sliding block.

(c) Mount the synchronizer gear sleeve and the gear hub together; Check if they may slide smoothly without seizure.

(d) Check the front and rear ends of internal surface of the gear sleeve for damage.

NOTICE:

If the synchronizer gear sleeve or the gear hub is required to be changed, both of them should be replaced together.



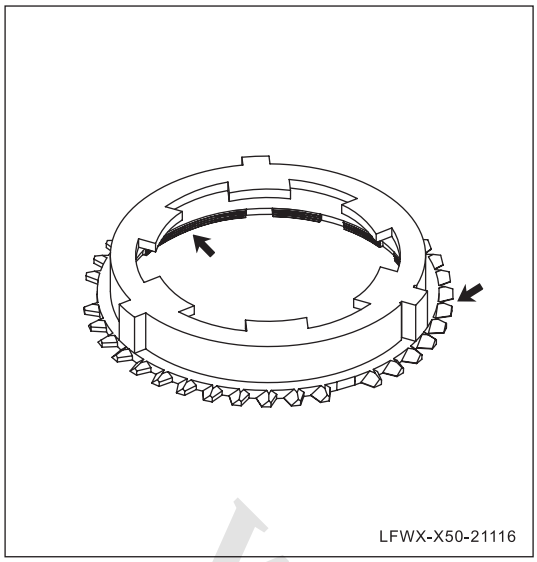
3. CHECK GEARS IN ALL SPEEDS

(a) Measure clearance between the synchronizer ring back and the gear end surface by a feeler gauge; replace the synchronizer ring if it is beyond limit value.

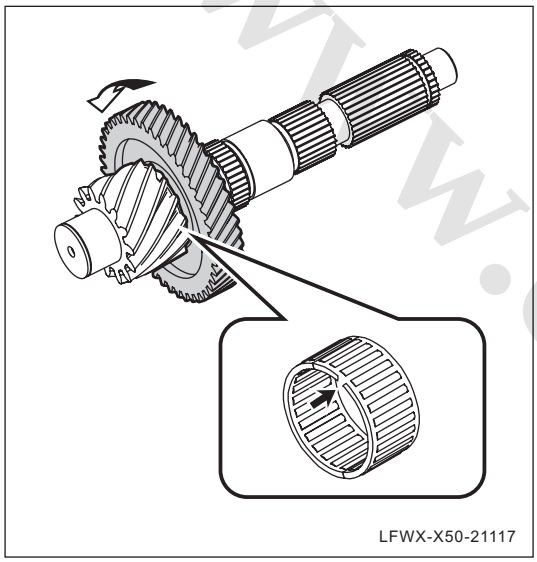
Minimum value 0.8mm

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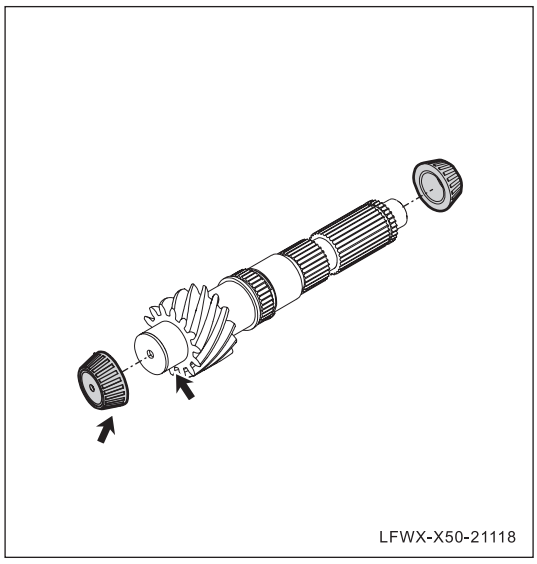

LFWX-X50-21116

(b) Tooth surface of the synchronizer gear ring should be free of damage and other defects Internal surface of a cone should be free of damage, wear; or the thread teeth should not be broken.


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(c) Check if the needle bearings of gears in all speeds are worn or broken; Check if the needle bearing bracket is broken; replace it when necessary.

(d) When the output shaft, the sliding sleeve and the gears are rotating together, the rotation should be smooth without abnormal noise.


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4. CHECK FRONT AND REAR BEARINGS OF INPUT SHAFT

(a) Check the tapered roller bearing's roller for wear and breakage. Replace it on time when necessary.

(b) Check the tapered roller bearing's bracket for deformation; replace it on time when necessary.

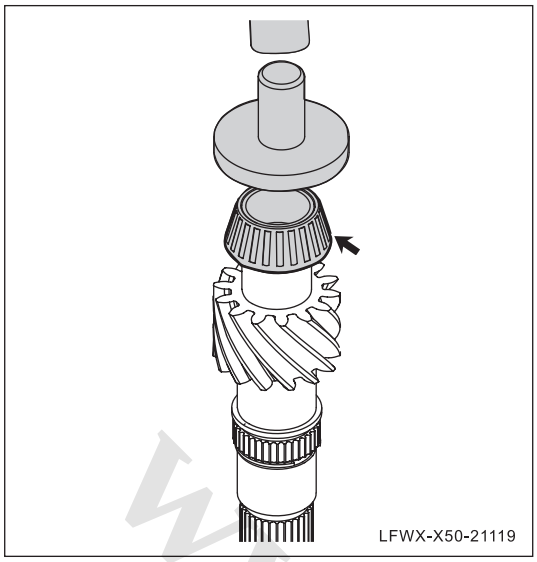
NOTICE:

The bearing outer sleeve should be replaced when changing the tapered roller bearing.

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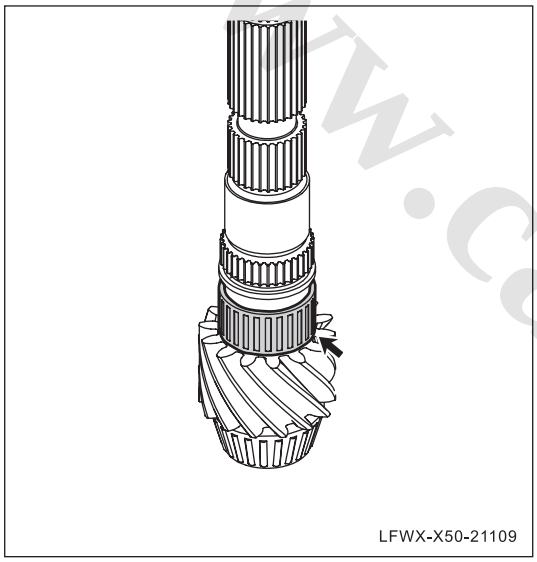
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ASSEMBLING



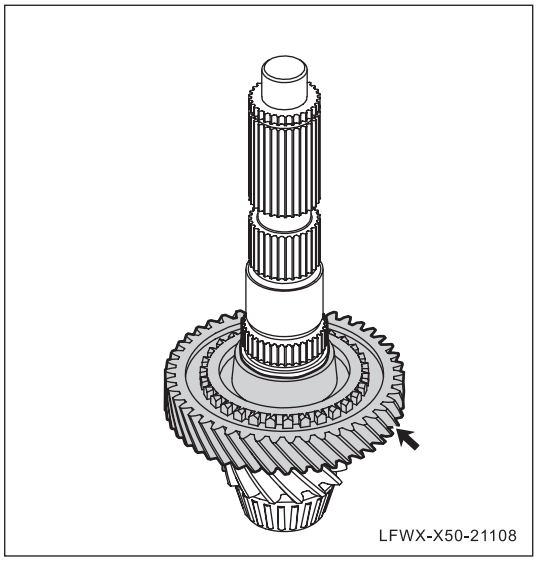
1. INSTALL THE OUTPUT SHAFT FRONT BEARING

(a) Install the output shaft front shaft to the correct position by a special bearing punch sleeve.



2. INSTALL THE 1ST-SPEED DRIVEN GEAR SET

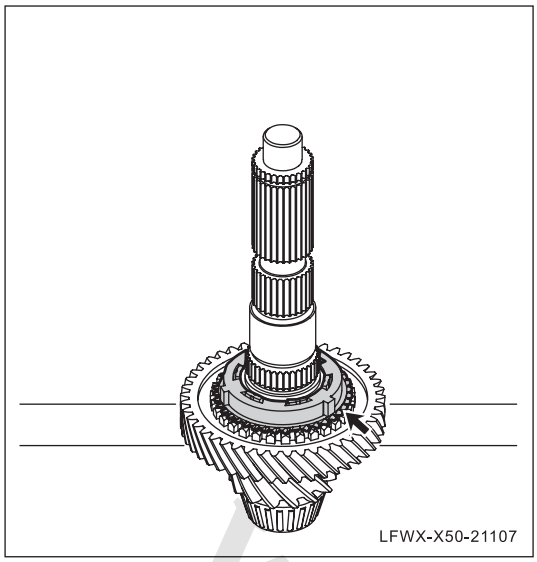
(a) Install the 1st-speed needle bearing.



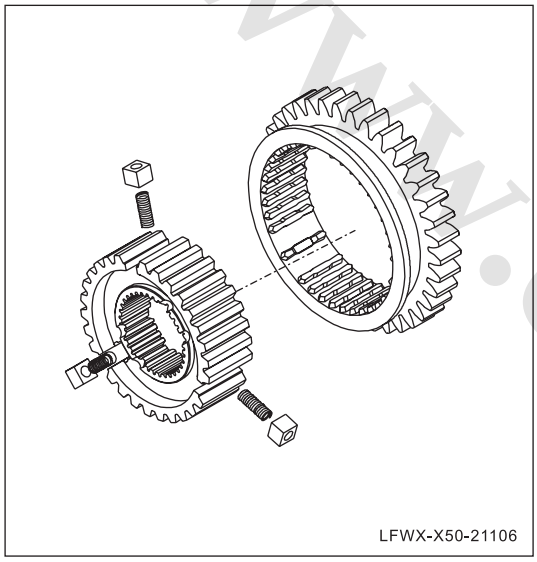
(b) Install the 1st-speed driven gear set.

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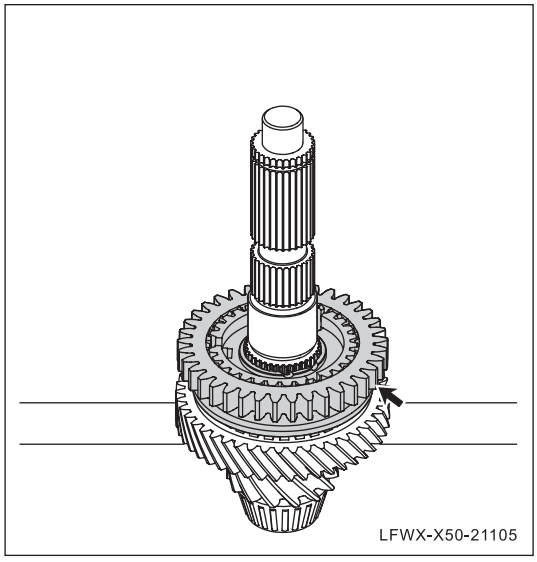


(c) Install the 1st-speed synchronizer ring assembly.



3. INSTALL THE 1ST/2ND-SPEED SYNCHRONIZER ASSEMBLY

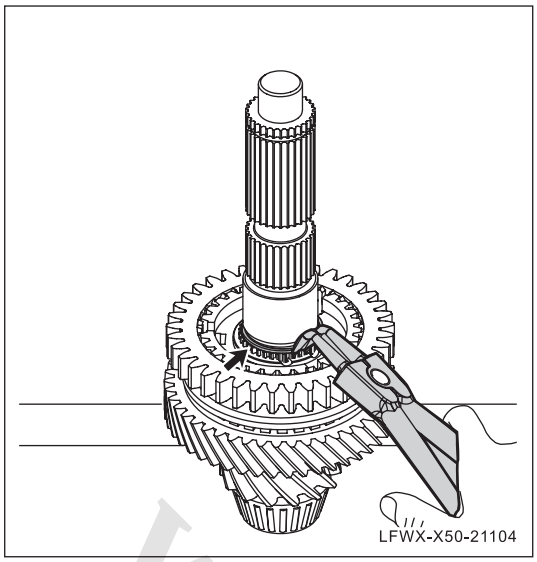
(a) Assemble the 1st/2nd-speed synchronizer.



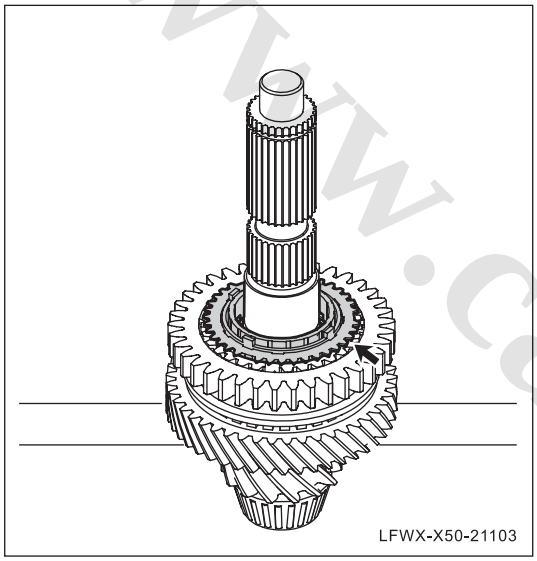
(b) According to "Upward" mark made during removal, mount the 1st/2nd-speed synchronizer onto the output shaft and then press it tightly.

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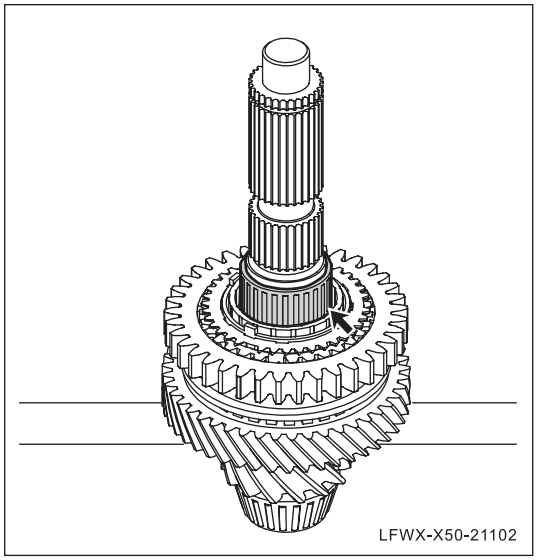
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(c) Install the 1st/2nd-speed synchronizer circlip by snap ring pliers.



(d) Install the 2nd-speed gear synchronizer ring assembly.

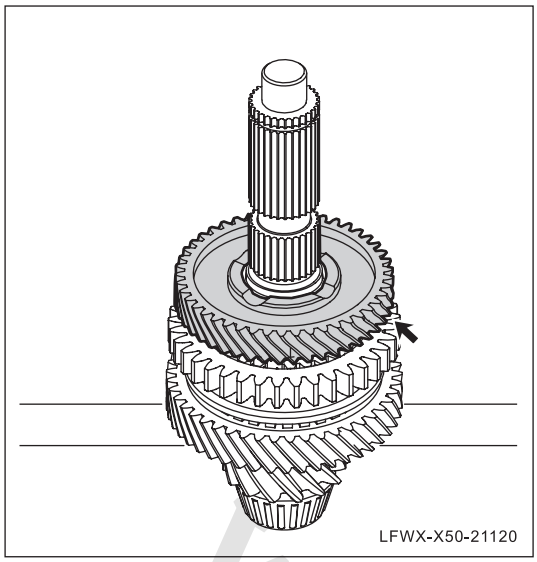


4. INSTALL THE 2ND-SPEED DRIVEN GEAR ASSEMBLY.

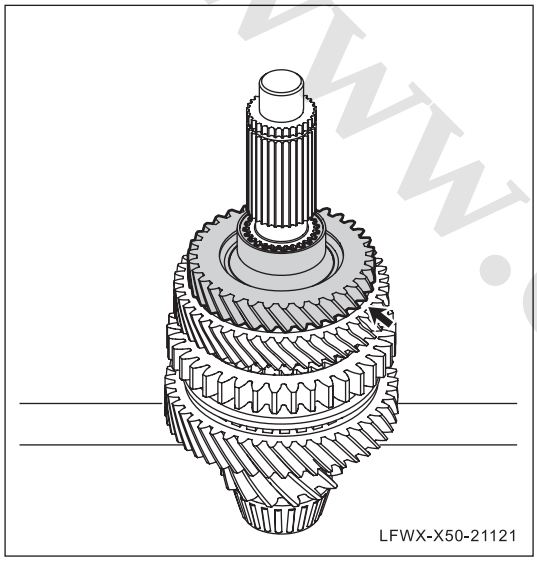
(a) Install the 2nd-speed driven gear needle bearing.

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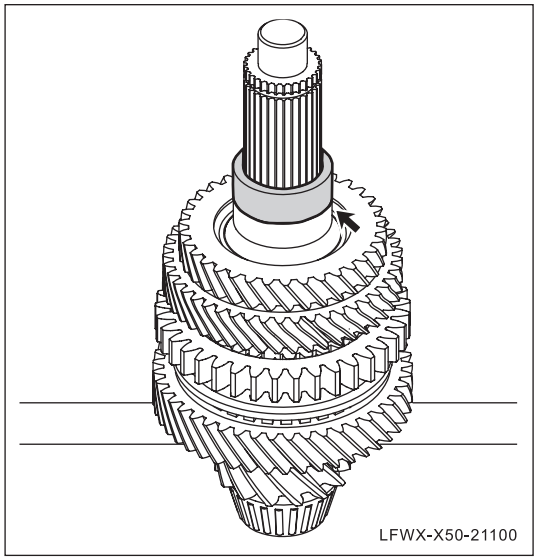


(b) Install the 2nd-speed driven gear set.



5. INSTALL THE 3RD-SPEED DRIVEN GEAR SET

(a) Install the 3rd-speed driven gear, and then press and mount it to the mounting position.

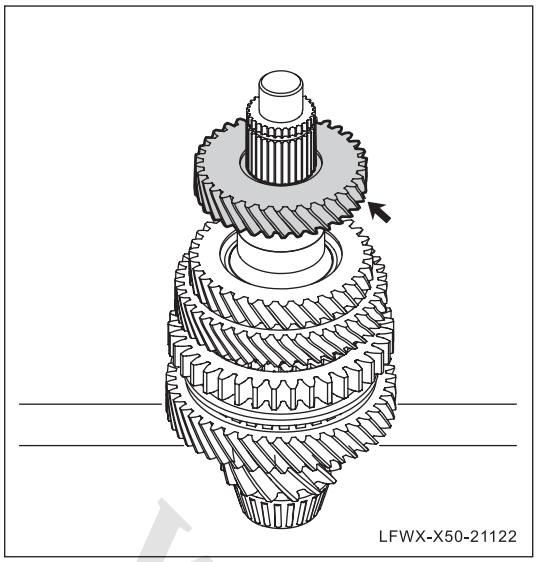


6. INSTALL THE 4TH-SPEED DRIVEN GEAR SET

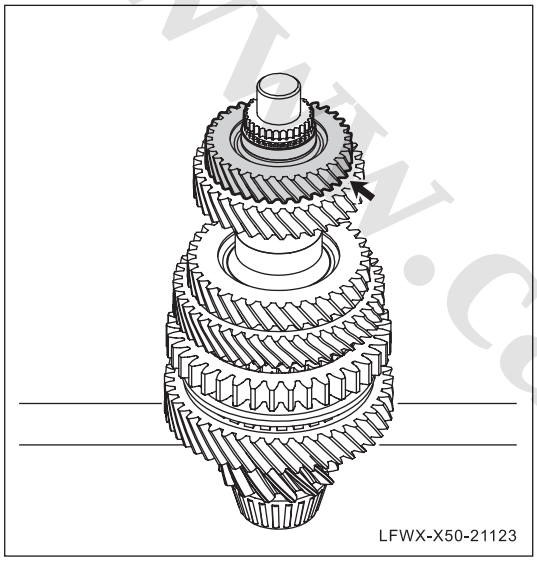
(a) Install the 3rd/4th-speed spacing sleeve.

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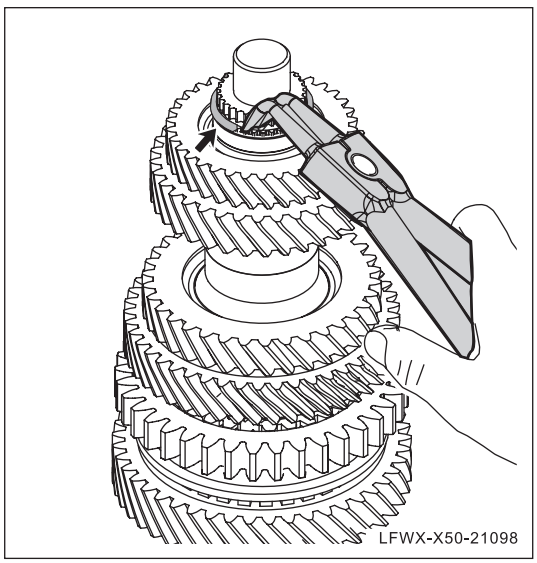


(b) Install the 4th-speed driven gear, and then press and install to the mounting position.



7. INSTALL THE 5TH-SPEED DRIVEN GEAR SET

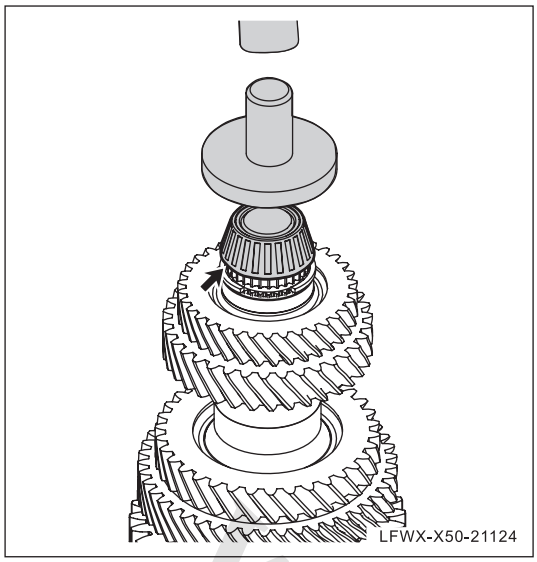
(a) Install the 5th-speed driven gear, and then press and install to the mounting position.



(b) Install the 5th-speed gear retainer ring by snap-ring pliers.

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8. INSTALL OUTPUT SHAFT REAR BEARING.

(a) Install the output shaft rear bearing to the correct position by a special bearing punch sleeve.

9. CHECK INSTALLATION OF THE OUTPUT SHAFT; INSTALL IT AGAIN IF IT IS OUT OF STANDARD REQUIREMENTS

(a) Check clearance between gears.

(b) Check if the synchronizer may slide normally without seizure.

(c) Rotate the gears and they should be free of abnormal sound.

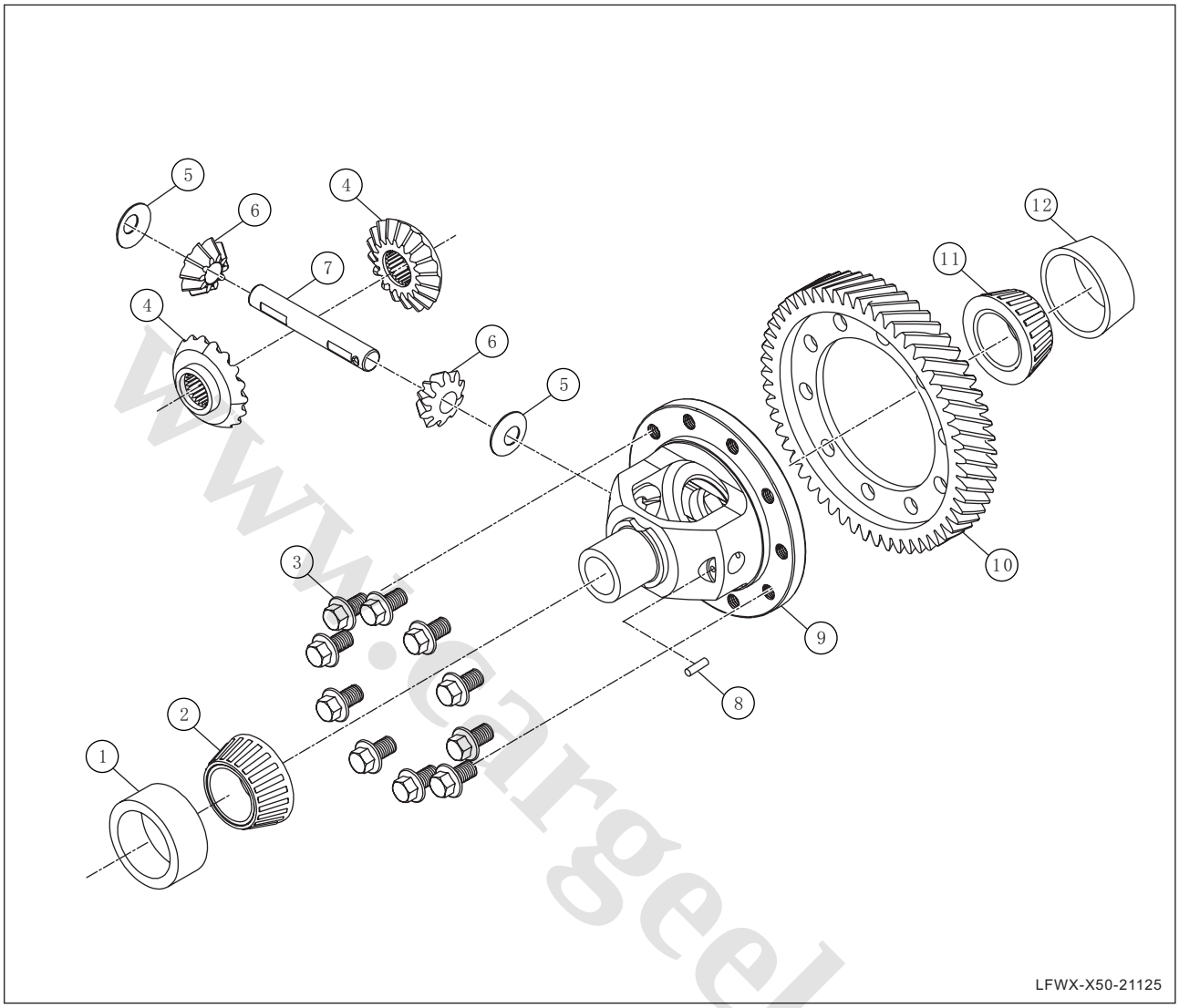
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DIFFERENTIAL ASSEMBLY

COMPONENTS



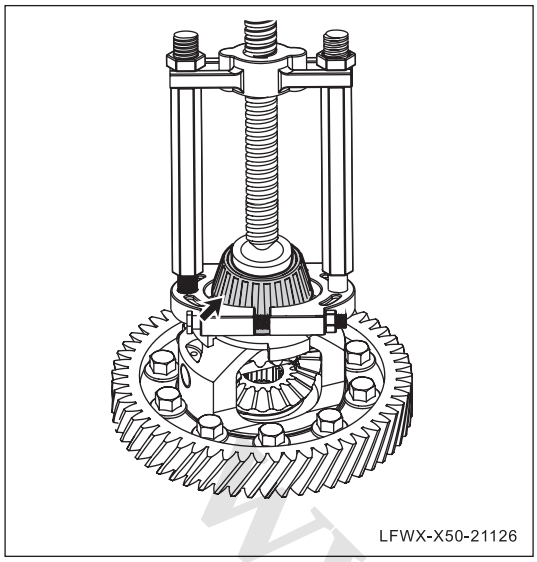
1	Differential front bearing cover
2	Differential front bearing
3	Case fastener
4	Axle shaft gear
5	Planetary gear gasket
6	Planetary gear

7	Planetary-gear shaft
8	Planetary-gear shaft elastic cylindrical pin
9	Differential housing
10	Differential ring gear
11	Differential rear bearing
12	Differential rear bearing cover

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DISMANTLING

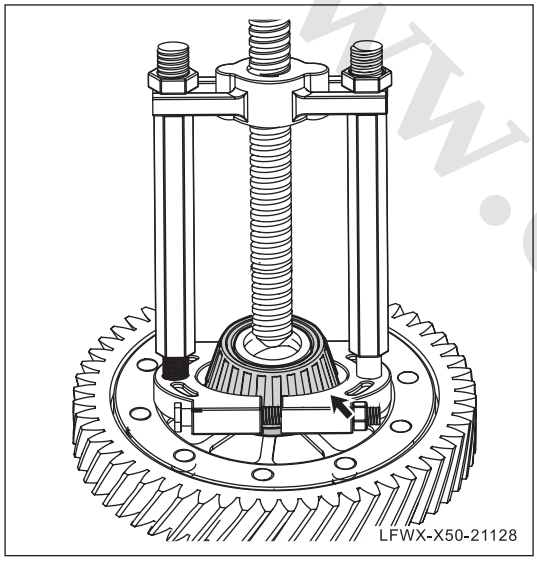


1. REMOVING DIFFERENTIAL FRONT AND REAR BEARINGS

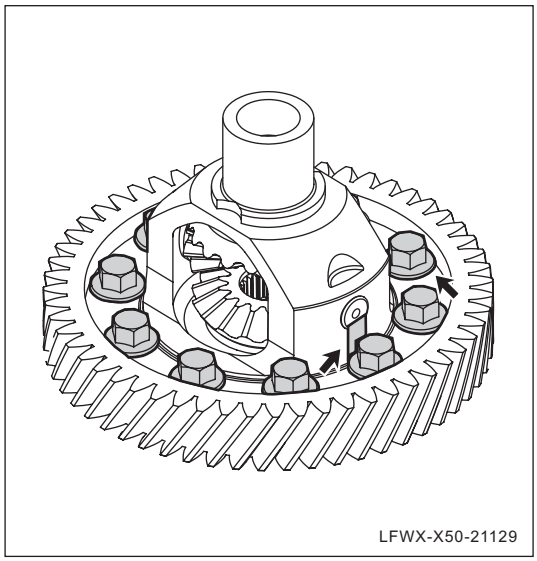
(a) Fit the puller and the remove the differential front bearing.

NOTICE:

Puller should be installed on roller of front bearing.



(b) Remove the rear bearing by a bearing puller.

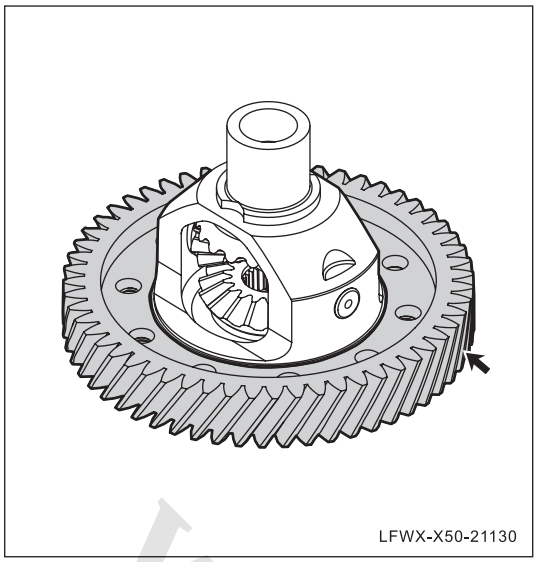


2. REMOVE DIFFERENTIAL RING GEAR

(a) Remove the differential ring gear bolts.

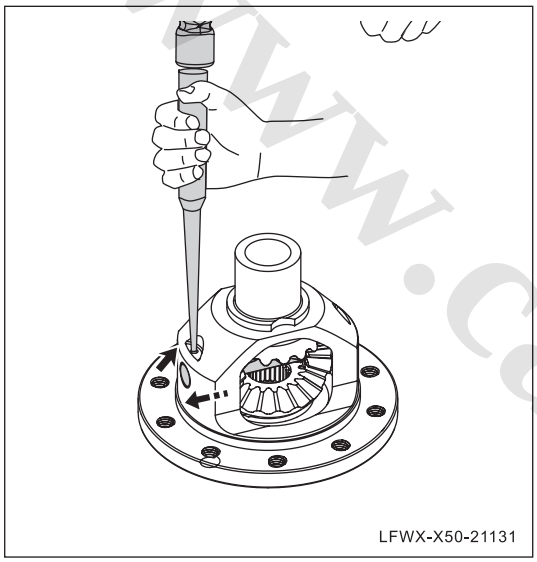
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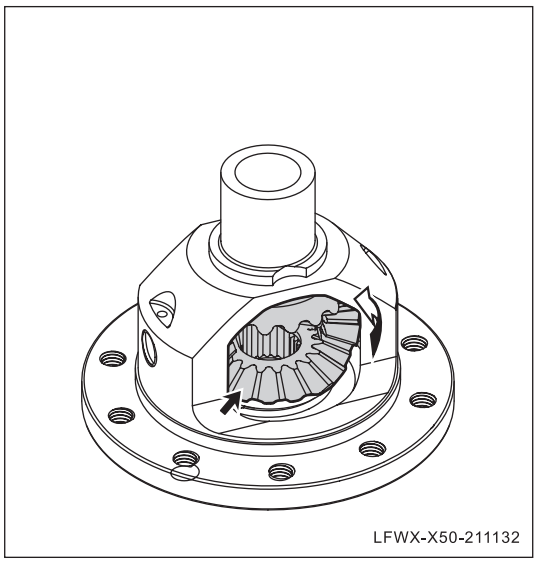
(b) Take out the differential ring gear.



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3. REMOVE DIFFERENTIAL PLANETARY GEAR AND THE AXLE SHAFT GEAR

(a) Remove the differential planetary gear shaft cylindrical pin by a punch and then take out the planetary gear shaft.



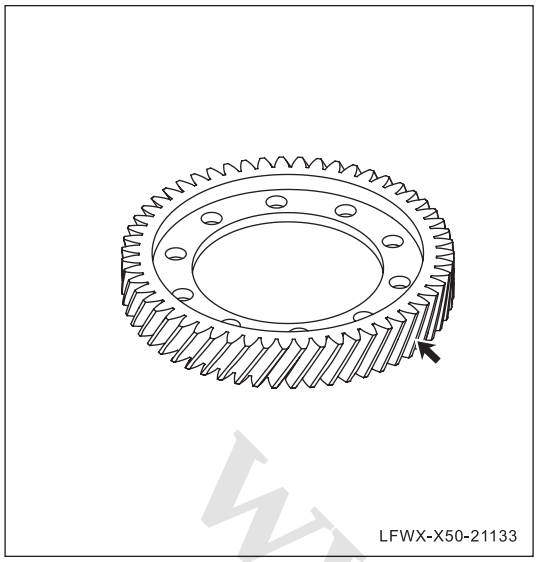
LFWX-X50-211132

(b) Rotate gears and then take out the planetary gear, planetary gear shims and axle shaft gear.

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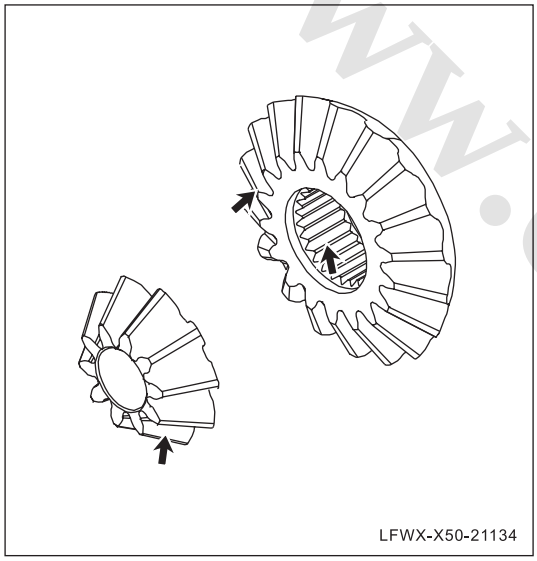
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CHECK



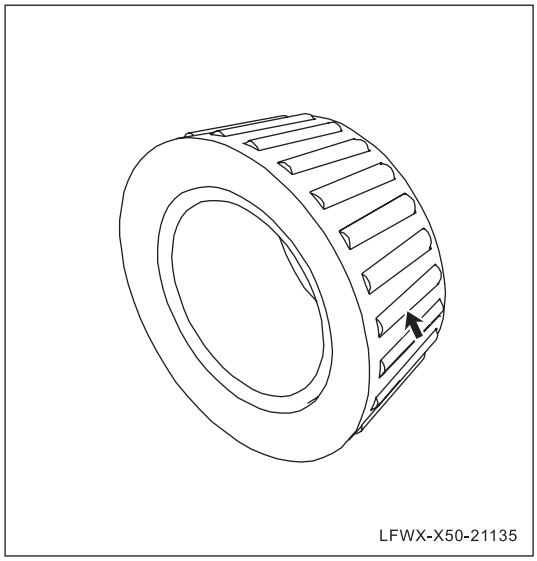
1. CHECK FINAL DRIVE GEAR RING.

(a) Check if the final drive gear ring has broken tooth, or scoring tooth surface or severely worn tooth surface or tooth surface gluing; if any symptom above-mentioned is found, replace the final drive gear ring.



2. CHECK PLANETARY GEAR AND AXLE SHAFT GEAR

(a) Check the planetary gear and the axle shaft gear as well as the spline teeth for serious wear or damage. If so, replace it.



3. CHECK DIFFERENTIAL FRONT AND REAR BEARINGS

(a) Check the tapered roller bearing external ring and the rollers for wear; if badly worn, replace the bearing.

NOTICE:

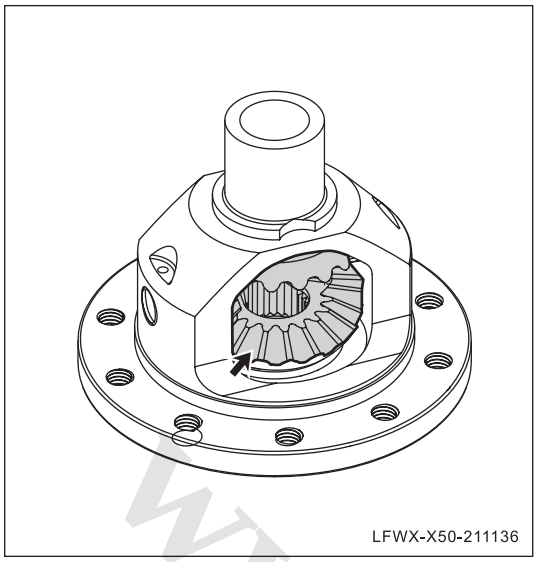
At the same time, external rings of the differential front and rear tapered roller bearings should be replaced.

(b) Feel by hands whether the bearing may rotate smoothly without seizure. If it can not rotate smoothly or seizure exists, replace the bearing.

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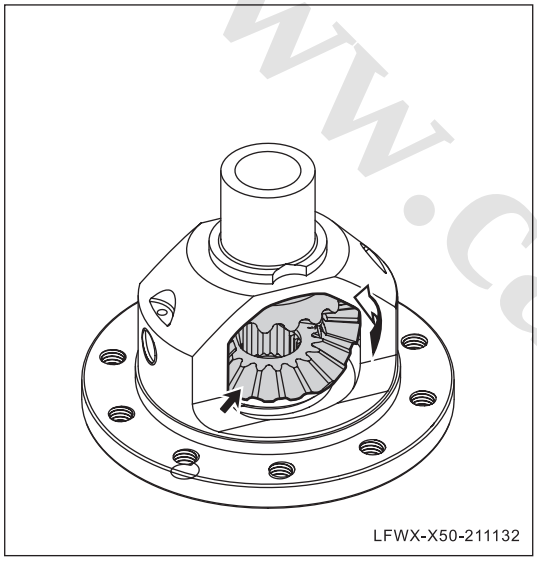
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ASSEMBLING

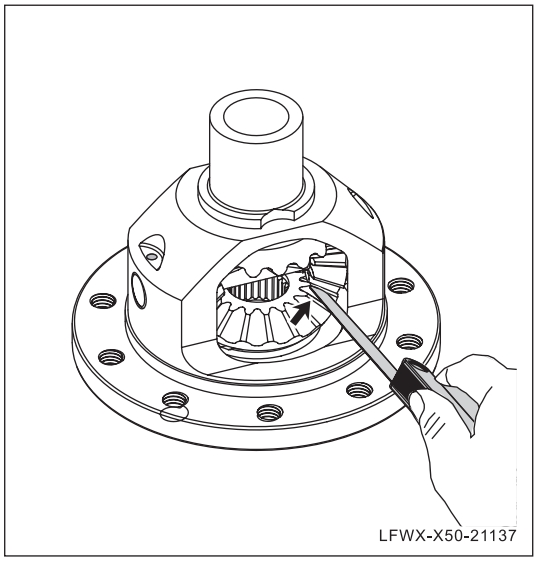


1. INSTALL DIFFERENTIAL PLANETARY GEAR AND AXLE SHAFT GEAR

(a) Install the axle shaft gear into the differential body.



(b) Engage planetary gear with axle shaft gear, and install planetary-gear shaft to the specified position while rotating gear holder.



(c) Check the gear clearance between planetary gear and axle shaft gear, if the backlash exceeded standard value, the appropriated space ring shall be selected, and the backlash measured.

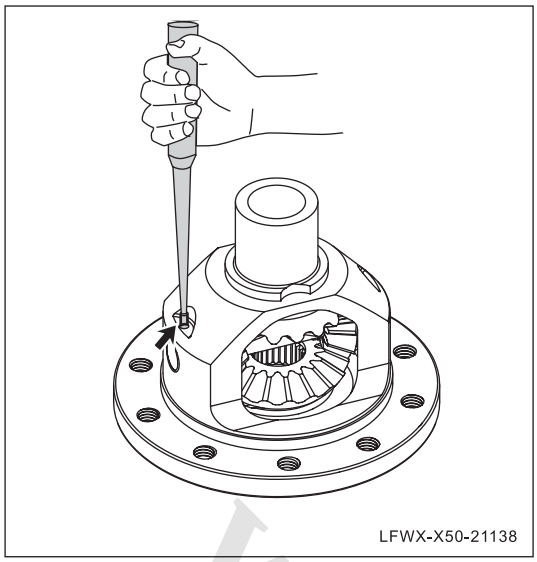
Standard value: 0.025 - 0.150mm

NOTICE:

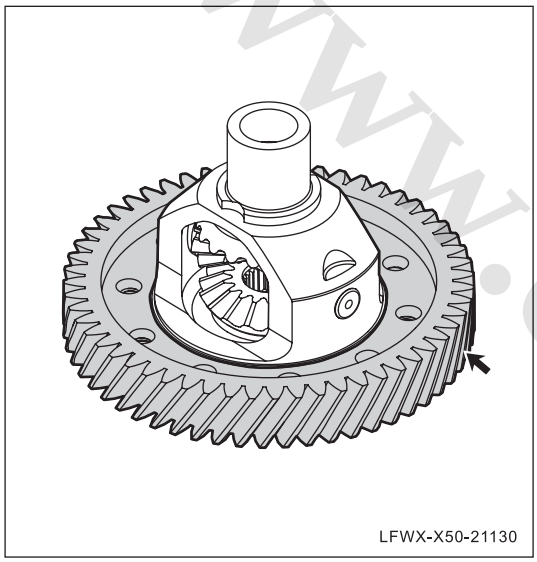
Gear clearance on both sides shall be adjusted into equal.

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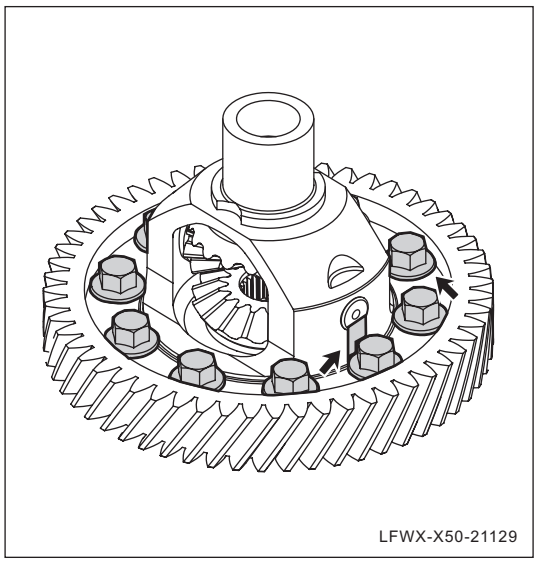


(d) Install planetary gear shaft elastic cylindrical pin.



2. INSTALL DIFFERENTIAL RING GEAR

(a) Install the differential ring gear onto the differential housing and align bolt holes.



(b) Install the differential ring gear bolts, and then install all retaining plates on bolts in the both sides of the planetary gear shaft.

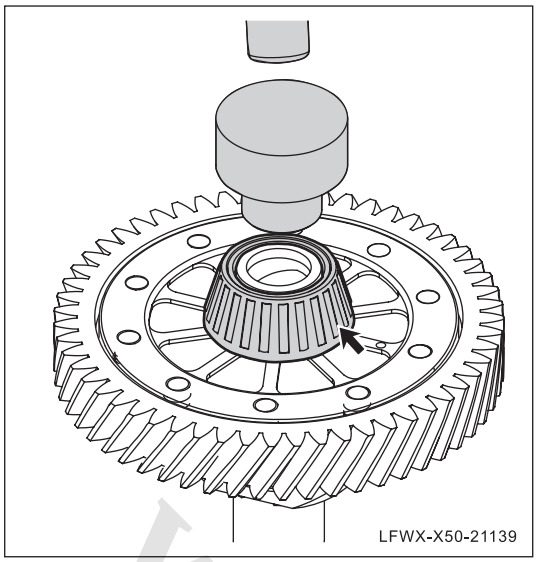
Torque: 130 - 135N•m

△ HINT:

Smear anaerobic sealant on the threads before installation of bolts.

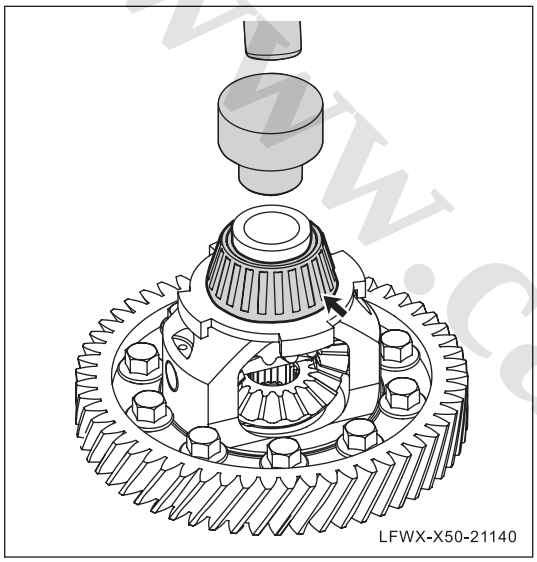
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3. INSTALL DIFFERENTIAL FRONT AND REAR BEARINGS

(a) Install the rear shaft of differential to the correct position with special bearing punch sleeve.



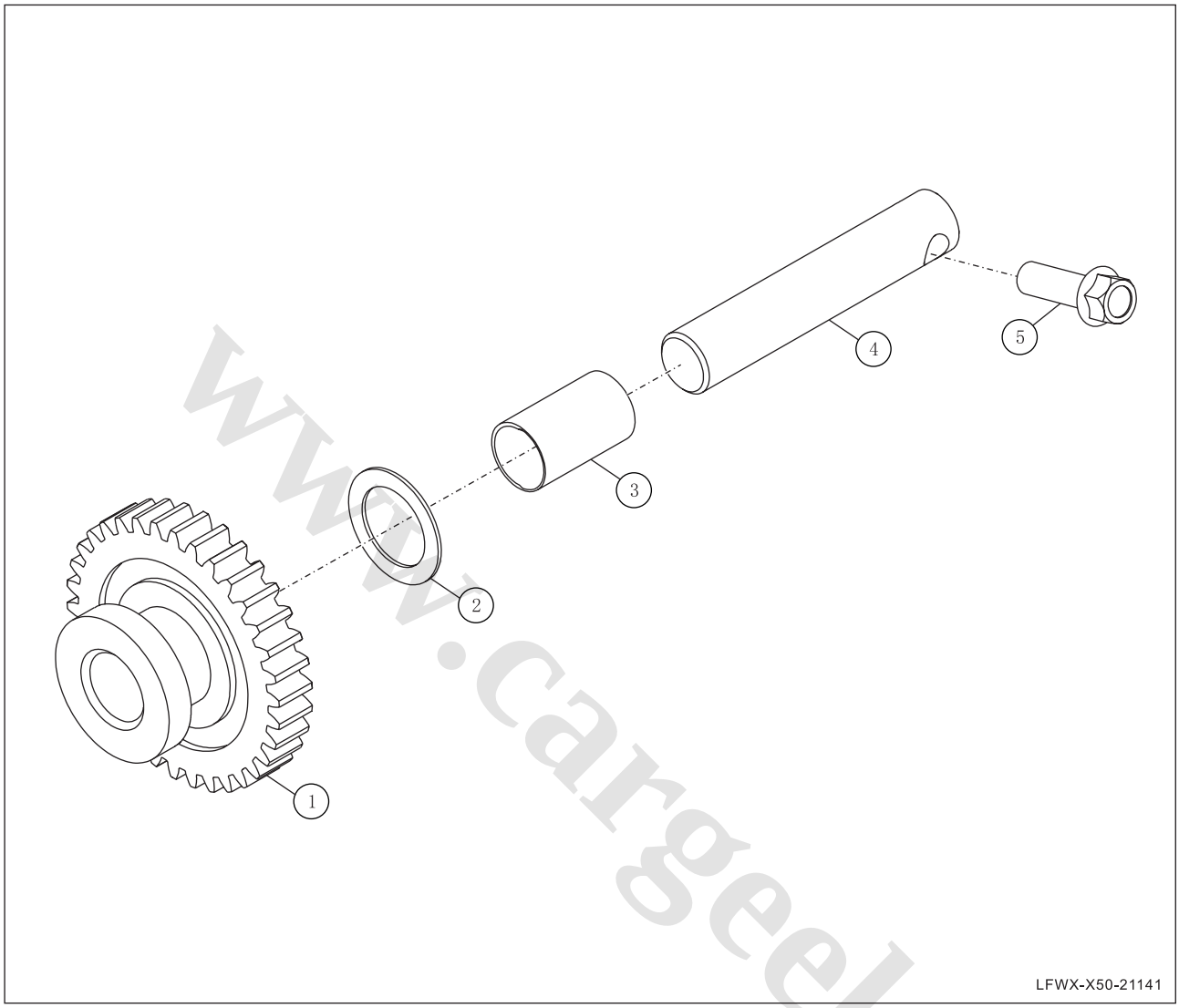
(b) Install the front shaft of differential to the correct position with special bearing punch sleeve.

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REVERSE IDLER GEAR ASSEMBLY

COMPONENTS



1	Reverse idler gear assembly
2	Nylon shim
3	Gear sleeve

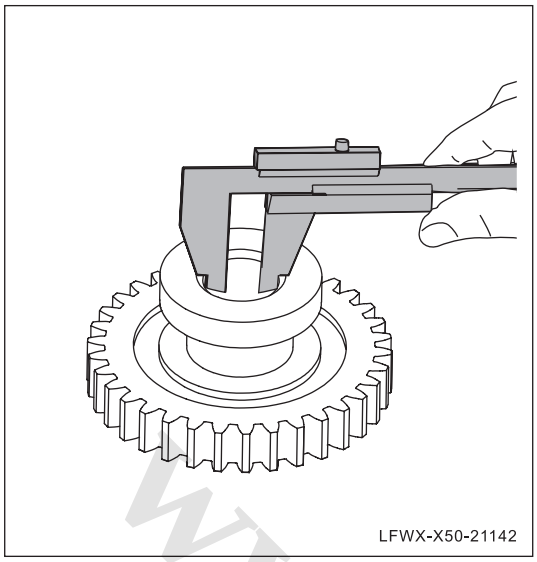
4	Reverse idler shaft
5	Reverse idler gear bolts

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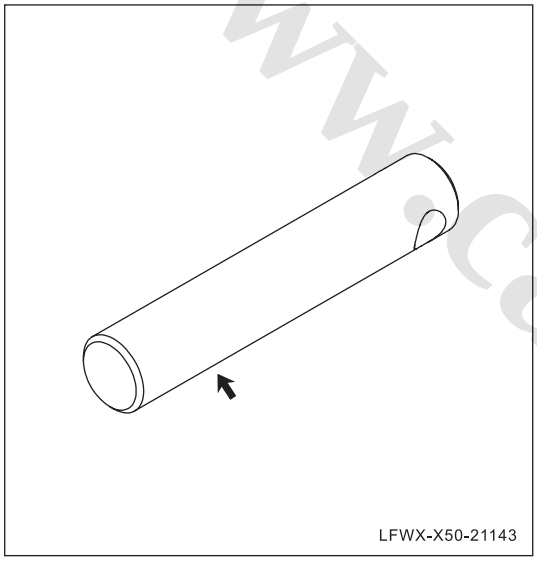
CHECK



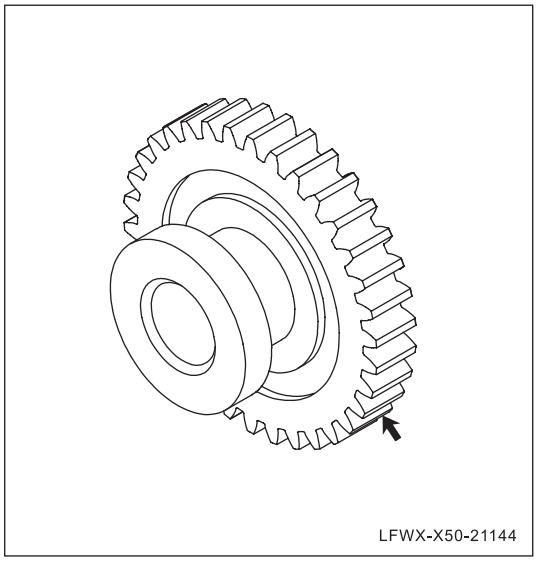
1. CHECK REVERSE IDLER GEAR

(a) Use a dial caliper to check if the gear sleeve is internally worn; if worn, replace the gear sleeve.

Wear limit: 0.2mm



(b) Check whether the reverse gear shaft is worn, and if seriously worn, replace it.

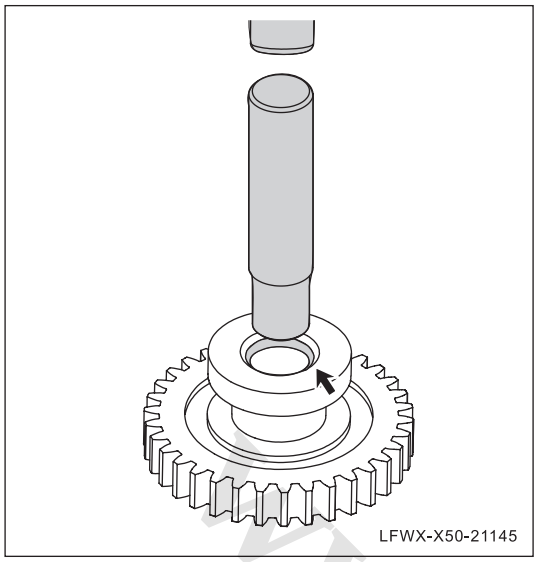


(c) Check if gears have worn tooth, or peeling due to fatigue, or corrosion spots or fracture; and replace the reverse idler gear if any.

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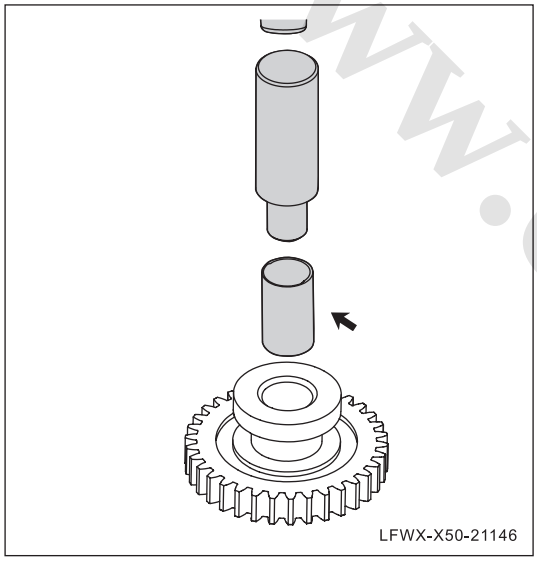
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REPLACEMENT



1. REPLACE REVERSE IDLER GEAR SLEEVE

(a) Push out the reverse idler gear sleeve by a sleeve punch.



(b) Use punching pin of lining to install reverse idler gear lining onto the mounting position.

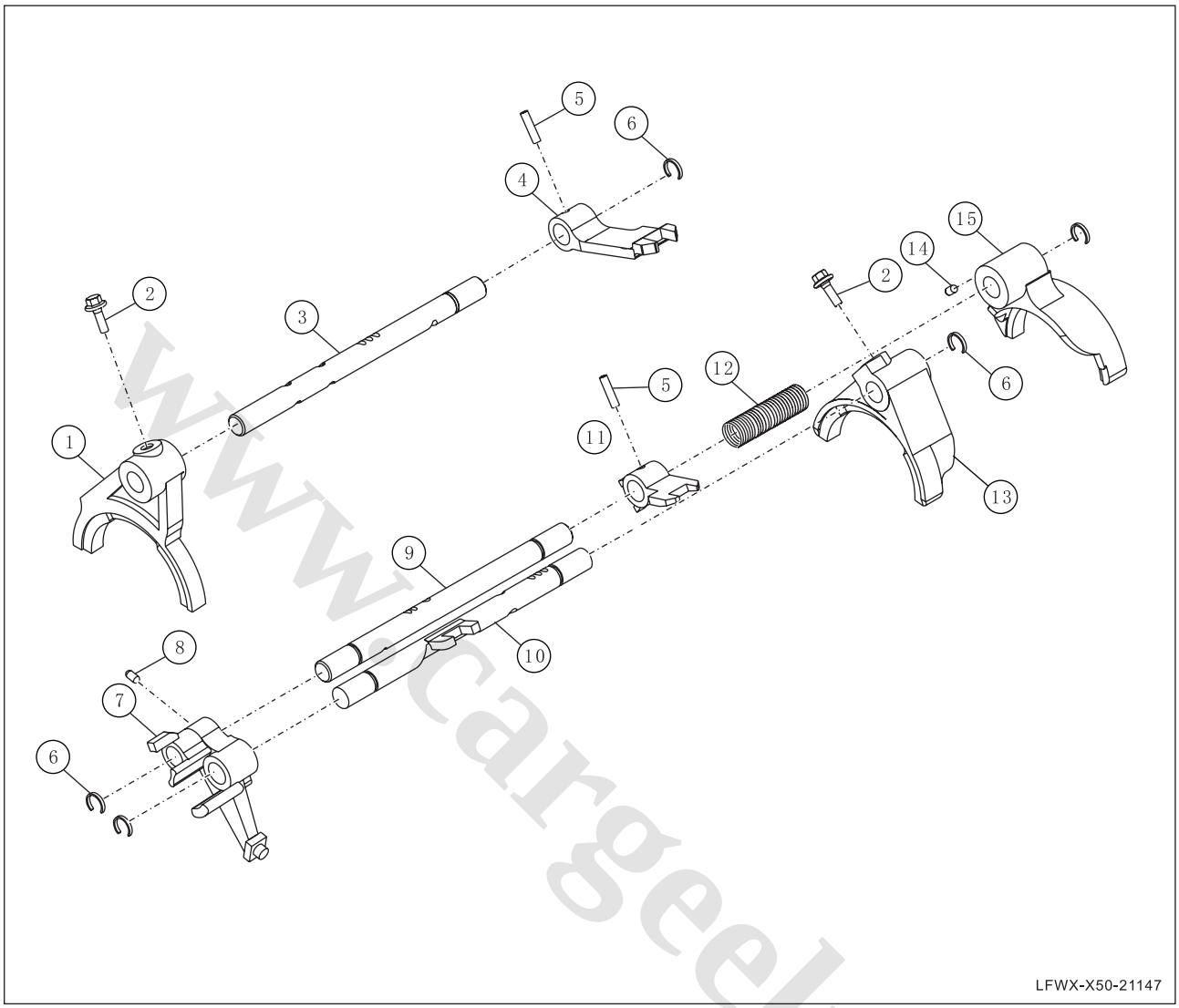
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FORK SHAFT ASSEMBLY

COMPONENTS



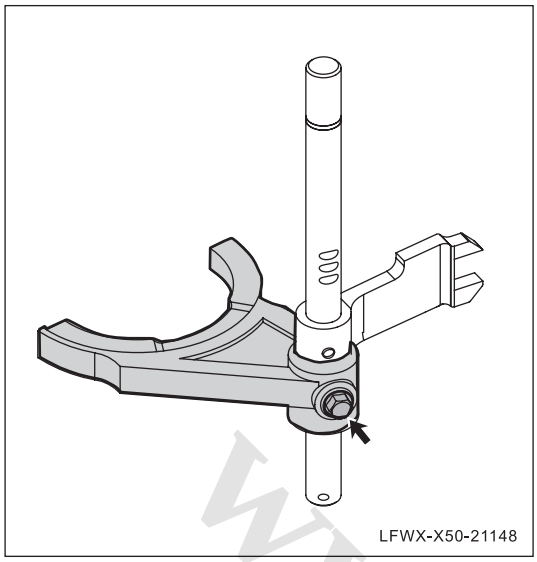
1	1st/2nd-speed shift fork
2	Gear shift fork stopper bolt
3	1st/2nd-speed fork shaft
4	1st-2nd-speed shift guide block
5	Elastic cylindrical pin
6	Fork shaft spacer
7	Reverse shifting block
8	Interlock pin A

9	5th-speed and reverse shift fork
10	3rd/4th-speed fork shaft
11	5th-speed-reverse shift guide block
12	Fork return spring
13	3rd/4th-speed shift fork
14	Interlock pin B
15	5th-speed shift fork

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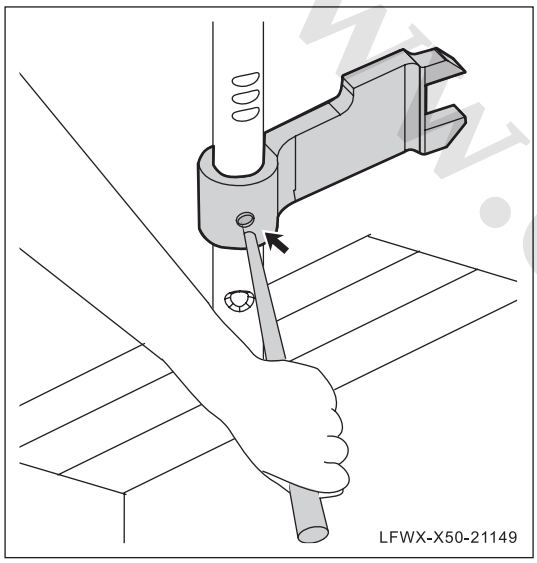
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DISMANTLING

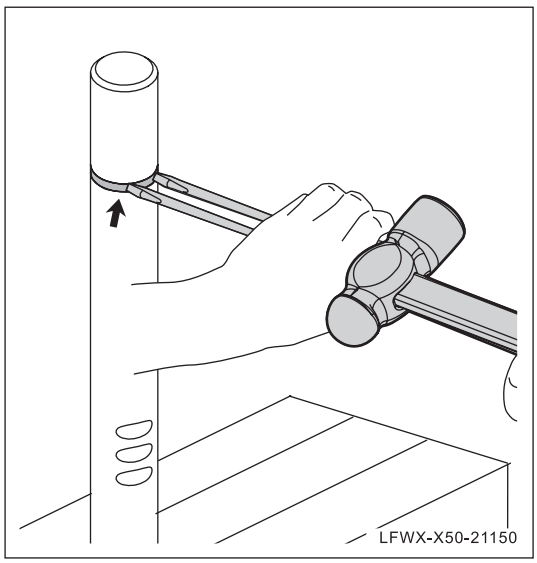


1. DECOMPOSE THE 1ST/2ND-SPEED FORK SHAFT

(a) Remove the retaining bolts of the 1st/2nd-speed shift fork and take off the 1st/2nd-speed shift fork.



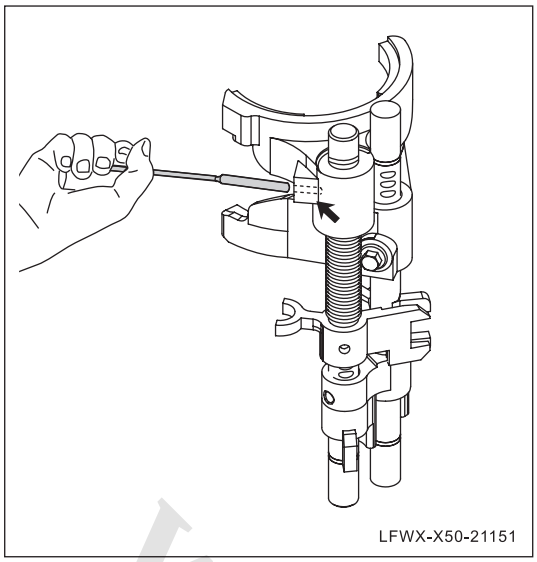
(b) Fix the 1st/2nd-speed fork shaft and then push out the gear shift guide block elastic cylindrical pin. Take off the 1st/2nd-speed gear shift guide block.



(c) Remove the 1st/2nd-speed fork shaft spacers.

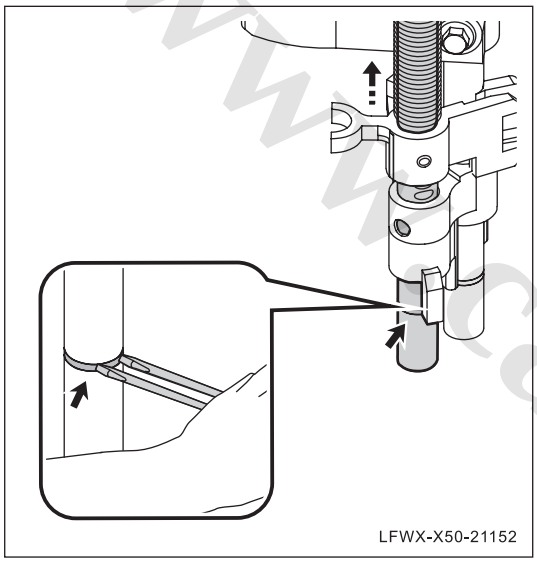
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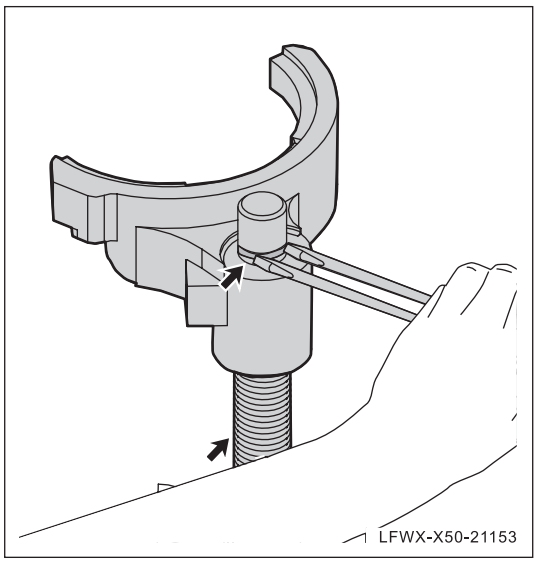


2. DECOMPOSE THE 3RD/4TH-SPEED FORK SHAFT AND THE 5TH-SPEED AND REVERSE FORK SHAFT

(a) Take out the interlock pin out from the 5th gear shift fork interlock pin hole.



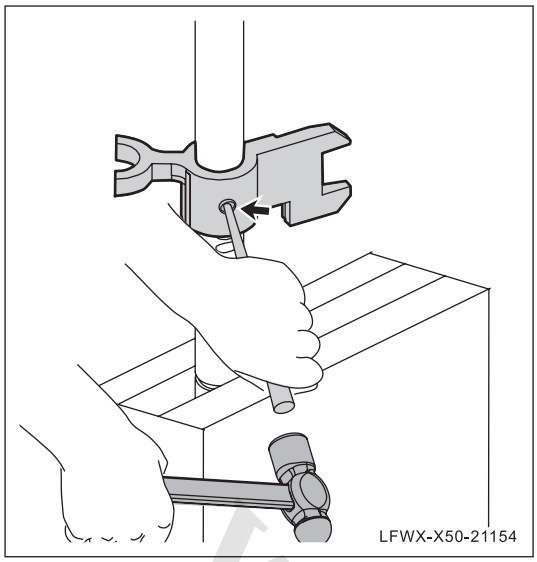
(b) Remove retainer ring under 5th-speed and reversing gear shift fork shaft. Remove 5th-speed and reversing gear shift fork shaft from reversing block. And take out interlock pin of reversing block.



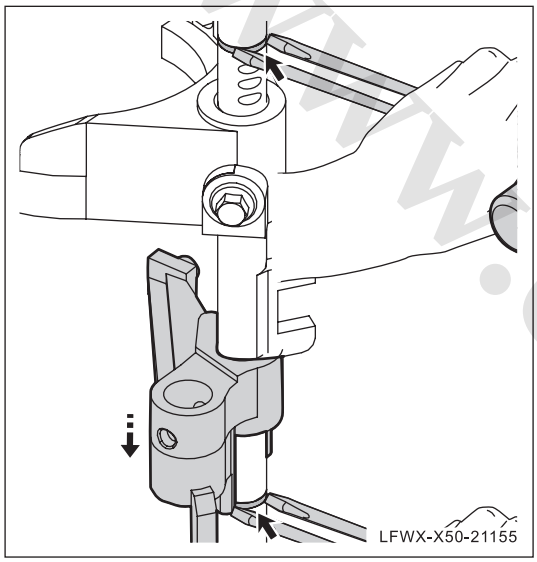
(c) Push out the spacers above the 5th-speed and reverse fork shaft and then take out the 5th-speed gear shift fork and the stirring fork return spring.

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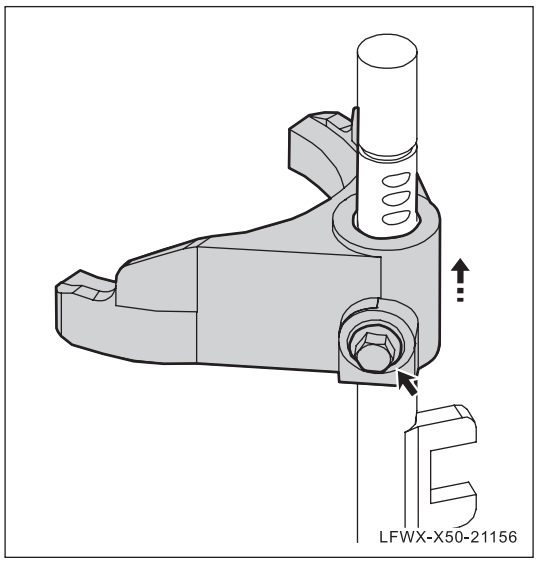
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(d) Fix the 5th-speed and reverse fork shaft and then push out the gear shift guide block elastic cylindrical pin of the 5th-speed and reverse gear. Take off the 5th-speed and reverse gear shift guide block.



(e) Fix the 3rd/4th-speed fork shaft and push out the upper and lower fork shaft spacers, and then take off the reverse shifting block.

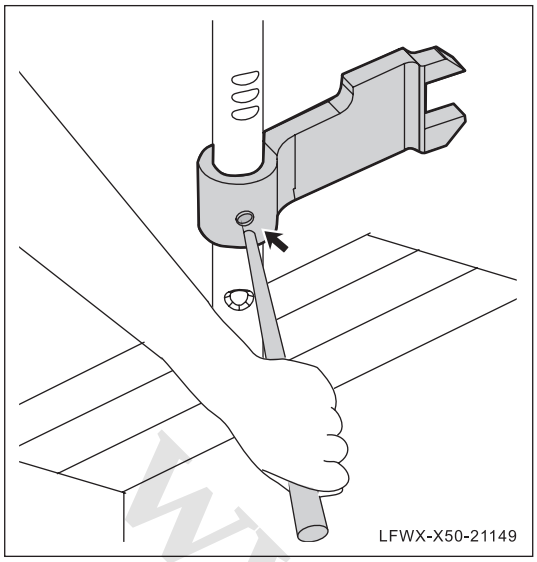


(f) Remove the retaining bolts of the 3rd/4th-speed shift fork and take off the 3rd/4th-speed shift fork.

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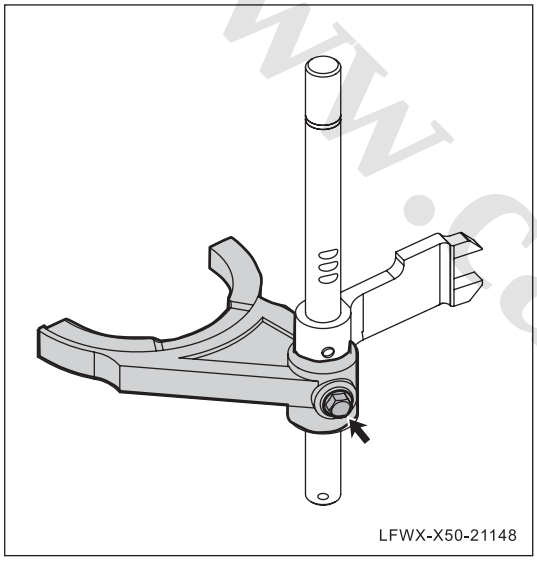
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ASSEMBLING

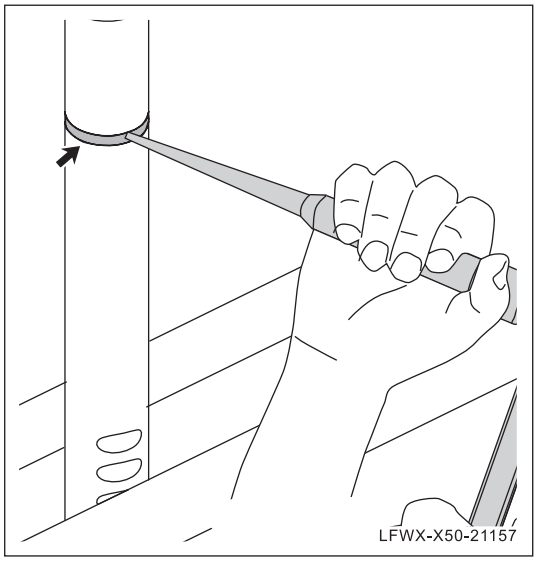


1. ASSEMBLE THE 1ST/2ND-SPEED FORK SHAFT

(a) Install the 1st/2nd-speed fork shaft shift guide block and mount the elastic cylindrical pin for fixing.



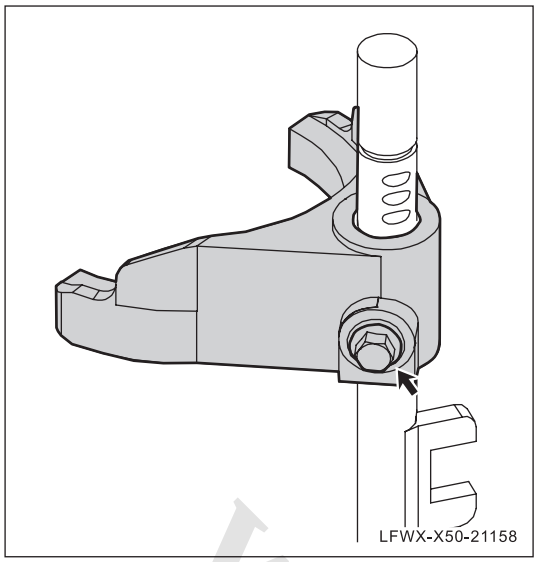
(b) Install the 1st/2nd-speed shift fork and align the bolt holes; and then mount the gear shift fork retaining bolts.



(c) Install the 1st/2nd-speed fork shaft spacers.

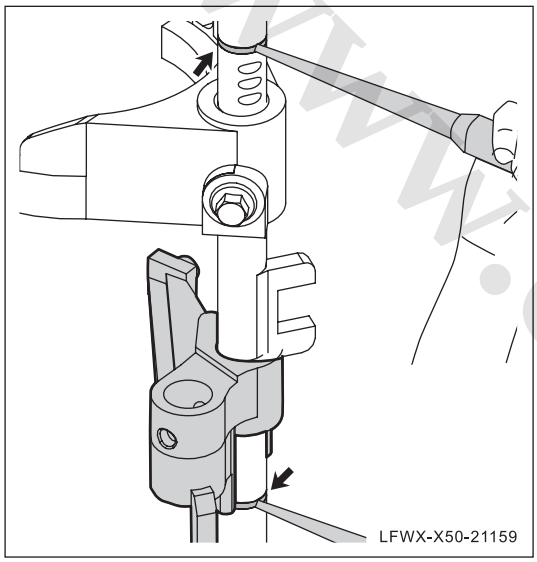
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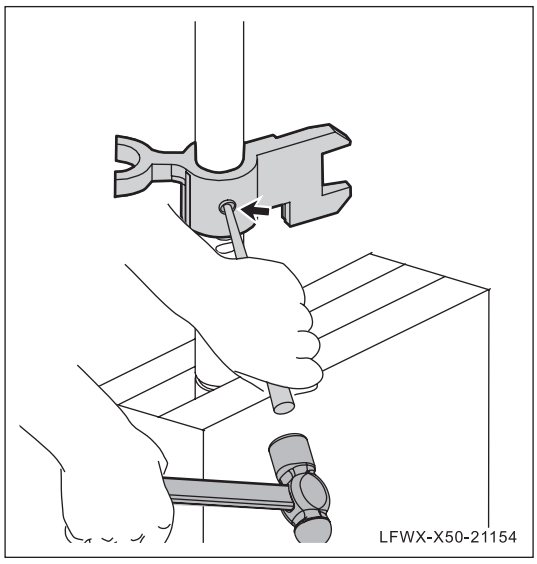
2. ASSEMBLE THE 3RD/4TH-SPEED FORK SHAFT AND THE 5TH-SPEED AND REVERSE FORK SHAFT

(a) Install the 3rd/4th-speed shift fork and align the bolt holes; and then mount the gear shift fork retaining bolts.



(b) Install the reverse shifting block onto the 3rd/4th-speed fork shaft.

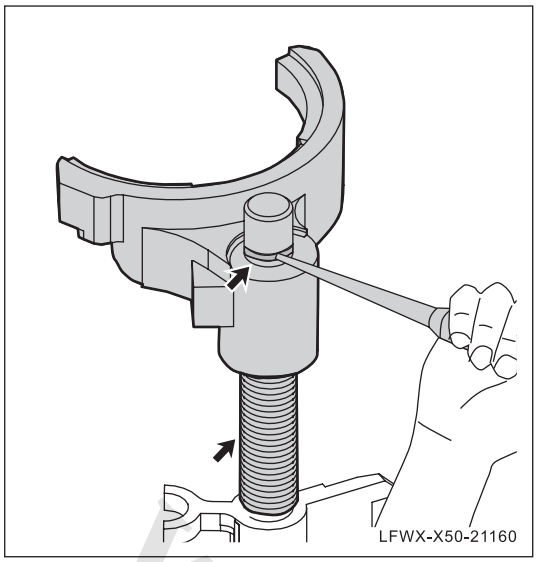
(c) Install the upper and lower fork shaft spacers onto the 3rd/4th-speed fork shaft .



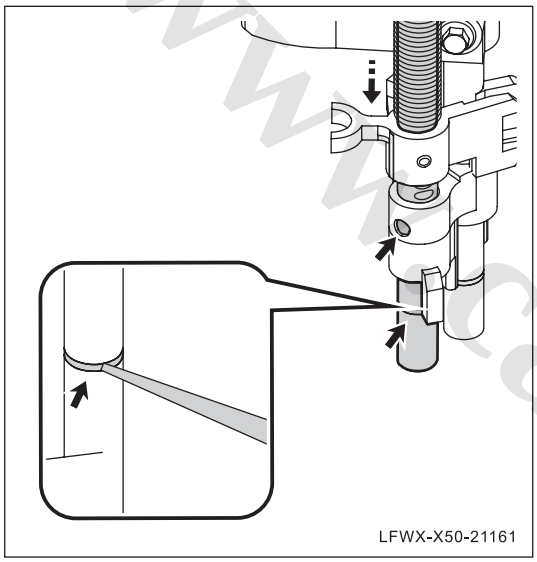
(d) Install the 5th-speed and reverse shift guide block onto the 5th-speed and reverse fork shaft; align the pin holes and mount it onto the elastic cylindrical pin.

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(e) Install the fork return spring and the 5th-speed shift fork onto the 5th-speed and reverse fork shaft, and then mount the fork shaft spacers.



(f) Install the interlock spin on the reverse shifting block interlock pin holes; and then mount the 5th-speed and reverse fork shaft into the reverse shifting block shaft hole.

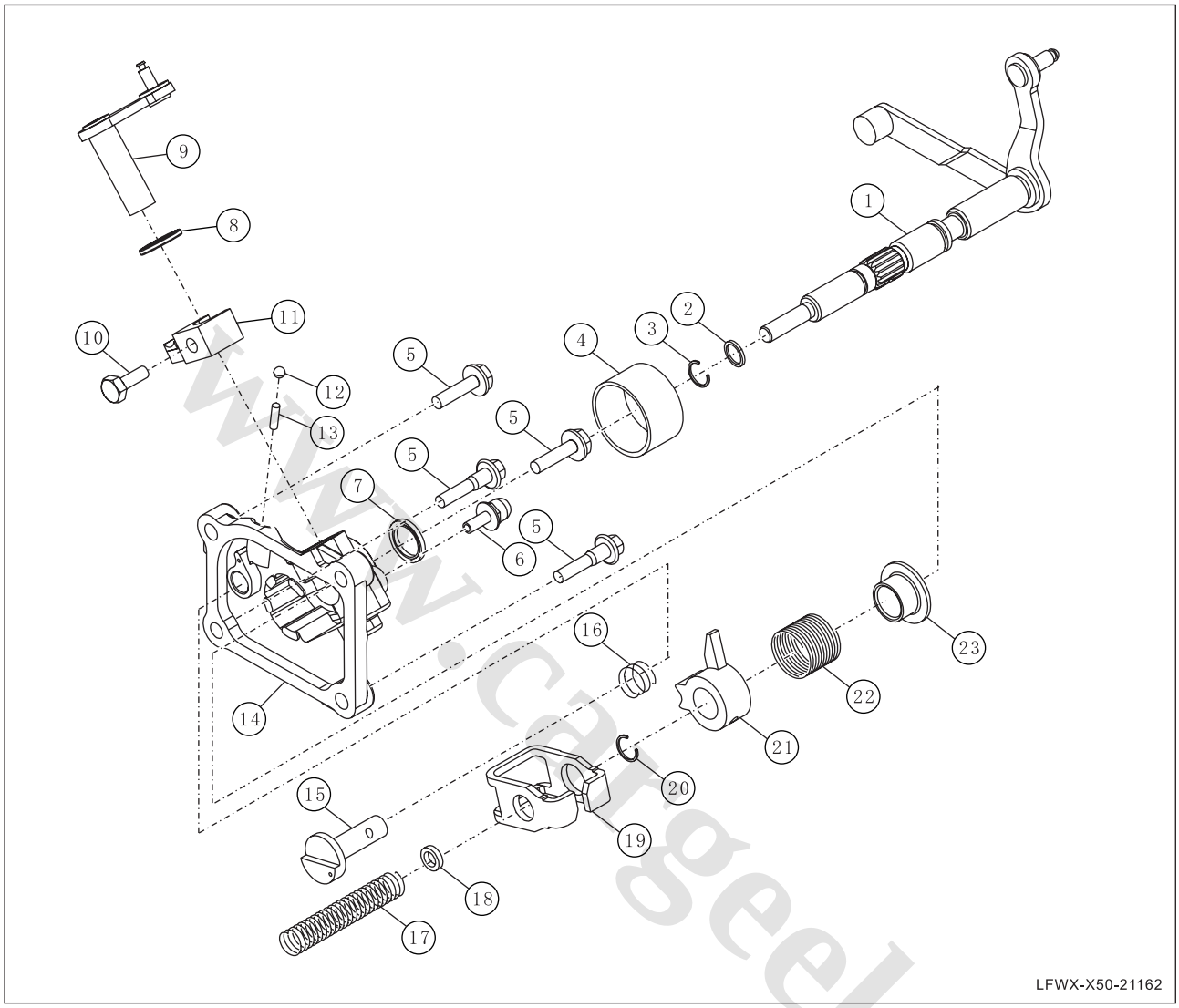
(g) Install the fork spacers below the 5th-speed and reverse fork shaft.

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GEAR SHIFT MECHANISM ASSEMBLY

COMPONENTS



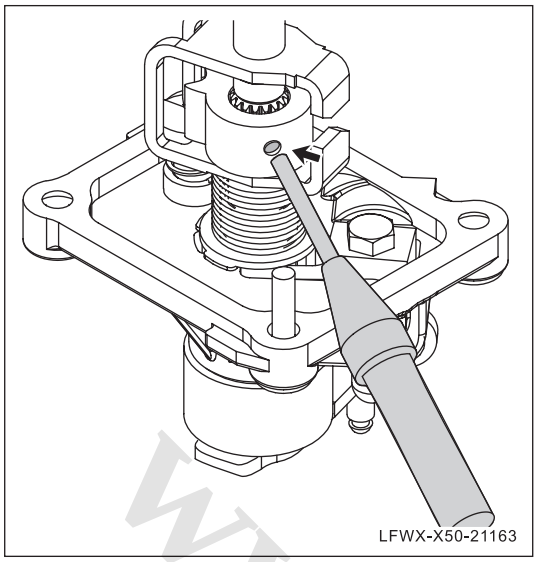
1	Shift guide shaft component
2	Gear shift guide shaft nylon washe
3	Shift guide shaft circlip
4	Shift guide shaft shield sleeve
5	Shift cover bolt
6	Vent valve assembly
7	Shift cover oil seal
8	Seal, selector arm
9	Gear shift swing arm
10	Gear shift transverse arm bolt
11	Gear shift swing link
12	5th-speed-reverse interlock cam seal ball

13	5th-speed-reverse interlock cam pin
14	Shift cover
15	5th-speed-reverse interlock cam
16	5th-speed-reverse interlock cam spring
17	Spring
18	Shift guide shaft oil seal
19	Shift rocker lever interlock bracket
20	Shift guide shaft circlip
21	Shift rocker lever
22	Return spring
23	Return spring seat

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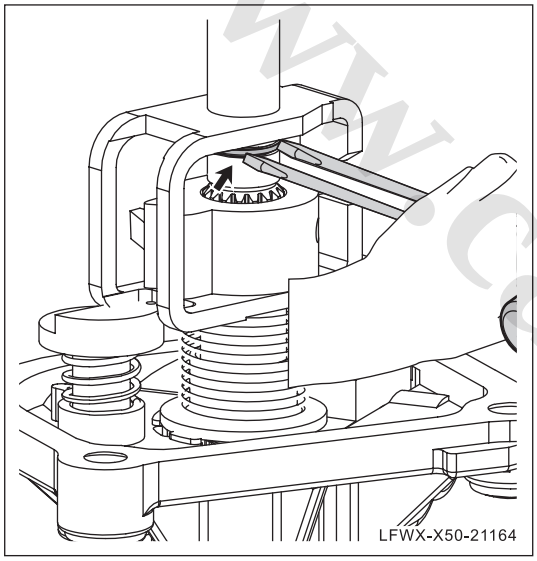
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DISMANTLING

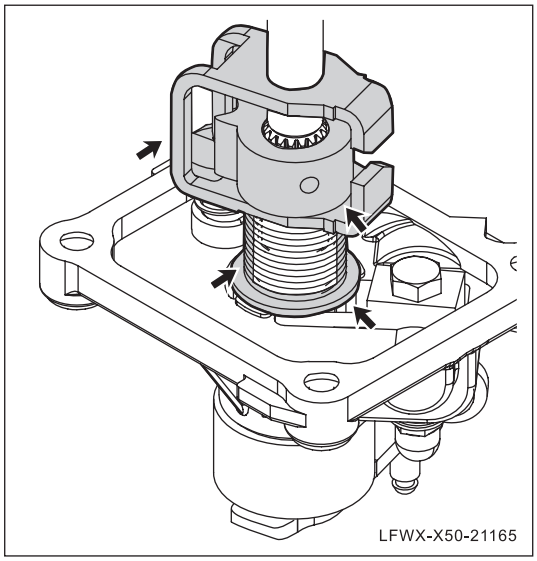


1. REMOVE GEAR SHIFT SWING LINK

(a) Push the gear shift swing link out of the elastic cylindrical pin by a punch.



(b) Remove the shift guide shaft circlip.



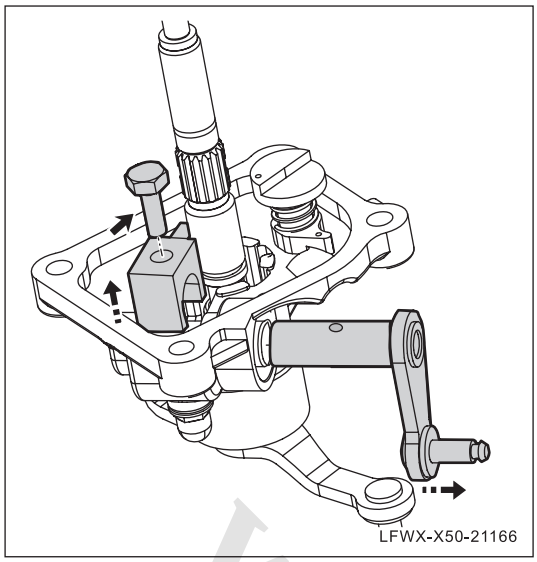
(c) Remove the gear shift swing link, the gear shift swing link interlocking bracket, the return spring and the return spring from the gear shift guide shaft.

NOTICE:

When removing the gear shift swing link, make a mark on the gear shift swing link and the guide shaft for easy installation.

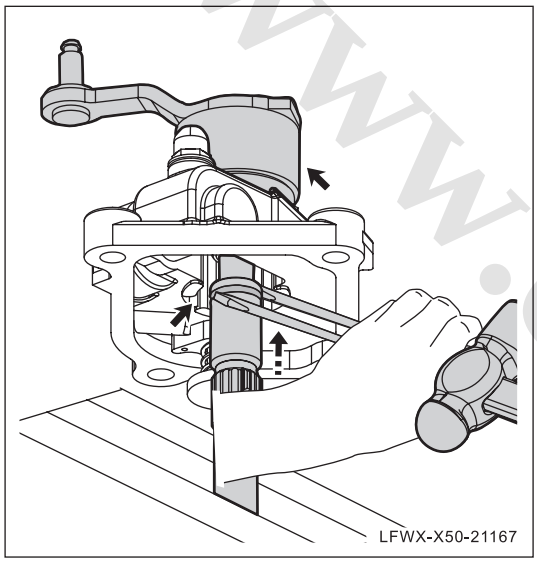
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2. REMOVE GEAR SHIFT SWING LINK.

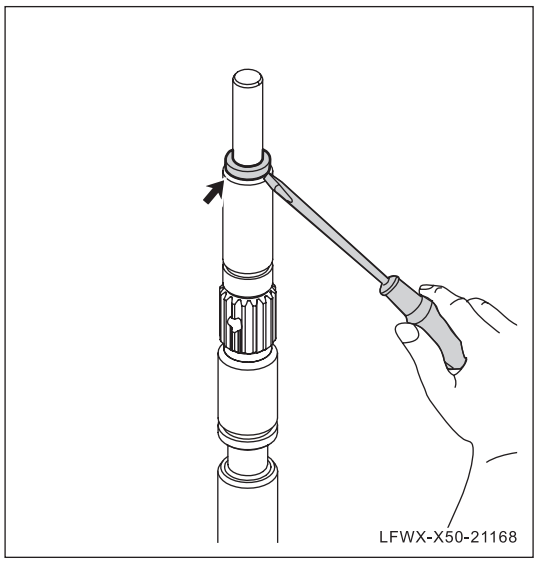
(a) Remove the gear shift swing link bolts and take out the gear shift swing arm, and then take off the gear shift swing link.



3. REMOVE SHIFT GUIDE SHAFT.

(a) Push out the shift guide shaft circlip.

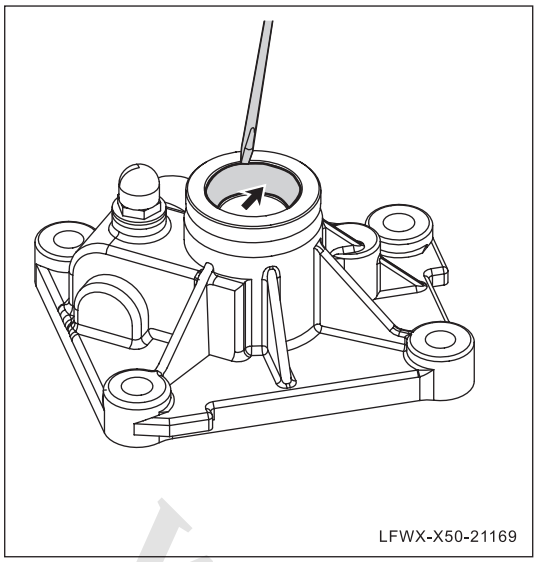
(b) Remove the gear shift guide shaft and the sheath from the shift cover.



(c) Pry off the shift guide shaft nylon washers from the shift guide shaft by a screwdriver.

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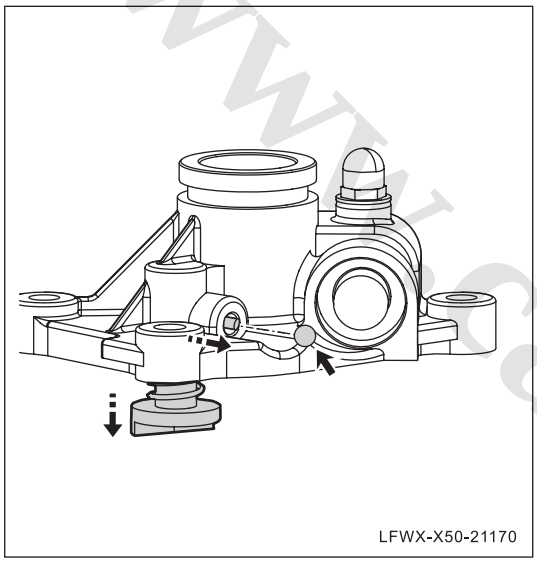

LFWX-X50-21169

4. REMOVE SHIFT COVER

(a) Pry off the shift cover oil seal by a screwdriver.

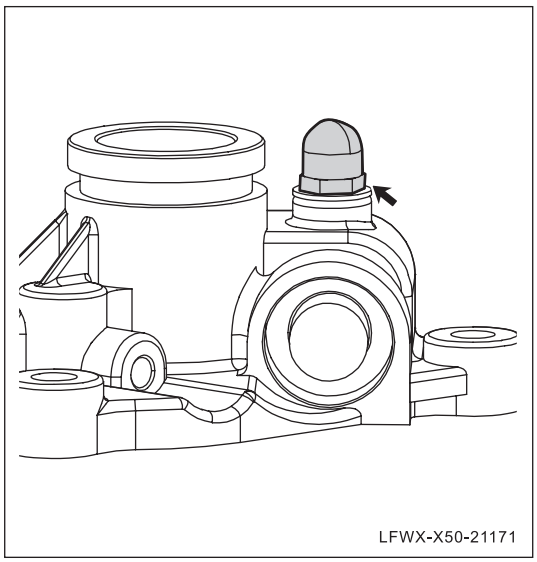
NOTICE:

After removal, the seal must be replaced, but never used again.


LFWX-X50-21170

(b) Pry the 5th-speed and reversing gear interlock cam sealing ball. Use magnetic bar to take out 5th and reversing gear interlock cam pin.

(c) Take off the 5th-speed-reverse interlock cam and springs.

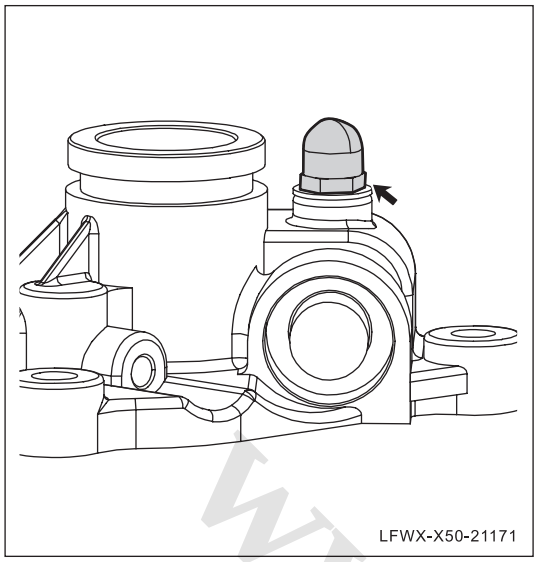

LFWX-X50-21171

(d) Remove the vent valve bolt, and take out the vent valve.

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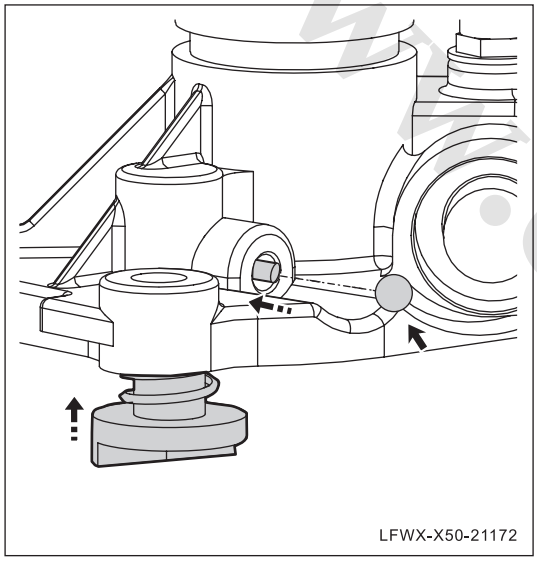
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ASSEMBLING



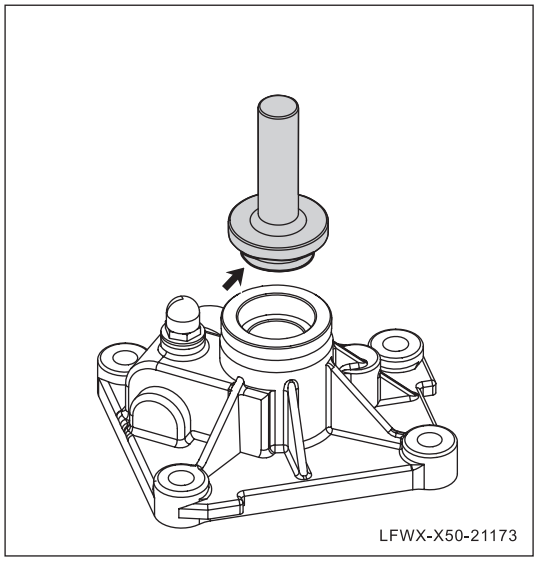
1. ASSEMBLE THE SHIFT COVER

(a) Install the vent valve and fasten the vent valve bolt.



(b) Install the 5th-speed-reverse interlock cam and springs into the shift cover holes.
Press it tightly to align the 5th-speed interlock cam opening with the pin hole; and then mount the 5th-speed reverse interlock cam pin.

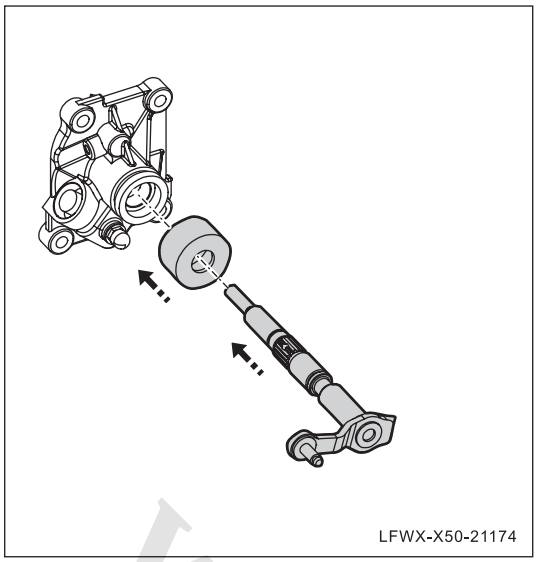
(c) Seal the pin opening by sealing balls with sealant.



(d) Install the shift cover oil seals by mounting tool for oil seal.

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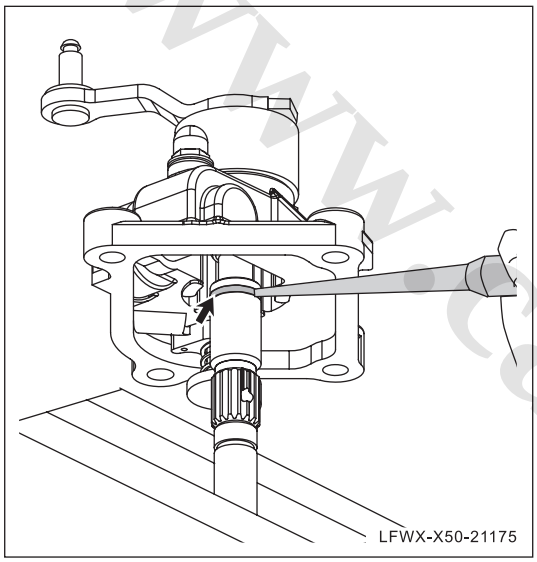


2. INSTALL THE SHIFT GUIDE SHAFT

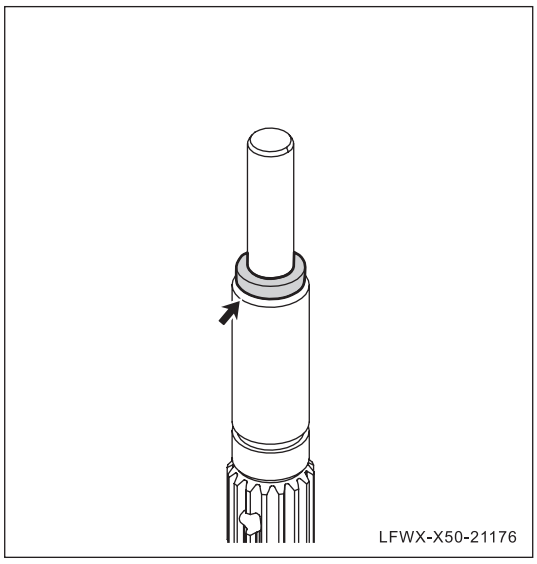
(a) Install the shift guide shaft sheath into the shift cover.

NOTICE:

Do not damage the shift cover oil seal when mounting the shift guide shaft.



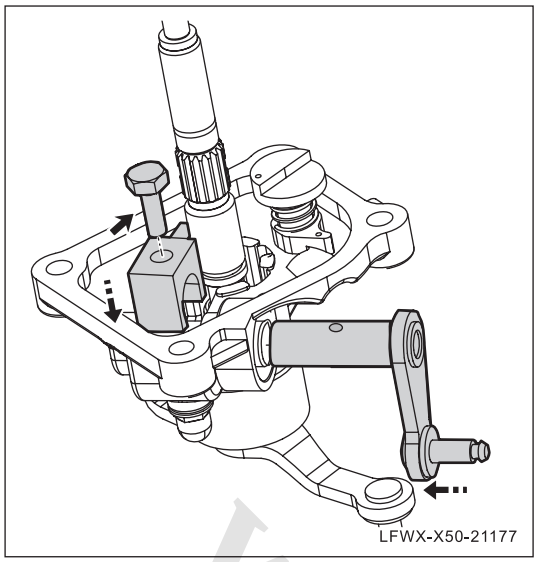
(b) Install the shift guide shaft washers into the shift guide shaft circlip groove.



(c) Install the shift guide shaft nylon washers into the shift guide shaft.

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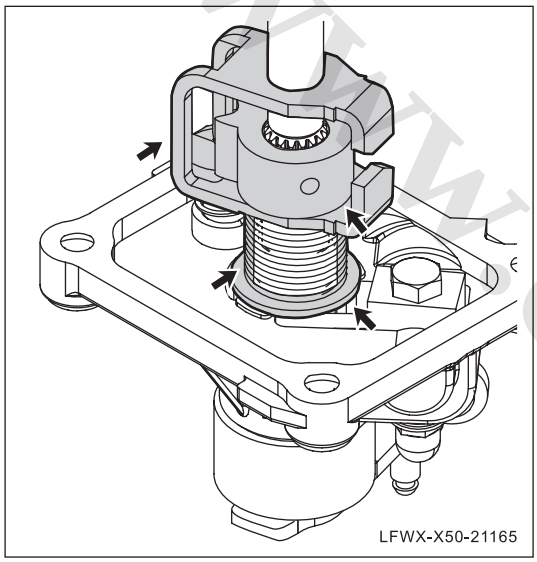
3. INSTALL GEAR SHIFT SWING LINK.

(a) Install the gear shift swing link into the shift cover groove and then insert the gear shift swing arm.

(b) Rotate the gear shift swing arm to align bolts with the gear shift swing link bolt holes; mount and tighten the gear shift swing link bolts.

NOTICE:

Do not damage the shift cover oil seal when mounting the gear shift swing arm.

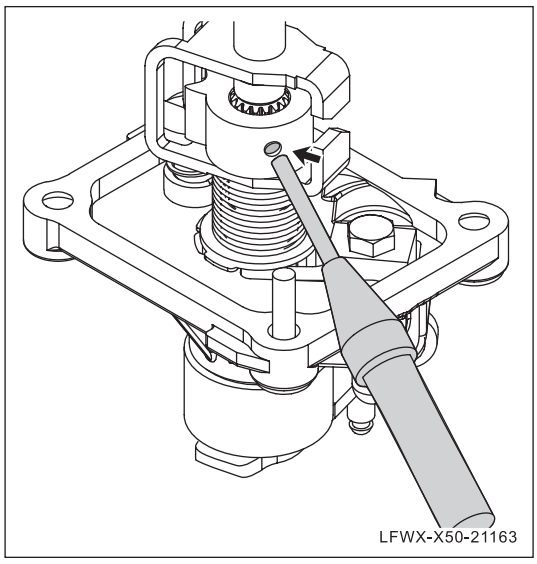


4. INSTALL GEAR SHIFT SWING LINK.

(a) Mount successively the return spring seat, the return spring, the gear shift swing link and the interlocking bracket of the gear shift swing link onto the shift guide shaft.

NOTICE:

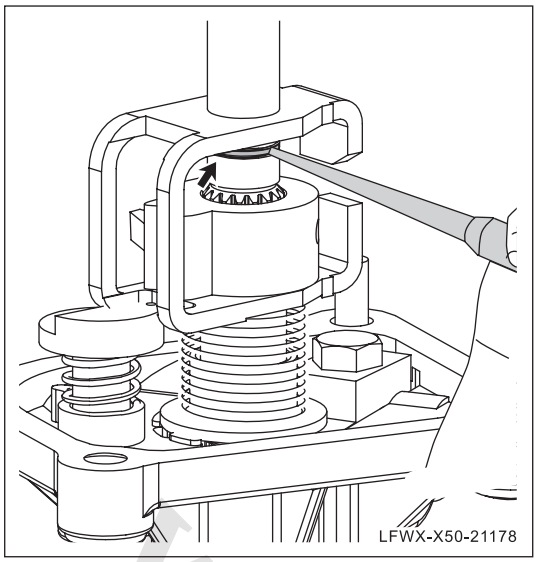
Align the pin hole with the shift guide shaft pin hole when mounting the gear shift swing link; mount and remove it according to marks.



(b) Push the gear shift swing link elastic cylindrical pin into the gear shift swing link pin hole.

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(c) Install circles onto the shift guide shaft

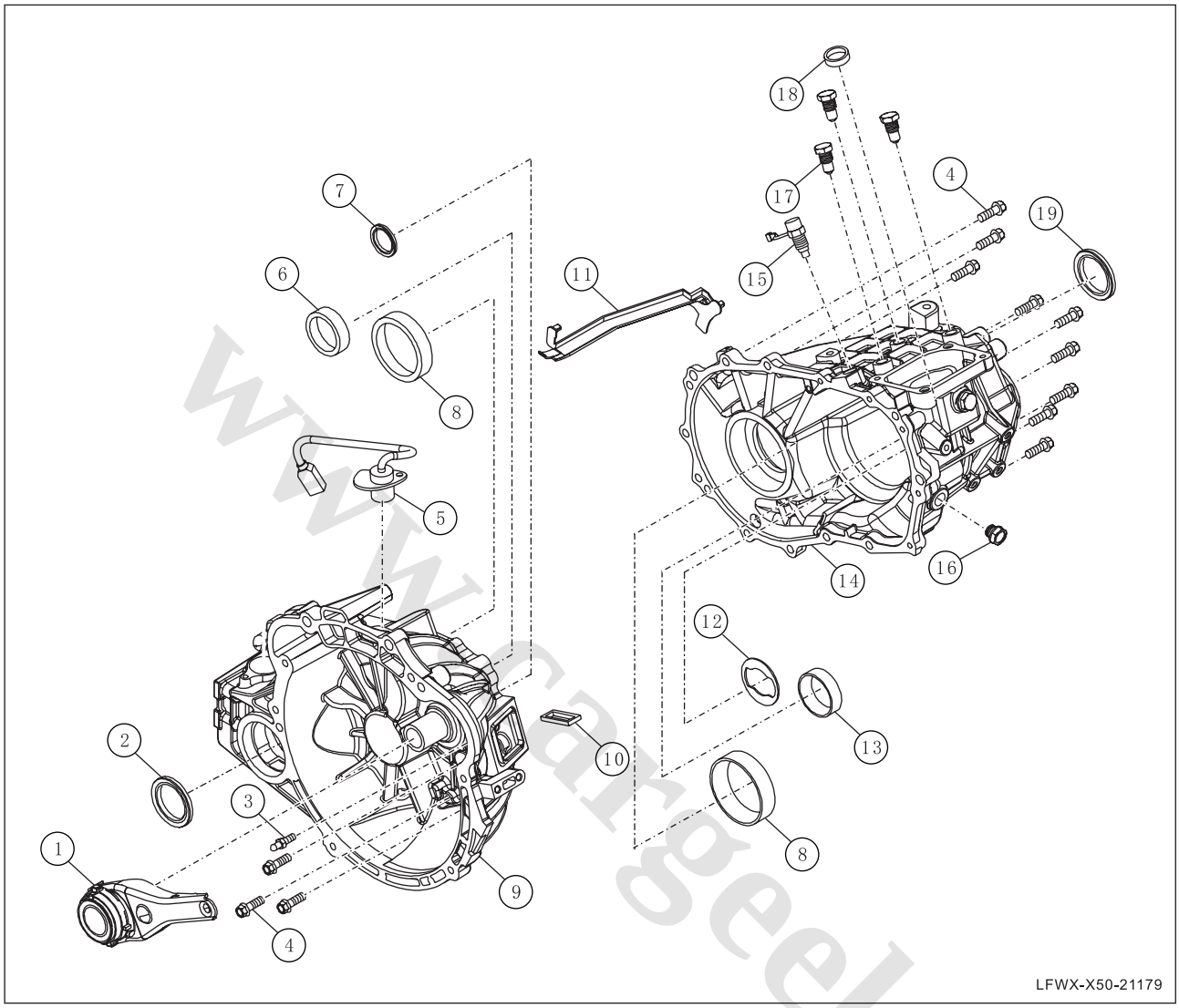
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HOUSING ASSEMBLY

COMPONENTS



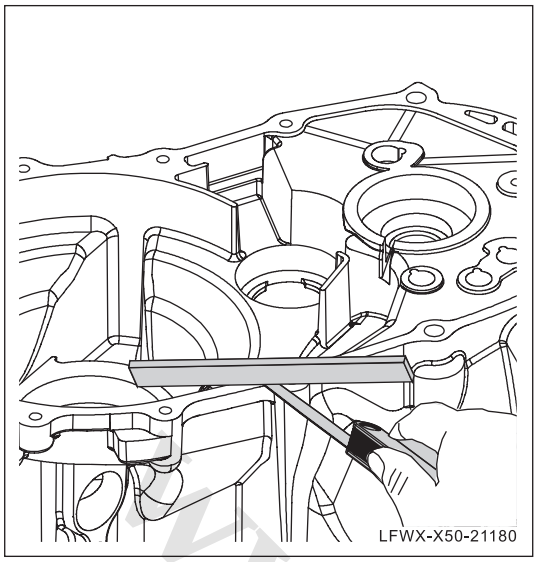
1	Clutch fork
2	Oil seal
3	Ball stud
4	Connecting bolt
5	Crankshaft position sensor
6	External sleeve of output shaft front bearing
7	Input shaft oil seal
8	External sleeve of differential bearing
9	Clutch housing
10	Ferromagnet

11	Oil guide groove
12	Input shaft gasket
13	External sleeve of output shaft rear bearing
14	Transmission housing
15	Reverse light switch sensor
16	Oil drain bolt
17	Damper bolt
18	Shift guide shaft sleeve
19	Oil seal

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CHECK



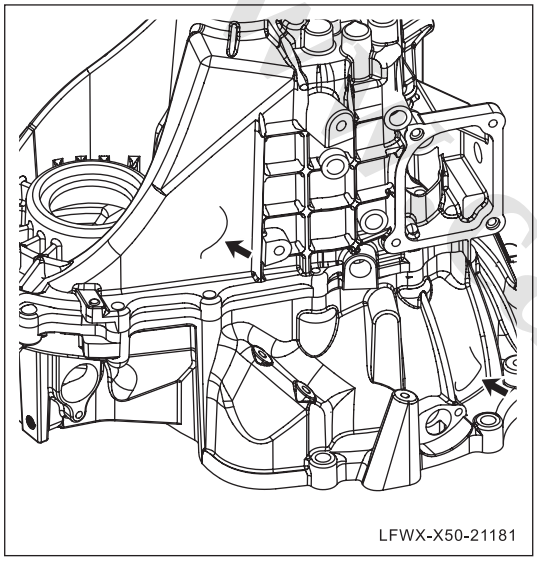
1. CHECK HOUSING ASSEMBLY

(a) Use a flat steel ruler and a feeler gauge to measure flatness of the contacting surface between the clutch housing and the transmission housing, and flatness of the shift cover contacting surface; if measured value is out of standard requirements, repair or replace to avoid oil leakage.

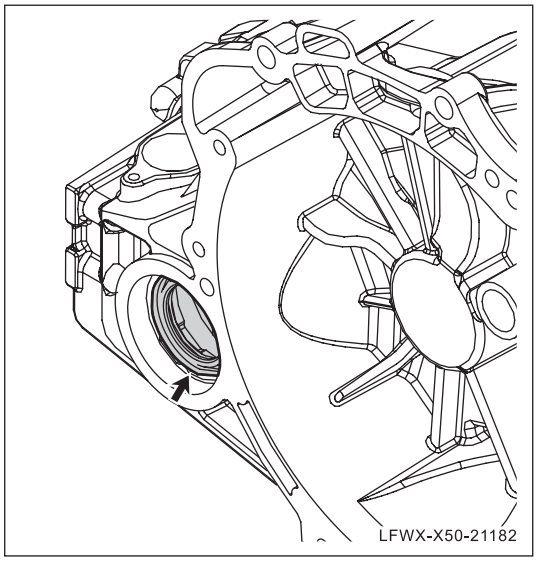
Wear limit: 0.2mm

△ HINT:

Move the steel ruler and the feeler gauge in different directions during inspection; after measuring many times, you may obtain rather correct values.



(b) Check if the housing assembly is cracked or damaged; replace it when necessary.

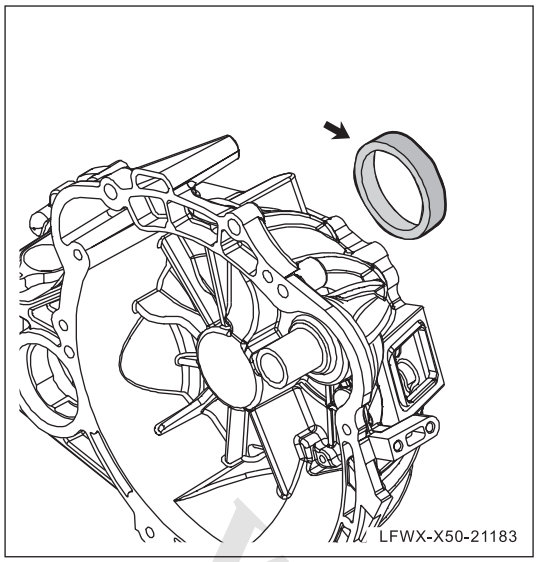


2. CHECK HOUSING OIL SEALS

(a) Check oil seals in both sides of differential and the input shaft oil seals for damage and obvious oil leakage; replace oil seals when necessary.

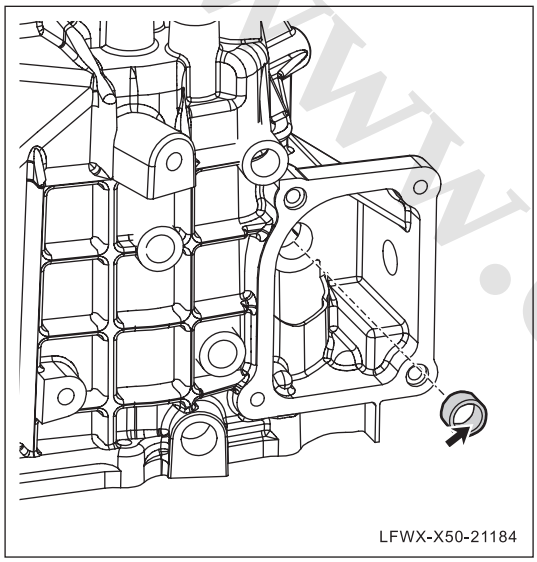
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3. CHECK TAPERED ROLLER BEARING EXTERNAL SLEEVE.

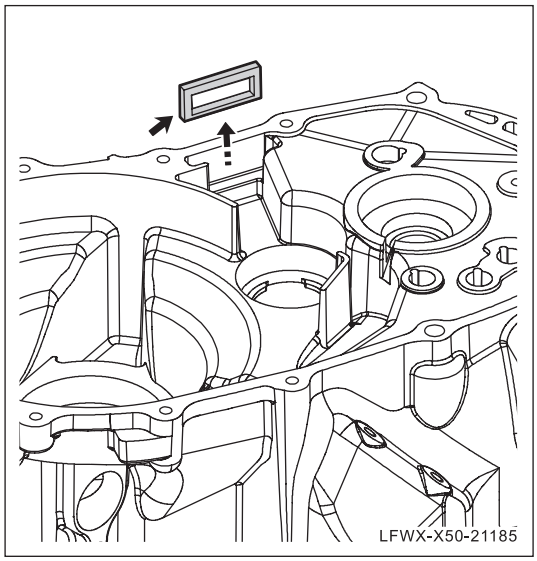
(a) Check if the differential and the upper/lower tapered roller bearing external sleeves of the output shaft are worn. Replace the whole tapered roller bearing when necessary.



4. CHECK SHIFT GUIDE SHAFT SLEEVE

(a) Check if the shift guide shaft sleeve is internally worn; if worn, replace the gear sleeve.

REPLACEMENT

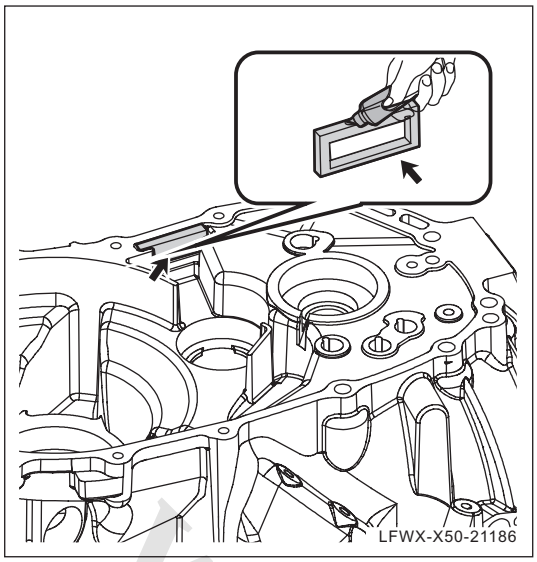


1. REMOVE CLUTCH HOUSING SQUARE MAGNET.

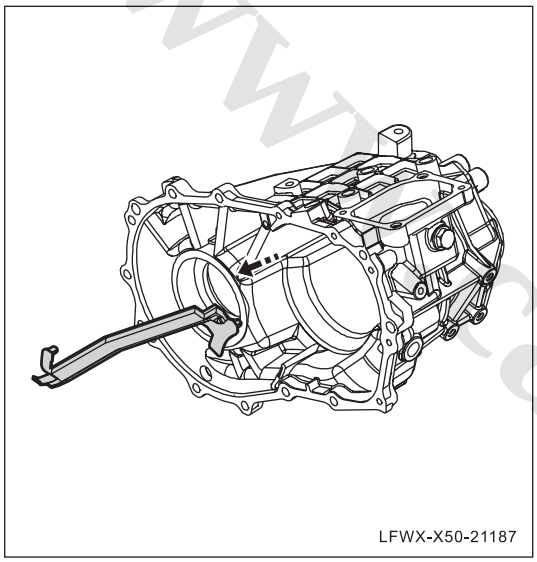
(a) Take out the square magnet from the clutch housing, and use a clean cloth to wipe off scrap iron on the square magnet.

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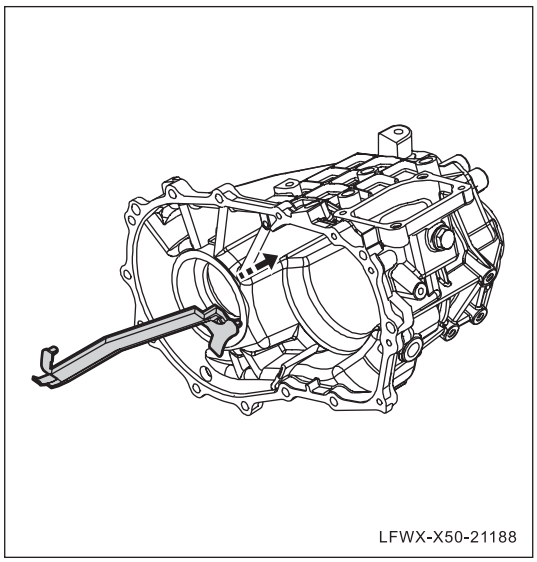


(b) Smear anarobic sealant on the contacting surface between the square magnet and the housing; attach securely it onto the clutch housing.



2. REPLACE OIL GUIDE GROOVE

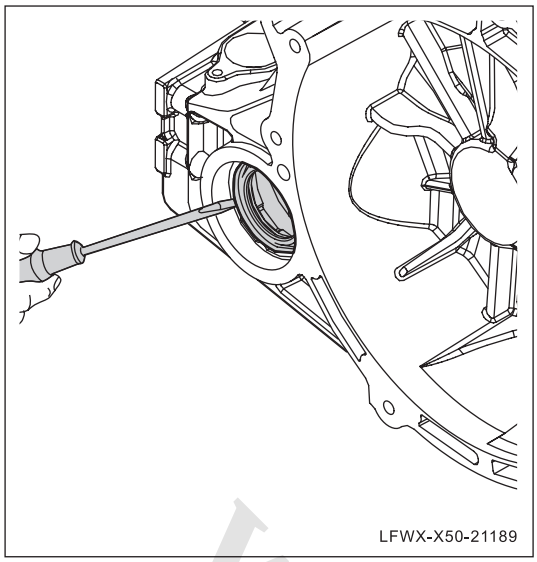
(a) Remove the transmission oil guide groove from the transmission housing.



(b) Install the oil guide groove on the transmission housing.

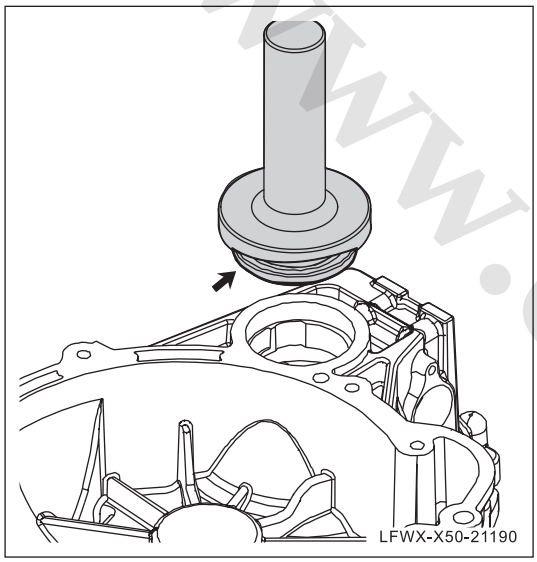
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3. REPLACE HOUSING OIL SEAL.

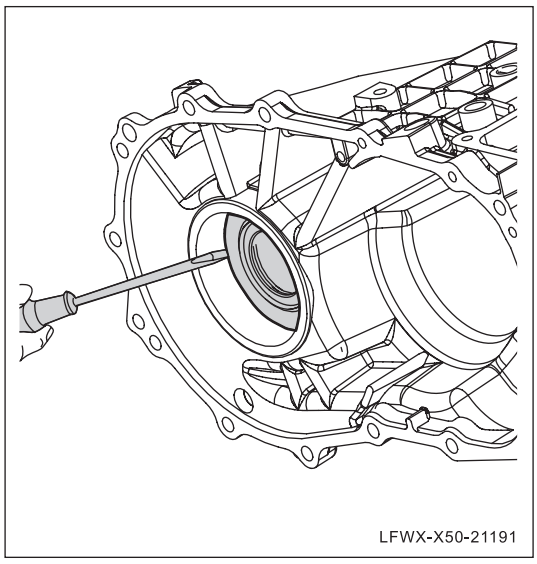
(a) Remove the differential axle shaft oil seal by a screwdriver.



(b) Install the differential axle shaft oil seal by an oil seal mounting device.

NOTICE:

Pay attention to the mounting direction of oil seal in installation.

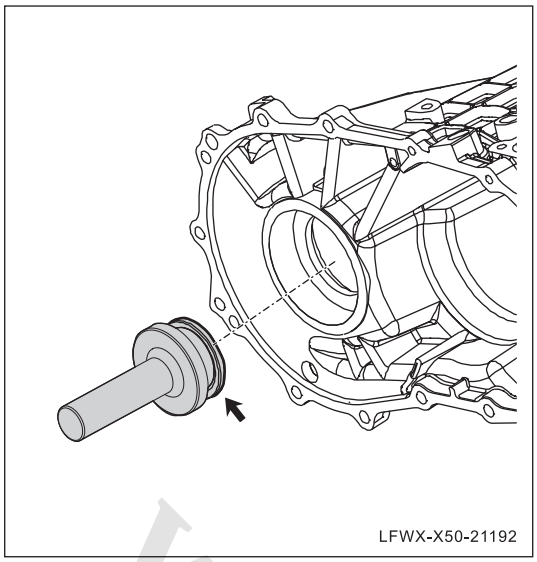


(c) Use a screwdriver to remove the input shaft oil seal.

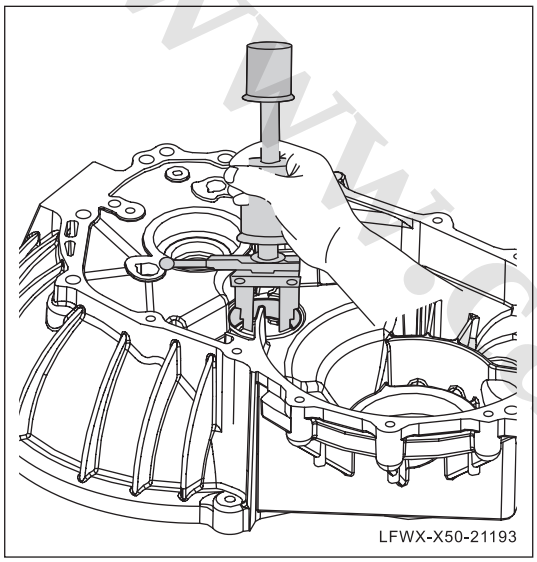
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(d) Install the input shaft oil seals by an oil seal mounting device.



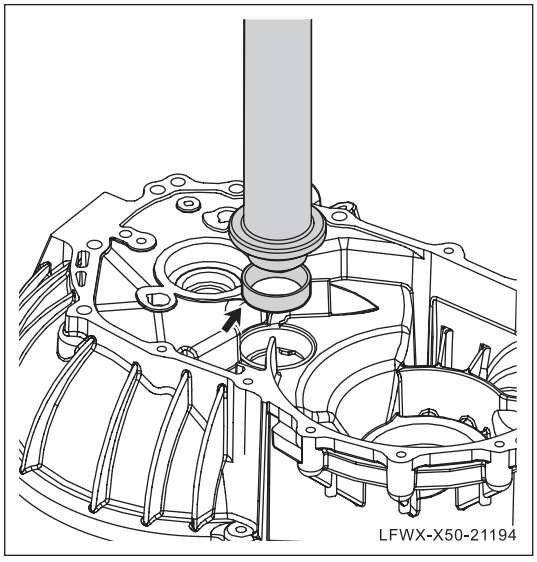
4. REPLACE BEARING EXTERNAL SLEEVES OF THE OUTPUT SHAFT AND THE DIFFERENTIAL.

(a) Remove the output shaft upper/lower bearing external sleeve by special remover.

(b) Remove the differential upper/lower bearing external sleeve by special remover.

NOTICE:

The tapered roller bearing and the external circle must be replaced in pair.

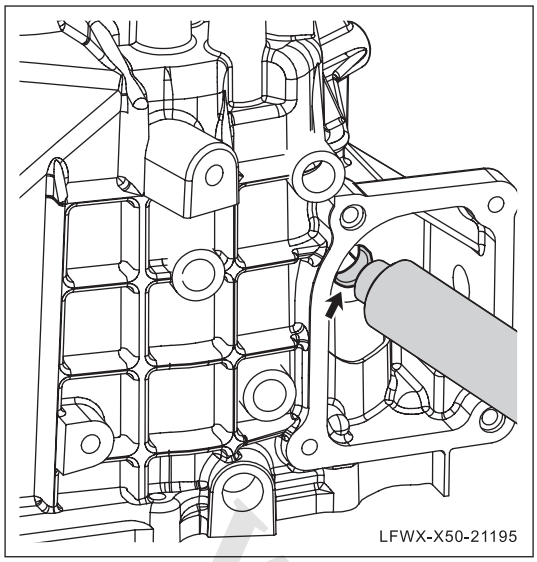


(c) Install the output shaft bearing external sleeve onto the fitting position by a bearing external sleeve installation punch.

(d) Install the differential bearing external sleeve onto the fitting position by a bearing sleeve installation punch.

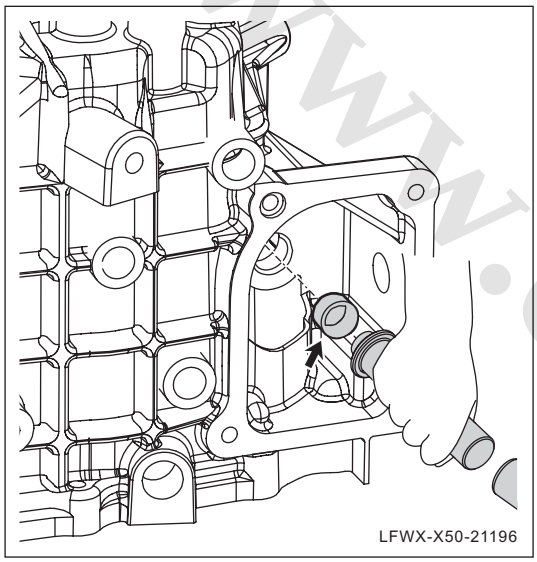
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5. REPLACE SHIFT GUIDE SHAFT SLEEVE

(a) Push out the shift guide shaft sleeve from the housing by a punch.



(b) Install the sleeve installation punch and mount the sleeve onto the fitting position.

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Continuously Variable Transmission (CVT)

Automatic transmission.....22-1
System description.....22-1
Preparation.....22-5
Service data.....22-5
Precautions.....22-6
Components.....22-8
Circuit diagram.....22-10
On-vehicle inspection.....22-11
Diagnosis.....22-21
Read and clear of DTCs.....22-21
Read the data flow.....22-21
Fault symptom table.....22-23
Symptom diagnosis.....22-24
DTC list.....22-32
DTC diagnosis.....22-35
Transmission fluid.....22-48
Replacement.....22-48
Transmission assembly.....22-51
Replacement.....22-51
Wheel speed sensor.....22-57
Replacement.....22-57
Pressure sensor.....22-58
Replacement.....22-58
Oil pan.....22-59
Replacement.....22-59
Solenoid valve.....22-61
Replacement.....22-61
TCU assembly.....22-63
Replacement.....22-63
Shift bracket assembly.....22-64
Replacement.....22-64
Shift flexible shaft assembly.....22-66
Replacement.....22-66
Oil cooler.....22-68
Replacement.....22-68
Differential oil seal.....22-70
Replacement.....22-70

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AUTOMATIC TRANSMISSION

SYSTEM DESCRIPTION

1. FUNCTION

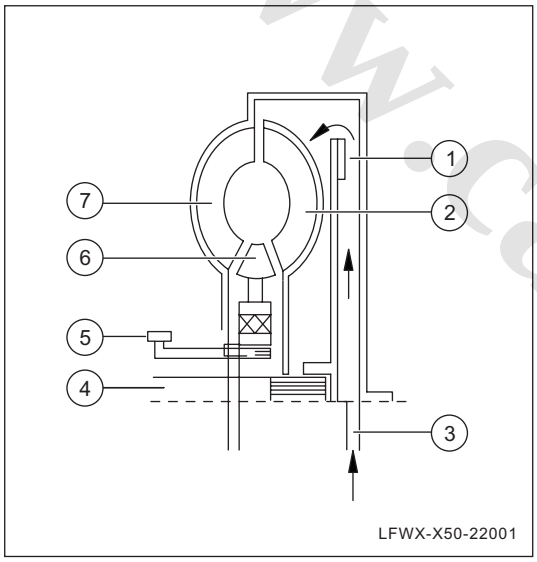
This model is equipped with continuously variable transmission (“CVT”). According to the driver's needs, CVT performs forward, reverse, parking operations, and changes vehicle speed during driving.

2. COMPONENTS

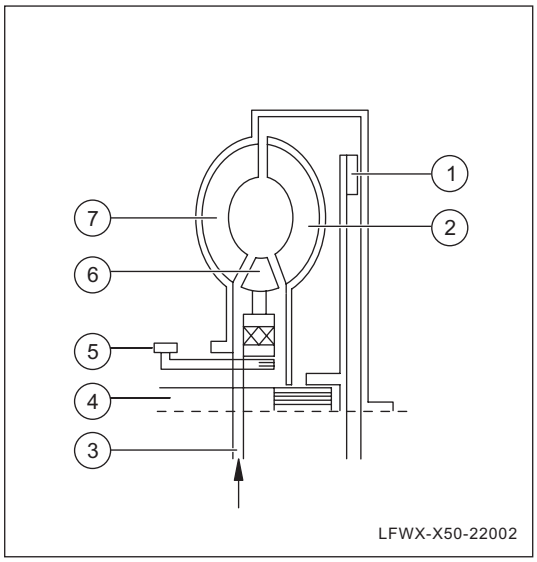
CVT mainly consists of hydraulic torque converter, metal belt transmission, fuel supply system, automatic shift control system, lock operator, self-diagnosis system, transmission fluid cooling system, etc.

(a) Hydraulic torque converter.

Hydraulic torque converter is located at the front-most end of the automatic transmission and installed on the flywheel of the engine. Engine power is transmitted to the input shaft of the CVT by using the kinetic energy through the circulating flow of the transmission fluid, and the transmission ratio and torque ratio will be changed automatically in a certain range according to the changes of the vehicle running resistance, having functions of deceleration and increasing torque.



1. Lock-up clutch mechanism
2. Turbine
3. Hydraulic torque converter oil line (releasing)
4. Input shaft
5. Fuel pump
6. Idler wheel
7. Impeller



1. Lock-up clutch mechanism
2. Turbine
3. Hydraulic torque converter oil line (lock-up)
4. Input shaft
5. Fuel pump
6. Idler wheel
7. Impeller

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There is a certain sliding between the pump wheel and the turbine in the hydraulic torque converter. Especially, it will reduce fuel economy when the vehicle is running at a high speed. This will be eliminated by applying hydraulic torque converter locking device. When the locking device is connected to the turbine, transmission control unit ("TCU") will activate the locking clutch solenoid valve, and then the locking clutch solenoid valve will control the locking control valve, to guide the fluid to lock or release the hydraulic torque converter. Locking hydraulic pressure is applied to the locking feed pipe of the hydraulic torque converter to force the friction lining of the locking device to come into contact with the pump pulley, thus generating a mechanical connection and eliminating the sliding between the pump pulley and the turbine. Releasing hydraulic pressure is applied to the releasing feed pipe of the hydraulic torque converter to force the friction lining to lose contact with the pump pulley, thus re-enabling the hydraulic connection between the pump pulley and the turbine.

TCU monitors the relationship between vehicle speed and throttle position, and determines when to lock the hydraulic torque converter.

Hydraulic torque converter locking system may reduce roughness and impact during separating and locking processes. TCU activates the locking solenoid valve and makes the oil pressure change gradually and applied to the locking control valve, which slows the engagement and disengagement of locking clutch, thus achieving a smooth operation.

To speed up the engine preheating at a low temperature, TCU will inhibit the locking if the engine temperature is below 40˚C .

(b) Metal belt transmission mechanism.

Metal belt transmission mechanism consists of two conical discs and a steel chain. Conical disc is a drive disc with a V-shaped groove formed by combining two cone-shaped discs together. Conical disc makes axial movement under the thrust of the hydraulic pressure, extruding the steel chain to adjust the width of the V-shaped groove. When the conical disc moves inwardly, the steel chain will outwardly move away from the center of the circle in centrifugal direction under the extrusion of the conical disc. In this way, disc diameter driven by the steel chain will be increased, making the transmission ratio change accordingly.

(c) Fuel supply system.

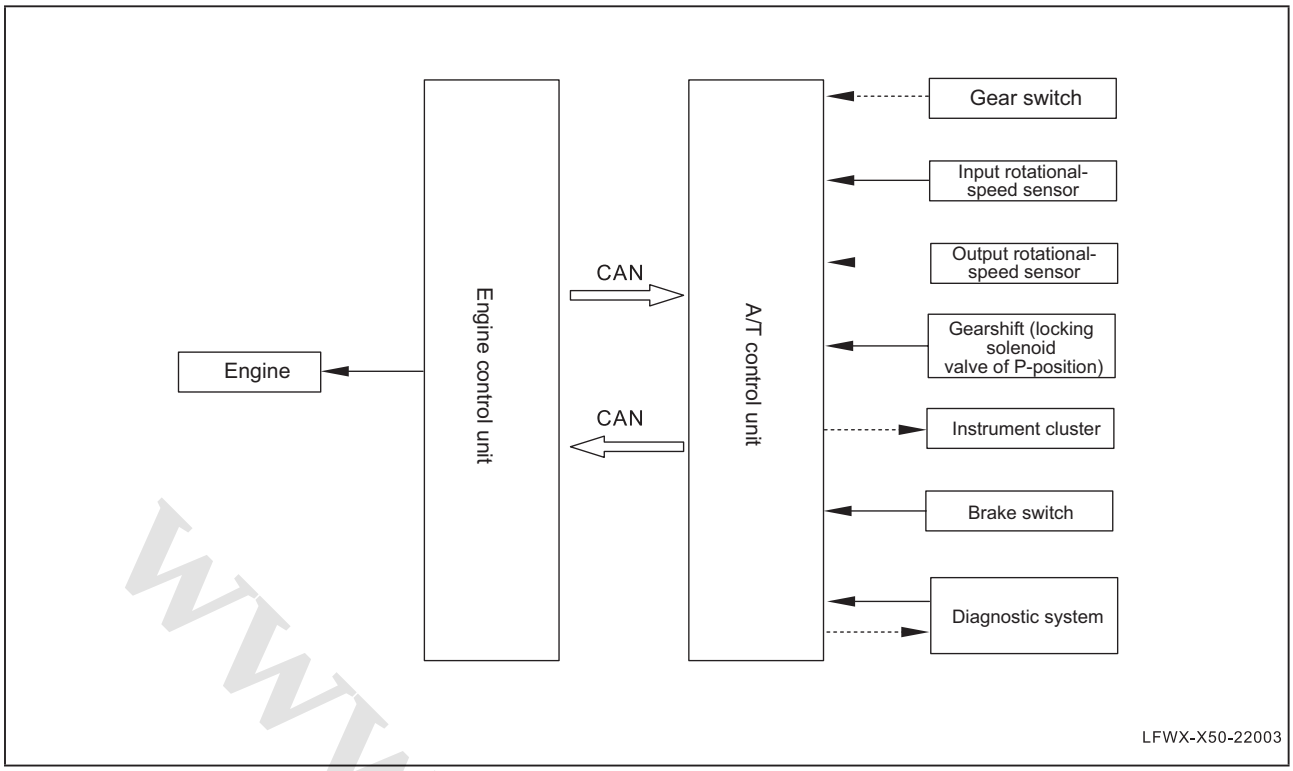
CVT's fuel supply system mainly consists of oil pump, filter, pressure regulator and oil duct. As one of the most important assemblies of CVT, oil pump is usually mounted on the rear of the torque converter, and is driven by the bushing at the back end of the torque converter housing. When the engine is running, no matter whether the vehicle is running or not, the oil pump will continuously work, and provide oil pressure for the torque converter, shift actuator, and automatic shift control system, while the oil pressure is adjusted by the pressure regulator.

(d) Automatic shift control system.

CVT monitors the operating state of the vehicle and the engine through sensors and switches, and the collected data will be converted into electrical signals and input into the control unit. According to the input electrical signals, control unit will send instructions to control the opening and closing of the solenoid valve so as to change the oil lines to the respective shift executors (clutch and brake), thus controlling the gear shift time and position to achieve automatic transmission. See the figure below.

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(e) Lock operating mechanism.

To avoid mis-operation by the driver, lock operating mechanism is set in CVT and controlled by the solenoid valve. If the ignition switch is switched on while the brake pedal is not depressed, the shift lever is not allowed to shift out from P.

(f) Self-diagnostic system.

If you turn the ignition switch to "ON", the system will perform self-diagnosis. If the system is not operating properly, the fault indicator lamp will be illuminated, and relevant fault codes are stored in the fault memory. The fault codes will be read by using a vehicle fault diagnostic scanner.

(g) Transmission fluid cooling system.

Transmission fluid temperature will rise with long-time or high-speed driving, slowing down CVT's response. Excessively high oil temperature will shorten the service life of transmission fluid. For a better operation of CVT, this vehicle is equipped with transmission fluid cooling system. It is installed independently at the front of the engine radiator, taking away heat of transmission fluid by using flowing air through transmission fluid cooler.

NOTICE:

Pay attention not to damage the radiator fins of the transmission fluid cooler while cleaning the vehicle.

3. WORKING PRINCIPLE

Automatic transmission adopts a drive belt together with an active and passive belt wheel featuring a variable working radius to transmit the power.

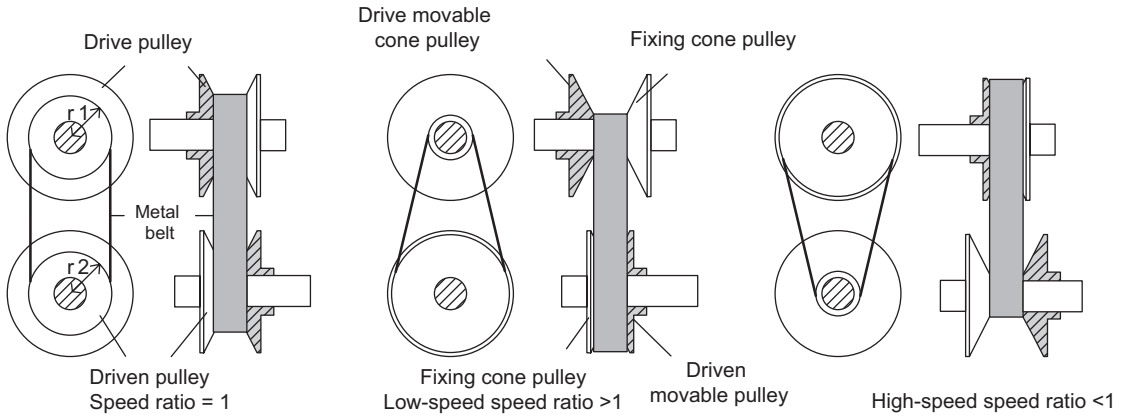
Its principles are:

- Firstly, the electronic control unit sends a control signal based on the driving mode and throttle openness to control the pressure of master and driven cylinder.
- Then, the movable bevel gear shaft on the driving and driven pulley shaft is driven by the hydraulic cylinder and moved axially to change the pitch radius r1 of the drive pulley and the pitch radius r2 of the driven pulley, so as to change speed ratio i=r2/r1 of CVT. The pitch radius can be varied continuously within its effective range, so it is possible to continuously change the speed ratio within the speed range (0.442 - 2.432) only if the CVT controls the

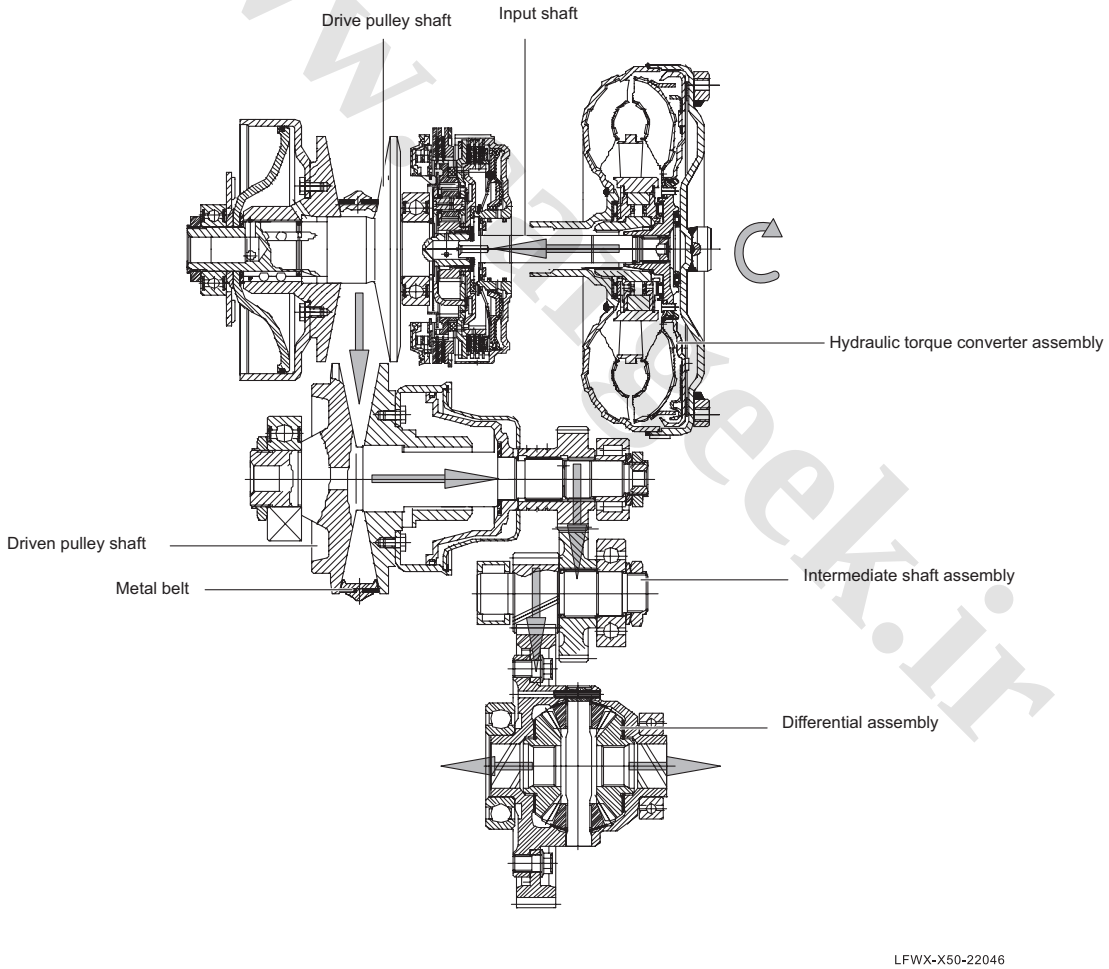
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pressure of the drive and driven pulley cylinders. See the figure below.



4. CVT MAIN TRANSMISSION COMPONENTS AND TRANSMISSION ROUTE MAP

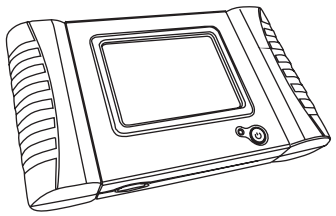
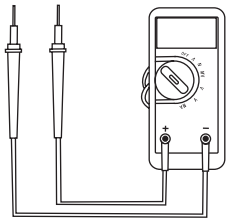
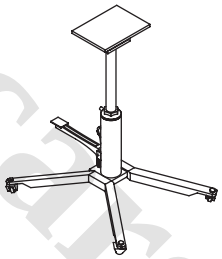


Power transferring route: Engine → Hydraulic torque converter assembly →Input shaft → Drive pulley shaft → Metal belt → Driven pulley shaft → Intermediate shaft assembly → Differential assembly → Axle shaft → Wheel

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PREPARATION

S/N	Tools	Outline diagram	Description
1	Diagnostic scanner		CVT fault diagnosis
2	Digital multimeter		Used for measuring voltage or resistance.
3	Support top		Disassembling and assembling CVT assembly

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Net weight (kg)	About 61
Maximum input torque (N•m)	150
Maximum input speed (rpm)	6000
Normal working temperature (°C)	-40 - 120
Maximum overall dimensions (mm)	364×448×417
Transmission total oil consumption (L)	5.8
CVT overall speed ratio	2.32 - 12.75
Reverse speed ratio	11.205
Final drive ratio	5.242
Transmission fluid type	CVTF-EX1

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2. TIGHTENING TORQUE TABLE

Item	N•m
Oil pan magnetic oil drain plug	40
Connecting bolt between engine and transmission	55 - 65
Engine left mounting fixing bolt	65 - 85
Starter fixing bolts	80 - 86
Torque converter fixing bolt	26 - 30
Transmission check plate fixing bolt	55 - 65
Lower trim panel fixing bolt of the engine compartment	8 - 12
Engine rear mounting fixing bolt	185 - 225
(Drive) Wheel speed sensor fixing bolt	9 - 11
(Driven) Wheel speed sensor fixing bolt	9 - 11
Pressure sensor	21 - 25
Oil pan fixing bolt	9 - 11
Oil filter mounting bolt	11
Fixing bolt of TCU assembly	8 - 12
Shift-gear support assembly fixing bolt	20 - 25
Selector and shift flexible shaft bracket fixing nut	8 - 12
Oil cooler upper bracket fixing bolt	8 - 12
Pressure sensor protection cover supporting plate mounting bolt	21

PRECAUTIONS

1. CONSIDERATIONS FOR VEHICLE DRIVING WITH CVT

(a) Before driving, you should check the safety status of the vehicle and confirm that it is free of any safety risk before start-up.

(b) When you start the engine, depress the brake pedal, and let the gear shifting handle kept at the P (parking) position or N position (at any other position, you can not start the engine).

(c) After the engine is started, check the instrument fault lamp, and if there is any fault lamp flashing, immediately contact the nearest authorized service station for troubleshooting.

(d) If the engine is idling at a higher speed just after started, you need to have it fully heated, and never engage gears to move until the idle speed becomes normal (about 800 rpm).

(e) Correct starting method: depress on the brake pedal → engage the required driving gear → release the hand brake → release the brake pedal gradually → depress the accelerator pedal gently → start to move (Never start with a large throttle after the required driving gear is engaged. Otherwise, the CVT may have shorter service life).

(f) Before shifting gears (between P, R, N and D or P, R, N and S), you should ensure that the vehicle has completely stopped (During running, only the D and S gears or E/D mode can be switched).

(j) If any abnormality is found during the process of the vehicle driving, immediately contact the nearest authorized service station for troubleshooting but never continue to drive long in case of “sickness”, so as to avoid damage to the important parts of the vehicle.

(h) Never engage Gear N for sliding while the vehicle is running. Otherwise, the CVT will be damaged due to poor lubrication.

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(i) Correct parking method: depress on the brake pedal gently → decelerate to stop → engage the P (parking) gear → pull up the hand brake → release the brake pedal.

(j) If the vehicle needs to be towed, its drive wheels should be kept off the ground in advance.

(k) The CVT uses special lubricating oil, so never use any other CVT fluid not specified. Otherwise, the CVT will be seriously damaged. If the CVT fluid needs to be replaced, contact the authorized service station.

2. CONSIDERATIONS FOR REPLACING THE CVT ASSEMBLY

(a) Protect the CVT peripheral parts, such as the pressure sensor, speed sensor, gear switch, wire harness and wire harness plug.

(b) When demounting the CVT, do keep it level to prevent the torque converter from coming out; after the CVT is demounted, mount the torque converter baffle in time, install the differential plug and put the CVT in its package and fix it firmly.

(c) When mounting the CVT, keep it level to prevent the torque converter from coming out.

(e) When mounting the drive shaft, you should ensure the cleanliness of the drive shaft to be installed into the differential.

3. PRECAUTIONS FOR INSPECTION OR REPAIR

(a) Before CVT inspection, check whether the ambient environment is in line with the requirements of working conditions:

- Smoke and fire are strictly prohibited. Ensure that the fire extinguishing equipment is used as required.
- The working place should be unimpeded and unobstructed, and have good ventilating effect without the risk of being poisoned due to gas retention.
- Spare part and tools should be placed neatly, and the floors, working tables should be clean and free from moisture.

(b) Before inspection, check that protective kit such as safety shoes, work gloves, and safety goggles is available or have worn or such equipment is available, so as to ensure personal safety.

(c) During inspection, operations must be done according to the relevant instructions, e.g., relevant instruction manual should be referred to before using lifts, maintenance equipment and special tools.

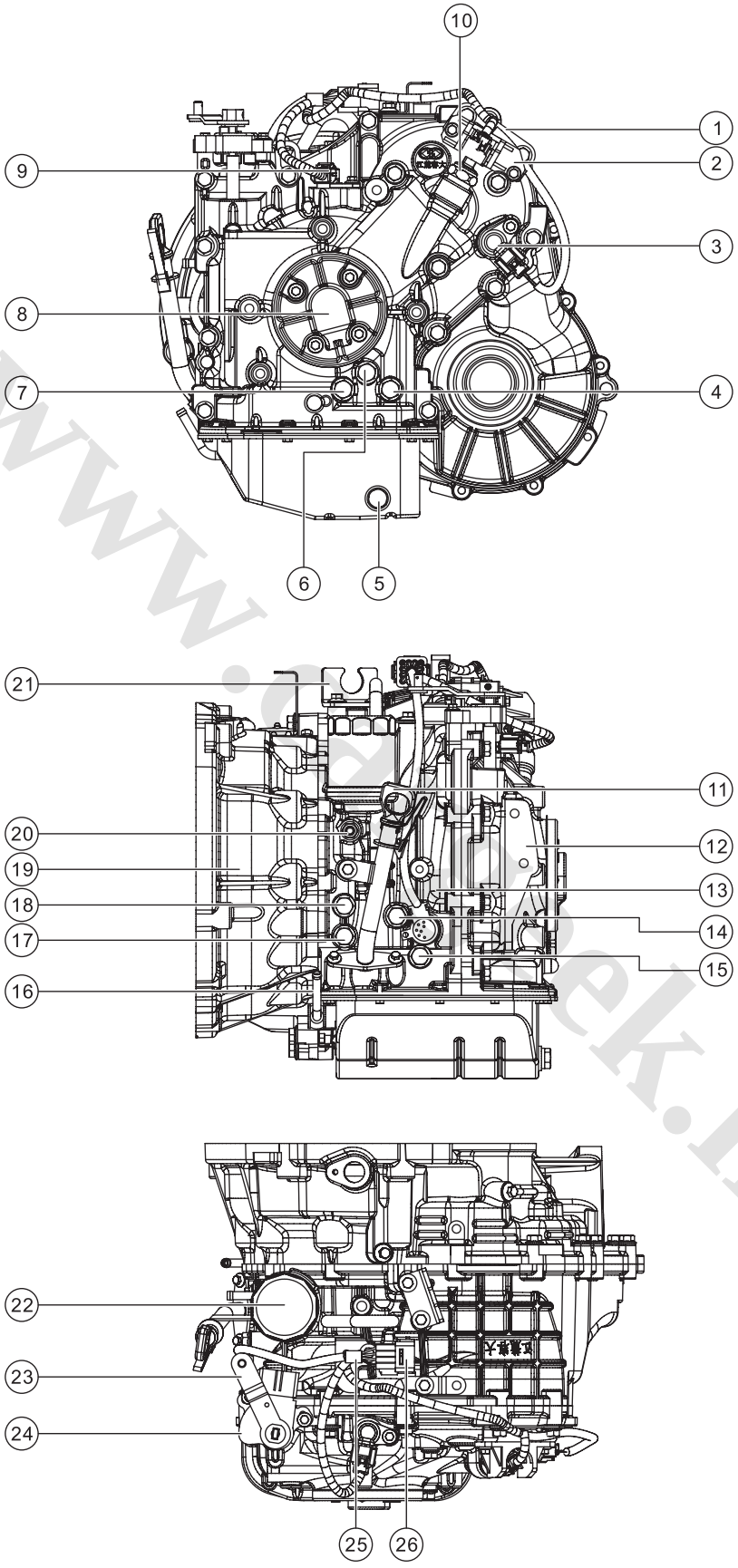
(d) When maintaining all the components and parts of CVT, you should:

- Make sure that appropriate measures have been taken to protect the vehicle, such as wearing protective sleeves for the seats and the steering wheel.
- When disassembling the parts sticking together, use aluminum or lead tools if the pars are ferrous materials; use wood or resin tools if the parts are aluminum material.
- When performing maintenance, be sure to operate in strict accordance with the tightening torque and adjustment data specified in the maintenance manual.
- Replace one-time gaskets, O-rings, oil seals, clamps, self-locking nuts, bolts and all ineffective parts in strict accordance with the stipulations in the maintenance manual.
- After dismantling the CVT's components and parts, be sure to take protective measures to prevent the system piping or the precision parts from contamination.
- Always use genuine parts for replacement. The use of other parts will make the CVT work abnormally and even damage the engine.

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COMPONENTS



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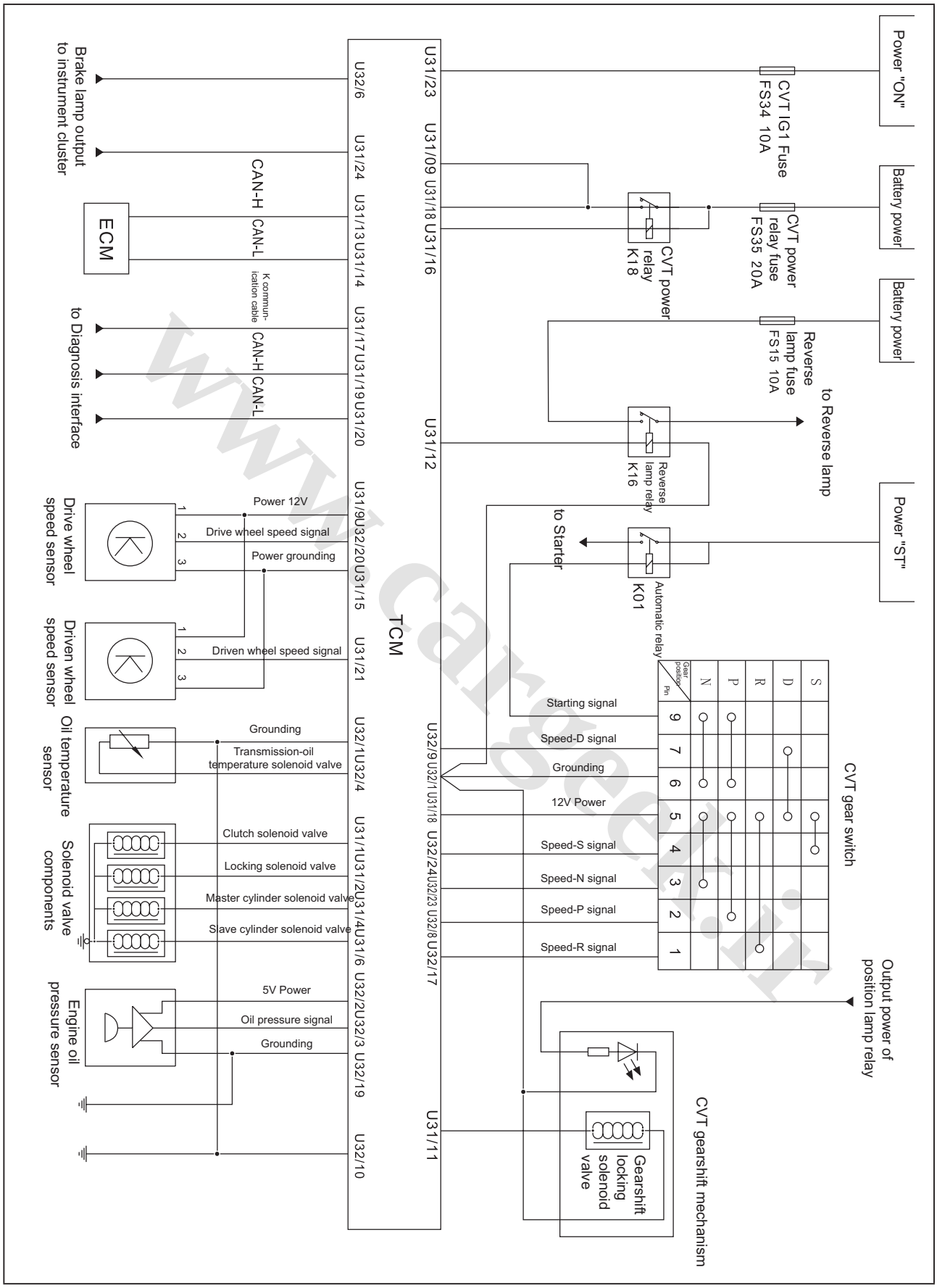
1	Support plate of pressure sensor protection cover
2	Assembly of pressure sensor protection cover
3	(Passive) Speed sensor assembly
4	Pressure measurement point of the system pressure (passive pressure)
5	Oil drain plug
6	Lubrication pressure measurement point
7	Active pressure measurement point
8	Rear end cap
9	(Active) Speed sensor assembly
10	Pressure sensor
11	Dipstick assembly
12	Rear housing
13	Middle housing
14	Pressure measurement point of reverse gear clutch cylinder
15	Pressure measurement point of forward gear clutch cylinder
16	Oil return pipe
17	Unlocking pressure measurement point
18	Locking pressure measurement point
19	Rear housing
20	Delivery connection body
21	Cable bracket
22	Filter
23	Control rod weldment
24	Gear level switch assembly
25	Housing wire harness assembly
26	Gearbox wire harness plug

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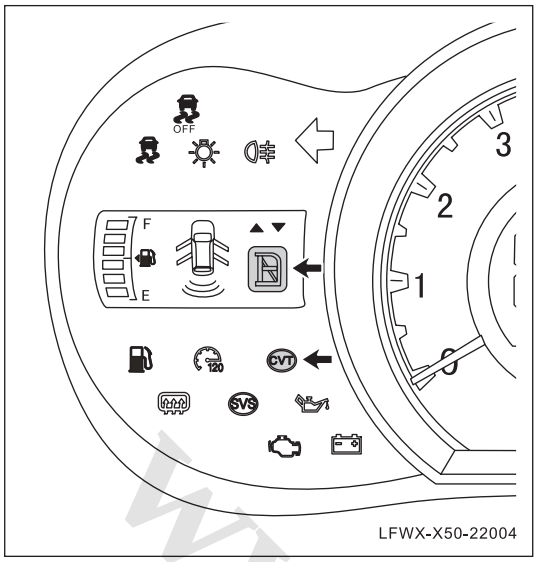
CIRCUIT DIAGRAM



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ON-VEHICLE INSPECTION



1. CHECK THE LAMPS OF INSTRUMENT CLUSTER

(a) Turn the ignition switch to "ON", and check whether the CVT fault indicator lamps will go out after a few seconds of self-test.

(b) Manipulate the shift lever to check whether the gear indications on instrument cluster are the same as those of the actual shift lever.

△ HINT:

If not, it means that the system is faulty.

2. FUNCTIONAL INSPECTION OF CVT

△ HINT:

Functional inspection of CVT is to check the CVT's overall performance and analyze its fault causes, which will simplify complex issues and bring targeted diagnosis.

Steps	Inspection Item		Recommended action
1	**Check before starting the engine** When the shift lever is in "P", turn the ignition switch from "OFF' position to "ON" position. (Do not start the engine) Check whether CVT fault indicator lamp goes off after self-test and whether the gear indicator displays the current transmission gear	YES	Go to Next Step
		NO	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
2	**Inspection of shift lever** • Push the shift lever button while the brake pedal is depressed to ensure that the shift lever can be shifted to other gears other than P • The shift lever cannot be shifted from P to other gears if the brake pedal is not depressed. • Move the shift lever and check that there should be no "external force", "friction", "noise" or "vibration". • Make sure that each gear can be engaged smoothly when the shift lever is shifted among various gear positions.	YES	Go to Next Step
		NO	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
3	**Checking if the engine starts** • Place the shift lever in P or N • Start the engine Check if the engine starts.	YES	Go to Next Step
		NO	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table

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Steps	Inspection Item		Recommended action
4	**Inspection of P function** • Shift the shift lever to P • Turn ignition switch to "OFF" position. • Release the parking brake • Push the vehicle forward or backward Check whether the vehicle is moving or not when the vehicle is being pushed forward or backward.	YES	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
		NO	Go to Next Step
5	**Inspection of R function** • Shift the lever to R • Checking whether the reverse lamp will be illuminated. • Release the parking brake • Release the brake pedal Check whether the vehicle is moving backward.	YES	Go to Next Step
		NO	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
6	**Inspection of N function** • Start the engine • Shift the lever to N • Release the parking brake Check whether the vehicle is moving forward.	YES	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
		NO	Go to Next Step
7	**Inspection of D function** • Shift the lever to D • Release the brake pedal for a few seconds Check whether the vehicle is moving forward slowly.	YES	Go to Next Step
		NO	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
8	**Inspection of gear impact when shifting from N to R** • Depress the brake pedal • Shift the lever from N to R Check whether there is a huge impact when shifting the shift lever from N to R.	YES	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
		NO	Go to Next Step
9	**Inspection of gear impact when shifting from N to D** • Depress the brake pedal • Shift the shift lever from N to D Check whether there is a huge impact when shifting the shift lever from N to D.	YES	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Symptom Table
		NO	The inspection is completed.

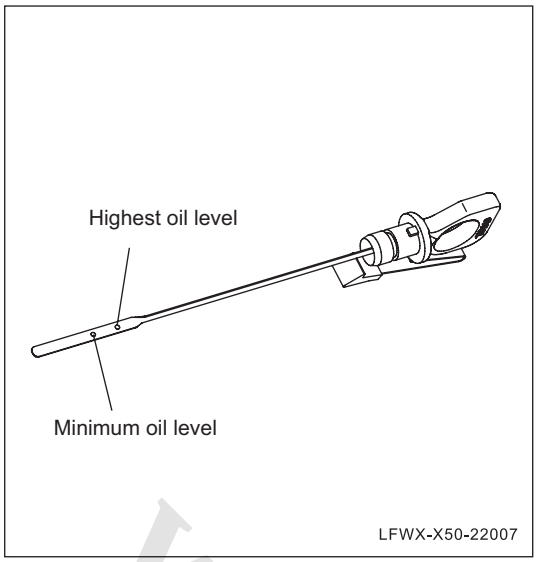
3. INSPECTION OF OIL LEVEL AND OIL QUALITY OF CVT

NOTICE:

- Be sure to use the specified transmission fluid when adding or completely replacing the oil.
- Measure the oil level when transmission temperature is 50 - 80℃ .
- The shift lever must be placed in P when checking the oil level.
- When the transmission is very hot, removing the oil drain plug will make the hot transmission fluid erupt from the outlet, resulting in serious personal scald. Be sure to cool the CVT before removing the oil drain plug.

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(a) Check the oil level.

- Place the vehicle on the flat ground.
- Be sure to pull up the parking brake lever to prevent the vehicle from sliding
- Start the engine when the transmission gear is in P; after the CVT runs for about 10 min, pull out the oil dipstick, and the oil level should be within two graduations on the oil dipstick when the vehicle is idling. See left figure.

△ HINT:

If the oil is insufficient, then special CVT fluid shall be added. If there is too much oil, then drain the excessive transmission fluid through the drain plug drain.

(b) Inspection of oil quality.

△ HINT:

- Due to the special internal structure of CVT products, and high precision requirements for the parts, so the housing can be dismantled and maintained only by special tools and equipments, and it can be inspected and tested only by special equipments after being maintained. In order to ensure the product quality, strictly follow the specification requirements.
- The CVT is subject to oil inspection for every 20000 km, and determine whether the special oil for CVT is changed in terms of the oil condition. Oil inspection, judgement methods and replacement steps:
- Taking the oil.

  Pull out the CVT dipstick, and suck about 100 - 200ml oil with a transparent rubber hose from the oil filler, or release a small amount of CVT fluid from the drain plug.

△ HINT:

Use a clean ware to hold the oil. Clean the oil outlet before taking oil from the oil drain plug. Prevent the oil from spilling on other parts of CVT when taking the oil.

- Judgement of oil quality.

  Judge the oil quality by means of viewing or smelling, it shall be replaced with new oil in case of either of following conditions. If the oil condition is not normal, refer to the table below for treatment:

Oil condition	Possible causes	Required operations
Paint-like (light brown or dark brown and sticky)	Clutch is burnt	Check the CVT assembly and replace the defective parts and CVT fluid
Milk white or turbid	There is water in the CVT fluid	Check the CVT assembly and replace the defective parts and CVT fluid
A large amount of metal powder is mixed.	There is abnormal wear in the CVT	Check the CVT assembly and replace the defective parts and CVT fluid
It flows like water.	Low viscosity, oil failure	Check the CVT assembly and replace the defective parts and CVT fluid
Sticky mud colloidal state	CVT is seriously worn out	Check the CVT assembly and replace the defective parts and CVT fluid

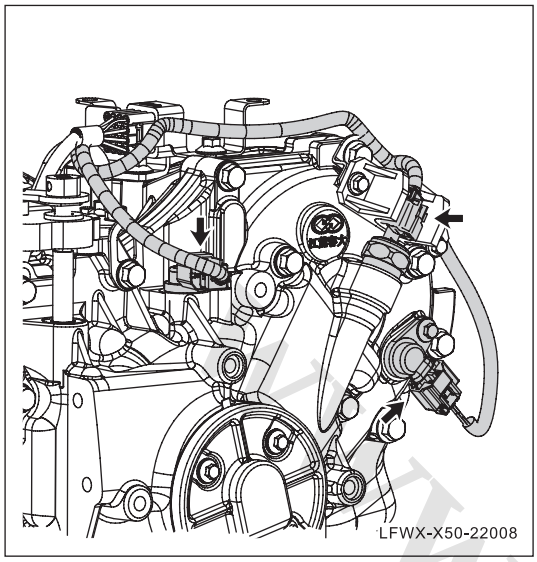
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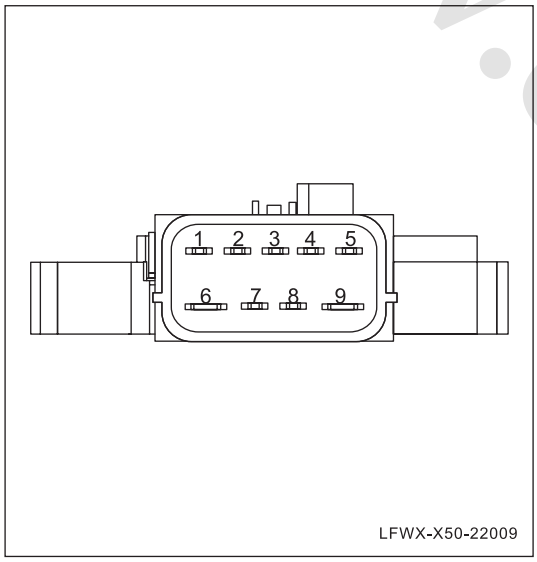
4. BASIC INSPECTION OF THE PERIPHERAL PARTS OF CVT AND INSPECTION OF THE SENSOR ACTUATOR

(a) Check transmission fluid leak.

Check whether the oil pan, filter, plugs, oil seals, sensors, CVT, engine, oil cooler inlet pipes and other positions have oil leakage.


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(b) Check whether the sensors (1 pressure sensor, 2 speed sensors) are broken and whether the wire harness is loose.



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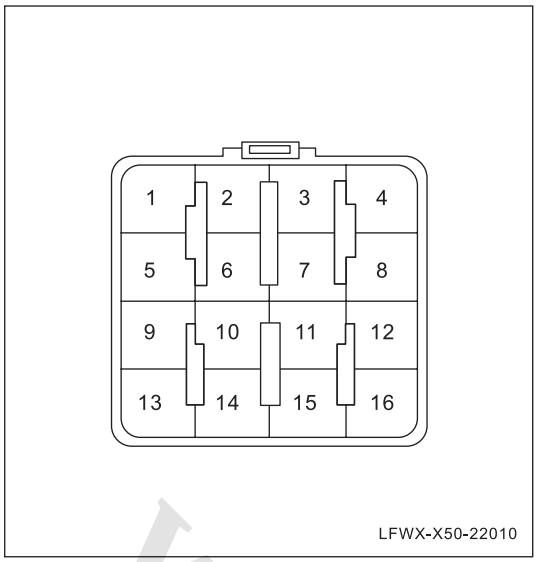
(c) Check whether the gearshift switch has any visual damage and whether the wire harness connector is loose.

(d) Check the continuity among various pins on the shift switch with a digital multimeter.

Gears	Terminal	Status
P	5 - 2	Continuity
	6 - 9	Continuity
R	5 - 1	Continuity
	6 - 9	Not continuity
N	5 - 3	Continuity
	6 - 9	Continuity
D	5 - 7	Continuity
	6 - 9	Not continuity
S	5 - 4	Continuity
	6 - 9	Not continuity

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(c) Check the solenoid valve and the oil temperature sensor assembly.

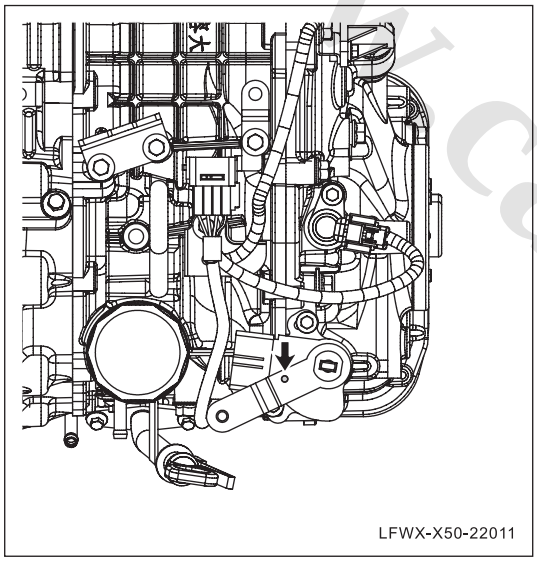
- Unplug the transmission wire harness connector and check whether there is any pin deformed or withdrawn.

△ HINT:

As the solenoid valve is inside CVT, conduct inspection through the wire harness connector of CVT.

- Measure the respective resistance values of the solenoid valves with a multimeter on the corresponding pins.

Name	Terminal	Status
Proportional pressure-reducing valve	6 - 16	6 - 8Ω
Proportional overflow valve	5 - 16	6 - 8Ω
Solenoid on/off valve	8 - 16	14 - 18Ω
high speed on/off valve	10 - 16	3.4 - 4.4Ω

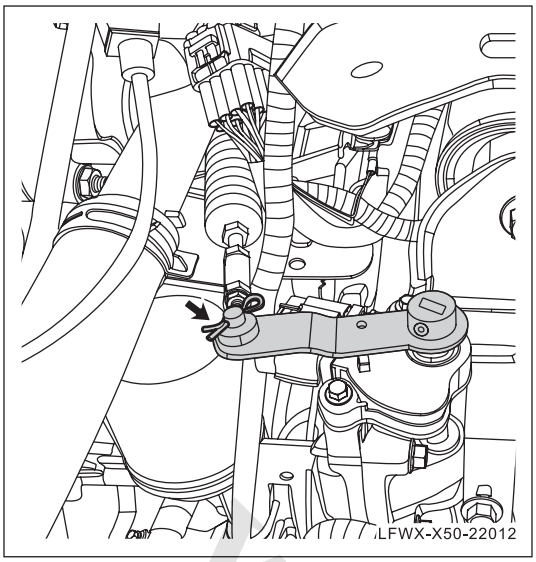

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(d) Check mechanical matching.

- Check whether the hole of the lever welded part aligns with the hole of the shift switch in N position.

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- Check the matching between the gearshift cable and the CVT lever.

△ HINT:

- Gearshift cables should be able to move up and down freely in the corresponding gears after the latches on the fixing gear cable of the lever is removed.
- Remove the cable, and have the gear shifter and the CVT engaged in the same gear to see whether the cable can be easily mounted onto the lever. If not, then you need to adjust the cable length, or the cable bracket distance.

5. MECHANICAL SYSTEM TEST PREPARATION

(a) Pull up the parking brake, and use the wheel brake blocks on the front and rear wheels.

(b) Check engine oil level. (See Section 16-Lubrication System Lubrication System, On-vehicle Inspection)

△ HINT:

If the oil level is not correct, solve the oil level problem first.

(c) Check engine coolant level. (see 15 - Cooling System, Cooling System, On-Vehicle Inspection)

△ HINT:

If the coolant level is too low, identify its cause, and then proceed to the next step after the problem is solved.

(d) Check the CVT fluid level, and check for CVT fluid leakage.

(e) Connect the diagnostic scanner, and check the engine idling and ignition timing.

6. CVT FLUID PRESSURE TEST

(a) Prepare mechanical system test.

(b) Connect the diagnostic scanner, and read the data flow of "slave cylinder pressure" of CVT.

(c) Start the engine till the CVT "oil temperature" reaches 50 - 80 ℃ after running for about 10 min, then check the CVT fluid volume, and add oil if necessary.

(d) Always keep the brake pedal fully depressed, and measure the pipeline pressure of all gears at the idle speed. In the meantime, write down the pressure values.

Pipeline pressure reference values:

Engine RPM	Gears	Pipeline pressure (Mpa)
Idle speed	N	2.2
	R	2.2
	D	2.2
	S	2.2

(e) Judge the possible fault according to the test results:

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Test result	Possible causes
Pipeline pressure values in all gear positions are lower than the reference values	Engine idle speed is too low
	CVT fluid pressure sensor failed
	Drive pulley cylinder gasket is broken through
	Oil filter in the oil pump suction port is clogged
	Slave cylinder solenoid valve seized
	Oil pump is seriously worn
Pressure in N is normal, while pressure in R is low	Seal ring of the reverse clutch cylinder is damaged
Pressure in N is normal, while pressures in D and S gears are low	Seal ring of the forward clutch cylinder is damaged
Pipeline pressure values in all gear positions are higher than the reference values	CVT fluid pressure sensor fails
	Slave cylinder solenoid valve is seized

7. CVT STALL TEST

(a) Prepare mechanical system test.

(b) Connect the diagnostic scanner, and read the data flow of "engine speed" of CVT.

(c) Start the engine till the CVT "oil temperature" reaches 50 - 80℃ after running for about 10 min.

NOTICE:

Be sure to fix the front and rear wheels with the parking brake or the blocks to prevent the vehicle from sliding.

(d) Depress the brake pedal, and place the gearshift lever in D.

(e) Depress the accelerator pedal slowly while depressing the brake pedal.

(f) Quickly read the stall speed. Then release the accelerator pedal quickly.

NOTICE:

During testing, do not depress the accelerator pedal for more than 5s. Otherwise, the CVT may be damaged.

(g) Shift the gearshift lever to N to make the engine run for 1 min or longer, thus cooling the CVT fluid.

(h) Perform stall test in P gear position by using the same methods specified in steps c - f.

Standard stall speed values: 2250 ± 150 rpm

(i) Shut down the engine.

(j) Judge the possible fault according to the test results:

Test result	Possible causes
Stall is greater than the standard value in D gear only	Forward gear clutch fault
Stall is less than the standard value in D and R gears	Fault of the engine and hydraulic torque converter clutch
Stall is greater than the standard value in D and R gears	Pipeline pressure is low (Mpa)
	Fault of drive pulley, driven pulley or metal belt

8. CVT DELAY TEST

(a) Prepare mechanical system test.

(b) Start the engine.

NOTICE:

Be sure to use the parking brake and the position wheel brake block to prevent the vehicle from

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slipping.

(c) Operate the engine till the CVT "oil temperature" reaches 50 - 80℃ after running for about 10min.

(d) Shift the gearshift lever from N to D.

(e) Measure the time spent from the shifting to the vibration felt with a stopwatch. Record 3 measurement results for each test and calculate the average value with the following formula.

Formula: Average time lag = (time 1+ time 2+ time 3)/3

(f) Perform the test from N to R according to the above methods.

Standard delay time reference values:

Gearshift change	Time spent
From N to D	Less than 1 s
From N to R	Less than 1.2 s

(g) Judge the possible fault according to the test results:

Test result	Possible causes
Time spent from N to D is longer than the standard time	Main oil line pressure is too low
	Forward gear clutch fault
Time spent from N to R is longer than the standard time	Main oil line pressure of the reverse gear is too low
	Reverse gear clutch fault

9. TCU TESTING

NOTICE:

If TCU assembly is replaced in the after-sales service, the new TCU assembly should be given a functional test after replacement.

Specific operation process is as follows:

(a) Firstly, make sure that the vehicle is in stationary state, then place the shift lever in P, and release the brake pedal and the accelerator pedal.

(b) Turn the ignition switch to "ON" position (without starting the engine).

(c) Depress the accelerator pedal to its limit.

(d) Release the accelerator pedal and depress the brake pedal.

(e) Place the shift lever in R.

(f) Place the shift lever in N.

(g) Place the shift lever in D.

(h) Place the shift lever in S.

(i) Place the shift lever in P.

(j) Turn the ignition switch to "START" position, and then start the engine.

(k) Wait until the system pressure self-test is completed (3s).

(l) Drive the vehicle on road for test, with the speed greater than 20km/h.

(m) If there is no fault, the fault lamp will go out and the off-line detection will be completed.

△ HINT:

During the off-line detection, your can judge the detection status of each step by means of the instrument scale display and fault lamp status. If the fault lamp status has no change, then check the current

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item, and continue to complete the following operations after troubleshooting.

10. CLUTCH ADAPTIVE ADJUSTMENT

NOTICE:

If the vehicle suffers from excessive gear shift impact, you need to complete the clutch self-adaption adjustment.

Specific operation process is as follows:

(a) Clutch self-adaption shall firstly satisfy the following conditions:

- The vehicle should be stopped.
- Depress on the brake pedal in the whole procedure.
- Check whether the CVT fails (simply judged as follows: Start the engine before the clutch self-adaption operation, check whether the CVT fault lamp is always on, and if so, it indicates that the CVT has failed. Otherwise, it is normal), and if there is any fault, you must first trouble-shoot it. Otherwise, never carry out self-adaption operation of the clutch.

(b) Operation process:

- Turn the ignition switch to the “ON” position (do not start the engine) engage the gearshift handle to the “N” gear, and the dashboard will display the "N" gear.
- Step down the brake pedal, and simultaneously step the accelerator pedal to the bottom (with the accelerator opening of 100%). Notice that the CVT fault lamp on the instrument panel will flash once, at that time, immediately release the accelerator pedal, and turn the ignition switch to the “START” position to start the engine. Moreover, make sure that the time of the flashing of CVT fault lamp to starting the engine shall not exceed 10s. After engine starting, if the CVT fault lamp is on all the time, it indicates that TCU has entered the mode of clutch self-adaption operation, otherwise, shut down the engine, remove the ignition key, and repeat above operation after delay for 5s (TCU is completely powered off).

(c) After the engine is idling stably, follow the steps below:

Steps	Contents
1	N Gear
2	Engage the R gear
3	Wait for 3s
4	Judge whether the R gear is subject to any gearshift impact
5	If there is any gearshift impact in Gear R, repeat Step 1 - 4 until no impact appears and then return to Gear N
6	N Gear
7	Engage the D gear
8	Wait for 3s
9	Judge whether D gear is subject to any gearshift impact
10	If D gear is subject to any gearshift impact, repeat Step 6 - 9 until no impact appears and then return to N gear
11	After R gear and D gear have their gearshift impact well adjusted, push the gear shift handle to the P-gear position, stop the engine, and then the clutch self-adaption process has been completed.
12	Restart the engine, and check whether there is a shift impact during shifting; otherwise, repeat the Step 1 - 11 for realignment

△ HINT:

Exit conditions if the operator has entered the clutch self-adaption mode by mistake:

- Stop the engine and it will automatically exit the clutch self-adaption mode.

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- When the vehicle speed is greater than 5km/h, it will automatically exit the clutch self-adaption mode.
- When the time exceeds 10s from the CVT fault lamp flickering to the engine start-up, the clutch self-adaption mode will exit.

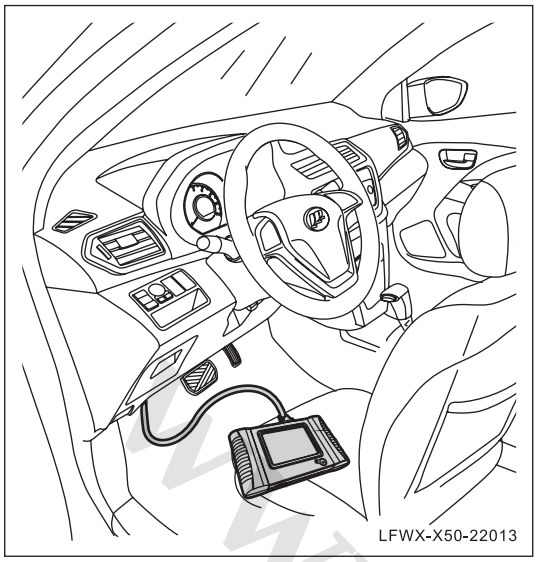
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DIAGNOSIS

READ AND CLEAR OF DTCS



1. READ AND CLEAR OF DTCS

(a) Connect a diagnostic scanner to the diagnosis interface.

(b) Select "Powertrain" and enter "Automatic Transmission (CVT)".

(c) Read the DTC or clear the DTC.

READ THE DATA FLOW

1. READ THE DATA FLOW

(a) Connect the diagnostic scanner to the diagnostic interface.

(b) Select "Powertrain" and enter "Automatic Transmission (CVT)".

(c) Read data flow.

NOTICE:

Stationary state refers to the data flow reference value when the engine is not started;

Idle state refers to the data flow reference value when the engine idles when the air conditioner is not started, and the CVT is in the neutral position.

Item	Data flow	Description
Engine RPM	2039rpm	Roughly in line with the engine speed
Drive wheel speed	0rpm	About 48.63 times of the vehicle speed
Driven wheel speed	0rpm	Roughly in line with the engine speed during driving
Slave cylinder pressure	1.41Mpa	Pressure is 1.41 MPa in N and P gears, and the pressure is greater than or equal to 2 MPa in R, D, S and D gears, with the pressure value ranging from 0 to 6 MPa
Throttle opening	9	Display the current opening percentage of the engine throttle valve, with the opening ranging from 0 to 100
Accelerator pedal opening	4	Display the current percentage of the accelerator pedal, with the opening range of 0 - 100
Oil temperature	44	Display the current transmission fluid temperature, with the temperature ranging from -40℃ to 120℃
Gear position signal	P	Display the current CVT gear information, P, R, N, D and S gear positions are available

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Item	Data flow	Description
Brake signal	0	Display whether the current brake pedal is depressed or not, with “0” indicating that the brake pedal is not depressed, and “1“ indicating that the brake pedal has been depressed
Normal idle speed is used to adjust the control volume offset value of the forward gear clutch	3	
Normal idle speed is used to adjust the control volume offset value of the reverse gear clutch	2	
High idle speed is used to adjust the control volume offset value of the forward gear clutch	0	
High idle speed is used to adjust the control volume offset value of the reverse gear clutch	0	
Off-line inspection state	Off-line detection is completed	

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FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Diagnostic scanner cannot communicate with TCU	1. Diagnostic interface fuse (blown out) 2. Wire harness or connector (loose, open or short circuit) 3. TCU (damaged)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (1. Diagnostic scanner cannot communicate with TCU)
CVT fault indicator lamp does not illuminate, and gear indicator displays incorrectly or does not display	1. Instrument cluster (damaged) 2. Wire harness (loose, open or short circuit) 3. TCU (damaged)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (2. CVT fault indicator lamp does not illuminate, and gear indicator displays incorrectly or does not display)
The engine cannot be started when the shift lever is in P or N	1.Gear switch (damaged) 2. Wire harness (loose, open or short circuit) 3. Starter system (damaged)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (3. The engine cannot be started when the shift lever is in in P or N)
Gear P can't be pulled out	1. CVT power lines (damaged) 2. Mechanical fault of shift mechanism (loosening, open circuit or short circuit) 3. Shift lock solenoid valve (damaged) 4. Wire harness (loose, open or short circuit)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (4. P gear cannot be pulled up)
Great impact will be generated when shifting from N to R or D	1. Engine (mechanical or control system failed) 2. CVT fluid (insufficient or poor quality) 3. Pipeline pressure (too low) 4. Gear signal line (poor contact)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (5. Great impact will be generated when shifting from N to R or D)
The maximum speed has decreased significantly due to insufficient power	1. Engine (mechanical or control system failed) 2. CVT peripheral components (damaged or faulty)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (6.The maximum speed has decreased significantly due to insufficient power)
Great gearshift impact, fuse burning, and flameout	1. Engine (mechanical or control system failed) 2. Clutch solenoid valve (damaged or faulty) 3. CVT assembly (damaged or faulty)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (7. Great gearshift impact, fuse burn, engine stall)
CVT abnormal sound	1. CVT fluid (insufficient or poor quality) 2. CVT oil pump (worn or damaged) 3. CVT bearing (worn or damaged)	See 22 - Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (8. CVT Abnormal Sound)
The vehicle cannot move when shifted, or cannot move or move incorrectly with the corresponding gears	1. Transmission lever (faulty) 2. CVT fluid (insufficient or poor quality) 3. CVT peripheral components (damaged or faulty) 4. CVT internal components (damaged or faulty)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (9. The vehicle cannot move when shifted, or cannot move or move incorrectly with the corresponding gears

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SYMPTOM DIAGNOSIS

1. DIAGNOSTIC SCANNER CANNOT COMMUNICATE WITH TCU

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether to enter "CVT automatic transmission system"	Diagnosis is completed	Diagnostic scanner cannot communicate with TCU	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check the fuse FS18, FS19 of diagnosis interface is not blown	Go to Step 2	Fuse is blown out	Replace the fuse with the same specification.
2	Check the diagnosis interface power and grounding circuit	Normal	Faulty	Instruction
	• When the ignition switch is in "ON" position, check the voltages between the No. 8 and No. 16 terminal of I22 connector and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 4 terminal of I22 and grounding. **Resistance: <2Ω**	Go to Step 3	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
3	Check TCU power and grounding wire	Normal	Faulty	Instruction
	• Disconnect the TCU connector U31 & U32 • When the ignition switch is in "ON" position, check the voltages between the No. 16 and No. 23 terminal of TCU connector and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 4 terminal of U31 and grounding **Resistance: <2Ω**	Go to Step 4	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
4	Check the diagnostic communication line of TCU	Normal	Faulty	Instruction
	When the ignition switch is in "ON" position, check the voltages between the No. 9 terminal of diagnosis interface connector I22 and the grounding Voltage: Battery voltage	Go to Step 6	Diagnostic communication line is faulty	Go to Step 5
5	Check the diagnostic communication line of TCU	Normal	Faulty	Instruction
	• Disconnect the TCU connector U31 • Check whether it is connected between the No. 17 terminal of U31 and the No. 9 terminal of I22	Go to Step 6	The wire harness or connector has open circuit point	Check and repair the open circuit between the diagnosis interface and the TCU connector
6	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Replace TCU with one with same model, and check whether the fault code can be read with the diagnostic scanner	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

2. CVT FAULT INDICATOR LAMP IS NOT ILLUMINATED, AND GEAR INDICATOR LAMP IS DISPLAYED INCORRECTLY OR NOT DISPLAYED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn ignition switch to "ON" position and check the indicator on instrument cluster for self-test	Diagnosis is completed	Gear indicator lamp or CVT fault indicator lamp fault	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Inspect whether TCU fuse FS34 and FS35 are burned out	Go to Step 2	Fuse is blown	Replace the fuse with the same specification
2	Check relay	Normal	Faulty	Instruction
	Check CVT power relay K18 for damage by replacing	Go to Step 3	Relay failure	Replace the relay
3	Check trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and read the fault code of CVT	Go to Step 4	With DTC	Diagnose it according to the hint of DTC
4	Check TCU power and grounding wire	Normal	Faulty	Instruction
	• Disconnect the TCU connector U31 & U32 • When the ignition switch is in "ON" position, check the voltages between the No. 16 and No. 23 terminal of TCU connector and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 4 terminal of U31 and grounding **Resistance: <2Ω**	Go to Step 5	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
5	Check of the k communication line	Normal	Faulty	Instruction
	• Disconnect the TCU connector U31 and instrument cluster connector I09 • Check whether it is connected between the No. 4 terminal of I09 and the No. 24 terminal of U31	Go to Step 6	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
6	Replacement and check	Normal	Faulty	Instruction
	Replace the instrument cluster with the same model, and check if the fault is eliminated	Replace the instrument cluster	Fault still exists	Go to Step 7
7	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with one with same model, and check whether the fault is eliminated	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

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3. THE ENGINE CANNOT BE STARTED WHEN IN P OR N

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON", and check whether the engine in P or N will be started	Diagnosis is completed	The engine cannot be started when the shift lever is in P or N	Go to Step 1
1	Check the gear switch	Normal	Faulty	Instruction
	Check the connectivity between the respective terminals of the shift switch wire harness connector by referring to inspection items at the time of vehicle reception	Go to Step 3	Gear switch has fault	Go to Step 2
2	Calibration the shift switch position	Normal	Faulty	Instruction
	• Calibrate the shift switch position • Recheck the shift switch position	Go to Step 3	Fault still exist	Repair or replace the gear shift switch
3	Check the fuse, relay of the starting system	Normal	Faulty	Instruction
	Check whether the fuse, relay of the starting system are in good condition	Go to Step 4	Fuse is burnt out or relay is damaged	Replace the fuse or relay with the same specification.
4	Check the starting control line	Normal	Faulty	Instruction
	• Disconnect the connector U30 of the shift switch • Check the voltage between the No. 9 terminal of U30 and the ground connection **Voltage: 9 - 13V** • Check the resistance between No. 6 terminal of U30 and grounding Resistance: < 2Ω	Go to Step 5	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
5	Check the starter	Normal	Faulty	Instruction
	Check whether the starter is in good condition	Go to Step 6	Starter is damaged	Replace the starter
6	Verification and check	Normal	Faulty	Instruction
	Check the fault is eliminated	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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4. GEAR P CAN'T BE PULLED OUT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON", depress the brake pedal, and check whether the shift lever can move freely	Diagnosis is completed	Gear P can't be pulled out	Go to Step 1
1	Check the fuse	Normal	Faulty	Instruction
	Inspect whether TCU fuse FS35 is burned out	Go to Step 2	Fuse is blown out	Replace the fuse with the same specification
2	Check the relay	Normal	Faulty	Instruction
	Check CVT power relay K18 for damage by replacing	Go to Step 3	Relay failure	Replace the relay
3	Check trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether there is fault code output in the CVT	Go to Step 4	With DTC	Diagnose it according to the hint of DTC
4	Check the gearshift mechanism	Normal	Faulty	Instruction
	Check whether the gearshift mechanism is installed correctly	Go to Step 5	Improper installation or the part is damaged	Reinstall or replace the shift mechanism
5	Check the gearshift lock solenoid valve	Normal	Faulty	Instruction
	• Disconnect the connector I20 of the gearshift mechanism • Check the voltage between No. 6 terminal of I20 and grounding. **Voltage: 9 - 13V** • Check if there is continuity between No. 7 terminal of I20 and grounding • Check if there is continuity between No. 6 terminal and No. 7 of I20	Go to Step 6	There is an open circuit point in the wire harness or the connector or the shift solenoid valve is damaged	Repair the relevant wire harness, connectors or terminals, or replace the shift solenoid valve
6	Verification and check	Normal	Faulty	Instruction
	Check the fault is eliminated	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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5. GREAT IMPACT WILL BE GENERATED WHEN SHIFTING FROM N TO R OR D

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON", manipulate the shift switch, and check whether a great impact is generated when checking the shift	Diagnosis is completed	Great impact will be generated when shifting from N to R or D	Go to Step 1
1	Check trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and enter CVT automatic transmission system, then read DTCs.	Go to Step 2	With DTC	Diagnose it according to the hint of DTC
2	Check engine idle speed	Normal	Faulty	Instruction
	Check whether engine is running normally when idling	Go to Step 3	Engine mechanical or control system is faulty	Repair or adjust the engine
3	Check the CVT fluid	Normal	Faulty	Instruction
	Check that the CVT fluid is sufficient and qualified according to on-vehicle inspection.	Go to Step 4	CVT fluid is insufficient or unqualified	Add or refill RD-CVT special oil
4	Check the pipeline pressure	Normal	Faulty	Instruction
	Check CVT pipeline pressure according to on-vehicle inspection	Go to Step 5	Abnormal CVT fluid pressure	Perform pipeline pressure test to determine whether it required to be repaired according to on-vehicle inspection
5	Check the symptoms	Normal	Faulty	Instruction
	Recheck engine idling	Inspection is over	Fault is remaining	Go to Step 6
6	Check TCU gear input and output signals	Normal	Faulty	Instruction
	• Disconnect the TCU connector and shift switch connector • Check whether the stitch terminal of the connector is in good condition, or whether the connection to the wire harness connector is loose • Check whether it is connected between the No. 1 terminal of U30 and the No. 17 terminal of U32, and between No. 7 terminal of U30 and the No. 9 terminal of U32	Diagnosis is completed	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal

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6. THE MAXIMUM SPEED HAS DECREASED SIGNIFICANTLY DUE TO INSUFFICIENT POWER.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check whether the gear is normally displayed	Go to Step 1	Incorrect gear display	See fault symptom table
1	Check trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and enter CVT automatic transmission system, then read DTCs.	Go to Step 2	With DTC	Diagnose it according to the hint of DTC
2	Read the data flow.	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and enter CVT to read the driving and driven speeds and the system pressure	Go to Step 3	CVT speed is abnormal, and the system pressure is abnormal	Judge and diagnose the fault according to on-vehicle inspection items
3	Check the CVT peripheral electric components	Normal	Faulty	Instruction
	• Check that the housing harness or connector is no falling or fracture • Check that the CVT peripheral electric components are normal	Go to Step 4	CVT wire harness or electric component is faulty	Repair or replace the relevant CVT peripheral parts or electric components
4	Verification and check	Normal	Faulty	Instruction
	Perform road test to check the power is sufficient and vehicle speed is normal	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

7. GREATSHIFT IMPACT, FUSE BURNING, AND FLAMEOUT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Adjust the shift impact • Recheck whether the fault occurs	Go to Step 1	The shift impact is too great to be adjusted (the impact can not be in a cyclic change in "small → large→ small" when adjusting)	Clutch solenoid valve fails
1	Check the trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and enter CVT automatic transmission system, then read DTCs.	Go to Step 2	With DTC	Diagnose it according to the hint of DTC
2	Check the clutch solenoid valve	Normal	Faulty	Instruction
	Check whether the transmission wire harness is intact, and check the resistance of the clutch solenoid valve by referring to on-vehicle inspection items	Go to Step 3	Wire harness or connector terminal is damaged, or clutch solenoid valve is damaged	Replace the clutch solenoid valve
3	Verification and check	Normal	Faulty	Instruction
	Perform road test to check the power is sufficient and vehicle speed is normal	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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8. CVT ABNORMAL SOUND

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Perform stall test and CVT function inspection by referring to on-vehicle inspection items, and check whether an abnormal sound is generated while CVT is running according to on-vehicle inspection	Diagnosis is completed	CVT abnormal sound	Go to Step 1
1	Check the oil volume. When it is insufficient, the oil pump will be empty absorbing, and noise may arise.	Normal	Faulty	Instruction
	• Check the CVT fluid level • Locate and troubleshoot the oil leakage	Go to Step 2	CVT fluid leaks or insufficient oil	Repair the fault or add CVT fluid
2	Check the bearings and other internal parts. If they are damaged, noise may arise	Normal	Faulty	Instruction
	Dismantle the CVT assembly, and check whether the internal bearing is worn	Go to Step 3	CVT internal bearing is worn or damaged	Replace the faulty parts or replace the CVT assembly
3	Verification and check	Normal	Faulty	Instruction
	Perform road to check CVT for abnormal noise	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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9. THE VEHICLE CANNOT MOVE WHEN SHIFTED, OR CANNOT MOVE OR MOVE INCORRECTLY WITH THE CORRESPONDING GEARS

Steps	Inspection Item	Inspection result		
0	Check the trouble code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and enter CVT automatic transmission system, then read DTCs	Go to Step 1	With DTC	Diagnose it according to the hint of DTC
1	Check the transmission lever	Normal	Faulty	Instruction
	Check the transmission lever and the shift switch	Go to Step 2	Transmission control lever is not properly installed or is damaged, or shift switch is faulty	Repair corresponding failure
2	Check the CVT fluid	Normal	Faulty	Instruction
	Check that the CVT fluid is sufficient and qualified according to on-vehicle inspection.	Go to Step 3	CVT fluid is insufficient or unqualified	Add or refill RD-CVT special oil
3	Check CVT peripheral electric components	Normal	Faulty	Instruction
	• Check that the housing harness or connector is no falling or fracture • Check that the CVT peripheral electric components are normal	Go to Step 4	CVT wire harness or electric component is faulty	Repair or replace the relevant CVT peripheral parts or electric components
4	Check the pipeline pressure	Normal	Faulty	Instruction
	Check CVT pipeline pressure according to on-vehicle inspection	Go to Step 5	Abnormal CVT fluid pressure	Perform pipeline pressure test to determine whether it required to repair according to on-vehicle inspection
5	Check the engine stall speed	Normal	Faulty	Instruction
	Check the engine stall speed by referring to on-vehicle inspection items	Go to Step 6	Stall speed is too high or too low	Perform stall test to determine whether it required to be repaired according to on-vehicle inspection
6	Check engine idle speed	Normal	Faulty	Instruction
	Check engine is running normally when idling	Go to Step 7	Engine mechanical or control system is faulty	Repair or adjust the engine
7	Check automatic transmission	Normal	Faulty	Instruction
	• Remove oil pan • Check whether the metal belt is broken or the drive or driven pulleys are seriously worn	Go to Step 8	Internal faults of the CVT	Replace CVT assembly
8	Verification and check	Normal	Faulty	Instruction
	Perform road test to check CVT for abnormal noise	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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DTC LIST

The following table will help you to locate the fault information needed.

DTC (DTC)	Fault code description	Possible causes	Recommended action
P0750	Master cylinder solenoid valve	1. Wire harness or connector is open circuit, and harness is short to ground. 2. The signal is constantly shown as 0V 3. Wire harness is short circuit 12V: 4. The signal is constantly shown as 12V	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (1. P0750, P0755, P0745, P0760P - Solenoid valve fault)
P0755	Slave cylinder solenoid valve	1. Wire harness or connector is open circuit, and harness is short to ground. 2. The signal is constant in 0V. When the wire harness is short, the voltage is 12V 3. The signal is constantly shown as 12V	
P0745	high speed on/off valve	1. Wire harness or connector is open circuit, and harness is short to ground. 2. The signal is constantly shown as 0V 3. Wire harness is short circuit 12V 1. The signal is constantly shown as 12V	
P0760	Locking solenoid valve	1. Wire harness or connector is open circuit, and harness is short to ground. 2. The signal is constantly shown as 0V 3. Wire harness is short circuit 12V 4. The signal is constantly shown as 12V	
P0720	Driven wheel speed	1. The driven wheel speed signal wire harness or connectors are open or shorted. 2. Power wire harness open circuit 3. Speed is 0 r/min	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (2. P0720, P0715 - Speed sensor fault)
P0715	Drive wheel speed	1. The driving wheel speed signal wire harness or connectors are open or shorted. 2. Power wire harness open circuit 3. Speed is 0 r/min	
P0705	Gearshift switch: gear P, R, N, D, S	1. The wire harness is opened or shorted 2. Any gear has failed 3. No gear is valid 4. Several gears are valid at the same time 5. The current gear has failed while some other gears are constantly effective	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (3. P0705 - gearshift switch fault)

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DTC (DTC)	Fault code description	Possible causes	Recommended action
P1707	Driven cylinder pressure	1. signal or connector open circuit 2. Suspended value short to ground 3. The signal is constantly shown as 0V 4. The signal line is shorted to 5V 5. The signal is constantly shown as 5V 6. Power line open 7. The signal is constantly shown as 0V	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (4. P1707 - Passive pressure sensor fault)
P0710	Oil temperature sensor	1. The oil temperature sensor has failed and the wire harness is shorted or open circuit	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (5. P0710 - Oil temperature sensor fault)
P0708	Adverse gear ratio tracking	1. The actual gear ratio features greater difference from the target ratio over a period of time.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (6. P0708 - Speed ratio cannot be tracked)
P1710	Excessively high oil temperature	1. The transmission fluid temperature is abnormal and always kept higher.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (7. P1710 – Excessively high oil temperature fault)
P1709	Adverse pressure tracking	1. The transmission has its passive actual pressure features greater difference from the target pressure over a period of time.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (8. P1709 - Poor pressure tracking fault)
P0703	Brake signal	1. Open circuit, short to ground 2. The brake signal is always kept invalid 3. Shorted to +12V 4. The brake is always kept valid;	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (9. P0703 - Brake signal fault)
P1706	Throttle opening	1. Signal out of range	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (10. P1706 - Throttle opening signal fault)
U0001	CAN bus is turned fault	1. CAN bus is turned fault	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (11. U0001, U1012, U1013, U1015 - CAN communication fault)
U1012	Engine speed error on the CAN bus	1. Engine speed signal error on the CAN bus	
U1013	Accelerator pedal error on the CAN bus	1. Accelerator pedal signal error on the CAN bus	
U1015	Throttle percentage error on the CAN bus	1. Throttle percentage signal error on the CAN bus	
P0730	Transmission mechanism fault	1. The variable ratio goes beyond the normal range, and the actual ratio >2.432 or <0.442.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (12. P0730 - Transmission mechanism fault)
P0882	Battery fault	The battery voltage is too low (lower than 9V) The battery voltage is too high (higher than 16V)	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (13. P0882, P0883 - Battery fault)
P0883			

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DTC (DTC)	Fault code description	Possible causes	Recommended action
P0602	TCU fault	Programming errors occur in the process of program update.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (14. P0602, P0604, P0605 - TCU fault)
P0604		RAM error	
P0605		ROM error	
P0613		Main processing error	
P1701	Off-line detection fault	Off-line detection is not completed.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (15. P1701 - Off-line inspection fault)
P1750		No P-gear is detected during the off-line detection.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (16.P1750, P1751, P1752, P1753, P1754 - Off-line inspection fault)
P1751		No R-gear is detected during the off-line detection.	
P1752		No N-gear is detected during the off-line detection.	
P1753		No D-gear is detected during the off-line detection.	
P1754		No S-gear is detected during the off-line detection.	
P1755		The maximum accelerator pedal opening is not detected during the off-line detection.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (17. P1755 - Uncompleted accelerator pedal opening degree inspection fault)
P1756		No brake pedal signal is detected during the off-line detection.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (18. P1756 - Uncompleted brake pedal inspection fault)
P1757		The system pressure is not detected or has not reached the highest set value during the off-line detection.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (19. P1757 - Uncompleted off-line system pressure inspection fault)
P1712	Shift locking signal	1. The shift locking signal wire harness is open circuit	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (20. P1712, P1711 - Shift lock and key lock signal fault)
P1711	Key locking signal	1. The key locking signal wire harness is open circuit	
P0770	Clutch fault	1. The torque converter can't lock due to mechanical failure, and the difference is abnormal between the engine speed and the driving wheel speed.	See 22-Automatic Transmission (CVT) Diagnosis, Fault Code Diagnosis (21. P0770 - Hydraulic torque converter assembly fault)

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DTC DIAGNOSIS

1. P0750, P0755, P0745, P0760-SOLENOID VALVE FAULT

The setting conditions of DTC:

1. Active cylinder solenoid valve feedback voltage ≥ 4.999 or ≤ 0.001 appears within 2s.
2. Slave cylinder solenoid valve feedback voltage ≥ 4.999 appears within 2s.
3. The solenoid valve has its feedback voltage ≥ 1.01 or ≤0.99.
4. The locking solenoid valve has its feedback voltage ≥ 4.88 or ≤0.49 within consecutive 2s.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0750, P0755, P0745 and P0760.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the solenoid valve line 1	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Check the resistances respectively between the No. 4 terminal (solenoid valve of master cylinder), No. 6 terminal (solenoid valve of slave cylinder), No. 1 terminal (clutch solenoid valve) and No. 2 terminal (lock solenoid valve) of automatic transmission wire harness U31 and No. 1 terminal (grounding) of U32. **Resistance: >1MΩ**	Go to Step 2	The corresponding solenoid valve circuit has a ground short circuit point	Check and repair corresponding circuit
2	Check the solenoid valve line 2	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Check the resistances respectively between the No. 4 terminal (master solenoid valve fault), No. 6 terminal (slave solenoid valve fault), No. 1 terminal (high clutch solenoid valve) and No. 2 terminal (lock solenoid valve fault) of automatic transmission wire harness U31 and No. 9 terminal (12V power supply) of U31. **Resistance: >1MΩ**	Go to Step 3	The corresponding solenoid valve circuit has a power short circuit point	Check and repair corresponding circuit
3	Check the solenoid valve line 3	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Check whether the solenoid valve resistance is in the normal range by referring to on-vehicle inspection	Go to Step 4	If the resistor value is not in a reasonable range, the solenoid valve is damaged	Replace the corresponding solenoid valve
4	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

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2. P0720, P0715 - SPEED SENSOR FAULT

The setting conditions of DTC:

1. No pulse signal is captured within consecutive 2s and the drive wheel has its speed larger than 700rpm.
2. No pulse signal is captured within consecutive 2s and the driven wheel has its speed larger than 250rpm.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0720 and P0715.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check speed sensor wiring	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Unplug the speed sensor connector • Unplug the housing wire harness connector • Check the resistances respectively between the No. 20 terminal (active wheel speed sensor fault) of the front compartment wire harness U32 and the No. 2 terminal of the CVT wire harness T02, No. 21 terminal (slave wheel speed sensor fault) of the front compartment wire harness U32 and the No. 2 terminal of the CVT wire harness To4 active wheel speed sensor connector **Resistance: <2Ω** • Check the resistances respectively between the No. 9 terminal of the front compartment wire harness U31 and the No. 1 terminal of the CVT wire harness T02, and No. 1 terminal of T04 **Resistance: <2Ω** • Check the resistances respectively between the No. 3 terminal of the CVT wire harness T02 and No. 3 terminal of T04 and the grounding Resistance: < 2Ω	Go to Step 2	Corresponding circuit has open circuit points	Check and repair corresponding circuit
2	Replace the speed sensor	Normal	Faulty	Instruction
	Check whether the fault is eliminated after the speed sensor has been replaced.	Go to Step 3	Go to Step 4	
3	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation	Replace TCU	Fault still exists	Find the cause out from other fault symptoms
4	Verification and check	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check if the system has DTC output after DTC cleared.	Replace TCU	Fault code still exists	See fault code list

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3. P0705-SHIFT SWITCH FAULT

The setting conditions of DTC:

1. Within consecutive 4s, no gear in PRNDS is detected

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0705.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the mechanical part	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Check the CVT shift switch and gears matching	Go to Step 2	The shift switch is damaged or the shift gears are mismatching	Repair corresponding failure
2	• Check the shift switch line	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Unplug the connectors of the gear switch and transmission control unit. • Check the resistances respectively between the No. 1 (R signal), No. 2 (P signal), No. 3 (N signal), No. 4 (L signal), No. 7 (D signal), No. 5 (12V power signal) and No. 6 (grounding wire) terminals of the U30 shift switch connector of front compartment wire harness and No. 17, No. 8, No. 23, No. 24, No. 9 terminals of U32, No. 9 terminal of U31 and No. 1 terminal of U32 **Resistance: < 2 Ω**	Go to Step 3	Corresponding circuit has open circuit points	Check and repair corresponding circuit
3	Replace gear switch	Normal	Faulty	Instruction
	Replace the shift switch, and check whether the fault is eliminated	Go to Step 5	Go to Step 4	
4	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms
5	Verification and check	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check if the system has DTC output after DTC cleared.	Replace TCU	See fault code list	Find the cause out from other fault symptoms

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4. P1707 - PASSIVE PRESSURE SENSOR FAULT

The setting conditions of DTC:

1. Within consecutive 2s, the passive cylinder pressure ≥ 4.7Mpa or ≤ 0.35Mpa.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1707.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the passive pressure sensor circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Respectively disconnect the pressure sensor and the CVT wire harness connector • Respectively check the resistances between the intermediate signal line, black grounding wire and red power line of the pressure sensor connector and the No. 2, No. 3, No. 1 terminals of the transmission wire harness UT1 **Resistance: < 2Ω** • Respectively check the resistance between the No. 3 pinand No. 1 and No. 2 pins of the CVT wire harness UT1 **Resistance: > 1MΩ**	Go to Step 2	The inspection resistance is out of the specified range	Repair corresponding circuit
2	Check the oil pressure sensor	Normal	Faulty	Instruction
	Replace the oil pressure sensor, and check whether the fault is eliminated	Replace the oil pressure sensor	Fault still exists	Go to Step 3
3	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

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5. P0710 - OIL TEMPERATURE SENSOR FAULT

The setting conditions of DTC:

1. Within consecutive 4s, the oil temperature voltage value > 4.95 or <0.05

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0710.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check oil temperature sensor wiring	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position • Disconnect the CVT wire harness connector • Check the resistance between No. 11 of the CVT wire harness connector UT1 and the grounding, and check whether the line has an open circuit	Go to Step 2	There is an open circuit between the lines	Repair corresponding circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

6. P0708 - SPEED RATIO CANNOT BE TRACKED

The setting conditions of DTC:

1. When the vehicle speed is more than 40km/h, the deviation of the target ratio to the actual gear ratio exceeds 0.6 within consecutive 4s.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0708.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Read the data flow.	Normal	Faulty	Instruction
	• Read the data flow • Check whether the slave cylinder pressure is normal	Dismantle the CVT to check the internal parts	Check that the pressure is not within the normal range	Go to Step 2
2	Check the solenoid valve	Normal	Faulty	Instruction
	Check whether the active cylinder solenoid valve and the slave cylinder solenoid valve are normal by referring to on-vehicle inspection	Find the cause out from other fault symptoms	Solenoid valve failed	Replace the active cylinder solenoid valve or slave cylinder solenoid valve

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7. P1710 - EXCESSIVELY HIGH OIL TEMPERATURE FAULT

The setting conditions of DTC:

1. Within consecutive 2s, the oil temperature is greater than 120℃ .

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1710.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Natural cooling	Normal	Faulty	Instruction
	Check whether the oil temperature falls after a period of flameout.	Check the CVT cooling system	Oil temperature does not drop	Perform maintenance according to the oil temperature sensor fault

8. P1709 - POOR PRESSURE TRACKING FAULT

The setting conditions of DTC:

1. The deviation of the target pressure to the actual pressure exceeds 0.5 within consecutive 4s.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1709.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the periphery	Normal	Faulty	Instruction
	Check whether the passive pressure sensor connector is plugged in or broken, and whether the sensor is normal	Go to Step 2	Periphery of the sensor is faulty	Repair or replace the fault point.
2	Replace the mechanical parts	Normal	Faulty	Instruction
	Replace the slave cylinder solenoid valve	Replace the slave cylinder solenoid valve	Fault still exists	Go to Step 4
3	Replace the mechanical parts	Normal	Faulty	Instruction
	Replace valve block assembly	Replace valve block assembly	Fault still exists	Go to Step 4
4	Replace the mechanical parts	Normal	Faulty	Instruction
	Replace the oil pump assembly	Replace the oil pump assembly	Fault still exists	Find the cause out from other symptoms

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9. P0703 - BRAKE SIGNAL FAULT

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0703.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Inspect circuit.	Normal	Faulty	Instruction
	When depress the brake pedal, check the voltage between No. 6 terminal of U32 and grounding. **Voltage: 9 - 13V**	Go to Step 2	Incorrect voltage	Check brake lamp circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with the same model, and check whether the fault still exists	Replace TCU	Fault still exists	Find causes from other faults

10. P1706 - THROTTLE OPENING SIGNAL FAULT

The setting conditions of DTC:

1. Within consecutive 2s, the throttle signal > 99.96

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1706.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the engine fault	Normal	Faulty	Instruction
	Check whether the engine electronic control system has fault code output	Go to Step 2	There is relevant fault code output	Diagnose it according to the hint of DTC
2	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

11. U0001, U1012, U1013, U1015 - CAN COMMUNICATION FAULT

The setting conditions of DTC:

1. The bus is faulty within 1s.
2. This signal is invalid on the bus within 1s.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

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Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides U0001, U1012, U1013 and U1015.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Inspect circuit.	Normal	Faulty	Instruction
	Use a multimeter to measure whether the Pin 13 of U31 and Pin 14 of U32 are connected with the CAN communication lines of the ECU.	Go to Step 2	Circuit exists abortion	Repair corresponding circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

12. P0730 - TRANSMISSION MECHANISM FAULT

The setting conditions of DTC:

1. Within consecutive 2s, the actual gear ratio ≥ 2.432 or ≤ 0.442.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0730.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the transmission	Normal	Faulty	Instruction
	Check whether the CVT is faulty	Replace transmission assembly	Fault still exists	Find the cause out from other fault symptoms

13. P0882, P0883 - BATTERY FAULT

The setting conditions of DTC:

1. Within 2s, the battery voltage < 9V.
2. Within 2s, the battery voltage >16V.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0882 and P0883.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the battery voltage	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Measure the battery voltage, and check whether the voltage value is normal	Go to Step 2	The voltage is not within the normal range	Recharge or replace the battery
2	Check the output voltage of generator	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check the battery voltage data flow while the engine is at idle running Voltage: 13 - 15V	Diagnosis is completed	Alternator fault	Repair or replace the alternator.

14. P0602, P0604, P0605 - TCU FAULT

The setting conditions of DTC:

1. Programming errors occur in the process of program update.
2. ROM and RAM checksum error in time of TCU power-on
3. Main processing error.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P0602, P0604 and P0605.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

15. P1701 - OFF-LINE DETECTION FAULT

The setting conditions of DTC:

1. The off-line detection steps are not completed as specified.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1701.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Off-line detection	Normal	Faulty	Instruction
	Implement the off-line detection once again according to requirements	Fault detection completed	Fault still exists	Find the cause out from other fault symptoms

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16. P1750, P1751, P1752, P1753, P1754 - OFF-LINE DETECTION FAULT

The setting conditions of DTC:

1. No P, R, N, D, S-gear is detected during the off-line detection.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1750, P1751, P1752, P1753 and P1754.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Off-line detection	Normal	Faulty	Instruction
	Implement the off-line detection once again according to requirements	Fault detection completed	Fault still exists	Find the cause out from other fault symptoms

17. P1755 - UNCOMPLETED ACCELERATOR PEDAL OPENING DEGREE INSPECTION FAULT

The setting conditions of DTC:

1. The maximum accelerator pedal opening is not detected during the off-line detection.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1755.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the accelerator pedal	Normal	Faulty	Instruction
	• Force the pedal down to see whether the accelerator pedal travel can reach its maximum limit • Connect the diagnostic scanner, check whether the accelerator pedal opening degree is correct when depressing or not depressing the brake pedal	Find the cause out from other fault symptoms	Brake pedal is obstructed by the foreign object	Remove the foreign object and reinstall the brake pedal or replace the accelerator pedal

18. P1756 - INCOMPLETED BRAKE PEDAL DETECTION FAULT

The setting conditions of DTC:

1. No brake pedal signal is detected during the off-line detection.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

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Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1756.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the accelerator pedal	Normal	Faulty	Instruction
	See flow for diagnosis of the brake signal faults	Replace brake pedal	Fault still exists	Find the cause out from other fault symptoms

19. P1757 - INCOMPLETED OFF-LINE SYSTEM PRESSURE DETECTION FAULT

The setting conditions of DTC:

1. No brake pedal signal is detected during the off-line detection.

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1757.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the accelerator pedal	Normal	Faulty	Instruction
	Flow for Diagnosis of Passive Pressure Sensor Faults and Flow for Diagnosis of Bad Pressure Tracking Faults	Replace the accelerator pedal.	Fault still exists	Find the cause out from other fault symptoms

20. P1712, P1711 - SHIFT AND KEY LOCKING SIGNAL FAULTS

DTC clearing condition:

1. Condition of setting fault code is no longer existing.
2. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1712 and P1711.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Inspect circuit.	Normal	Faulty	Instruction
	Use a multimeter to measure whether the TCU, shift locking signal line and key locking signal line disconnected or connected.	Go to Step 2	Fault exists in the circuit	Repair corresponding circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace TCU with same model, and confirm TCU is in normal operation through the verification by replacing	Replace TCU	Fault still exists	Find the cause out from other fault symptoms

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21. P0770 - TORQUE CONVERTER ASSEMBLY FAULT

DTC clearing condition:

1. After locked, the engine speed tends to be 1000rpm greater than the speed of the driving wheels within 2s.
2. Condition of setting fault code is no longer existing.
3. Clear with fault diagnostic scanner.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect with diagnostic scanner and use it to check the automatic transmission system has other fault codes besides P1712 and P1711.	Go to Step 1	Other fault codes exist	Diagnose it according to the hint of DTC
1	Check the peripheral mechanical parts	Normal	Faulty	Instruction
	Jack up the vehicle and check whether the torque converter has normal peripheral mechanical parts	Go to Step 2	Peripheral machine is faulty	Maintain the fault of mechanical parts
2	Replacement and check	Normal	Faulty	Instruction
	Replace the hydraulic torque converter, and check whether it is working normally	Replace torque converter	Fault still exists	Find the cause out from other fault symptoms

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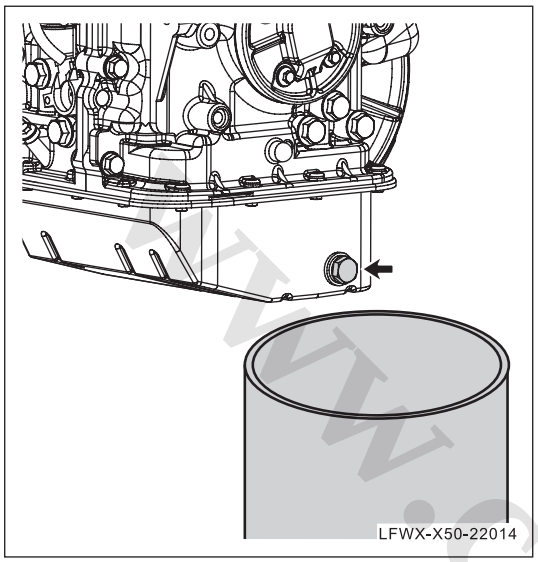
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TRANSMISSION FLUID

REPLACEMENT

NOTICE:

The CVT special lubricating oil specified by LIFAN shall be used. No mixture with other oil is permitted. Any other oil except for the CVT special lubricating oil specified by LIFAN will reduce the driving performance and the CVT durability and may damage the CVT, but such damage is beyond the warranty.

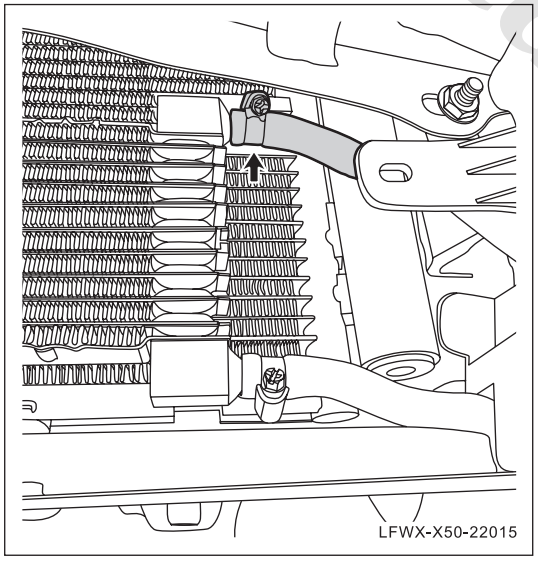


1. DRAIN THE TRANSMISSION FLUID

(a) Clean the oil pan of oil outlet, and cover the surrounding parts that the oil column may spill during oil drainage.

(b) Place a recycling container under the transmission fluid outlet, and loosen and remove the fluid drain plug to drain the transmission fluid.

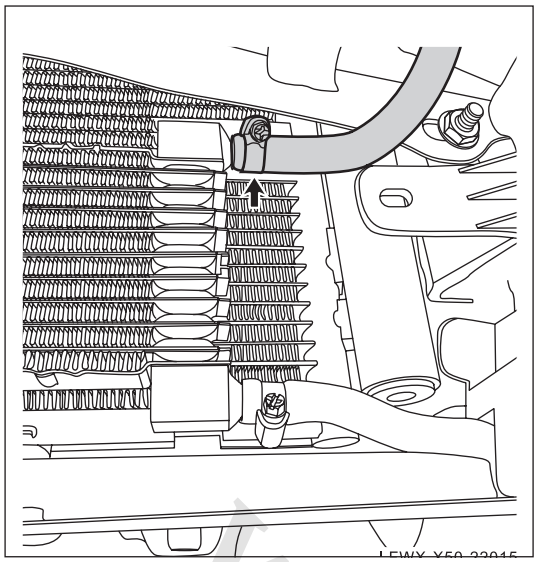
(c) Remove front bumper (see 81 Interiors and Exteriors - Front Bumper, Replacement)



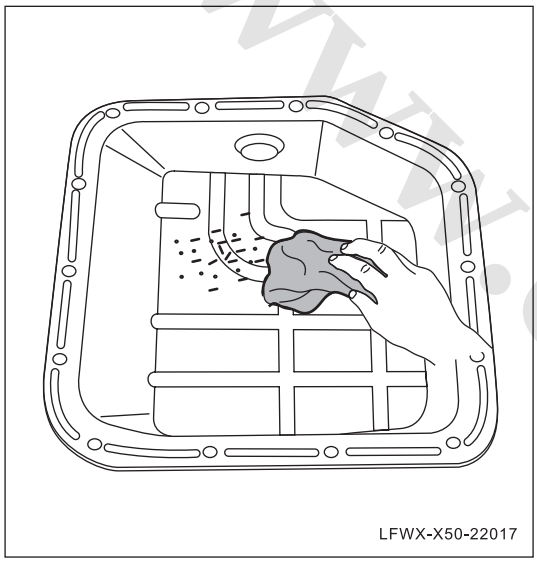
(d) Loosen the fixing clamp of the oil cooler inlet pipe, and pull out the oil cooler inlet pipe.

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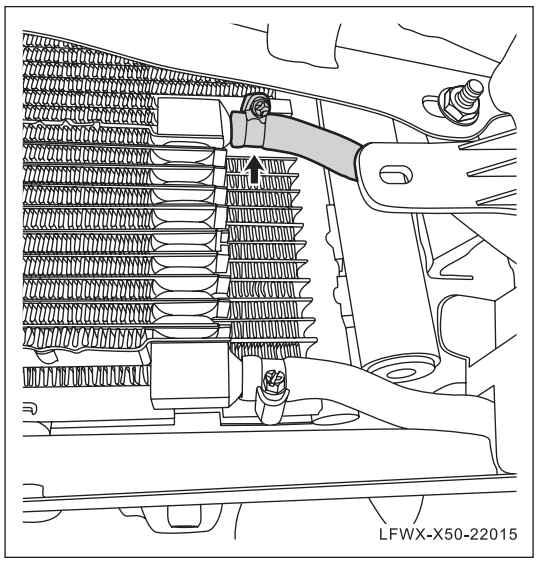


(e) Slowly inject the compressed air in the oil cooler inlet, so that the transmission fluid stored in the oil cooler is blown out completely.



(f) Remove the oil pan to clean the impurities precipitated on the bottom and use magnet to adsorb impurities. (see 22 - Automatic Transmission, Oil Pan, Replacement)

(g) Install the oil pan onto the transmission (see 22 - Automatic Transmission, Oil Pan, Replacement)



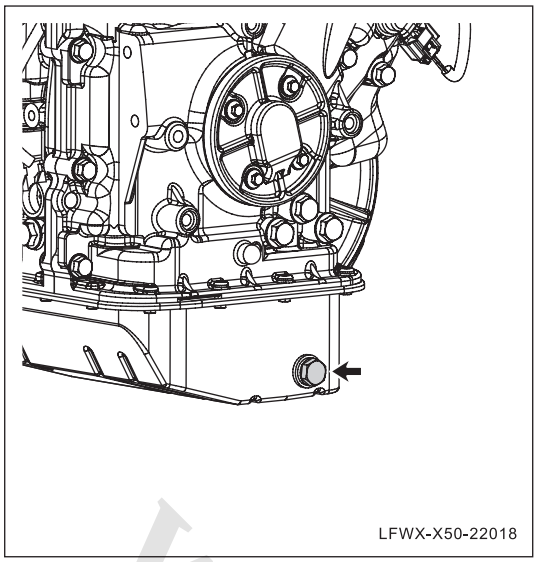
2. FILL TRANSMISSION FLUID

(a) Install the oil cooler inlet pipe onto the oil cooler inlet and fix it with the clamps.

(b) Install the front bumper (see 81 Interiors and Exteriors - Front Bumper, Replacement)

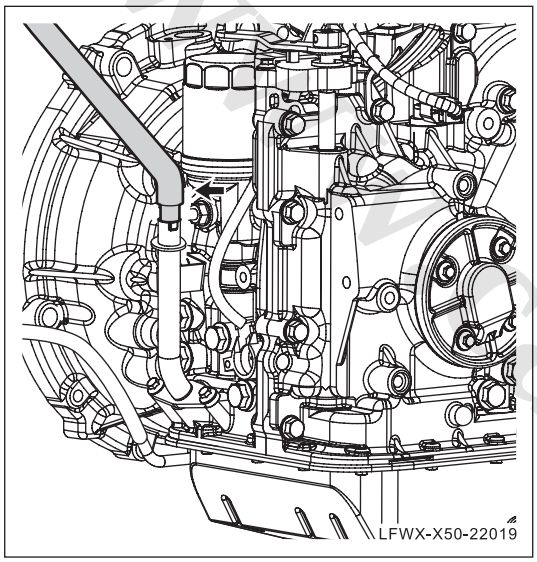
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(c) Install the oil pan magnetic oil drain plug and tighten it.

Torque: 40N•m



(d) Remove the air filter. (See 14 - Intake / exhaust system - Air filter, Replacement)

(e) Pull out the oil dipstick of transmission, and fill the transmission fluid from the dipstick tube.

△ HINT:

- When adding CVT fluid, note that no oil is splashed on the hot parts, such as exhaust system and etc.
- Fill the transmission fluid to the specified level (filling amount is about 3.5L because the oil in the cylinder, oil passage and hydraulic torque converter is not drained completely).

(f) Start the engine, and run the transmission for about 1min, then shift to gear P to check the level and state of transmission fluid, and add the fluid to scale range of the dipstick (if the engine idles).

△ HINT:

If the newly added transmission fluid is contaminated by the old transmission fluid inside, replace the filter, drain the transmission fluid and then refill new fluid.

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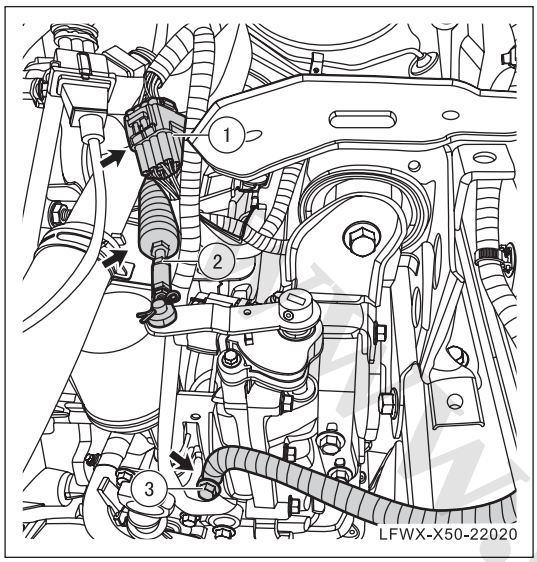
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TRANSMISSION ASSEMBLY

REPLACEMENT

NOTICE:

Before disassembling the transmission, hang the engine with a hanger or place the support top on the bottom of the engine, so as not to damage the engine caused by engine tilt during disassembling the left engine mounting.



1. **REMOVE THE BATTERY AND BRACKET ASSEMBLY (SEE 18 - STARTING CHARGING SYSTEM, BATTERY, REPLACEMENT)**
2. **REMOVE THE INTAKE TUBE AND THE AIR FILTER (SEE 14 - INTAKE AND EXHAUST SYSTEM, INTAKE PIPE LINE/AIR FILTER, AND REPLACEMENT)**
3. **REMOVE THE TRANSMISSION ASSEMBLY**

△ HINT:

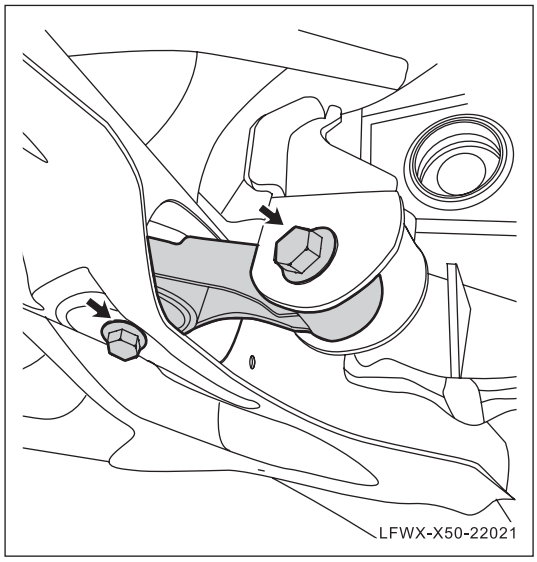
When disassembling the transmission, be sure to protect the surrounding parts of the transmission, such as pressure sensor, speed sensors, gear switch, wire harnesses and wire harness connector.

(a) Disconnect the transmission connector ① , shift flexible shaft ② , and grounding wire ③ .

(b) Discharge the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

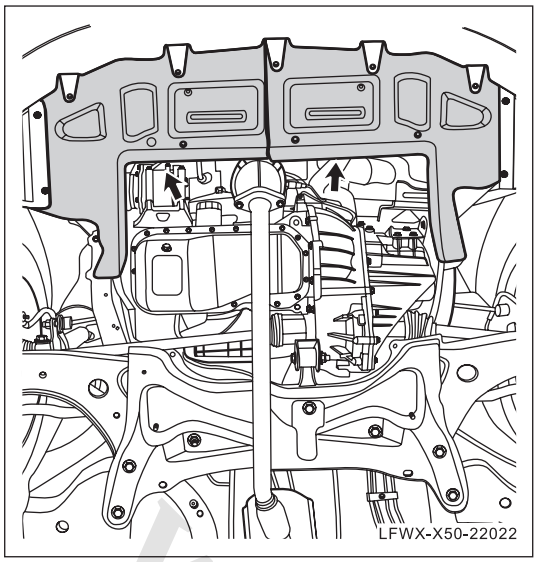
(c) Remove the drive shaft. (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)

(d) Remove the engine rear mounting.

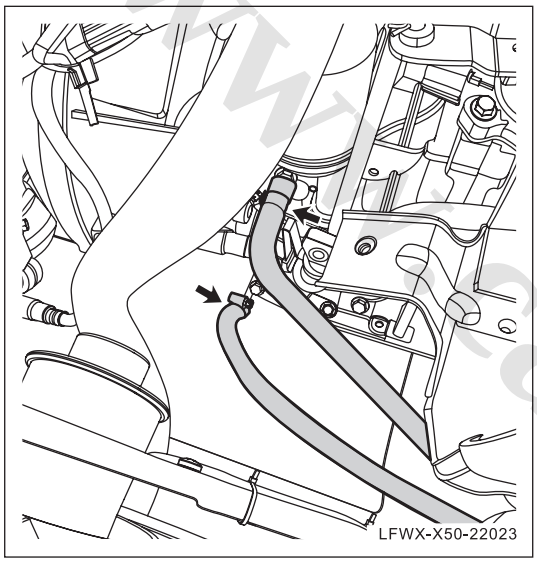


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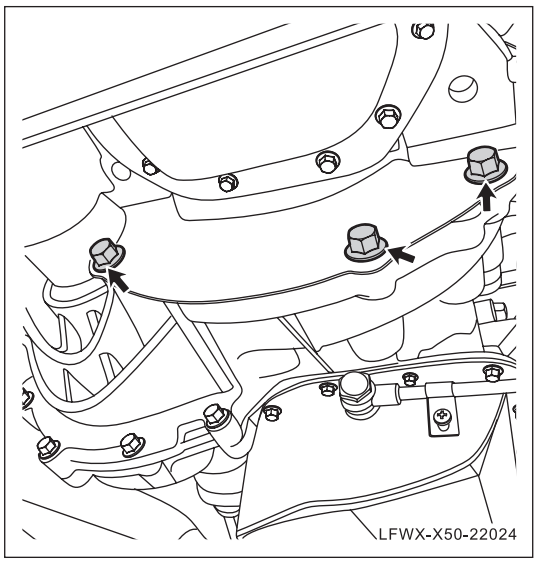
(e) Remove the lower trim panel of the engine compartment



(f) Loosen the transmission outlet and return pipe fixing clamps, and pull out the outlet and return pipes.

△ HINT:

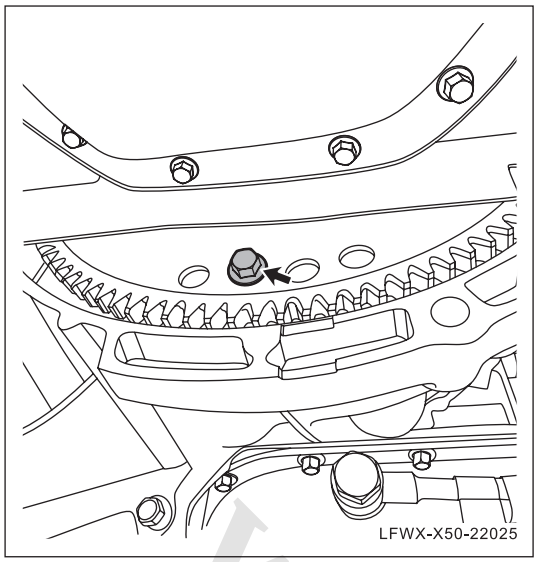
It is recommended to make the assembly marks on the oil pipes to avoid installation mistakes.



(g) Remove the transmission baffle fixing bolt, and then remove the baffle.

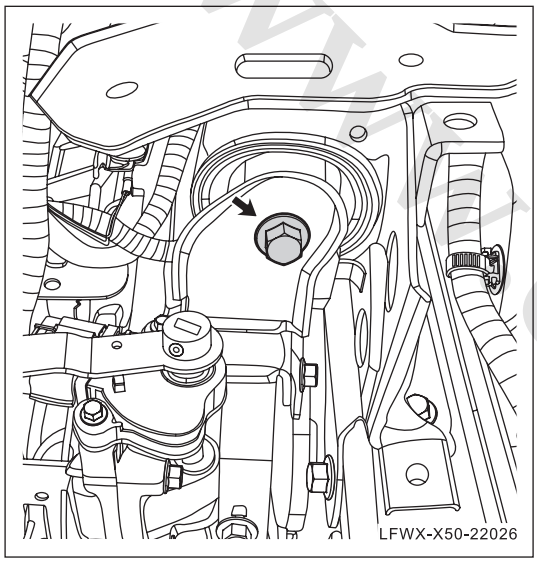
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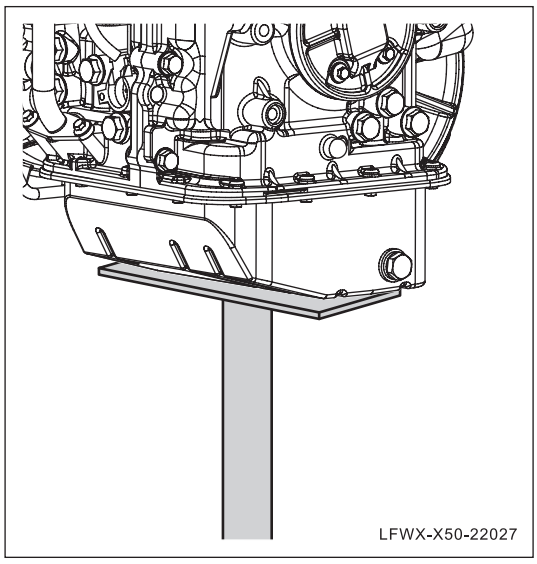


(h) Turn the flywheel with a screwdriver, until the connecting bolts of the flywheel and the hydraulic torque converter appear, and then remove the hydraulic torque converter fixing bolts (6 bolts in total).

(i) Remove the fixing bolts of the starter.



(j) Remove the fixing bolts of the engine left mounting.



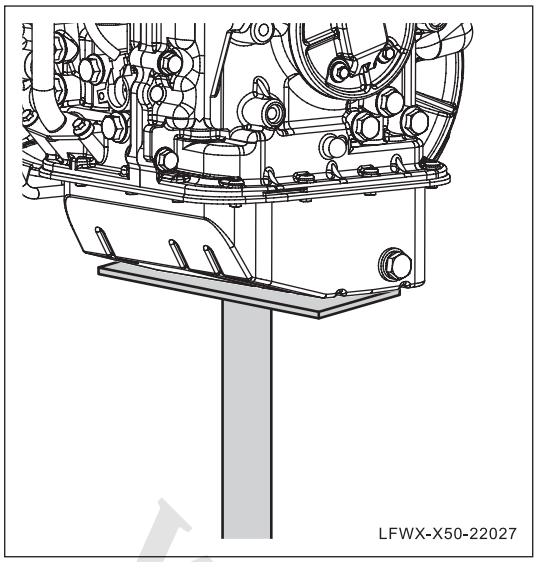
(k) Place the support top on the bottom of the transmission, remove the connecting bolt of the transmission and the engine, and lower the support top slowly, and then remove the transmission assembly.

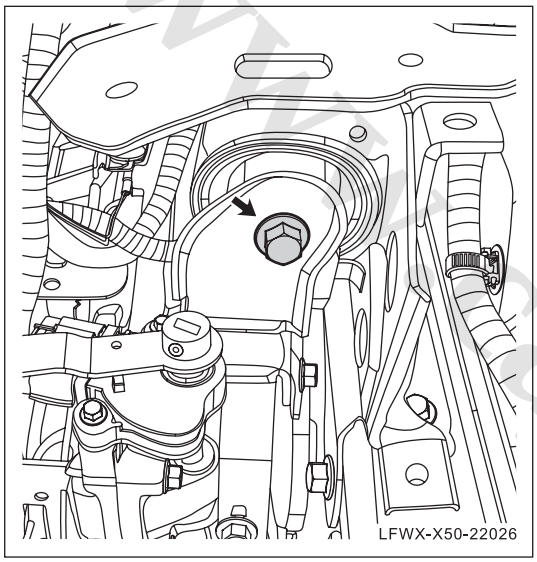
△ HINT:

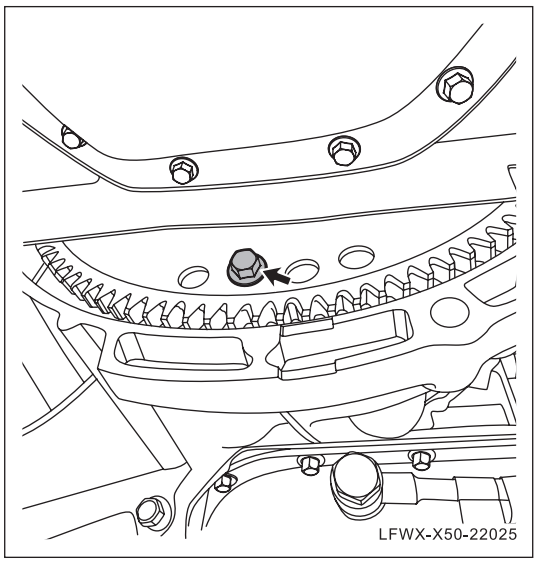
Keep the transmission level when removing it to prevent the hydraulic torque converter from coming out; install the hydraulic torque converter baffle timely after removing the transmission, and install the differential plug.

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4. INSTALL THE TRANSMISSION ASSEMBLY

(a) Place the transmission on the support top, slowly lift the transmission and install it aligning with the engine installation position, install the connecting bolts of the engine and the transmission and then tighten them.

Torque: 55 - 65N•m

△ HINT:

- When installing the transmission, be sure to protect the transmission surrounding parts, such as pressure sensor, speed sensors, shift switch, wire harnesses and wire harness connector.
- When mounting the transmission, keep it level to prevent the torque converter from coming out.

(b) Install the fixing bolts of the engine left mounting and tighten them.

Torque: 65 - 85N•m

(c) Install fixing bolts of the starter and tighten them.

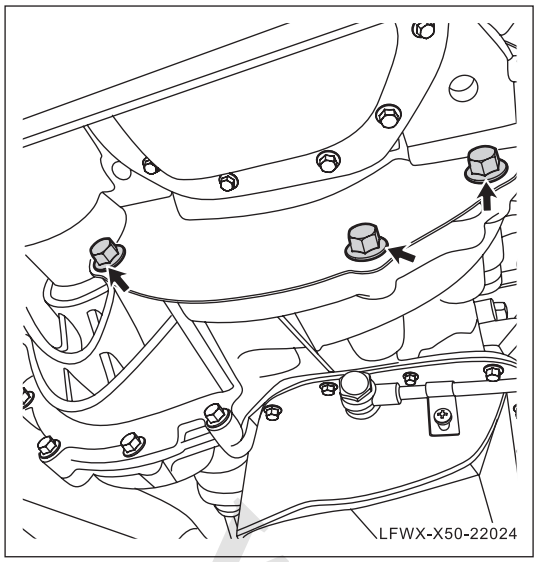
Torque: 80 - 86N•m

(d) Rotate the flywheel with a screwdriver, making the flywheel thread hole aligned with the hydraulic torque converter thread hole, install the hydraulic torque converter fixing bolts (6 in total) and then tighten them.

Torque: 26 - 30N•m

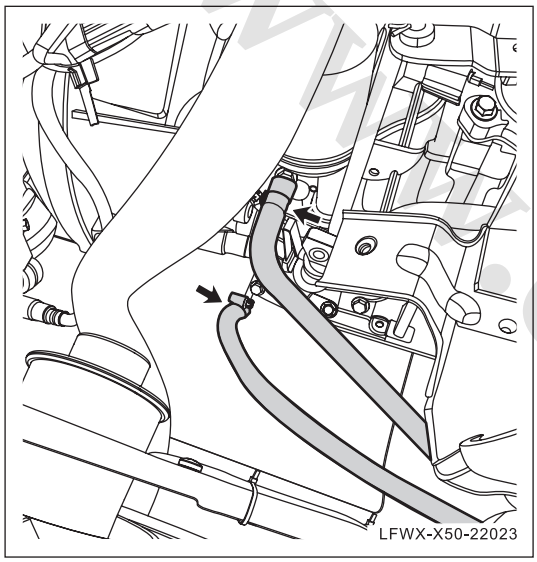
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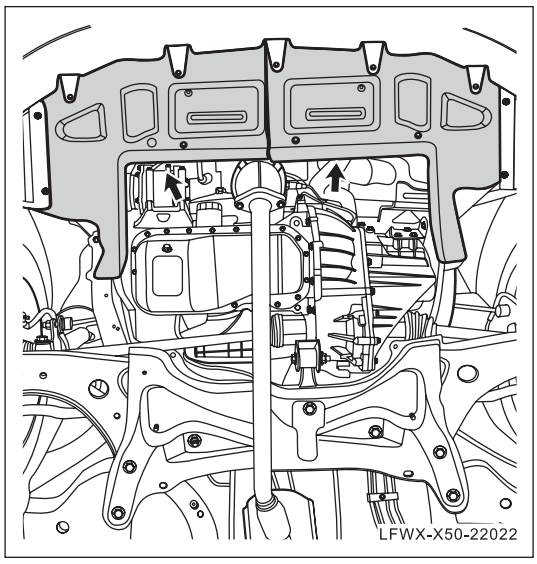


(e) Install the transmission baffle, and then install the fixing bolts and tighten them.

Torque: 55 - 65N•m



(F) Install the transmission outlet and return pipes and fix them with clamps.

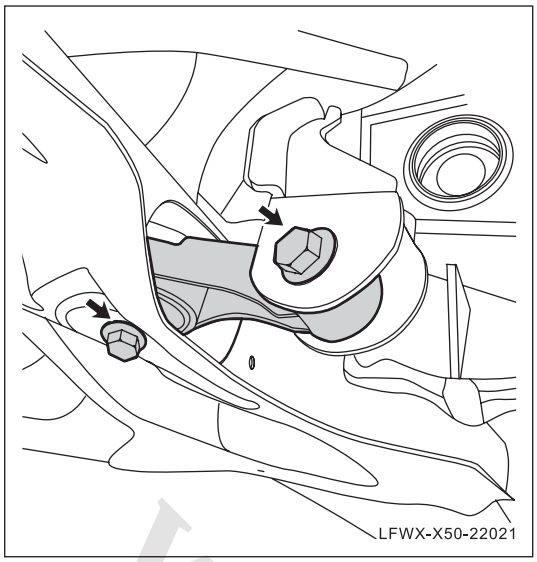


(g) Install the lower trim panel of the engine compartment, install the fixing bolts and then tighten them.

Torque: 8 - 12N•m

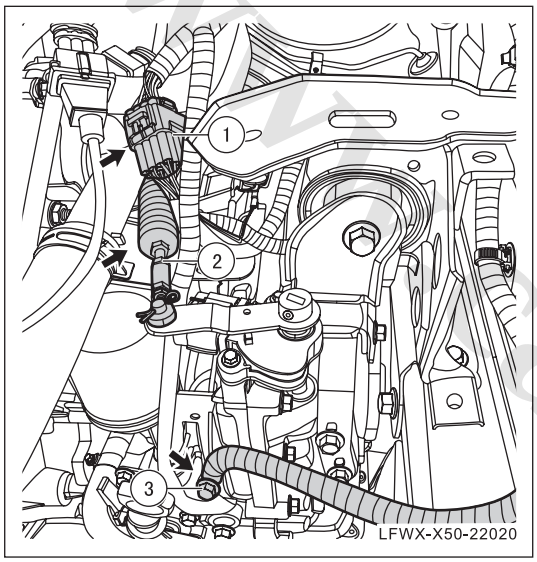
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(h) Install the engine rear mounting and install the fixing bolts and tighten them.

Torque: 185 - 225N•m



(i) Install the drive shaft. (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)

(j) Install the transmission connector ① , gearshift flexible shaft ② , and grounding wire ③ .

(k) Fill the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

5. INSTALL THE INTAKE TUBE AND THE AIR FILTER (SEE 14 - INTAKE AND EXHAUST SYSTEM, INLET PIPE LINE/AIR FILTER, AND REPLACEMENT)

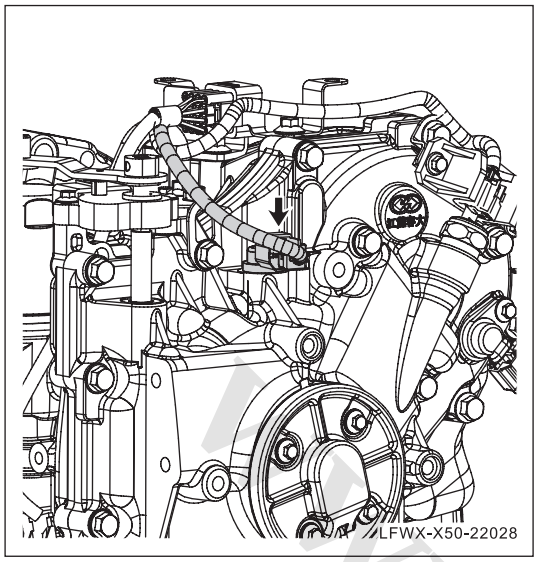
6. INSTALL THE BATTERY AND BRACKET ASSEMBLY (SEE 18 - STARTING AND CHARGING SYSTEM BATTERY, REPLACEMENT)

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WHEEL SPEED SENSOR

REPLACEMENT



1. REPLACEMENT OF THE (ACTIVE) WHEEL SPEED SENSOR

(a) Remove the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)

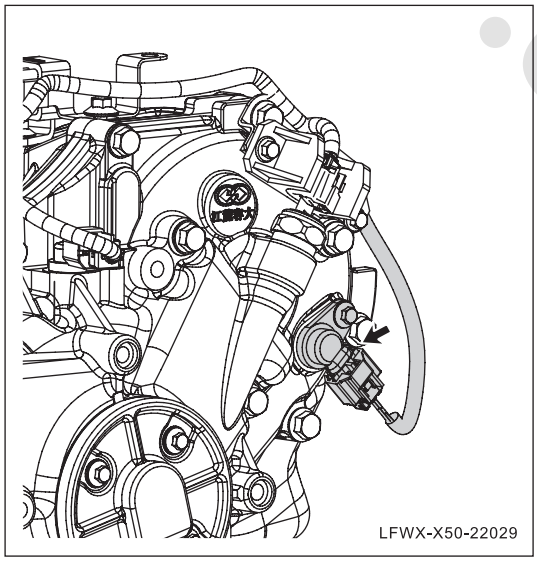
(b) Disconnect the (active) wheel speed sensor connector, remove the (active) wheel speed sensor fixing bolts, and remove the (active) wheel speed sensor.

(c) Install the (active) wheel speed sensor on automatic transmission, install the fixing bolts and then tighten them.

Torque: 9 - 11N•m

(d) Connect (active) wheel speed sensor connector.

(e) Install the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)



2. REPLACEMENT OF (PASSIVE) WHEEL SPEED SENSOR

(a) Remove the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)

(b) Disconnect the (passive) wheel speed sensor connector, remove the (passive) wheel speed sensor fixing bolts, and remove the (passive) wheel speed sensor.

(c) Install the (passive) wheel speed sensor on transmission, and install the fixing bolts and then tighten them.

Torque: 9 - 11N•m

(d) Connect (passive) wheel speed sensor connector.

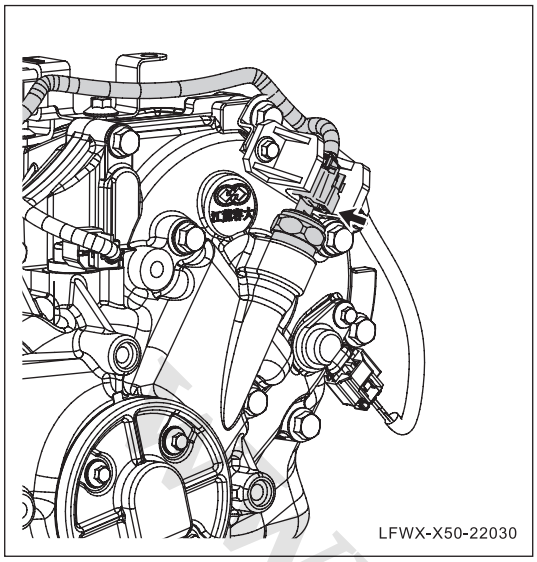
(e) Install the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)

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PRESSURE SENSOR

REPLACEMENT



1. REPLACEMENT OF PRESSURE SENSOR

(a) Remove the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)

(b) Disconnect the pressure sensor connector ① , disassemble the pressure sensor ② , and remove the pressure sensor ② .

(c) Install the pressure sensor on automatic transmission and then tighten it.

Torque: 21 - 25N•m

(d) Connect the pressure sensor connector ① .

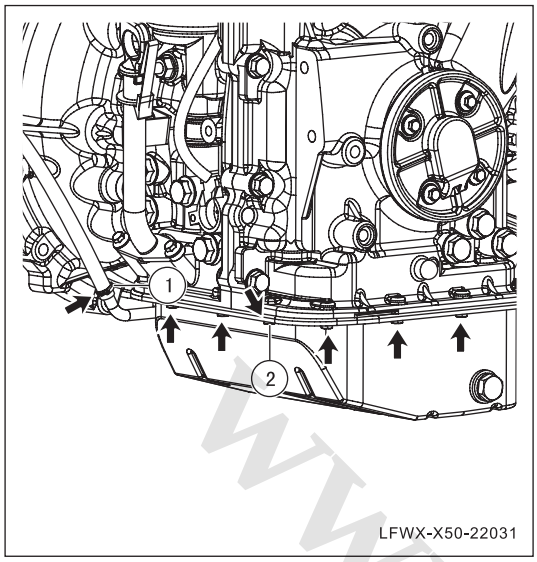
(e) Install the battery with bracket assembly. (see 18 - Starting and Charging System, Battery, Replacement)

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OIL PAN

REPLACEMENT



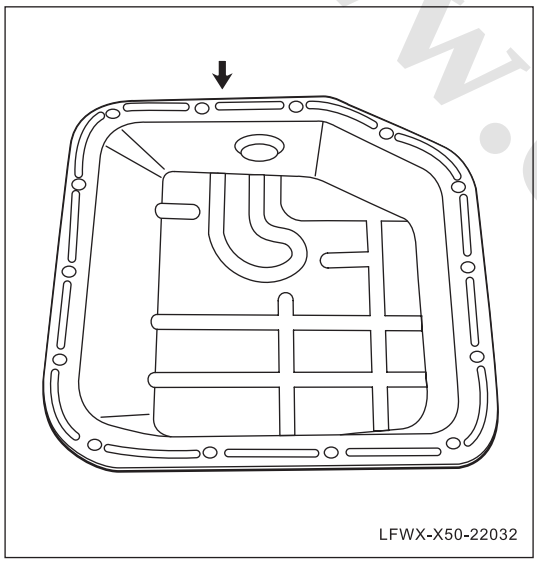
LFWX-X50-22031

1. REMOVE THE OIL PAN

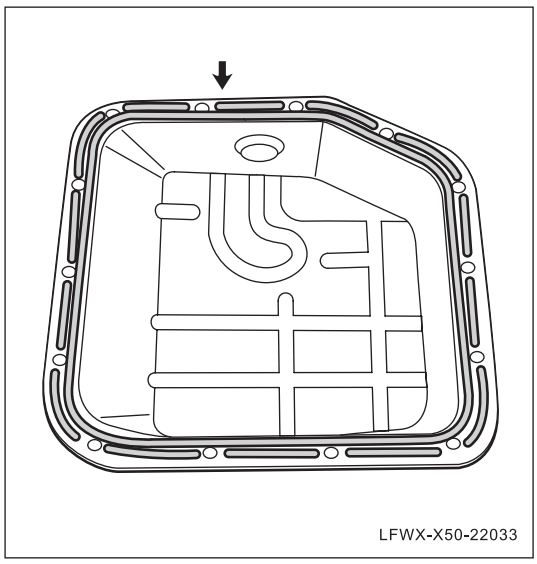
(a) Drain the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

(b) Loosen the clamp ① of the oil return pipe on the oil pan, pull out the oil return pipe, and plug up the oil pipe to prevent the outflow of oil.

(c) Remove fixing bolt ② of the oil pan and use a nylon block (or rod) pad to strike the oil pan side to remove it.


LFWX-X50-22032

(d) Check the oil pan, and if there is no deformation, perforation or oil leakage, you can continue to use it, otherwise, replace it.


LFWX-X50-22033

2. INSTALL THE OIL PAN.

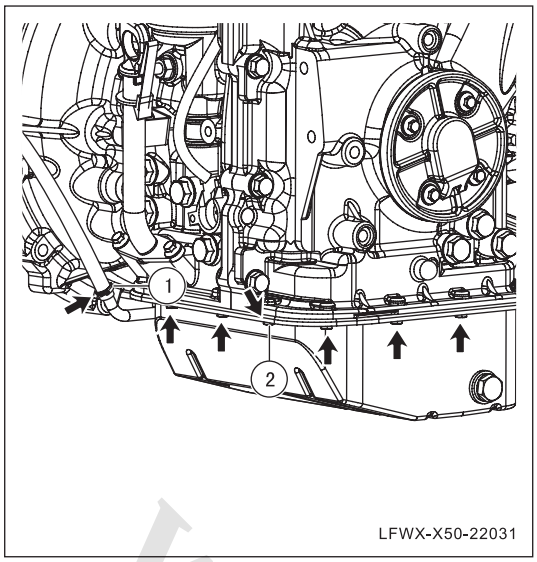
(a) Clean up the sealant on the housing and oil pan.

(b) Use clean kerosene to clean up the impurities in the oil pan.

(c) Apply the contact surface of the oil pan with special sealant (Loctite 5460) about 2mm in diameter, its form is shown in the figure.

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(d) Install oil pan onto the transmission housing, and install fixing bolt ② and tighten them.

Torque: 9 - 11N•m

(e) Install the return pipe on the oil pan and fix it with the clamp ① .

(f) Fill the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

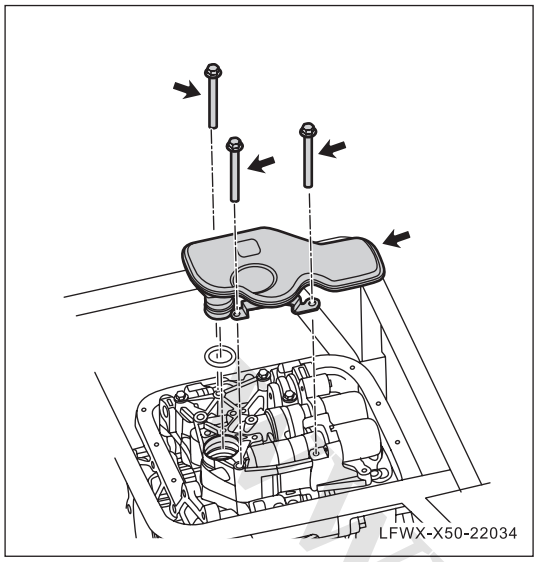
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SOLENOID VALVE

REPLACEMENT

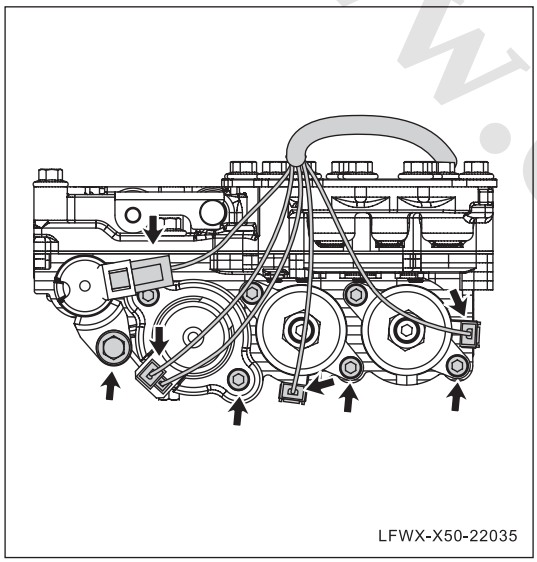


1. REMOVE THE SOLENOID VALVE

(a) Remove the oil pan. (see 22 - Automatic Transmission, Oil Pan, Replacement)

(b) Remove the wire harness from the wire clip of the oil filter.

(c) Remove the oil filter fixing bolts (3 in total), and remove the oil filter by rotating it left and right.

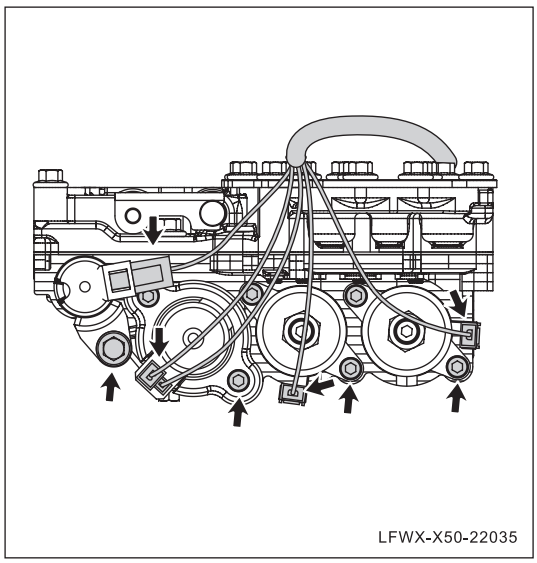


(d) Disconnect the wire harness connectors on the respective solenoid valves.

△ HINT:

Make the assembly marks on wire harnesses during removing to avoid installation mistakes.

(e) Remove the fixing bolts of the respective solenoid valves, and remove the solenoid valves by rotating it left and right.



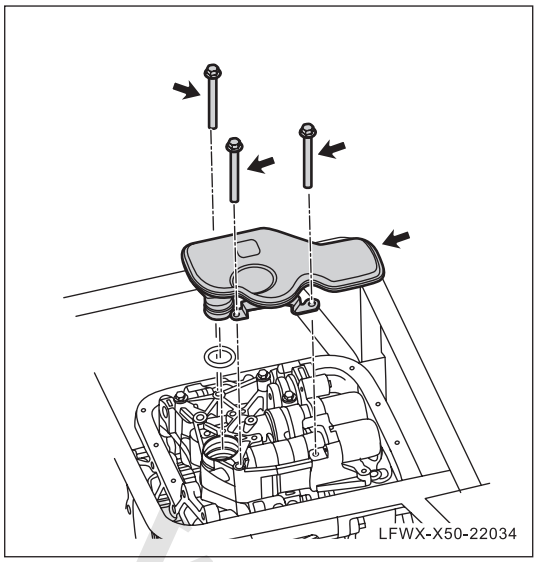
2. INSTALL THE SOLENOID VALVE

(a) Install the solenoid valve to the corresponding locations, and install the fixing bolts and then tighten them.

(b) Connect the connectors corresponding to the solenoid valves according to the marks, and make sure that they are fixed firmly.

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(e) Install the oil filter, and install the fixing bolts and tighten them.

Torque: 11N•m

(d) Fix the wire harness on the line card.

(e) Install the oil pan. (see 22 - Automatic Transmission, Oil Pan, Replacement)

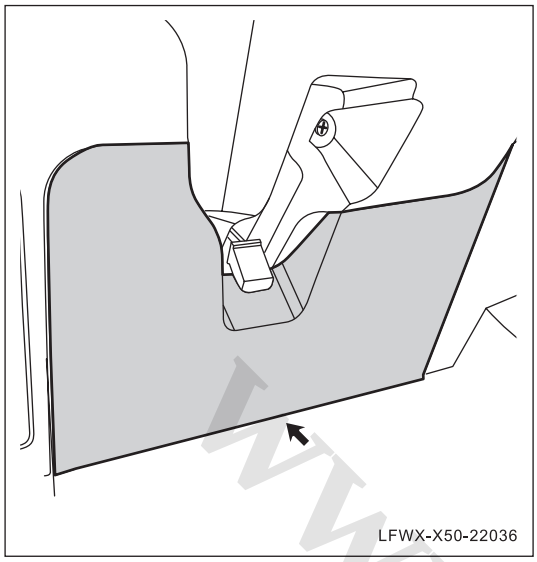
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TCU ASSEMBLY

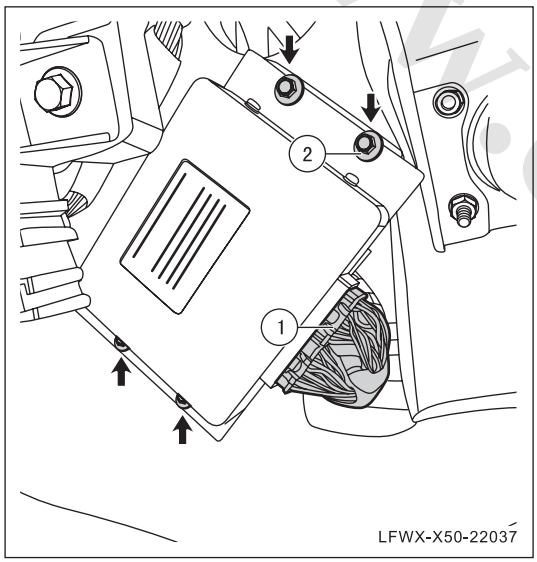
REPLACEMENT



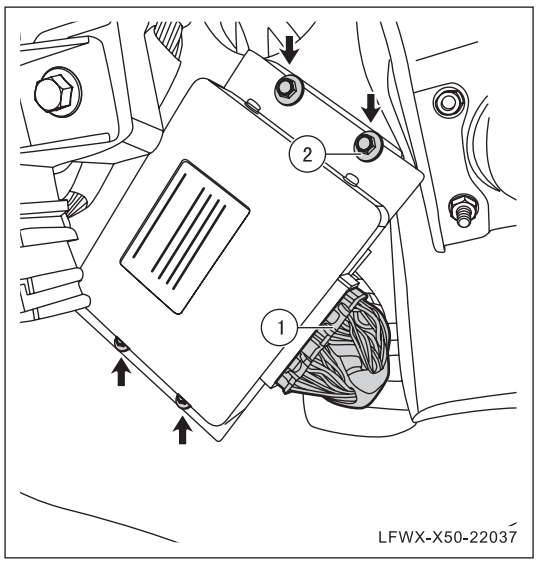
1. REMOVE THE TCU ASSEMBLY

(a) Disconnect negative cable of battery.

(b) Remove dashboard access cover plate.



(c) Disconnect the TCU assembly connector ① , remove the TCU assembly fixing bolt ② , and take down TCU assembly.



2. INSTALL THE TCU ASSEMBLY

(a) Install the TCU assembly on the bracket, install the fixing bolts ② and then tighten them.

Torque: 8 - 12N•m

(b) Connect the TCU assembly connector ① .

(c) Install the dashboard access cover plate.

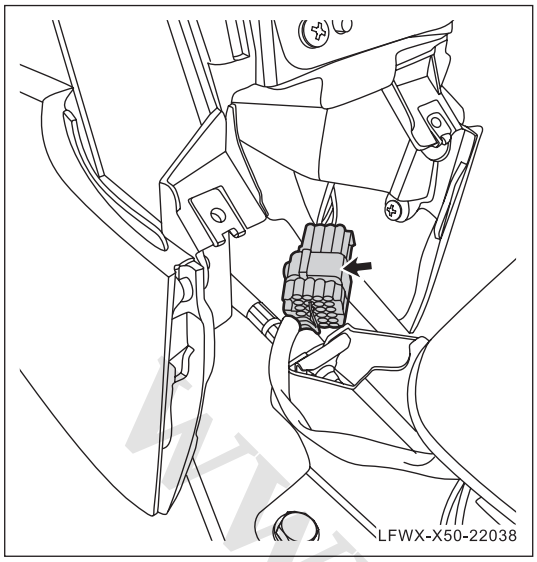
(d) Connect the negative cable of battery.

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SHIFT BRACKET ASSEMBLY

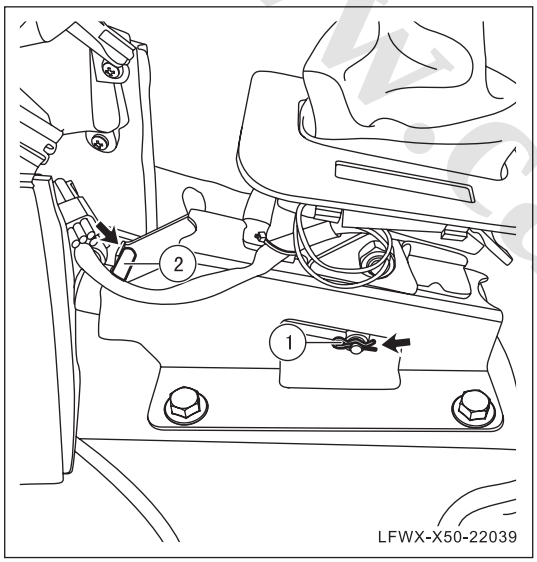
REPLACEMENT



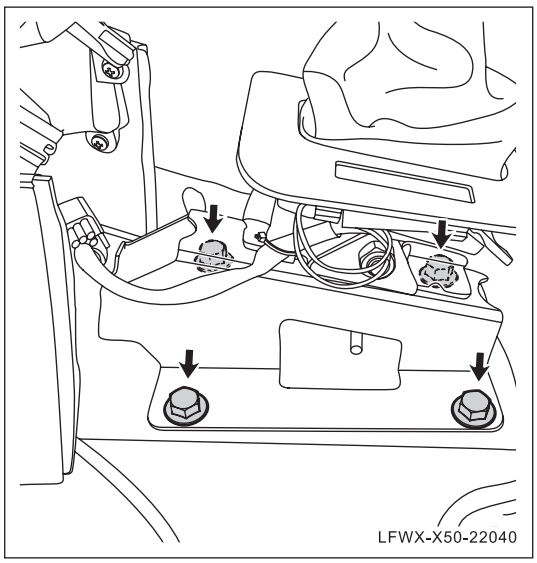
1. **REMOVE THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)**
2. **REMOVE THE GEARSHIFT BRACKET ASSEMBLY**

(a) Disconnect negative cable of battery.

(b) Disconnect the shift bracket support connector.



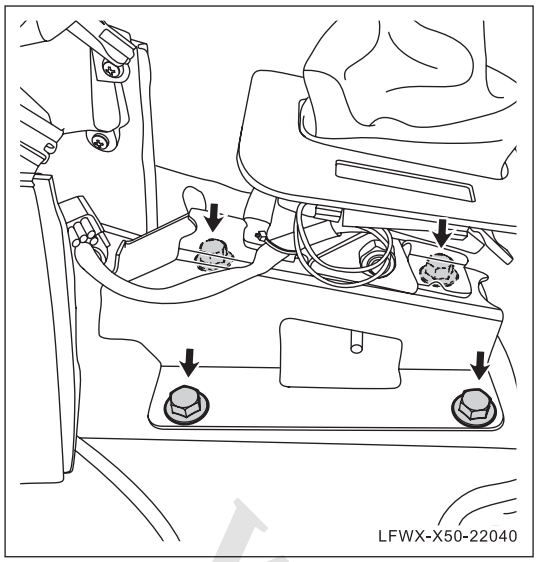
(c) Remove the lock pin ① connecting the shift flexible shaft with the shift bracket, pull out the shift flexible shaft board ② , and remove the shift flexible shaft from the slot.



(d) Remove the shift bracket fixing bolts, and then take out the shift bracket assembly.

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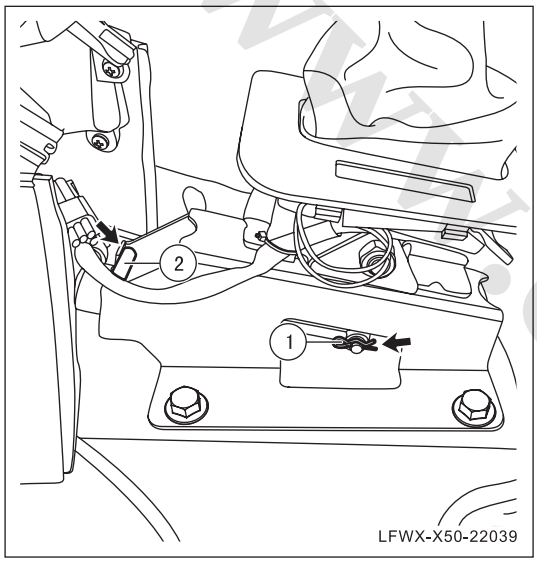
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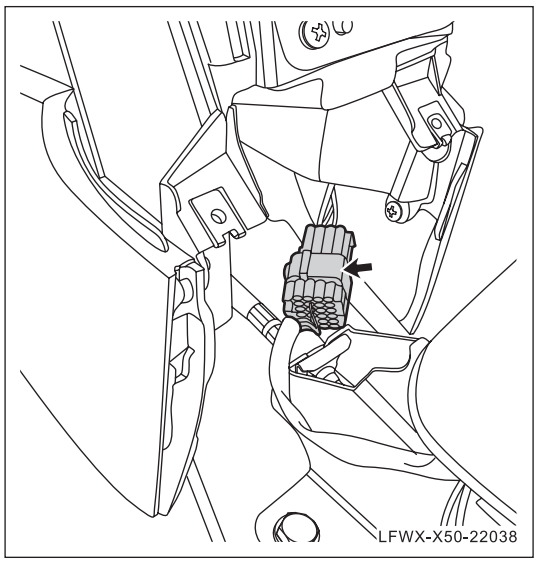
3. INSTALL THE SHIFT BRACKET ASSEMBLY

(a) Install the shift bracket assembly on the vehicle floor, install the fixing bolts and then tighten them.

Torque: 20 - 25N•m



(b) Install the shift flexible shaft card sleeve in the shift bracket groove, and fix it with the board ② ; install the shift flexible shaft on the shift bracket, and fix it with the lock pin ① .



(c) Connect the shift bracket connector.

(d) Connect the negative cable of battery.

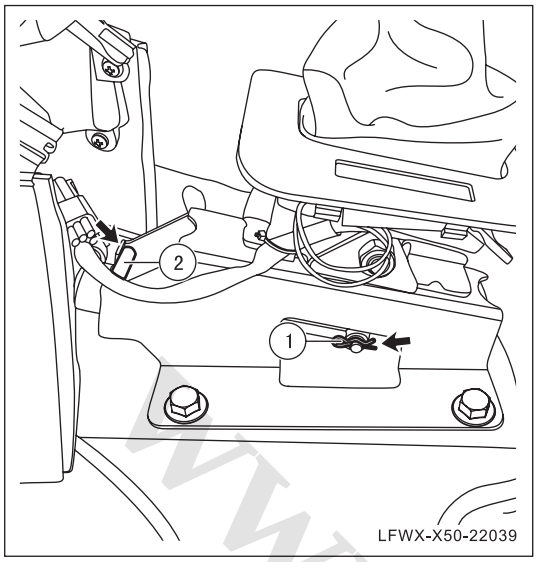
4. INSTALL THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)

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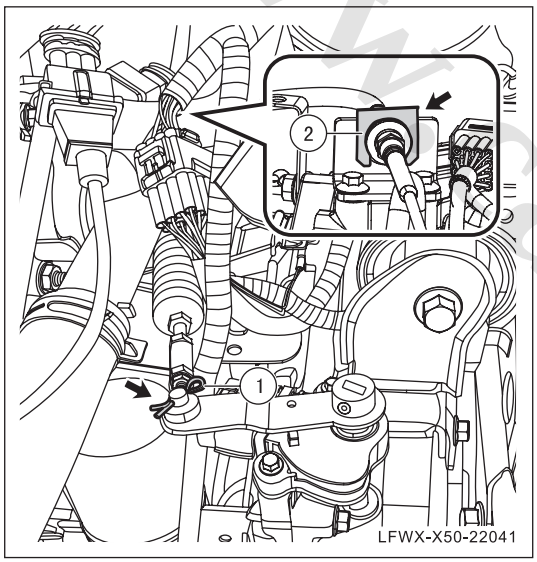
SHIFT FLEXIBLE SHAFT ASSEMBLY

REPLACEMENT

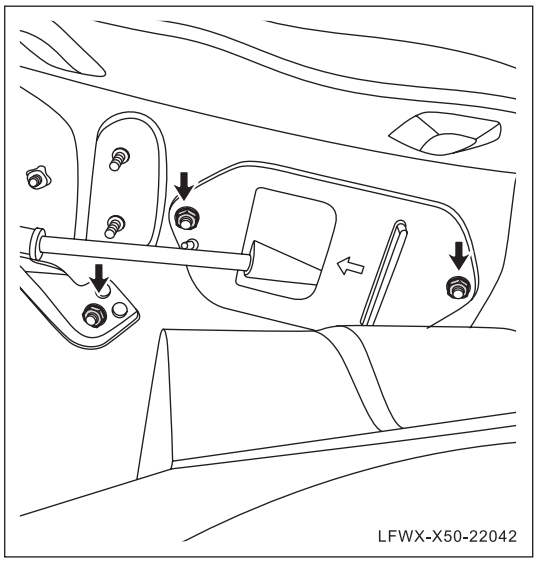


1. **REMOVE THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)**
2. **REMOVE THE SHIFT FLEXIBLE SHAFT ASSEMBLY**

(a) Remove the lock pin ① connecting the shift flexible shaft with the shift bracket, pull out the shift flexible shaft board ② , and remove the shift flexible shaft from the slot.



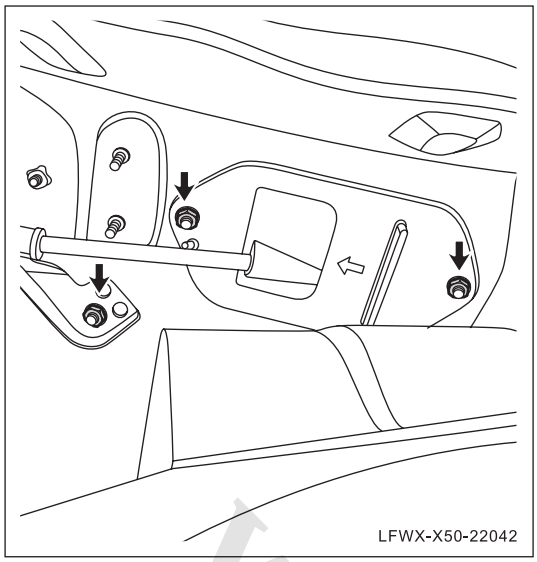
(b) Remove the lock pin ① connecting the shift flexible shaft with the shift switch, pull out the shift flexible shaft board ② , and remove the shift flexible shaft from the slot.



(c) Remove the shift flexible shaft bracket fixing nut, and remove the shift flexible shaft assembly.

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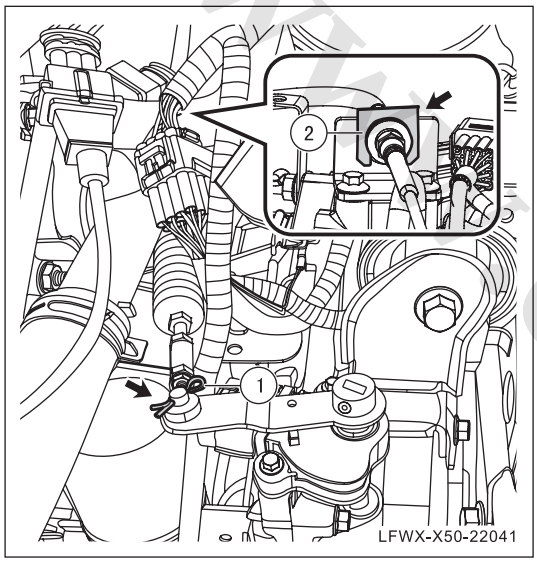


3. INSTALL THE SHIFT FLEXIBLE SHAFT ASSEMBLY

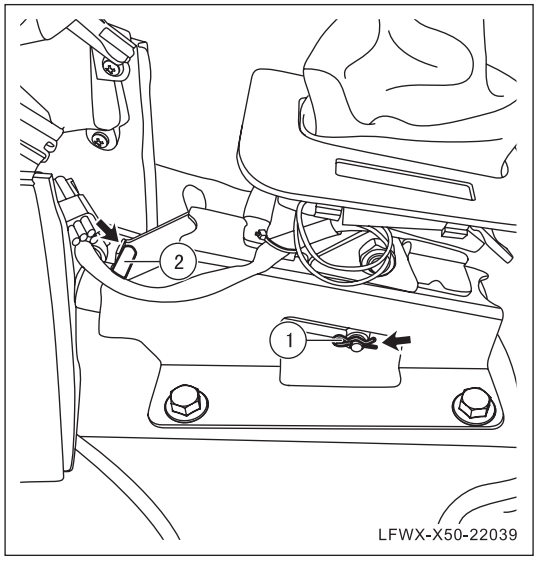
(a) Place the shift flexible shaft through the vehicle floor and make it neat and smooth.

(b) Install the shift flexible shaft bracket fixing nuts and then tighten them.

Torque: 8 - 12N•m



(c) Install the shift flexible shaft sleeve in the bracket groove of the transmission, and fix it with the board ② ; install the shift flexible shaft on the shift switch, and install the lock pin ① .



(d) Install the shift flexible shaft sleeve in the shift bracket groove, and fix it with the board ② ; install the shift flexible shaft on the shift bracket, and fix it with the lock pin ① .

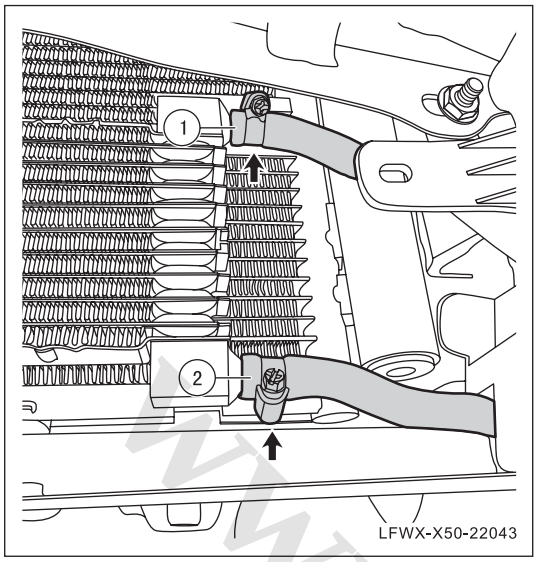
4. INSTALL THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)

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OIL COOLER

REPLACEMENT



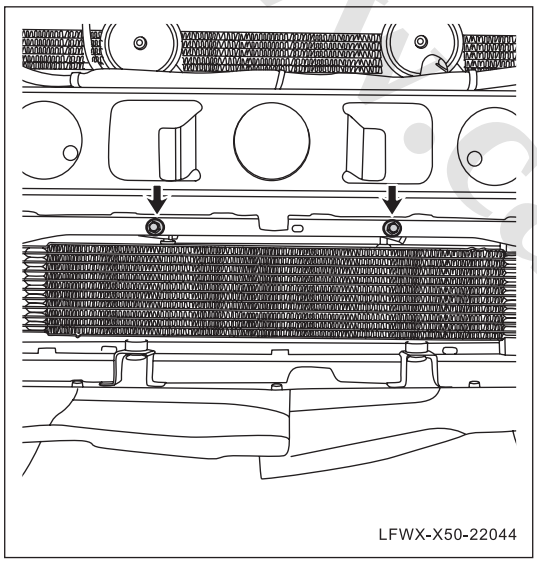
1. REMOVE THE FRONT BUMPER (SEE 81 - INTERIORS AND EXTERIORS, FRONT BUMPER, REPLACEMENT)

2. REMOVE THE OIL COOLER

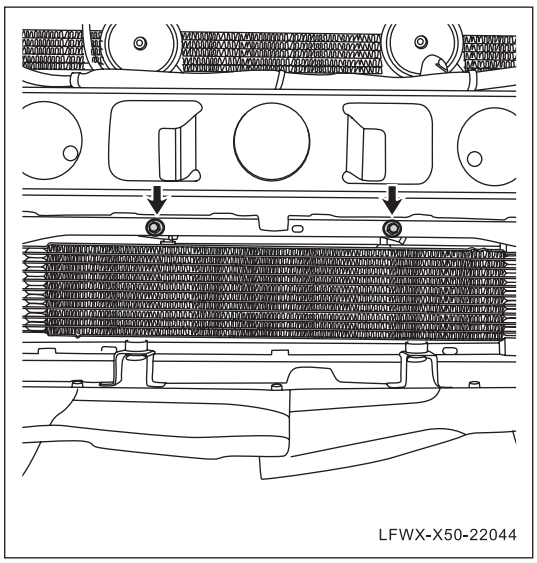
(a) Drain the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

(b) Loosen the fixing clamp of the oil cooler oil inlet pipe ① , and pull out the oil cooler inlet pipe.

(c) Loosen the fixing clamp of the oil cooler oil outlet pipe ② , and pull out the oil cooler outlet pipe.



(d) Remove the oil cooler bracket fixing bolts, and take out oil cooler.



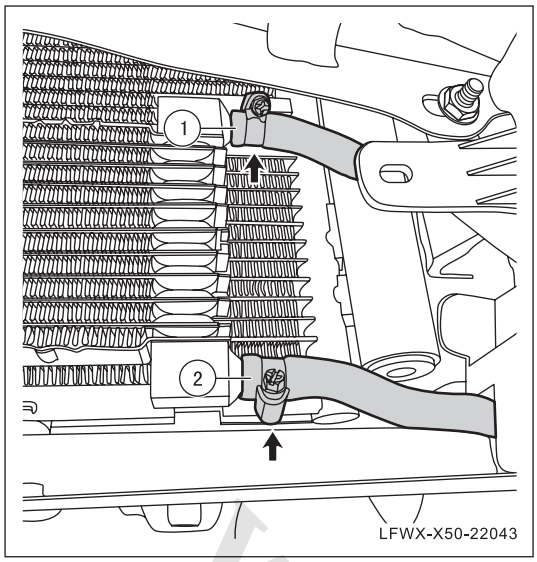
3. INSTALL THE OIL COOLER

(a) Install the oil cooler in the bushing between the upper and the lower brackets, align the upper bracket with the mounting hole, and install the fixing bolts and then tighten them.

Torque: 8 - 12N•m

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(b) Install the oil cooler inlet pipe ① on the oil cooler inlet and fix it with the clamps.

(d) Install the oil cooler outlet pipe ② on the oil cooler outlet and fix it with the clamps.

(d) Fill the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

4. INSTALL THE FRONT BUMPER (SEE 81 INTERIORS AND EXTERIORS, FRONT BUMPER, REPLACEMENT)

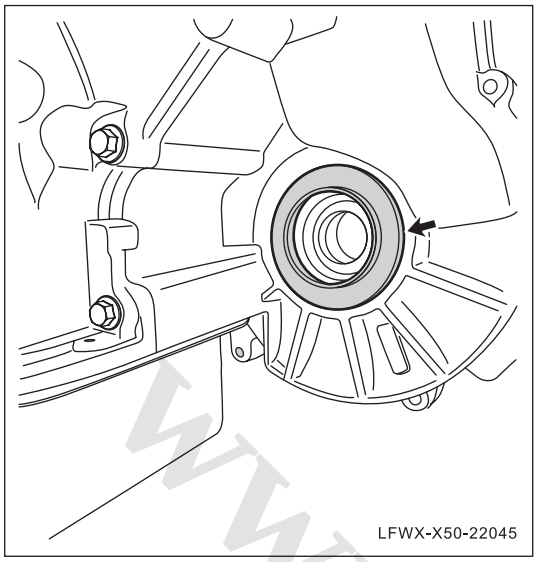
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DIFFERENTIAL OIL SEAL

REPLACEMENT



1. REMOVE THE DIFFERENTIAL OIL SEAL

(a) Drain the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

(b) Remove the drive shaft. (See 41 - Drive Shaft, Drive Shaft Assembly, Replacement)

(c) Remove the differential oil seal.

△ HINT:

Check whether the differential housing inner hole is damaged or worn, and if any edge burr is found, deburr the edge. If severely worn, then replace the transmission assembly.

2. INSTALL THE DIFFERENTIAL OIL SEAL

(a) Place a new oil seal on the housing, and install the oil seal with installing tool.

△ HINT:

Apply the lubricant on the cylindrical surface of the oil seal before installing the oil seal.

(b) Mount the drive shaft. (See 41 - Drive Shaft, Drive Shaft Assembly, Replacement)

(c) Fill the transmission fluid. (see 22 - Automatic Transmission (CVT), Transmission Fluid, Replacement)

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Clutch

Clutch 23-1
System description 23-1
Preparation 23-2
Service data 23-3
Precautions 23-4
Components (I) 23-5
Components (II) 23-6
Components (III) 23-7
Function and Fault of components 23-8
On-vehicle inspection 23-9
Diagnosis 23-12
Fault symptom table 23-12
Fault diagnosis 23-14
Clutch fluid (brake fluid) 23-21
Exhaust 23-21
Replacement 23-23
Clutch pedal 23-25
Adjustment 23-25
Replacement 23-26
Clutch master cylinder 23-30
Check 23-30
Replacement 23-31
Clutch slave cylinder 23-35
Check 23-35
Replacement 23-36
Clutch pressure plate and driven plate 23-39
Check 23-39
Replacement 23-42
Clutch release bearing and release fork 23-44
Check 23-44
Replacement 23-45
Clutch oil pipe 23-46
Replacement 23-46

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CLUTCH

SYSTEM DESCRIPTION

1. FUNCTION

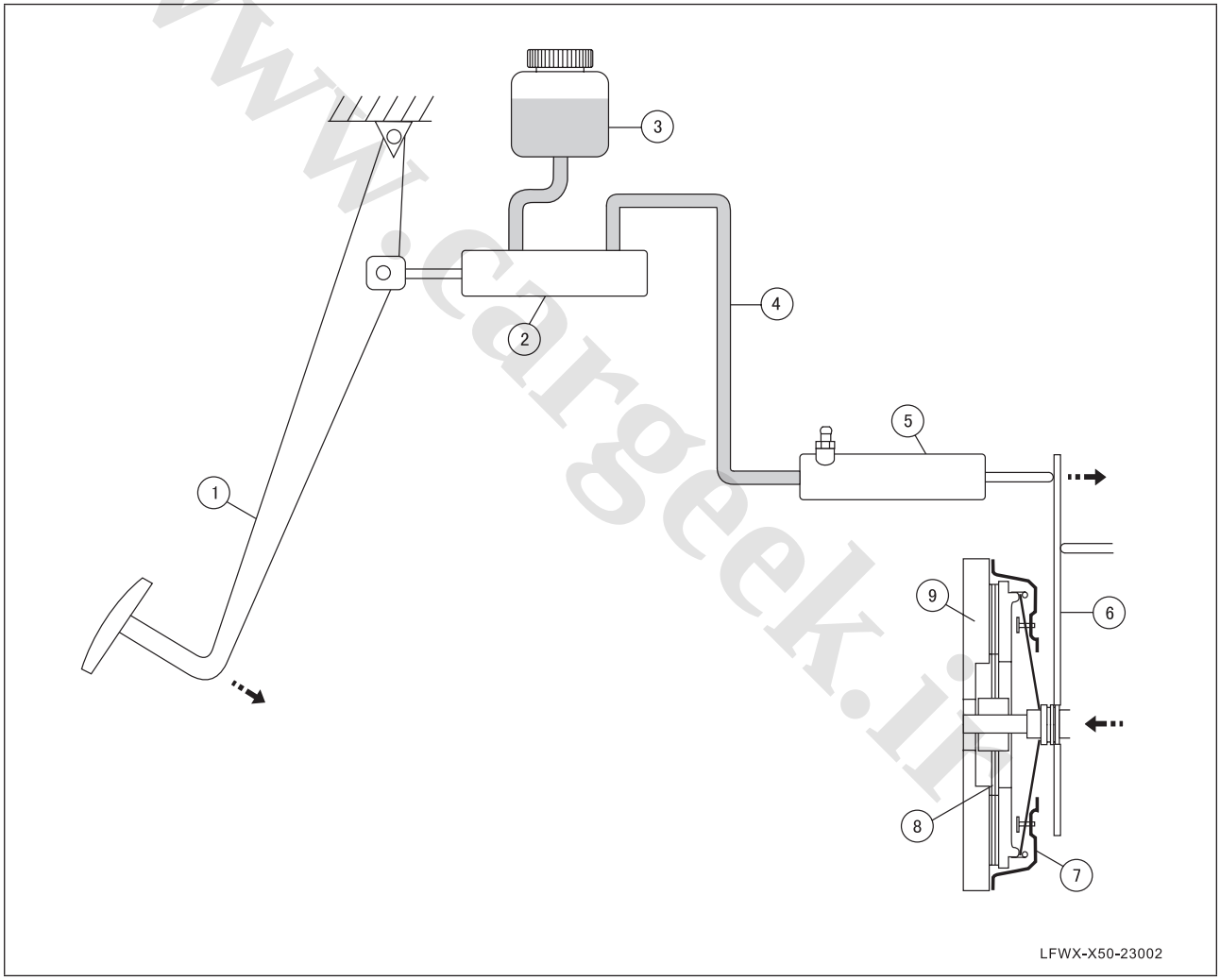
Clutch is installed between the engine and the transmission and directly connects with the engine in automobile drive train. Functions of clutch:

- Engage the engine and the drive train gradually and ensure that the automobile starts stably.
- Ensure that the drive train operates smoothly during gearshift.
- Limit the torque transferred to prevent overloading of drive train.

2. COMPONENTS

Clutch system mainly consists of a clutch pedal, a clutch master cylinder, clutch oil pipes, a clutch slave cylinder, a release fork, a release bearing, a clutch pressure plate, a clutch driven plate, etc.

3. WORKING PRINCIPLE



1	Clutch pedal
2	Clutch master cylinder
3	Brake fluid reservoir
7	Clutch pressure plate
8	Clutch driven plate

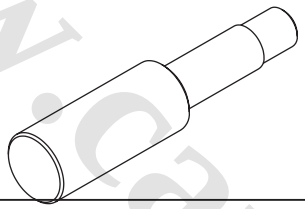
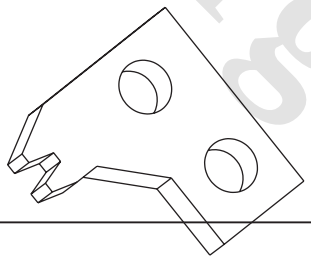
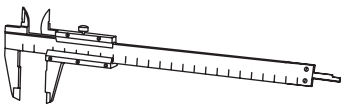
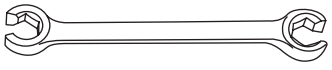
4	Clutch hydraulic line
5	Clutch slave cylinder
6	Release fork
9	Flywheel

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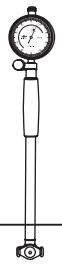
Function of clutch is to disconnect and connect engine power transfer. When clutch is connected, the pedal is located at the highest position and there is clearance between release fork and release bearing. Pressure plate press driven plate tightly under the action of diaphragm spring. Torque of engine is transfered to driven plate through flywheel and pressure plate and then to input shaft of transmission from driven plate. When disconnecting clutch, depress clutch pedal. After removing the clearance through push rod, release fork and release bearing, outer end of release fork push pressure plate to move rearward overcoming pressure of press spring and there is clearance between pressure plate and driven plate which indicates that friction torque disappears. Then clutch drive and driven parts are disconnected, cutting power transfer. When power transfer is required, release clutch pedal slowly. Under the action of diaphragm, pressure plate moves forward and press driven plate tightly gradually as well as friction force increases gradually. When pressure plate and driven plate comes into contact, friction torque is small. Clutch drive and driven parts cannot rotate synchronously and clutch clips. As press force increases gradually, rotation speed of clutch drive and driven parts becomes the same gradually until connected completely and stop slipping.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Alignment tool for clutch driven plate assembly		Installation and location of clutch driven plate assembly
2	Flywheel stopper		Preventing the flywheel from rotating when removing and installing the clutch pressure plate
3	Dial caliper		Measuring the clutch wear
4	Pipe wrench		Removing and installing the oil pipe nut and clutch slave cylinder bleeder plug

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S/N	Tools	Outline diagram	Description
5	Internal dial gauge		Measuring cylinder bore

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Clutch pedal height		100 mm
Free play of clutch pedal		9 mm
Brake fluid model		DOT4
Brake fluid filling amount		0.6 L
Clearance between clutch slave cylinder body and piston	Standard value	Diameter of slave cylinder: φ22.22+0.033 0
		Diameter of slave piston: φ22.22-0.040 -0.073
Free length of clutch slave cylinder return spring	Standard value	36.5 ± 0.6 mm
Diaphragm spring end thickness	Standard value	2.2 mm
	Limit value	2.2 ± 0.25 mm
Diaphragm spring point flatness	Standard value	0.6 mm
	Limit value	0.6 mm
Clutch pressure plate flatness	Limit value	0.2 mm
Clutch driven plate rivet depth	Limit value	1.25 mm
Clearance between clutch driven plate spline and transmission input shaft	Standard value	Major diameter of spline: 19.05+0.1 -0.3
		Minor diameter of spline: 16.29+0 -0.3
Clutch driven plate end face run-out	Standard value	0.5 mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Lock nut of clutch pedal sensor	12 - 18
Lock nut of clutch master cylinder push rod	12 - 18
Fixing bolt of clutch pedal bracket subassembly upper end	20 - 26
Fixing nut of clutch master cylinder	20 - 26
Union nut of clutch master cylinder oil outlet pipe	8 - 14
Fixing bolt of clutch slave cylinder	20 - 26
Union nut of clutch slave cylinder oil pipe	8 - 14
Clutch pressure plate fixing bolt	30 - 34
Union nut connecting clutch pipe with hose	8 - 14

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PRECAUTIONS

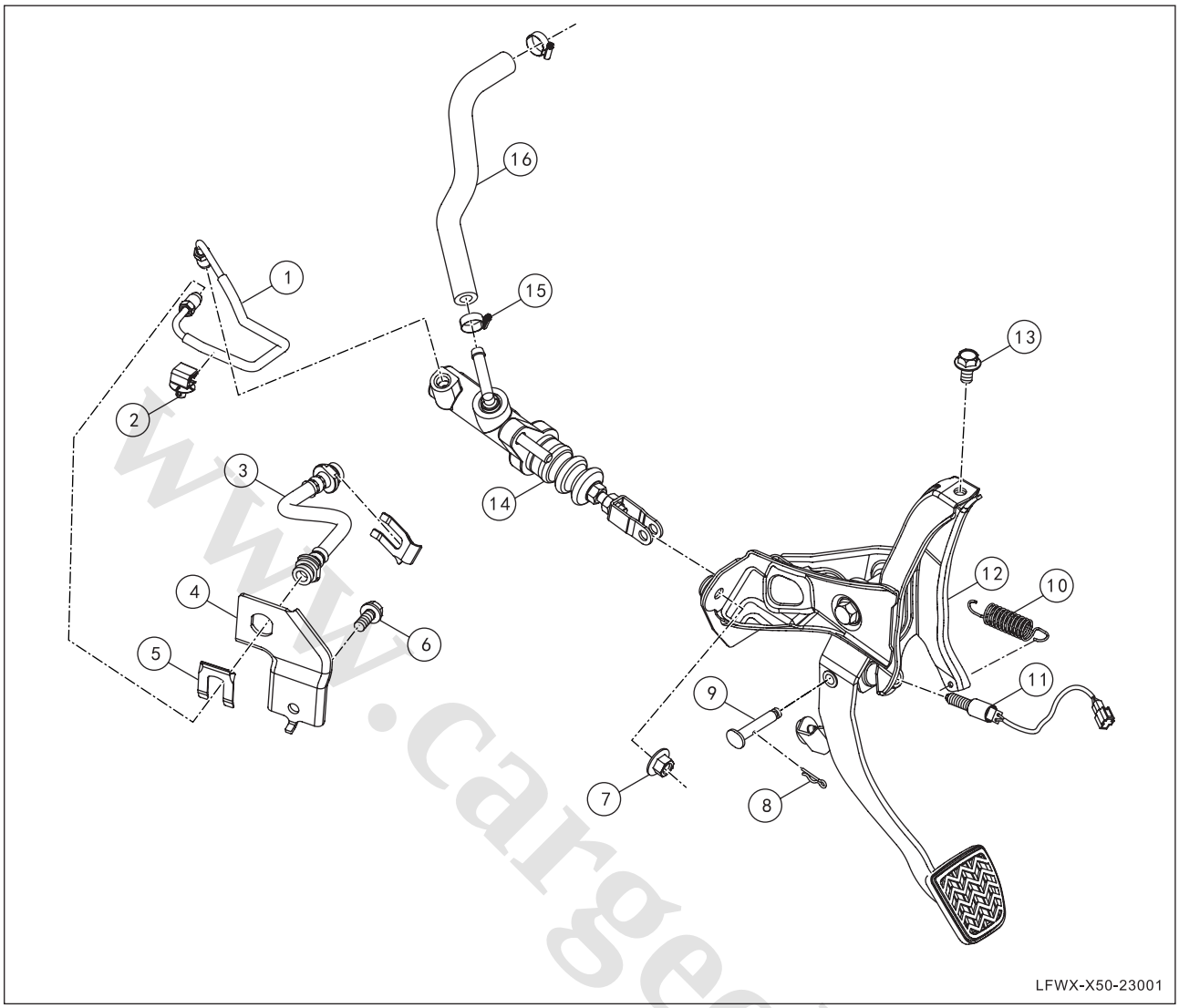
1. Drained out brake fluid cannot be reused.
2. Do not spill brake fluid on vehicle. Otherwise, it may damage the paint. If the brake fluid is spilled on the paint coating, clean it immediately with water.
3. Never use gasoline to clean the clutch pressure plate.
4. Don't clean the release bearing with oil or liquid substances when the release bearing is filled with grease.
5. To ensure the driven plate to move along the spline of the transmission input shaft smoothly, be sure to lubricate the driven plate spline and the transmission input shaft spline properly with temperature-proof and pressure-roof grease when installing the clutch. Excessive lubrication will result in slippage of the friction plates.
6. When the friction plate is worn down to the specified limit, replace the driven plate assembly timely in order to avoid scratches on the pressure plate and flywheel surfaces due to slippage of the clutch.

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COMPONENTS (I)



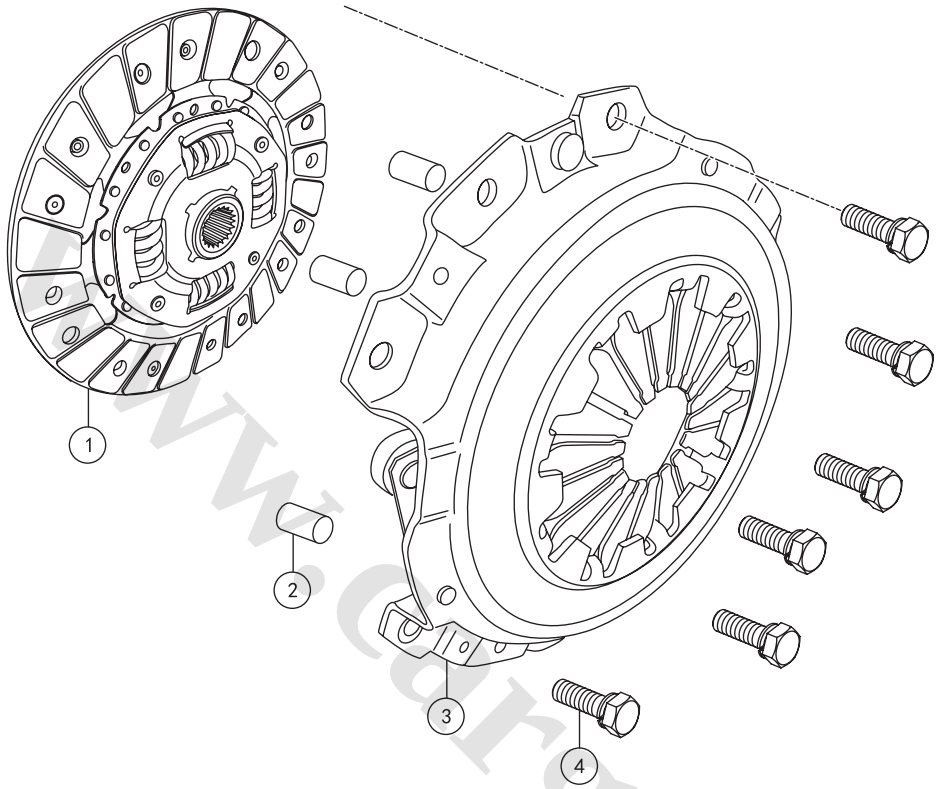
1	Clutch master cylinder oil outlet pipe
2	Clamp
3	Clutch outlet oil hose
4	Clutch outlet oil hose bracket
5	E-type clip
6	Hexagon head bolt and plain washer assembly
7	Nut
8	Locking pin

9	Lock shaft
10	Return spring
11	Clutch pedal sensor
12	Clutch pedal bracket subassembly
13	Hexagon bolt with flange
14	Clutch master cylinder
15	A-type worm drive type hose hoop
16	Clutch master cylinder oil inlet pipe

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COMPONENTS (II)



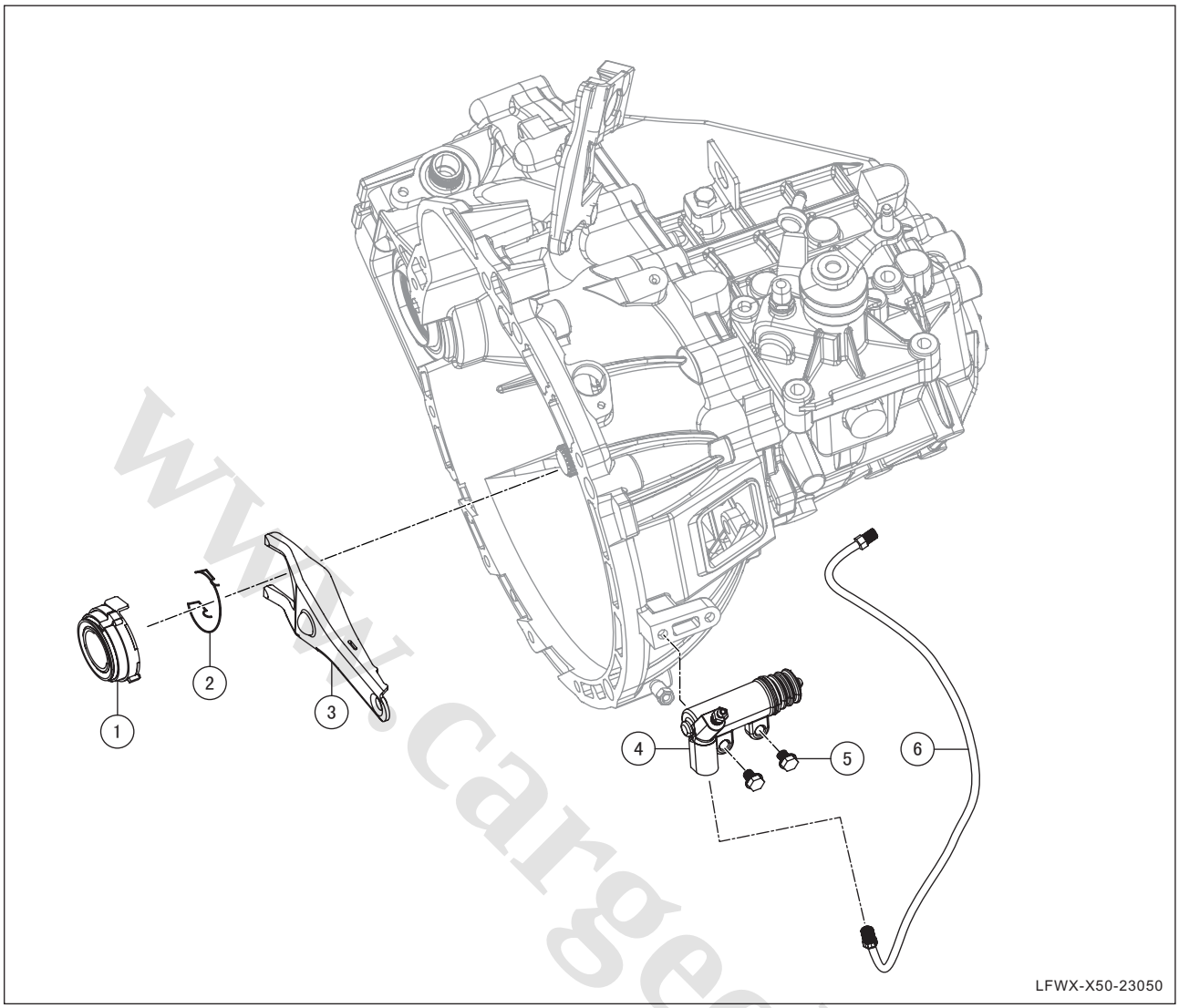
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1	Clutch driven plate assembly	3	Clutch pressure plate assembly
2	Locating pin	4	Clutch pressure plate combination bolts

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COMPONENTS (III)



1	Clutch release bearing
2	Snap ring
3	Release fork

4	Clutch slave cylinder
5	Tightening bolt of clutch slave cylinder
6	Clutch slave cylinder oil pipe

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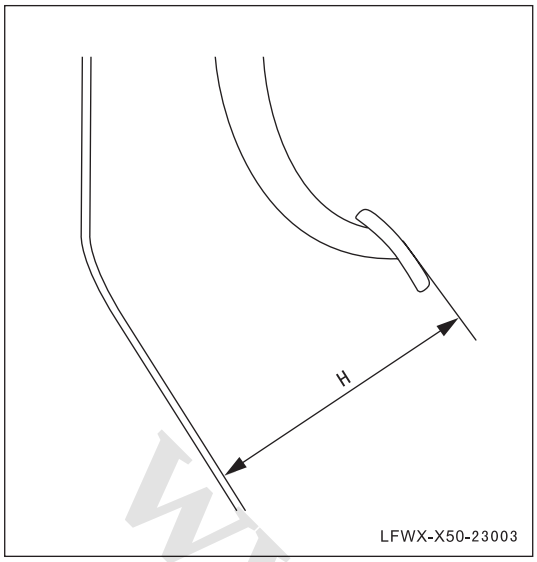
FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common faults	Fault symptom
Clutch pedal	To operate clutch	Bent and deformed, with incorrect free play and pedal height	Clutch pedal is hard to be depressed and clutch cannot be disengaged
Clutch master cylinder	To collect information of pedal play and output high-pressure clutch fluid	The cup is damaged and the internal is stuck or blocked	Clutch pedal is loose and soft and cannot return to its position. Clutch slips
Clutch oil pipe	To deliver clutch fluid	Leakage, internal blockage, twist	Clutch is difficult to be disengaged or is not disengaged completely
Clutch slave cylinder	High pressure clutch fluid delivered by clutch master cylinder pushes the piston and thus release fork operates	The cup is damaged and the internal is stuck or blocked	Clutch pedal is loose and soft and cannot return to its position. Clutch slips
Release fork	To function as a lever	Deformed or bent	Pedal cannot return to its position and clutch cannot be disengaged
Release bearing	Release bearing allow clutch pressure plate diaphragm spring to spin as well as move along the axial direction of clutch output shaft. Thus ensure smooth engagement and soft disengagement of clutch, reduce wear and prolong service life of clutch and the entire drive train.	Stuck or poor lubrication	Vehicle vibration during start and abnormal clutch noise
Clutch pressure plate	To deliver or cut off engine outputting power	Diaphragm spring is worn or pressure plate is twisted or deformed	Vehicle vibrates during start
Clutch driven plate	To deliver engine power to transmission input shaft; to prevent drive train from overloading	Clutch driven plate is excessively worn, damping plate is broken or damping spring is fatigued or broken	Clutch slips or vehicle vibrates during start

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ON-VEHICLE INSPECTION



1. CHECK CLUTCH PEDAL HEIGHT

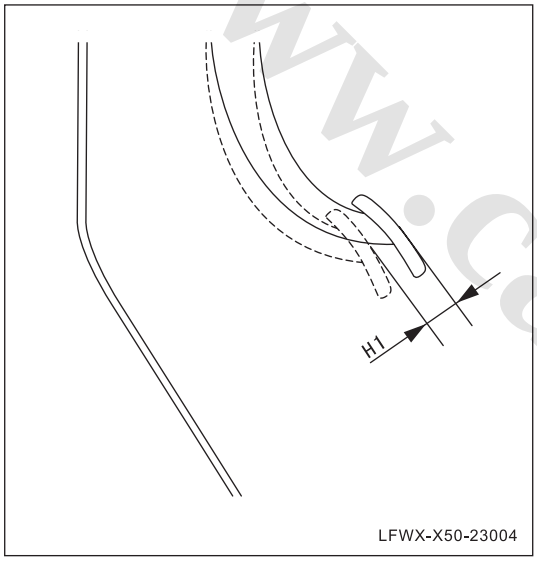
(a) Turn over the carpet under clutch pedal.

(b) Check clutch pedal height H.

Standard value: 100 mm

△ HINT:

If clutch pedal height does not conform to the standard value, adjust the clutch pedal. (See 23 - Clutch, Clutch Pedal, Adjustment)



2. CHECK FREE PLAY OF CLUTCH PEDAL

(a) If clutch pedal height is correct, depress the clutch pedal by hand until the clutch resistance begin to be felt and check clutch pedal free play H1.

Standard value: 9 mm

△ HINT:

- When depressing pedal by hand, the process to gradually feel resistance of pedal is divided into two steps as follows:

  Step 1: The pedal moves until its push rod contacts the master cylinder piston.

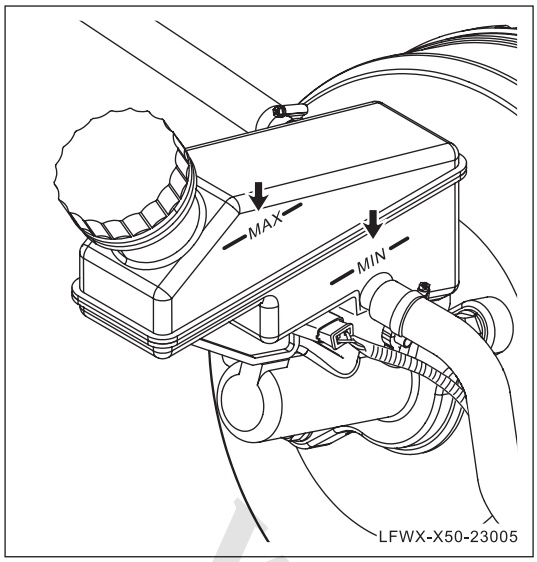
  Step 2: The pedal moves until the master cylinder causing rise of hydraulic pressure

  Before the clutch release bearing pushes diaphragm spring, movement along with pedal is the free play of clutch pedal.

- If clutch pedal free play does not conform to the standard, adjust clutch pedal. (See 23 - Clutch, Clutch Pedal, Adjustment)

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3. CHECK BRAKE FLUID LEVEL

(a) Check that brake fluid level is between "MAX' and "MIN".

Brake fluid

Model: DOT4

Filling amount: 0.6 L

△ HINT:

If brake fluid level is close to or below "MIN', fill brake fluid as soon as possible.

4. CHECK WHETHER BRAKE FLUID IS POLLUTED

(a) Check whether there is water in brake fluid.

(b) Check whether there is dust or debris in brake fluid.

(c) Check whether there is oil pollution in brake fluid.

△ HINT:

If brake fluid is polluted, replace brake fluid and damaged parts and clean clutch hydraulic pipeline.

5. CHECK WHETHER THE CLUTCH IS DISENGAGED COMPLETELY

(a) During engine idling, occurrence of any of following phenomena indicates incomplete disengagement of clutch and check and repair it.

- Only when clutch pedal is depressed almost to the bottom, output power of engine can be cut.
- When depressing clutch pedal, it feels difficult to engage a gear.
- When depressing clutch pedal, transmission gears generate harsh crashing noise.
- When depressing and holding the clutch pedal, the vehicle starts to run after engaging a gear.

△ HINT:

If the clutch cannot be disengaged completely, carry out troubleshooting according to fault diagnosis.

6. CHECK WHETHER THERE IS STRANGE NOISE WHEN CLUTCH IS OPERATING

(a) Disengage and engage the clutch through depressing and releasing clutch pedal and check whether there is strange noise.

△ HINT:

If there is strange noise when the clutch is operating, carry out troubleshooting according to trouble diagnosis.

7. CHECK WHETHER THE VEHICLE VIBRATES WHEN STARTING

(a) Start the vehicle at low speed, gradually release the clutch pedal and slowly depress the accelerating pedal according to the operation regulation and check whether the clutch can be engaged smoothly.

△ HINT:

When the clutch cannot be engaged smoothly and vibrates, carry out troubleshooting according to fault diagnosis.

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8. CHECK WHETHER CLUTCH SLIPS ABNORMALLY

(a) When starting the vehicle at low speed, any of the following phenomena indicates abnormal slippage of the clutch.

- After releasing the clutch pedal, the vehicle cannot be started flexibly or is difficult to be started.
- When the vehicle is accelerating, the vehicle cannot speed up along with the rise of the engine rotation speed. Weak driving could be felt and even burning smell or smoking occurs under serious conditions.

△ HINT:

If the clutch slips abnormally, carry out troubleshooting according to fault diagnosis.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Clutch pedal is soft to depress	1. Clutch hydraulic system (with air) 2. Clutch master cylinder cup (damaged) 3. Clutch slave cylinder cup (damaged)	See 23 - Clutch, Diagnosis, Fault Diagnosis (1. Clutch Pedal is Soft to Depress)
Vehicle vibrates when starting	1. Release fork (internal height is not in the same plane) 2. Clutch driven plate or clutch pressure plate (twisted or deformed) 3. Flywheel (circle run-out on operation end face is serious) 4. Clutch driven plate (oily, burn, surface hardened, rivet can be seen from outside and surface is worn or broken) 5. Clutch driven plate (damping plate is broken or damping spring is fatigued or broken) 6. Diaphragm spring (fatigued or broken) 7. Fixing bolts of engine mounting and transmission (loose) 8. Middle of release bearing and conduit (with a lot of oil and dust)	See 23 - Clutch, Diagnosis, Fault Diagnosis (2. Vehicle Vibrates When Starting)
Clutch pedal is hard to depress	1. Clutch pedal (damaged) 2. Brake fluid (model is incorrect) 3. Brake fluid (polluted) 4. Clutch hydraulic hose (twisted or damaged) 5. Clutch driven plate (excessively worn)	See 23 - Clutch, Diagnosis, Fault Diagnosis (3. Clutch Pedal is Hard to Depress)
Clutch cannot be disengaged	1. Brake fluid (insufficient) 2. Clutch pedal (with over large free play and damaged) 3. Clutch hydraulic system (with air) 4. Clutch master cylinder (stuck or blocked, with internal leakage) 5. Clutch slave cylinder (stuck or blocked) 6. Clutch driven plate (damaged, twisted or bent) 7. Clutch pressure plate (excessive worn) 8. Clutch release bearing (worn) 9. Clutch release fork (abnormally worn)	See 23 - Clutch, Diagnosis, Fault Diagnosis (4. Clutch Cannot be Disengaged)
The pedal cannot return to its position (but the clutch has been disengaged)	1. Release bearing (stuck) 2. Clutch fork (stuck) 3. Diaphragm spring (too weak) 4. Clutch master cylinder (stuck or blocked) 5. Clutch slave cylinder (stuck or blocked) 6. Clutch hydraulic hose (twisted or damaged)	See 23 - Clutch, Diagnosis, Fault Diagnosis (5. The Pedal cannot Return to Its Position (but the Clutch has been Disengaged))

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Symptom	Suspected area	Recommended action
Clutch slips	1. Clutch pedal (without free play)	See 23 - Clutch, Diagnosis, Fault Diagnosis (6. Clutch Slips)
	2. Clutch driven plate (oily, burn, surface hardened, rivet can be seen from outside and surface is worn or broken)	
	3. Clutch pressure plate (seriously worn or twisted)	
	4. Flywheel (seriously worn or twisted)	
	5. Diaphragm spring (fatigued or broken)	
	6. Clutch master cylinder (stuck or blocked)	
	7. Clutch slave cylinder (stuck or blocked)	
	8. Release fork (bent or deformed)	
Abnormal clutch noise	1. Release bearing (short of lubricant)	See 23 - Clutch, Diagnosis, Fault Diagnosis (7. Abnormal Clutch Noise)
	2. Release bearing and release fork (without clearance)	
	3. Middle of release bearing and conduit (with a lot of oil and dust)	
	4. Return spring of clutch pedal (fatigued, broken or falling off)	
	5. Clutch driven plate gear hub and input shaft spline (matching is loose)	
	6. Clutch driven plate (damping spring is fatigued or broken)	
	7. Clutch driven plate (rivet is loose or can be seen from outside)	

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FAULT DIAGNOSIS

1. CLUTCH PEDAL IS SOFT TO DEPRESS

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check clutch fluid (brake fluid) level	Go to Step 1	Clutch fluid (brake fluid) level is too low	Fill clutch fluid and analyze the cause for low clutch fluid. Abnormal consumption requires check of brake fluid leakage (see 51 - Service Brake, Service Brake, On-vehicle Inspection)
1	Check the working conditions of the clutch pedal	Normal	Faulty	Instruction
	Depress the clutch pedal to check the working conditions of the clutch slave cylinder	Go to Step 2	The pedal is soft to depress and the clutch salve cylinder does not operate	Carry out exhaust of clutch hydraulic system (see 23 - Clutch, Clutch Fluid (Brake Fluid), Exhaust)
2	Check clutch slave cylinder	Normal	Faulty	Instruction
	Check and repair the clutch slave cylinder and check the clutch slave cylinder parts (see 23 - Clutch, Clutch Slave Cylinder, Check)	Go to Step 3	Clutch slave cylinder cup is damaged	Replace the clutch slave cylinder cup or assembly (see 23 - Clutch, Clutch Slave Cylinder, Replacement)
3	Check clutch master cylinder	Normal	Faulty	Instruction
	Check and repair the clutch master cylinder and check the clutch master cylinder parts (see 23 - Clutch, Clutch Master Cylinder, Check)	Go to Step 4	Clutch master cylinder cup is damaged	Replace the clutch master cylinder cup or assembly (see 23 - Clutch, Clutch Master Cylinder, Replacement)
4	Verification and check	Normal	Faulty	Instruction
	Depress the clutch pedal and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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2. VEHICLE VIBRATES WHEN STARTING

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Ask the user about the vehicle vibration condition	Diagnosis is over	Vibration occurs when starting	Judge the clutch vibrates and go to Step 1
1	Check engine mounting	Normal	Faulty	Instruction
	Check the tightening condition of the engine mounting bolts	Go to Step 2	Bolts are loose	Tighten the loose bolts
2	Check the connecting bolts of the transmission and engine	Normal	Faulty	Instruction
	Check the connecting bolts of the transmission and engine for tightening condition	Go to Step 3	Bolts are loose	Tighten the loose bolts
3	Inspect whether the clutch vibrates	Normal	Faulty	Instruction
	Idle the engine, engage low gear and release the clutch pedal slowly and speed up the accelerator pedal to check the vehicle condition	Go to Step 4	Vehicle body vibrates obviously	Confirm the clutch vibrates
4	Check the clutch driven plate	Normal	Faulty	Instruction
	Check the clutch driven plate use condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 5	Driven plate is worn excessively	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
5	Check the driven plate damping spring	Normal	Faulty	Instruction
	Check the driven plate damping spring condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 6	1. Driven plate spring is broken 2. Driven plate spring obviously fails	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
6	Check the clutch pressure plate	Normal	Faulty	Instruction
	Check the clutch pressure plate condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 7	Clutch pressure plate is excessively worn	Replace the clutch pressure plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
7	Check the flywheel	Normal	Faulty	Instruction
	Check the flywheel condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check (4. Check Flywheel))	Go to Step 8	1. Flywheel fixing bolt is loose 2. Flywheel is worn excessively	1. Tighten the flywheel bolt 2. Replace the flywheel (see 11 - Engine Mechanical System, Crankshaft and Flywheel, Replacement)

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Steps	Inspection item	Inspection result		
8	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptoms	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

3. CLUTCH PEDAL IS HARD TO DEPRESS

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check clutch fluid (brake fluid) model and pollution condition	Go to Step 1	1. Model is incorrect 2. Polluted	Replace clutch fluid (brake fluid) (see 23 - Clutch, Clutch Fluid (Brake Fluid), Replacement)
1	Check the clutch pedal	Normal	Faulty	Instruction
	Check the clutch pedal use condition (see 23 - Clutch, Clutch, On-vehicle Inspection)	Go to Step 2	1. Clutch pedal height and free play parameter are incorrect 2. Clutch pedal is in poor lubrication condition and mechanically damaged	1. Adjust the clutch pedal (See 23 - Clutch, Clutch Pedal, Adjustment) 2. Replace the clutch pedal (See 23 - Clutch, Clutch Pedal, Replacement)
2	Check the clutch hydraulic hose	Normal	Faulty	Instruction
	Check the installation condition of the clutch hydraulic hose	Go to Step 3	Hose is twisted or damaged	Replace the clutch hydraulic hose (see 23 - Clutch, Clutch oil pipe, Replacement)
3	Check the clutch driven plate	Normal	Faulty	Instruction
	Check the clutch driven plate use condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 4	Driven plate is excessively worn	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
4	Verification and check	Normal	Faulty	Instruction
	Depress the clutch pedal and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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4. CLUTCH CANNOT BE DISENGAGED

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check clutch fluid (brake fluid) level	Go to Step 1	Clutch fluid (brake fluid) level is too low	Fill clutch fluid and analyze the cause for low clutch fluid. Abnormal consumption requires check of brake fluid leakage (see 51 - Service Brake, Service Brake, On-vehicle Inspection)
1	Check the clutch pedal	Normal	Faulty	Instruction
	Check the clutch pedal use condition (see 23 - Clutch, Clutch, On-vehicle Inspection)	Go to Step 2	1. Clutch pedal height and free play parameter are incorrect 2. Clutch pedal is in poor lubrication condition and mechanically damaged	1. Adjust the clutch pedal (See 23 - Clutch, Clutch Pedal, Adjustment) 2. Replace the clutch pedal (See 23 - Clutch, Clutch Pedal, Replacement)
2	Check the clutch hydraulic system	Normal	Faulty	Instruction
	Depress the clutch pedal to check the operation condition of the clutch slave cylinder	Go to Step 3	The pedal is soft to depress and the clutch salve cylinder does not operate	Carry out exhaust of clutch hydraulic system (see 23 - Clutch, Clutch Fluid (Brake Fluid), Exhaust)
3	Check the clutch slave cylinder	Normal	Faulty	Instruction
	Check and repair the clutch slave cylinder and check the clutch slave cylinder parts (see 23 - Clutch, Clutch Slave Cylinder, Check)	Go to Step 4	Clutch slave cylinder cup is damaged	Replace the clutch slave cylinder cup or assembly (see 23 - Clutch, Clutch Slave Cylinder, Replacement)
4	Check the clutch master cylinder	Normal	Faulty	Instruction
	Check and repair the clutch master cylinder and check the clutch master cylinder parts (see 23 - Clutch, Clutch Master Cylinder, Check)	Go to Step 5	Clutch master cylinder cup is damaged	Replace the clutch master cylinder cup or assembly (see 23 - Clutch, Clutch Master Cylinder, Replacement)
5	Check the clutch driven plate	Normal	Faulty	Instruction
	Check the clutch driven plate use condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 6	Driven plate is worn excessively	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
6	Check the clutch pressure plate	Normal	Faulty	Instruction
	Check the clutch pressure plate condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 7	Clutch pressure plate is excessively worn	Replace the clutch pressure plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)

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Steps	Inspection item	Inspection result		
7	Check the release bearing	Normal	Faulty	Instruction
	Check the clutch release bearing condition (see 23 - Clutch, Clutch Release Bearing and Release Fork , Check)	Go to Step 8	Release bearing is worn	Replace the clutch release bearing (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
8	Check the release fork	Normal	Faulty	Instruction
	Check the clutch release fork condition (see 23 - Clutch, Clutch Release Bearing and Release Fork, Check)	Go to Step 9	Release fork is worn	Replace the clutch release fork (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
9	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

5. THE PEDAL CANNOT RETURN TO ITS POSITION (BUT CLUTCH HAS BEEN DISENGAGED)

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the installation condition of the clutch hydraulic hose	Go to Step 1	Hose is twisted or damaged	Replace the clutch hydraulic hose (see 23 - Clutch, Clutch oil pipe, Replacement)
1	Check the clutch slave cylinder	Normal	Faulty	Instruction
	Check and repair clutch the slave cylinder and check the clutch slave cylinder parts (see 23 - Clutch, Clutch Slave Cylinder, Check)	Go to Step 2	Clutch slave cylinder cup is damaged	Replace the clutch slave cylinder cup or assembly (see 23 - Clutch, Clutch Slave Cylinder, Replacement)
2	Check clutch master cylinder	Normal	Faulty	Instruction
	Check and repair the clutch master cylinder and check the clutch master cylinder parts (see 23 - Clutch, Clutch Master Cylinder, Check)	Go to Step 3	Clutch master cylinder cup is damaged	Replace the clutch master cylinder cup or assembly (see 23 - Clutch, Clutch Master Cylinder, Replacement)
3	Check the release bearing	Normal	Faulty	Instruction
	Check the clutch release bearing condition (see 23 - Clutch, Clutch Release Bearing and Release Fork, Check)	Go to Step 4	Release bearing is worn	Replace the clutch release bearing (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
4	Check the release fork	Normal	Faulty	Instruction
	Check the clutch release fork condition (see 23 - Clutch, Clutch Release Bearing and Release Fork, Check)	Go to Step 5	Release fork is worn	Replace the clutch release fork (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
5	Check clutch pressure plate	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the clutch pressure plate condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 6	Diaphragm spring is too weak	Replace the clutch pressure plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Reinstall the parts and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

6. CLUTCH SLIPS

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Ask the user whether rotation speed raises but driving speed hardly raises, acceleration is slow, vehicle is weak when driving on uphill and the clutch loses a lot of turns	Go to Step 1	The rotation speed raises, but speed hardly raises	Judge whether the clutch slips when the tachometer is not damaged
1	Confirm clutch slips	Normal	Faulty	Instruction
	Engage the 1st gear when starting the engine on site and do not release the parking brake at this time. Then release the clutch slowly until it is released completely. The engine should flame out	Go to Step 2	Engine doesn't flame out	Confirm clutch slips
2	Check the clutch driven plate	Normal	Faulty	Instruction
	Check the clutch driven plate use condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 3	1. Driven plate has oil stain 2. Driven plate is polished	1. Clean or replace the clutch driven plate 2. Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
3	Check the driven plate damping spring	Normal	Faulty	Instruction
	Check the driven plate damping spring condition carefully	Go to Step 4	1. Driven plate spring is broken 2. Driven plate spring obviously fails	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
4	Check the clutch pressure plate	Normal	Faulty	Instruction
	Check the clutch pressure plate condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Check)	Go to Step 5	Clutch pressure plate is deformed	Replace the clutch pressure plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
5	Check flywheel	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check flywheel condition (see 23 - Clutch, Clutch Pressure Plate and Driven Plate,Check (4. Check Flywheel))	Go to Step 6	Flywheel is deformed	Replace the flywheel (see 11 - Engine Mechanical System, Crankshaft and Flywheel, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Conduct the road test and re-check the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

7. ABNORMAL CLUTCH NOISE

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Ask the user whether he/she depresses the clutch frequently or depresses the clutch by habit during driving	Go to Step 1	1. Depress the clutch frequently 2. Depress the clutch by habit	Judge that abnormal clutch noise is resulted from release bearing wear and replace the clutch release bearing (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
1	Check abnormal clutch noise	Normal	Faulty	Instruction
	Depress the clutch pedal to check abnormal clutch noise condition	Diagnosis is over	Hear abnormal noise from the clutch clearly	Go to Step 2
2	Check release fork	Normal	Faulty	Instruction
	Check the lubrication and return condition of clutch release fork	Go to Step 3	Release fork is in poor lubrication condition or cannot return to its position	Lubricate or replace the clutch release fork (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
3	Check the release bearing	Normal	Faulty	Instruction
	Check the clutch release bearing condition (see 23 - Clutch, Clutch Release Bearing and Release Fork , Check)	Go to Step 4	Release bearing is worn	Replace the clutch release bearing (see 23 - Clutch, Clutch Release Bearing and Release Fork, Replacement)
4	Check the clutch driven plate	Normal	Faulty	Instruction
	Check the use condition of the clutch driven plate spline part	Go to Step 5	Driven plate spline is worn	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
5	Check the driven plate damping spring	Normal	Faulty	Instruction
	Check the driven plate spring condition carefully	Go to Step 6	1. Driven plate spring is broken 2. Driven plate spring obviously fails	Replace the clutch driven plate (see 23 - Clutch, Clutch Pressure Plate and Driven Plate, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Depress the clutch pedal and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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CLUTCH FLUID (BRAKE FLUID)

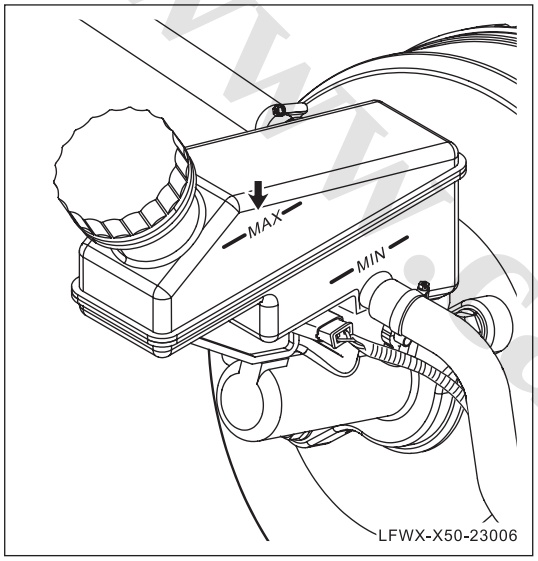
EXHAUST

NOTICE:

When removing the clutch line, clutch master cylinder and clutch slave cylinder, or when the clutch pedal is soft to depress, it is required to exhaust the clutch hydraulic system.

△ HINT:

- Drained out brake fluid cannot be reused.
- Confirm that brake fluid is not polluted by foreign matter.
- Do not spill brake fluid on vehicle. Otherwise, it may damage the paint. If the brake fluid is spilled on the paint coating, clean it immediately with water.
- When starting exhausting, the brake fluid level in brake fluid reservoir should locate at "MAX". After exhausting, it is necessary to check the clutch slave cylinder for leakage.

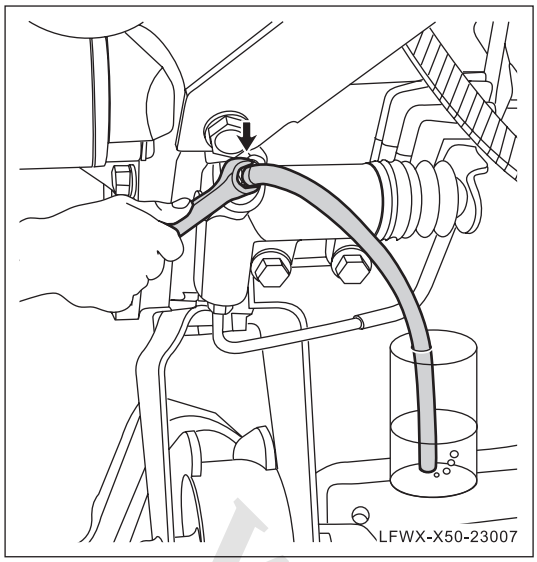


1. EXHAUST CLUTCH HYDRAULIC SYSTEM

(a) Check brake fluid and make sure brake fluid level is higher than "MAX" position.

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(b) Remove the bleeder screw dust cover of the clutch slave cylinder.

(c) Connect transparent hose to bleeder screw of the clutch slave cylinder and place the other end of the hose to a special recycling container with brake fluid.

(d) Prepare to loose and tighten the bleeder screw of the clutch slave cylinder at any time with a oil pipe wrench.

△ HINT:

When exhausting, two persons are required to work together - one sitting in cab and depressing the clutch pedal; and another operating the bleeder screw.

(e) The driver continuously depresses the clutch pedal 2 or 3 times and then steps the pedal to the bottom and holds it; unscrew the bleeder screw and bleed the air in the clutch slave cylinder and the oil pipe.

(f) Tighten the bleeder screw and release the clutch pedal.

(g) Repeat step "(e)" and "(f)" several times until the brake fluid drained from the system is clean and has no bubble. Tighten the bleeder screw and cover the dust cover.

ⓘ NOTICE:

In the process of bleeding the clutch hydraulic system, pay attention to refill brake fluid and keep fluid level in the reservoir between "MAX' and "MIN".

(h) Fill brake fluid to keep fluid level at "MAX' position.

2. CHECK WHETHER EXHAUSTING OF CLUTCH HYDRAULIC SYSTEM IS COMPLETED

(a) Start the engine, depress the clutch pedal, and wait about 2s before shifting to the reverse gear. If large noise is heard in selecting a gear, depress the clutch pedal completely 5 times.

(b) Wait about 30s, and then check the clutch operating conditions. If there is still a large noise, repeat step 1 for exhausting.

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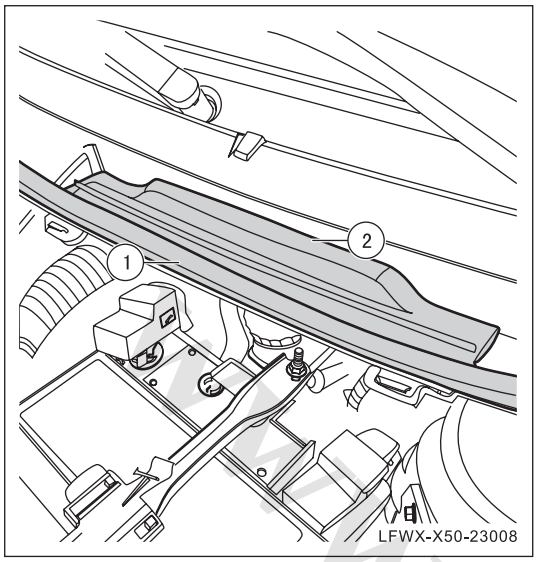
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REPLACEMENT

1. DRAIN BRAKE FLUID

△ HINT:

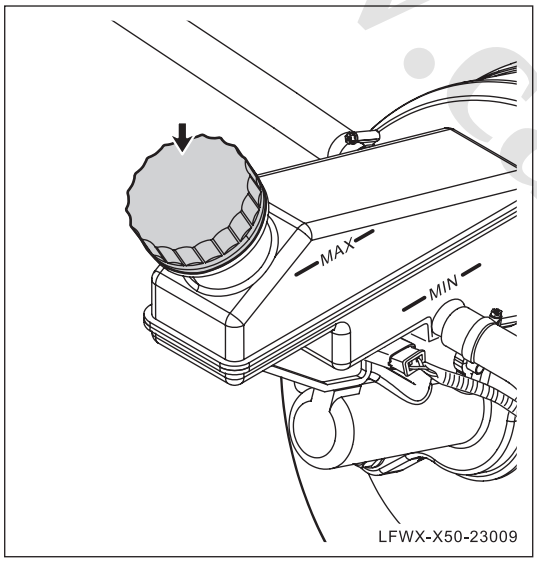
Method for draining brake fluid is the same as that of air exhausting of the clutch hydraulic system.



2. ADD BRAKE FLUID

(a) Open the engine hood.

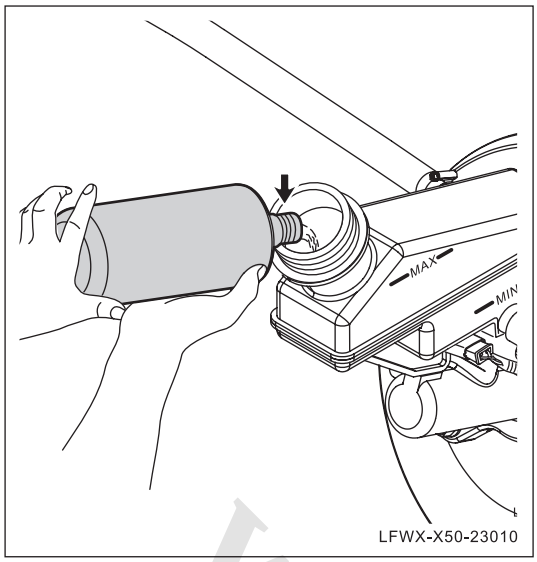
(b) Remove seal strip ① and brake fluid filler cap ② .



(c) Open the brake fluid reservoir cap.

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(d) Fill brake fluid to brake fluid reservoir.

Brake fluid

Model: DOT4

Filling amount: 0.6L

(e) Exhaust the clutch hydraulic system and the brake fluid system.

(f) Tighten the brake fluid reservoir cap.

(g) Install the brake fluid filler cap and seal strip.

(h) Close and lock the engine hood.

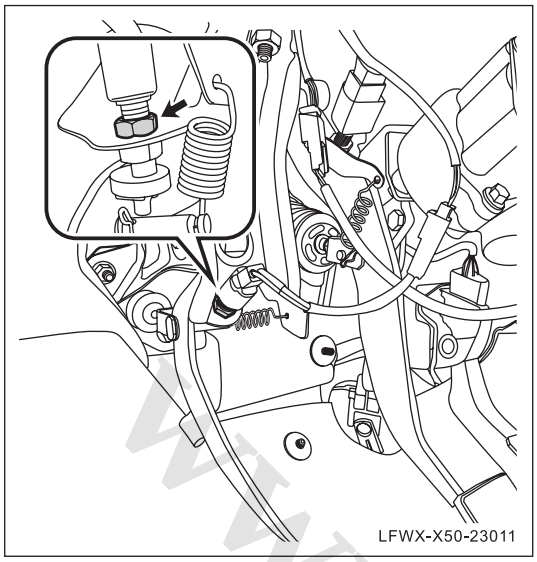
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CLUTCH PEDAL

ADJUSTMENT

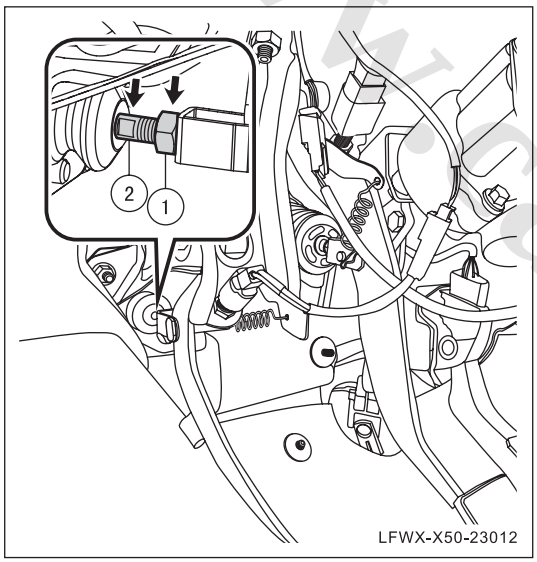


1. ADJUST THE HEIGHT OF CLUTCH PEDAL

(a) Unscrew the lock nuts of the clutch pedal sensor and turn the clutch pedal sensor to have it adjusted to the standard range of pedal height.

(b) Tighten the lock nuts of the clutch pedal sensor.

Torque: 12 - 18 N•m



2. ADJUST FREE PLAY OF CLUTCH PEDAL

(a) Tighten lock nut ① of the clutch master cylinder push rod and turn push rod ② to have it adjusted to the standard range of pedal free play.

(b) Tighten lock nut ① of the push rod.

Torque: 12 - 18 N•m

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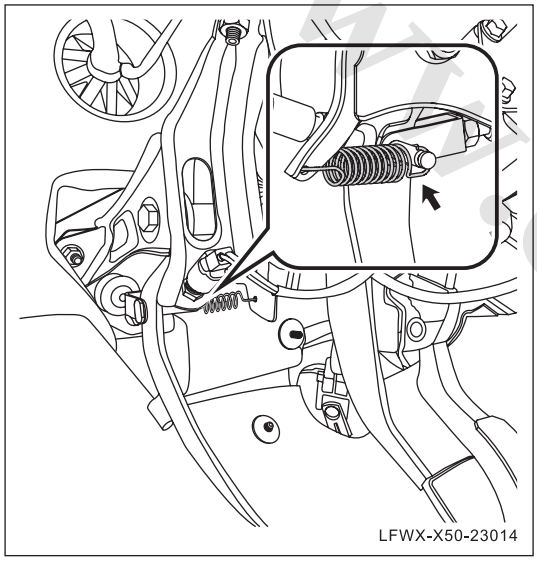
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REPLACEMENT

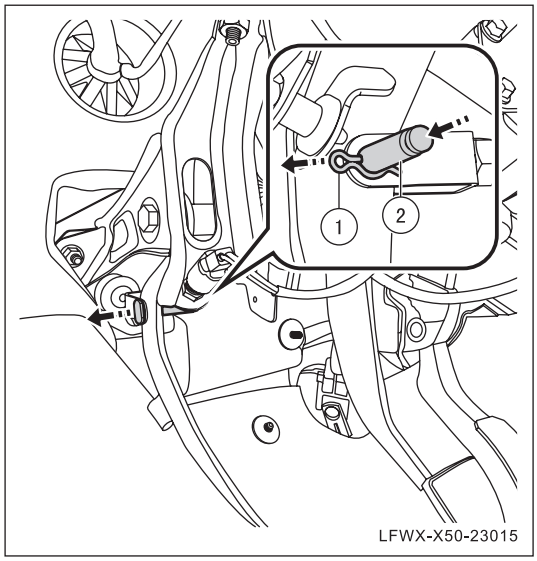


1. REMOVE CLUTCH PEDAL ASSEMBLY

(a) Remove the dashboard access cover plate.



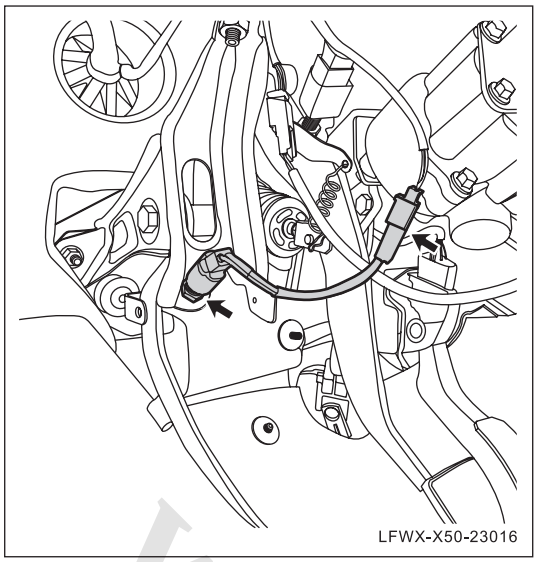
(b) Remove the clutch pedal return spring.



(c) Remove connecting pin shaft lock pin ① of the clutch pedal and the clutch master cylinder push rod and take down the lock pin ① and pin shaft ② .

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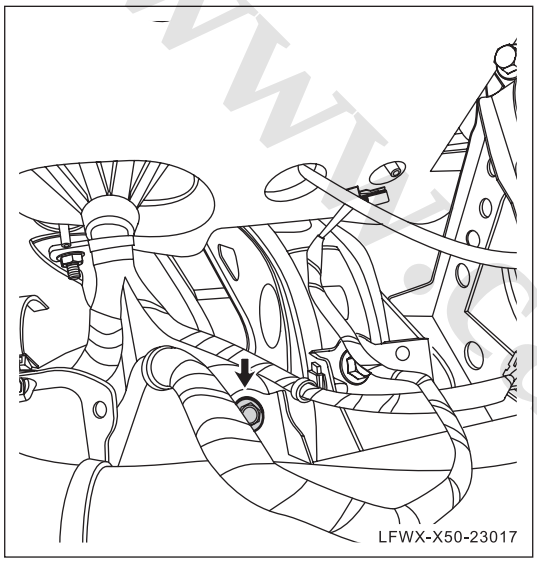


(d) Disconnect the clutch pedal sensor connector and remove the clutch pedal sensor.

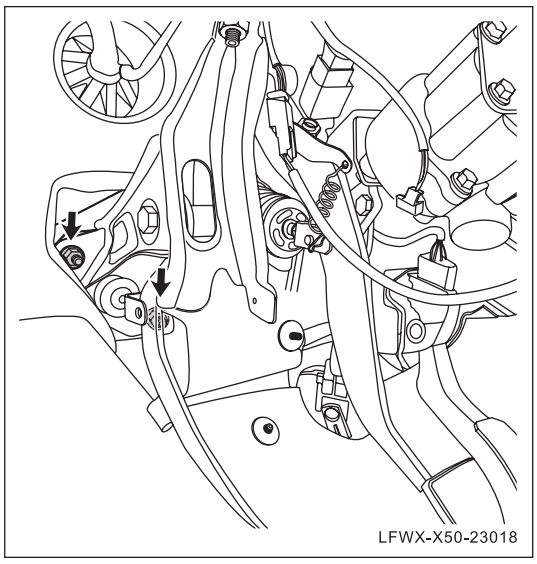
△ HINT:

When clutch pedal sensor probe is in free state, inspect that the clutch pedal sensor is continuity with a multimeter. If not, replace the clutch pedal sensor.

(e) Remove the dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)



(f) Remove the fixing bolts at the clutch pedal bracket subassembly upper end.

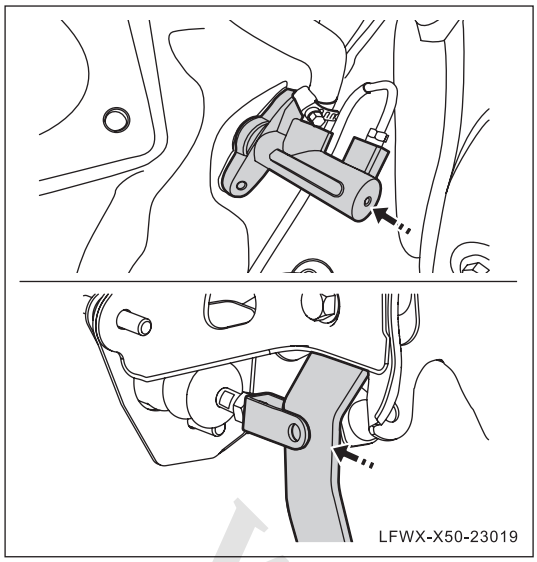


(g) Remove the connecting nuts of the clutch pedal bracket subassembly and the clutch master cylinder.

(h) Remove the clutch pedal bracket subassembly.

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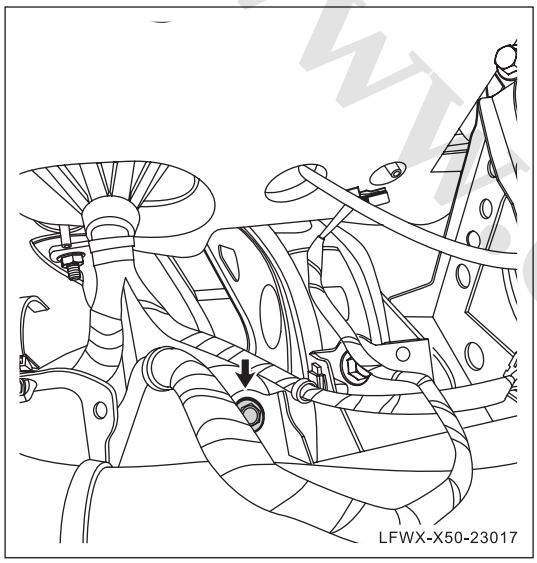


2. INSTALL CLUTCH PEDAL

(a) Align the fixing holes on the clutch pedal bracket subassembly lower end with the fixing bolts of the clutch master cylinder and install and tighten the fixing nuts.

△ HINT:

- When installing the clutch pedal bracket subassembly, fix the clutch master cylinder by an assistant (as illustrated in the figure) to avoid the clutch master cylinder being ejected during alignment of the clutch pedal bracket subassembly with the installation hole.
- When installing the clutch pedal bracket subassembly, install the clutch pedal into the push rod fork of the clutch master cylinder (as illustrated in the figure).

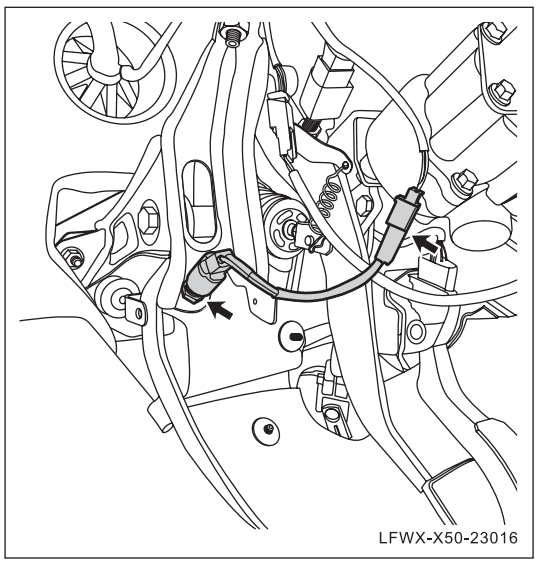


(b) Install and tighten the fixing bolts at the clutch pedal bracket subassembly upper end.

Torque: 20 - 26 N•m

(c) Tighten the connecting nuts of the clutch pedal bracket subassembly and the clutch master cylinder according to the specified torque.

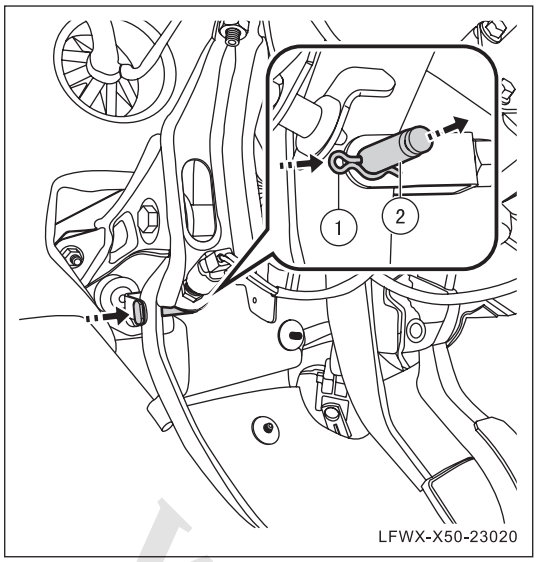
(d) Install the dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)



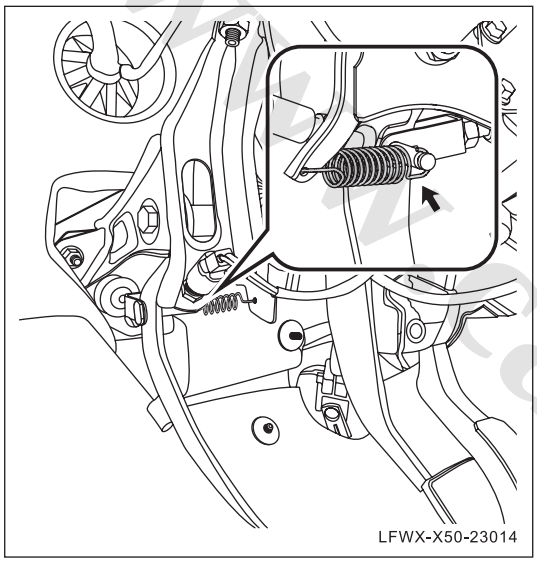
(e) Install the clutch pedal sensor on the clutch pedal bracket subassembly and connect the clutch pedal sensor connector.

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(f) Align the clutch pedal fixing hole with the push rod fork hole of the clutch master cylinder, put into pin shaft ② from left to right and install lock pin ① .



(g) Install the return spring of the clutch pedal.

(h) Adjust height and free play of the clutch pedal.

(i) Install the dashboard fuse box cover.

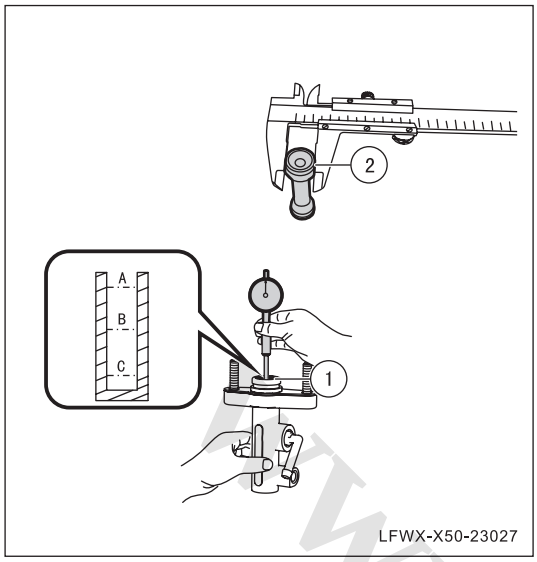
(j) Check whether the clutch pedal fault is eliminated.

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CLUTCH MASTER CYLINDER

CHECK



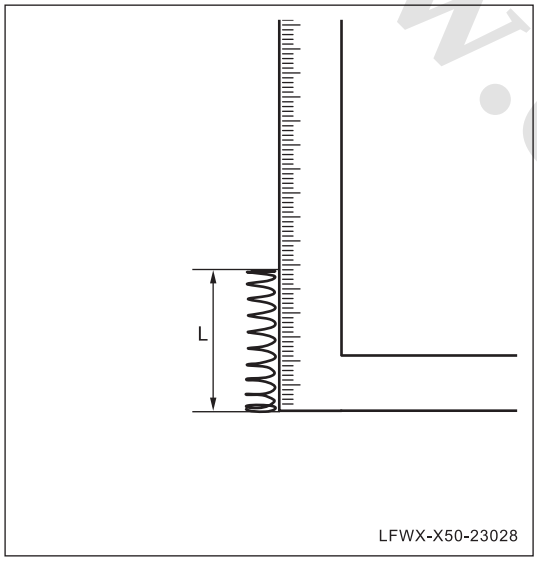
1. CHECK CLUTCH MASTER CYLINDER

(a) Remove the clutch master cylinder. (see 23 - Clutch, Clutch Master Cylinder, Replacement)

(b) Check the clearance between the clutch master cylinder body and piston.

△ HINT:

- Clearance value = Cylinder inner diameter ① - Piston outer diameter ②
- Measure the cylinder inner diameter of the clutch master cylinder at 3 positions (the bottom, center and edge) with a dial bore gauge. If the clearance between the clutch master cylinder and piston outer diameter exceeds the limit value, replace the clutch master cylinder.



(c) Check free length L of the clutch master return spring.

(d) Check cup and piston for wear. Oil leakage indicates that the cup and piston are damaged and replace them.

(e) Check whether the push rod is worn or bent.

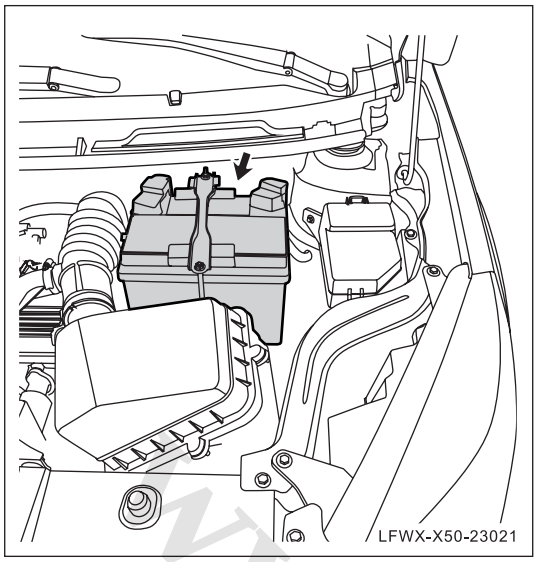
△ HINT:

If the push rod is worn, repair or replace it.

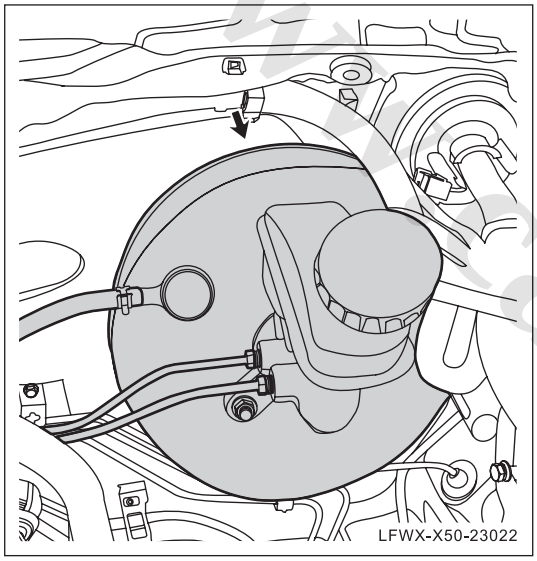
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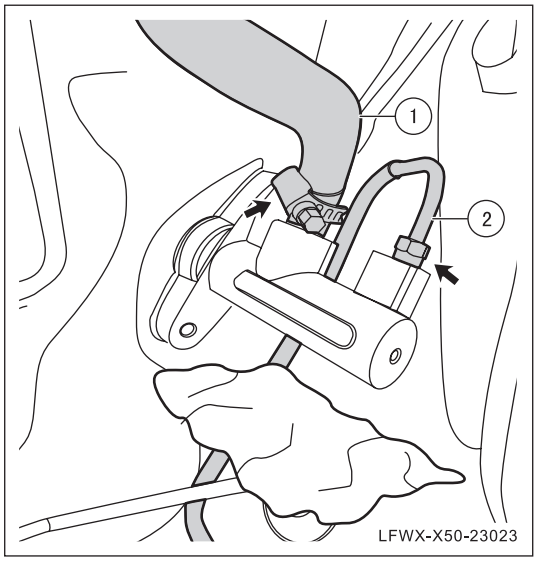
REPLACEMENT



1. **REMOVE THE BATTERY ASSEMBLY (SEE 18 - STARTING CHARGING SYSTEM, BATTERY, REPLACEMENT)**
2. **DRAIN BRAKE FLUID (SEE 23 - CLUTCH, CLUTCH FLUID (BRAKE FLUID), REPLACEMENT)**



3. **REMOVE THE VACUUM BOOSTER WITH BRAKE MASTER CYLINDER ASSEMBLY (SEE 51 - SERVICE BRAKE, VACUUM BOOSTER, REPLACEMENT)**



4. **REMOVE CLUTCH MASTER CYLINDER**

(a) Remove the inlet hose hoop of the clutch master cylinder, and unplug inlet hose ① of the clutch master cylinder.

△ HINT:

- Before pulling out the oil pipe, place a piece of cloth without fiber under the master cylinder.
- Seal the disconnected oil pipe timely.

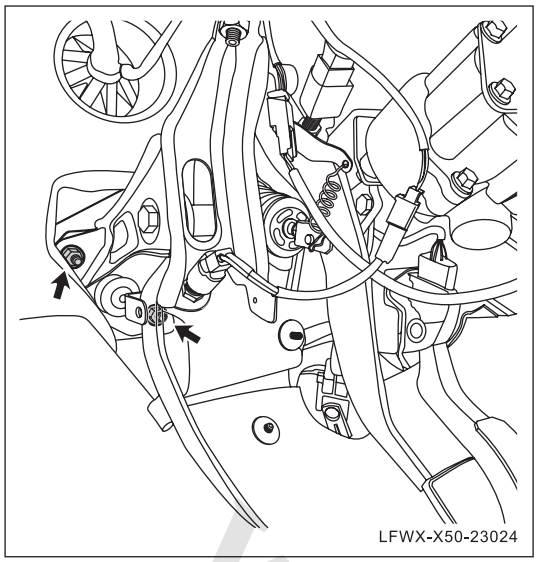
(b) Remove the clutch outlet oil pipe union nut, and disconnect clutch outlet oil pipe ② .

(c) Remove the return spring of the clutch pedal.

(d) Remove the lock pin of the clutch pedal pin shaft and take down the lock pin and pin shaft.

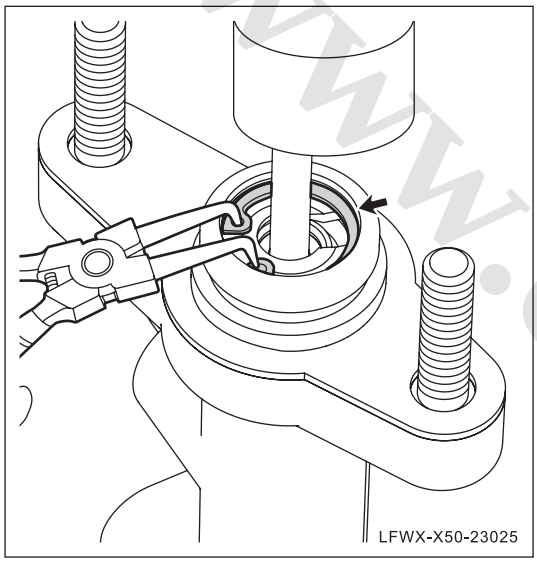
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(e) Remove the connecting nuts of the clutch pedal bracket subassembly and the clutch master cylinder.

(f) Take the clutch master cylinder and washer out from the engine compartment.

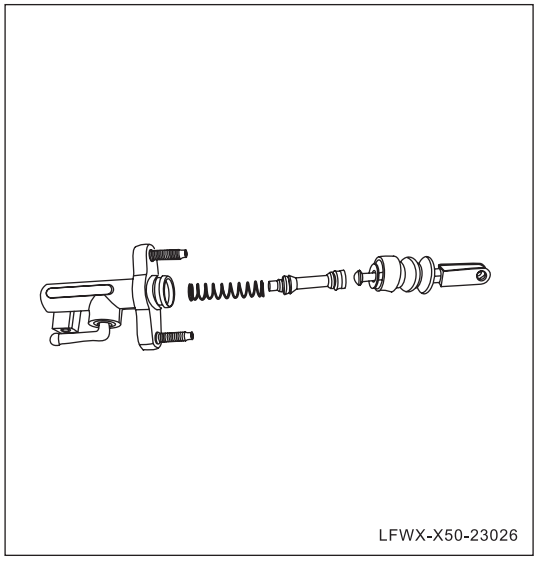


5. DISASSEMBLE CLUTCH MASTER CYLINDER

△ HINT:

Check the clutch master cylinder housing for leakage. In case of leakage, replace the clutch master cylinder.

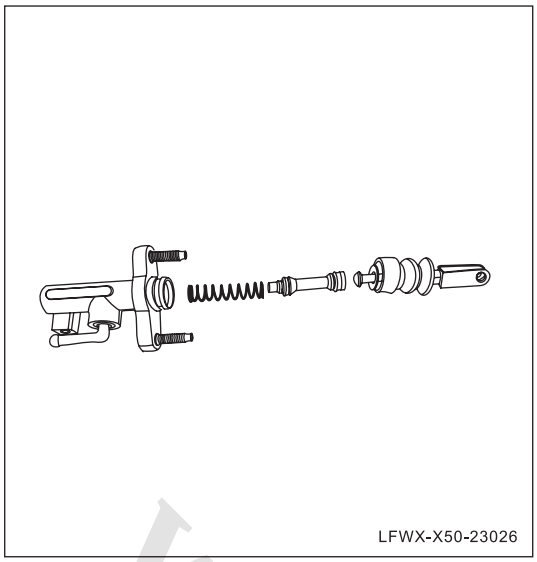
(a) Remove the dust cover and take down the piston retainer ring with internal circlip pliers.



(b) Remove the push rod assembly and piston assembly.

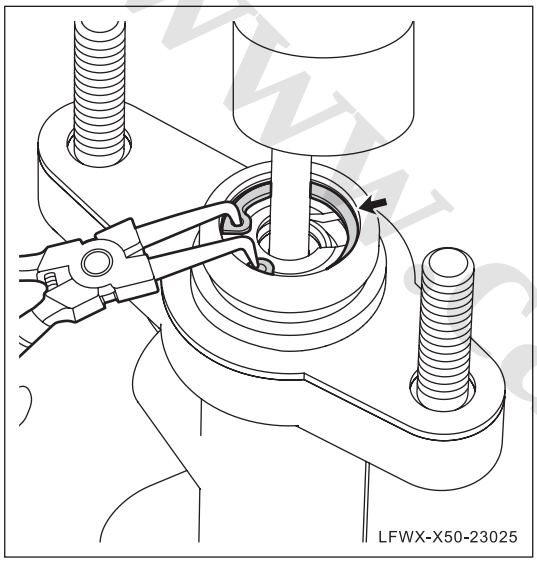
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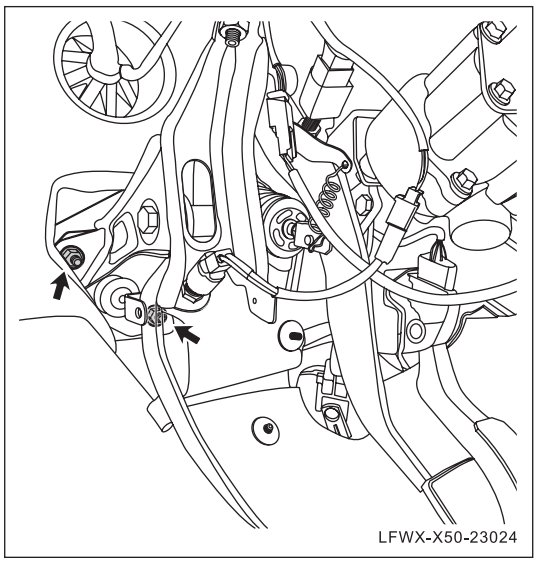
6. ASSEMBLE CLUTCH MASTER CYLINDER

(a) Apply clean brake fluid on the piston assembly and the cup and insert the piston assembly and the push rod assembly into the clutch master cylinder housing.


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(b) Install pthe iston retainer ring with internal circlip pliers.

(c) Install the dust cover.


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7. INSTALL CLUTCH MASTER CYLINDER

(a) Put the clutch master bolt through the dash panel from the engine compartment, align the fixing holes on the clutch pedal bracket subassembly with bolts of the clutch master cylinder and install and tighten the fixing nuts.

Torque: 20 - 26 N•m

△ HINT:

Do not forget to install the clutch master cylinder washer.

(b) Install the clutch master cylinder push rod pin shaft, and then install the lock pin.

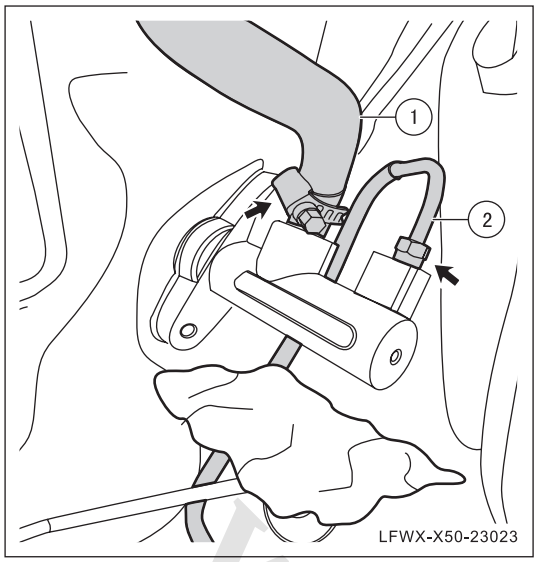
△ HINT:

When installing, make sure to apply sealant on the pin shaft.

(c) Install the return spring of clutch pedal.

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(d) Install clutch master cylinder inlet hose ① onto the clutch master cylinder and then tighten it with hoops.

(e) Install clutch master cylinder outlet pipe ② , and then tighten the union nuts of the clutch master cylinder outlet pipe.

Torque: 8 - 14 N•m

8. **INSTALL THE VACUUM BOOSTER WITH BRAKE MASTER CYLINDER ASSEMBLY (SEE 51 - SERVICE BRAKE, VACUUM BOOSTER, REPLACEMENT)**
9. **INSTALL THE BATTERY ASSEMBLY (SEE 18 - STARTING CHARGING SYSTEM, BATTERY, REPLACEMENT)**
10. **REFILL BRAKE FLUID AND BLEED BRAKE HYDRAULIC SYSTEM AND CLUTCH HYDRAULIC SYSTEM**

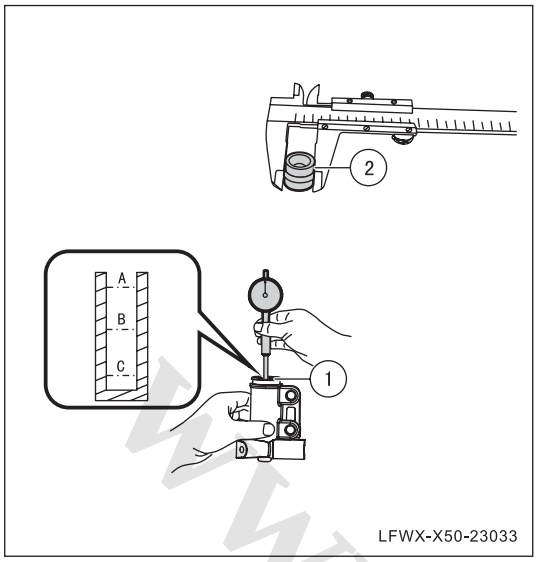
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CLUTCH SLAVE CYLINDER

CHECK



1. CHECK CLUTCH SLAVE CYLINDER

(a) Remove and disassemble the clutch slave cylinder. (see 23 - Clutch, Clutch Slave Cylinder, Replacement)

(b) Check clearance between the clutch slave cylinder body and piston.

Standard value:

Diameter of slave cylinder: φ22.22+0.033 0 mm

Diameter of slave cylinder piston: φ22.22-0.040 -0.073 mm

△ HINT:

Measure the clutch slave cylinder inner diameter at 3 positions (the bottom, center and edge) with a dial bore gauge. If the clearance between the clutch slave cylinder and piston outer diameter exceeds the limit value, replace the clutch slave cylinder assembly.

(c) Check free length of the clutch slave cylinder return spring.

Standard value: 36.5 ± 0.6 mm

(d) Check the cup and piston for wear. Oil leakage indicates that the cup and piston are damaged and replace them.

(e) Check whether the push rod is worn or bent.

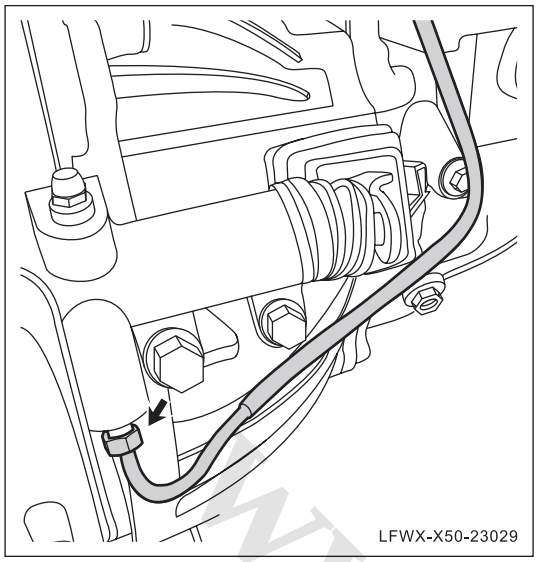
△ HINT:

If the push rod is worn, repair or replace it.

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REPLACEMENT



1. REMOVE CLUTCH SLAVE CYLINDER

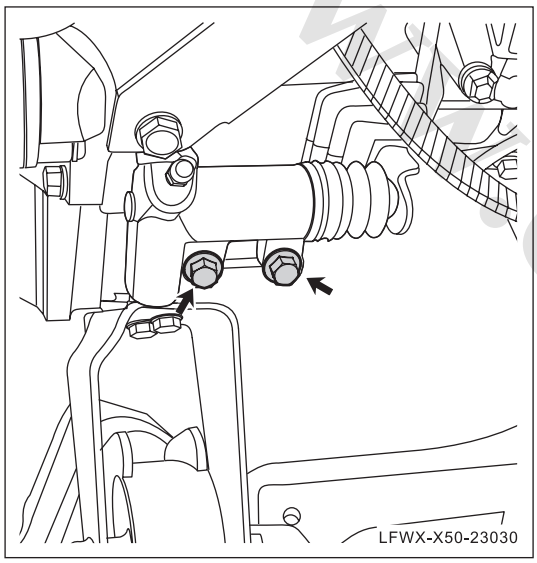
(a) Open the engine hood.

(b) Drain the brake fluid. (see 23 - Clutch, Clutch Fluid (Brake Fluid), Replacement)

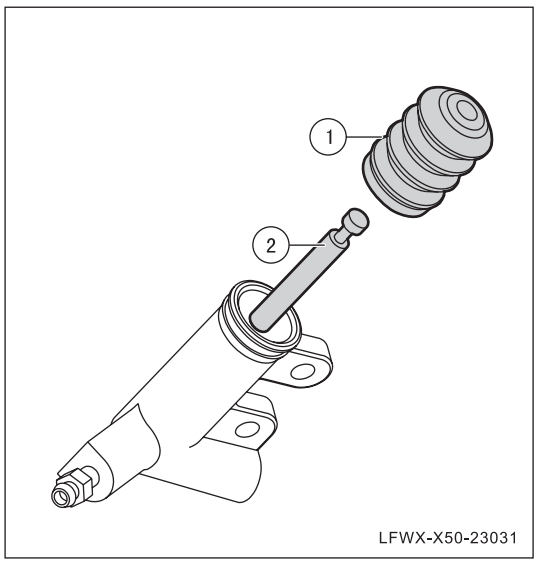
(c) Remove the clutch slave cylinder oil pipe nuts and pull out the clutch slave cylinder oil pipe.

△ HINT:

After disconnecting the oil pipe, seal it timely.



(d) Remove the fixing bolts of the clutch slave cylinder and then take down the clutch slave cylinder.

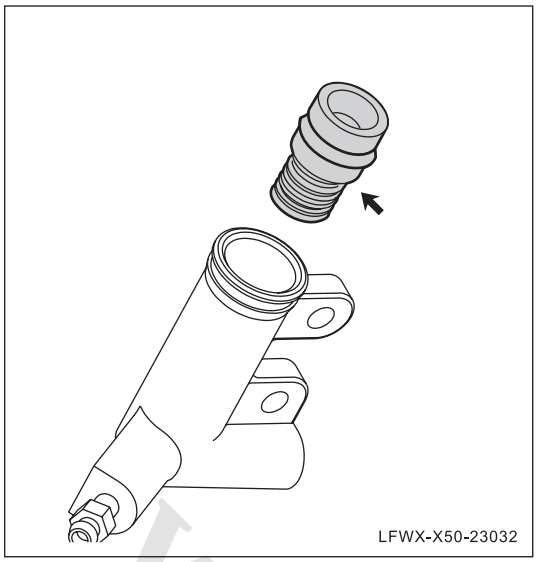


2. DISASSEMBLE CLUTCH SLAVE CYLINDER

(a) Remove clutch slave cylinder dust cover ① and push rod ② .

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(b) Remove the piston and spring from the cylinder body.

NOTICE:

Do not damage the internal surface of the cylinder body.

3. ASSEMBLE CLUTCH SLAVE CYLINDER

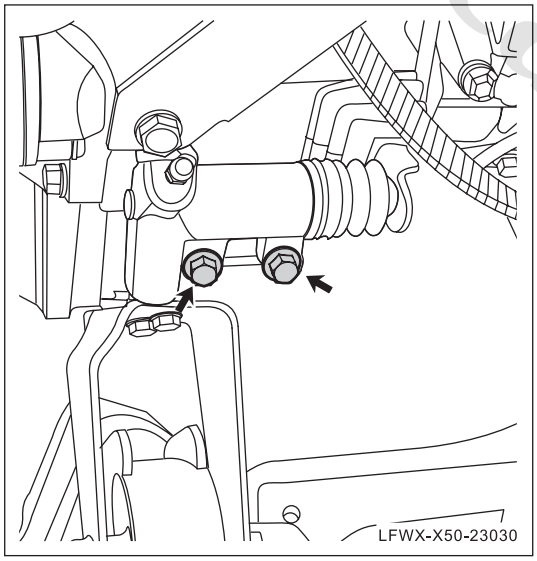
(a) Apply clean brake fluid on the piston and cup.

(b) Install spring on the piston and install the piston and spring into cylinder body.

NOTICE:

Do not damage the internal surface of the cylinder body.

(c) Install the clutch slave cylinder dust cover and the push rod.



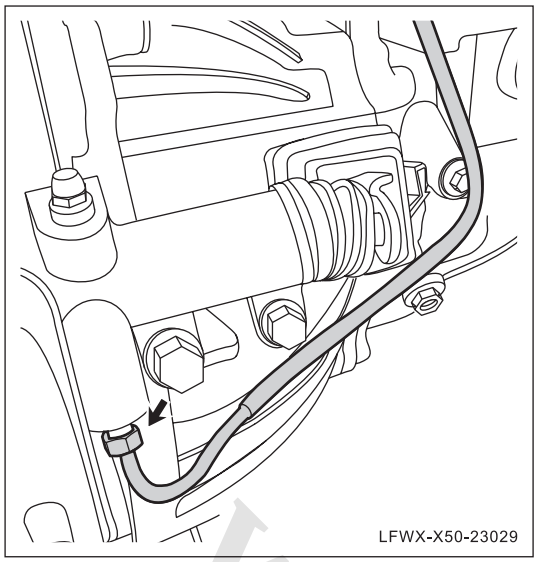
4. INSTALL CLUTCH SLAVE CYLINDER ASSEMBLY

(a) Make the clutch slave cylinder push rod against the clutch fork groove and then install and tighten the fixing bolts.

Torque: 20 - 26 N•m

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(b) Install the clutch slave cylinder oil pipe and tighten the union nuts.

Torque: 8 - 14 N•m

(c) Fill brake fluid and bleed the brake hydraulic system and the clutch hydraulic system.

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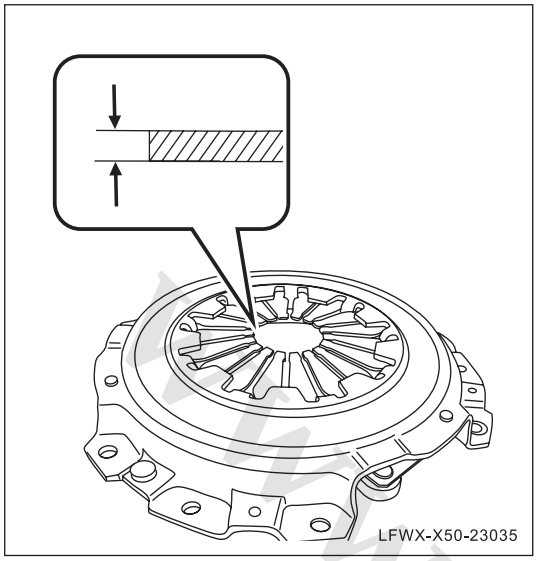
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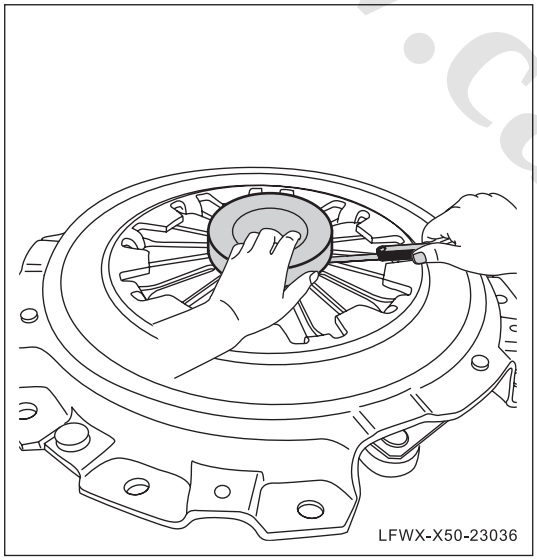
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CLUTCH PRESSURE PLATE AND DRIVEN PLATE

CHECK

1. REMOVE CLUTCH PRESSURE PLATE AND DRIVEN PLATE (SEE 23 - CLUTCH, CLUTCH PRESSURE PLATE AND DRIVEN PLATE, REPLACEMENT)





2. CHECK CLUTCH PRESSURE PLATE

(a) Check the clutch pressure plate surface for wear, cracks and stagnation. Replace the clutch pressure plate if necessary.

(b) Check whether the diaphragm spring is fatigued, broken or bent. Replace it if necessary.

(c) Check the lapping rivet for looseness. Replace with new parts if necessary.

(d) Check the diaphragm spring end for wear and height difference. If there is obvious wear or wear exceeds the limit value, replace the clutch pressure plate.

Standard value: 2.2 mm

Limit value: 2.2 ± 0.25 mm

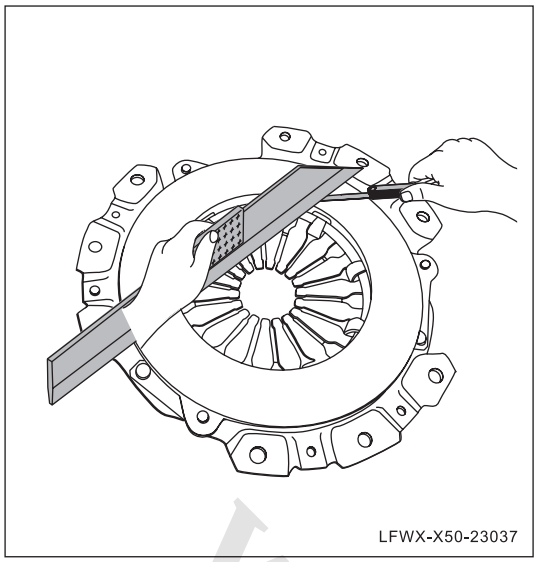
(e) Check diaphragm spring point flatness.

- Place the release bearing at the diaphragm spring end and check diaphragm spring flatness with a feeler.

Limit value: 0.6 mm

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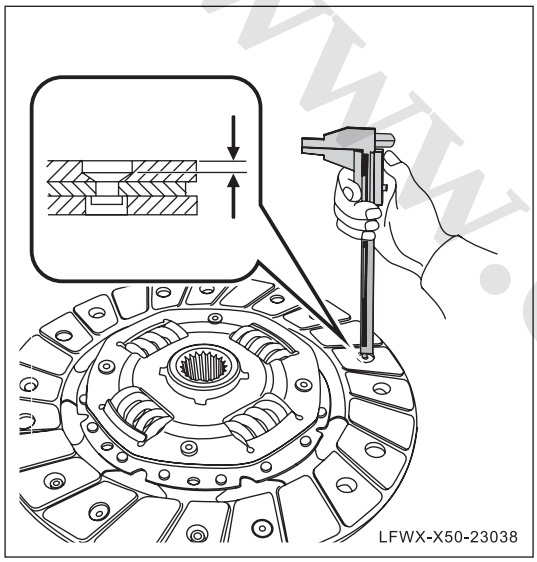
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(f) Check clutch pressure plate flatness.

- Check clutch pressure plate flatness with the knife edge.

  Limit value: 0.2 mm


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3. CHECK CLUTCH DRIVEN PLATE

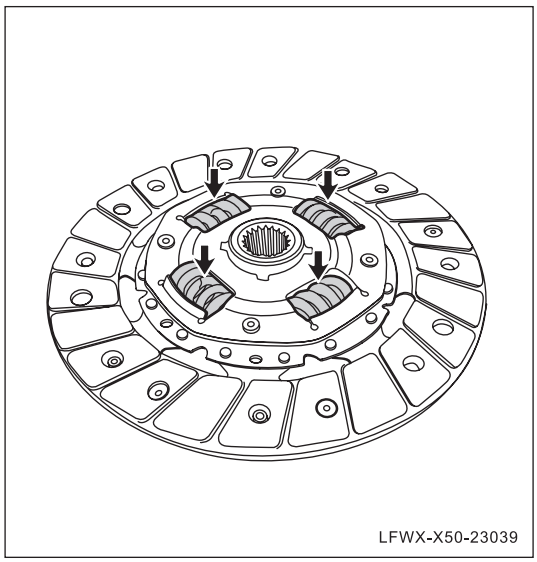
NOTICE:

Don't clean the clutch driven plate with gasoline!

(a) Check the surface for rivet looseness, single-face contacting, burning resulting in deterioration, attached grease or others. If you find any one of the above problems, replace the clutch driven plate.

(b) Measure the depth of the rivet embedded in the driven plate. If the depth exceeds the limited value, replace the clutch driven plate.

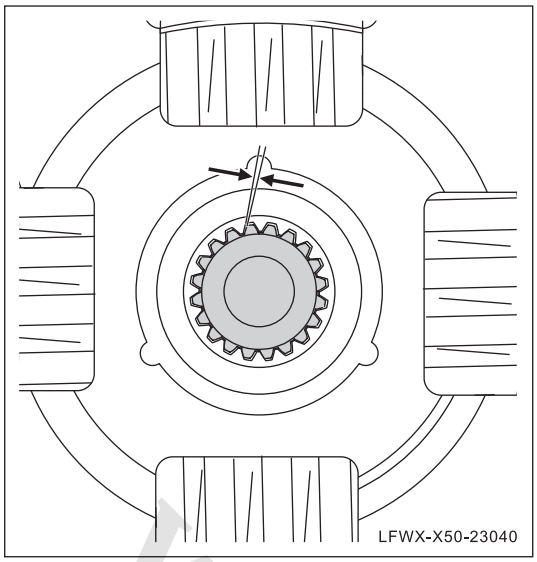
Limit value: 1.25 mm


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(c) Check whether the torsional spring is damaged or fatigued, and if there is any fault, replace the clutch driven plate.

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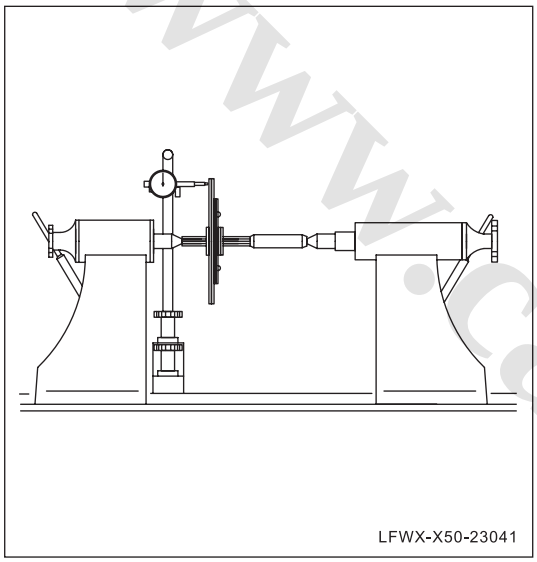
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(d) Check the clearance between the clutch driven plate spline and the transmission input shaft.

Standard value: major diameter of spline: 19.05+0.1 -0.3 mm

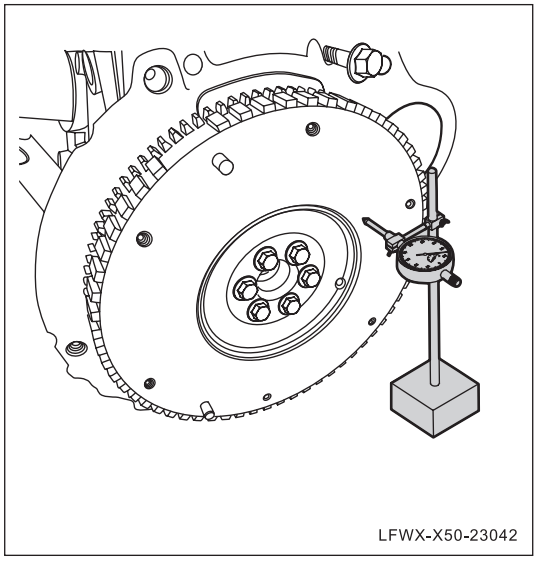
Limit value: minor diameter of spline: 16.29+0 -0.3 mm



(e) Check the driven plate end face circle run-out.

- Measure circle run-out with a dial gauge.

Standard value: 0.5 mm



4. CHECK FLYWHEEL

(a) Check the flywheel run-out with a dial gauge.

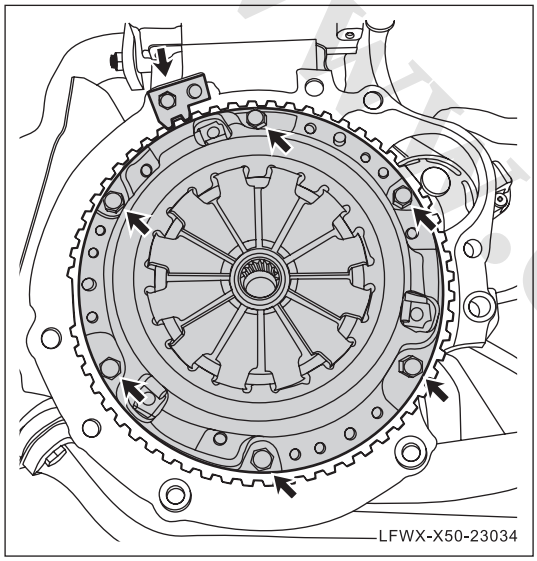
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REPLACEMENT

△ HINT:

- When the diaphragm spring wear of the clutch pressure plate assembly exceeds more than the half, replace it.
- It is recommended to replace the clutch pressure plate assembly and the clutch driven plate assembly together.
- It is necessary to replace the clutch driven plate assembly and the clutch pressure plate assembly if their rivet connecting is damaged or loose.
- After the clutch driven plate is burned down, to reduce the level of residual odor, it is necessary to clean the clutch pressure plate assembly and the flywheel completely.
- When installing the clutch driven plate assembly, apply a layer of lubricant grease on the spline to ensure that the input shaft moves smoothly and make sure excessive lubricant grease is removed.
- Clean the input shaft spline and the clutch driven plate assembly spline and make sure that the clutch driven plate assembly moves freely on the input shaft spline.



1. REMOVAL OF CLUTCH PRESSURE PLATE AND DRIVEN PLATE

(a) Remove the transmission assembly. (See 21 - Manual Transmission, Transmission Assembly, Replacement)

(b) Remove the fixing bolts of the clutch pressure plate.

△ HINT:

Install the flywheel stopper to prevent the flywheel from rotating with the clutch pressure plate when removing the bolts.

ⓘ NOTICE:

When removing the last bolt, support the pressure plate to prevent the clutch driven plate from falling off.

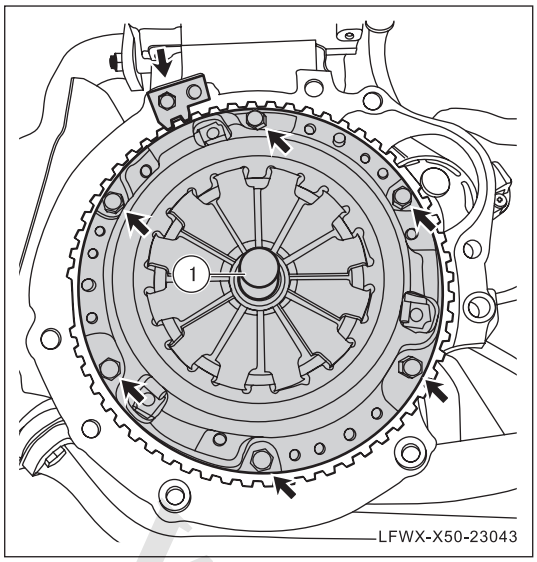
(c) Remove the clutch pressure plate and driven plate.

ⓘ NOTICE:

Pay attention to the placing position of the clutch driven plate to avoid attaching oil dirt.

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2. INSTALL CLUTCH PRESSURE PLATE AND DRIVEN PLATE

(a) Install alignment tool ① for the clutch driven plate assembly on the flywheel.

(b) Install the clutch driven plate and pressure plate.

NOTICE:

- **Make the convex face of the clutch driven plate assembly face the transmission side.**
- **When installing the clutch pressure plate, align it with the locating pin hole.**

(c) Tighten the clutch pressure plate fixing bolts uniformly in diagonal method.

Torque: 30 - 34 N•m

(d) Remove the alignment tool for the clutch driven plate assembly.

(e) Install the transmission assembly. (See 21 - Manual Transmission, Transmission Assembly, Replacement)

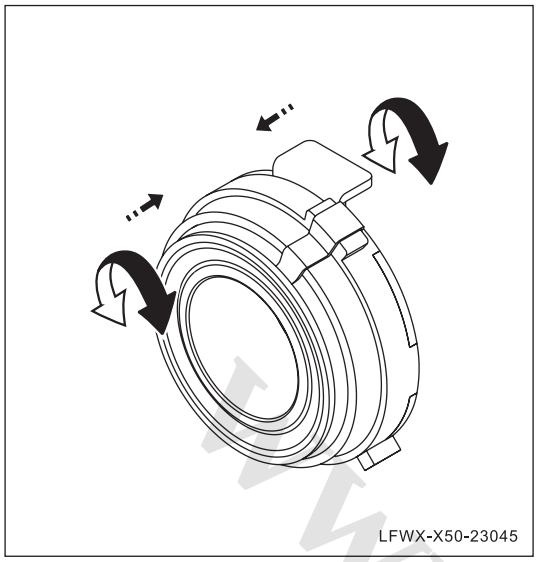
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CLUTCH RELEASE BEARING AND RELEASE FORK

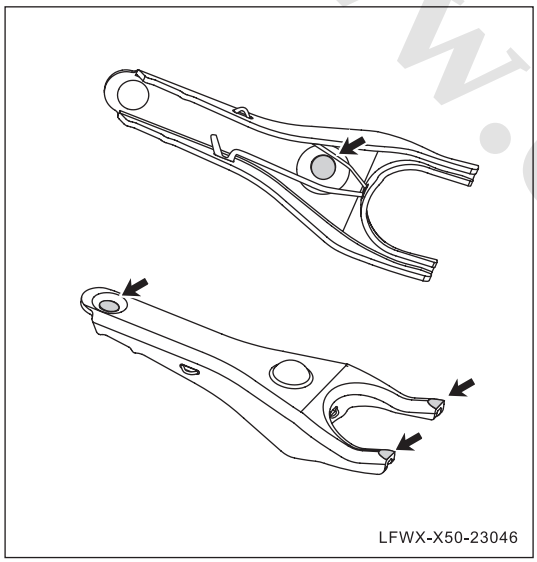
CHECK



1. CHECK CLUTCH RELEASE BEARING

(a) Apply force in the axial direction and at the same time rotate the release bearing; Check if the release bearing is stuck or has abnormal sound; replace it if necessary.

(b) Check the clutch release bearing outer diameter surface and inner diameter surface and replace with new parts in case of deformation or damage.



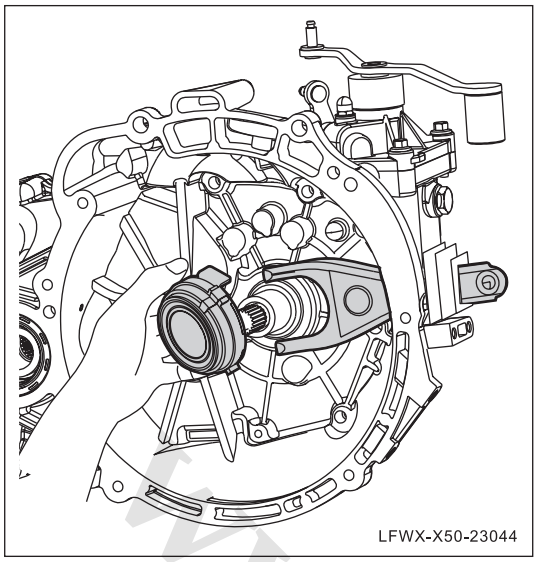
2. CHECK CLUTCH RELEASE FORK.

(a) Check the clutch release fork for wear or deformation and replace it if any.

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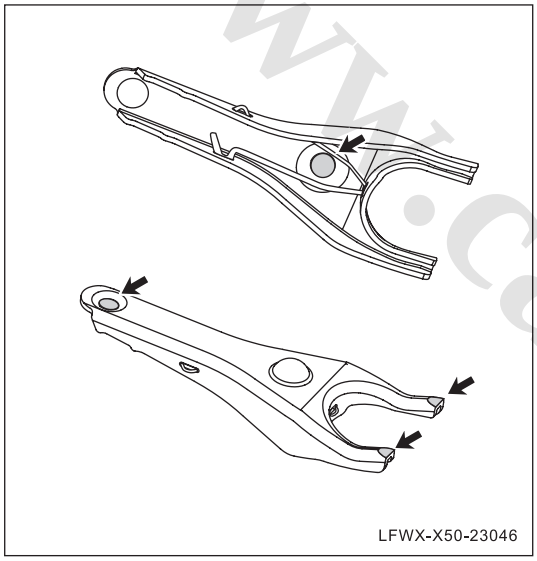
REPLACEMENT



1. REMOVE CLUTCH RELEASE BEARING AND RELEASE FORK

(a) Remove the transmission assembly. (See 21 - Manual Transmission, Transmission Assembly, Replacement)

(b) Remove the release bearing and release fork from the transmission input shaft.



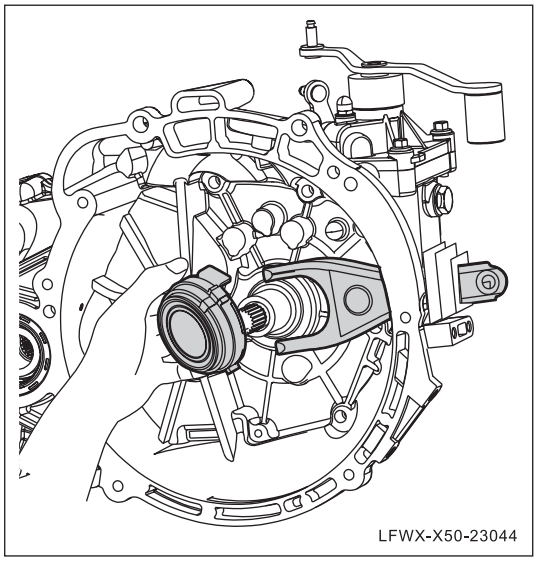
2. INSTALLATION OF CLUTCH RELEASE BEARING AND YOKE

(a) Apply lubricating grease onto the contacting faces between the release fork and the release bearing and between the release fork and the push rod, as well as onto the release fork pivot.

(b) Place the clutch release fork into the transmission fork hole and install the release bearing to the input shaft.

NOTICE:

Pay attention to that the clutch release bearing should be installed with flat end facing flywheel.



(c) Install the release fork to the retaining groove of the release bearing and clip the fork snap ring to the release fork shore.

(d) Install the release fork dust cover.

NOTICE:

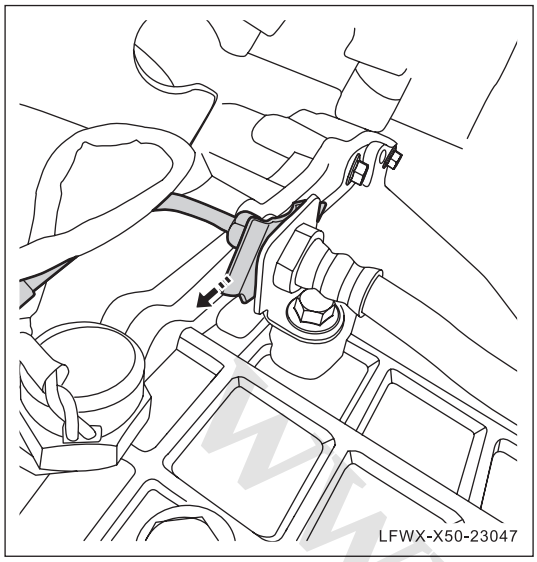
After installation, move the release fork forward and backward to check whether the release bearing can slide smoothly. If not, check for cause and eliminate it.

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CLUTCH OIL PIPE

REPLACEMENT



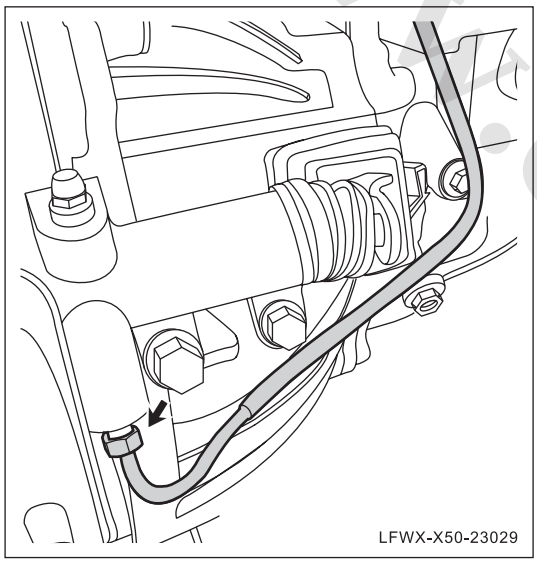
1. REMOVE CLUTCH OIL PIPE

(a) Drain the brake fluid. (see 23 - Clutch, Clutch Fluid (Brake Fluid), Replacement)

(b) Remove the battery and bracket. (see 18 - Starting Charging System, Battery, Replacement)

(c) Remove the union nut connecting the clutch pipe with the hose

(d) Pull out the installation clip of the clutch hose, disconnect the clutch pipe and the clutch hose and seal the pipe.



(e) Remove the connecting nuts of the clutch oil pipe and the clutch slave cylinder and pull out and seal the oil pipe.

2. INSTALL CLUTCH OIL PIPE

(a) Make the clutch oil pipe smooth.

(b) Install and tighten the connecting nuts of the clutch oil pipe and the clutch slave cylinder.

Torque: 10 - 14 N•m

(c) Insert the clutch hose into the bracket and fix it with clips.

(d) Install and tighten the union nut connecting the clutch pipe with hose

Torque: 10 - 14 N•m

(e) Install the battery and bracket. (see 18 - Starting Charging System, Battery, Replacement)

(f) Fill brake fluid and bleed the brake hydraulic system and the clutch hydraulic system.

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Front Suspension

Front suspension 31-1
System description 31-1
Preparation 31-1
Service data 31-2
Precautions 31-3
Components 31-4
Function and fault of components 31-5
On-vehicle inspection 31-6
Diagnosis 31-8
Fault symptom table 31-8
Fault diagnosis 31-9
Front absorber with spring assembly ..31-14
Replacement 31-14
Steering knuckle and wheel hub.....31-24
Components 31-24
Replacement 31-25
Swing arm assembly 31-35
Replacement 31-35
Sub frame assembly.....31-38
Replacement 31-38
Front stabilizer bar 31-43
Replacement 31-43
Swing arm ball joint.....31-44
Replacement 31-44
Hub bearing.....31-46
Replacement 31-46

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FRONT SUSPENSION

SYSTEM DESCRIPTION

1. FUNCTION

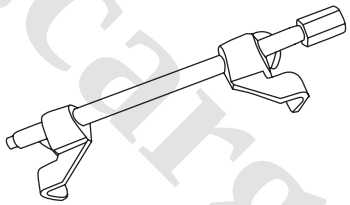
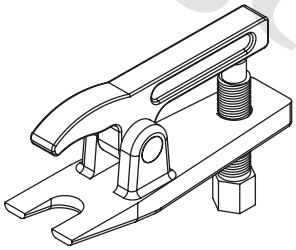
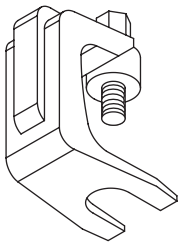
Vehicle suspension is the power transmission device between frame and wheel. The front suspension of this vehicle model adopts MacPherson independent suspension system with the following functions:

- Buffer the impact of frame or body from road surface and decrease the body vibration resulting from the impact to ensure the stability, comfort and safety during driving.
- Transmit drive force and brake force resulting from friction between road surface and wheel to frame and body.
- Support body and keep appropriate geometrical relationship between body and wheels.

2. COMPONENTS

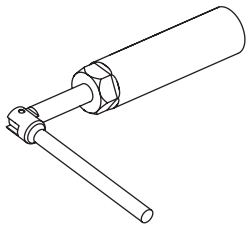
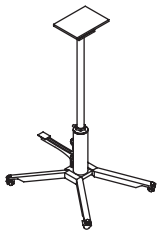
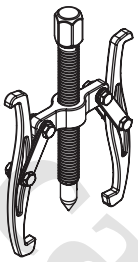
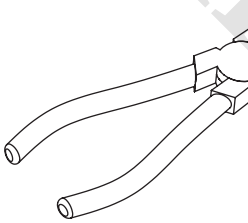
Front suspension mainly consists of absorber with spring assembly, sub frame, swing arm, front stabilizer bar, steering knuckle, hub, etc.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Spring compressor		Compress the spring when removing or installing the absorber
2	Ball joint remover		
3	Wheel bolt remover		Remove and install the wheel bolts

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S/N	Tools	Outline diagram	Description
4	Absorber nut remover		Remove and install the absorber fixing nut
5	Hydraulic bracket		Support wheels and lift the frame
6	Puller		Remove the hub and hub bearing
7	Inner snap ring pliers		Remove and install the hub bearing fixing snap ring

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Standard free length of absorber spring	364.2±1.5mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing nuts of absorber spring	82 - 89
Upper fixing nuts of absorber	55 - 65
Fixing bolts for connection of absorber and steering knuckle	200 - 220
Front stabilizer bar connecting rod ball fixing nut	85 - 105

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Item	N•m
Front brake bottom plate fixing bolt	37
Front brake assembly fixing bolt	30 - 36
Swing arm ball joint slotted nut	80 - 100
Swing arm ball joint fixing bolts and nuts	85 - 105
Drive shaft slotted nut	180 - 240
Slotted nut of connecting ball joint of pull rod of steering gear	80 - 100
Brake pipe hollow bolt	35 - 45
Fixing bolt of wheel speed sensor	12 - 18
Swing arm assembly fixing bolt	200 - 220
Sub frame fixing bolt	110 - 130
Engine rear mounting fixing bolt	185 - 225

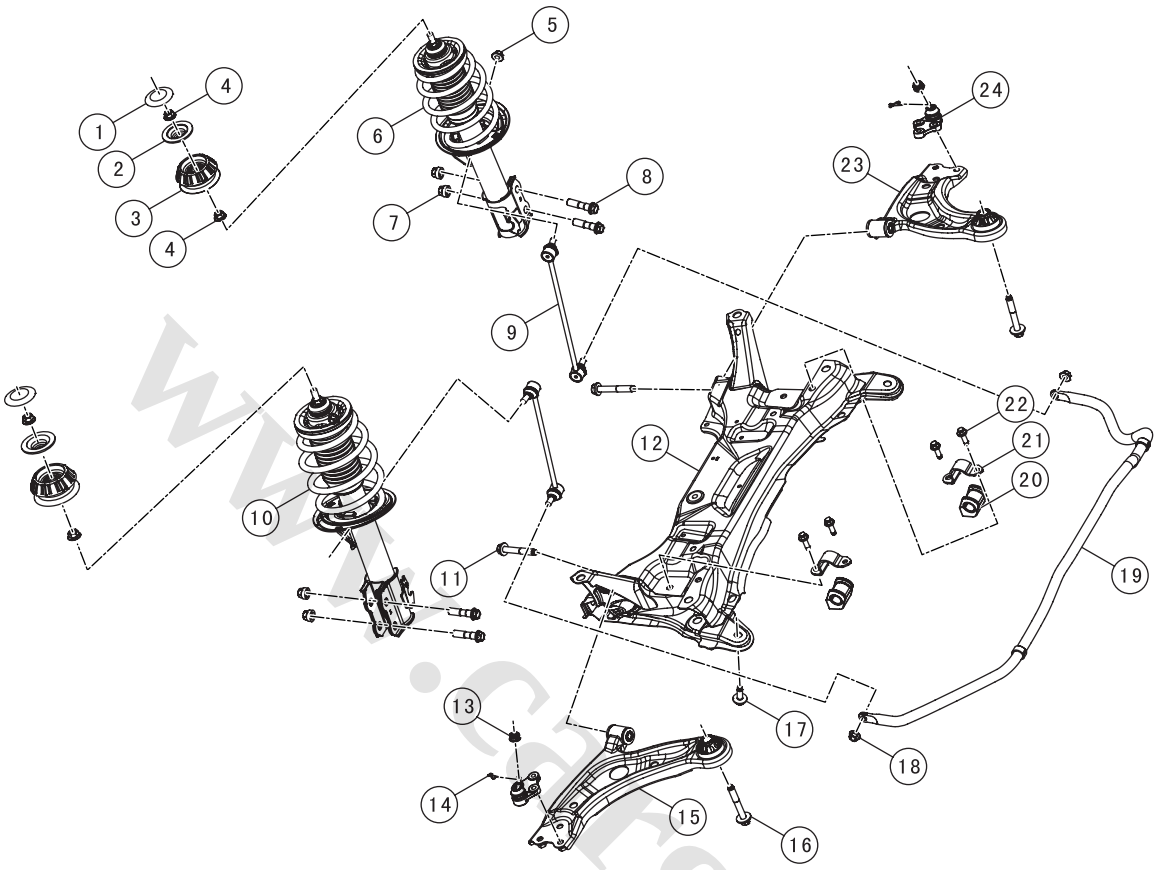
PRECAUTIONS

1. Check the parts and components thoroughly before repairing or replacing them.
2. Don't reuse the non-reusable parts.
3. During operation, avoid making the parts dirty and prevent the entrance of any foreign object.
4. Clean the dismantled parts (excluding rubber parts) with diesel or light oil and dry them.
5. When removing the oil pipes, block the brake pipes with rubber caps to avoid the brake fluid leak.
6. After installation, be sure to check the fasteners for their specified torques.
7. Be sure to check the wheel alignment after maintaining the suspension parts and components.

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COMPONENTS



1	Dust cover of retaining nut on the front absorber
2	Front absorber upper mounting pad
3	Front absorber upper mounting bracket
4	Hexagon nut with flange
5	Hexagon nut with flange
6	Front right absorber
7	Hexagon nut with flange
8	Hexagon bolt with flange
9	Front stabilizer bar link component
10	Front left absorber
11	Hexagon bolt and plain washer assembly
12	Sub frame assembly

13	Hexagon slotted nut with flange
14	Cotter pin
15	Front left swing arm assembly
16	Hexagon bolt with flange and large washer assembly
17	Hexagon bolt with flange and large washer assembly
18	Hexagon nut with flange
19	Front stabilizer bar
20	Front stabilizer bar bush
21	Front stabilizer bar press plate
22	Hexagon head bolt and plain washer assembly
23	Front right swing arm assembly
24	Swing arm ball joint

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Absorber	Restrain rebound vibration and impact from road surface after the spring absorbs shock	Oil leakage and failure of shock absorber	Tilt and sinking of body
Front swing arm	Support and guide front suspension	Deformed	Vehicle off tracking
Sub frame	Support axle and suspension and insulate vibration and noise	Deformed	Vehicle off tracking
Front stabilizer bar	Prevent the body from transverse tilt during turning and keep the body balanced as much as possible	Bent or broken	Body sinking
Steering knuckle	For bearing front load of vehicle, and supporting and driving front wheels to pivot the main pin to make the vehicle turn.	/	/
Wheel hub	Supporting tire	/	/
Hub bearing	Used for load bearing and providing accurate guide to hub rotation	Worn	Vehicle off tracking
Bolts, nuts	Connecting parts and components	Loose	Abnormal sound of vehicle

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ON-VEHICLE INSPECTION

1. CHECK THE FRONT ABSORBER PRIMARILY

(a) Press the vehicle front with two hands, and then release it immediately.

- The vehicle shall become still after bobbing up and down 2 to 3 times.
- Check and repair the front absorber with spring assembly if the vehicle do not bob or bob too many times.

2. CHECK THE CONNECTION BUSHING FOR AGING AND BREAKAGE

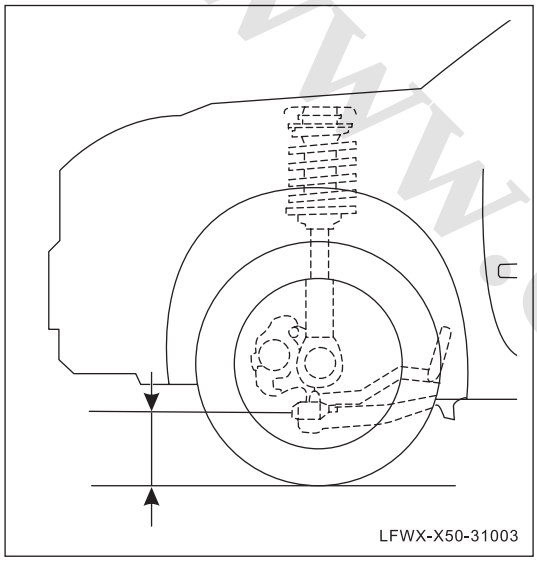
3. CHECK ALL THE CONNECTING BOLTS FOR LOOSENESS

4. CHECK EACH CONNECTING COMPONENT FOR DEFORMATION AND CRACKS

5. CHECK FRONT STABILIZER BAR

(a) Shake front stabilizer bar up and down with hands to check if the front stabilizer bar is loose.

- If the front stabilizer bar is loose, it indicates that the bar bushing is aged and have it replaced,



6. MEASURE THE VEHICLE HEIGHT

△ HINT:

- Make sure the tire reaches the standard tire pressure value when measuring the vehicle height.
- Measurement point of front suspension is the distance from the ground to the front swing arm mounting bolt center during no-load of vehicle.

NOTICE:

If vehicle body height does not meet the requirement, check the vehicle front suspension for damage or deformation.

7. CHECK THE FRONT ABSORBER ASSEMBLY

(a) Visual inspection.

- Check absorber for oil leakage.
- Check if the dust cover is damaged.

(b) Road test inspection.

- Drive the car on special test road or rather poor road for 10km and then stop it.
- Check front absorber for oil leakage.
- Touch the front absorber housing by hand; if it is not enough hot, it indicates that front absorber has no interior resistance and doesn't work and it shall be replaced.

8. CHECK THE SWING ARM BALL JOINT COMPONENTS

(a) Put pry bar between the swing arm ball joint and steering knuckle to pry up and down.

- If the connection between the swing arm ball joint and steering knuckle is firm, it indicates that the swing arm ball joint is normal.
- If there is relative movement between the swing arm ball joint and steering knuckle, have the swing arm ball joint replaced.

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9. CHECK THE HUB BEARING

(a) Jack the vehicle up to make the tire off the ground, and then shake the tire several times by holding its upper and lower part with two hands.

- If it is not loose, it indicates the hub is normal.
- Otherwise, have the hub bearing replaced.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Body sinking/tilt	1. Tire (improper pressure) 2. Vehicle (overload) 3. Spring (failed) 4. Absorbers (damaged) 5. Front stabilizer bar (bent or broken)	See 31 - Front Suspension, Diagnosis, Fault Diagnosis (1.Body sinking/tilt)
Front wheel shaking and vibrating	1. Tire (worn or improper pressure) 2. Wheel (not balanced) 3. Wheel alignment (wrong) 4. Steering gear ball joint (worn) 5. Wheel hub bearing (worn) 6. Steering gear (misaligned or damaged)	See 31 - Front Suspension, Diagnosis, Fault Diagnosis (2.Front wheels shakes and vibrates)
Vehicle off tracking	1. Tire (worn or improper pressure) 2. Wheel alignment (wrong) 3. Hub bearing (worn) 4. Spring (failed) 5. Absorbers (damaged) 6. Sub frame or swing arm (deformed)	See 31 - Front Suspension, Diagnosis, Fault Diagnosis (3.Vehicle off tracking)
Abnormal sound of suspension	1. Tire (excessive pressure) 2. Suspension parts (loose bolts) 3. Absorber (loose or damaged bolts) 4. Upper bearing of absorber (damaged) 5. Front stabilizer link ball joint (worn)	See 31 - Front Suspension, Diagnosis, Fault Diagnosis (4. Abnormal sound of suspension)

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FAULT DIAGNOSIS

1. BODY SINKING/TILT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the tire pressure.	Go to Step 1	The tire pressure is insufficient	Correct tire pressure (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)
1	Measure vehicle height	Normal	Faulty	Instruction
	Measure vehicle height (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 2	Body sinking/tilt	Judge that front suspension system has fault
2	Check front suspension	Normal	Faulty	Instruction
	Check performance condition of each component of front suspension (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 3	1. Front absorber fails 2. Connecting bush is aged and damaged 3. Connecting bolt is loose 4. Connecting part is deformed and has cracks 5. Front stabilizer bar is loose	1. Replace front absorber (see 31- Front Suspension, Front Absorber with Spring Assembly, Replacement) 2. Replace connecting bushing (see 31 - Front Suspension, Sub Frame Assembly, Replacement) 3. Tighten the bolts 4. Replace the deformed and cracked parts 5. Tighten and replace the stabilizer bar (see 31 - Front Suspension, Front Stabilizer Bar, Replacement)
3	Verification and check	Normal	Faulty	Instruction
	Measure vehicle height again and check fault symptom	Diagnosis is completed.	Fault still exists	Find the cause out from other fault symptoms

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2. FRONT WHEEL SHAKING AND VIBRATING

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the tire pressure.	Go to Step 1	The tire pressure is insufficient	Correct tire pressure (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)
1	Check tire wear	Normal	Faulty	Instruction
	Check tire wear condition (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)	Go to Step 2	Abnormal tire wear	Troubleshoot tire wear fault (see 33 - Wheels and Tires, Diagnosis, Fault Diagnosis)
2	Check the wheel alignment.	Normal	Faulty	Instruction
	Check the front wheel alignment (see 33 - Wheels and Tires, Four Wheel Alignment, Inspection)	Go to Step 3	Wheel alignment is of large deviation	Conduct the front wheel alignment operation (see 33 - Wheels and Tires, Four Wheel Alignment, Adjustment)
3	Check wheel dynamic balance	Normal	Faulty	Instruction
	Check the wheel dynamic balance (see 33 - Wheels and Tires, Wheel Balance, Inspection)	Go to Step 4	Wheel out-of-round	Adjust the wheel balance (see 33 - Wheels and Tires, Wheel Balance, Adjustment)
4	Check the hub bearing	Normal	Faulty	Instruction
	Check the wear condition of hub bearing (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 5	Hub bearing is worn excessively	Replace the hub bearing (see 31 - Front Suspension, hub bearing, Replacement)
5	Check the steering gear ball joint	Normal	Faulty	Instruction
	Check the wear condition of steering gear ball joint	Go to Step 6	Ball joint is worn excessively	Replace the steering gear ball joint (see 61 - Electric Power Steering System, Steering Gear, Replacement)
6	Check the steering gear	Normal	Faulty	Instruction
	Check the working condition of steering gear	Go to Step 7	Steering gear is misaligned or damaged	Replace the steering (see 61 - Electric Power Steering System, Steering Gear, Replacement)
7	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed.	Fault still exists	Find the cause out from other fault symptoms

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3. VEHICLE OFF TRACKING

Steps	Inspection Item	Inspection result		
0	**Preliminary inspection**	**Normal**	**Faulty**	**Instruction**
	Check the tire pressure.	Go to Step 1	The tire pressure is insufficient	Correct tire pressure (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)
1	Check tire wear	Normal	Faulty	Instruction
	Check wear condition of tire (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)	Go to Step 2	Tire is worn excessively	Troubleshoot tire wear fault (see 33 - Wheels and Tires, Diagnosis, Fault Diagnosis)
2	Check the wheel alignment.	Normal	Faulty	Instruction
	Check the front wheel alignment (see 33 - Wheels and Tires, Four Wheel Alignment, Inspection)	Go to Step 3	Wheel alignment is of large deviation	Conduct the wheel alignment operation (see 33 - Wheels and Tires, Four Wheel Alignment, Adjustment)
3	Check front suspension	Normal	Faulty	Instruction
	Check performance condition of each component of front suspension (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 4	1. Front absorber fails 2. Connecting bush is aged and damaged 3. Connecting bolt is loose 4. Connecting part is deformed and has cracks 5. Front stabilizer bar is loose	1. Replace front absorber (see 31-Front Suspension, Front Absorber with Spring Assembly, Replacement) 2. Replace connecting bush (see 31 - Front Suspension, Sub Frame Assembly, Replacement) 3. Tighten the bolts 4. Replace the deformed and cracked parts 5. Tighten and replace the stabilizer bar (see 31 - Front Suspension, Front Stabilizer Bar, Replacement)
4	Check the hub bearing	Normal	Faulty	Instruction
	Check the wear condition of hub bearing (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 5	Hub bearing is worn excessively	Replace the hub bearing (see 31 - Front Suspension, Replacement)
5	Check for brake blockage	Normal	Faulty	Instruction
	Conduct road test and check if there is brake blocked symptom on one side.	Go to Step 6	Blocked symptom occurs	Troubleshoot blocked reason (See 51 - Service Brake, Diagnosis)

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Steps	Inspection Item	Inspection result		
6	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

4. ABNORMAL SOUND OF SUSPENSION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the tire pressure.	Go to Step 1	Tire pressure is too high	Correct tire pressure (see 33 - Wheels and Tires, Wheels and Tires, On-vehicle Inspection)
1	Check front suspension	Normal	Faulty	Instruction
	Check performance condition of each component of front suspension (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 2	1. Front absorber fails 2. Connecting bush is aged and damaged 3. Connecting bolt is loose 4. Connecting part is deformed and has cracks 5. Front stabilizer bar is loose	1. Replace front absorber (see 31-Front Suspension, Front Absorber with Spring Assembly, Replacement) 2. Replace connecting bush (see 31 - Front Suspension, Sub Frame Assembly, Replacement) 3. Tighten the bolts 4. Replace the deformed and cracked parts 5. Tighten and replace the stabilizer bar (see 31 - Front Suspension, Front Stabilizer Bar, Replacement)
2	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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FRONT ABSORBER WITH SPRING ASSEMBLY

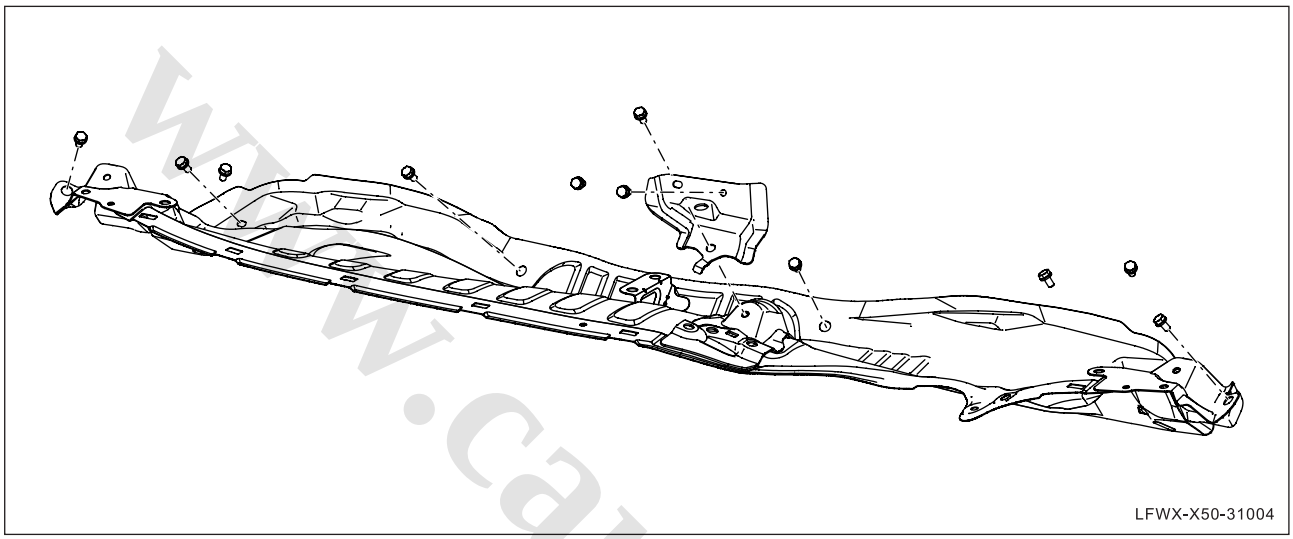
REPLACEMENT

△ HINT:

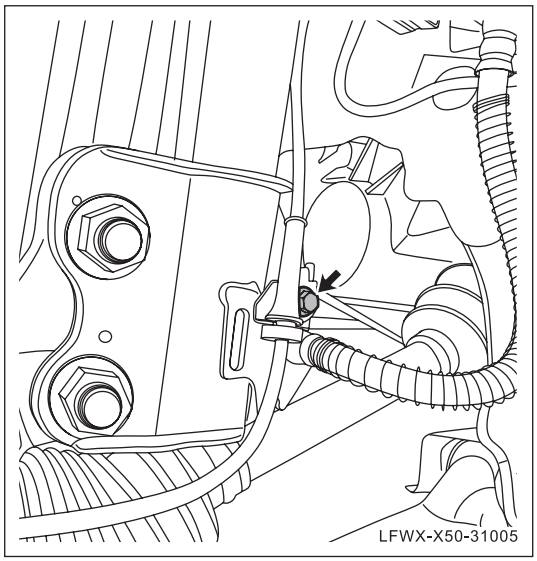
Removal method of left and right absorber assembly is basically the same, so this chapter only take the removal method of front left absorber assembly as example.

1. **REMOVE WIPER ASSEMBLY (SEE 86 - WIPER AND WASHER SYSTEM, WIPER LINKAGE MECHANISM AND MOTOR ASSEMBLY, REPLACEMENT)**
2. **REMOVE COWL TOP GRILLE MOUNTING PLATE ASSEMBLY**

(a) Remove the fixing bolts of cowl top grille mounting plate to take down the plate assembly.



3. **LIFT THE VEHICLE UP TO REMOVE THE FRONT WHEELS (SEE 33 - WHEELS AND TIRES, WHEELS ASSEMBLY, REPLACEMENT)**



4. **REMOVE THE BRAKE OIL PIPE AND THE WHEEL SPEED SENSOR WIRE HARNESS BRACKET**

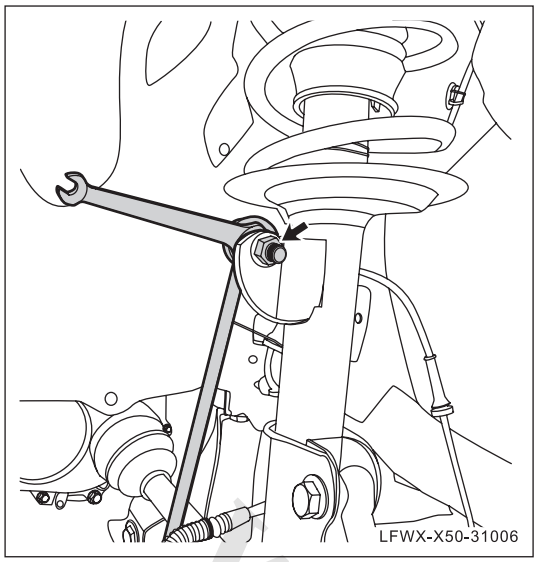
(a) Remove fixing bolts of brake oil pipe and wheel speed sensor wire harness bracket, and take down the brake oil pipe and wheel speed sensor wire harness bracket.

△ HINT:

After removing bolts, take out the bracket of wheel speed sensor and brake pipe and do not disconnect the pipe connector and wire harness connector.

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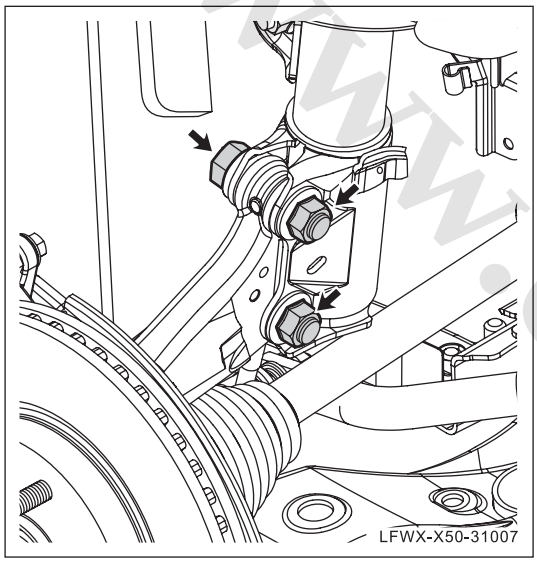


5. REMOVE THE FRONT STABILIZER LINK ASSEMBLY

(a) Remove the front stabilizer link upper ball joint fixing nut and then remove the stabilizer link.

△ HINT:

To avoid rotation of ball joint, use open wrench to fix the ball joint.

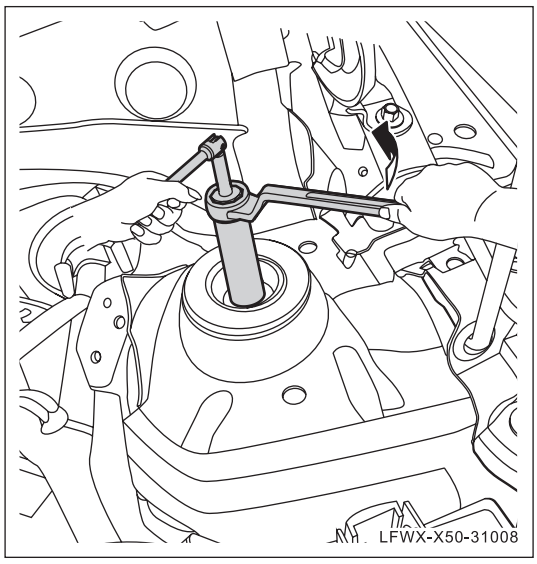


6. REMOVE THE FRONT ABSORBER WITH SPRING ASSEMBLY

(a) Remove the fixing bolts and nuts of the absorber and the steering knuckle.

△ HINT:

After removing the fixing nuts, you may lift up the front brake with the steering knuckle assembly, and then pull out the bolt with punch.



(b) Take off the dust cover of fixing nut on the absorber.

(c) Remove the fixing nuts on the front absorber assembly with special tool, and then take down the front absorber upper mounting pad plate and the front absorber upper mounting bracket.

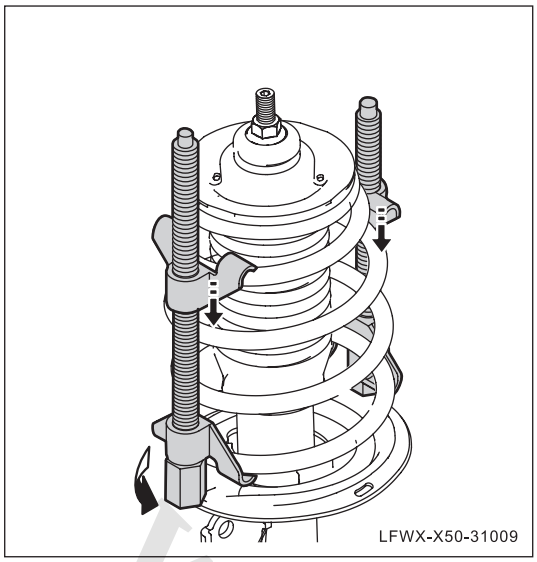
△ HINT:

When removing upper fixing nuts of absorber, a worker shall hold the absorber assembly beneath to prevent the absorber from falling down and being damaged.

(d) Take out front absorber with spring assembly from below.

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7. DECOMPOSE THE FRONT ABSORBER WITH SPRING ASSEMBLY

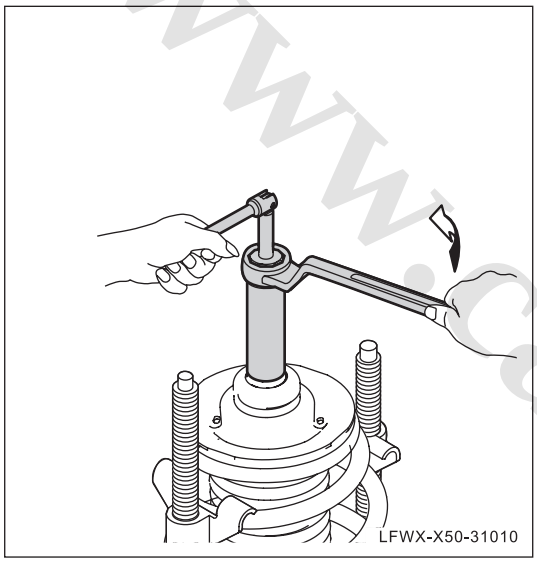
(a) Fix the front absorber assembly on the bench vice.

(b) Install the spring compressor.

(c) Compress the front absorber spring until the spring is separated with the spring seat.

NOTICE:

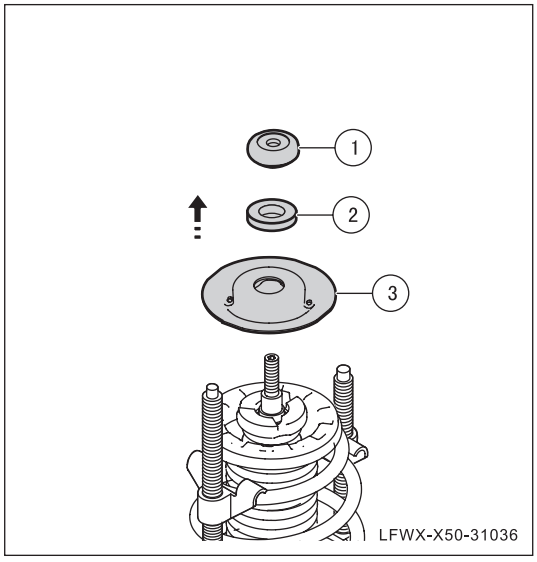
- **Make sure the spring compressor is installed in place, and then begin to compress coil spring to avoid personal injury from spring disengagement.**
- **Do not use a pneumatic tool when tightening the spring compressor bolt.**



(d) Remove the fixing nuts of absorber spring.

△ HINT:

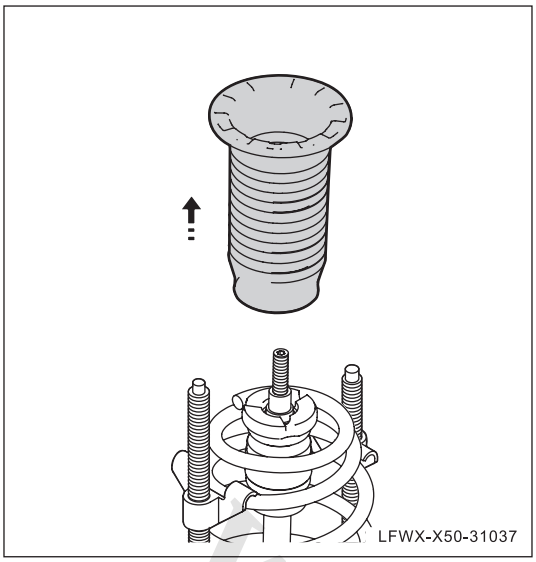
Remove the fixing nuts of absorber spring with special tool.



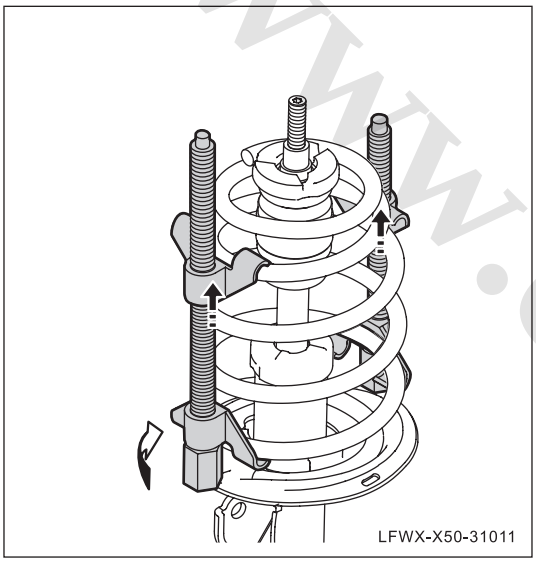
(e) Take down the absorber bearing ① , washer ② and spring upper bracket ③ .

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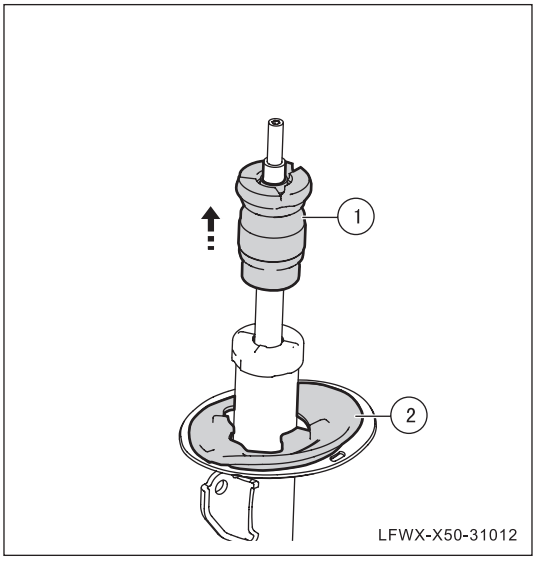
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(f) Take down the dust cover of front absorber.



(g) Remove the spring compressor and take down the spring.

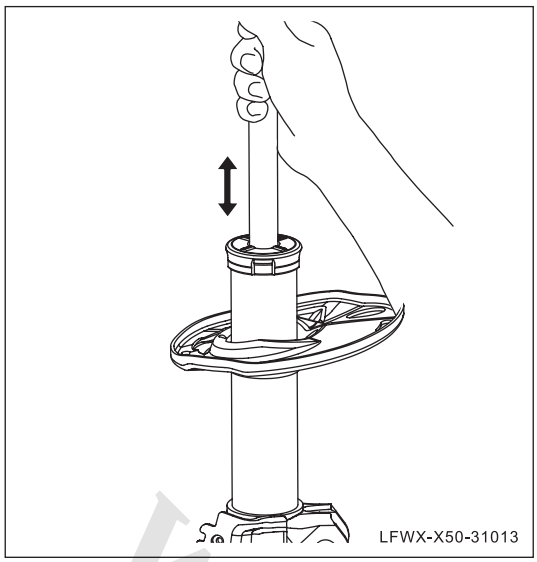


(h) Take down the front absorber buffer block ① .

(i) Take down the spring lower cushion ② .

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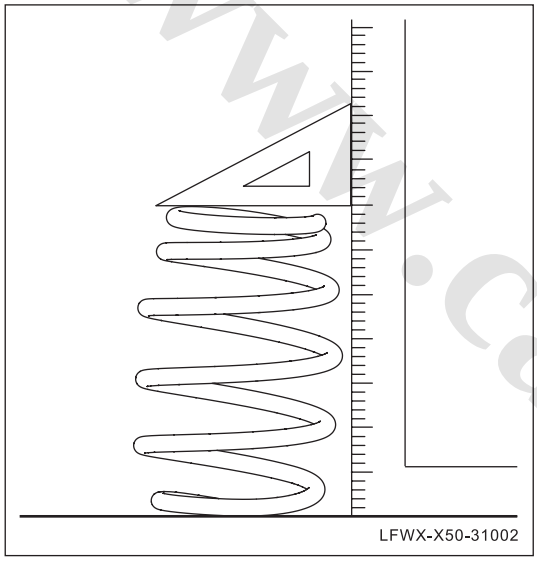
8. CHECK THE FRONT ABSORBER ASSEMBLY

(a) Compress and elongate the absorber push rod; check if there is abnormal resistance or abnormal sound during operation.

- If any abnormality is found, have the absorber replaced.

(b) Check absorber for oil leakage.

- Have the absorber replaced if oil leakage is found.



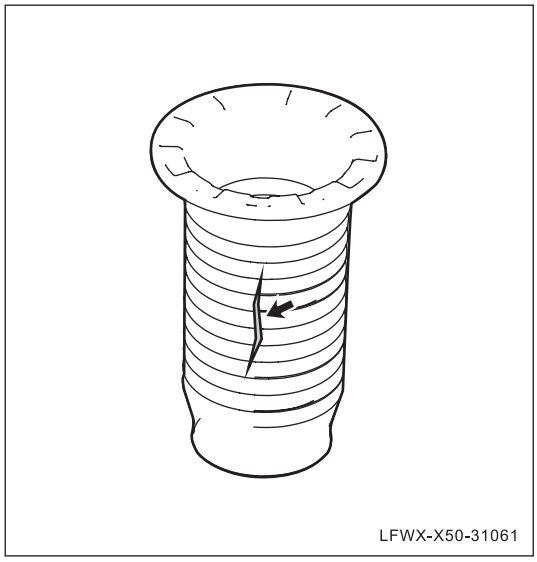
(c) Check absorber spring for cracks.

- Have the absorber spring replaced if there are cracks.

(d) Measure the free length of absorber spring

- If the measured length is decreased by 5% compared with standard spring free length, this indicates the absorber spring has permanent deformation and it must be replaced.

Standard free length of absorber spring: 364.2±1.5mm

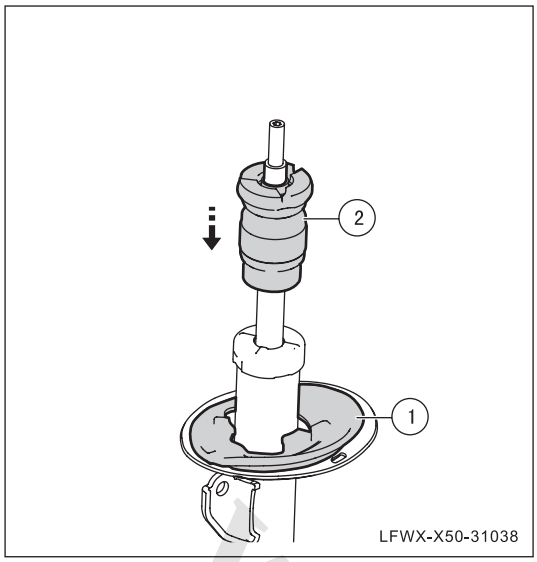


(e) Check if the absorber dust cover is damaged.

- Have the absorber dust cover replaced if it is damaged.

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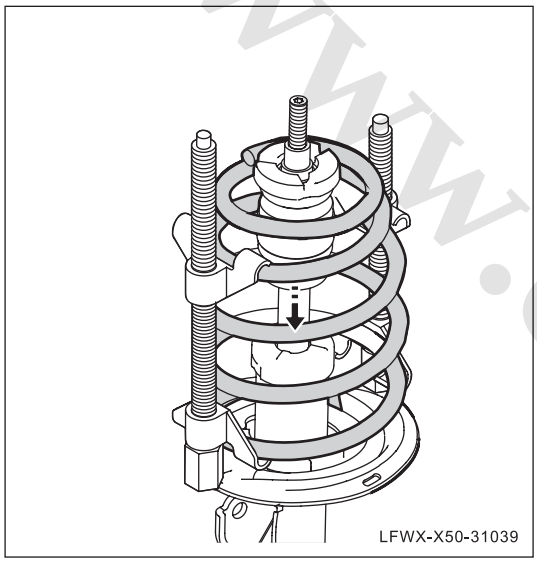
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9. ASSEMBLE THE FRONT ABSORBER WITH SPRING ASSEMBLY

(a) Install the front absorber spring lower cushion ① onto the absorber.

(b) Install the front absorber buffer block ② .

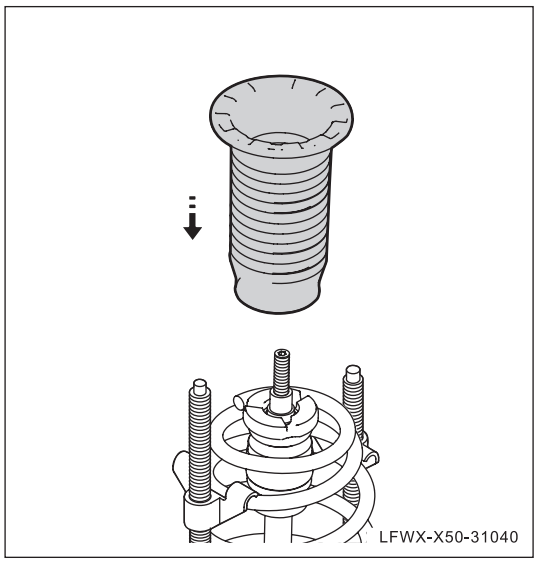


(c) Use spring compressor to press absorber spring.

(d) Install the absorber spring onto the absorber.

△ HINT:

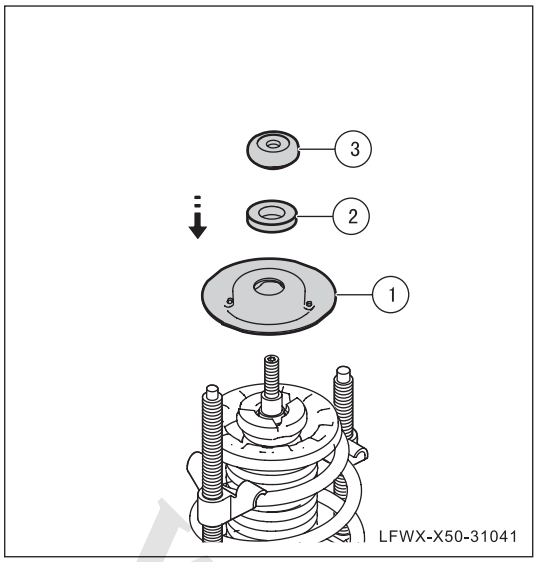
Install the low end of the absorber spring into the spring lower bracket notch.



(e) Install dust cover of front absorber.

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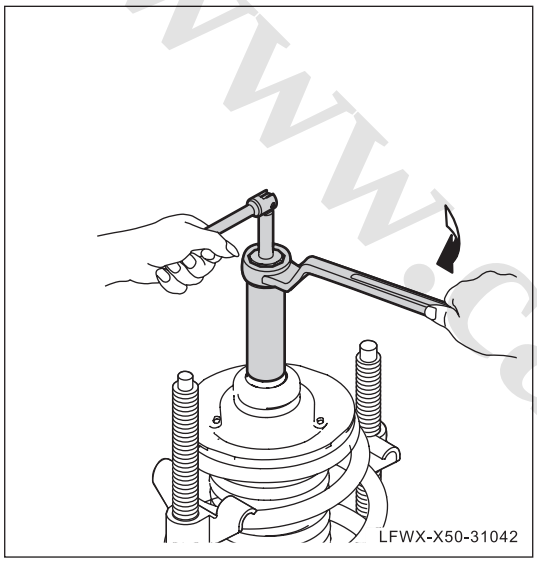
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(f) Install the spring upper bracket ① ,washer ② and absorber bearing ③ .

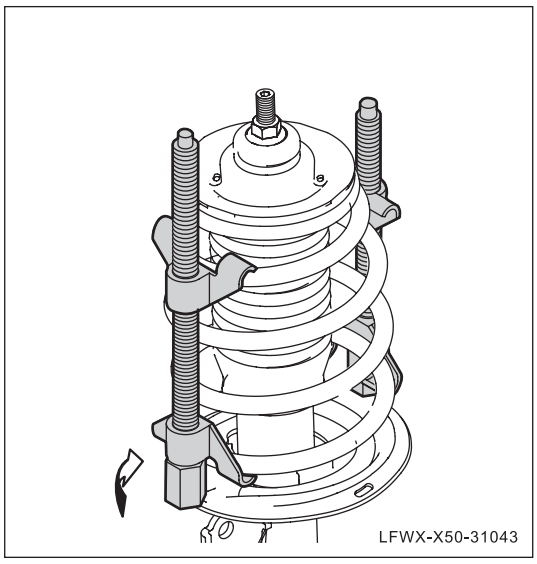
△ HINT:

Pay attention to the installation angle of spring upper bracket to avoid damaging the bearing due to wrong installation.



(g) Install the fixing nut of absorber spring and tighten it.

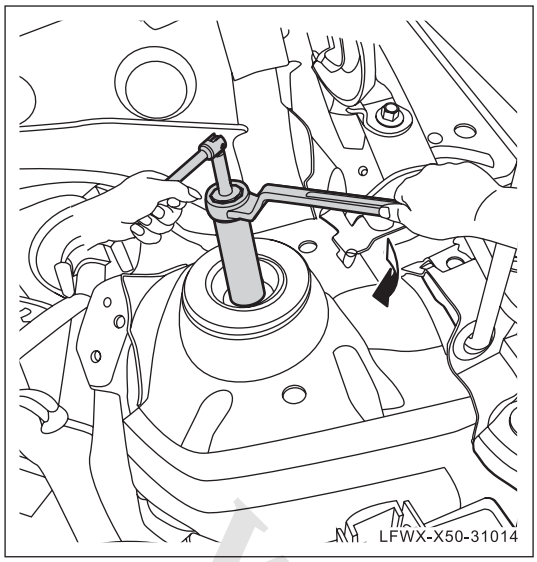
Torque: 82 - 89 N•m



(h) Loosen the absorber spring compressor and take it down.

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10. INSTALL THE FRONT ABSORBER WITH SPRING ASSEMBLY

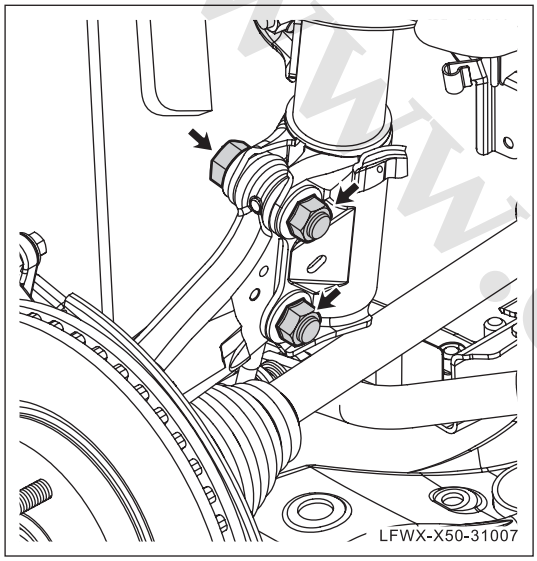
(a) Install the front absorber assembly from below the vehicle body.

(b) Install the front absorber upper mounting bracket and the front absorber upper mounting pad plate.

(c) Install the front absorber upper fixing nuts and tighten them.

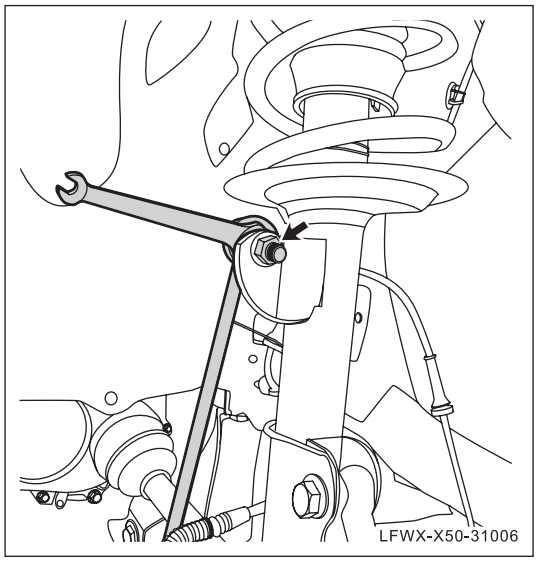
Torque: 55 - 65 N•m

(d) Install the dust cover of upper fixing nut of the front absorber.



(e) Install the fixing bolts and nuts of the front absorber and the steering knuckle and tighten them.

Torque: 200 - 220 N•m



11. INSTALL THE FRONT STABILIZER LINK ASSEMBLY

(a) Install the front stabilizer link ball joint onto the front absorber and install the ball joint fixing nuts and tighten them.

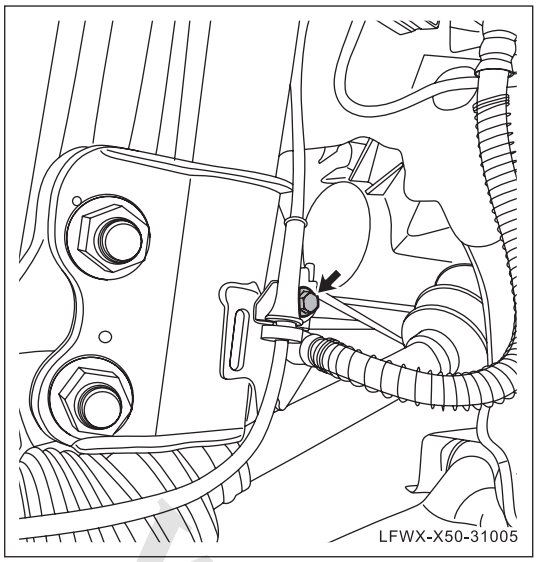
Torque: 85 - 105 N•m

△ HINT:

To avoid rotation of ball joint, use open wrench to fix the ball joint.

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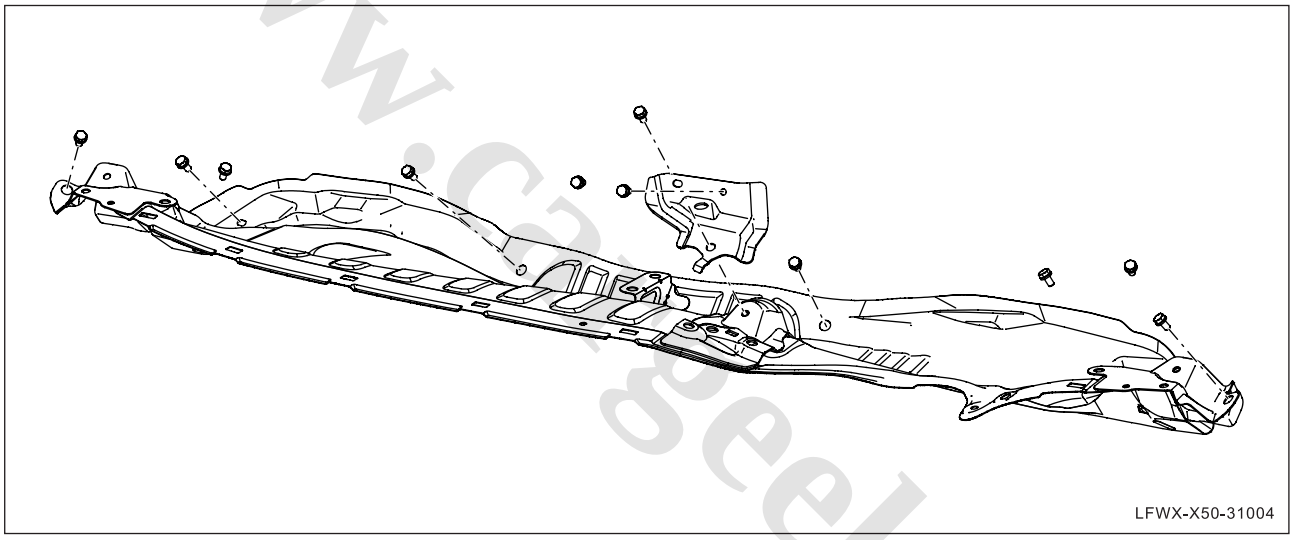
12. MOUNT THE BRAKE PIPE AND THE WHEEL SPEED SENSOR WIRE HARNESS BRACKET

(a) Install the brake pipe and the wheel speed sensor wire harness bracket onto the front absorber and install bracket fixing bolts and tighten them.

13. INSTALL THE FRONT WHEEL ASSEMBLY AND LOWER DOWN THE VEHICLE (SEE 33 - WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT).

14. INSTALL COWL TOP GRILLE MOUNTING PLATE ASSEMBLY

(a) Install cowl top grille mounting plate and and mount the fixing bolts and tighten them.



15. INSTALL WIPER ASSEMBLY (SEE 86 - WIPER AND WASHER SYSTEM, WIPER LINKAGE MECHANISM AND MOTOR ASSEMBLY, REPLACEMENT)

16. CONDUCT THE FOUR WHEEL ALIGNMENT OPERATION (SEE 33 - WHEELS AND TIRES, FOUR WHEEL ALIGNMENT, ADJUSTMENT)

17. CHECK THE FRONT ABSORBER

(a) After installation of front absorber, stop the vehicle after driving about 10km on a special test road or a poor road and touch the absorber surface with hand.

- If the temperature difference of two absorbers is quite large, it indicates that the resistance differs large; the absorber with lower temperature has less resistance.
- If the surface temperature is not higher than the air temperature, it indicates that there is no resistance in the absorber; at this time, have this failed absorber replaced.

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(b) Make the vehicle drive slowly and conduct emergency braking.

- If the vehicle vibrates violently, it indicates that the absorber has problem and have it replaced.

(c) The absorber makes abnormal sound during driving.

- This mainly results from impact of absorber with spring and frame, rubber mat damage or drop, deformation of absorber dust cover and insufficient fluid. Find out the cause and repair it.

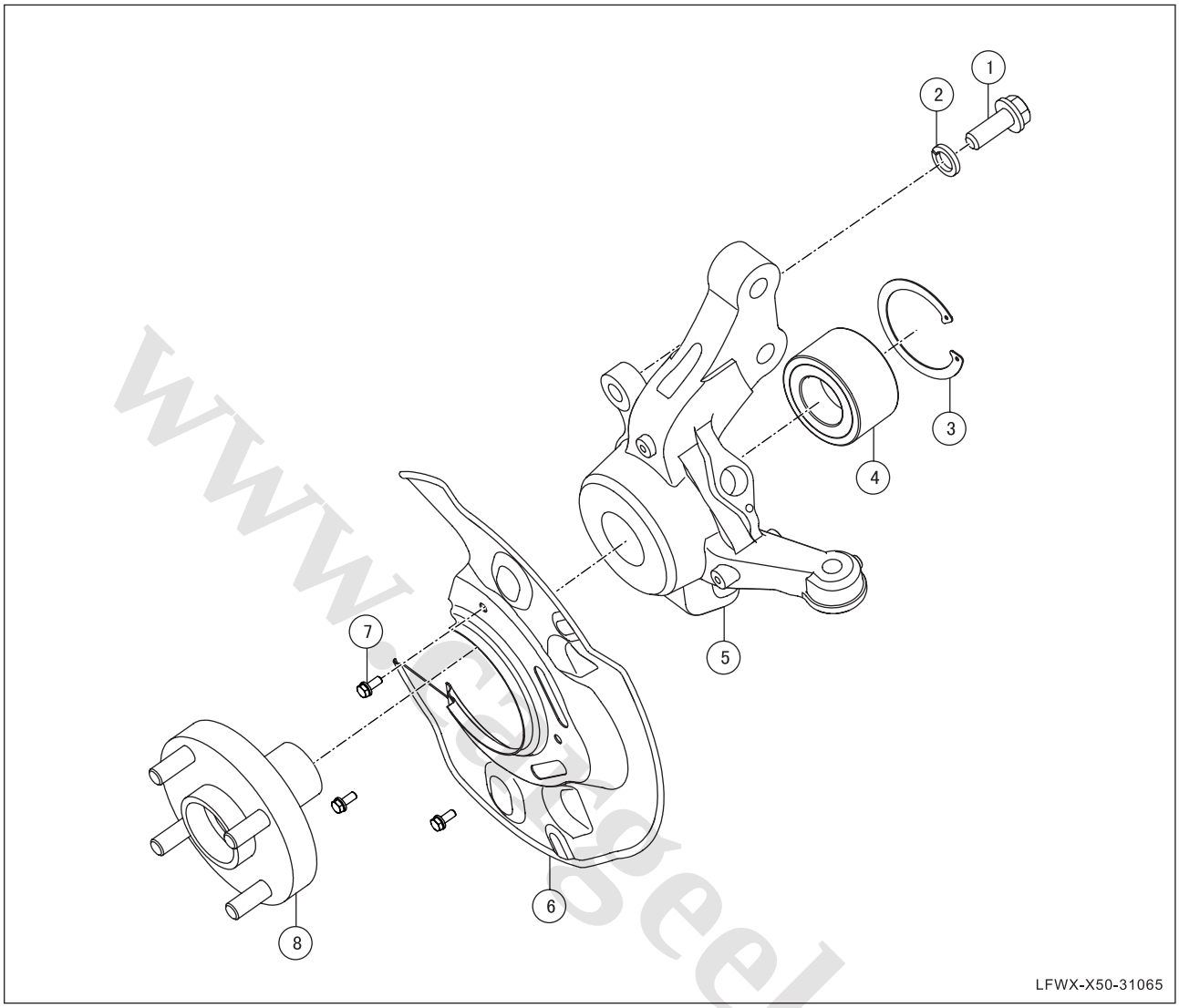
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STEERING KNUCKLE AND WHEEL HUB

COMPONENTS



1	Hexagon bolt with flange	5	Steering knuckle
2	Heavy-duty spring washer	6	Front brake bottom plate
3	Bearing retainer ring	7	Hexagon head bolt and plain washer assembly
4	Hub bearing assembly	8	Front wheel hub assembly

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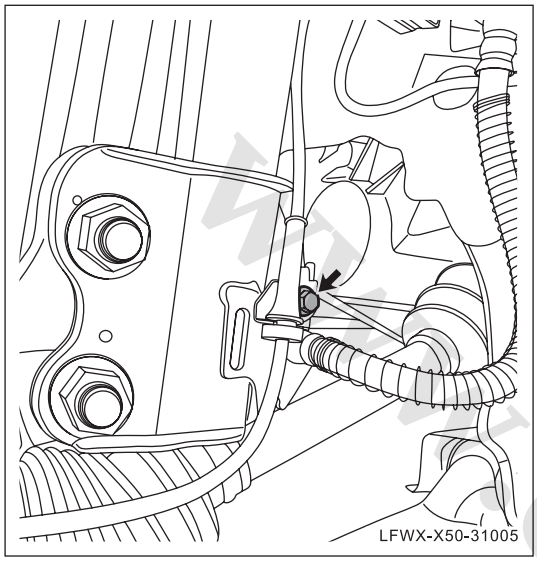
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REPLACEMENT

△ HINT:

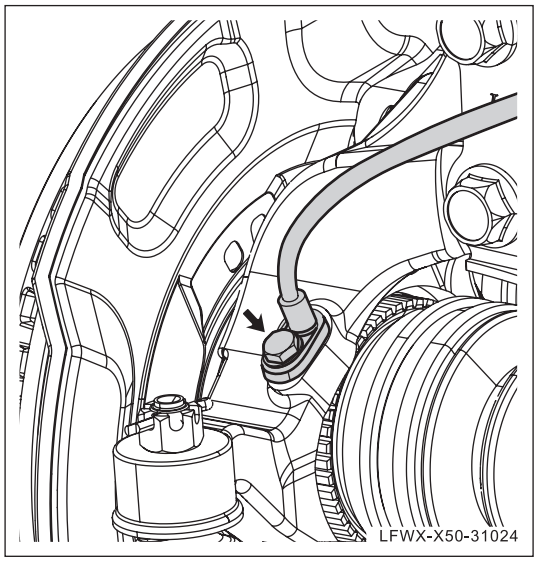
Removal method of front left and right steering knuckle is basically the same, so this chapter only take the removal method of front left steering knuckle and wheel hub as example.

1. **LIFT THE VEHICLE UP TO REMOVE THE FRONT WHEELS (SEE 33 - WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT)**
2. **DRAIN BRAKE FLUID IN BRAKE SYSTEM (SEE 51 - SERVICE BRAKE, BRAKE FLUID, REPLACEMENT)**



3. **REMOVE THE WHEEL SPEED SENSOR AND FRONT BRAKE PIPE BRACKET**

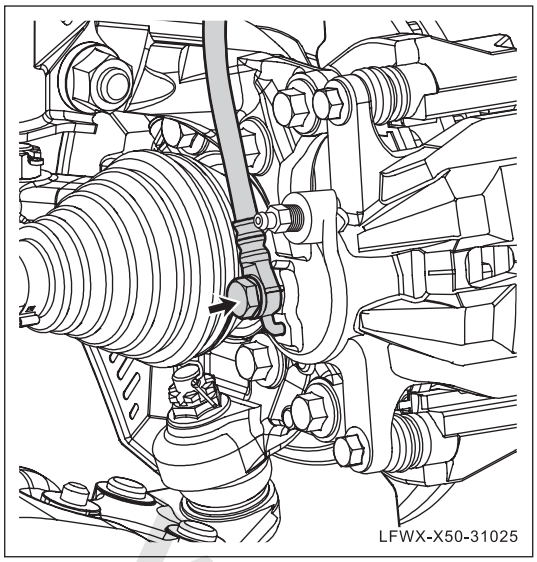
(a) Remove fixing bolts of brake oil pipe and wheel speed sensor wire harness bracket and take the bracket down.



(b) Remove fixing bolts front wheel speed sensor, and take out wheel speed sensor.

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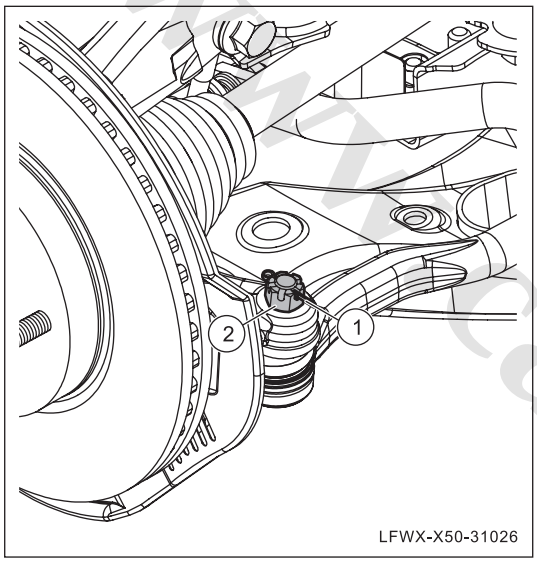
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(c) Remove the front brake pipe hollow bolt and take down the seal ring; and then move away the brake hose.

△ HINT:

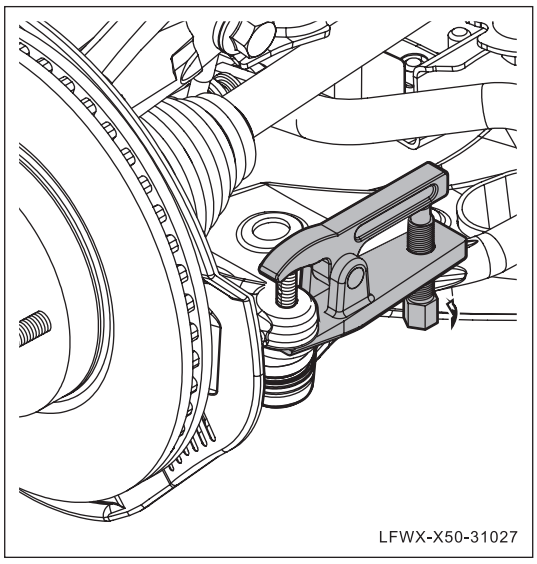
Take the pipe down and seal the mounting hole with plug cap to prevent dust or dirt from entering.



4. REMOVE THE STEERING KNUCKLE ASSEMBLY

(a) Remove cotter pin ① of slotted nut of connecting ball joint of steering gear tie rod.

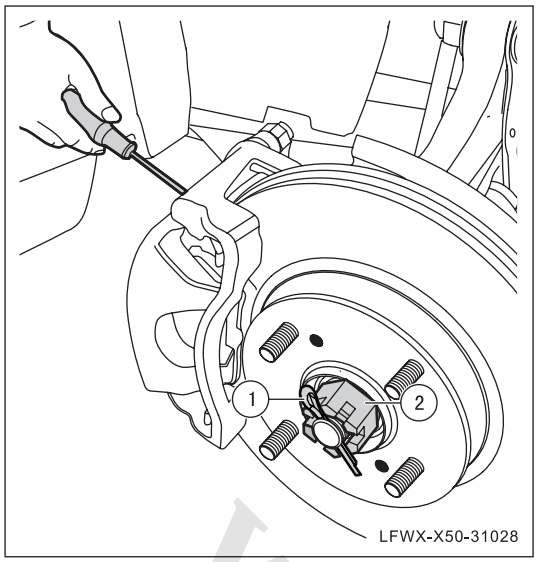
(b) Remove slotted nut ② of connecting ball joint of steering gear tie rod.



(c) Remove the steering gear tie rod connecting ball joint by a ball joint remover.

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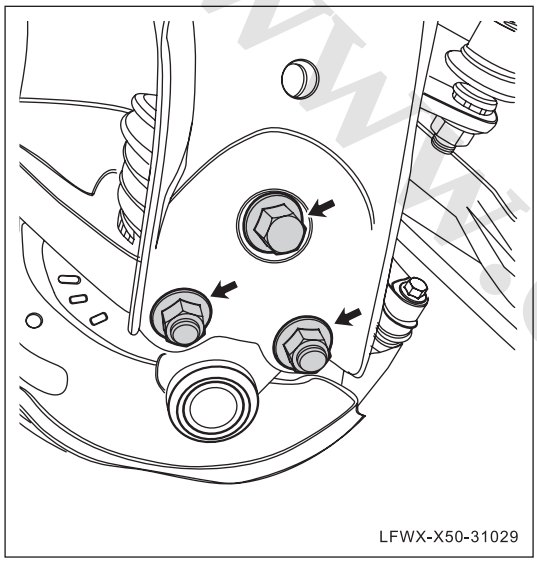


(d) Remove cotter pin ① of the front suspension steering knuckle and the drive shaft slotted nut.

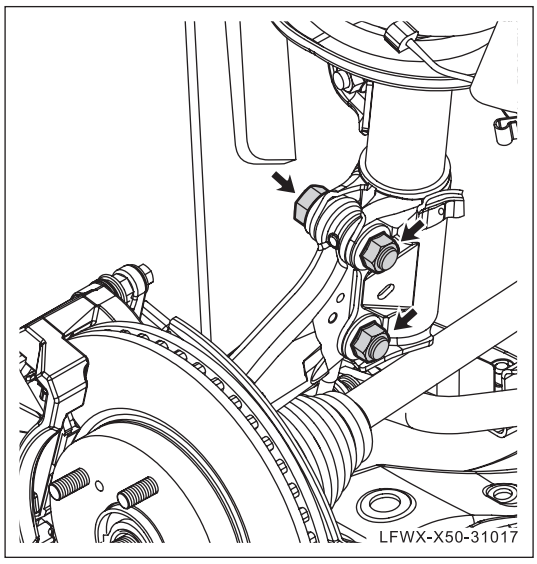
(e) Remove slotted nut ② of drive shaft.

△ HINT:

While removing this slotted nut, to facilitate removing, use a screwdriver to clamp the brake disc to avoid nut and drive shaft rotating along with wrench during removing.



(f) Remove the swing arm ball joint fixing bolts and nuts.

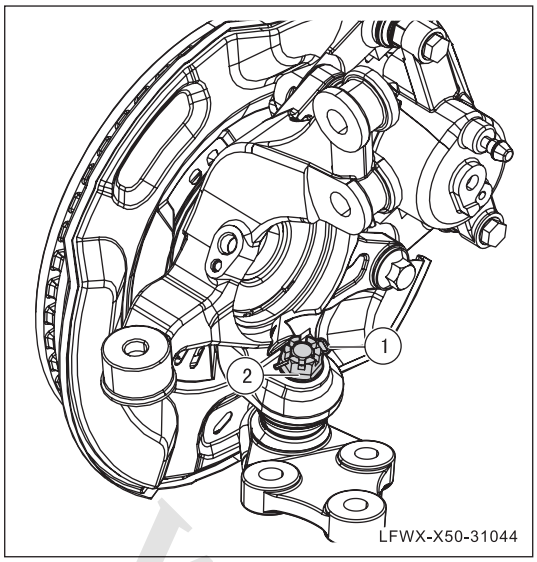


(g) Remove the fixing bolts and nuts of the absorber and the steering knuckle.

(h) Take down the swing arm ball joint and front steering knuckle assembly.

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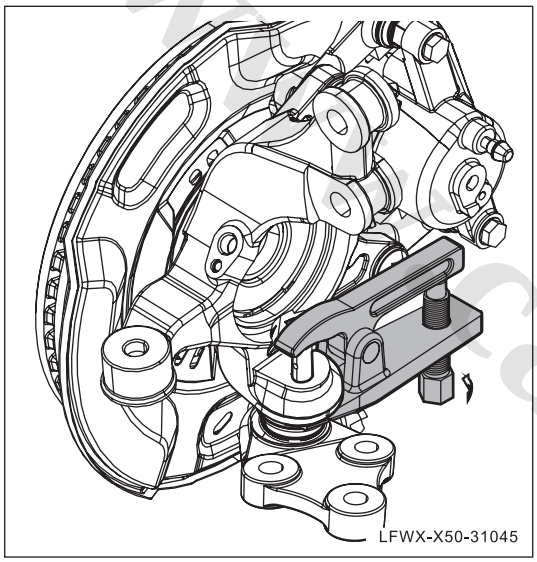
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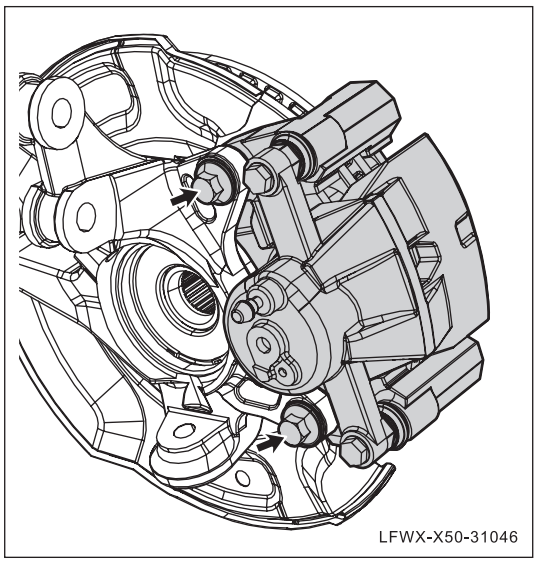
5. REMOVE THE SWING ARM BALL JOINT

(a) Remove the cotter pin ① of swing arm ball joint slotted nut.

(a) Remove the swing arm ball joint slotted nut ② .



(c) Remove the swing arm ball joint using a ball joint remover.

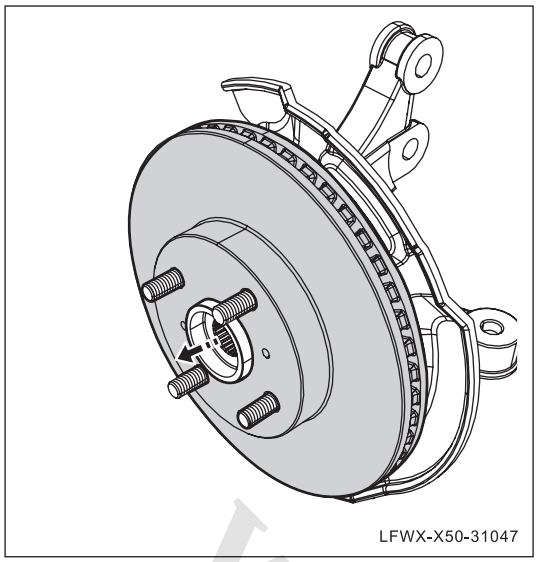


6. REMOVE THE BRAKE ASSEMBLY

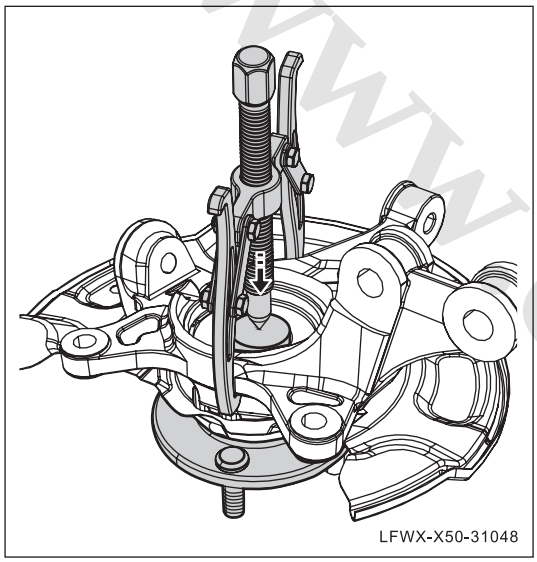
(a) Remove the fixing bolts of brake bracket, and take the brake down.

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(b) Take the brake disc down.

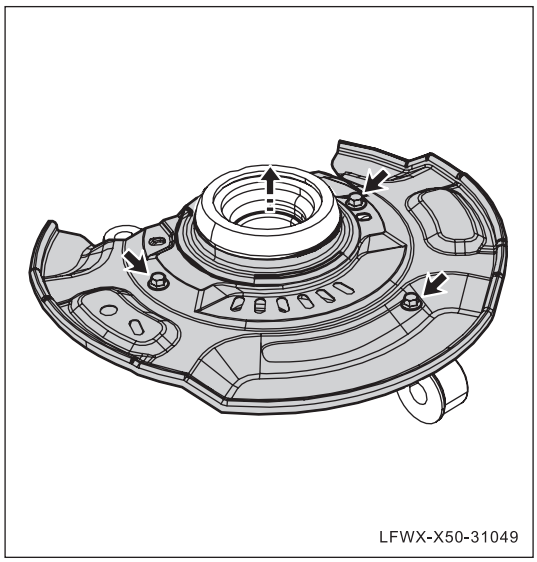

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7. REMOVE THE FRONT WHEEL HUB ASSEMBLY

(a) Put a circular steel plate on the hub end and use puller to push the front wheel hub assembly out.

△ HINT:

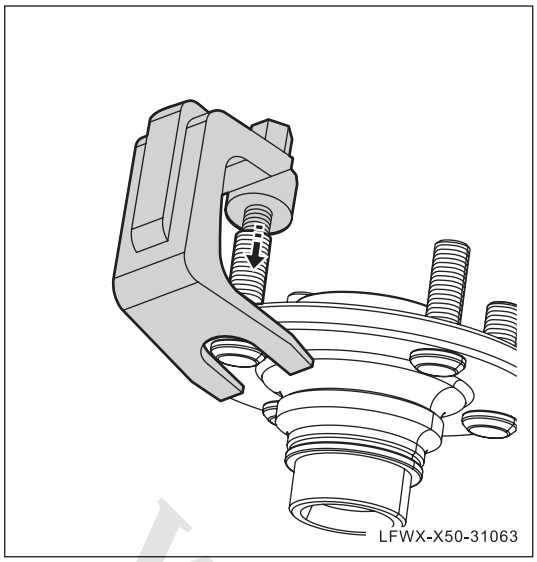
When pushing the front hub assembly out, half of hub bearing will be removed together with the hub; use puller to pull it out again.


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(b) Remove the brake bottom plate fixing bolts and take out the brake bottom plate.

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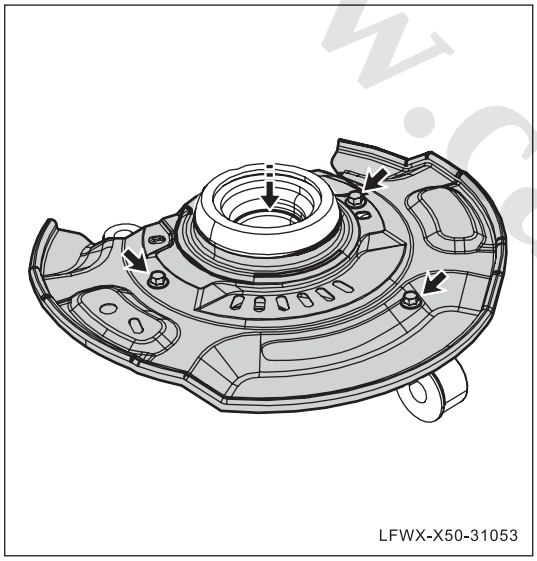


8. REMOVE THE WHEEL BOLTS

(a) Use wheel bolt remover to remove wheel bolts.

9. INSTALL THE WHEEL BOLTS

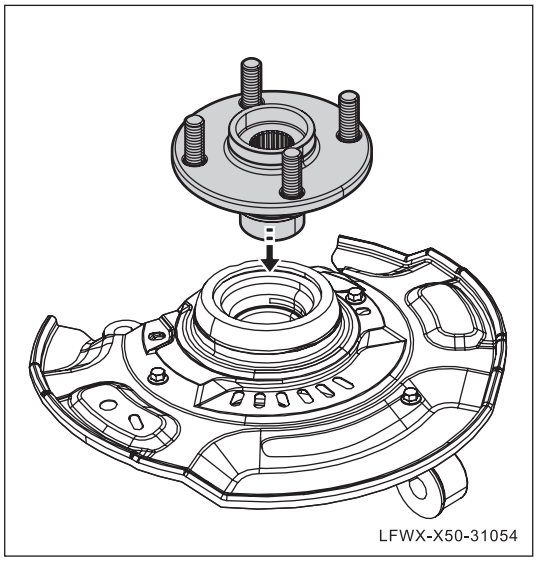
(a) Install the wheel bolts into the wheel bolt mounting holes and use the bolts remover to press them in place.



10. INSTALL THE FRONT WHEEL HUB ASSEMBLY

(a) Install the front brake bottom plate onto the steering knuckle and install the fixing bolts and tighten them.

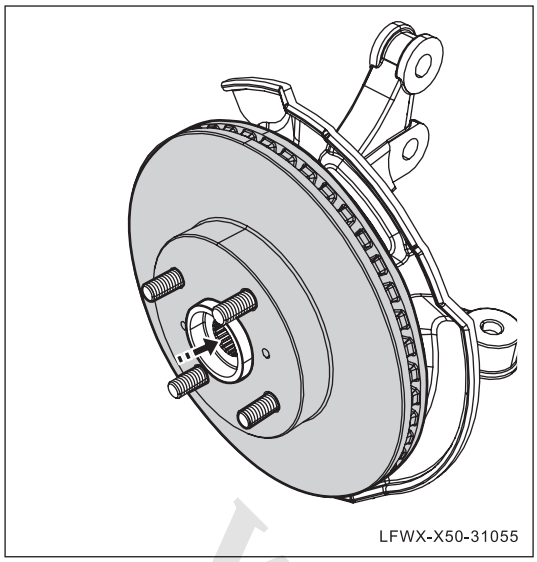
Torque: 37 N•m



(b) Press into the front hub assembly on the hydraulic bench.

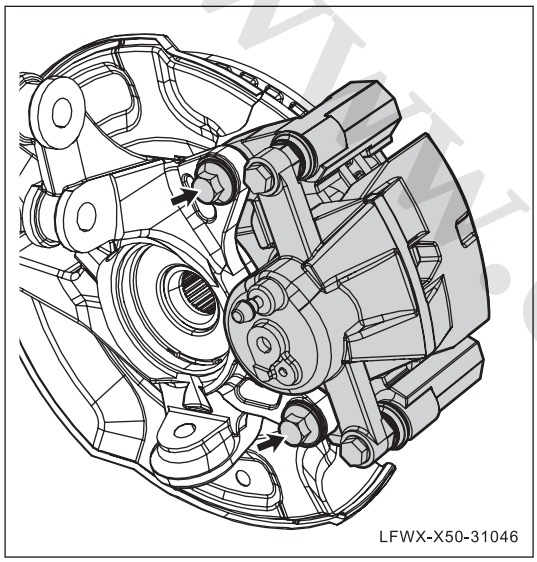
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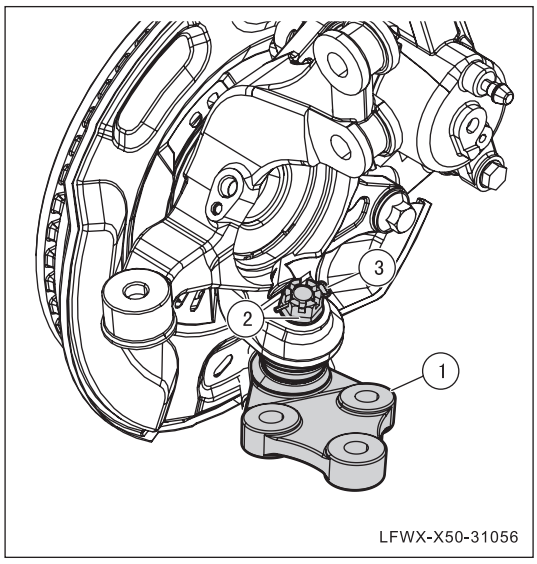
11. INSTALL THE BRAKE ASSEMBLY

(a) Install the brake disc onto the steering knuckle.


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(b) Install the front brake assembly onto the steering knuckle and mount the fixing bolts and tighten them.

Torque: 30 - 36 N•m



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12. INSTALL THE SWING ARM BALL JOINTS COMPONENTS

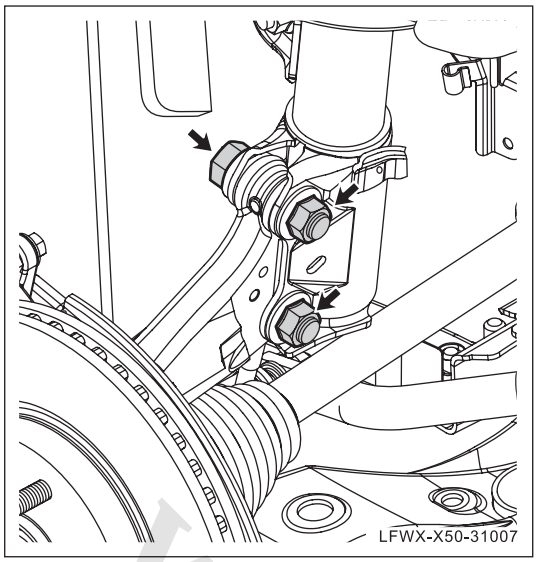
(a) Install the swing arm ball joint ① onto the steering knuckle and install the slotted nut ② and tighten it.

Torque: 80 - 100 N•m

(b) Install the cotter pin ③ and tighten it.

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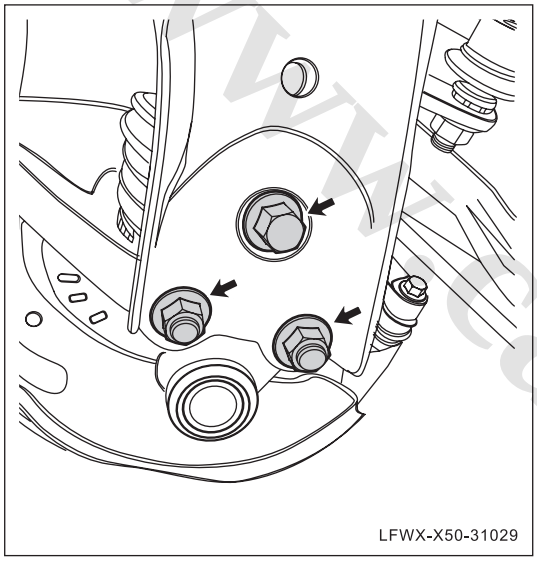


13. INSTALL THE STEERING KNUCKLE ASSEMBLY

(a) Install the steering knuckle onto the drive shaft.

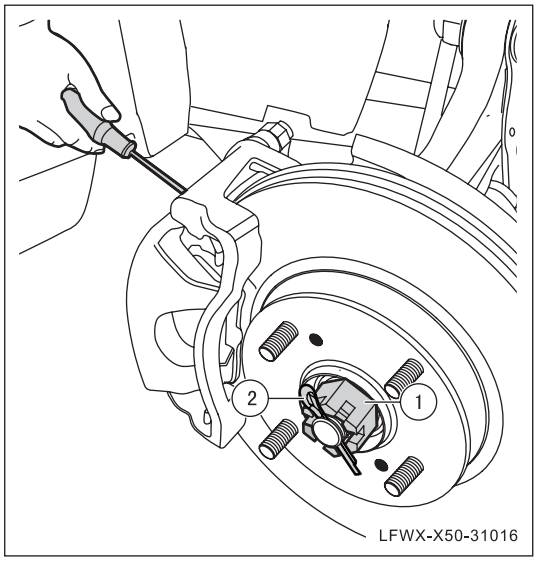
(b) Lift the front steering knuckle, and install connecting bolts of steering knuckle and front absorber assembly. Mount fixing nuts and tighten them.

Torque: 200 - 220 N•m



(c) Install the steering knuckle assembly onto the lower swing arm; install the fixing bolts and nuts of swing arm ball joint and then tighten them.

Torque: 85 - 105 N•m



(d) Install the drive shaft slotted nuts ① and then tighten them to expose cotter pin mounting hole.

Torque: 180 - 240 N•m

△ HINT:

When tightening this slotted nut, use the screwdriver to clamp brake disc for easy tightening and to prevent nut and drive shaft from rotating along with the wrench.

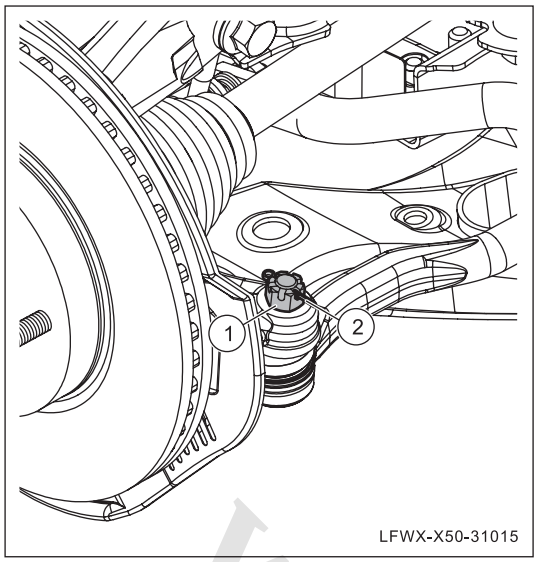
NOTICE:

If the nut opening isn't aligned with pin hole , further tighten slotted nuts to make the notch of slotted nut align with pin hole.

(e) Install the cotter pin ② and tighten it.

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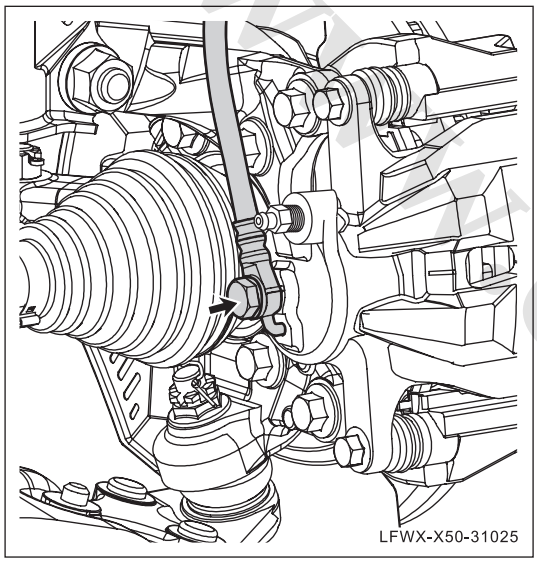


(f) Install connecting ball joint of steering gear tie rod onto steering knuckle.

(g) Install slotted nut ① of connecting ball joint of steering gear tie rod and tighten it.

Torque: 80 - 100 N•m

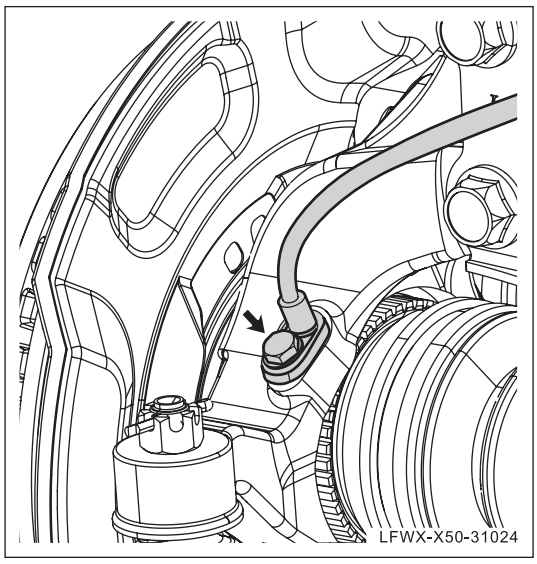
(h) Install the cotter pin ② and tighten it.



14. INSTALL THE BRAKE PIPE AND THE WHEEL SPEED SENSOR

(a) Install the front brake pipe onto the brake and install the hollow bolt and O-ring of brake pipe and then tighten the hollow bolt.

Torque: 35 - 45 N•m

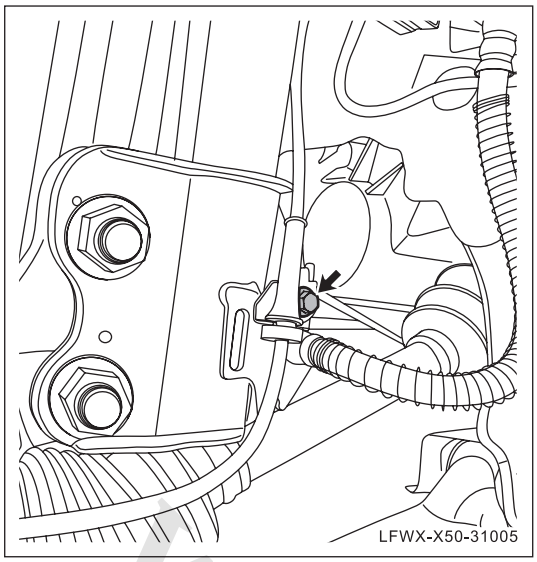


(b) Install the wheel speed sensor onto the steering knuckle and mount the fixing bolts and tighten them.

Torque: 12 - 18 N•m

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(c) Install the brake pipe and wheel speed sensor wire harness bracket and then mount the fixing bolts and tighten them.

15. INSTALL THE FRONT WHEELS (SEE 33 WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT) .

16. CONDUCT FOUR WHEEL ALIGNMENT (SEE 33 - WHEELS AND TIRES, FOUR WHEEL ALIGNMENT, ADJUSTMENT)

17. BRAKE SYSTEM EXHAUST (SEE 51 - SERVICE BRAKE, BRAKE FLUID, EXHAUST)

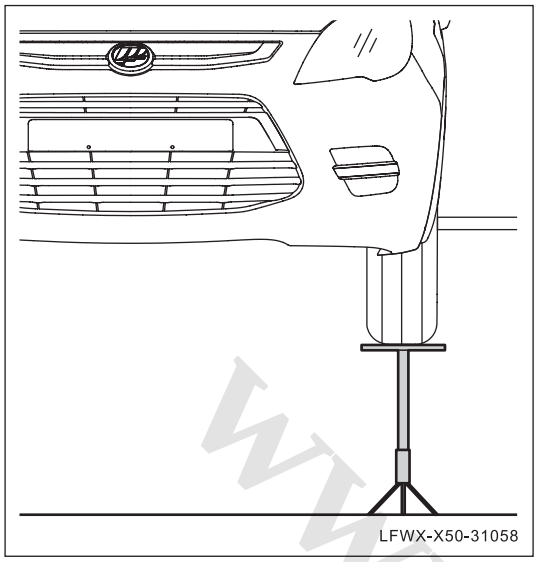
18. CHECK AND TEST THE VEHICLE

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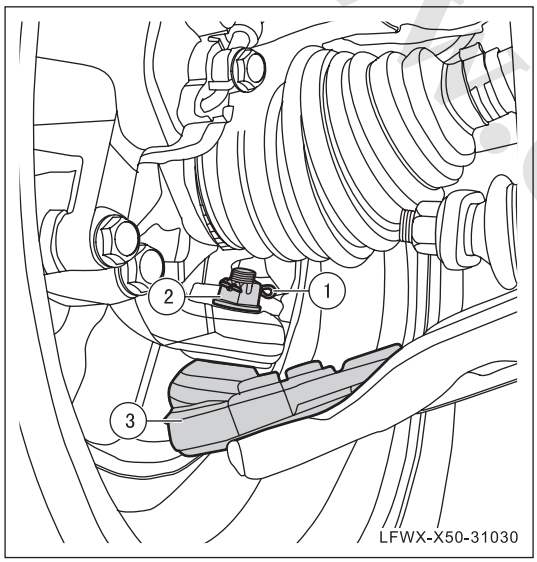
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SWING ARM ASSEMBLY

REPLACEMENT



1. LIFT THE VEHICLE TO PUT BRACKET BELOW THE FRONT WHEEL; LOWER DOWN THE VEHICLE SLOWLY TO HAVE THE FRONT WHEELS SUPPORTED SLIGHTLY.

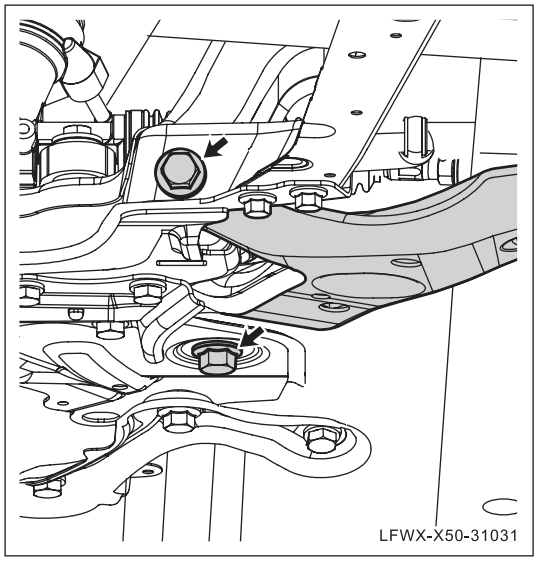


2. REMOVE THE SWING ARM ASSEMBLY

(a) Remove the cotter pin ① of slotted nut of the swing arm ball joint assembly.

(a) Remove the slotted nut ② of swing arm ball joint assembly.

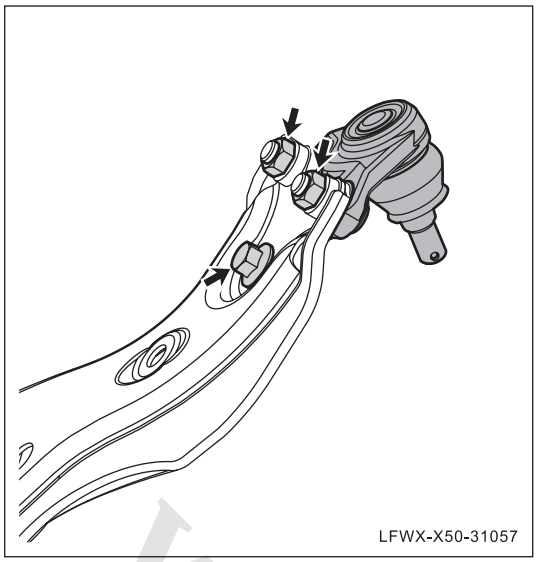
(c) Remove the swing arm ball joint assembly ③ using a ball joint remover.



(d) Remove connecting bolts of the swing arm and the sub frame and take down the swing arm assembly.

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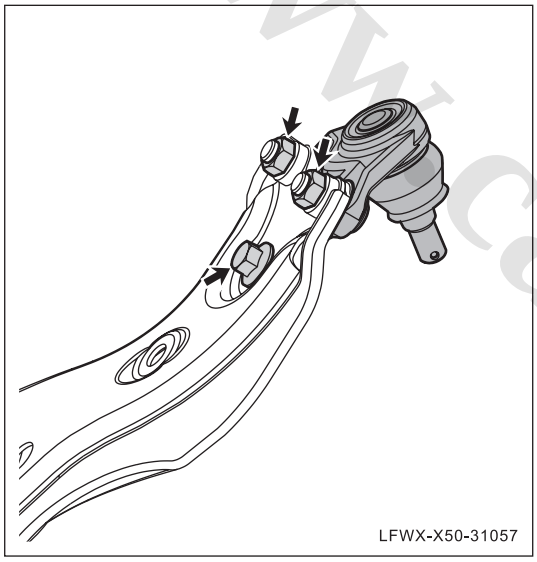
3. REMOVE THE SWING ARM BALL JOINT

(a) Remove the swing arm ball joint fixing bolts and nuts to take the ball joint down.

△ HINT:

Check if the ball joint is seriously worn or loose and have it replaced if necessary.

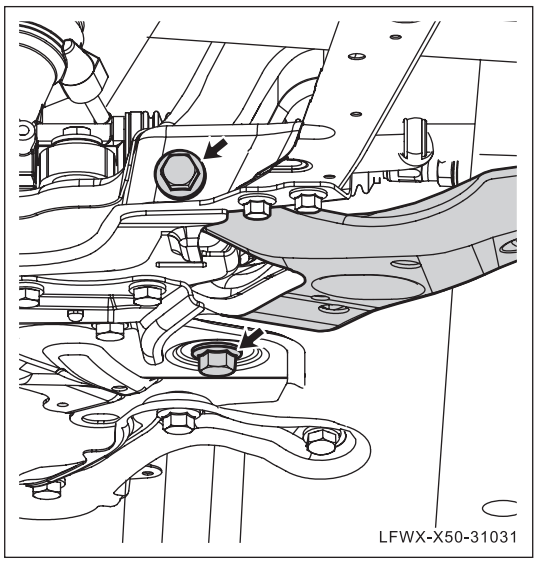
4. CHECK IF THE SWING ARM ASSEMBLY IS DEFORMED AND HAVE IT REPLACED IF NECESSARY



5. INSTALL THE SWING ARM BALL JOINT

(a) Install the swing arm ball joint onto the swing arm and mount the fixing nuts and bolts and tighten them.

Torque: 85 - 105 N•m



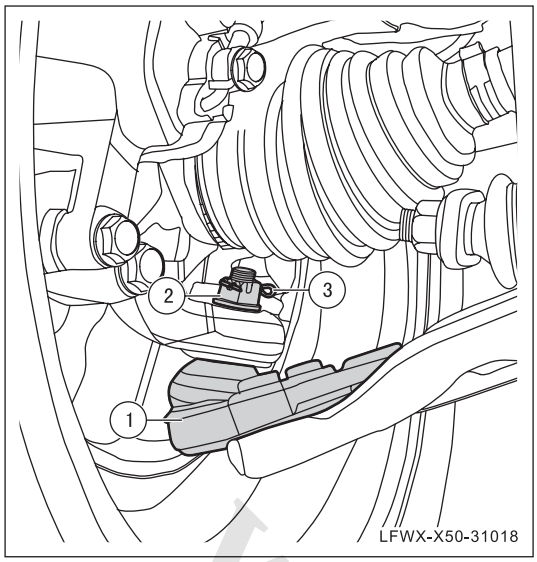
6. INSTALL SWING ARM ASSEMBLY

(a) Install the swing arm assembly onto the sub frame assembly and mount the fixing bolts and tighten them.

Torque: 200 - 220 N•m

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(b) Install the swing arm ball joint assembly ① onto the steering knuckle.

(c) Install the slotted nut ② of swing arm ball joint assembly and tighten it.

Torque: 80 - 100 N•m

(d) Install the cotter pin ③ and tighten it.

7. LIFT THE VEHICLE AND TAKE THE BRACKET OUT

8. CONDUCT THE FOUR WHEEL ALIGNMENT (SEE 33 - WHEELS AND TIRES, FOUR WHEEL ALIGNMENT, ADJUSTMENT)

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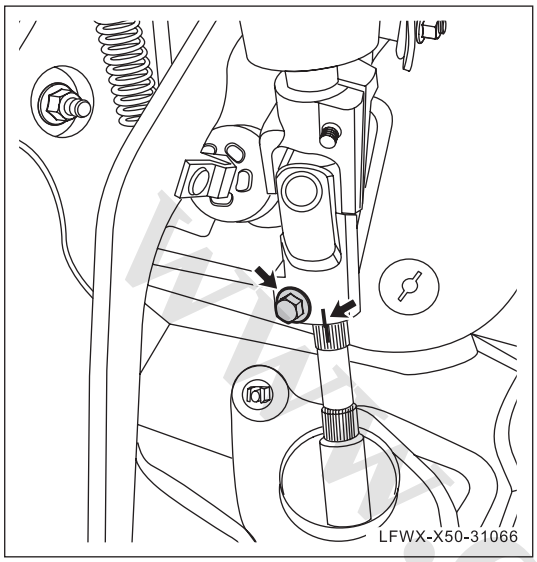
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SUB FRAME ASSEMBLY

REPLACEMENT

1. **REMOVE THE CONNECTING PIPE WITH CORRUGATED PIPE (SEE 14 - INTAKE AND EXHAUST SYSTEM, REAR MUFFLER, REPLACEMENT)**
2. **DISCONNECT THE STEERING GEAR BALL JOINT AT BOTH ENDS (SEE 61 - ELECTRIC POWER STEERING SYSTEM, STEERING GEAR, REPLACEMENT)**

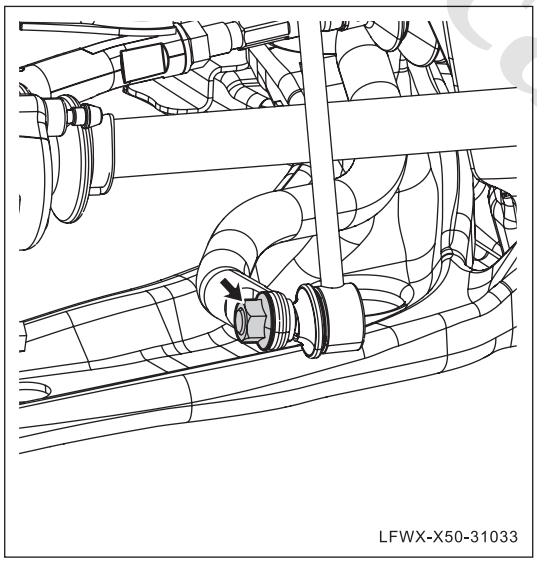


3. **DISCONNECT THE CONNECTING BOLT OF THE STEERING GEAR AND STEERING DRIVE SHAFT**

△ HINT:

Make assembling mark when removing to facilitate installation.

6. **REMOVE THE FRONT SWING ARM ASSEMBLY (SEE 31 - FRONT SUSPENSION, SWING ARM ASSEMBLY, REPLACEMENT)**

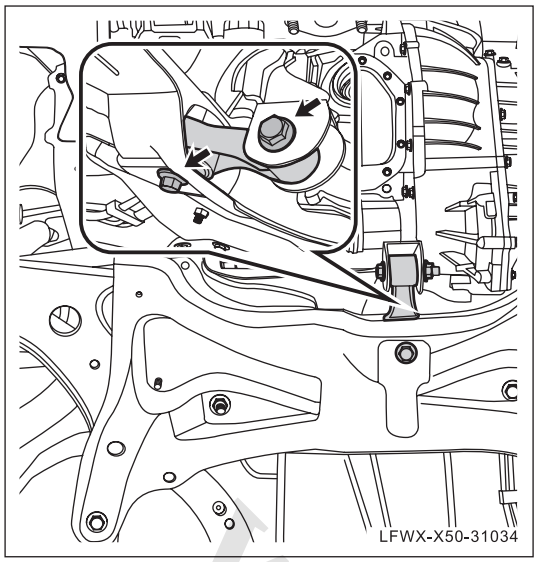


4. **REMOVE THE SUB FRAME ASSEMBLY**

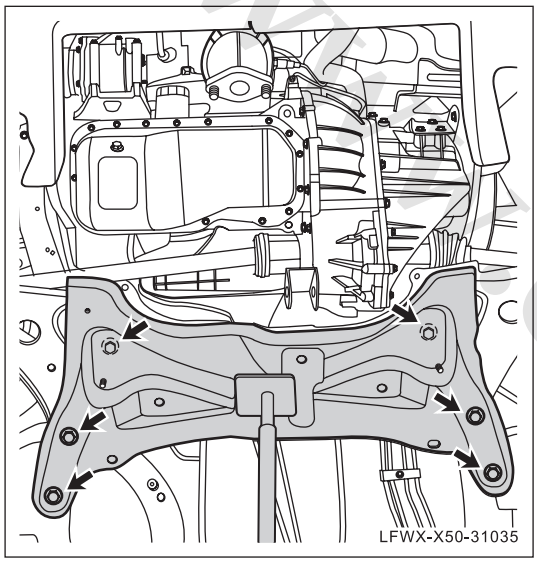
(a) Remove the front stabilizer bar ball joint fixing nut and then disconnect the connection between the the front stabilizer bar and its link.

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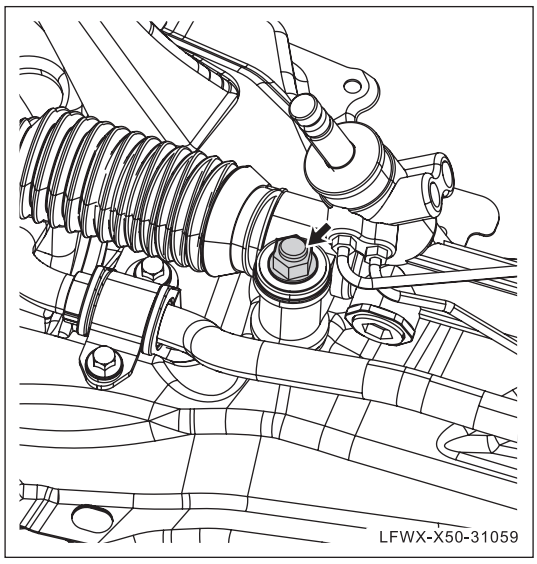
(b) Remove the fixing bolts of the engine rear mounting, and then take down the engine rear mounting.



(c) Support the sub frame with a bracket, remove the sub frame assembly fixing bolts and take the sub frame assembly down.

NOTICE:

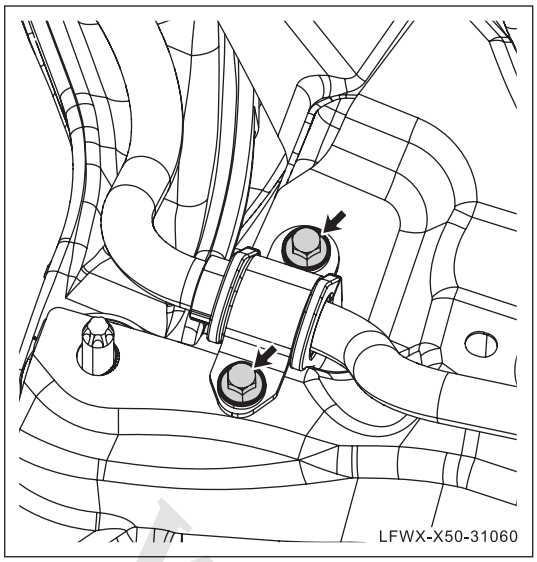
Two or more persons are required to remove it in order to avoid drop of the sub frame.



(d) Remove the steering gear fixing nuts and take down the steering gear assembly.

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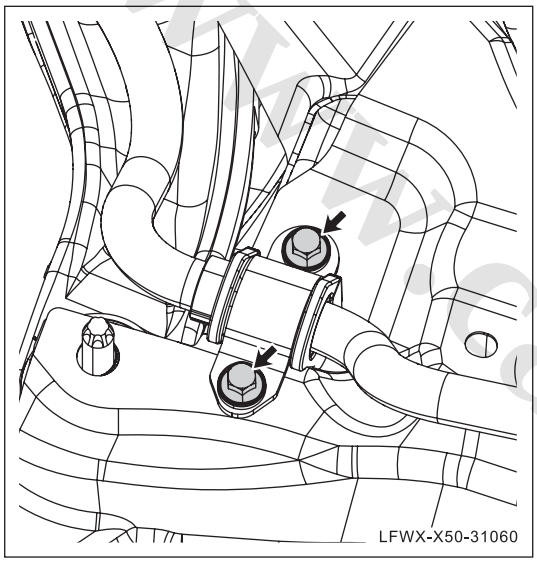


(e) Remove the front stabilizer bar pressure plate fixing bolt, and take down the plate.

(f) Take out the front stabilizer bar from the sub frame and the take down the front stabilizer bar sleeve.

△ HINT:

Replace the stabilizer bar sleeve.



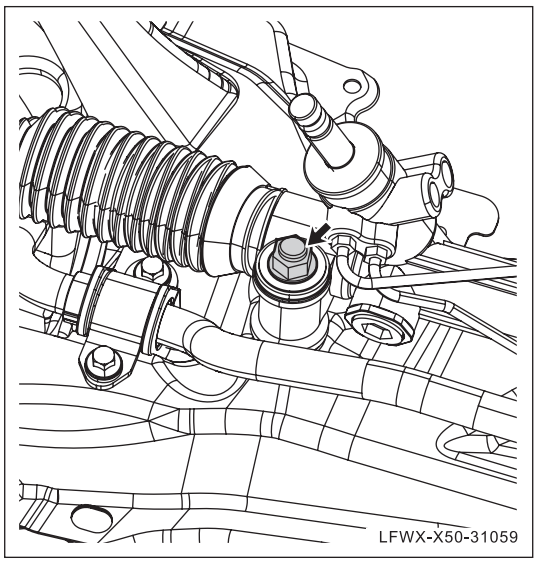
5. INSTALL THE SUB FRAME ASSEMBLY

(a) Install the front stabilizer bar sleeve onto the stabilizer bar.

(b) Install the front stabilizer bar onto sub frame.

(c) Install the front stabilizer bar pressure plate and mount the fixing bolts and tighten them.

Torque: 65 - 85 N•m

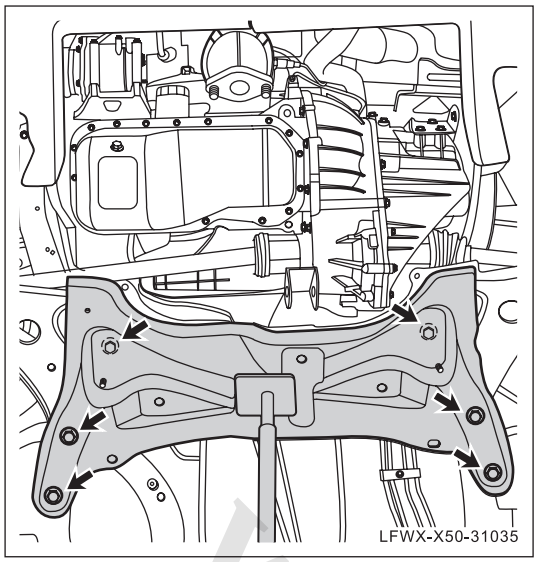


(d) Install steering gear onto sub frame, and mount fixing bolts and nuts and tighten them.

Torque: 85 - 105 N•m

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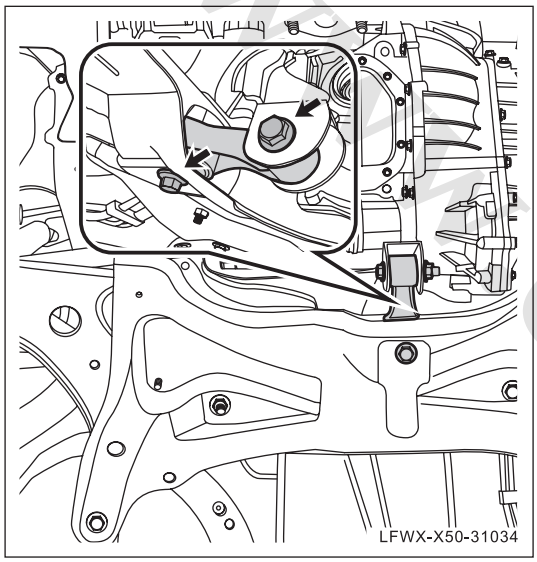


(e) Support the sub frame assembly with a bracket and install the sub frame assembly to the frame; Install sub frame fixing bolts and tighten them.

Torque: 110 - 130 N•m

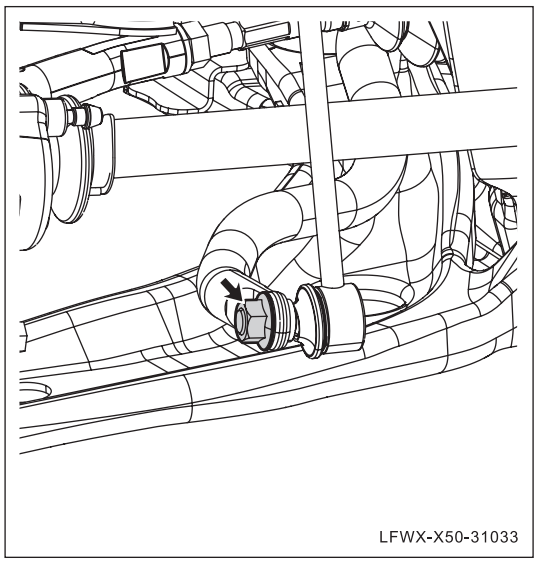
NOTICE:

Two or more persons are required to mount it in order to avoid falling of the sub frame.



(f) Install the engine rear mounting and mount the fixing bolts and tighten them.

Torque: 185 - 225 N•m

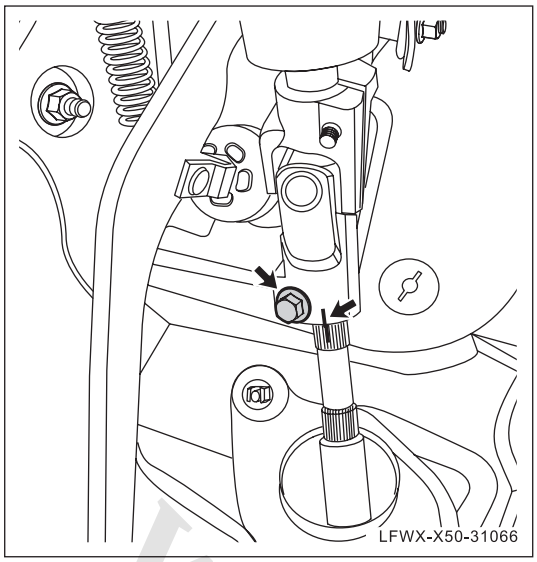


(g) Connect the front stabilizer bar and its link and install the front stabilizer bar ball joint nuts and tighten them.

Torque: 85 - 105 N•m

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6. **INSTALL THE CONNECTING BOLT OF THE STEERING GEAR AND STEERING DRIVE SHAFT**

△ HINT:

Install the lower steering shaft onto the steering shaft universal joint, and then mount & tighten fixing bolts according to the marks made during removing.

7. **INSTALL THE FRONT SWING ARM ASSEMBLY (SEE 31 - FRONT SUSPENSION, SWING ARM ASSEMBLY, REPLACEMENT)**
8. **CONNECT THE STEERING GEAR BALL JOINTS (SEE 61 - ELECTRIC POWER STEERING SYSTEM, STEERING GEAR, REPLACEMENT)**
9. **INSTALL THE CONNECTING PIPE WITH CORRUGATED PIPE (SEE 14 - INTAKE AND EXHAUST SYSTEM, REAR MUFFLER, REPLACEMENT)**

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FRONT STABILIZER BAR

REPLACEMENT

△ HINT:

For replacement of front stabilizer bar, see 31 - Front Suspension, Sub Frame Assembly, Replacement.

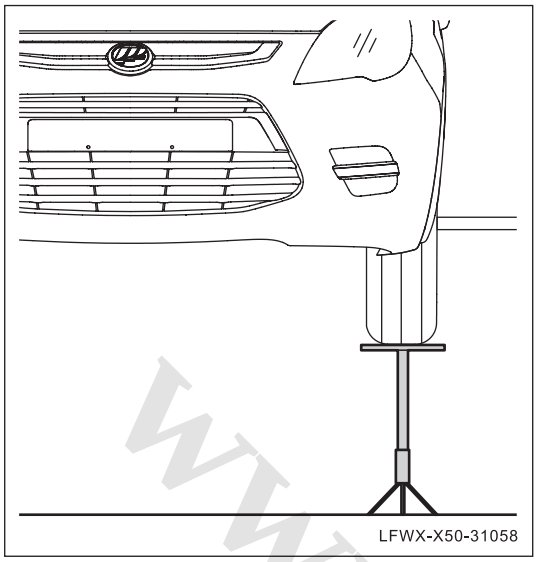
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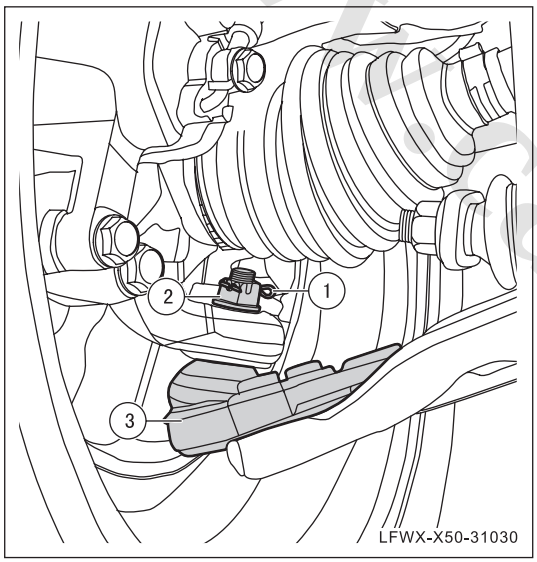
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SWING ARM BALL JOINT

REPLACEMENT


LFWX-X50-31058

1. **LIFT THE VEHICLE TO PUT BRACKET BELOW THE FRONT WHEEL; LOWER DOWN THE VEHICLE SLOWLY TO HAVE THE FRONT WHEELS SUPPORTED SLIGHTLY.**



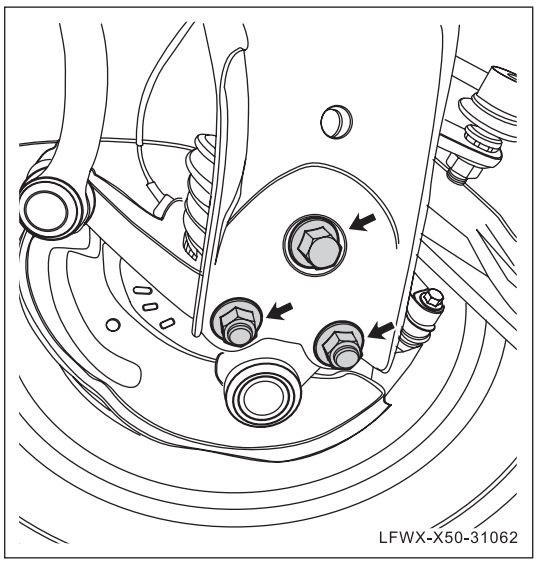
LFWX-X50-31030

2. **REMOVE THE SWING ARM BALL JOINT**

(a) Remove the slotted nut cotter pin of the swing arm ball joint assembly.

(a) Remove the slotted nut of swing arm ball joint assembly.

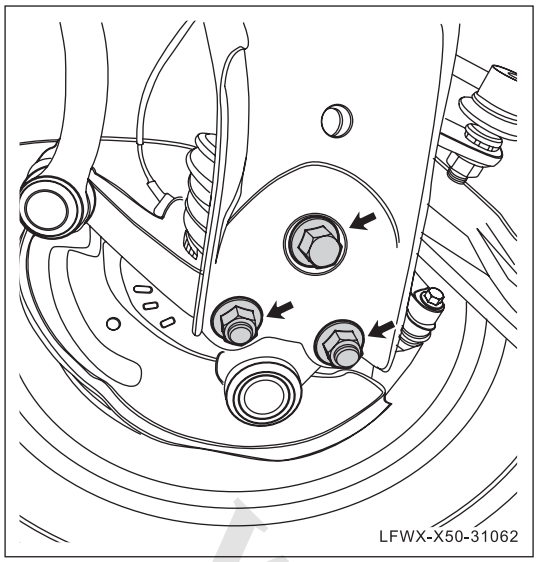
(c) Remove the swing arm ball joint assembly using a ball joint remover.


LFWX-X50-31062

(d) Remove the swing arm ball joint fixing bolts sand nuts and take the swing arm ball joint down.

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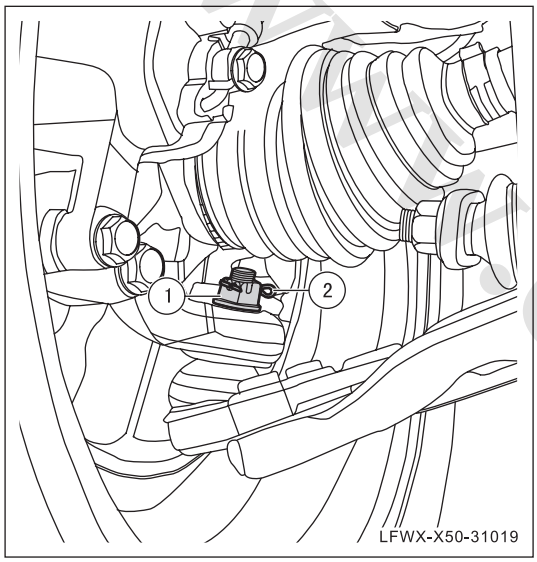


3. INSTALL THE SWING ARM BALL JOINT

(a) Install the swing arm ball joint onto the swing arm.

(b) Install the swing arm ball joint fixing bolts and nuts and tighten them.

Torque: 85 - 105 N•m



(c) Install the swing arm ball joint slotted nut ① and tighten it.

Torque: 80 - 100 N•m

(d) Install the cotter pin ② and tighten it.

4. LIFT THE VEHICLE AND TAKE THE BRACKET OUT.

5. CONDUCT THE FOUR WHEEL ALIGNMENT

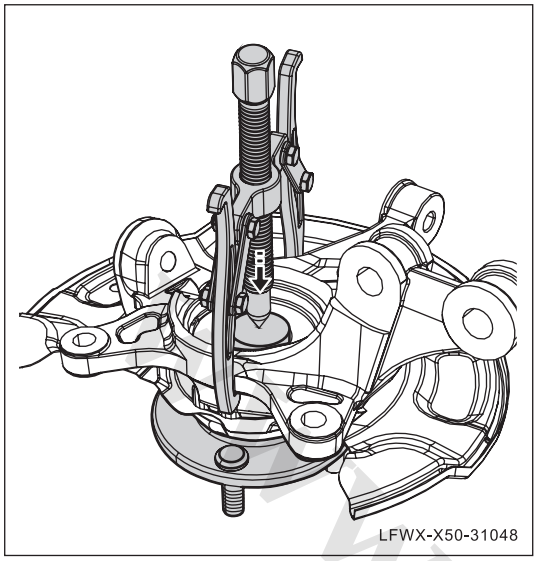
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HUB BEARING

REPLACEMENT

1. REMOVE THE STEERING KNUCKLE WITH FRONT WHEEL HUB ASSEMBLY (SEE 31 - FRONT SUSPENSION, STEERING KNUCKLE AND WHEEL HUB, REPLACEMENT)


LFWX-X50-31048

2. REMOVE THE HUB BEARING

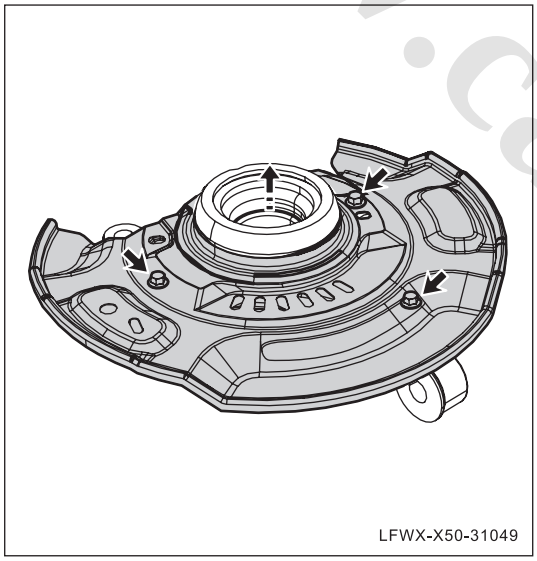
(a) Put a circular steel plate on the hub end and use puller to push the front wheel hub assembly out.

△ HINT:

When pushing the front hub out, half of hub bearing will be removed together with hub; use puller to pull it out again.

△ HINT:

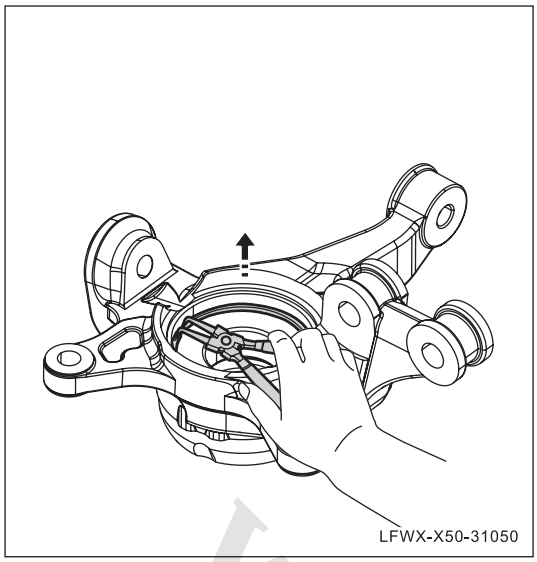
Removed hub bearing shall not be reused.


LFWX-X50-31049

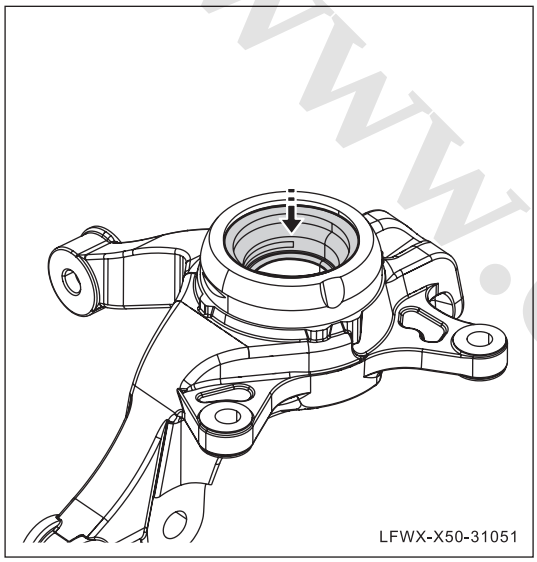
(b) Remove the brake bottom plate fixing bolts and take out the brake bottom plate.

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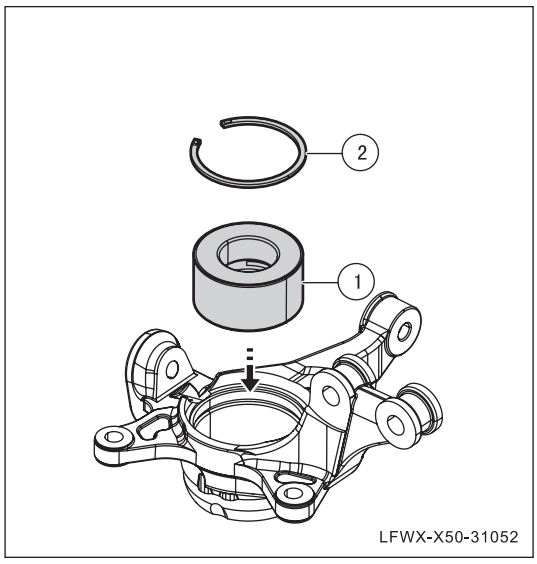
(c) Remove the hub bearing snap ring with circlip plier.



(d) Press the hub bearing out with hydraulic bench.

△ HINT:

Removed hub bearing shall not be reused.



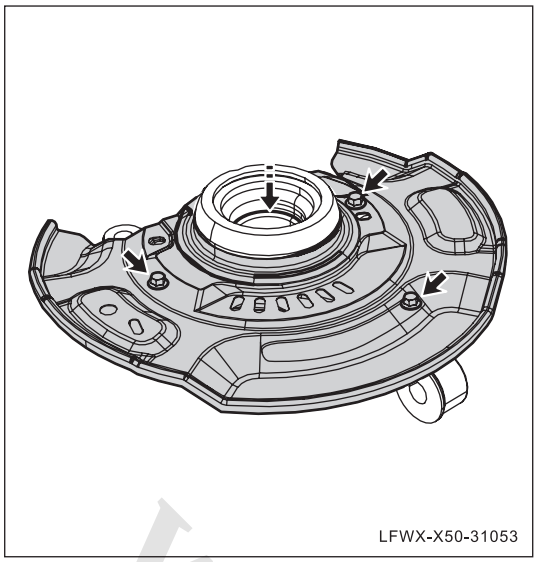
3. INSTALL THE WHEEL HUB BEARING ASSEMBLY

(a) Press into the hub bearing ① with hydraulic bench.

(b) Install the hub bearing fixing snap ring ② with circlip plier.

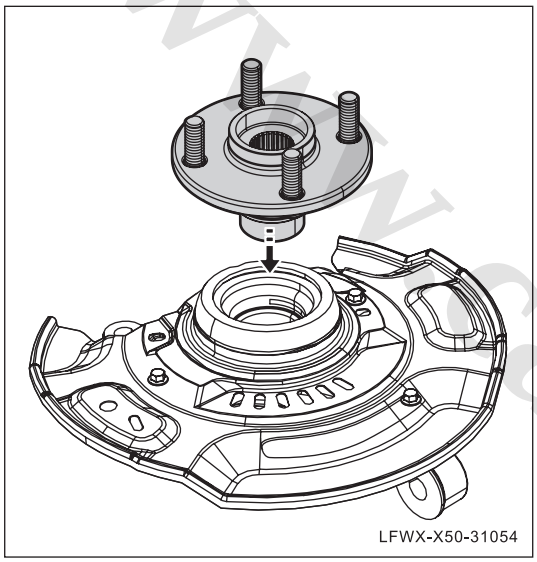
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(c) Install the front brake bottom plate onto the steering knuckle and install the fixing bolts and tighten them.

Torque: 37 N•m



(d) Press into the front hub assembly with hydraulic bench.

4. INSTALL THE STEERING KNUCKLE WITH FRONT WHEEL HUB ASSEMBLY (SEE 31 - FRONT SUSPENSION, STEERING KNUCKLE AND WHEEL HUB, REPLACEMENT)

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Rear Suspension

Rear suspension.....32-1
System description.....32-1
Preparation.....32-1
Service data.....32-2
Precautions.....32-2
Components.....32-3
Function and fault of components.....32-4
On-vehicle inspection.....32-5
Diagnosis.....32-6
Fault symptom table.....32-6
Fault diagnosis.....32-6
Rear axle.....32-7
Replacement.....32-7
Rear absorber.....32-11
Components.....32-11
Replacement.....32-12
Rear coil spring.....32-16
Replacement.....32-16
Rear hub.....32-18
Replacement.....32-18

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REAR SUSPENSION

SYSTEM DESCRIPTION

1. FUNCTION

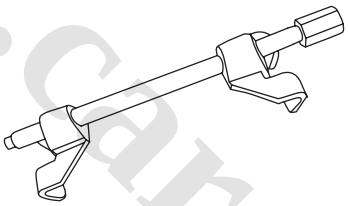
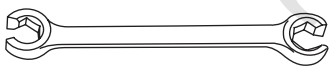
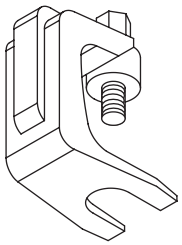
Suspension is the power transmission device between frame and wheels. The rear suspension of this model adopts trailing arm and torsion beam combined type suspension, whose functions are as follows:

- Buffer the impact of frame or body from road surface and decrease the body vibration resulting from the impact to ensure the stability, comfort and safety during driving.
- Transmit drive force and brake force resulting from friction between road surface and wheel to frame and body.
- Support body and keep appropriate geometrical relationship between body and wheels.

2. COMPONENTS

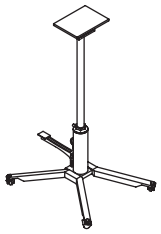
Rear suspension mainly consists of rear axle, absorber, coil spring and hub, etc.

PREPARATION

S/N	Tool	Outline diagram	Description
1	Spring compressor		Compressing the spring when removing and installing the coil spring
2	Oil pipe wrench		Installing and removing brake oil pipe.
3	Wheel bolt remover		Removing and installing the wheel bolts

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S/N	Tool	Outline diagram	Description
4	Hydraulic bracket		Supporting wheel and lifting rear axle

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Standard free length of rear coil spring	345±3 mm

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of rear axle	110 - 130
Fixing bolt of rear axle protection bracket	22 - 28
Connecting bolt between the rear axle and absorber assembly	55 - 65
Brake oil pipe nut	20 - 25
Fixing bolt of wheel speed sensor	12 - 18
Rear absorber upper fixing nut	30 - 40
Fixing bolt of rear hub	80 - 100

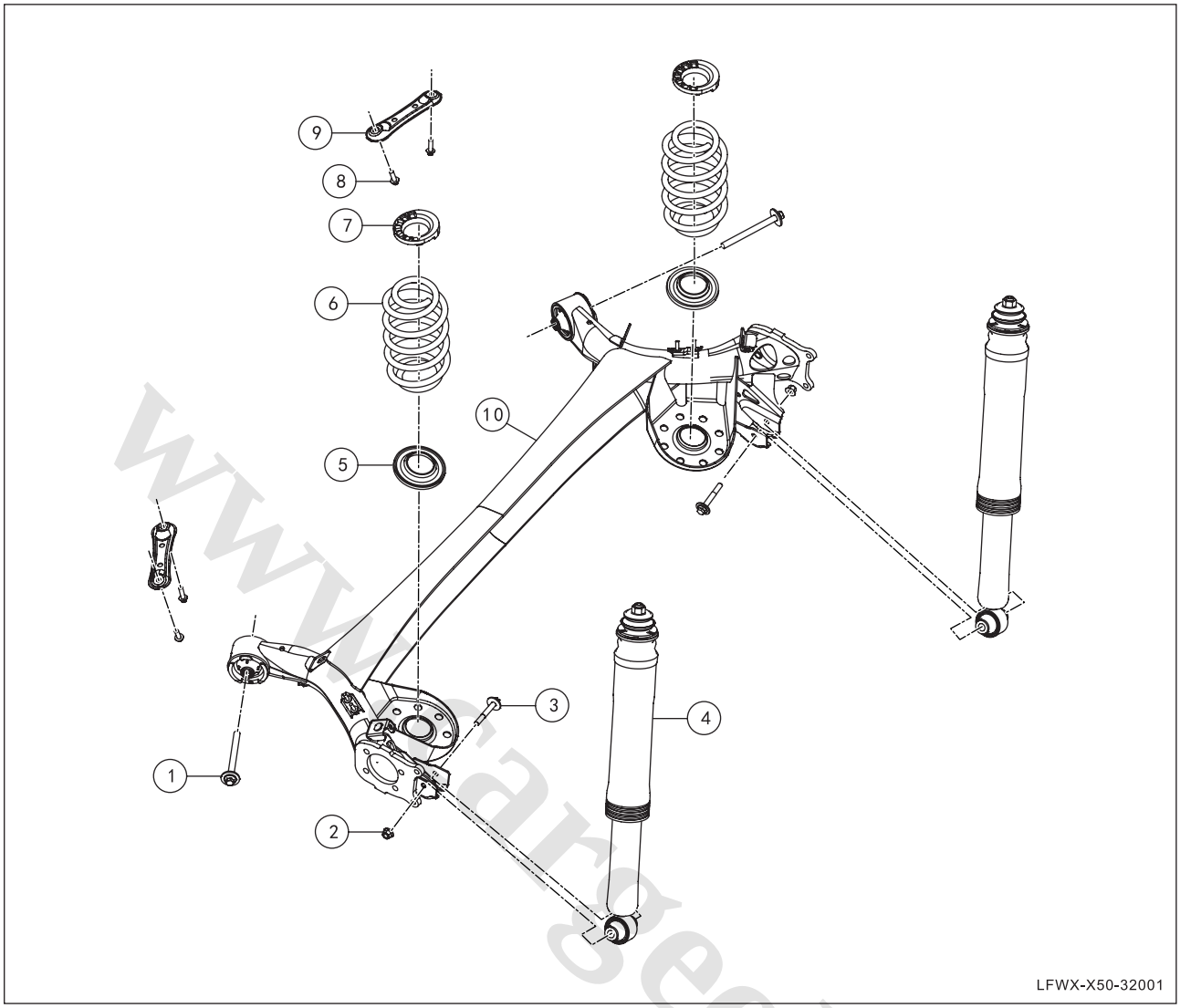
PRECAUTIONS

1. Check the components thoroughly before repairing or replacing them.
2. Don't reuse the non-reusable components.
3. Be careful to perform operation on the components to avoid dirt to the components and to prevent the entrance of any foreign matter.
4. Clean and dry the dismantled components (excluding rubber components) using gasoline.
5. When removing the oil pipes, block up the brake pipes with rubber caps to avoid leakage of brake fluid.
6. After installation, be sure to check the fasteners for their specified torques.
7. Be sure to check the wheel alignment after maintaining the suspension components.

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COMPONENTS



1	Hex flange bolt and large washer assembly	6	Rear coil spring
2	Prevailing torque type all-metal hexagon nuts with flange	7	Rear coil spring upper rubber pad
3	Hex flange bolt and large washer assembly	8	Hexagon bolt with flange
4	Rear absorber assembly	9	Rear axle protection bracket
5	Rear coil spring lower rubber pad	10	Rear axle assembly

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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common fault	Fault symptom
Rear axle assembly	Connecting the rear wheel and supporting the body	/	/
Rear absorber	Restraining the rebound vibration after the spring absorbs shock	Oil leakage and failure of absorber	Tilt and sinking of body
Rear coil spring	Restraining the impact from road surface	Failure and breakage of coil spring	Tilt and sinking of body
Hub	Supporting tire	/	/
Bolts, nuts	Connecting components	Loose	Abnormal sound of vehicle

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ON-VEHICLE INSPECTION

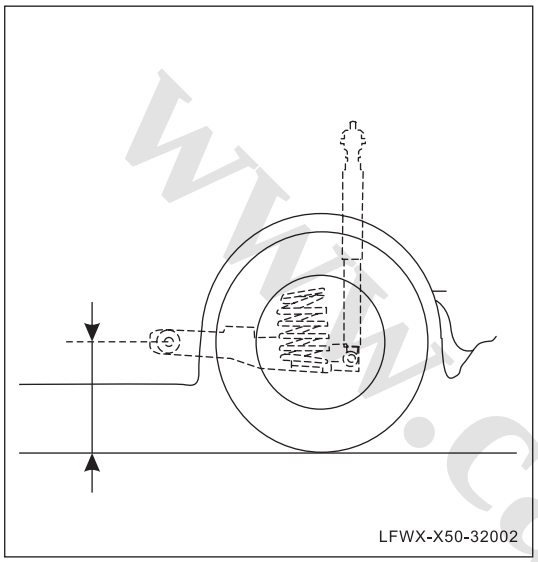
1. CHECK THE REAR ABSORBER PRIMARILY

(a) Open the tail door, press the rear part of the vehicle with two hands and release hands immediately.

- The vehicle shall become still after bobbing twice or 3 times.
- Check and repair the rear absorber and rear coil spring if the vehicle does not bob or bobs too many times.

2. CHECK THE CONNECTION BUSHING OF REAR AXLE FOR AGING AND BREAKAGE

3. CHECK ALL THE CONNECTING BOLTS FOR LOOSENESS



4. MEASURE VEHICLE HEIGHT

△ HINT:

- Make sure the tire comes up to the standard tire pressure value when measuring the vehicle height.
- Measurement point of rear suspension is the distance from the ground to the rear suspension mounting bolt center during no-load of vehicle.

NOTICE:

If the body height does not meet the requirement, check the rear suspension for damage or deformation.

5. CHECK THE REAR ABSORBER ASSEMBLY

(a) Visual check.

- Check absorber for oil leakage.

(b) Road test check.

- Drive the car on special test road or rather poor road for 10 km and then stop it.
- Check rear absorber for oil leakage.
- Touch the rear absorber housing by hand; if it is not enough hot, it indicates that rear absorber doesn't work without interior resistance and it shall be replaced.

6. CHECK THE HUB

(a) Jack the vehicle up to make the tire off the ground, and then shake the tire several times by holding its upper and lower part with two hands.

- If it is not loose, it indicates the hub is normal.
- Otherwise, have the hub replaced.

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DIAGNOSIS

FAULT SYMPTOM TABLE

△ HINT:

See 31 - Front Suspension, Diagnosis, Fault Symptom Table.

FAULT DIAGNOSIS

△ HINT:

See 31 - Front Suspension, Diagnosis, Fault Diagnosis.

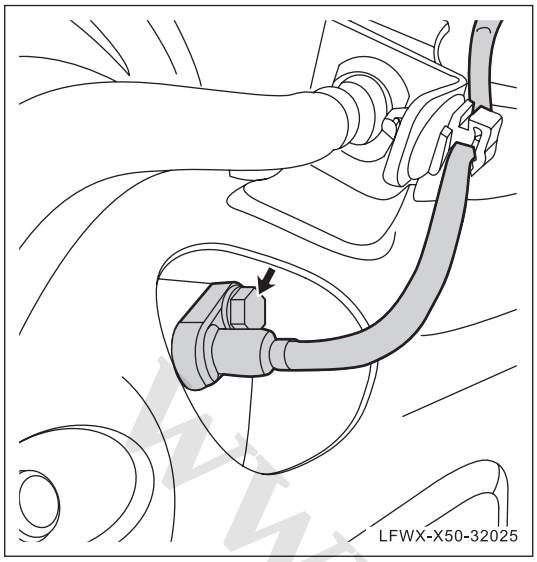
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REAR AXLE

REPLACEMENT

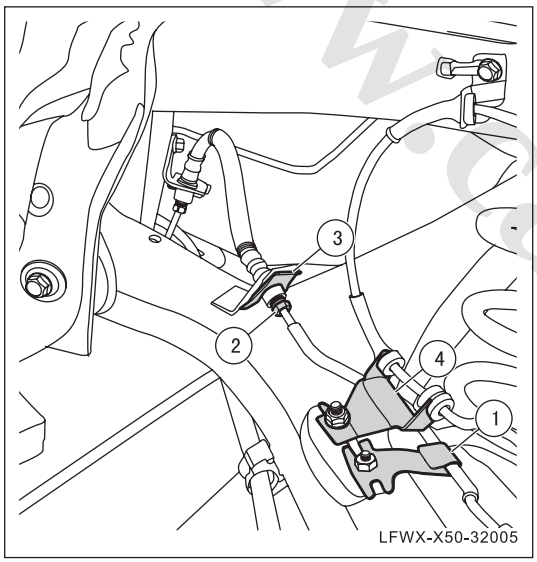


1. LIFT THE VEHICLE AND REMOVE THE REAR WHEELS (SEE 33 - WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT)

2. REMOVE THE BRAKE ASSEMBLY (SEE 51 - SERVICE BRAKE, REAR BRAKE, REPLACEMENT)

3. REMOVE THE REAR AXLE ASSEMBLY

(a) Remove the fixing bolts of wheel speed sensor, and then pull out the sensor and place it onto the position not affecting removal.



(b) Disconnect the fixing support of rear brake pipe ① .

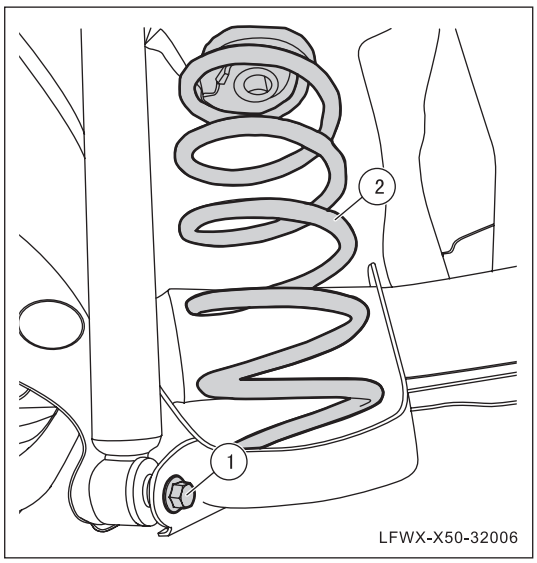
(c) Remove the oil pipe nut ② with oil pipe wrench, disconnect rear brake pipe, and use rubber cap to plug rear brake pipe.

△ HINT:

Use cap to plug brake pipe to avoid entrance of dust or dirt.

(d) Remove E-type clip ③ of rear brake pipe and move rear brake pipe off.

(e) Take down wheel speed sensor wire harness from its fixing support ④ and move the wire harness off.



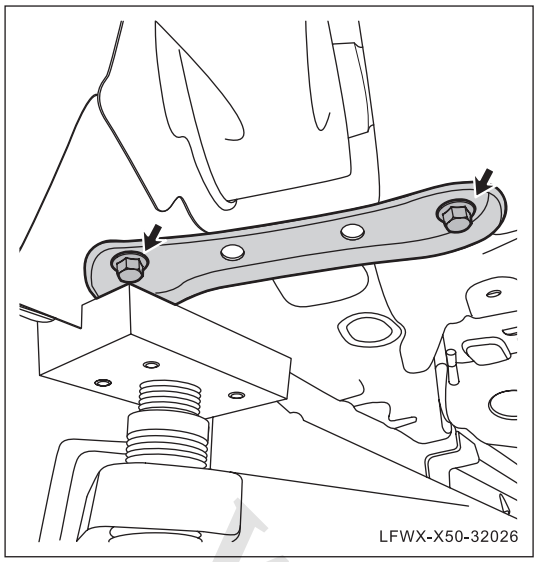
(f) Use bracket to be against the position of coil spring on both sides of rear axle assembly and have the rear axle supported slightly.

(g) Remove connecting bolts ① between the rear axle assembly and absorber assembly.

(h) Lower the bracket slowly and remove the coil spring ② and the its upper/lower rubber pads from the rear axle assembly.

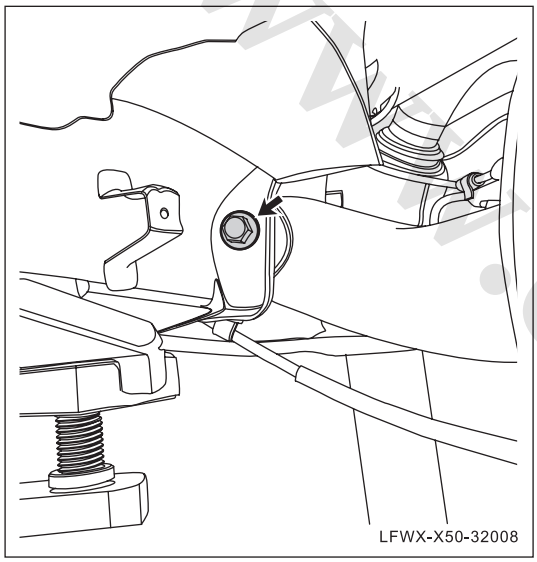
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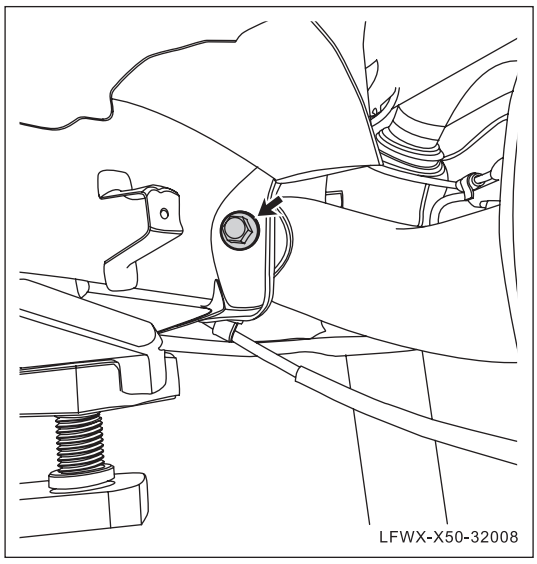


(i) Move the bracket to the rear axle center and have the rear axle supported slightly.

(j) Remove the fixing bolts of rear axle protection bracket and take out the bracket.



(k) Remove the fixing bolts on both sides of rear axle, lower down the bracket slowly and put the rear axle assembly down.



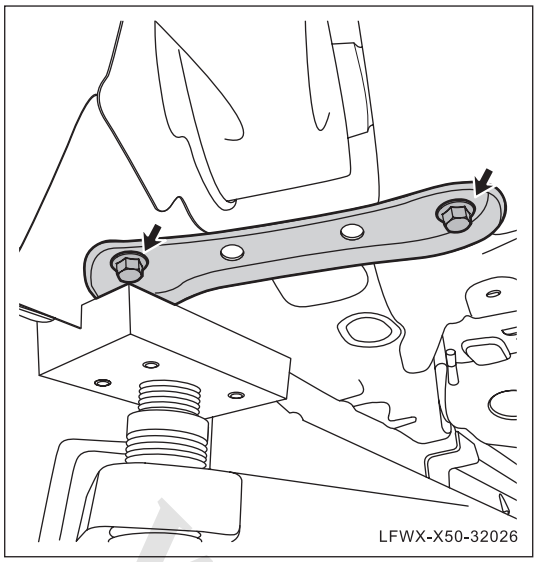
4. INSTALL THE REAR AXLE ASSEMBLY

(a) Put the rear axle onto the bracket, lift the rear axle to the installation position and install & tighten its fixing bolts.

Torque: 110 - 130 N•m

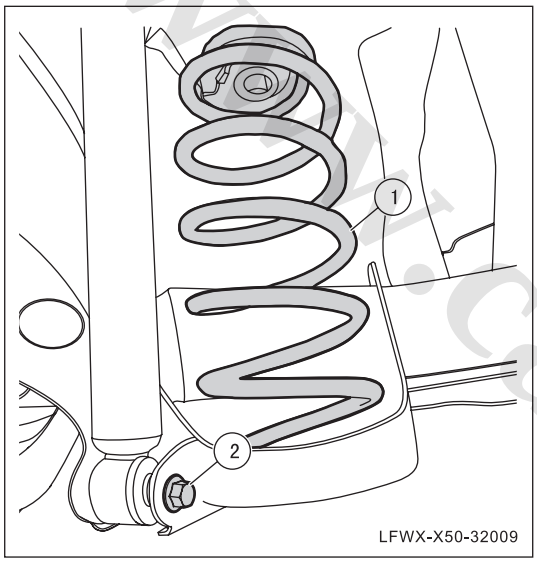
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(b) Install rear axle protection bracket, and then mount & tighten the fixing bolts.

Torque: 22 - 28 N•m



(c) Use bracket to be against the position of coil spring on both sides of rear axle assembly.

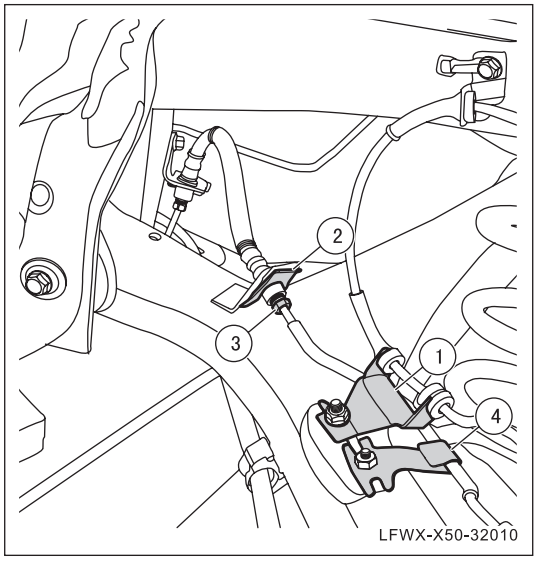
(d) Install the coil spring and its upper/lower rubber pads, and lift the bracket to compress the coil spring ① tightly.

NOTICE:

The coil spring opening shall be aligned with its mounting position.

(e) Install the connecting bolts ② and nuts between the rear axle assembly and absorber assembly and tighten them.

Torque: 55 - 65 N•m



(f) Install wheel speed sensor wire harness onto the bracket ① .

(g) Install the rear brake pipe E-type clip ② .

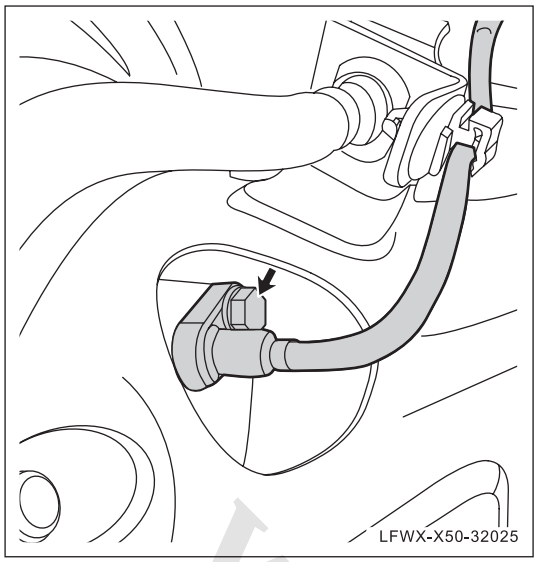
(h) Connect the brake pipe and tighten the oil pipe nuts ③ with oil pipe wrench.

Torque: 20 - 25 N•m

(i) Fix the rear brake pipe onto its bracket ④ .

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(j) Install the wheel speed sensor onto the rear hub, and then mount & tighten its fixing bolts.

Torque: 12 - 18 N•m

5. **INSTALL THE BRAKE ASSEMBLY (SEE 51 - SERVICE BRAKE, REAR BRAKE, REPLACEMENT)**
6. **INSTALL THE REAR WHEELS (SEE 33 - WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT).**

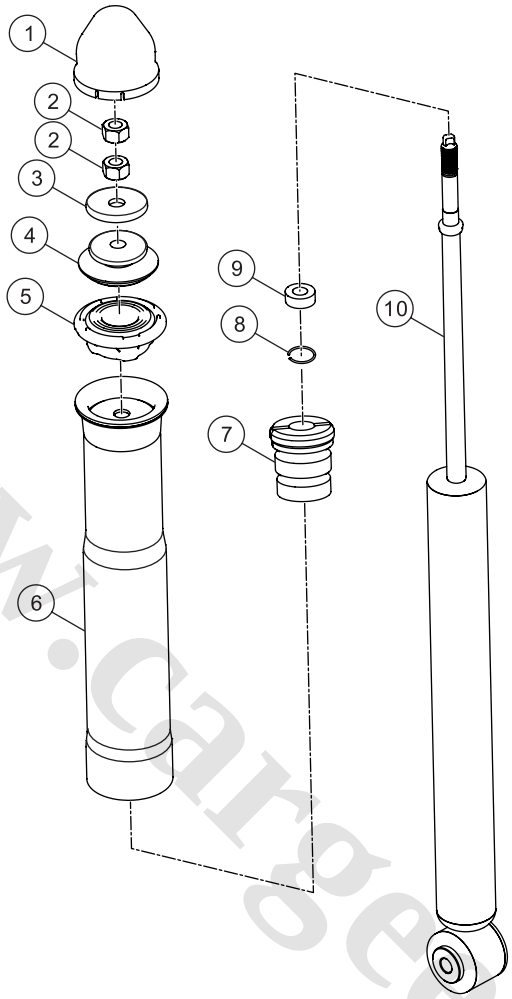
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REAR ABSORBER

COMPONENTS



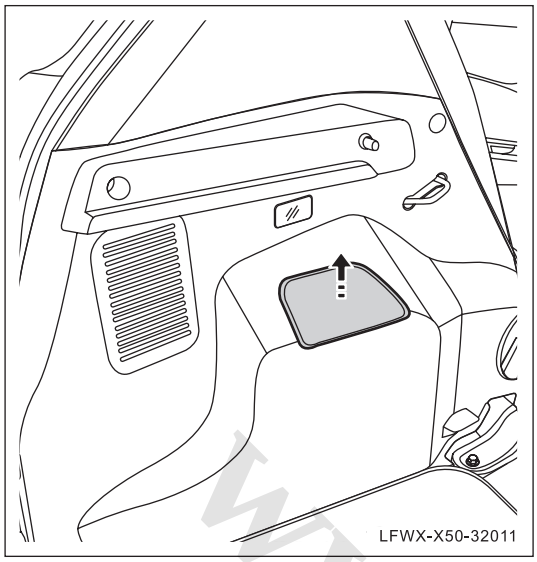
LFWX-X50-32007

1	Rear absorber upper fixing nut dust cover	6	Rear absorber dust cover
2	Rear absorber upper fixing nut	7	Rear buffer block
3	Washer	8	Snap ring
4	Rear absorber upper installation sleeve	9	Support pad
5	Rear absorber lower sleeve	10	Rear absorber assembly

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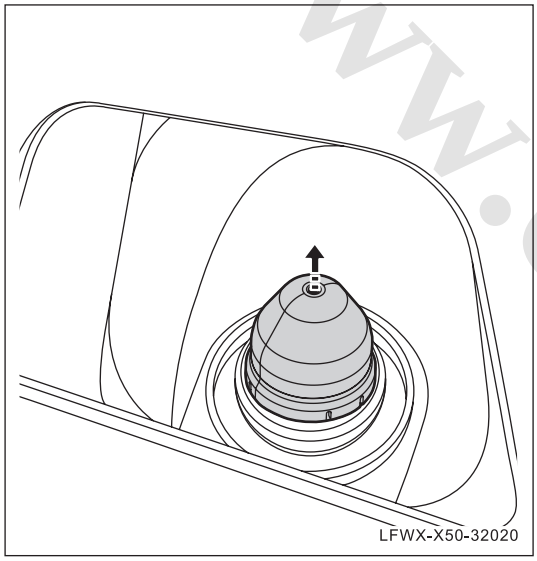
REPLACEMENT



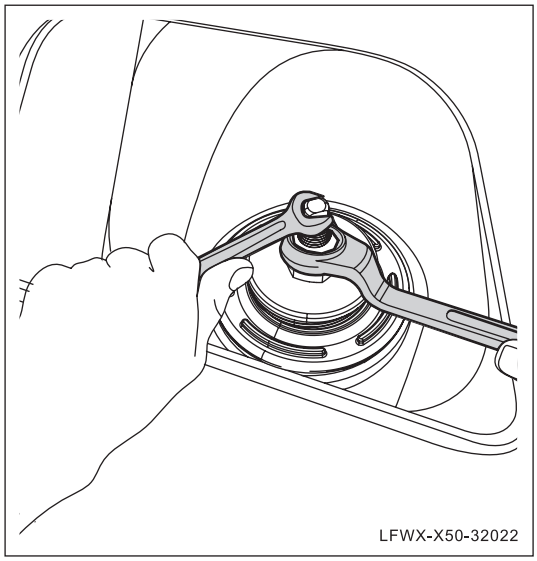
1. REMOVE THE REAR ABSORBER

(a) Lift the vehicle, put the bracket below the rear tires, lower the vehicle down slowly and have the tire fallen onto the bracket.

(b) Take down the maintenance cover plate of absorber.



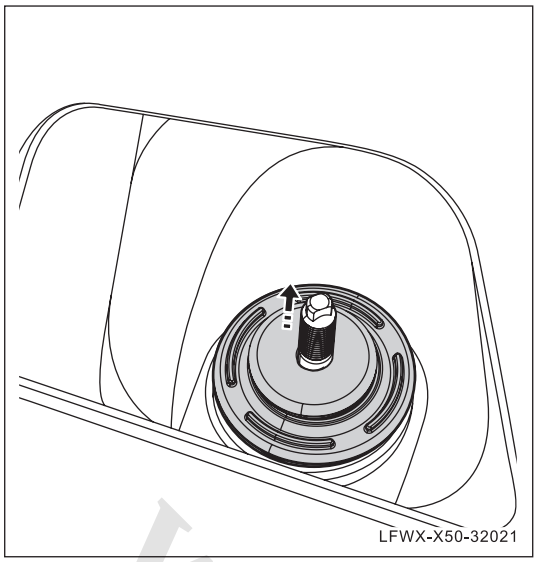
(c) Take out rear absorber upper fixing nut dust cover.



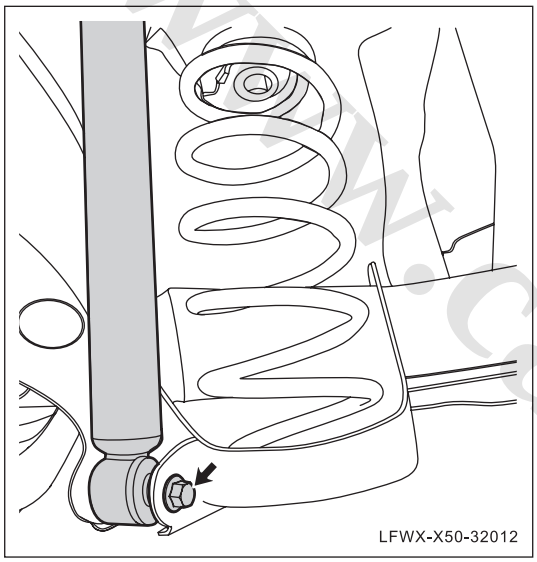
(d) Remove the rear absorber upper fixing nuts, and then take out the nuts and washers.

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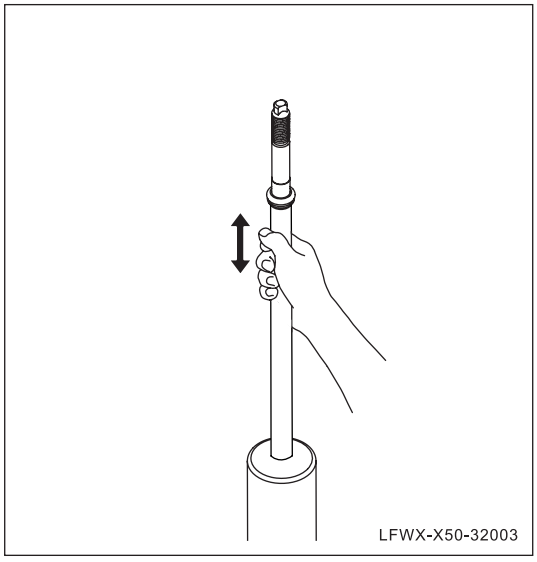
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(e) Take out the rear absorber upper installation sleeve.



(f) Remove the connecting bolts and nuts between rear absorber and rear axle, and then take out the rear absorber.



2. CHECK THE REAR ABSORBER ASSEMBLY

(a) Compress and elongate the absorber push rod; Check if abnormal resistance or abnormal sound is found during operation.

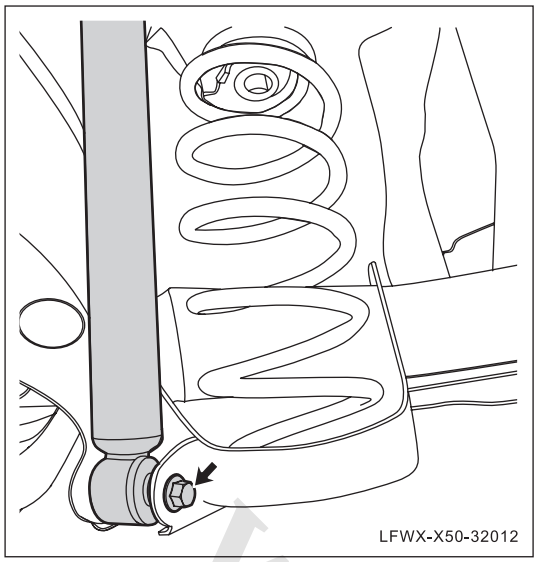
- If any abnormality is found, have the absorber replaced.

(b) Check absorber for oil leakage.

- If any oil leakage is found, have the absorber replaced .

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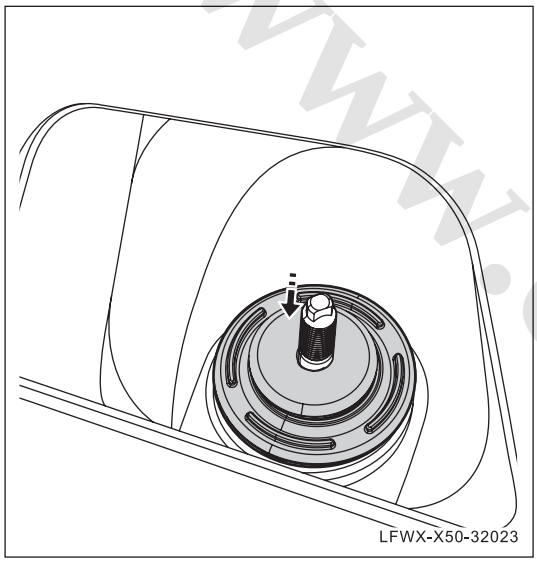
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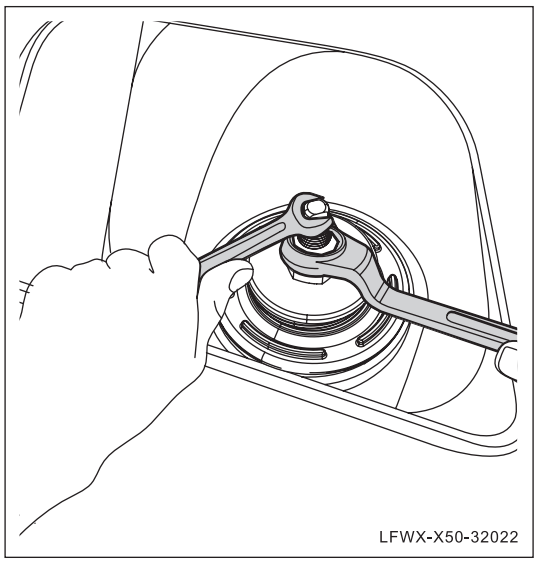
3. INSTALL REAR ABSORBER

(a) Install rear absorber onto the body installation position, and then mount & tighten the connecting bolts and nuts between rear absorber and rear axle.

Torque: 55 - 65 N•m



(b) Install the rear absorber upper installation sleeve.



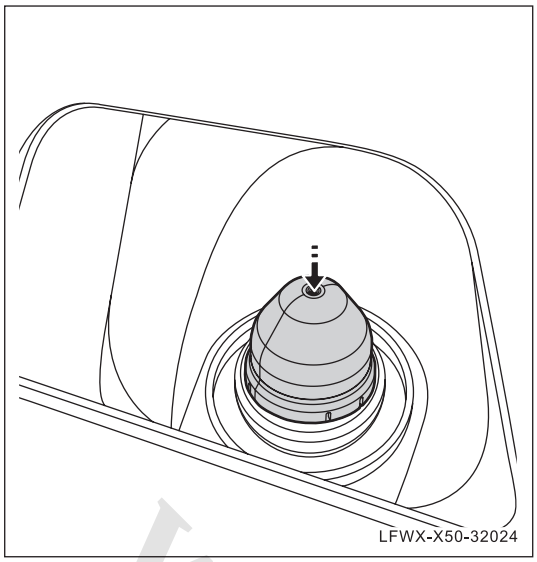
(c) Install the rear absorber upper fixing nuts and washers.

Torque: 30 - 40 N•m

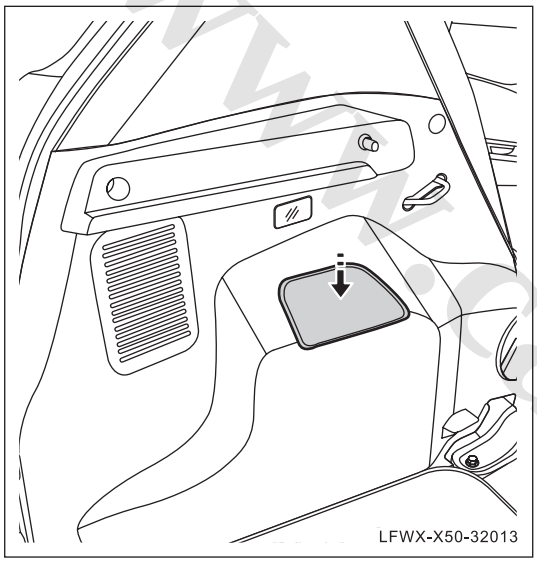
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(d) Install the rear absorber upper fixing nut dust cover.



(e) Install the maintenance cover plate of absorber.

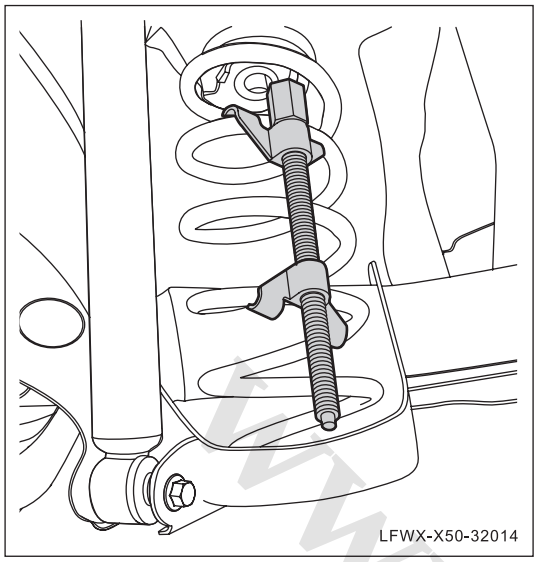
(f) Lift the vehicle up and take out the bracket.

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REAR COIL SPRING

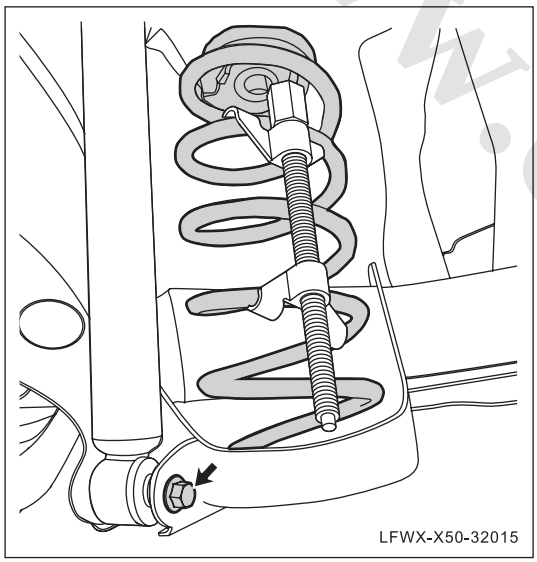
REPLACEMENT



1. REMOVE THE REAR COIL SPRING

(a) Lift the vehicle, put the bracket below the rear tires, lower the vehicle down slowly and have the tire fallen onto the bracket.

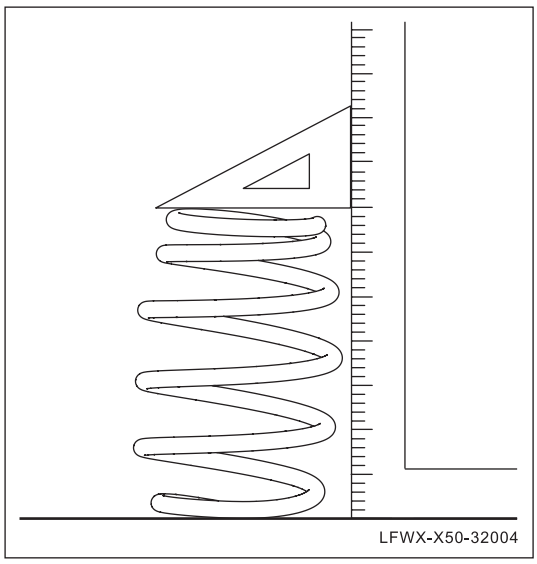
(b) Install the spring compressor and compress the rear coil spring.



(c) Remove the connecting bolts and nuts between rear absorber and rear axle.

(d) Lower the bracket slowly until take out the coil spring and spring rubber pad.

(e) Take out the spring compressor.



2. CHECK THE REAR COIL SPRING

(a) Check rear coil spring for crack.

- Have the coil spring replaced if there crack.

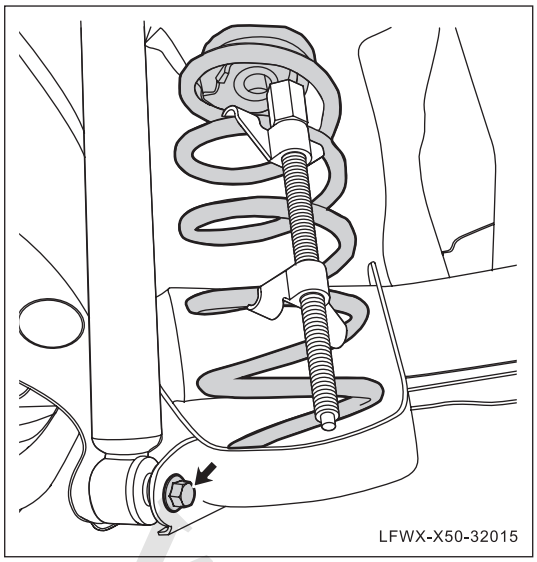
(b) Measure the free length of rear coil spring.

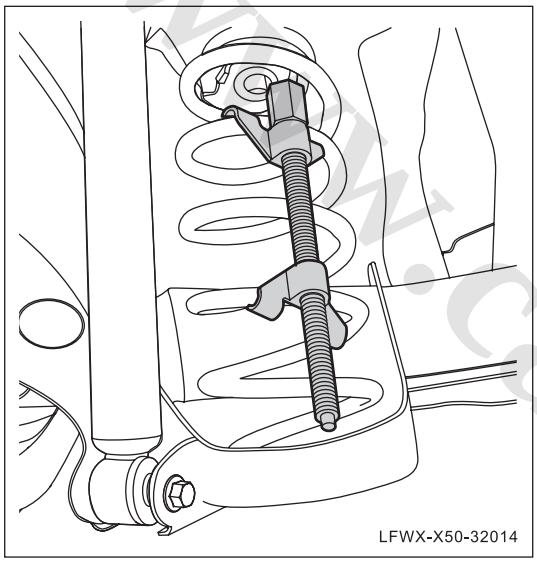
- If the measured length is decreased by 5% compared with standard spring free length, this indicates the rear coil spring has permanent deformation and it must be replaced.

Standard free length of rear coil spring: 345 ± 3 mm

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3. INSTALL THE REAR COIL SPRING

(a) Install the spring compressor and compress the rear coil spring.

(b) Install the rear coil spring upper and lower rubber pads and rear coil spring.

NOTICE:

The coil spring opening shall be aligned with the mounting position .

(c) Lift the bracket and install the connecting bolts and nuts between rear absorber and rear axle.

Torque: 55 - 65 N•m

(d) Remove the spring compressor.

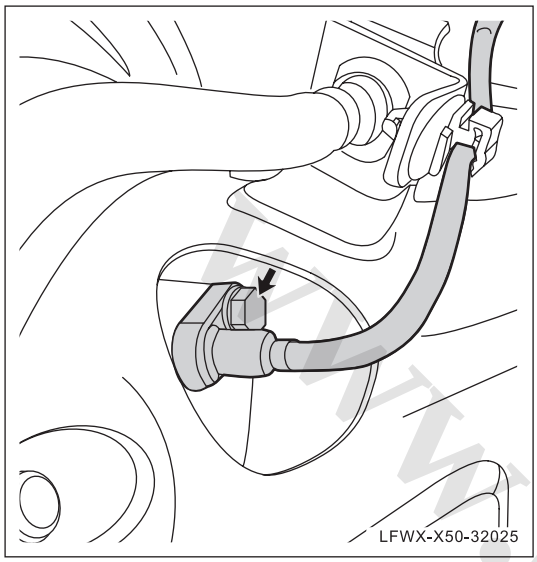
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REAR HUB

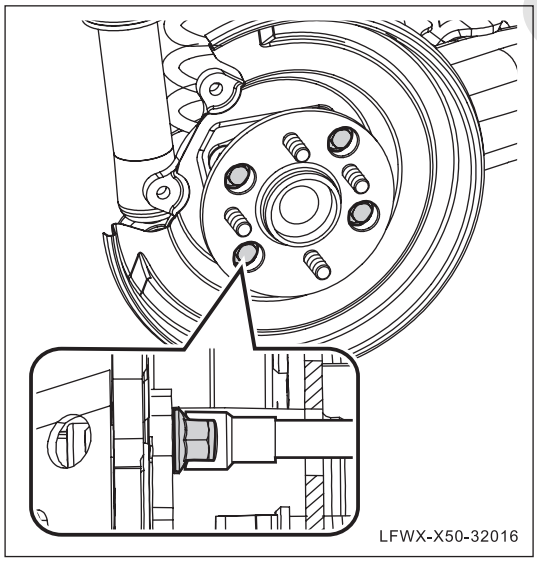
REPLACEMENT

1. **REMOVE THE REAR WHEELS (SEE 33 - WHEELS AND TIRES, WHEEL ASSEMBLY, REPLACEMENT) .**
2. **REMOVE THE REAR BRAKE ASSEMBLY (SEE 51 - SERVICE BRAKE, REAR BRAKE, REPLACEMENT)**



3. REMOVE THE WHEEL SPEED SENSOR

(a) Remove the fixing bolts of wheel speed sensor, and then take out the wheel speed sensor.



4. REMOVE THE REAR HUB ASSEMBLY

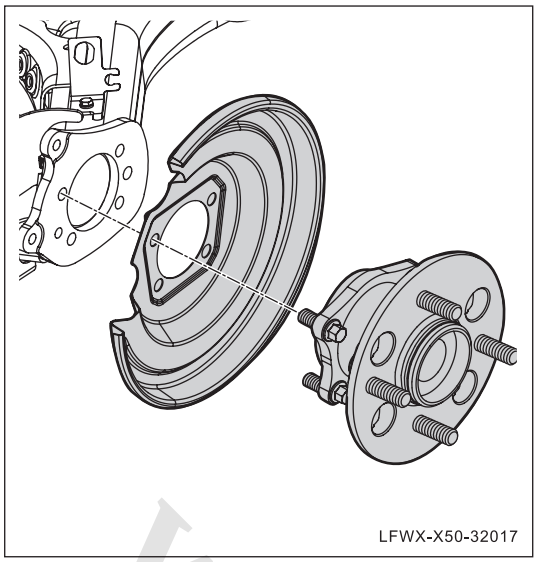
(a) Remove the fixing bolts of rear hub assembly.

△ HINT:

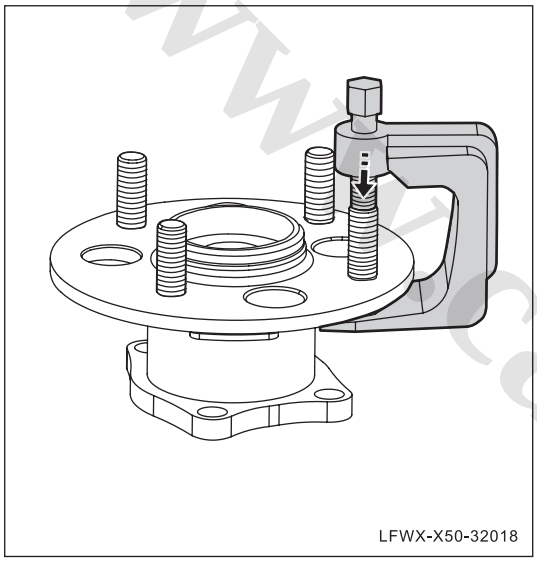
When removing the fixing bolts of rear hub assembly, you may use the socket and the hub flange disc to remove them.

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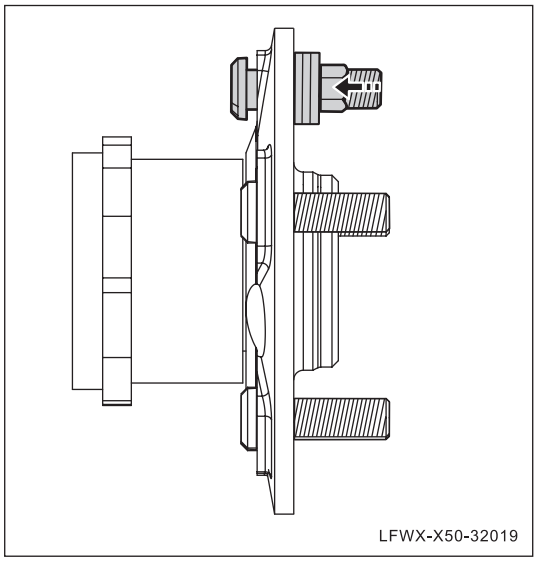


(b) Take out the rear hub assembly and the rear brake bottom plate.



5. REMOVE WHEEL BOLTS OF REAR HUB.

(a) Press out the wheel bolts using a wheel bolt remover.



6. INSTALL WHEEL BOLTS.

(a) Install the wheel bolts into the wheel bolt mounting-holes.

(b) Add gaskets with a certain thickness and tighten them by nuts to tension the wheel bolts completely.

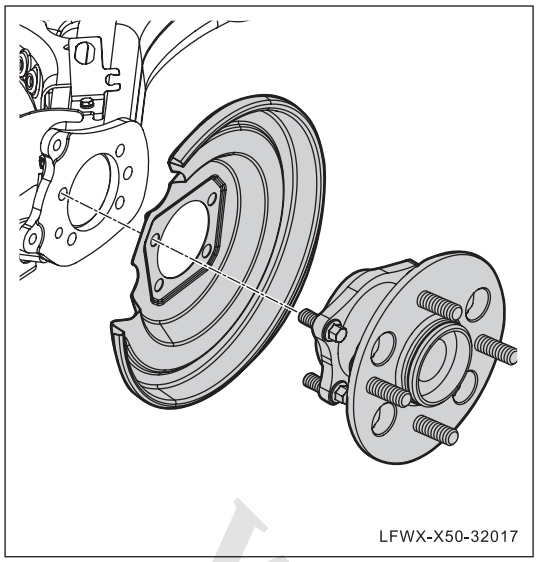
(c) Remove nuts and take out all gaskets.

NOTICE:

Do not damage the bolts and splines in the holes when installing.

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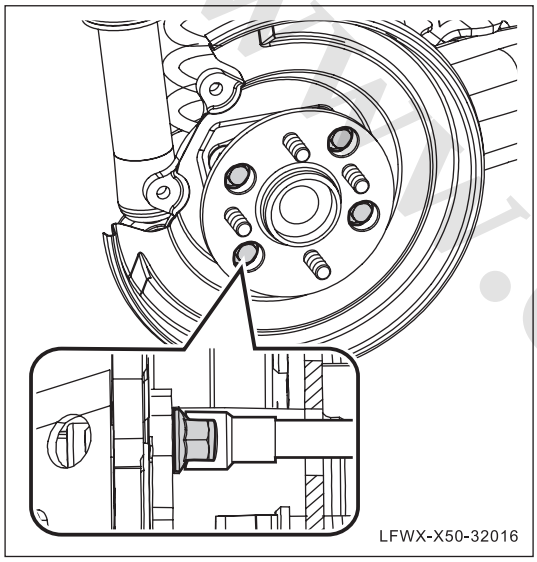
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7. INSTALL REAR HUB ASSEMBLY

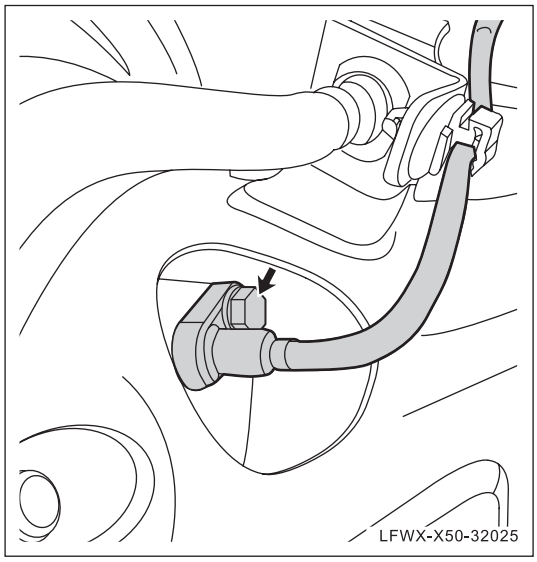
(a) Install the rear brake bottom plate.

(b) Install the rear hub assembly in place.



(c) Install the fixing bolts of rear hub assembly, and then tighten them from the inner rear hub flange hole.

Torque: 80 - 100 N•m



8. INSTALL THE WHEEL SPEED SENSOR

(a) Install the wheel speed sensor onto the hub, and mount & tighten the fixing bolts.

9. INSTALL THE BRAKE ASSEMBLY (SEE 51 - SERVICE BRAKE, REAR BRAKE, REPLACEMENT)

10. INSTALL THE REAR WHEELS (SEE 33 - WHEELS AND TIRES, WHEELS ASSEMBLY, REPLACEMENT)

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Wheel and Tire

Wheel and tire 33-1
System description 33-1
Preparation 33-1
Service data 33-2
Precautions 33-3
Components 33-4
Function and fault of components 33-5
On-vehicle inspection 33-5
Diagnosis 33-8
Fault symptom table 33-8
Fault diagnosis 33-8
Wheel assembly.....33-11
Tire rotation 33-11
Replacement 33-11
Wheel balance.....33-13
Inspection 33-13
Adjustment 33-15
Four-wheel alignment 33-16
Inspection 33-16
Adjustment 33-17
Spare tire 33-20
Use 33-20

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WHEEL AND TIRE

SYSTEM DESCRIPTION

1. FUNCTION

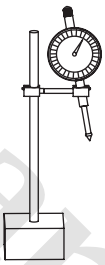
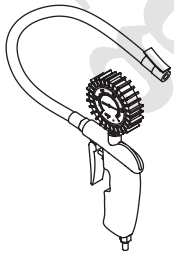
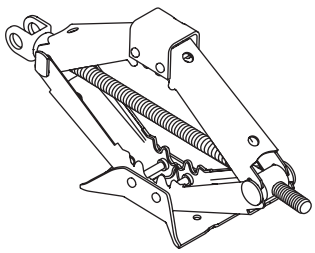
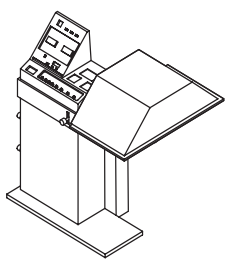
The tire comes into contact directly with the road surface and is one of the important components of automobiles. Functions of the tire are listed as below:

- To absorb the shock during driving and ensure the automobile riding comfort and running smoothness.
- To ensure good traction between wheel and road surface and improve the vehicle traction, braking and passability.
- To support the vehicle weight.

2. COMPONENTS

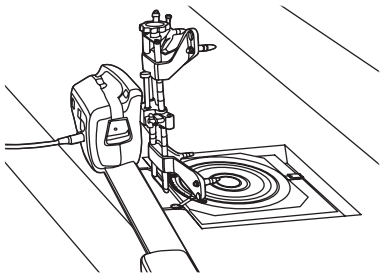
Wheels and tires mainly consists of wheels and spare tires.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Dial gauge		Check wheel axial and radial run-outs.
2	Tire pressure gauge		Check the tire pressure.
3	Jack		Lift and jack up the vehicle.
4	Wheel balancing machine		Inspect and adjust wheel balance.

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S/N	Tools	Outline diagram	Description
5	Four-wheel alignment indicator		Inspect wheel alignment.

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Front and rear tire no-load air pressure (cold)		230 kPa
Tire specification		195/60 R15
Wheel alignment	Front wheel camber value	0.083°±0.75°
	Front wheel toe-in value	1.5±2 mm
	Kingpin inclination value	10.8°
	Kingpin caster value	4.43°±0.75°
	Rear wheel camber value	-0.9°±0.5°
	Rear wheel toe-in value	2.2±3 mm
Maximum steering angle of front wheels		Inner side: 38°/42° (no-load/full-load) Outer side: 33°/35.5° (no-load/full-load)
Requirements for wheel dynamic balance		Steel wheel (counterweight at single side ≤ 35g, total counterweight ≤ 75g) Aluminum wheel (single side ≤ 75g, left and right unbalance ≤ 10g)

2. TIGHTENING TORQUE TABLE

Item	N•m
Wheel nut	110 - 120
Lock nut of toe-in adjusting lever	70 - 80
Steering wheel lock nut	80 - 110

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PRECAUTIONS

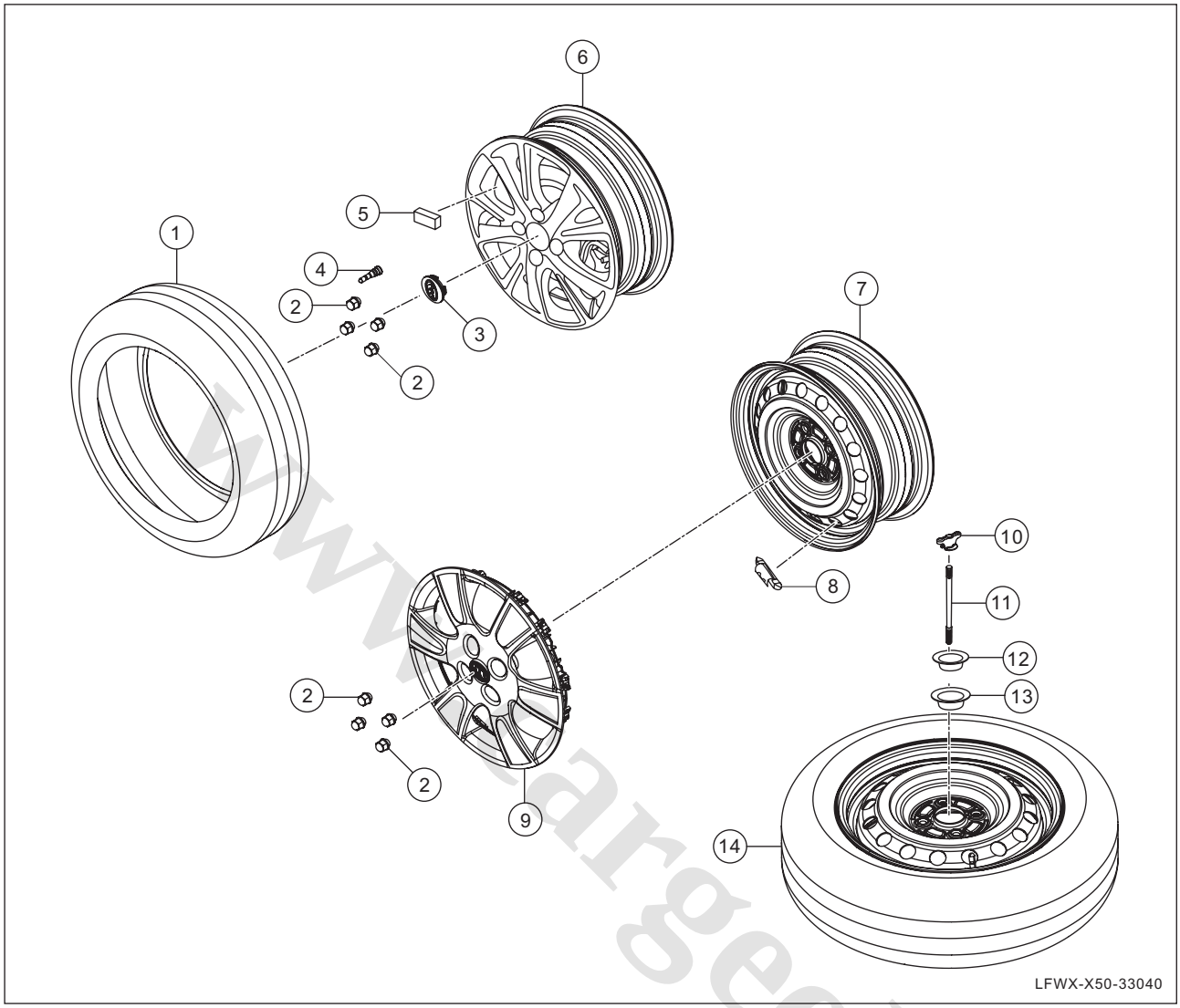
1. Attention should be paid to regularly rearrange the tires to reduce the camber wear of tire and ensure the driving performance of the vehicle and prolong the service life of the tire.
2. The mud and gravel on the tires shall be timely flushed away to avoid vehicle vibration or tire damage during high-speed running.
3. Park the car on a flat and solid ground and engage the parking brake and place the transmission at neutral position. If it is necessary, place a stopper under the tire in the diagonal direction of the replaced tire.
4. When blocking wheels, put the stopper in front of the front wheel or behind the rear wheel.
5. All wheels must have the consistent type, without mixed use of radial tire, bias tire or diagonal-ply tire. Otherwise, it will cause typical control risks and have the car out of control.
6. Lifan special tires should be used. Tires with different specifications and patterns should not be used in the same car.
7. Use a jack according to its User's Manual.
8. Make sure to put the jack on a flat and solid ground. Make sure that the jack is set at the point designated for proper lifting.
9. Do not put any of your body under the vehicle section which is supported by a jack to avoid personal injury.
10. It is forbidden to jack up the vehicle if someone is in the vehicle.
11. When jacking up the vehicle with a jack, don't start or run the engine.
12. Do not use oil or lubricant on the bolts or nuts.

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COMPONENTS



1	Tire (195/60 R15)	8	5g nip-type balance block
2	Wheel nut	9	Wheel cover
3	Aluminum wheel cover plate	10	Spare tire cap
4	Valve nozzle assembly	11	Spare tire fixing rod
5	5g adhesive balance block	12	Back felt pad of spare tire compression lid
6	Aluminum wheel rim assembly	13	Spare tire compression lid
7	Steel wheel rim assembly	14	Spare tire

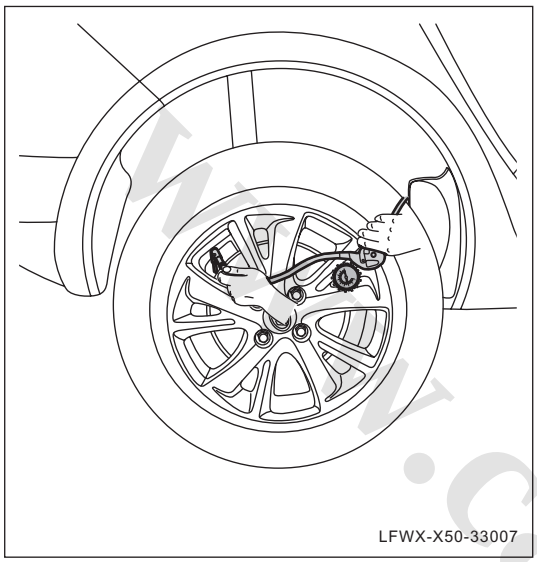
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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common faults	Fault symptom
Wheel	Supporting the vehicle and absorb the shock during driving	Inadequately inflated, wear	Tilt or off tracking
Spare tire	For emergency use in case of tire damage or flat tire	/	/

ON-VEHICLE INSPECTION


LFWX-X50-33007

1. INSPECTION OF TIRES

(a) Inflate the tire to the standard value.

Front wheel: 230 kPa (cold)

Rear wheel: 230 kPa (cold)

△ HINT:

The tire pressure should not be lower than 10% of the standard pressure under ambient temperature.

(b) Check the tire valve for air leakage with soap water.

- Remove the tire valve cover, apply proper soap water on each tire valve and observe them for air leakage.

△ HINT:

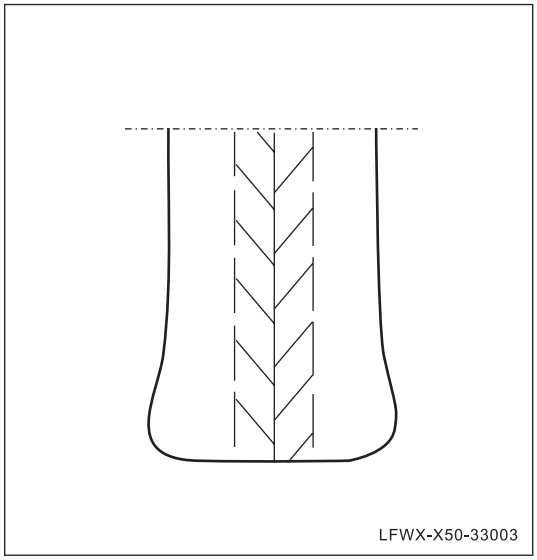
In case of leakage of tire valve, replace the tire.

(c) Check the tire for cracks or damage. If any, replace it.

(d) Check the tire surface for any nail, gravel or other foreign matter. If any, be sure to clear it.

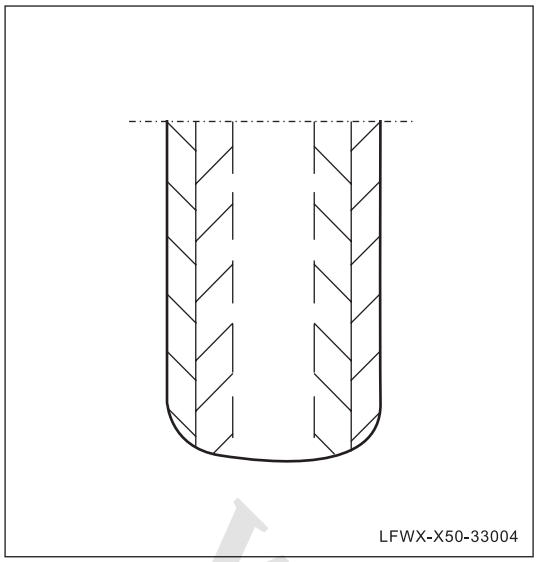
(e) Check the tire for any abnormal wear. If any, be sure to find out the cause of the malfunction.

- Insufficient air pressure may cause rapid wear of tire shoulder, tire flexing and increase of rolling resistance.

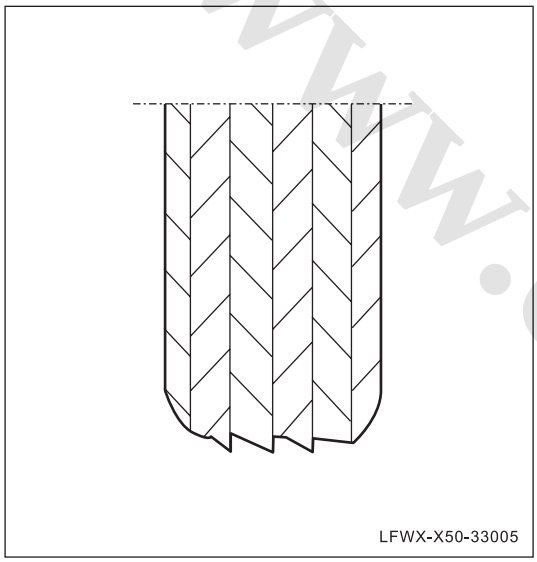

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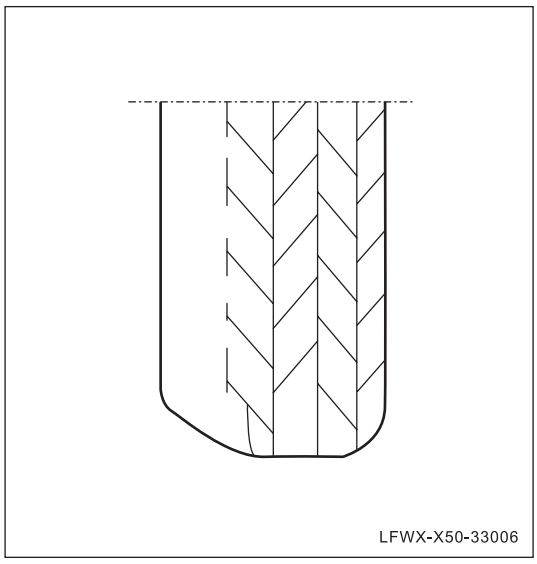
- Too much pressure may cause rapid wear of tire tread center and reduce the buffering capacity of the tire.


LFWX-X50-33005

- Tire has feather type wear and front wheel toe-in and rear wheel toe-in are too big (or small).

△ HINT:

Adjust the toe-in and replace or rotate the tires according to wear condition.


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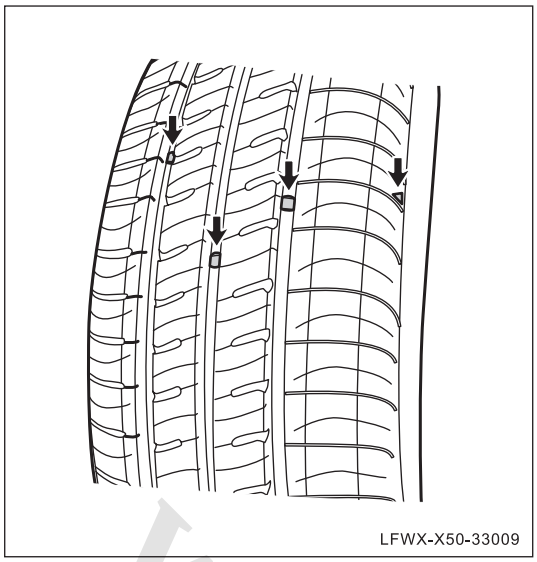
- Single side wear (camber angle problem).

△ HINT:

Adjust camber angle; replace or rotate tires according to wear condition.

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(f) Observe the wear mark at the bottom of the tire groove and if the tread wear is up to the bottom wear mark, replace with a new tire.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Tire wear	1. Driver (bad driving habits)	See 33 - Wheel and Tire, Diagnosis, Fault Diagnosis (1. Tire Wear)
	2. Tire pressure (not standard)	
	3. Suspension system (fault)	
	4. Tire specification (not consistent)	
	5. Wheel alignment (inaccurate)	
	6. Wheel hub bearing (worn)	
	7. Wheel (deformed and unbalance)	

FAULT DIAGNOSIS

1. TIRE WEAR

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Ask the user questions about driving habits: 1. Whether apply emergency brake frequently? 2. Whether drive at a high speed under poor road condition? 3. Whether drive at a high speed when cornering? 4. Whether drive at a high speed even in case of inadequately inflated tire?	Go to Step 1	Bad driving habits exist	Judge that the wheel wear is caused by bad driving habits and warn the user to correct the bad driving habits
1	Check the wheel specifications	Normal	Faulty	Instruction
	Check whether all the wheel specifications are consistent	Go to Step 2	Different specifications	Replace the wheels (see 33- Wheel and Tire, Wheels Assembly, Replacement) .
2	Check the tire pressure.	Normal	Faulty	Instruction
	Check the tire pressure.	Go to Step 3	The tire pressure does not conform to the standard	Correct tire pressure (see 33 - Wheel and Tire, Wheel and Tire, On-vehicle Inspection)
3	Check the tire shoulder for wear	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the tire wear type carefully	Go to Step 4	Tire shoulder is worn too fast	The inflation pressure is excessively low and re-correct the inflation pressure (see 33 - Wheel and Tire, Wheel and Tire, On-vehicle Inspection)
4	Check the tread center for wear	Normal	Faulty	Instruction
	Check the tire wear type carefully	Go to Step 5	Tread center is worn too fast	The inflation pressure is excessively high and re-correct the inflation pressure (see 33 - Wheel and Tire, Wheel and Tire, On-vehicle Inspection)
5	Check the tire sidewall for wear	Normal	Faulty	Instruction
	Check the tire wear type carefully	Go to Step 6	Single side of the tire is worn quickly	Wheel alignment is inaccurate and re-conduct the wheel alignment (see 33 - Wheel and Tire, Four-wheel Alignment, Adjustment)
6	Check individual area wear	Normal	Faulty	Instruction
	Check the tire wear type carefully	Go to Step 7	Wear appears on certain area of the tire	Judge that wheels are unbalance and the hub bearing is damaged
7	Check the corrugated wear	Normal	Faulty	Instruction
	Check the tire wear type carefully	Go to Step 8	Corrugated wear appears	Wheel alignment is inaccurate and re-conduct the wheel alignment (see 33 - Wheel and Tire, Four-wheel Alignment, Adjustment)
8	Check wheel balance	Normal	Faulty	Instruction
	Check the wheel balance condition (see 33 - Wheel and Tire, Wheel Balance, Inspection)	Go to Step 9	Imbalanced vehicle wheel	Adjust the wheel balance (see 33 - Wheel and Tire, Wheel Balance, Adjustment)
9	Check the hub bearing	Normal	Faulty	Instruction
	Check the worn condition of hub bearing (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 10	Hub bearing is worn abnormally	Replace the hub bearing (see 31 - Front Suspension, Hub Bearing, Replacement)
10	Check the suspension	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the performance condition of each component of the suspension (see 31/32 - Front Suspension/Rear Suspension, Front Suspension/Rear Suspension, On-vehicle Inspection)	Go to Step 11	Suspension is deformed or its components are loose and worn	Replace the damaged components (see 31/32 - Front Suspension/Rear Suspension)
11	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

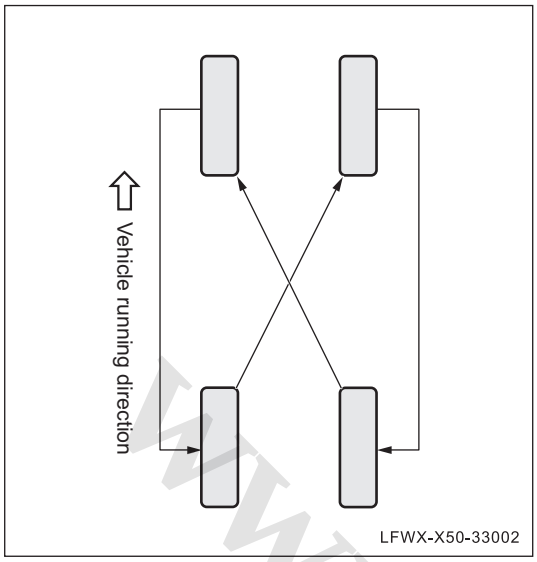
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WHEEL ASSEMBLY

TIRE ROTATION

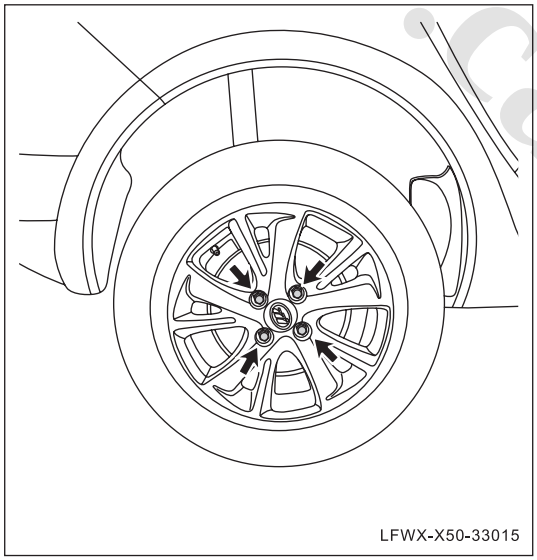


1. TIRE ROTATION

△ HINT:

To ensure even tire wear and prolong tire lifespan, it is recommended to rotate the tires every 10000 km. However, the most appropriate interval for tire rotation depends on the driver's normal driving habits and road conditions.

REPLACEMENT



1. REMOVAL OF THE WHEEL

(a) Park the vehicle on a smooth and steady ground, engage the parking brake and block the diagonal wheel to the removed one with a trig.

△ HINT:

Block the front of the front wheel or the rear of the rear wheel with a sprag.

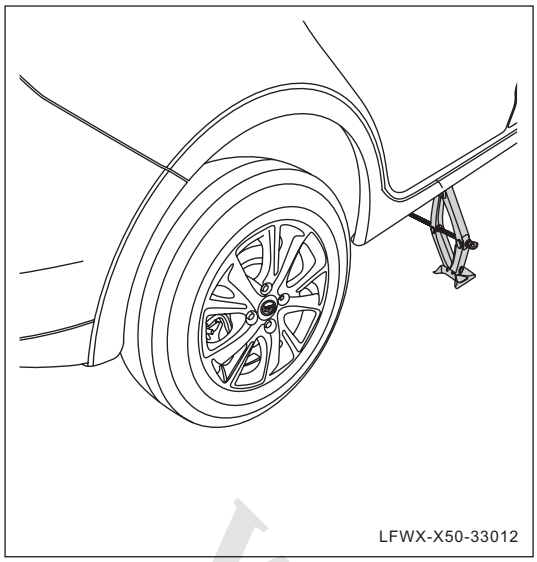
(b) Using a wrench, unscrew the wheel nuts 1-2 circles.

NOTICE:

Do not remove the nut and only unscrew the wheel nut 1-2 circles.

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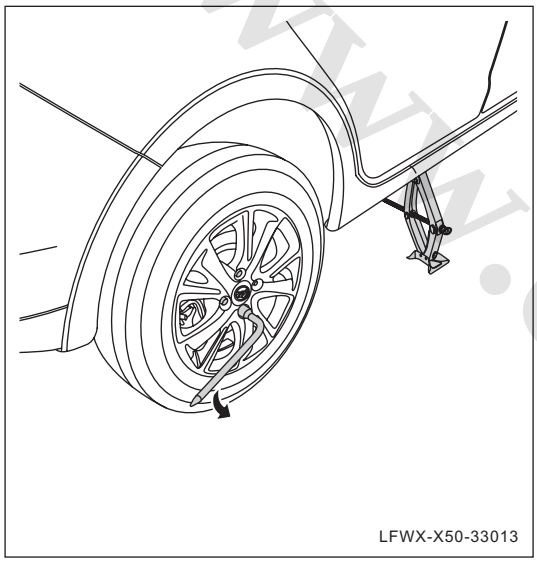
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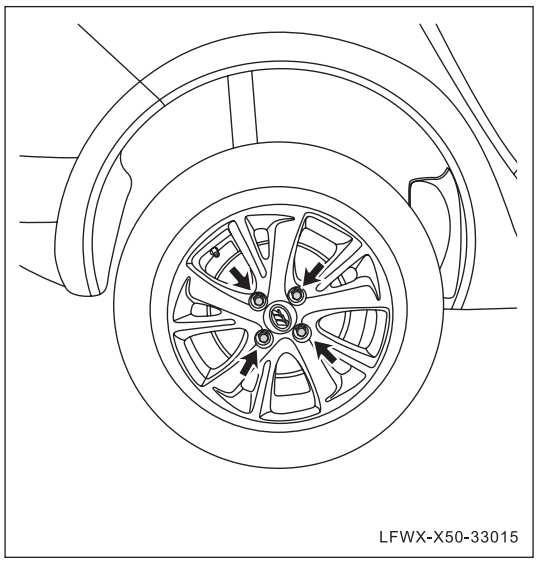
(c) Jack the vehicle body with a jack to lift the wheel slightly off the ground.

NOTICE:

- **Place the jack under the correct support point of the vehicle.**
- **Make sure the jack is placed stably.**


LFWX-X50-33013

(d) Remove all wheel nuts in diagonal sequence and then take down the wheel.


LFWX-X50-33015

2. INSTALLATION OF THE WHEEL

(a) Install the wheel on the hub, mount the wheel nuts and tighten the wheel nuts in turn by the diagonal sequence.

(b) Remove the jack to lower the vehicle on the ground and tighten the wheel nuts to the specified torque by the diagonal sequence.

Torque: 110 - 120 N•m

NOTICE:

- **Before installing the wheel, be sure to scrap the deposited rust on the wheel mounting surface and the hub mounting surface, or remove it with a steel brush.**
- **Do not apply oil or lubricant to the bolt or nut.**

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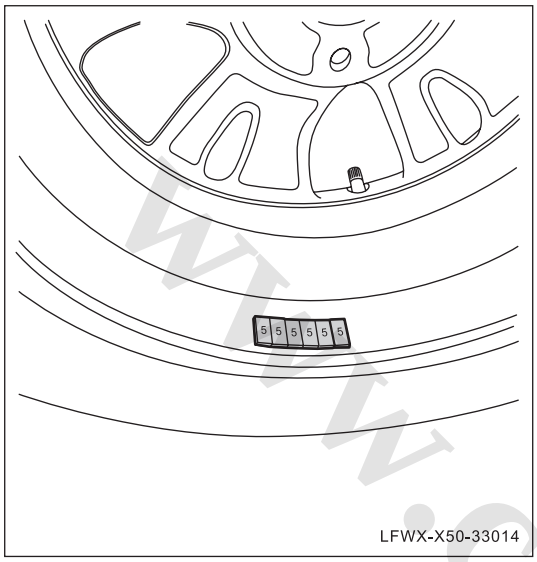
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WHEEL BALANCE

INSPECTION

△ HINT:

Tire imbalance of a vehicle can cause vibration during high speed rotation of wheels, especially the front wheel vibration, which can make the front wheel swing and affect safety and smoothness when the vehicle driving; meanwhile, it will increase wear of tires. So inspection and adjustment of dynamic balance of tires are very important.



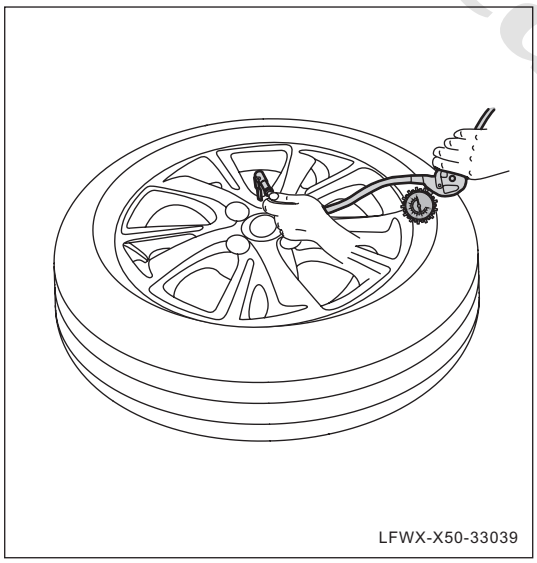
1. PREPARATION BEFORE INSPECTION

(a) Clean the wheels being inspected and clean off dirt and gravel.

NOTICE:

- **If impurities in the tire tread are not removed, they may fly out under action of centrifugal force, easily leading to personal injury.**
- **Check if tire tread and sidewall are defective. These defects might impact the balance of wheels.**

(b) Remove the old balance blocks.



(c) Inflate the tires to the standard pressure value.

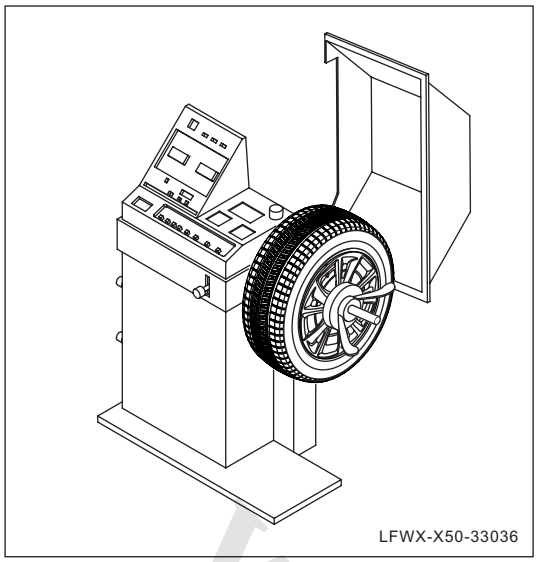
Standard pressure: 230 kPa (front) (cold)

230 kPa (rear) (cold)

33

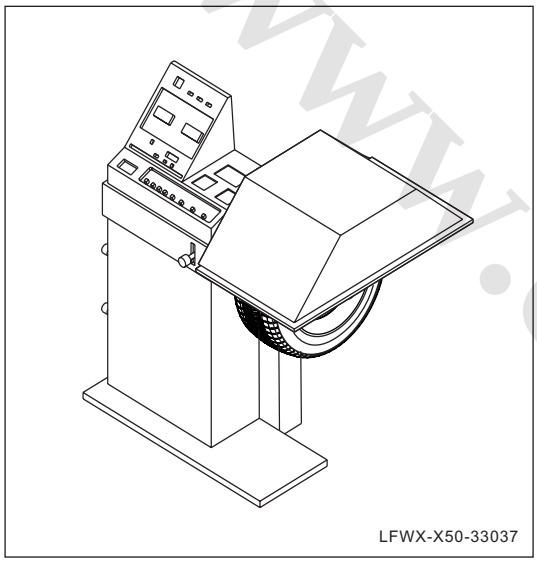
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2. CHECK THE WHEEL BALANCE

(a) Install the wheel correctly to the balancing machine.


LFWX-X50-33037

(b) Fix the tires and enter the three parameters - wheel rim width, diameter and distance of wheel rim edge from the balancing machine.

(c) Lower the protective cover, start the balancing machine, and begin to measure.

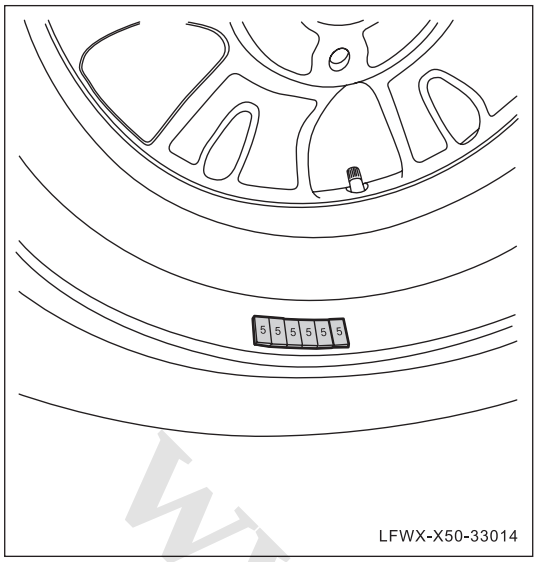
(d) Stop rotating tires, and then open the protective cover; rotate the tires by hands and read unbalance amount by the display screen on the left and right side; confirm the unbalance position.

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ADJUSTMENT

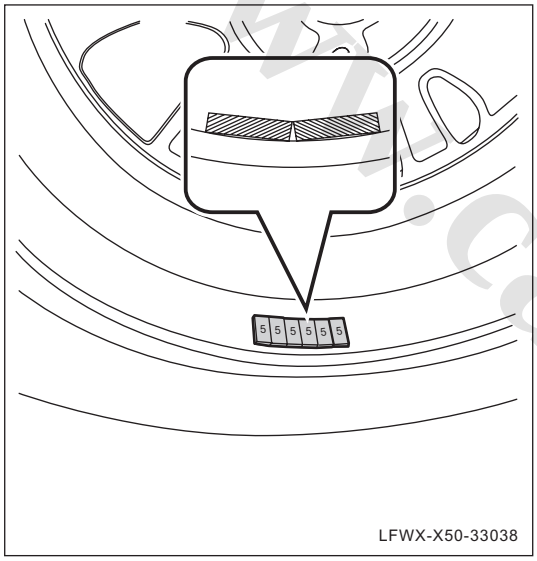


1. ADJUST THE WHEEL BALANCE

(a) According to the imbalance amount displayed on the balancing machine, add corresponding balance block on the imbalance position.

NOTICE:

Before installing the balance block, be sure to clean the mating surface of wheels.



(b) When installing balance blocks onto the wheels, align the balance block center with the positions (or angles) specified by the wheel balancing machine.

(c) If the balance weight calculated exceeds 50 g, mount the 2 balance blocks on a straight line.

NOTICE:

- **Balance block can not be reused; always use a new one in each time of replacement.**
- **Always use the original balance block.**
- **Do not place one balance block onto another one.**

(d) Start again the wheel balancing machine to confirm that the remaining imbalance value is less than 10 g; if the remaining imbalance value on one side is more than 10 g, repeat the installation steps of the balance block.

Requirements for wheel dynamic balance:

Steel wheel (counterweight at single side ≤ 35 g, total counterweight ≤ 75 g)

Aluminum wheel (single side ≤ 75 g, left and right unbalance ≤ 10 g)

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FOUR-WHEEL ALIGNMENT

INSPECTION

△ HINT:

- Four-wheel alignment is very important for maintaining driving safety, steering stability and normal tire wear. Incorrect alignment angle may cause off tracking or side sliding in emergency brake, resulting in serious accidents. In normal running, it may shorten the tire lifespan and misalignment or failure of the steering tie rod usually leads to steering out of control, results caused by which may beyond expectation. Therefore, four-wheel alignment is very important to vehicles.
- The vehicle measurement can be carried out only until the vehicle mileage reaches 1000 km - 2000 km, because the settlement process of the coil spring can be finished after that.
- Four-wheel alignment includes front wheel alignment and rear wheel alignment. Front wheel alignment includes front wheel camber, kingpin caster, kingpin inclination angle and front wheel toe-in; rear wheel alignment includes rear wheel camber and rear wheel toe-in.

1. IT IS NECESSARY TO CARRY OUT THE WHEEL ALIGNMENT IN THE FOLLOWING CONDITIONS

(a) There are driving performance defects.

(b) Single side tire is worn and off tracking.

(c) It is necessary to carry out the wheel alignment after removing or replacing the following parts and components.

- Front lower arm assembly
- Front lower arm ball head
- Front sub frame
- Front steering knuckle
- Drive shaft
- Front spring shock absorber assembly
- Steering gear assembly
- Steering wheel
- Electric power steering column assembly
- Rear toe-in arm assembly
- Rear trailing arm assembly
- Rear upper arm assembly
- Rear lower arm assembly
- Rear sub frame assembly
- Rear coupling assembly
- Rear coil spring

2. PRE-ALIGNMENT INSPECTION

(a) Check that each axle uses the tires with the same structure and tread type and the tread wear amount and overall diameter should be the same. Check that the wheel radial and axial run-out do not exceed the tolerance. The tire pressure should within the specified pressure range.

(b) Check that the steering linkage and suspension do not have excessive clearance; check the steering tie rod end head and ball hinge for wear; check that the spring is not loose and the swing arm and front pillar do not have excessive clearance.

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(c) The vehicle fuel tank should be filled fully. The vehicle should be under no-load and should have a spare tire and attached tools and no excessive load within it.

(d) Vibrate the front and the rear of the vehicle for several times and make sure the vehicle is at the normal driving height.

(e) Check that the corresponding height position of both sides of the vehicle is consistent.

(f) When the wheel is at the straight forward direction, the steering wheel should be at the center. Remove the steering wheel for adjustment if necessary.

(g) The hub bearing has proper pre-tightening force and the fixing nuts reach the specified torque.

(h) Carry out the wheel dynamic balance test and re-install the wheel to the vehicle after the test.

3. PREPARATION BEFORE THE ALIGNMENT MEASUREMENT

(a) Carry out the rim offset compensation.

(b) Return the steering wheel and fix the steering wheel with its fixing tool. Depress the brake pedal with the brake pedal loading device at the same time.

4. WHEEL ALIGNMENT PARAMETER

Wheel alignment (Curb status)	Front wheel	Toe-in of front wheel	1.5±2 mm
		Front wheel camber	0.083° ± 0.75°
		Kingpin caster	4.43° ± 0.75°
		Kingpin inclination angle	10.8°
	Rear wheel	Toe-in of rear wheel	2.2 ± 3 mm
		Rear wheel camber	-0.9° ± 0.5°

5. INSPECTION

△ HINT:

- Check the wheel alignment according to the operation instruction of the four-wheel alignment indicator.
- It is necessary to follow the following operation steps.

(a) Inspect the front wheel camber.

- Be aware that the camber cannot be adjusted. (See 33 - Wheel and Tire, Four-wheel Alignment, Adjustment)

(b) Check the front wheel toe-in and adjust if necessary.

- Adjust the front wheel toe-in (See 33 - Wheel and Tire, Four-wheel Alignment, Adjustment)

ADJUSTMENT

1. ADJUSTMENT SEQUENCE

(a) For four-wheel alignment, adjust the rear wheel first and then the front wheel.

(b) For the rear wheels, adjust the camber first and then the toe-in.

NOTICE:

Rear wheel alignment value of this vehicle model cannot be adjusted. If the parameter exceeds the specified range, replace the rear axle directly.

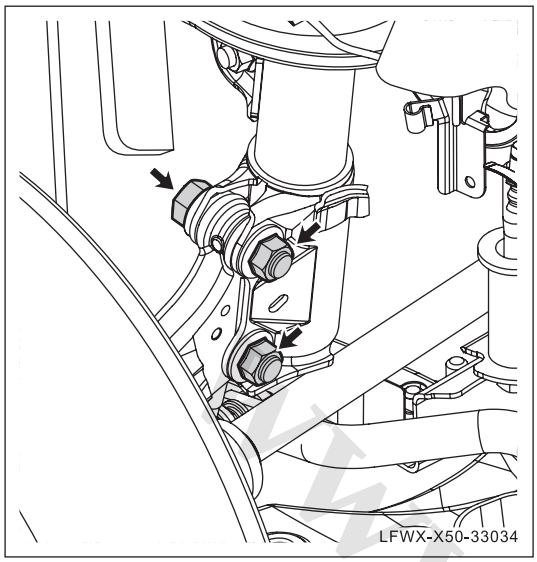
(c) Sequence for front wheel adjustment is: kingpin camber, kingpin inclination angle, front wheel camber and front wheel toe-in.

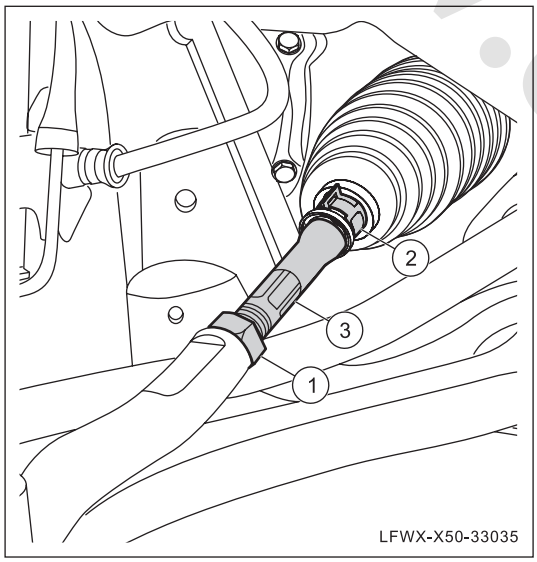
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NOTICE:

Kingpin caster and inclination angle are designed to ensure the structure and doesn't require adjusting during use. If the parameter exceeds the specified range, replace the steering knuckle directly.





2. ADJUSTMENT OF FRONT WHEEL CAMBER

△ HINT:

In normal condition, it's not necessary to adjust the camber after assembling of the independent suspension and the wheel steering knuckle assembly. If the camber defects exceeds the tolerance range due to other reasons, correct it with the connecting bolt of the independent suspension and the steering knuckle .

(a) Check (visually) the driving components for damage and replace the damaged components before correction.

(b) If the front wheel camber exceeds the tolerance, loosen the connecting bolt of the front shock absorber and the steering knuckle and move the wheel to correct it.

Front wheel camber: 0.083° ± 0.75°

3. ADJUSTMENT OF FRONT WHEEL TOE-IN

(a) Loosen the right steering tie rod lock nut ① and elastic protective sleeve snap ring ② .

(b) Adjust the length of the toe-in adjusting rod ③ to the specified value if necessary.

Front wheel toe-in value: 1.5 ± 2 mm

(c) Tighten the lock nut ① , re-install the protection sleeve elastic snap ring ② , and check that the lock nut ① is screwed tightly and the protection sleeve is at correct position.

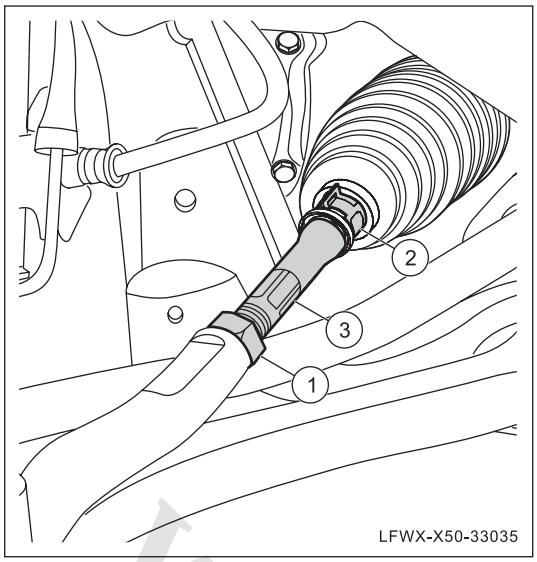
Torque: 70 - 80 N•m

(d) After adjusting the front wheel toe-in, check the steering wheel faces the right front. Otherwise, remove the lock nuts of the steering wheel, and after adjusting the steering wheel, tighten the lock nuts of the steering wheel to the specified torque.

Torque: 80 - 110 N•m

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3. ADJUSTMENT OF MAXIMUM FRONT WHEEL STEERING ANGLE

(a) Loosen the steering tie rod lock nut ① and elastic sleeve snap ring ② together.

(b) Adjust the length of the adjusting rod ③ of steering angle at both sides to the specified value if necessary.

Maximum steering angle:

Inner side: 38°/42° (no-load/full-load)

Outer side: 33°/35.5° (no-load/full-load)

(c) Tighten the lock nut ① , re-install the protection sleeve elastic snap ring ② , and check that the lock nut ① is screwed tightly and the protection sleeve is at correct position.

(d) Re-check the maximum steering angle and continue the adjustment in case of not conforming to the standard.

(e) Re-adjust the steering wheel to the horizontal position after adjustment.

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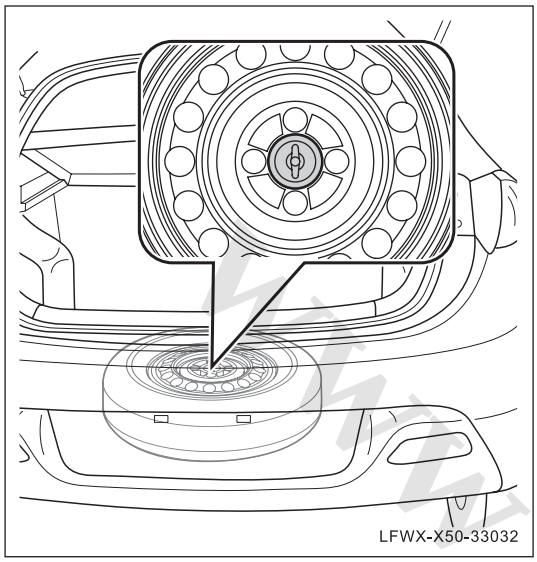
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SPARE TIRE

USE

NOTICE:

Spare tire only can be used for a short time and it is not proper to be used for high-speed driving (maximum speed should not exceed 90 km/h; mileage should be within 50 km).



1. **OPEN THE TAIL DOOR AND TAKE OUT THE TRUNK FLOOR CARPET (SEE 81 - INTERIORS AND EXTERIORS, FLOOR CARPET, REPLACEMENT)**
2. **REMOVE THE FIXING NUTS OF THE SPARE TIRE AND TAKE OUT THE SPARE TIRE**
3. **REPLACE THE FLAT TIRE OR TIRE REQUIRING REPAIR WITH A SPARE TIRE (SEE 33 - WHEEL AND TIRE, WHEEL ASSEMBLY, REPLACEMENT)**

NOTICE:

Do not use a flat tire for driving. Even traveling for a short distance will cause irreparable damage to tires.

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Drive Shaft

Drive shaft 41-1
System description 41-1
Preparation 41-1
Service data 41-2
Precautions 41-2
Components 41-3
Function and fault of components 41-4
On-vehicle inspection 41-4
Diagnosis 41-5
Fault symptom table 41-5
Fault diagnosis 41-6
Drive shaft assembly.....41-11
Check 41-11
Replacement 41-11
Disassembly and assembly.....41-16

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DRIVE SHAFT

SYSTEM DESCRIPTION

1. FUNCTION

Drive shaft transmits the power from transmission to wheels. Rzeppa universal joint in the drive shaft can ensure the direction variability and continuity of power transmission.

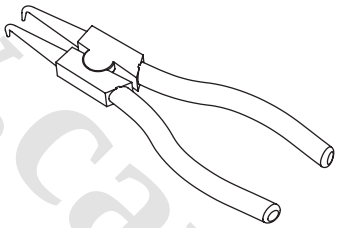
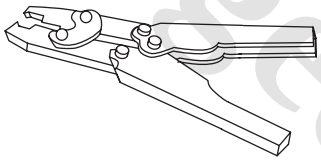
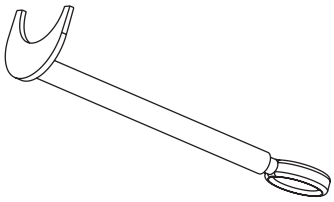
2. COMPONENTS

Drive shaft consists of left and right mandrels, rzeppa universal joint and dust cover, etc.

3. WORKING PRINCIPLE

Transmission transmits the power from engine to drive shaft. Rzeppa universal joint on each side of drive shaft can ensure the stability of transmission under the condition that wheels change position constantly.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Snap ring pliers		Remove the snap ring or retainer rings on the drive shaft.
2	Clamp tightening tool		Tighten dust cover clamp
3	Drive shaft remover		Remove the drive shaft from the transmission

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SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Connecting bolts of steering knuckle and front absorber	200 - 220
Connecting nuts of drive shaft and front brake	180 - 240
Wheel speed sensor wire harness bracket fixing bolts	20 - 25

PRECAUTIONS

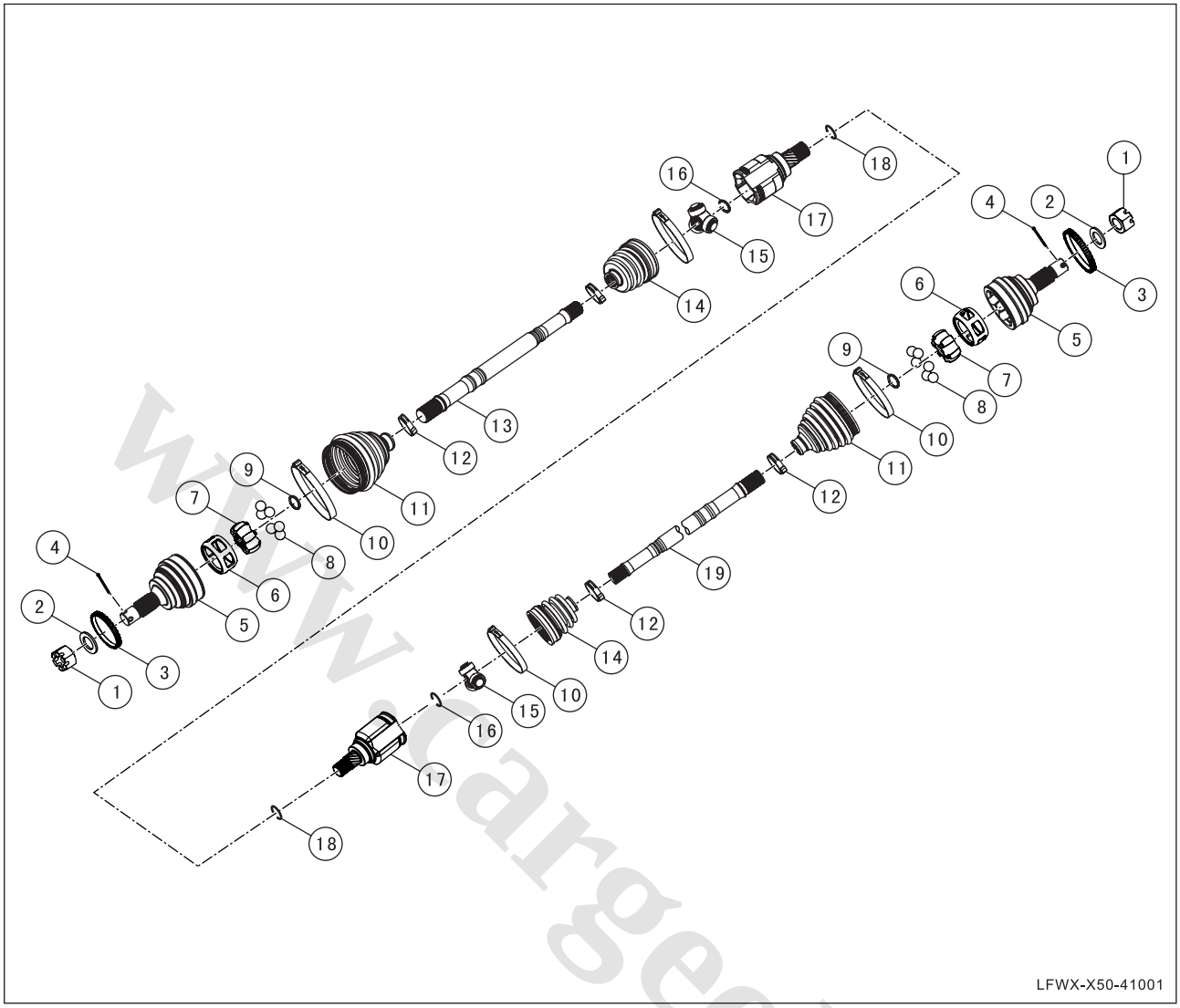
1. During daily maintenance, check drive shaft frequently for scratches and interference with other components.
2. Do not have shield of drive shaft rubbed with other components for a long time when the vehicle is running. Avoid impacting with sharp objects when removing the shield, otherwise it will be damaged.
3. Don't reuse the non-reusable parts.
4. Clean the external surfaces of the components before dismantling or assembling drive shaft.
5. Do not contaminate parts in the process of repair and prevent foreign objects from entering.
6. Decomposed parts (except for rubber parts) should be cleaned by kerosene and then dried by air, or wiped by paper towel or cloth.

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COMPONENTS



1	Hexagon thin slotted nut
2	Plain washer
3	ABS ring gear
4	Cotter pin
5	Rzeppa universal joint
6	Retaining bracket
7	Inside wheel
8	Steel ball
9	Snap ring
10	Large clamp

11	BJ end dust cover
12	Small clamp
13	Left mandrel
14	TJ end dust cover
15	Trident shaft
16	C-shaped snap ring
17	Left tripod universal joint
18	C-shaped snap ring
19	Right mandrel

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Drive shaft mandrel	Transmit the power	Bend, spline wear, poor lubrication	Drive shaft vibration, loud noise during driving
Rzeppa universal joint	Change the direction of power transmission to transmit power	Wear	Accelerated vibration
Tripod universal joint	Change the direction of power transmission to transmit power	Wear	Accelerated vibration
Dust cover	Prevent dust from entering universal joint interior	Damage	/
Clamp	Fix the dust cover	/	/

ON-VEHICLE INSPECTION

1. CHECK DRIVE SHAFT FOR OBVIOUS DAMAGES

(a) Check drive shaft and universal joint for looseness.

(b) Check dust cover for cracks or other damages.

2. CHECK IF THERE IS "CLICK" WHEN DRIVE SHAFT ROTATES

3. CHECK IF THERE IS CLUNK DURING SLIDING ACCELERATION

4. CHECK IF THERE IS VIBRATION WHEN THE VEHICLE IS ACCELERATING

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Shake or vibration during acceleration	1. Tripod universal joint (worn) 2. Rzeppa universal joint (worn) 3. Universal joint (angle is too large) 4. Suspension spring (set height is too big) 5. Powertrain mounting base (worn or error)	See 41 - Drive Shaft, Diagnosis, Fault Diagnosis (1.Shake or vibration during acceleration)
There is "click" when rotating	1. Rzeppa universal joint (worn) 2. Universal joint dust cover (worn) 3. Universal joint(poor lubrication, polluted)	See 41 - Drive Shaft, Diagnosis, Fault Diagnosis (2.There is "click" when rotating)
There is clunk during sliding acceleration	1. Universal joint dust cover (worn) 2. Universal joint(poor lubrication, polluted) 3. Tripod universal joint (worn)	See 41 - Drive Shaft, Diagnosis, Fault Diagnosis (3.There is clunk during sliding acceleration)
Drive shaft falls off	1. C-shaped snap ring on the connecting end of drive shaft and transmitter (deformed) 2. Drive shaft (deformed) 3. Slotted thin nut of drive shaft (damaged) 4. Front suspension (deformed, twisted)	See 41 - Drive Shaft, Diagnosis, Fault Diagnosis (4.Drive shaft falls off)
Vehicle shakes and vibrates with low speed	1. Wheel (imbalanced) 2. Wheel (wrong alignment of four wheels) 3. Wheel hub bearing (worn) 4. Suspension (deformed, worn) 5. Drive shaft (damaged)	See 41 - Drive Shaft, Diagnosis, Fault Diagnosis (5.Vehicle shakes and vibrates with low speed)

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FAULT DIAGNOSIS

1. SHAKE OR VIBRATION DURING ACCELERATION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check performance condition of each component of front suspension (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 1	1. Front absorber fails 2. Connecting bush is aged and damaged 3. Connecting bolt is loose 4. Connecting component is deformed with cracks 5. Front stabilizer bar is loose	1. Replace front absorber (see 31- Front Suspension, Front Absorber with Spring Assembly, Replacement) 2. Replace connecting bush (see 31 - Front Suspension, Sub Frame Assembly, Replacement) 3. Tighten the bolts 4. Replace the deformed and cracked components 5. Tighten and replace the stabilizer bar (see 31 - Front Suspension, Front Stabilizer Bar, Replacement)
1	Check the dust cover of drive shaft	Normal	Faulty	Instruction
	Check the dust cover of drive shaft for damages	Go to Step 2	Damages of dust cover of drive shaft are found	Replace the dust cover of drive shaft (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
2	Check drive shaft assembly	Normal	Faulty	Instruction
	Remove drive shaft assembly to check the performance condition of drive shaft assembly (see 41 - Drive Shaft, Drive Shaft Assembly, Check)	Go to Step 3	Drive shaft assembly fails	Replace drive shaft assembly (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)
3	Check powertrain mounting base	Normal	Faulty	Instruction
	Check the wear condition of connecting part between drive shaft and transmission	Go to Step 4	Powertrain mounting base is worn excessively	Replace transmission differential axle shaft gear (see 21 - Manual Transmission, Differential Assembly)
4	Check rzeppa universal joint	Normal	Faulty	Instruction
	Check the wear condition of rzeppa universal joint	Go to Step 5	Rzeppa universal joint is worn	Replace rzeppa universal joint (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
5	Check tripod universal joint	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the wear condition of tripod universal joint	Go to Step 6	Tripod universal joint is worn	Replace tripod universal joint (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
6	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is completed.	Fault still exists	Find the cause out from other fault symptoms

2. THERE IS “CLICK” WHEN ROTATING.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine and make it idle to check if there is noise of "click"	Diagnosis is completed	The noise of "click" is sound when the drive shaft is rotating	Go to Step 1
1	Check the dust cover of drive shaft	Normal	Faulty	Instruction
	Check the dust cover of drive shaft for damages	Go to Step 2	Damages of dust cover of drive shaft are found	Replace the dust cover of drive shaft (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
2	Check drive shaft assembly	Normal	Faulty	Instruction
	Remove drive shaft assembly to check the performance condition of drive shaft assembly (see 41 - Drive Shaft, Drive Shaft Assembly, Check)	Go to Step 3	Drive shaft assembly fails	Replace drive shaft assembly (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)
3	Check the lubrication of universal joint	Normal	Faulty	Instruction
	Check the lubrication condition of drive shaft universal joint	Go to Step 4	Universal joint is lubricated poorly, stuck and moves unsmoothly	Lubricate the universal joint
4	Check rzeppa universal joint	Normal	Faulty	Instruction
	Check the wear condition of rzeppa universal joint	Go to Step 5	Rzeppa universal joint is worn	Replace rzeppa universal joint (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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3. THERE IS CLUNK DURING SLIDING ACCELERATION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Conduct the sliding acceleration operation and check the noise condition of drive shaft	Diagnosis is completed	There is clunk in the drive shaft	Go to Step 1
1	Check the dust cover of drive shaft	Normal	Faulty	Instruction
	Check the dust cover of drive shaft for damages	Go to Step 2	Damages of dust cover of drive shaft are found	Replace the dust cover of drive shaft (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
2	Check drive shaft assembly	Normal	Faulty	Instruction
	Remove drive shaft assembly to check the performance condition of drive shaft assembly (see 41 - Drive Shaft, Drive Shaft Assembly, Check)	Go to Step 3	Drive shaft assembly fails	Replace drive shaft assembly (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)
3	Check the lubrication of universal joint	Normal	Faulty	Instruction
	Check the lubrication condition of drive shaft universal joint	Go to Step 4	Universal joint is lubricated poorly, stuck and moves unsmoothly	Lubricate the universal joint
4	Check tripod universal joint	Normal	Faulty	Instruction
	Check the wear condition of tripod universal joint	Go to Step 5	Tripod universal joint is worn	Replace rzeppa universal joint (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
5	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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4. DRIVE SHAFT FALLS OFF

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check performance condition of each component of front suspension (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 4	1. Front absorber fails 2. Connecting bush is aged and damaged 3. Connecting bolt is loose 4. Connecting component is deformed and has cracks 5. Front stabilizer bar is loose	1. Replace front absorber (see 31- Front Suspension, Front Absorber with Spring Assembly, Replacement) 2. Replace connecting bush (see 31 - Front Suspension, Sub Frame Assembly, Replacement) 3. Tighten the bolts 4. Replace the deformed and cracked components 5. Tighten and replace the stabilizer bar (see 31 - Front Suspension, Front Stabilizer Bar, Replacement)
1	Check the dust cover of drive shaft	Normal	Faulty	Instruction
	Check the dust cover of drive shaft for damages	Go to Step 2	Damages of he dust cover of drive shaft and wrong installation are found	Replace the dust cover of drive shaft (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
2	Check drive shaft assembly	Normal	Faulty	Instruction
	Remove drive shaft assembly to check the performance condition of drive shaft assembly (see 41 - Drive Shaft, Drive Shaft Assembly, Check)	Go to Step 3	Drive shaft assembly fails	Replace drive shaft assembly (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)
3	Check the C-shaped snap ring of drive shaft	Normal	Faulty	Instruction
	Check the performance condition of C-shaped snap ring of drive shaft	Go to Step 4	C-shaped snap ring is deformed	Replace the C-shaped snap ring of drive shaft
4	Check the slotted thin nut of drive shaft	Normal	Faulty	Instruction
	Check the slotted thin nut of drive shaft	Go to Step 5	Slotted thin nut is damaged	Replace the slotted thin nut
5	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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5. VEHICLE SHAKES AND VIBRATES WITH LOW SPEED

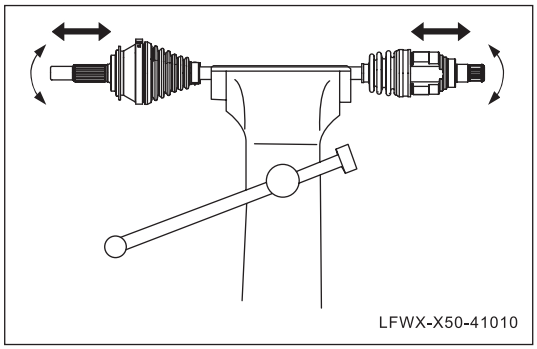
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the wheel balance condition (see 33 - Wheels and Tires, Wheel Balance, Inspection)	Go to Step 1	Imbalanced vehicle wheel	Adjust the wheel balance (see 33 - Wheels and Tires, Wheel Balance, Adjustment)
1	Check the wheel alignment.	Normal	Faulty	Instruction
	Check the front wheel alignment (see 33 - Wheels and Tires, Four Wheel Alignment, Inspection)	Go to Step 2	Wheel alignment is of large deviation	Conduct the wheel alignment operation(see 33 - Wheels and Tires, Four Wheel Alignment, Adjustment)
2	Check the wheel hub bearing	Normal	Faulty	Instruction
	Check the wear condition of wheel hub bearing (see 31 - Front Suspension, Front Suspension, On-vehicle Inspection)	Go to Step 3	Wheel hub bearing is worn excessively	Replace the hub bearing (see 31 - Front Suspension, Wheel Hub Bearing, Replacement)
3	Check the suspension	Normal	Faulty	Instruction
	Check performance condition of each component of suspension (see 31/32 - Front Suspension/ Rear Suspension, Front Suspension/Rear Suspension, On-vehicle Inspection)	Go to Step 4	Suspension is deformed or components are loose and worn	Replace the damaged components (see 31/32 - Front Suspension/Rear Suspension)
4	Check the dust cover of drive shaft	Normal	Faulty	Instruction
	Check the dust cover of drive shaft for damages	Go to Step 5	Damages of he dust cover of drive shaft and wrong installation are found	Replace the dust cover of drive shaft (see 41 - Drive shaft, Drive Shaft Assembly, Disassembly and Assembly)
5	Check drive shaft assembly	Normal	Faulty	Instruction
	Remove drive shaft assembly to check the performance condition of drive shaft assembly (see 41 - Drive Shaft, Drive Shaft Assembly, Check)	Go to Step 6	Drive shaft assembly fails	Replace drive shaft assembly (See 41 - Drive Shaft - Drive Shaft Assembly, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Complete the maintenance operation and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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DRIVE SHAFT ASSEMBLY

CHECK



1. CHECK THE DRIVE SHAFT

△ HINT:

If any of abnormality below is detected, always disassemble the drive shaft and then repair or replace damaged parts.

(a) Check whether the wheel universal joint is obviously loose.

(b) Check whether the universal joint in transmission may smoothly slide in axial direction without seizure.

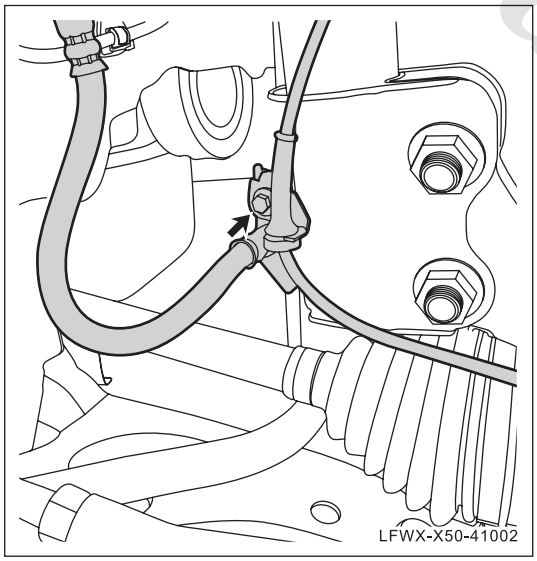
(c) Check whether the universal joint in transmission has too large gap in radial direction.

(d) Check if dust cover is damaged.

NOTICE:

Keep the drive shaft assembly in level in the process of inspection.

REPLACEMENT



1. DRAIN THE TRANSMISSION GEAR OIL

2. LIFT UP THE VEHICLE AND REMOVE FRONT WHEELS

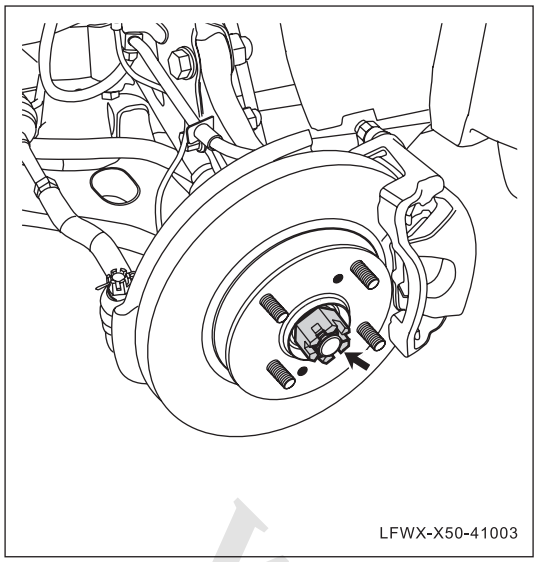
3. REMOVE FIXING BOLTS OF THE BRAKE PIPE AND THE WHEEL SPEED SENSOR WIRE HARNESS BRACKET

△ HINT:

Only remove the brake hose and the wheel speed sensor wire harness from the front suspension bracket and do not disconnect them.

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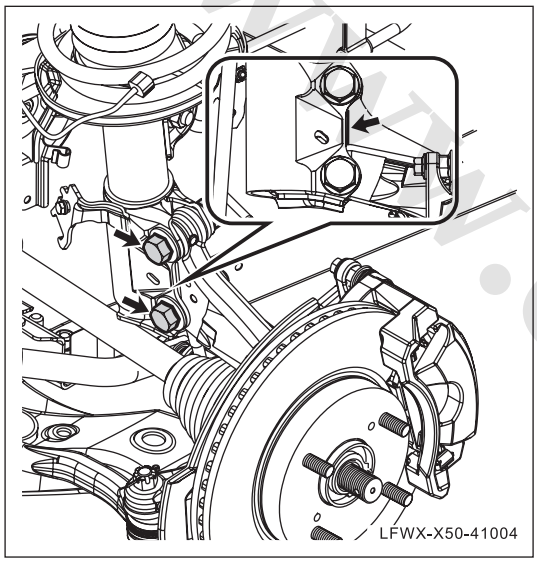
4. REMOVE THE FRONT BRAKE WITH STEERING KNUCKLE ASSEMBLY

(a) Remove cotter pin of the drive shaft slotted nut.

(b) Remove slotted nuts of the drive shaft and take out plain washer.

△ HINT:

When removing this slotted nut, you should shift transmission to the reverse gear and depress the brake pedal for easy removal and to prevent drive shaft from rotating with the wrench.


LFWX-X50-41004

(c) Make marks on the front absorber.

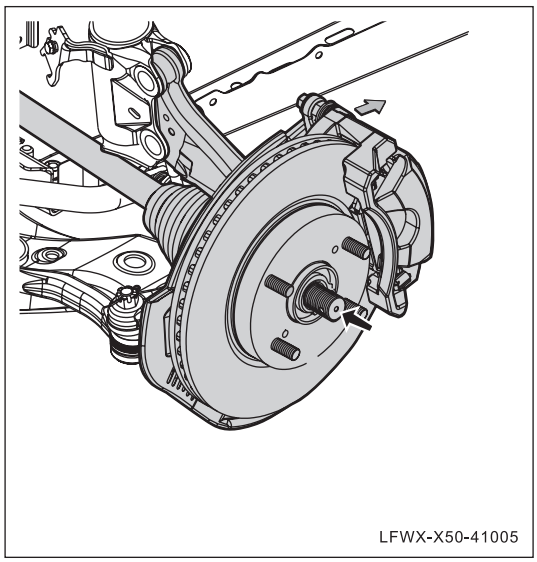
△ HINT:

Before removal of bolt, make marks; if you conduct installation according to marks, there is no need to carry out the four-wheel alignment. If there is no mark, you must carry out the four-wheel alignment after installation.

(d) Remove the connecting bolts of the front absorber and the steering knuckle.

△ HINT:

After removing the locking nuts and the fixing bolts, lift up the front brake with the steering knuckle assembly, and then pull out the bolt.

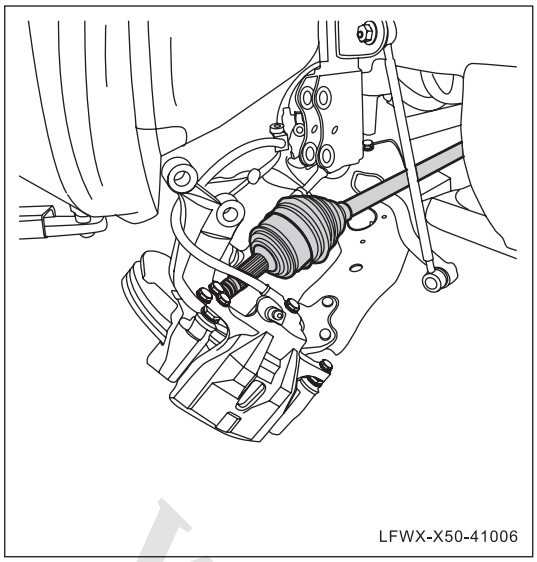

LFWX-X50-41005

5. REMOVE THE DRIVE SHAFT ASSEMBLY

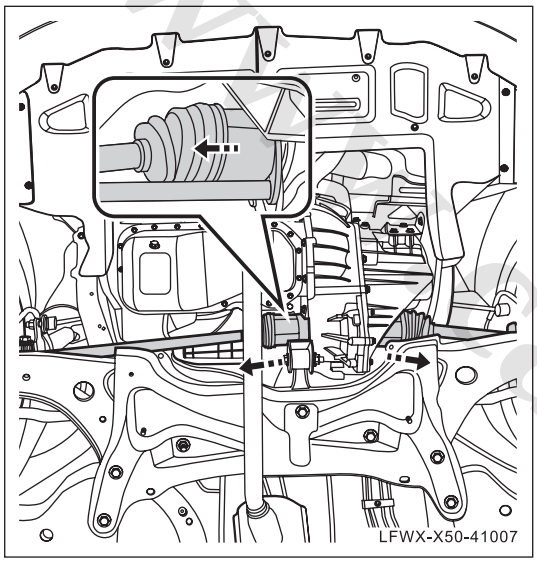
(a) Turn the front brake with the steering knuckle assembly to a proper angle.

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(b) Pull out the drive shaft in wheel side from the steering knuckle hub.



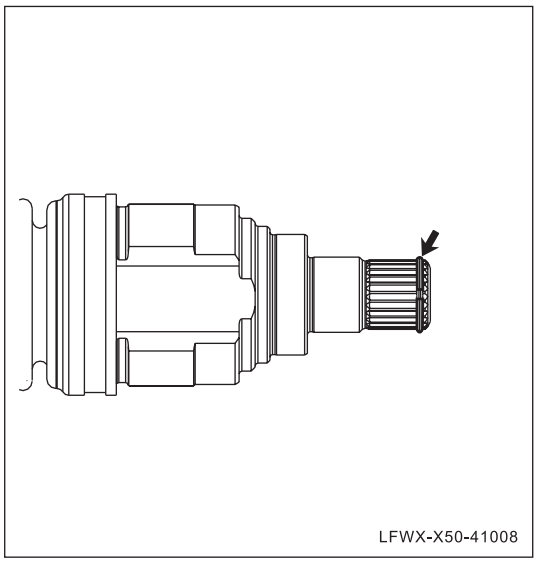
(c) Pull out the drive shaft assembly from the transmission.

△ HINT:

Drive shaft remover or equivalent tool must be used to remove the drive shaft assembly; do not use heavy-duty tool to knock directly the drive shaft assembly. Otherwise the drive shaft will be damaged.

NOTICE:

- **Pay attention not to damage dust cover and oil seal.**
- **Pay attention not to drop drive shaft.**
- **Do not directly pull the drive shaft assembly as it may cause the drive shaft's left/right tripod universal joint end falling down, even damaging the dust-proof rubber boot.**



6. INSTALL THE DRIVE SHAFT ASSEMBLY

(a) Check if the spring retainer ring on the transmission side of drive shaft assembly is installed in place.

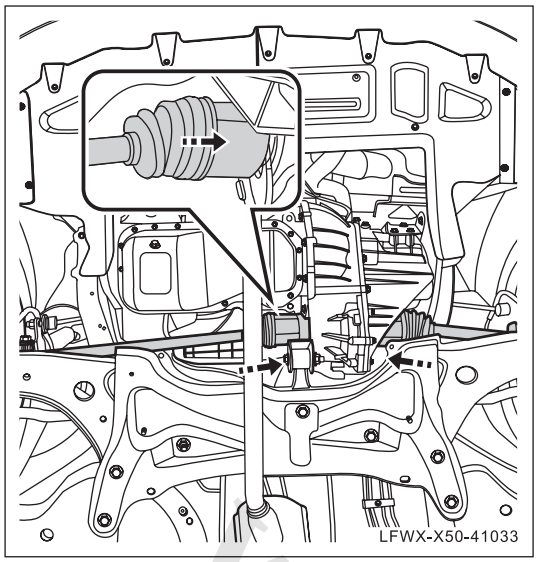
△ HINT:

Try to replace the snap ring after each removal and installation.

(b) Apply gear oil on the universal joint spline shaft on the transmission side of drive shaft.

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(c) Align the internal end of drive shaft with the differential center hole; gently rotate the drive shaft to fit the spline gear and then push it into forcefully; and then install the transmission side of drive shaft into the differential.

△ HINT:

- Through rotation of drive shaft, by hearing sound and feeling, or gently pulling the drive shaft, you can know whether spine shaft of universal joint on transmission side is installed in place.
- You can use a rubber hammer to knock the drive shaft assembly to punch the universal joint spline shaft into the differential.

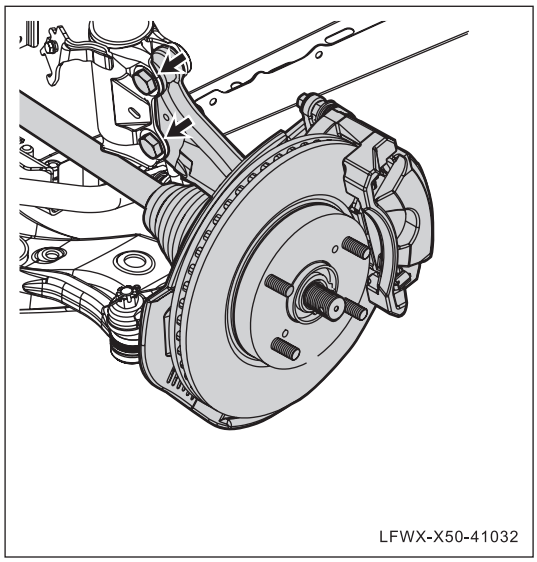
NOTICE:

- **While installing, opening of spring retainer ring should be placed downwards.**
- **Pay attention not to damage dust cover and oil seal.**

7. INSTALL THE FRONT BRAKE WITH STEERING KNUCKLE ASSEMBLY

(a) Turn the front steering knuckle and then install the drive shaft steering knuckle side onto the steering knuckle wheel hub.





(b) Lift up front steering knuckle, and install connecting bolts and nuts of steering knuckle and front absorber assembly, and tighten them.

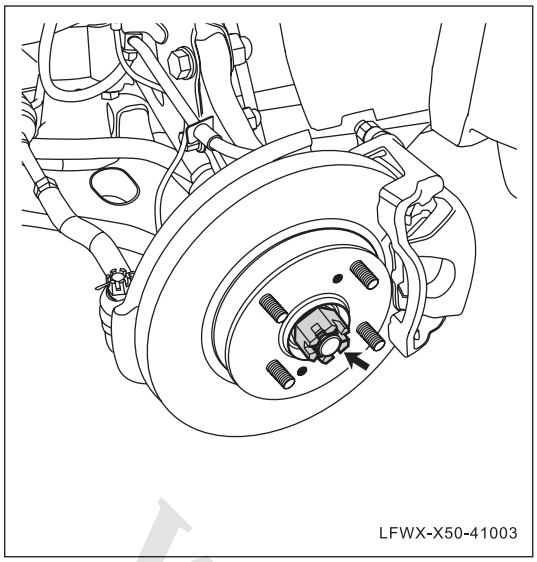
Torque: 200 - 220N•m

NOTICE:

Pay attention to align marks made in removal during installation.

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(c) Install the drive shaft slotted nuts and plain washers and then tighten them to expose cotter pin mounting-hole.

Torque: 180 - 240N•m

△ HINT:

When tightening this slotted nut, you should shift transmission to the 1st-gear and depress the brake pedal for easy tightening and to prevent nut and drive shaft from rotating with the wrench.

NOTICE:

If pin holes are misaligned, further tighten slotted nuts to align its slot with the shaft lock pin hole.

(d) Install the cotter pin.

8. FIX THE BRAKE PIPE AND THE WHEEL SPEED SENSOR WIRE HARNESS AGAIN ON THE ABSORBER BRACKET, AND THEN MOUNT AND TIGHTEN FIXING BOLTS

Torque: 20 - 25N•m

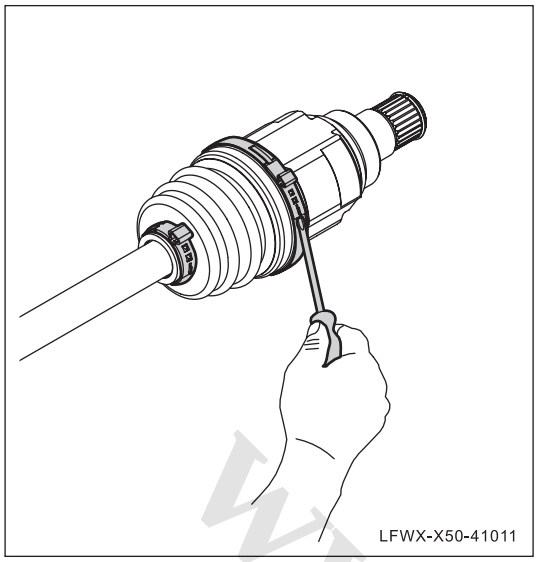
9. INSTALL THE FRONT WHEELS

10. FILL TRANSMISSION GEAR OIL

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DISASSEMBLY AND ASSEMBLY

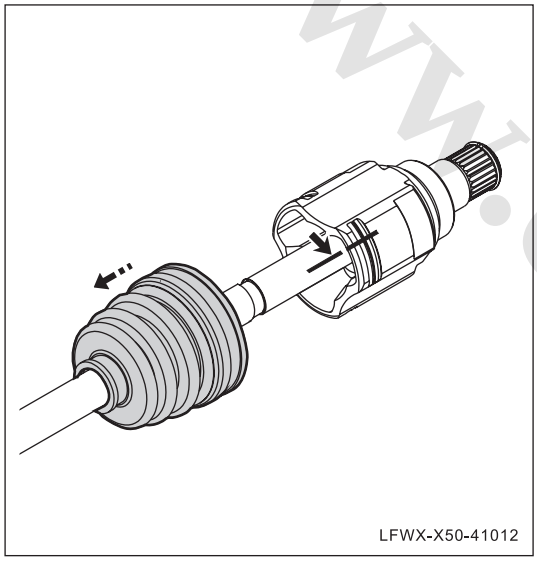


1. DISASSEMBLE THE TRIPOD UNIVERSAL JOINT ASSEMBLY ON THE TRANSMISSIONSIDE.

(a) Pry off large and small clamps on both sides of dust cover in the sliding end of the drive shaft by a screwdriver.

NOTICE:

After the clamps are removed, they must be replaced; do not damage dust cover in the process of removal.



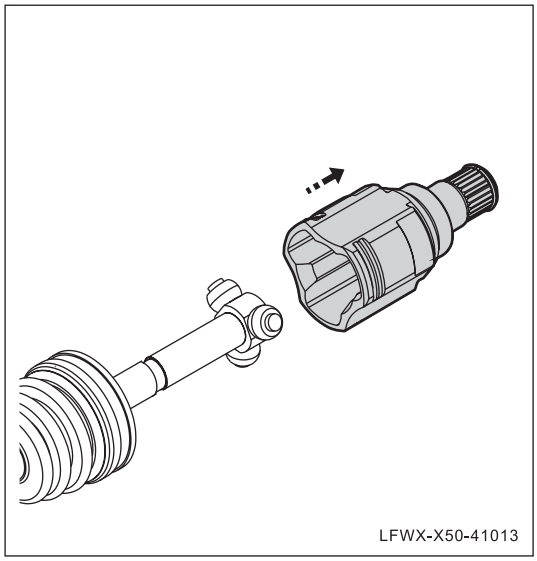
(b) Pull out the dust cover from the tripod universal joint housing and move it toward the center of the drive shaft.

(c) Wipe off grease in the tripod universal joint by a rag or paper towel.

(d) Draw fitting marks in the tripod universal joint housing and the drive shaft.

NOTICE:

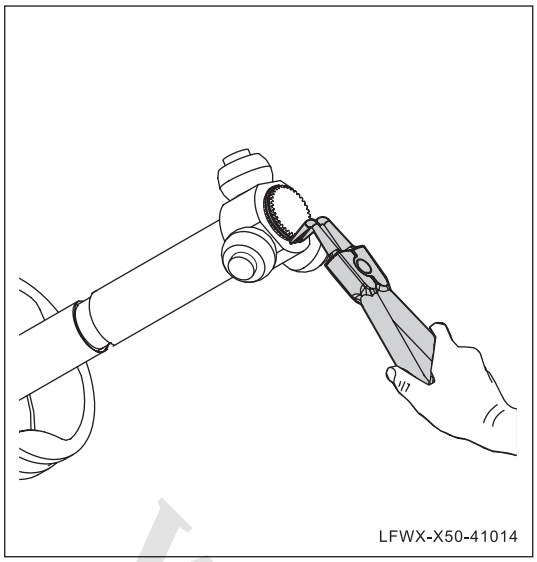
Make marks by a marker pen instead a punch or a chisel.



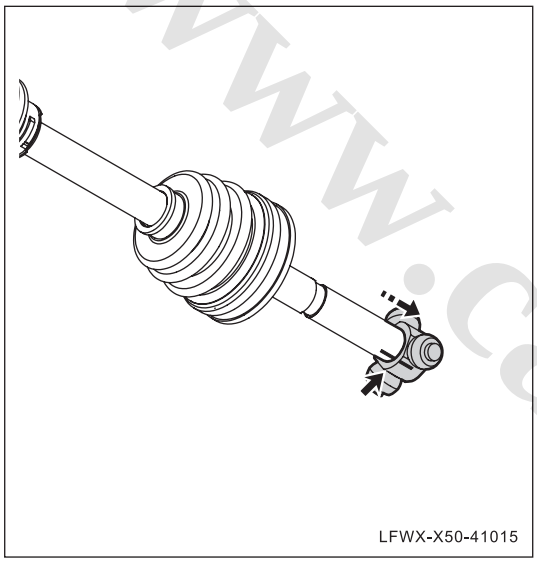
(e) Remove the tripod universal joint from the drive shaft.

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(f) Remove the C-shaped retainer ring inside the drive shaft by a snap ring pliers.



(g) Make marks on the trident shaft for easy installation.

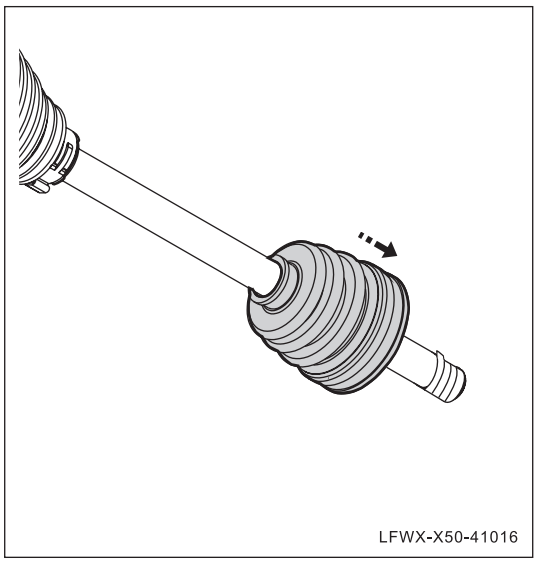
NOTICE:

Make marks by a marker pen instead of a punch or a chisel.

(h) Push off the trident shaft from the drive shaft by a copper rod or a rubber hammer.

NOTICE:

Do not tap the roller in the process of removal.



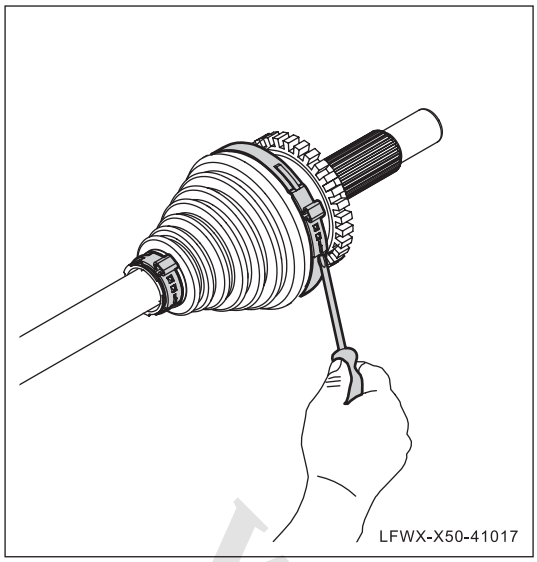
(i) Take down the dust cover from the drive shaft.

NOTICE:

Wrap the spline by tapes to avoid damage of dust cover when taking it down.

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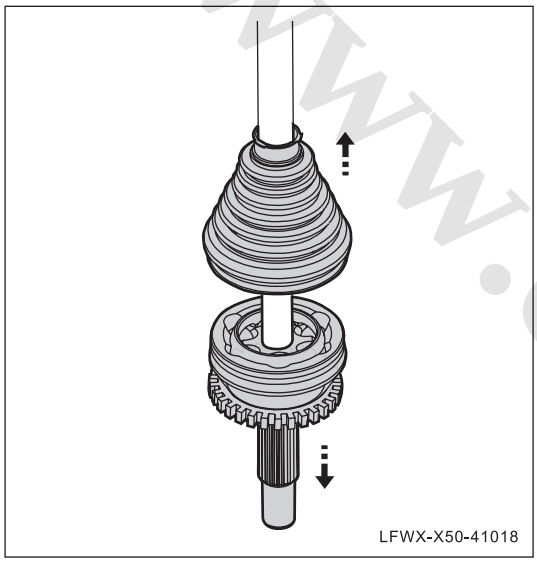


2. DISASSEMBLE THE WHEEL SIDE RZEPPA TYPE UNIVERSAL JOINT ASSEMBLY

(a) Loose large and small clamps on both sides of dust cover on fixed end by a screwdriver.

NOTICE:

Clamps can not be reused. After the clamps are removed, they must be replaced; do not damage dust cover in the process of removal.

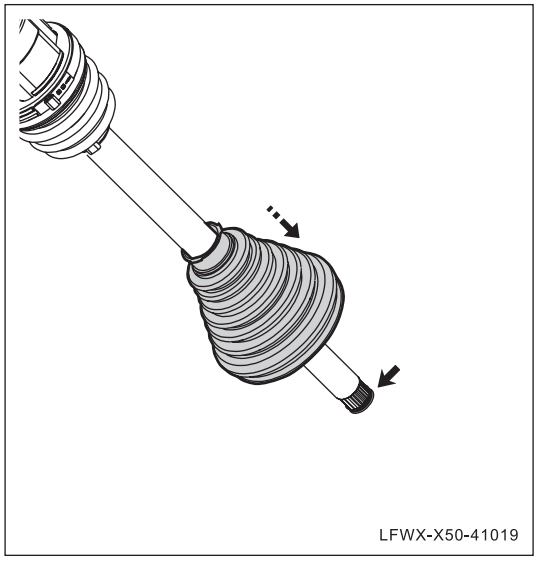


(b) Pull out the dust cover from the rzeppa universal joint assembly and move the seal cover toward the center of the drive shaft.

(c) Pull out the wheel side rzeppa universal joint assembly from the drive shaft.

△ HINT:

Fix the drive shaft by a vise; and then take out the rzeppa universal joint assembly vertically in axial direction by a rubber hammer or a copper rod.



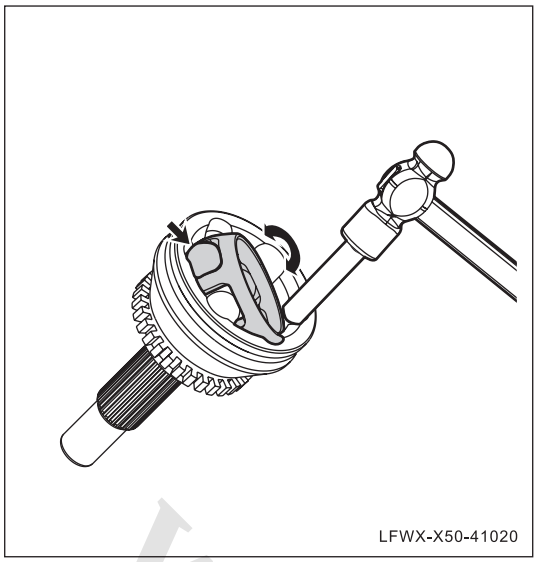
(d) Take down the steel wire retainer ring and the seal cover on the fixed end of the drive shaft.

NOTICE:

Wrap the spline by tapes to avoid damage of dust cover when taking it down.

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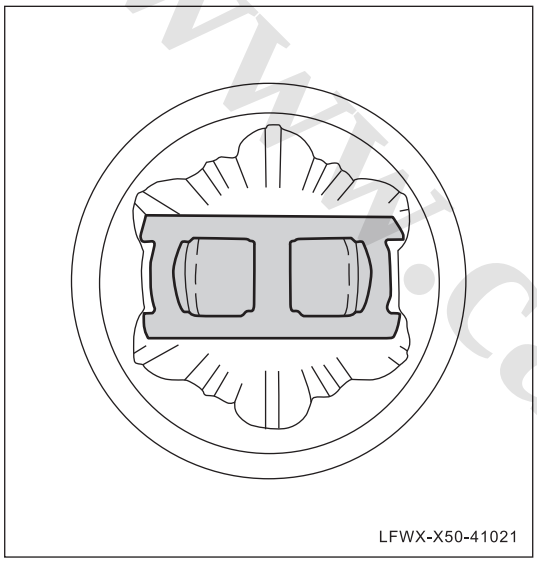

LFWX-X50-41020

(e) Knock the rzeppa universal joint rolling bearing retaining bracket by a copper rod or a hammer to tilt it.

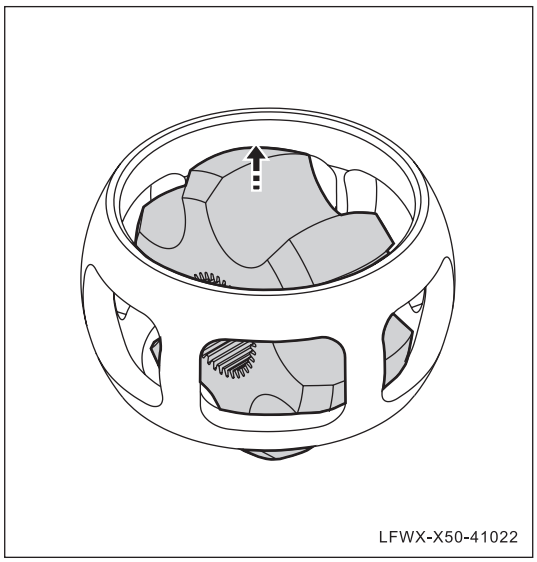
(f) When the rzeppa universal joint rolling bearing keeps tilting, take out the first steel ball.

(g) Tilt the constant velocity universal joint rolling bearing retaining bracket along reverse direction and then take out the opposite steel balls.

(h) Take out each steel ball one by one according to this method.


LFWX-X50-41021

(i) Turn the rzeppa universal joint rolling bearing retaining bracket and the inside wheels to a proper angle and take them out.


LFWX-X50-41022

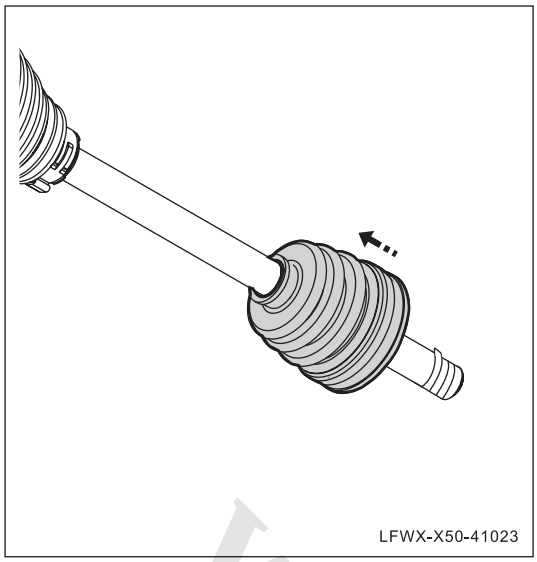
(j) Take out inside wheels from the rzeppa universal joint rolling bearing retaining bracket.

(k) Clean decomposed parts and remove the grease and contaminants; dry all parts by wind.

(l) Check if parts of the rzeppa universal joint assembly are worn, broken or damaged abnormally; replace the parts if necessary.

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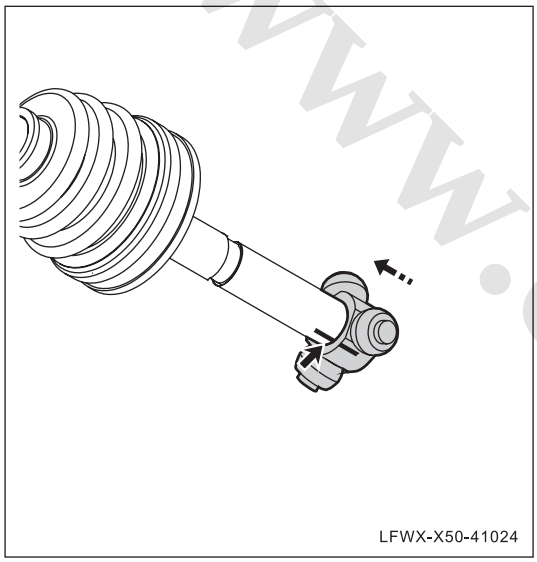

LFWX-X50-41023

3. ASSEMBLE THE TRIPOD UNIVERSAL JOINT ASSEMBLY ON THE TRANSMISSION SIDE

(a) Wrap the spline of drive shaft by tapes to avoid damage of dust cover and install the dust cover on the sliding end onto the shaft.

NOTICE:

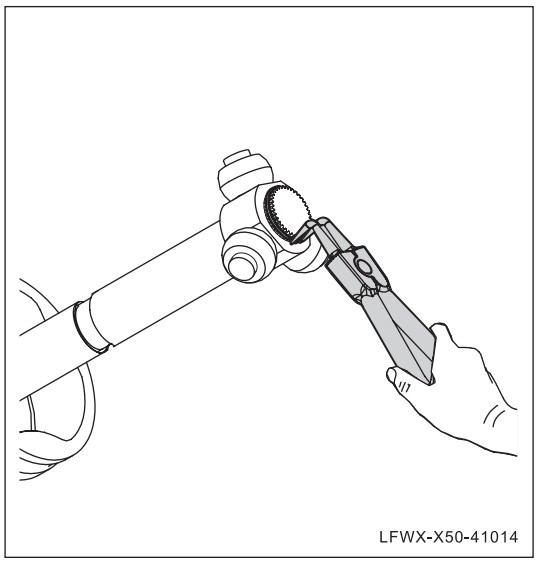
- **Clamp of dust cover can not be reused.**
- **After installation, remove the tapes wrapping around the spline of drive shaft.**


LFWX-X50-41024

(b) Install the trident shaft aligning with the marks.

NOTICE:

Install the trident shaft by a copper rod or a rubber hammer.

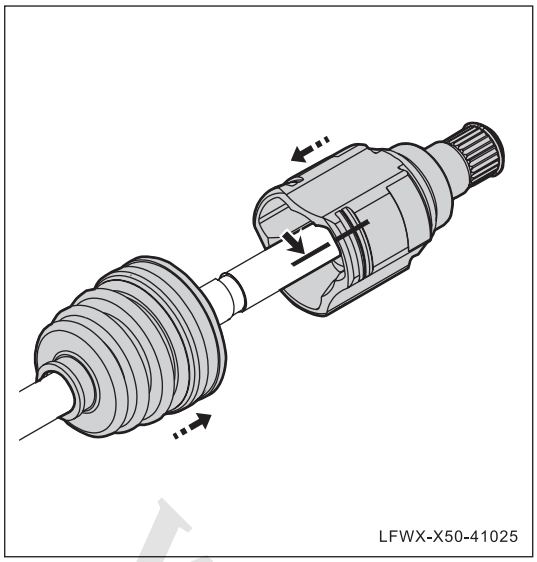

LFWX-X50-41014

(c) Install the C-shaped retainer ring inside the drive shaft.

(d) Apply grease on the trident shaft assembly.

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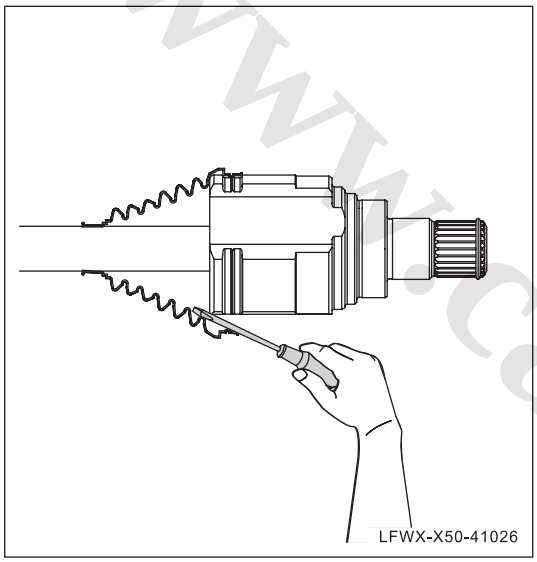
(e) Align with the marks and install the drive shaft tripod universal joint on the transmission side.

(f) Add a proper amount of grease.

(g) Install the dust cover on the sliding end onto the constant velocity universal joint.

NOTICE:

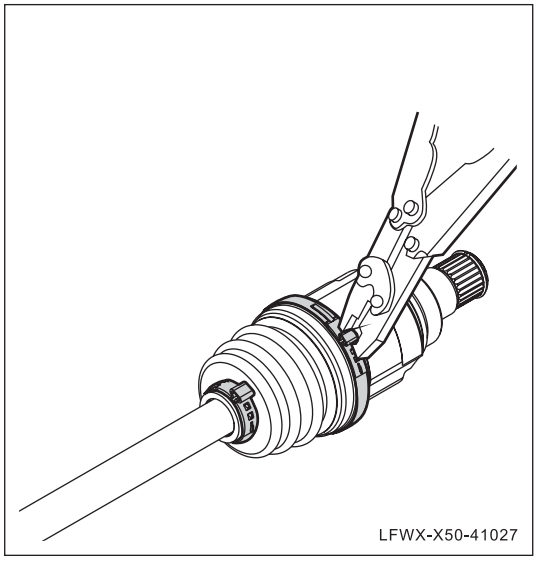
If the grease is sticked onto the fixing surface of dust cover, the dust cover may fall off. Therefore, have the grease on the surface cleared completely when installing the dust cover.



(h) Insert the flat end screwdriver from the large diameter side of the dust cover on the sliding end and bleed the air inside; adjust installation length of dust cover and avoid deformation of dust cover.

NOTICE:

- **If the dust cover installation length is too big, it may cause damage to dust cover.**
- **Be careful to use a flat end screwdriver to avoid damage to the dust cover.**



(i) Install new sliding end dust cover clamp.

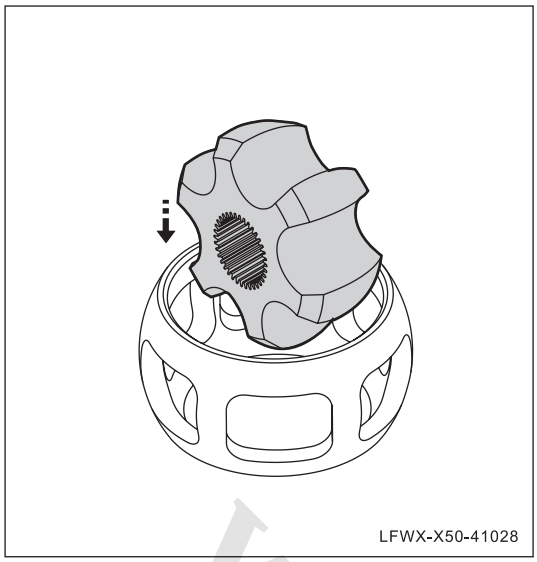
(j) Tighten new dust cover clamp by a tool.

NOTICE:

The removed dust cover clamp must be replaced, and the dust cover clamp can not be reused.

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LFWX-X50-41028

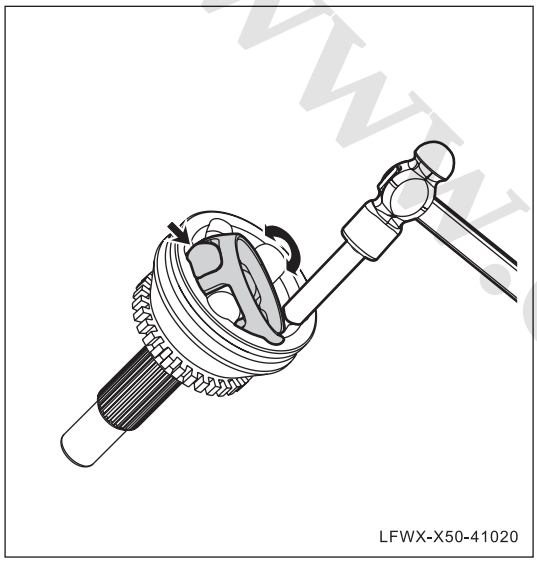
4. ASSEMBLE THE WHEEL SIDE RZEPPA TYPE UNIVERSAL JOINT ASSEMBLY

(a) Install the inside wheel to the rolling bearing retaining bracket.

(b) Turn the rolling bearing retaining bracket and the inside wheels for a proper angle and install it into the rzeppa universal joint.

NOTICE:

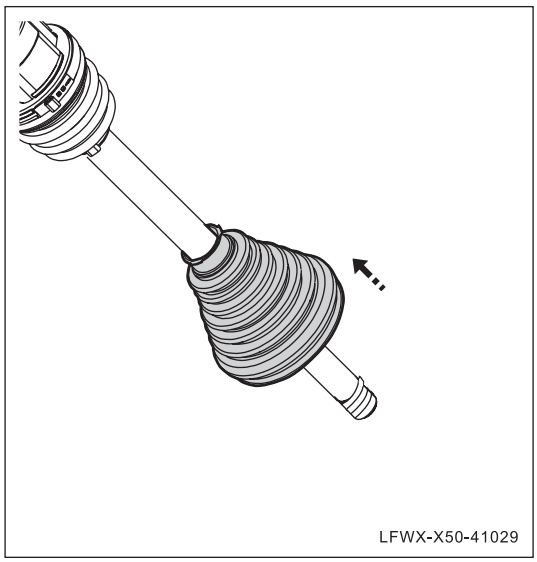
Make sure that the side with the inside wheel fixed ring should face the drive shaft journal.


LFWX-X50-41020

(c) Install the first steel ball; and then tilt the universal joint rolling bearing retaining bracket towards reverse direction and then fit the opposite steel ball.

(d) Install each steel ball one by one according to this method.

(e) Apply a proper amount of grease on the jagged holes of universal joint subassembly until grease starts flowing out from the circular groove and the jagged holes. After applying grease, clear grease flowing out by a cloth.


LFWX-X50-41029

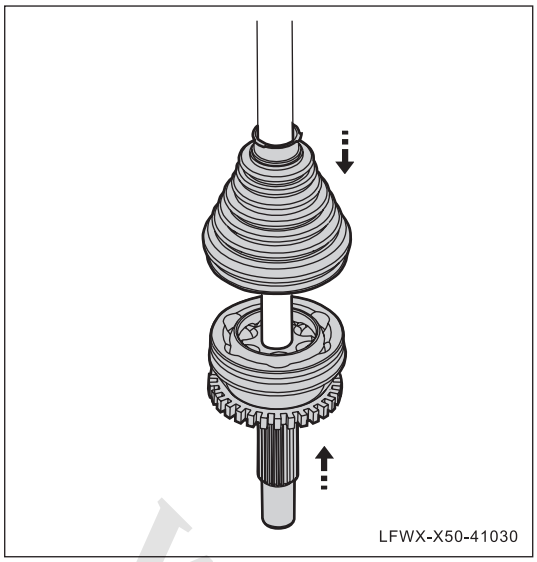
(f) Wrap the spline of drive shaft by tapes to avoid damage to the seal. Install the dust cover on the fixed end onto the shaft.

NOTICE:

- **Do not reuse dust cover clamps.**
- **Remove the tapes wrapping around the drive shaft spline after installation.**

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(g) Install the steel wire retainer ring on the fixed end onto the drive shaft; place the rzeppa universal joint vertically and then insert the drive shaft into the center hole of the rzeppa universal joint until it is installed to the bottom.

△ HINT:

Confirm that the universal joint subassembly is correctly engaged when rotating the drive shaft.

(h) Fill a proper amount of grease evenly from the large diameter side of dust cover on the fixed end.

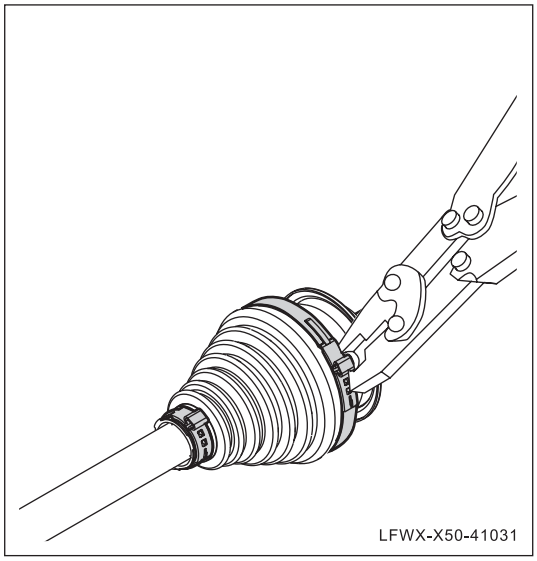
NOTICE:

- **If the grease is sticked onto the fixing surface of dust cover, the dust cover may fall off. Therefore, have the grease on the surface cleared completely when installing the dust cover.**
- **Clear all the grease on the surface of dust cover completely.**

(i) Insert the flat end screwdriver from the large diameter side of dust cover on the fixed end and bleed the air inside; adjust installation length of dust cover and avoid deformation of dust cover.

NOTICE:

- **If the dust cover installation length is too long, it might cause damage to dust cover.**
- **Be careful to use a flat end screwdriver to avoid damage to the dust cover.**



(j) Install new fixed end dust cover clamp.

(k) Tighten new dust cover clamp by a tool.

NOTICE:

Do not reuse dust cover clamps.

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Service Brake

Service brake 51-1
System description 51-1
Preparation 51-1
Service data 51-2
Precautions 51-3
Components 51-4
Function and fault of components 51-5
On-vehicle inspection 51-6
Diagnosis 51-8
Fault symptom table 51-8
Fault diagnosis 51-10
Brake pedal 51-20
Adjustment 51-20
Replacement 51-22
Brake master cylinder 51-24
Inspection 51-24
Replacement 51-24
Vacuum booster 51-28
COMPONENTS 51-28
Inspection 51-29
Replacement 51-30
Brake fluid 51-34
Replacement 51-34
Exhaust 51-35
Front brake 51-37
Components 51-37
Inspection 51-38
Replacement 51-40
Rear brake 51-43
Components 51-43
Replacement 51-44
Brake pipeline 51-48
Components 51-48
Replacement 51-49
Brake switch and fluid level switch ...51-52
Replacement 51-52

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SERVICE BRAKE

SYSTEM DESCRIPTION

1. FUNCTION

As an necessary part of a vehicle for running normally, the service brake system can slow down or stop the vehicle. Meanwhile, the service brake system ensures the driving safety of a vehicle. It slows down the vehicle speed immediately when the vehicle is in an emergency to ensure the safety of the vehicle and passengers.

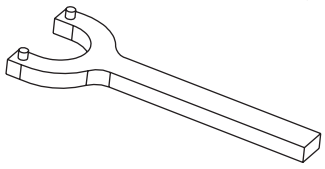
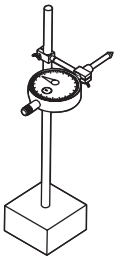
2. COMPONENTS

The service brake system consists of brake pedal, vacuum booster mechanism, brake master cylinder, brake pipeline, ABS, brake caliper, lining and brake disc.

3. WORKING PRINCIPLE

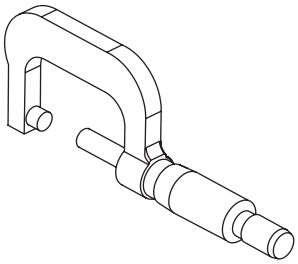
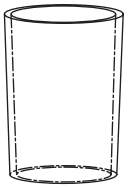
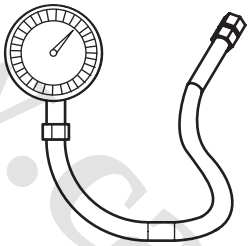
The driver depresses the brake pedal activating the vacuum booster. And the vacuum booster pressurizes the fluid in the brake master cylinder to make it flow into the ABS control unit, then the fluid flows into the brake calipers piston of the four wheels after being allocated and gives force to the lining to compress the brake disc, so as to slow down the vehicle.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Pipe wrench		For removing the nuts of pipe joints
2	Rear brake piston remover		For Removing the rear brake cylinder piston
3	Dial gauge		For measuring the front and rear brake disc

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S/N	Tools	Outline diagram	Description
4	Micrometer		For measuring the brake disc thickness
5	Cup		For collecting brake fluid
6	Pressure gauge		For measuring the vacuum booster

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Brake pedal height above ground		100±5mm
Front and rear brake lining	Standard thickness	12mm
	Wear limit thickness	2mm
Front brake disc	Standard thickness	22mm
	Wear limit thickness	20mm
Rear brake disc	Standard thickness	9mm
	Wear limit thickness	7mm
Maximum swinging amount of brake disc		0.2mm
Brake fluid model		DOT4
Brake fluid filling amount		0.6L

2. TIGHTENING TORQUE TABLE

Item	N•m
Locking nut of brake pedal switch	20 - 26
Nut for connecting brake master cylinder to vacuum booster	20 - 26
Joints of brake hard pipe	12 - 18
Nuts for connecting the vacuum booster and the vehicle body	20 - 26

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Item	N•m
Fixing bolt of brake caliper	30 - 36
Fixing bolt of brake caliper bracket	80 - 100
Hollow bolt of front brake hose	35 - 40
Hollow bolt for rear brake hose	35 - 40
Wheel speed sensor wire harness bracket fixing bolt	20 - 26

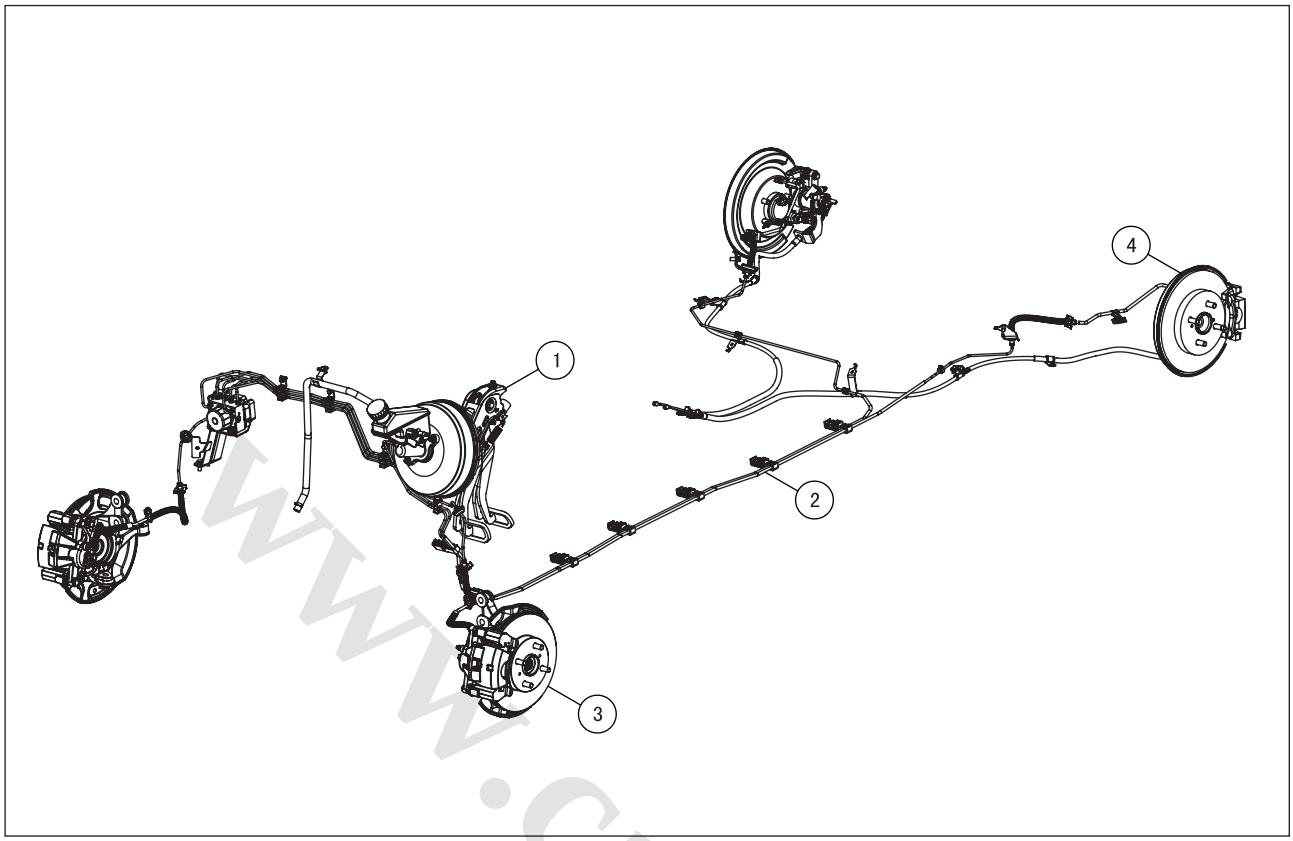
PRECAUTIONS

1. The performance of the service brake seriously affects driving safety, so be sure to keep the service brake always at it its best performing state. Repair it in time in case of any fault.
2. Be sure to check and maintain the service brake system regularly to eliminate potential safety hazard.
3. Be sure to use the brake fluid recommended by LIFAN and do not mix it with brake fluid of other models.
4. Never replace brake fluid with other fluids to avoid damage to hydraulic system components.
5. Brake fluid is rather corrosive, so do not allow fluid to spill onto your skin and the vehicle body paint when maintaining the brake system. If contamination occurs by accident, wash immediately with plenty of clean water.
6. Be sure to prevent the lining and the brake disc from being contaminated by oil dirt. If contamination occurs, grind it clean with a piece of gauze.
7. Do not depress the brake pedal while removing the brake caliper piston to prevent the piston from springing out, damaging the dust cover.
8. In the process of repair, the brake slave cylinder and the brake lining must be cleaned completely to minimize damage resulting from the particles in air or other substances.
9. Clean all parts of the brake caliper by clear brake fluid when repairing the brake caliper.
10. Do not reuse the exhausted brake fluid and it should be stored in a special sealing container.
11. Observe the brake fluid level in the reservoir while bleeding the brake system. If the level is below the lowest mark, add brake fluid immediately.
12. After bleeding the brake system and adding brake fluid, check the brake system for leakage. In case of leakage, immediately repair it to ensure the driving safety.

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COMPONENTS



1	Brake control mechanism	3	Front brake
2	Brake pipeline	4	Rear brake

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Brake pedal	The control mechanism of the brake system, making the brake system perform at the driver's willing.	Free stroke, operating stroke and pedal reserve distance is abnormal	Brake performance is poor
Vacuum booster	Acting as a booster through transferring and magnifying the force of the brake pedal	Leakage and short of vacuum degree	Brake performance is poor with noise, and the brake pedal is heavy
Vacuum check valve	Making air flow in one direction forming vacuum in the vacuum booster	Damage	Brake performance is poor and the brake pedal is heavy
Brake master cylinder	Applying force to the brake fluid to be transmitted to every brake piston, then the pistons pushed to compress the lining	Leakage and stuck	Brake performance is poor, the brake fails and the brake is blocked
Brake caliper	Supporting the brake piston and the lining	The brake piston is stuck	Brake performance is poor, the brake fails and the brake is blocked
Lining	Providing friction force to the brake disc to slow down the vehicle	Excessove wear, contamination of oil dirt on the surface and the brake clearance is too less	Brake performance is poor, the brake fails, the brake deviates and the brake is blocked
Brake disc	Connectted to the wheel hub and transferring the resistance generated by rubbing with the lining to the wheels to slow down the vehicle	Excessove wear, thickness difference is too much, twist and contamination of oil dirt	Brake has strange noise, abnormal heating and the brake deviates
Hydraulic pipeline	Transferring brake fluid	Leakage and breakage	Brake performance is poor, the brake fails and the brake is blocked
Bolt	Tightening parts and components	Looseness	Brake performance is poor, the brake fails and brake has strange noise

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ON-VEHICLE INSPECTION

1. CHECK ALL THE PARTS IN THE SERVICE BRAKE SYSTEM FOR DAMAGE AND OIL LEAKAGE

(a) Check for oil leakage between the brake master cylinder and the booster.

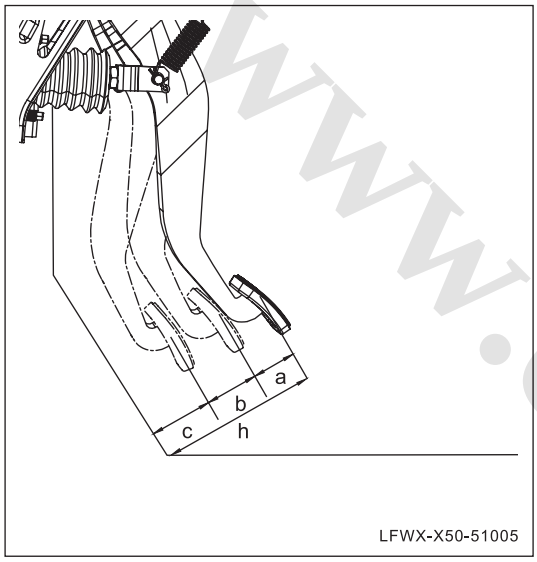
(b) Check for any damage or oil leakage on pipe connectors around the brake master cylinder and the booster.

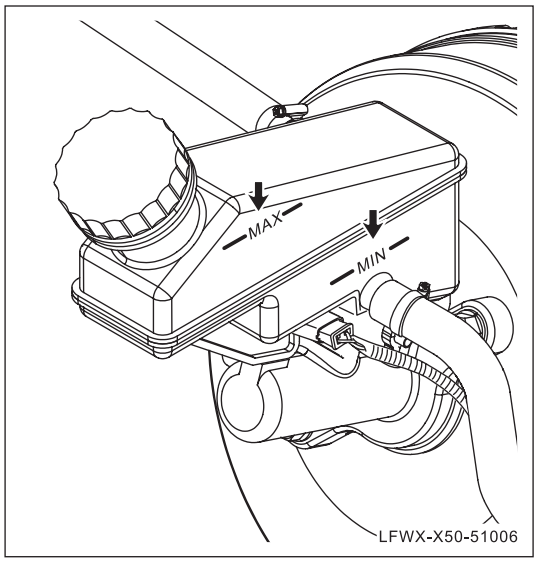
(c) Check for any leakage on the installation surface of master cylinder and brake oil reservoir, and the brake pipe connector.

(d) Check if pipe connectors and the integrated bolt connectors are damaged or leak oil;

(e) Check the hose and the pipeline for oil leakage.

(f) Check whether the pipeline is twisted or bent excessively.





2. INSPECT THE BRAKE PEDAL

(a) Measure the height (h) from the brake pedal to the floor. Adjust the brake pedal, if it is too low or high.

Height to floor (h): 100 ± 5 mm

(b) When the ignition switch is in "LOCK" position, push the brake pedal with hands until the pedal becomes heavy to check free stroke “a” of the brake pedal. Adjust it if free stroke “a” exceeds the specified value.

(c) Depress the brake pedal with force and measure the overall pedal stroke. Overall pedal stroke minus free stroke is brake pedal operating stroke "b".

(d) Depress the brake pedal with force and measure the distance from the pedal to the floor which is pedal reserve distance "c".

3. CHECK THE BRAKE FLUID

(a) Inspect whether brake fluid in brake fluid reservoir is between the "MAX" and "MIN"scales. If it is lower than "MIN"scale, fill brake fluid.

(b) If fluid level is too low, inspect whether there is any leakage around the brake fluid reservoir and the brake system. If any, replace the brake fluid reservoir or the leaked oil pipe.

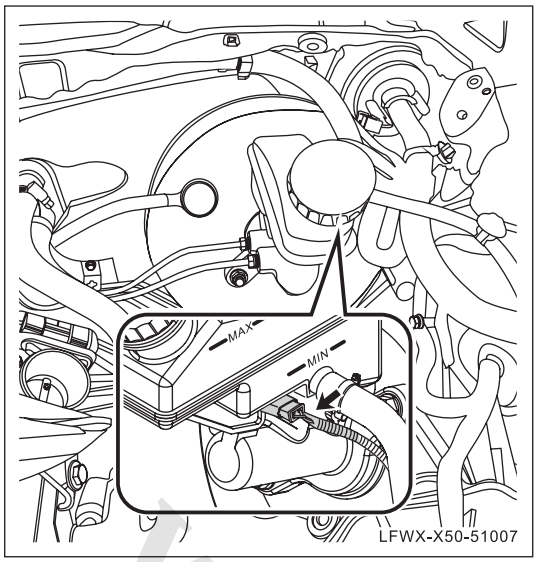
NOTICE:

If it is found that the brake system has oil leakage or brake fluid leaks, replace relevant parts.

(c) Starting the vehicle, release the parking brake lever and observe the brake warning lamp. If the lamp does not go out, check the service brake switch and the brake fluid level switch for faults.

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4. CHECK THE BRAKE FLUID LEVEL SWITCH

(a) Disconnect the connector of the brake fluid switch.

(b) Drain out the brake fluid from the brake fluid reservoir completely. When the floater locates at the bottom, be sure it is connected before measuring with a multimeter

(c) Fill brake fluid into the brake fluid reservoir to the level of "MAX". When the floater locates at the top, be sure it is not connected before measuring with a multimeter.

(d) Connect the connector of the brake fluid level switch.

5. INSPECT THE BRAKE SWITCH

(a) Remove the brake switch.

(b) Check if the brake pedal switch operates normally; if not, replace it.

- When the brake switch is in free state, inspect the 2 terminals of the brake pedal switch with a multimeter at its Ohm range. Be sure it is connected, if not, have the brake switch replaced.
- If the terminals are not connected when pressing the switch more than 4mm, but the terminals are connected after released, this indicates the brake pedal switch is in normal operation.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Brake performance is poor	1. Brake hydraulic system (with air)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (1. Brake performance is poor)
	2. Oil pipe connector (loosen or pipe leaks)	
	3. Brake pipeline (blocked)	
	4. Brake master cylinder, slave cylinder piston cup (deformed, aging, damaged or seized due to expansion)	
	5. Brake lining (badly worn, surface hardened, and with oil dirt)	
	6 . Brake pedal stroke (too large)	
	7. Vacuum booster (damaged)	
	8. Brake fluid (insufficient) or brake pipeline (clogged)	
	9. Holes of brake master cylinder and slave cylinder (badly worn)	
	10. Slave cylinder piston (seized and it can not move)	
	11. Brake disc (seriously warpped and deformed)	
	12. Vacuum check valve is damaged	
Brake is blocked	1. Brake pedal (without free play)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (2. Brake is blocked)
	2. Maladjustment of parking brake (fail to be disengaged completely)	
	3. Brake pipeline (blocked, and clogged oil return)	
	4. Piston of brake master or slave cylinder (seized, and failed to return)	
	5. Brake disc (serious warpped and deformed)	
	6. Brake caliper (loose or imbalanced)	
	7. Brake caliper (seized or stuck)	
	8. Brake lining (cracked or deformed)	
	9. Brake lining (with dirts)	
	10. Vacuum booster (bad airtight with air leak)	

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Symptom	Suspected area	Recommended action
Brake fails	1. Brake fluid (too low)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (3. Brake fails)
	2. Brake pipeline (broken or loose)	
	3. Brake hydraulic system (with air)	
	4. Brake master cylinder or slave cylinder (sealing parts fails)	
	5. ABS control unit (failure)	
	6. Mechanical connection part (falling)	
Brake pedal is soft	1. Brake pipeline (leakage)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (4. Brake pedal is soft)
	2. Slave cylinder piston (leakage and the cup is damaged)	
	3. Brake master cylinder (leakage and the cup is damaged)	
Brake pedal is heavy	1. Vacuum brake booster (failure)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (5. Brake pedal is heavy)
	2. Vacuum tube (broken or loose)	
	3. Piston of brake master cylinder and slave cylinder (stuck)	
	4. Vacuum check valve (damaged)	
There is abnormal noise when braking	1. Brake caliper sleeve (poor lubrication)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (6. There is abnormal noise when braking)
	2. Noise insulation clamp (improper installation)	
	3. Brake disc (badly worn)	
	4. Brake caliper, suspension system and bushing (loose)	
	5. Brake disc (thickness difference is too much)	
Braking deviates	1. Air pressure between the left/right wheel tires (large difference)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (7. Braking deviates)
	2. Clearance between the left/right wheel brake lining and the brake disc (large difference)	
	3. Specific brake lining (badly worn, hardening or poor contact)	
	4. Specific brake lining (adhered with oil or grease)	
	5. Front wheel alignment (misalignment)	
	6. Suspension guide mechanism (severely deformed)	
Brake disc emits heat abnormally	1. Brake pedal (stroke is too small)	See 51 - Service Brake, Diagnosis, Fault Diagnosis (8. Brake disc emits heat abnormally)
	2. Piston of brake master or slave cylinder (seized)	
	3. Lining (incorrect installation)	

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FAULT DIAGNOSIS

1. BRAKE PERFORMANCE IS POOR

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Eliminate electronic control faults of brake system
1	Check the status of the brake system	Normal	Faulty	Instruction
	Operate the brake pedal and check the brake performance in different conditions	Go to Step 2	1. Depress the brake pedal. If the pedal is low, depress it for several times successively, then the pedal height increases and the brake performs better	1. Judge that the free stroke of the brake pedal is too much (see 51 - Service Brake, Brake Pedal, Adjustment)
			2. Depress the brake pedal. If the pedal is low, depress it for several times successively, and the pedal height is still low. Besides, the master cylinder piston does not return after depressing the pedal for the first time.	2. Judge that the brake master cylinder is damaged (see 51 - Service Brake, Brake Master Cylinder, Inspection)
			3. Depress the pedal for several times successively and the pedal keeps the height. The pedal goes down slowly or quickly.	3. Judge that the brake hydraulic system leaks and is short of fluid (see 51 - Service Brake, On-Vehicle Inspection)
			4. Depress the pedal for several time successively and the pedal goes higher with elasticity	4. Judge that air enters into the brake system (see 51 - Service Brake, Brake Fluid, Exhaust)
			5. Depress the pedal for several times successively to its bottom but feeling no reaction of the pedal	5. Judge that the brake fluid reservoir is short of fluid (see 51 - Service Brake, Brake Fluid, Replacement)
			6. Depress the pedal for several times successively, and the pedal is soft to depress and its height is low	6. Judge that the brake hydraulic system is blocked (see 51 - Service Brake, Service Brake, On-Vehicle Inspection)
			7. Depress the pedal pedal and the pedal height is proper, but the pedal is too hard to depress and the brake performance is poor	7. Judge that the brake vacuum booster system fails (see 51 - Service Brake, Vacuum Booster, Inspection)

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Steps	Inspection Item	Inspection result		
2	Check brake fluid	Normal	Faulty	Instruction
	Check the remaining status of brake fluid	Go to Step 3	Brake fluid is insufficient	Refill brake fluid
3	Check the operating parameter of the brake pedal	Normal	Faulty	Instruction
	Check the height, free stroke and reserve distance of the brake pedal	Go to Step 4	1. The brake pedal height exceeds the specified range 2. The brake pedal free stroke exceeds the specified range 3. The brake pedal reserve distance exceeds the specified range	Adjust the operating parameter of the brake pedal (see 51 - Service Brake, Brake Pedal, Adjustment)
4	Check for brake fluid leakage	Normal	Faulty	Instruction
	Lift the vehicle and check the brake hydraulic system for leakage	Go to Step 5	Obvious leakage exists	Replace the parts that leaking fluid
5	Check the brake lining	Normal	Faulty	Instruction
	Check the wear condition of the brake lining	Go to Step 6	1. The lining is badly worn 2. The lining has oil dirt 3. The lining is hardened	1. Replace the lining (see 51 - Service Brake, Front Brake/ Rear Brake) 2. Check the resource for oil dirt 3. Replace the lining (see 51 - Service Brake, Front Brake/ Rear Brake)
6	Check the vacuum booster	Normal	Faulty	Instruction
	Check the working condition of the vacuum booster system (see 51 - Service Brake, Vacuum Booster, Inspection)	Go to Step 7	The vacuum booster system fails	Replace the failed parts (see 51 - Service Brake, Vacuum Booster, Replacement)
7	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 8	The brake master cylinder fails	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
8	Check the brake disc	Normal	Faulty	Instruction
	Check the working condition of the brake disc (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 9	1. The brake disc has oil dirt 2. The measuring parameter of the brake disc exceeds the specified value	1. Check the resource for oil dirt 2. Replace the brake disc (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
9	Check the brake slave cylinder	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 10	The brake piston in the brake caliper is stuck	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
10	Verification and check	Normal	Faulty	Instruction
	Operate the brake system and recheck the brake performance	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

2. BRAKE IS BLOCKED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Troubleshoot brake system for electronic control faults (see 53 - ABS, Diagnosis)
1	Check the parking brake	Normal	Faulty	Instruction
	Release the parking brake completely and check the rotation condition of each wheel	Go to Step 2	Blocked symptom exists	Adjust the parking brake (see 52 - Parking Brake, Parking Brake Control, Adjustment)
2	Check for blocked symptom	Normal	Faulty	Instruction
	Perform the brake operation continuously and check that all the brake discs have the same heat generating condition.	Go to Step 3	Specific brake discs emit heat abnormally	Judge that it is the brake itself that causes blocked symptoms. Check and repair the brake (see 51- Service Brake, Front Brake/Rear Brake)
3	Check the free stroke of the brake pedal	Normal	Faulty	Instruction
	Measure the free stroke of the brake pedal (see 51 - Service Brake, Service Brake, On-vehicle inspection	Go to Step 4	The brake pedal free stroke exceeds the specified value	Adjust the free stroke of the brake pedal (see 51 - Service Brake, Brake Pedal, Adjustment)
4	Check the performance of the pedal spring	Normal	Faulty	Instruction
	Check the performance condition of the brake pedal spring	Go to Step 5	Spring fails	Replace the pedal spring and the pedal assembly (see 51 - Service Brake, Brake Pedal, Replacement)
5	Check the brake fluid return	Normal	Faulty	Instruction
	Open the brake fluid reservoir cap, depress the brake pedal to the bottom and release it suddenly. Check the fluid condition in the brake fluid reservoir	Go to Step 6	The brake fluid level is still or with tiny fluctuation	Judge that the brake fluid return is poor and the hydraulic system is mixed with air and blocked

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Steps	Inspection Item	Inspection result		
6	Check the vacuum booster return	Normal	Faulty	Instruction
	Check the return condition of the vacuum booster	Go to Step 7	The booster cannot return or returns hard	Replace the vacuum booster (see 51 - Service Brake, Vacuum Booster, Replacement)
7	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 8	The brake master cylinder is stuck	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
8	Check the brake slave cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 9	The brake piston in the brake caliper is stuck	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
9	Verification and check	Normal	Faulty	Instruction
	Operate the brake system and recheck the brake performance	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

3. BRAKE FAILS

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Troubleshoot brake system for electronic control faults (see 53 - ABS, Diagnosis)
1	Check brake fluid	Normal	Faulty	Instruction
	Check the remaining status of brake fluid	Go to Step 2	Brake fluid	Fill brake fluid (see 51 - Service Brake, Brake Fluid, Replacement)
2	Check the system connection	Normal	Faulty	Instruction
	Check the connection status of each connection part of the system	Go to Step 3	Some connections fall off	Reinstall the connections that falling off
3	Check for brake fluid leakage	Normal	Faulty	Instruction
	Lift the vehicle and check the brake hydraulic system for leakage	Go to Step 4	Obvious leakage exists	Replace the parts that leaking fluid
4	Check the brake fluid return	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Open the brake fluid reservoir cap, depress the brake pedal fully and release it suddenly. Check the fluid condition in the brake fluid reservoir	Go to Step 5	The brake fluid level is still or with tiny fluctuation	Judge that the brake fluid return is poor and the hydraulic system is mixed with air or blocked
5	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 6	The brake master cylinder is stuck	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
6	Check the brake slave cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 7	Piston of salve cylinder gets stuck	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
7	Verification and check	Normal	Faulty	Instruction
	Operate the brake system and recheck the brake performance	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

4. THE BRAKE PEDAL IS SOFT TO DEPRESS

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Troubleshoot brake system for electronic control faults (see 53 - ABS, Diagnosis)
1	Check brake fluid	Normal	Faulty	Instruction
	Check the remaining status of brake fluid	Go to Step 2	Brake fluid is insufficient	Fill brake fluid (see 51 - Service Brake, Brake Fluid, Replacement)
2	Check the pipeline connection	Normal	Faulty	Instruction
	Check the connection status of each connection part of the pipeline	Go to Step 3	Some connections fall off	Reinstall the connections that falling off
3	Check for brake fluid leakage	Normal	Faulty	Instruction
	Lift the vehicle and check the brake hydraulic system for leakage	Go to Step 4	Obvious leakage exists	Replace the parts that leaking fluid
4	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 5	The brake master cylinder has no resistance	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
5	Check the brake slave cylinder	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 6	The sealing parts of the slave cylinder fail	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Depress the brake pedal and recheck its performance	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

5. THE BRAKE PEDAL IS HEAVY TO DEPRESS

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Troubleshoot brake system for electronic control faults (see 53 - ABS, Diagnosis)
1	Check the vacuum booster	Normal	Faulty	Instruction
	Check the working condition of the vacuum booster system (see 51 - Service Brake, Vacuum Booster, Inspection)	Go to Step 2	The vacuum booster system fails	Replace the failed parts (see 51 - Service Brake, Vacuum Booster, Replacement)
2	Check brake fluid for blockage	Normal	Faulty	Instruction
	Open the brake fluid reservoir cap, depress the brake pedal fully and release it suddenly. Check the fluid condition in the brake fluid reservoir	Go to Step 3	The brake fluid is still or with tiny fluctuation	Judge that the brake fluid return is poor and the hydraulic system is mixed with air and blocked (see 51 - Service Brake, Brake Fluid)
3	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 4	The brake master cylinder is stuck	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
4	Check the brake slave cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 5	The piston of the brake salve cylinder is seized	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
5	Verification and check	Normal	Faulty	Instruction
	Depress the brake pedal and recheck its performance	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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6. ABNORMAL NOISE APPEARS WHEN APPLYING THE BRAKE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Conduct road test to find out the parts generating abnormal noise	Diagnosis is completed	1. Abnormal noise appears at one wheel side 2. Abnormal noise appears at other parts	1. Judge that the brake fails 2. Find the cause out from other fault symptoms
1	Check the suspension system	Normal	Faulty	Instruction
	Check the installation status of each part in the suspension system	Go to Step 2	Some parts of in the suspension system are loose or damaged	Tighten or replace the faulty parts
2	Check brake caliper	Normal	Faulty	Instruction
	Check the installation status of the brake caliper and the lubricating status of its sleeve	Go to Step 3	1. The installation of the brake caliper is loose 2. The brake caliper sleeve is in poor lubrication	1. Tighten the brake caliper (see 51 - Service Brake, Front Brake/Rear Brake, Replacement) 2. Lubricate the brake caliper sleeve
3	Check the noise insulation clamp	Normal	Faulty	Instruction
	Check the installation status of the noise insulation clamp	Go to Step 4	The noise insulation clamp is in poor installation	Reinstall the noise insulation clamp (see 51 - Service Brake, Front Brake/Rear Brake, Replacement)
4	Check the brake lining	Normal	Faulty	Instruction
	Check the installation and wear condition of the brake lining	Go to Step 5	1. The lining is badly worn 2. The lining is installed improperly	1. Replace thelining (see 51 - Service Brake, Front Brake/ Rear Brake) 2. Reinstall the lining (see 51 - Service Brake, Front Brake/ Rear Brake)
5	Check the brake disc	Normal	Faulty	Instruction
	Check the working condition of the brake disc (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 6	The measuring parameter of the brake disc exceeds the specified value	Replace the brake disc (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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7. BRAKING DEVIATES

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the type, status and pressure of the tires on both sides	Go to Step 1	1. The wheels are not installed correctly 2. The tires are badly worn 3.The tires have different pressure	1. Reinstall the wheels (see 33 - Wheels and Tires - Wheel Assembly, Replacement) 2. Troubleshoot the cause that the tires are worn 3.Correct the tire pressure (see 33 - Wheels and Tires, Wheels and Tires, On-Vehicle Inspection)
1	Check the suspension system	Normal	Faulty	Instruction
	Visually check the front suspension system status	Go to Step 2	Obvious damage exists in the suspension system	Correct and replace the front suspension system (see 31 - Front Suspension)
2	Check the wheel alignment	Normal	Faulty	Instruction
	Check the front wheel alignment (see 33 - Wheels and Tires, Four Wheel Alignment, Inspection)	Go to Step 3	Wheel alignment is of large deviation	Conduct the wheel alignment operation (see 33 - Wheels and Tires, Four Wheels Alignment, Adjustment)
3	Check the brake lining	Normal	Faulty	Instruction
	Check the wear condition of the brake lining	Go to Step 4	1. The lining is badly worn	1. Replace the lining (see 51 - Service Brake, Front Brake/ Rear Brake)
			2. The lining has oil dirt	2. Check the resource for oil dirt
			3. The lining is hardened	3. Replace the lining (see 51 - Service Brake, Front Brake/ Rear Brake)
4	Check the brake disc	Normal	Faulty	Instruction
	Check the working condition of the brake disc (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 5	1. The brake disc has oil dirt 2. The measuring parameter of the brake disc exceeds the specified value	1. Check the resource for oil dirt 2. Replace the brake disc (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
5	Check brake caliper	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the brake slave cylinder piston	Go to Step 6	The piston of the brake salve cylinder is seized	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
6	Check the brake pipeline	Normal	Faulty	Instruction
	Check the brake pipeline for blockage and leakage	Go to Step 7	The brake pipeline is damaged	Replace the brake pipeline (see 51 - Service Brake, Brake Pipeline, Replacement)
7	Check the ABS control unit	Normal	Faulty	Instruction
	Using a diagnostic scanner, check whether the ABS control unit has fault	Go to Step 8	The ABS control unit fails	Perform according to the DTC (see 53 - ABS, Diagnosis)
8	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

8. THE BRAKE DISC EMITS HEAT ABNORMALLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the status of the brake fault lamp	Go to Step 1	The brake fault lamp is always on	Troubleshoot brake system for electronic control faults (see 53 - ABS, Diagnosis)
1	Check the status of heat emitting	Normal	Faulty	Instruction
	Conduct road test and check the status of heat emitting in brake disc	Go to Step 2	1. All the brake discs emit heat abnormally 2. A certain brake disc emits heat abnormally	1. Judge that the fault cause is not on the brake 2. Reinstall the lining on this side (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
2	Check the free stroke of the brake pedal	Normal	Faulty	Instruction
	Measure the free stroke of the brake pedal (see 51 - Service Brake, Service Brake, On-Vehicle Inspection)	Go to Step 3	The brake pedal free stroke parameter value exceeds the specified value	Adjust the free stroke of the brake pedal (see 51 - Service Brake, Brake Pedal, Adjustment)
3	Check the performance of the pedal spring	Normal	Faulty	Instruction
	Check the performance condition of the brake pedal spring	Go to Step 4	Spring fails	Replace the pedal spring and the pedal assembly (see 51 - Service Brake, Brake Pedal, Replacement)
4	Check the brake fluid return	Normal	Faulty	Instruction

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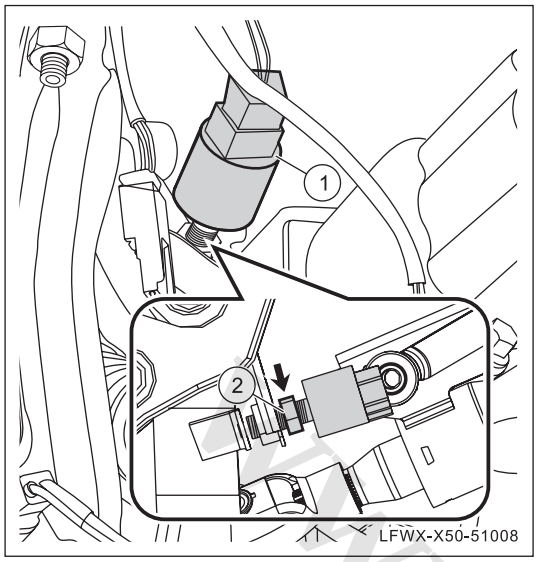
Steps	Inspection Item	Inspection result		
	Open the brake fluid reservoir cap, depress the brake pedal fully and release it suddenly. Check the fluid condition in the brake fluid reservoir	Go to Step 5	The brake fluid level is still or with tiny fluctuation	Judge that the brake fluid return is poor and the hydraulic system is mixed with air and blocked
5	Check the vacuum booster return	Normal	Faulty	Instruction
	Check the return condition of the vacuum booster	Go to Step 6	The booster cannot return or returns hard	Replace the vacuum booster (see 51 - Service Brake, Vacuum Booster, Replacement)
6	Check the brake master cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Inspection)	Go to Step 7	The brake master cylinder is stuck	Replace the brake master cylinder (see 51 - Service Brake, Brake Master Cylinder, Replacement)
7	Check the brake slave cylinder	Normal	Faulty	Instruction
	Check the working condition of the brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection)	Go to Step 8	The brake piston in the brake caliper is stuck	Replace the brake caliper assembly (see 51 - Service Brake, Front Brake/ Rear Brake, Replacement)
8	Verification and check	Normal	Faulty	Instruction
	Conduct road test and recheck the fault symptom	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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BRAKE PEDAL

ADJUSTMENT



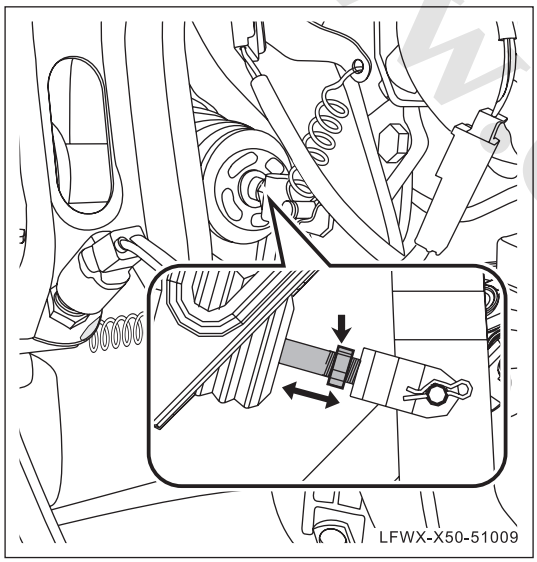
1. ADJUST THE HEIGHT OF BRAKE PEDAL

(a) Remove the dashboard access cover plate assembly.

(b) Disconnect connector ① from the brake pedal switch.

(c) Unscrew the brake pedal switch lock nut ② .

(d) Remove the brake pedal switch.



(e) Loosen the vacuum booster push rod lock nuts, and rotate the push rod for length adjustment; so as to adjust the brake pedal to the proper height.

(f) Tighten the vacuum booster push rod lock nuts.

(g) Install the brake pedal switch and connect the brake pedal switch connector.

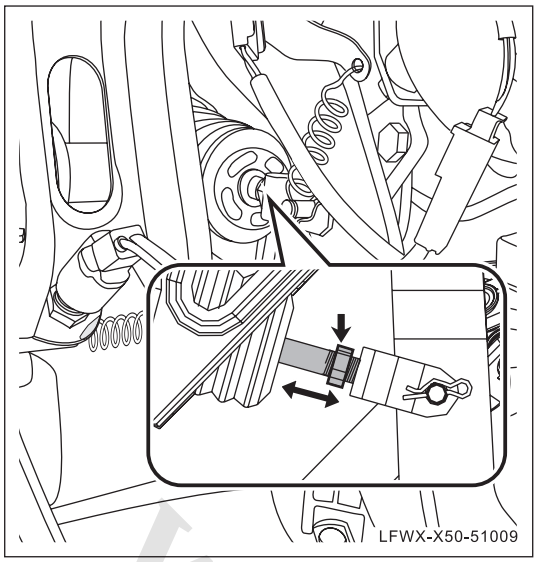
(h) Depress the brake pedal surface for 5 - 15mm, and then rotate the brake pedal switch until the brake lamp goes out; lock the lock nut at this position.

(i) After installing it, the brake lamp shall go on after depressing the brake pedal for 5 - 15mm.

(j) Install the access cover plate assembly.

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2. ADJUST THE FREE PLAY OF BRAKE PEDAL

△ HINT:

The method of adjusting the free stroke of the brake pedal is the same as that of adjusting the pedal height, so refer to the method of adjusting the pedal height to adjust the free stroke of the brake pedal.

3. ADJUST THE OPERATING STROKE OF THE BRAKE PEDAL

△ HINT:

In general, abnormal operating stroke of the brake pedal is caused by leakage or air existing in the brake hydraulic system; if the operating stroke of the brake pedal is abnormal, find out and eliminate faults.

4. ADJUST THE BRAKE PEDAL RESERVE DISTANCE

△ HINT:

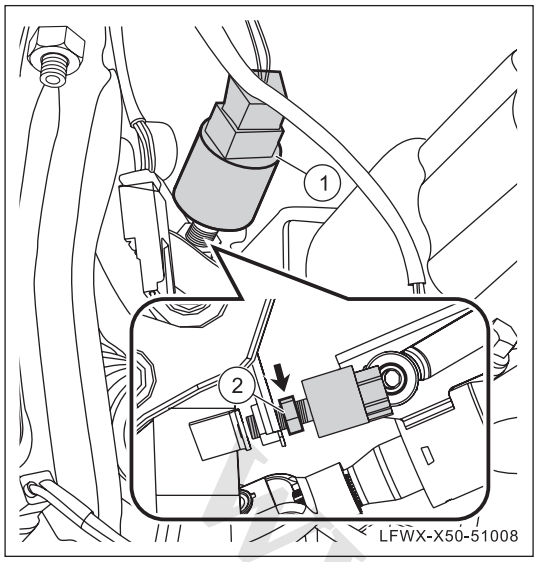
Insufficient of the brake pedal reserve distance is caused by abnormal operating stroke or free stroke of the brake pedal. If the brake pedal reserve distance is abnormal, adjust the free stroke and operating stroke.

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REPLACEMENT

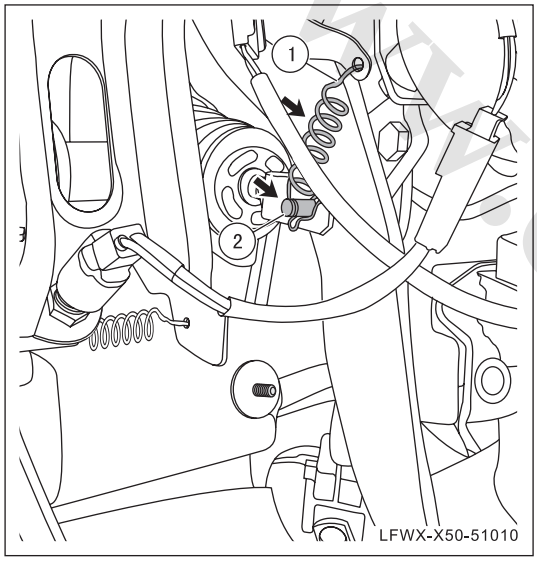


1. REMOVE THE ACCESS COVER PLATE ASSEMBLY.

2. REMOVE THE BRAKE PEDAL

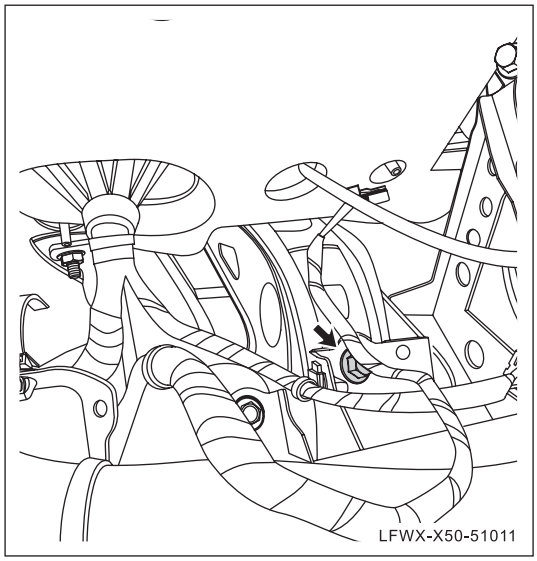
(a) Disconnect connector ① from brake pedal switch.

(b) Unscrew lock nut ② from the brake pedal switch, and remove the brake pedal switch.



(c) Remove return spring ① of the brake pedal.

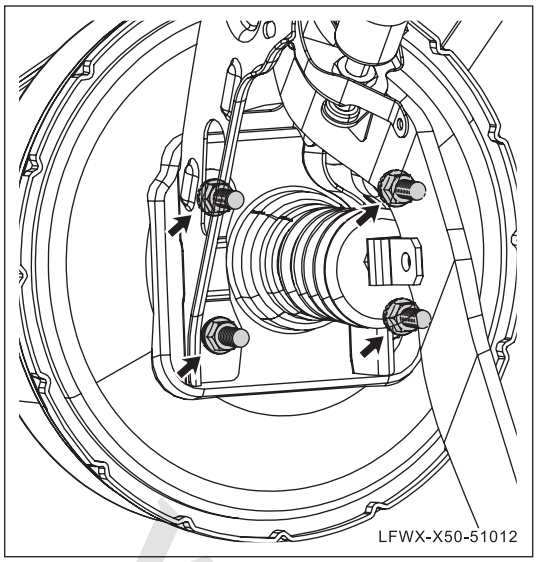
(d) Remove the lock pin of axis pin connecting the push rod of vacuum booster and brake pedal, and remove axis pin ② .



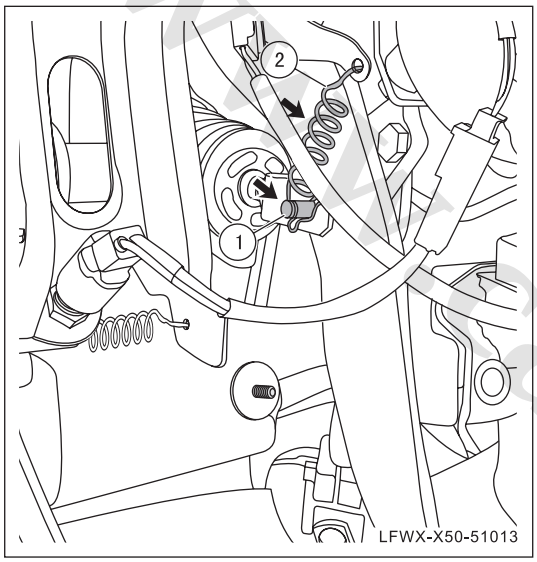
(e) Remove the upper fixing bolt of the pedal bracket.

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(f) Remove the nut connecting the pedal bracket and the vacuum booster Take down the brake pedal with bracket assembly.



3. INSTALL THE BRAKE PEDAL

(a) Put the brake pedal with bracket assembly in its installation position and install the fixing nut and tighten it.

(b) Install the axle pin connecting the vacuum booster push rod and the brake pedal and install locking pin ① .

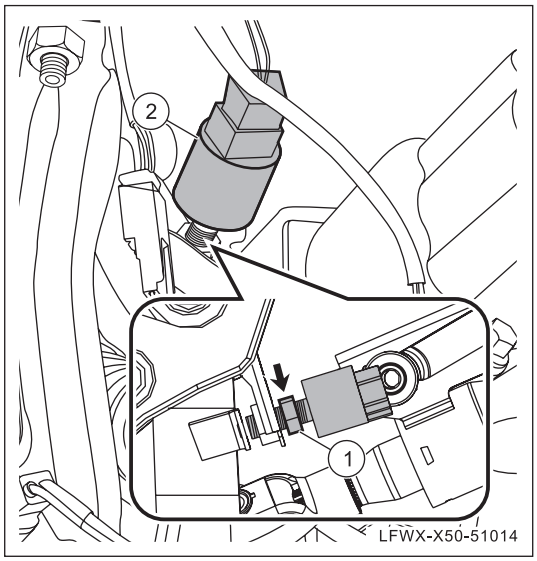
(c) Install return spring ② of the brake pedal.

△ HINT:

Check and adjust brake pedal height.

NOTICE:

When installing the brake pedal bracket, it is required to fix the vacuum booster by a person to prevent it from being popped out by the brake pedal bracket.



(d) Install the brake pedal switch and adjust the clearance, and then tighten lock nut ① .

Torque: 20~26N•m

(e) Connect connector ② of the brake pedal switch.

4. INSTALL THE ACCESS COVER PLATE ASSEMBLY

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BRAKE MASTER CYLINDER

INSPECTION

1. INSPECT THE BRAKE MASTER CYLINDER FOR LEAKAGE

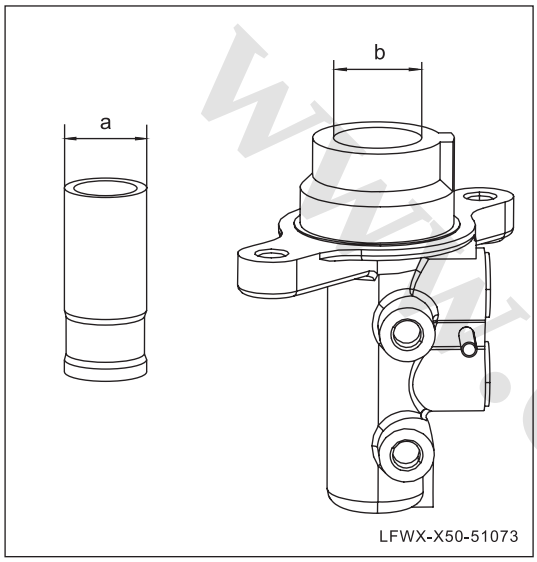
(a) Check the brake master cylinder connector for oil leakage and the master cylinder for cracks.

NOTICE:

Brake fluid is rather corrosive, so do not allow fluid to spill onto your skin or the vehicle body paint. Otherwise, wash immediately.

2. CHECK THE CUP FOR DAMAGE

(a) Check the brake master cylinder cup for damage. If any, replace it.



3. CHECK THE PISTON CLEARANCE OF THE BRAKE MASTER CYLINDER

(a) Measure the piston outer diameter a and master cylinder inner wall inner diameter b and figure out the master cylinder piston clearance.

Inner diameter of cylinder wall: mm

Outer diameter of piston: mm

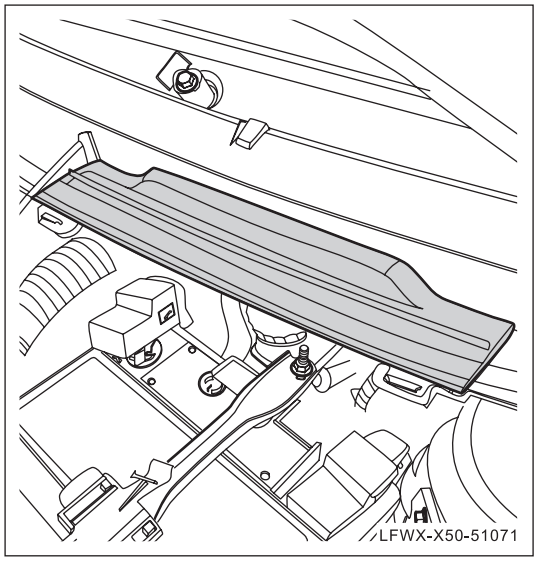
Piston clearance: mm

Limit value of piston clearance: mm

△ HINT:

Piston clearance = inner diameter of cylinder wall - outer diameter of piston, if piston clearance exceeds the limit value, replace the brake master cylinder.

REPLACEMENT



1. REMOVE BRAKE MASTER CYLINDER

(a) Remove the brake fluid filler cap.

(b) Remove the battery.

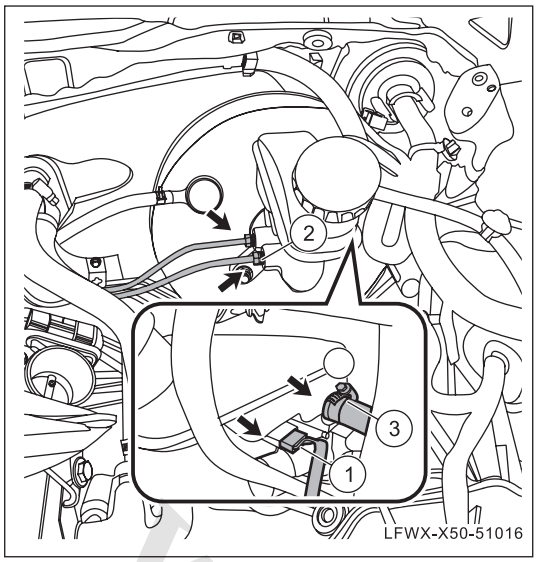
(c) Drain brake fluid in brake fluid reservoir and pipeline.

NOTICE:

Brake fluid is rather corrosive, so do not allow fluid to spill onto your skin or the vehicle body paint. Otherwise, wash immediately.

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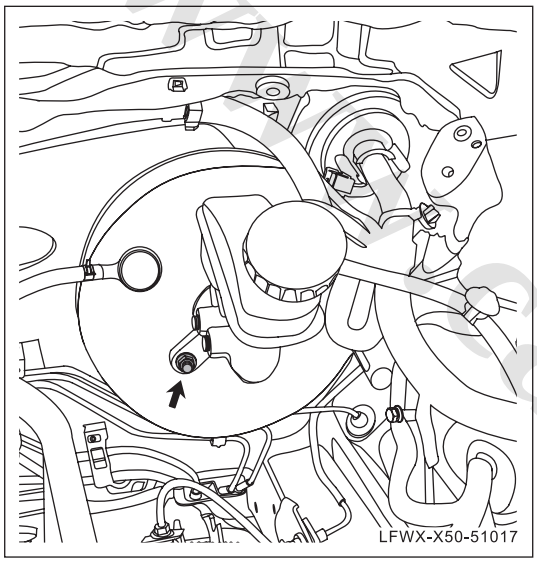
(d) Disconnect connector ① of liquid level warning lamp switch.

(e) Remove the brake master cylinder oil pipe ② .

(f) Remove the clutch master cylinder inlet pipe hoop ③ , and disconnect the clutch master cylinder inlet pipe.

NOTICE:

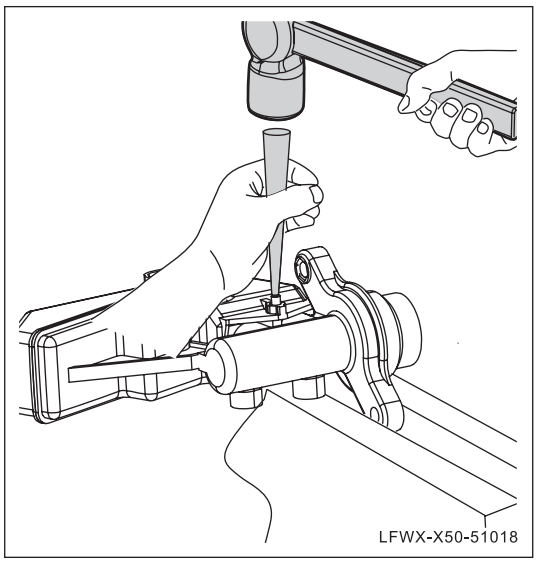
- **Install a rubber cap or plug into the brake pipe connector end to avoid loss of brake fluid and prevent brake fluid from pollution.**
- **When removing the brake master pipe, make marks to avoid mixed installation.**



(g) Remove the two fixing nuts of the brake master cylinder.

(h) Take out the brake master cylinder with brake fluid reservoir assembly.

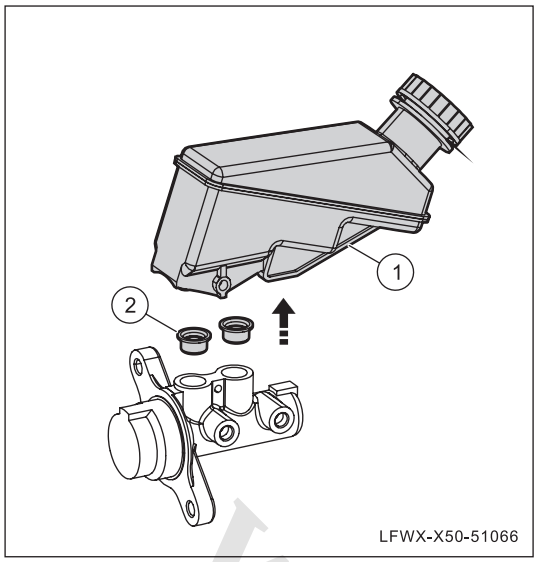
(i) Drain the remaining brake fluid in the master cylinder brake fluid reservoir .



(j) Fix the brake master cylinder in the vise and then punch out the brake master cylinder and the brake fluid reservoir lock pin by a punch.

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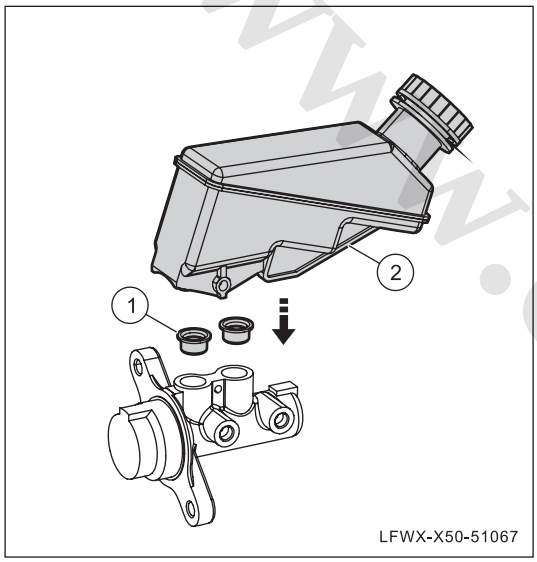
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(k) Remove brake fluid reservoir ① and O-ring ② .

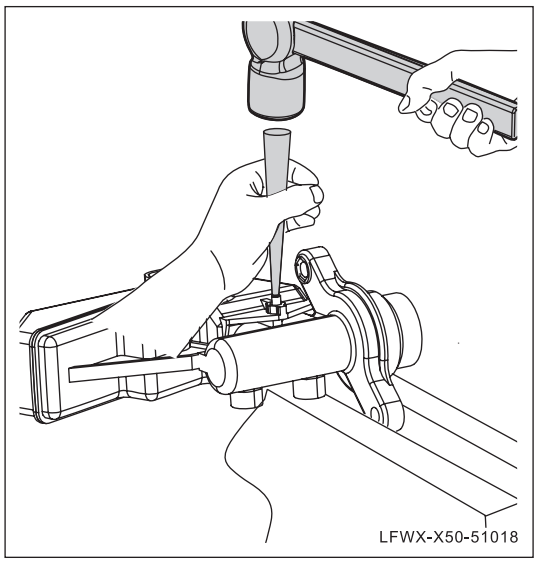
△ HINT:

Push the brake fluid reservoir upward to facilitate removing it from pump body of brake master cylinder, and dismantle O-ring from the groove of brake fluid reservoir. Inspect whether brake fluid reservoir has crack or deformation. If necessary, replace brake fluid reservoir. Use sanitary alcohol to clean brake fluid reservoir. Use compressed air without lubricating oil to dry brake fluid reservoir.



2. INSTALL THE BRAKE MASTER CYLINDER

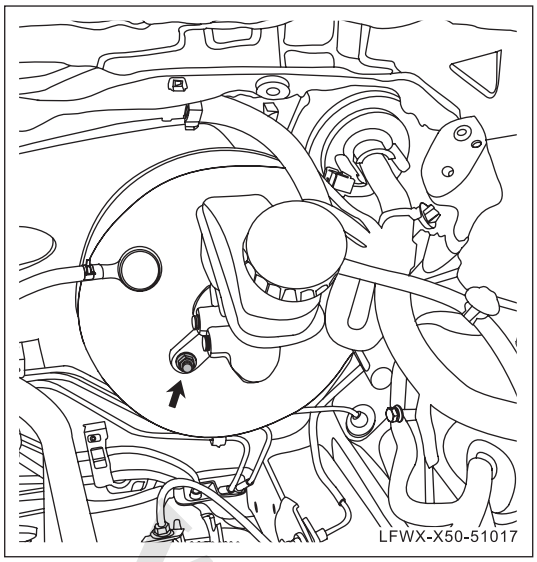
(a) Apply greasel onto O-ring ① of fluid reservoir and then install it into the brake master cylinder, and install brake fluid reservoir ② .



(b) Using a punch, install the lock pin of the brake fluid reservoir.

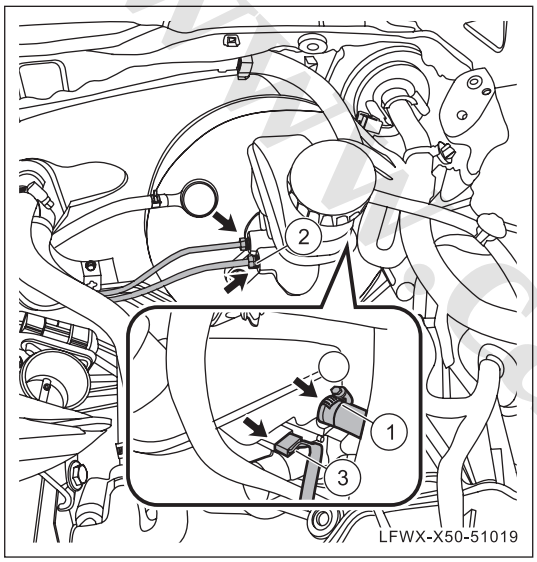
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(c) Install the brake master cylinder and the brake fluid reservoir assembly onto the vacuum booster and then install the fixing nuts and tighten them.

Torque: 20 - 26N•m



(d) Install the clutch master cylinder inlet oil pipe and tighten the fixing clamp ① .

(e) Unplug the rubber cap or rubber plug and then install the brake master cylinder outlet oil pipe by an oil pipe wrench and tighten oil pipe nut ② .

Torque: 12 - 18N•m

(f) Connect connector ③ of the liquid level warning lamp switch.

(g) Install the battery assembly.

(h) Add brake fluid. Bleed the brake system.

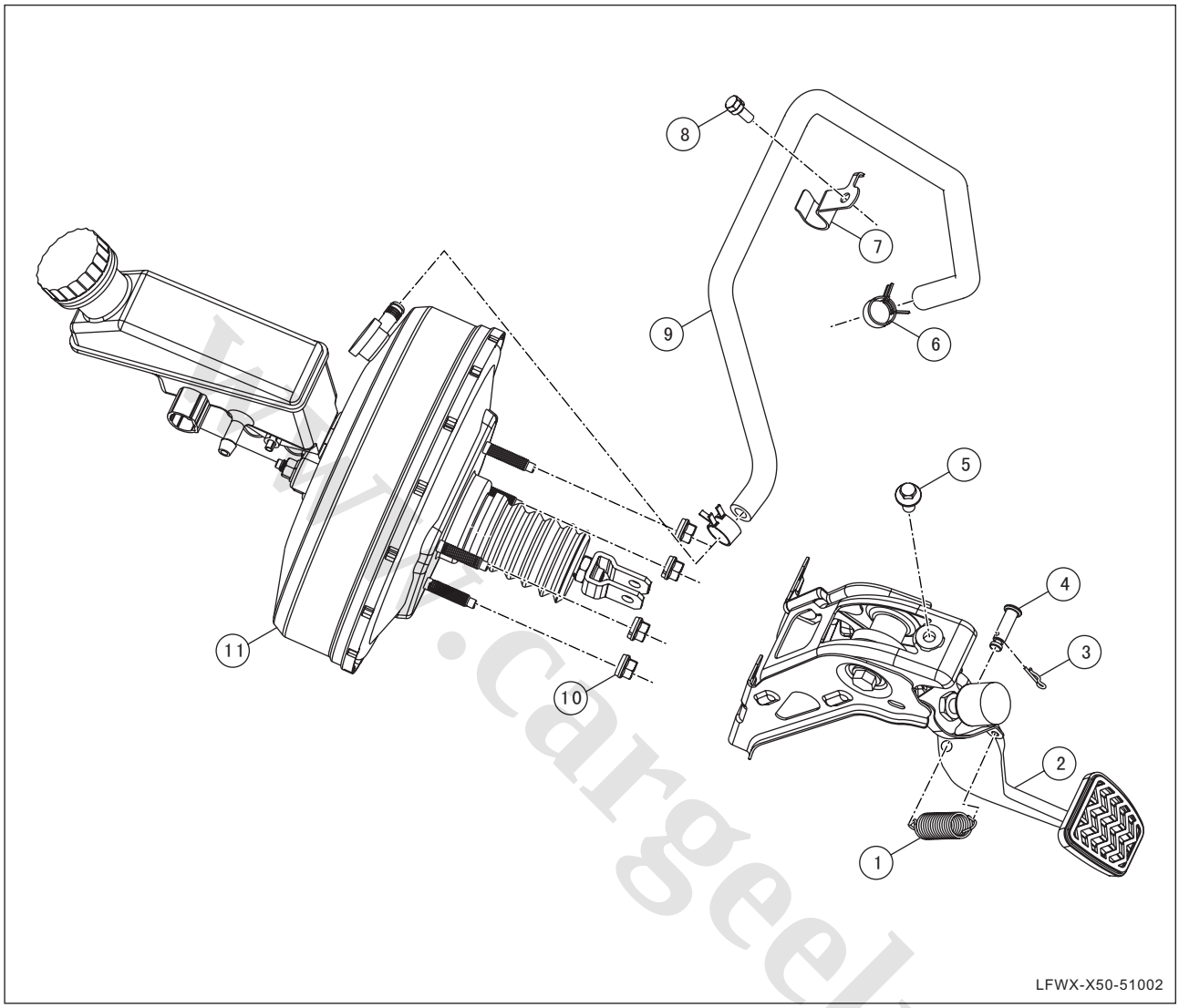
(i) Install the brake fluid filler cap.

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VACUUM BOOSTER

COMPONENTS



1	Return spring
2	Brake pedal with bracket assembly
3	Lock pin
4	Axis pin
5	Hexagon bolt with flange
6	Elastic clamp

7	Brake vacuum hose bracket
8	Hexagon head bolt and spring washer assembly
9	Brake vacuum hose
10	Nut
11	Vacuum booster with brake master cylinder assembly

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INSPECTION

1. CHECK THE VACUUM BOOSTER

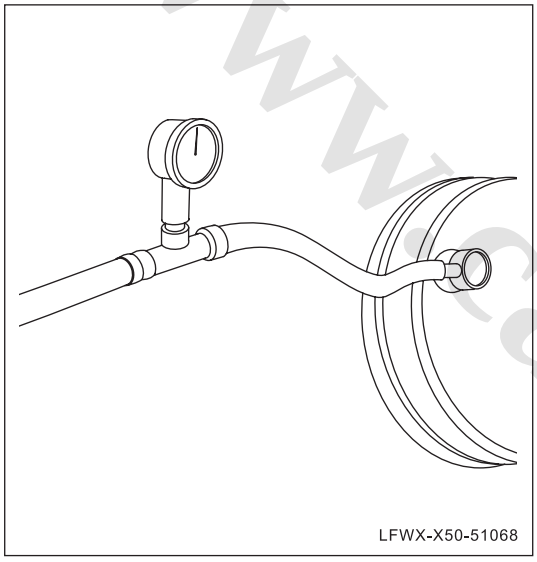
(a) Shut the engine down and then depress the brake pedal several times (to keep the vacuum in the brake vacuum booster level with air). Depress the brake pedal to the bottom, start the engine and observe whether the clearance between the brake pedal and the floor decreases.

NOTICE:

Interval to depress the brake pedal is 5s.

(b) Check air tightness. if it malfunctions, replace the vacuum booster.

- Start the engine and shut it down after idling for 1min. Depress the brake pedal normally to eliminate vacuum. Confirm that clearance between the brake pedal and the floor increases slowly.
- When the engine is running, depress the brake pedal and then shut the engine down. Depress the brake pedal 30s. If the brake stroke does not change, it indicates that the vacuum booster is well sealed.



(c) Install a vacuum meter, hose connecting joints and proper hoses between the vacuum booster and its vacuum hoses.

(d) Start the engine, adjust the engine rotation speed to make the reading of the vacuum meter is 40.0 - 66.7kPa using the accelerator pedal, and then shut the engine down and read the data on the vacuum meter. After 30s, if the reading of the vacuum meter decreases by 2.7kPa or more, check the check valve/vacuum hose, sealing parts, vacuum booster and brake master cylinder for leakage.

NOTICE:

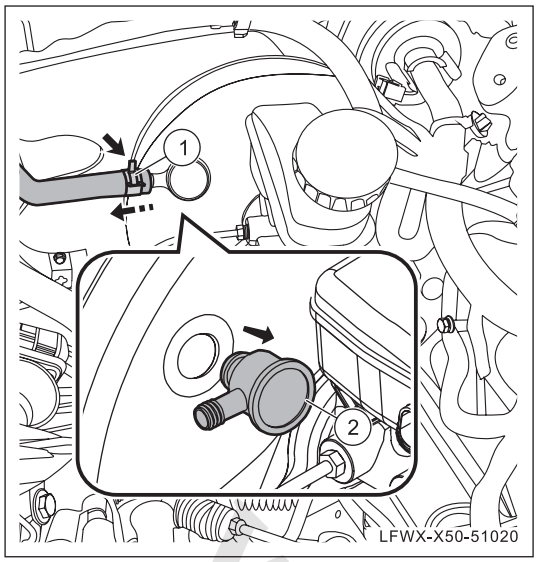
If the vacuum booster has fault, replace the vacuum booster assembly rather than dismantle it.

(e) Check air tightness. if it malfunctions, replace the vacuum booster.

- Start the engine and keep idling for 1min and shut if down when vacuum is present in the brake vacuum booster. Depress the brake pedal normally to eliminate vacuum. Confirm that clearance between the brake pedal and the floor increases slowly.
- While the engine is running, depress the brake pedal and then shut the engine down with the brake pedal being depressed. Depress the brake pedal 30s. If the pedal stroke does not change, it indicates that the vacuum booster is well sealed.

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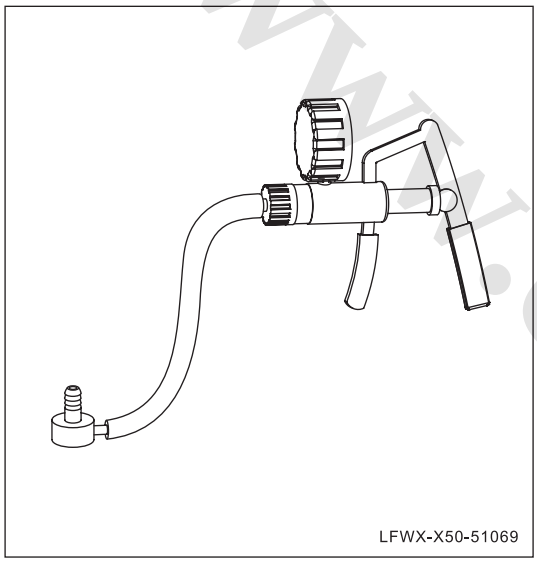


2. INSPECT THE VACUUM HOSE CHECK VALVE

(a) Remove the brake fluid filler cap.

(b) Remove elastic hoop ① of the vacuum booster pipe and disconnect the vacuum booster pipe.

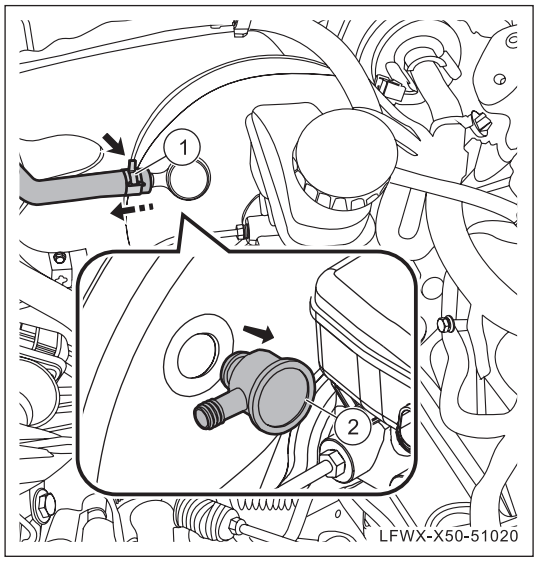
(c) Unplug check valve ② from the vacuum booster.



(d) Connect the brake vacuum hose at the engine side to the hand vacuum pump, adjust the hand vacuum pump to pressure mode (out position), wrench the hand vacuum pump lever, at this moment, the pressure showed on the reading of the hand vacuum pump meter should increase with the increasing times of wrenching the lever; When the pressure increases to a certain value, it begins to decrease, then the brake vacuum hose should be replaced for the check valve of the vacuum hose fails.

(e) Install the brake vacuum hose.

REPLACEMENT



1. REMOVE THE VACUUM BOOSTER WITH MASTER CYLINDER ASSEMBLY

(a) Remove the brake fluid filler cap.

(b) Remove the battery assembly.

(c) Remove elastic hoop ① of the vacuum booster pipe and disconnect the vacuum booster pipe.

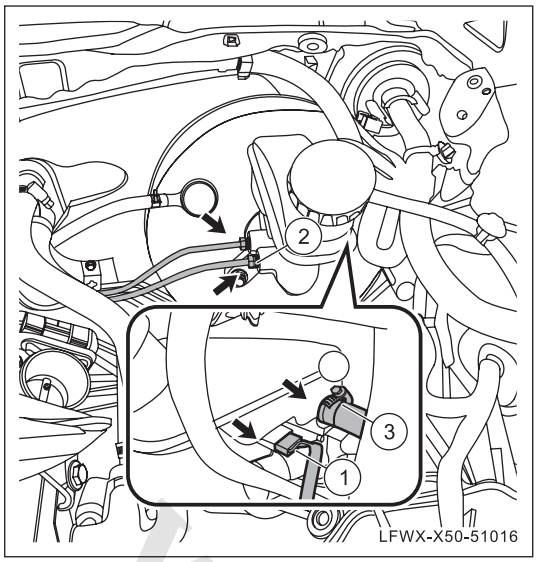
(d) Pull check valve ② out from the vacuum booster.

NOTICE:

Check the check valve for conductivity.

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(e) Drain brake fluid in brake fluid reservoir and pipeline.

NOTICE:

Brake fluid is rather corrosive, so do not allow fluid to spill onto your skin or the vehicle body paint. Otherwise, wash immediately.

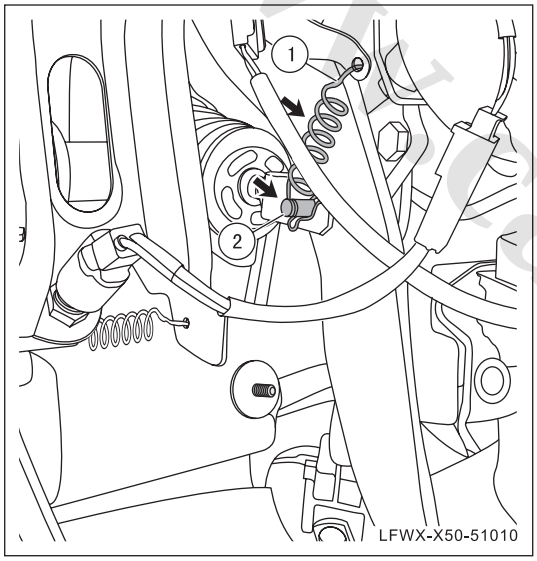
(f) Disconnect connector ① of liquid level warning lamp switch.

(g) Remove connector ② of the brake master cylinder outlet oil pipe by an oil pipe wrench.

(h) Remove fixing hoop ③ of the clutch master cylinder inlet pipe, and disconnect the clutch master cylinder inlet pipe.

NOTICE:

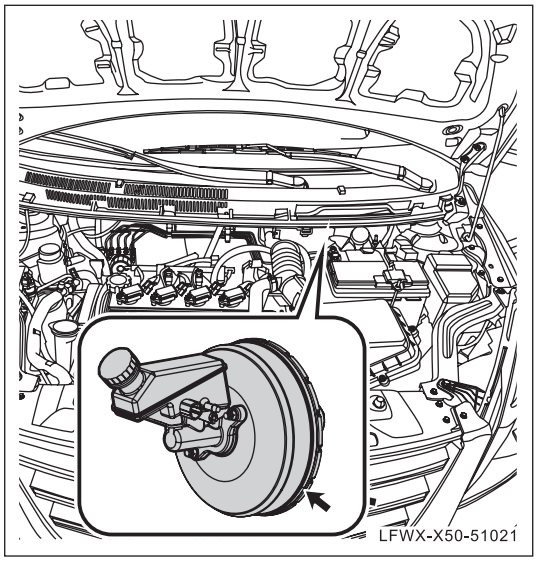
Install a rubber cap or plug onto the exposed brake pipe connector end to avoid loss of brake fluid and prevent brake fluid from pollution.



(i) Remove the brake pedal return spring ① .

(j) Remove the lock pin of axis pin connecting the push rod of vacuum booster and brake pedal, and remove axis pin ② .

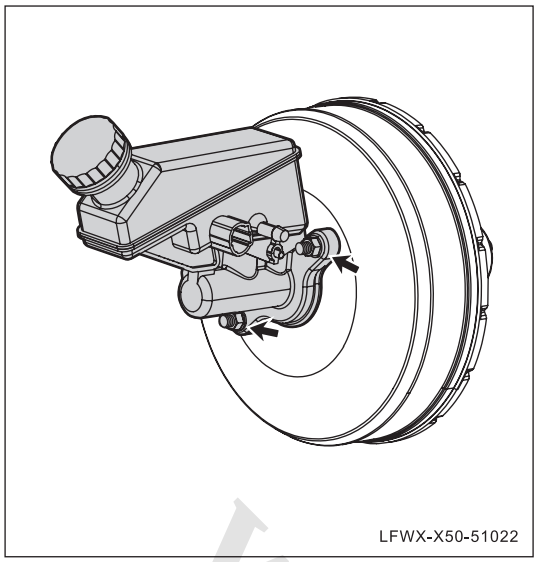
(k) Remove the fixing nuts connecting the vacuum booster with brake master cylinder assembly and vehicle body.



(l) Remove the vacuum booster with brake master cylinder assembly and the gasket from the engine compartment.

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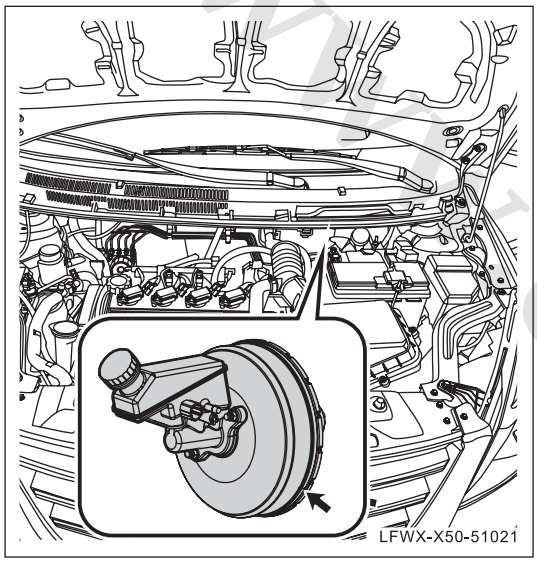
2. DISASSEMBLE VACUUM BOOSTER WITH MASTER CYLINDER ASSEMBLY

(a) Remove the fixing nuts of the brake master cylinder on the vacuum booster and then take down the brake master cylinder and the brake fluid reservoir.

3. ASSEMBLE VACUUM BOOSTER WITH MASTER CYLINDER ASSEMBLY

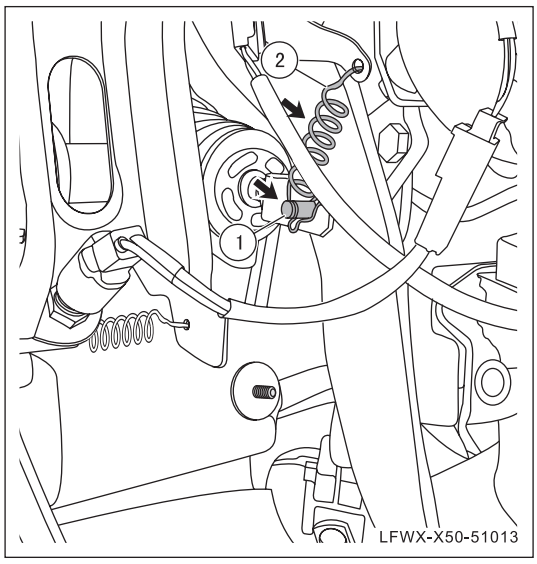
(a) Install the brake master cylinder with brake fluid reservoir assembly onto the vacuum booster and then install the fixing bolts and tighten them.

Torque: 20 - 26N•m



4. INSTALL THE VACUUM BOOSTER

(a) Install the vacuum booster with brake master cylinder assembly and the gasket into the vehicle body from the engine compartment.



(b) Install the fixing nuts of the vacuum booster bolts from the cab and tighten them.

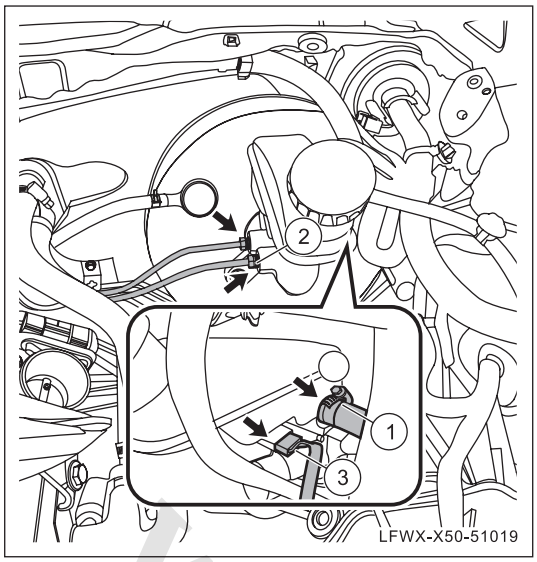
Torque: 20 - 26N•m

(c) Install axis pin ① connecting the vacuum booster push rod and the brake pedal and then install the lock pin.

(d) Install return spring ② of the brake pedal.

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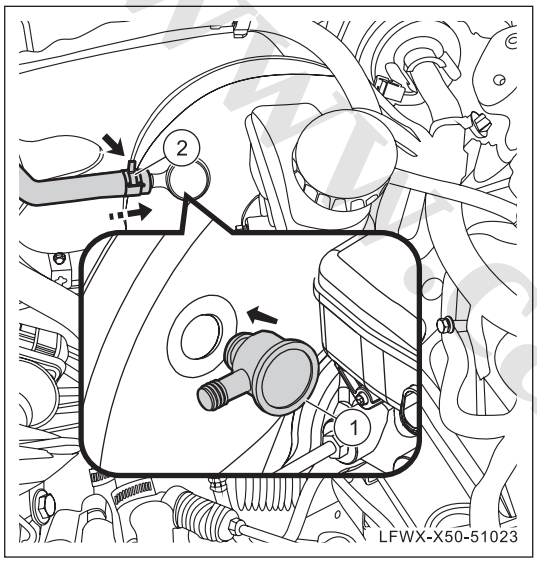


(e) Install the clutch master cylinder inlet oil pipe and elastic clamp ① .

(f) Using a oil pipe wrench, install outlet hose connector ② of the brake master cylinder.

Torque: 12 - 18N•m

(g) Connect the connector ③ of the liquid level warning lamp switch.



(h) Install check valve ① of the vacuum booster.

(i) Connect the booster vacuum pipe by steel strip elastic hoop ② .

(j) Adjust the height of brake pedal.

(k) Fill brake fluid, and bleed air from the brake system.

(l) Install the battery assembly.

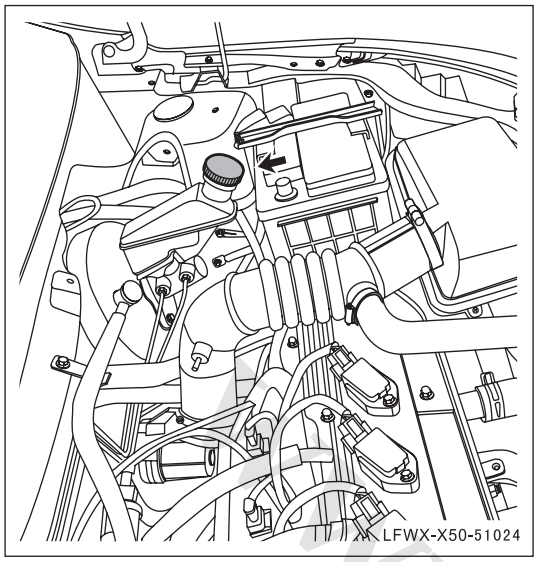
(m) Install the brake fluid filler cap.

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BRAKE FLUID

REPLACEMENT

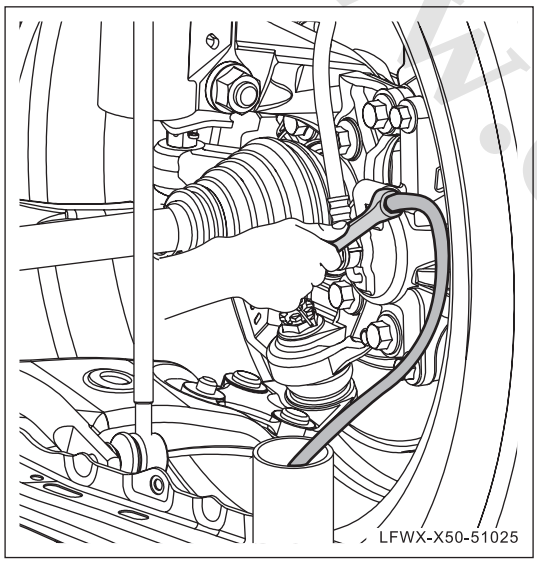


1. DRAIN BRAKE FLUID

(a) Remove the brake fluid filler cap.

(b) Park the vehicle on a smooth road, switch the transmission to neutral position and enable the parking brake.

(c) Unscrew the brake fluid filler cap.



(d) Fit a transparent plastic hose over the brake air exhaust plug and place another end of the pipe into the brake fluid container.

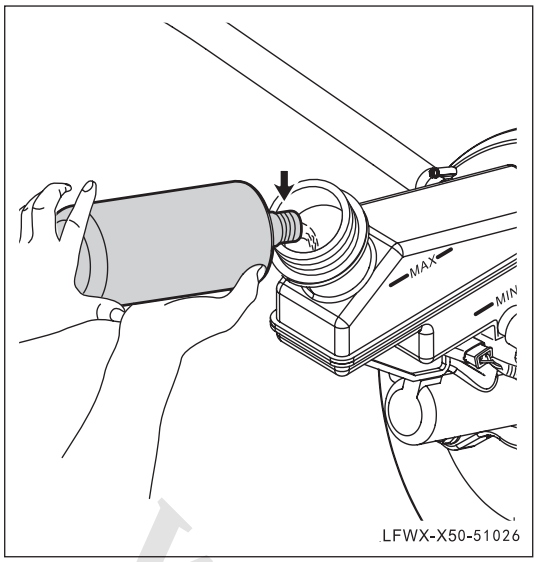
(e) Unscrew the bleeder plug and depress the brake pedal continuously until there is no brake fluid flowing out.

NOTICE:

- Conduct this operation to each wheel to ensure that all brake fluid is drained.
- Drained out brake fluid cannot be reused.

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2. REFILL BRAKE FLUID

(a) Open brake fluid reservoir cap.

(b) Fill brake fluid into the brake fluid reservoir and observe the height of fluid reservoir level to make sure that the brake fluid level is between "MAX" and "MIN" scales.

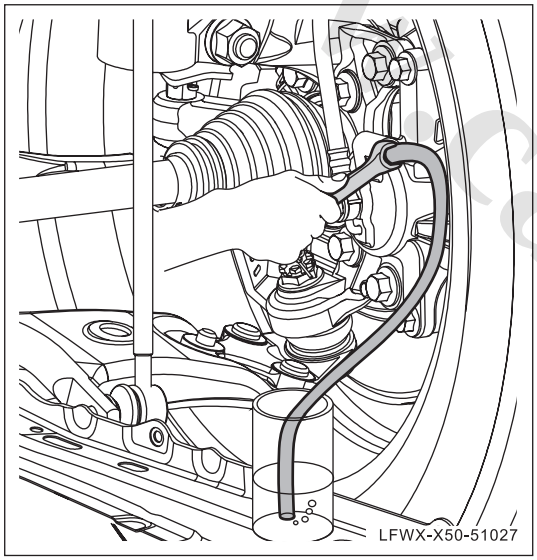
Brake fluid model: DOT4

NOTICE:

- **Never mix brake fluid of different models.**
- **After filling brake fluid, be sure to exhaust air from the brake system.**
- **Brake fluid is rather corrosive, wash immediately with plenty of clean water if fluid spills onto your skin or the vehicle body paint.**

(c) Screw the brake fluid filler cap and install it.

EXHAUST



1. BRAKE SYSTEM EXHAUST

(a) Lift the car to proper height.

(b) Install the transparent plastic hose onto the brake caliper bleeder plug.

(c) Immerse one end of transparent plastic hose into the container containing clean brake fluid.

(d) Depress the brake pedal several times, and then keep depressing it; loosen the bleeder plug.

(e) When no more bubble comes out from the brake fluid container, tighten the bleeder plug and release the brake pedal.

(f) Repeat steps (d) and (e) until there is no bubble coming out from the container.

(g) Repeat the above steps, in sequence: rear right - rear left - front right - front left, to exhaust air from the wheel brake system.

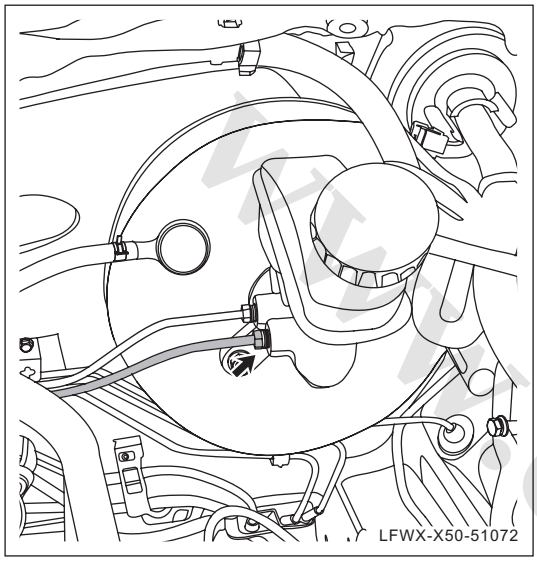
NOTICE:

- **If air enters the brake system when repairing or replacing the brake parts, carry out complete exhaust procedures.**
- **If air enters the brake system for the reason that the fluid level is too low or the master cylinder brake pipeline is disconnected, be sure to exhaust all the air in the brake hydraulic system.**
- **If the brake hose of one wheel is disconnected, just exhaust air in the brake system of this wheel.**

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- **If any brake pipeline connector between the master cylinder and the brake is disconnected, just exhaust air in the disconnected pipeline or the brake system related to the hose.**
- **During exhausting, check whether brake fluid level in brake fluid reservoir is lower than the minimum scale. If it is, fill brake fluid.**
- **Drained out brake fluid cannot be reused.**
- **If air exists in the brake master cylinder, be sure to firstly exhaust air in the master cylinder.**



2. EXHAUST AIR IN THE BRAKE MASTER CYLINDER

(a) Unscrew one piece of the brake master cylinder oil pipes, put a cloth under the pipe and let your assistant depress the pedal in the vehicle until all the air has been exhausted.

(b) Tighten the brake master cylinder oil pipe.

Torque: 12 - 18N•m

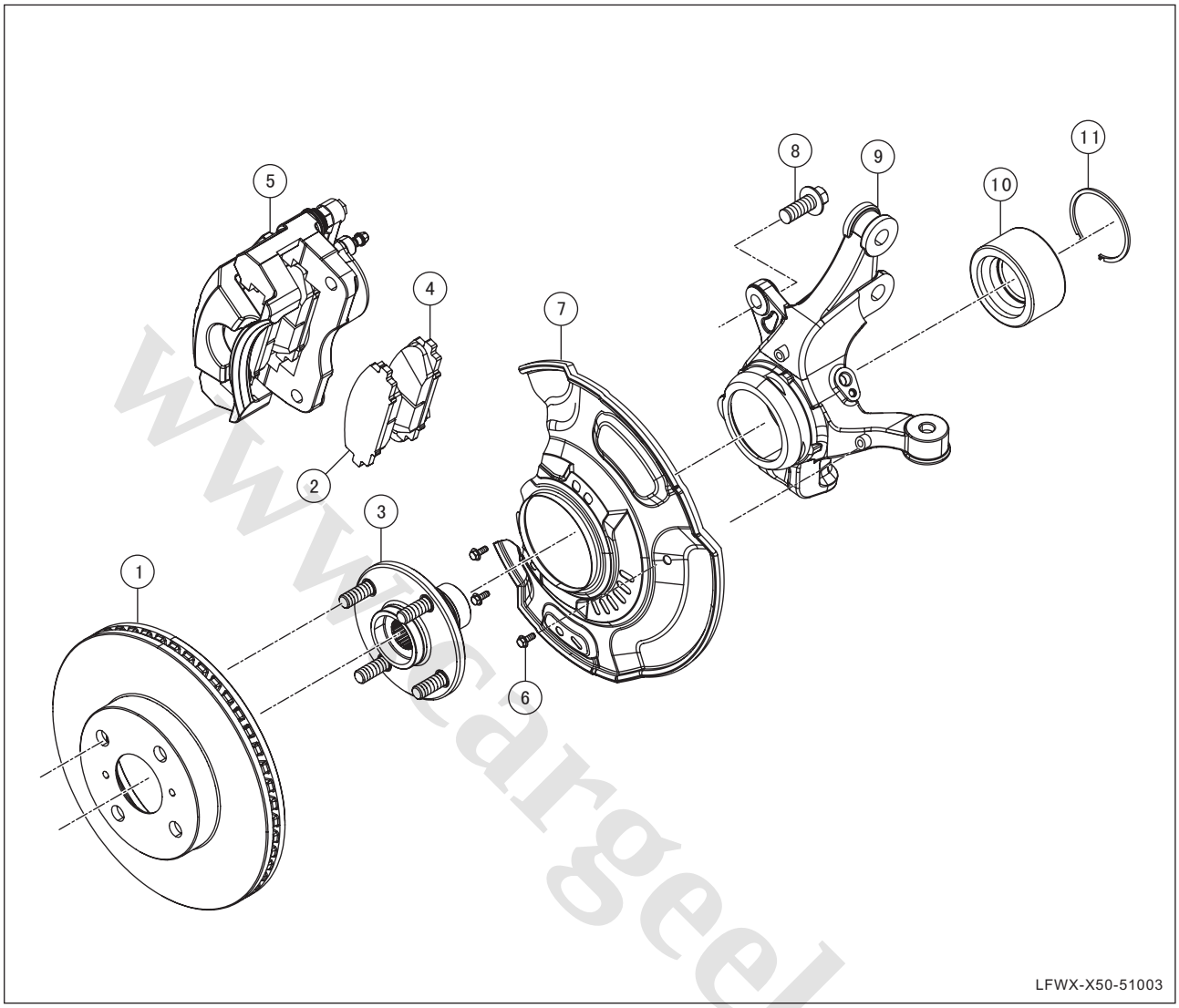
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FRONT BRAKE

COMPONENTS



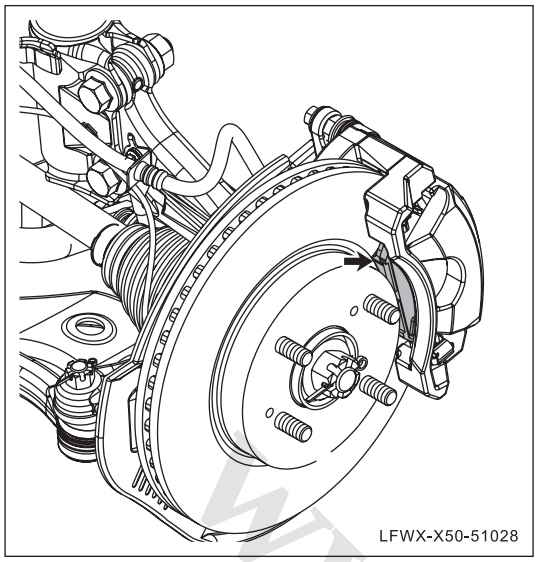
1	Front brake disc
2	Front external brake lining
3	Front wheel hub assembly
4	Front internal brake lining
5	Front brake caliper
6	Bolt

7	Front brake bottom plate
8	Hexagon bolt with flange
9	Steering knuckle assembly
10	Front wheel hub bearing
11	Elestic retainer ring for holes

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INSPECTION



1. CHECK BRAKE LINING AND BRAKE DISC

(a) Check wear of front and rear brake lining; replace it if it exceeds wear limit.

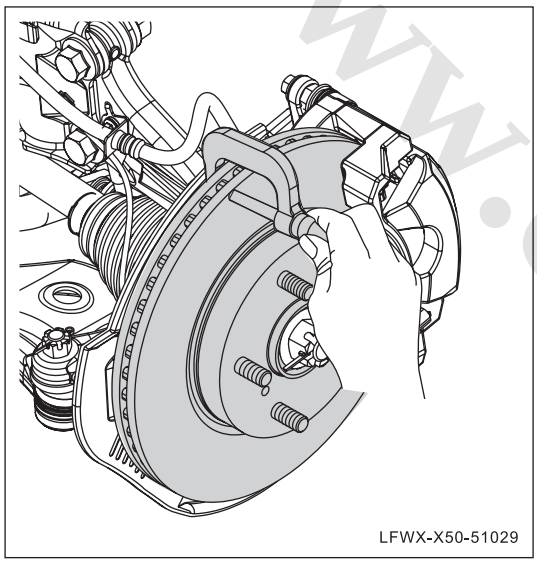
Standard thickness: 12mm

Wear limit thickness: 2mm

(b) Check if the steel plates in the front and rear brake wear indicator are flexible enough without deformation, cracks or wear; replace it if necessary.

△ HINT:

Clean rust, oil stains and other sundries from the lining surface; be sure to replace the lining if oil stains soaks it.



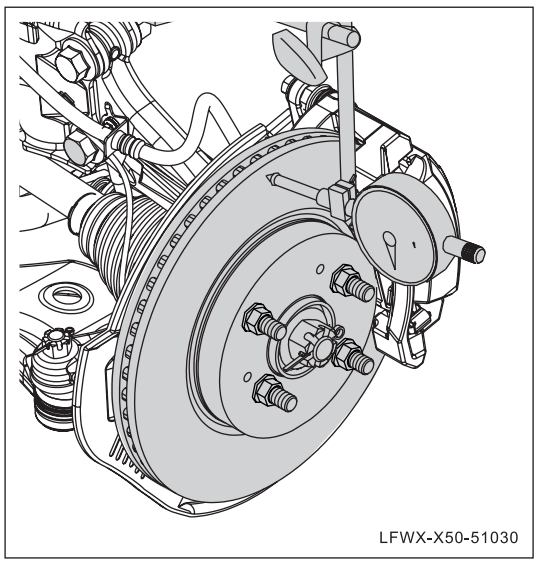
(c) Measure the brake disc thickness by a micrometer; replace the brake disc if it exceeds the wear limit thickness.

Standard thickness of front brake disc: 22mm

Wear limit thickness: 20mm

Standard thickness of rear brake disc: 9mm

Wear limit thickness: 7mm



(d) Install nuts to fix the brake disc, and measure swinging amount of brake disc at 10mm from the brake disc edge with dial gauge.

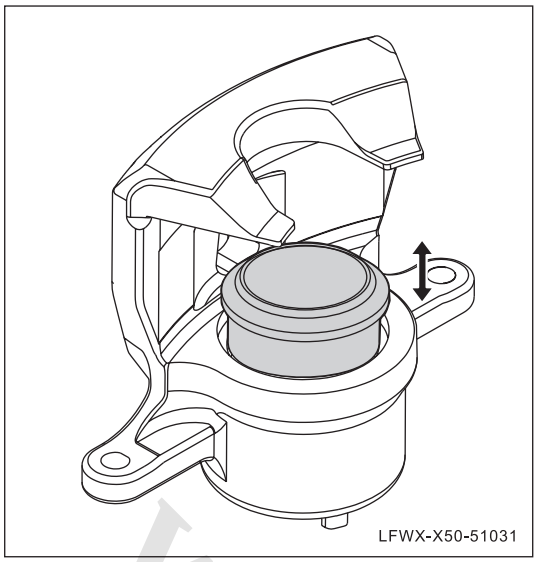
Maximum swinging amount of brake disc: 0.2mm

△ HINT:

If swinging amount reaches or exceeds limit value, check radial gap of wheel hub bearing and swinging of wheel hub; if bearing and wheel hub work normally, replace the brake disc.

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2. CHECK THE BRAKE CALIPER

(a) Check whether the brake piston in the brake caliper is stuck.

△ HINT:

Remove the rust, oil stains and other dirt on the piston.

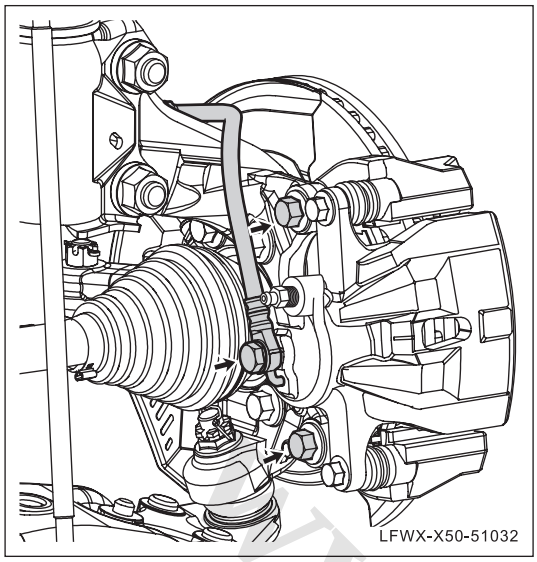
(b) Check that the sliding pin of the brake caliper is on good lubrication.

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REPLACEMENT


LFWX-X50-51032

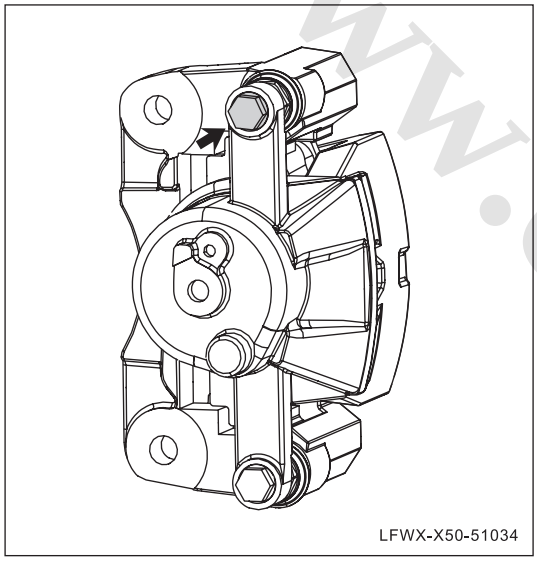
1. LIFT THE VEHICLE AND REMOVE FRONT WHEELS

2. REMOVE THE FRONT BRAKE CALIPER

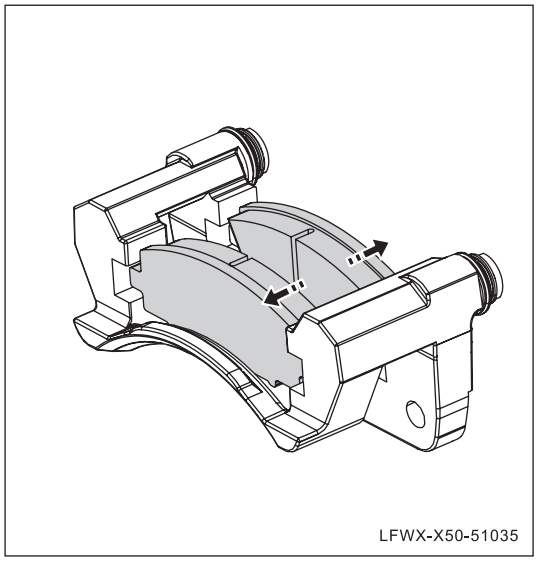
(a) Drain brake fluid in the brake system.

(b) Remove the front brake pipe hollow bolt and take down the O-ring; and then move away the brake hose.

(c) Remove the fixing bolts of the brake caliper bracket, and take down the brake caliper bracket with brake caliper assembly. Remove the fixing bolts of the brake caliper, and take down the front brake caliper.


LFWX-X50-51034

(d) Remove the fixing bolts of the brake caliper, and take down the front brake caliper.


LFWX-X50-51035

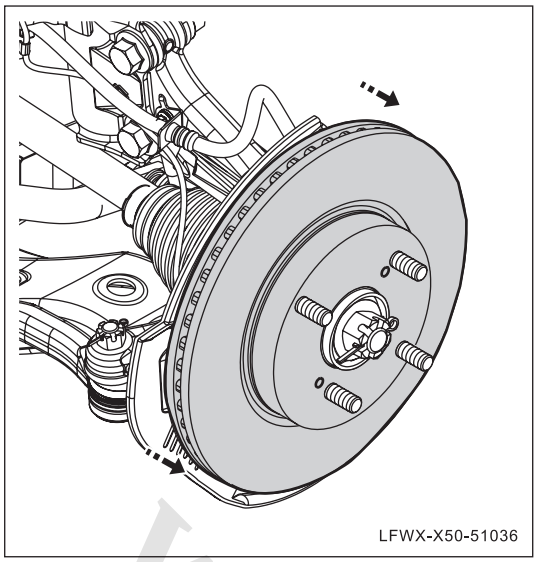
(e) Take down the brake lining from the brake caliper bracket; check the brake lining thickness.

△ HINT:

- Make marks on the brake flining and its installation position and install it according to the marks.
- Measure the thickness of the brake lining; replace the brake lining if it exceeds the wear limit.

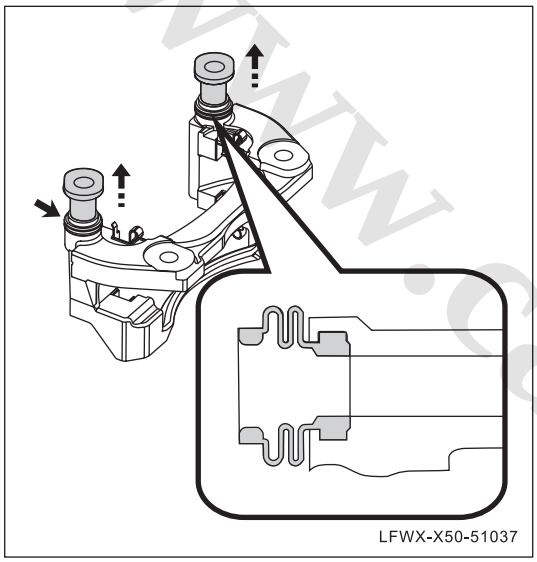
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3. REMOVE THE FRONT BRAKE DISC

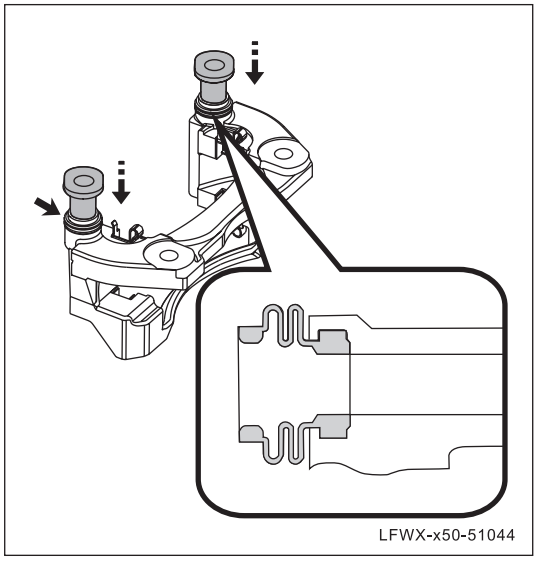
(a) Remove the front brake disc from the front wheel hub; Check if the brake disc is required to be replaced.



4. REMOVE THE FRONT BRAKE CALIPER SLIDING PIN

(a) Take out the sliding pin from the brake caliper bracket.

(b) Remove the sliding pin dust cover from the front brake caliper bracket.



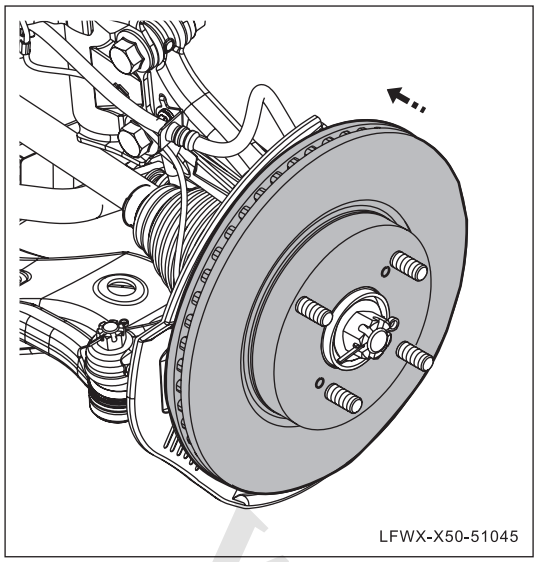
5. INSTALL THE FRONT BRAKE CALIPER SLIDING PIN

(a) Apply grease on the front brake caliper bracket sliding pin dust cover, and then install it on the front brake caliper bracket.

(b) Install the two sliding pins of the front brake caliper.

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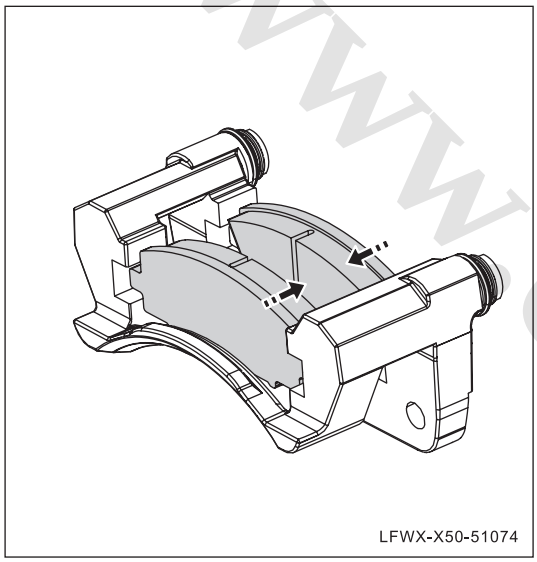


6. INSTALL THE BRAKE DISC

(a) Install the front brake disc onto the front wheel hub.

NOTICE:

No oil dirt is allowed to stay on the contact surface between the brake disc and brake lining. If any, be sure to remove it.

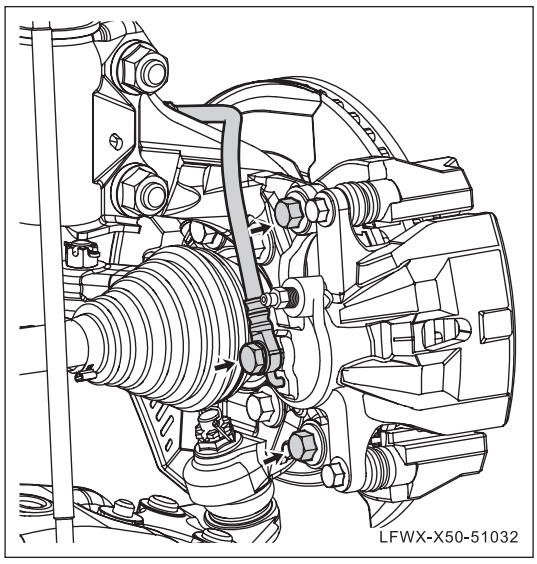


7. INSTALL THE BRAKE CALIPER ASSEMBLY

(a) Install the brake linings onto the installation position on both sides of the brake caliper bracket.

(b) Install the brake caliper with lining assembly on the caliper bracket and fix it with bolts.

Torque: 30 - 36N•m



(c) Install the brake caliper with bracket assembly on its installation position and fix it with bolts.

Torque: 80 - 100N•m

(d) Install the hollow bolts and the O-ring of the front brake hose.

Torque: 35 - 40N•m

(e) Install the front wheel.

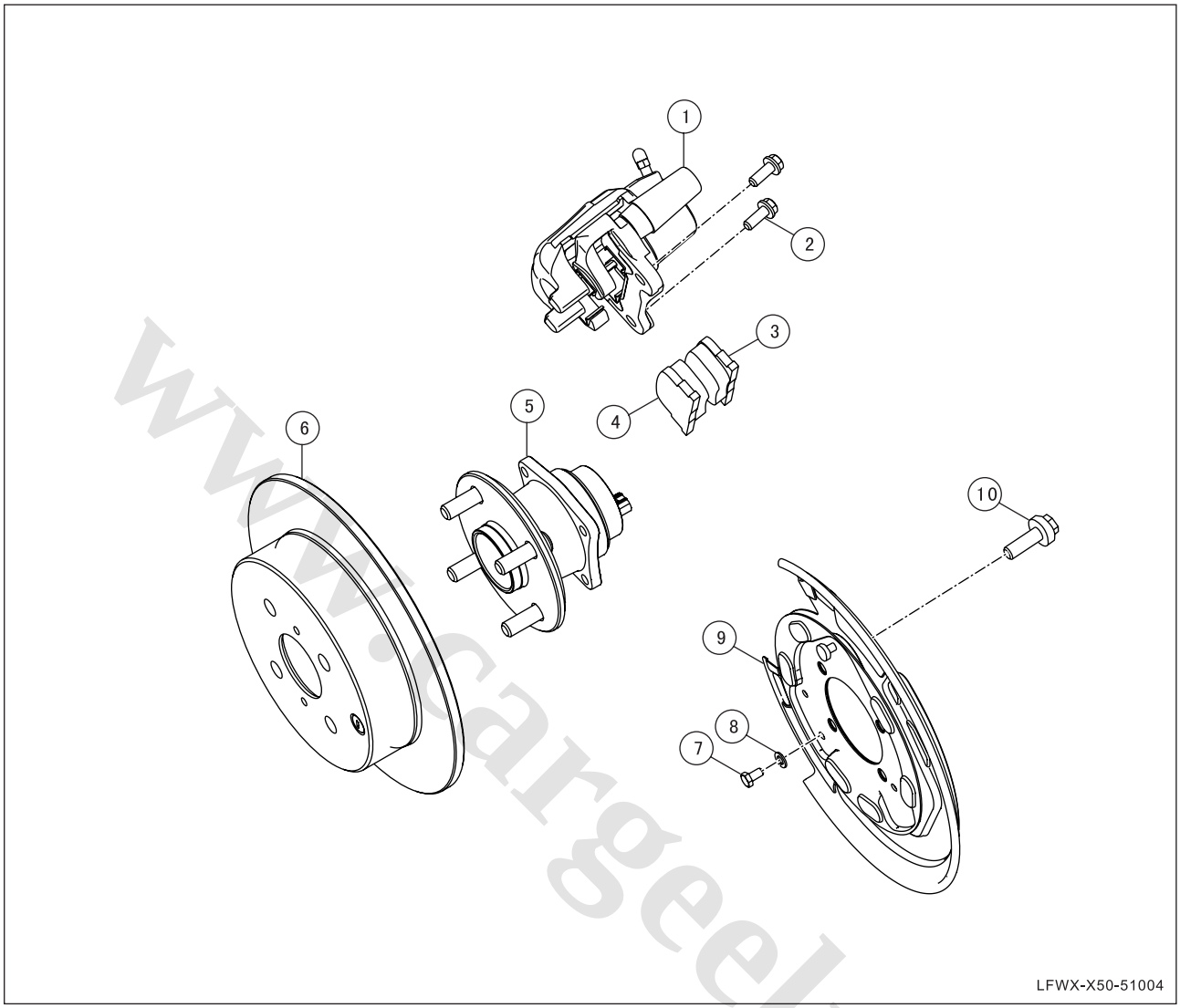
(f) Fill brake fluid, and exhaust air in the brake system.

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REAR BRAKE

COMPONENTS



1	Rear brake caliper assembly	6	Rear brake disc
2	Mounting bolts of rear brake caliper	7	Hexagon head bolt
3	Rear internal brake lining	8	Standard-type spring washer
4	Rear external brake lining	9	Rear brake bottom plate
5	Rear wheel hub assembly	10	Hexagon bolt with flange

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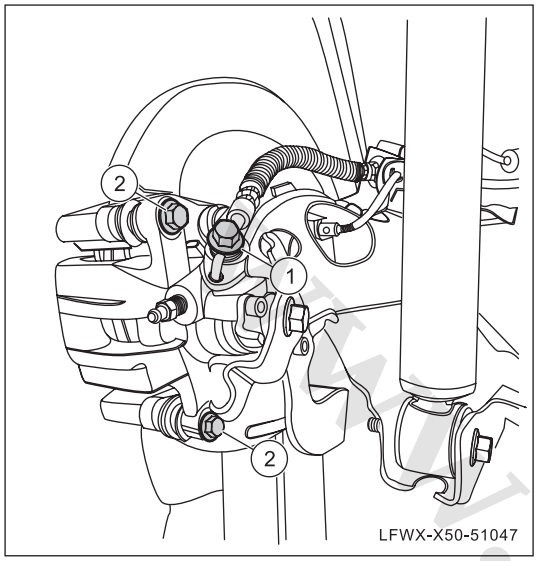
REPLACEMENT

1. LIFT THE VEHICLE AND REMOVE REAR WHEELS

2. REMOVE REAR CALIPER

(a) Drain brake fluid from the brake system.

(b) Remove the parking brake back-end cable. (see 52 - Parking Brake, Parking Brake Cable, Replacement)



(c) Remove the hollow bolt ① and the O-ring of rear brake hose, and then move away the brake hose.

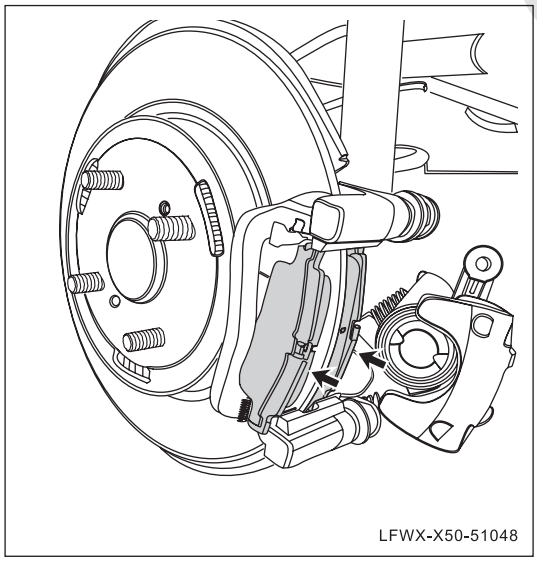
△ HINT:

If not replace the brake caliper assembly, never disconnect the brake hose from the brake caliper.

(d) Fix the rear brake caliper sliding pin by a wrench, remove the fixing bolt ② of brake caliper, and take down the rear brake caliper.

△ HINT:

When removing the brake caliper from the brake caliper bracket while the brake hose still keeps connecting, prop up the brake caliper with thick steel wire or equivalent tool. Otherwise, the brake hose may carry weight of the brake caliper, damaging the brake hose, and then resulting in brake fluid leakage.



(e) Remove the brake lining from the brake disc; check the brake lining thickness. If it is beyond limit value, replace the brake lining.

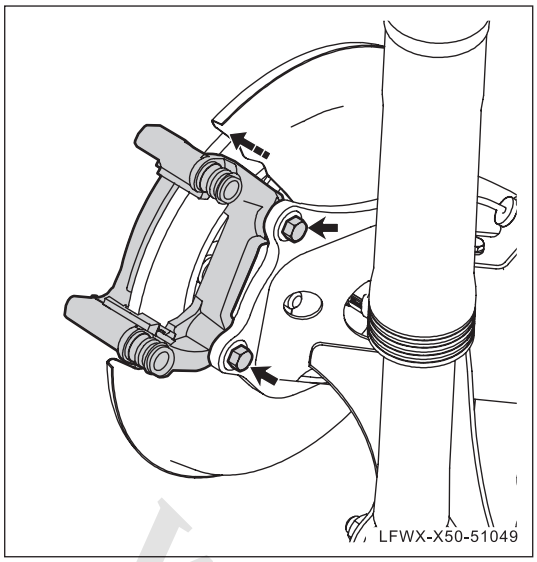
△ HINT:

Make marks on the brake lining and its installation position and install it according to the marks.

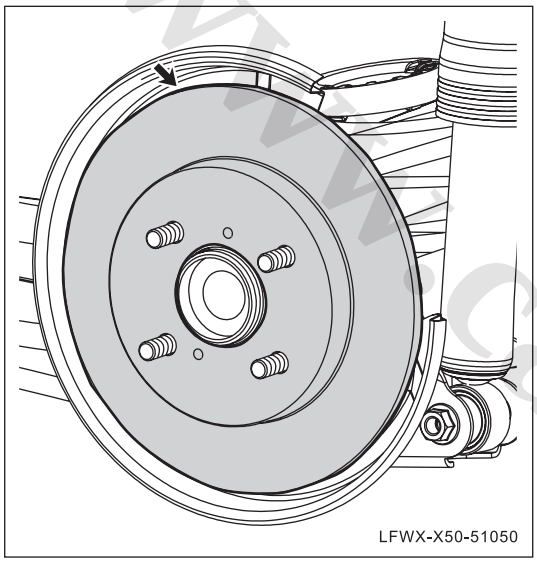
(f) Take out two sliding blocks of the holder.

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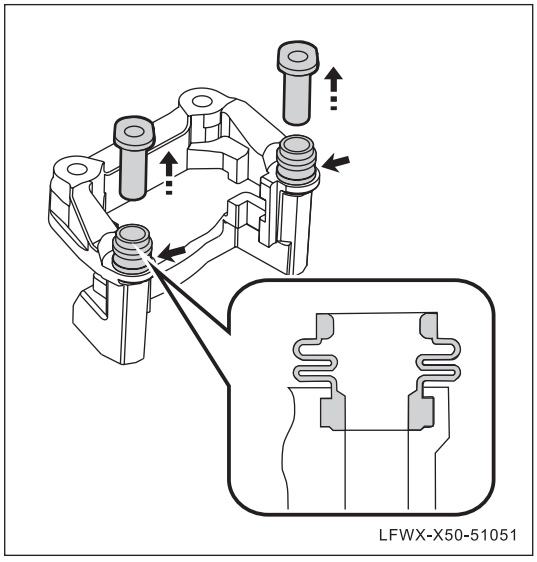


(g) Remove the fixing bolts of brake caliper bracket, and take down the bracket.



3. REMOVE THE REAR BRAKE DISC

(a) Remove the rear brake disc from the rear wheel hub; Check if the brake disc is required to be repalced.



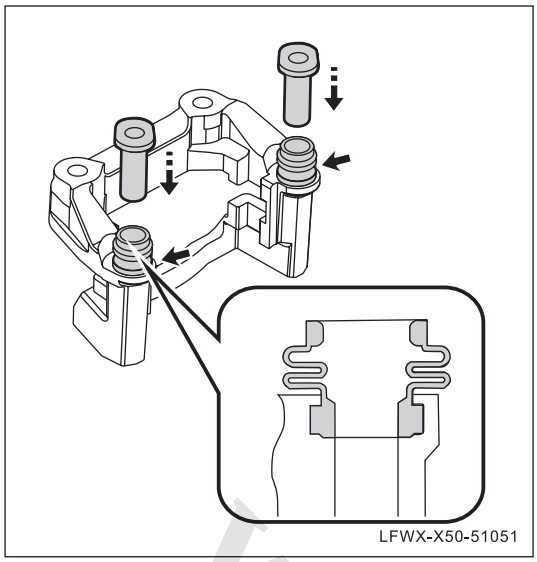
4. REMOVE THE REAR BRAKE CALIPER SLIDING PIN

(a) Take out the sliding pin.

(b) Remove the sliding pin dust cover.

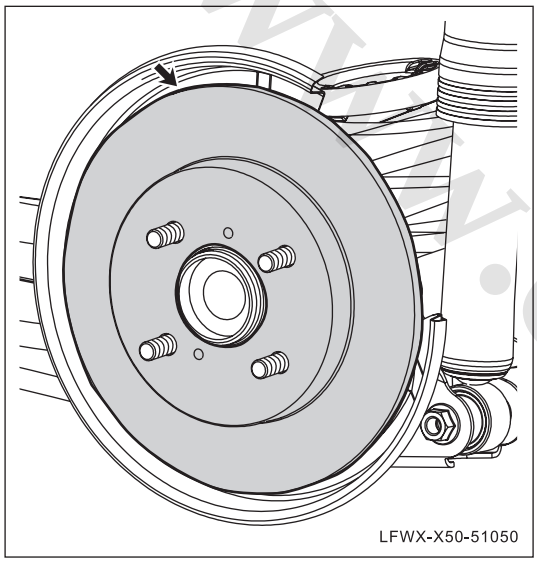
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5. INSTALL REAR BRAKE CALIPER SLIDING PIN

(a) Apply grease on the rear brake caliper bracket sliding pin dust cover, and then install it on the rear brake calipe bracket.

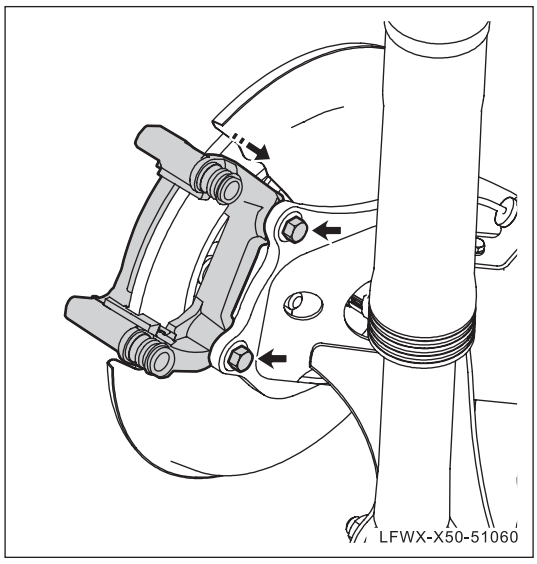


6. INSTALL THE REAR BRAKE DISC

(a) Install the rear brake disc onto the rear wheel hub.

NOTICE:

No oil dirt is allowed to stay on the contact surface between the brake disc and brake lining.



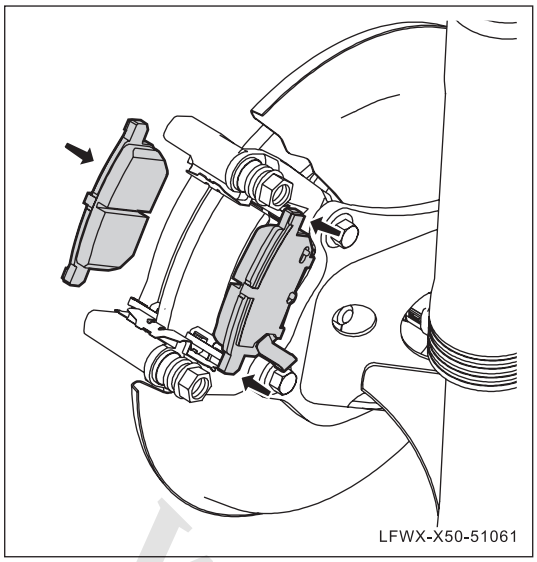
7. INSTALL THE REAR BRAKE CALIPER

(a) Install the brake caliper bracket and then install the fixing bolts and tighten them.

Torque: 80 - 100N•m

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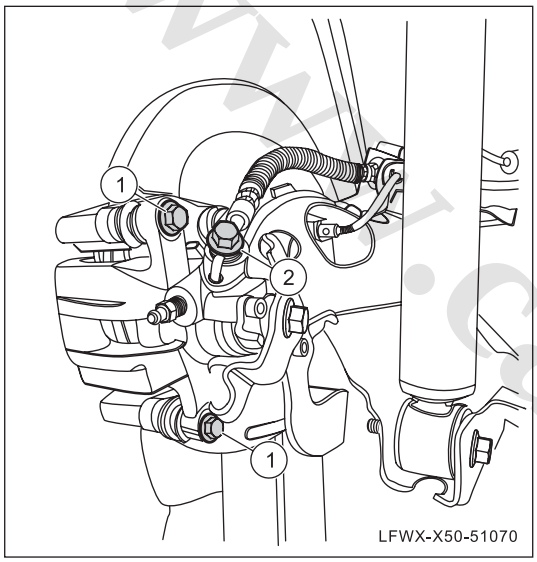


(b) Install the brake lining holder sliding block.

(c) Install the brake lining onto the rear brake caliper bracket.

NOTICE:

No oil dirt is allowed to stay on the contact surface between the brake disc and brake lining. If contamination of oil occurs, grind it with a piece of gauze.



(d) Fix the brake caliper on the brake lining on both sides; fix the rear brake caliper sliding pin by a wrench; install the fixing bolts ① of the brake caliper and tighten them.

Torque: 30 - 36N•m

(e) Install hollow bolt ② and O-ring of rear brake hose.

Torque: 35 - 40N•m

(f) Install the parking brake back-end cable. (see 52 - Parking Brake, Parking Brake Cable, Replacement)

(g) Install the rear wheels.

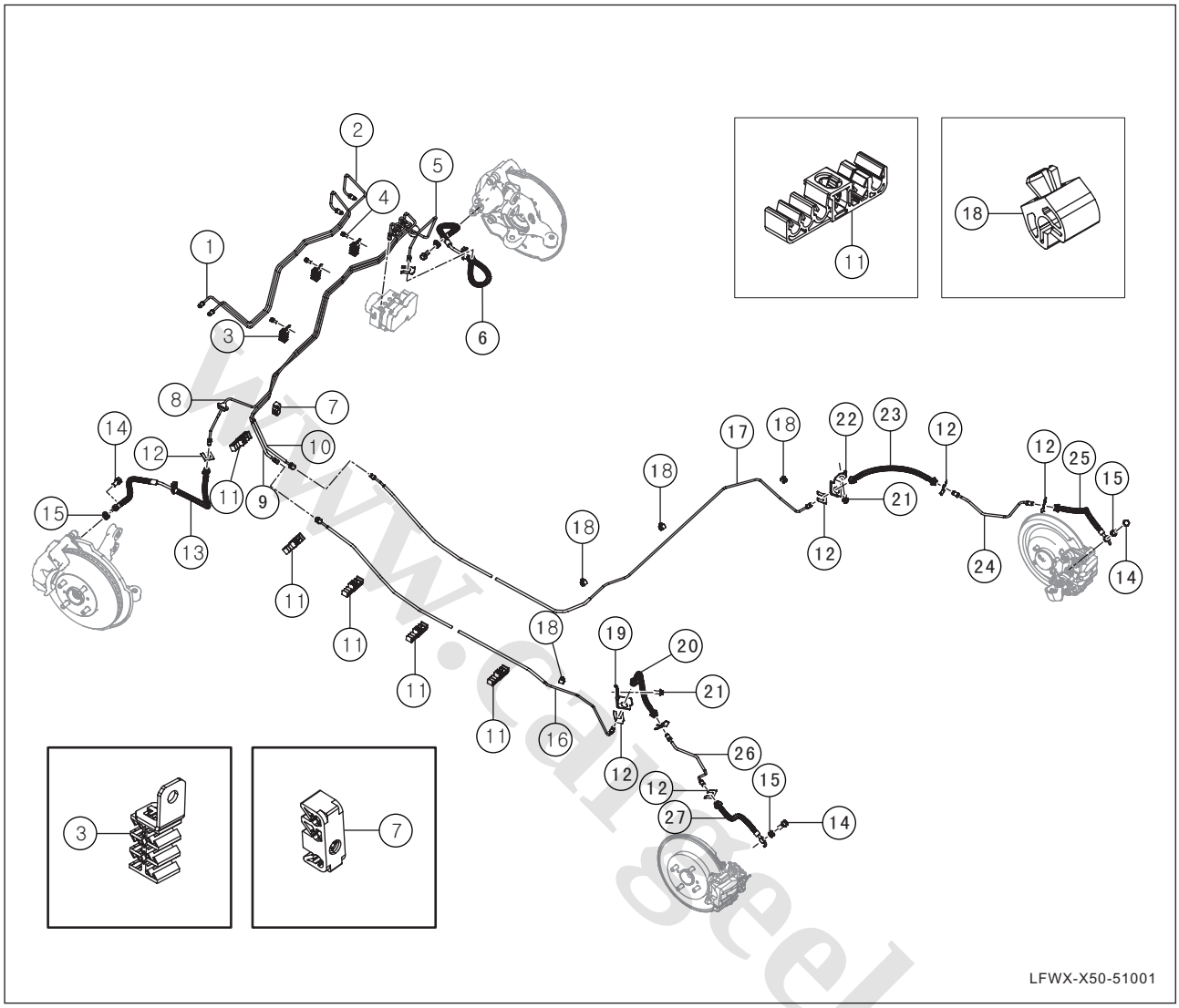
(h) Fill brake fluid, and exhaust air in the brake system.

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BRAKE PIPELINE

COMPONENTS



1	Oil pipe subassembly from ABS to brake master cylinder rear chamber	11	Fixing clip component VIII clamp of brake pipe
2	Oil pipe subassembly from ABS to brake master cylinder front chamber	12	U-type clip
3	Six-hole pipe clamp assembly	13	Front left brake hose assembly
4	Hexagon head bolt with gasket assembly	14	Hollow bolt
5	Front right brake pipe assembly	15	Copper shim
6	Front right brake hose assembly	16	Pipe subassembly II from ABS to rear left wheel
7	Triple clamp E	17	Pipe subassembly II from ABS to rear right wheel
8	Front left brake pipe assembly	18	Single pipe clamp III
9	Pipe subassembly I from ABS to rear left wheel	19	Brake pipeline bracket III
10	Pipe subassembly I from ABS to rear right wheel	20	Rear left brake hose assembly I
21	Hexagon bolt with flange	25	Rear right brake hose assembly II

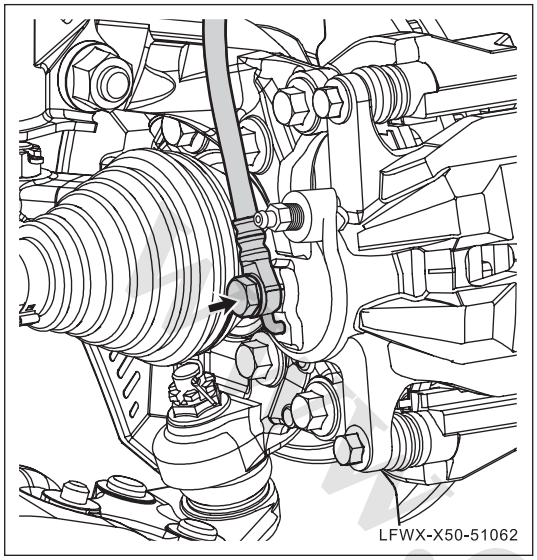
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22	Brake pipe bracket IV
23	Rear right brake hose assembly I
24	Pipe subassembly III from ABS to rear right wheel

26	Pipe subassembly III from ABS to rear left wheel
27	Rear left brake hose assembly II

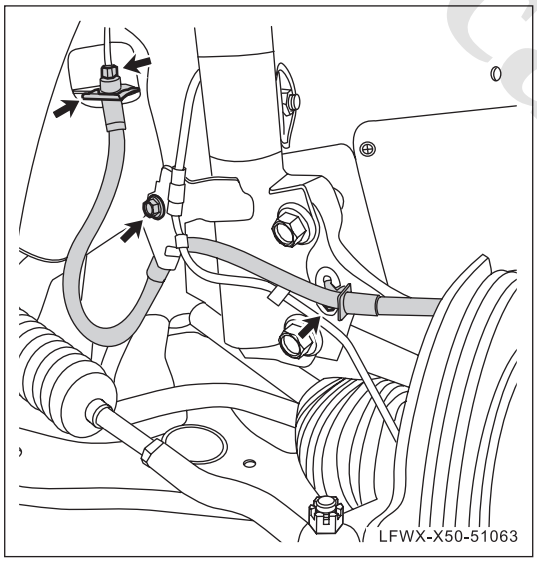
REPLACEMENT



1. REMOVE THE FRONT BRAKE HOSE

(a) Drain the brake fluid.

(b) Remove the hollow bolts and the O-rings of front brake hose.



(c) Remove the fixing bolts of the front brake pipe bracket and the wheel speed sensor wire harness bracket.

(d) Remove the oil pipe connector nuts by an oil pipe wrench and then unplug the front brake pipe E-type clip and then take out the front brake oil pipe.

2. INSTALL THE FRONT BRAKE PIPELINE

(a) Make the front brake oil pipe pass through the body mounting bracket and install the E-type clip to fix the oil pipe.

(b) Tighten the oil pipe connector nut.

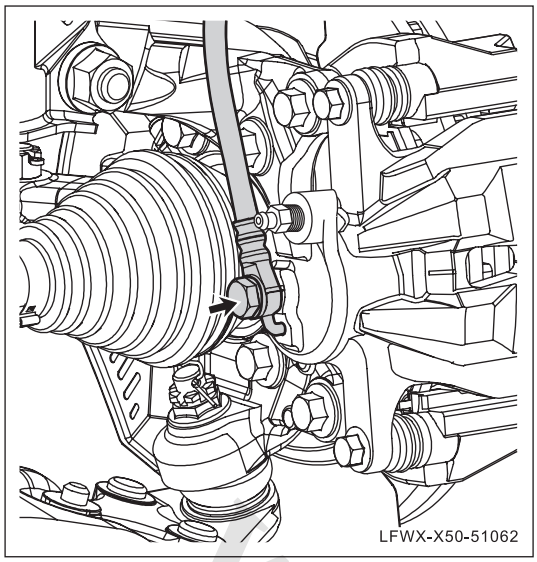
Torque: 12 - 18N•m

(c) Install the front brake pipe bracket and the wheel speed sensor wire harness bracket, and then install the fixing bolts and tighten them.

Torque: 20 - 26N•m

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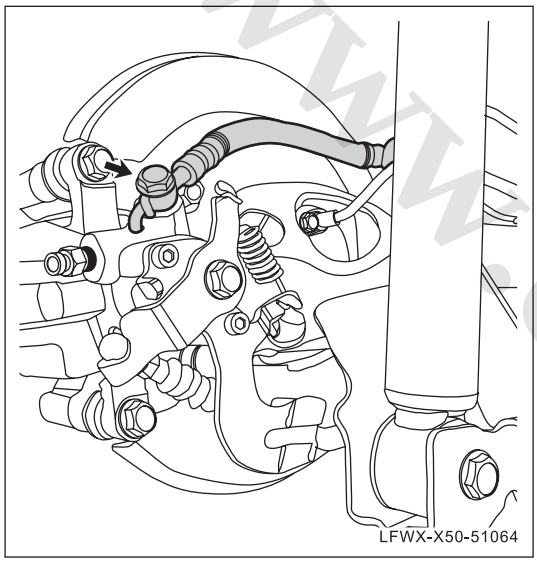
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(d) Install the front brake hose hollow bolt and the O-ring onto the brake, and then install the hollow bolt s and tighten them .

Torque: 35 - 40N•m

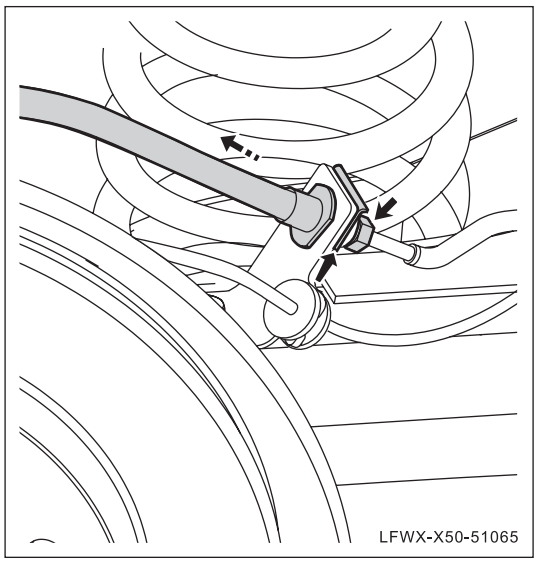
(e) Fill brake fluid, and exhaust air in the brake system.



3. REMOVE THE REAR BRAKE OIL PIPE

(a) Drain the brake fluid.

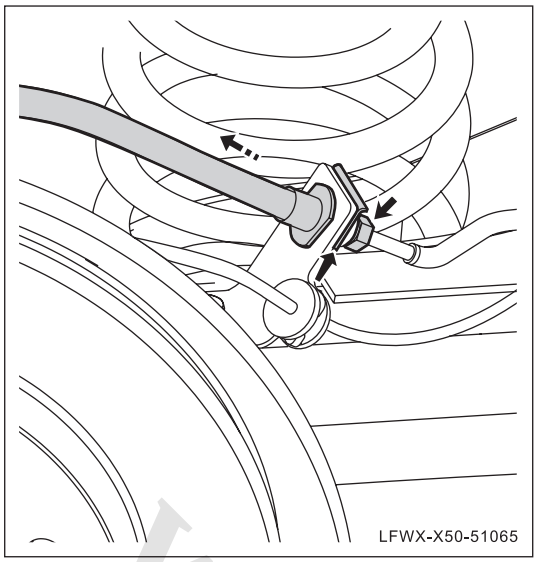
(b) Remove the rear brake hose hollow bolts and the O-rings.



(c) Remove the oil pipe connector nuts by an oil pipe wrench and then unplug the E-type clip and then take down the rear brake hose.

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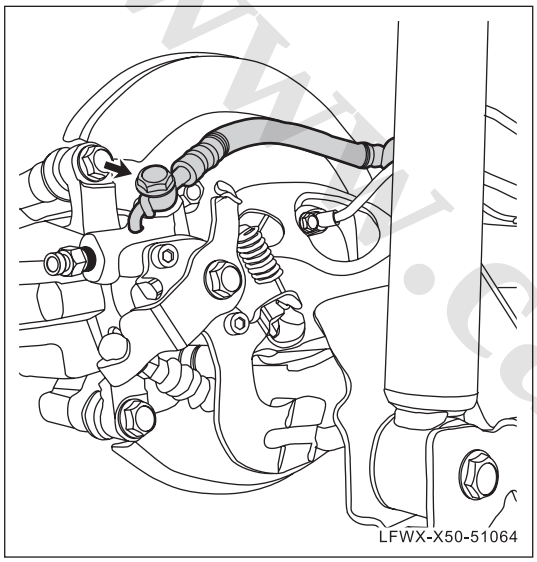


4. MOUNT THE REAR BRAKE PIPE

(a) Connect the brake hoses and tighten the oil pipe connector nut.

Torque: 12 - 18N•m

(b) Install the E-type clip to fix the oil pipe.



(c) Install the rear brake hose hollow bolt and the O-ring onto the rear brake, and then tighten the hollow bolt.

Torque: 35 - 40N•m

(d) Install the front wheel.

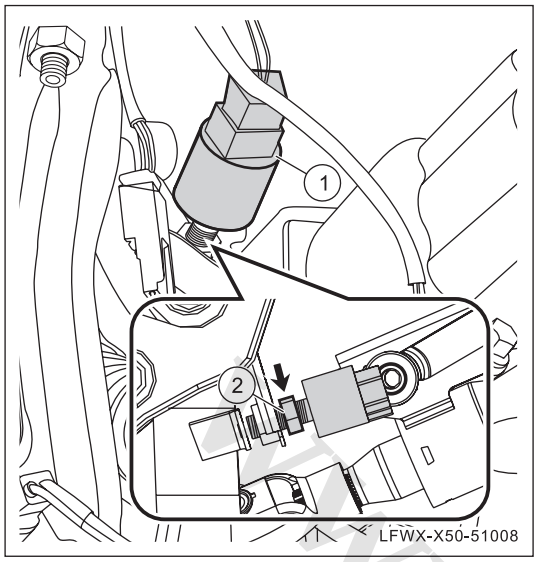
(e) Fill brake fluid, and exhaust air in the brake system.

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BRAKE SWITCH AND FLUID LEVEL SWITCH

REPLACEMENT

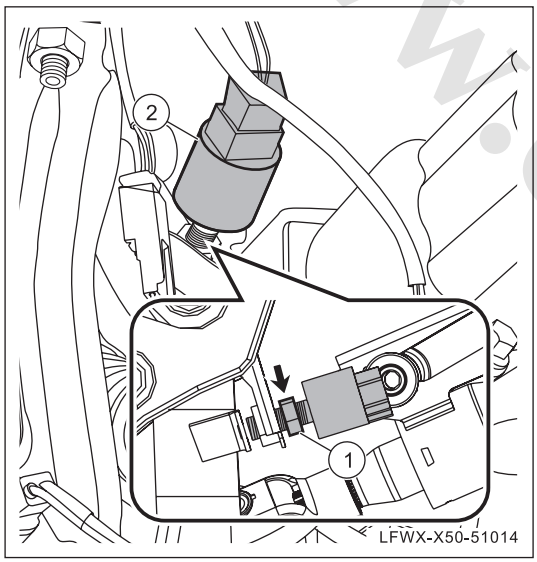


1. REPLACE THE BRAKE SWITCH

(a) Remove the dashboard access cover plate.

(b) Remove the brake switch.

- Disconnect connector ① from brake pedal switch.
- Unscrew lock nut ② of the brake pedal switch, and remove the brake pedal switch.



(c) Install the brake pedal switch and adjust the clearance, and then tighten lock nut ① .

Torque: 20 - 26N.m

(d) Connect the connector ② of the brake pedal switch.

(e) Install the dashboard access cover plate.

4. REPLACE THE FLUID LEVEL SWITCH

△ HINT:

Because the fluid level switch is positioned together with the brake fluid reservoir, have the brake fluid reservoir replaced directly if the fluid level switch is damaged. (see 51 - Service Brake, Brake Master Cylinder, Replacement)

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Parking Brake

Parking brake.....52-1
System description.....52-1
Preparation.....52-1
Service data.....52-2
Precautions.....52-2
Components.....52-3
Function and fault of components.....52-4
On-vehicle inspection.....52-4
Diagnosis.....52-5
Fault symptom table.....52-5
Fault diagnosis.....52-6
Parking brake lever.....52-8
Check.....52-8
Adjustment.....52-8
Replacement.....52-10
Parking brake cable.....52-13
Replacement.....52-13

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PARKING BRAKE

SYSTEM DESCRIPTION

1. FUNCTION

Parking brake system allows the vehicle parking safely in a place for a long time and makes it convenient for the driver to start the vehicle on the ramp. If the service brake system in driving fails, the parking brake can be used for emergency brake.

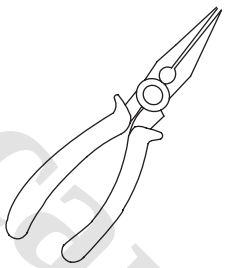
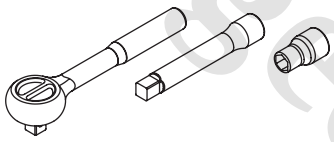
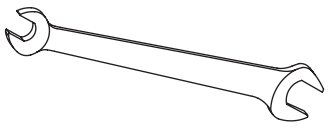
2. COMPONENTS

Parking brake system consists of parking brake lever, parking brake cable and brake, etc.

3. WORKING PRINCIPLE

In the use of the parking brake, pull the parking brake lever to drive the parking brake cable so as to make the brake have the effect of parking brake.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Needle-nose plier		Removing the lock plate in the parking brake cable rear end
2	Fast wrench and sleeve subassembly		Removing and installing the fixing bolts
3	Open-end wrench		Adjusting the parking brake cable

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SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of parking brake cable	8 - 12
Fixing bolt of parking brake cable bracket	8 - 12
Fixing bolt of parking brake lever	8 - 12
Fixing bolt of console bracket	8 - 12

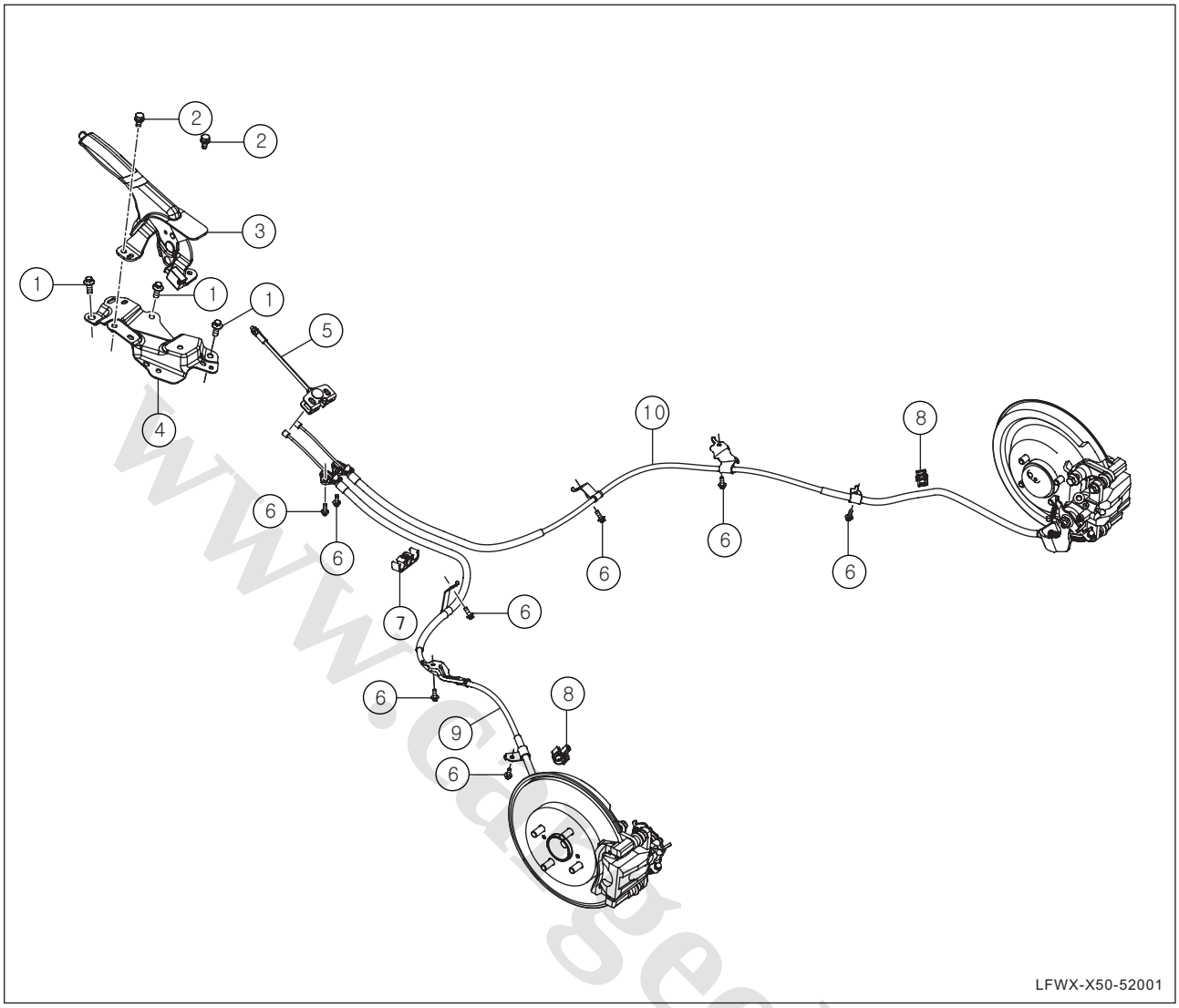
PRECAUTIONS

1. The parking brake cannot replace the service brake and it can be used to decelerate only in case of emergency in driving.
2. The parking brake cable is provided with a plastic jacket, requiring no periodical lubrication.
3. When checking the parking brake system, stop the vehicle on level ground and secure the wheels with trigs.
4. Be careful to replace any part. Incorrect installation will affect the parking brake performance and cause danger.
5. Be sure to have the parking brake performance tested after the parking brake system maintained and ensure it functions safely and reliably.
6. Be sure to check it regularly; once each 10,000km.
   - Check the function of the parking brake.
   - Check the stroke of the parking brake lever.
   - Check the connections for looseness.
   - Check that the parking brake system operates normally.

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COMPONENTS



1	Hexagon bolt with flange
2	Hexagon head bolt, spring washer and plain washer assembly
3	Parking brake control mechanism
4	Parking brake control mechanism bracket
5	Front section of cable

6	Hexagon bolt with flange
7	Double-pipe clamp of parking brake cable
8	Single-pipe clamp of parking brake cable
9	Left parking brake cable
10	Right parking brake cable

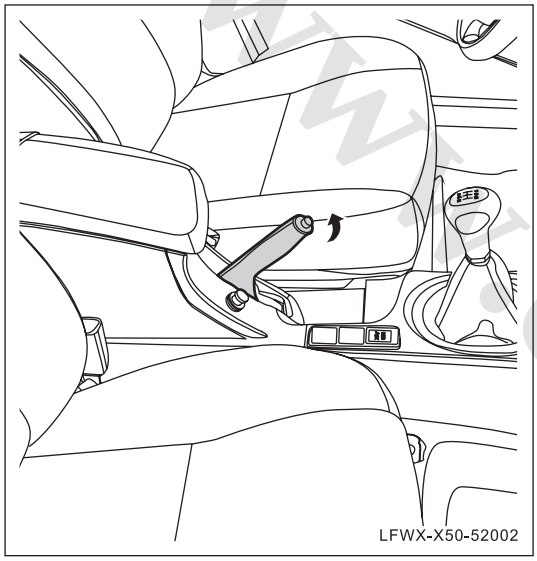
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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common faults	Fault symptom
Parking brake lever	Controlling the parking brake	Parking brake lever spring fails, parking brake lever detent and ratchet are worn excessively and parking brake lever is deformed	Parking brake lever can't be positioned
Brake cable	Transmitting power	Ruptured and damaged	Parking brake performance is poor or failed
Bolt	Fixing line	Loosening	/
Adjusting nut	Adjusting the parking brake	Adjust improperly	Parking brake force is insufficient

ON-VEHICLE INSPECTION



1. CHECK THE STROKE OF PARKING BRAKE LEVER

(a) Pull up the parking brake lever with 100N force to ensure that the detent is within the specified range.

Standard value: 5 - 7 teeth

△ HINT:

Each time passing one tooth, you may hear "clatter" sound; you may listen and calculate times of clatter sound of detent for inspection.

2. CHECK THE CONDITION OF PARKING BRAKE

(a) If the brake operates normally, depress the brake pedal to stop the vehicle on a slope with gradient about 20%, and then apply the parking brake.

(b) Release slowly the brake pedal and hold the vehicle at least 5 min without declining. If necessary, adjust the parking brake (see 52 - Parking Brake, Parking Brake Lever, Adjustment)

3. PARTS INSPECTION

(a) Check that each part is securely fixed.

(b) Check whether the parking brake lever assembly is bent, damaged or cracked. If any, replace the lever.

(c) Check the parking brake cable for wear and damage. If any, replace the cable.

4. PARKING BRAKE INDICATOR LAMP SWITCH

(a) Check whether the parking brake warning lamp switch works normally. Check or replace the switch if it does not work normally.

- When pulling up the parking brake lever, the parking brake indicator lamp should come on.
- When lowering the parking brake lever, the parking brake indicator lamp should go out.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Poor parking brake	1. Parking brake lever (stroke is incorrect) 2. Front section of cable (loosened and ruptured) 3. Parking brake cable (ruptured, stuck and fell off) 4. Parking brake cable bracket (deformed and loosened) 5. Rear brake friction plate (excessively worn) 6. Rear brake slave cylinder (stuck) 7. Parking brake return spring (aging and failed)	See 52 - Parking Brake, Diagnosis, Fault Diagnosis (1. Parking brake performance is poor)
Parking brake is dragged	1. Parking brake lever (stroke is too small) 2. Parking brake return spring (aging and failed) 3. Parking brake cable (stuck) 4. Rear brake caliper (stuck)	See 52 - Parking Brake, Diagnosis, Fault Diagnosis (2. Parking brake is dragged)
Parking brake indicator lamp remains on	1. Parking brake switch (damaged) 2. The wire harness between the parking brake switch and the instrument cluster (short circuit) 3. Instrument cluster (damaged)	See 52 - Parking Brake, Diagnosis, Fault Diagnosis (3. Parking brake indicator lamp remains on)
In parking state, the ignition switch is turned to "ON" position and the parking brake indicator lamp dose not come on	1. Instrument cluster fuse (disconnected) 2. Instrument cluster power wire (disconnected) 3. Instrument cluster grounding wire (disconnected) 4. Parking brake switch (damaged) 5. Parking brake switch wire harness connector (loosened) 6. The wire harness between the parking brake switch and the instrument cluster (disconnected) 7. Instrument cluster connector (loosened) 8. Instrument cluster (damaged)	See 52 - Parking Brake, Diagnosis, Fault Diagnosis (4. In parking state, the ignition switch is turned to "ON" position and the parking brake indicator dose not come on)

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FAULT DIAGNOSIS

1. PARKING BRAKE PERFORMANCE IS POOR

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the condition of the parking brake	Diagnosis is over	Poor parking brake	Go to Step 1
1	Check the stroke of the parking brake lever	Normal	Faulty	Instruction
	Check if the stroke of the parking brake is normal (see 52 - Parking Brake, Parking Brake, On-vehicle Inspection)	Go to Step 2	The stroke is incorrect	Adjust the stroke of the parking brake (see 52 - Parking Brake, Parking Brake Lever, Adjustment)
2	Check the parking brake cable	Normal	Faulty	Instruction
	Check the working condition of the parking brake cable	Go to Step 3	The cable is loosened, damaged or stuck	Repair or replace the parking brake cable (see 52 - Parking Brake, Parking Brake Cable, Replacement)
3	Check the front section of the cable	Normal	Faulty	Instruction
	Check the working condition of the front section of the parking brake cable	Go to Step 4	The cable is loosened or ruptured	Replace the front section of the cable or the parking brake lever (see 52 - Parking Brake, Parking Brake Lever, Replacement)
4	Check the parking brake return spring and the cable bracket	Normal	Faulty	Instruction
	Check the working condition of the parking brake return spring and the cable bracket	Go to Step 5	1. The return spring fails 2. The cable bracket is loosened and deformed	1. Replace the parking brake return spring 2. Correct the cable bracket, and replace the rear brake caliper assembly (see 51 - Parking Brake, Rear Brake, Replacement) Hint: The unit comes with integral cable bracket and rear brake
5	Check the rear brake friction plate	Normal	Faulty	Instruction
	Check the wear condition of the rear brake friction plate	Go to Step 6	The friction plate is excessively worn	Replace the rear brake friction plate (see 51 - Service Brake, Rear Brake, Replacement)
6	Check the rear brake slave cylinder	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the working condition of the rear brake slave cylinder (see 51 - Service Brake, Front Brake, Inspection) Hint: The inspection method of the rear brake slave cylinder is the same as that of the front brake	Go to Step 7	The brake piston in the brake caliper is stuck	Replace the brake caliper assembly (see 51 - Service Brake, Rear Brake, Replacement)
7	Verification and check	Normal	Faulty	Instruction
	Operate the parking brake and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

2. PARKING BRAKE IS DRAGGED

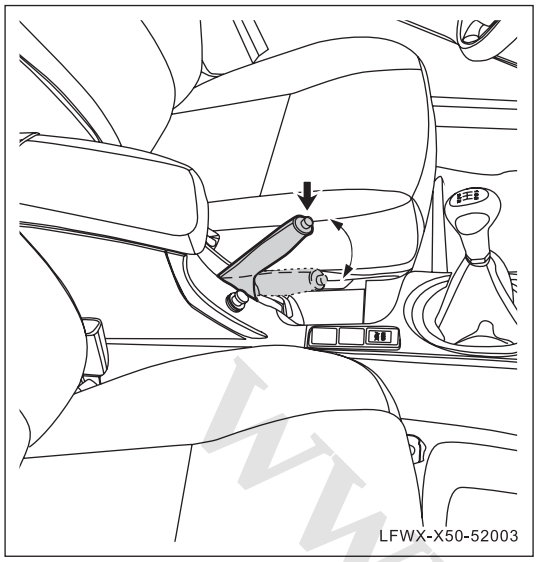
Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the condition of the parking brake	Diagnosis is over	Parking brake is dragged	Go to Step 1
1	Check the stroke of the parking brake lever	Normal	Faulty	Instruction
	Check if the stroke of parking brake is normal (see 52 - Parking Brake, Parking Brake, On-vehicle Inspection)	Go to Step 2	The stroke is too small	Adjust the stroke of the parking brake (see 52 - Parking Brake, Parking Brake Lever, Adjustment)
2	Check the parking brake cable	Normal	Faulty	Instruction
	Check the working condition of the parking brake cable	Go to Step 3	The cable is loosened, damaged or stuck	Repair or replace the parking brake cable (see 52 - Parking Brake, Parking Brake Cable, Replacement)
3	Check the parking brake return spring	Normal	Faulty	Instruction
	Check the working condition of the parking brake return spring	Go to Step 4	Return spring fails	Replace the parking brake return spring
4	Check the rear brake friction plate	Normal	Faulty	Instruction
	Check the installing condition of the rear brake friction plate	Go to Step 5	Incorrect installation of friction plate	Re-install the friction plate
5	Check the rear brake caliper	Normal	Faulty	Instruction
	Check the working condition of the rear caliper (see 51 - Service Brake, Front Brake, Inspection) Hint: The inspection method of the rear brake slave cylinder is the same as that of the front brake	Go to Step 6	The brake piston in the brake caliper is stuck	Replace the brake caliper assembly (see 51 - Service Brake, Rear Brake, Replacement)
6	Verification and check	Normal	Faulty	Instruction
	Operate the parking brake and recheck the fault symptom	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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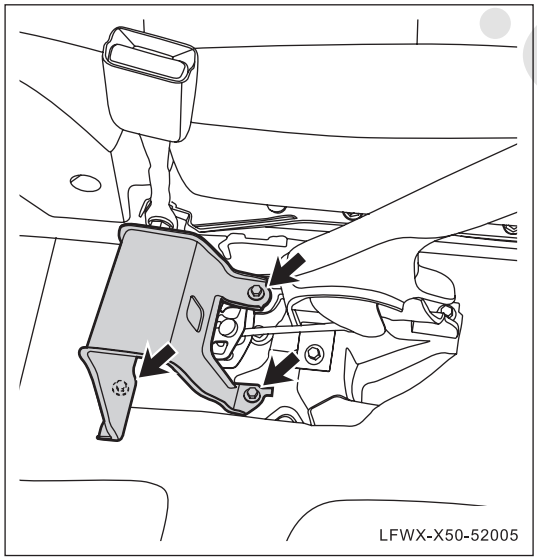
PARKING BRAKE LEVER

CHECK



1. Check whether the button mechanism operates smoothly. If it can not normally return to the original position, replace it.
2. Check whether the parking brake lever detent is worn.

ADJUSTMENT



1. ADJUST THE PARKING BRAKE LEVER

(a) Remove the console. (see 85 - Dashboard and Console, Console, Replacement)

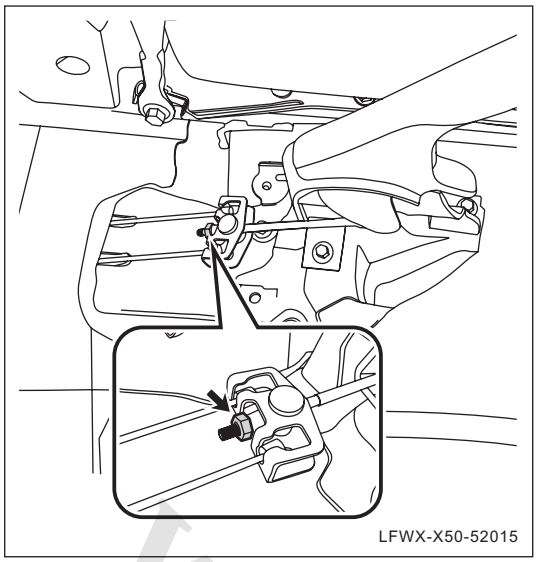
(b) Remove the console bracket.

NOTICE:

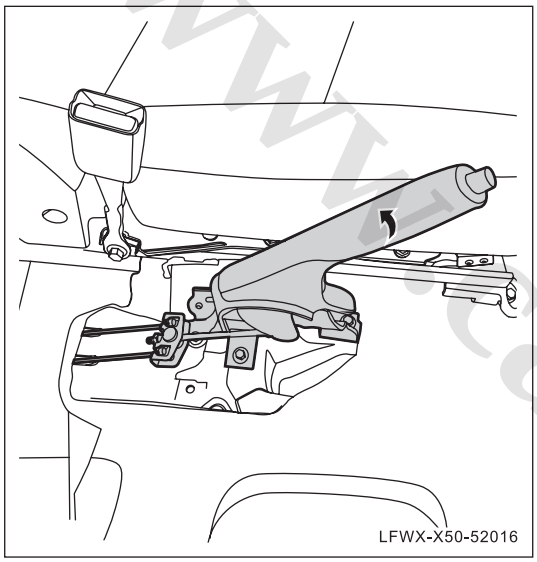
If the rear brake cable have been disconnected, the parking brake cable must be adjusted manually.

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(c) Adjust the brake cable adjusting nut.



(d) After adjustment, pull up the parking brake lever with a force of 100N in the direction vertical to the lever; now 5-7 teeth should be pulled up. Otherwise it is required to adjust it again.

△ HINT:

Each time passing one tooth, you may hear "clatter" sound; you may listen and calculate times of clatter sound of detent for inspection.

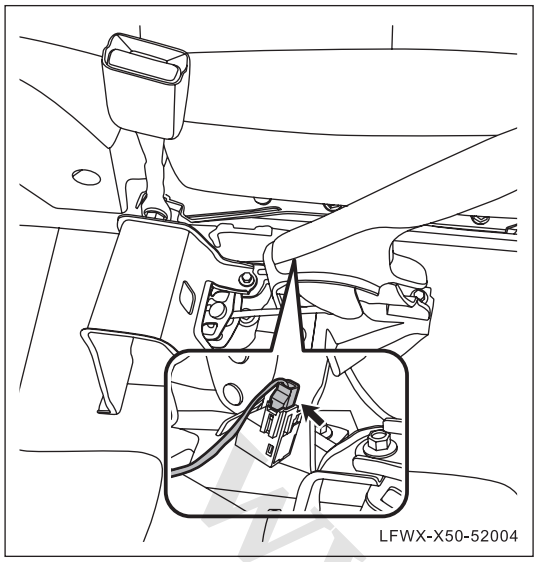
(e) Install the console bracket.

(f) Install the console (see 85 - Dashboard and Console, Console, Replacement)

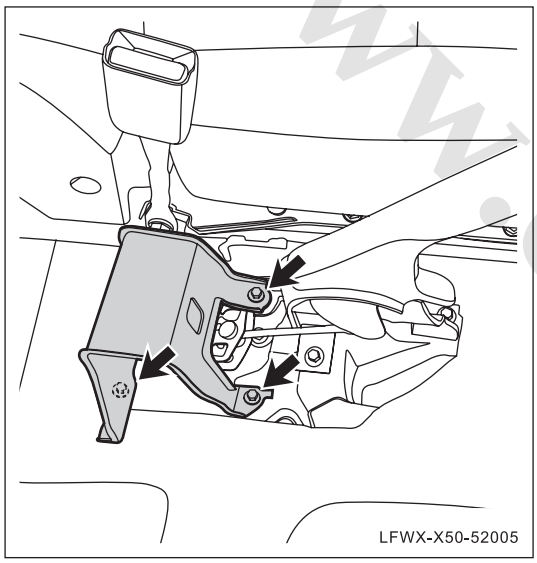
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REPLACEMENT



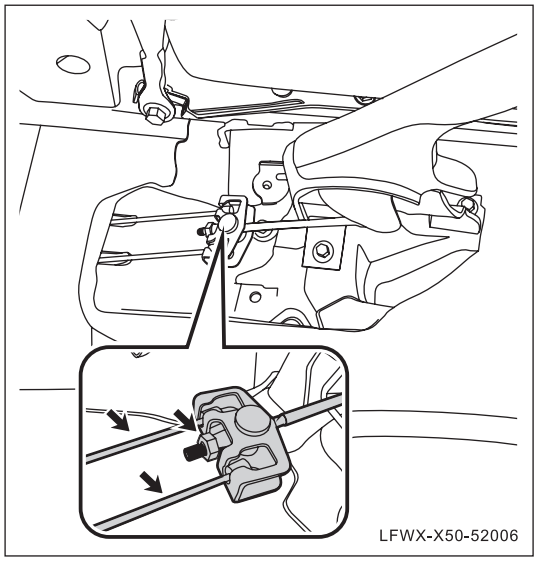
1. **REMOVE THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)**
2. **PULL UP THE PARKING BRAKE LEVER, AND DISCONNECT THE PARKING BRAKE LAMP SWITCH CONNECTOR.**



3. **REMOVE PARKING BRAKE LEVER**

(a) Place the parking brake lever to the lowest position.

(b) Remove the fixing bolts of the console bracket, and take out the console bracket.

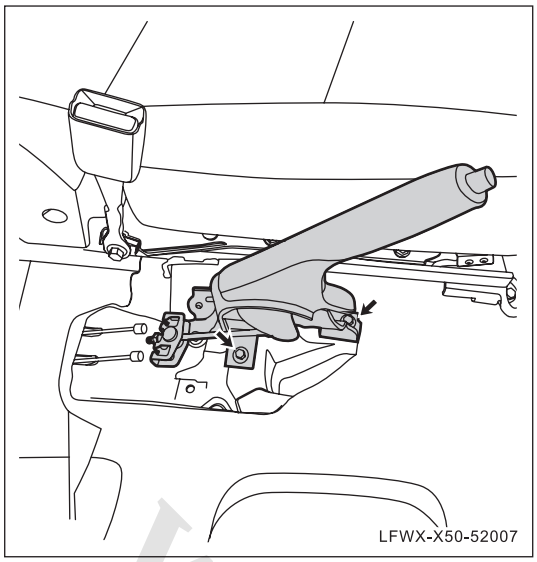


(c) Loosen the parking brake lever adjusting nut.

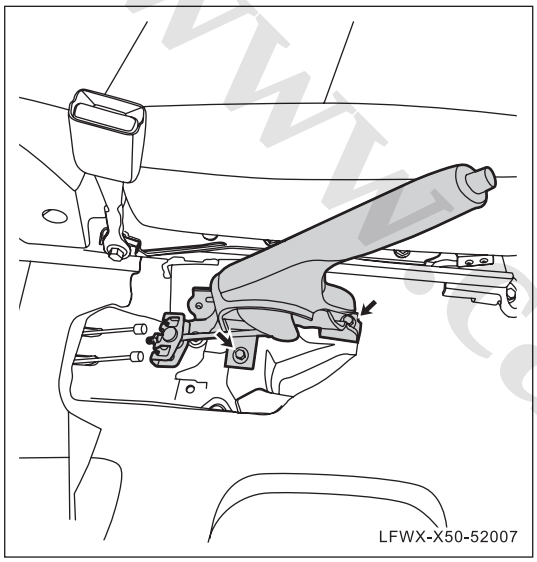
(d) Take down the parking brake left/right cable from the front section of the cable.

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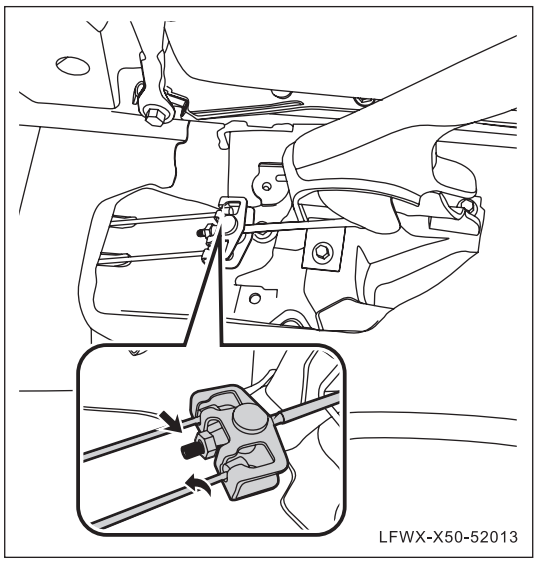
(e) Remove the fixing bolts of the parking brake lever assembly, and take down the parking brake lever assembly.



4. INSTALL PARKING BRAKE LEVER ASSEMBLY

(a) Install the parking brake lever assembly in place, and then install and tighten the bolts.

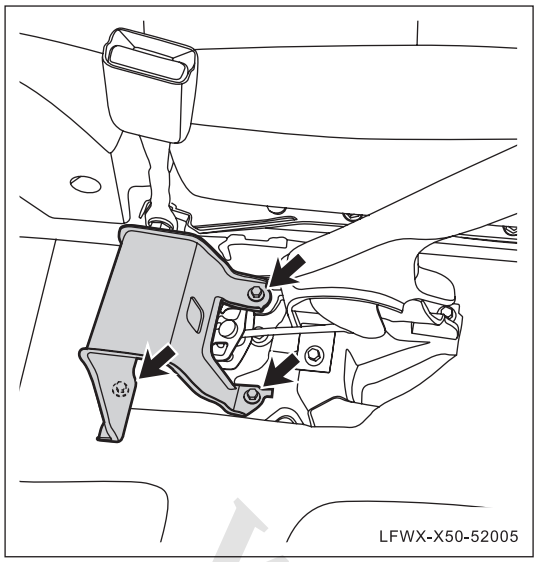
Torque: 8 - 12 N•m



(b) Install the parking brake cable to the front section of the parking brake lever.

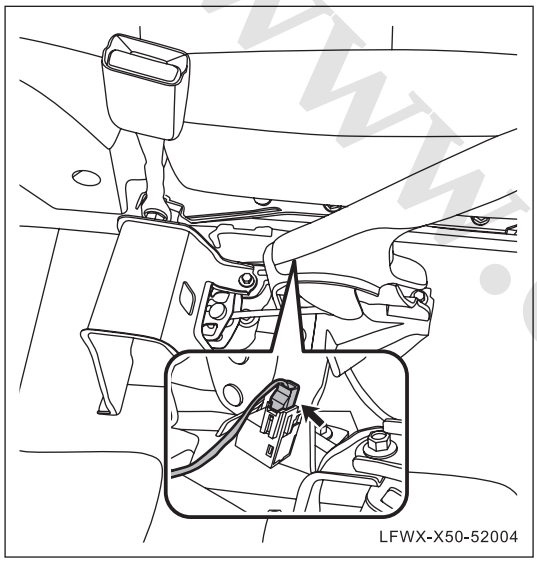
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(c) Install the console bracket, and then install and tighten the fixing bolts.

Torque: 8 - 12 N•m



5. INSTALL THE BRAKE LAMP SWITCH CONNECTOR

(a) Connect the parking brake lamp switch connector.

6. ADJUST THE PARKING BRAKE AFTER INSTALLATION (SEE 52 - PARKING BRAKE, PARKING BRAKE LEVER, ADJUSTMENT)

7. INSTALL THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)

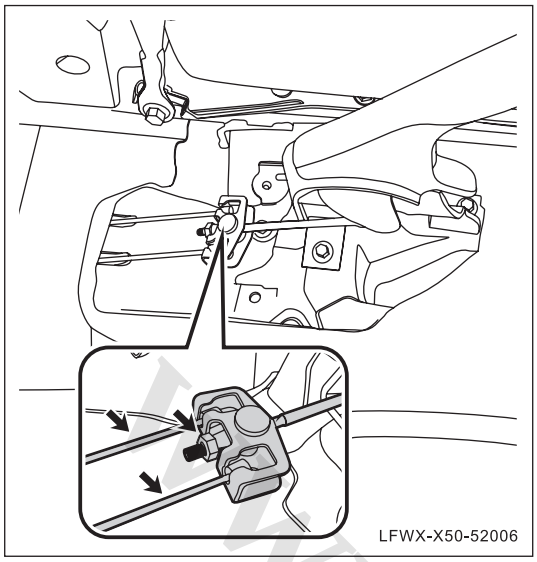
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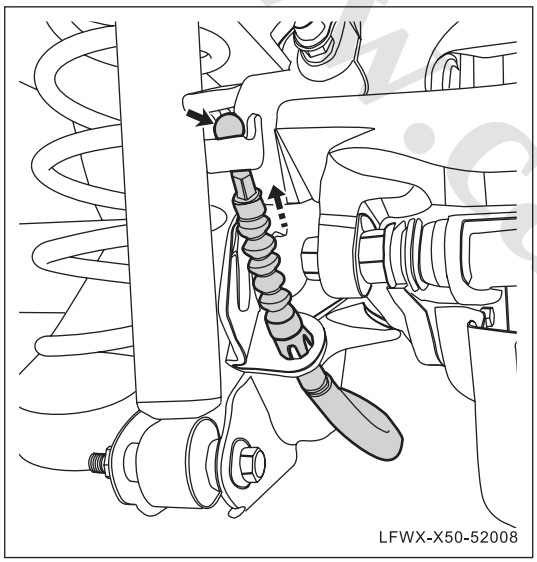
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PARKING BRAKE CABLE

REPLACEMENT



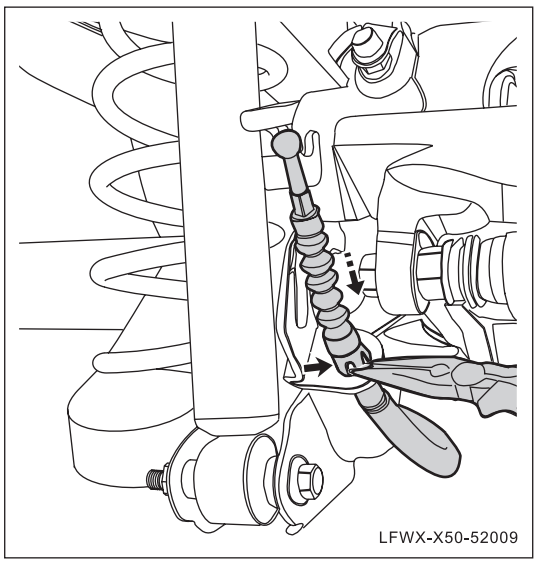
1. **REMOVE THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)**
2. **DISCONNECT TEH CONNECTION OF THE PARKING BRAKE CABLE FRONT SECTION AND THE CABLE (SEE 52 - PARKING BRAKE, PARKING BRAKE LEVER, REPLACEMENT)**



3. **REMOVE THE PARKING BRAKE LEFT/RIGHT CABLE ASSEMBLY**

(a) Lift the vehicle.

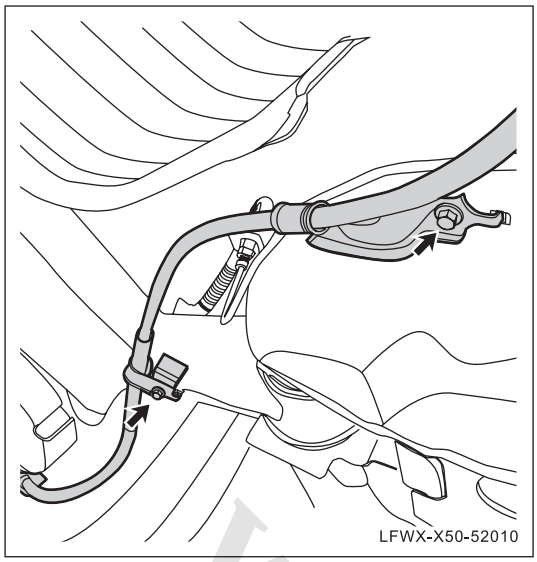
(b) Take down the parking brake cable from the rear brake.



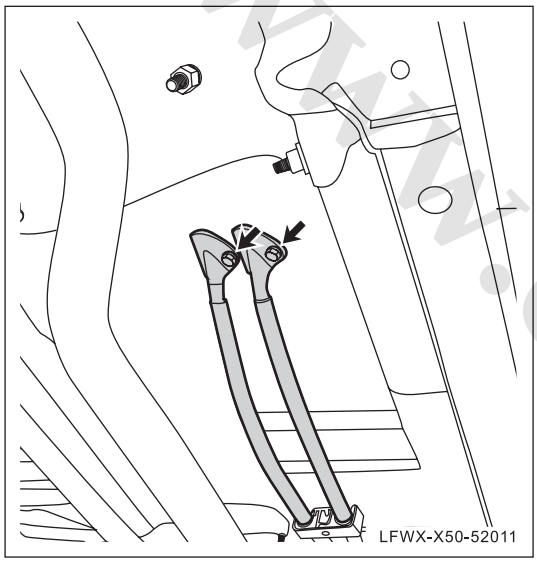
(c) Press down the parking brake cable lock plate and pull out the parking brake cable from the bracket.

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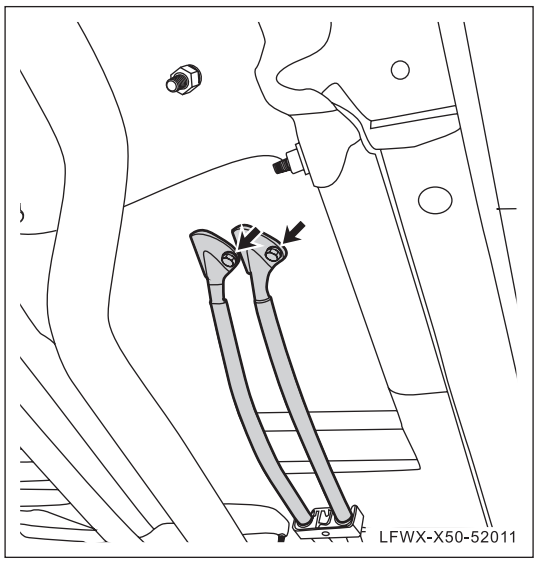


(d) Remove all brackets and clamps on the parking brake cable.



(e) Remove the fixing bolt of the parking brake cable.

(f) Take down the parking brake cable.



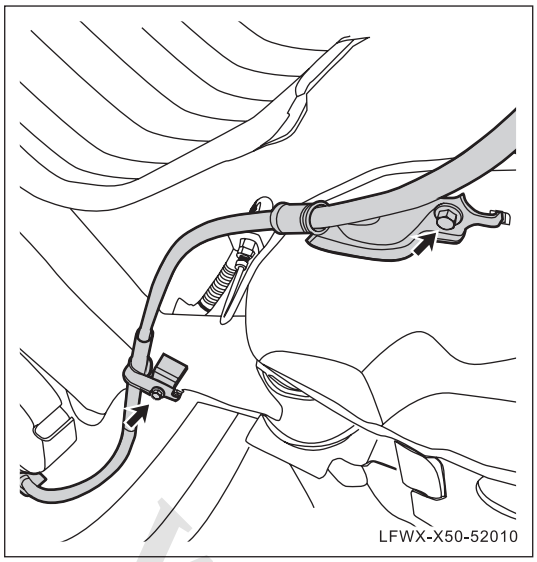
4. INSTALL LEFT AND RIGHT CABLE ASSEMBLY OF PARKING BRAKE.

(a) Pass the front section of the left/right parking brake cable through the vehicle body bottom mounting-hole, and then install and tighten the fixing bolts of the cable assembly.

Torque: 8 - 12 N•m

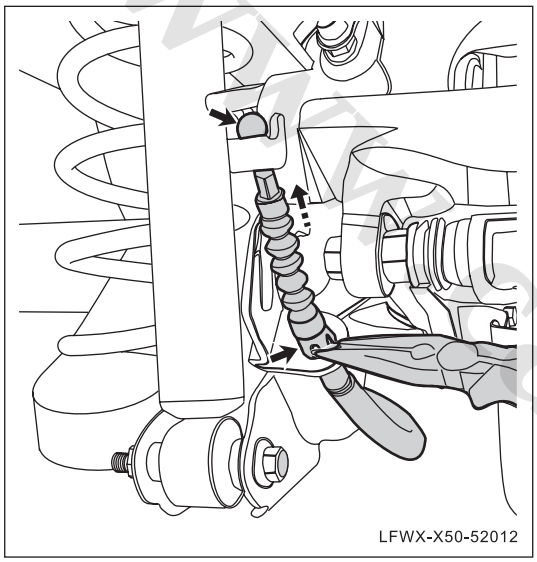
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(b) Sort out the parking brake cable, and install and tighten the fixing bolts of all brackets and clamps on the parking brake cable.

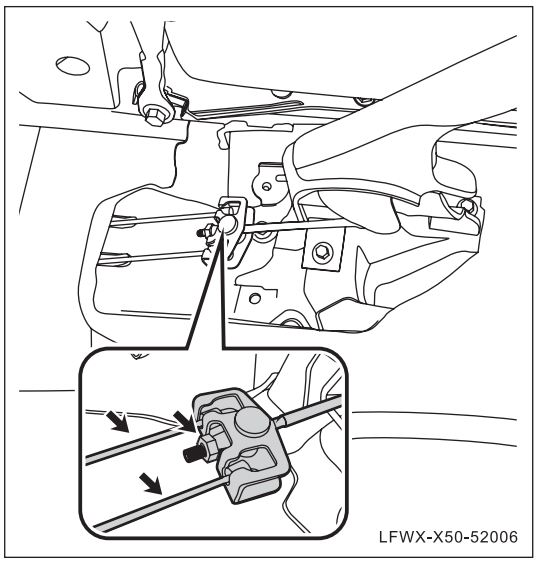
Torque: 8 - 12 N•m



(c) Pass the left/right parking brake cable through the rear brake caliper bracket hole and install them onto the rear brake caliper.

△ HINT:

Confirm that the parking brake cable lock plate can not be detached from the bracket hole.



5. **CONNECT THE FRONT SECTION OF THE PARKING BRAKE CABLE AND THE PARKING BRAKE CABLE (SEE 52 - PARKING BRAKE, PARKING BRAKE LEVER, REPLACEMENT)**
6. **INSTALL THE CONSOLE (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)**
7. **ADJUST THE PARKING BRAKE AFTER INSTALLATION (SEE 52 PARKING BRAKE, PARKING BRAKE LEVER, ADJUSTMENT)**

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Anti-lock Brake System

Anti-lock brake system 53-1
System description 53-1
Preparation 53-2
Service data 53-2
Precautions 53-3
Components 53-4
Function and fault of components 53-5
On-vehicle inspection 53-5
Diagnosis 53-6
Fault symptom table 53-6
Fault diagnosis 53-7
DTC list 53-11
Diagnosis of dtc 53-13
Read and clear DTCs 53-18
Data flow 53-18
Wheel speed sensor 53-20
Replacement 53-20
ABS control unit 53-22
Replacement 53-22
ABS artificial exhaust 53-24

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ANTI-LOCK BRAKE SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

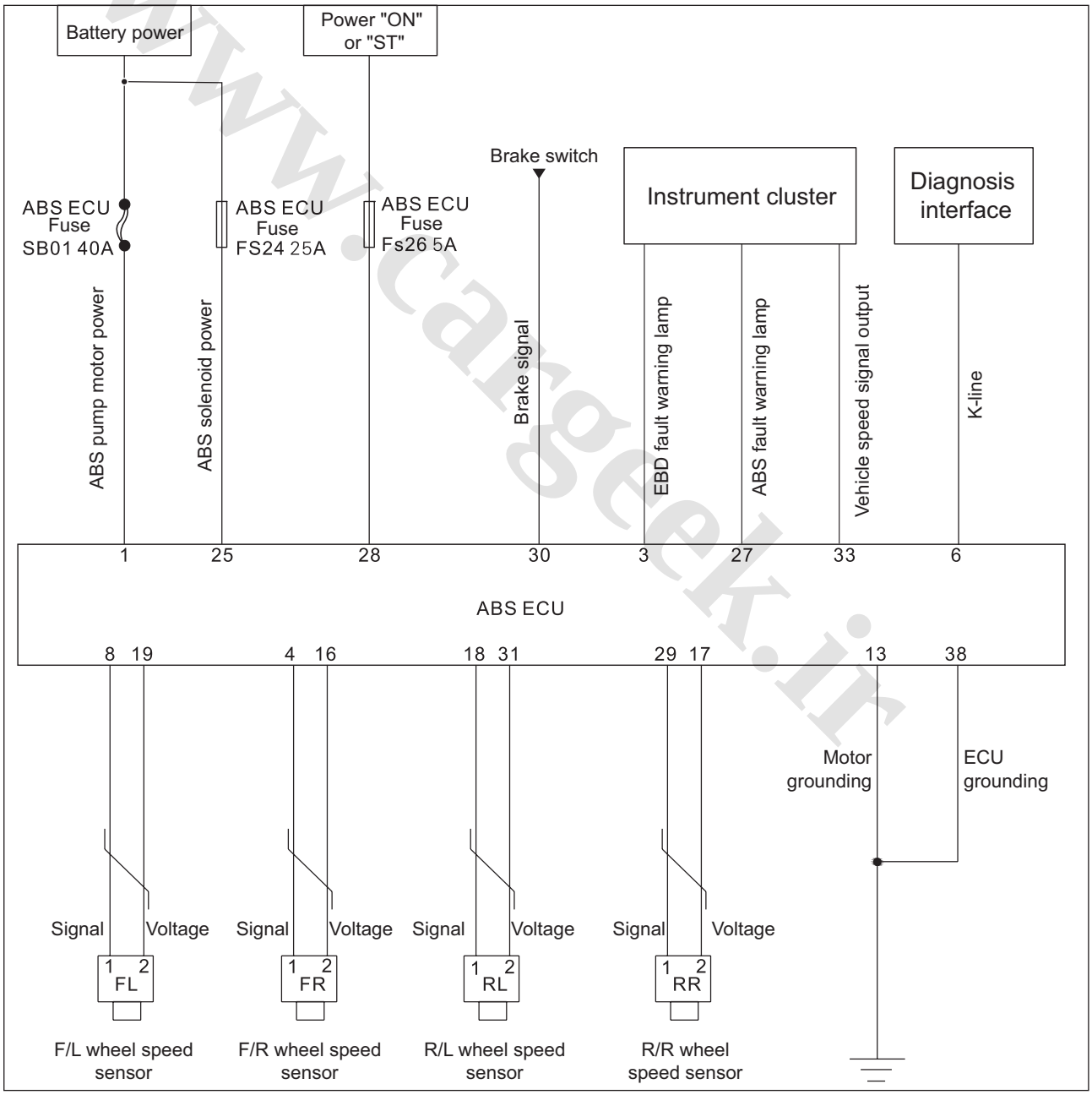
Anti-lock brake system can prevent the wheels from locking at the time of emergency brake, keep the vehicle stable and steering performance during braking and ensure safe driving.

2. COMPONENTS

Anti-lock brake system consists of ABS control unit, pipeline and wheel speed sensor, etc.

3. WORKING PRINCIPLE

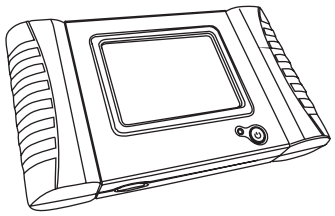
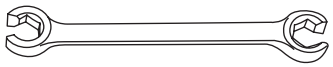
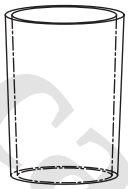
The vehicle brakes at the speed of 15km/h or more, and the wheel speed sensor detects the rotation speed of each hub and then transfers signals to the ECU. When the wheel is locked and its slip rate is extremely large, ECU controls the brake to reduce the brake torque of one wheel or more to prevent them from locking and skidding.



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Diagnostic scanner		Diagnosing ABS faults
2	Pipe wrench		Removing the nuts of pipe joints
3	Cup		Assisting the brake system exhaust

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Brake fluid model	DOT4
Tire model	195/60 R15

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing nut of ABS control unit	20 - 25
Fixing bolt of wheel speed sensor	15 - 20

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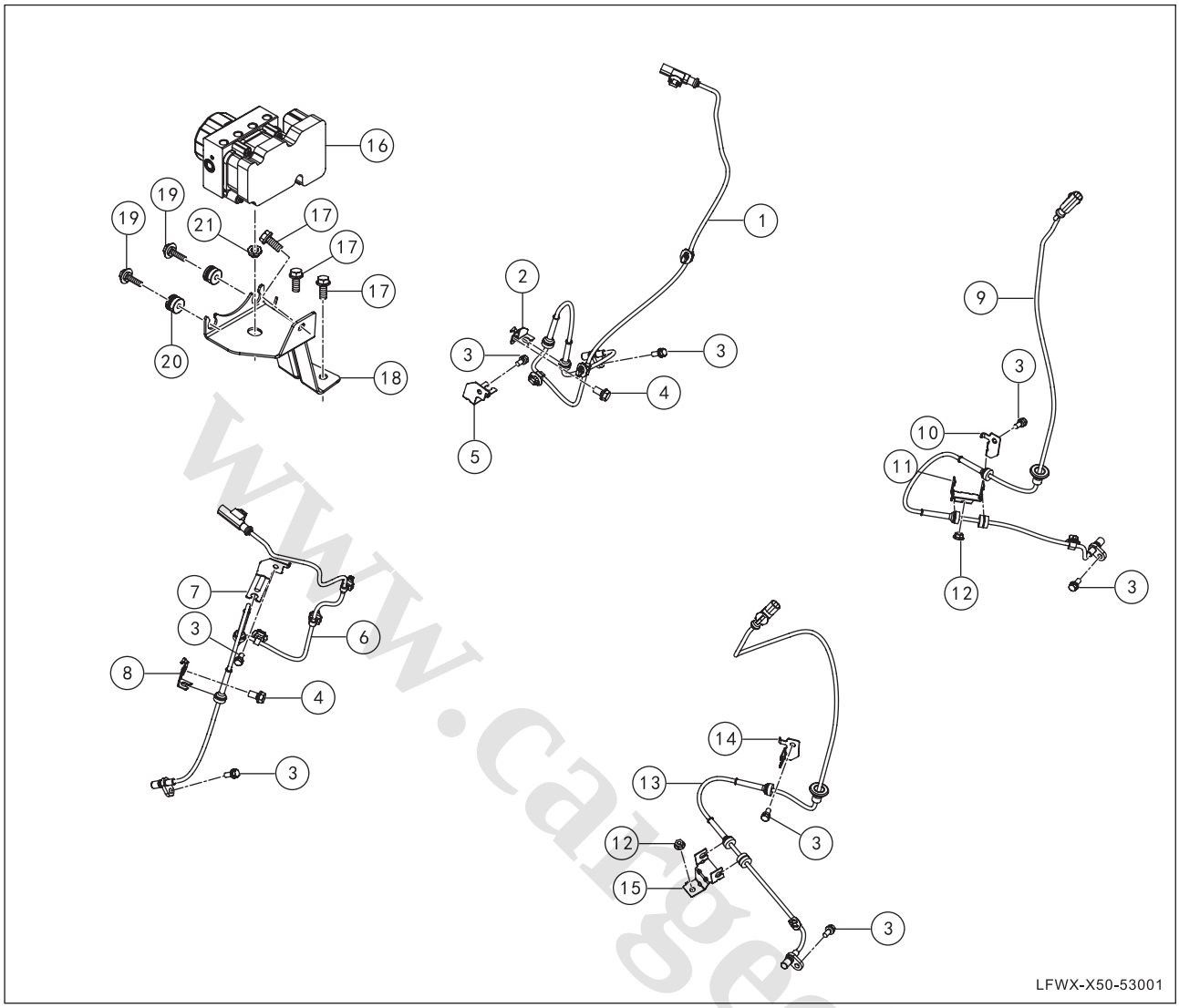
PRECAUTIONS

1. When the vehicle is being electrified or the engine is being started, it may emit short time noise "buzz", which is the sound of the ABS performing self-test and is a normal phenomenon.
2. Make sure that the service brake system works normally without faults before diagnosing the ABS system.
3. When the ABS system is working normally, sound comes from the following sources:
   - Action sound of the motor, solenoid valve and reflux pump in the ABS control unit.
   - The brake pedal may generate sound in rebounding.
   - Sound of impacting between the suspension and the vehicle body due to emergency brake.
4. The following two cases indicate that ABS faults have been detected:
   (a) Turn on the ignition switch, the system self-test is completed, and the ABS warning lamp comes on.
   (b) ABS warning lamp remains on in driving the vehicle.
5. ABS shall be repaired by the skilled, well-trained technicians and can only be replaced with the genuine parts.
6. Turn off the ignition switch and disconnect the battery negative terminal before unplugging the wire harness connectors of the ABS control unit and wheel speed sensor.
7. Confirm that connectors are dry and clean, and prevent any foreign matter from entering.
8. Wire harness connectors of ABS control unit must be installed in place in vertical and horizontal directions to avoid damaging connectors.
9. Ensure correct connection when connecting ABS braking pipelines. The ABS control unit can not judge whether the brake line is connected correctly or not. Wrong connection might cause serious accidents. Always conform to the marks on the ABS assembly when connecting the brake pipeline:
   (a) MC1: connect brake pipeline 1 of the brake master cylinder.
   (b) MC2: connect brake pipeline 2 of the brake master cylinder.
   (c) FL: connect brake pipeline of the front left wheel brake slave cylinder
   (d) FR: connect brake pipeline of the front right wheel brake slave cylinder
   (e) RL: connect brake pipeline of the rear left wheel brake slave cylinder
   (f) RR: connect brake pipeline of the rear right wheel brake slave cylinder
10. The ABS control unit can be only replaced integrally, and cannot be disassembled or replaced/interchanged partially. LIFAN will not provide individual spare parts and doesn't guarantee repair for disassembled ABS control unit, and won't take any responsibility for consequence after disassembling or partially replacing/ interchanging ABS control unit. Before being delivered to the customer, the ABS must be tested after maintenance, and ensure the troubleshooting is completed.

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COMPONENTS



1	Front right wheel speed sensor assembly
2	Fixing bracket II of front right wheel speed sensor
3	Hexagon head bolt, spring washer and plain washer assembly
4	Hexagon head bolt
5	Fixing bracket I of front right wheel speed sensor
6	Front left wheel speed sensor assembly
7	Fixing bracket I of front left wheel speed sensor
8	Fixing bracket II of front left wheel speed sensor
9	Rear right wheel speed sensor assembly
10	Fixing bracket II of rear right wheel speed sensor
11	Fixing bracket I of rear right wheel speed sensor

12	Hexagon nut with flange
13	Rear left wheel speed sensor assembly
14	Fixing bracket II of rear left wheel speed sensor
15	Fixing bracket I of rear left wheel speed sensor
16	ABS control unit
17	Hexagon head bolt and plain washer assembly
18	Bracket of ABS control unit
19	Mounting bolt of ABS control unit
20	Upper mounting sleeve of ABS control unit
21	Lower mounting sleeve of ABS control unit

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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common faults	Fault symptom
ABS control unit	Controlling the braking torque of each wheel	Damaged	The ABS does not work and its indicator lamp is abnormal
Wheel speed sensor	Checking the rotation speed of each wheel	Damaged	The ABS does not work and its indicator lamp is abnormal
Pipeline	Delivering brake fluid and transmitting torque	Leakage and breakage	ABS does not work
Bolt	Tightening parts	Loosened	ABS does not work

ON-VEHICLE INSPECTION

1. Make sure that only the tires and rims with recommended size can be mounted on the vehicle and the tread type and depth of tires in the same axle must be the same.

   Tire specification: 195/60 R15

2. Check the ABS control unit, brake pipelines and brake pipeline connections for leakage
3. Check the ABS fuses, and ensure that the fuse is not blown and its model is correct. The ABS system has three kinds of fuses, they are:

   Pump motor fuse: 40A

   Solenoid valve fuse: 25A

   Electronic control unit fuse: 5A

4. Check the battery voltage, and check if the battery terminals are corroded or loosened. Normal operating voltage range of ABS is 9.3 V -16.8 V.
5. Check whether the ABS ground wire's grounding point is loosened, and whether the grounding location is changed
6. ABS grounding wire must have good air tightness performance to avoid losing function resulting from water and moisture ingress into the ABS control unit connectors from the hole of the wire harness due to siphonage.
7. Check the following electrical parts visually and check through appearance:
   (a) Check if ABS parts wire harness and connectors are properly connected and check for damage due to clamping or cutting.
   (b) Check if the wire harness is more closer to the devices with high voltage or high current, such as high voltage power supply or parts, generator and motor, or after-sale additionally-installed stereo.

NOTICE:

Devices with high voltage or high current might cause circuit to generate induced noise, consequently interfering with the normal working of the circuit.

   (c) ABS parts are very sensitive to electromagnetic interference. If an intermittent fault is in doubt, check if after-sale additionally-installed anti-theft device, lamps and mobile telephone cause interference to it.

8. ABS is an active safety system. Its main function is to make full use of ground adhesion to keep the car controllable and stable in running. But when traveling with speed exceeding physical limit or on wet and sliding road, ABS can't completely prevent sliding movement of the vehicle.
9. Following causes might result in excessively loud noise of ABS at work:

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(a) Connection between the ABS control unit and the ABS control unit bracket is loose.

(b) Connection between the ABS control unit bracket and the vehicle body is loose.

(c) Plastic washers in the ABS control unit bracket are missed or damaged.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
ABS fault alarm lamp does not come on	1. ABS fuse FS26 (blown)	See 53 - Anti-lock Brake System, Diagnosis, Fault Diagnosis (1. ABS fault alarm lamp does not come on)
	2. ABS fault alarm lamp circuit (short circuit or open circuit)	
	3. Instrument cluster (damaged)	
	4. ABS control unit (damaged)	
ABS fault alarm remains on	1. Check whether the system outputs DTC	See 53 - Anti-lock Brake System, Diagnosis, Fault Diagnosis (2. ABS fault alarm lamp remains on)
	2. ABS fault alarm lamp circuit (short circuit)	
	3. Instrument cluster (damaged)	
	4. ABS control unit (damaged)	
EBD fault alarm lamp remains on	1. EBD fault alarm lamp circuit (short circuit or open circuit)	See 53 - Anti-lock Brake System, Diagnosis, Fault Diagnosis (3. ABS fault alarm lamp remains on)
	2. Brake fluid (insufficient)	
	3. Instrument cluster (damaged)	
	4. ABS control unit (damaged)	
ABS does not work	1. Check whether the system outputs DTC	-
	2. Check the service brake system	See 51 - Service Brake, Diagnosis, Fault Diagnosis
	3. ABS control unit (damaged)	Replacement

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FAULT DIAGNOSIS

1. ABS FAULT ALARM LAMP DOSE NOT COME ON

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON" position and check if the indicator lamp on instrument cluster performs self-test	Diagnosis is over	ABS fault alarm lamp dose not come on during the self-test of instrument cluster	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check whether ABS ECU fuse FS26 in the cab fuse box is blown	Go to Step 3	Too much current in the power circuit (short circuit or overload)	Replace the fuse with the same specification. Goto Step 2, if the fuse is blown again
2	Check the ABS ECU power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between ABS ECU power leads and the grounding	Go to Step 3	There is short circuit in the power circuit or in the instrument cluster if the resistance is too small	Gradually troubleshoot to identify the short circuit point, and then replace the fuse with the same specification
3	Check the voltage in ABS ECU power supply	Normal	Faulty	Instruction
	• Disconnect ABS ECU connector U07 • Turn the ignition switch to "ON" position, and check the voltage between the terminal 28 of U07 and the grounding Voltage: 9 - 13 V	Go to Step 4	There is open circuit in the wire harness if the voltage is out of the specified range	Check the circuit between the fuse and the ABS ECU
4	Check the grounding circuit of ABS ECU	Normal	Faulty	Instruction
	Check the resistance between the terminal 13 and 38 of ABS ECU connector U07 and the grounding Resistance: <2Ω	Go to Step 5	The circuit has open circuit point	Overhaul the circuit between the wire harness U07 in the engine compartment and the grounding point G15
5	Check the ABS fault alarm lamp circuit	Normal	Faulty	Instruction
	Disconnect the ABS ECU connectors, and check the voltage between the terminal 27 of U07 and the grounding when the ignition switch is "ON". Voltage: 9 - 13 V	Go to Step 8	Faulty instrument cluster circuit	Go to Step 6
6	Check the circuit between the ABS ECU and the instrument cluster	Normal	Faulty	Instruction
	Check for continuity between the terminal 27 of ABS ECU connector U07 and the terminal 25 of instrument cluster connector I03	Go to Step 7	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
7	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Replace the instrument cluster with the same model, and check if the fault is eliminated	Replace the instrument cluster	Fault still exists	Go to Step 8
8	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the fault is eliminated	Replace the ABS actuator assembly	Fault still exists	Find the cause out from other fault symptoms

2. ABS FAULT ALARM LAMP REMAINS ON

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON" position and check if the indicator lamp on the instrument cluster is lit correctly	Diagnosis is over	ABS indicator lamp remains on.	Go to Step 1
1	Inspection of diagnostic scanner	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether it has DTC to output	Go to Step 2	With DTC	Maintain it according to the hint of DTC
2	Check the circuit between the ABS ECU and the instrument cluster	Normal	Faulty	Instruction
	Check whether the circuit between the terminal 27 of ABS ECU connector U07 and the terminal 25 of instrument cluster connector I03 is short circuit to ground	Go to Step 3	The wire harness or connector has open circuit point	Repair the corresponding wire harness, connector or terminal
3	Check the voltage in ABS ECU power supply	Normal	Faulty	Instruction
	• Disconnect ABS ECU connector U07 • Turn the ignition switch to "ON" position, and check the voltage between the terminal 1, 25 and 28 of U07 and the grounding respectively Voltage: 9 - 13 V	Go to Step 4	There is open circuit in the wire harness if the voltage is out of the specified range	Check the circuit between the fuse and the ABS ECU
4	Check the grounding circuit of the ABS ECU	Normal	Faulty	Instruction
	Check the resistance between the terminal 13 and 38 of ABS ECU connector U07 and the grounding Resistance: <2Ω	Go to Step 5	The circuit has open circuit point	Overhaul the circuit between the wire harness U07 in the engine compartment and the grounding point G15
5	Replacement and check	Normal	Faulty	Instruction
	Replace the instrument cluster with the same model, and check if the fault is eliminated	Replace the instrument cluster	Fault still exists	Go to Step 5
6	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the fault is eliminated	Replace the ABS actuator assembly	Fault still exists	Find the cause out from other fault symptoms

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3. EBD FAULT ALARM LAMP REMAINS ON

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON" position and check if the indicator lamp on the instrument cluster is lit correctly	Diagnosis is over	EBD fault alarm lamp remains on	Go to Step 1
1	Inspection of diagnostic scanner	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check if the system has DTC to output	Go to Step 2	With DTC	Maintain it according to the tip of DTC
2	Check brake fluid	Normal	Faulty	Instruction
	Check if brake fluid is sufficient	Go to Step 3	Insufficient brake fluid	Fill brake fluid
3	Check the brake fluid level switch	Normal	Faulty	Instruction
	Check the brake fluid level switch for damage	Go to Step 4	Brake fluid level switch is damaged	Replace the brake fluid level switch
4	Check the circuit between ABS ECU and the instrument cluster	Normal	Faulty	Instruction
	Check whether the circuit between the terminal 3 of ABS ECU connector U07 and the terminal 11 of instrument cluster connector I09 is grounding short circuit	Go to Step 5	The wire harness or connector has short circuit point	Repair the corresponding wire harness, connector or terminal
5	Check the voltage in ABS ECU power supply	Normal	Faulty	Instruction
	• Disconnect ABS ECU connector U07 • Turn the ignition switch to "ON" position, and check the voltage between the terminal 1, 25 and 28 of U07 and the grounding respectively Voltage: 9 - 13 V	Go to Step 6	There is open circuit in the wire harness if the voltage is out of the specified range	Check the circuit between the fuse and the ABS ECU
6	Check the grounding circuit of the ABS ECU	Normal	Faulty	Instruction
	Check the resistance between the terminal 13 and 38 of ABS ECU connector U07 and the grounding Resistance: <2Ω	Go to Step 7	The circuit has open circuit point	Overhaul the circuit between the wire harness U07 in the engine compartment and the grounding point G15
7	Replacement and check	Normal	Faulty	Instruction
	Replace the instrument cluster with the same model, and check if the fault is eliminated	Replace the instrument cluster	Fault still exists	Go to Step 8
8	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the fault is eliminated	Replace the ABS actuator assembly	Fault still exists	Find the cause out from other fault symptoms

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DTC LIST

DTC (DTC)	Fault code description	Possible causes	Recommended action
C1900	Too high voltage in ECU power supply	1. Battery voltage is too high 2. ECU is damaged	See 53 - Anti-lock Brake System, Diagnosis, DTC (1.C1900, C1901- high/low power supply voltage)
C1901	Too low voltage in ECU power supply	1. Battery voltage is too low 2. ECU is damaged	
C1000	ECU has fault (hardware and microprocessor error)	1. ECU is damaged	See 53 - Anti-lock Brake System, Diagnosis, DTC (2.C1000, C1010 - ECU fault)
C1010	ECU has fault (software error)	1. ABS control unit	
C0031	Front left wheel speed sensor signal fault: out of range, loss, noise and intermittent interruption	1. The wheel speed sensor circuit is disconnected, and the connector is loose and ruptured 2. Wheel speed sensor signal wire is short circuit to power supply 3. Wheel speed sensor power supply wire is short circuit to ground; 4. Non-installation of gear ring, teeth missed, foreign matter in gear ring, demagnetization and eccentric gear ring 5. An excessive air gap appears between the sensor and the gear ring. 6. The wheel speed sensor is interfered by external magnetic fields (wheel or axle is not demagnetized) 7. Wheel speed sensor body fault 8. Wrong number of teeth in gear ring 9. Tire size is out of specified range 10. ECU is damaged	See 53 - Anti-lock Brake System, Diagnosis, DTC (3. C0031, C00A9, C0034, C00AA, C0037, C00AB, C003A, C00AC, C1099 - wheel speed sensor signal fault)
C00A9	Front left wheel speed sensor fault: cause is impossible to be detected		
C0034	Front right wheel speed sensor signal fault: out of range, loss, noise and intermittent interruption		
C00AA	Front right wheel speed sensor fault: cause is impossible to be detected		
C0037	Rear left wheel speed sensor signal fault: out of range, loss, noise and intermittent interruption		
C00AB	Rear left wheel speed sensor fault: cause is impossible to be detected		
C003A	Rear right wheel speed sensor signal fault: out of range, loss, noise and intermittent interruption		
C00AC	Rear right wheel speed sensor fault: cause is impossible to be detected		
C1099	Wheel speed sensor group fault (wheel speed sensors interchanged, speed differences of wheels are too large, several wheel speed sensors fault)		
C006B	Unreasonable ABS control (too long control time)	1. Continuous brake on icy ground 2. Wheel speed differences are too large	See 53 - Anti-lock Brake System, Diagnosis, DTC (4.C006B-unreasonable ABS control
C0020	Reflux pump electric motor fault	1. Pump motor is in poor grounding 2. Over-heating protection of system 3. The power supply of pump motor is abnormal (fuse and external relay) 4. Pump motor relay fault 5. Pump motor fault	See 53 - Anti-lock Brake System, Diagnosis, DTC (5.C0020 - pump motor fault)

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DTC (DTC)	Fault code description	Possible causes	Recommended action
C0032	Front left wheel speed sensor circuit fault: open circuit	1. The wheel speed sensor circuit is disconnected, and the connector is loose and ruptured 2. Reversed connection of wheel speed sensor signal wire and power lead 3. Signal wire is short circuit to ground	See 53 - Anti-lock Brake System, Diagnosis, DTC (6. C0032, C00A0, C00A1, C00A9, C0035, C00A2, C00A3, C00AA, C0038, C00A4, C00A5, C00AB, C003B, C00A6, C00A7, C00AC, C1099 - wheel speed sensor circuit fault)
C00A0	Front left wheel speed sensor circuit fault: short circuit to ground		
C00A1	Front left wheel speed sensor circuit fault: short circuit to power supply		
C00A9	Front left wheel speed sensor fault: fault cause is impossible to be detected		
C0035	Front right wheel speed sensor circuit fault: open circuit		
C00A2	Front right wheel speed sensor circuit fault: short circuit to ground		
C00A3	Front right wheel speed sensor circuit fault: short circuit to power supply		
C00AA	Front right wheel speed sensor fault: the cause is impossible to be detected		
C0038	Rear left wheel speed sensor circuit fault: open circuit		
C00A4	Rear left wheel speed sensor circuit fault: short circuit to ground		
C00A5	Rear left wheel speed sensor circuit fault: short circuit to power supply		
C00AB	Rear left wheel speed sensor fault: the cause is impossible to be detected		
C003B	Rear right wheel speed sensor circuit fault: open circuit		
C00A6	Rear right wheel speed sensor circuit fault: short circuit to ground		
C00A7	Rear right wheel speed sensor circuit fault: short circuit to power supply		
C00AC	Rear right wheel speed sensor fault: the cause is impossible to be detected		
C1099	Wheel speed sensor group fault (wheel speed sensor interchanged, speed differences of wheel are too large, several wheel speed sensors fault)		
C0010	Front left fluid inlet valve fault	1. The solenoid valve is short circuit to power supply or to ground, and its circuit is open circuit 2. Fuse fault 3. Overheating protection of system 4. ABS is damaged	See 53 - Anti-lock Brake System, Diagnosis, DTC (7.C0010, C0011, C0014, C0015, C0018, C0019, C001C, C001D, C1095, C0072 - solenoid valve and group valve relay fault)
C0011	Front left fluid outlet valve fault		
C0014	Front right fluid inlet valve fault		
C0015	Front right fluid outlet valve fault		
C0018	Rear left fluid inlet valve fault		
C0019	Rear left fluid outlet valve fault		
C001C	Rear right fluid inlet valve fault		
C001D	Rear right fluid outlet valve fault		
C1095	Valve relay fault		
C0072	Valve module fault (overheating protection, invalid signal, hardware damaged)		

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DIAGNOSIS OF DTC

1. C1900, C1901 - SUPPLY VOLTAGE HIGH OR LOW

The setting conditions of DTC:

1. In the beginning when the vehicle is being electrified, voltage is below 4.5V.
2. Ignition switch is in the "ON" position, and voltage is below 7.7V or above 16.8V.
3. Vehicle speed is above 6km/h, and voltage is 7.7 - 9.2V.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 1	Perform on-vehicle inspection	
1	Check the battery voltage	Normal	Faulty	Instruction
	Disconnect connectors of ABS control unit, and check the voltage between terminal 1 and 25 of wire harness connector U07 in the engine compartment and the grounding Voltage: 9 V - 13 V	Go to Step 2	The detection value is out of the specified range	The abnormal voltage indicates that there is open circuit in the power circuit of the ABS control unit. Check and repair the circuit between the connectors of the ABS control unit and the fuse
2	Check the ignition switch power supply	Normal	Faulty	Instruction
	Disconnect connectors of ABS control unit, start the engine making it run idle, and then check the voltage between terminal 28 of wire harness connector U07 in the engine compartment and the grounding Voltage: 13 V - 15 V	Go to Step 3	Too high voltage indicates the alternator has fault	Overhaul the circuit of the alternator voltage adjuster
3	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

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2. C0010, C0011, C0014, C0015, C0018, C0019, C001C, C001D, C1095, C0072 - SOLENOID VALVE AND GROUP VALVE RELAY FAULT

The setting conditions of DTC:

1. Power supply of valve is abnormal. (power supply is short circuit to ground or open circuit to grounding wire)
2. The temperature of the solenoid valve is too high. (overheating protection)
3. More than 5 solenoid valves are short circuit. (fuse FS24 is blown)
4. Do the motion test of the corresponding solenoid valve, but no response occurs;
5. Solenoid valve fault.
6. Group valve relay fault

Steps	Inspection item	Inspection result		
0	Fault location	Normal	Faulty	Instruction
	Stop the car and cool it down for 5 min; Check if the fault is eliminated	Diagnosis is over	Go to Step 1	
1	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 2	Perform on-vehicle inspection	
2	Inspect circuit.	Normal	Faulty	Instruction
	• Check if the fuse FS24 is blown. • Check if wire harness connectors, wire harness and grounding wire are open circuit or short circuit. • Check if voltage in the solenoid valve power supply connector pin (No. 25 terminal of U07) is battery voltage;	Go to Step 3	The circuit is open circuit, and/or short circuit	Check and repair the circuit between the connectors of the ABS control unit and the fuse
3	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, make cross-validation to ABS assembly and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms
4	Verification and check	Normal	Faulty	Instruction
	Eliminate detected fault and test if the fault is eliminated Hint: Stop the car after accelerating it to 15 km/h, and check if this fault occurs again	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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3. C0020 - PUMP MOTOR FAILED

The setting conditions of DTC:

1. Pump motor is overloaded, with excessive high temperature; (overheating protection)
2. After reflux pump motor relay works 60 ms, the reflux pump monitor can not inspect voltage signal yet.
3. The reflux pump motor relay does not work, and the reflux pump monitor detects voltage for above 2.5s.
4. The reflux pump motor relay stops working, and the reflux pump monitor detects that voltage does not drop.

Steps	Inspection item	Inspection result		
0	Fault location	Normal	Faulty	Instruction
	Stop the car and cool it down for 5 min; Check if the fault is eliminated	Diagnosis is over	Go to Step 1	
1	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 2	Perform on-vehicle inspection	
2	Inspect circuit.	Normal	Faulty	Instruction
	• Check if the fuse SB01 is blown • Check if connectors, wire harness and grounding wire are open circuit or short circuit. • Check if voltage in the pump motor power supply connector pin (terminal 1 of U07) is battery voltage	Go to Step 3	The circuit is open circuit, and/or short circuit	Check and repair the circuit between the connectors of the ABS control unit and the fuse
3	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, make cross-validation to ABS assembly and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

4. C0032,C00A0,C00A1,C00A9,C0035,C00A2,C00A3,C00AA,C0038, C00A4,C00A5,C00AB,C003B,C00A6,C00A7,C00AC,C1099 - WHEEL SPEED SENSOR FAULT

The setting conditions of DTC:

1. ECU detects that the wheel speed sensor signal wire is short circuit to ground.
2. Wheel speed sensor circuit is open circuit.

Steps	Inspection item	Inspection result		
0	Fault location	Normal	Faulty	Instruction
	Stop the car and cool it down for 5 min; Check if the fault is eliminated	Diagnosis is over	Go to Step 1	
1	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 2	Perform on-vehicle inspection	
2	Inspect circuit.	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check if all wheel speed sensor connectors work normally, and check if wheel speed sensor circuit is open circuit and short-circuit.	Go to Step 3	The circuit is open circuit, and/or short circuit	Check and repair the circuit between the connectors of the ABS control unit and the fuse
3	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

5. C0031, C00A9, C0034, C00AA, C0037, C00AB, C003A, C00AC, C1099 - WHEEL SPEED SENSOR SIGNAL FAULT

The setting conditions of DTC:

1. ECU detects that the wheel speed sensor signal wire is short circuit to power.
2. ECU detects that the wheel speed sensor power supply wire is short circuit to ground.
3. Wheel speed sensor signal is abnormal.

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 1	Perform on-vehicle inspection	
1	Inspect circuit.	Normal	Faulty	Instruction
	• Check if the connection of all wheel speed sensor is intact • Check if the wheel speed sensor circuit in wire harness is open circuit or short circuit	Go to Step 2	The circuit is open circuit, and/or short circuit	Check and repair the circuit between the connectors of the ABS control unit and the fuse
2	Check wheel speed sensor and gear ring	Normal	Faulty	Instruction
	• Check air gap between wheel speed sensor and gear ring • Check if gear ring is contaminated and has foreign matter; and that teeth are missed. • Check if the number of teeth in gear ring is correct.	Go to Step 3	Check if it is normal	Eliminate the corresponding faults, and replace the corresponding parts
3	Check the data flow	Normal	Faulty	Instruction
	Lift the vehicle by a lifter and rotate wheels. Observe by data flow from diagnostic scanner, that the wheel speed sensor signal output conforms to the wheel speed	Go to Step 5	Wheel speed sensor has fault	Go to Step 4
4	Check the wheel speed sensor	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect wheel speed sensor connector. Connect 12V power supply cable between two pins of wheel speed sensor connector and connect ammeter in series. Connect the positive pole of power supply to pin 2; while negative pole of power supply to pin 1. • Slowly turn the wheel and observe whether the number displayed in the ammeter is in the vicinity of approximately 7mA and 14mA	Go to Step 5	Wheel speed sensor is damaged	Replace the wheel speed sensor
5	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

NOTICE:

- **For wheel speed sensor signal fault, after elimination, it is necessary to start the vehicle and accelerate speed to about 15km/h, and then the ABS warning lamp will goes out.**
- **Wheel speed sensor supply voltage to the ECU cannot be measured; as long as open circuit exists in the wheel speed sensor circuit, ECU automatically stops power supply and then provides electricity when the next ignition self-test is finished.**

6. C1000, C1010 - ECU FAILURE

The setting conditions of DTC:

1. ECU power supply has fault
2. ECU is damaged

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 1	Perform on-vehicle inspection	
1	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

7. C006B - UNREASONABLE ABS CONTROL

The setting conditions of DTC:

1. ABS receives continuous working instructions (more than 1min)

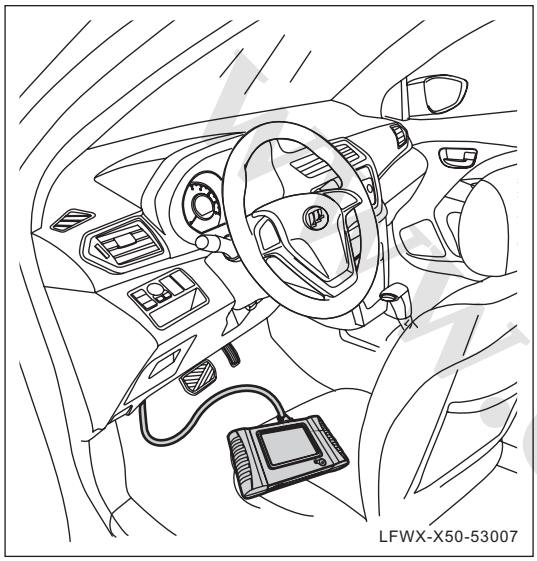
Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Whether the on-vehicle inspection has been performed	Go to Step 1	Perform on-vehicle inspection	
1	Check wheel speed sensor and gear ring	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Is the wheel speed sensor mounted correctly • Check the signal gears for scratches, adhesive scrap metal or external objects	The installation of the wheel speed sensor is wrong or the signal gears have fault	Go to Step 2	Troubleshooting
2	Replacement and check	Normal	Faulty	Instruction
	Replace the ABS control unit with the same model, and check if the ABS works normally	Replace the ABS control unit	Fault still exists	Find the cause out from other fault symptoms

READ AND CLEAR DTCS



1. USE THE DIAGNOSTIC SCANNER TO READ THE DIAGNOSTIC TROUBLE CODE (DTC)

(a) Connect Lifan V30 diagnostic scanner to the diagnostic interface.

(b) Select "Chassis Control" and enter "ABS".

(c) Read or clear the DTC.

△ HINT:

If the DTCs cannot be cleared, it indicates that the fault is not eliminated. Eliminate the fault according to the tips of the DTC. After the ABS completes the dynamic self-test with the vehicle driving at speed above 15km/h, clear DTCs.

DATA FLOW

△ HINT:

Read the data flow with the diagnostic scanner and observe the working condition of relay, actuator and other components without removal of parts. Do the road test firstly for reading data flow at the time of troubleshooting saving the diagnostic time greatly.

Item	Display	Description
Filling state of hydraulic unit	Complete and normal	-
Front left wheel speed	0	Displaying the front left wheel speed
Front right wheel speed	0	Displaying the front right wheel speed
Rear left wheel speed	0	Displaying the rear left wheel speed
Rear right wheel speed	0	Displaying the rear right wheel speed
Vehicle speed	0	Displaying the current vehicle speed output to other control units
Front left oil inlet solenoid valve	ON/OFF	Displaying the operation state of front left oil inlet solenoid valve
Front left oil outlet solenoid valve	ON/OFF	Displaying the operation state of front left oil outlet solenoid valve
Front right oil inlet solenoid valve	ON/OFF	Displaying the operation state of front right oil inlet solenoid valve

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Item	Display	Description
Front right oil outlet solenoid valve	ON/OFF	Displaying the operation state of front right oil outlet solenoid valve
Rear left oil inlet solenoid valve	ON/OFF	Displaying the operation state of rear left oil inlet solenoid valve
Rear left oil outlet solenoid valve	ON/OFF	Displaying the operation state of rear left oil outlet solenoid valve
Rear right oil inlet solenoid valve	ON/OFF	Displaying the operation state of rear right oil inlet solenoid valve
Rear right oil outlet solenoid valve	ON/OFF	Displaying the operation state of rear right oil outlet solenoid valve
The state of relay	ON/OFF	Displaying the current state of ABS relay
The state of pump motor	ON/OFF	Displaying the current operation state of pump motor
The state of BLS	ON/OFF	Displaying the state of the brake lamp switch signal input
Battery voltage	10 - 15 V	Displaying the voltage in ABS ECU power supply

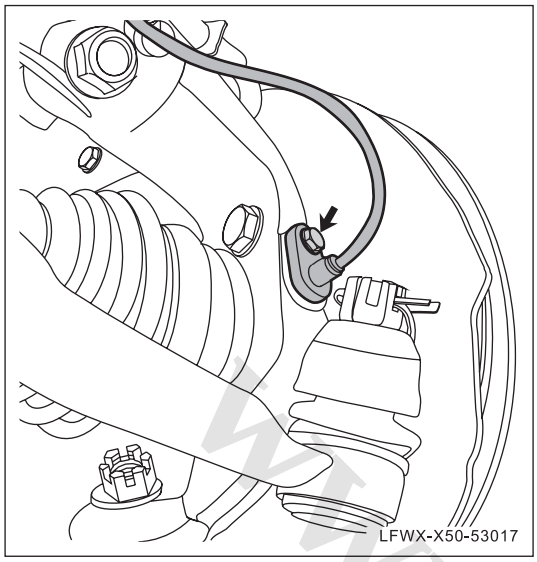
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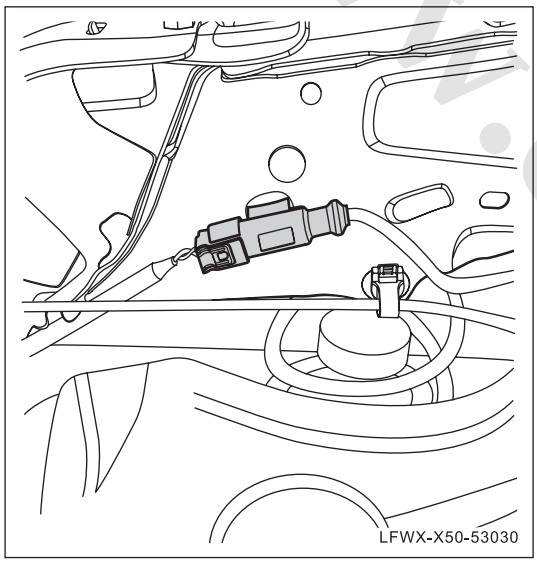
WHEEL SPEED SENSOR

REPLACEMENT



1. REPLACEMENT OF FRONT WHEEL SPEED SENSOR

(a) Remove the fixing bolts of the front wheel speed sensor, and take down the wheel speed sensor of the front wheel.



(b) Remove the front wheel mudguard. (see 81 - Interiors and Exteriors, Mudguard, Replacement)

(c) Disconnect the connector of the front wheel speed sensor, and remove the wheel speed sensor.

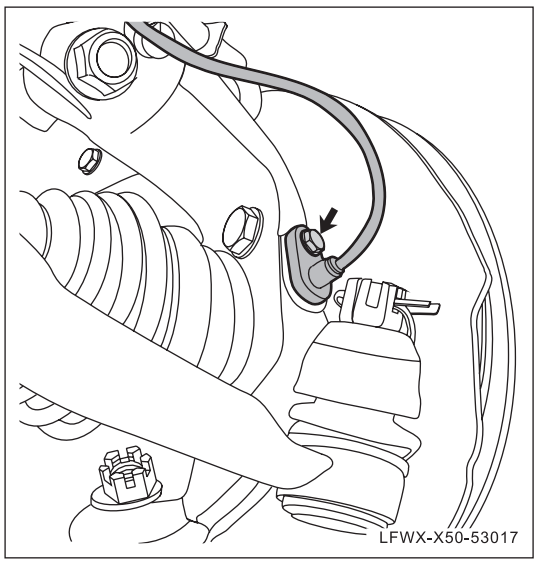
NOTICE:

Do not pull the wheel speed sensor wire harness with heavy force.

(d) Check that no foreign matter exist inside the sensor mounting-hole and that no impurities such as metal scrap exist in the surface of the brake disc.

NOTICE:

Clean the sensor mounting-hole and the brake disc surface prior to installation.



(e) Install the front wheel speed sensor and then install and tighten the fixing bolts.

Torque: 15 - 20 N•m

NOTICE:

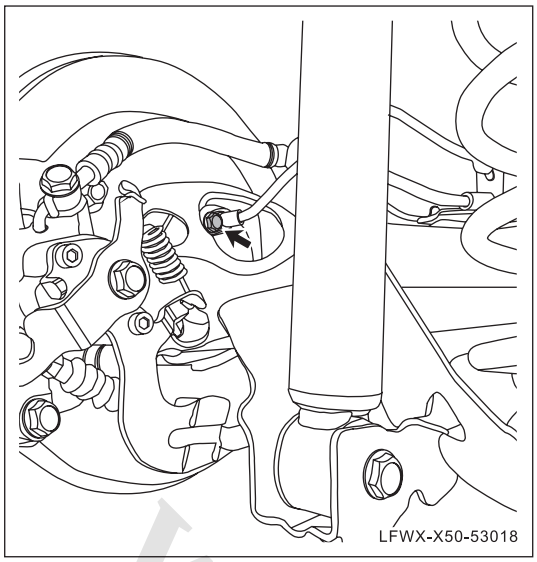
Wire harness should not be twisted when the installation is finished.

(f) Connect the front wheel speed sensor connector.

(g) Install the front wheel mudguard. (see 81 - Interiors and Exteriors, Mudguard, Replacement)

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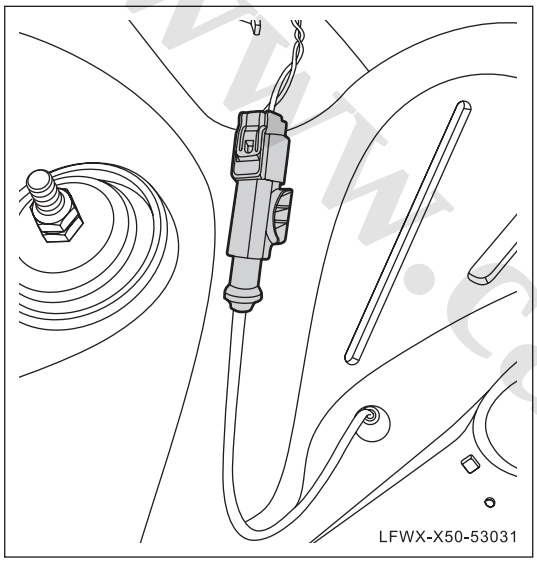
2. REPLACEMENT OF REAR WHEEL SPEED SENSOR

(a) Remove the fixing bolts of the rear wheel speed sensor, and take down the wheel speed sensor.

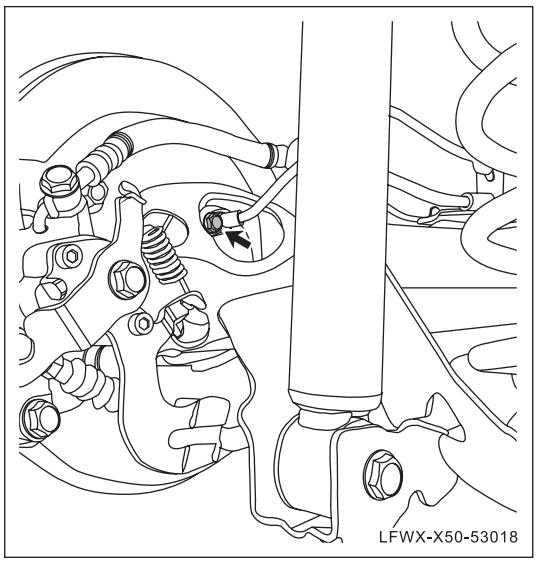
NOTICE:

Do not pull the wheel speed sensor wire harness with heavy force.

(b) Remove C pillar lower trim panel. (see 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)



(c) Disconnect the rear wheel speed sensor connector.



(d) Check that no foreign matter exist inside the sensor mounting-hole and that no impurities such as metal scrap exist in the surface of the brake disc.

NOTICE:

Clean the sensor mounting-hole and the brake disc surface prior to installation.

(e) Install the rear wheel speed sensor and then install and tighten the fixing bolts.

Torque: 15 - 20 N•m

NOTICE:

Wire harness should not be twisted when the installation is finished.

(f) Connect the rear wheel speed sensor connector.

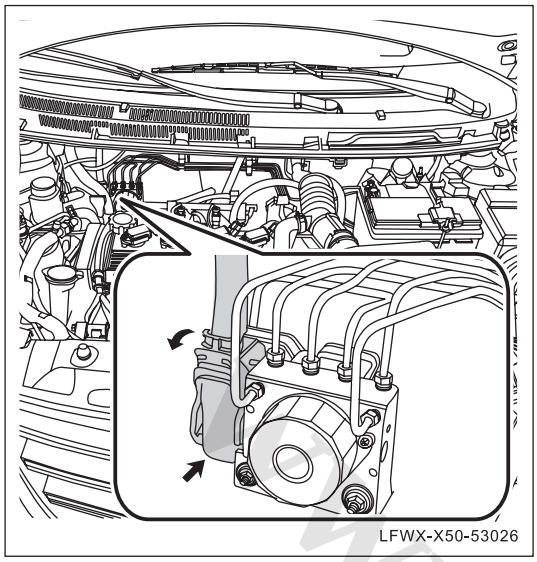
(g) Install C pillar lower panel.

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ABS CONTROL UNIT

REPLACEMENT


LFWX-X50-53026

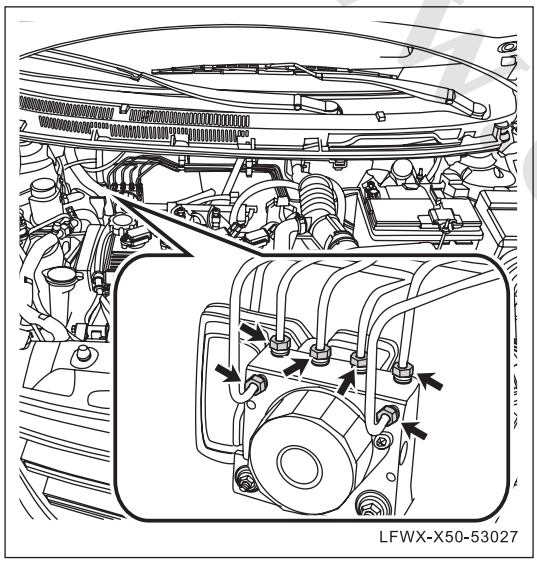
1. REMOVE THE ABS CONTROL UNIT

(a) Turn the ignition switch to "OFF" position and disconnect the negative cable of battery.

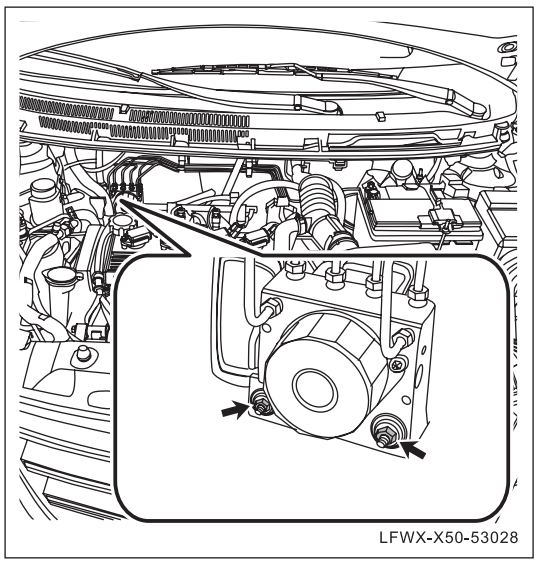
(b) Disconnect the connectors of ABS control unit.

△ HINT:

Turn up the ABS control unit connector snap-fit and then unplug the ABS control unit connector.


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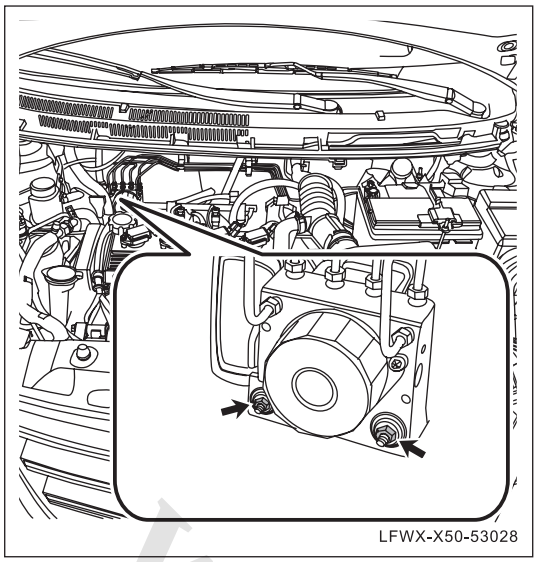
(c) Remove the brake pipeline and then block the thread hole and the oil hole of the brake pipelines of the ABS control unit assembly with plugs.


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(d) Remove the fixing bolts of ABS control unit on the mounting bracket and then take down the ABS control unit.

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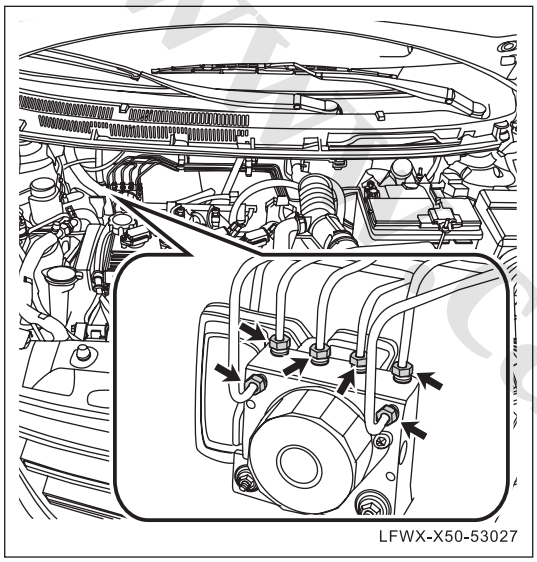
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2. INSTALL ABS CONTROL UNIT

(a) Install ABS control unit onto the mounting bracket, and then install and tighten the fixing bolts.

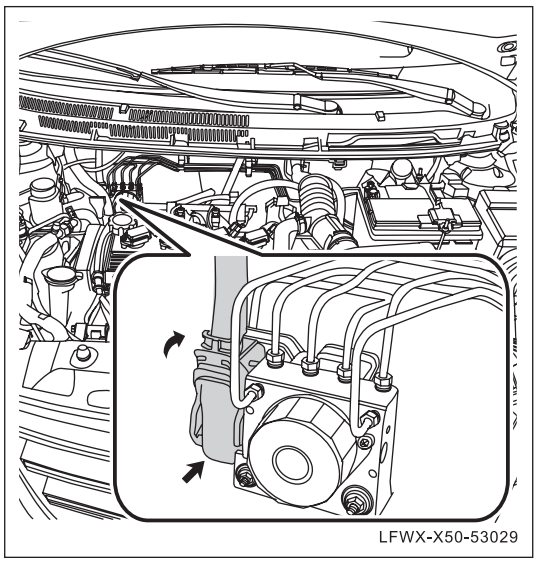
Torque: 20 - 25 N•m



(b) Install brake oil pipe.

△ HINT:

Remove the thread hole of the ABS control unit and the oil hole plug of the brake pipeline before installation, and then install the corresponding pipelines into the ABS control unit holes.



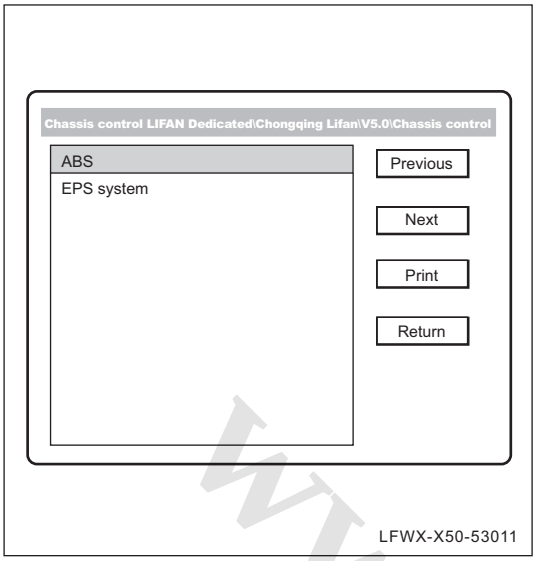
(c) Install the ABS control unit wire harness.

(d) Install the negative cable of battery.

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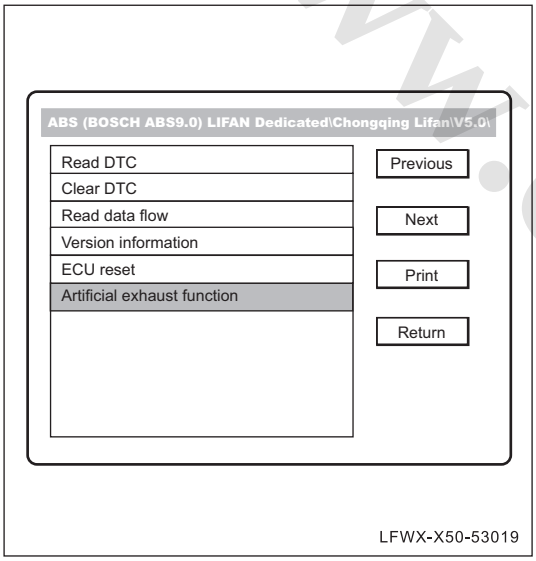
ABS ARTIFICIAL EXHAUST



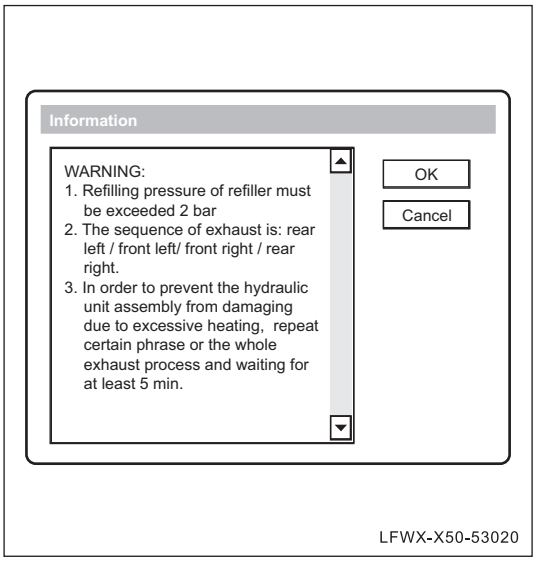
1. ABS ARTIFICIAL EXHAUST

(a) Select and enter "ABS".

(b) Select and enter "BOSCH ABS9 530K".



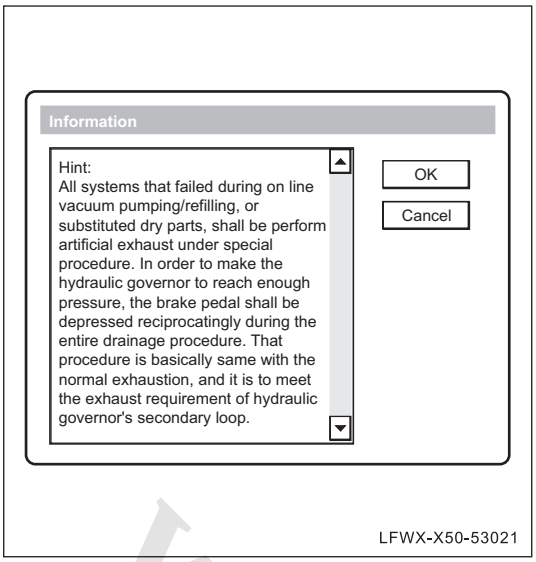
(c) Click to select "artificial exhaust function" and conduct exhaust operation.



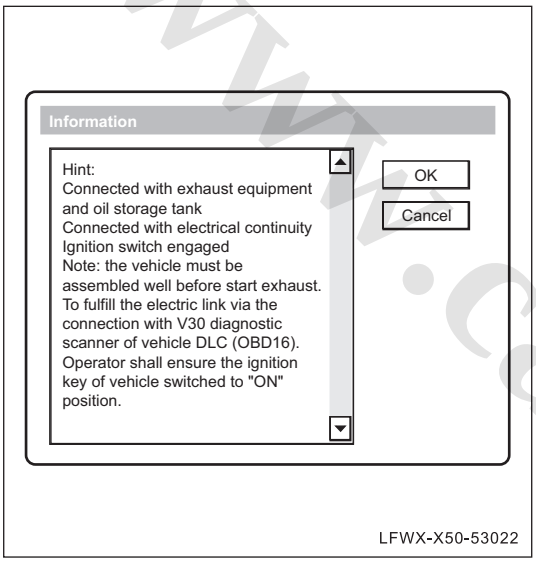
(d) Read warning instructions of diagnostic scanner and click "OK".

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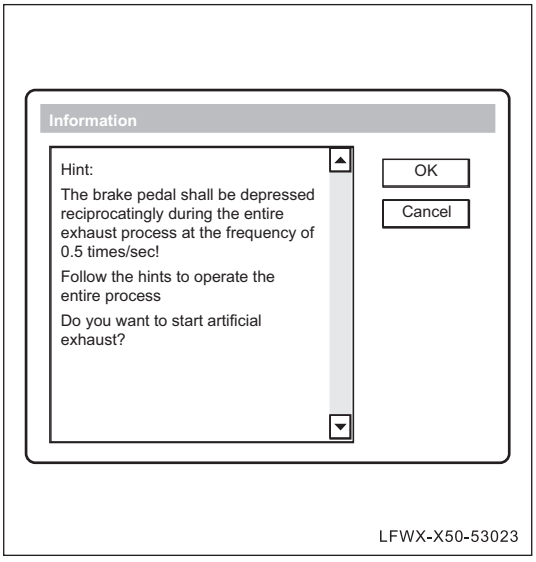
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(e) Conduct procedures displayed in the diagnostic scanner and then click "OK".



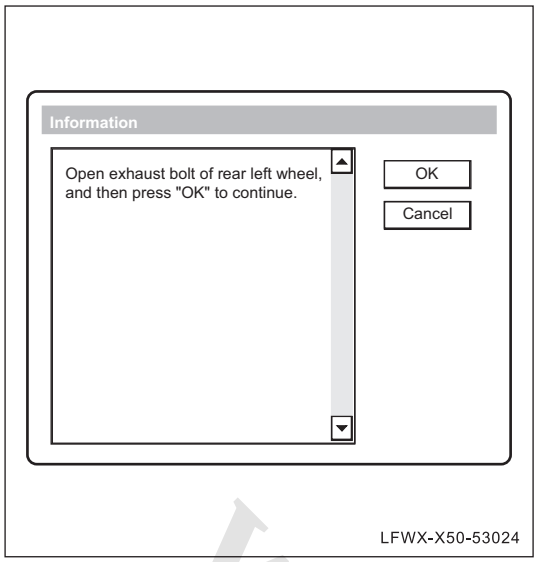
(f) Conduct procedures displayed in the diagnostic scanner and then click "OK".



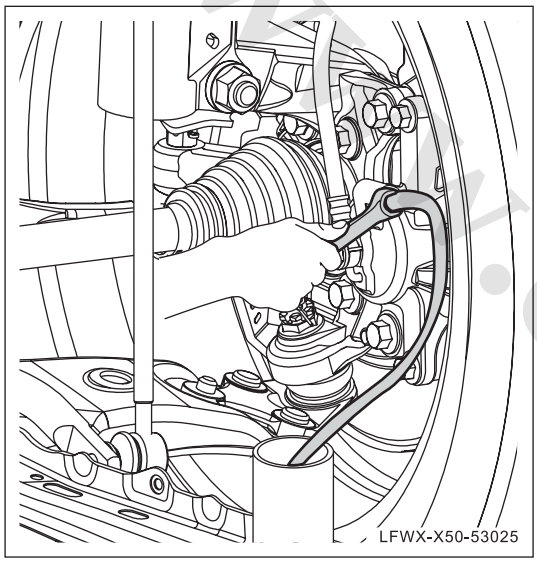
(g) Conduct procedures displayed in the diagnostic scanner and then click "OK" to start artificial exhaust.

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(h) Open exhaust bolts of the rear left wheel and then click "OK" to next step.



(i) Conduct procedures according to instructions displayed in the diagnostic scanner and then complete ABS artificial exhaust.

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Electric Power Steering System

Electric power steering system.....61-1
System description 61-1
Schematic diagram.....61-2
Preparation.....61-3
Service data 61-3
Precautions 61-4
Components 61-5
Function and fault of components 61-6
On-vehicle inspection 61-7
Diagnosis 61-10
Read and clear DTCs.....61-10
Fault symptom table 61-10
Fault diagnosis 61-12
DTC list.....61-15
DTC diagnosis.....61-16
Steering wheel 61-21
Replacement 61-21
Steering shaft.....61-24
Check 61-24
Replacement 61-25
Steering gear.....61-32
Replacement 61-32
EPS control unit.....61-39
Replacement 61-39

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ELECTRIC POWER STEERING SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

- Reduce force applying on the steering wheel, especially when turning in the same place or making a big turn at low vehicle speed.
- Improve steering sensitivity.
- Reduce impact on the steering wheel from ground recoil strength.
- In case of a tire blasting, it may better prevent wheels from abruptly turning, thereby improving safety of traveling.
- Allow larger load on the steering wheels and increase freedom degree of the whole arrangement.

2. COMPONENTS

- Torque sensor

Torque sensor consists of sliding block, steel ball, input/output shaft and potentiometer. It obtains signals about the amount and direction of control force applying on the steering wheel, converts them into voltage values, and transmits them to the EPS control unit.

- Steering electric motor

Motor mounted on the steering column consists of a worm, a worm gear and a D/C motor. Function of the electric motor is to output proper boosting torque according to the instructions from of the EPS control unit. It is the power source of the EPS system.

- Speed reduction mechanism

The boosting motor speed reduction mechanism of the EPS system connects with the electric motor's output shaft to reduce speed and increase torque. Speed reduction mechanism uses worm mechanical structure. In order to restrain noise and increase durability, partial teeth of the speed reduction mechanism use resin material or are designed with special tooth.

- EPS control unit

The EPS control unit is the core component of the EPS system, generally divided into the control circuit and the drive circuit. According to input signals from sensors above-mentioned and motor voltage/current signals detected by itself, the control circuit may verify the drive status of the motor and send corresponding control signal to the drive circuit; the drive circuit may realize driving of motor according to control signal.

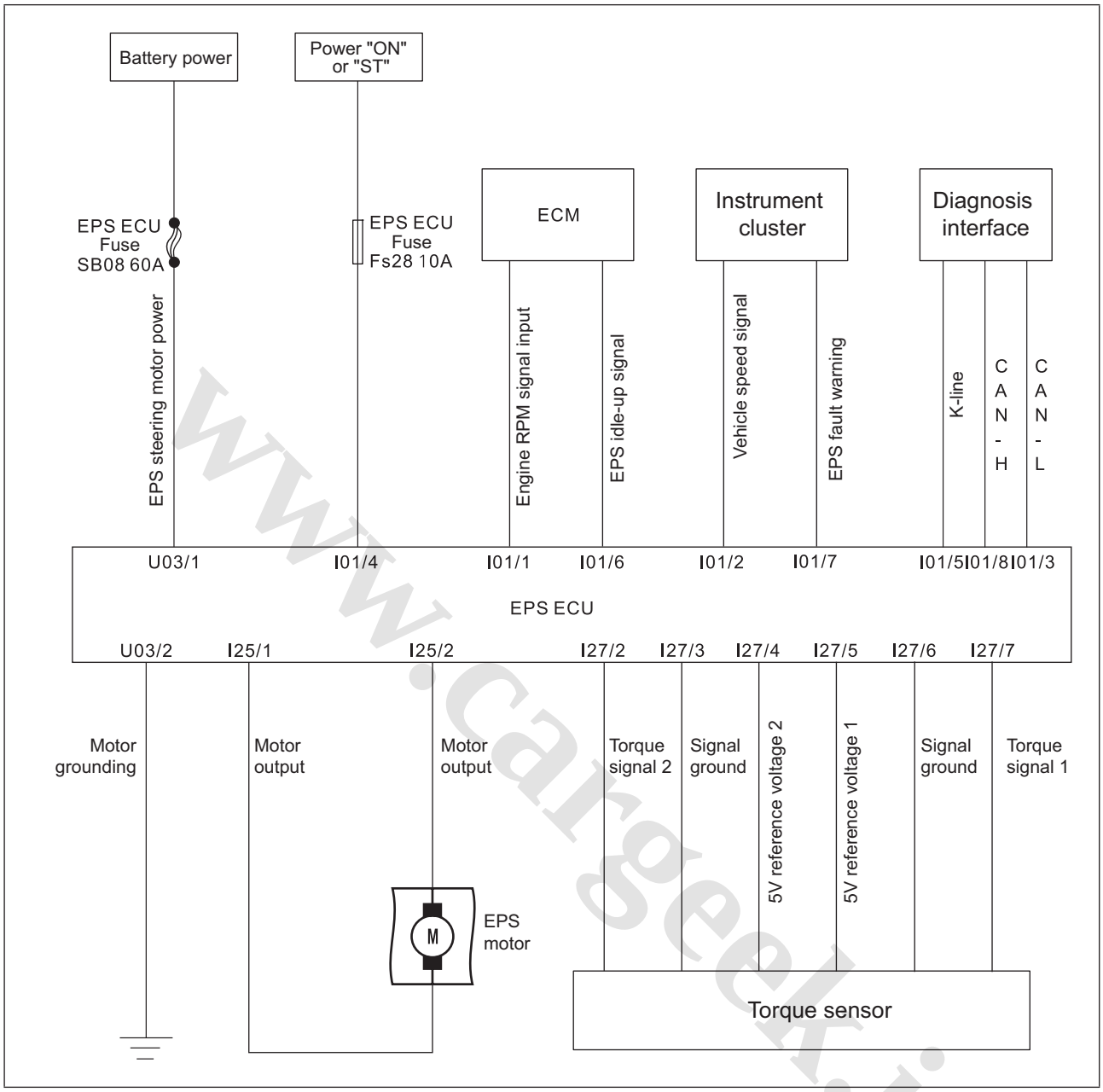
3. WORKING PRINCIPLE

Vehicle electric power steering gear is a new generation of vehicle power steering system with mechatronics feature. It consists of EPS control unit, torque sensor, motor assembly and the mechanical column. Electric power steering gear uses ESP control unit to confirm the amount and direction of electric power steering force in a certain algorithm with signals from torque sensor, vehicle speed sensor and engine speed sensor to controller and drive the motor to carry out the steering operation by the reduction speed mechanism assisting the steering system. It may assist a driver in steering control and obtaining good steering sense.

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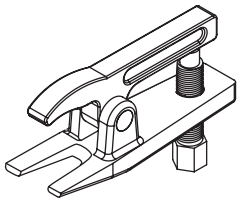
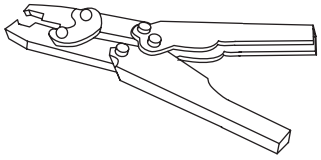
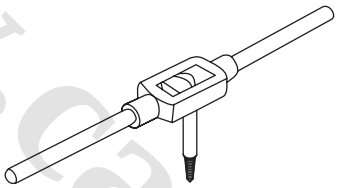
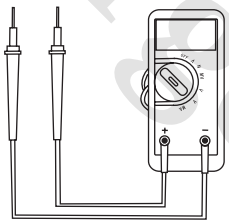
SCHEMATIC DIAGRAM



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Ball joint remover		Remove the swing arm and the steering knuckle connecting ball joint
2	Clamp tightening tool		Tighten the dust cover clamp
3	Left-hand tap		Remove the ignition switch bolt
4	Digital multimeter		Check steering motor and torque sensor

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Steering wheel free play	10 - 15°

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of steering shaft universal joint	20 - 28
Connecting bolt and nut of steering shaft assembly and dashboard bracket	20 - 28
Fixing nut of steering shaft assembly	20 - 28
Fixing bolt of lower steering shaft and steering gear spline shaft	20 - 28
Fixing bolt of lower steering shaft and steering shaft universal joint	20 - 28

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Item	N•m
Fixing screw of steering shaft upper & lower cover	5 - 6
Ball head lever lock nut	70 - 80
Fixing bolt and nut of steering gear	85 - 105
Fixing nut of EPS control unit with bracket assembly	8 - 12
Fixing nut of steering wheel	80 - 110

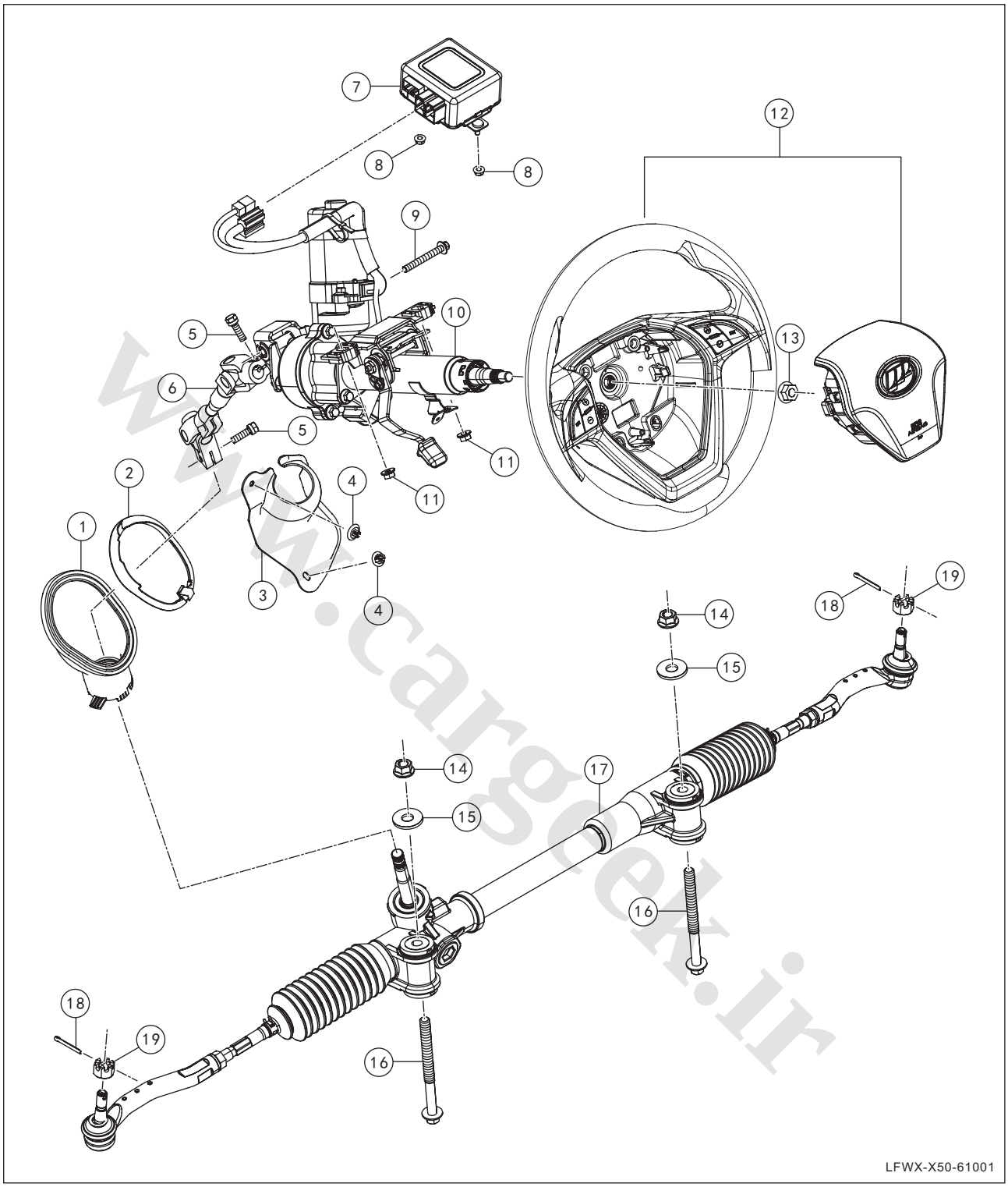
PRECAUTIONS

1. Keep battery in good condition: low battery power may cause hard steering.
2. Check the tire pressure frequently and ensure that it meets the requirement.
3. All connectors in electric power steering system must be in good contact: connectors must avoid humid or hot environment. This way, good electrical conductivity can be ensured.
4. Do not share its wire harnesses with other electrical systems: the electric power steering system operates with support from electrical energy; do not share wire harness with electrical systems in the complete vehicle, otherwise power supply performance will be impacted.
5. Disconnect the battery negative electrode when doing any repair.
6. Place the vehicle on level dry ground when checking the steering system.
7. To avoid damage to the parts of steering system, do not move the vehicle with the steering wheel locked.
8. Replace any lock bolt or nut detected to have three or more damaged threads.
9. Steering gear comes to limit position and the boosting current also comes to maximum value, easily leading to heating of the motor and the controller. Hold the steering gear in limit position no more than 3s, otherwise, excessive current will cause damage to the components.
10. EPS control unit fails to conduct self-test. It is strictly prohibited to connect voltmeter or ohmmeter to controller when controller connector and controller are disconnected.
11. In case of abnormal noise, poor return or hard steering, immediately stop the vehicle to find and eliminate the fault.
12. Once abnormal clearance, seizure and swinging condition are found, first analyze where is the possible fault position, and then solve the problems.
13. Ccheck carefully the parts of steering system for abnormal impact frequently. Be sure to replace immediately the damaged or faulty parts.
14. Never weld any parts of the steering gear and any rods.
15. Comprehensively check the stability and flexibility of the steering system installed. For example, check the steering wheel for hard steering or excessive play. Measure the maximum steering angle of the front wheel.
16. All bolts of the steering system must be tightened to specified torques.
17. Check the wheel alignment after repairing the steering gear or other steering mechanism.

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COMPONENTS



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1	Lower steering shaft cover
2	Lower steering shaft cover mounting clip
3	Upper steering shaft cover
4	Plastic snap-fit
5	Hexagon head bolt and plain washer assembly
6	Lower steering shaft assembly
7	Steering electronic control (ECU) assembly
8	Hexagon nut with flange
9	Hexagon bolt with flange
10	Electric steering upper steering shaft assembly

11	Hexagon nut with flange
12	Steering wheel assembly
13	Hexagon nut with flange
14	Steering gear mounting nut
15	Big plain washer
16	Steering gear mounting bolt
17	Steering gear assembly
18	Cotter pin
19	Hexagon slotted nut - fine thread

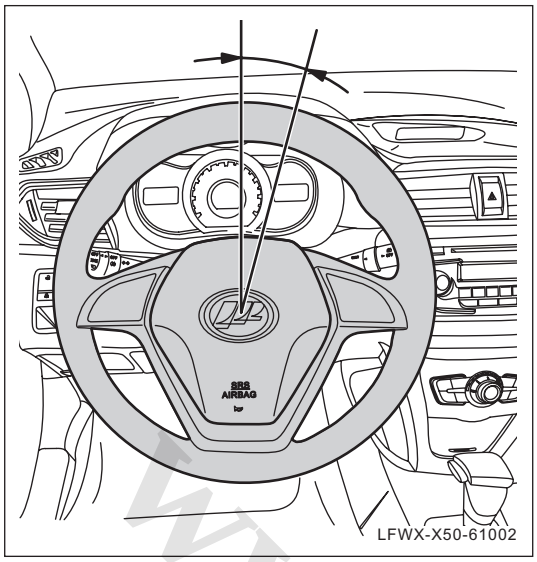
FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Steering wheel	Controlling the vehicle driving direction	Wear and/or excessive clearance	Excessive steering wheel free play
Torque sensor	It obtains signals about the amount and direction of control force applying on the steering wheel, converts them into voltage values, and transmits them to the EPS control unit	Damage	Steering yawing and/or insufficient return
Steering motor	Output proper boosting torque according to the instructions from the EPS control unit	Poor performance and/or damage	No steering force and/or insufficient return
Speed reduction mechanism	Connecting with the motor's output shaft to reduce speed and increase torque	Damage	
EPS control unit	Controlling the circuit	Damage	Insufficient return, insufficient return
Steering shaft	Transmitting the steering torque	Worn steering-shaft bearing and cross shaft	Too large free clearance of steering wheel, abnormal steering noise and steering vibration
Steering gear	Transmitting the steering force to wheels to realize steering	Steering gear damaged	Hard steering and/or no steering force Steering vibration

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ON-VEHICLE INSPECTION



LFWX-X50-61002

1. CHECK THE STEERING WHEEL FREE PLAY

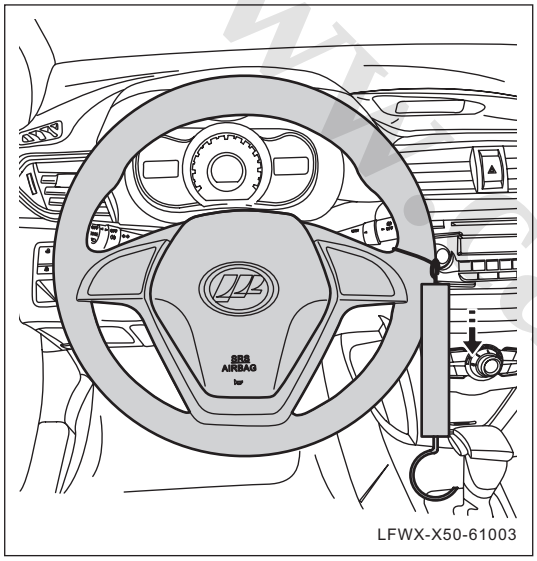
(a) Make the front wheel on direct driving position.

(b) Turn the steering wheel to left/right without the front wheel moving, and measure the steering wheel free play.

Steering wheel free play; 10 - 15°

△ HINT:

Check the steering gear and steering shaft, if the steering wheel free play is out of the specified range.



LFWX-X50-61003

2. CHECK THE STEERING FORCE OF STEERING WHEEL

NOTICE:

It should be performed under certain conditions such as original tire and standard tire pressure.

(a) Park the vehicle on a level ground.

(b) Keep the front wheels in straight driving position and connect the spring dynamometer to the steering wheel rim.

(c) Turn the ignition switch to ON.

(d) Pull the spring dynamometer until the front wheel begins to turn, and then record reading in the spring dynamometer.

△ HINT:

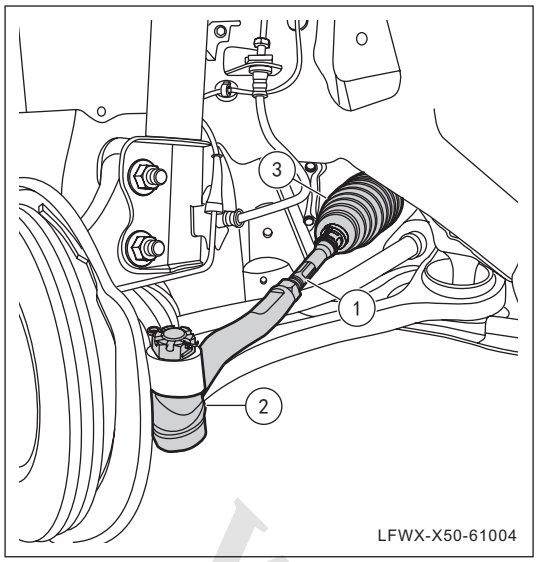
If the reading of steering force is too high, check the following parts:

- Steering tie rod
- Steering shaft
- Rack guide mechanism adjustment
- Steering motor

61

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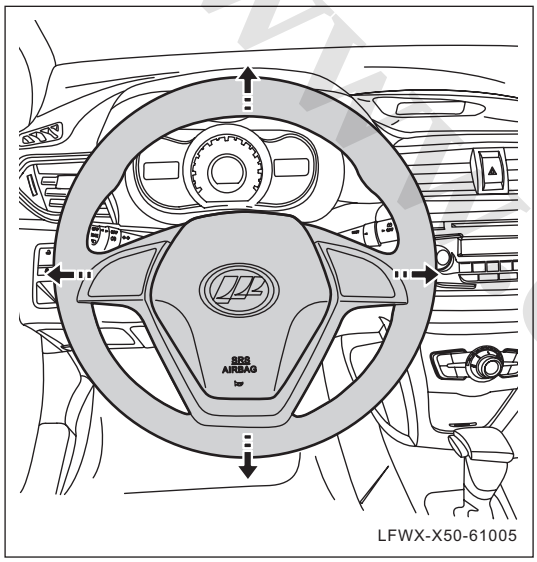
LFWX-X50-61004

3. CHECK THE FIXING DEVICE AND DUST COVER OF STEERING TIE ROD

(a) Lift the vehicle, shake the steering tie rod ① by hand to check whether the steering tie rod ① has clearance. Tighten or replace it if necessary.

(b) Check the steering tie rod ball head dust cover ② for damage, if any, replace the steering tie rod ball head.

(c) Check the steering gear dust cover ③ for damage, if any, replace the steering gear dust cover.

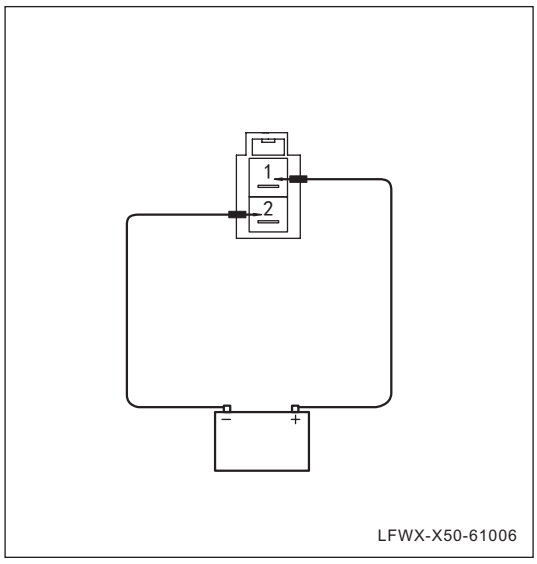


LFWX-X50-61005

4. CHECK THE STEERING MECHANISM

(a) Check installation of the steering mechanism assembly and the steering shaft.

- Check whether clearance is caused when the steering wheel moves up and down, left and right, and axially.
- Check whether the fixing nut and bolt of steering mechanism assembly are loose.



LFWX-X50-61006

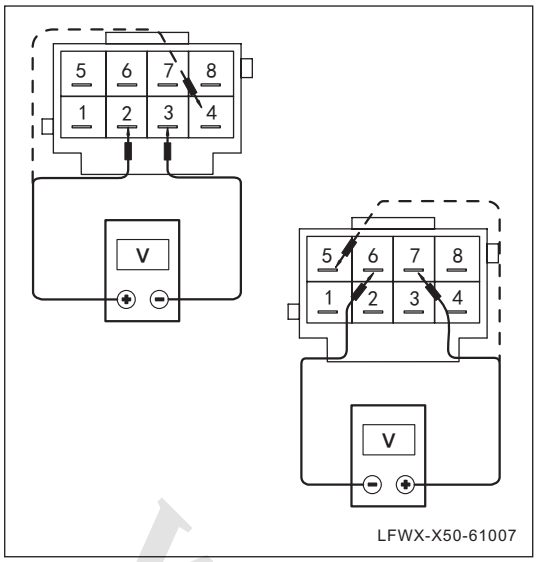
5. CHECK THE STEERING MOTOR

(a) Disconnect the steering motor connector.

(b) Connect the cathode and anode of the battery respectively to terminal 1# and 2# of the motor; now the steering motor should work normally.

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6. CHECK THE VOLTAGE IN ALL TERMINALS OF TORQUE SENSOR

(a) Turn the ignition switch to "ON" position.

(b) Measure voltage in all terminals of torque sensor by a digital multimeter.

Voltage values between the terminals are as follows:

Terminal No.	Voltage value (condition)
Terminal 2# and 3#	About 2.5V (steering wheel in straight ahead position)
	Larger than 3.5V (steering wheel in right limit position)
	Less than 1.5V (steering wheel in left limit position)
Terminal 7# and 6#	About 2.5V (steering wheel in straight ahead position)
	Less than 1.5V (steering wheel in right limit position)
	Larger than 3.5V (steering wheel in left limit position)
Terminal 5# and 6#	About 5V
Terminal 4# and 3#	About 5V

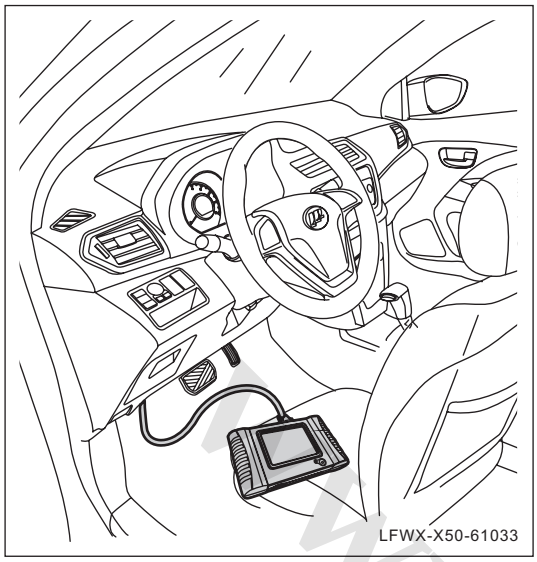
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DIAGNOSIS

READ AND CLEAR DTCS



1. USE THE DIAGNOSTIC SCANNER TO READ THE DTC

(a) Connect Lifan V30 diagnostic scanner to the diagnostic interface.

(b) Select"Chassis Control" and enter "Electric Power Steering System (EPS)".

(c) Read the DTC or clear the DTC.

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
EPS warning lamp does not come on	1. Circuits (open-circuit or short-circuit)	See 61 - Electric Power Steering System, Diagnosis, Fault Diagnosis (1. EPS warning lamp dose not come on)
	2. Instrument cluster (damaged)	
	3. EPS control module (damaged)	
Steering is hard or stuck	1. Steering wheel (wrong installation)	See 61 - Electric Power Steering System, Diagnosis, Fault Diagnosis (2. Steering is hard or stuck)
	2. Vehicle speed sensor (poor performance)	
	3. Torque sensor (poor performance)	
	4. Motor (Motor works abnormally, and abnormal heating of motor results in short-term decline in power)	
	5. Steering shaft (damaged)	
	6. Steering shaft bearing (damaged)	
	7. Steering shaft universal joint (worn)	
	8. Controller (damaged)	
	9. Steering gear (damaged)	
	10. Steering tie rod ball head (worn or with poor lubrication)	
	11. Steering knuckle lower ball pin (worn or with poor lubrication)	
	12. Front absorber bearing (damaged)	
Abnormal steering noise	1. Steering shaft (wrong installation)	See 61 - Electric Power Steering System, Diagnosis, Fault Diagnosis (3. Abnormal steering noise)
	2. Steering motor (abnormal sound)	
	3. Steering shaft fixing bolt (loose)	

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Symptom	Suspected area	Recommended action
Electric power steering operates occasionally	1. Circuits (open-circuit or short circuit)	See 61 - Electric Power Steering System, Diagnosis, Fault Diagnosis (4. Electric power steering operates occasionally)
	2. Electric power steering column (damaged)	
	3. EPS control module (damaged)	
Steering yawing and/or insufficient return	1. Torque sensor (main signal offset or damage)	See 61 - Electric Power Steering System, Diagnosis, Fault Diagnosis (5. Steering yawing and/or insufficient return)
	2. Steering column (damaged)	
Steering wheel vibration	1. Tires (pressure is too low or tire is badly worn)	Check tire pressure and replace worn tire
	2. Front wheel (wrong alignment)	Conduct the four-wheel alignment
	3. Steering gear fixing bolt (loose)	Tighten steering gear fixing bolts
	4. Steering gear (clearance is too large)	Replace the steering gear
	5. Steering gear tie rod ball head (clearance is too large)	Replace the steering gear tie rod ball head
	6. Steering knuckle lower ball pin (clearance is too large)	Replace the steering knuckle lower ball pin
	7. Front absorber bearing (damaged)	Replace the front absorber bearing
Free clearance of steering wheel is too large	1. Steering shaft universal joint (clearance is too large or the part is damaged)	Replace the steering shaft universal joint
	2. Steering tie rod ball head (clearance is too large)	Replace the steering tie rod ball head
	3. Steering gear fixing bolt (loose)	Tighten the bolts
	4. Steering shaft bearing (damaged)	Replace the steering shaft bearing
	5. Steering gear (fault)	Replace the steering gear

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FAULT DIAGNOSIS

1. EPS FAULT INDICATOR LAMP DOES NOT COME ON OR STAYS CONSTANTLY BRIGHT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if other indicator lamps on the instrument cluster come on normally	Go to Step 1	Other indicator lamps on the instrument cluster do not come on	Repair the circuit of the instrument cluster
1	Check the EPS fuse	Normal	Faulty	Instruction
	Check if the fuse FS28 in cab fuse box and the fuse SB08 in engine compartment fuse box are blown out	Go to Step 3	Fuse is blown out	• Replace the fuse with the same capacity • Goto Step 2, if the fuse is blown out again
2	Check the EPS power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the EPS power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the EPS power and grounding circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to "LOCK" position, and disconnect the connector of EPS control unit • Turn the ignition switch to "ON" position, and measure the voltage between the terminal 4 of EPS control unit connector I11 and the terminal 1 of U03 and the grounding respectively **Voltage: 9 - 13V** • Measure the resistance between terminal 3 of U03 and grounding **Resistance: <2Ω**	Go to Step 4	The inspecition voltage or resistance is not in a reasonable range	Repair the EPS control unit power and grounding circuit
4	Check the circuit between the EPS control unit and the instrument cluster	Normal	Faulty	Instruction
	• Turn the ignition switch to "LOCK" position, and disconnect the connector of the EPS control unit and the instrument cluster • Check the resistance between the terminal 7 of I01 and the terminal 24 of I03 **Resistance: <2Ω** • Check the resistance between terminal 7 of I01 and grounding **Resistance: >1MΩ**	Go to Step 5	The inspection resistance is out of the specified range	Repair the faulty wire harness or connector
5	Check EPS control module	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Connect the diagnostic scanner, and check whether the EPS have DTC to output	Go to Step 6	There is DTC output	Diagnose it according to the hint of DTC
6	Replacement and check	Normal	Faulty	Instruction
	Replace the instrument cluster and inspect if the EPS fault indicator lamp is normal	Replace the instrument cluster	EPS fault indicator lamp dose not come on	Find the cause out from other fault symptoms

2. STEERING IS HARD OR STUCK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Perform road test and turn the steering wheel to check if the steering wheel is turned normally	Inspection is over	Steering is hard	Go to Step 1
1	Check the steering wheel	Normal	Faulty	Instruction
	Check if the steering wheel is installed correctly	Go to Step 2	Steering wheel is installed incorrectly	Install and adjust the steering wheel in place
2	Read the fault code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check if the vehicle speed sensor, torque sensor and motor have DTCs to output	Go to Step 3	With DTC	Diagnose it according to the hint of DTC
3	Check the steering mechanism	Normal	Faulty	Instruction
	Check if the steering mechanism is normal	Go to Step 4	Steering column fault	Check and repair the steering column
4	Replacement and check	Normal	Faulty	Instruction
	Replace the EPS control unit, perform road test, and check if the EPS is normal	Replace the EPS control unit	Fault still exists	Find the cause out from other fault symptoms

3. ABNORMAL STEERING NOISE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Perform road test and turn the steering wheel to check for abnormal noise	Inspection is over	There is abnormal noise when turning the steering wheel	Go to Step 1
1	Check the steering column	Normal	Faulty	Instruction
	Check if the steering column is installed correctly	Go to Step 2	Installation interference of steering column with complete vehicle	Adjust the installation position of the steering column to ensure the correct installation
2	Check if the motor is installed correctly	Normal	Faulty	Instruction
	Check if the installation position of motor and the installation of bolt & nut is proper	Go to Step 3	Wrong installation position of motor or installation of bolt & nut	Check and repair the faulty point
3	Replacement and check	Normal	Faulty	Instruction
	Replace the steering motor, perform road test, and check if the EPS is normal	Replace the steering motor	Fault still exists	Find the cause out from other fault symptoms

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△ HINT:

Screw the motor screws in place by hand before tightening them to ensure that the motor shaft is coaxial with the worm and keep the motor in good working condition. Turn the steering wheel by right hand, and hold the motor by left hand to check if the motor shakes. If not, tighten the screws. If any, adjust the position of motor until it dose not shake and then tighten the screws. Otherwise, replace the motor and repeat the above operation.

4. ELECTRIC POWER STEERING OPERATES OCCASIONALLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the connector of EPS control unit for damage, poor contact, aging and looseness, etc.	Go to Step 1	EPS connector fault	Repair the faulty point
1	Read the fault code	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether the ABS & EPS have DTC to output	Go to Step 2	There is DTC output	Diagnose it according to the hint of DTC
2	Replacement and check	Normal	Faulty	Instruction
	Replace the EPS control unit, perform road test, and check if the EPS is normal	Replace the EPS control unit	Fault still exists	Find the cause out from other fault symptoms

5. STEERING YAWING AND/OR INSUFFICIENT RETURN

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Perform road test, and check if there is steering yawing and/or insufficient return when turning the steering wheel	Inspection is over	Steering yawing and/or insufficient return symptom during turning the steering wheel	Go to Step 1
1	Check DTC	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether the EPS have DTC to output	Go to Step 2	There is DTC output	Diagnose it according to the hint of DTC
2	Check the torque sensor	Normal	Faulty	Instruction
	Check the connector of torque sensor wire harness for normal connection and check the terminal for corrosion	Go to Step 3	The wire harness or the connector terminal fail	Repair the wire harness of torque sensor or the terminal of connector fault
3	Check the torque sensor	Normal	Faulty	Instruction
	Replace the torque sensor, perform road test, and check if the EPS is normal	Replace the torque sensor	Fault still exists	Go to Step 4
4	Check the steering column	Normal	Faulty	Instruction
	Replace the steering column assembly, perform road test, and check if the EPS is normal	Replace the steering column assembly	Fault still exists	Find the cause out from other fault symptoms

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DTC LIST

DTC (DTC)	Fault code description	Possible causes	Recommended action
C1111	Torque sensor main signal open circuit or short circuit	Torque sensor main circuit signal fault (open circuit or short circuit)	See 61 - Electric Power Steering System, Diagnosis, DTC (1. C1111, C1113, C1114 torque sensor fault)
C1113	Torque sensor main and auxiliary circuit, and out of tolerance	Signal synchronization between main circuit & auxiliary circuit of torque sensor (large difference in signal values or sum of signal values is out of specified range) fault	
C1114	Voltage of torque sensor is out of tolerance	The reference power supply of the torque sensor main circuit signal fault	
C1115	Torque sensor auxiliary signal open circuit or short circuit	Torque sensor auxiliary signal open circuit or short circuit	
C1121	Vehicle speed sensor signal fault / no signal 1	Vehicle speed sensor signal fault / no signal 1	See 61 - Electric Power Steering System, Diagnosis, DTC (2. C1121, C1123, C1124 vehicle speed signal fault)
C1123	Vehicle speed sensor signal fault / no signal 2	Vehicle speed sensor signal fault / no signal 2	
C1124	Vehicle speed sensor signal fault / emergency deceleration	Vehicle speed sensor signal fault / emergency deceleration	
C1122	Engine RPM signal is not detected	No engine RPM signal	See 61 - Electric Power Steering System, Diagnosis, DTC (3. C1122 engine RPM signal fault)
C1141	Motor is of open circuit	Abnormal motor	See 61 - Electric Power Steering System, Diagnosis, DTC (4. C1141 steering motor fault)
C1153	Too low voltage of power supply or poor contact of relay	Too low battery voltage or faulty charging system	See 61 - Electric Power Steering System, Diagnosis, DTC (5. C1153 system voltage fault)
C1155	Internal fault of controller	Abnormal ECU	See 61 - Electric Power Steering System, Diagnosis, DTC (6. C1155 Internal fault of EPS control unit)

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DTC DIAGNOSIS

1. C1111, C1113, C1114 TORQUE SENSOR FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Check the terminals of the corresponding wire harness connectors for damage, poor contact, aging and looseness, etc. • Check the steering column for excessive wear	Go to Step 1	Terminals of the wire harness connector is worn or steering column is excessively worn	Repair the parts with fault, and replace them if necessary
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the diagnostic scanner, and check if the DTC can be read	The fault is sporadic	If there is DTC, go to Step 2	The fault is sporadic. Check the connector of EPS control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Calibrate the torque sensor, and inspect the DTC again	Normal	Faulty	Instruction
	• Calibrate the torque sensor • Clear the DTC, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Calibrate the torque sensor again	DTC and fault symptom still exist	Go to Step 3
3	Check wire harness connector	Normal	Faulty	Instruction
	When the power supply is "OFF", disconnect the negative terminal (-) of the battery and the connectors of the EPS control unit and the torque sensor and check if the connectors are normal. Check if the circuit between the EPS control unit and the torque sensor is normal with multimeter	Go to Step 4	Wire is short circuit or open circuit	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction
	• Replace the torque sensor and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the torque sensor	Fault still exists	Go to Step 5
5	Replacement and check	Normal	Faulty	Instruction
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the ECM	Fault still exists	Find the cause out from other fault symptoms

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2. C1121, C1123, C1124 VEHICLE SPEED SIGNAL FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the vehicle diagnostic scanner, and check if the DTC can be read	Go to Step 2	There is no DTC	The fault is sporadic. Check the pin of EPS control unit connector for looseness or corrosion
2	Check vehicle speed signal wire	Normal	Faulty	Instruction
	• Check if the speedometer displays normally • Disconnect the connectors of the EPS control unit and the instrument cluster • Check if the connectors are normal and check that the circuit between the terminal 2 of the EPS control unit connector I01 and the terminal 9 of the instrument cluster connector I03 is normal with multimeter	Go to Step 3	Speedometer fault or the wire is short circuit or open circuit	Repair the circuit of the instrument cluster or the faulty wire harness
3	Replacement and check	Normal	Faulty	Instruction
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the EPS control unit	DTC and fault symptom exist	Find the cause out from other fault symptoms

3. C1122 ENGINE SPEED SIGNAL FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is the normal working voltage **Voltage: 9 - 13V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the diagnostic scanner, and check if the DTC can be read	Go to Step 2	There is no DTC	The fault is sporadic. Check the pin of EPS control unit connector for looseness or corrosion
2	Check the engine speed signal wire	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• When the power supply is "OFF", disconnect the negative terminal (-) of the battery and the connectors of the EPS control unit and the engine control unit • Check if the connectors are normal and check that the circuit between the terminal 19 of the EPS control unit connector I01 and the terminal 8 of the engine control unit E01 is normal with multimeter	Go to Step 3	Wire is short circuit or open circuit	Repair the faulty wire harness
3	Replacement and check	Normal	Faulty	Instruction
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the EPS control unit	DTC and fault symptom still exist	Find the cause out from other fault symptoms

4. C1141 STEERING MOTOR FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is the normal working voltage **Voltage: 9 - 13V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the diagnostic scanner, and check if the DTC can be read	The fault is sporadic	If there is DTC, go to Step 2	The fault is sporadic. Check the connector of EPS control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Check the motor	Normal	Faulty	Instruction
	Disconnect the EPS motor and supply the battery voltage for the both sides of motor to inspect if the EPS works normally	Go to Step 3	EPS motor has fault	Replace the EPS motor
3	Check wire harness connector	Normal	Faulty	Instruction
	• When the power supply is "OFF", disconnect the negative terminal (-) of the battery and the connectors of the EPS control unit and the EPS motor • Check if the connectors are normal and check that the circuit between the EPS control unit connector and EPS motor is normal with multimeter	Go to Step 4	Wire is short circuit or open circuit	Repair the faulty wire harness
4	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the EPS control unit	DTC and fault symptom still exist	Replace the steering motor assembly

5. C1153 SYSTEM VOLTAGE FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is the normal working voltage **Voltage: 9 - 13V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the diagnostic scanner, and check if the DTC can be read	The fault is sporadic	If there is DTC, go to Step 2	The fault is sporadic. Check the connector of EPS control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Check fuse	Normal	Faulty	Instruction
	Check if the EPS motor fuse SB08 in engine compartment fuse box and the fuse FS28 in cab fuse box are blown out	Go to Step 3	Fuse is blown out	Replace the fuse with the same specification.
3	Check the EPS power circuit	Normal	Faulty	Instruction
	When the power supply is "ON", and measure the voltage between the terminal 4 of EPS control unit connector I01 and the terminal 1 of U03 and the grounding respectively with multimeter **Voltage: 9 - 13V**	Go to Step 4	• The inspection voltage is out of the specified range	Check the wire harness between the connector of EPS control unit and fuse for fault
4	Check the EPS grounding circuit	Normal	Faulty	Instruction
	Measure the resistance between the terminal 2 of EPS control unit connector U03 and the grounding with multimeter **Resistance: <2Ω**	Go to Step 5	The circuits have open circuit points	Check the wire harness between the connector of EPS control unit and the grounding point G14 for open circuit
5	Replacement and check	Normal	Faulty	Instruction
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the EPS control unit	DTC and fault symptom still exist	Find the cause out from other fault symptoms

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6. C1155 INTERNAL FAULT OF EPS CONTROL UNIT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is the normal working voltage **Voltage: 9 - 13V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Check the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and then read and clear the DTC • Start the engine again, connect the diagnostic scanner, and check if the DTC can be read	The fault is sporadic	If there is DTC, go to Step 2	The fault is sporadic. Check the connector of EPS control unit for looseness, damage and check the terminal of wire harness for corrosion
2	Replacement and check	Normal	Faulty	Instruction
	• Replace the same EPS control unit, and perform road test • Diagnose it again, read the DTC and check if there are DTCs and fault symptoms	Replace the EPS control unit	DTC and fault symptom still exist	Find the cause out from other fault symptoms

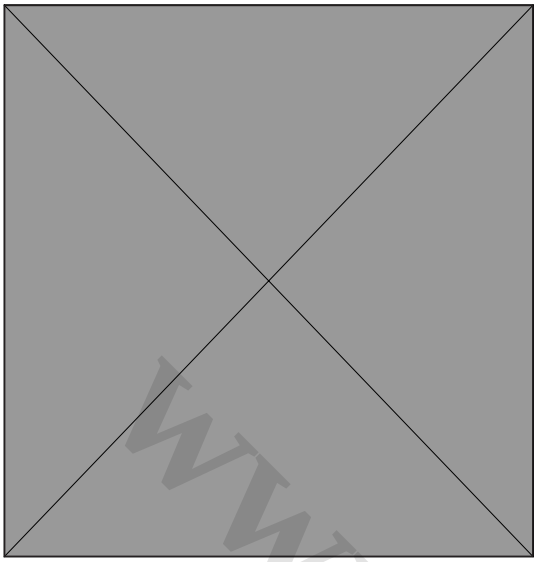
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STEERING WHEEL

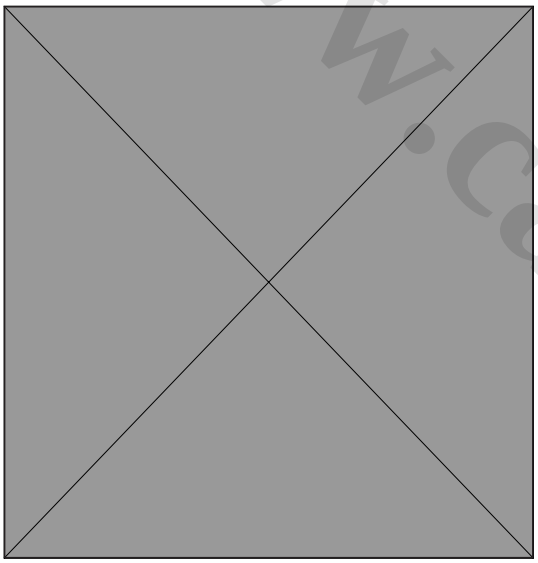
REPLACEMENT



1. DISCONNECT THE NEGATIVE CABLE OF BATTERY

2. REMOVE THE DRIVER AIRBAG

(a) Pry the front protective cover of the airbag and pry inward the fixing snap rings at both sides of the airbag with screwdriver (as shown in the figure) to remove the airbag.



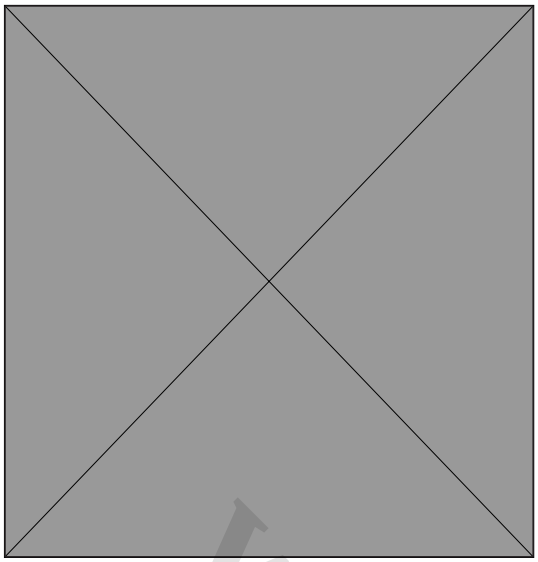
(b) Disconnect driver airbag connector.

- Disconnect airbag connector ① .
- Disconnect horn switch wire harness connector ② .

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3. REMOVE THE STEERING WHEEL

△ HINT:

Turn the steering wheel to adjust the front wheel facing straight forward before removing the steering wheel.

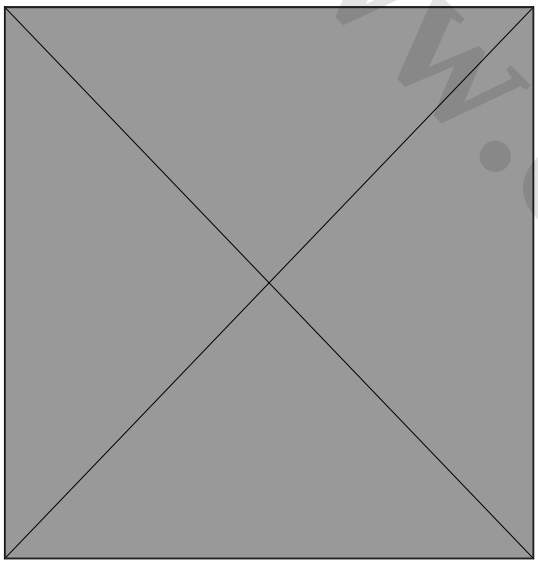
(a) Remove the fixing nuts of the steering wheel, and remove the steering wheel upward.

△ HINT:

Before taking out the steering wheel, make assembling marks on the steering shaft and the steering wheel to ensure that steering wheel will be installed to the original position in the time of assembling.

NOTICE:

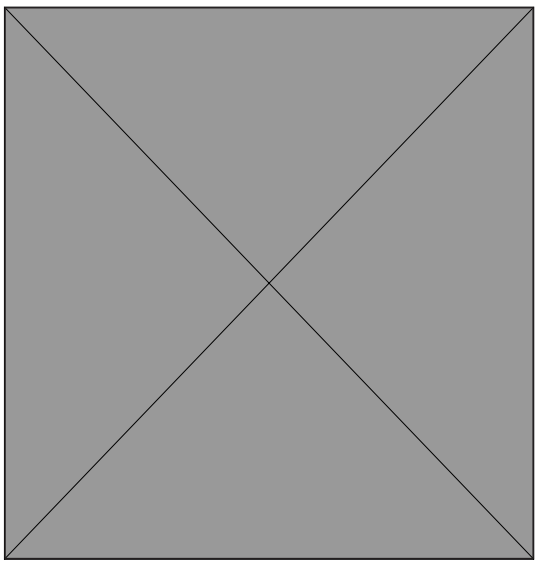
Do not turn the clock spring when removing the steering wheel. If the clock spring has been turned, turn the clock spring to limit position clockwise/ counterclockwise, and then turn it reversely by three circles.



4. INSTALL THE STEERING WHEEL

(a) Insert the wire harness of the clock spring and the horn through the steering wheel to install the steering wheel onto the steering shaft, and then install and tighten the fixing nuts according to the marks made during removing.

Torque: 80 - 110N•m



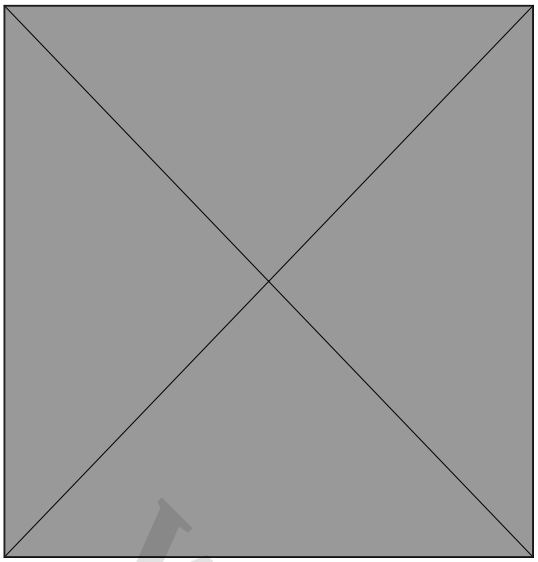
5. INSTALL THE DRIVER AIRBAG

(a) Connect driver airbag connector.

- Connect airbag connector ① .
- Connect horn switch wire harness connector ② .

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(b) Fit the driver airbag well, and install the snap ring in place.

(c) Connect the negative cable of battery.

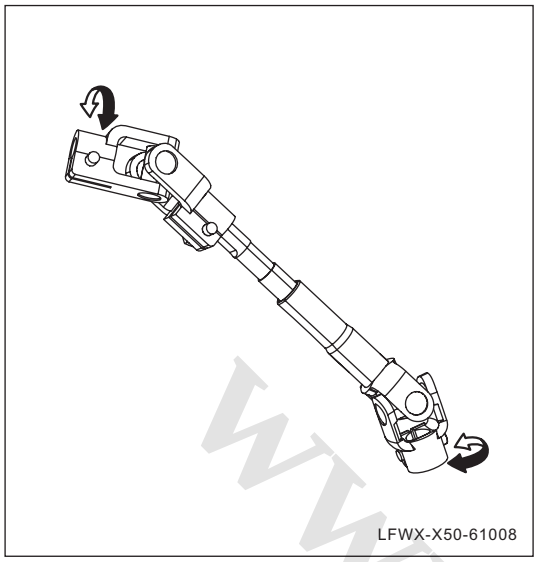
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STEERING SHAFT

CHECK



1. CHECK THE LOWER STEERING SHAFT ASSEMBLY

△ HINT:

Hold two ends of the cross shaft universal joint by both hands, and then rotate it reversely. Check if any clearance exists in the universal joint of steering shaft. If any, replace it.

2. CHECK THE UPPER STEERING SHAFT ASSEMBLY

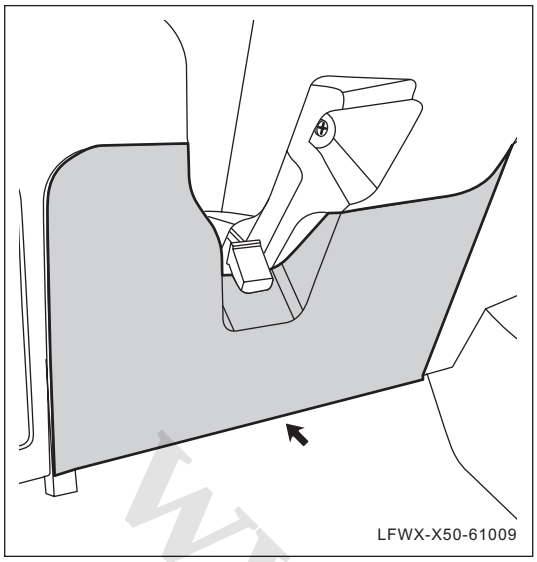
(a) Fix the steering column of the upper steering shaft; shake the upper steering shaft; Ccheck if any clearance exists in the upper steering shaft bearing; if any, replace the upper steering shaft assembly.

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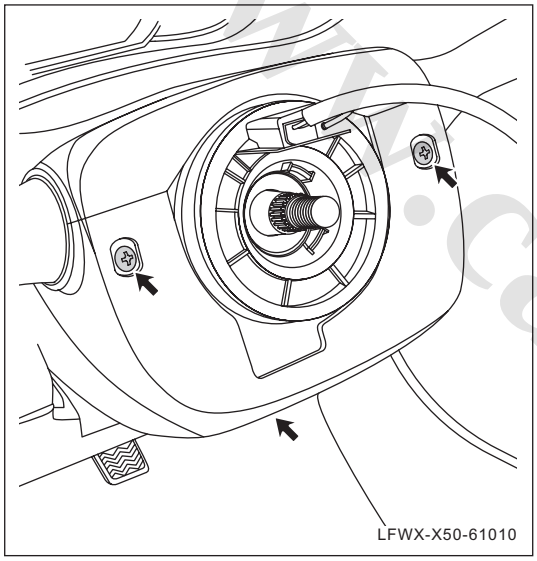
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REPLACEMENT



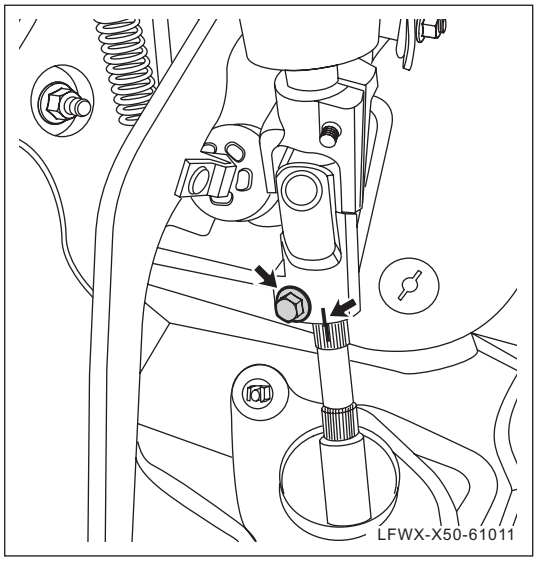
1. **REMOVE THE STEERING WHEEL ASSEMBLY**
2. **REMOVE THE STEERING COLUMN COVER**

(a) Remove the dashboard access cover plate.



(b) Remove the fixing screws of steering column cover, and then take out the steering shaft upper & lower cover.

3. **REMOVE THE CLOCK SPRING (SEE 72 - SAFE-TYROTECTION DEVICE, CLOCK SPRING, RE-PLACEMENT)**
4. **REMOVE THE COMBINATION SWITCH**



5. **REMOVE THE STEERING SHAFT ASSEMBLY**

(a) Make the assembling marks on lower steering shaft and universal joint.

△ HINT:

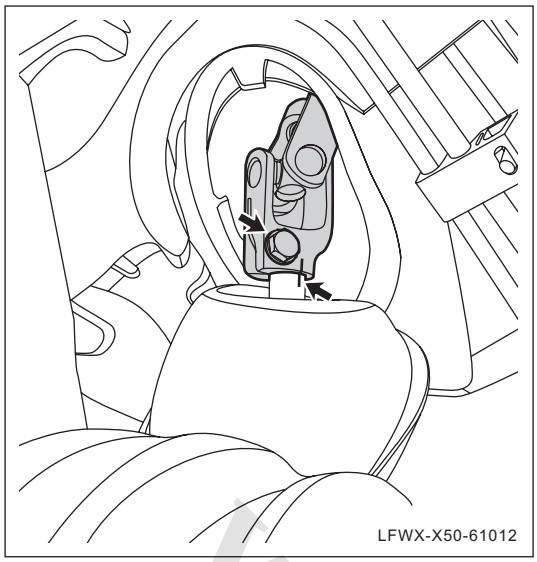
Make assembling marks for easy installation when re-moving.

(b) Remove the fixing bolts of lower steering shaft uni-versal joint.

61

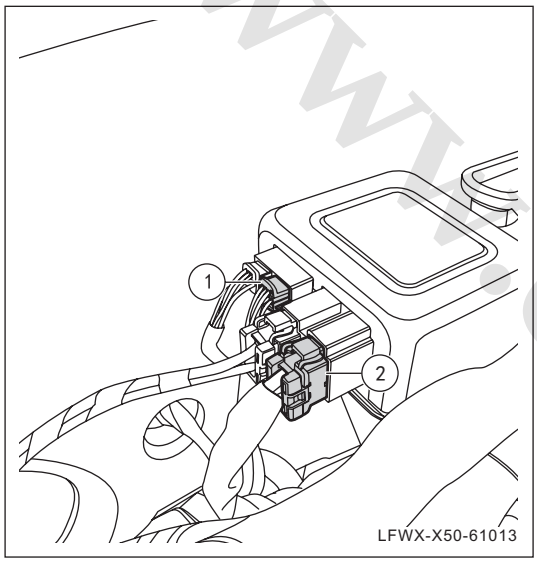
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(c) Pry lower steering shaft cover, and make the assembling marks on the steering gear spline shaft and the lower steering shaft universal joint.

(d) Remove the fixing bolts of lower steering shaft universal joint, and take down the lower steering shaft.

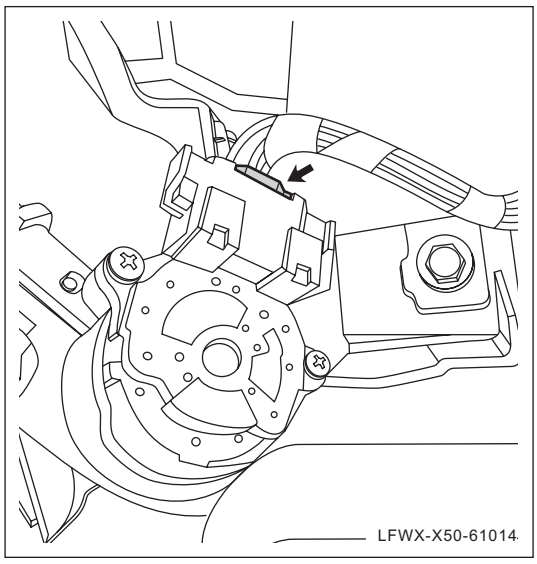


(e) Remove dashboard upper panel assembly. (See 85 - Dashboard and Console, Dashboard Lower Panel, Replacement)

(f) Disconnect torque sensor connector ① and steering boosting motor connector ② .

△ HINT:

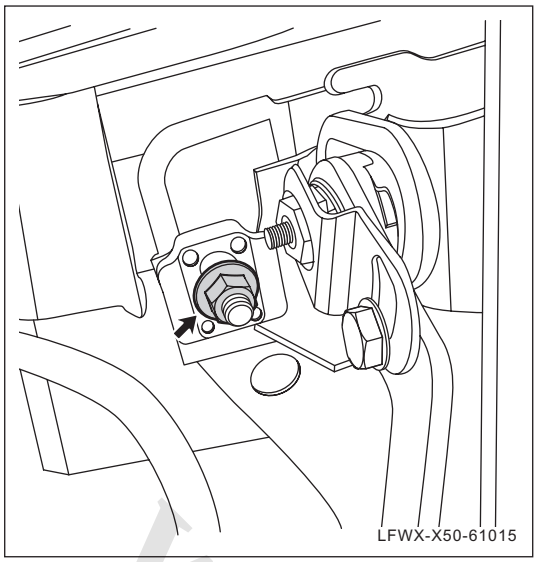
Cut off the connector wire harness tie.



(g) Disconnect the ignition switch connector.

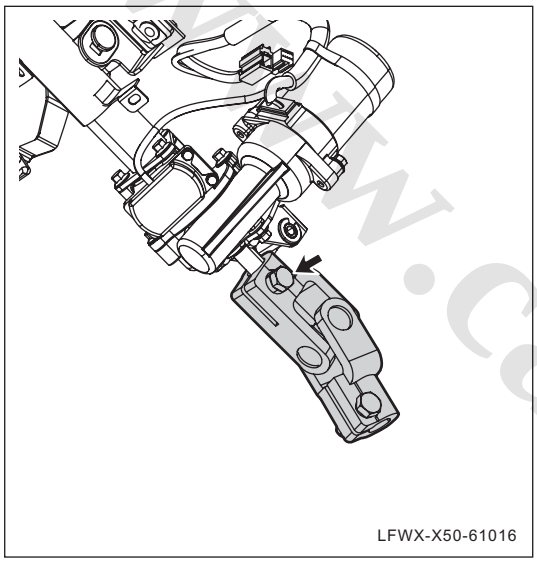
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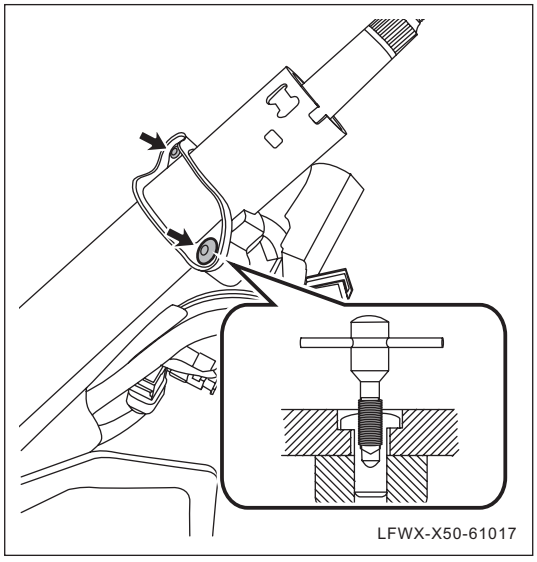
(h) Remove fixing nuts of the upper steering shaft assembly.

(i) Remove the lower connecting bolts, and take down the upper steering shaft assembly.



(j) Make the assembling marks on upper steering shaft and universal joint.

(k) Remove the fixing bolts, and take down steering shaft universal joint.



6. REMOVE THE IGNITION SWITCH ASSEMBLY

(a) Drill hole on the ignition switch fixing bolt by an electric drill.

(b) Remove the fixing bolt of ignition switch clamp with left-hand tap, and take down the ignition switch assembly.

△ HINT:

The ignition switch fixing bolt is a kind of special bolt; replace the same ignition switch fixing bolt after removal.

7. REMOVE THE STEERING MOTOR ASSEMBLY

(a) Remove the fixing bolts of torque sensor cover and take down the torque sensor cover.

(b) Remove the fixing bolts of torque sensor and take out the torque sensor.

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(c) Remove the steering motor fixing bolt and take out the steering motor assembly.

8. INSTALL THE STEERING MOTOR ASSEMBLY

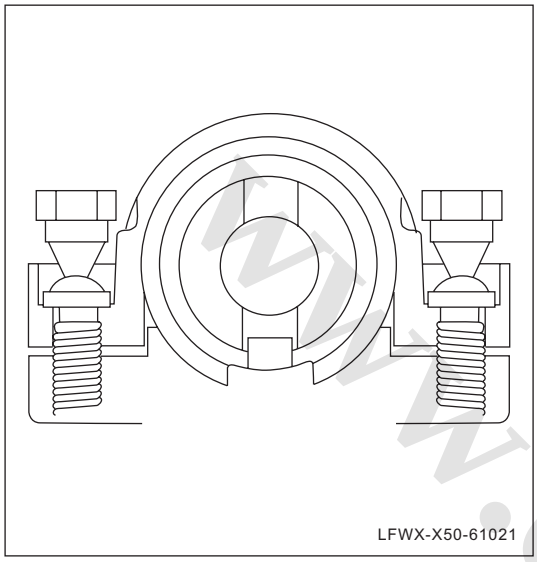
(a) Install the steering motor onto the steering shaft, and then install the fixing bolts and tighten them.

(b) Install the torque sensor onto the steering shaft, and then install the fixing bolts and tighten them.

△ HINT:

After installation, fill the torque sensor adjusting groove with sealant.

(c) Install the torque sensor cover, and then intall the fixing bolts and tighten them.



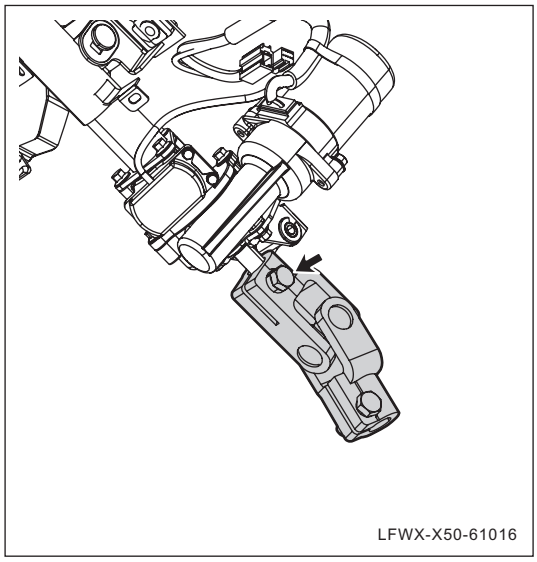
9. INSTALL THE IGNITION SWITCH ASSEMBLY

(a) Install the ignition switch and clamp.

(b) Install the fixing bolts of ignition switch and tighten them.

NOTICE:

- **Align the lock notch of steering column when installing the ignition switch, and lock the ignition switch temporarily.**
- **Make sure that the special bolt is locked up after the correct operation of the ignition switch until the bolt head is twisted off.**



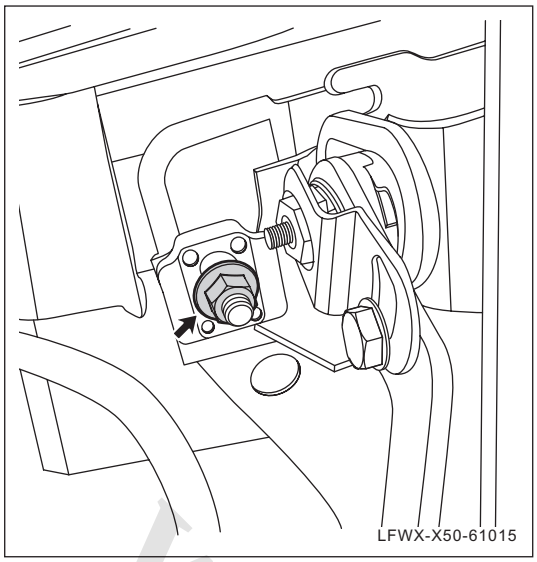
10. MOUNT THE STEERING SHAFT ASSEMBLY

(a) Install the upper steering shaft universal joint, and then install the fixing bolts and tighten them according to the marks made during removing

Torque: 20 - 28N•m

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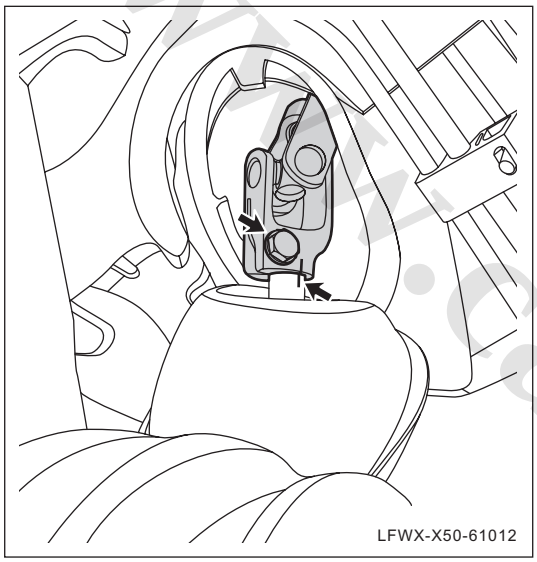


(b) Install steering shaft assembly onto dashboard bracket and connecting bolts, and then install the lock nuts and tighten them.

Torque: 20 - 28N•m

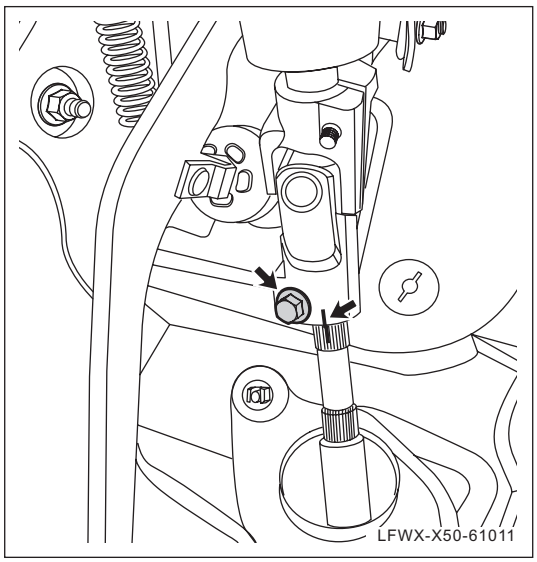
(c) Install the fixing nuts of the steering shaft assembly and tighten them.

Torque: 20 - 28N•m



(d) Install the lower steering shaft onto the steering shaft spline shaft, and then install the fixing bolts of universal joint and tighten them according to the marks made during removing.

Torque: 20 - 28N•m

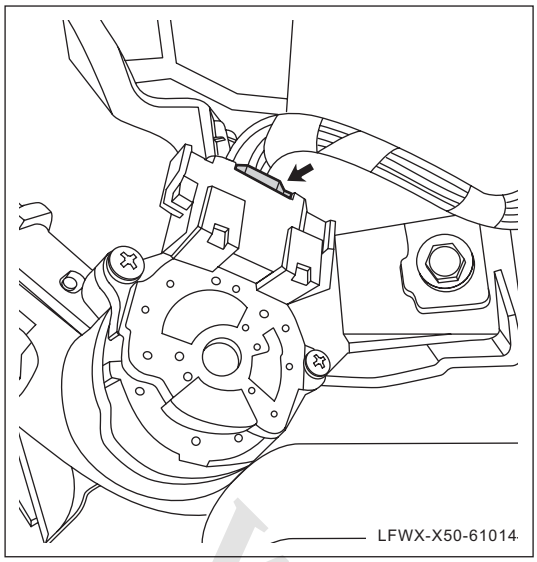


(e) Install the lower steering shaft onto the steering shaft universal joint, and then install the fixing bolts and tighten them according to the marks made during removing.

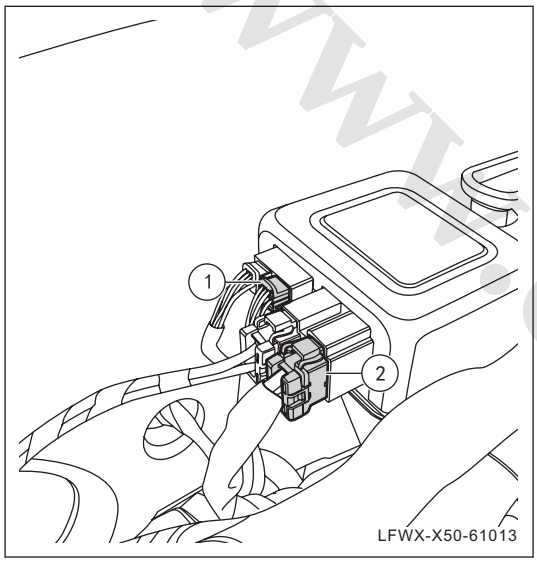
Torque: 20 - 28N•m

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(f) Install the ignition switch connector.

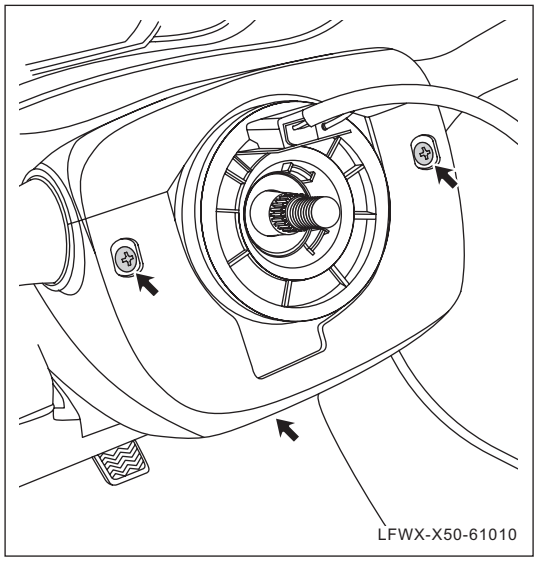


(g) Install torque sensor connector ① and steering boosting motor connector ② .

(h) Install the dashboard upper panel assembly. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)

11. INSTALL THE COMBINATION SWITCH

12. INSTALL THE CLOCK SPRING (SEE 72 - SAFETY PROTECTION DEVICE, CLOCK SPRING, REPLACEMENT)



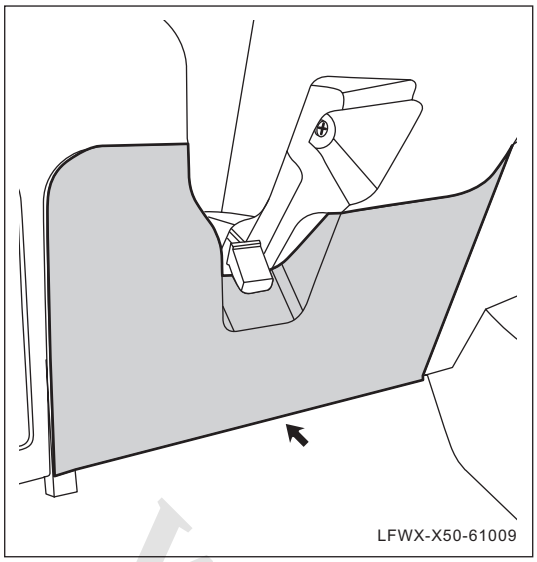
13. REMOVE STEERING COLUMN COVER

(a) Install the steering shaft upper & lower cover, and then install the fixing screws and tighten them.

Torque: 5 - 6N•m

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(b) Install the dashboard access cover plate.

14. INSTALL THE STEERING WHEEL ASSEMBLY

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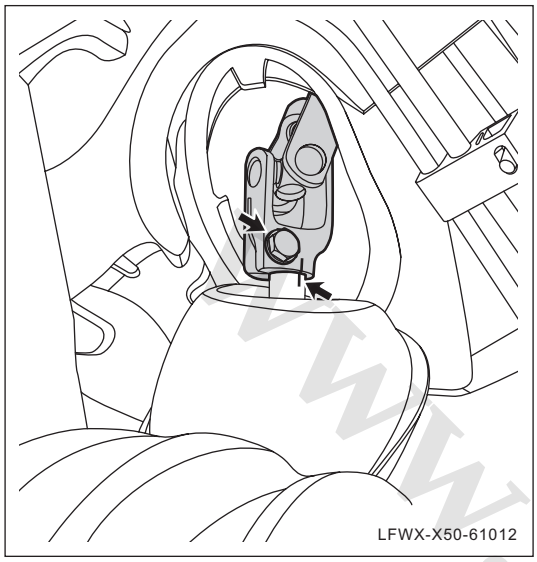
STEERING GEAR

REPLACEMENT

1. LIFT THE VEHICLE, AND REMOVE FRONT WHEELS

△ HINT:

Turn the steering wheel to right limit position to facilitate the removal of steering gear.



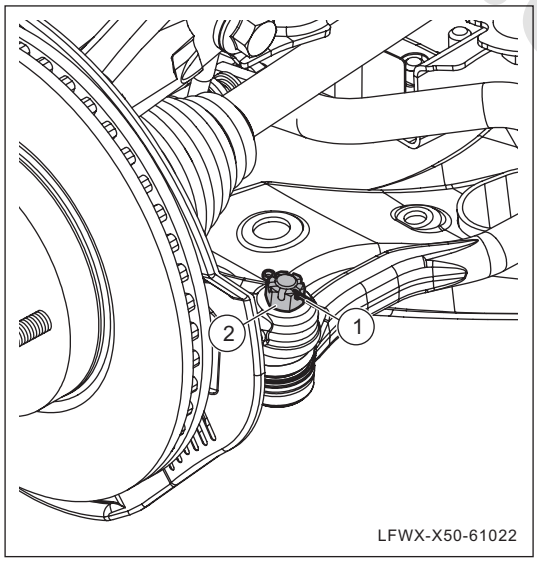
2. REMOVE THE STEERING GEAR ASSEMBLY

(a) Pry lower steering shaft cover, and make the assembling marks on the steering gear spline shaft and the steering shaft universal joint.

△ HINT:

Make assembling mark for easy installation when removing.

(b) Remove the fixing bolts of steering shaft universal joint, and pull out the steering shaft.

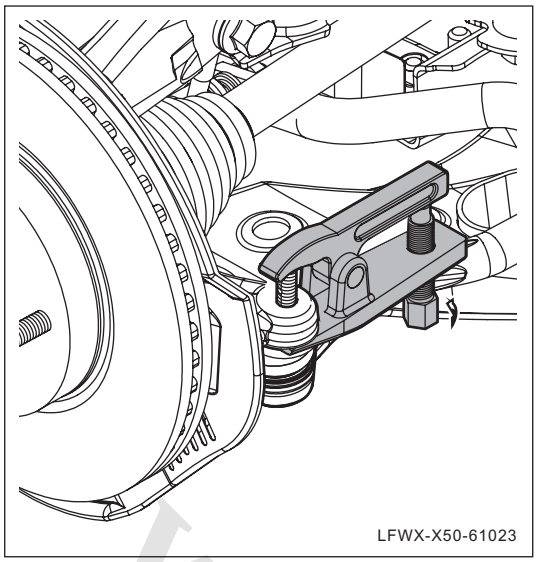


(c) Remove cotter pin ① of slotted nut of the steering gear tie rod ball head.

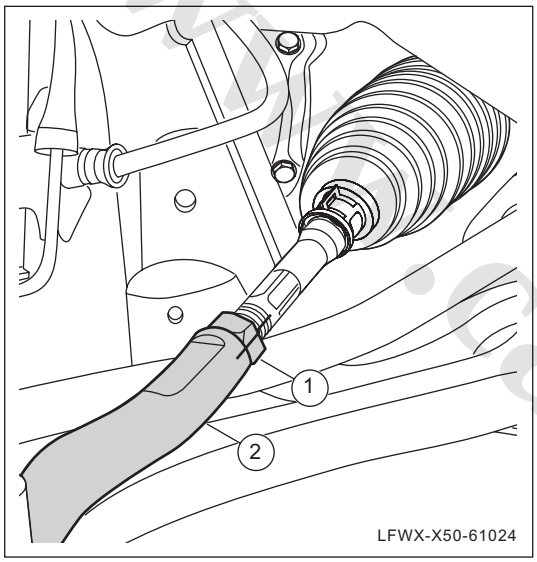
(d) Remove the slotted nut ② of the steering gear tie rod ball head.

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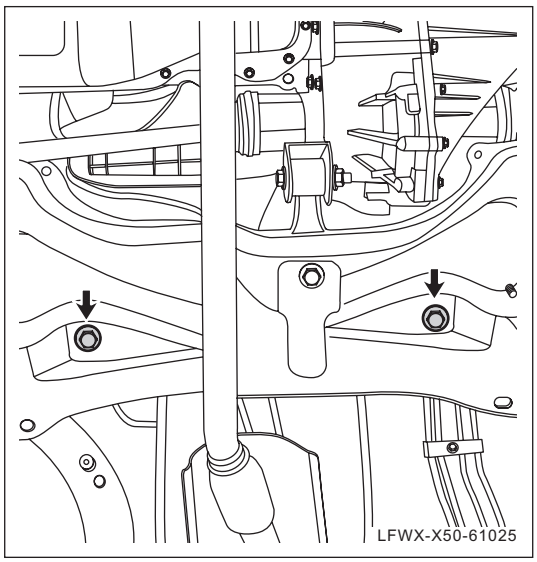
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(e) Remove the steering gear tie rod ball head by a ball head remover.



(f) Make assembling marks at the connecting position of steering gear right ball head tie rod, unscrew the lock nut ① , and then remove steering gear right ball head tie rod ② .

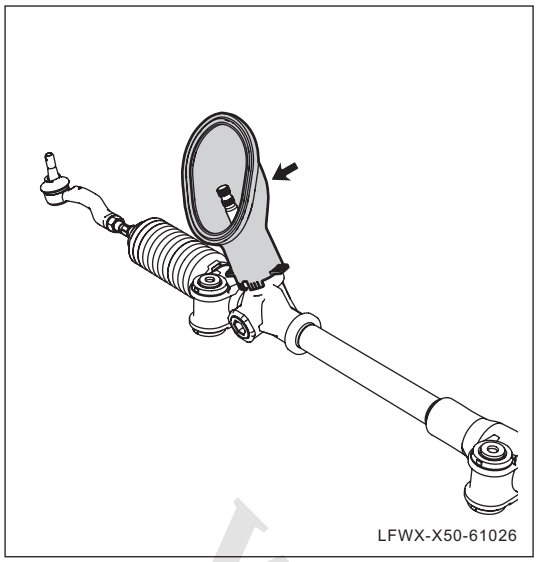


(g) Remove the fixing bolts and nuts of steering gear.

(h) Move and take out the steering gear from right wheel.

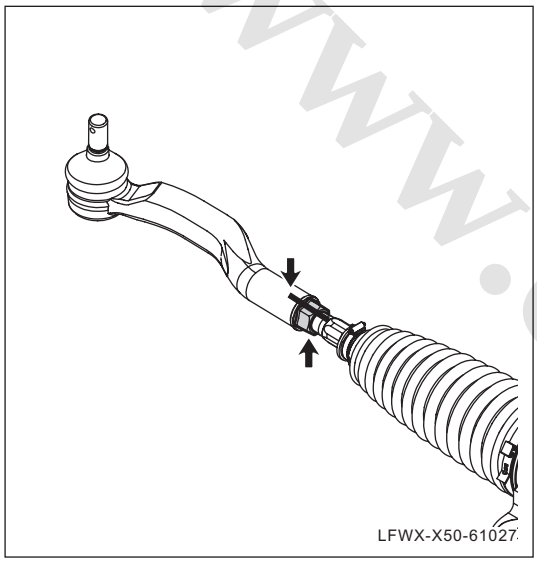
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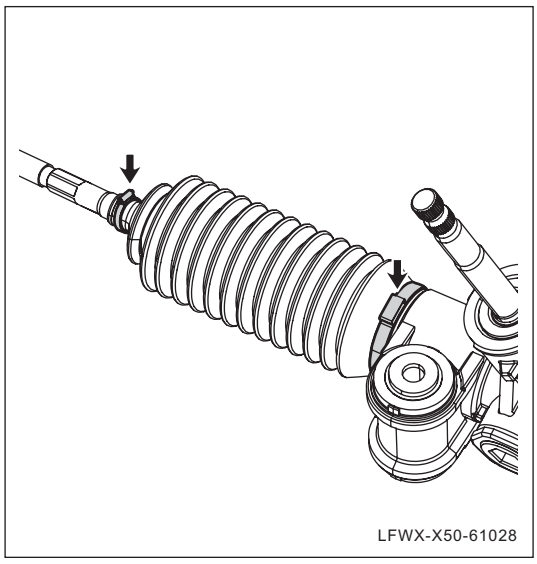


3. DISASSEMBLE THE STEERING GEAR ASSEMBLY

(a) Remove the lower steering shaft cover.



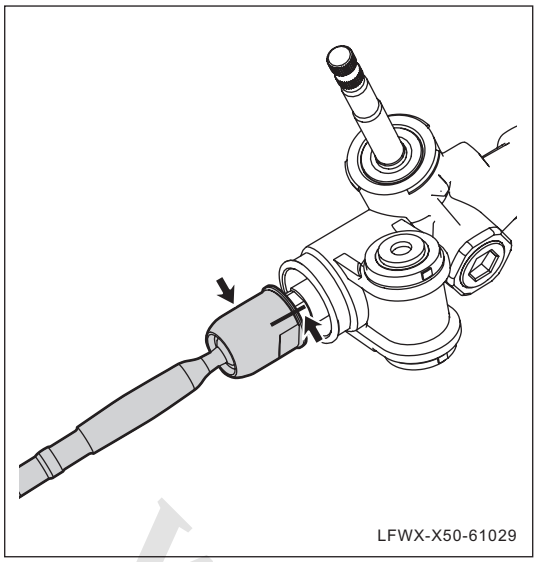
(b) Make assembling marks at the connecting position of steering gear left ball head tie rod, unscrew the lock nuts, and then remove steering gear left ball head tie rod.



(c) Remove clamps on the both side of the dust cover, and take out the steering gear dust cover.

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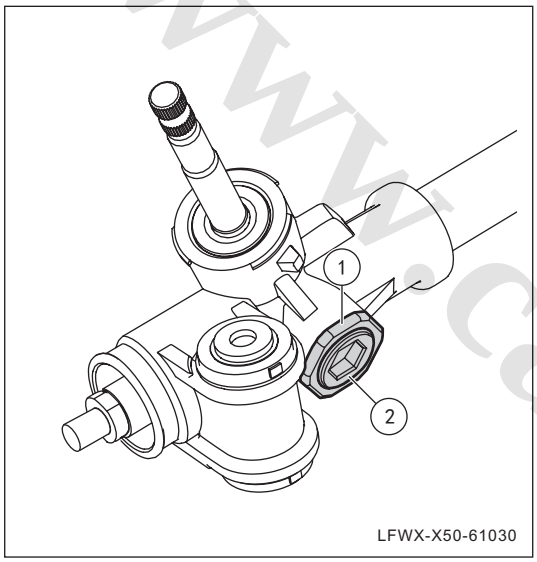
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(d) Fix the steering gear and remove the steering gear tie rod.

△ HINT:

Make marks on the end of the left/right rack end.



(e) Unscrew the rack guide spring cover lock nuts ① , and then remove the guide spring cover ② .

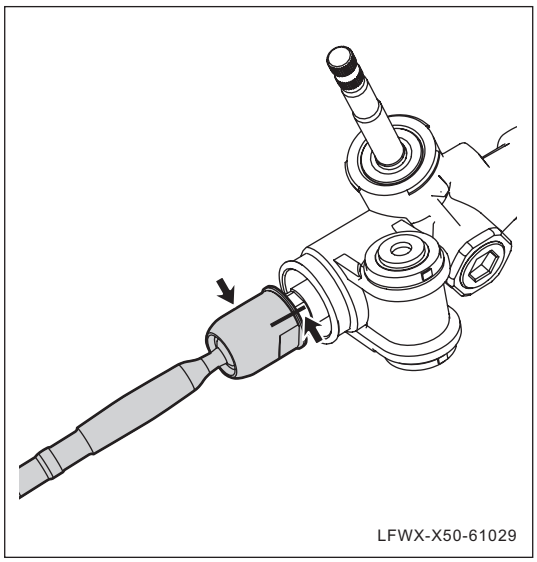
(f) Remove guide spring and guide block.

4. ASSEMBLE THE STEERING GEAR ASSEMBLY

(a) Install the rack guide block and the guide spring.

(b) Install the rack guide spring cover and tighten it to a specified pre-loading value.

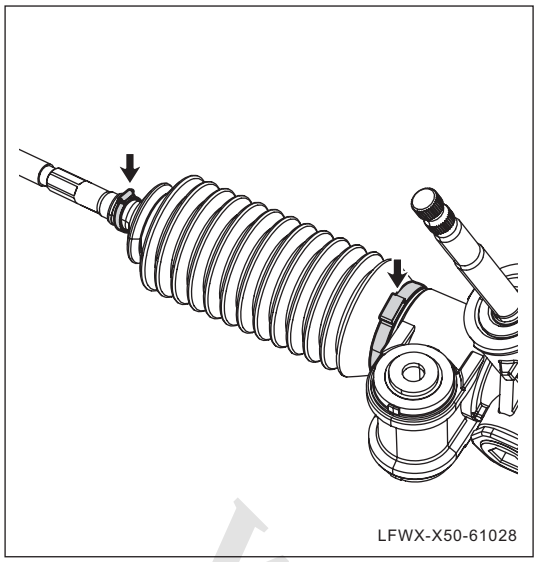
(c) Tighten the rack guide spring cover lock nut.



(d) Fix the steering gear and install rack tie rod according to marks made during removing.

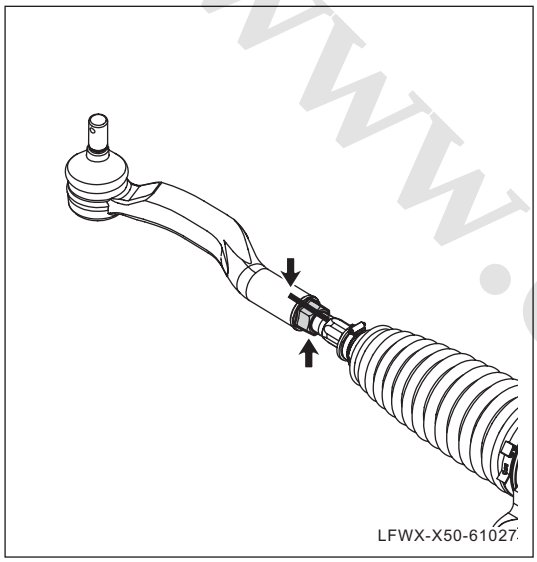
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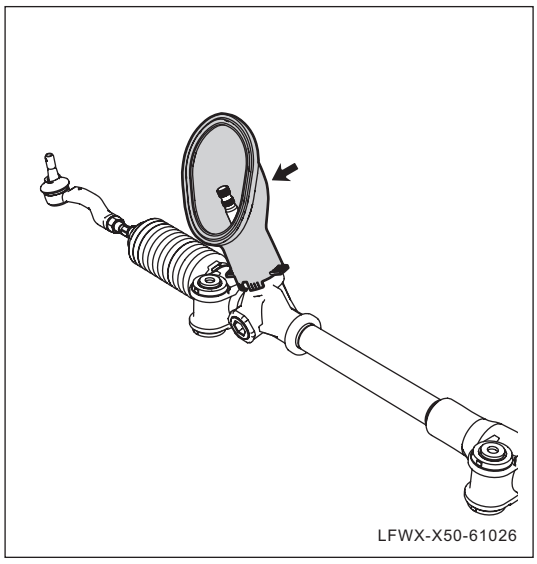
(e) Install dust cover on both sides onto steering gear.

(f) Install clamps on both sides of dust cover, and tighten them using special tools.



(g) Install the left ball head tie rod on the steering gear and align marks made in removal and then tighten lock nuts.

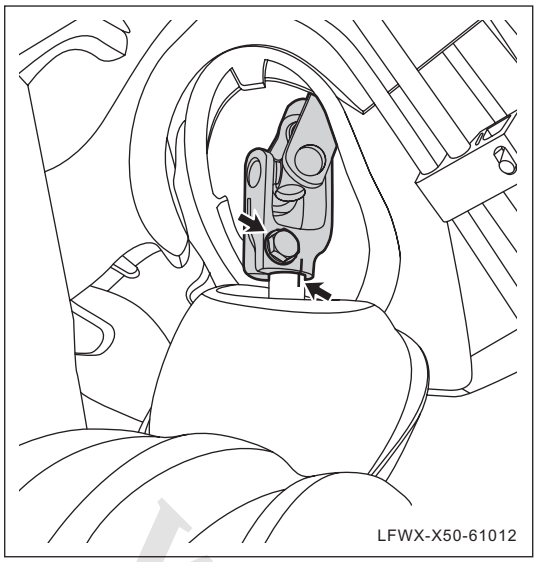
Torque: 70 - 80N•m



(h) Install the lower steering shaft cover.

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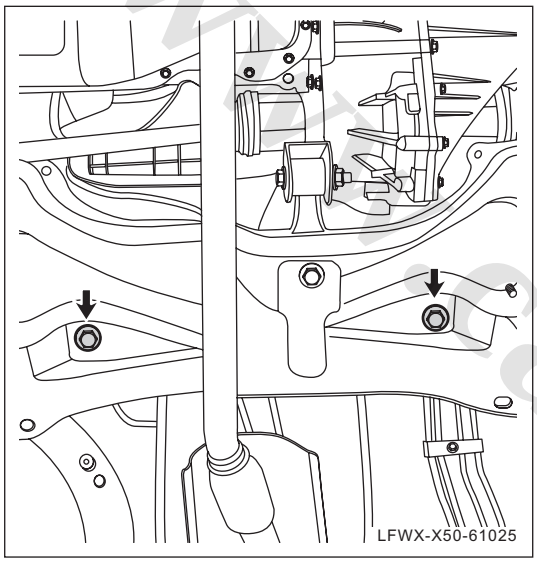


5. INSTALL THE STEERING GEAR ASSEMBLY

(a) Install the steering gear from the right wheel side onto the front sub frame.

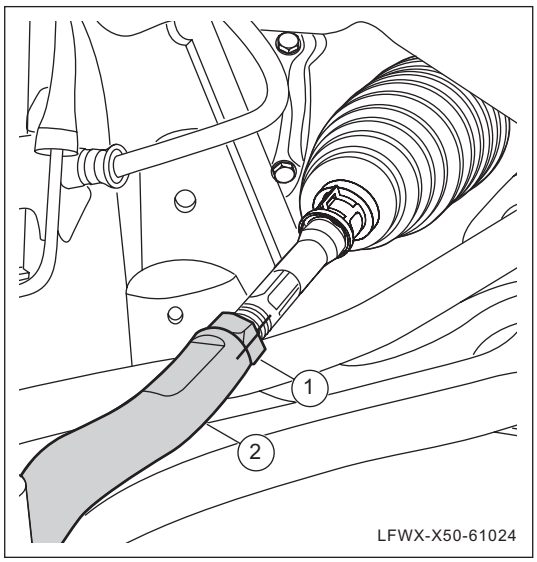
(b) Install the lower steering shaft onto the steering gear spline shaft, and then install the fixing bolts and tighten them according to the marks made during removing.

Torque: 20 - 28N•m



(c) Install the fixing bolts and nuts and tighten them.

Torque: 85 - 105N•m



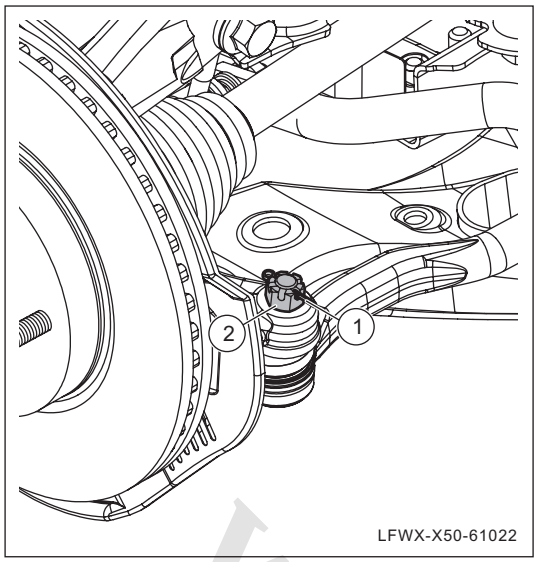
(d) Install the steering gear right ball head tie rod ②, and tighten the lock nuts ① according to the marks made during removing.

Torque: 70 - 80N•m

61

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(e) Install ball head of steering gear tie rod onto steering knuckle.

(f) Install the slotted nut ② and tighten them.

Torque: 80 - 100N•m

(g) Install the slotted nut cotter pin ① and lock them.

6. INSTALL THE FRONT WHEELS AND LOWER DOWN THE VEHICLE

7. CHECK THE STEERING FORCE OF STEERING WHEEL

△ HINT:

If the steering force of steering wheel is too large, adjust the tightness of steering gear rack guide spring cover.

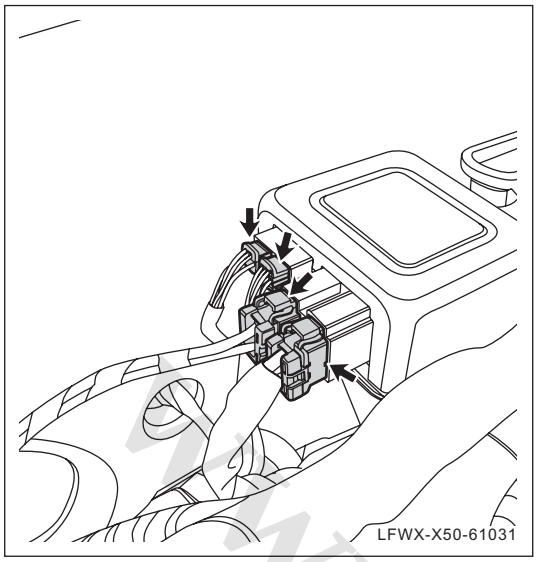
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EPS CONTROL UNIT

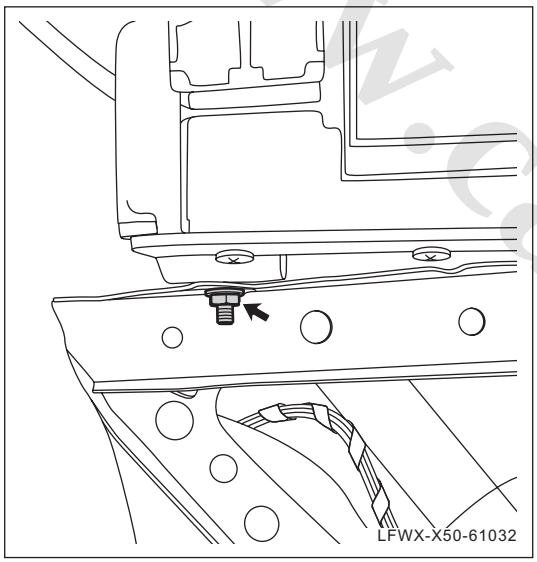
REPLACEMENT



1. REMOVE THE EPS CONTROL UNIT WITH THE BRACKET ASSEMBLY

(a) Remove dashboard upper panel assembly. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)

(b) Disconnect the connectors of EPS control unit.

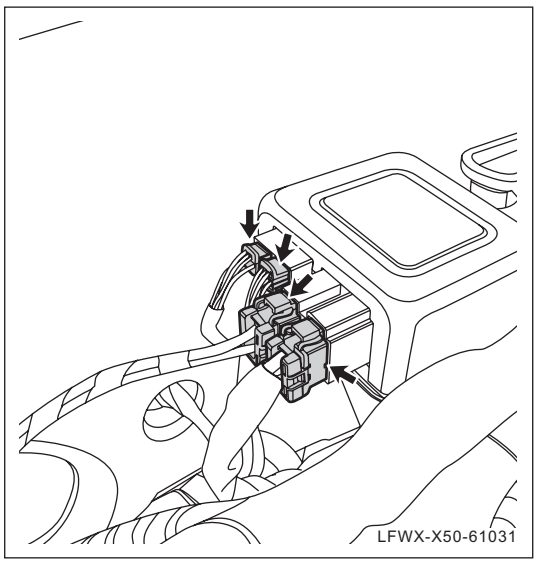


(c) Remove the fixing nuts of EPS control unit with bracket assembly, and take down the EPS control unit with bracket assembly.

2. INSTALL THE EPS CONTROL UNIT WITH THE BRACKET ASSEMBLY

(a) Install the EPS control unit with bracket assembly, and then install the fixing nuts and tighten them.

Torque: 8 - 12N•m



(b) Install the connectors of EPS control unit.

(c) Install the dashboard upper panel assembly. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)

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Air Conditioner

Air conditioner system.....71-1
System description.....71-1
Preparation.....71-4
Service data.....71-6
Precautions.....71-6
Schematic diagram.....71-9
Components.....71-10
Function and fault of components.....71-11
On-vehicle inspection.....71-13
Diagnosis.....71-20
Fault symptom table.....71-20
Fault diagnosis.....71-23
Refrigerant.....71-39
Check.....71-39
Recovery.....71-41
Refilling.....71-42
Compressor lubricant.....71-43
Drain.....71-43
Refilling.....71-43
Vacuuming of air-conditioner system.....71-44
HVAC assembly.....71-45
Replacement.....71-45
A/C compressor.....71-54
Check and repair.....71-54
Condenser and drying tank assembly.....71-61
Check and repair.....71-61
Air conditioner control.....71-65
Check and repair.....71-65

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AIR-CONDITIONER SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

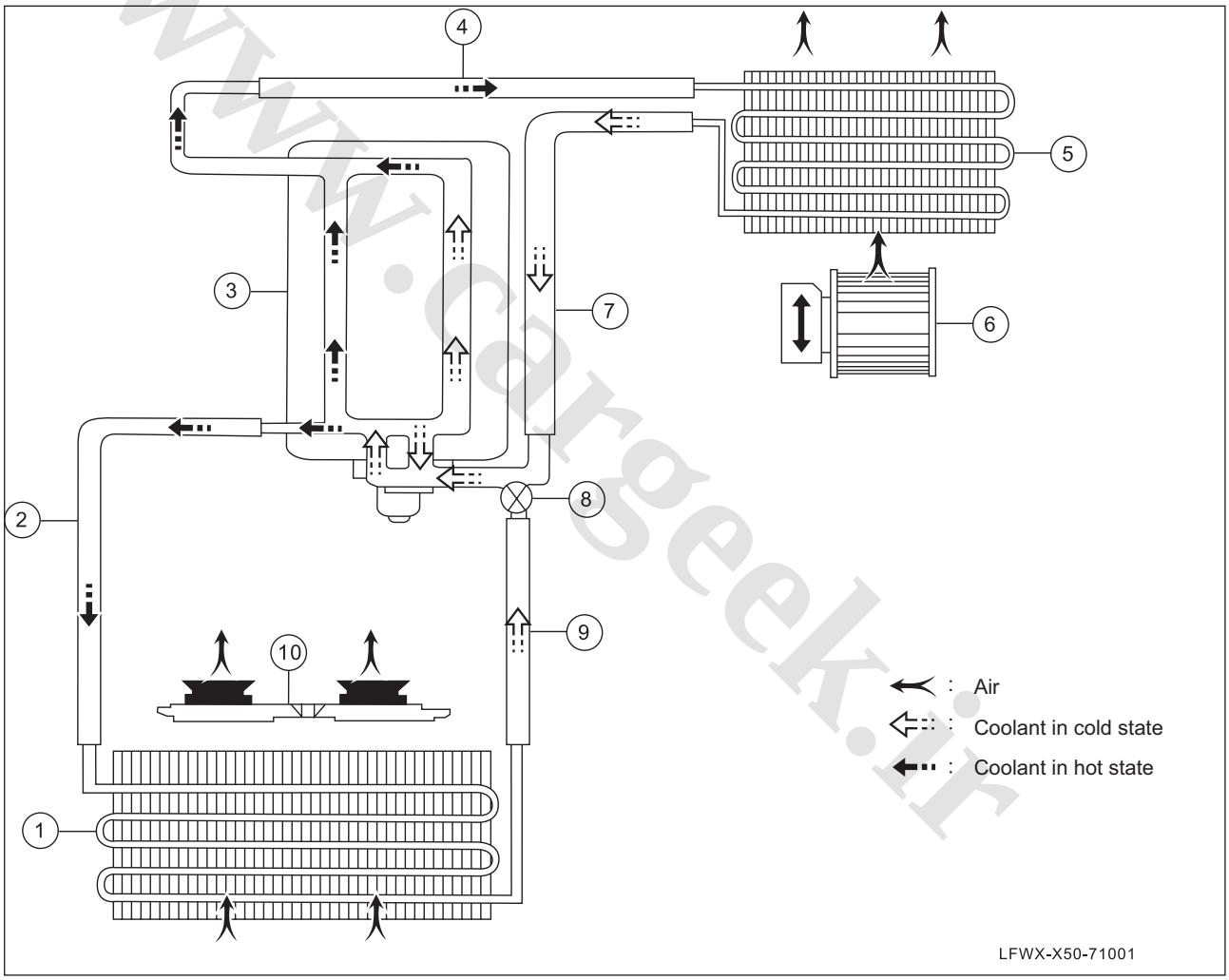
The air conditioner of this vehicle integrates cooling and heating together (refrigerating, heating and ventilating share the same blower and duct controlled by the same controller), and refrigerates, heats, changes and filters the compartment air, so as to provide a comfortable environment to passengers, reduce driver's fatigue and improve the driving safety.

2. COMPONENTS

The air conditioner mainly consists of HVAC assembly, A/C compressor, condenser and drying tank, air-conditioner controller, refrigerant, air-conditioner duct, heater pipe, etc.

3. WORKING PRINCIPLE

Heater system



1	Radiator
2	Radiator inlet hose
3	Engine
4	Heater tank inlet hose
5	Heater tank

6	Blower assembly
7	Heater tank outlet hose
8	Water pump
9	Engine inlet water pipe
10	Radiator fan

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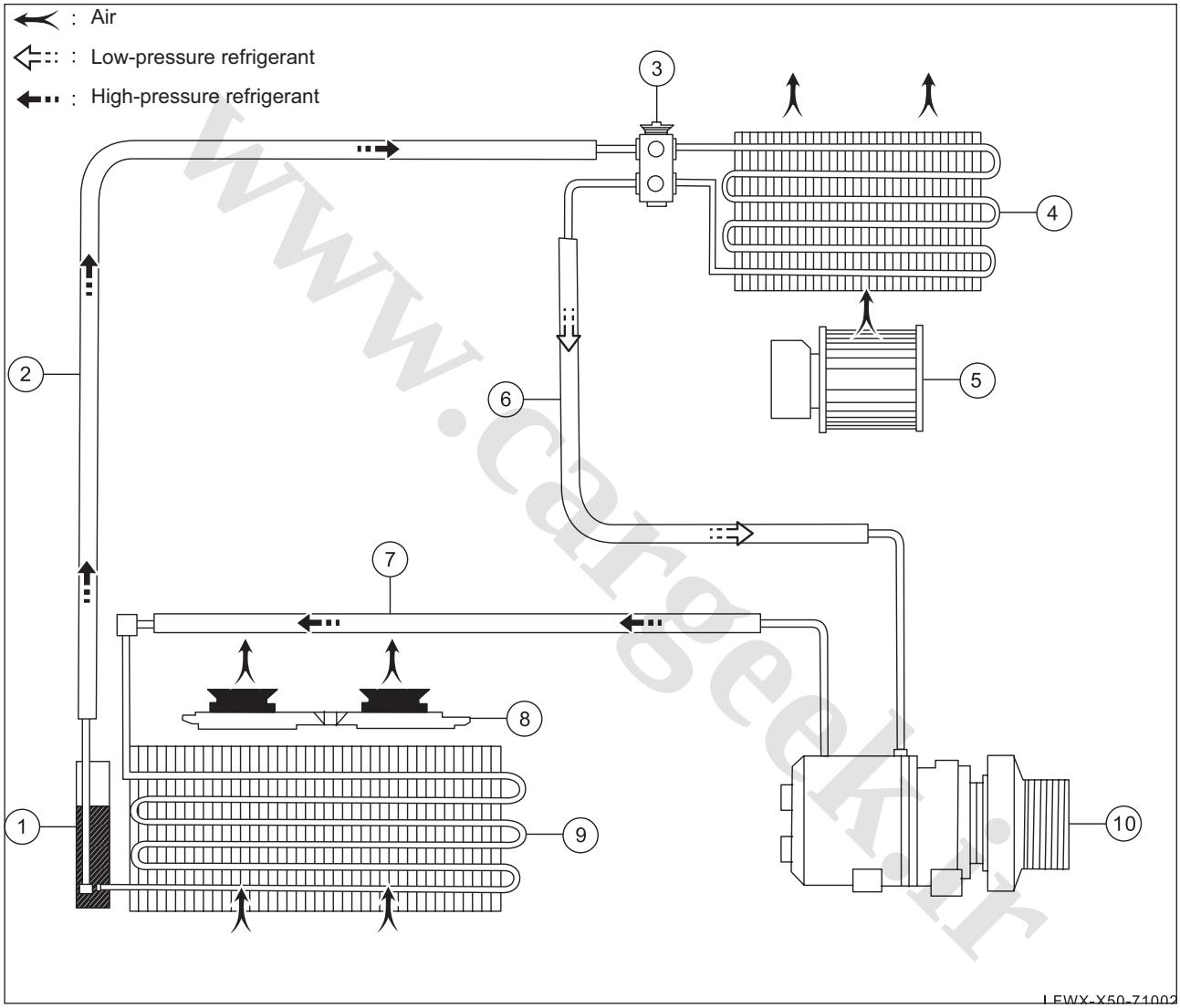
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(a) The heater leads engine coolant into the radiator inside and then transfers heat energy, radiated by coolant, to the vehicle compartment or windshield glass to increase temperature in the vehicle compartment or defrost.

(b) The heater tank is installed on the heater housing, and hot coolant from the engine flows into the heater tank inlet hose, and the outlet hose connects with the engine water pump.

(c) Hot coolant circulates in the heater tank to radiate heat energy which will be transferred to the vehicle compartment or windshield glass by a blower and the guide air pipe. The thermostat in the engine outlet controls water flow of the heater tank, and the out air temperature is controlled by the fan speed adjusting switch and the output temperature adjusting switch.

Refrigeration system



1	Drying tank	6	Low pressure pipeline
2	High pressure pipeline	7	High pressure pipeline
3	Expansion valve	8	Condenser fan
4	Evaporator	9	Condenser
5	Blower	10	A/C compressor

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(a) The compressor compresses the gaseous refrigerant into high-temperature and high-pressure refrigerant gas and then exhaust it.

(b) After the high-temperature and high-pressure refrigerant gas flows into the condenser via a line, it may radiate heat energy and cooled down in the condenser, and further is condensed into a high-temperature high-pressure liquid refrigerant before flowing out.

(c) The high-temperature and high-pressure liquid refrigerant is throttled through the expansion valve and then its status changes drastically into a low-temperature low-pressure liquid Refrigerant.

(d) The low-temperature and low-pressure liquid refrigerant enters inlet into the evaporator immediately, and may absorb air heat flowing through the evaporator, so that the air temperature drops and cool air will go out to realize cooling effect. Refrigerant is evaporated into a low temperature and low pressure gaseous refrigerant due to absorption of the heat.

(e) Low-temperature and low-pressure gaseous refrigerant is draw into by compressor through the pipeline for compression; now enter the next circulation; as long as the compressor is working continuously, refrigerant may circulate continuously in air-conditioner system to produce cooling effect. The compressor stops working. Refrigerant in the air-conditioner system stops flowing and does not produce cooling effect.

Air-conditioner control system

△ HINT:

- Air-conditioner control system consists of power supply control circuit, compressor clutch control circuit and safety protection control circuit, data communication circuit, etc. It mainly consists of air-conditioner controller (air-conditioner system), coolant temperature sensor, pressure switch, relay and temperature controller, etc.
- The function of air-conditioner control system is to guarantee the air-conditioner system can work normally under any circumstance, and ensure the safety running of air-conditioner system and engine.

(a) Refrigeration temperature control.

- It mainly consists of the circuits related to the evaporator temperature sensor and the air-conditioner controller.
- When the temperature changes within the evaporator, the resistance of the sensor changes accordingly, so that the A/C control obtains a signal corresponding to voltage signal; after this signal is amplified by the amplifier circuit in the controller, it can used to control the electromagnetic clutch relay.
- When the electromagnetic clutch relay is turned on, the compressor electromagnetic clutch engages and the compressor works and temperature may drop; When the electromagnetic clutch relay is switched off, the compressor electromagnetic clutch disengages and the compressor stops working and temperature may rise. The air-conditioner control system controls the compressor to keep the refrigeration temperature within the preset scope.

(b) Engine control.

EFI engine controls working condition of compressor in order to reduce engine load under some special working conditions: such as engine starting, sharp acceleration and overspeed running, A/C compressor will also stop working.

(c) Control of safety protection control.

To ensure the normal operation of the system, the pressure and the temperature of the system is monitored via the pressure switch installed on the high-pressure hard pipe, which realizes the safety protection control.

- Low pressure protection: when the pressure is lower than 0.196 ± 0.02 MPa, the pressure switch is disconnected, the compressor clutch power is cut off and the compressor stops working.

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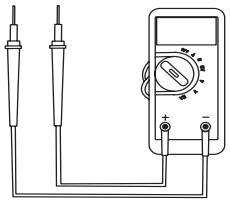
- Overpressure protection: when the pressure is higher than 3.14±0.2 MPa, pressure switch will be switched off and compressor clutch will be disconnected, and the compressor will stop working;
- Control high pressure: when the pressure is higher than or equal to 1.77 ± 0.08 MPa, pressure switch is turned on to send the engine ECM a trigger signal to have the cooling fan run at high speed;
- Low-temperature protection: when the temperature sensed by evaporator temperature sensor is lower than 3.5℃ , compressor clutch will be disconnected, and the compressor will stop working;
- High temperature protection: when the coolant temperature sensor sense temperature is above 110.25°C, thermal protection may activate and the compressor clutch power is cut off and the compressor stops working.

(d) Control of engine cooling system (electric fan)

Engine cooling system control consists of coolant temperature sensor, engine ECM, fan control relay, cooling fan, condenser fan and relevant circuits, etc. Engine ECM controls the switching on and switching off of circuit related to fan control relay and achieves the following control functions:

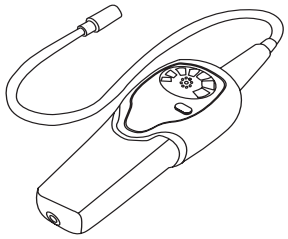
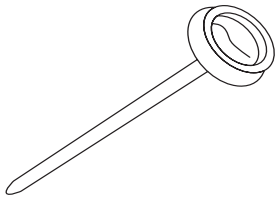
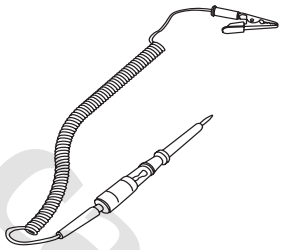
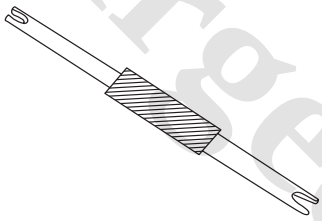
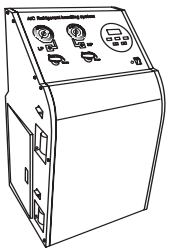
- When coolant temperature is 93 °C - 96 °C, the engine ECM electrifies the fan low speed relay and two fan motors connect in series and simultaneously are run at low speed.
- When coolant temperature is 98 °C - 100 °C, the engine ECM electrifies the fan high speed relay and two electric fans run at high speed.
- When coolant temperature reaches 110 °C, the warning lamp for high coolant temperature in the instrument cluster illuminates.
- When the compressor is working, the cooling fan runs at low speed regardless of coolant temperature.
- When pressure in the air-conditioner cooling system is greater than or equal to 1.77± 0.08 MPa, the cooling fan rotates at high speed.
- If the coolant temperature sensor signal is abnormal (coolant temperature sensor is damaged), the engine ECM may consider that the engine is running with large load and the cooling fan may runs at high speed.

PREPARATION

S/N	Tool	Outline diagram	Description
1	Digital multimeter		Measuring the resistances and voltages of circuits and sensors.

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S/N	Tool	Outline diagram	Description
2	Halogen leak detector		Detecting the specific location of air-conditioner system refrigerant leak
3	Precision thermometer		Measuring the air-conditioner system performance
4	Test lamp		Checking wiring for conductivity
5	Remover for valve core		Removing and installing the valve core in the high/low pressure pipeline in air conditioner
6	Refrigerant recovery filling machine		Recovering refrigerant from the air-conditioner system

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Refrigerant	Model	R134a
	Amount	500g
The standard clearance value between the A/C compressor and the electromagnetic clutch		0.35 - 0.60mm

PRECAUTIONS

1. Switch off the power supply.

(a) Before removing or installing any electrical mechanism, or when the tool or the device is easily contacting the naked electrical pin, firstly the negative cable of battery must be disconnected to avoid personal injury or vehicle damage.

△ HINT:

If equipped with center door locking, do not leave the key in the car before disconnecting the negative cable of battery. Otherwise you can not take the key out when the car is locked.

(b) The ignition switch must be turned off, otherwise specified.

2. Disconnecting the negative cable of battery can reset the trip meter and timer on the instrument cluster.

△ HINT:

The odometer will not be reset.

3. When the negative cable of battery is disconnected, the sound system will lose saved setting.

△ HINT:

After connecting the negative cable of battery again, it is required to set the sound system again.

4. Do not conduct this job in a closed environment or in a place near the fire source.
5. Do not weld any part containing refrigerant.
6. Always wear protective goggles.
7. Do not have liquid refrigerant flow into eyes or contact with skin. If liquid refrigerant flows into eyes or contacts with skin, wash the contacted part by plenty of cool water.

ⓘ NOTICE:

Do not rub your eyes and skin.

(a) Apply clean Vaseline.

(b) Immediately go to hospital.

8. Do not heat or place the tank body onto the open flame.
9. When moving it, take care not to let it fall off and impact it.
10. Do not operate the compressor when the cooling system has insufficient refrigerant.

    If not enough refrigerant in the cooling system, it is probably to provide sufficient lubrication and the compressor might be burnt. So pay attention to this case.

11. When the compressor is running, do not open the high-pressure pipeline.

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△ HINT:

After filled through high pressure pipeline, the refrigerant will flow backward, this will cause the compressor cylinder body to be broken. Therefore you must open the low pressure valve to fill.

12. Do not fill refrigerant with excessive amount.

△ HINT:

If adding excessive refrigerant, it will lead to poor abstraction of heat, poor fuel economy and overheating engine.

13. After the cooling system is turned on, you must cover or bind the seal on time to prevent moisture or impurities from entering.
14. Seal the coolant reservoir immediately to avoid the water in air entering in resulting in deterioration. This vehicle's coolant model is PAG56. Coolant of different brands cannot be used together to avoid declining of oil quality and viscosity.
15. Before filling refrigerant, firstly fill the system with coolant and then with refrigerant.
16. Clean and dry the tools; clean the repair place.
17. Various sealing soft pad (washer) must be made of rubber sealing material having good compatibility with refrigerant.
18. Drain refrigerant slowly to prevent coolant from being taken out; do not contact with glossy metal surface.
19. Low-pressure end can't be filled with liquid refrigerant. When filling refrigerant from high-pressure end, do not turn on the compressor.
20. Avoid using steam to wash condenser and evaporator; only cold water or compressed air can be used.
21. Cushion should be used to protect the car when repairing the cooling system.
22. Do not start the compressor when the cooling system is not filled with refrigerant.
23. If you intend to store the compressor (used) for a long term, exhaust all air in the compressor and then top up the compressor by coolant or dry nitrogen in order to avoid corrosion.
24. Before conducting vacuum job, check sealing condition carefully. In case of leakage, deal it with in a proper manner. After installation is completed, check whether action of each part of vehicle is normal and air conditioner pipeline, refrigeration system and circuit are in good condition, and check whether air conditioner performance is good.
25. Check clearance between various parts when installing parts; do not have them contact or keep close; use insulation material when necessary.

(a) Clearance between fan shroud and condenser (or water tank): >5 mm

(b) Clearance between cooling fan (steel) and condenser or water tank: >15 mm

(c) Clearance between cooling fan (plastic) and condenser or water tank: >20 mm

(d) Clearance between cooling fan and fan shroud (or radiator): >15 mm

(e) Clearance between cooling fan and crankshaft (or tension pulley): >4 mm

(f) Clearance between cooling fan and the condenser hose: >15 mm

(g) Clearance between V-belt loose side and air-conditioner hose: >20 mm

26. Add spring washers when installing metal parts.
27. Parts installed on the engine must be tightened by specified torque.
28. Do not use hard pipe for connection when various assemblies are fitted with parts with different overhanging body or different vibration frequency.
29. Instructions related with wiring:

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(a) To avoid wire has short-circuit, before installing parts, it is necessary to remove negative cable of battery (or grounding cable)

(b) Cable connection must be secure and tightened firmly.

(c) If wire needs to pass through vehicle metal plates, it is necessary to add rubber ring (to protect wire).

(d) If other cables are removed or moved away in the process of repair, they must be restored.

(e) Cables must be fixed on the original wire harness of the car by plastic tape or original fasteners.

(f) Do not clip the wire harness when mounting other parts of air conditioner.

(g) If new cables will be welded with original cable, the cable with the same diameter must be used and the connecting point must be wrapped by tape.

(h) Wire can't approach movable parts or high temperature parts (such as exhaust pipe of engine, cylinder block, etc.), and keep away from heat source for more than 50mm.

(i) Wire must be separated with fuel pipe and keep away from fuel pipe for more than 100 mm.

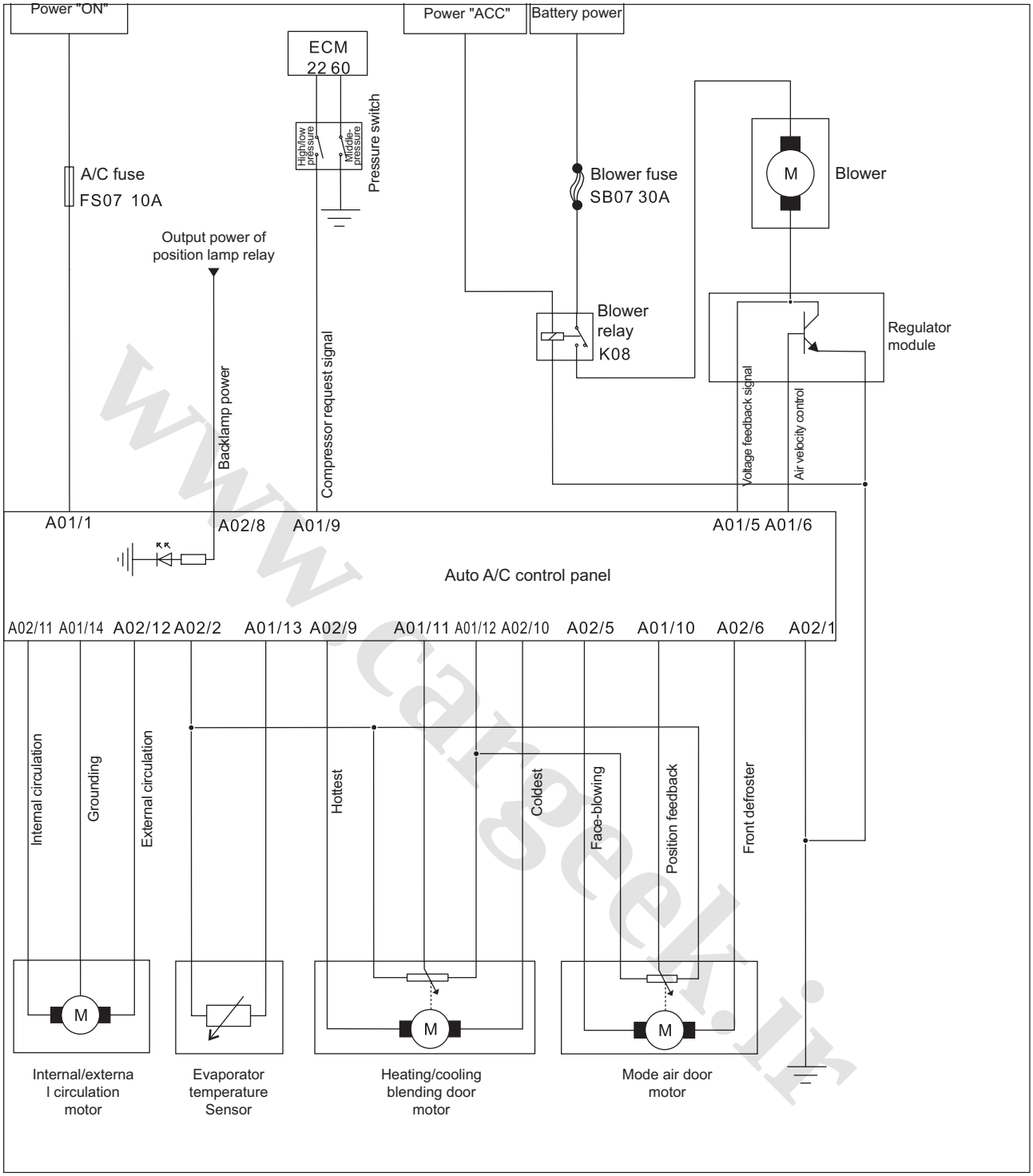
(j) Check carefully that cables contact with sharp object or movable parts.

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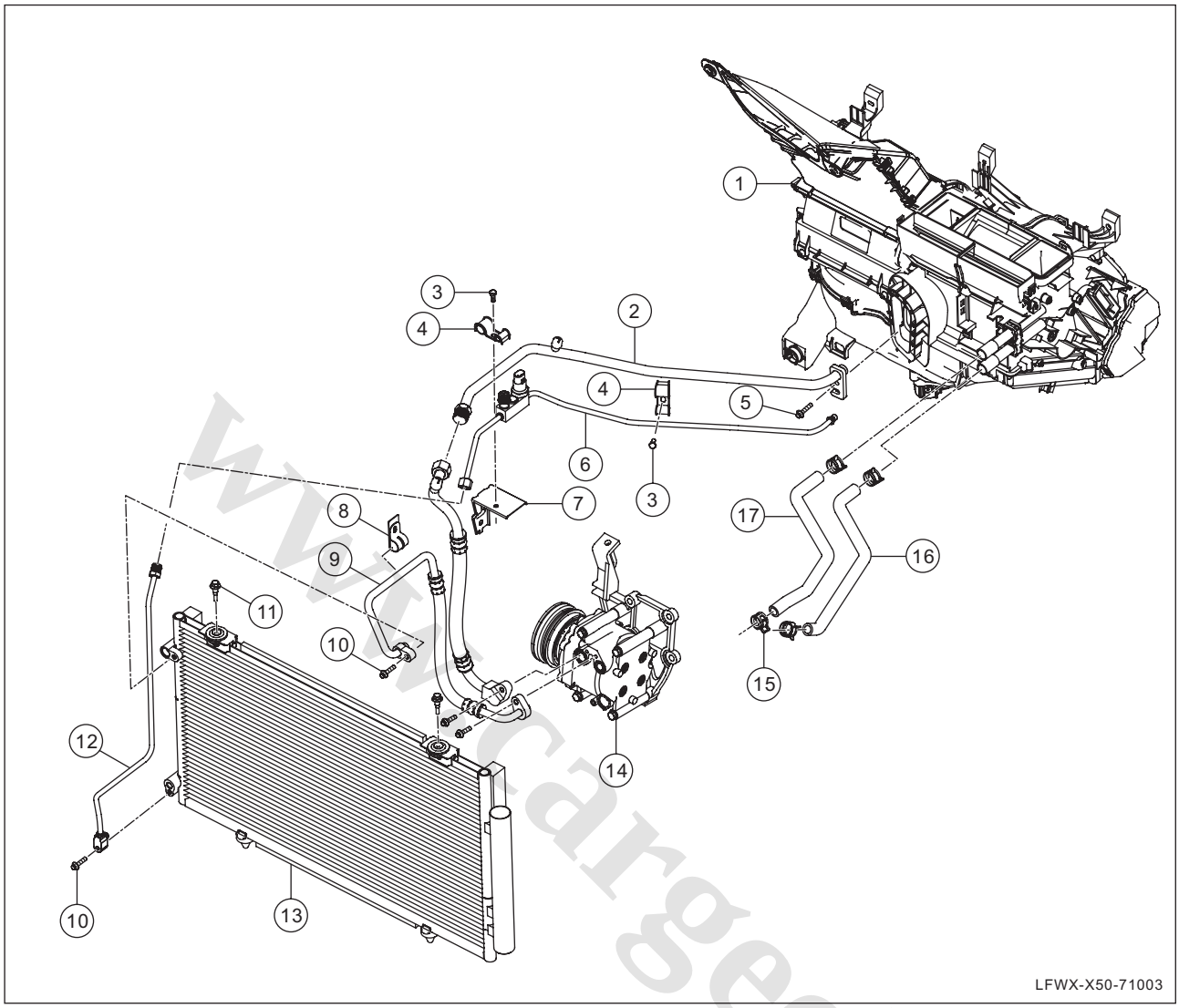
SCHEMATIC DIAGRAM



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COMPONENTS



1	HVAC assembly
2	Hard pipe section of compressor suction pipe
3	Hexagon bolt
4	Double-pipe clamp of cooling pipe
5	Hexagon bolt with flange
6	Condenser outlet pipe in the engine compartment section
7	High pressure switch mounting bracket
8	Air-conditioner high pressure pipe clamp
9	Compressor discharge pipe assembly

10	Hexagon bolt with flange
11	Hexagon bolt with flange
12	Condenser outlet pipe in the condenser section
13	Condenser assembly
14	Compressor assembly
15	Steel belt type elastic hoop
16	Heater inlet hose
17	Heater outlet hose

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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common fault	Fault symptom
Evaporator	After the low-pressure liquid refrigerant is throttled by expansion valve and pressure drops, the liquid refrigerant and some refrigerant are evaporated with absorption of heat to realize temperature drop and dehumidification in the passenger compartment.	Blockage and leakage	/
Expansion valve	Under throttling function, the expansion valve reduces pressure of high-pressure liquid refrigerant; it can automatically adjust flow rate of refrigerant according to refrigerant temperature of compressor and ensure that the compressor refrigerant is gaseous.	Blockage and damage	Cooling system does not have cooling performance
Blower	Use air entry port motor to switch air mode inside and out side, and absorb indoor air or outdoor air.	Damage	HVAC system have abnormal sound, no warm air or insufficient warm air
Speed regulation resistance	Adjust speed of the blower motor according to change of output current	Damage	Air speed cannot be controlled
Pressure switch	• The engine control unit receives medium-pressure switch signal and rotates the cooling fan at high speed. In this way, it is possible to avoid performance reduction resulting from the pressure rise. • Meanwhile, when pressure (high/low pressure) is abnormal, ECM makes the compressor stop rotating to protect the air-conditioner system	Damage	Refrigeration system does not have cooling performance and air conditioner is not cold
Temperature switch	It is used to feel temperature of evaporator core and transmit it to air-conditioner controller to avoid freezing of evaporator.	Damage	Refrigeration system does not have cooling performance and air conditioner is not cold
Air door motor	• Mode air door motor conducts selection of air vent position • Internal/external circulation air door motor conducts selection of internal and external circulation of air conditioner. • Mixed air door motor conducts operation of heating temperature.	The internal of the air door is accumulated with dust and blocked and the motor is damaged or its wire harness is short circuit	The cooling and heating modes are out of control and the inlet and outlet modes cannot be selected

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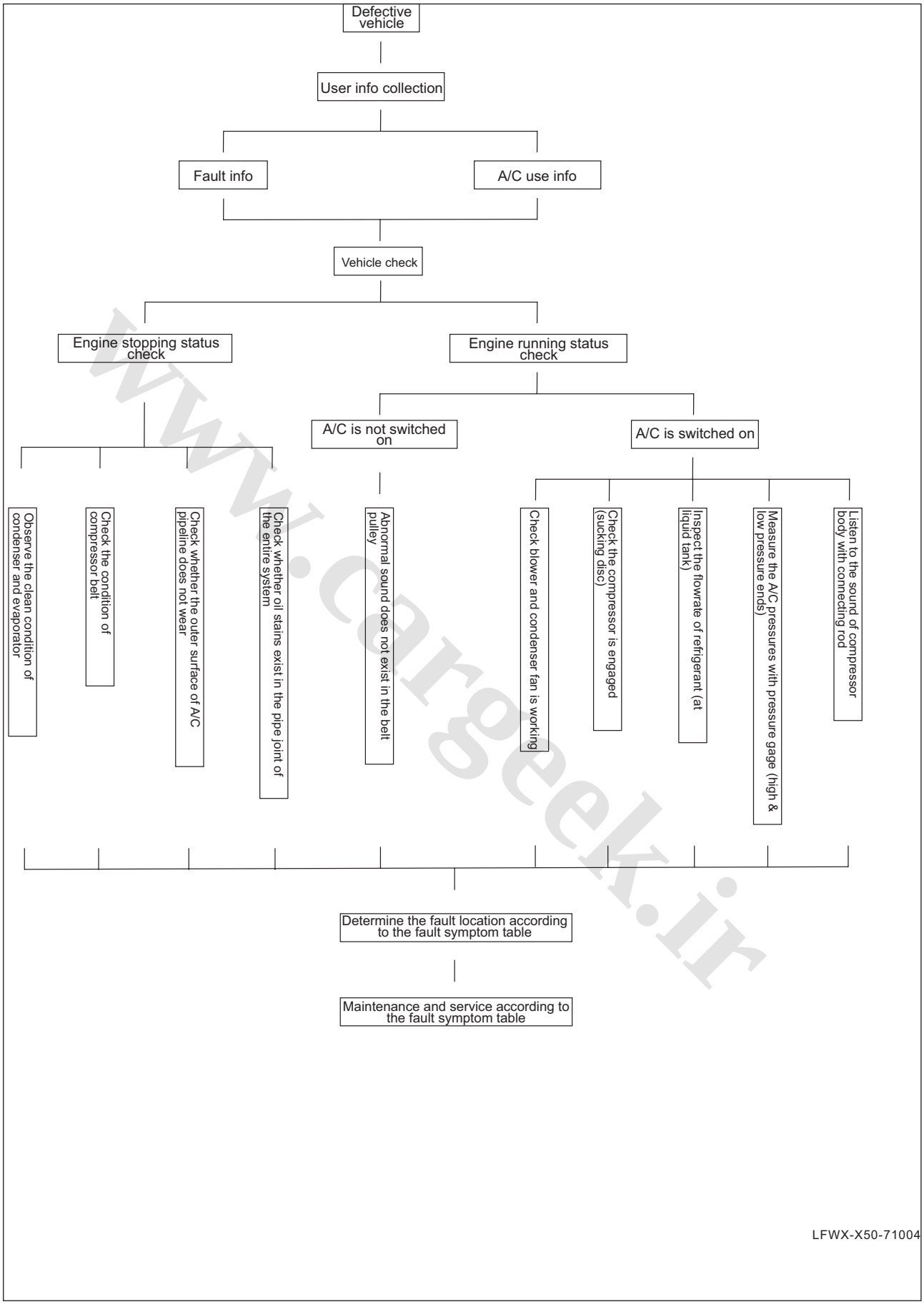
Component name	Component function	Common fault	Fault symptom
A/C compressor	Exhaust and drain refrigerant to make it circulate continuously	The electromagnetic clutch malfunctions or the internal of the A/C compressor malfunctions	The air conditioner is not cold and the A/C compressor has strange noises
Condenser and drying tank assembly	Condenser's function is to radiate heat of high temperature and high pressure gaseous refrigerant exhausted from compressor, and change refrigerant into liquid type. Drying tank's function is to absorb dampness, filter impurities and store the refrigerant for assisting the regular performance of the system	Blockage and damage	/
Air-conditioner controller	Control air-conditioner system	Damage	Air-conditioner cannot switch on or off

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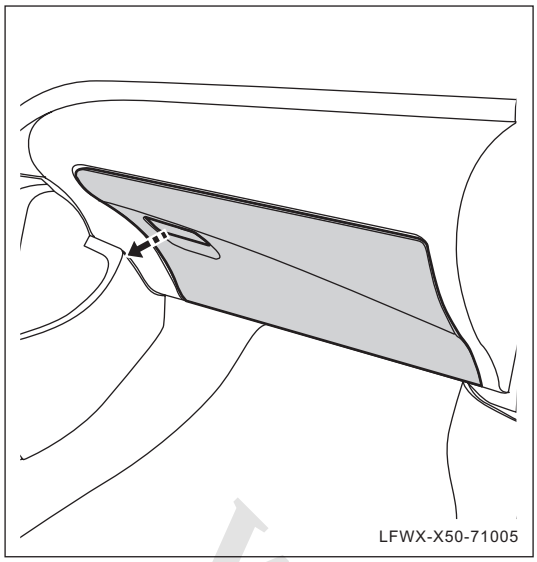
ON-VEHICLE INSPECTION



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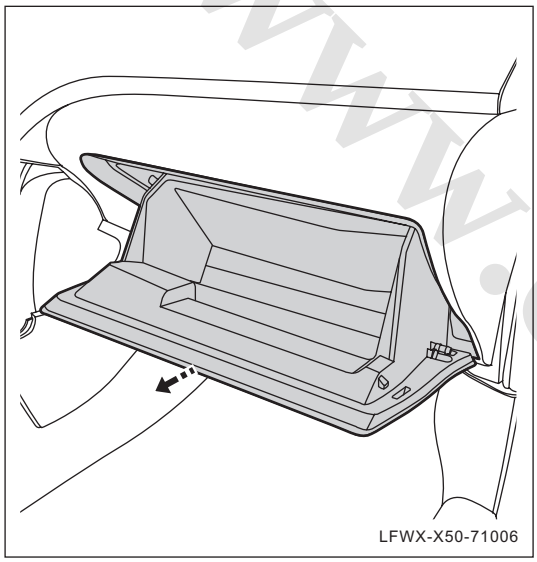
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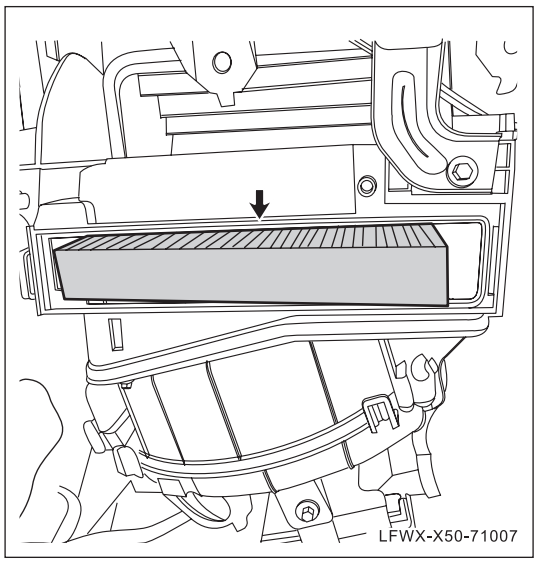


1. CHECK THE AIR FILTER

(a) Open the glove box.



(b) Grasp both sides of the glove box and draw it outward, and then take out the glove box.



(c) Remove the air filter cover.

△ HINT:

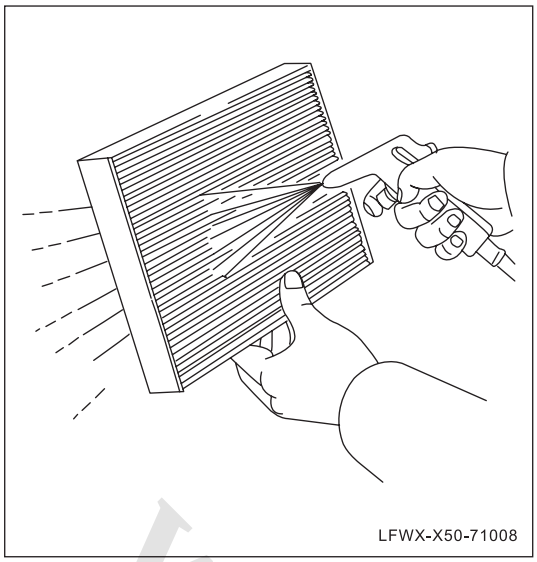
Lift up the air filter cover from the right side.

(d) Take out the air filter from the air conditioner air vent.

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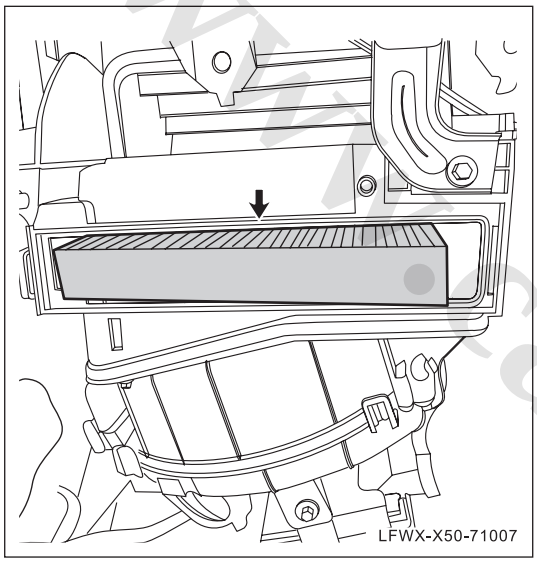


(e) Clean the air filter.

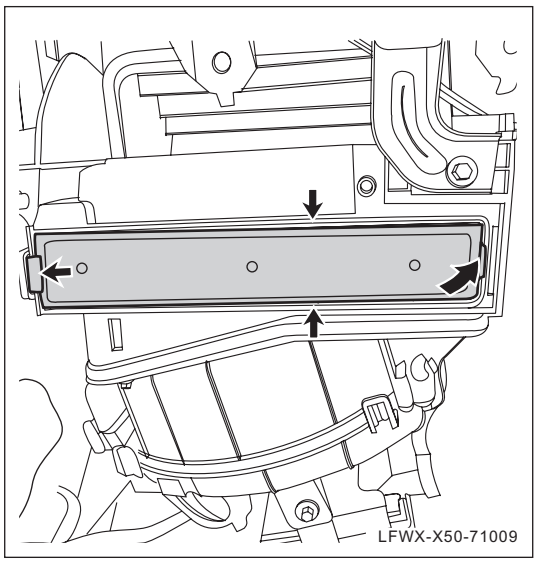
- If the filter is rather dirty, blow compressed air from the cleaner side to the other side to clean it.

△ HINT:

Keep the air gun 5 cm away from the air filter; blow it about 2 min by compressed air of 500 kPa.



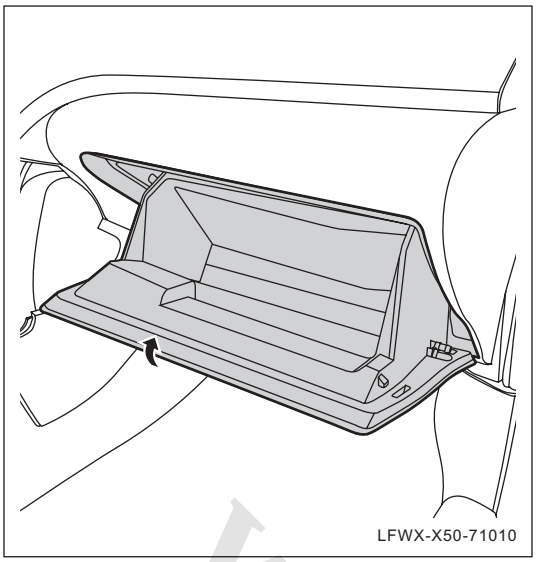
(f) Install the air-conditioner air filter.



(g) Install the air filter cover.

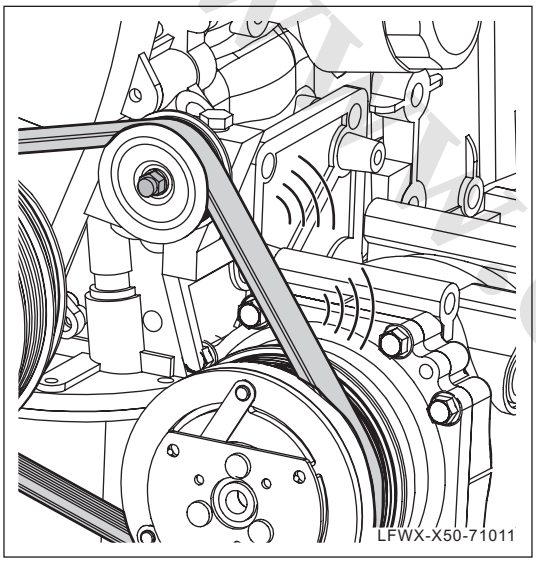
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(h) Install glove box.

(i) Close the glove box.

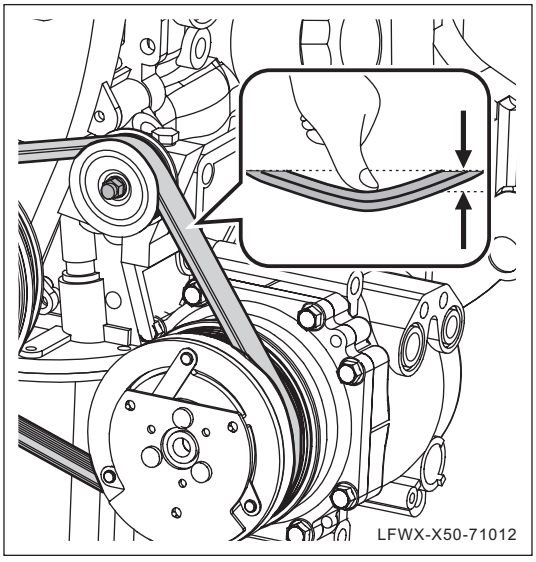


2. CHECK A/C COMPRESSOR BELT.

(a) Turn on the air conditioner and check by listening that the A/C compressor belt is slipping.

△ HINT:

If this symptom exists, adjust the A/C compressor belt tension or replace the compressor belt.



(b) Check if the A/C compressor belt is loose.

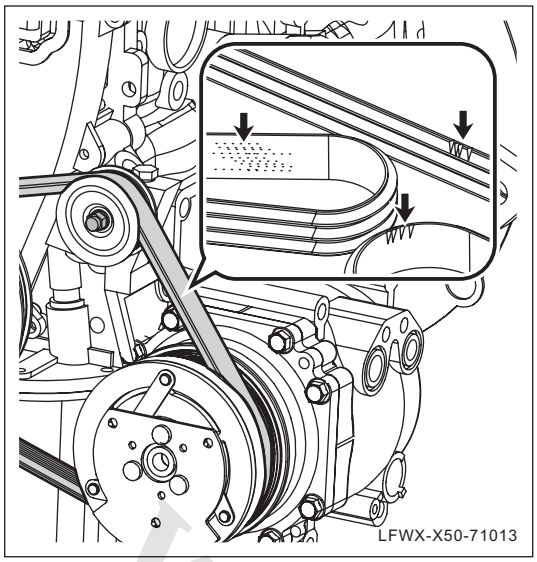
- Press the center of the longest free edge by your thumb and check its deflection.

△ HINT:

- Press it down with 100 N force, and belt deflection is 13 - 14 mm (new belt is 9 - 10 mm).
- If belt is loosen, it is necessary to tighten the belt.

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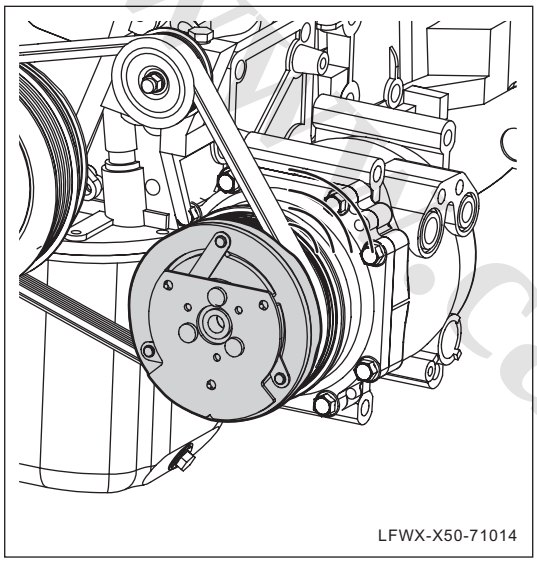


(c) Check if the A/C compressor belt is degraded, corroded and damaged.

△ HINT:

Carefully check various parts of belt; replace the belt if any symptom below is found.

- Rubber on back side is aging and polish, no sign and elasticity occur when scratching it with fingernails.
- Back rubber is cracked.
- Bottom of the belt teeth is cracked.

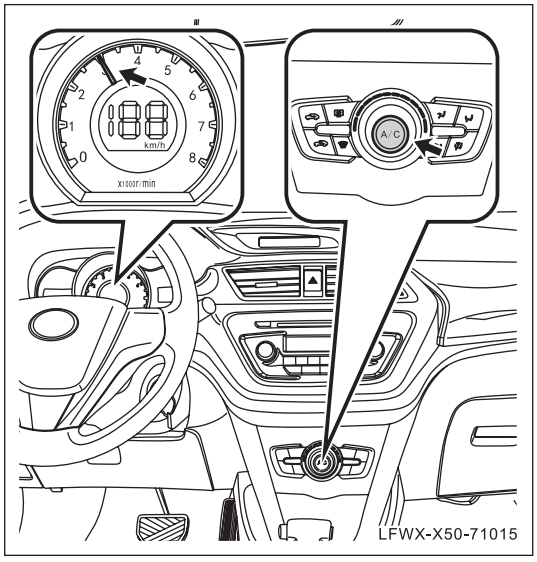


3. CHECK THE A/C COMPRESSOR

(a) Turn on the air conditioner and check by listening that the A/C compressor clutch is engaged with "Pa" sound.

△ HINT:

If yes, it indicates that A/C compressor works normally; if no, it indicates that A/C compressor fails to work.



4. CHECK TEMPERATURE OF AIR-CONDITIONER SYSTEM

△ HINT:

Measure temperature and check if the air-conditioner system works normally.

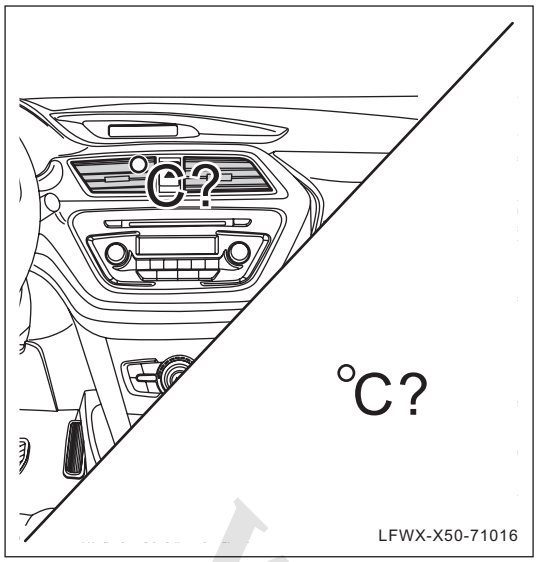
(a) Operate the air-conditioner setting to meet temperature measurement conditions.

Conditions of temperature measurement:

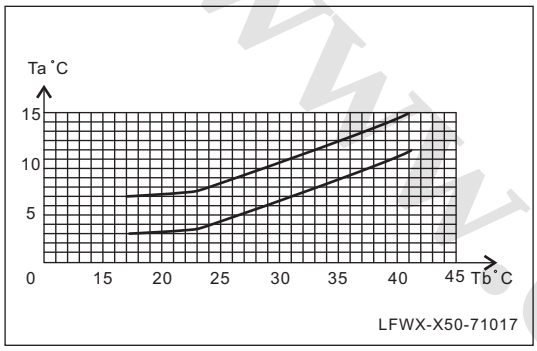
- After the engine warms up, increase rotation speed to 3000 r/min, and close the engine hood tightly.
- Turn on the A/C control switch.
- Adjust the blower to maximum speed, and open all vents.

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(b) After the refrigeration system works 3 min, measure temperature (Ta) of center vent and the ambient temperature outside (Tb) by a thermometer and then judge whether temperature is normal.



(c) If it is found that intersection point of Ta and Tb is out of normal range, it indicates that temperature of cooling system is abnormal (as shown in the figure and table below).

Air status outside car		Supply air temperature (° C) at the vent nearest to evaporator
Relative humidity (%)	Drying air temperature (° C)	
50 - 60	20	2 - 5
	25	6 - 9
	30	10 - 13
	35	14 - 17
	40	19 - 22
60 - 70	20	4 - 7
	25	8 - 11
	30	12 - 15
	35	16 - 19
	40	21 - 24

△ HINT:

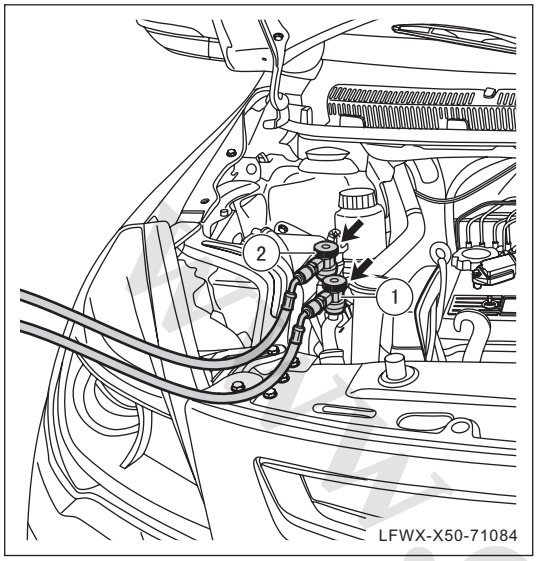
Optionally check temperature of air-conditioner system by hands; checking method is as follows:

1. Touch the high pressure pipe and the low pressure pipe of the cooling system by hand; it is ok if obvious temperature difference exists and temperature of high pressure pipe is high and temperature of low pressure pipe is low; but low pressure pipe should not frost.

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2. Touch temperature of inlet and outlet pipes of dryer by hands; temperature in them should be consistent without temperature difference.
3. Touch inlet and outlet pipe temperature of the condenser by hands; temperature of inlet should be higher than temperature of outlet.
4. Touch pipes from the condenser to the expansion valve by hands; temperature between the front and the rear should be same.



5. CHECK THE AIR CONDITIONING AND REFRIGERATION CYCLE PRESSURE

(a) Connect quick joint ② of red high pressure pipe on air conditioner refrigerant recovery filling machine to the high pressure interface of air conditioner; connect quick joint ① of blue low pressure pipe to the low pressure interface of air conditioner.

(b) Open the valves of quick joint ① and ② .

(c) Start the engine, turn the air conditioner refrigeration system on to observe the pressure value of high and low pressure gauges and check the value for meeting the technical standard in the table.

Standard pressure data of high and low pressure pipeline:

Engine RPM	Low pressure pipeline pressure	High pressure pipeline pressure
Idle speed (MPa)	0.147 - 0.196	1.422 - 1.471

△ HINT:

See 71 - Air Conditioner, Diagnosis, Fault Diagnosis for possible causes and trouble shooting methods for abnormal pressure in high and low pressure sides of the refrigeration system.

6. Check air-conditioner pipelines.

(a) Check if all naked copper pipes, hoses and pipelines connector of air-conditioner system have interference, wear, squeezing and looseness. If any symptom above is found, repair or replace the related part according to actual situation.

△ HINT:

When replacing air-conditioner pipelines, O-rings in the pipe connection should be abandoned; do not use them again.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
The air conditioner controller does not display.	1. The air conditioner fuse (blown) 2. Wire harness (open circuit or short circuit to ground) 3. A/C control module (damaged)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (1. The air conditioner controller does not display)
Blower does not run	1. Blower fuse S/B1 (blown) 2. Blower relay (damaged) 3. Blower loop (connectors loose or open circuit) 4. Speed regulation module (damaged) 5. Blower (damaged) 6. A/C control module (damaged)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (2. Blower does not run)
Blower air flow changes abnormally	1. Blower speed regulation module (damaged) 2. A/C control module (damaged)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (3. The blower air flow changes abnormally)
A/C inlet and outlet modes change abnormally	1. Mode air door motor (damaged) 2. Internal and external circulation motor (damaged) 3. A/C control module (damaged) 4. Air conditioner duct (blocked) 5. Air inlet and outlet actuator (stagnation)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (4. A/C inlet and outlet modes change abnormally)

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Symptom	Suspected area	Recommended action
The compressor does not run or runs discontinuously	1. Compressor fuse F32 (blown)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (5. The compressor does not run or runs discontinuously)
	2. Compressor relay (damaged)	
	3. ECM (damaged)	
	4. Connectors (joints loose or broke off)	
	5. Circuits (open circuit or short circuit to ground)	
	6. Electromagnetic clutch (electromagnetic coil short circuit or open circuit)	
	7. Air-conditioner switch (damaged)	
	8. Pressure switch (damaged)	
	9. Evaporator temperature sensor (damaged)	
	10. Air conditioner controller (damaged)	
	11. Compressor belt (slippery or loose and broke off)	
	12. Refrigerant (insufficient)	
	13. Compressor (damaged)	
Cold air is insufficient	1. Compressor belt (slippery or loose and broke off)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (4. Cold air is insufficient (air flow is abnormal)
	2. Blower circuit (poor contact)	
	3. Pressure switch (damaged)	
	4. Heating/cooling mixed door motor (damaged)	
	5. Evaporator core (freezing)	
	6. Duct (blocked or leaking air)	
	7. Refrigerant (insufficient)	
	8. Condenser (its surface has impurities or damaged)	
	9. Electronic fan (malfunction or damaged)	
	10. A/C control module (damaged)	

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Symptom	Suspected area	Recommended action
No warm air or insufficient warm air	1. Blower (damaged) 2. Cooling/heating actuator (damaged) 3. Warm air duct (connector falls off) 4. Coolant (insufficient or clogged) 5. Heater core fin (deformed) 6. Heater pipeline (blocking)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (7. No warm air or insufficient warm air)
Excessive high pressure in high pressure pipeline of refrigeration cycle system	1. Air enters into the system 2. Refrigerant (too much) 3. Condenser fin (blocked) 4. Condenser fan operates abnormally 5. Refrigerant pipeline (deformed and damaged)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (8. Excessive high pressure in high pressure pipeline of refrigeration cycle system)
Excessive low pressure in high pressure pipeline of refrigeration cycle system	1. Refrigerant is insufficient 2. Compressor relief valve faults 3. Compressor O-ring faults 4. Expansion valve faults	See 71 - Electric Air Conditioner, Diagnosis, Fault Diagnosis (9. Excessive low pressure in high pressure pipeline of refrigeration cycle system)
Excessive high pressure in low pressure pipeline of refrigeration cycle system	1. Expansion valve (damaged) 2. Refrigerant (too much) 3. Compressor (damaged) 4. High pressure pipeline (deformed and blocked)	See 71 - Electric Air Conditioner, Diagnosis, Fault Diagnosis (10. Excessive high pressure in low pressure pipeline of refrigeration cycle system)
Excessive low pressure in low pressure pipeline of refrigeration cycle system	1. Refrigerant (insufficient) 2. Expansion valve (blocked) 3. Air enters into the system 4. Evaporator temperature sensor (damaged)	See 71 - Heater and Air Conditioner, Diagnosis, Fault Diagnosis (11. Excessive low pressure in low pressure pipeline of refrigeration cycle system)

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FAULT DIAGNOSIS

1. Air conditioner controller does not display

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the "ON" position, turn on the air conditioner and observe whether it works normally	Diagnosis end	The air conditioner control does not display.	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check whether fuse FS07 of cab fuse box is blown	Go to Step 2	Fuse is blown	Replace the blown fuse
2	Check the power circuit of air-conditioner system	Normal	Faulty	Instruction
	• When the ignition switch is in the "OFF" position, disconnect the connectors of the air conditioner controller • When the ignition switch is in the "ON" position, measure the voltage between No. 1 terminal of A01 and the grounding with a digital multimeter **Voltage: 9 - 13 V**	Go to Step 3	The power circuit of air-conditioner system has open circuit points	Inspect and repair the circuits between the air-conditioner controller and the air conditioner fuse FS07
3	Check the air-conditioner system for grounding circuits	Normal	Faulty	Instruction
	Check the resistance between No. 1 terminal of connector A02 on air-conditioner controller B and grounding with a digital multimeter **Resistance: <2 Ω**	Go to Step 4	The grounding circuits have open circuit points	Check the circuit between air-conditioner controller connector and grounding point G23
4	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Replace the air-conditioner controller with a new one of the same model and confirm that the air conditioner works normally	Replace the air-conditioner controller	Fault still exists	Find the cause out from other fault symptoms

2. BLOWER DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the “ON” position, turn on the air conditioner and observe whether it works normally	Diagnosis end	Blower does not work	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Inspect whether blower fuse SB07 is blown.	Go to Step 2	Blower fuse is blown	Replace the blown fuse
2	Check relay	Normal	Faulty	Instruction
	Pull off blower relay K08 and check whether the relay works normally	Go to Step 3	The relay fault	Replace the blower relay
3	Inspect circuit connectors	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• When the ignition switch is in the "OFF" position, disconnect the connectors of the blower and check the connectors and terminals for abnormality. Measure whether there is conductivity between No. 1 terminal of blower connectors and the blower relay and between No. 2 terminal of blower connectors and speed regulation module with a multimeter • Check the circuits between speed regulation module and air-conditioner controller and between speed regulation module and grounding for abnormality	Go to Step 4	Circuits or connectors and terminals fault	Inspect and repair faulty connectors and circuits
4	Check the speed regulation module	Normal	Faulty	Instruction
	Check the blower speed regulation module for abnormality	Go to Step 5	Blower speed regulation module fault	Replace the blower speed regulation module
5	Check Blower	Normal	Faulty	Instruction
	Disconnect the connectors of the blower motor and measure the resistance between the two terminals of the blower Resistance: 1.5 Ω - 8 Ω	Go to Step 6	Blower fault	Replace blower
6	Replacement and check	Normal	Faulty	Instruction
	Replace the A/C control with a new one of the same model and confirm that the air conditioner works normally	Replace the air-conditioner controller	Fault still exists	Find the cause out from other fault symptoms

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3. BLOWER AIR FLOW CHANGES ABNORMALLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the "ON" position, turn on the blower, regulate the blower flow and check the blower flow to see whether it increases and decreases correspondingly	Diagnosis end	Blower air flow changes abnormally	Go to Step 1
1	Inspect circuit connectors	Normal	Faulty	Instruction
	Measure whether there is conductivity between No. 2 terminal of speed regulation module and No. 5 terminal of air conditioner connector A01 with a multimeter	Go to Step 2	Circuits or connectors fault	Inspect and repair faulty connectors and circuits
2	Check the speed regulation module	Normal	Faulty	Instruction
	Replace the speed regulation module with a new one of the same model and check whether the blower flow changes normally	Replace speed regulation module	Fault still exists	Go to Step 3
3	Replacement and check	Normal	Faulty	Instruction
	Replace the air-conditioner controller with a new one of the same model and confirm that the air conditioner works normally	Replace the air-conditioner controller	Fault still exists	Find the cause out from other fault symptoms

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4. AIR CONDITIONER INLET AND OUTLET MODES CHANGE ABNORMALLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the "ON" position, turn on the blower, change between inlet and outlet modes, and check the blower inlet and outlet modes to see whether it changes correspondingly	Diagnosis end	Air conditioner inlet and outlet modes change abnormally	Go to Step 1
1	Check the blower duct	Normal	Faulty	Instruction
	Check the blower duct for blockage, the internal and external circulation actuator and mode selection actuator for stagnation	Go to Step 2	The blower duct is blocked or the mode selection actuator faults	Repair the corresponding faults
2	Check the mode air door motor	Normal	Faulty	Instruction
	• Disconnect the connectors of mode air door motor • Check whether there is conductivity between No. 4 terminal and No. 5 terminal of mode air door motor • Check the resistance between No. 1 and No. 3 terminals, and between No. 2 and No. 3 terminals, of mode air door motor. When rotating mode air door motor, check the change of resistance between them	Go to Step 3	Mode air door motor is damaged	Replace the mode air door motor
3	Check the internal and external circulation motor	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the connectors of internal and external circulation motor • Check whether there is conductivity between No. 1 and No. 4 terminals, and between No. 4 and No. 5 terminals, of internal and external circulation motor	Go to Step 4	Internal and external circulation motor is damaged	Replace the internal and external circulation motor
4	Check the circuits of the internal and external circulation motor and the mode air door motor	Normal	Faulty	Instruction
	• Disconnect the connectors of the internal and external circulation motor, the mode air door motor and the air-conditioner controller • Check the circuits between the actuator motor and the air-conditioner controller respectively	Go to Step 5	The connectors and terminals are damaged or the circuits have open circuit points	Repair the connectors, terminals or wire harnesses
5	Replacement and check	Normal	Faulty	Instruction
	Replace the air-conditioner controller with a new one of the same model and confirm that the air conditioner works normally	Replace the air-conditioner controller	Fault still exists	Find the cause out from other fault symptoms

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5. THE COMPRESSOR DOES NOT RUN OR RUNS DISCONTINUOUSLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the “ON” position, turn on the air conditioner and observe whether it works normally	Diagnosis end	The compressor does not run or runs discontinuously	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check that the compressor fuses FS06 is blown	Go to Step 2	The compressor fuse is blown	Replace the blown fuse
2	Check relay	Normal	Faulty	Instruction
	Pull off blower relay K04 and main relay K02 and check whether the relays work normally	Go to Step 3	The relay fault	Replace the faulty relay
3	Check DTC	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether the engine control system has DTC to output	Go to Step 4	With DTC	Diagnose it according to the hint of DTC
4	Check the circuit of electromagnetic clutch	Normal	Faulty	Instruction
	• When the ignition switch is in the "OFF" position, disconnect the connectors of the electromagnetic clutch, check the connectors and terminals for abnormality and check the resistance between the electromagnetic clutch and the grounding with a multimeter Resistance: <5Ω	Go to Step 5	Connectors and terminals fault or there is no conductivity between the electromagnetic clutch and the grounding	Repair the connectors and terminals or the electromagnetic clutch

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Steps	Inspection Item	Inspection result		
5	Check the electro-magnetic clutch	Normal	Faulty	Instruction
	Check whether the A/C compressor and electromagnetic clutch are normal	Go to Step 6	The clutch clearance is wrong or the compressor is faulty	Adjust the clutch clearance or replace the compressor
6	Check the A/C switch	Normal	Faulty	Instruction
	Press the A/C switch and observe the A/C indicator lamp to see whether it comes on	Go to Step 7	The A/C switch faults	Inspect and repair the power circuit of air-conditioner controller of replace the air-conditioner controller
7	Check the pressure switch	Normal	Faulty	Instruction
	• After pressing the A/C switch, check the voltage between No. 2 terminal of the air conditioner three-state switch connector and the grounding **Voltage: 9 - 13V** • Check whether there is continuity between No. 2 and No. 4 terminals of the pressure • Check whether there is continuity between wire harnesses of the air conditioner three-state switch connectors and the ECM connectors	Go to Step 8	The air conditioner three-state switch faults, the refrigerant of refrigeration system faults or the wire harnesses faults	Replace the air conditioner three-state switch, and inspect and repair the faults of refrigeration pipeline or the wire harnesses
8	Inspect evaporator temperature sensor	Normal	Faulty	Instruction
	Check the resistance between the two terminals of evaporator temperature sensor	Go to Step 9	The evaporator temperature sensor fault	Replace evaporator temperature sensor.
9	Replacement and check	Normal	Faulty	Instruction
	Replace the air-conditioner controller with a new one of the same model and confirm that the air conditioner works normally	Replace the air conditioner controller	Fault still exists	Go to Step 10

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Steps	Inspection Item	Inspection result		
10	Check the compressor belt	Normal	Faulty	Instruction
	Check whether the compressor belt meets the standards	Go to Step 11	The compressor belt is slippery or loose and broke off	Readjust or replace the belt
11	Check refrigerant	Normal	Faulty	Instruction
	Check whether the refrigerant amount meets the standards	Go to Step 12	Insufficient amount of refrigerant	Refill refrigerant
12	Replacement and check	Normal	Faulty	Instruction
	Replace the ECM with a new one of the same model and confirm that the air conditioner works normally	Replace the ECM.	Fault still exists	Find the cause out from other fault symptoms

6. COLD AIR IS INSUFFICIENT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Start the engine, turn on the air conditioner and observe whether it works normally	Diagnosis end	Cold air is insufficient	Go to Step 1
1	Check the electromagnetic clutch	Normal	Faulty	Instruction
	Check whether the A/C compressor and electromagnetic clutch are normal	Go to Step 2	The clutch clearance is wrong or the compressor fault	Adjust the clutch clearance or replace the compressor
2	Check the electromagnetic clutch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	When the ignition switch is in the "OFF" position, disconnect the connectors of the electromagnetic clutch, check the connectors and terminals for abnormality and check the resistance between the electromagnetic clutch and the grounding with a multimeter Resistance: <5Ω	Go to Step 3	Connectors and terminals fault or there is no conductivity between the electromagnetic clutch and the grounding	Repair the connectors and terminals or the electromagnetic clutch
3	Check the air conditioner outlet duct and the refrigerant pipeline	Normal	Faulty	Instruction
	• Under all sorts of outlet modes, check whether the air flow of each air vent is normal • Check the surfaces of the condenser for impurities or the condenser for damage • Check whether the refrigerant pressure is normal	Go to Step 4	The air conditioner pipeline or the refrigerant pipeline fault	Repair the refrigerant pipeline or the air conditioner duct
4	Inspect evaporator temperature sensor	Normal	Faulty	Instruction
	• Check the connector terminals of the evaporator temperature sensor and the vicinity of evaporator core for impurities • Check the resistance between the two terminals of the evaporator temperature sensor	Go to Step 5	The evaporator temperature sensor fault	Replace evaporator temperature sensor
5	The engine system fault	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Check the engine cooling system • Check the engine control system	Find the cause out from other fault symptoms	The engine cooling system or the control system fault	Repair the faulty engine cooling system or the faulty control system

7. NO WARM AIR OR INSUFFICIENT WARM AIR

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch is in the "ON" position, turn on the air conditioner, switch to heater position and observe the air conditioner whether it works normally	Diagnosis end	No warm air or insufficient warm air	Go to Step 1
1	Check the warm air duct	Normal	Faulty	Instruction
	Check the warm air vent for abnormal connection	Go to Step 2	The warm air vent is loose and broke off	Connect the warm air duct
2	Check the coolant	Normal	Faulty	Instruction
	Check the coolant amount for abnormality	Go to Step 3	Coolant is insufficient or clogged	Fill coolant according to the standards
3	Check the heater pipeline	Normal	Faulty	Instruction
	Check the heater pipeline for abnormality	Go to Step 4	The heater pipeline is blocked	Clean the heater pipeline
4	Check the heater core fins	Normal	Faulty	Instruction
	Check the heater core fins for abnormality	Go to Step 5	The heater core fins are deformed	Adjust the fins by a tweezers or a fin comb
5	Check the heating/ cooling blending door motor	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the connectors of the heating/cooling blending door motor • Check whether there is conductivity between No. 1 terminal and No. 2 terminal of the heating/cooling blending door motor • Check the resistance between No. 3 and No. 5 terminals, and between No. 3 and No. 4 terminals, of the heating/cooling blending door motor. When rotating the heating/cooling blending door motor, check the change between them	Go to Step 6	The heating/cooling blending door motor is damaged	Replace the heating/cooling blending door motor
6	Check the heating/cooling blending door motor circuits	Normal	Faulty	Instruction
	• Disconnect the connectors of the heating/cooling blending door motor and the air conditioner controller • Check the circuits between the heating/cooling blending door motor and the air conditioner controller	Find the cause out from other fault symptoms	The connectors and terminals are damaged or the circuits have open circuit points	Repair the corresponding connectors, terminals or wire harnesses

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8. Excessive high pressure of refrigeration cycle system

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the refrigerant amount and the pressure of the refrigeration system	Go to Step 1	The system pressure is abnormal and the refrigerant amount is too much	Recover or drain refrigerant
1	Check the electronic fan	Normal	Faulty	Instruction
	Check whether the electronic fan motor works normally	Go to Step 2	The internal part of the electronic fan is short circuit or the heat dissipation is poor	Replace the electronic fan assembly
2	Check the condenser	Normal	Faulty	Instruction
	Check the condenser for blockage	Go to Step 3	The cooling fin of the condenser is blocked	Clean or replace the condenser
3	Check the expansion valve	Normal	Faulty	Instruction
	Check whether the operating status of the expansive valve is normal	Go to Step 4	Expansion valve is blocked or fails	Replace the expansion valve
4	Check the electromagnetic clutch	Normal	Faulty	Instruction
	Check whether the A/C compressor and electromagnetic clutch are normal	Go to Step 5	The clutch clearance is wrong or the compressor is faulty	Adjust the clutch clearance or replace the compressor
5	Verification and check	Normal	Faulty	Instruction
	After inspection and repair, check whether the fault occurs	Diagnosis end	Faults still exits	Find the cause out from other fault symptoms

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9. EXCESSIVE LOW PRESSURE IN HIGH PRESSURE PIPELINE OF REFRIGERATION CYCLE SYSTEM

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the refrigerant amount and the pressure of the refrigeration system	Go to Step 1	The system pressure is abnormal and the refrigerant amount is too less	Fill refrigerant to standard amount
1	Check the expansion valve	Normal	Faulty	Instruction
	Check whether the operating status of the expansive valve is normal	Go to Step 2	Expansion valve is blocked or fails	Replace the expansion valve
2	Check the electromagnetic clutch	Normal	Faulty	Instruction
	Check whether the A/C compressor and clutch are normal	Go to Step 3	The coil in the clutch is open circuit or the clearance is wrong	Adjust the clutch clearance or replace the compressor
3	Check the A/C compressor	Normal	Faulty	Instruction
	Check whether the A/C compressor is normal	Go to Step 4	The pipeline leaks and its pressure is insufficient, and the A/C compressor is faulty.	Replace the A/C compressor
4	Verification and check	Normal	Faulty	Instruction
	After inspection and repair, check whether the fault occurs	Diagnosis end	Faults still exits	Find the cause out from other fault symptoms

10. EXCESSIVE HIGH PRESSURE IN LOW PRESSURE PIPELINE OF REFRIGERATION CYCLE SYSTEM

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the refrigerant amount and the pressure of the refrigeration system	Go to Step 1	The system pressure is abnormal and the refrigerant amount is too much	Recover or drain refrigerant
1	Check the expansion valve	Normal	Faulty	Instruction
	Check whether the operating status of the expansive valve is normal	Go to Step 2	Expansion valve is blocked or fails	Replace the expansion valve
2	Check the A/C compressor	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check whether the A/C compressor is normal	Go to Step 3	The pipeline leaks and its pressure is insufficient, and the A/C compressor is faulty.	Replace the A/C compressor
3	Verification and check	Normal	Faulty	Instruction
	After inspection and repair, check whether the fault occurs	Diagnosis end	Faults still exits	Find the cause out from other fault symptoms

11. EXCESSIVE LOW PRESSURE IN LOW PRESSURE PIPELINE OF REFRIGERATION CYCLE SYSTEM

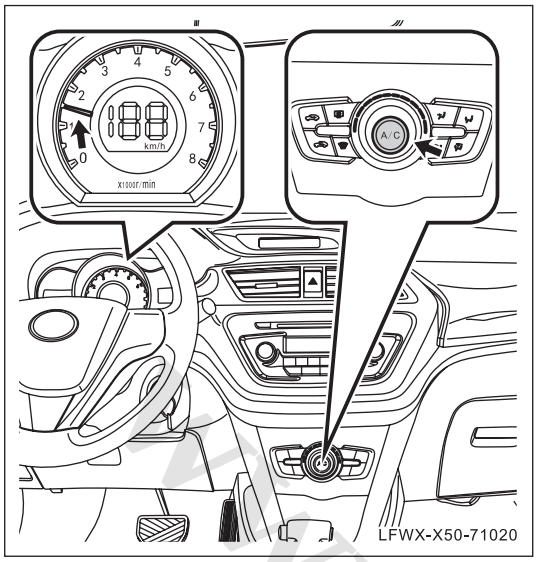
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check the refrigerant amount and the pressure of the refrigeration system	Go to Step 1	The system pressure is abnormal and the refrigerant amount is too less	Fill refrigerant to standard amount
1	Check the expansion valve	Normal	Faulty	Instruction
	Check whether the operating status of the expansive valve is normal	Go to Step 2	Expansion valve is blocked or fails	Replace the expansion valve
2	Check the evaporator	Normal	Faulty	Instruction
	Check the evaporator for blockage	Go to Step 3	The evaporator is blocked	Replace the evaporator
3	Verification and check	Normal	Faulty	Instruction
	After inspection and repair, check whether the fault occurs	Diagnosis end	Faults still exits	Find the cause out from other fault symptoms

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REFRIGERANT

CHECK

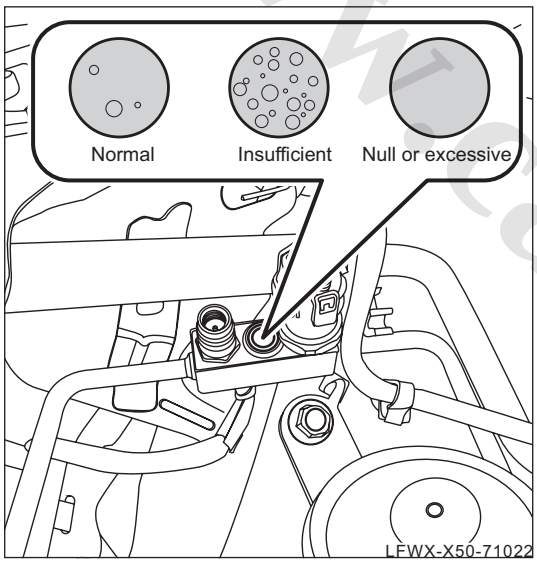


1. CHECK THE FILLING AMOUNT OF REFRIGERANT

(a) Operate the air-conditioner setting to meet inspection conditions.

Inspection conditions:

- Engine RPM: 1500 r/min.
- Turn on the air-conditioner control switch.
- Adjust the temperature control switch to "Max Cold" position.
- Adjust the blower to maximum speed, and open all vents.
- All doors are fully closed.



(b) Observe refrigerant flow rate by inspection window and check refrigerant amount.

(c) According to the following instructions, determine that refrigerant amount is proper.

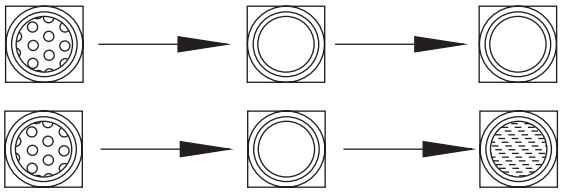
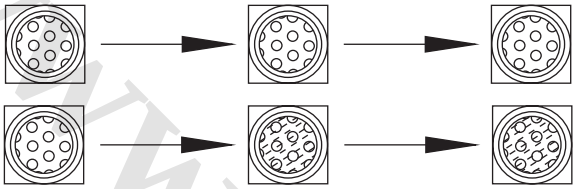
△ HINT:

If liquid level is clear and no bubbles are found or just bubbles are noticed in 45 s, it indicates that refrigerant is sufficient; if a large number of bubbles exist, it indicates that refrigerant is insufficient and more refrigerants are required.

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Standards:

Refrigerant filling amount	State of the inspection window (about 1 min after the A/C switch is turned on)	Pressure conditions in high pressure side (about)
Appropriate		1.8 - 2.5 MPa
Excessive		>2.5 MPa
Insufficient		<1.2 MPa

State description

	Transparent: All of the refrigerant in the liquid state was transparent.
	With bubbles: Bubbles generated in mixed state of gas and liquid.
	White and turbid: Cold engine oil and refrigerant in separated state are lightly milky.
	With bubbles and white and turbid: When gaseous refrigerant and separated cold engine are mixed, the state is lightly milky with baubles.

NOTICE:

- **If it is found by inspection window that bubbles exist for a long time, it indicates that refrigerant in the system is insufficient.**
- **If it is found by inspection window that there are no bubbles and the vent is not cold, it indicates that all refrigerant in the system leaked.**
- **If refrigerant in the hole disappears immediately when the air conditioner is turned off, and the inspection window is clear, it indicates that there are too much refrigerant in the system.**
- **If bubbles in the hole firstly appear and then disappears when the air conditioner is turned off, it indicates that there are proper amount of refrigerants in the system.**
- **If the inspection window is hazed, it indicates that it is too dirty inside the cooling system or the dryer is damaged.**

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3. CHECK COOLANT FOR LEAKAGE

△ HINT:

Coolant leakage is the most common fault occurred in the use of air conditioner; the common inspection methods are by eyes, soapy water, halogen lamp and fluorescent.

(a) Visual inspection.

Method: visually check the pipeline, if found oil traces at some point of the system, then this point might be leaking point.

Advantages and disadvantages: Visual inspection is easy without cost; but its big disadvantage is that this method is only applicable to big leakage point suddenly breaking where colored liquid media flows out; otherwise it is impossible to use this method. Because position with leakage is often small, many leakage points may become invisible.

(b) By soapy water.

Method: Fill the system with pressure nitrogen of 1 - 2 MPa, and then apply soapy water in various parts of the system; points with bubbling are leakage points.

Advantages and disadvantages: length of the human arm is limited, and the range of vision is limited as well; therefore it is impossible to detect leakage point in many conditions.

(c) By halogen lamp

Methods: Illuminate the leakage detection light and hold the air pipe by halogen light; when the pipe nozzle is close to leakage of the system, the flame color become purple blue, it indicates lots of leakages occurred here.

Advantages and disadvantages: this method may produce open fire which is not only dangerous and will produce poisonous gas when open fire encounters refrigerant. In addition, the method is uneasy to correctly locate leakage point.

(d) By fluorescent

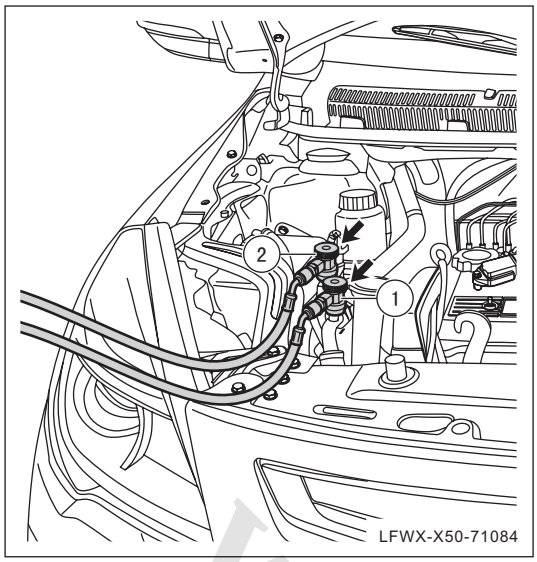
Methods: Add fluorescent to the system by a certain proportion. After the system runs 20 min, wear a pair of special glasses; shine the system outside by fluorescent. Yellow fluorescence indicates leakage.

Advantages and disadvantages: accurate positioning; leakage can certainly directly seen with the eyes; the inspection tool is easy to be carried; inspection cost is low.

RECOVERY

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1. RECYCLE REFRIGERANT

(a) Turn off the ignition switch.

(b) Switch on the power of air conditioner refrigerant recovery filling machine.

(c) Connect the refrigeration cycle high and low pressure pipeline.

(d) Turn on low pressure valve switch ① and high pressure valve switch ② of A/C refrigerant recovery filling machine.

(e) Select the selection "refrigerant recovery" on the refrigerant recovery filling machine to start it and begin recovering.

(f) Check the pressure value on the low pressure gauge of air conditioner refrigerant recovery filling machine, when the value reaches vacuum degree -34 kPa, turn off the equipment and stop recovering.

REFILLING

1. REFILLING REFRIGERANT.

(a) Fill refrigerant according to the following standards.

Refrigerant model: R134a

Filling amount: 500 g

△ HINT:

Be sure to refill refrigerant after refilling the A/C compressor lubricant.

(b) Connect the refrigeration cycle high and low pressure pipe.

(c) Select the selection "refrigerant filling" on the refrigerant recovery filling machine to adjust filling amount.

(d) Turn on the low pressure valve switch and start the air conditioner refrigerant recovery filling machine to refill.

(e) Observe the display of the air conditioner refrigerant recovery filling machine, when the filling amount reaches the setting value, the display will indicate that filling is over.

(f) Close the valve.

△ HINT:

If the air conditioner refrigerant recovery filling machine indicates that the filling speed is too slow, refer to the following filling methods:

- Disconnect the high pressure joint of refrigeration cycle and only connect the low pressure end.
- Close the high and low pressure valves of the air-conditioner refrigerant recovery filling machine.
- Apply the parking brake of the vehicle, start the engine, turn on the air conditioner and set it to low temperature mode.
- Open the low pressure valve of the air-conditioner refrigerant recovery filling machine and refill refrigerant to the refrigeration pipeline through the low pressure end.
- When the pressure gauge indicates that the pressure value reaches the standard value of low pressure, disconnect the joint of the low pressure end.

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- The refilling of refrigerant is over.

2. CHECK REFRIGERANT FOR LEAKAGE (SEE 71- AIR CONDITIONER, REFRIGERANT, INSPECTION)

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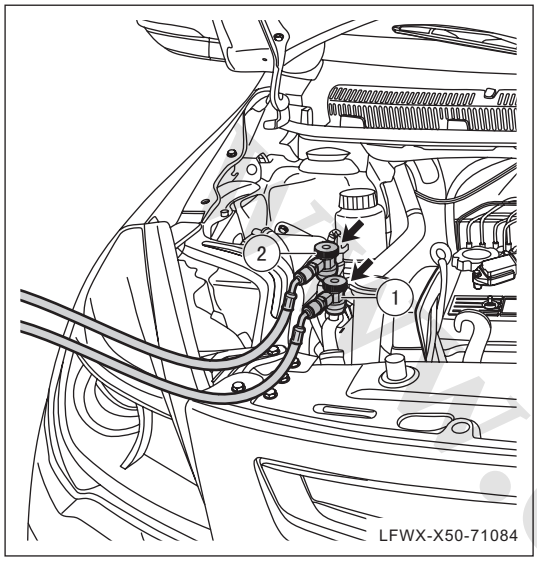
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COMPRESSOR LUBRICANT

DRAIN

NOTICE:

- **The A/C compressor lubricant will exhaust after finishing the refrigerant recovery.**
- **Recover the abandoned lubricant and refrigerant according to the related laws and regulations.**
- **Empty the collecting bottle for the exhaust oil of recovery machine.**



1. EXHAUST THE COMPRESSOR LUBRICANT

(a) Connect the refrigeration cycle high and low pressure pipeline.

(b) Turn on low pressure valve switch ① and high pressure valve switch ② of air-conditioner refrigerant filling machine.

(c) Open the starting equipment of the oil exhaust valve on the air-conditioner refrigerant filling machine control panel and check whether the A/C compressor lubricant is exhausted into the collecting bottle.

(d) Stop exhaust oil and close the oil exhaust valve after finishing the exhaust of the A/C compressor lubricant.

(e) Check the collecting bottle and record the lubricant amount.

REFILLING

1. REFILL COMPRESSOR LUBRICANT

△ HINT:

- Fill new lubricant according to the lubricant amount in the collecting bottle.
- If replace only one of the following parts, fill more A/C compressor lubricant according to the standards.

Parts	Filling amount ml
Condenser	
Evaporator	
Refrigeration pipeline	

NOTICE:

Only after exhausting all the lubricant in the compressor and vacuuming can new lubricant be filled.

(a) Connect the refrigeration cycle high and low pressure pipeline and open the high pressure valve of the air-conditioner refrigerant filling machine and the filling switch of compressor lubricant.

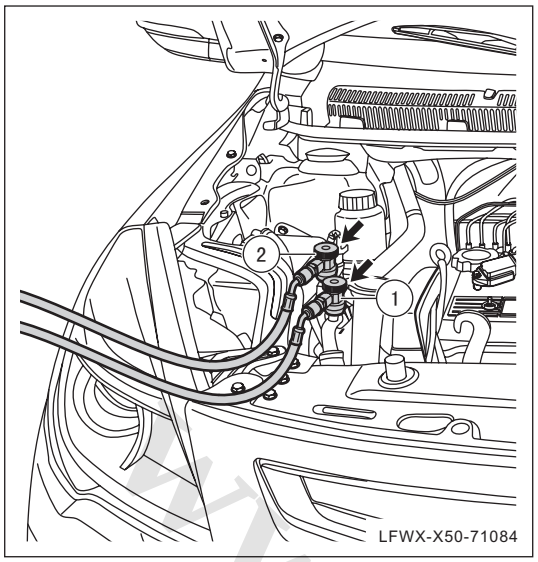
(b) Start the air-conditioner refrigerant filling machine and observe the oil level in the filling bottle until it reaches the needed amount.

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(c) Close the high pressure valve.

VACUUMING OF AIR-CONDITIONER SYSTEM



1. VACUUMING OF AIR-CONDITIONER SYSTEM

(a) Connect the refrigeration cycle high and low pressure pipeline.

(b) Open high pressure valve ② of the equipment, select the selection of "vacuuming", and set the time of 15 min. Start the air-conditioner refrigerant filling machine to vacuum and when the set time over, the equipment stops operating automatically.

(c) Close high pressure valve ② of the air-conditioner refrigerant filling machine, and check the pressure value on the low pressure gauge.

(d) If the pressure value reaches the set value without increasing again, then the refrigeration cycle has no leakage, so it is permitted to fill more compressor lubricant and refrigerant.

(e) If the pressure value increases, then check the refrigerant cycle for leakage.

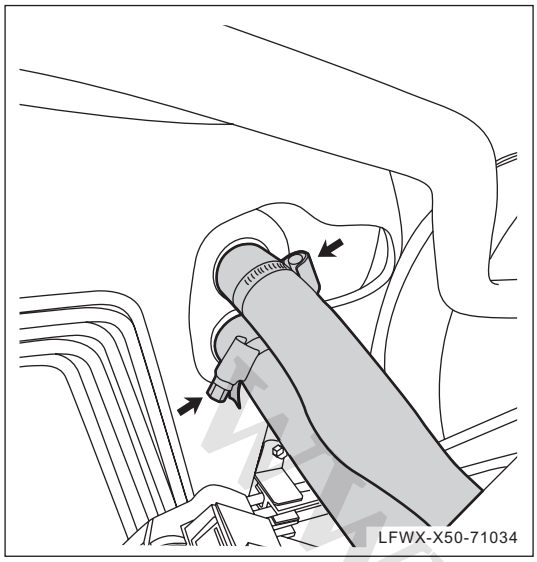
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HVAC ASSEMBLY

REPLACEMENT



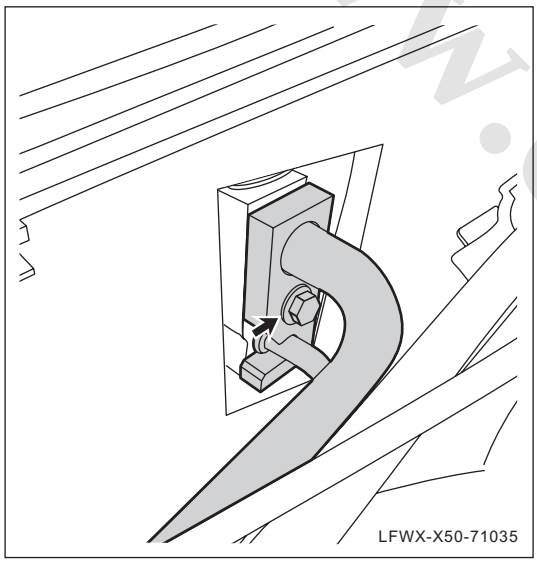
1. REMOVE THE HVAC ASSEMBLY

(a) Open the engine hood.

(b) Drain engine coolant.

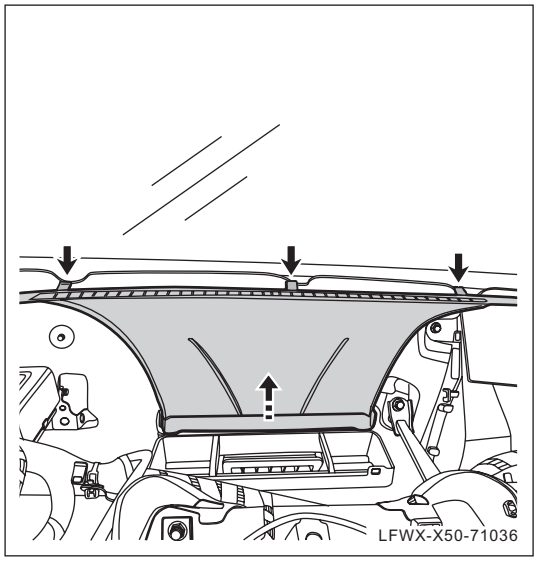
(c) As shown in the figure, loosen the fixing clamps between the heater pipe and the HVAC assembly, and then pull out the heater water pipe.

(d) Recover the refrigerant. (See 71 - Air Conditioner, Refrigerant, Recovery)



(e) Remove fixing bolts which are used to tighten the air-conditioner high and low pressure pipe and the HVAC assembly; and then pull out the high and low pressure pipes.

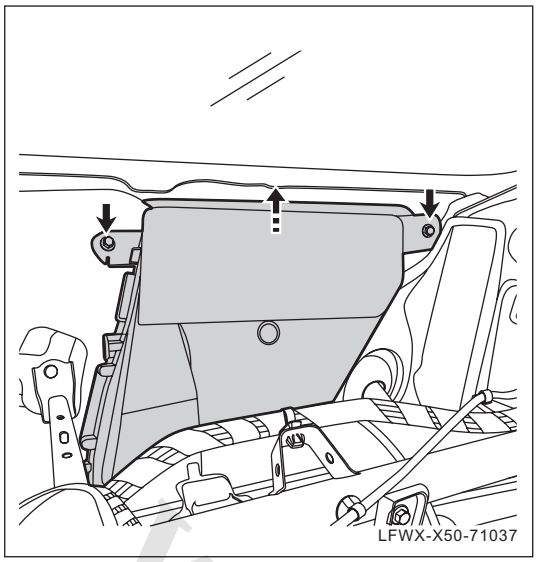
(f) Remove dashboard assembly. (See 85 - Dashboard and Console, Instrument Panel, Replacement)



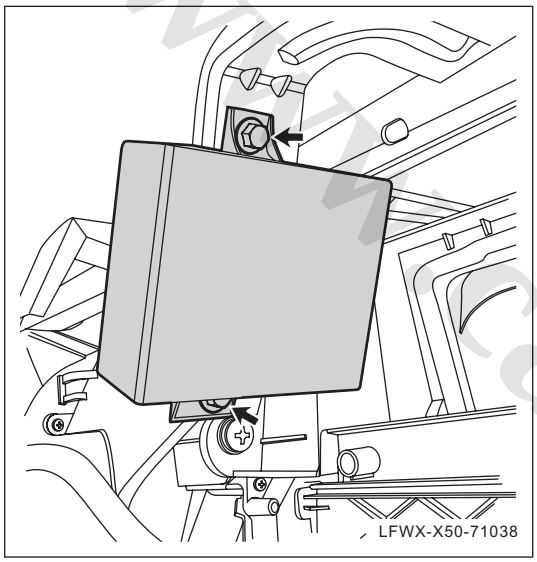
(g) Pry the fixing snap-fits of the central defrosting duct and pull out the central defrosting duct upward.

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(h) Remove the right duct assembly fixing bolts, and take out the right duct assembly.



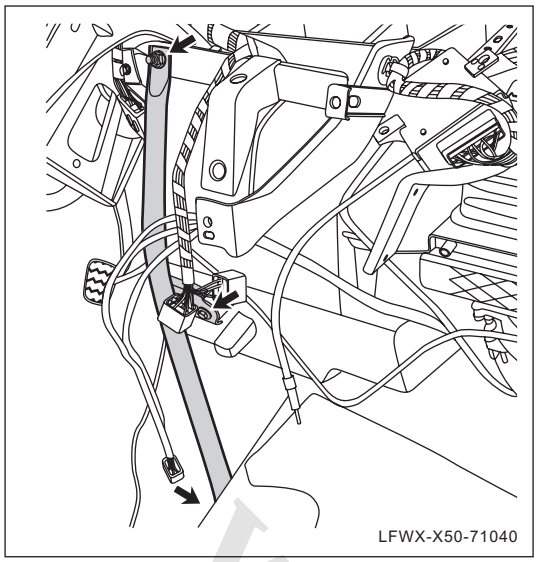
(i) Remove the center door locking controller fixing bolts, and place the controller to a place which does not impact removal of the HVAC.



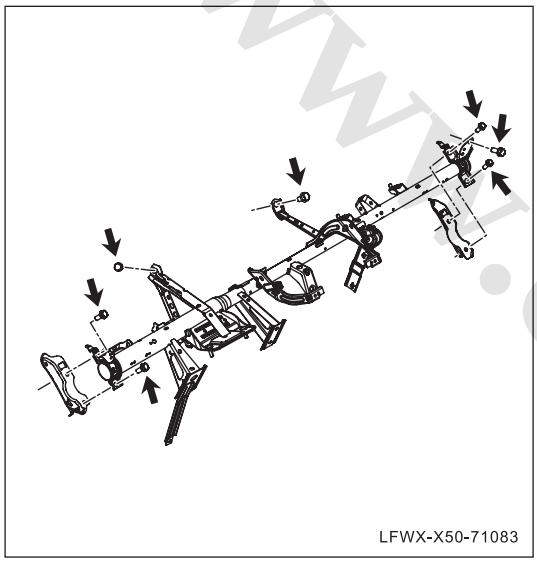
(j) Disconnect the HVAC assembly connector.

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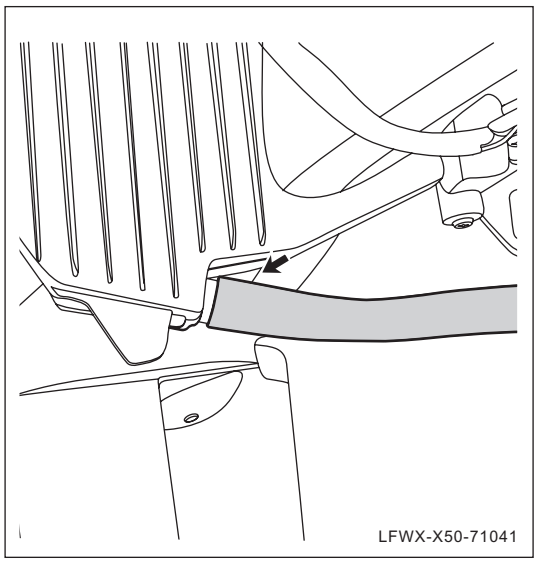
(k) Remove the fixing nuts, screws and bolts of the dashboard cross beam intermediate support rod subassembly; and take out the dashboard cross beam intermediate support rod subassembly.



(l) Remove the dashboard bracket fixing bolts and take out the dashboard bracket.

△ HINT:

- Before removing the dashboard bracket, remove all the parts fixed on it; before taking out the dashboard bracket, take out the snap-fits of the dashboard wire harness and put the wire harness to a place where cannot affect removing.
- Be sure to sort the wire harness when installing.

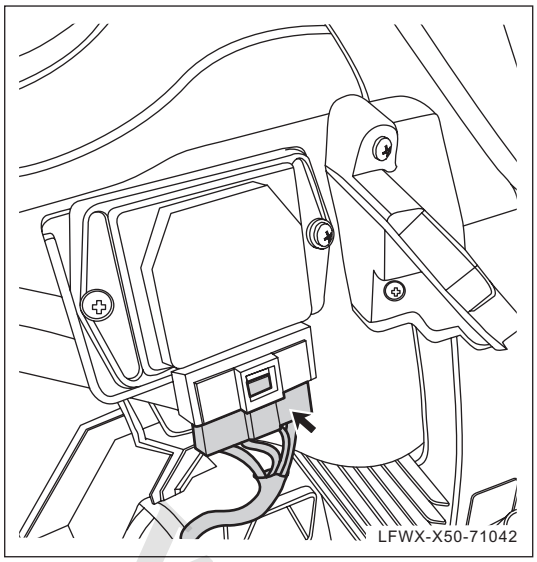


(m) Pull out the HVAC drip pipe.

(n) Remove the HVAC assembly fixing bolts, and take out the HVAC assembly.

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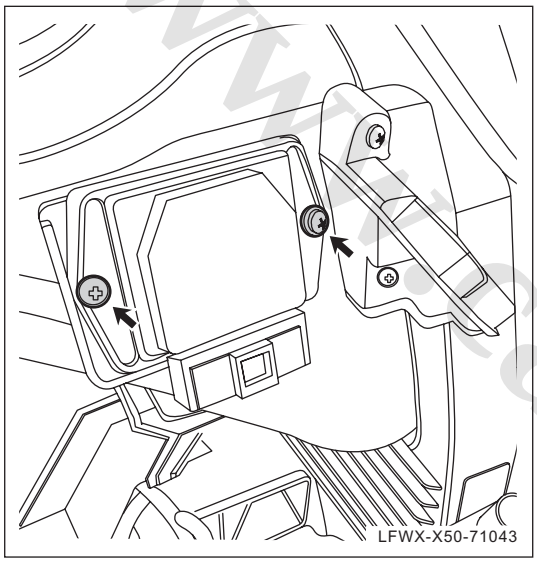
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2. CHECK AND REPAIR HVAC ASSEMBLY

(a) Check and repair speed regulation resistance.

- Disconnect speed regulation resistance connector.

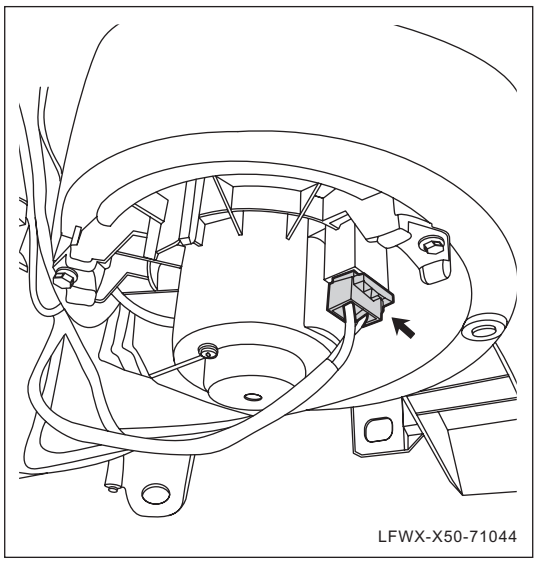


- Remove fixing screws of speed regulation resistance, and take out speed regulation resistance.

△ HINT:

Check whether the speed regulation resistance is damaged, if any, replace it.

- Install speed regulation resistance, and install and tighten fixing screws of speed regulation resistance.

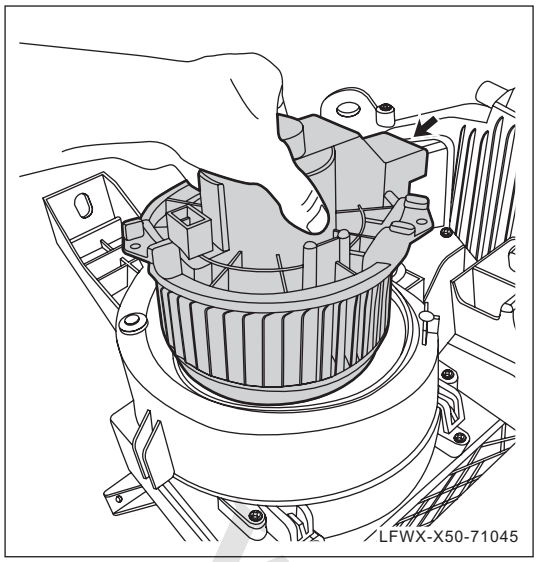


(b) Check and repair the blower assembly.

- Disconnect the blower assembly connector.

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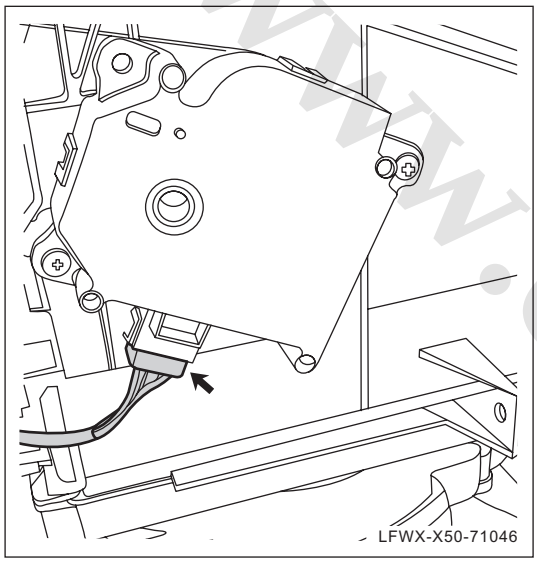


- Remove the fixing bolts of blower assembly and take out blower assembly.

△ HINT:

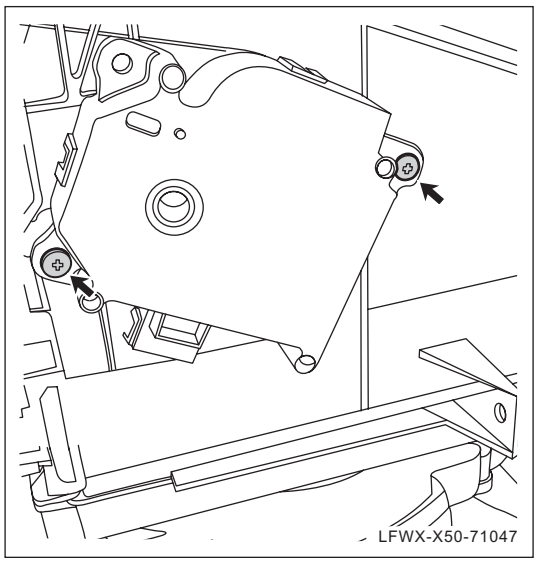
Check whether the blower assembly is damaged, if any, replace it.

- Install the blower assembly, and install and tighten its fixing bolts.



(c) Check and repair circulation air door motor.

- Disconnect the circulation air door motor assembly connector.



- Remove the fixing screws of circulation air door motor, and then take out the circulation air door motor.

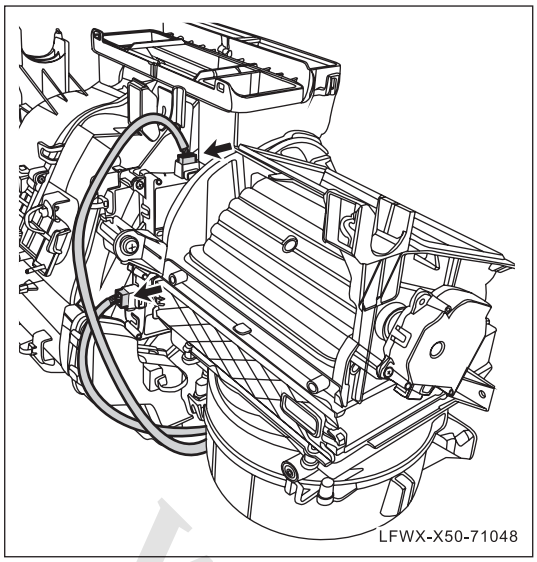
△ HINT:

Check if circulation air door motor is damaged; if damaged, replace it.

- Install the circulation air door motor, and install and tighten its fixing screws.

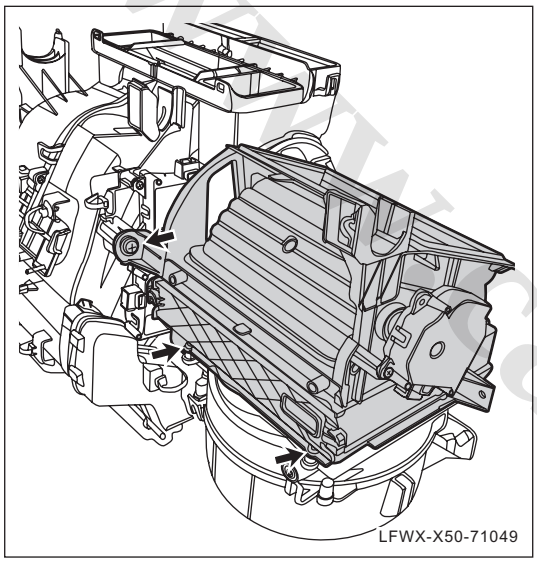
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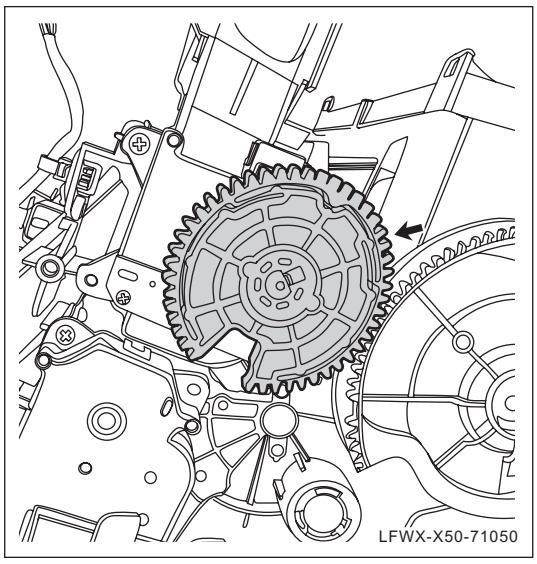


(d) Check and repair the mode air door motor and the mixed air door motor.

- Disconnect connectors of the mode air door motor and the mixed air door motor.



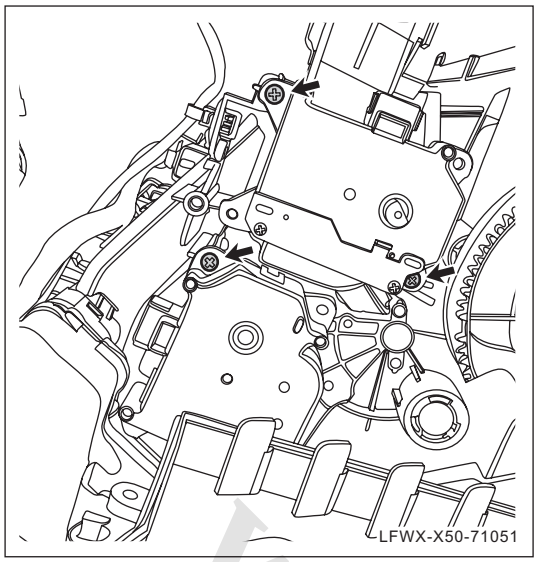
- Remove the bellow fixing screws, pry the snap-fits and take out the bellow.



- Take out the mode air door motor gear.

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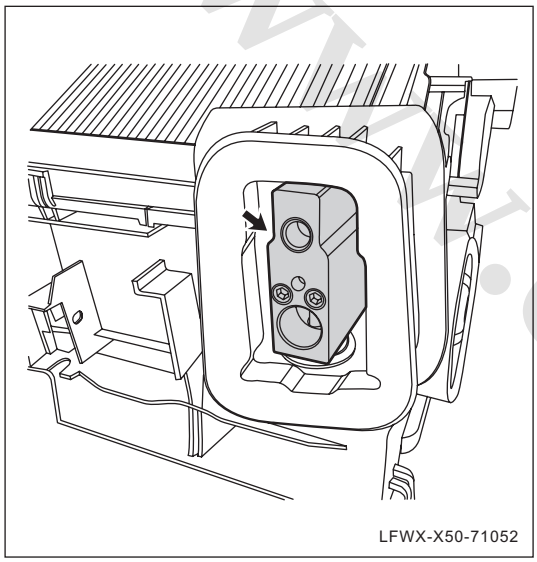


- Remove the fixing screws of mode air door motor and the mixed air door motor , and take out motors.

△ HINT:

Check if the mode air door motor and the mixed air door motor are damaged; if any, replace the motors.

- Install the mode air door motor and the mixed air door motor in reverse sequence used in removal.



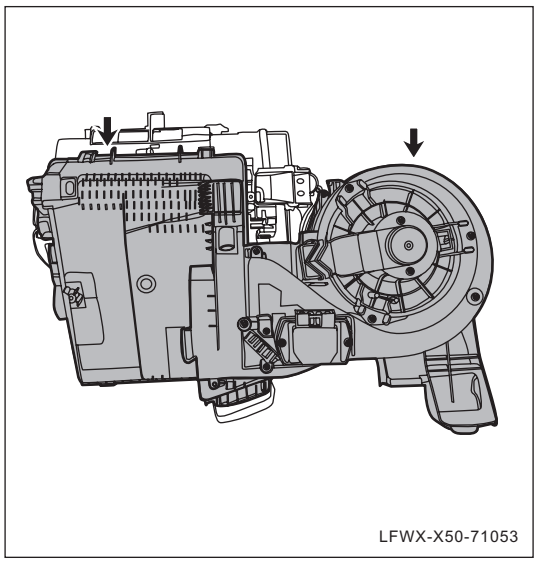
(e) Check and repair the expansive valve.

- Remove the fixing screws of expansion valve, and take out expansion valve.

△ HINT:

Check the expansion valve is damaged, if any, replace it.

- Put the expansion valve into the correct position, and then install and tighten the fixing screws.

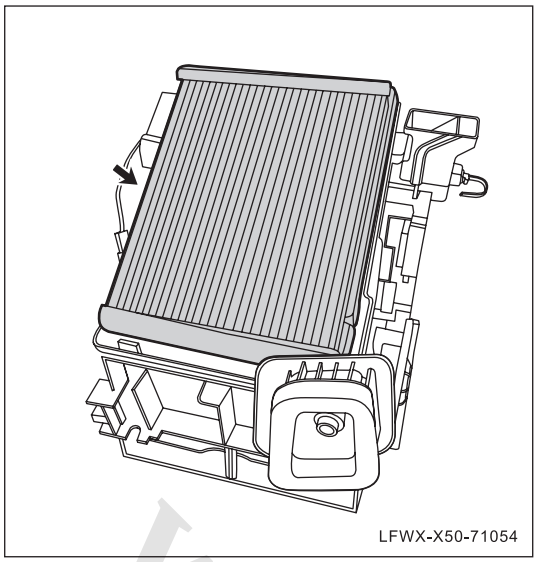


(f) Check and repair the evaporator.

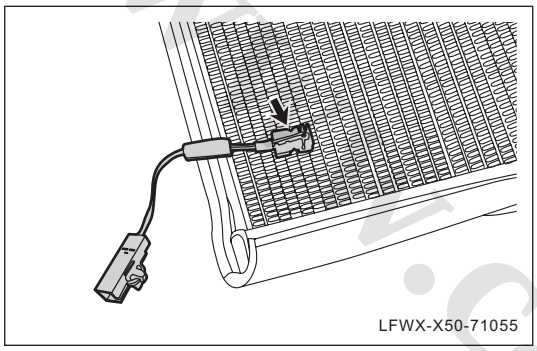
- Remove the bellow assembly.
- Remove the fixing screws of heater box, and take out the heater box.
- Remove the expansion valve assembly.

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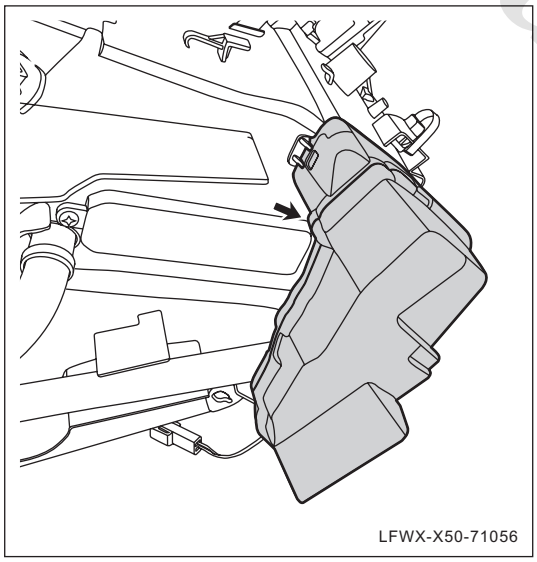


- Take out the evaporator assembly.
- Check if evaporator fins are damaged; if any, repair or replace the evaporator assembly.
- Install the evaporator assembly in reverse sequence used in the removal.



(g) Check and repair the temperature switch.

- Remove evaporator assembly.
- Remove the temperature switch from the evaporator.
- Install the temperature switch onto the evaporator.
- Install evaporator assembly.

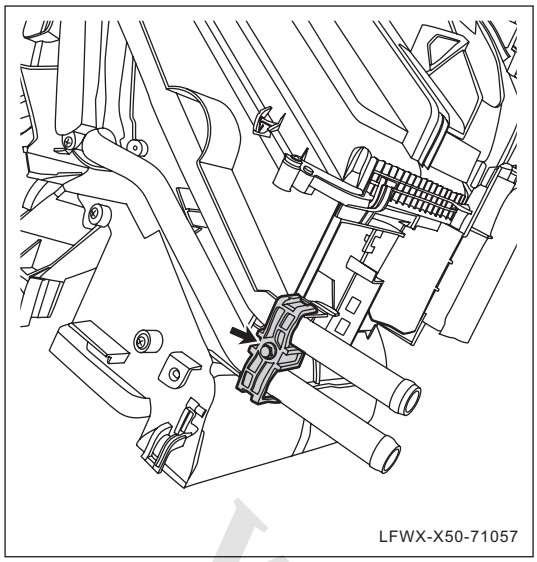


(h) Check and repair the heater tank

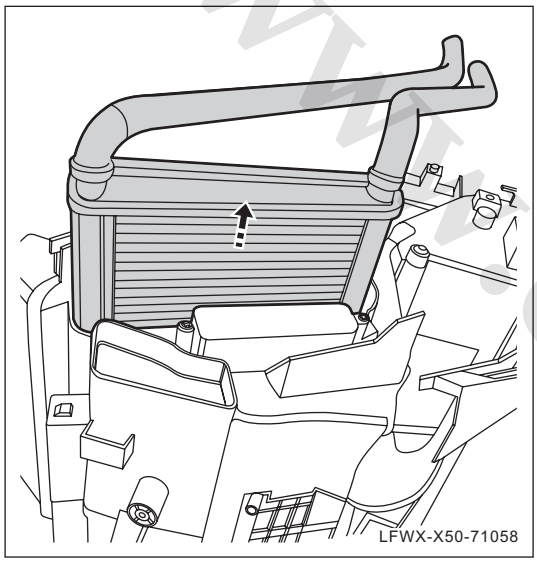
- Pry the protective cover snap-fit of the heater tank and take out the protective cover of the heater tank.

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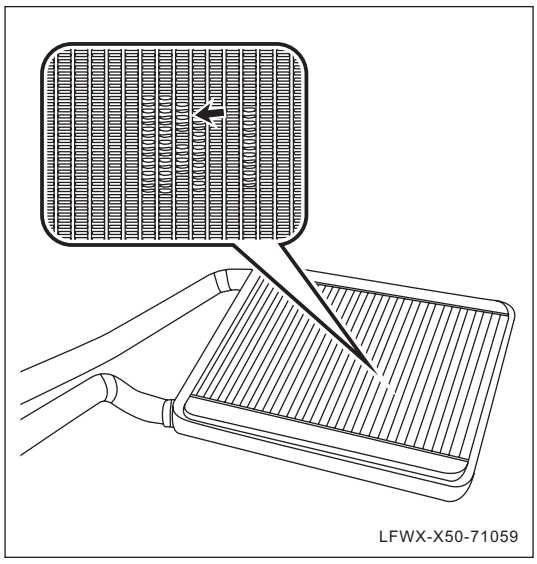
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- Remove the pipe clamp of the heater tank.



- Take out the heater tank assembly.



- Check if heater tank fins are damaged; if any, repair or replace the heater tank assembly.
- Install the heat tank assembly in reverse sequence used in the removal.

3. INSTALL THE HVAC ASSEMBLY

△ HINT:

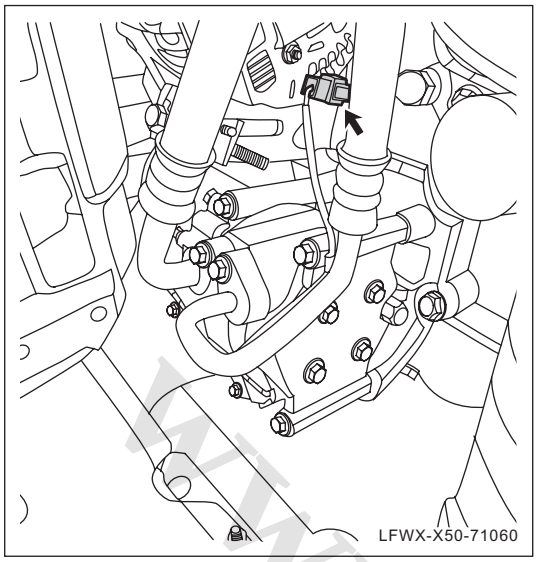
Install the HVAC assembly in reverse sequence used in the removal.

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A/C COMPRESSOR

CHECK AND REPAIR



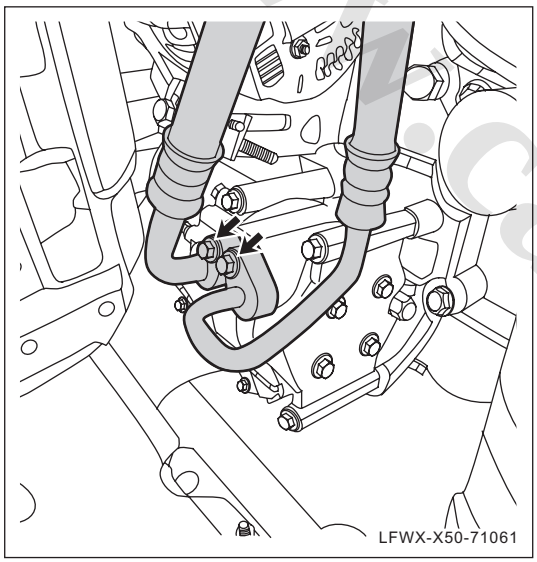
1. REMOVE A/C COMPRESSOR ASSEMBLY

(a) Recover the refrigerant. (See 71 - Air Conditioner, Refrigerant, Replacement)

(b) Disconnect electromagnetic clutch wire harness connector.

NOTICE:

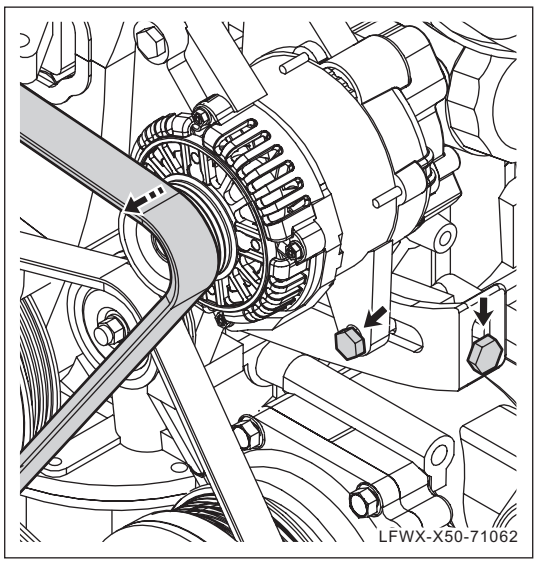
Do not use hands to directly unplug wire harness. Take it out by pressing wire harness connector clip.



(c) Remove fixing bolts of high/low pressure pipe plates for A/C compressor and pull out high/low pressure pipes.

NOTICE:

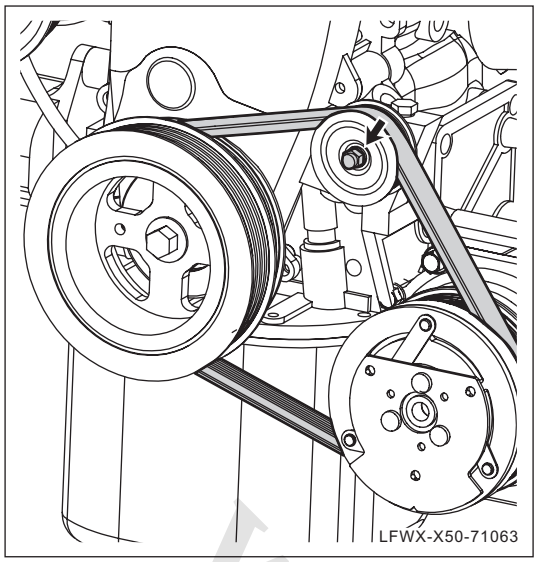
High/low pressure pipes and inlet/outlet of the compressor shall be covered to prevent dust and water in the air from entering.



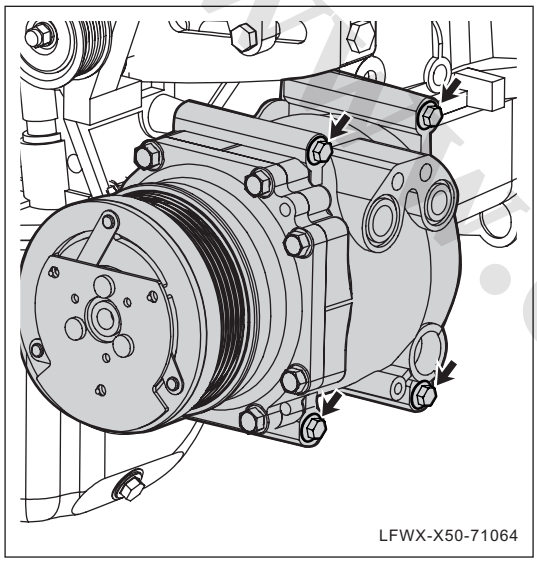
(d) Unscrew fixing bolts of the alternator, and adjust bolts of the alternator to loosen the alternator belt and then remove it.

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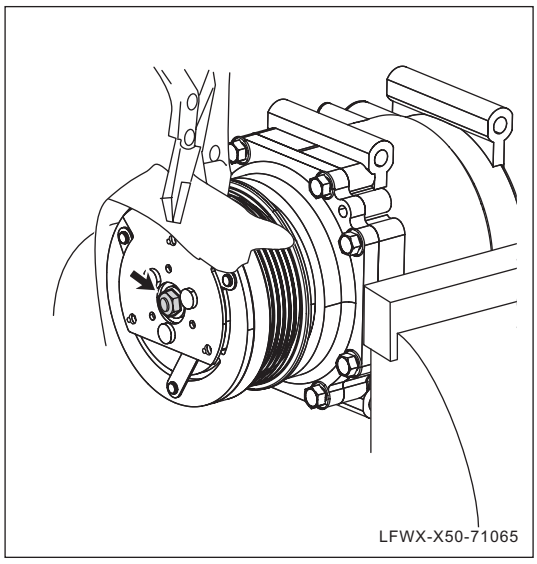
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(e) Adjust belt tensioner to the loosest position and take the compressor drive belt.



(f) Remove the fixing bolts of A/C compressor and take out the A/C compressor.



2. REMOVE ELECTROMAGNETIC CLUTCH

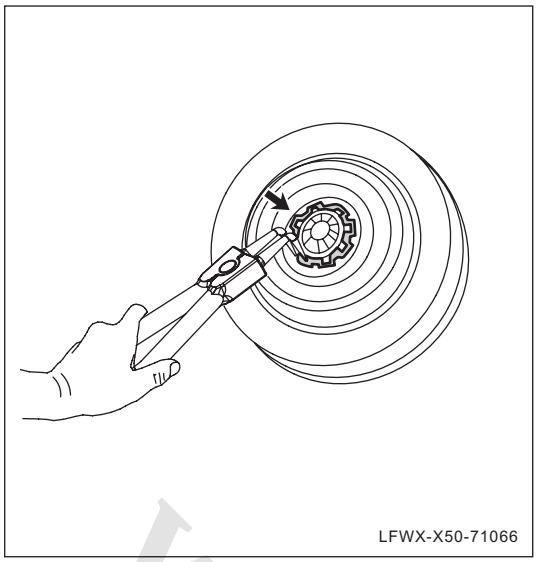
(a) Remove the fixing nuts of pressure plate.

△ HINT:

Fix the compressor on the vise and driving wheel with vise grip pliers (wrap fixed driving wheel with a cloth), then remove fixing nuts of electromagnetic clutch pressure plate.

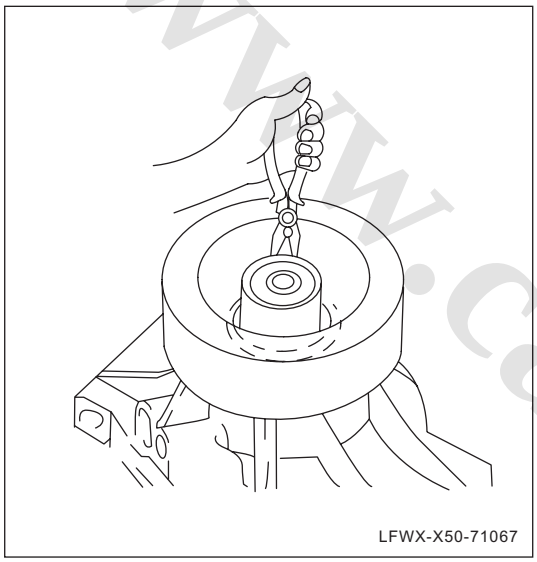
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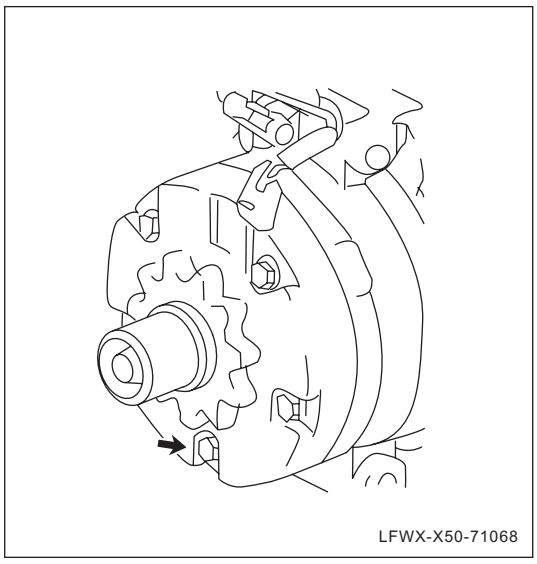

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(b) Remove driving wheel.

- Remove snap spring of fixing driving wheel by snap ring pliers.
- Take down driving wheel.


LFWX-X50-71067

(c) Remove fixing snap ring of electromagnet by snap ring pliers and take out electromagnetic coil.


LFWX-X50-71068

3. INSTALL ELECTROMAGNETIC CLUTCH

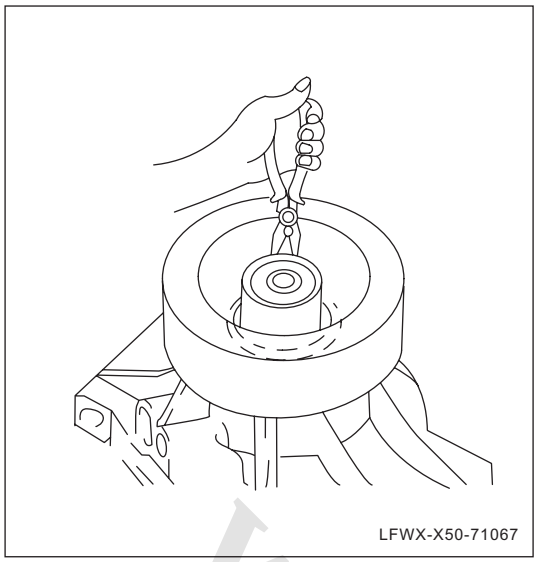
(a) Install electromagnet.

△ HINT:

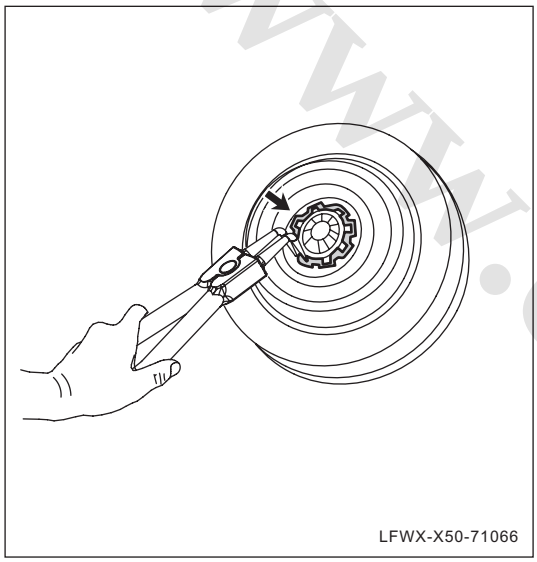
Align installation location mark.

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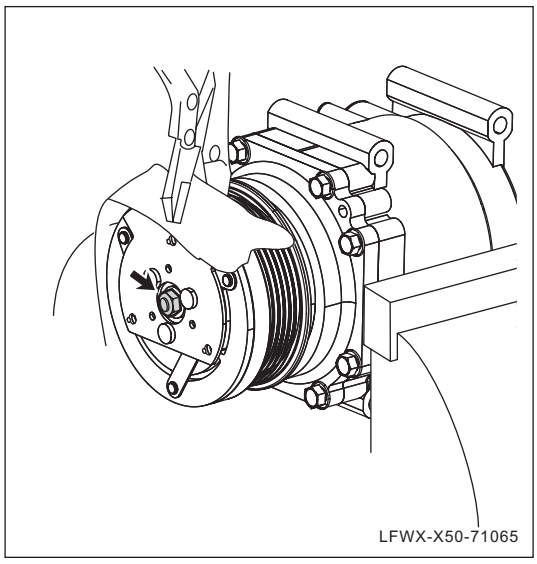
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LFWX-X50-71067

(b) Install electromagnetic coil in place and fix it by snap ring.


LFWX-X50-71066

(c) Install driving wheel and install the snap ring in place by snap ring pliers.


LFWX-X50-71065

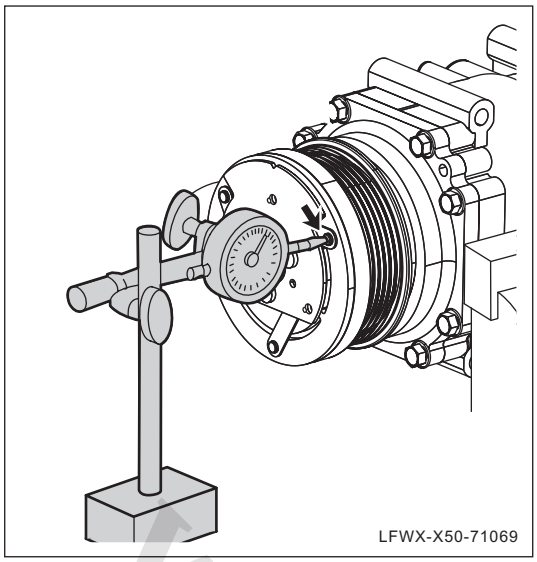
(d) Install pressure plate of electromagnetic clutch on belt pulley, and install and tighten fixing bolts.

△ HINT:

Fix the compressor on the vise and driving wheel with vise grip pliers (wrapping fixed driving wheel with cloth); install fixing bolts of pressure plate for electromagnetic clutch.

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4. INSPECT ELECTROMAGNETIC CLUTCH CLEARANCE

(a) Switch on electromagnetic clutch and measure the clearance of electromagnetic clutch by switching on/off.

Standard value: 0.35 - 0.60 mm

△ HINT:

If the measured value is out of standard range, remove pressure plate and adjust belt pulley.

NOTICE:

Adjust less than 3 times.

5. Check refrigerant oil

△ HINT:

- Generally, it is not necessary to check the volume of refrigerant oil. If a great amount of refrigerant oil outflows during the course of maintenance, it is necessary to fill refrigerating oil only when the compressor is installed.

  Filling amount = outflow volume

- If it is replaced with a new compressor, first discharge refrigerant in air conditioner refrigerating system before installing, then pour out refrigerant oil of the new compressor according to the following standards.

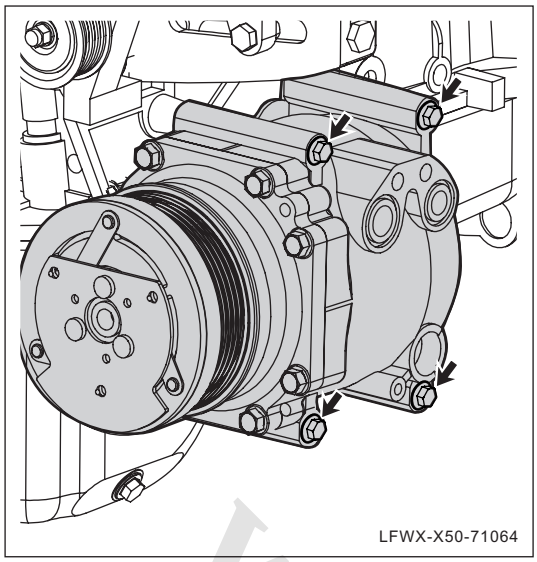
  The amount of refrigerant oil in new compressor-the amount of residual refrigerant oil in oil compressor = the amount of oil in the new compressor to be discharged

NOTICE:

- **When checking oil amount, pay attention to removing and installing.**
- **Because refrigerant oil may remain in the pipe of the vehicle, if a new compressor with some refrigerant oil is installed, the system will have excessive oil, which affects the rate of heat exchange of refrigeration pipe and causes poor refrigeration.**
- **If the compressor removed has little residual oil, it is necessary to check if refrigerant oil leaks.**
- **Confirm if correct refrigerant oil is used.**

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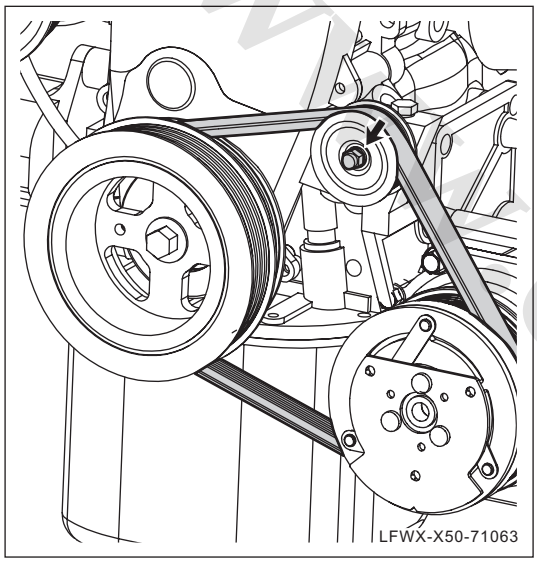
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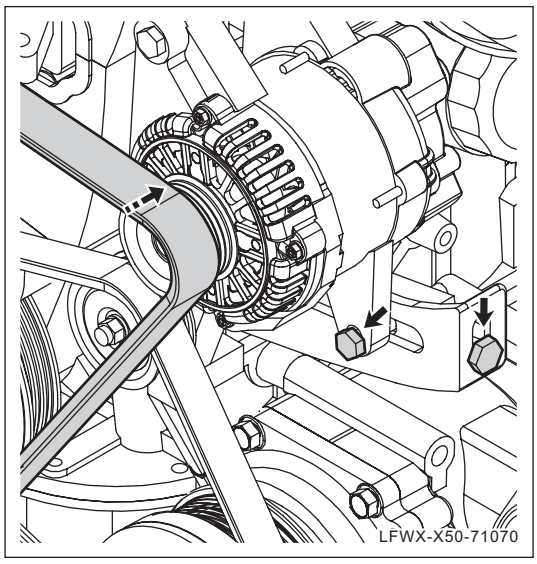
6. INSTALL A/C COMPRESSOR ASSEMBLY

(a) Align A/C compressor with mounting position, install and tighten fixing bolts.

Torque: 25 - 30 N•m



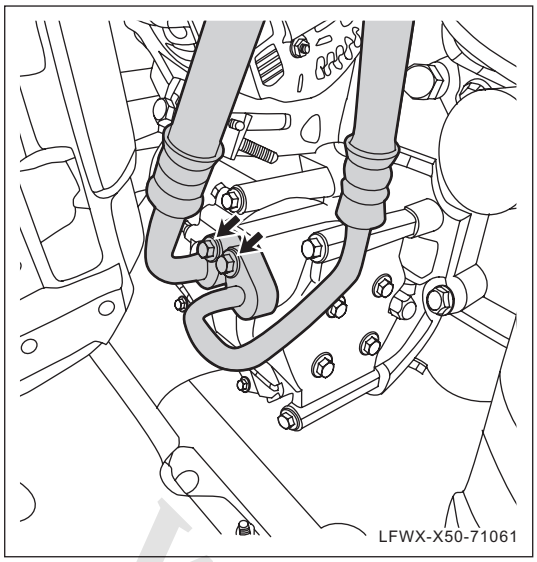
(b) Adjust belt tensioner to the loosest position and install A/C compressor belt.



(c) Install the alternator belt on belt pulley, adjust the bolts of alternator to an appropriate position and tighten fixing bolt of the alternator.

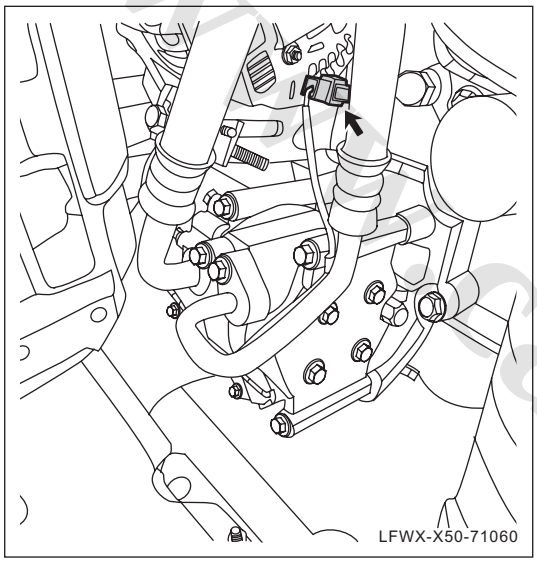
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(d) Use refrigerant oil to lubricate O-ring on high and low pressure joints, and insert high and low pressure air pipe of compressor into the mounting-hole of compressor, and then install fixing bolts of pressure plate and tighten them.

Torque: 25 - 30 N•m



(e) Connect the electromagnetic clutch connector.

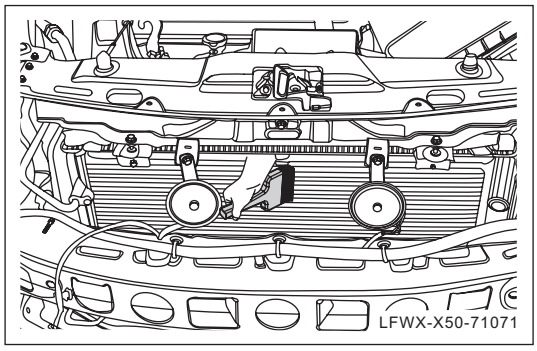
7. **ADJUST THE A/C COMPRESSOR AND ALTERNATOR BELT (SEE 71 - AIR CONDITIONER, AIR-CONDITIONER SYSTEM, ON-VEHICLE INSPECTION)**
8. **REFILL REFRIGERANT (SEE 71 - AIR CONDITIONER, REFRIGERANT, REFILLING)**
9. **CHECK WHETHER REFRIGERANT LEAKS (SEE 71 - AIR CONDITIONER - REFRIGERANT, CHECK)**

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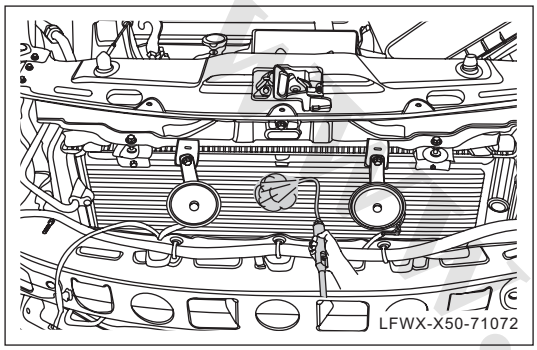
CONDENSER AND DRYING TANK ASSEMBLY

CHECK AND REPAIR

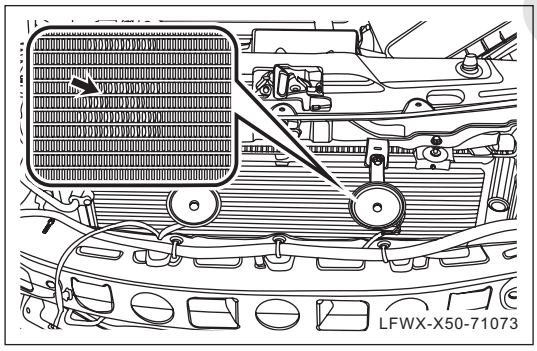


1. ON-VEHICLE INSPECTION

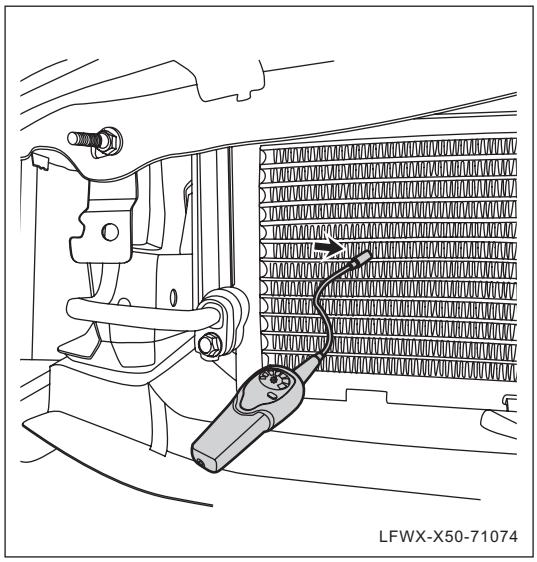
(a) Check if condenser fin is very dirty. If it is dirty, banister brush can be used for cleaning.



(b) Check if there is dust on the condenser. If any, compressed air can be used to remove dust from the condenser.



(c) Check if condenser fin is deformed. If it is deformed, use tweezers to correct the fin or use fin comb to correct it.



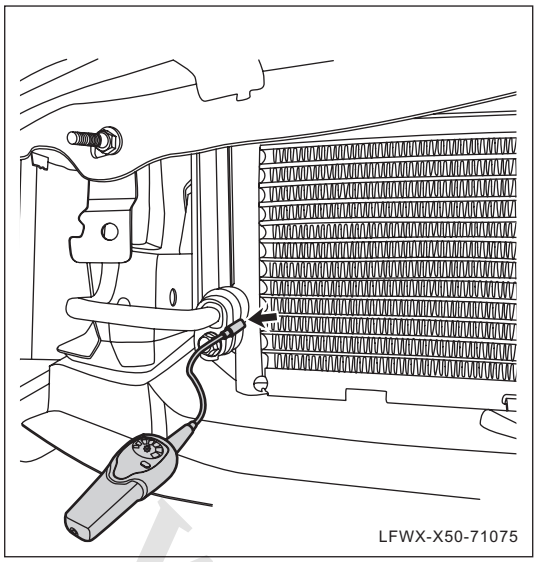
(d) Check if the condenser leaks refrigerant with a leak detector. If it leaks, it is necessary to remove and weld it. If it is impossible to weld, replace the condenser and drying tank assembly.

△ HINT:

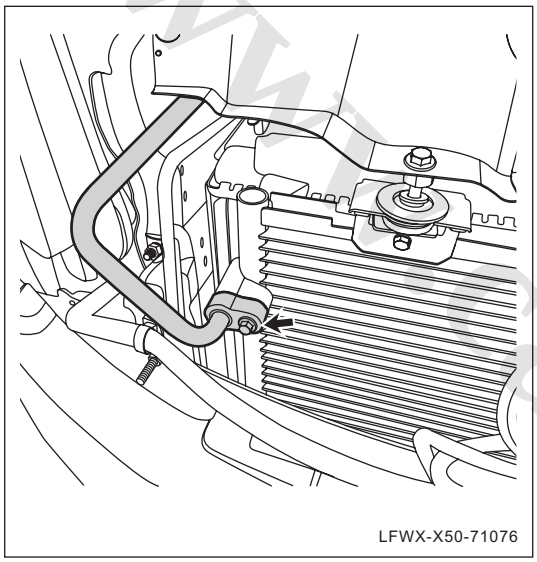
The precondition of checking the condenser for leakage: start the engine to run the engine idly and turn on A/C switch, then turn fan switch in high gear.

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(e) Check pipe joint for gas leaks with a leak detector. If it does, check if joint bolt has standard torque.

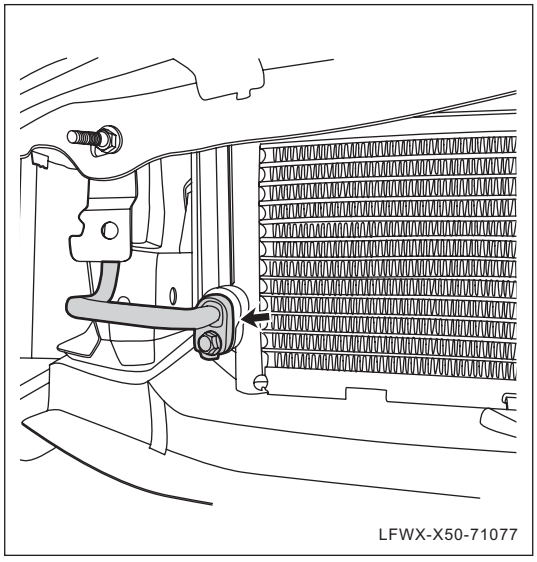


2. REMOVE CONDENSER AND DRYING TANK ASSEMBLY

(a) Recover the refrigerant. (See 71 - Air Conditioner, Refrigerant, Recovery).

(b) Remove front bumper assembly. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

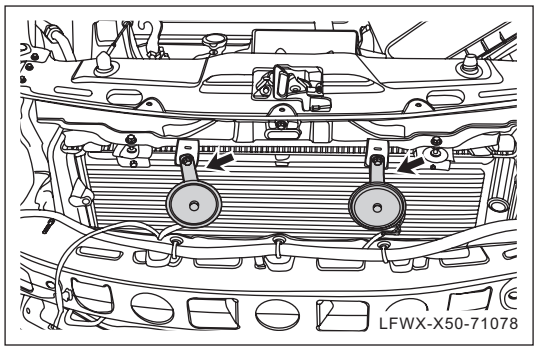
(c) Remove fixing bolts between compressor discharge pipe and the condenser, and pull out compressor discharge pipe.



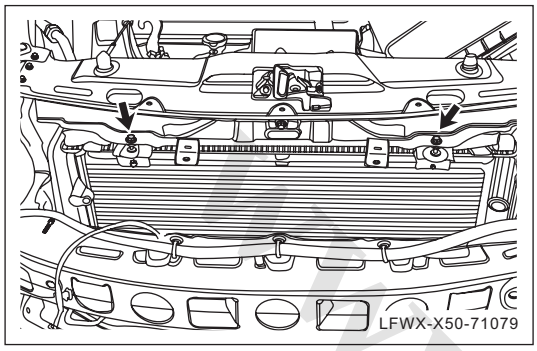
(d) Remove fixing bolts of the condenser outlet pipe and the condenser and pull out the condenser outlet pipe.

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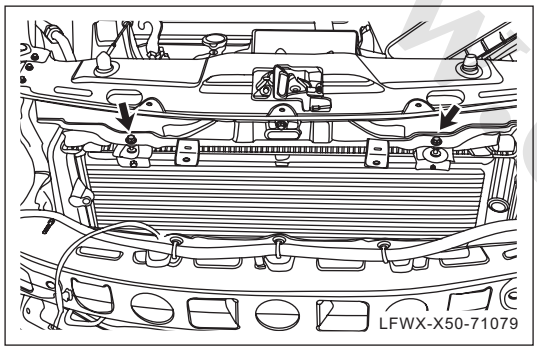
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(e) Disconnect horn connector, and remove fixing bolts of horn bracket, then take out the horn.



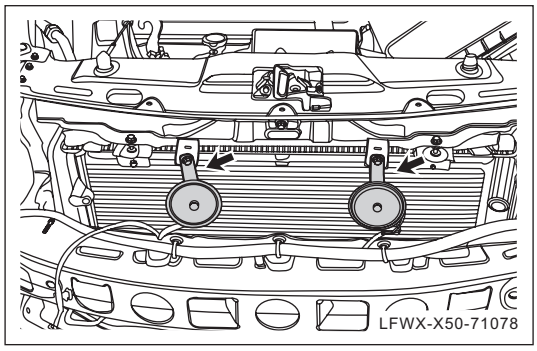
(f) Remove fixing bolts on upper end of condenser and drying tank, and incline outwards a little then pull out the condenser drying tank assembly upwards.



3. INSTALL CONDENSER AND DRYING TANK ASSEMBLY

(a) Incline lower end of the condenser and drying tank a little inwards and install lower end into fixing hole.

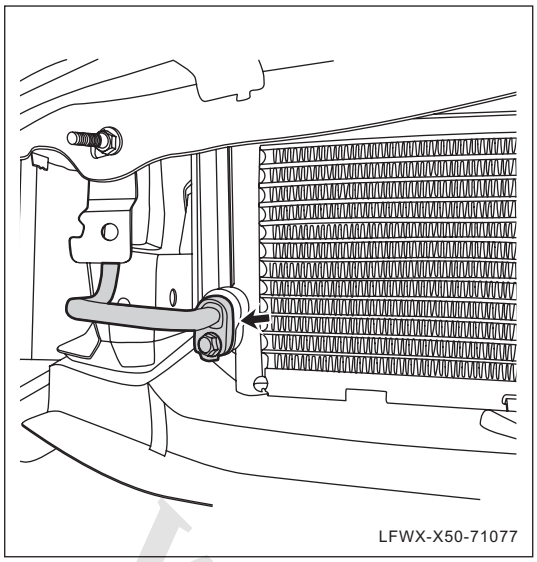
(b) Align upper end of the condenser with mounting-hole, and install and tighten fixing bolts.



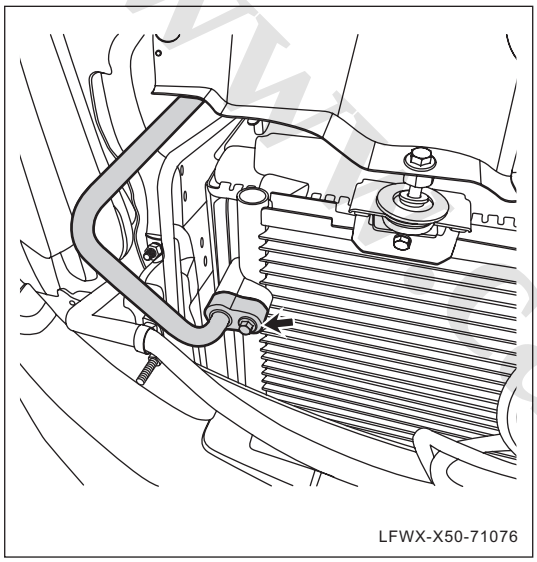
(c) Install horn bracket onto front compartment beam of the engine, and install and tighten fixing bolts, then connect horn connector.

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(d) Insert the condenser outlet pipe into the condenser interface, and install and tighten fixing bolts.



(e) Insert compressor discharge pipe into condenser connector, and install & tighten the fixing bolts.

(f) Refill refrigerant. (See 71 - Air Conditioner, Refrigerant, Refilling)

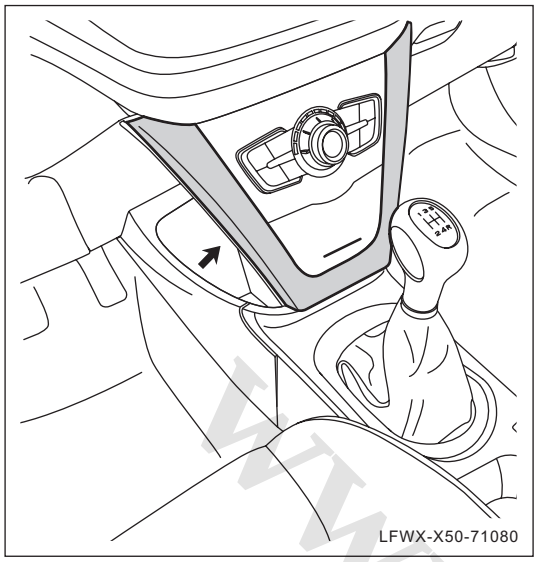
4. CHECK REFRIGERANT FOR LEAKAGE (SEE 71- AIR CONDITIONER, REFRIGERANT, INSPECTION)

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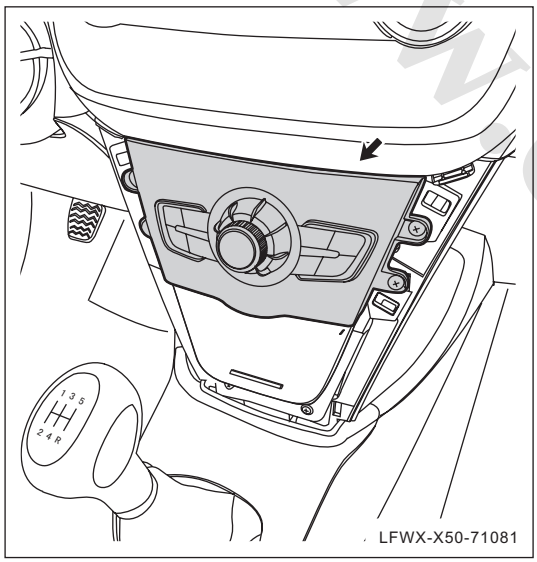
AIR CONDITIONER CONTROLLER

CHECK AND REPAIR

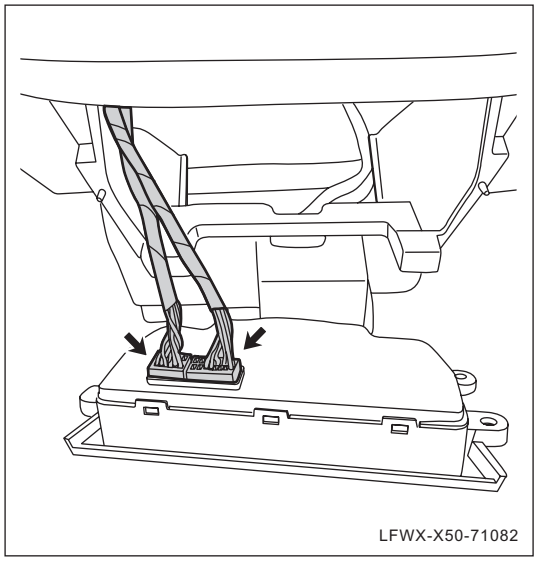


1. REMOVE THE AIR CONDITIONER CONTROLLER

(a) Remove the dashboard lower center trim frame cluster.



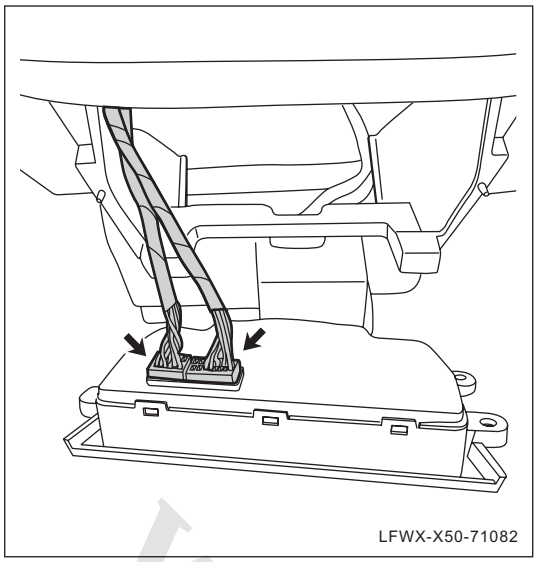
(b) Remove the fixing screws of air conditioner controller.



(c) Take out a bit the air conditioner controller. Disconnect the connectors of air conditioner controller.

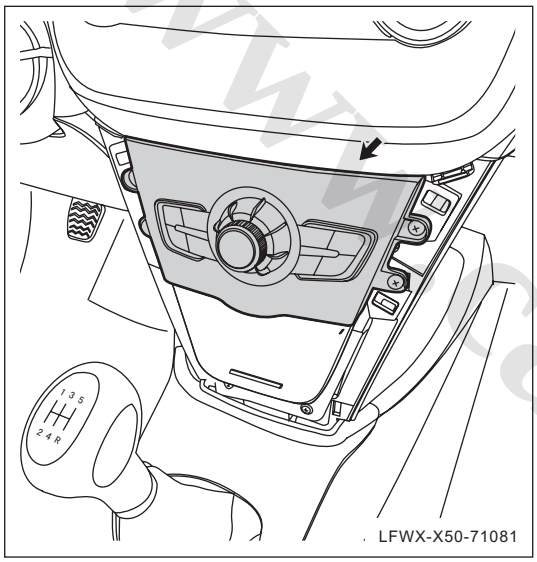
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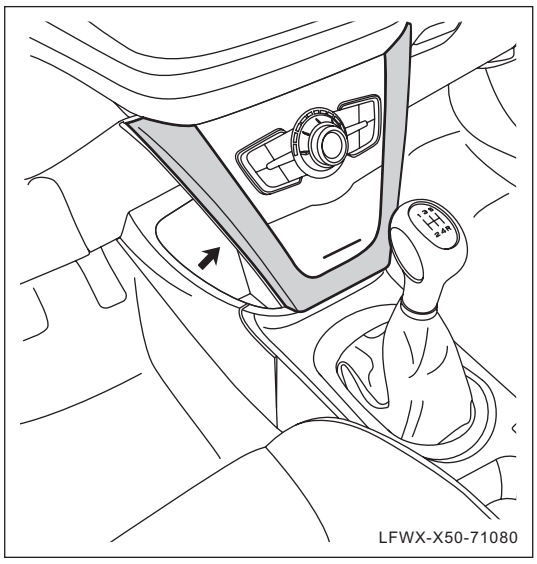


2. INSTALL THE AIR CONDITIONER CONTROLLER

(a) Connect the connectors of air conditioner controller.



(b) Put the air conditioner controller in place, and install and tighten its fixing screws.



(c) Install the dashboard lower center trim frame cluster.

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Safety Protection Device

Airbag 72-1
System description 72-1
Preparation 72-2
Service data 72-3
Precautions 72-3
Components 72-5
Schematic diagram 72-6
On-vehicle inspection 72-7
Diagnosis 72-10
Pre-check 72-10
Fault symptom table 72-11
Symptom diagnosis 72-11
DTC list 72-14
DTC diagnosis 72-18
SRS ECU 72-34
Replacement 72-34
Driver airbag 72-37
Replacement 72-37
Disposal 72-39
Passenger airbag 72-44
Replacement 72-44
Disposal 72-46
Clock spring 72-48
Replacement 72-48
Seat belt 72-51
Preparation 72-51
Service data 72-51
Precautions 72-51
Components 72-52
Diagnosis 72-53
Fault symptom table 72-53
Seat belt 72-54
Inspection 72-54
Replacement 72-56
Rear seat belt 72-60
Inspection 72-60
Replacement 72-60
Height adjuster 72-66
Check 72-66
Replacement 72-66

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AIRBAG

SYSTEM DESCRIPTION

1. FUNCTION

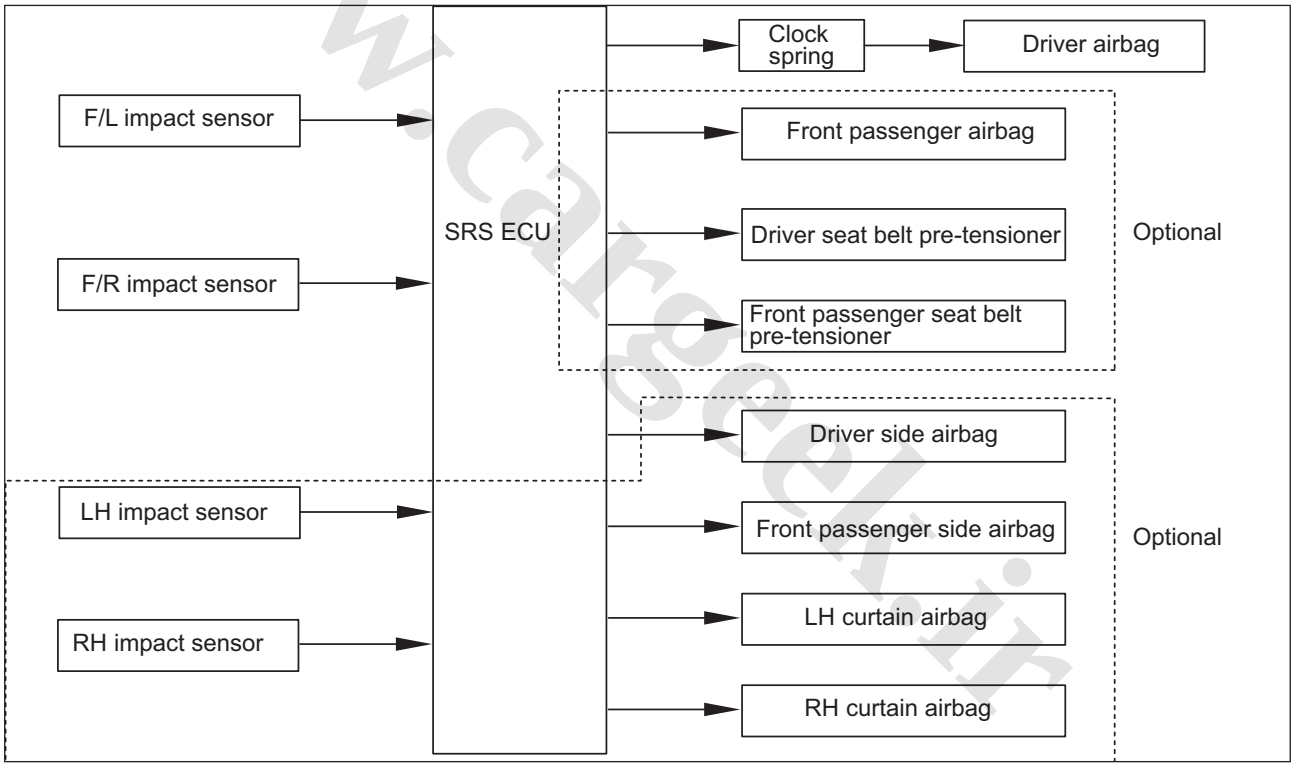
Airbags provide protection for the driver and passengers during emergency, and help to reduce injuries of the driver and passengers.

2. COMPONENTS

Airbag system mainly consists of impact sensor, airbag module, SRS ECU, clock spring, etc.

3. WORKING PRINCIPLE

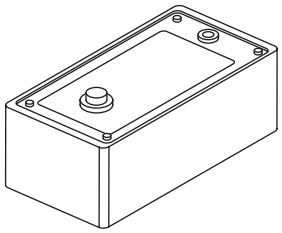
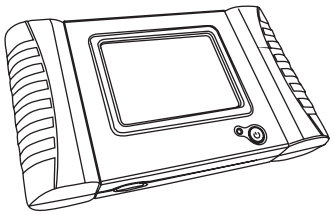
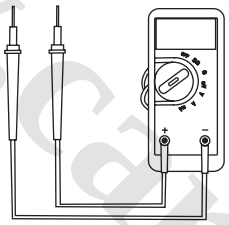
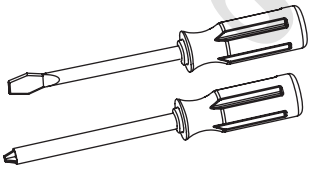
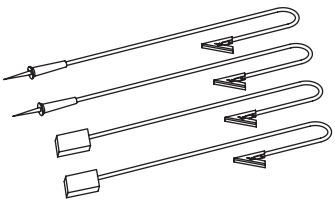
If a frontal impact occurs to the vehicle, and it meets the requirements of the airbag deployment, SRS ECU will send signals to trigger the inflator of the driver's and front passenger airbags; the inflator will generate a chemical reaction in an instant to make the bag filled with air, by which baffle the forward impact speed of the driver and the front passenger, and prevent the driver and the front passenger from directly hitting the steering wheel and the upper and lower dashboards. While the SRS ECU also sends signals to the pretensioner to tighten the seat belt backward. Meanwhile, if a vehicle equipped with a side impact sensor, side airbag, and curtain airbag, the side impact sensor detects a side impact, and sends a signal to the SRS ECU, and the SRS ECU controls the side airbag and curtain airbag to work.



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PREPARATION

S/N	Tools	Outline diagram	Description
1	A special tool for airbag deployment		Deploying the airbag
2	Diagnostic scanner		Diagnosing airbag system fault
3	Digital multimeter		Measuring voltage and resistance
4	Screwdriver		Removing and installing screws and prying snap spring.
5	Wire harness set		Testing circuits

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SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Airbag system	
Working temperature	- 35 °C - 85 °C
Working voltage	12 V±3 V
Clock spring	
Total number of coils for rotating body	≥ 6.3

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of SRS ECU	6 - 10
Fixing bolts of driver airbag	8 - 10

PRECAUTIONS

1. Performing maintenance to the airbag system must follow the correct operation procedures; incorrect operation may cause the airbag to deploy suddenly, or even lead to a serious accident.
2. Confirm that ignition switch is turned to OFF and the battery positive and negative cables are disconnected for more than 90s, and then conduct the operation (safety protection system is provided with backup power. Therefore, if operation is conducted within 90s after the battery positive and negative cables are disconnected, airbag may deploy suddenly).
3. Because it is difficult to confirm the fault of airbag, diagnostic trouble code (DTC) is regarded as the most important information source for troubleshooting. When troubleshooting is conducted for airbag, be sure to check diagnostic trouble code (DTC) before disconnecting the battery.
4. If the airbag assembly does not deploy in vehicle collision, check the horn button assembly and the SRS electronic control module (SRS ECU).
5. The SRS electronic control unit(SRS ECU) may be impacted during the course of maintenance, be sure to disconnect airbag electronic control unit (SRS ECU) connector at first.
6. The airbag system parts and components cannot be reused.
7. Check system circuit fault with a high resistance digital multimeter.
8. After disconnecting the battery negative cable, the electronic clock and audio system memory will be cleared. Before maintenance, all necessary data shall be recorded. After maintenance, reset the audio system and adjust the electronic clock. Do not try to use the backup power out of this vehicle to prevent data in system memory from losing. Backup power will charge airbag, which will make the airbag deploy suddenly during the course of maintenance.
9. It is forbidden to disassemble or repair the airbag module and the SRS electronic control unit (SRS ECU) assembly of drivers and front passengers because of reusing or other reasons.
10. Baking finish may bring an effect due to overheating (above 93°C), you must remove SRS ECU, airbag module and clock spring and other parts, then put them away.
11. SRS electronic control unit (SRS ECU) assembly connector, connector connecting SRS electronic control unit (SRS ECU) assembly and clock spring, connector connecting to clock spring and driver's airbag module, and connector connecting to front passenger seat airbag module and SRS electronic control unit (SRS ECU) assembly, are equipped with protective mechanism. When repairing airbag system, requirements must be strictly followed, to avoid sudden deployment of airbag and damage of parts.

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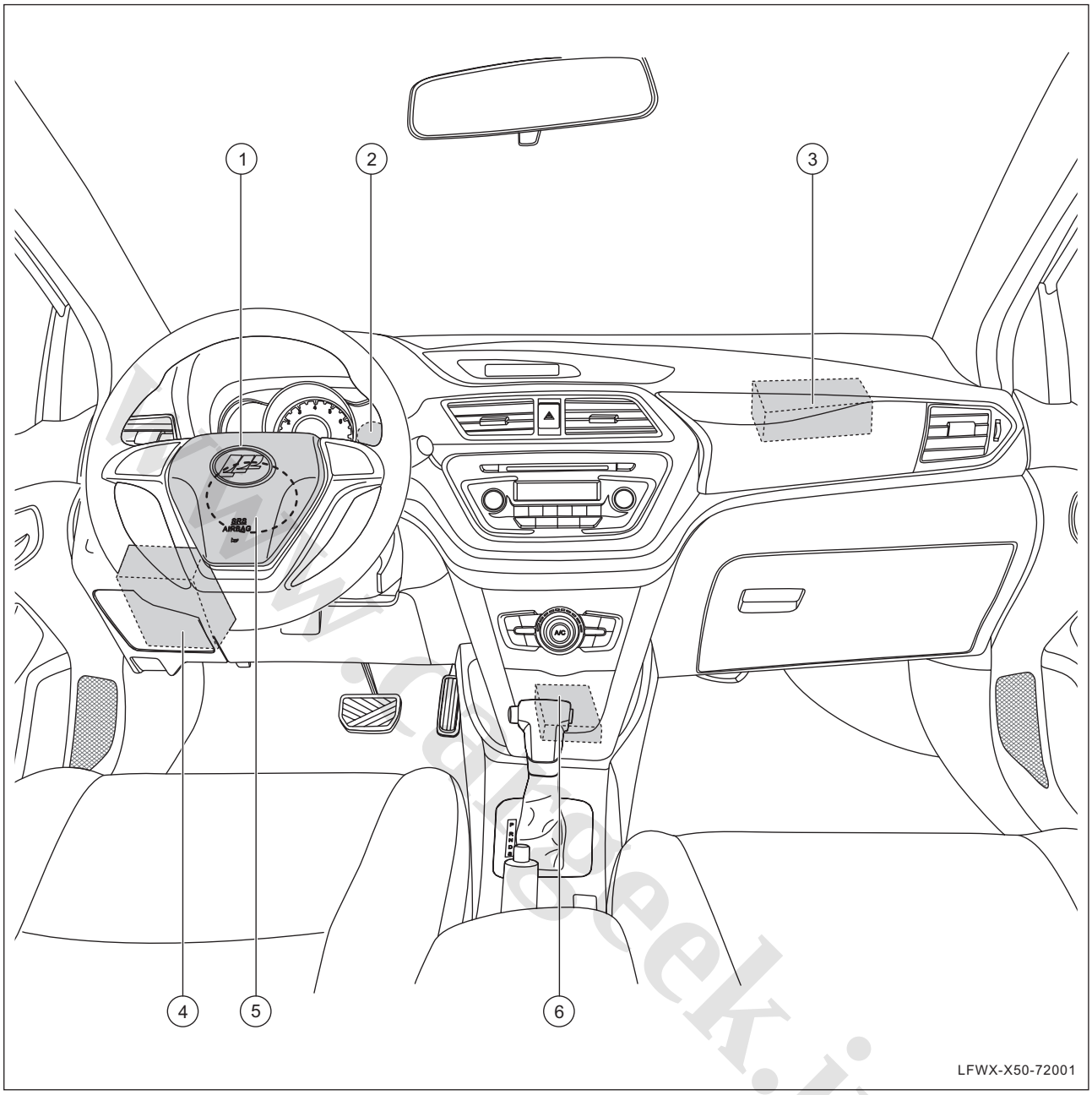
12. During the course of maintaining airbag, airbag modules shall be installed on vehicles after being taken out of the container. If it is required to stop working, airbag modules shall be placed into the container. It is not allowed to keep airbag modules unattended. When storing dismantled airbag modules, keep the side of airbag deployment upwards.
13. Never place the airbag assembly in a hot environment or an open flame.
14. After the maintenance is finished, do not connect the airbag module to power supply right now. Do electrical inspection first, and connect it to the power supply if no fault is found.
15. There should be no any person in the vehicle when connecting the airbag system to the power supply.
16. After maintenance, check if the SRS warning lamp is normal.
17. The service life of the airbag is limited. For expiration of service life, the airbag module and label must be replaced.

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COMPONENTS



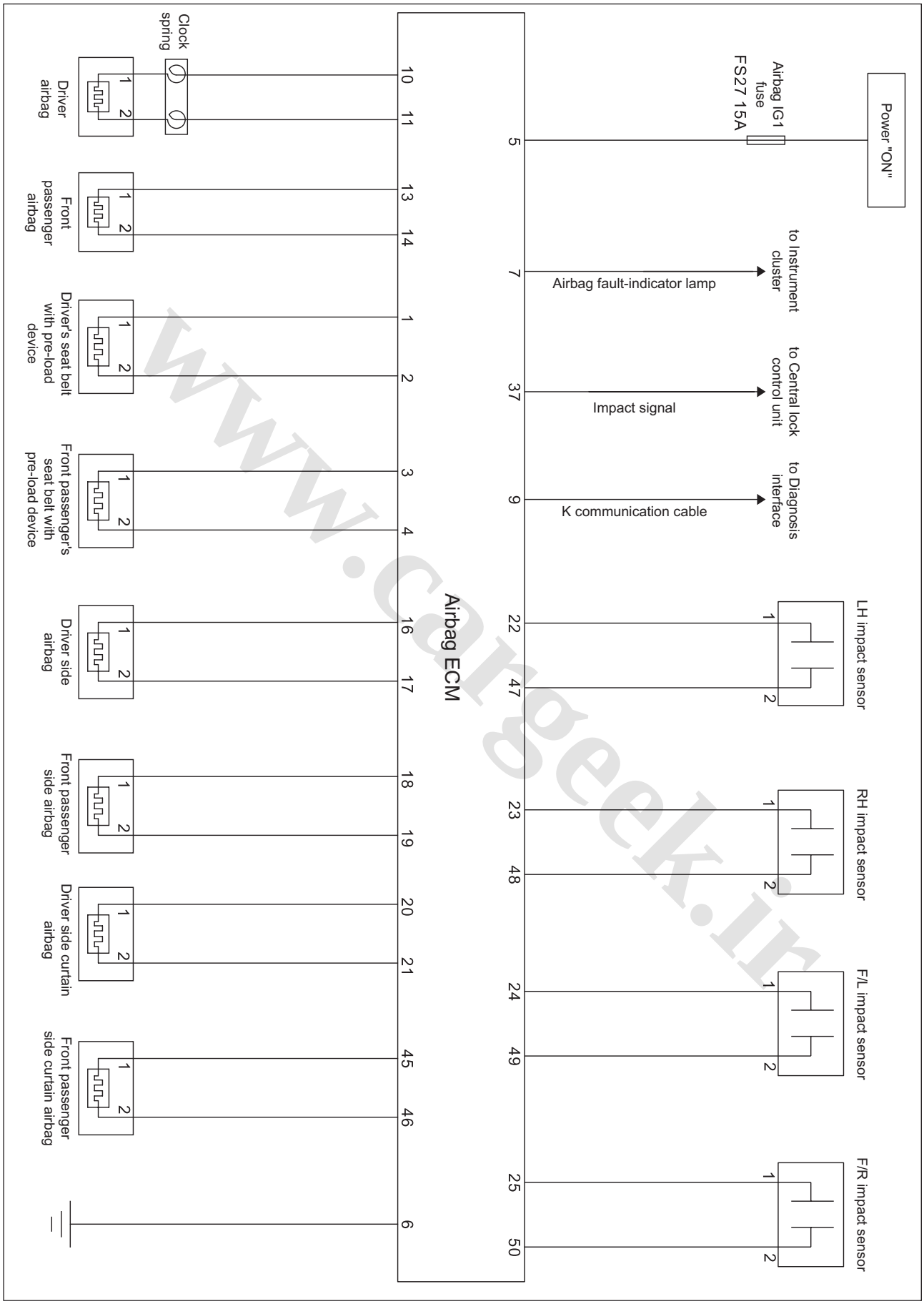
1	Driver airbag module assembly
2	Instrument cluster (SRS fault indicator lamp)
3	Passenger airbag module assembly

4	Central control box (fuse) in the cab
5	Clock spring
6	SRS electronic control unit (SRS ECU)

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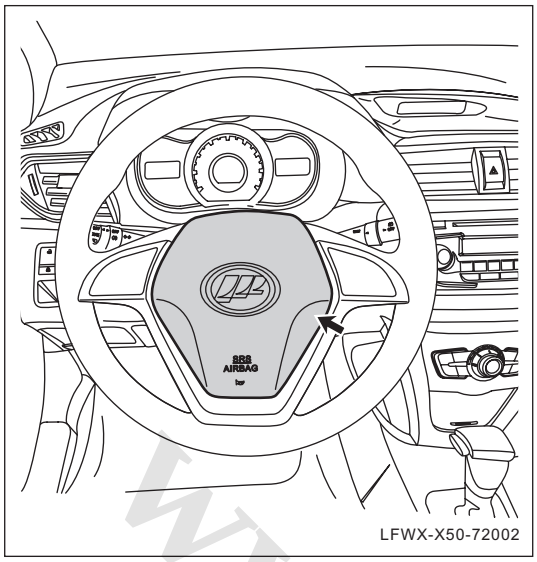
SCHEMATIC DIAGRAM



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ON-VEHICLE INSPECTION

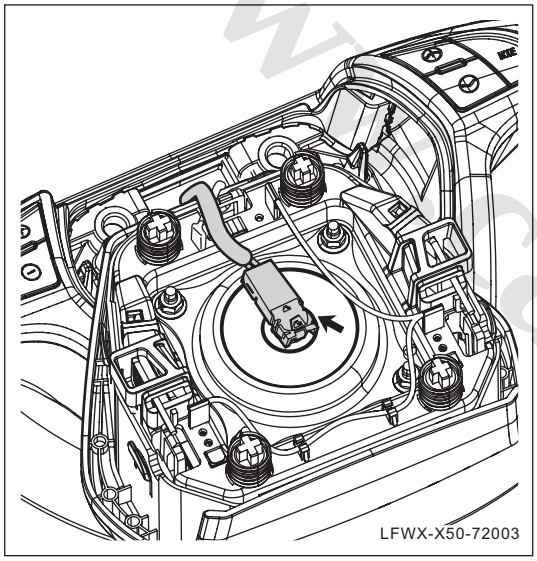


LFWX-X50-72002

1. CHECK DRIVER AIRBAG (NO COLLISION)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Check the surface of driver airbag, cut gap, fine crack visually for damage or obvious discoloring.


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2. CHECK DRIVER AIRBAG MODULE (COLLISION OCCURS BUT AIRBAG DOES NOT DEPLOY)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Check the surface of driver airbag, cut gap, fine crack visually for damage or obvious discoloring.

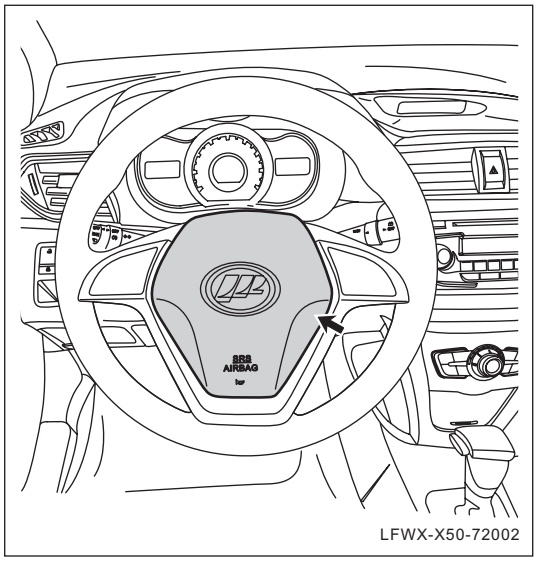
(c) Check if SRS wire harness is scratched and the connector is damaged or broken.

(d) Check if steering wheel is deformed.

(e) Check if horn button contact chip is deformed or damaged.

△ HINT:

If the horn button contact chip is damaged, it is necessary to replace horn button assembly. No maintenance is required.



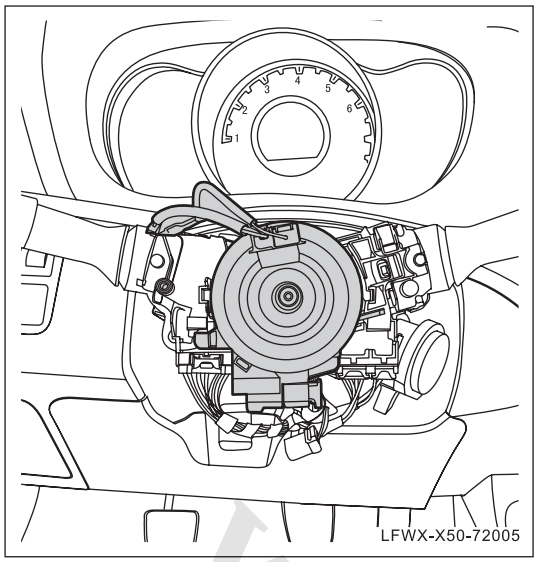
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NOTICE:

Driver airbag and steering wheel shall not interfere with each other. When a new driver airbag is installed on steering wheel, the clearance around it shall be uniform.

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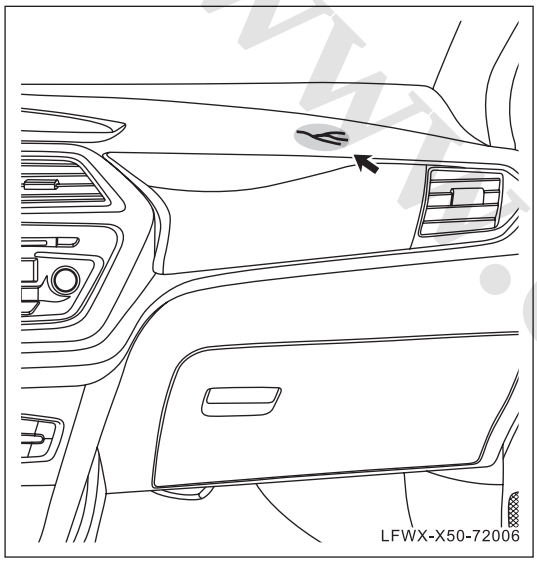


3. CHECK DRIVER AIRBAG MODULE (COLLISION OCCURS AND AIRBAG DEPLOYS)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Remove the driver airbag from the vehicle.

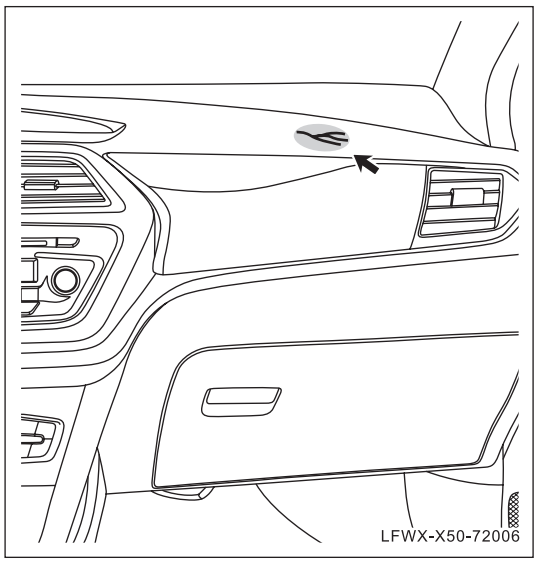
(c) Check if clock spring and wire harness are damaged.



4. CHECK PASSENGER AIRBAG (NO COLLISION)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Check the surface of passenger airbag visually. If there is a bulge or crack, replace the passenger airbag.



5. CHECK PASSENGER AIRBAG (COLLISION OCCURS BUT AIRBAG DOES NOT DEPLOY).

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Check the surface of passenger airbag visually. If there is a bulge or crack, replace the passenger airbag.

(c) Check if SRS wire harness is scratched and the connector is damaged or broken.

(d) Check if the dashboard and its reinforced rib for damage.

NOTICE:

If the dashboard and its reinforced rib are damaged, replace them immediately instead of maintaining.

6. CHECK PASSENGER AIRBAG MODULES (COLLISION OCCURS AND AIRBAG DEPLOYS) .

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-

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check)

(b) Remove the passenger airbag module assembly from the vehicle.

(c) Check carefully if parts and wire harness near the passenger airbag module are damaged.

NOTICE:

If the dashboard and its reinforced rib, airbag module wire harness and connector are damaged, replace them directly instead of maintaining.

7. CHECK SRS ECU (NO COLLISION)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

8. CHECK SRS ECU (COLLISION OCCURS BUT AIRBAG DOES NOT DEPLOY)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

9. CHECK SRS ECU (COLLISION OCCURS AND AIRBAG DEPLOYS)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

10. CHECK SRS WIRE HARNESS AND CONNECTOR (NO COLLISION)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

11. CHECK SRS WIRE HARNESS AND CONNECTOR (COLLISION OCCURS)

(a) Check the system with a diagnostic scanner. (see 72 - Safety Protection Device, Diagnosis, Pre-check)

(b) Check if all SRS wire harnesses are broken, cracked or segmented.

(c) Check if all SRS wire harness connectors are damaged.

△ HINT:

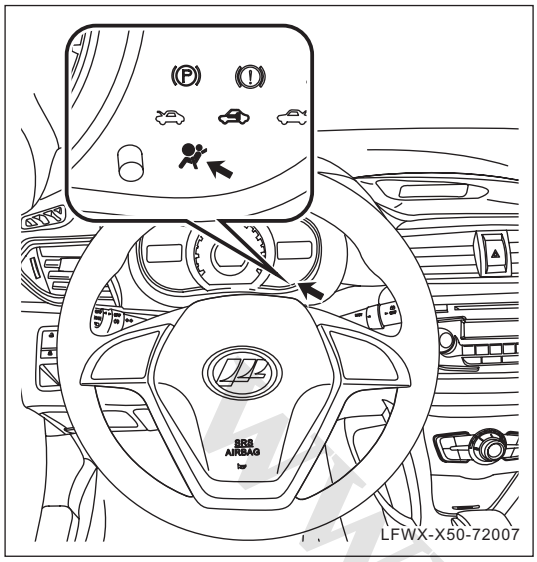
The SRS wire harnesses are yellow.

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DIAGNOSIS

PRE-CHECK



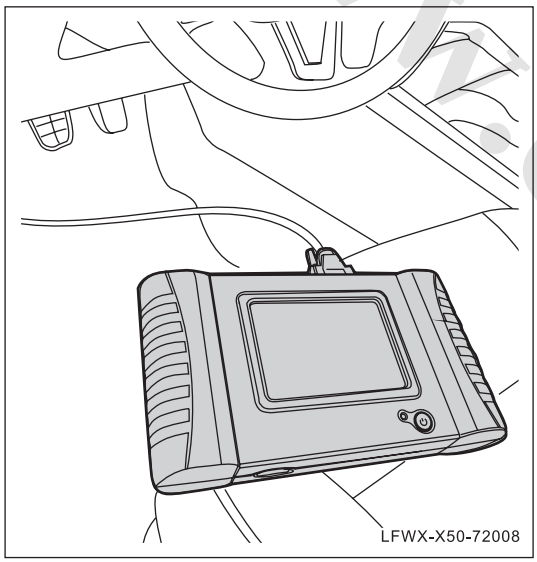
1. SELF-DIAGNOSIS SYSTEM CHECK

(a) Turn the ignition switch to "ON".

(b) Check the SRS fault indicator lamp on the instrument cluster.

Standards:

SRS fault indicator lamp goes out automatically within 5 - 6s after the ignition switch is turned to on. If the SRS fault indicator lamp remains on, it indicates that the airbag system is faulty, repair it after reading the diagnostic trouble code (DTC) with the diagnostic scanner.



2. READ AND CLEAR THE DTC

(a) Connect V30 diagnostic scanner to the diagnostic interface.

(b) Enter "Body electronics - airbag system" to read the DTC according to the display of the diagnostic scanner.

(c) Perform diagnosis referring to the DTC list according to the DTC hints. (see 72 - Safety Protection Device, Diagnosis, DTC Diagnosis)

(d) After diagnosing and troubleshooting the fault according to the DTC, clear the DTC.

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FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
The diagnostic scanner cannot communicate with the airbag system	1. Diagnostic interface fuse (blown) 2. Harness (short circuit or open circuit) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, Fault Diagnosis (1. The Diagnostic Scanner cannot Communicate with the Airbag System)
SRS fault indicator lamp is not lit	1. SRS fault indicator lamp circuit (short circuit) 2. SRS ECU (damaged) 3. Instrument cluster (damaged)	See 72 - Safety Protection Device, Diagnosis, Fault Diagnosis (2. The SRS Fault Indicator Lamp does not Come On)
SRS fault indicator lamp remains on	1. SRS fault indicator lamp circuit (open circuit) 2. SRS ECU (damaged) 3. Instrument cluster (damaged)	See 72 - Safety Protection Device, Diagnosis, Fault Diagnosis (3. The SRS Fault Indicator Lamp Remains On)

SYMPTOM DIAGNOSIS

1. THE DIAGNOSTIC SCANNER CANNOT COMMUNICATE WITH THE AIRBAG SYSTEM

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the diagnostic scanner, check whether it can enter the airbag system, and then read the DTC and data flow	Diagnosis is over	The diagnostic scanner cannot communicate with the airbag system	Go to Step 1
1	Check the fuse	Normal	Faulty	Instruction
	Check whether fuse FS18 and fuse FS19 of the central control box in the cab are blown.	Go to Step 2	The fuse line is faulty or the fuse is blown	Check and repair the fuse line, and replace the fuse with a new one of rated capacity
2	Check the diagnostic interface connector	Normal	Faulty	Instruction
	• Check whether the diagnostic interface connector and terminals are in good conditions • Turn the ignition switch to the “ON” position. • Check respectively the voltage between terminal 8 &9 of diagnostic interface connector I22 and the grounding with a multimeter **Voltage: 9 - 13 V**	Go to Step 3	The wire has an open circuit point	Repair the line fault between the diagnostic interface and the central control box
3	Check the voltage of the airbag diagnosis communication line	Normal	Faulty	Instruction
	• Turn the ignition switch to the "ON" position. • Measure the voltage between terminal 12 of the diagnostic interface I22 and the grounding **Voltage: 9 - 13 V**	Go to Step 6	The voltage or resistance is not in a reasonable range	Go to Step 4

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Steps	Inspection item	Inspection result		
4	Check SRS ECU	Normal	Faulty	Instruction
	• Turn the ignition switch to the "LOCK" position, and disconnect the SRS ECU wire harness connector • Turn the ignition switch to the "ON" position, and measure the voltage between terminal 5 of the SRS ECU and the body grounding **Voltage: 9 - 13 V** • Measure the resistance between terminal 6 of the SRS ECU wire harness connector and the body grounding point **Resistance: <2Ω**	Go to Step 5	The wire has an open circuit point	Repair the SRS ECU power and the grounding circuit
5	Check the airbag diagnosis communication line	Normal	Faulty	Instruction
	Check if there is continuity between terminal 9 of SRS ECU connector S01 and terminal 12 of diagnostic interface connector I22	Go to Step 6	The wire has an open circuit point	Repair the faulty wire harness open circuit point
6	Replacement and check	Normal	Faulty	Instruction
	Replace the SRS ECU, and recheck whether SRS DTC can be read by a diagnostic scanner	Replace the SRS ECU	Fault still exists	Find the cause out from other fault symptoms

2. SRS FAULT INDICATOR LAMP IS NOT LIT

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to the "ON" position, and check whether the instrument cluster SRS indicator lamp displays normally	The SRS fault indicator lamp goes off after self-test	The instrument cluster indicator lamp does not come on	• If the other indicator lamps on the instrument cluster does not come on, check the instrument cluster power and grounding lines • If just the SRS fault indicator lamp does not come on, go to the Step 1
1	Check the SRS fault indicator lamp line	Normal	Faulty	Instruction
	Disconnect the instrument cluster connector, turn the ignition switch to the "ON" position, and check the voltage between terminal 26 of instrument cluster connector I03 and the grounding **Voltage: 9 - 13 V**	Go to Step 2	If the voltage is not within the reasonable range, there is fault inside the instrument cluster	Replace the instrument cluster
2	Check the line between the SRS ECU and the instrument cluster	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect SRS ECU connector S01 • Check whether terminal 7 of SRS ECU connector S01 and terminal 26 of instrument cluster connector I03 is conducted	Go to Step 3	The SRS ECU, or the instrument cluster connector terminal or line has an open circuit fault	Check and repair the connector, terminal or wire harness between the SRS ECU and the instrument cluster
3	Check SRS ECU power line and the grounding line	Normal	Faulty	Instruction
	• Disconnect SRS ECU connector S01 • Turn the ignition switch to the "ON" position, and measure the voltage between terminal 5 of SRS ECU and the body grounding **Voltage: 9 - 13 V** • Measure the resistance between terminal 6 of the SRS ECU wire harness connector and the body grounding point **Resistance: <2Ω**	Go to Step 4	The wire has an open circuit point	Repair the SRS ECU power and the grounding circuit
4	Replacement and check	Normal	Faulty	Instruction
	Replace the SRS ECU, and check whether the SRS fault indicator lamp is normal	Replace the SRS ECU	Fault still exists	Find the cause out from other fault symptoms

3. SRS FAULT INDICATOR LAMP REMAINS ON

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Whether the airbag has exploded	Go to Step 1	The airbag is exploded	Replace the airbag
1	Read the DTC	Normal	Faulty	Instruction
	Read the airbag system DTC with the diagnostic scanner, and measure whether there is a DTC output	Go to Step 2	With DTC	Perform diagnosis according to the DTC hints
2	Check the SRS ECU connector	Normal	Faulty	Instruction
	• Turn the ignition switch to "OFF" position. • Disconnect the battery negative cable, and check whether the SRS ECU connector and terminal are connected normally	Go to Step 3	The SRS ECU connector has a connection fault	Properly connect the SRS ECU connector and terminal
3	Check the SRS fault indicator lamp line	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Turn the ignition switch to the "LOCK" position, disconnect the battery negative cable, and then disconnect the SRS ECU wire harness connector • Measure the resistance between terminal 7 of SRS ECU wire harness connector S01 and the body grounding point **Resistance: >1 MΩ**	Go to Step 4	The wire has a short circuit point	Check and repair the line fault between the SRS ECU and the instrument cluster
4	Check the instrument cluster	Normal	Faulty	Instruction
	Replace the instrument cluster, and confirm whether the SRS warning lamp works normally	Replace the instrument cluster	Fault still exists	Go to Step 5
5	Replacement and check	Normal	Faulty	Instruction
	Replace the SRS ECU, and confirm whether the SRS warning lamp works normally	Replace the SRS ECU	Fault still exists	Find the cause out from other fault symptoms

DTC LIST

NOTICE:

When performing a DTC check in the check mode, if a DTC is displayed, check the circuit system corresponding to the codes listed in the following table.

DTC (DTC)	Fault code description	Possible causes	Recommended action
$80D2	User configuration error	1. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (1. The SRS ECU Internal Fault)
$80D3	Control internal sensor error		
$80D4	Internal fault		
$80D5	Controller has ignited		
$80D6	Power voltage is too low	1. Battery (voltage too low) 2. Alternator (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (2. Power Supply Line Fault)
$80D7	Power voltage is too high		
$80D8	No power voltage		
$8001	Driver airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Driver airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (3. The Driver Airbag Circuit Fault)
$8002	Driver airbag igniter connecting the battery		
$8003	Driver airbag igniter with high resistance		
$8004	Driver airbag igniter with low resistance		
$8005	Driver airbag igniter is short to other channels		
$8011	Front passenger airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Front passenger airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (4. Front Passenger Airbag Circuit Fault)
$8012	Front passenger airbag igniter connecting the battery		
$8013	Front passenger airbag igniter with high resistance		
$8014	Front passenger airbag igniter with low resistance		
$8015	Front passenger airbag igniter is short to other channels		

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DTC (DTC)	Fault code description	Possible causes	Recommended action
$8021	Driver seat belt pre-tensioning igniter grounding	1. Wire harness (short circuit or open circuit) 2. Driver seat belt pretensioner (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (5. Driver Pretensioning Seat Belt Circuit Fault)
$8022	Driver seat belt pre-tensioning igniter connecting the battery		
$8023	Driver seat belt pre-tensioning igniter with high resistance		
$8024	Driver seat belt pre-tensioning igniter with low resistance		
$8025	Driver seat belt pre-tensioning igniter is short to other channels		
$8031	Front passenger seat belt pre-tensioning igniter grounding	1. Wire harness (short circuit or open circuit) 2. Front passenger seat belt pretensioner (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (6. The Front Passenger Pretensioning Seat Belt Circuit Fault)
$8032	Front passenger seat belt pre-tensioning igniter connecting the battery		
$8033	Front passenger seat belt pre-tensioning igniter with high resistance		
$8034	Front passenger seat belt pre-tensioning igniter with low resistance		
$8035	Front passenger seat belt pre-tensioning igniter is short to other channels		
$8008	Left side airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Driver side airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (7. The Left Side Airbag Circuit Fault)
$8009	Left side airbag igniter connecting the battery		
$800A	Left side airbag igniter with high resistance		
$800B	Left side airbag igniter with low resistance		
$800C	Left side airbag igniter is short to other channels		
$8018	Right side airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Front passenger side airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (8. The Right Side Airbag Circuit Fault)
$8019	Right side airbag igniter connecting the battery		
$801A	Right side airbag igniter with high resistance		
$801B	Right side airbag igniter with low resistance		
$801C	Right side airbag igniter is short to other channels		
$8028	Left curtain airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Left side curtain airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (9. The Left Side Curtain Airbag Circuit Fault)
$8029	Left curtain airbag igniter connecting the battery		
$802A	Left curtain airbag igniter with high resistance		
$802B	Left curtain airbag igniter with low resistance		
$802C	Left curtain airbag igniter is short to other channels		

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DTC (DTC)	Fault code description	Possible causes	Recommended action
$8038	Right curtain airbag igniter grounding	1. Wire harness (short circuit or open circuit) 2. Right side curtain airbag (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (10. The Right Side Curtain Airbag Circuit Fault)
$8039	Right curtain airbag igniter connecting the battery		
$803A	Right curtain airbag igniter with high resistance		
$803B	Right curtain airbag igniter with low resistance		
$803C	Right curtain airbag igniter is short to other channels		
$8101	Left side impact sensor connection error or sensor fault	1. Wire harness (short circuit or open circuit) 2. Left side impact sensor (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (11. The Left Side Impact Sensor Circuit Fault)
$8102	Left side impact sensor model error		
$8103	Left side impact sensor communication error		
$8104	Left side impact sensor is short to ground or overcurrent		
$8105	Left side impact sensor is short to power supply		
$8111	Right side impact sensor connection error or sensor fault	1. Wire harness (short circuit or open circuit) 2. Right side impact sensor (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (12. The Left Side Impact Sensor Circuit Fault)
$8112	Right side impact sensor model error		
$8113	Right side impact sensor communication error		
$8114	Right side impact sensor is short to ground or overcurrent		
$8115	Right side impact sensor is short to power supply		
$8121	Left side front crash sensor connection error or sensor fault	1. Wire harness (short circuit or open circuit) 2. Left front impact sensor (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (13. The Left Front Impact Sensor Circuit Fault)
$8122	Left side front crash sensor model error		
$8123	Left side front crash sensor communication error		
$8124	Left side front crash sensor is short to ground or overcurrent		
$8125	Left side front crash sensor is short to power supply		
$8131	Right side front crash sensor connection error or sensor fault	1. Wire harness (short circuit or open circuit) 2. Right front impact sensor (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (14. The Right Front Impact Sensor Circuit Fault)
$8132	Right side front crash sensor model error		
$8133	Right side front crash sensor communication error		
$8134	Right side front crash sensor is short to ground or overcurrent		
$8135	Right side front crash sensor is short to power supply		
$8071	Status indicator lamp is short to ground or disconnected.	1. Wire harness (short circuit or open circuit) 2. Instrument cluster (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (15. The SRS Fault Indicator Lamp Circuit Fault)
$8072	Status indicator lamp is short to power supply		
$8073	The airbag inhibit indicator lamp is short circuit to ground or broken		
$8074	The airbag inhibit indicator lamp is short circuit to power supply		

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DTC (DTC)	Fault code description	Possible causes	Recommended action
$8061	Collision output 1 is short to ground or disconnected	1. Wire harness (short circuit or open circuit) 2. Central lock control unit (damaged) 3. SRS ECU (damaged)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (16. The Impact Output Circuit Fault)
$8062	Collision output 1 is short to power supply		
$8063	Collision output 2 is short to ground or disconnected		
$8064	Collision output 2 is short to power supply		
$8081	Driver airbag configuration error	1. SRS ECU (installed incorrectly or mismatched models) 2. Sensor or actuator (incorrect models)	See 72 - Safety Protection Device, Diagnosis, DTC Diagnosis (17. The Airbag System Configuration Fault)
$8082	Front passenger airbag configuration error		
$8083	Driver seat belt pre-tensioning configuration error		
$8084	Front passenger seat belt pre-tensioning configuration error		
$8085	Driver side airbag configuration error		
$8086	Front passenger side airbag configuration error		
$8087	Driver curtain configuration error		
$8088	Front passenger curtain configuration error		
$8091	Collision output 1 configuration error		
$8092	Collision output 2 configuration error		
$80A0	Left side impact sensor configuration error		
$80A1	Right side impact sensor configuration error		
$80A2	Left side front crash sensor configuration error		
$80A3	Right side front crash sensor configuration error		

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DTC DIAGNOSIS

1. THE INTERNAL PART OF THE SRS ECU FAULT

$8000 - Undefined error

$80D1 - Excessive number of the fault record

$80D2 - User configuration errors or controller in locked state

$80D4 - Internal fault

$80D5 - The controller has ignited

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Restart the engine to perform the road test, reread the DTC, and check whether the DTC can be read	Go to Step 2	The DTC does not exist	The fault is sporadic
2	Replacement and check	Normal	Faulty	Instruction
	• Replace the SRS ECU, and perform road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

2. POWER CIRCUIT FAULT

$80D6 - The power supply voltage is too low

$80D7 - The Power voltage is too high

$80D8 - There is no power supply voltage

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector is loose or damaged, and whether the wire harness terminal is corroded
2	Check the alternator voltage	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Connect vehicle diagnostic scanner, read the alternator data flow under various conditions, and then confirm whether the alternator voltage is normal Voltage: 13 - 15 V	Go to Step 3	The voltage is not within the normal range	Check and repair the alternator circuit
3	Check SRS ECU	Normal	Faulty	Instruction
	• Replace the SRS ECU, and perform the road test. • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

3. DRIVER AIRBAG CIRCUIT FAULT

$8001 Driver airbag igniter grounding

$8002 Driver airbag igniter connecting the battery

$8003 Driver airbag igniter resistance is high

$8004 Driver airbag igniter resistance is low

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the driver airbag connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the clock spring connector	Normal	Faulty	Instruction
	Disconnect the clock spring connector, check whether the SRS ECU and the clock spring connectors are loose or damaged, and whether the wire harness terminal is corroded	Go to Step 3	The connector and pin are abnormal	Clean the connector and pin
3	Check the clock spring line	Normal	Faulty	Instruction
	Measure whether there is continuity between terminal 1 & 2 of clock spring connector S02 and terminal 10 &11 of SRS ECU connector	Go to Step 4	The wire between the clock spring and the SRS ECU has an open circuit point	Repair the faulty wire
4	Check the clock spring	Normal	Faulty	Instruction
	Check whether the wire in the clock spring works normally	Go to Step 5	The clock spring internal wire is faulty	Replace the clock spring
5	Check the driver airbag	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Replace the driver airbag • Diagnose it again, read the DTC and check if there are DTCs & fault symptoms	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

4. THE FRONT PASSENGER AIRBAG CIRCUIT FAULT

$8011 The front passenger airbag igniter grounding

$8012 The front passenger airbag igniter connecting the battery

$8013 The front passenger airbag igniter resistance is high

$8014 The front passenger airbag igniter resistance is low

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the front passenger airbag connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the front passenger airbag line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the front passenger airbag connector S03 • Measure the wires between the terminal 1 of S03 and the terminal 14 of S01, and terminal 2 of S03 and the terminal 13 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the front passenger airbag and the SRS ECU is short circuit or open circuit	Repair the faulty wire
3	Check the front passenger airbag	Normal	Faulty	Instruction
	Replace the front passenger airbag, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the front passenger airbag	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

5. THE DRIVER PRETENSIONING SEAT BELT CIRCUIT FAULT

$8021 Driver seat belt pre-tensioning igniter grounding

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$8022 Driver seat belt pre-tensioning igniter connecting the battery

$8023 Driver seat belt pre-tensioning igniter with high resistance

$8024 Driver seat belt pre-tensioning igniter with low resistance

$8025 Driver seat belt pre-tensioning igniter is short to other channels

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the driver pretensioning seat belt connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the driver pretensioning seat belt line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the driver pretensioning seat belt connector S05 • Measure the wires between the terminal 1 of S05 and the terminal 1 of S01, and terminal 2 of S05 and the terminal 2 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the driver pretensioning seat belt and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the driver pretensioning seat belt	Normal	Faulty	Instruction
	Replace the driver pretensioning seat belt, perform re-diagnosis, read the DTC, and confirm existence of DTC and symptom.	Replace the driver pretensioning seat belt	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

6. THE FRONT PASSENGER PRETENSIONING SEAT BELT CIRCUIT FAULT

$8031 Front passenger seat belt pre-tensioning igniter grounding

$8032 Front passenger seat belt pre-tensioning igniter connecting the battery

$8033 Front passenger seat belt pre-tensioning igniter with high resistance

$8034 Front passenger seat belt pre-tensioning igniter with low resistance

$8035 Front passenger seat belt pre-tensioning igniter is short to other channels

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Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the front passenger pretensioning seat belt connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the front passenger airbag line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the front passenger pretensioning seat belt connector S09 • Measure the wires between the terminal 1 of S09 and the terminal 3 of S01, and terminal 2 of S09 and the terminal 4 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the front passenger pretensioning seat belt and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the front passenger pretensioning seat belt	Normal	Faulty	Instruction
	Replace the front passenger pretensioning seat belt, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the front passenger pretensioning seat belt	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

7. DRIVER SIDE AIRBAG CIRCUIT FAULT

$8008 The left side airbag igniter grounding

$8009 The left side airbag igniter connecting the battery

$800A The left side airbag igniter resistance is high

$800B The left side airbag igniter resistance is low

$800C Left side airbag igniter is short to other channels

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery

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Steps	Inspection item	Inspection result		
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the driver side airbag connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the driver side airbag line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the driver side airbag connector S04 • Measure the wires between the terminal 1 of S04 and the terminal 16 of S01, and terminal 2 of S04 and the terminal 17 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the driver side airbag and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the driver side airbag	Normal	Faulty	Instruction
	Replace the driver side airbag, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the driver side airbag	With DTC and fault symptom	Go to Step 4
4	Check the SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

8. FRONT PASSENGER SIDE AIRBAG CIRCUIT FAULT

$8018 The right side airbag igniter grounding

$8019 The right side airbag igniter connecting the battery

$801A Right side airbag igniter with high resistance

$801B Right side airbag igniter with low resistance

$801C Right side airbag igniter is short to other channels

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and front passenger side airbag connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the front passenger side airbag line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the front passenger side airbag connector S08 • Measure the wires between the terminal 1 of S08 and the terminal 18 of S01, and terminal 2 of S08 and the terminal 19 of S01 for continuity , and check whether they are short circuit to ground	Go to Step 3	The wire between the front passenger side airbag and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the front passenger side airbag	Normal	Faulty	Instruction
	Replace the front passenger side airbag, perform re-diagnosis, read the DTC, and confirm existence of DTC and symptom	Replace the front passenger side airbag	With DTC and fault symptom	Go to Step 4
4	Check the SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

9. LEFT SIDE CURTAIN AIRBAG CIRCUIT FAULT

$8028 The left side curtain airbag igniter grounding

$8029 The left side curtain airbag igniter connecting the battery

$802A Left curtain airbag igniter with high resistance

$802B Left curtain airbag igniter with low resistance

$802C Left curtain airbag igniter is short to other channels

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the left side curtain airbag connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the left side curtain airbag wiring	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the left side curtain airbag assembly connector S107 • Measure the wires between the terminal 1 of S07 and the terminal 20 of S01, and terminal 2 of S07 and the terminal 21 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the left side curtain airbag and the SRS ECU is open circuit or short circuit.	Repair the faulty wire
3	Check the left side curtain airbag	Normal	Faulty	Instruction
	Replace the left side curtain airbag assembly, perform rediagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the left side curtain airbag assembly	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform rediagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

10. RIGHT SIDE CURTAIN AIRBAG CIRCUIT FAULT

$8038 The right side curtain airbag igniter grounding

$8039 The right side curtain airbag igniter connecting the battery

$803A Right curtain airbag igniter with high resistance

$803B Right curtain airbag igniter with low resistance

$803C Right curtain airbag igniter is short to other channels

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the right side curtain airbag assembly connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the right side curtain airbag assembly wiring	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the right side curtain airbag assembly connector S11 • Measure whether the wires between the terminal 1 of S11 and the terminal 45 of S01, and terminal 2 of S11 and the terminal 46 of S01 are conducted, and check whether they are short circuit to ground	Go to Step 3	The wire between the right side curtain airbag assembly and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the right side curtain airbag assembly	Normal	Faulty	Instruction
	Replace the right side curtain airbag assembly, perform rediagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the right side curtain airbag assembly	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform rediagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

11. LEFT SIDE IMPACT SENSOR CIRCUIT FAULT

$8101 Left side impact sensor connection error or sensor fault

$8102 Left side impact sensor model error

$8103 Left side impact sensor communication error

$8104 Left side impact sensor is short to ground or overcurrent

$8105 Left side impact sensor is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the left side impact sensor connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the left side impact sensor wiring	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the left side impact sensor connector S06 • Measure the wires between the terminal 1 of S06 and the terminal 22 of S01, and terminal 2 of S06 and the terminal 47 of S01 for continuity and check whether they are short circuit to ground	Go to Step 3	The wire between the left side impact sensor and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the left side impact sensor	Normal	Faulty	Instruction
	Replace the left side impact sensor, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the left side impact sensor	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

12. RIGHT SIDE IMPACT SENSOR CIRCUIT FAULT

$8111 Right side impact sensor connection error or sensor fault

$8112 Right side impact sensor model error

$8113 Right side impact sensor communication error

$8114 Right side impact sensor is short to ground or overcurrent

$8115 Right side impact sensor is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the right side impact sensor connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the right side impact sensor line	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the right side impact sensor connector S10 • Measure the wires between the terminal 1 of S10 and the terminal 23 of S01, and terminal 2 of S10 and the terminal 48 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the right side impact sensor and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the right side impact sensor	Normal	Faulty	Instruction
	Replace the right side impact sensor, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the right side impact sensor	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

13. LEFT FRONT IMPACT SENSOR CIRCUIT FAULT

$8121 Left side front impact sensor connection error or sensor fault

$8122 Left side front impact sensor model error

$8123 Left side front impact sensor communication error

$8124 Left side front impact sensor is short to ground or overcurrent

$8125 Left side front impact sensor is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the left front impact sensor connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the left front impact sensor wiring	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the front left impact sensor connector U20 • Measure the wires between the terminal 1 of U20 and the terminal 24 of S01, and terminal 2 of U20 and the terminal 49 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the front left impact sensor and the SRS ECU is open circuit or short circuit	Repair the faulty wire
3	Check the left front impact sensor	Normal	Faulty	Instruction
	Replace the left front impact sensor, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom	Replace the left front impact sensor	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

14. RIGHT FRONT IMPACT SENSOR CIRCUIT FAULT

$8131 Right side front impact sensor connection error or sensor fault

$8132 Right side front impact sensor model error

$8133 Right side front impact sensor communication error

$8134 Right side front impact sensor is short to ground or overcurrent

$8135 Right side front impact sensor is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the right front impact sensor connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the right front impact sensor wiring	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector S01 and the right front impact sensor connector S14 • Measure the wires between the terminal 1 of U14 and the terminal 25 of S01, and terminal 2 of U14 and the terminal 50 of S01 for continuity, and check whether they are short circuit to ground	Go to Step 3	The wire between the right front impact sensor and the SRS ECU is short circuit or open circuit.	Repair the faulty wire
3	Check the right front impact sensor	Normal	Faulty	Instruction
	Replace the right front impact sensor, perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the right front impact sensor	With DTC and fault symptom	Go to Step 4
4	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

15. SRS FAULT INDICATOR LAMP CIRCUIT FAULT

$8071 The state indicator lamp is short circuit to ground or open circuit

$8072 The state indicator lamp is short circuit to power supply

$8073 The airbag inhibit indicator lamp is short circuit to ground or open circuit

$8074 The airbag inhibit indicator lamp is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to the "ON" position, and observe whether the instrument cluster airbag indicator lamp displays normally	Go to Step 1	The SRS fault indicator lamp is abnormal	Go to Step 1
1	Read the DTC	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the instrument cluster connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the line between the instrument cluster and the SRS ECU	Normal	Faulty	Instruction
	• Disconnect the SRS ECU connector and the instrument cluster connector • Measure the wire between the terminal 26 of the instrument cluster wire harness connector I03 and the terminal 7 of the SRS ECU connector S01 for continuity, and check whether the wire harness is short circuit to power supply or grounding short circuit	Go to Step 3	The wire between the instrument cluster and the SRS ECU has an open circuit point	Repair the faulty wire
3	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform rediagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

16. IMPACT OUTPUT CIRCUIT FAULT

$8071 Impact output 1 is short circuit to ground or open circuit

$8072 Impact output 1 is short circuit to power supply

$8073 Impact output 2 is short circuit to ground or open circuit

$8074 Impact output 2 is short circuit to power supply

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the SRS ECU connector and the central locking control unit connector are loose or damaged, and whether the wire harness terminal is corroded
2	Check the line between the central locking control unit and the SRS ECU	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect the central locking control unit and the instrument cluster connectors • Measure the wire between the terminal 7 of the central locking control unit wire harness connector I16 and the terminal 37 of the SRS ECU connector S01 for continuity, and check whether the wire harness is short circuit to power supply or grounding short circuit	Go to Step 3	The wire between the central locking control unit and the SRS ECU has short circuit or open circuit point	Repair the faulty wire
3	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

17. AIRBAG SYSTEM CONFIGURATION ERROR

$8081 Driver airbag configuration error

$8082 Front passenger airbag configuration error

$8083 Driver seat belt pre-tensioning configuration error

$8084 Front passenger seat belt pre-tensioning configuration error

$8085 Driver side airbag configuration error

$8086 Front passenger side airbag configuration error

$8087 Driver curtain configuration error

$8088 Front passenger curtain configuration error

$8091 Collision output 1 configuration error

$8092 Collision output 2 configuration error

$80A0 Left side impact sensor configuration error

$80A1 Right side impact sensor configuration error

$80A2 Left side front crash sensor configuration error

$80A3 Right front impact sensor configuration error

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the battery voltage is normal **Voltage: 9 - 13 V**	Go to Step 1	The inspection voltage is out of the specified range	Charge or replace the battery
1	Read the DTC	Normal	Faulty	Instruction
	• Connect the vehicle diagnostic scanner, and read and clear the DTC • Reread the DTC, and check whether the DTC can be read	The fault is sporadic	If there is a DTC, go to the Step 2	The fault is sporadic. Check whether the connectors of the relevant electrical components are loose or damaged, and whether the wire harness terminal is corroded

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Steps	Inspection item	Inspection result		
2	Check the electrical components	Normal	Faulty	Instruction
	• Check whether the components related with DTC are the original accessories • Read the diagnostic data flow, and check whether the electrical components match the vehicle	Go to Step 3	The electrical components are not original accessories or the components do not match the SRS ECU	Replace the accessories or re-match the airbag
3	Check SRS ECU	Normal	Faulty	Instruction
	Replace the SRS ECU, and perform the road test; perform re-diagnosis, read the DTC, and confirm the existence of DTC and symptom.	Replace the SRS ECU	Fault still exists	Find the cause out from other symptoms

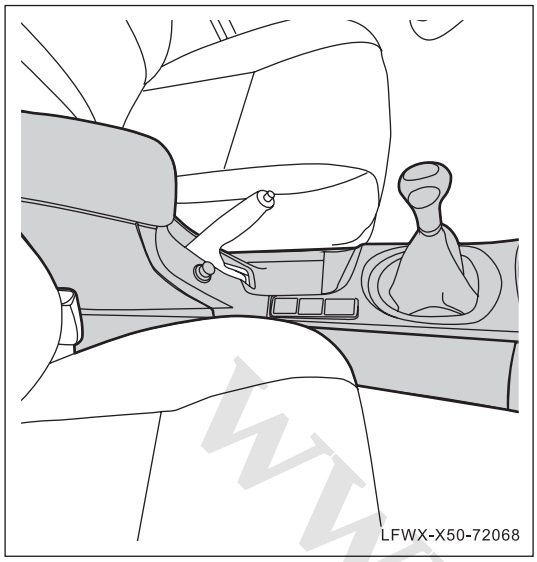
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SRS ECU

REPLACEMENT

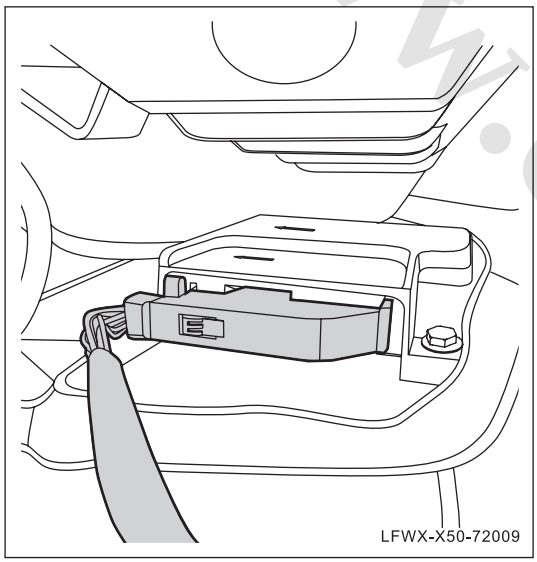


1. TURN OFF THE IGNITION SWITCH AND DISCONNECT THE BATTERY NEGATIVE CABLE

△ HINT:

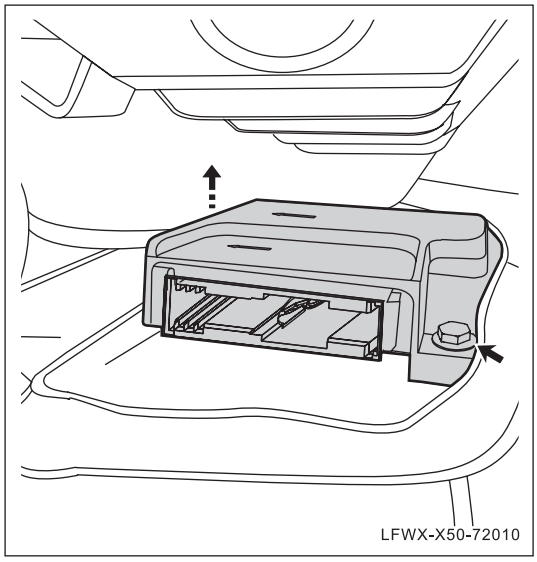
After disconnecting the battery negative cable, wait for at least 90s and conduct the following operations.

2. REMOVE THE CONSOLE ASSEMBLY (SEE 85 - DASHBOARD AND CONSOLE DASHBOARD, CONSOLE, REPLACEMENT)



3. REMOVE SRS ECU

(a) Disconnect the SRS ECU connector.

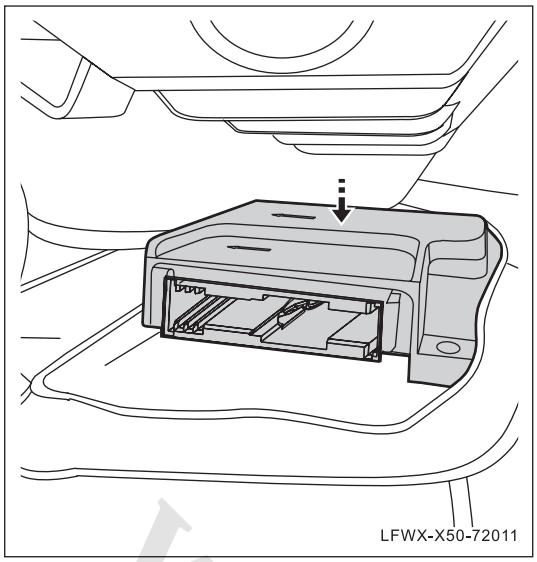


(b) Remove the fixing bolts of SRS ECU.

(c) Remove SRS ECU.

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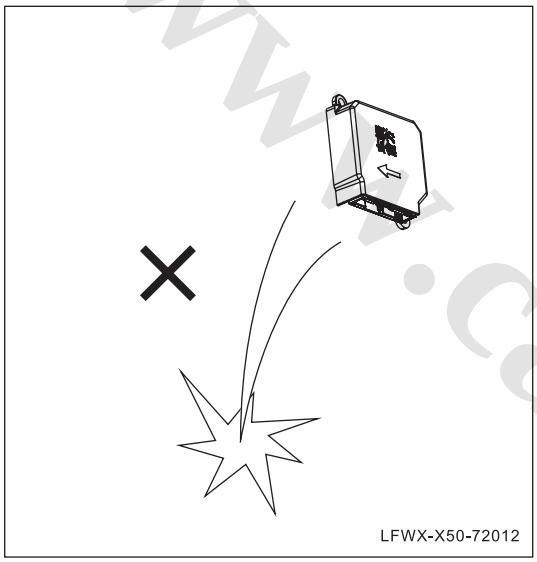


4. INSTALL SRS ECU

(a) Place the ECU in the installation position.

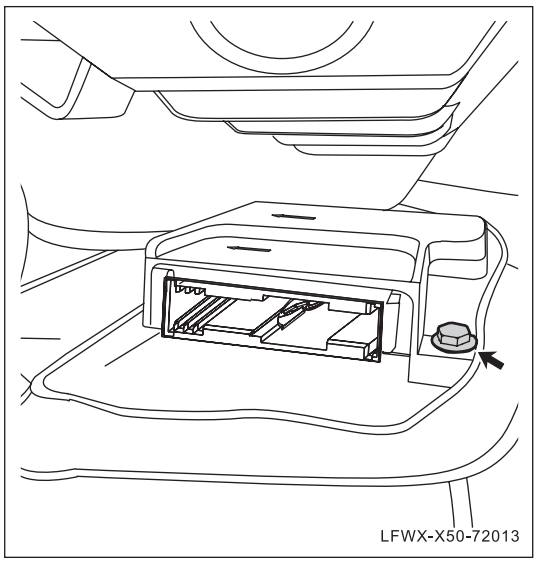
△ HINT:

- There must be no foreign matter on the mounting surface of ECU to ensure that ECU can be laid in level condition.
- Ensure that the arrow direction on the ECU label is the front of the vehicle, and align the three mounting holes of the ECU with the mounting holes on the ECU bracket.



NOTICE:

Handle SRS ECU with care to avoid it from falling off. If SRS ECU falls off, replace a new ECU and it is prohibited to install the damaged ECU to the vehicle.

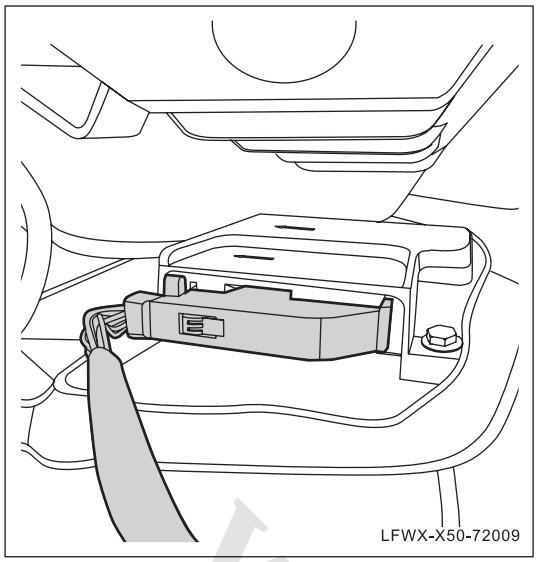


(b) Install the fixing bolts of SRS ECU.

Torque: 6 - 10 N•m

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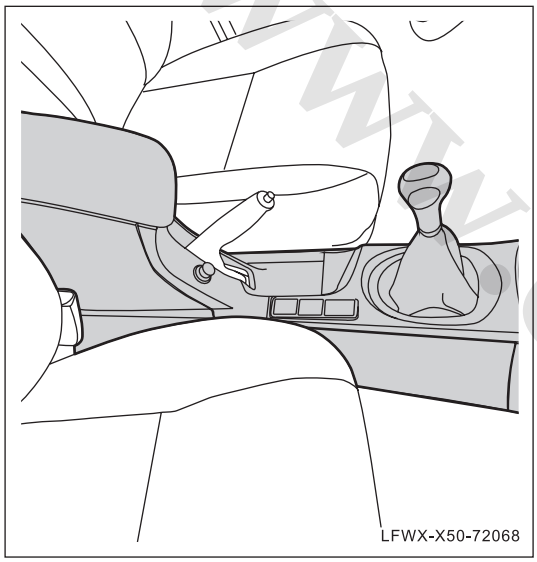
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(c) Connect the SRS ECU connector.

△ HINT:

Make sure all related connectors are fixed and all wire harnesses are not damaged.



5. INSTALL THE CONSOLE ASSEMBLY (SEE 85 - DASHBOARD AND CONSOLE, CONSOLE, REPLACEMENT)

6. CONNECT THE BATTERY NEGATIVE CABLE.

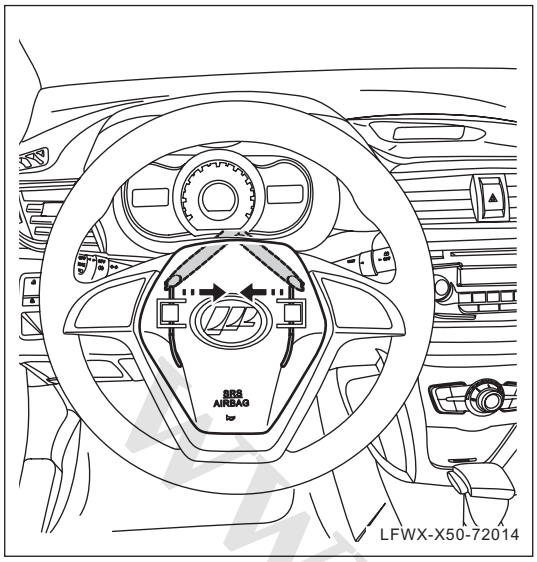
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DRIVER AIRBAG

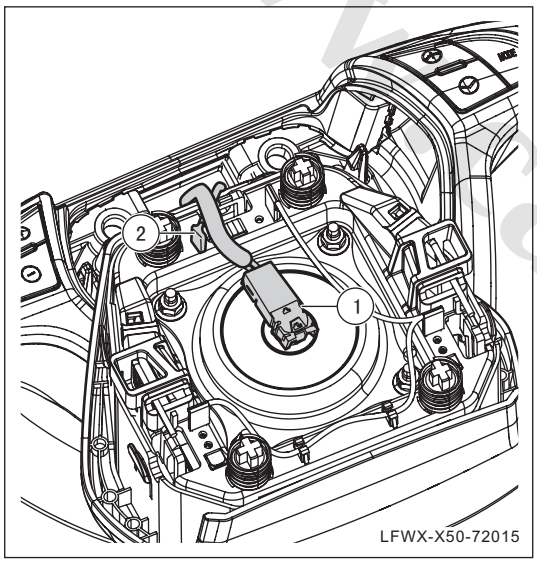
REPLACEMENT



1. TURN OFF THE IGNITION SWITCH AND DISCONNECT THE BATTERY NEGATIVE CABLE

2. REMOVE DRIVER AIRBAG

(a) Pry the front protective cover of the airbag and pry inward the fixing snap rings at both sides of the airbag with a screwdriver (as shown in the figure) to remove the airbag.



(b) Disconnect the driver airbag connector.

- Disconnect safety airbag connector ① .
- Disconnect horn switch wire harness connector ② .



(c) Remove the driver airbag module assembly and place it safely.

NOTICE:

Placing face down the airbag module is very dangerous. If the airbag deploys, the module movement may cause serious injury to the people around; therefore, be sure to place face up the airbag module.

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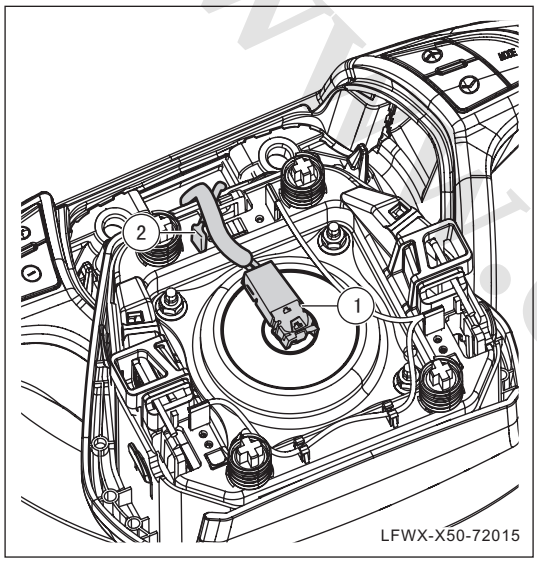

LFWX-X50-72018

3. INSTALL AIRBAG MODULE FOR THE DRIVER

(a) Bring a new airbag module for the driver.

NOTICE:

Improper handling may suddenly trigger the new airbag module, resulting in serious personal injury; therefore, be sure to place the face of the airbag module toward the front of the body during handling to reduce possible injury.

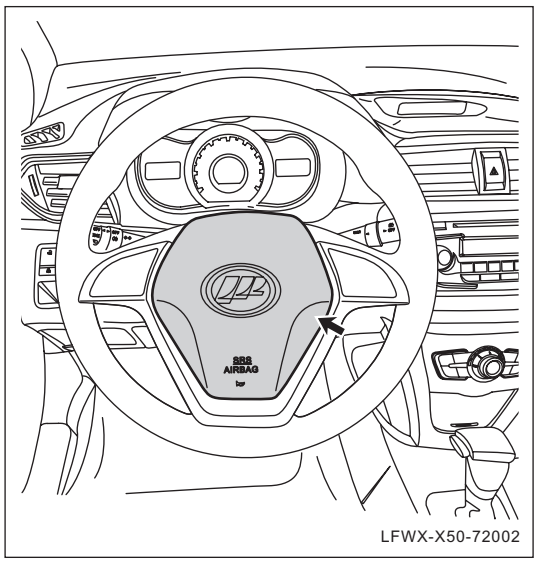


LFWX-X50-72015

4. INSTALL DRIVER AIRBAG

(a) Connect the driver airbag connector.

- Connect safety airbag connector ① .
- Connect horn switch wire harness connector ② .



LFWX-X50-72002

(b) Tighten the driver airbag, and install the snap ring in place.

(c) Connect the battery negative cable.

5. CHECK DRIVER AIRBAG MODULE

6. CHECK SRS FAULT INDICATOR LAMP

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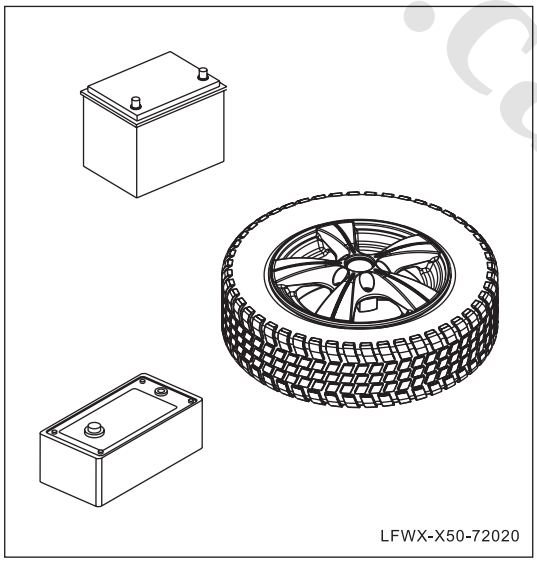
DISPOSAL

△ HINT:

When scrapping a vehicle or disposing of the driver airbag module, be sure always first deploy the driver airbag to avoid the disposed driver airbag from deployment in special circumstances. Dispose of the deployment according to the following procedures. If the disposed driver airbag cannot be deployed in accidents, contact with the service station authorized by LIFAN.

⚠ WARNING:

- **Never dispose of a driver airbag module that is not deployed.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified special tools by LIFAN. The operation shall be done in a place far away from electrical interference.**
- **When deploying the airbag, perform the operation at least 10 m away from the airbag assembly.**
- **The airbag is very hot after being deployed, so leave it alone for at least 30 minutes after deployment to avoid being scalded.**
- **Use gloves and safety glasses when handling the deployed airbag.**
- **Do not apply water to the airbag assembly after being deployed.**
- **Always wash your hands with water after completing the operation.**



1. PREPARATION

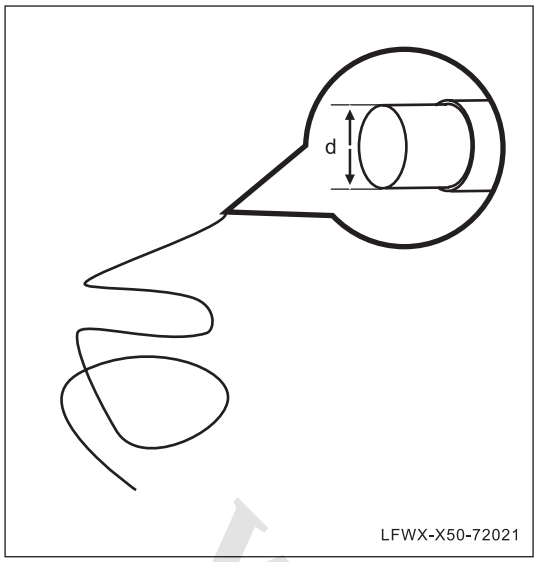
(a) Prepare special tools to deploy the airbag.

(b) Prepare a battery for the power source to deploy the airbag.

(c) Prepare one waste wheel with one steel rim and some waste tires (without steel rims) or hard carton and heavy objects.

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(d) Prepare some waste wire harnesses for vehicle maintenance.

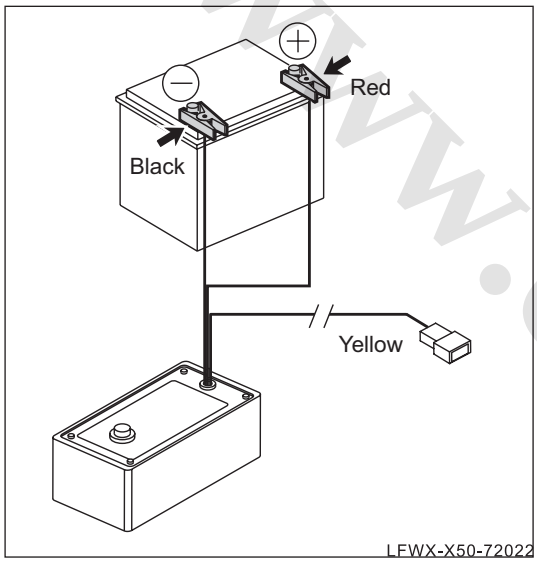
△ HINT:

The diameter "d" of bare wire harness shall be larger than 1.3 mm, i.e., sectional area of bare wire harness is larger than 1.25 mm^2.

⚠ WARNING:

If the wire harness for binding the driver airbag is too thin or unreliable, it may be broken when the airbag deploys. It is very dangerous. Therefore, selected wire harness or equivalent shall be reliable.

(e) Select a spacious and appropriate space.

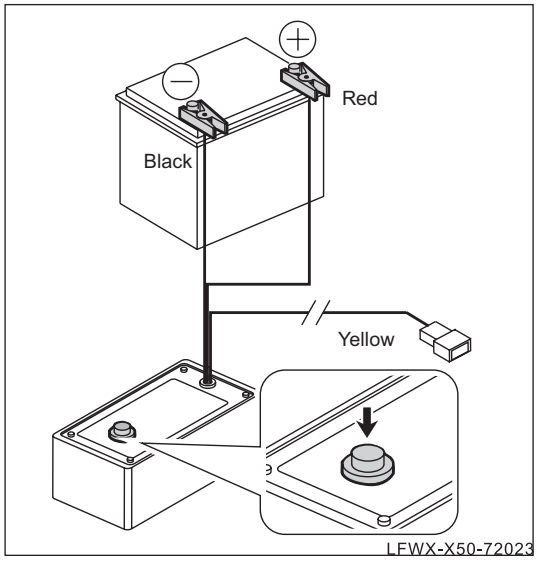


2. CHECK THE PERFORMANCE OF SPECIAL TOOL FOR DEPLOYING AIRBAG.

(a) Connect the special tool for deploying airbag to the battery.

△ HINT:

Connect the red clip of special tool for deploying airbag to the battery positive (+) terminal and the black clip to the battery negative (–) terminal. Do not connect the yellow wire. It is used to connect the airbag module.



(b) Press the activation switch of special tools for deploying airbag and check if the LED is lit.

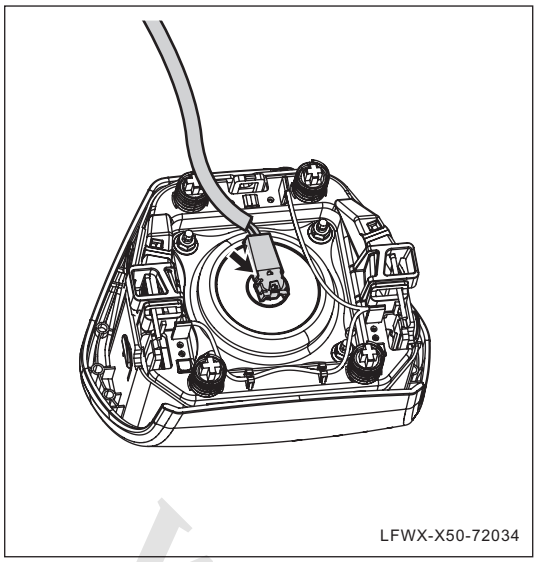
⚠ WARNING:

If the LED is not lit, then the special tool for deploying airbag may have a fault. Therefore, it cannot be used.

(c) Disconnect the special tool for deploying airbag from the battery.

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LFWX-X50-72034

3. FIX DRIVER AIRBAG MODULE

(a) Connect the driver airbag wire harness to the driver airbag module.



LFWX-X50-72024

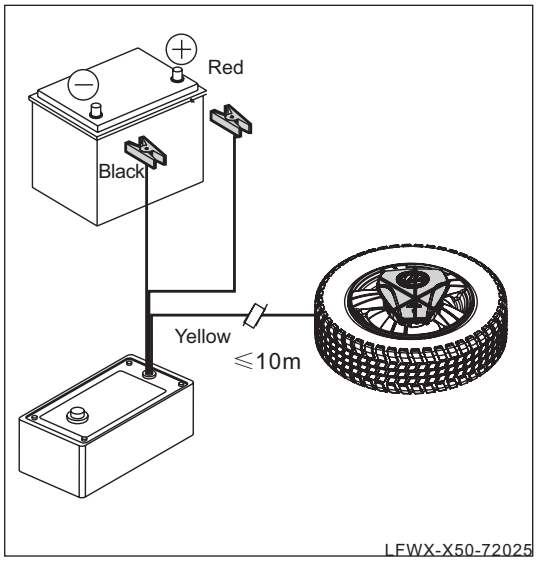
(b) Fix the driver airbag on the prepared wheel with wire harness.

△ HINT:

When the driver airbag deploys, it will damage the wheel. Therefore, it requires waste wheels.

⚠ WARNING:

- **Make sure wire harness is reliable and tight. If the wire harness is broke when the airbag module is deploying, the airbag module will bounce out, which is very dangerous.**
- **Make sure the driver airbag surface is bound upwards. If the metal surface is upwards, the wire harness will be broke when the airbag module is deploying. As a result, the driver airbag flies to the sky, which is very dangerous.**



LFWX-X50-72025

4. CONNECT SPECIAL TOOLS FOR DEPLOYING AIRBAG.

(a) Connect the driver airbag wire harness to the yellow connector of the special tool for deploying airbag.

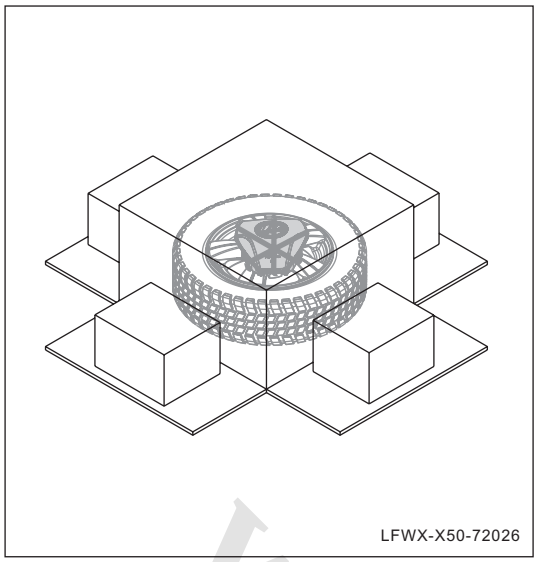
△ HINT:

In order to avoid damaging the connector and the wire harness of the special tool for deploying airbag, do not lock the secondary lock of the twin lock. At the same time, make sure the wire harness inside the tire is a little bit loose. Twin lock and loose wire harness can ensure that the wire harness connector can be disconnected in time to protect the wire harness of the special tool for deploying airbag when the airbag deploys, although the vibration is very high.

(b) Move the special tool for deploying airbag more than 10 m away from the bound airbag.

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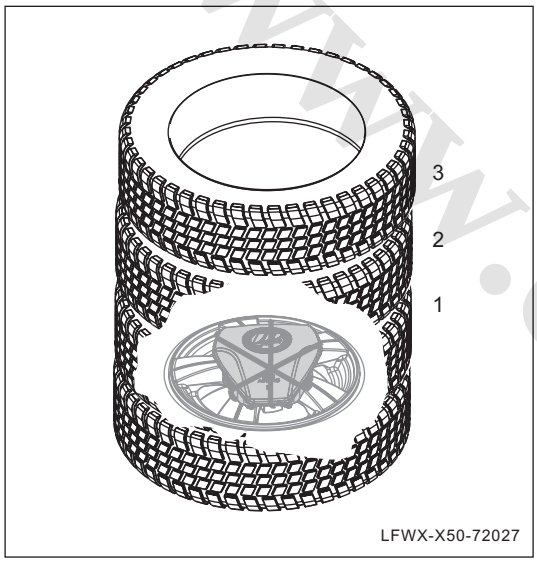


5. COVER AND HANDLE BOUND AIRBAG MODULE

(a) Cover the bound airbag module with hard cartons or waste tires.

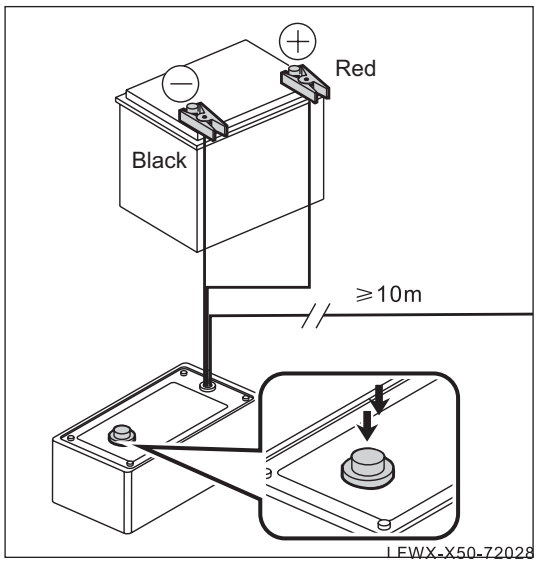
- Covering method with hard cartons:

Use a hard carton that is larger than the wheel to cover the bound airbag module, and place heavy objects that are larger than 190 kg around the hard carton. As shown in the figure.



- Covering method with tires:

Use 3 or more waste tires without rim to cover the bound airbag module. As shown in the figure.



6. DEPLOY AIRBAG MODULE

(a) Connect the red and black clips of the special tool for deploying airbag to the battery positive (+) and negative (-) terminals, respectively.

(b) Ensure that no one or animal is within 10 m area around the bundled airbag.

(c) Press the activation switch and deploy the airbag.

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7. DISPOSE OF DRIVER AIRBAG MODULE

(a) Remove the driver airbag module from the steel ring.

(b) Put the driver airbag into a plastic bag and seal it, and dispose of the driver airbag module as disposal of waste parts.

⚠ WARNING:

- **The airbag is very hot after being deployed, so leave it alone for at least 30 minutes after deployment to avoid being scalded.**
- **Use gloves and safety glasses when handling the deployed airbag.**
- **Do not apply water to the airbag assembly after being deployed.**
- **Always wash your hands with water after completing the operation.**

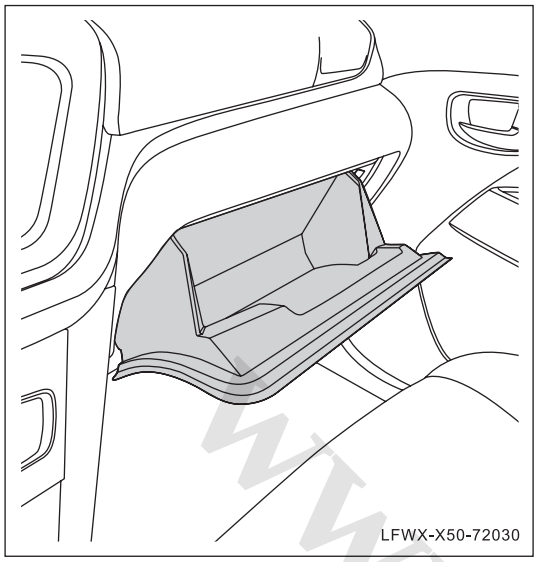
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PASSENGER AIRBAG

REPLACEMENT

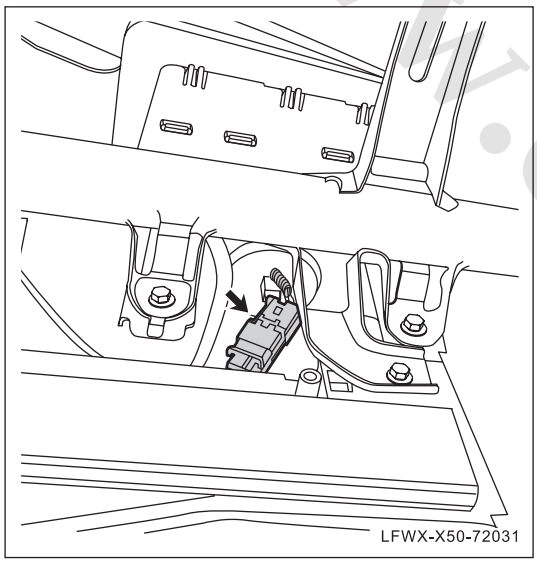


1. TURN OFF THE IGNITION SWITCH AND DISCONNECT THE BATTERY NEGATIVE CABLE

△ HINT:

After disconnecting the battery negative cable, wait for at least 90s and conduct the following operations.

2. REMOVE THE GLOVE BOX (SEE 85 - DASHBOARD AND CONSOLE, GLOVE BOX, REPLACEMENT)

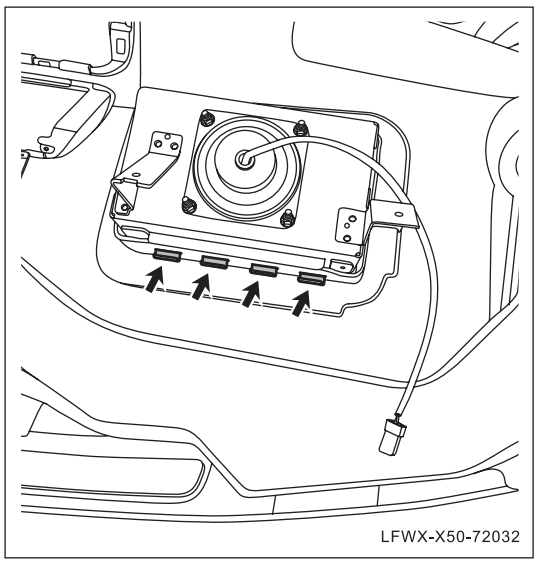


3. DISCONNECT FRONT PASSENGER AIRBAG CONNECTOR

⚠ WARNING:

Before operating the airbag, read Chapter 72 - Safety Protection Device, Airbag, Precautions.

4. REMOVE THE DASHBOARD UPPER TRIM PANEL (SEE 85 - DASHBOARD AND CONSOLE, DASHBOARD UPPER TRIM PANEL, REPLACEMENT)



5. REMOVE PASSENGER AIRBAG MODULE ASSEMBLY

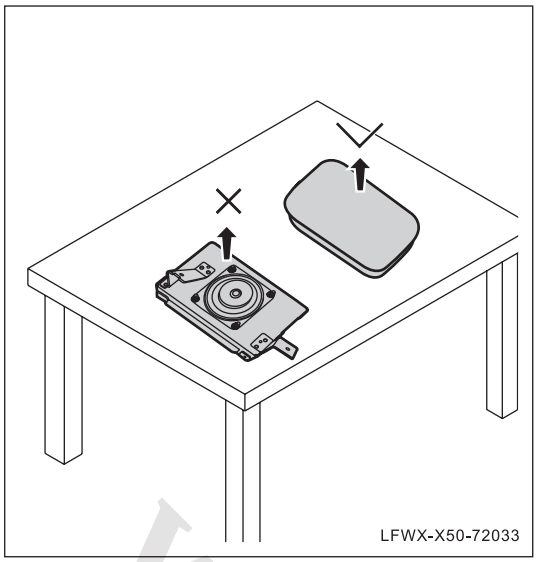
(a) Slight pry the snap plate connecting the passenger airbag module and the dashboard.

⚠ WARNING:

Never disassemble the front passenger airbag module.

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(b) Remove the passenger airbag module assembly and place it safely.

NOTICE:

When placing the airbag module, it is dangerous to keep the face downwards. If the airbag deploys, the module movement will cause serious injury. Therefore, place it with the face upwards.

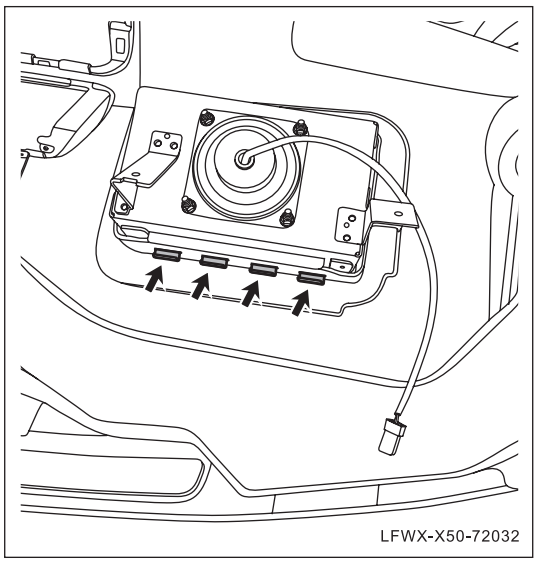


6. INSTALL PASSENGER AIRBAG MODULE ASSEMBLY

(a) Fetch a new passenger airbag module.

NOTICE:

Improper handling may suddenly trigger the new airbag module, resulting in serious personal injury; therefore, be sure to place the face of the airbag module toward the front of the body during handling to reduce possible injury.



(b) Install the new passenger airbag to the dashboard.

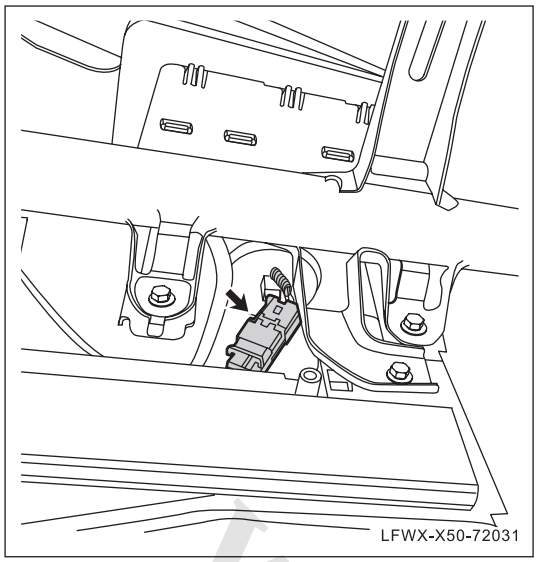
NOTICE:

After installation, check carefully if it is installed in place.

7. INSTALL THE DASHBOARD UPPER TRIM PANEL (SEE 85 - DASHBOARD AND CONSOLE, DASHBOARD UPPER TRIM PANEL, REPLACEMENT)

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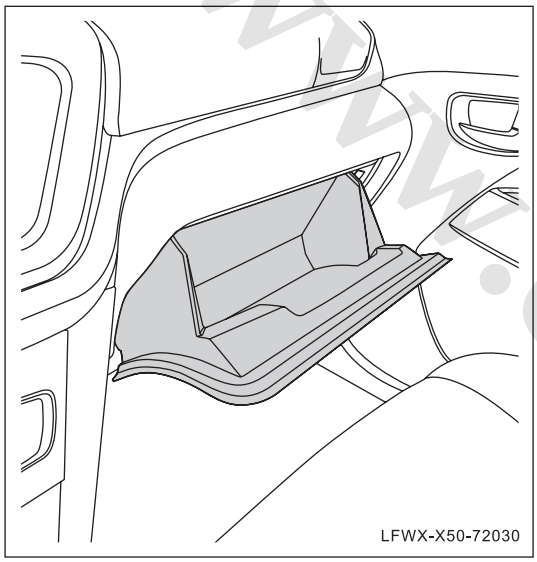
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8. **CONNECT FRONT PASSENGER AIRBAG CONNECTOR**

NOTICE:

Do not pull the SRS wire harness forcedly.



9. **INSTALL GLOVE BOX (SEE 85 - DASHBOARD AND CONSOLE, GLOVE BOX, REPLACEMENT)**
10. **CONNECT THE BATTERY NEGATIVE CABLE**
11. **INSPECT PASSENGER SAFETY AIRBAG MODULE**
12. **CHECK SRS FAULT INDICATOR LAMP**

DISPOSAL

△ HINT:

When scrapping a vehicle or disposing of the passenger airbag module, be sure always first deploy the passenger airbag to avoid the disposed passenger airbag from deployment in special circumstances. Dispose of the deployment according to the following procedures. If the disposed driver airbag cannot be deployed in accidents, contact with the service station authorized by LIFAN.

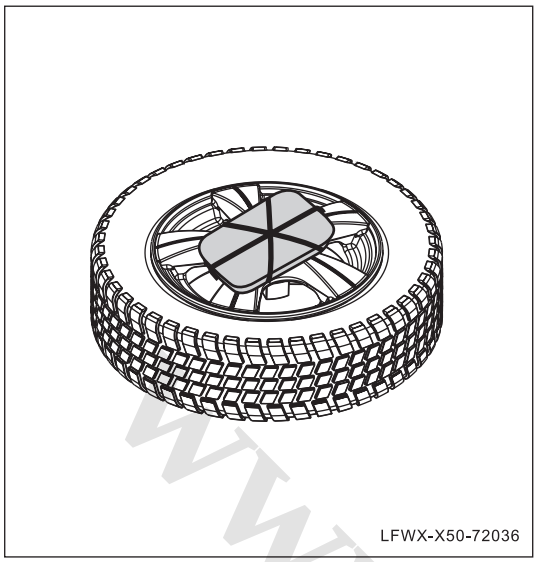
⚠WARNING:

- **Never dispose of a passenger airbag module that is not deployed.**
- **The airbag produces a sizeable exploding sound when it deploys, so perform the operation out of doors and where it will not create a nuisance to nearby residents.**
- **When deploying the airbag, always use the specified special tools by LIFAN. The operation shall be done in a place far away from electrical interference.**
- **When deploying the airbag, perform the operation at least 10 m away from the airbag assembly.**
- **The airbag is very hot after being deployed, so leave it alone for at least 30 minutes after deployment to avoid being scalded.**

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- **Use gloves and safety glasses when handling the deployed airbag.**
- **Do not apply water to the airbag assembly after being deployed.**
- **Always wash your hands with water after completing the operation.**



△ HINT:

The disposal method of the passenger airbag is the same as that of the driver airbag. (see 72 - Safety Protection Device, Driver Airbag, Disposal Process)

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CLOCK SPRING

REPLACEMENT

1. TURN OFF THE IGNITION SWITCH AND DISCONNECT THE BATTERY NEGATIVE CABLE

△ HINT:

After disconnecting the battery negative cable, wait for at least 90s and conduct the following operations.

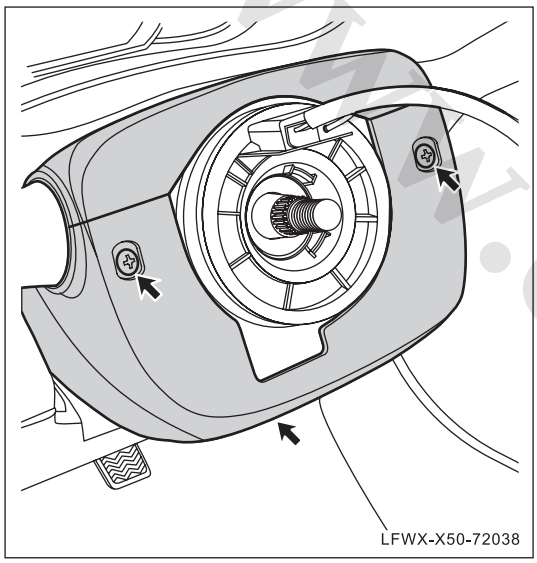
2. WHEELS SHALL FACE FORWARDS

3. REMOVE DRIVER AIRBAG MODULE (SEE 72 AIRBAG - DRIVER AIRBAG, REPLACEMENT)

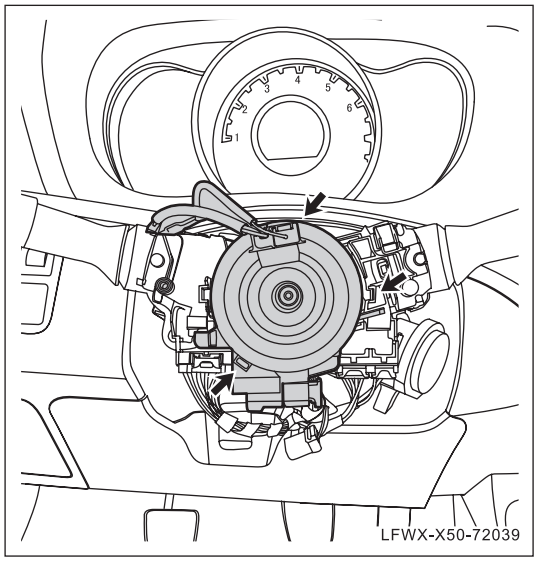
⚠ WARNING:

Before operating the airbag, carefully read 72 - Safety Protection Device, Airbag, Precautions.

4. REMOVE THE STEERING WHEEL (SEE 61 - HYDRAULIC STEERING SYSTEM, STEERING WHEEL, REPLACEMENT)



5. REMOVE STEERING COLUMN COVER

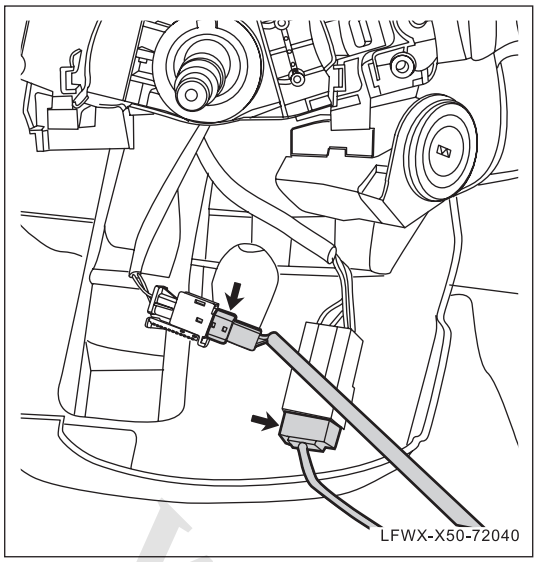


6. REMOVE CLOCK SPRING

(a) Pry up the clock spring catch.

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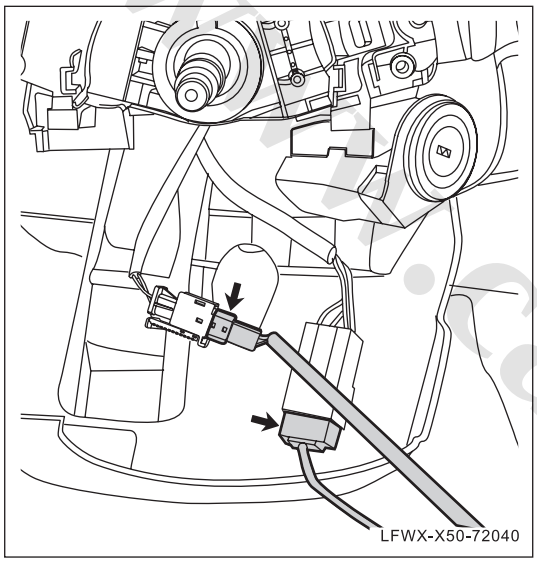
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(b) Remove the clock spring, and disconnect the clock spring connector.

NOTICE:

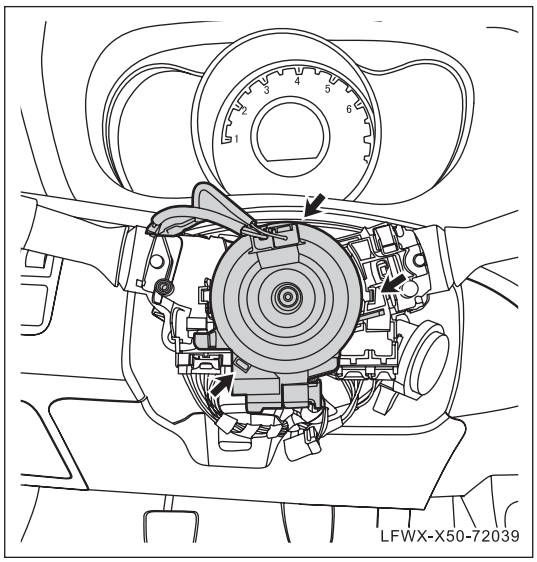
Do not pull the SRS wire harness forcedly.



7. INSTALL CLOCK SPRING

(a) Check if the front wheel is right ahead.

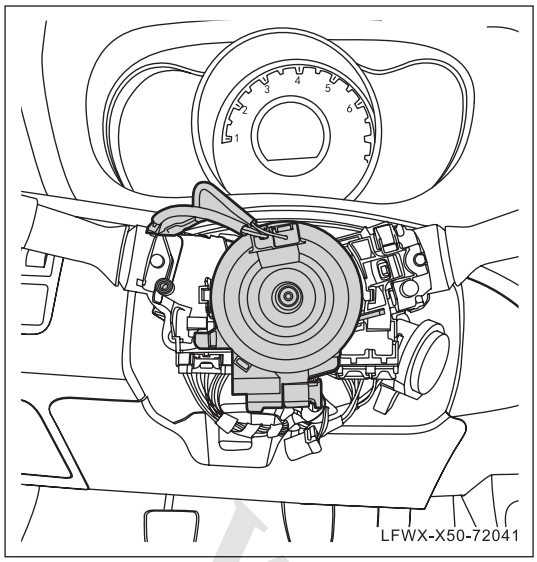
(b) Connect the clock spring connector.



(c) Install the catch of the clock spring and fix the clock spring.

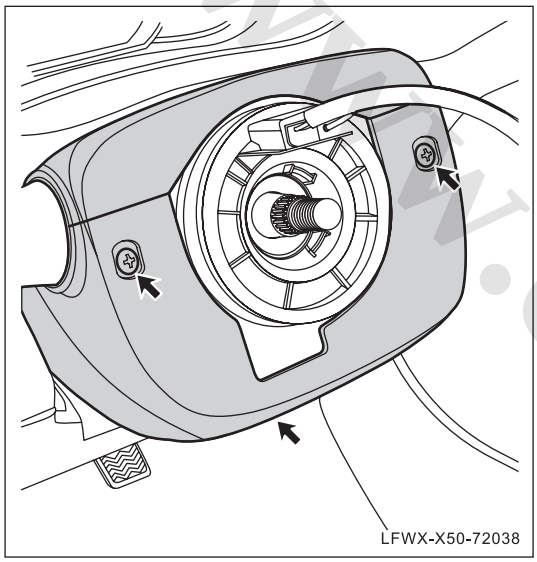
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8. ALIGN CLOCK SPRING

(a) Turn clock spring to the left of the right to the limit position, then turn for 3 circles in the opposite direction.



9. INSTALL THE STEERING COLUMN COVER

10. INSTALL THE STEERING WHEEL (SEE 61 - HYDRAULIC STEERING SYSTEM, STEERING WHEEL, REPLACEMENT)

11. INSTALL DRIVER AIRBAG MODULE (SEE 72 - AIRBAG - DRIVER AIRBAG, REPLACEMENT)

12. CONNECT THE BATTERY NEGATIVE CABLE

13. CHECK PASSENGER SAFETY AIRBAG MODULE

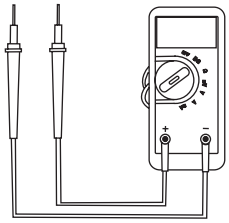
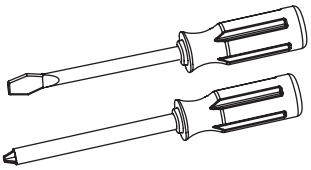
14. CHECK SRS FAULT INDICATOR LAMP

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SEAT BELT

PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Measuring voltage and resistance
2	Screwdriver		Removing and installing screws and prying snap springs.

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolts and screws of front seat belt retractor	Upper: 10 Lower: 65 - 85
Lower fixing plate bolts of front seat belt	65 - 85
Upper fixing plate bolts of front seat belt	65 - 85
Fixing bolts of front seat belt buckle	65 - 85
Fixing bolts of rear row seat belt retractor assembly	65 - 85
Lower fixing plate bolts of rear seat belt	65 - 85
Fixing bolts of rear seat belt buckle and waistband	65 - 85

PRECAUTIONS

1. If the seat belt is damaged, split or its buckle function is abnormal, replace it immediately.
2. If any collision occurs and the seat belt bears a certain impact force, even if the seat belt is not damaged, it is also necessary to replace it immediately.
3. Do not insert any foreign objects into the seat belt buckle or modify or remove the seat belt.
4. When a seat belt is dirty, use neutral detergent to wash it. Do not use corrosive, dye or dry cleaning agent, etc. Otherwise, they will affect the seat belt strength seriously.
5. If the seat belt is damaged, cracked or deformed due to chemical action and sunlight, be sure to replace the seat belt.
6. If the metal connecting part of the seat belt is bent, deformed or corrosive, be sure to replace the seat belt.
7. Performance requirements of the retractor: at mounting angle, it shall be retracted freely and auto-

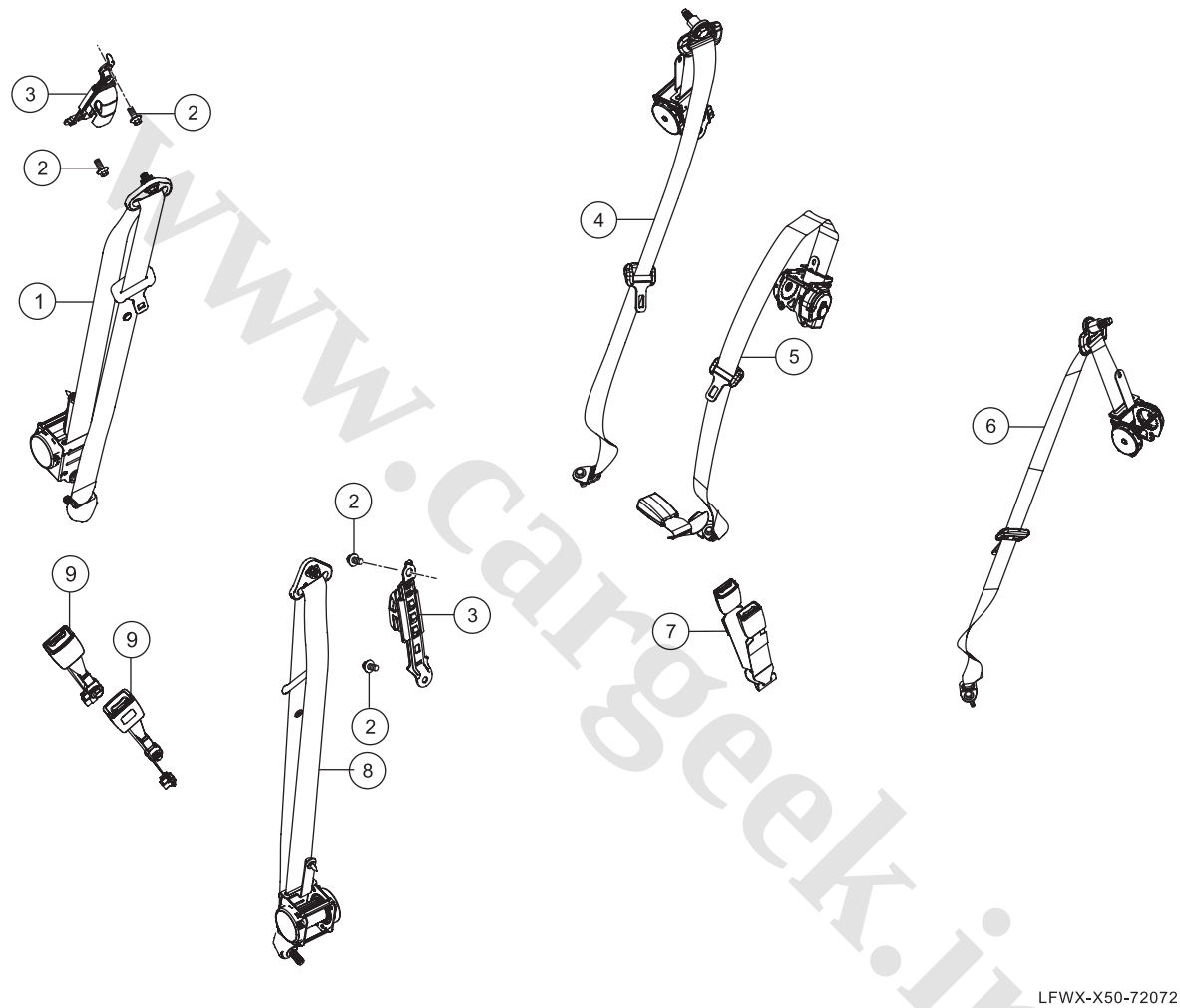
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matically.

8. Performance requirements of the regulating part: regulating part shall be regulated easily. After regulating, the braid cannot be loose by itself and should be safe and reliable.
9. Performance requirements of the padlock: inserting the locking dog and unlocking the buckle shall be obviously in place. Buckle shall not open by itself. The assembly shall not be invalid.

COMPONENTS



1	Front right row seat belt assembly
2	Hexagon bolt with flange
3	Seat belt height adjuster assembly of the front seat
4	Right seat belt assembly of the rear seat
5	Middle seat belt and buckle assembly of the rear seat

6	Left seat belt assembly of the rear seat
7	Middle double-buckle assembly of the rear seat
8	Front left row seat belt assembly
9	Front seat belt buckle assembly of the front seat

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Seat belt cannot be pulled out.	1. Seat belt retractor assembly (damaged)	Replacement
Seat belt cannot retracts automatically	1. Seat belt retractor assembly (damaged)	Replacement
Seat belt buckle cannot be engaged	1. Seat belt buckle (damaged)	Replacement
Seat belt buckle cannot be disengaged after being engaged	1. Seat belt buckle (damaged)	Replacement
Seat belt cannot be locked immediately after being pulled beyond the specified length	1. Seat belt retractor assembly (damaged)	Replacement
Driver seat belt indicator does not come on	1. Fuse (blown)	Replacement
	2. Instrument cluster (damaged)	Replacement
	3. Driver seat belt buckle (internally damaged)	Replacement
	4. Wire harness (open circuit or short circuit)	Repair or replace the harness or connector

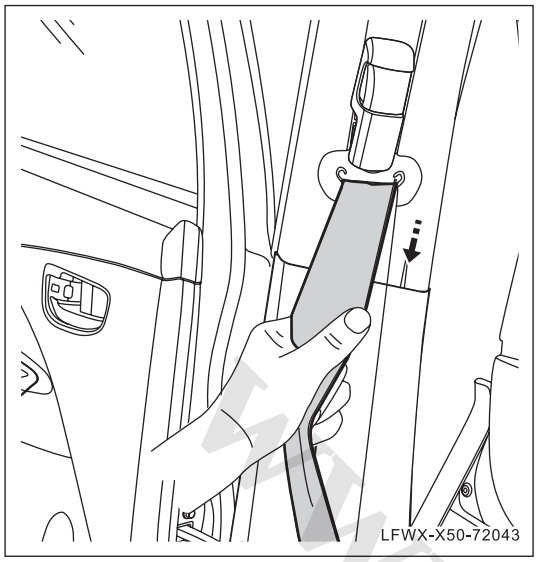
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SEAT BELT

INSPECTION

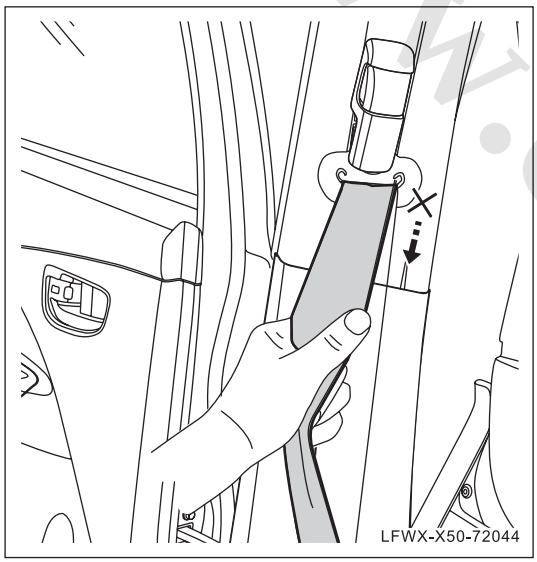


1. INSPECT SEAT BELT RETRACTOR

(a) Pull out the seat belt in constant force; the seat belt should be pulled out rather easily.

NOTICE:

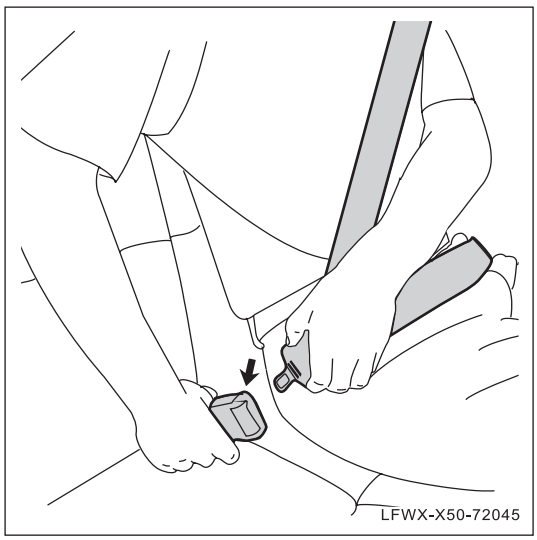
If it cannot be pulled out easily, replace the seat belt.



(b) The seat belts should be immediately locked if quickly pull them, and cannot be extended any more

NOTICE:

If it cannot be locked immediately, replace the seat belt immediately.



2. INSPECT SEAT BELT BUCKLE

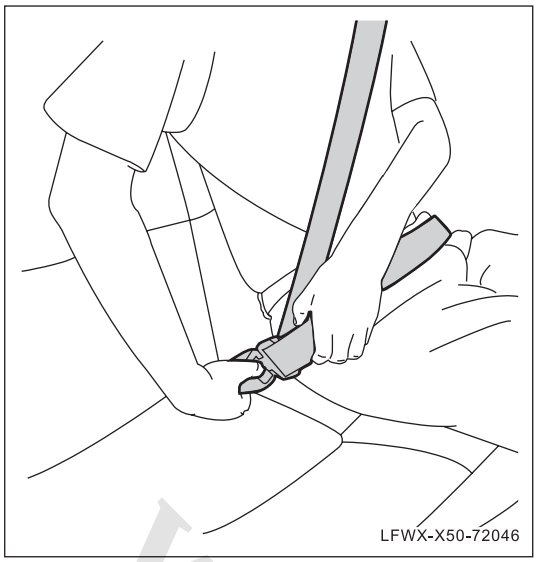
(a) Insert the seat belt into the buckle.

△ HINT:

The buckle should be locked reliably, and the surface should be smooth and without sharp edges. If the seat belt is not easily inserted and pulled out from the buckle, the buckle needs to be replaced and inspected again.

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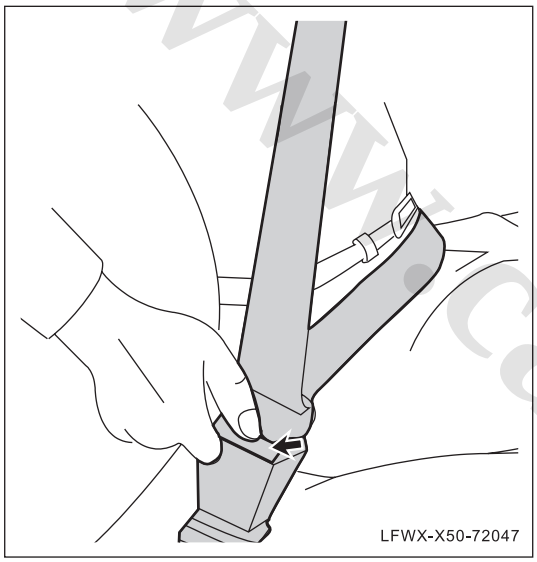
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(b) Pull the seat belt forcedly, and the seat belt shall be locked.

NOTICE:

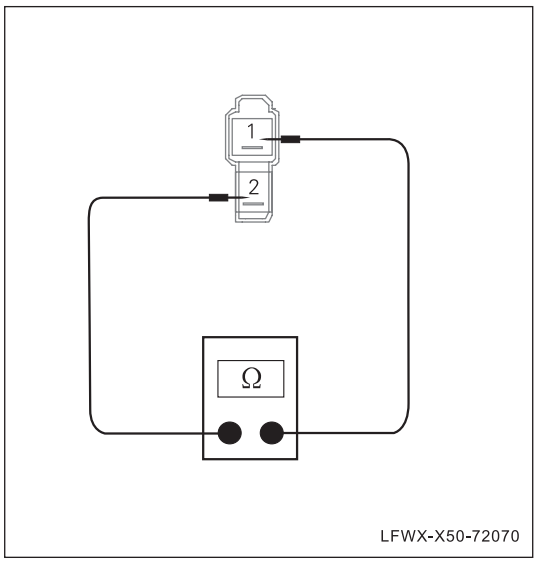
If the seat belt escapes from the buckle, it is necessary to replace the seat belt buckle.



(c) Press the button, then the seat belt should be easily taken out.

NOTICE:

If not so, it is recommended to immediately replace the seat belt buckle to eliminate potential hazard.



3. INSPECT DRIVER SEAT BELT BUCKLE

(a) Check the continuity of the driver seat belt buckle.

Standards:

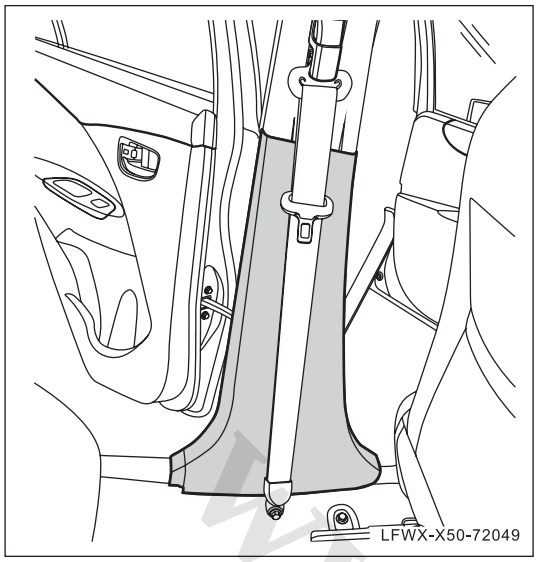
Terminal No.	Seat belt	Specification
1-2	Fixed	No continuity
1-2	Loose	Continuity

If it does not conform to the requirements, replace the driver seat belt buckle.

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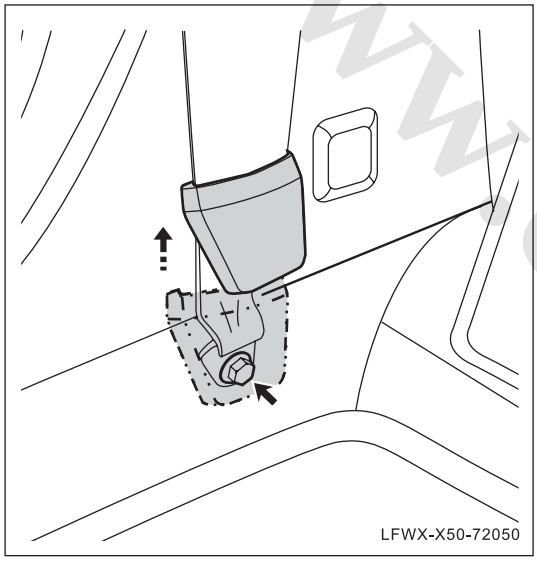
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REPLACEMENT



1. REMOVE THE SEAT BELT RETRACTOR ASSEMBLY

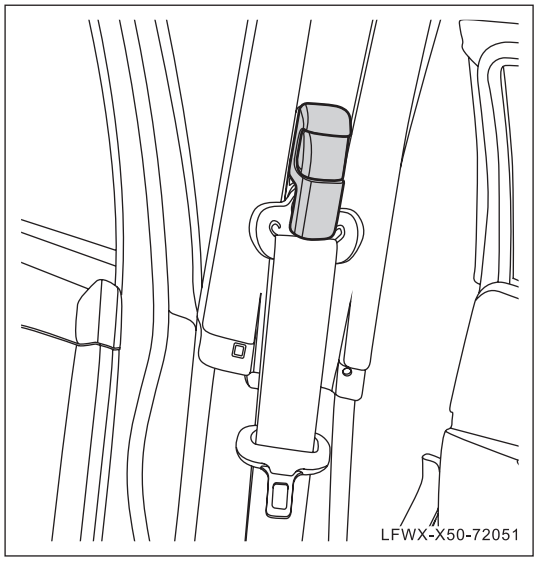
(a) Remove B pillar lower trim panel. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)



(b) Remove the lower fixing plate of the front seat belt.

△ HINT:

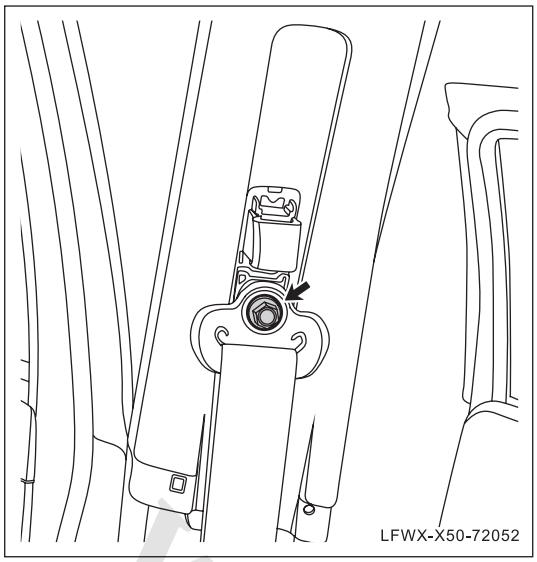
Push the lower fixing plate shield of the front seat belt aside and move it up, and remove the fixing plate bolts and remove the lower fixing plate of the front seat belt.



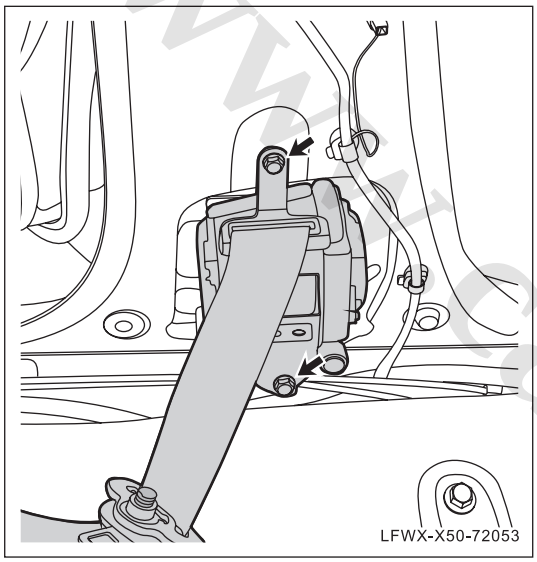
(c) Remove the height adjuster cover of the driver seat belt. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

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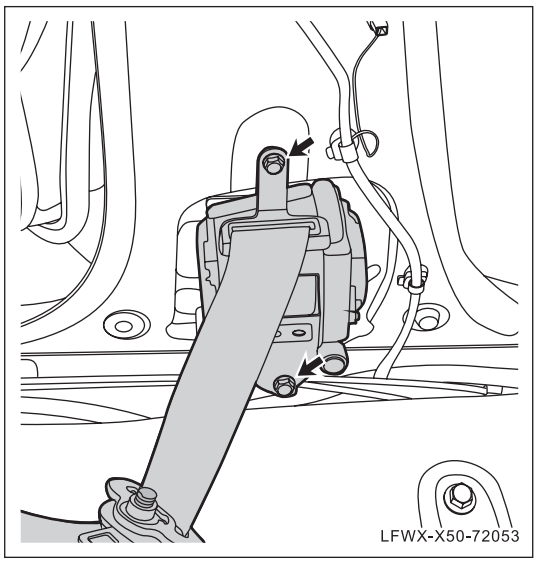


(d) Remove the upper fixing plate bolts of the front seat belt and take down the upper fixing plate of the seat belt.



(e) Remove the fixing bolts of the front seat belt retractor assembly.

(f) Take down the front seat belt retractor assembly.



2. INSTALL FRONT SEAT BELT RETRACTOR ASSEMBLY

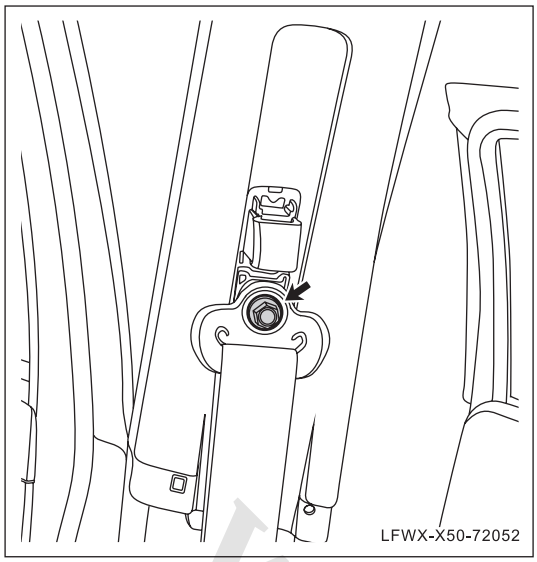
(a) Install the front seat belt retractor assembly, and install the fixing bolts and screws of the front seat belt retractor.

Screw torque at upper end: 10 N•m

Bolt torque at lower end: 65 - 85 N•m

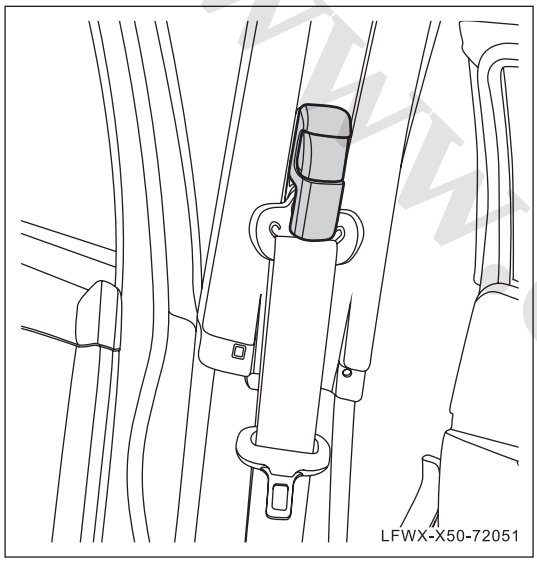
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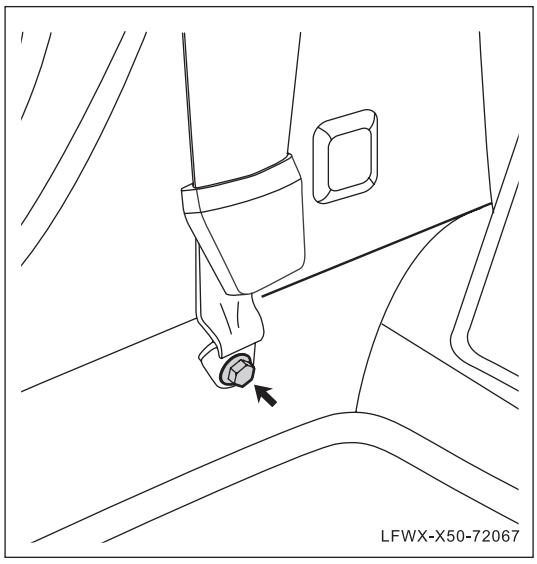


(b) Install the upper fixing plate of the front seat belt and install and tighten the fixing bolts.

Torque: 65 - 85 N•m



(c) Install the driver seat belt height adjuster cover. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)



(d) Install the fixing plate of the front seat belt and install and tighten the fixing bolts.

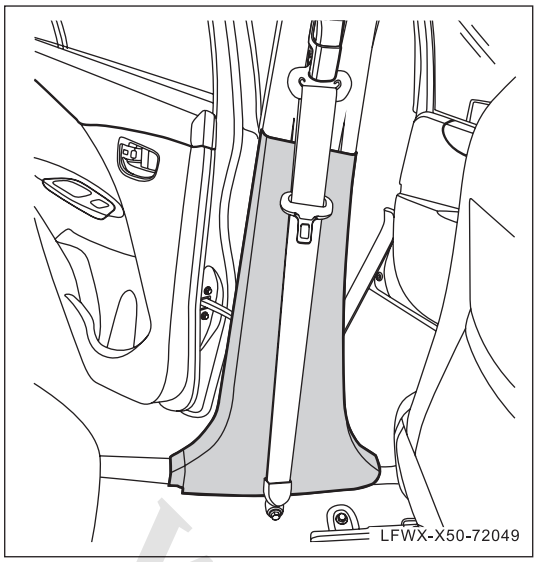
Torque: 65 - 85 N•m

△ HINT:

After installing the seat belt, check if each fixing bolt is fixed and check the performance status of the seat belt to avoid personal injury in emergency.

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(e) Install B pillar lower panel. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

3. CHECK FRONT SEAT BELT RETRACTOR ASSEMBLY (SEE 72 - SUPPLEMENTARY RESTRAINT DEVICE, FRONT SEAT BELT, INSPECTION)

4. REMOVE FRONT SEAT BELT BUCKLE

(a) Disconnect the front seat belt buckle connector.

(b) Remove the front seat belt buckle fixing bolts, and take down the front seat belt buckle.

5. INSTALL FRONT SEAT BELT BUCKLE

(a) Install the front seat belt buckle and install and tighten its fixing bolts.

Torque: 65 - 85 N•m

(b) Install the front seat belt buckle connector.

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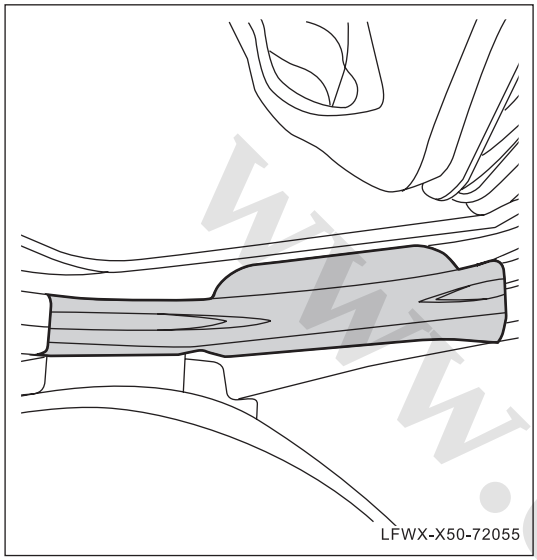
REAR SEAT BELT

INSPECTION

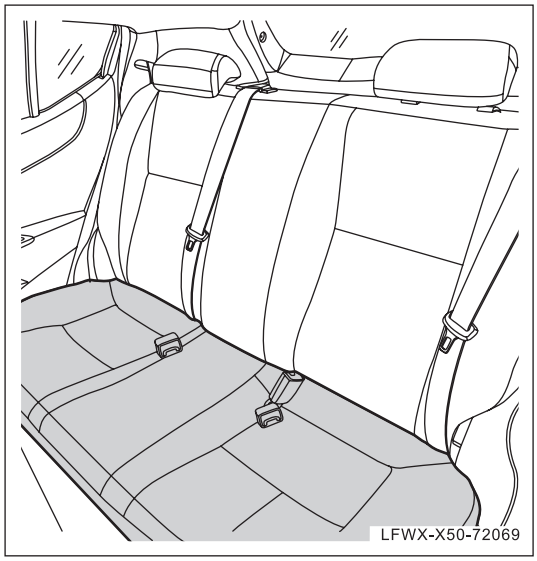
△ HINT:

Inspection method of the rear seat belt retractor and buckle is the same as that of the front seat belt retractor and buckle. Refer to the inspection method of the front seat belt.

REPLACEMENT



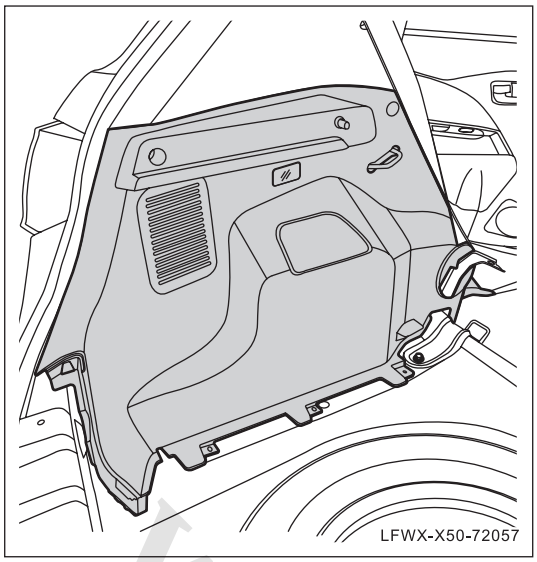
1. **REMOVE THE REAR DOORSILL TRIM PANEL ASSEMBLY (SEE 81 - INTERIORS AND EXTERIORS, REAR DOORSILL TRIM PANEL, REPLACEMENT)**



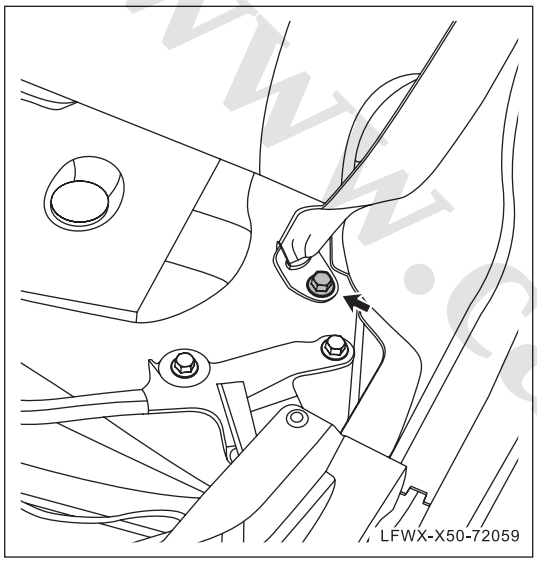
2. **REMOVE THE REAR SEAT ASSEMBLY (SEE 84 - SEAT, REAR SEAT, REPLACEMENT)**

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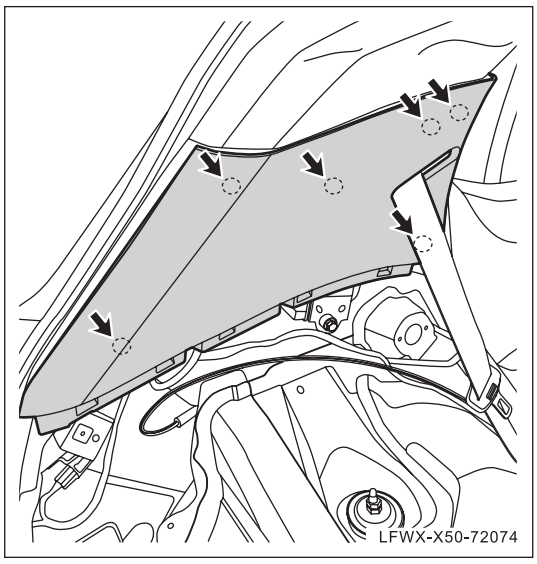


3. **REMOVE C PILLAR LOWER TRIM PANEL ASSEMBLY (SEE 81 - SEAT, C PILLAR TRIM PANEL, REPLACEMENT)**



4. **REMOVE REAR SEAT BELT RETRACTOR ASSEMBLY**

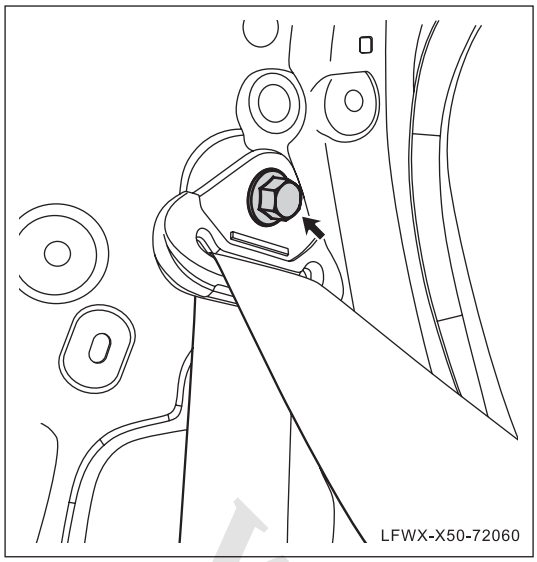
(a) Remove the lower fixing plate bolt of rear seat belt assembly.



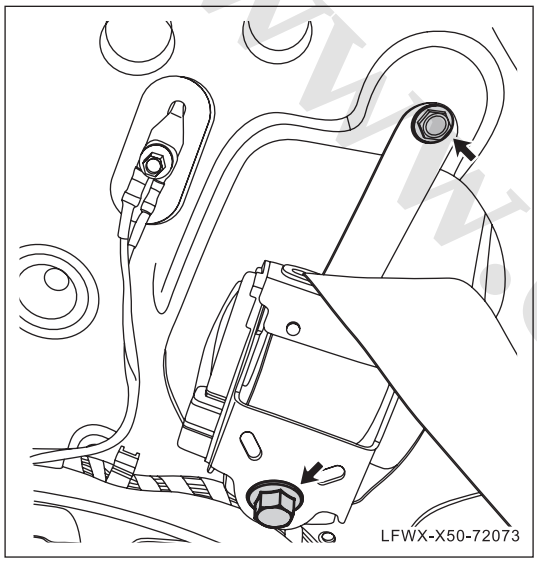
(b) Remove C pillar upper trim panel assembly. (see 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

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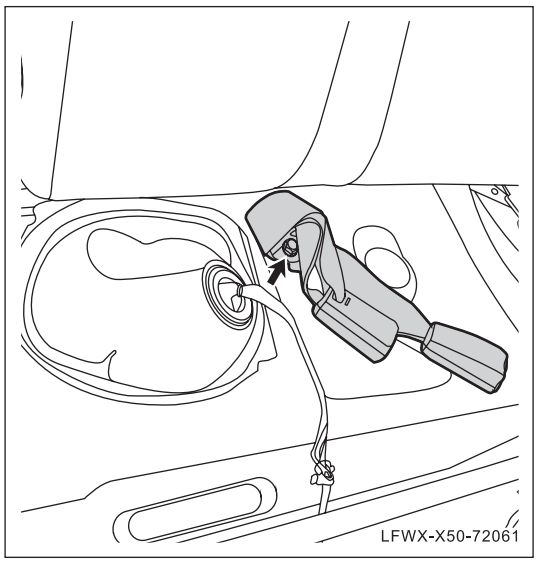
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(c) Remove the upper fixing plate bolts of the rear seat belt.



(d) Remove the rear seat belt retractor fixing bolts and take down the rear seat belt.



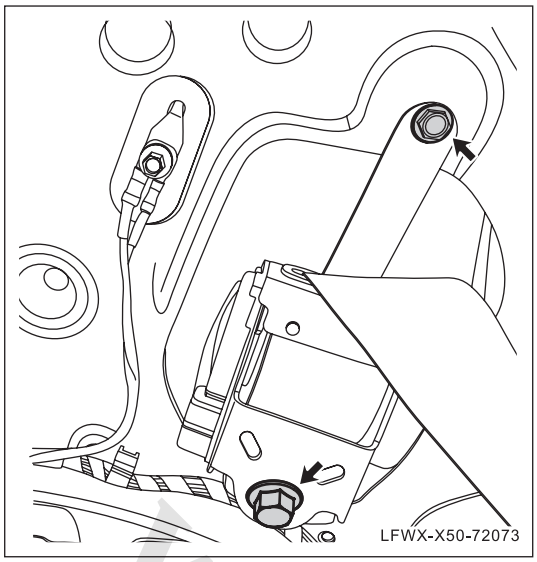
6. REMOVE THE REAR SEAT BELT BUCKLE

(a) Remove the fixing bolt of the rear seat belt buckle.

(b) Take down the rear seat belt buckle assembly.

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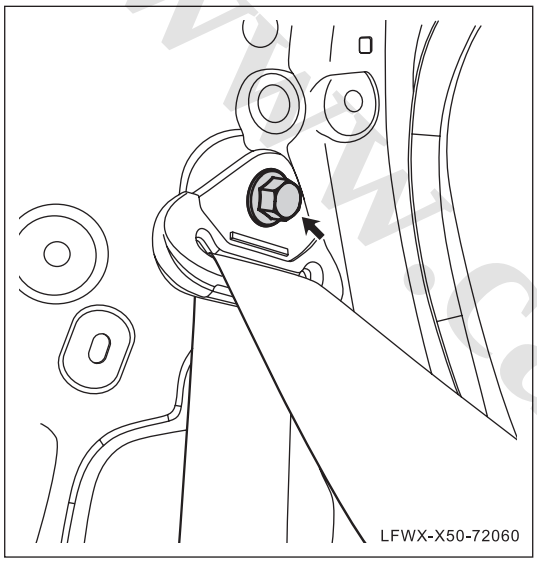
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7. INSTALL REAR SEAT BELT RETRACTOR ASSEMBLY

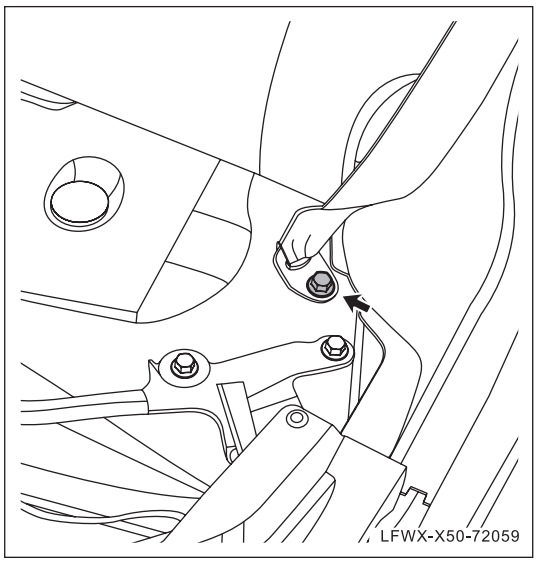
(a) Install the rear seat belt retractor assembly, and install the fixing bolts of the rear seat belt retractor assembly and tighten them.

Torque: 65 - 85 N•m



(b) Install the upper fixing plate bolts of the rear seat belt and tighten them.

(c) Install C pillar upper trim panel assembly. (see 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

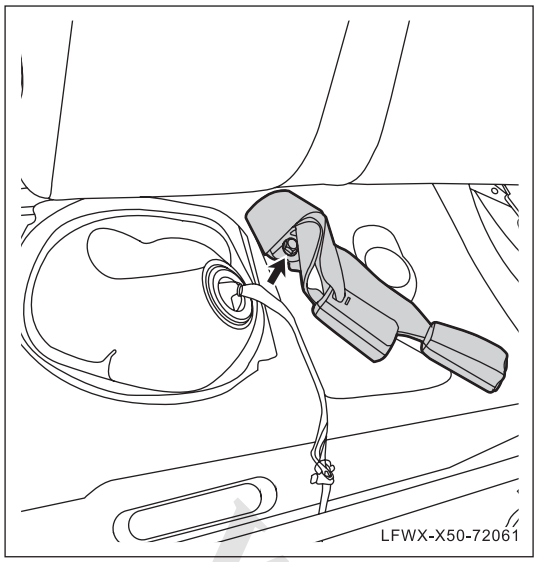


(d) Install the lower fixing plate bolts of the rear seat belt and tighten them.

Torque: 65 - 85 N•m

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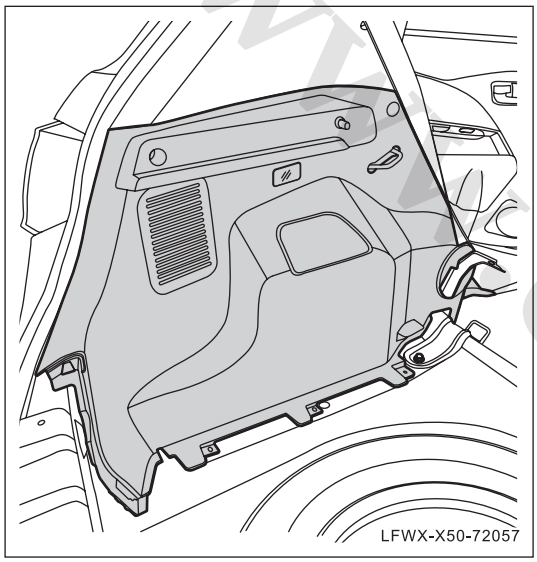


8. INSTALL THE REAR SEAT BELT BUCKLE ASSEMBLY.

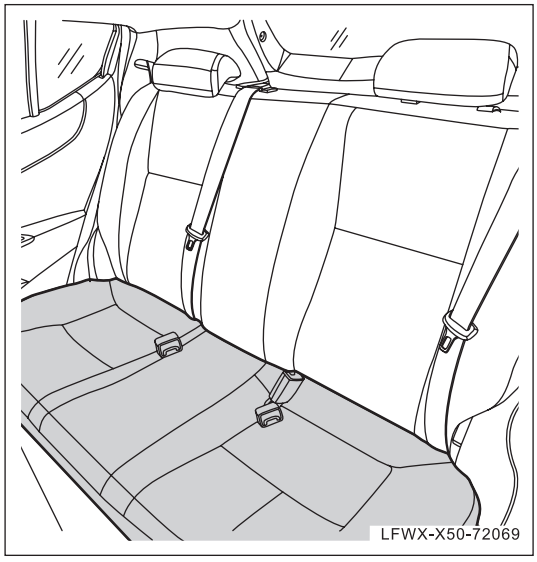
(a) Install the rear seat belt buckle assembly.

(b) Install the fixing bolts of the rear seat belt buckle assembly and tighten them.

Torque: 65 - 85 N•m



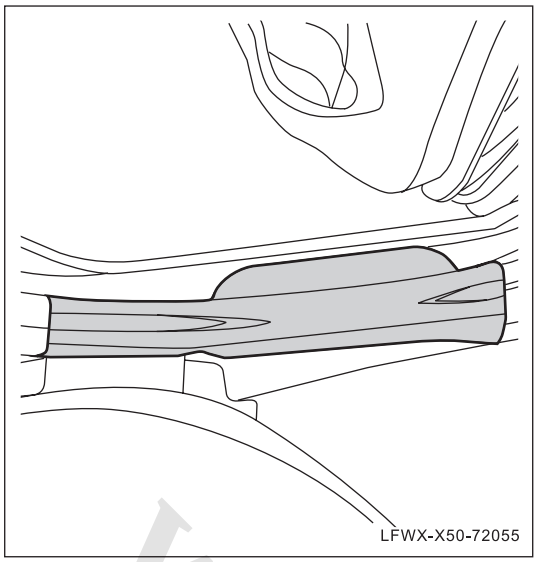
9. INSTALL C PILLAR LOWER TRIM PANEL ASSEMBLE (SEE 81 - INTERIORS AND EXTERIORS, C PILLAR TRIM PANEL, REPLACEMENT)



10. INSTALL THE REAR SEAT ASSEMBLY (SEE 84 - SEAT, REAR SEAT, REPLACEMENT)

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11. **INSTALL THE REAR DOORSILL TRIM PANEL ASSEMBLY (SEE 81 - INTERIORS AND EXTERIORS, REAR DOORSILL TRIM PANEL, REPLACEMENT)**

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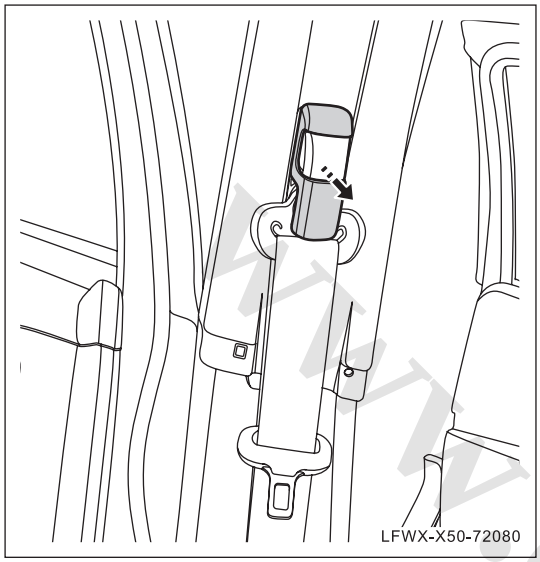
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HEIGHT ADJUSTER

CHECK

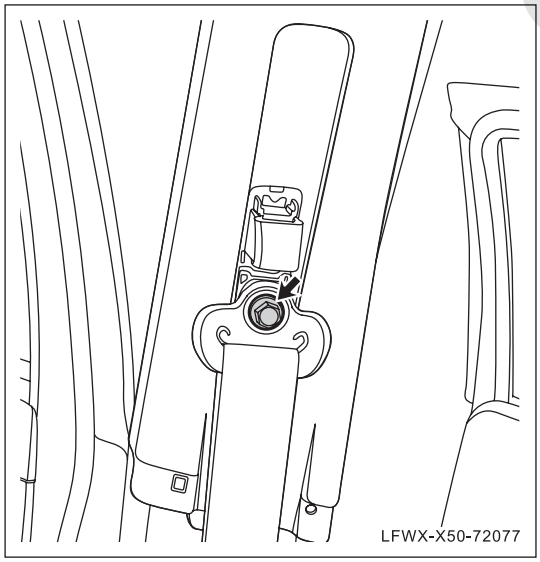
1. CHECK WHETHER THE HEIGHT ADJUSTMENT OF THE HEIGHT ADJUSTER IS SMOOTH, AND WHETHER THE LOCKING IS RELIABLE; REPLACE IT IF THERE IS ANY PROBLEM

REPLACEMENT



1. REMOVE THE HEIGHT ADJUSTER

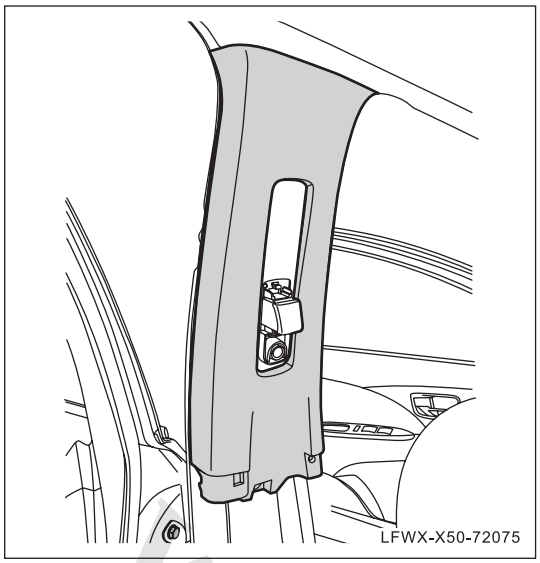
(a) Remove the seat belt height adjuster cover.



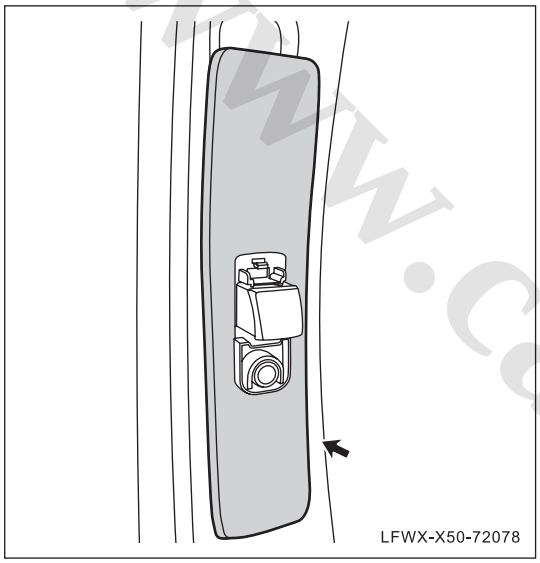
(b) Remove the fixing plate of the upper fixing plate of the front seat belt and take down the upper fixing plate of the front seat belt.

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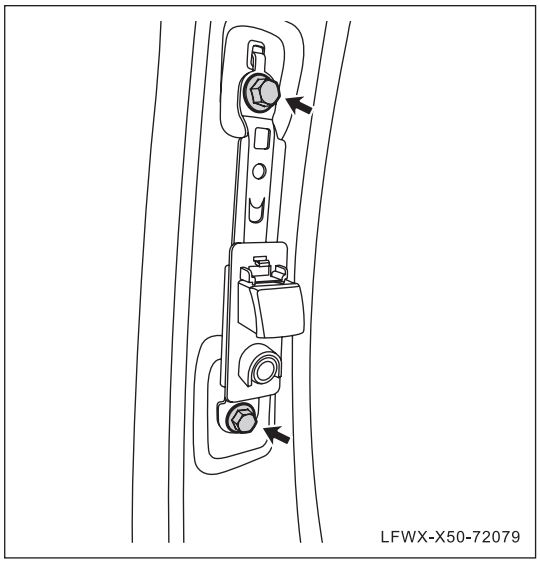
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(c) Remove B pillar trim panel. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)



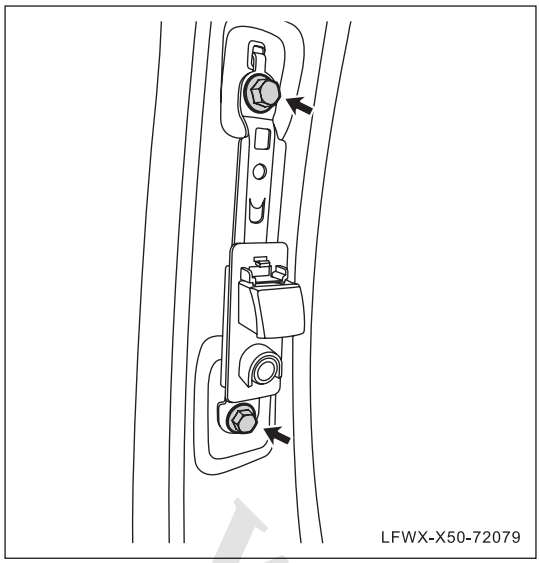
(d) Remove the seat belt height adjuster trim panel.



(e) Remove the seat belt height adjuster slide rail assembly.

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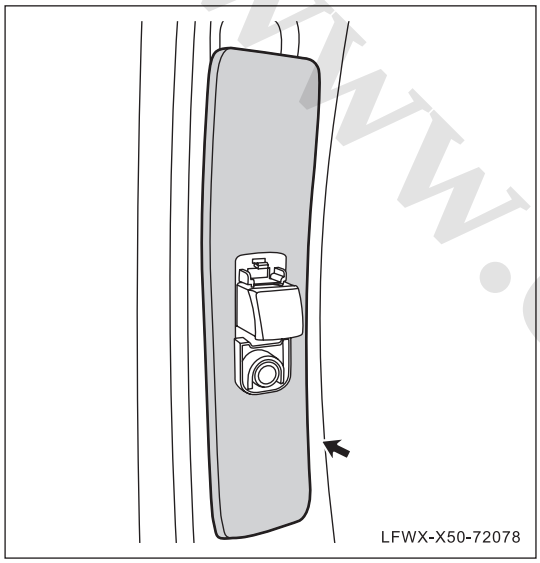
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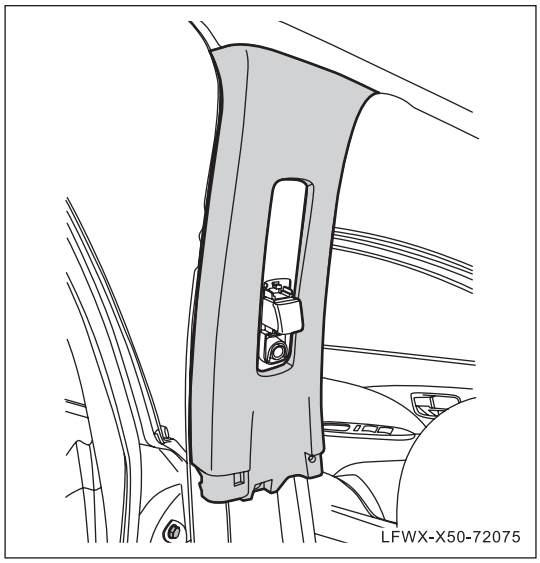
2. INSTALL THE HEIGHT ADJUSTER

(a) Install the height adjuster slide rail assembly, and install and tighten the fixing bolts.

Torque: 65 - 85 N•m



(b) Install the seat belt height adjuster trim panel.

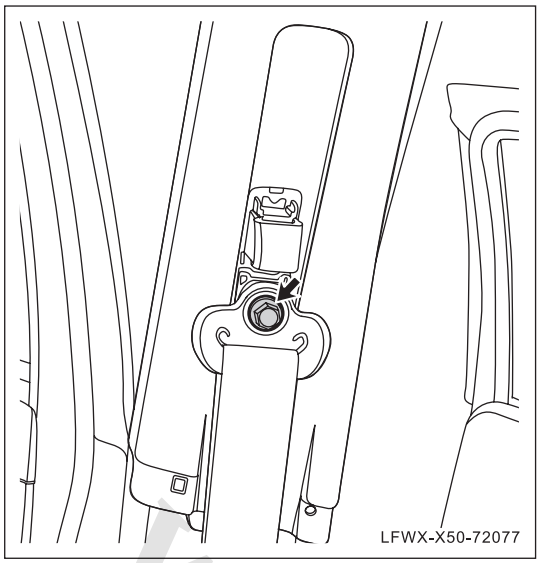


(c) Install B pillar upper trim panel. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

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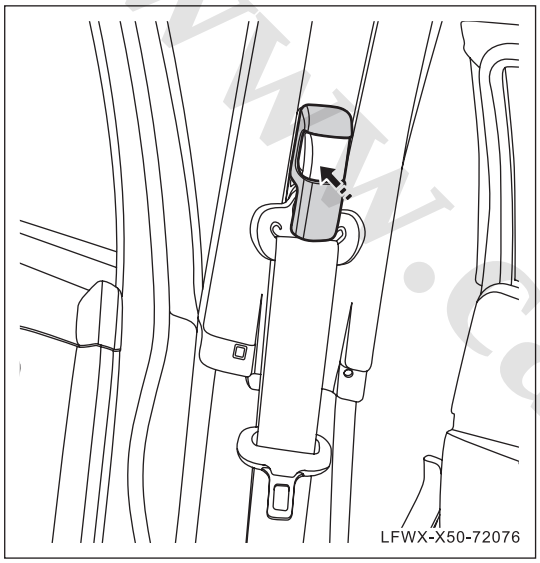
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(d) Install the front seat belt upper fixing plate, and install and tighten the fixing bolts of the front seat belt upper fixing plate.

Torque: 65 - 85 N•m



(e) Install the seat belt height adjuster cover.

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Remote Control Central Lock System

Remote control central lock system....73-1
System description....73-1
Schematic diagram....73-2
Preparation....73-3
Service data....73-3
Precautions....73-3
Function and fault of components....73-4
Remote key matching....73-4
On-vehicle inspection....73-5
Diagnosis....73-6
Fault symptom table....73-6
Fault diagnosis....73-7
Central lock control unit....73-16
Replacement....73-16
Front left door locking device....73-18
Inspection....73-18
Replacement....73-18
Front right door locking device....73-19
Inspection....73-19
Replacement....73-19
Rear left door locking device....73-20
Inspection....73-20
Replacement....73-20
Rear right door locking device....73-21
Inspection....73-21
Replacement....73-21
Tail door locking device....73-22
Inspection....73-22
Replacement....73-22
Remote control battery....73-23
Replacement....73-23

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REMOTE CONTROL CENTRAL LOCK SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

Central power door lock system can make the use of vehicle more convenient and make driving safer.

- Central control: driver can open or close all door simultaneously by controlling door lock switch
- Speed control: each door can lock by itself, when the driving speed reaches 20km/h, to prevent the door from opening by the passenger's mis-operation of inner handle
- Independent control: the other three doors except for the driver's door are provided with a separate spring switch, which can control the opening and closing of a door.

2. COMPONENTS

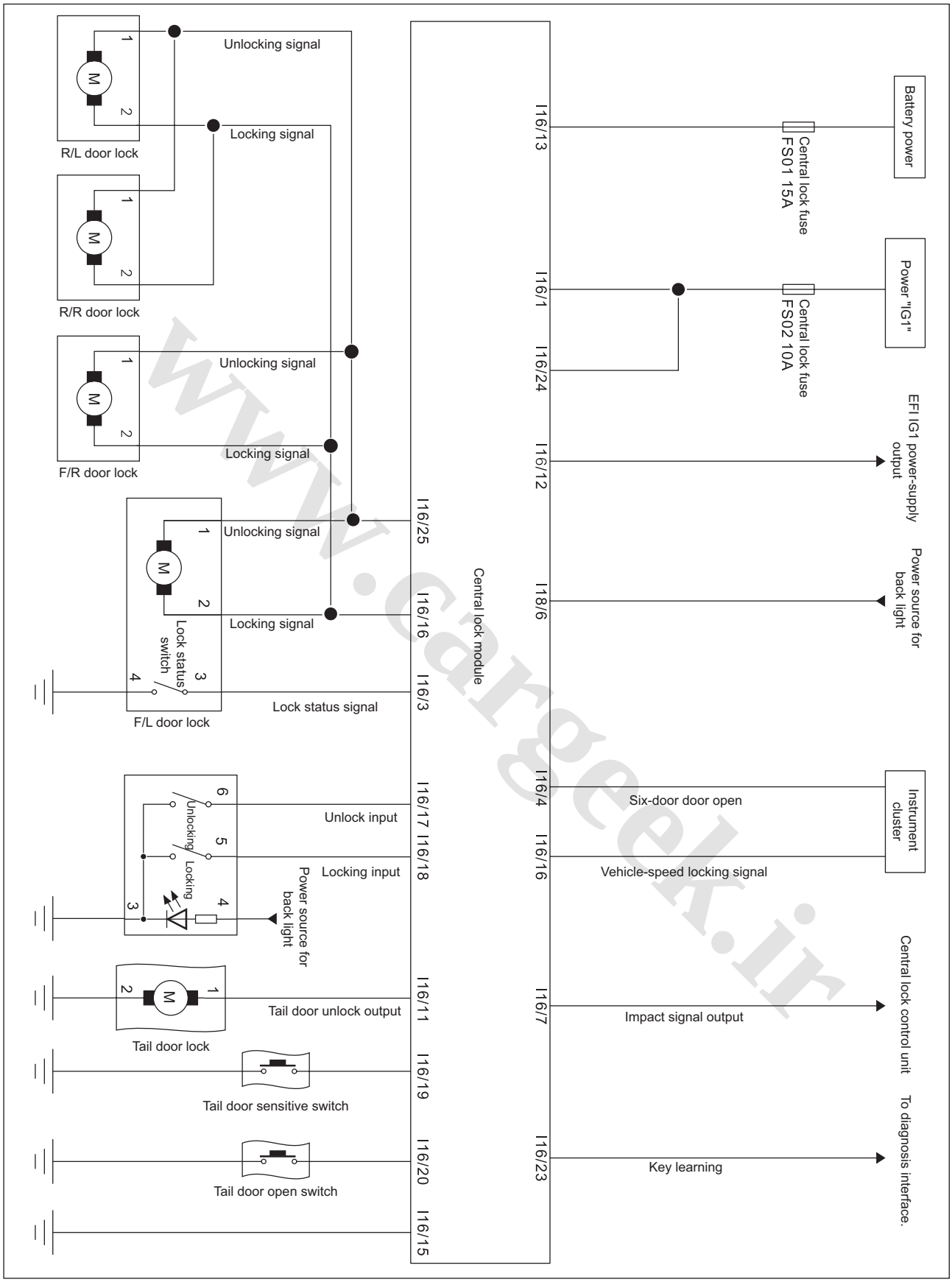
Remote control central lock system consists of controller, central lock control unit, door locking device, central lock switch, etc.

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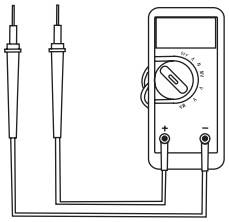
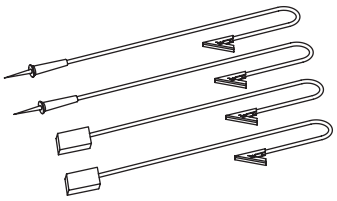
SCHEMATIC DIAGRAM



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Used for measuring voltage and resistance
2	Wiring set		Used for testing circuits

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Front left door locking device resistance	≤2Ω
Rear right door locking device resistance	≤2Ω
Rear left door locking device resistance	≤2Ω
Rear right door locking device resistance	≤2Ω
Tail door locking device resistance	≤2Ω

2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of central lock control unit	8 - 12
Fixing bolt of locking device	8 - 12
Fixing screw of door lock body	8 - 12
Fixing bolt of door lock body bracket	8 - 12
Fixing screw of door outer handle base	8 - 12

PRECAUTIONS

1. Before dismantling or installing any electrical device, or when a tool or device contacts exposed electrical terminal easily, first disconnect the negative cable of battery to prevent personal hurt or vehicle damage.
2. Before disconnecting the negative cable of battery , do not leave the key in the vehicle to avoid the vehicle door from being locked.
3. The ignition switch must be turned off, unless otherwise specified.
4. Do not lose any component when replacing the battery of remote control.

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Remote control	Remote controlling each door lock	Low battery power and damaged remote control	The controlling range of remote control becomes smaller, and the remote control cannot open the door
Central lock controller	Controlling door lock	Damaged	The remote control cannot open the door
Door locking device	Locking door	Damaged	The door cannot be opened

REMOTE KEY MATCHING

1. USE THE DIAGNOSTIC SCANNER TO MATCH THE KEY

(a) Connect diagnostic scanner.

(b) Match the key according to prompt steps of diagnostic scanner.

2. DO NOT USE THE DIAGNOSTIC SCANNER TO MATCH THE KEY

(a) Close all doors, and operate the front left door in turn according to the order: open-close-open-close.

(b) Insert the ignition key, and turn the ignition switch in turn according to the order: ACC--ON--ACC--ON within 6s. Stop turning it when the turn signal lamp flashing The key learning is activated after the turn signal lamp flashing twice.

(c) Press the Unlock and Lock key on the remote control until the turn signal lamp flashes 5 times At this time, this key learning is successful and going on to the next key learning.

△ HINT:

It indicates that the key learning is not successful if the turn signal lamp is not lit. Re-learn after trouble-shooting. There are 4 remote keys to learn at most in the central lock unit.

(d) After the key learning is completed, turn the ignition switch to "OFF" position to exit from the key learning.

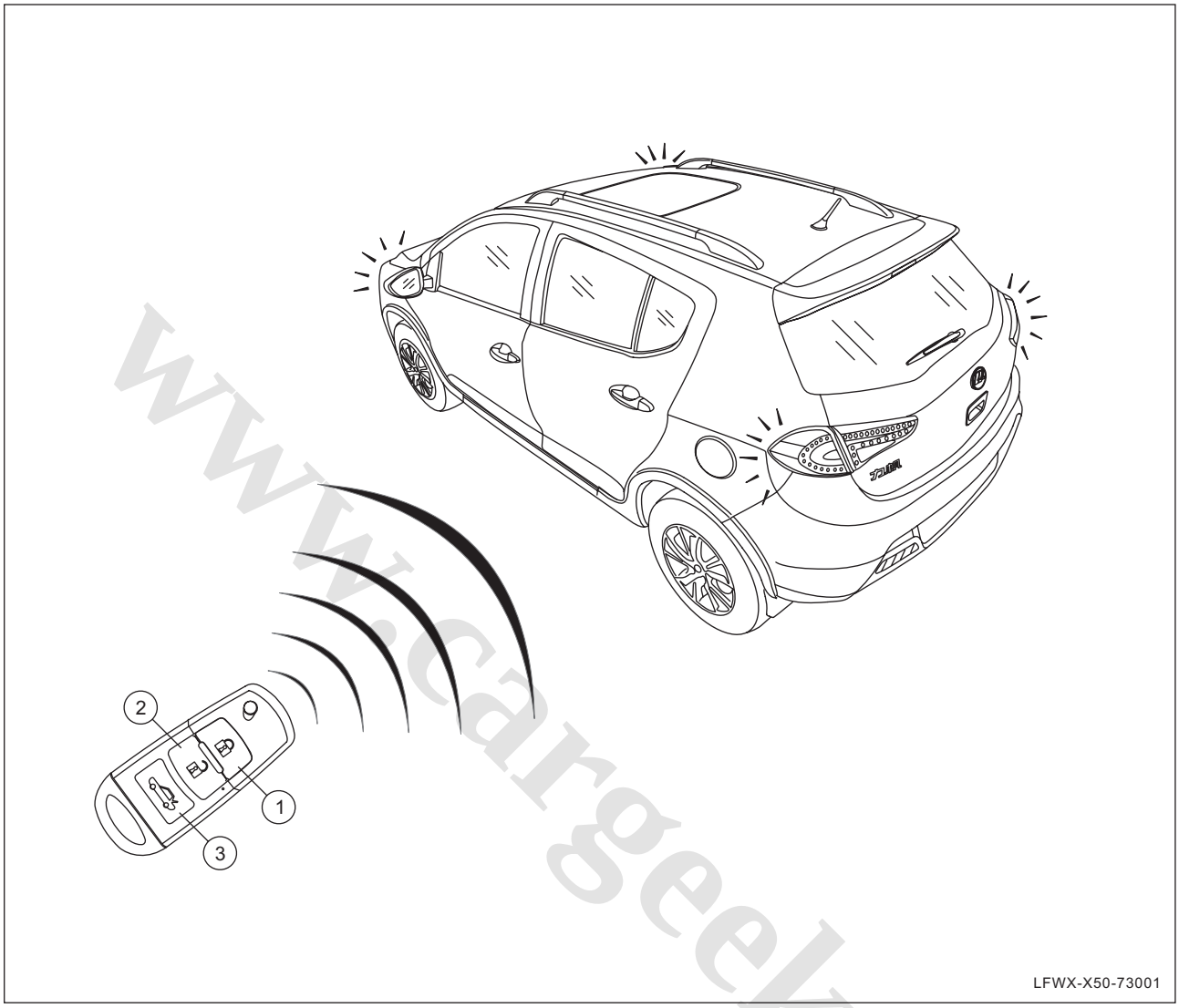
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ON-VEHICLE INSPECTION

△ HINT:

Refer to Operating Manual of LIFAN X50, and check functions of remote control central lock system.



1	Remote control locking key	3	Remote control tail door opening key
2	Remote control unlocking key		

NOTICE:

- **On the condition that remote control has enough electric quantity and remote control distance is less than 12m, remote control can work.**
- **Make sure there is no radio station or airport radio transmitter nearby that may interfere normal operation of remote control.**

△ HINT:

Remote control locking:
Press locking switch to lock all doors simultaneously. Now, the turn signal lamp flashes once.
Remote control unlocking:
Press unlocking switch to unlock all doors simultaneously. Now, the turn signal lamp flashes twice.
After unlocking by remote control, the doors can be opened within 30s. If the doors are not opened within this period, all doors will be locked again automatically (the turn signal lamp flashes once).

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Central lock is invalid (only remote control is invalid)	1. Remote control (running out of power, damaged or mismatching) 2. Remote control (too far away from the vehicle or there is interference source nearby) 3. Central lock control unit (damaged)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (1.Central Lock Is Invalid (only remote control is invalid))
Central lock is invalid (only manual control is invalid)	1. Central lock switch (damaged) 2. Wire harness (open circuit or short circuit)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (2. Central Lock Is Invalid (only manual control is invalid))
Central lock is invalid (remote/manual controls are invalid)	1. Central lock fuse (blown) 2. Wire harness (open circuit or short circuit) 3. Central lock control unit (damaged)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (3. Central Lock Is Invalid (remote and manual controls are invalid))
Only front left door central lock is invalid	1. Front left door locking device (damaged) 2. Wire harness (open circuit or short circuit)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (4. Only Front Left Door Central Lock Is Invalid)
Only front right door central lock is failed	1. Front right door locking device (damaged) 2. Wire harness (open circuit or short circuit)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (5. Only Front Right Door Central Lock Is Failed)
Only rear left door central lock is failed	1. Rear left door locking device (damaged) 2. Wire harness (open circuit or short circuit)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis 6. Only Rear Left Door Central Lock Is Invalid
Only rear right door central lock is failed	1. Rear right door locking device (damaged) 2. Wire harness (open circuit or short circuit)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis 7. Only Rear Right Door Central Lock Is Failed
Only tail door lock is invalid	1. Tail door locking device (damaged) 2. Tail door sensitive switch (damaged) 3. Tail door open switch (damaged) 4. Wire harness (open circuit or short circuit) 5. Central lock control unit (damaged)	See 73 - Remote Control Central Lock System Diagnosis, Fault Diagnosis (8. Only Tail Door Lock Is Invalid)

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FAULT DIAGNOSIS

1. CENTRAL LOCK IS INVALID (ONLY REMOTE CONTROL IS INVALID)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the door can be opened with remote control after the door is locked, and observe the flashing condition of indicator ray on the remote control	Diagnosis is over	The door is not opened Go to Step 1	Ensure there is no strong magnetic field at the time of check and confirmation
1	Check the battery of the remote control	Normal	Faulty	Instruction
	Check the battery voltage of the remote control **Standard voltage: 3V**	Go to Step 2	Replace the remote control battery.	
2	Check the programming of the remote control	Normal	Faulty	Instruction
	Re-match the key with the remote control (see 73 - Remote Control Central Lock System, Remote Key Matching)	If door can be opened after remote key matching, the check is over	The door cannot be opened after remote key matching or the remote key matching cannot matched smoothly	Go to Step 3 **Notice:** **Ensure the key being checked is the vehicle's original key before going to this step**
3	Replacement and check	Normal	Faulty	Instruction
	Replace the central lock control unit, and check if the door can be opened by remote control with the key matching with the central lock control unit	Replace the central lock control unit (see 73 - Remote Control Central Lock System, Central Lock Control Unit, Replacement)	Fault still exists	Find the cause out from other fault symptoms

2. CENTRAL LOCK IS INVALID (ONLY MANUAL CONTROL IS INVALID)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the door can be unlocked / locked with the central lock switch after the door is locked	Diagnosis is over	The door is not opened Go to Step 1	
1	Check central lock switch	Normal	Faulty	Instruction
	• Press the unlocking key of central lock and check the resistance between the terminal 6 and terminal 3 of central lock switch **Resistance: <2Ω** • Press the locking key and check the resistance between the terminal 6 and terminal 5 of central lock switch **Resistance: <2Ω**	Go to Step 2	Replace the central lock switch (see 73 - Remote Control Central Lock System, Central Lock Switch, Replacement)	
2	Check front left door lock	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the connector of front left door lock when the ignition switch is at "LOCK" position • Check the resistance between the terminal 3 and terminal 4 of front left door lock **Resistance: >1MΩ** • Check the resistance between the terminal 3 and terminal 4 of front left door lock when the door is locked by mechanical key **Resistance: <2Ω**	Go to Step 3	Front left door lock state switch is unlocked / locked frequently, which will make the central lock invalid Hint: Front left door lock state switch integrates in the front left door lock, detects the front left door lock state and sends lock state signal to central lock unit. Central lock control unit sends the central lock / unlock signal according to the above lock state signal	Replace the front left door lock (See 73 - Remote Control Central Lock System, Front Left Door Locking Device, Replacement)
3	Check grounding circuit of central lock switch	Normal	Faulty	Instruction
	• Check the resistance between No. 3 terminal of central lock switch and grounding **Resistance: <2Ω** • Turn on the position lamp. If the position lamp on the central lock switch is not lit, it indicates that the grounding circuit of central lock switch has fault, therefore check the corresponding wire harness	Go to Step 4	The resistance is out of the specified range	Check and repair the circuit between the terminal 3 of dashboard wire harness I06 and the grounding for open circuit
4	Check central lock switch signal circuit	Normal	Faulty	Instruction
	Disconnect the connector of central lock switch, and check the resistance between terminal 5, terminal 6 of dashboard wire harness I06 and the grounding respectively **Resistance: >1MΩ**	Fault still exists	The circuit between I06 and the grounding is short circuit	Check and repair the circuit between the terminal 5, terminal 6 of I06 and the grounding for short circuit

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3. CENTRAL LOCK IS INVALID (REMOTE/MANUAL CONTROLS ARE INVALID)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the central lock works normally with remote control unlock/lock door or pressing central lock unlock/lock key	Diagnosis is over	The central lock cannot be unlocked / locked	Go to Step 1
1	Check central lock fuse	Normal	Faulty	Instruction
	Check if the central lock fuse FS01 in the compartment fuse box is blown	Go to Step 3	Too much current in the power circuit (short circuit or overload)	Replace the fuse with the same specification. **Rated capacity:** FS01 15A Goto Step 2, if the fuse is blown again
2	Check the power circuit of central lock	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between central lock power leads and the grounding	Go to Step 3	There is short circuit in the power circuit or in the central lock if the resistance is too small	Gradually troubleshoot to identify the short circuit point, and then replace the fuse with the same specification
3	Check the power circuit of central lock	Normal	Faulty	Instruction
	• Disconnect the connector of central lock control unit when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1, terminal 24 of I16 and the grounding **Voltage: 9V - 13V**	Go to Step 4	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is open circuit in the power circuit of central lock control unit. Check and repair the circuit between the connectors of dashboard wire harness central lock control unit and fuse
4	Check the grounding circuit of central lock	Normal	Faulty	Instruction
	• Disconnect the connector of central lock control unit when the ignition switch is at "LOCK" position • Check the resistance between No. 15 terminal of I16 and ground. **Resistance: <2Ω**	Go to Step 5	The inspection resistance is out of the specified range	The abnormal resistance indicates that there is open circuit in the grounding circuit of central lock control unit. Check and repair the circuit between the connectors of dashboard wire harness central lock control unit and the grounding point G23
5	Replacement and check	Normal	Faulty	Instruction
	Replace the same central lock control unit and check if the control function of central lock is good	(See 73 - Remote Control Central Lock System, Central Lock Control Unit, Replacement)	Fault still exists	Find the cause out from other fault symptoms

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4. ONLY FRONT LEFT DOOR CENTRAL LOCK IS INVALID

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the front left door central lock works normally with remote control unlocking/locking door or pressing central lock unlocking/locking key	Diagnosis is over	The front left door central lock cannot be unlocked / locked	Go to Step 1
1	Check the unlocking function of front left door lock	Normal	Faulty	Instruction
	• Disconnect the connector of front left door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 2 of front left door wire harness D05 and the grounding at the time of unlocking **Voltage: 9V - 13V**	Go to Step 2	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 1 of front left door wire harness D05 and the terminal 20 of wire harness DI1
2	Check the locking function of front left door central lock	Normal	Faulty	Instruction
	• Disconnect the connector of front left door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1 of front left door wire harness D05 and the grounding at the time of locking **Voltage: 9V - 13V**	Go to Step 3	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 2 of front left door wire harness D05 and the terminal 19 of wire harness DI1
3	Check front left door lock	Normal	Faulty	Instruction
	Check front left door lock (see 73 - Remote Control Central Lock System, Front Left Door Locking Device, Detection)	Find the cause out from other fault symptoms	Front left door lock is damaged	Replace front left door lock (see 73 - Remote Control Central Lock System, Front Left Door Locking Device, Replacement)

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5. ONLY FRONT RIGHT DOOR CENTRAL LOCK IS FAILED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the front right door central lock works normally with remote control unlocking/locking door or pressing central lock unlocking/locking key	Diagnosis is over	The front right door central lock cannot be unlocked / locked	Go to Step 1
1	Check the unlocking function of front right door lock	Normal	Faulty	Instruction
	• Disconnect the connector of front right door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 2 of front right door wire harness K05 and the grounding at the time of unlocking **Voltage: 9V - 13V**	Go to Step 2	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 1 of front right door wire harness K05 and the terminal 9 of wire harness KI1
2	Check the locking function of front right door central lock	Normal	Faulty	Instruction
	• Disconnect the connector of front right door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1 of front left door wire harness K05 and the grounding at the time of locking **Voltage: 9V - 13V**	Go to Step 3	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 2 of front right door wire harness K05 and the terminal 10 of wire harness KI1
3	Check front right door lock	Normal	Faulty	Instruction
	Inspection of front right door lock (See 73 - Remote Control Central Lock System, Front Right Door Locking Device, Detection)	Find the cause out from other fault symptoms	Front right door lock is damaged	Replace front right door lock (see 73 - Remote Control Central Lock System, Front Right Door Locking Device, Replacement)

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6. ONLY REAR LEFT DOOR CENTRAL LOCK IS INVALID

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the rear left door central lock works normally with remote control unlocking/locking door or pressing central lock unlocking/ locking key	Diagnosis is over	The rear left door central lock cannot be unlocked / locked	Go to Step 1
1	Check the unlocking function of rear left door lock	Normal	Faulty	Instruction
	• Disconnect the connector of front rear door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 2 of rear left door wire harness M02 and the grounding at the time of unlocking **Voltage: 9V - 13V**	Go to Step 2	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 1 of rear left door wire harness M02 and the terminal 3 of the wire harness MB1
2	Check the locking function of rear left door central lock	Normal	Faulty	Instruction
	• Disconnect the connector of front rear door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1 of rear left door wire harness M02 and the grounding at the time of locking **Voltage: 9V - 13V**	Go to Step 3	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 2 of rear left door wire harness M02 and the terminal 4 of the wire harness MB1
3	Check rear left door lock	Normal	Faulty	Instruction
	Check rear left door lock (see 73 - Remote Control Central Lock System, Rear Left Door Locking Device, Detection)	Find the cause out from other fault symptoms	Rear left door lock is damaged	Replace rear left door lock (see 73 - Remote Control Central Lock System, Rear Left Door Locking Device, Replacement)

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7. ONLY REAR RIGHT DOOR CENTRAL LOCK IS FAILED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the rear left door central lock works normally with remote control unlocking/locking door or pressing central lock unlocking/locking key	Diagnosis is over	The rear right door central lock cannot be unlocked / locked	Go to Step 1
1	Check the unlocking function of rear right door lock	Normal	Faulty	Instruction
	• Disconnect the connector of rear right door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 2 of rear right door wire harness N02 and the grounding at the time of unlocking **Voltage: 9V - 13V**	Go to Step 2	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 1 of rear right door wire harness N02 and the terminal 3 of the wire harness NB1
2	Check the locking function of rear right door central lock	Normal	Faulty	Instruction
	• Disconnect the connector of rear right door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1 of rear right door wire harness N02 and the grounding at the time of locking **Voltage: 9V - 13V**	Go to Step 3	If the voltage is out of the specified range, the circuit is open circuit	Check and repair the circuit between the terminal 2 of rear right door wire harness N02 and the terminal 4 of the wire harness NB1
3	Check rear right door lock	Normal	Faulty	Instruction
	Check rear right door lock (see 73 - Remote Control Central Lock System, Rear R Door Locking Device, Detection)	Find the cause out from other fault symptoms	Rear right door lock is damaged	Replace the rear right door lock (See 73 - Remote Control Central Lock System, Rear Left Door Locking Device, Replacement)

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8. TAIL DOOR LOCK IS INVALID

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check if the tail door can be opened normally	Diagnosis is over	The tail door is not opened	Go to Step 1
1	Check tail door opening switch	Normal	Faulty	Instruction
	Disconnect the connector of tail door opening switch, press the tail door opening switch, and check the resistance between the terminal 2 and the terminal 3 of the tail door opening switch **Resistance: <2Ω**	Go to Step 2	If the resistance is more than 1MΩ, it indicates that the tail door opening switch is damaged	Replace tail door open switch
2	Check the wire harness of tail door opening switch	Normal	Faulty	Instruction
	• Disconnect the connector of tail door opening switch and check the voltage between the terminal 3 of the vehicle body wire harness connector B22 and the grounding **Voltage: 0V - 1V** • Check the resistance between the terminal 2 of the vehicle body wire harness connector B22 and the grounding **Resistance: <2Ω**	Go to Step 3	• If the voltage is 0, the circuit between the vehicle body wire harness connector B22 and the central lock control unit is open circuit. It indicates that the circuit is short circuit to power supply in the wire harness, if the voltage is the battery voltage • If the resistance is out of the specified range, it indicates that the circuit between the vehicle body wire harness connector B22 and the grounding point G24 is open circuit	• Check and repair the circuit between the vehicle body wire harness B22 and central lock control unit • Check and repair the circuit between the vehicle body wire harness B22 and G24 **Notice:** **The connector of tail door opening switch is green and wrong installation will make tail door unopened and damage the other devices of electrical system (for example: the wrong installation of the black driver's seat heater switch connector with the same shape or the white front passenger's seat heater connector)**
3	Check tail door sensitive switch	Normal	Faulty	Instruction
	Disconnect the connector of tail door sensitive switch, press the tail door sensitive switch, and check the resistance between the terminal 1 and the terminal 2 of the tail door sensitive switch **Resistance: <2Ω**	Go to Step 4	If the resistance is more than 1MΩ, it indicates that the tail door sensitive switch is damaged	Replace tail door sensitive switch
4	Check tail door sensitive switch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the connector of tail door sensitive switch and check the voltage between the terminal 1 of the tail door wire harness connector L09 and the grounding **Voltage: 0V - 1V** • Check the resistance between the No. 2 terminal of the tail door wire harness connector L09 and the grounding **Resistance: <2Ω**	Go to Step 5	• If the voltage is 0, the circuit between the tail door wire harness connector L09 and the central lock control unit is open circuit. It indicates that the circuit is short circuit to power supply in the wire harness, if the voltage is the battery voltage • If the resistance is out of the specified range, it indicates that the circuit between the tail door wire harness connector L09 and the grounding point G31 is open circuit	• Check and repair the circuit between the tail door wire harness connector L09 and the central lock control unit • Check and repair the circuit between the tail door wire harness connector L09 and G31
5	Check tail door lock	Normal	Faulty	Instruction
	Check tail door lock (see 73 - Remote Control Central Lock System, Tail Door Locking Device, Detection)	Go to Step 6	Tail door lock is damaged	Replace tail door lock (see 73 - Remote Control Central Lock System, Tail Door Locking Device, Replacement)
6	Check the power circuit of tail door	Normal	Faulty	Instruction
	• Disconnect the connector of tail door lock when the ignition switch is at "LOCK" position • Check the voltage between the terminal 1 of the tail door wire harness L08 and the grounding **Voltage: 9V - 13V**	Go to Step 7	The voltage is out of the specified range	• Check and repair the circuit between the tail door wire harness connector L08 and the central lock control unit
7	Check the grounding circuit of tail door	Normal	Faulty	Instruction
	• Check the resistance between the No. 2 terminal of the tail door wire harness connector L08 and the grounding **Resistance: <2Ω**	Go to Step 8	• If the resistance is out of the specified range, it indicates that the circuit between the tail door wire harness connector L08 and the grounding point G31 is open circuit	Check and repair the circuit between the tail door wire harness connector L08 and G31
8	Replacement and check	Normal	Faulty	Instruction
	Replace the same central lock control unit and check whether the tail door can be opened	(See 73 - Remote Control Central Lock System, Central Lock Control Unit, Replacement)	Fault still exists	Find the cause out from other fault symptoms

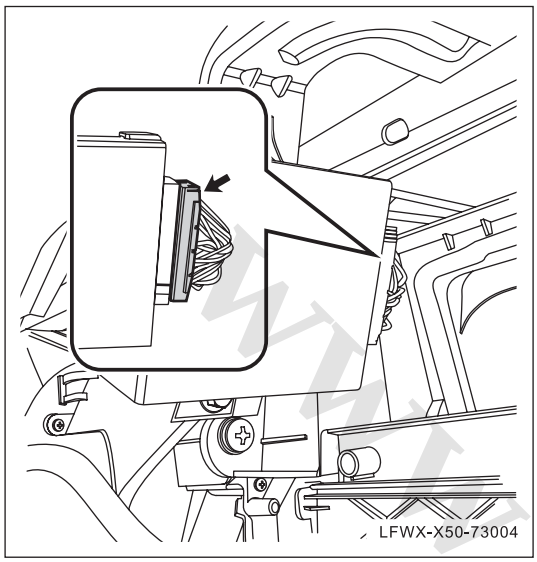
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CENTRAL LOCK CONTROL UNIT

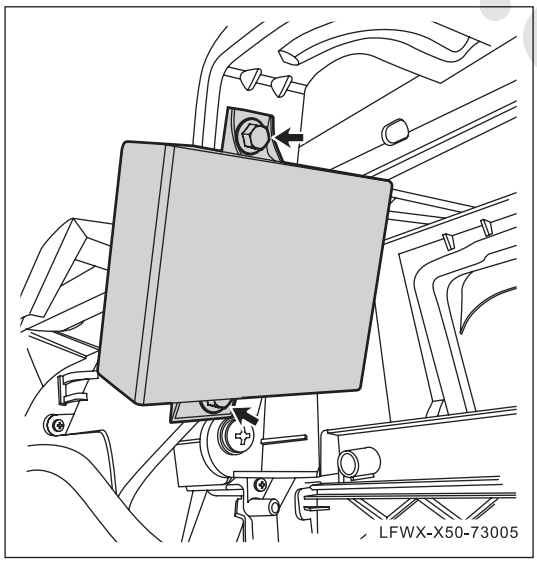
REPLACEMENT

1. **DISCONNECT THE NEGATIVE CABLE OF BATTERY**
2. **REMOVE DASHBOARD GLOVE BOX (SEE 85 - DASHBOARD AND CONSOLE GLOVE BOX, REPLACEMENT)**



3. **REMOVE CENTRAL LOCK CONTROL UNIT**

(a) Disconnect central lock control unit connector.



(b) Remove the fixing bolt of central lock control unit, and take down the central lock control unit.

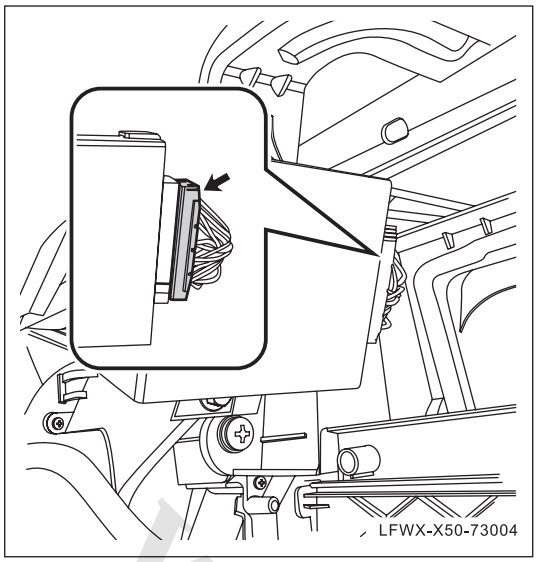
4. **INSTALL CENTRAL LOCK CONTROL UNIT**

(a) Install central lock control unit and central lock control unit bolts and tighten them.

Torque: 8 - 12N•m

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(b) Connect central lock control unit connector.

5. **INSTALL DASHBOARD GLOVE BOX (SEE 85 - DASHBOARD AND CONSOLE DASHBOARD, GLOVE BOX, REPLACEMENT)**
6. **CONNECT THE NEGATIVE CABLE OF BATTERY.**

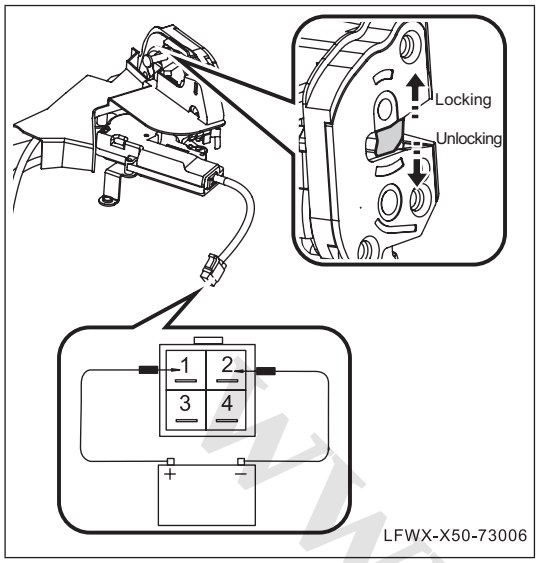
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FRONT LEFT DOOR LOCKING DEVICE

INSPECTION



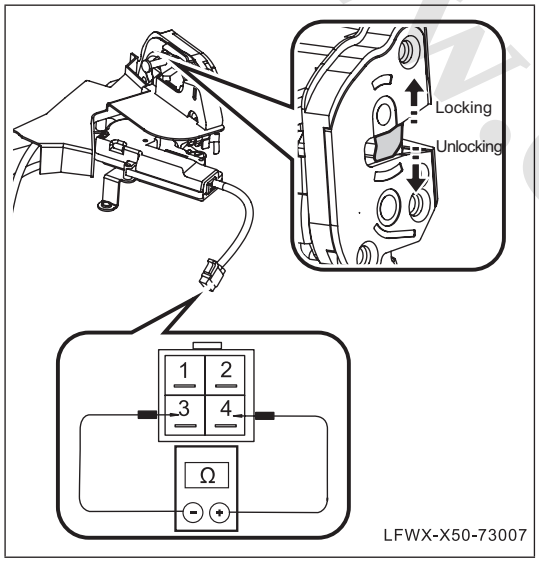
1. CHECK FRONT LEFT DOOR LOCKING DEVICE

(a) Connect No. 1 terminal of front left door locking device with the battery positive electrode, No. 2 terminal with the battery negative electrode.

Standard state: Unlocking

(b) Connect No. 2 terminal of front left door locking device with the battery positive electrode, No. 1 terminal with the battery negative electrode.

Standard state: Locking



(c) Set front left door lock in locking state and check whether there is connectivity between No. 3 & No. 4 terminals of front door locking device with the resistance position of a multimeter.

(d) Set front left door lock in locking state, check there is no connectivity between No. 3 & No. 4 terminals of front door locking device with the resistance position of a multimeter.

If it does not conform to the requirements, replace front left door lock assembly.

REPLACEMENT

△ HINT:

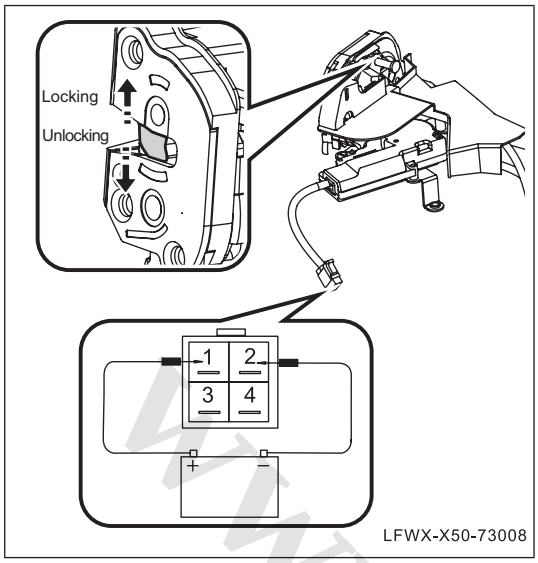
See 82 - Door and Door Lock Front Door Lock, Replacement.

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FRONT RIGHT DOOR LOCKING DEVICE

INSPECTION



1. **CHECK FRONT RIGHT DOOR LOCKING DEVICE**

(a) Connect No. 1 terminal of front right door locking device with the battery positive electrode, No. 2 terminal with the battery negative electrode.

Standard state: Unlocking

(b) Connect No. 2 terminal of front left door locking device with the battery positive electrode, No. 1 terminal with the battery negative electrode.

Standard state: Locking

If it does not conform to the requirements, replace front right door lock assembly.

REPLACEMENT

△ HINT:

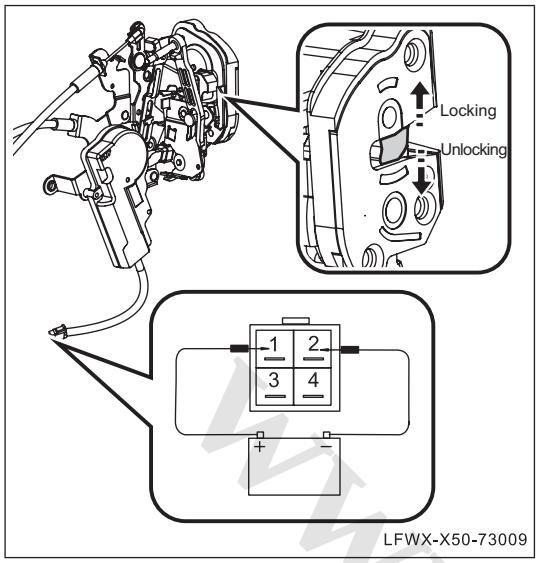
See 82 - Door and Door Lock Front Door Lock, Replacement.

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REAR LEFT DOOR LOCKING DEVICE

INSPECTION



1. CHECK REAR LEFT DOOR LOCKING DEVICE

(a) Connect No. 1 terminal of rear left door locking device with the battery positive electrode, No. 2 terminal with the battery negative electrode.

Standard state: Unlocking

(b) Connect No. 2 terminal of rear left door locking device with the battery positive electrode, No. 1 terminal with the battery negative electrode.

Standard state: Locking

If it does not conform to the requirements, replace right left door lock assembly.

REPLACEMENT

△ HINT:

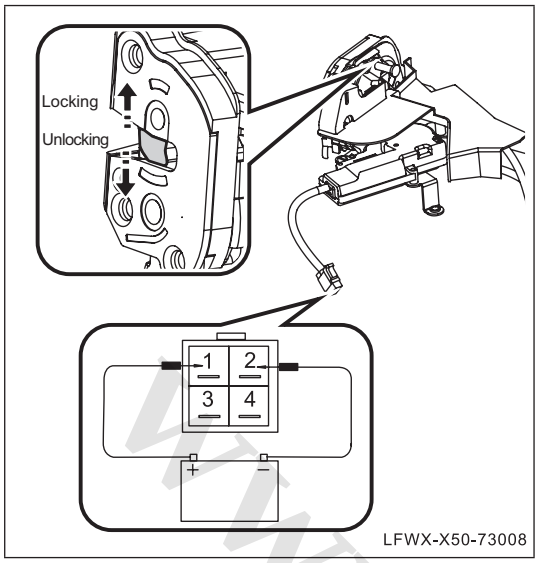
See 82 - Door and Door Lock Rear Door Lock, Replacement.

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REAR RIGHT DOOR LOCKING DEVICE

INSPECTION



1. CHECK REAR RIGHT DOOR LOCKING DEVICE

(a) Connect No. 1 terminal of rear right door locking device with the battery positive electrode, No. 2 terminal with the battery negative electrode.

Standard state: Unlocking

(b) Connect No. 2 terminal of rear right door locking device with the battery positive electrode, No. 1 terminal with the battery negative electrode.

Standard state: Locking

If it does not conform to the requirements, replace rear right door lock assembly.

REPLACEMENT

△ HINT:

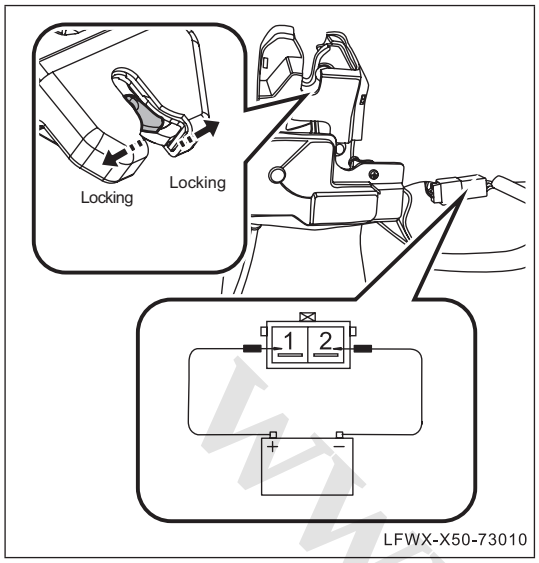
See 82 - Door and Door Lock Rear Door Lock, Replacement.

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TAIL DOOR LOCKING DEVICE

INSPECTION



1. CHECK TAIL DOOR LOCKING DEVICE

(a) Connect No. 1 terminal of tail door locking device with the battery positive electrode, No. 2 terminal with the battery negative electrode.

Standard state: Unlocking

If it does not conform to the requirements, replace tail door lock assembly.

REPLACEMENT

△ HINT:

See 82 - Door and Door Lock, Tail Door Lock, Replacement.

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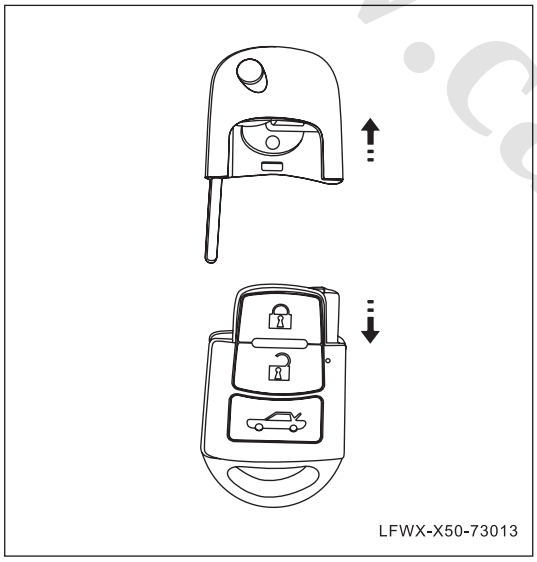
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REMOTE CONTROL BATTERY

REPLACEMENT

NOTICE:

- **Do not lose any component when replacing the battery of remote control.**
- **Keep the replaced battery or components properly to prevent from being swallowed by child(ren).**
- **Replace it with the same type of the battery recommended by service station authorized by LIFAN.**
- **Do not throw the waste battery removed from remote control about, hand over the waste battery to approved recycling station.**
- **Do not bend the joint.**
- **Confirm the positive and negative electrodes of the battery are installed properly.**
- **Do not replace the battery by wet hands because water may lead to rust.**
- **Do not touch or move any part in remote control. Otherwise, it will prevent correct operation.**
- **When the remote control battery is inserted, do not bend electrodes or adhere to dust and oil in remote control box.**



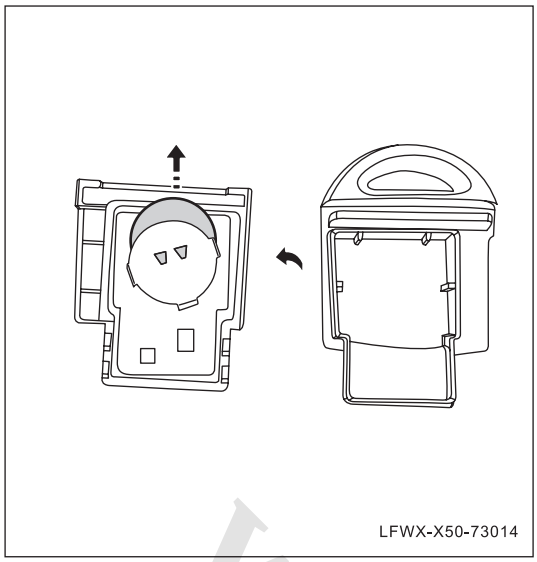
1. SEPARATE REMOTE CONTROL AND KEY ACCORDING TO THE ARROW INDICATION

△ HINT:

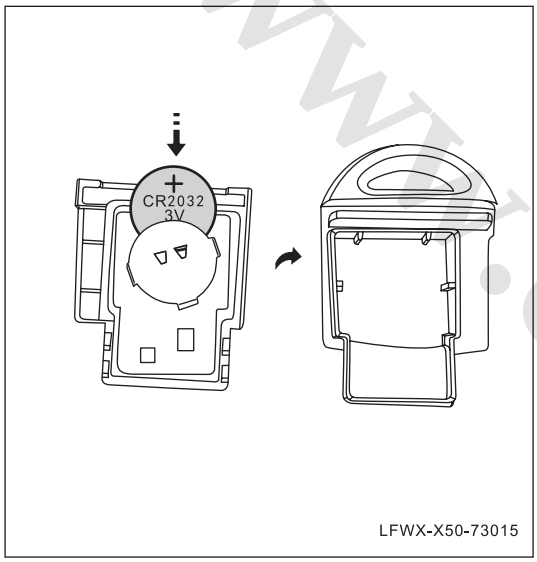
Remote control is a precise electronic component. Handle it with care.

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2. OPEN REMOTE CONTROL AND TAKE OUT ITS BATTERY.



3. INSTALL NEW REMOTE CONTROL BATTERY

Battery model: CR2032/3V

△ HINT:

Install the battery as shown in the figure.

4. INSTALL REMOTE CONTROL AND KEY, AND CHECK IF THE REMOTE CONTROL WORKS NORMALLY

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Audio System

Audio system 74-1
System description 74-1
Preparation 74-1
Service data 74-2
Precautions 74-2
Schematic diagram 74-3
Components 74-4
Function and fault of components 74-5
On-vehicle inspection 74-5
Diagnosis 74-6
Fault symptom table 74-6
Fault diagnosis 74-7
Radio/CD player 74-13
Replacement 74-13
Front door speaker 74-16
Inspection 74-16
Replacement 74-17
Rear door speaker 74-19
Inspection 74-19
Replacement 74-19
Antenna 74-21
Inspection 74-21
Replacement 74-21

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AUDIO SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

It will makes the vehicle to receive AM/FM broadcasting and play CD & MP3. And it also controls the playing information and volume for entertainment. All the items on the instrument cluster related to sound alarm function are provided signal by the instrument, dealt by the radio/CD player, and then send out by the speaker, such as door open, seat belt unfastened (showed on the multifunction display screen), clearance lamp hasn't been turned off, reverse radar warning, etc.

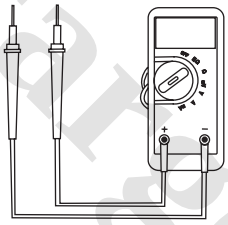
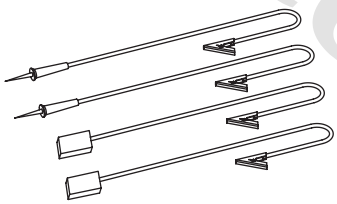
2. COMPONENTS

The audio system mainly consist of a radio/CD player, speakers, antenna, antenna feeder lines, USB data lines, etc.

3. WORKING PRINCIPLE

The radio/CD player receives signal and AM/FM broadcast through the outside mounted antenna; it plays CD through the CD player; meantime, the radio/CD player combines the functions of MP3 that it can connect movable device through the USB port to play the audio files inside and connect outside mounted audio device through the AUX port.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Used for measuring voltage and resistance
2	Wiring set		Used for testing circuits

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SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of Radio/CD player	8 - 10
Fixing screw of Radio/CD player	5 - 6
Fixing nut of antenna	15 - 20
Fixing screw of front door speaker	5 - 6
Fixing screw of rear door speaker	5 - 6

PRECAUTIONS

1. THE AM/FM STATION DATA STORED IN THE RADIO/CD PLAYER WILL BE ERASED WHEN THE NEGATIVE CABLE OF BATTERY IS DISCONNECTED.

△ HINT:

Record down those data before disconnecting the negative cable of battery if necessary, and reset them after the negative cable is connected.

2. WHEN REMOVING AND INSTALLING RADIO/CD PLAYER, THE CD(S) MUST BE TAKEN OUT OF THE RADIO/CD PLAYER.

△ HINT:

If CD is stuck in Radio/CD player and cannot be taken out, do not take it out forcedly and then drive the vehicle to our service station.

3. AVOID TOUCHING THE CONE OF SPEAKER.

4. WHILE INSTALLING ANTENNA ASSEMBLY, IT IS NECESSARY TO ENSURE FIRM GROUNDING CONNECTION.

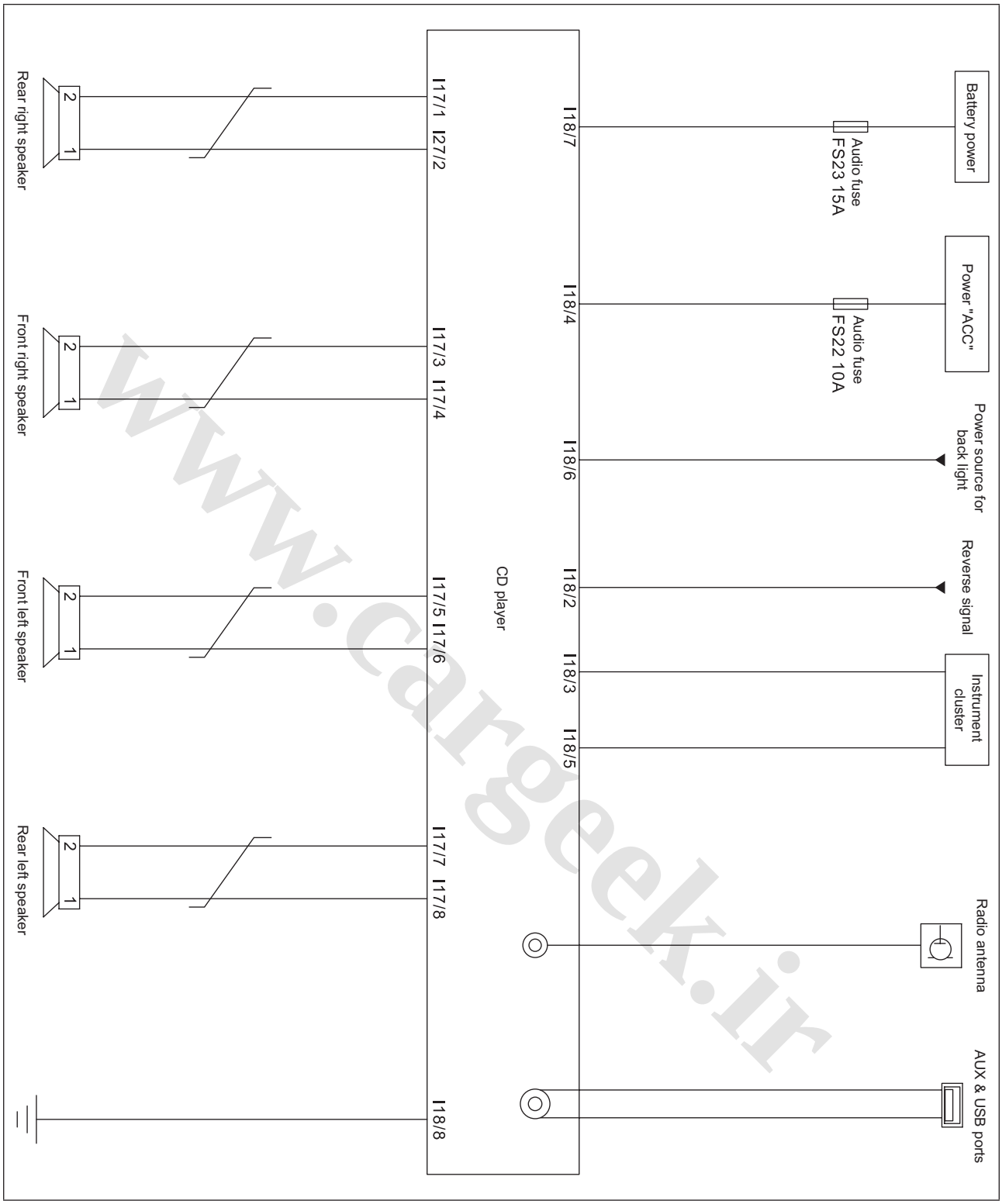
△ HINT:

Bad connection of antenna grounding will cause noise and weaken the receiving signal when receiving broadcast information

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SCHEMATIC DIAGRAM



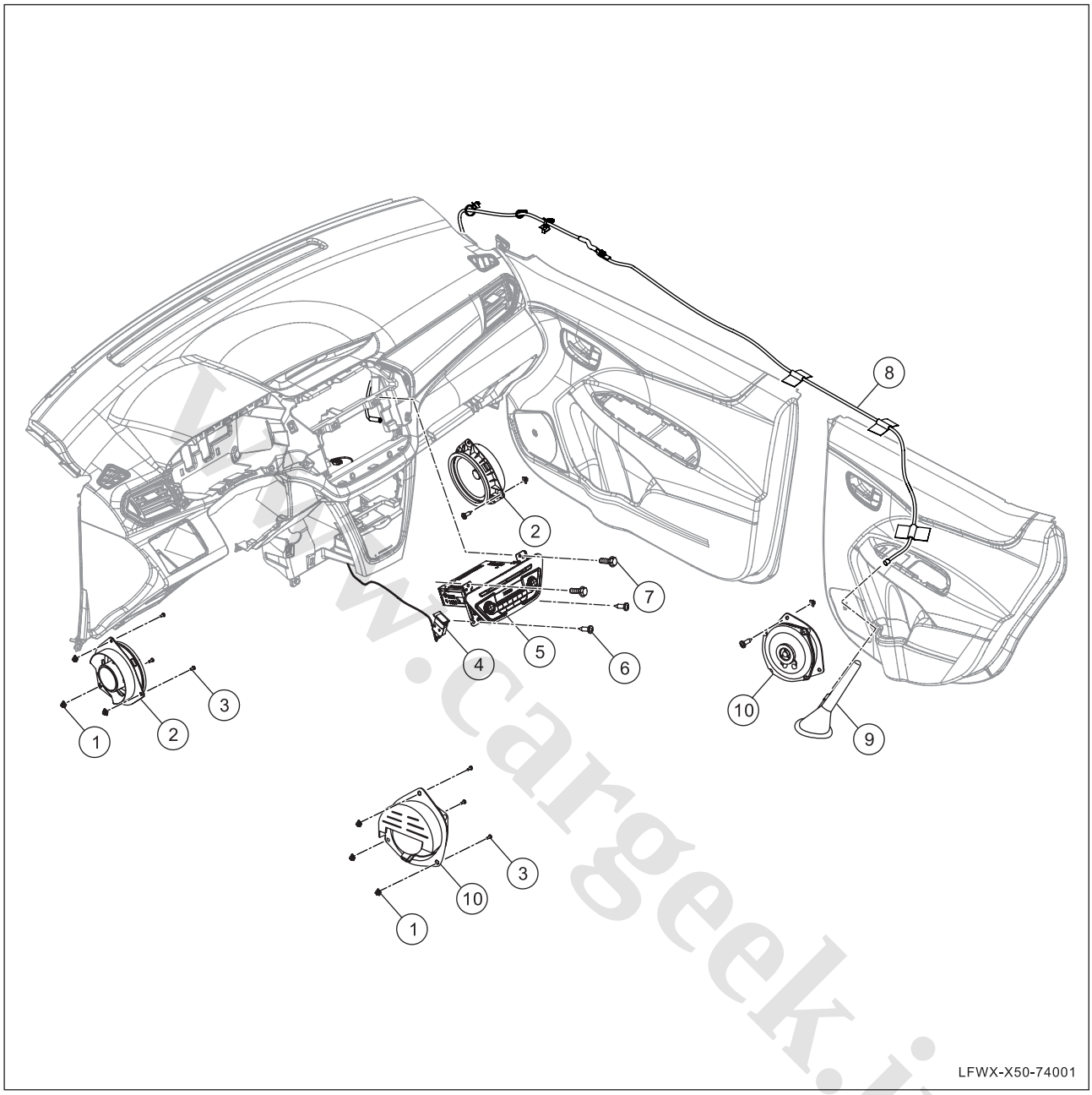
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COMPONENTS



1	Plastic square head snap-fit
2	Front-mounted speaker
3	Cross recessed pan head self-tapping screw
4	Data interface
5	Radio/CD player assembly

6	Screw
7	Bolt
8	Radio antenna feeder line assembly
9	Radio antenna system
10	Speaker

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
CD player	Combine the functions of AM/FM radio, CD player and MP3 player	Damage	Audio system can not work
Speaker	Convert electric energy into sound energy	Small volume or no sound	Small volume or no sound at some place
Antenna assembly	Receive AM/FM broadcast signal	Damaged and rusted	AM/FM broadcast signal is poor
Antenna feeder line	Transmit AM/FM broadcast signal	open circuit	No signal of AM/FM broadcast

ON-VEHICLE INSPECTION

△ HINT:

Refer to Owner's Manual of LIFAN X50 to check the functions of each button of vehicle-mounted CD panel. At the same time, check if each horn speaker works normally to determine fault causes and get rid of misoperation possibility.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Press the power switch but the radio/CD player has no reaction	1. Fuse (blown)	See 74 - Audio System, Diagnosis, Fault Diagnosis (1. Press the Power Switch but the Radio/CD Player Has No Reaction)
	2. Radio/CD player power supply and grounding circuit (open circuit or short circuit)	
	3. Radio/CD Player (damaged)	
No sound from speakers (the audio is mute)	1. The radio/CD player is set as mute	See 74 - Audio System, Diagnosis, Fault Diagnosis (2. No Sound from Speakers (the audio is mute))
	2. Speaker circuit (the wire harness is open circuit or the speaker is damaged)	
	3. Radio/CD Player (damaged)	
One speaker has no sound	1. The radio/CD player is set wrongly	See 74 - Audio System, Diagnosis, Fault Diagnosis (3.One Speaker Has No Sound)
	2. Speaker (damaged)	
	3. Wire harness or connector (open circuit or short circuit)	
	4. Radio/CD Player (damaged)	
Abnormal noise appears	1. Radio/CD player antenna (open circuit or short circuit)	See 74 - Audio System, Diagnosis, Fault Diagnosis (4. Abnormal Noise Appears)
	2. Speaker (damaged)	
	3. There is interference source surrounded	
Radio broadcasting cannot be received or received poorly	1. Radio/CD player antenna (open circuit or short circuit)	See 74 - Audio System, Diagnosis, Fault Diagnosis (5.Radio Broadcast Cannot be Received or Received Poorly)
	2. Radio/CD Player (damaged)	
Radio/CD player has no night illumination	1. Back lamp illumination circuit	See 74 - Audio System, Diagnosis, Fault Diagnosis (6. Radio/CD Player Has No Night Illumination)
	2. Radio/CD Player (damaged)	
There is a CD in the CD player, but there is no sound can be played	1. CD (front and back reversed)	Reinstall the CD
	2. CD (smudged or scratched)	Clean off smudges or scratches
	3. CD (no audio files in it)	Replace CD
	4. Radio/CD Player (damaged)	Replace Radio/CD Player
CD cannot be inserted or pop up after inserting.	1.CD (can't be identified or damaged)	See 74 - Audio System, Diagnosis, Fault Diagnosis (7. CD Cannot be Inserted in or Pops up After Inserting.)
	2. Radio/CD Player (damaged)	
CD cannot be taken out	1. CD (use unknown CD)	See 74 - Audio System, Diagnosis, Fault Diagnosis (8. CD Cannot be Taken out)
	2. Radio/CD Player (damaged)	
CD skipping and poor sound quality	1. CD (damaged)	See 74 - Audio System, Diagnosis, Fault Diagnosis (9. CD Skipping and Poor Sound Quality)
	2. Radio/CD Player (damaged)	

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FAULT DIAGNOSIS

1. PRESS THE POWER SWITCH BUT THE RADIO/CD PLAYER HAS NO REACTION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Press the power button continuously and check whether the radio/CD player is started up	Diagnosis is over	If the radio/CD player can only be started up after pressing the power button for a long time, then the button is in poor connection. And this fault can only be eliminated completely after replace the radio/CD play assembly	Go to Step 1
1	Check the Radio/CD Player fuse	Normal	Faulty	Instruction
	Check whether radio/CD player battery power supply fuse FS23 of the central control box in the cab and ACC power supply fuse FS22 is blown	Go to Step 3	For most of the time, fuses blown is caused by refitting the vehicle. Excessive load after refitting the vehicle causes too much electric current so as to blown the fuse. Or the power supply circuit is short circuit	After replacing the blown fuse with a new one of the specification, the fuse is blown again, then go to step 2
2	Check the Radio/CD Player power supply circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of battery, and check the resistance between the radio/CD player power supply circuit and the grounding with a digital multimeter.	Go to Step 3	There is short circuit in the power supply circuit or in the radio/CD player if the resistance is too small	Gradually identify the short circuit point, and then replace the fuse with the same capacity after troubleshooting **Rated capacity:** FS22 10A FS23 15A
3	Check the Radio/CD Player power supply circuit	Normal	Faulty	Instruction
	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position • Check the voltage between terminal 7 of I18 and the grounding with a multimeter • When the ignition switch is in "ACC" position, check the voltage between terminal 4 of I18 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 4	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is open circuit in the radio/CD player circuit. Inspect and repair the circuit between the connectors of the radio/CD player and fuses
4	Check the grounding circuit of the Radio/CD Player	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position • Check the resistance between terminal 8 of I18 and the grounding with a digital multimeter **Resistance: <2Ω**	Go to Step 5	The inspection resistance is out of the specified range	The abnormal voltage indicates that there is open circuit in the radio/CD player grounding circuit. Inspect and repair the circuit between the connectors of the radio/CD player and grounding point G21
5	Replacement and check	Normal	Faulty	Instruction
	Replace with a radio/CD player of the same kind and check whether the functions of the radio/CD player are in good condition	See 74 - Audio System, Radio/CD Player, Replacement	Fault still exists	Find the cause out from other fault symptoms

2. NO SOUND FROM SPEAKERS

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	After the radio/CD player is started, check whether it is set as mute	The volume is not set as 0 and go to Step 1	Set the radio/CD player volume as 0	Change the settingting
1	Check the Radio/CD player power supply circuit	Normal	Faulty	Instruction
	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position • Check the voltage between terminal 7 of I18 and the grounding with a digital multimeter • When the ignition switch is in "ACC" position, check the voltage between terminal 4 of I18 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 2	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is open circuit in the radio/CD player circuit. Inspect and repair the circuit between the connectors of the radio/CD player and fuses
2	Replacement and check	Normal	Faulty	Instruction
	Replace with a radio/CD player of the same kind and check that the radio/CD player can speak	Replace the radio/CD player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

3. ONE SPEAKER HAS NO SOUND

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	After the radio/CD player is started, check whether the radio/CD player sound track is set correctly	The sound track is set correctly, then go to Step 1	Left and right balance of the sound track is not set correctly	Change the setting
1	Check speaker circuit	Normal	Faulty	Instruction

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	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position Check the resistance between terminal 1 and terminal 2 of I17 with a multimeter **Resistance: 4Ω**	Go to Step 2	The inspection resistance is out of the specified range	Incorrect inspection resistance indicates that the speaker is damaged or the speaker circuit is open circuit. Check the speaker circuits for open circuit or inspect and repair the speaker (See 74 - Audio System, Radio/CD Player/Front Door Speaker, Inspection)
2	Replacement and check	Normal	Faulty	Instruction
	Replace with a radio/CD player of the same kind and check that the radio/CD player can speak	See 74 - Audio System, Radio/CD Player, Replacement	Fault still exists	Find the cause out from other fault symptoms

4. ABNORMAL NOISE APPEARS

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Find out the part that noise coming from and the time, and check whether the ambient environment has the following interference sources: • Electrical appliance of high power nearby • Strong magnetic field or strong electric field, etc.	Diagnosis is over	In an environment without external interference, the problem must come from the components of the radio/CD player if noise still exists	Go to Step 1
1	Check the speaker of the radio/CD player	Normal	Faulty	Instruction
	• Check whether the speaker is installed correctly • Check the speaker for foreign matter • Check the speaker cone for damage	Go to Step 2	• The speaker is installed incorrectly • There is foreign matter in the speaker • The speaker cone is damaged	• Reinstall the speaker • Clean off the foreign matter in the speaker • Replace the speaker
2	Check the antenna of the radio/CD player	Normal	Faulty	Instruction
	Check the antenna of the radio/CD player and the antenna shield wire of the radio/CD player (see 74 - Audio System, Antenna, Inspection)	Go to Step 3	The antenna or the shield wire is short circuit	Both short circuit of antenna and shield wire might cause the signal received by the radio/CD player to be interfered. At this moment, replace the antenna, check the shield wire grounding point or check the connection of the antenna and the radio/CD player
3	Replacement and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Replace with a radio/CD player of the same kind and check the radio/CD player for noise	Replace the radio/CD player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

5. RADIO BROADCASTING CANNOT BE RECEIVED OR RECEIVED POORLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	After confirming that there is no strong magnetic field interference surrounded, check the automatic station searching function of the radio/CD player	Diagnosis is over	It is common if the radio/CD player cannot receive signal when it is between high buildings, in mountain areas, in confined places or near high power electrical appliances	Go to Step 1
1	Check the Radio/CD player power supply circuit	Normal	Faulty	Instruction
	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position • Check the voltage between terminal 7 of I18 and the grounding with a digital multimeter • When the ignition switch is in "ACC" position, check the voltage between terminal 4 of I18 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 2	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is open circuit in the radio/CD player circuit. Inspect and repair the circuit between the connectors of the radio/CD player and fuses
2	Check the antenna of the radio/CD player	Normal	Faulty	Instruction
	Check the antenna of the radio/CD player and the antenna shield wire of the radio/CD player (see 74 - Audio System, Antenna, Inspection) △ HINT: Check whether the connector of the radio/CD player antenna is connected firmly and check the fixing nut of the roof antenna for rust	Go to Step 3	The antenna or the shield wire is short circuit	Both short circuit of antenna and shield wire might cause the signal received by the radio/CD player to be interfered. At this moment, replace the antenna, check the shield wire grounding point or check the connection of the antenna and the radio/CD player
3	Replacement and check	Normal	Faulty	Instruction
	Replace with a radio/CD player of the same kind and check the radio/CD player for noise	Replace Radio/CD Player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

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6. RADIO/CD PLAYER HAS NO NIGHT ILLUMINATION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the position lamp and check whether the internal back lamp lighting lamp is lit	Diagnosis is over	If all the back lamp lighting lamps are lit except the radio/CD player lighting lamp, check the lighting power supply of the radio/CD back lamp	Go to Step 1
1	Check the back lamp lighting power supply	Normal	Faulty	Instruction
	• Disconnect the connector of the radio/CD player when the ignition switch is in "LOCK" position • Check the voltage between the No. 6 terminal of I18 and the grounding **Voltage: 9 - 13V**	Go to Step 2	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is fault in the back lamp lighting power supply circuit. Inspect and repair the circuit between the radio/CD player connector and the back lamp power supply
2	Replacement and check	Normal	Faulty	Instruction
	Replace with a radio/CD player of the same kind and check whether the back lamp is lit	Replace Radio/CD Player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

7. CD CANNOT BE INSERTED OR POPS UP AFTER INSERTING.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check whether the CD is inserted correctly and confirm that the radio/CD player can play the files in the CD	Go to Step 1	The CD is not inserted correctly	Insert the CD correct
1	Check CD	Normal	Faulty	Instruction
	Check the CD surface and wipe the CD from its inside to the outside with a piece of soft cloth.	Go to Step 2	The CD is polluted and damaged	Insert the CD in the radio/CD player after being cleaned and check whether the radio/CD player can play it
2	Replacement and check	Normal	Faulty	Instruction
	Replace with another piece of CD and check whether the CD will be popped out again	Replace Radio/CD Player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

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8. CD CANNOT BE TAKEN OUT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the radio/CD player is powered on, press the CD eject button and check whether the CD can be taken out	Diagnosis is over	If the CD is in poor quality or the CD is not installed correctly, the CD might not be taken out intermittently	Go to Step 1
1	Check Radio/CD Player	Normal	Faulty	Instruction
	Check whether the radio/CD player is installed correctly, and check again with another piece of CD	The CD popped out normally	Replace Radio/CD Player (See 74 - Audio System, Radio/CD Player, Replacement)	

9. CD SKIPPING AND POOR SOUND QUALITY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check whether the CD is inserted correctly	Go to Step 1	The CD is not inserted correctly	Insert the CD correct
1	Check CD	Normal	Faulty	Instruction
	Check the CD surface and wipe the CD from its inside to the outside with a piece of soft cloth.	Go to Step 2	The CD is polluted and damaged	Insert the CD in the radio/CD player after being cleaned and check whether the radio/CD player can play it
2	Replacement and check	Normal	Faulty	Instruction
	Insert the CD into a radio/CD player of the same model and check whether the CD can be played	Replace Radio/CD player (See 74 - Audio System, Radio/CD Player, Replacement)	Fault still exists	Find the cause out from other fault symptoms

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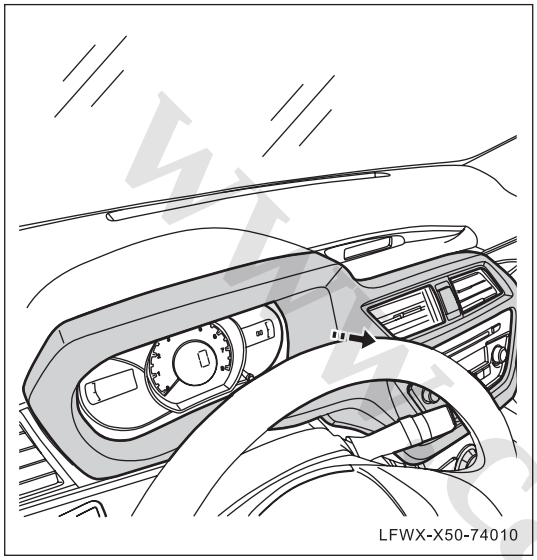
RADIO/CD PLAYER

REPLACEMENT

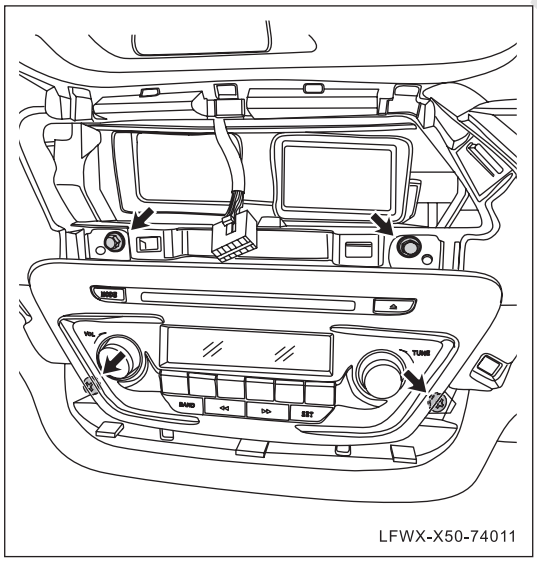
1. DISCONNECT THE NEGATIVE CABLE OF BATTERY

△ HINT:

- The AM/FM station data stored in the radio/CD player will be erased after the negative cable of battery is disconnected.
- Record down those data before disconnecting the negative cable of battery if necessary, and reset them after the negative cable is connected.



2. REMOVE INSTRUMENT CLUSTER COWL (SEE 85- DASHBOARD AND CONSOLE, INSTRUMENT CLUSTER COWL, REPLACEMENT)

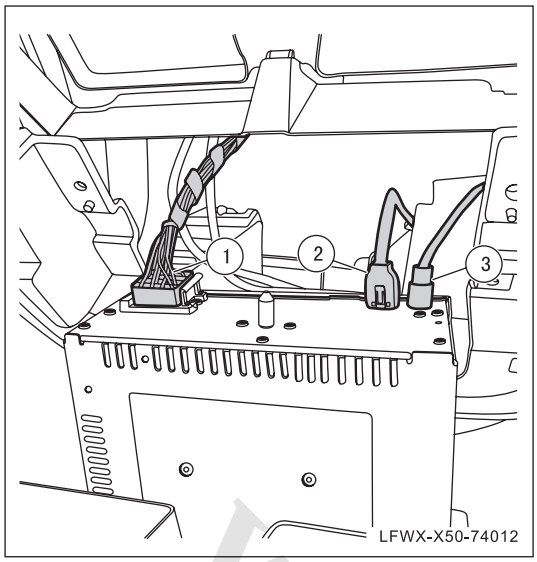


3. REMOVE RADIO/CD PLAYER

(a) Remove the fixing screws and fixing bolts of the radio/CD player.

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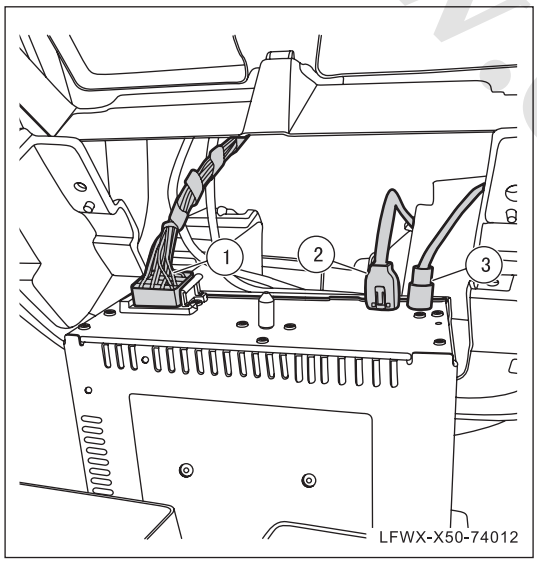


(b) Move the radio/CD player outward, disconnect radio/CD player connector ① , data connector ② and antenna feeder line connector ③ and take out the radio/CD player assembly.

4. INSPECT RADIO/CD PLAYER

△ HINT:

Replace the suspicious radio/CD player with a normal radio/CD player to determine if the radio/CD player is damaged indirectly.



5. INSTALL RADIO/CD PLAYER

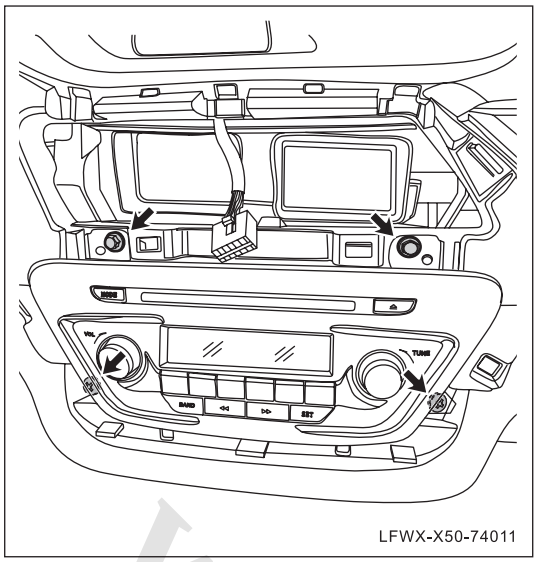
(a) Connect radio/CD player connector ① , data connector ② and antenna feeder line connector ③ .

NOTICE:

If you hear a clear “click” sound when connecting, it means the connector is connected well.

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(b) Install the radio/CD player onto the instrument console, and install the fixing bolts and fixing screws and tighten them.

Torque: 8 - 10N•m(bolt),5 - 6N•m(screw)

6. **INSTALL INSTRUMENT CLUSTER COWL (SEE 85 - DASHBOARD AND CONSOLE, INSTRUMENT CLUSTER COWL, REPLACEMENT)**
7. **CONNECT NEGATIVE CABLE OF BATTERY.**
8. **TURN ON RADIO/CD PLAYER AND CHECK THAT THE AUDIO SYSTEM WORKS NORMALLY**
9. **DEBUG RADIO/CD PLAYER AND ADJUST STATION SETTING**

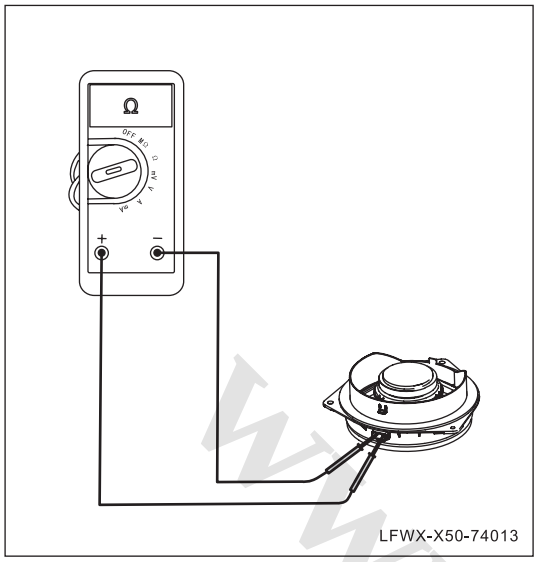
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FRONT DOOR SPEAKER

INSPECTION



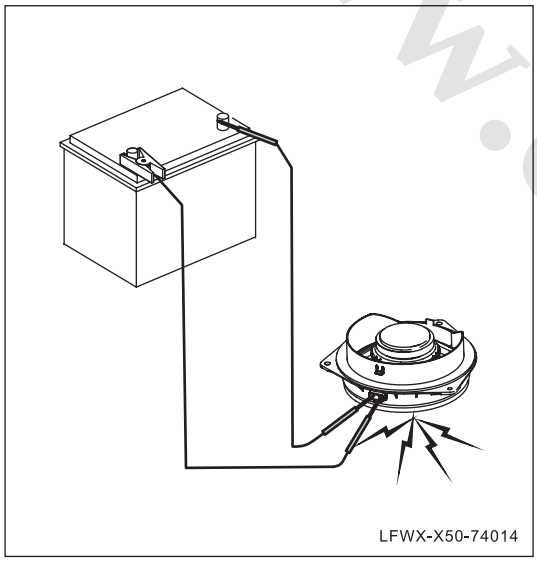
LFWX-X50-74013

1. COMPONENTS INSPECTION

(a) Measure the resistance between both terminals of front door speaker wire harness with a digital multi-meter.

- Replace the speaker if the resistance of the speaker is abnormal.

Standard resistance value: 4Ω


LFWX-X50-74014

(b) Connect one terminal of the front door speaker to the battery positive electrode and another terminal to the the battery negative electrode

- It is normal if the speaker has "buzz sound".
- Replace the speaker if it has no sound

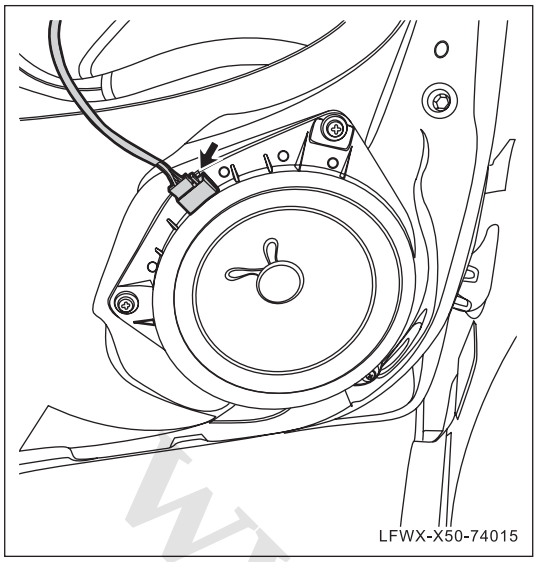
NOTICE:

The two terminals of the speaker cannot connect a battery for more than 3s.

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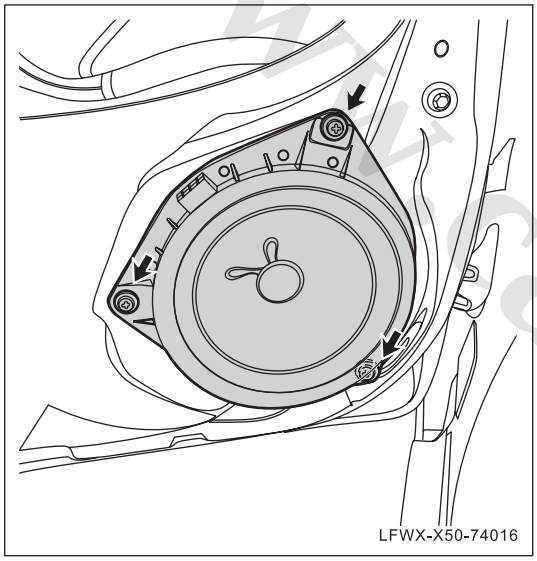
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REPLACEMENT



1. **DISCONNECT NEGATIVE CABLE OF BATTERY**
2. **REMOVE FRONT DOOR TRIM PANEL ASSEMBLY (SEE 81- INTERIORS AND EXTERIORS, FRONT DOOR TRIM PANEL, REPLACEMENT)**
3. **REMOVE FRONT DOOR SPEAKER**

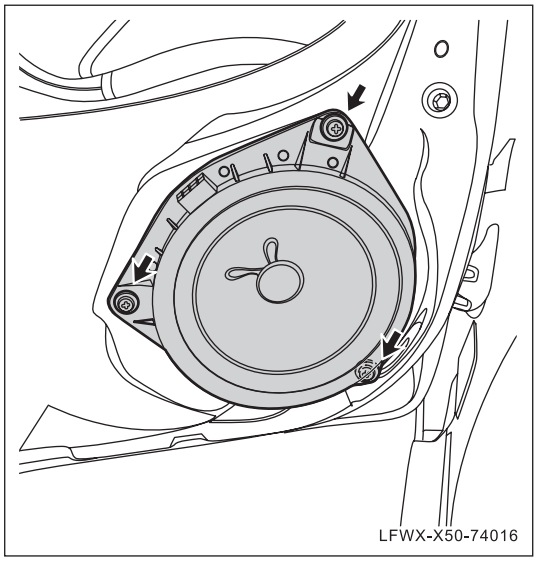
(a) Disconnect front door speaker connector.



(b) Remove the fixing screws of front door speaker, and take out the speaker.

NOTICE:

The speaker tapered cone is vulnerable, so do not press.



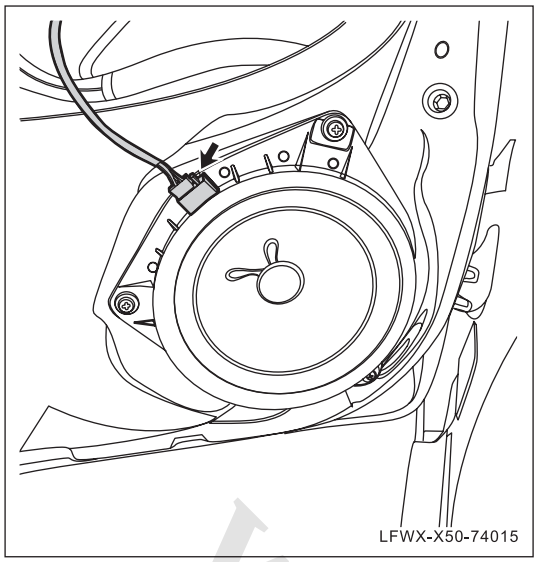
4. **INSTALL FRONT DOOR SPEAKER**

(a) Install the front door speaker on the front door, and install the fixing screws and tighten them.

Torque: 5 - 6N•m

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(b) Connect front door speaker connector.

5. **INSTALL FRONT DOOR TRIM PANEL ASSEMBLY (SEE 81- INTERIORS AND EXTERIORS, FRONT DOOR TRIM PANEL, REPLACEMENT)**
6. **CONNECT NEGATIVE CABLE OF BATTERY**
7. **TURN ON AUDIO SYSTEM, AND TEST IF FRONT DOOR SPEAKER WORKS NORMALLY**

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REAR DOOR SPEAKER

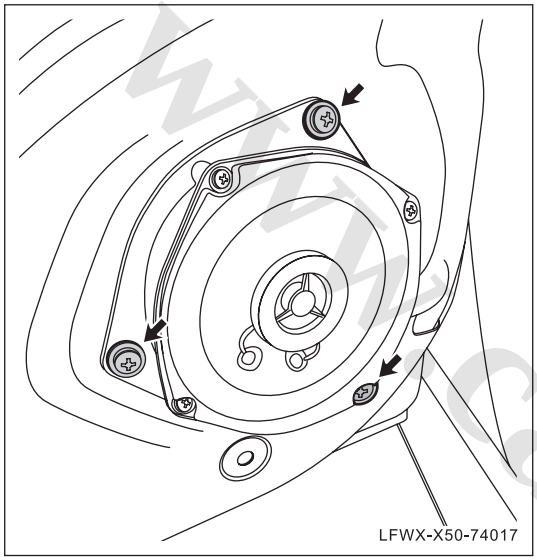
INSPECTION

△ HINT:

Check the rear door speaker in the same way as that of front door speaker and refer to inspection of the front door speaker.

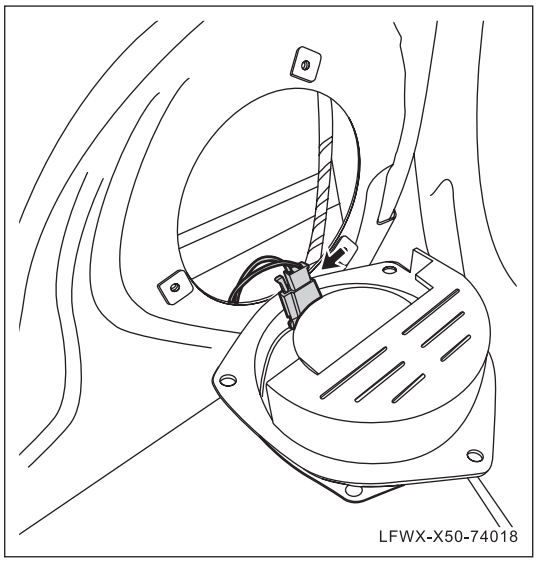
REPLACEMENT

1. **DISCONNECT NEGATIVE CABLE OF BATTERY**
2. **REMOVE REAR DOOR TRIM PANEL ASSEMBLY (SEE 81- INTERIORS AND EXTERIORS, REAR DOOR TRIM PANEL, REPLACEMENT)**



3. **REMOVE REAR DOOR SPEAKER**

(a) Remove the fixing screws of the rear door speaker



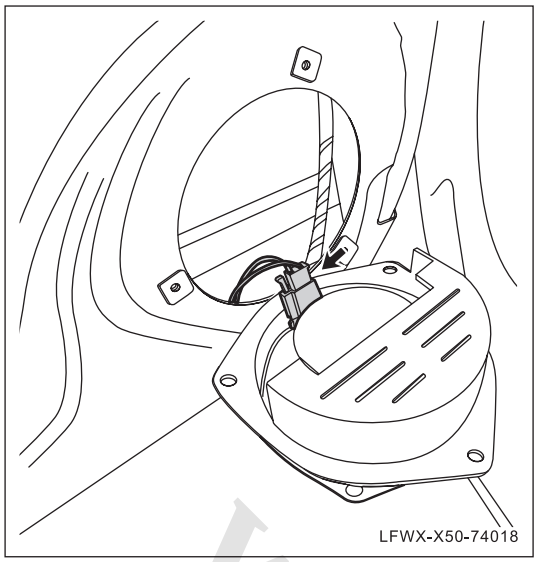
(b) Disconnect the rear door speaker connector and take off the rear door speaker.

NOTICE:

The speaker tapered cone is vulnerable, so do not press.

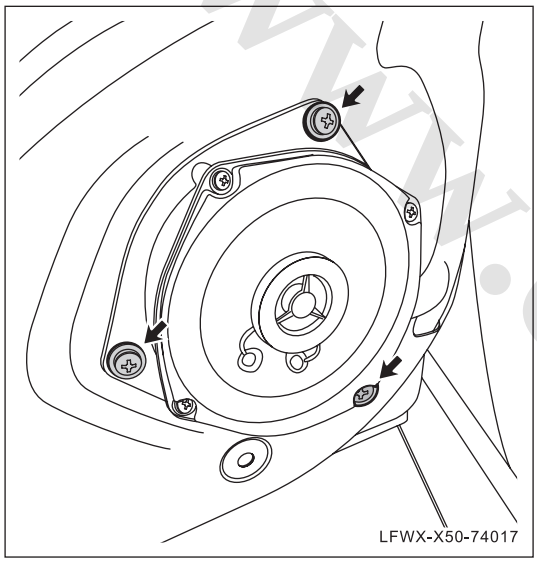
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4. INSTALL REAR DOOR SPEAKER

(a) Connect the rear door speaker connector.



(b) Install the fixing screws of the rear door speaker and tighten them.

Torque: 5 - 6N•m

5. INSTALL REAR DOOR TRIM PANEL ASSEMBLY (SEE 81- INTERIORS AND EXTERIORS, REAR DOOR TRIM PANEL, REPLACEMENT)

6. CONNECT NEGATIVE CABLE OF BATTERY

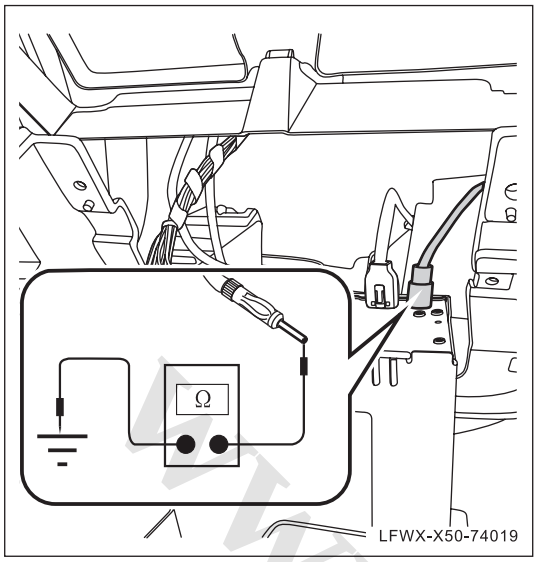
7. TURN ON AUDIO SYSTEM, AND TEST IF THE REAR DOOR SPEAKER WORKS NORMALLY

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ANTENNA

INSPECTION



1. CHECK ANTENNA

(a) Disconnect the antenna feeder line connect and measure the resistance between the antenna feeder line connect terminal with a digital multimeter.

Resistance value: Infinity

△ HINT:

If it does not conform to the above requirements, it means there is short circuit in the antenna feeder line or antenna, replace the antenna feeder line or antenna assembly.

NOTICE:

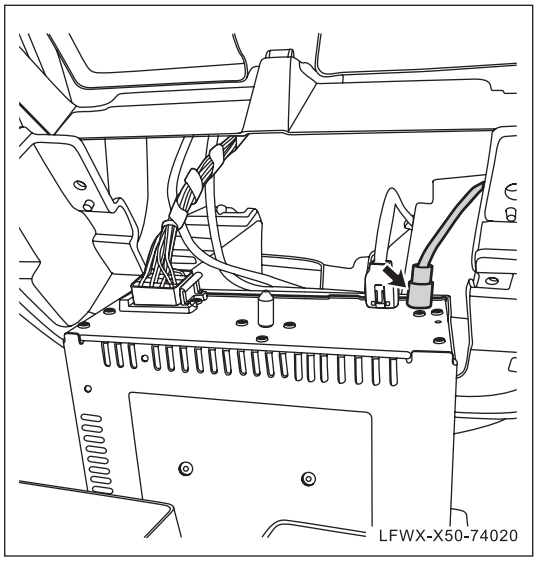
- **When measuring, the digital multimeter pointer needs to contact the metal part of the antenna end.**
- **This is a schematic diagram. In practice, one end of the grounding can be placed on the vehicle metal panel.**

REPLACEMENT

1. DISCONNECT NEGATIVE CABLE OF BATTERY

2. REMOVE RIGHT A PILLAR TRIM PANEL (SEE 81-INTERIORS AND EXTERIORS, A PILLAR TRIM PANEL, REPLACEMENT)

3. REMOVE ROOF TRIM PANEL (SEE 81 - INTERIORS AND EXTERIORS - ASSIST GRIP AND ROOF, REPLACEMENT).

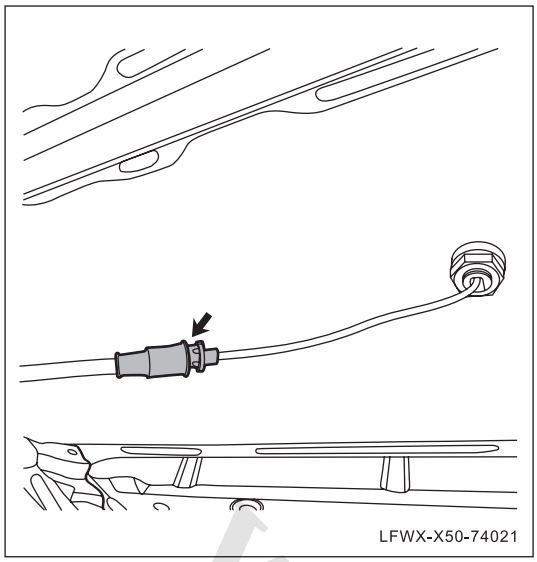


4. REMOVE ANTENNA ASSEMBLY

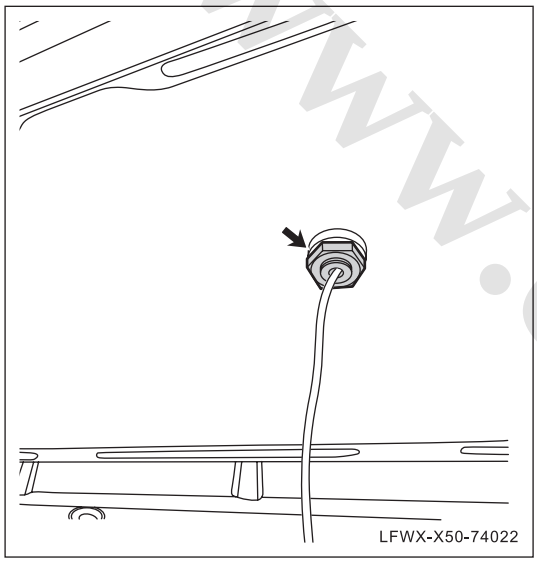
(a) Remove the radio/CD player and disconnect the antenna feeder line connector. (See 74 - Audio System, Radio/CD Player, Replacement)

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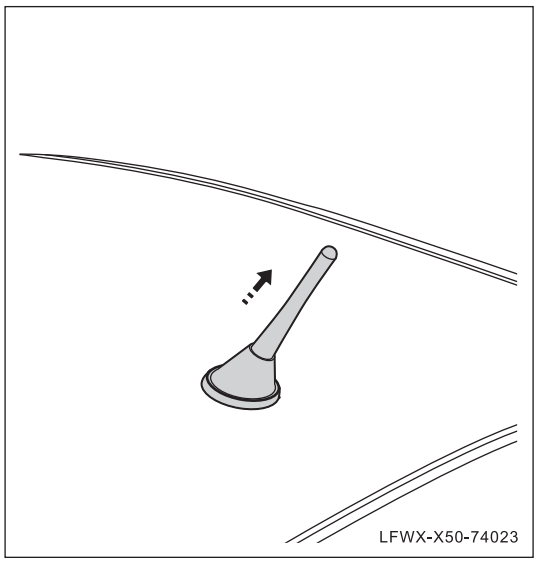
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(b) Disconnect the joint connecting the antenna feeder line and the antenna



(c) Remove fixing nuts of antenna assembly.

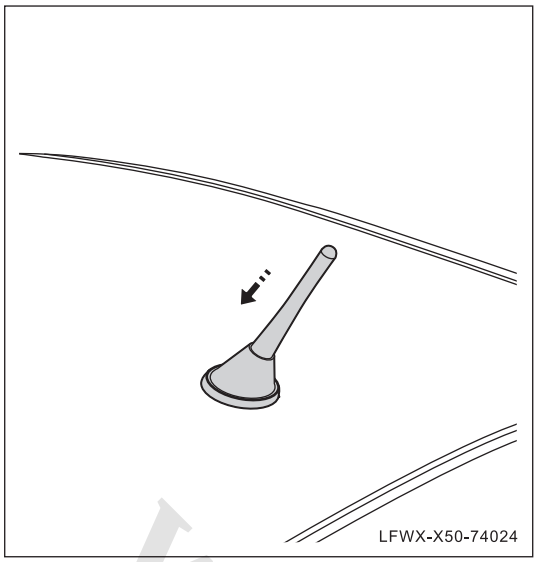


(d) Take antenna assembly out from vehicle top.

(e) Remove the line clamp of the antenna feeder line and take off the antenna feeder line.

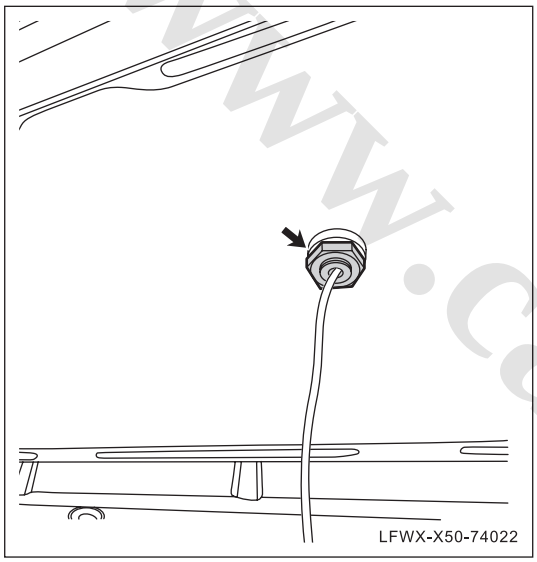
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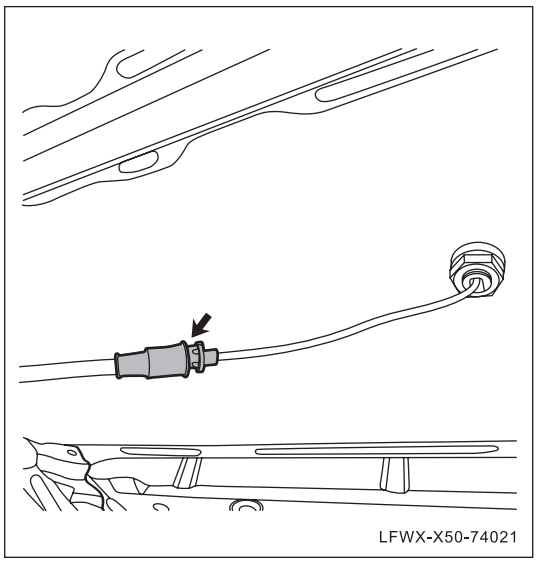
5. INSTALL ANTENNA ASSEMBLY

(a) Install antenna assembly from vehicle top.



(b) Install the fixing nuts of antenna assembly and tighten them.

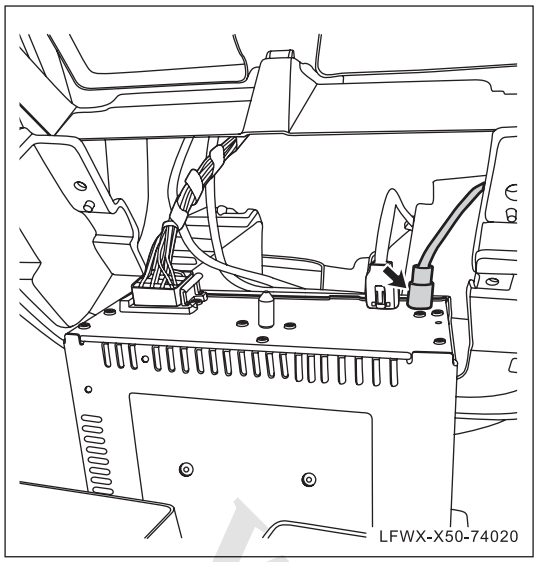
Torque: 15 - 20N•m



(c) Connect the joint connecting the antenna feeder line and the antenna.

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(d) Connect the joint connecting the antenna feeder line to the radio/CD player and install the radio/CD player. (See 74 - Audio System, Radio/CD Player, Replacement)

6. **INSTALL ROOF TRIM PANEL (SEE 81 - INTERIORS AND EXTERIORS - ASSIST GRIP AND ROOF, REPLACEMENT)**
7. **INSTALL RIGHT A PILLAR TRIM PANEL (SEE 81-INTERIORS AND EXTERIORS, A PILLAR TRIM PANEL, REPLACEMENT)**
8. **CONNECT NEGATIVE CABLE OF BATTERY**
9. **TURN ON AUDIO SYSTEM AND CHECK WHETHER IT RECEIVES SIGNAL NORMALLY**

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Driver Information System

Driver information system 75-1
System description 75-1
Preparation 75-4
Service data 75-4
Precautions 75-4
Schematic diagram (I) 75-5
Schematic diagram (II) 75-6
Components 75-7
Function and fault of components 75-7
Diagnosis 75-8
Fault symptom table 75-8
Fault diagnosis 75-9
Instrument cluster 75-17
Replacement 75-17
Multi-functional display 75-20
Replacement 75-20

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DRIVER INFORMATION SYSTEM

SYSTEM DESCRIPTION

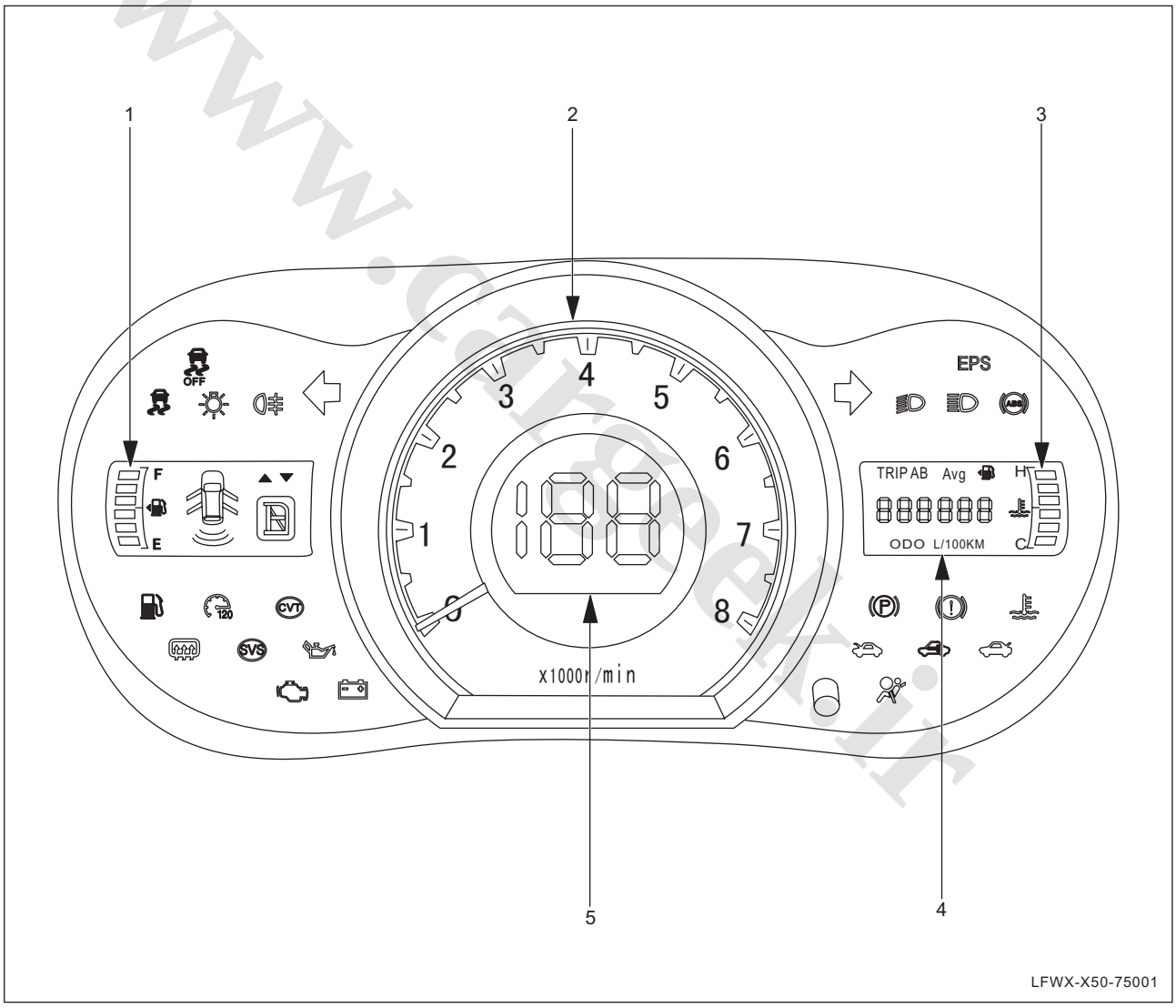
1. FUNCTION

The instrument cluster integrates the following components: instrument control unit, trip computer, engine tachometer, speedometer, instrument cluster display screen, engine coolant temperature indicator lamp, fuel level indicator lamp, mileage switch and instrument backlight brightness adjusting knob and indicator/warning lamp and warning buzzer with reminding function to remind the driver of related vehicle information.

All indicator lamps and warning lamps are light emitting diode (LED), such as indicator lamp for charging system, turn signal lamp, etc.

2. COMPONENTS

The driver information system consists of instrument cluster and multifunction display screen.



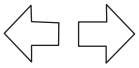
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1	Fuel gauge
2	Tachometer
3	Water-temperature gauge

4	LED display
5	Speedometer

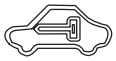
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S/N	Symbol	Name	Description
1		Turn signal lamp indicator lamp	When switching on turn signal lamp , turn signal lamp indicator and turn signal lamp flash at the same time. When switching off turn signal lamp , turn signal lamp indicator and turn signal lamp go out.
		Hazard warning lamp indicator	When pressing hazard warning lamp switch, hazard warning lamp indicator and all turn signal lamps flash. When pressing the hazard warning lamp switch again, hazard warning lamp indicator and all turn signal lamps go out.
2		Rear fog lamp indicator	This indicator lamp is used to indicate the working conditions of rear fog lamps. When rear fog lamps illuminate, this indicator lamp will be lit. After switching off the fog lamps, this indicator lamp will go out.
3		Low beam indicator	This indicator lamp is used to indicate the working conditions of low-beam lamps. When low beam lamp is lit, this indicator will be lit at the same time.
4		High beam indicator	This indicator is used to indicate the working conditions of high-beam lamps. When high beam lamp is lit, this indicator will be lit at the same time.
5		Position lamp indicator	This indicator is used to indicate the working condition of position lamp. When position lamp is lit, this indicator will be lit at the same time.
6		Rear windshield defroster/defogger indicator	Turn the ignition switch to ON. Pressing defroster switch, rear windshield defroster starts working for 15 min, then the system turns off the defroster automatically and the indicator goes out at the same time.
7		Engine failure warning lamp	When the engine (excluding the exhaust control system) fails, engine malfunction warning lamp flashes or stays on.
8		Engine OBD exhaust malfunction indicator lamp	Switch the ignition switch to "ON' position, this indicator is lit. After the engine is started, this indicator goes out. If this indicator stays on, it indicates that engine exhaust control system fails.
9		Charging system indicator	After the engine is started, the lamp will go out. If the charging system indicator stays on, it indicates that battery charging system fails.
10		Open engine hood indicator	Front engine hood is open.
11		EPS fault indicator	If the indicator stays on, electric power steering system fails.
12		ABS system fault warning lamp	When ignition switch is turned to "ON" position, this indicator is lit. After several seconds' self-test, it goes out. If the indicator stays on, it indicates that ABS system fails.
13		Parking brake indicator	When the parking brake is raised up, the indicator lamp will be lit automatically. When the parking brake is released, the indicator lamp will go out automatically. Otherwise, it is necessary to repair it.

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S/N	Symbol	Name	Description
14		Airbag fault warning lamp	When ignition switch is turned to "ON" position, this indicator is lit. After a few seconds of self-test, it goes out. If it stays on, it indicates that airbag system fails.
15		Open trunk lid indicator	When pressing the trunk, this indicator is lit. When closing the trunk, this indicator goes out.
16		Low fuel level warning lamp	This indicator lamp is used to indicate the quantity of fuel in the tank. When turning the ignition switch to the ON position, with the vehicle self-checking, the indicator lamp will be lit little and then go out. If the indicator stays on after the starting, it indicates that the fuel in the tank is insufficient.
17		Open door warning lamp Reversing radar warning lamp	After the door is opened, this indicator lamp will be lit. After all doors are closed, the indicator lamp will go out. When turning the ignition switch to the ON position and shifting the transmission gearshift lever to reverse position, and the distance between the vehicle tail and the barrier is less than 1.5m, this indicator will be lit and a hint sound will be produced from the Radio/CD Player.
18		High engine coolant temperature warning lamp	When ignition switch is turned to "ON" position, this indicator is lit. After several seconds' self-test, it goes out. If it stays on, it is an indication that the coolant temperature exceeds the specified value. Be sure to stop driving.
19		Low oil pressure warning lamp	When ignition switch is turned to "ON" position, this indicator is lit. After several seconds' self-test, it goes out. If this indicator stays on, it indicates that engine oil pressure is below specified value and the engine lubricating system fails. Repair it immediately.
20		Immobilizer indicator	If this indicator is lit, it indicates that the engine stays in immobilizer warning.
21		120 km/ h overspeed warning lamp	In the process of driving, when the vehicle speed exceeds 120km/h, this warning lamp will be lit to remind the driver of the vehicle overspeeding. When the vehicle speed is less than 120km/h, the warning lamp will go out automatically.
22		Brake system fault warning lamp	When turning the ignition switch to "ON" position, this indicator will be lit about 3 - 4s and then go out automatically. If it stays on or off, it indicates that brake fluid is insufficient or the brake system fails.
23		CVT fault warning lamp	This lamp is used to monitor the working state of the CVT system. When turning the ignition switch to "ON' position, the lamp is lit a few seconds for self-test and then goes out. If this lamp does not light up or does not go out or lights up during driving, immediately park your car at a safe place and contact a service station authorized by LIFAN for troubleshooting.

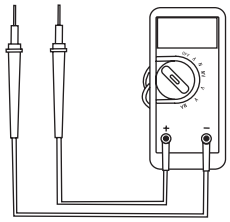
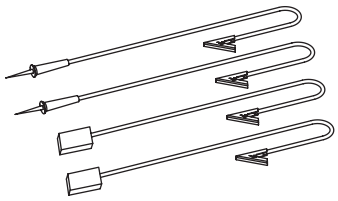
△ HINT:

The seat belt reminder is set on the multifunction display screen.

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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		For measuring voltage and resistance
2	Wiring set		For testing circuits

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Instrument cluster retaining screw	5 - 6
Multifunction display screen fixing screw	5 - 6

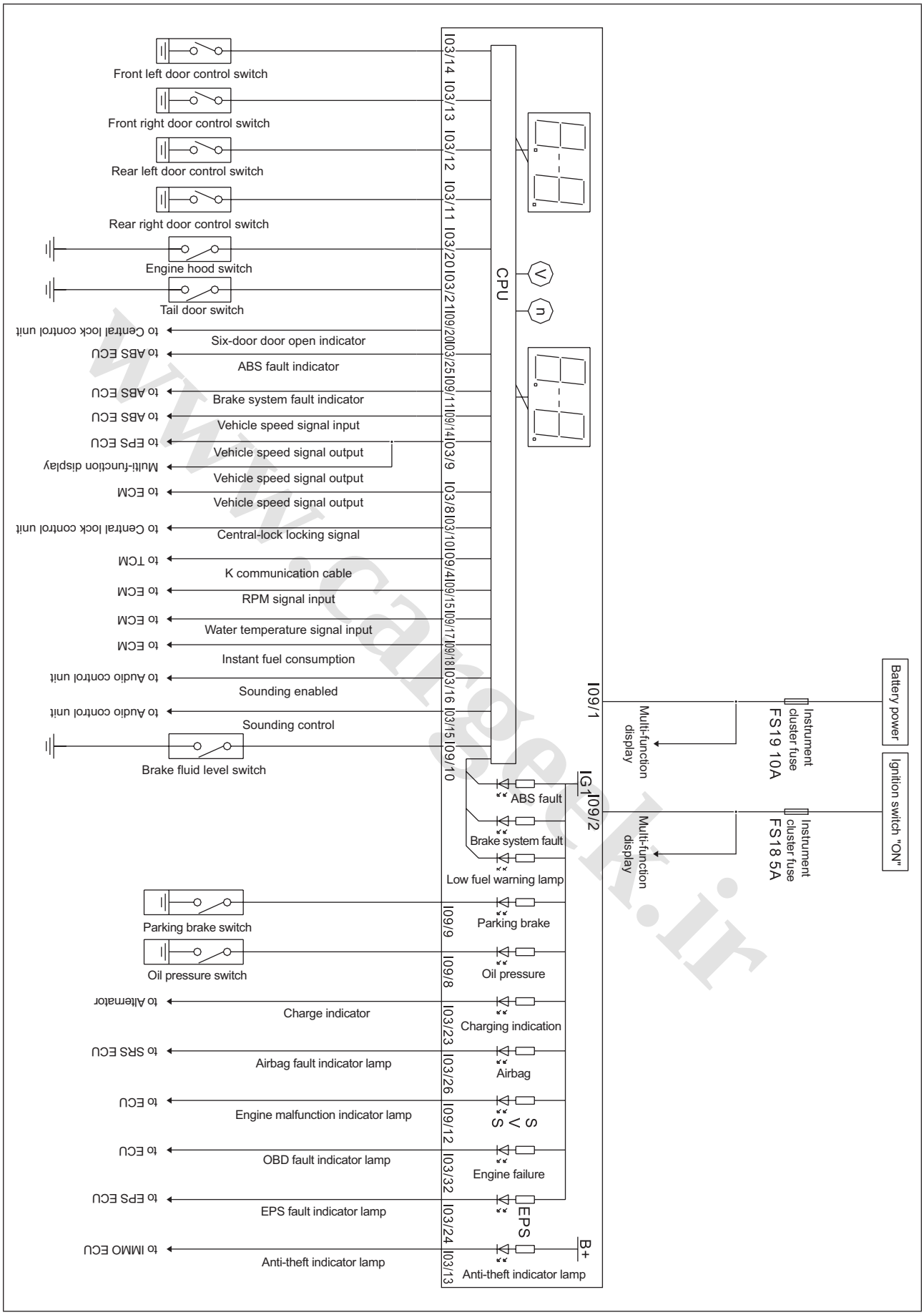
PRECAUTIONS

1. All indicators and warning lamps are light emitting diode (LED).
2. Instrument cluster is assembly part. Do not disassemble it for repair. In case of fault, replace instrument cluster assembly.
3. Check instrument cluster for normal operation after installation.

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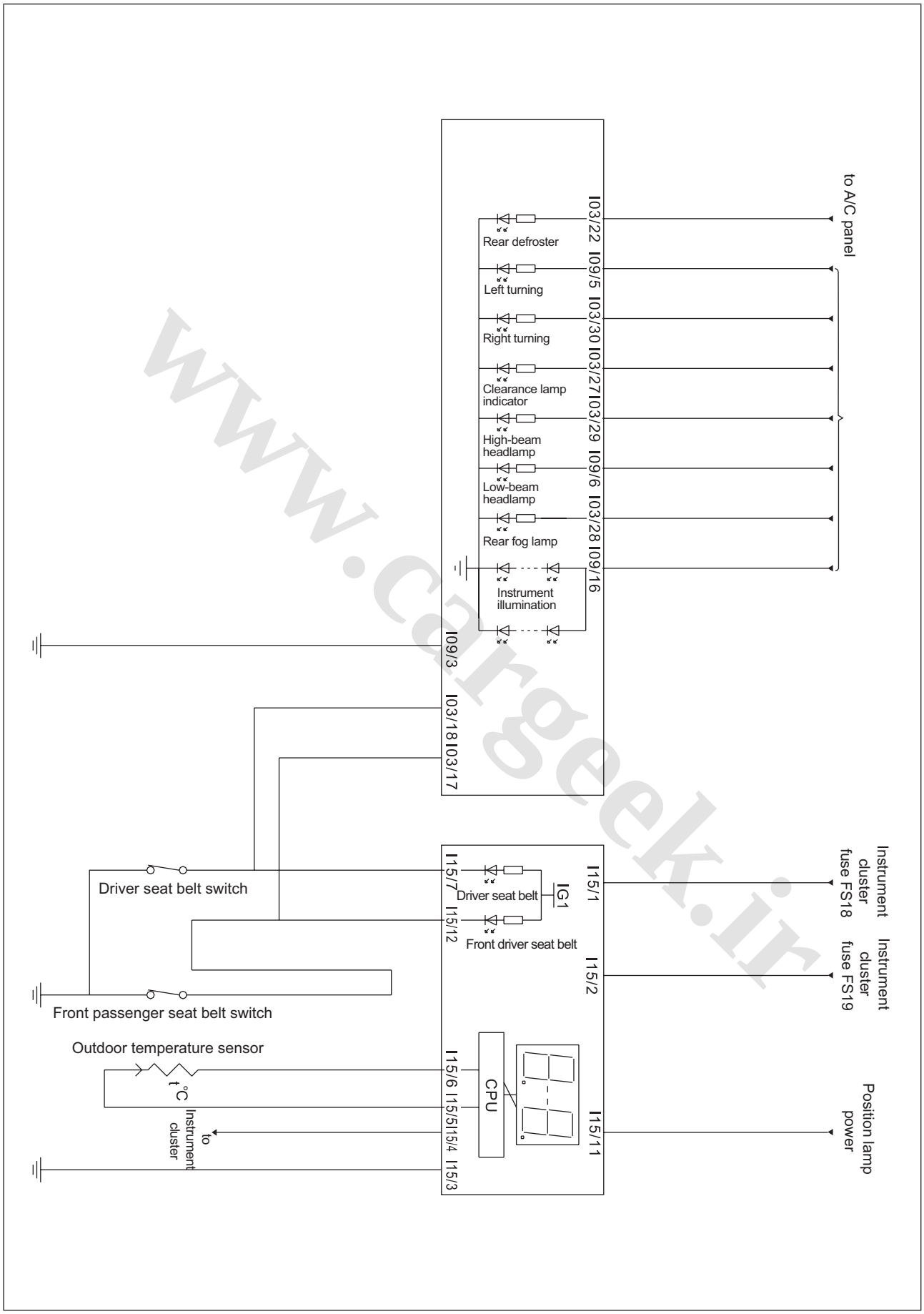
SCHEMATIC DIAGRAM (I)



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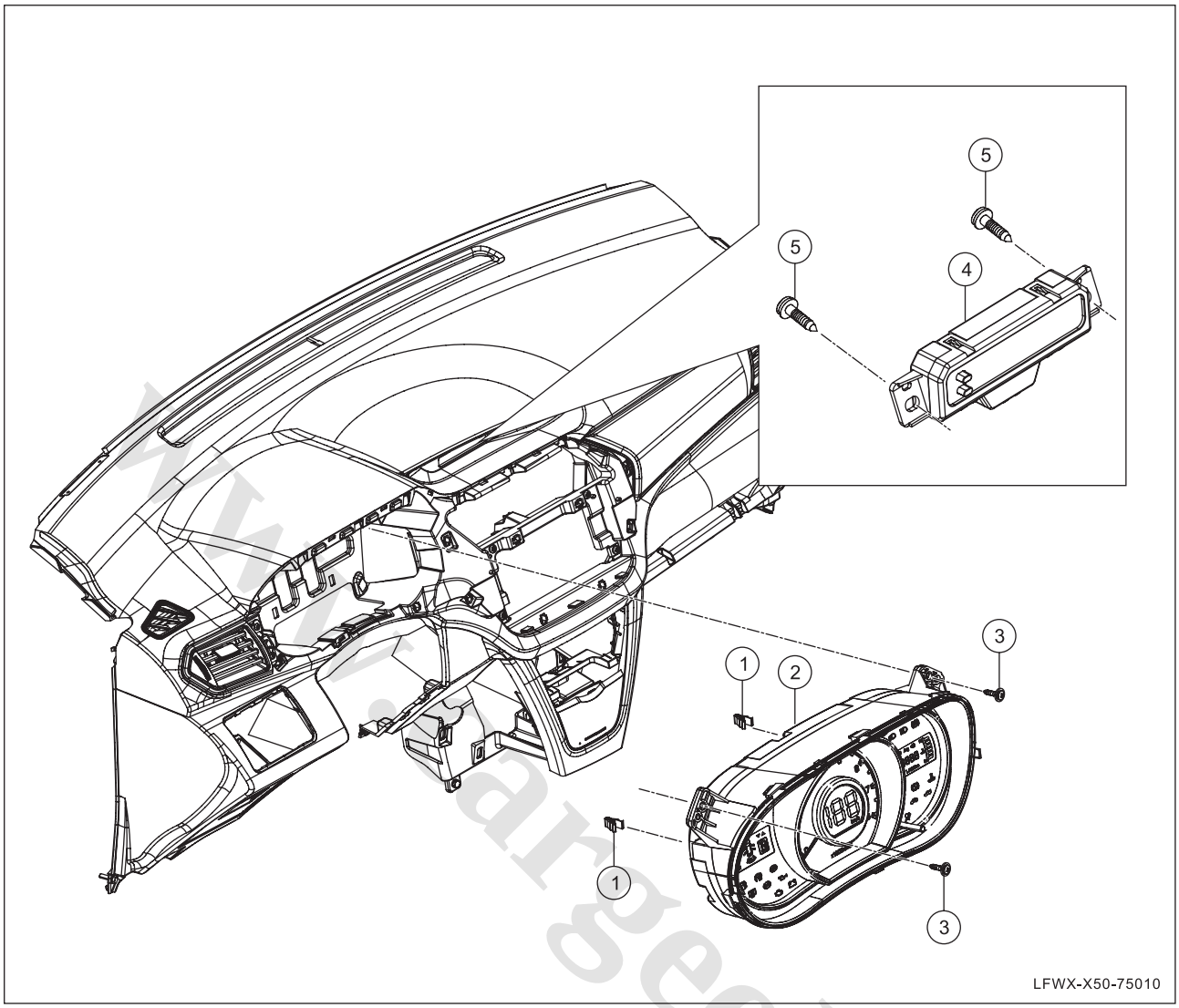
SCHEMATIC DIAGRAM (II)



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COMPONENTS



1	Snap-fit
2	Instrument cluster
3	Screw

4	Vehicle multi-functional display
5	Screw

FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Instrument cluster	To display vehicle information	Instrument does not operate and indicator is not lit/stays on	Instrument cluster is damaged and the circuit is broken or short-circuited
Multi-functional display	To display time and unfastened seat belt	Do not operate	Multifunction display screen is damaged and the circuit is broken or short-circuited.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
None instrument operates	1. Fuse (blown) 2. Circuits (open-circuit or short circuit) 3. Instrument cluster (damaged)	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (1. The Complete Instrument does not Operate)
Instrument background lighting lamp is not lit	1. Position lamp power 2. Circuits (open-circuit or short circuit) 3. Instrument cluster (damaged)	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (2. Instrument Background Lighting Lamp is not Lit)
Speedometer malfunction	1. Circuits (open-circuit or short circuit) 2. ABS system (damaged) 3. Instrument cluster (damaged)	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (3. Speedometer Fault)
Fault of fuel gauge	1. Circuits (open-circuit or short circuit) 2. Fuel sensor (damaged) 3. Instrument cluster (damaged)	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (4. Fault of Fuel Gauge)
Parking brake indicator is not lit/stays on	1. Circuits (open-circuit or short circuit) 2. Parking brake switch (damaged) 3. Instrument cluster	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (5. Parking Brake Indicator is not Lit/Stays on)
Oil pressure warning lamp is not lit/ stays on.	1. Circuits (open-circuit or short circuit) 2. Oil pressure warning switch (damaged) 3. Instrument cluster	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (6.Oil Pressure Warning Lamp is not Lit/ Stays on)
Tail door open trunk indicator is not lit/stays on	1. Circuits (open-circuit or short circuit) 2. Trunk switch (damaged) 3. Instrument cluster	See 75 Driver Information System, Diagnosis, Fault Diagnosis (7. Tail Door Open Trunk Indicator is not Lit/ Stays on)
Indicator for open engine hood is not lit/stays on	1. Circuits (open-circuit or short circuit) 2. Engine hood switch (damaged) 3. Instrument cluster	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (8. Indicator Lamp for Open Engine Hood Lid cannot be Illuminated/Stays on)
Liquid crystal display abnormality.	1. Instrument cluster	Replacement
Multifunction display screen won't work	1. Fuse (broken) 2. Circuits (open-circuit or short circuit) 3. Multifunction display screen (damaged)	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (9. Multifunction Display Screen won't Work)
Driver's seat belt reminder is not lit/stays on	1. Circuits (open-circuit or short circuit) 2. Driver's seat belt switch (damaged) 3. Instrument cluster	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (10. Driver's Seat Belt Reminder is not Lit/Stays on)
Front passenger seat belt reminder is not lit/stays on	1. Circuits (open-circuit or short circuit) 2. Front passenger seat belt switch (damaged) 3. Instrument cluster	See 75 - Driver Information System, Diagnosis, Fault Diagnosis (11.Front Passenger's Seat Belt Reminder Indicator is not Lit/Stays on)

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FAULT DIAGNOSIS

1. COMPLETE INSTRUMENT DO NOT OPERATE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal power supply • Turn the ignition switch to ON. Check whether the instrument cluster can work normally.	Diagnosis is over	None instrument operates	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether instrument cluster fuse FS18, FS19 are burned out	Go to Step 2	Instrument cluster fuse is blown out	Replace the fuse with the same capacity Rated capacity: FS18 5A FS19 10A
2	Check instrument cluster power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of battery, and check the resistance between instrument cluster circuit and the grounding	Go to Step 3	Power circuit or inside of instrument cluster has short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check instrument cluster power circuit	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I09 • Turn the ignition switch to ON • Check the voltage between terminal No. 1, No. 2 of instrument wire harness I09 and grounding respectively. **Voltage: 9 - 13V**	Go to Step 4	Instrument cluster power circuit has open circuit point	Check and repair the circuit between instrument wire harness connector and instrument cluster fuse.
4	Check instrument cluster grounding circuit	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I09 • Check the resistance between terminal No. 3 of instrument wire harness and grounding. **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Check and repair the circuit between instrument wire harness connector and grounding point G21.
5	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether it operates	Instrument cluster (damaged)	Go to Step 6	Replace the instrument cluster
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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2. SPEEDOMETER FAULT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Connect the diagnostic scanner, and check whether there is DTC output from ABS	Go to Step 1	Check ABS related fault	Hint: Speed signal of instrument is provided by ABS ECU
1	Check speedometer signal circuit	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I09 • Check the resistance between terminal No. 14 of instrument wire harness I09 and terminal No. 33 of front compartment wire harness U07 **Resistance: <2Ω** • Check the resistance between terminal No. 14 of instrument wire harness and grounding. **Resistance: >1MΩ**	Go to Step 2	Improper voltage indicates open circuit points in speed signal input circuit	Check vehicle speed signal input circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether speedometer displays normally	Instrument cluster (damaged)	Go to Step 3	Replace the instrument cluster
3	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

3. INSTRUMENT BACKGROUND LIGHTING LAMP IS NOT LIT

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal power supply • Open the position lamp and check whether instrument background lighting lamp is lit	Diagnosis is over	Go to Step 1	
1	Check position lamp circuit	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I09 • Open position lamp and check the voltage between terminal No. 16 of instrument wire harness I09 and grounding Voltage: 9 - 13V	Go to Step 2	Position lamp has open circuit points	Check and repair position lamp circuit
2	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether speedometer displays normally	Instrument cluster (damaged)	Go to Step 3	Replace the instrument cluster
3	Verification and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

4. FUEL GAUGE FAULT

Steps	Inspection Item	Inspection result		
0	Check fuel sensor circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to OFF. • Disconnect the fuel sensor connector B08 and the instrument cluster connector I09, I03 • Check the resistance between B08 terminal No. 2 and I09 terminal No. 19, B08 terminal No. 3 and I03 terminal No. 4 **Resistance: <2Ω**	Go to Step 1	Wire harness between instrument wire harness connector and fuel pump	Check and repair corresponding wire harness
1	Inspection of fuel sensor	Normal	Faulty	Instruction
	• Turn the ignition switch to OFF. • Disconnect fuel sensor connector B08 • Check fuel sensor resistance value **Resistance: 45 - 300Ω**	Go to Step 2	Fuel sensor is damaged	Replace fuel pump assembly
2	Check fuel pump for mechanical fault	Normal	Faulty	Instruction
	Remove fuel pump and check it for fault	Go to Step 3	Fuel float is seized, damaged or has impurities	Remove the impurities or replace fuel pump assembly
3	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether fuel gauge displays normally	Instrument cluster (damaged)	Go to Step 4	Replace the instrument cluster
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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5. PARKING BRAKE INDICATOR IS NOT LIT/STAYS ON

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system. • Check whether the parking brake indicator is not lit/stays on	Diagnosis is over	Go to Step 1	
1	Inspect parking brake switch.	Normal	Faulty	Instruction
	• Disconnect the parking brake switch connector B05 • Release parking brake lever and check the resistance between terminal No. 1 of B05 and grounding. **Resistance: >1MΩ** • Hold parking brake lever tightly and check the resistance between terminal No. 1 of B05 and grounding. **Resistance: <2Ω**	Go to Step 2	Improper voltage indicates that parking brake switch is damaged	Check and repair parking brake switch
2	Check parking brake indicator circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to OFF. • Disconnect the parking brake switch connector B05 and the instrument cluster connector I09 • Check the voltage between terminal No. 1 of body wire harness connector B05 and terminal No. 9 of dashboard wire harness I09 **Resistance: <2Ω**	Go to Step 3	Improper voltage indicates open circuit point in parking brake indicator circuit	Check and repair parking brake indicator circuit
3	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether speedometer displays normally	Instrument cluster (damaged)	Go to Step 4	Replace the instrument cluster
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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6. OIL PRESSURE WARNING LAMP IS NOT LIT/STAYS ON

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system. • Whether oil pressure warning lamp stays on /is not lit	Diagnosis is over	Oil pressure warning lamp is not lit/ stays on.	Go to Step 1
1	Check oil pressure switch circuit	Normal	Faulty	Instruction
	•Turn the ignition switch to OFF. Disconnect oil pressure warning switch connector E06. • Check the resistance between terminal No. 1 of engine wire harness E06 and grounding **Resistance: >1MΩ** • Check the resistance between terminal No. 1 of engine wire harness E06 and terminal No. 8 of dashboard wire harness **Resistance: <2Ω**	Go to Step 2	Improper voltage indicates open circuit points or short circuit points in oil pressure switch circuit	Check and repair oil pressure switch circuit
2	Check Engine Oil Pressure Switch	Normal	Faulty	Instruction
	• Turn on oil pressure switch connector E06 •Check the resistance between terminal No. 1 of E06 and grounding **Resistance: <2Ω**	Go to Step 3	Improper voltage indicates that oil pressure switch is damaged	Replace Engine Oil Pressure Switch
3	Replacement and check	Normal	Faulty	Instruction
	Replace with instrument cluster of the same model and check whether speedometer displays normally	Instrument cluster (damaged)	Go to Step 4	Replace the instrument cluster
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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7. MULTIFUNCTION DISPLAY SCREEN WON'T WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal power supply • Turn the ignition switch to ON, and check whether the multifunction display screen is in the normal working state.	Diagnosis is over	Go to Step 1	
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether instrument cluster fuse FS18, FS19 are burned out	Go to Step 2	Instrument cluster fuse is blown out	Replace the fuse with the same capacity Rated capacity: FS18 5A FS19 10A
2	Check multifunction display screen power circuit	Normal	Faulty	Instruction
	Disconnect negative cable of battery and check the resistance between multifunction display screen power circuit and grounding	Go to Step 3	There is short circuit in power circuit or multifunction display screen	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check multifunction display screen power circuit	Normal	Faulty	Instruction
	Disconnect the multifunction display screen connector I15. • Turn the ignition switch to ON • Check the voltage between No. 1, No. 2 terminals of instrument harness I15 and grounding respectively. **Voltage: 9 - 13V**	Go to Step 4	Multifunction display screen power circuit has open circuit points	Check and repair the circuit between instrument wire harness connector and instrument cluster fuse.
4	Check multifunction display screen grounding circuit	Normal	Faulty	Instruction
	Disconnect the multifunction display screen connector I15. • Check the resistance between No. 3 terminal of instrument wire harness I15 and grounding **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Check the circuit between instrument wire harness connector and grounding point G23.
5	Replacement and check	Normal	Faulty	Instruction
	Replace with multifunction display screen of the same model and check whether multifunction display screen operates	Multifunction display screen is damaged	Go to Step 6	Replacement of multifunction display screen
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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8. DRIVER SEAT BELT REMINDER INDICATOR IS NOT LIT/STAYS ON

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system. • Check whether the driver's seat belt reminder indicator stays on or is not lit	Diagnosis is over	Driver's seat belt reminder indicator stays on or is not lit	Go to Step 1
1	Check driver's seat belt switch circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to OFF. • Disconnect the driver seat belt switch connector B02 • Check the resistance between terminal No. 1 of body wire harness B02 and grounding **Resistance: >1MΩ** • Check resistance between terminal No. 1 of body wire harness B02 and terminal No. 7 of I15 **Resistance: <2Ω**	Go to Step 2	Improper voltage indicates open circuit points or short circuit points in driver's seat belt reminder indicator circuit	Check driver's seat belt reminder indicator circuit
2	Check Driver Seat Belt Switch	Normal	Faulty	Instruction
	• Disconnect the driver seat belt switch connector B02 • Buckle the seat belt buckle and check the resistance between terminal No. 1 and No. 2 of B02 **Resistance: >1MΩ** • Release seat belt buckle and check the resistance between terminal No. 1 and No. 2 of B02 **Resistance: <2Ω**	Go to Step 3	Improper voltage indicates that driver's seat belt switch is damaged	Replace Driver Seat Belt Switch
3	Replacement and check	Normal	Faulty	Instruction
	Replace with multifunction display screen of the same model and check whether driver's seat belt reminder indicator displays normally	Multifunction display screen is damaged	Go to Step 4	Replacement of multifunction display screen
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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9. FRONT PASSENGER'S SEAT BELT REMINDER INDICATOR IS NOT LIT/STAYS ON

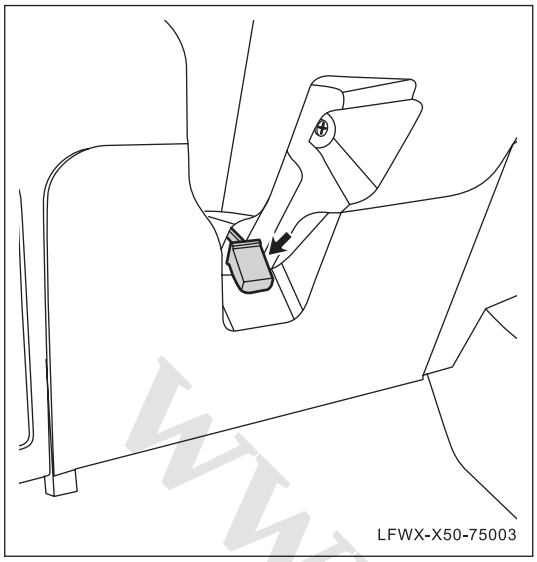
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system. • Check the front passenger's seat belt reminder indicator is not lit/stays on	Diagnosis is over	Go to Step 1	
1	Check driver's seat belt switch circuit	Normal	Faulty	Instruction
	• Turn the ignition switch to OFF. • Disconnect the front passenger seat belt switch connector B06 • Check voltage between No. 1 terminal of body wire harness B06 and grounding **Resistance: >1MΩ** • When front passenger's seat is occupied, check the resistance between No. 1 terminal of body wire harness B06 and No. 12 terminal of I15 **Resistance: <2Ω**	Go to Step 2	Improper resistance indicates open circuit points or short circuit points in front passenger's seat belt reminder indicator circuit	Check and repair front passenger's seat belt reminder indicator circuit
2	Check passenger detection sensor	Normal	Faulty	Instruction
	• Disconnect passenger detection sensor connector B02 • When front passenger's seat is occupied, check the resistance between terminal No. 1 and No. 2 of B26 **Resistance: <2Ω** • When front passenger's seat is not occupied, check the resistance between terminal No. 1 and No. 2 of B06 **Resistance: >1MΩ**	Go to Step 3	Improper voltage indicates that front passenger detection sensor is damaged	Replace front passenger detection sensor
3	Check the front passenger seat belt switch	Normal	Faulty	Instruction
	• Disconnect the front passenger seat belt switch connector B02 • Buckle seat belt buckle and check the resistance between terminal No. 1 and No. 2 of B06 **Resistance: >1MΩ** • Release seat belt buckle and check the resistance between terminal No. 1 and No. 2 of B06 **Resistance: <2Ω**	Go to Step 4	Improper resistance indicates that front passenger seat belt switch is damaged	Replacement of front passenger seat belt switch
4	Replacement and check	Normal	Faulty	Instruction
	Replace with multifunction display screen of the same model and check whether driver's seat belt reminder indicator displays normally	Multifunction display screen is damaged	Go to Step 5	Replacement of multifunction display screen
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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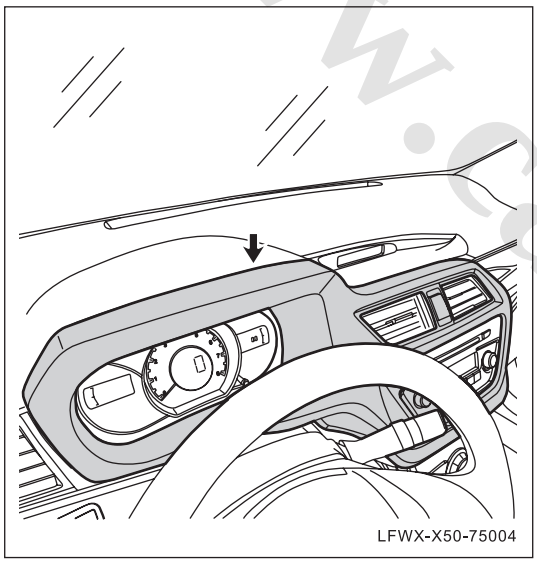
INSTRUMENT CLUSTER

REPLACEMENT

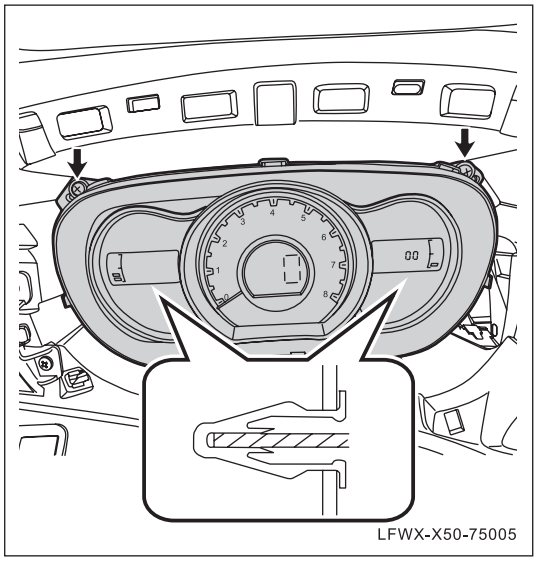

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1. **DISCONNECT THE BATTERY NEGATIVE ELECTRODE**
2. **ADJUST THE STEERING WHEEL**

(a) Adjust steering wheel adjusting handle and set steering wheel at the lowest position.


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3. **REMOVE INSTRUMENT CLUSTER SHIELD (SEE 85- DASHBOARD AND CONSOLE, INSTRUMENT CLUSTER SHIELD, REPLACEMENT)**


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4. **DISASSEMBLE INSTRUMENT CLUSTER**

(a) Using a cross screwdriver, remove the instrument cluster fixing screw.

NOTICE:

Be careful to prevent the screws from falling into the dashboard.

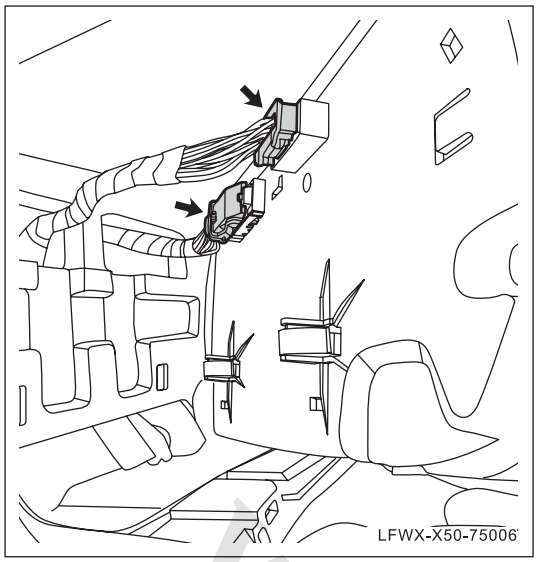
(b) Take out instrument cluster outward.

△ HINT:

The rear of instrument cluster is fixed by snap-fits and pay attention to the positions of snap-fits when taking out instrument cluster (as illustrated in the figure).

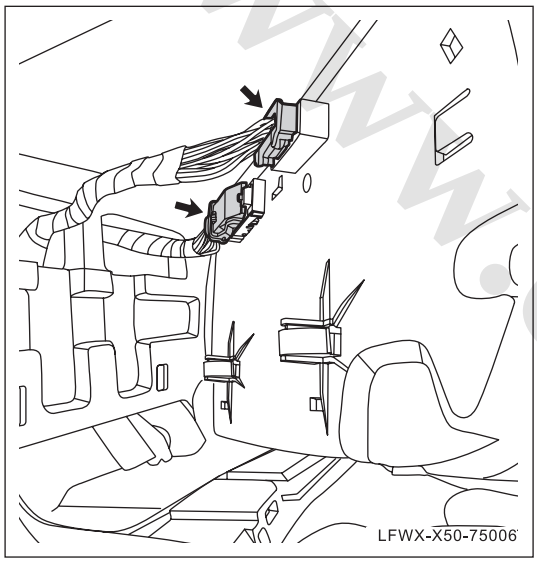
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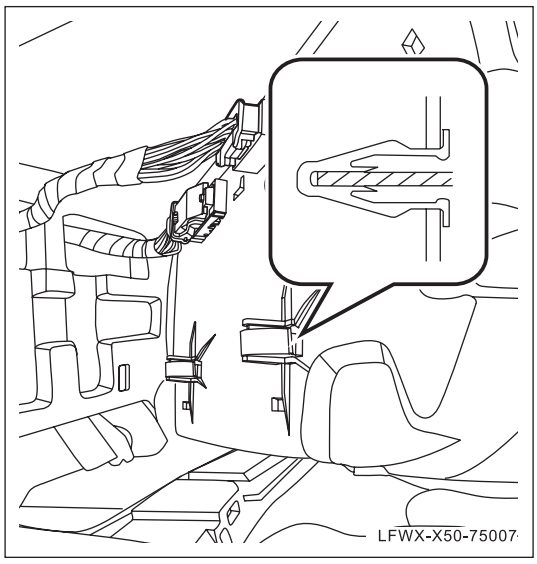
(c) Disconnect instrument cluster connector.

(d) Take out instrument cluster assembly.



5. INSTALL INSTRUMENT CLUSTER

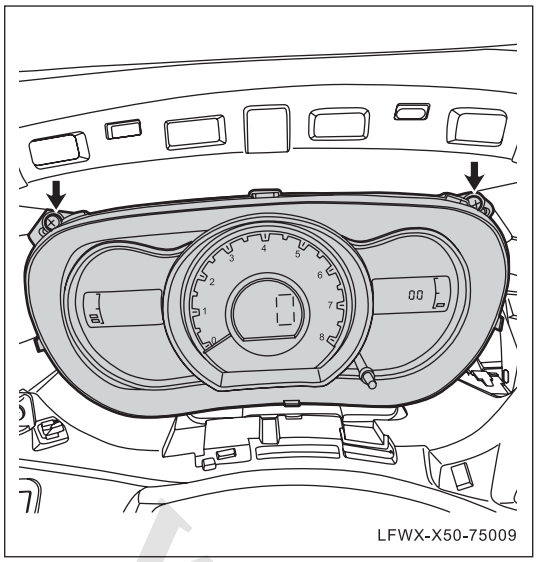
(a) Connect instrument cluster connector.



(b) Align the snap-fits with installation hole and install instrument cluster assembly.

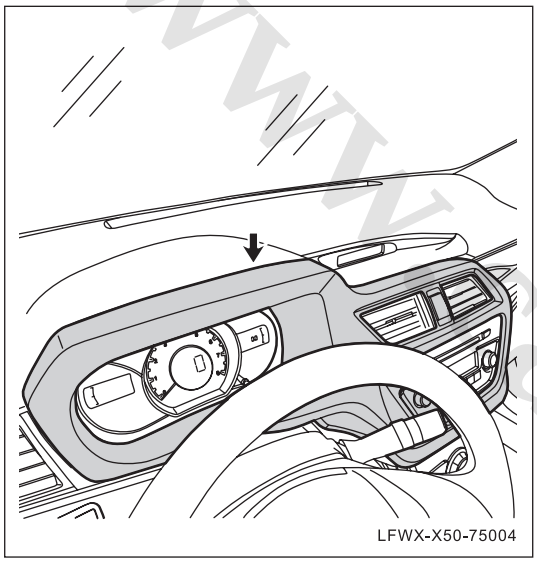
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(c) Align with fixing screw holes of instrument cluster and mount and tighten fixing bolts.

Torque: 5 - 6N•m



6. **INSTALL INSTRUMENT CLUSTER COVER(SEE 85 - DASHBOARD AND CONSOLE, INSTRUMENT CLUSTER COVER, REPLACEMENT)**

7. **ADJUSTMENT OF STEERING WHEEL**

8. **CONNECT THE BATTERY NEGATIVE CABLE, AND UNLOCK THE IGNITION LOCK TO TEST WHETHER THE INSTRUMENT CLUSTER IS IN THE NORMAL STATE.**

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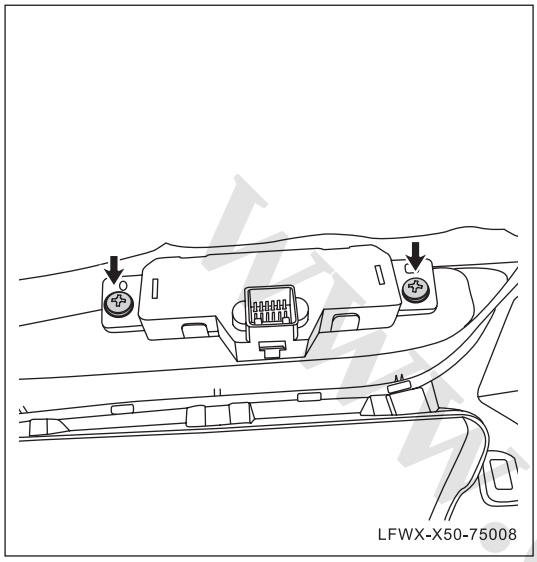
MULTI-FUNCTIONAL DISPLAY

REPLACEMENT

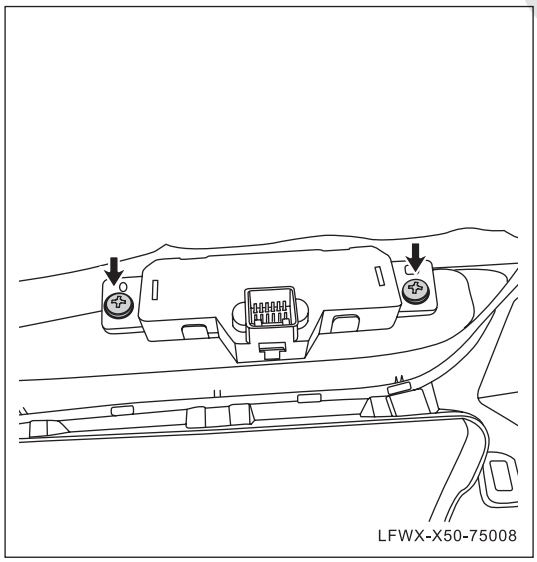
1. DISCONNECT THE NEGATIVE CABLE OF BATTERY

2. REMOVAL OF MULTIFUNCTION DISPLAY SCREEN

(a) Remove dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)



(b) Remove fixing screws of multifunction display screen and take out multifunction display screen.



3. INSTALLATION OF MULTIFUNCTION DISPLAY SCREEN

(a) Install multifunction display screen on dashboard upper panel and install & tighten fixing screws.

Torque: 5 - 6N•m

(b) Install dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)

4. CONNECT THE NEGATIVE CABLE OF BATTERY.

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Reverse Radar System

Reverse radar system 76-1
System description 76-1
Schematic diagram.....76-2
Preparation.....76-3
Service data 76-3
Precautions 76-4
Components 76-5
Function and fault of components 76-6
On-vehicle inspection 76-7
Diagnosis 76-9
Fault symptom table 76-9
Fault diagnosis 76-10
Reverse switch 76-16
Inspection 76-16
Replacement 76-16
Reverse radar sensor.....76-18
Inspection 76-18
Replacement 76-19

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REVERSE RADAR SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

Reverse radar system is a type of radar detection device installed on the rear bumper. The sensors will assist the driver in detecting certain obstacles and their distance from the rear bumper when reversing and parking. The reverse radar system will sound a tone to warn the driver of obstacles near the bumper to achieve safe and easy parking and to avoid collision.

2. COMPONENTS

Reverse radar system consists of reverse radar sensor and instrument cluster components, etc.

3. WORKING PRINCIPLE

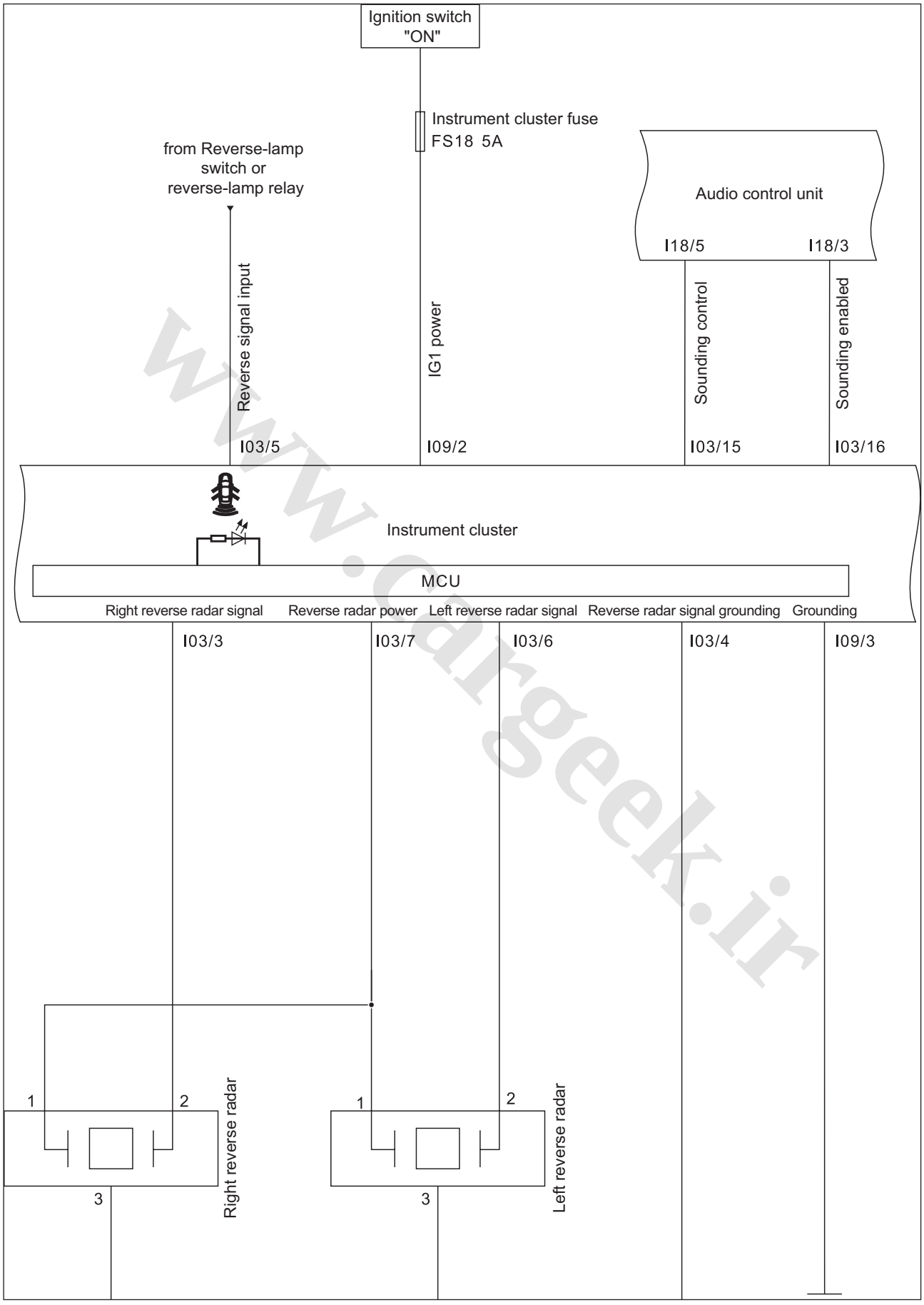
Reverse radar system of the LIFAN X50 is a type of vehicle monitoring system developed based on the detecting principles of bat flying. With two ultrasonic reverse radar sensors installed at the tail of the vehicle to send and receive signals and feed information back to the controller integrated inside the instrument cluster, the controller can calculate the distance of the measured barrier according to the round-trip time of the signal. And then, the controller will trigger various sounds or indicator alarms according to different distances to remind the driver of the distances between the barriers and the vehicle to improve the reversing convenience and safety.

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SCHEMATIC DIAGRAM

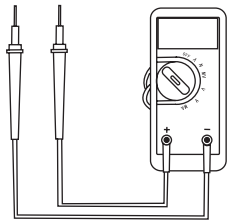
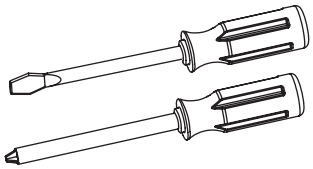
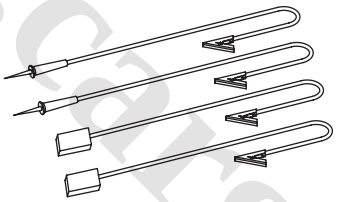


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PREPARATION

1. RECOMMENDED TOOLS

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Used for measuring voltage and resistance
2	Screwdriver		Used for removing screws and mounting bracket of reverse radar sensor
3	Wiring set		Used for testing circuits
4	Testing bar		Assist with testing reverse radar-detected distance

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Measuring distance	0.3 - 1.5m
Rating voltage of reverse radar sensor	12V
Working voltage of reverse radar sensor	9.0 - 16V

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2. TIGHTENING TORQUE TABLE

Item	N•m
Reverse switch	44 - 49

PRECAUTIONS

1. THE DETECTING FUNCTION MAY BE ABNORMAL UNDER THE FOLLOWING CONDITIONS

(a) Reverse radar sensor is covered by mud or snow or other impurities (the detecting function can be restored after the sensor being cleaned).

(b) Reverse radar sensor is frozen (the detecting function can be restored after the sensor temperature rise).

(c) Reverse radar sensor is shielded.

(d) If fault indication occurs in chilly weather, the Reverse radar sensor cannot detect barriers.

2. THE DETECTING RANGE CAN BE AFFECTED UNDER THE FOLLOWING CONDITIONS

(a) Reverse radar sensor covered by mud or snow or other impurities.

(b) Vehicles in extremely hot or cold areas.

3. FAULTY DETECTING CAN OCCUR UNDER THE FOLLOWING CONDITIONS

(a) Driving on bumpy or unpaved roads or through high grass.

(b) Sounds from another vehicle horn, motorcycle engine or large vehicle air brake or ultrasonic waves from another vehicle's sonar transmitted near the vehicle.

(c) Heavy rain or water dropped or spattered on the sensor.

(d) Excessive vehicle tilt.

(e) Vehicle equipped with other protection bar or radio antenna.

(f) Reverse radar sensor covered by mud or snow or other impurities.

(g) Vehicle moving toward high curbs or corners of outshoots.

4. THE REVERSE RADAR SENSOR CANNOT DETECT SOME OBJECTS

(a) Slight objects, such as lines or ropes.

(b) Materials absorbing ultrasonics, such as cotton or snow.

(c) Objects with sharp edges.

(d) Smallish objects.

(e) Highly-suspended objects.

5. OTHER PRECAUTIONS

(a) The Reverse radar sensor cannot detect the objects right under the bumper. (The reverse radar sensor can detect low objects or slight bars but lose tracking of such objects.)

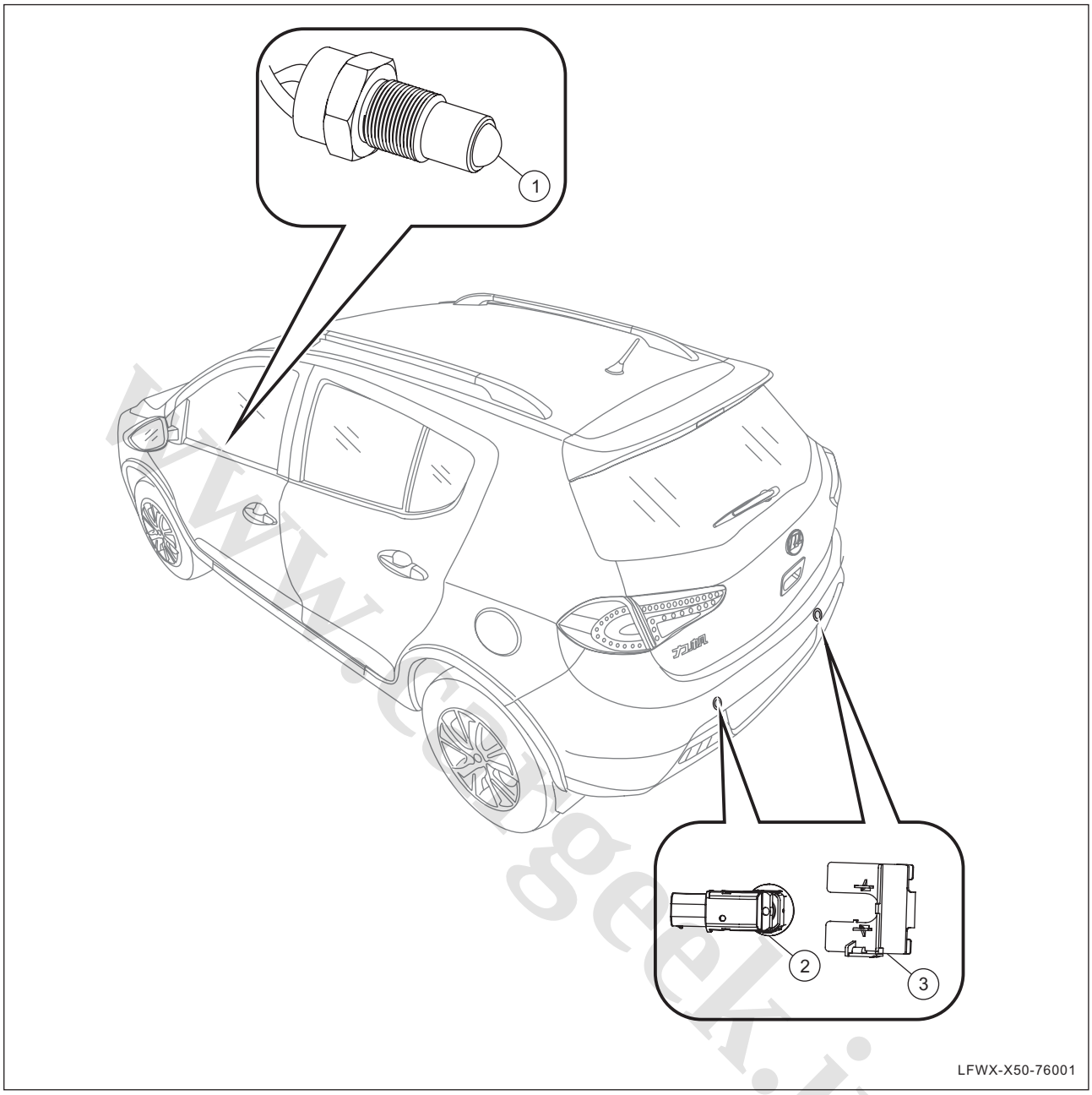
(b) The reverse radar sensor may be unable to detect extremely close barriers.

(c) The fallen or violently-crashed Reverse radar sensor may be unable to detect barriers.

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COMPONENTS



1	Reverse switch
2	Reverse radar sensor

3	Mounting bracket of reverse radar sensor

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FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Reverse radar sensor	Detecting the distance between the vehicle and the barrier	Damaged	Obstacles can not be detected
Speaker	Sounding to inform the driver according to the distance of the barrier	Damaged	Detect that obstacles can not sound
Multi-functional display	1. Display the barrier position and the approximate distance between the vehicle and the barrier. 2. Inform the driver of whether the ultrasonic sensor is faulty, frozen or dirty.	Damaged	Approximate position of obstacles can not be displayed
Reverse radar controller (integrated inside the instrument cluster)	1. Determine the approximate distance between the vehicle and the barrier and send it to the integration display according to the signal from the ultrasonic sensor. 2. Sound the speaker.	Damaged	/
Reverse switch	Send the reverse signal to the reverse radar controller (integrated inside the instrument cluster).	Damaged	Radar sensor can not receive reverse signal

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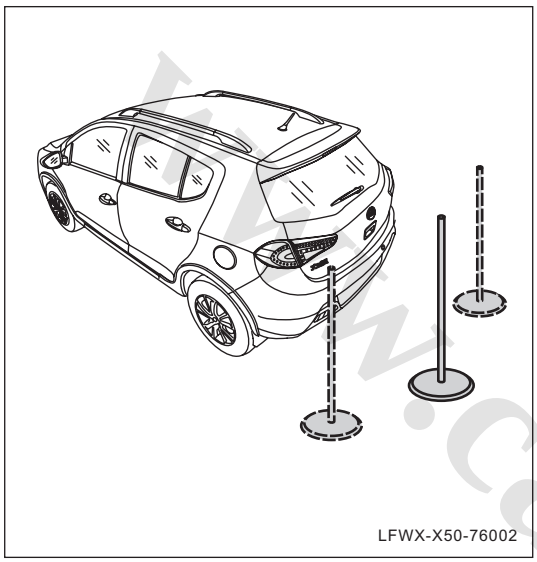
ON-VEHICLE INSPECTION

1. SELF-CHECKING FUNCTION OF REVERSE RADAR CONTROLLER (INTEGRATED INSIDE THE INSTRUMENT CLUSTER)

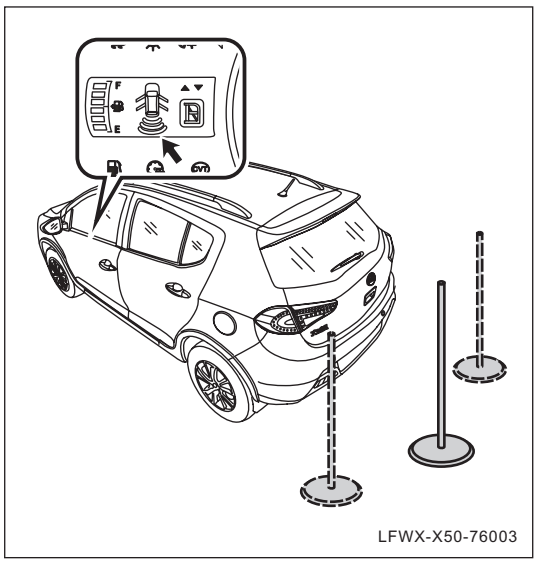
(a) Turn the ignition switch to ON.

(b) Shift to reverse position to allow the reverse radar controller (integrated inside the instrument cluster) to perform self-checking.

- If the reverse radar functions normally, it is an indication that the reverse indicator lamp and buzzer operate normally for 0.6 - 1.0s.
- If the reverse radar functions abnormally, it is an indication that the reverse indicator lamp and buzzer operate abnormally.



LFWX-X50-76002



LFWX-X50-76003

2. REVERSE RADAR SYSTEM INSPECTION

(a) Turn the ignition switch to ON. Shift the gear shift lever to Reverse Position and apply the parking brake to ensure the vehicle safety.

(b) Use a cylinder with diameter of 60mm to move around the sensor, so as to check the detection range of reverse radar sensor.

⚠ WARNING:

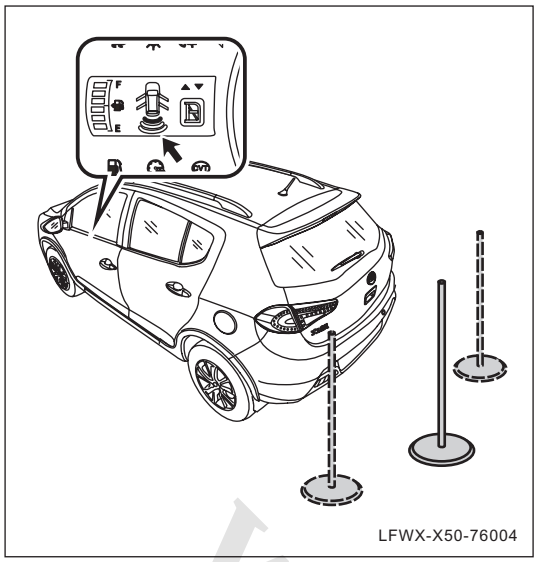
- **When testing the reversing radar, make sure that no people is behind the vehicle.**
- **To avoid damage to the vehicle, don't use any wall or other hard barriers instead of the column.**

(c) When detecting a barrier, the detecting indicator lamps and buzzers will work as follows:

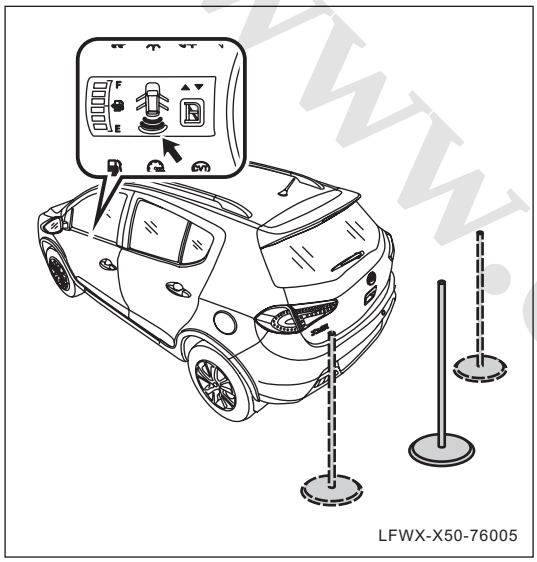
- When detecting a distance of A>1.5m, none of three segments will be illuminated.

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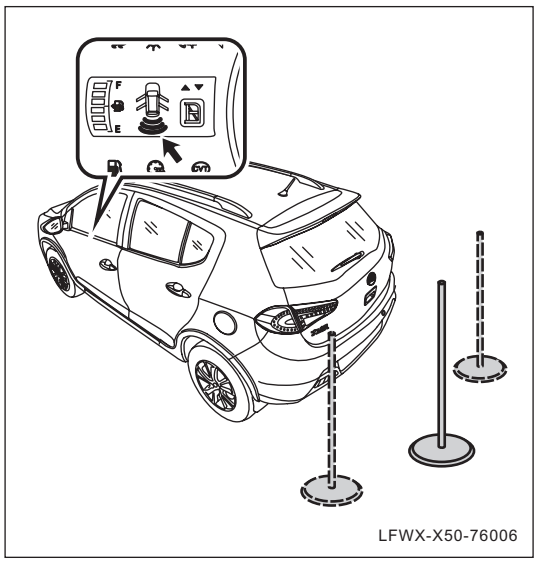
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- When detecting a distance of 1m<A ≤1.5 m, the innermost segment will be illuminated. (Hint sound: with an interval of 0.9s)



- When detecting a distance of 0.5m<A≤1m, the intermediate segment and the outermost segment will be illuminated. (Hint sound: with an interval of 0.6s)



- When detecting a distance of A<0.5m, all three segments will be illuminated. (continuous chime)

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DIAGNOSIS

FAULT SYMPTOM TABLE

Use the table below to assist in determining the cause of the problem. Check each part in order. Repair or replace parts if necessary.

Symptom	Suspected area	Recommended action
The system won't work completely.	1. Fuse (broken) 2. Reverse switch (damaged) 3. Instrument cluster (damaged) 4. Wire harness (open circuit or short circuit)	See 76 - Reverse Radar System, Diagnosis, Fault Diagnosis (1. System can not work)
The system will work without shifting to reverse position.	1. Reverse radar sensor (damaged) 2. Reverse switch (damaged) 3. Instrument cluster (damaged)	See 76 - Reverse Radar System, Diagnosis, Fault Diagnosis (2. Begin to work before switching to reverse gear)
The display indicates and buzzes abnormally.	1. Reverse radar sensor (damaged or impurities on the surface) 2. Instrument cluster (damaged) 3. Audio control unit (damaged) 4. Wire harness (open circuit or short circuit)	See 76 - Reverse Radar System, Diagnosis, Fault Diagnosis (3. The display indicates and buzzes abnormally)
Buzzer sounds intermittently after switching to reverse gear although there is no obstacles on the back of the vehicle	1. The road surface is not smooth 2. Reverse radar sensor (damaged or impurities on the surface) 3. Instrument cluster (damaged)	See 76 - Reverse Radar System, Diagnosis, Fault Diagnosis (4. Buzzer sounds intermittently after switching to reverse gear although there is no obstacles on the back of the vehicle)
Buzzer can not react to the detection distance from obstacles correctly	1. Instrument cluster (damaged) 2. Reverse radar sensor (installation is incorrect or, the surface has impurities or damaged) 3. Wire harness (open circuit or short circuit)	See 76 - Reverse Radar System, Diagnosis, Fault Diagnosis (5. Buzzer sounds intermittently after switching to reverse gear although there is no obstacles on the back of the vehicle)
System always works abnormally under certain particular conditions	1. There is interference sound source around	Eliminate interference sound source

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FAULT DIAGNOSIS

1. THE SYSTEM WON'T WORK COMPLETELY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to ON. • Place effective obstacles on the back of vehicle to check whether reverse radar works.	Diagnosis is over	The reverse radar does not work	Go to Step 1
1	Check the reverse lamp fuse.	Normal	Faulty	Instruction
	• Remove the glove compartment from the left lower panel of the instrument console • Check whether the fuse FS15 of reverse lamp blows	Go to Step 2	Reverse lamp fuse is burned out	• Replace reverse lamp fuse FS15 10A of with the same capacity • If the reverse lamp is switched on and the fuse is blown again, go to Step 2
2	Check reverse lamp power supply circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the reverse lamp power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check reverse lamp	Normal	Faulty	Instruction
	When the ignition switch is ON, shift to reverse position to check whether the reverse lamp will be lighted up	Go to Step 4	Reverse lamp is not lighted up	Check reverse lamp circuit
4	Check instrument cluster reverse signal	Normal	Faulty	Instruction
	• Turn the ignition switch to "OFF" position, and then disconnect the instrument cluster connector I03 • When the reverse lamp is on, check the voltage between the Terminal 5 of I03 and the grounding **Voltage: 9 - 13V**	Go to Step 5	Improper voltage indicates indicates there exists open-circuit point in the circuit between the instrument cluster and reverse lamp switch or reverse lamp relay	Check and repair the open circuit fault of the wire harness circuit between the instrument cluster and reverse lamp switch or reverse lamp relay
5	Check the reverse radar sensor power supply circuit	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect either reverse radar sensor • When the reverse lamp is on, check the voltage between the Terminal 1 of reverse radar sensor connector and the grounding **Voltage: 9 - 13V**	Go to Step 6	Improper voltage indicates there exists open-circuit point in the reverse radar sensor power supply circuit	Check and repair the open circuit of wire harness between reverse radar sensor and instrument cluster Hint: If the wire harness is impact, go to Step 7
6	Check the reverse radar sensor grounding circuit	Normal	Faulty	Instruction
	• Disconnect either reverse radar sensor • Check the resistance between the Terminal 3 of reverse radar sensor connector and the grounding **Resistance: <2Ω**	Go to Step 7	Improper voltage indicates open-circuit points in radar grounding circuit	Check and repair the open circuit of wire harness between reverse radar sensor and instrument cluster Hint: If the wire harness is impact, go to Step 7
7	Check sounding enabling and control of instrument cluster	Normal	Faulty	Instruction
	• When the ignition switch is ON, open any door to check whether the instrument cluster indicates corresponding door status • Check whether the speaker (door speaker) can sound.	Go to Step 8	Instrument displays abnormal and the speaker doesn't sound	Check sounding enabling and control circuit between instrument cluster and audio control unit
8	Check the instrument cluster	Normal	Faulty	Instruction
	Replace the instrument cluster with the same model, and check whether reverse radar functions normally	Replace the instrument cluster	Whether reverse radar function can be realized	Go to Step 9
9	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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2. THE SYSTEM WILL WORK WITHOUT SHIFTING TO REVERSE POSITION

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to ON. • Place obstacles on the back of vehicle to check whether reverse radar works	Diagnosis is over	Reverse radar works continuously	Go to Step 1
1	Check reverse lamp	Normal	Faulty	Instruction
	When the ignition switch is ON, check whether the reverse lamp will be on continuously	Go to Step 2	Reverse lamp is on continuously	Check the condition of reverse lamp circuit short to power supply
2	Check the instrument cluster	Normal	Faulty	Instruction
	Replace the instrument cluster with the same model, and check whether reverse radar functions normally	Replace the instrument cluster	Whether reverse radar function can be realized	Go to Step 3
3	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

3. THE DISPLAY INDICATES AND BUZZES ABNORMALLY.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to ON. • Place obstacles on the back of vehicle to check whether reverse radar works	Diagnosis is over	The display indicates and buzzes abnormally.	Go to Step 1
1	Check sounding enabling and control of instrument cluster	Normal	Faulty	Instruction
	• When the ignition switch is ON, open any door to check whether the instrument cluster indicates corresponding door status • Check whether the speaker (door speaker) can sound.	Go to Step 2	Speaker doesn't sound	Check whether the Radio/CD Player functions normally; if yes, go to Step 2
2	Check audio control unit reverse lamp signal	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect audio control unit connector I18 • When the reverse lamp is on, check the voltage between the Terminal 2 of I08 and the grounding **Voltage: 9 - 13V**	Go to Step 3	Radio/CD player reverse lamp signal fault	Check and repair wire harness connection between Radio/CD player and reverse switch
3	Check sounding enabling and control circuit of instrument cluster	Normal	Faulty	Instruction
	• Disconnect the instrument cluster connector I03 and audio control unit connector I18 • Check the resistance between Terminal 15 of I03 and Terminal 5 of I18, Terminal 16 of I03 and Terminal 3 of I18 **Resistance: <2Ω**	Go to Step 4	Wire harness has open circuit or short circuit	Check and repair wire harness connection between instrument cluster and audio control unit
4	Check the reverse radar sensor grounding circuit	Normal	Faulty	Instruction
	Disconnect reverse radar sensor connector to check the resistance between Terminal 3 of reverse radar sensor grounding wire and the grounding **Resistance: <2Ω**	Go to Step 5	Reverse radar grounding circuit has fault	Check and repair circuit between reverse radar sensor and grounding point G21
5	Check the reverse radar sensor power supply circuit	Normal	Faulty	Instruction
	Disconnect the connector of the reverse radar sensor. Use a slight wire to fetch out the terminals. Connect the connector of the reverse radar sensor. • When the power supply is on, shift to reverse gear and check the voltage between the Terminal 2 of reverse radar sensor signal wire and the grounding **Voltage: 9 - 13V** • Check the voltage between the Terminal 1 of reverse radar sensor power supply wire and the grounding **Voltage: <1.5V**	Go to Step 6	Wire is short-circuited or open-circuited	Check and repair the wire harness between reverse radar sensor and instrument cluster
6	Check the reverse radar sensor.	Normal	Faulty	Instruction
	Replace the reverse radar sensor with the same model, and check whether reverse radar functions normally	Replace reverse radar sensor	Whether reverse radar function can be realized	Go to Step 7
7	Check the instrument cluster	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Replace the instrument cluster with the same model, and check whether reverse radar functions normally	Replace the instrument cluster	Whether reverse radar function can be realized	Go to Step 8
8	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

4. BUZZER SOUNDS INTERMITTENTLY AFTER SWITCHING TO REVERSE GEAR ALTHOUGH THERE IS NO OBSTACLES ON THE BACK OF THE VEHICLE

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Check whether reverse radar sensor is installed correctly and its surface is smooth and clean	Go to Step 1	Installation of reverse radar sensor is incorrect or its surface has impurities	Reinstall the probe or clean the impurities
1	Check the ground around	Normal	Faulty	Instruction
	Check whether the ground around is smooth	Go to Step 2	The road surface is not smooth	Do the test again after the vehicle drives to plain road surface
2	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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5. BUZZER CAN NOT REACT TO THE DETECTION DISTANCE FROM OBSTACLES CORRECTLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to ON. • Place obstacles on the back of vehicle to check whether reverse radar works	Diagnosis is over	The display indicates and buzzes abnormally	Go to Step 1
1	Check the reverse radar sensor.	Normal	Faulty	Instruction
	Check whether surface of every reverse radar sensor is covered by mud or other impurities	Go to Step 2	Probe surface has impurities	Clean the probe surface
2	Check working condition of reverse radar	Normal	Faulty	Instruction
	Within effective range of reverse radar sensor of reverse assistance system on the vehicle rear, have one object approach the vehicle slowly from far to near to check whether buzzer displays detection results normally	Diagnosis is over	Reverse radar system can not indicate the detection results correctly	Go to Step 3
3	Check working condition of single reverse radar sensor	Normal	Faulty	Instruction
	Only keep the connection between one reverse radar sensor connector and wire harness and disconnect the other reverse radar sensor. Within effective range of reverse radar sensor of reverse assistance system on the vehicle rear, have one object approach the vehicle slowly from far to near to check whether buzzer displays detection results normally	Go to Step 4	Reverse radar system can not indicate the detection results correctly	Replace this reverse radar sensor
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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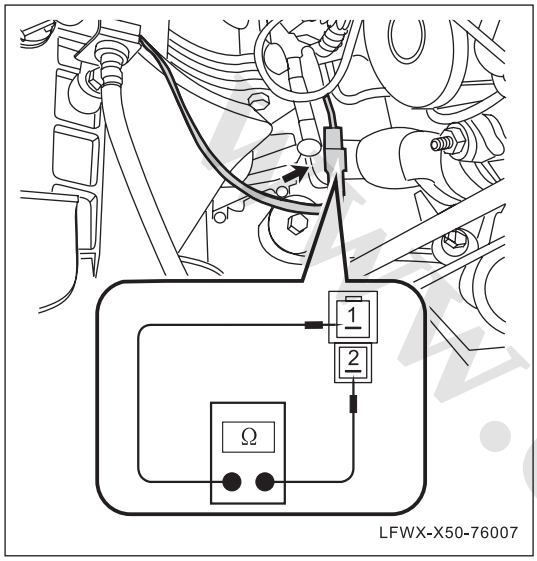
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REVERSE SWITCH

INSPECTION

△ HINT:

- The reversing switch also controls the reverse lamp. To avoid repetition, before checking the reversing switch, be sure to check whether the reverse lamp won't work, and then, check the reversing switch.
- When checking, repairing or removing the reversing switch, be sure to check the reversing switch harness for looseness. If there is , tighten the harness connector before testing the reversing switch.



1. INSPECT REVERSING SWITCH

(a) Turn the ignition switch to OFF.

(b) Disconnect the connector of the reverse lamp switch.

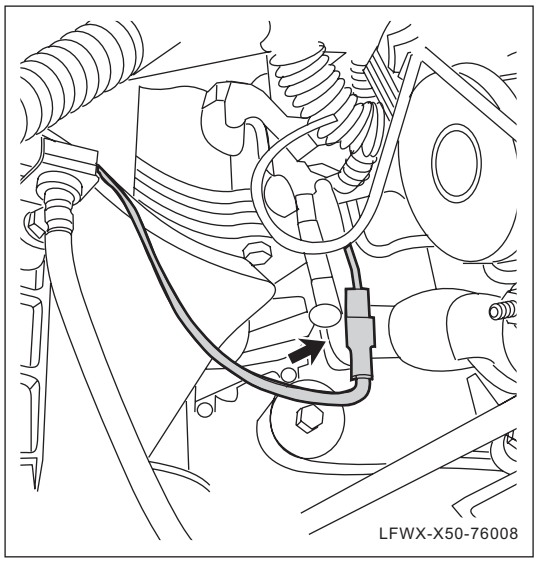
(c) Measure the reverse lamp switch with the digital multimeter.

Standards:

Condition	Measure the pins	Resistance value
Shift to reverse position.	1 - 2	<2 Ω
Withdraw from reverse position.	1 - 2	≥1 MΩ

(d) If it is inconsistent with the requirements, replace the reverse switch.

REPLACEMENT



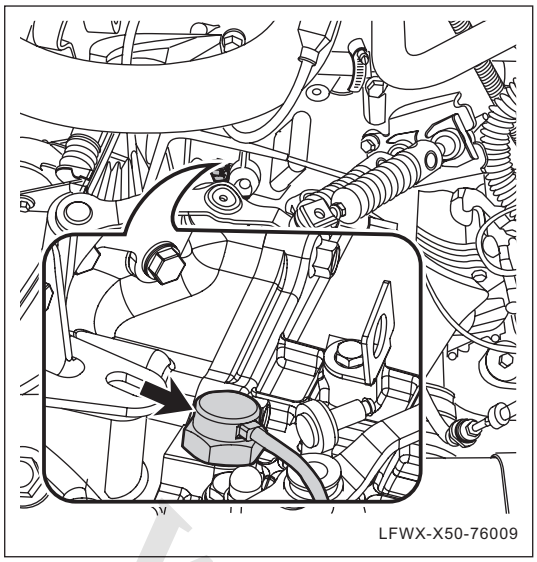
1. REMOVE REVERSING SWITCH

(a) Disconnect negative cable of battery.

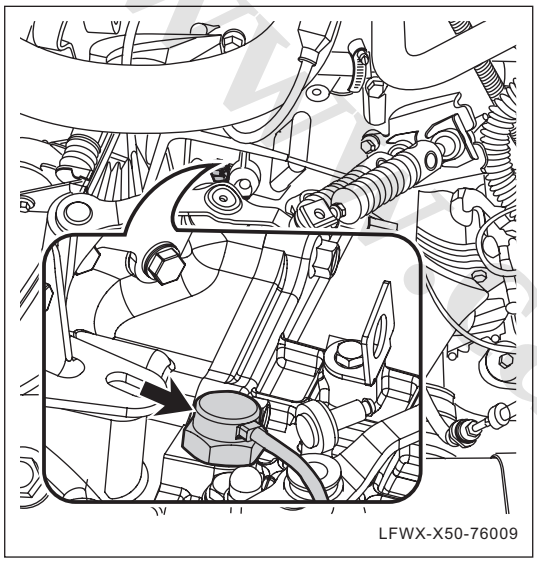
(b) Disconnect the connector of the reverse lamp switch.

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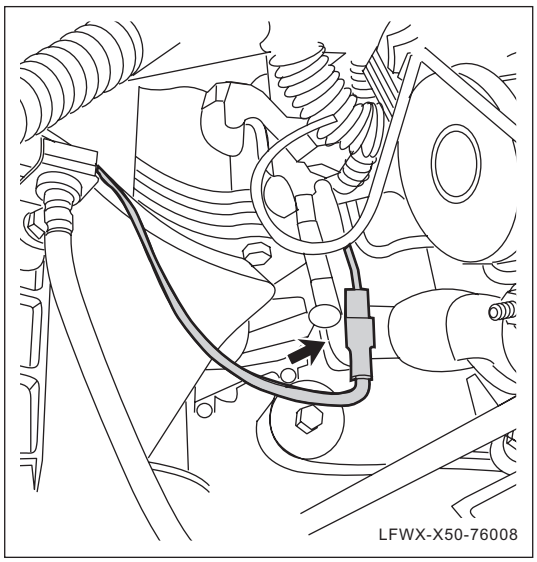
(c) Remove the reverse light switch.



2. INSTALL REVERSING SWITCH

(a) Install the reversing switch and tighten it.

Torque: 44 - 49N•m



(b) Connect the connector of the reverse lamp switch.

NOTICE:

If you hear a clear “click” sound when connecting, it means the connector is connected well.

(c) Connect the negative cable of battery.

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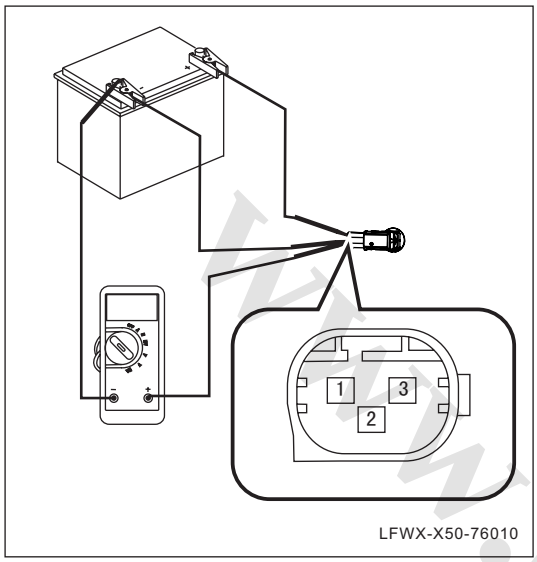
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REVERSE RADAR SENSOR

INSPECTION

△ HINT:

For the inspection of the reverse radar sensor, in general, use the substitution method to perform indirect testing. The following methods are seldom used in practice but for reference under special conditions.



1. INSPECT REVERSE RADAR SENSOR

(a) Connect the battery positive and negative cables to the Terminal 1 and Terminal 3 of the reverse radar respectively.

(b) Meanwhile use a digital multimeter voltage scale to check whether the voltage of No. 2 terminal of reverse radar sensor is 0.02V, or use oscilloscope to check whether there is square signal from No. 2 terminal of reverse radar sensor.

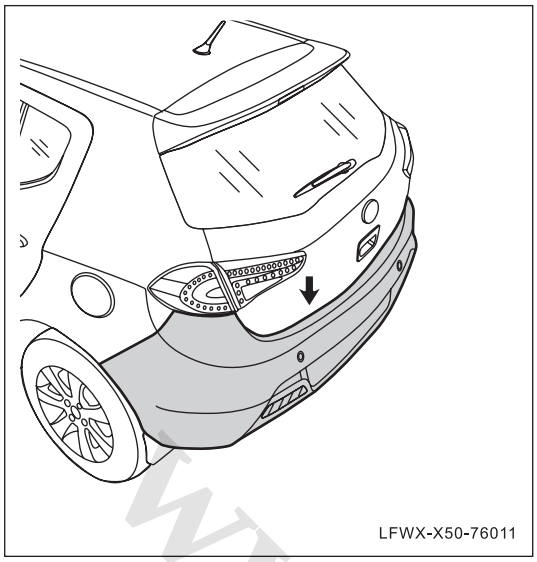
(c) If there is no output voltage or signal, it is an indication that the reverse radar sensor is damaged.

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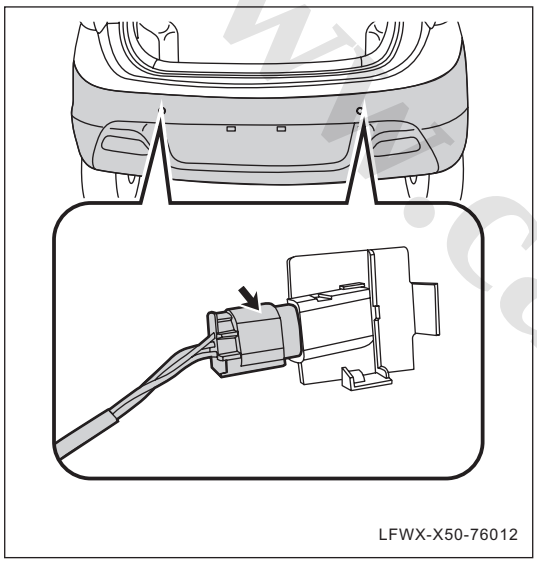
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REPLACEMENT



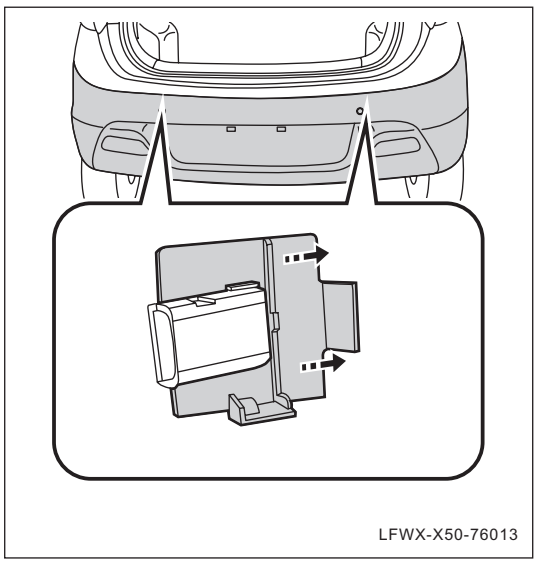
1. REMOVE REAR BUMPER

(a) Remove the rear bumper. (see 81- Interiors and Exteriors, Rear Bumper, Replacement).



2. REMOVE REVERSE RADAR SENSOR

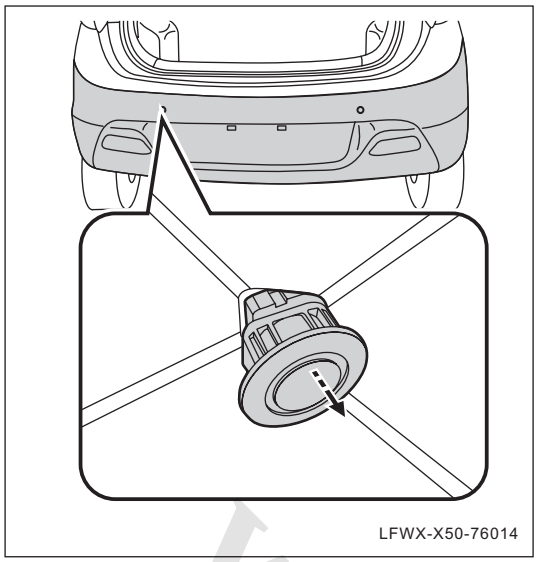
(a) Disconnect the connector of the reverse radar sensor.



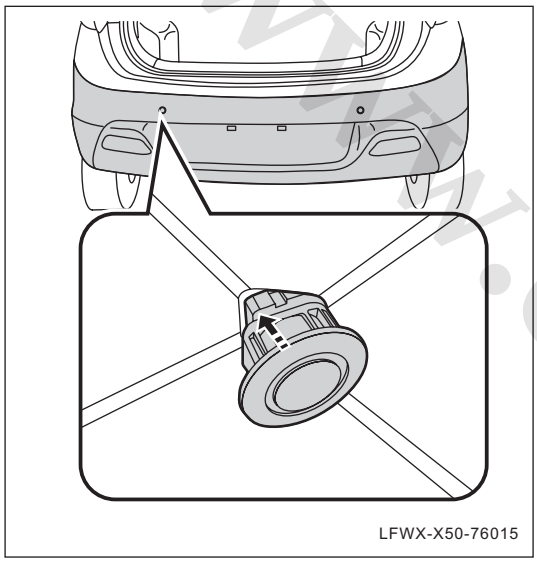
(b) Poke the mounting bracket of the reversing radar.

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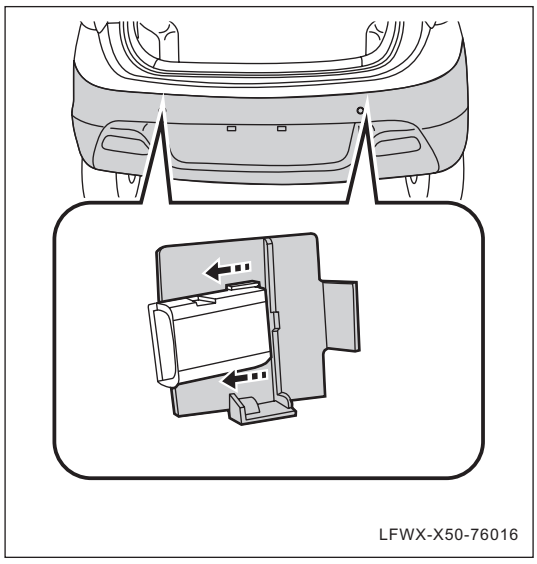


(c) Remove the reverse radar sensor from inner to outer.



3. INSTALL REVERSE RADAR SENSOR

(a) Install the reverse radar sensor from outer to inner.



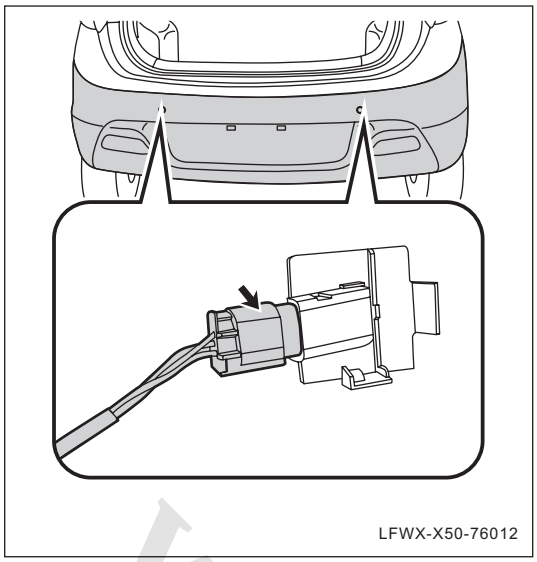
(b) Insert the mounting bracket of the reversing radar.

△ HINT:

After fixed the mounting bracket, shake the revering radar gently to check it for firm installation and check whether the reverse radar sensor joints with the rear bumper in place.

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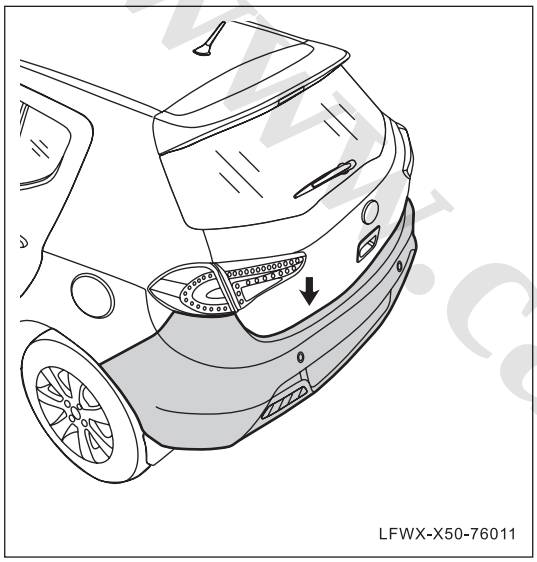


LFWX-X50-76012

(c) Connect the connector of the reverse radar sensor.

NOTICE:

If you hear a clear “click” sound when connecting, it means the connector is connected well.



LFWX-X50-76011

4. INSTALL REAR BUMPER

(a) Install rear bumper (see 81- Interiors and Exteriors, Rear Bumper, Replacement).

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Lighting System

Lighting system 77-1
System description 77-1
Schematic diagram (turn signal lamp, fog lamp, brake lamp, reverse lamp).....77-2
Schematic diagram (position lamp, daytime running lamp, high/low beam) 77-3
Schematic diagram (ceiling lamp) 77-4
Preparation.....77-5
Service data 77-5
Precautions 77-6
Components (exterior lighting) 77-7
Components (interior lighting) 77-8
Function and fault of components 77-9
On-vehicle inspection 77-10
Diagnosis 77-12
Fault symptom table 77-12
Fault diagnosis 77-15
Headlamp 77-37
Adjustment 77-37
Inspection 77-38
Replacement 77-40
Daytime running lamps.....77-45
Replacement 77-45
Tail lamp 77-47
Inspection 77-47
Replacement 77-48
Rear fog lamp.....77-55
Inspection 77-55
Replacement 77-55
Front ceiling lamp.....77-59
Inspection 77-59
Replacement 77-59
Front ceiling lamp (with sunroof version) 77-63
Inspection 77-63
Replacement 77-63
Rear ceiling lamp.....77-66
Inspection 77-66
Replacement 77-66

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High-mounted brake lamp 77-70
Replacement 77-70
Trunk lamp 77-73
Inspection 77-73
Replacement 77-73
License plate lamp 77-76
Inspection 77-76
Replacement 77-76
Combination switch 77-78
Replacement 77-78

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LIGHTING SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

Automotive lighting systems is one of the essential systems for safe driving.

To ensure a safe and reliable driving, various lighting and signal devices are equipped on the vehicle for lighting the road, indicating the vehicle width and location, lighting the interior vehicle, indicating the instruments and vehicle maintenance at night, etc. In addition, it will give off light or sound signals to warn the pedestrians and other vehicles under the conditions such as steering, braking, parking and reversing.

2. COMPONENTS

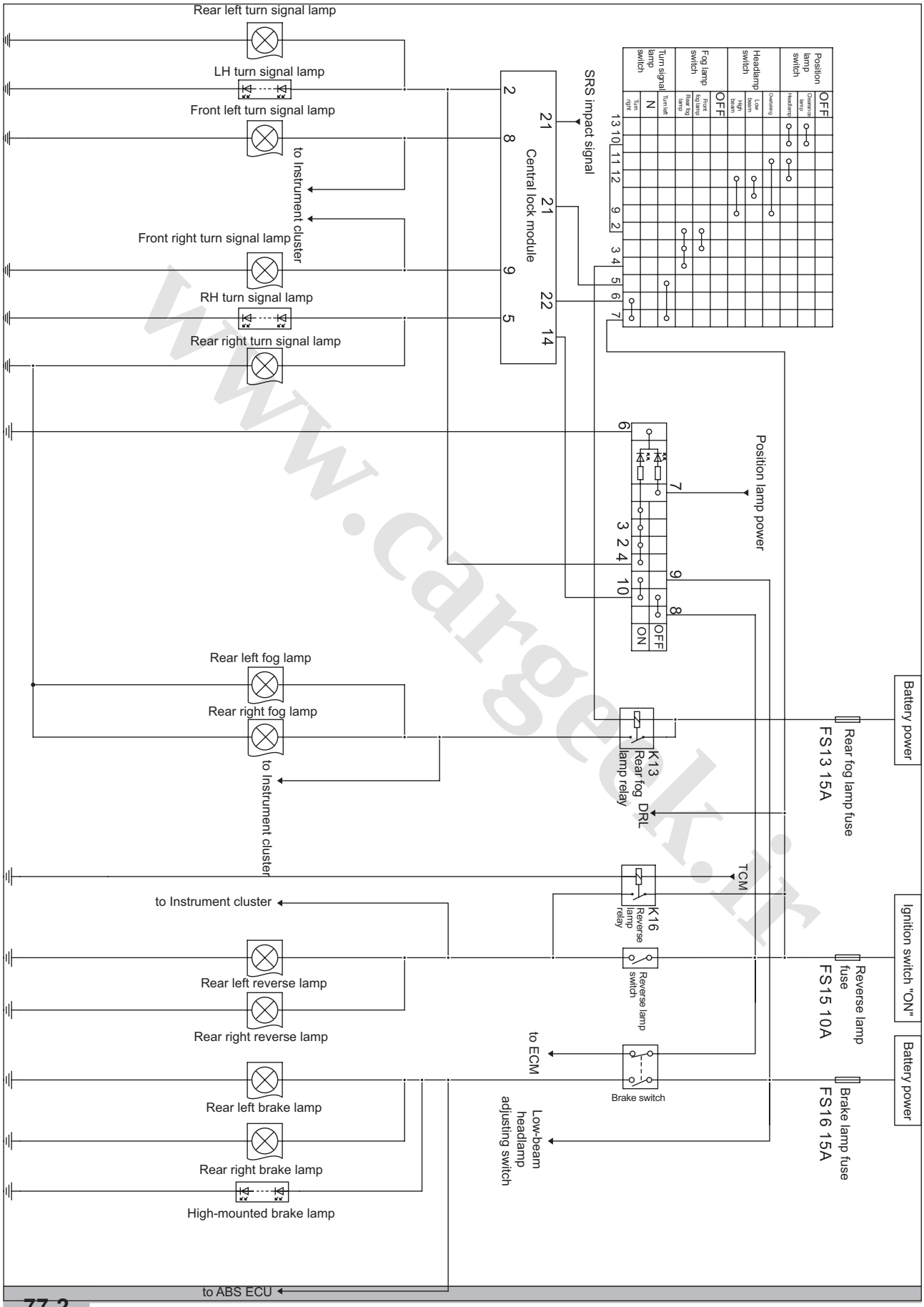
Lighting system consists of headlamp, tail lamp, front ceiling lamp, rear ceiling lamp, trunk lamp, daytime running lamp, high-mounted brake light, rear fog lamp, license plate lamp, etc.

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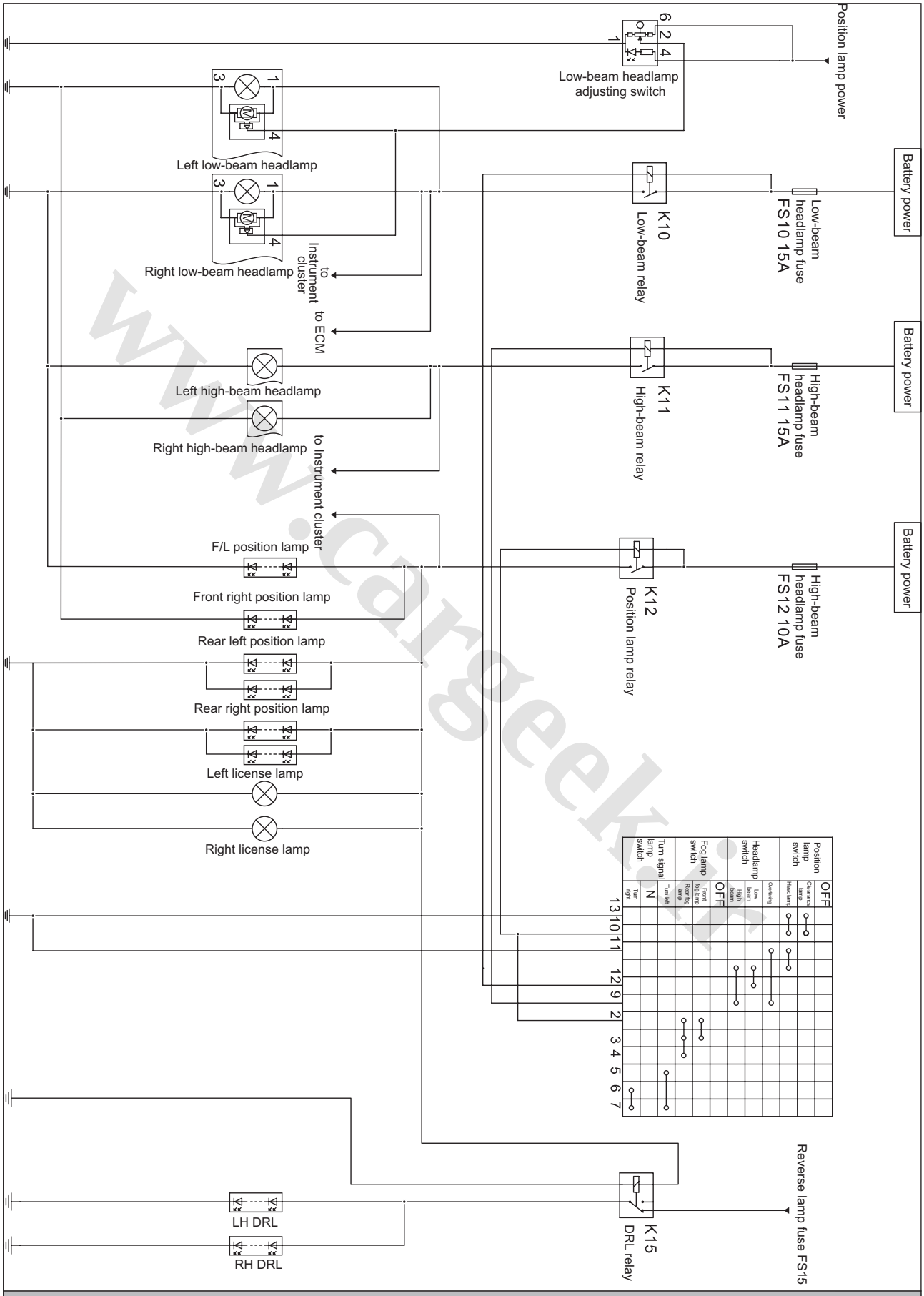
SCHEMATIC DIAGRAM (TURN SIGNAL LAMP, FOG LAMP, BRAKE LAMP, REVERSE LAMP)



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SCHEMATIC DIAGRAM (POSITION LAMP, DAYTIME RUNNING LAMP, HIGH/LOW BEAM)

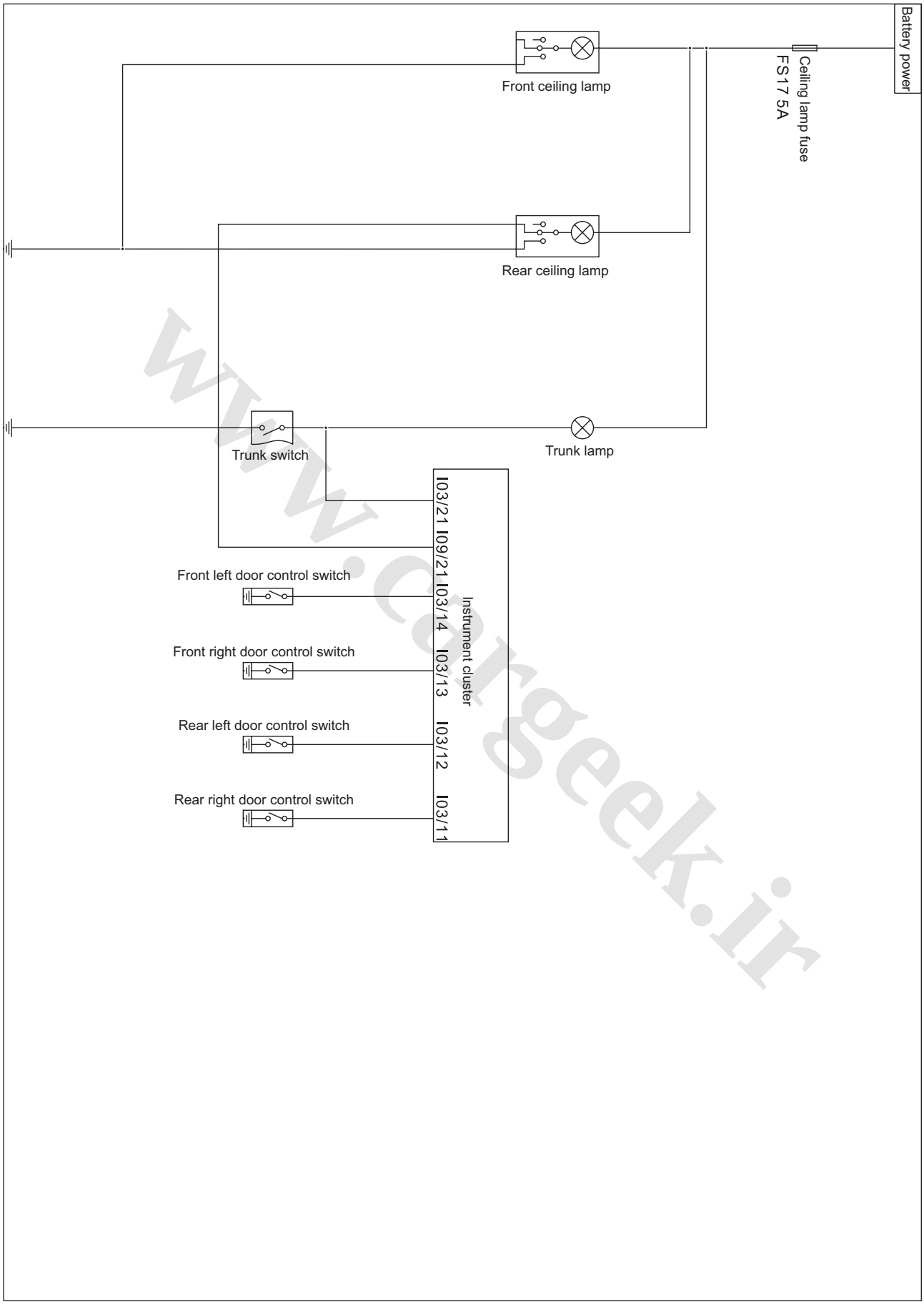


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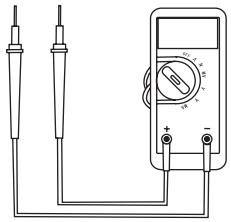
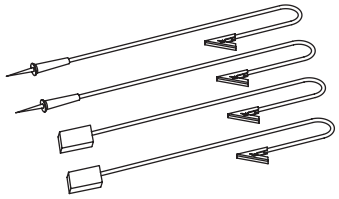
SCHEMATIC DIAGRAM (CEILING LAMP)



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		Used for measuring voltage or resistance.
2	Wiring set		Assist to measure voltage or resistance

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Bulb		Color	Watts (W)	Quantity
Headlamp	High-beam head-lamp	White	Bulb 55	2
	Low-beam head-lamp	White	Bulb 55	2
	Front position lamp	White	LED 1.2	2
	Front turn signal lamp	Amber	LED 3.5	2
Tail lamp	Turn signal lamp, rear	Amber	Bulb 21	2
	Rear position lamp	Red	LED 0.45 (fixed) LED 0.85 (active)	2
	Reverse lamp	White	Bulb 21	2
	Rear fog lamp	Red	Bulb 21	2
	Brake lamp	Red	LED 1.2 (fixed) LED 2.7 (active)	2
High-mounted brake lamp		Red	LED 2.1	1
License plate lamp		White	LED 0.5	2
Turn signal lamp, side		Amber	/	/
DRL		White	LED 4.8	2
Trunk lamp		White	Bulb 5	1
Front ceiling lamp (sunroof/non sunroof)		White	Bulb 10	1
Rear ceiling lamp		White	Bulb 10	1

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2. TIGHTENING TORQUE TABLE

Item	N•m
Headlamp assembly fixing bolt	8 - 12
Daytime running lamp assembly fixing screw	5 - 6
Fixed nuts of rear combination headlamp I	8 - 12
Tail lamp II fixing bolt and nut	8 - 12
Rear fog lamp assembly fixing screw	5 - 6
front ceiling lamp assembly retaining screw	5 - 6
Fixing screws of rear ceiling lamp assembly	5 - 6
Fixing nut of high-mounted brake lamp	8 - 12
Fixing nut of high-mounted brake lamp	8 - 12

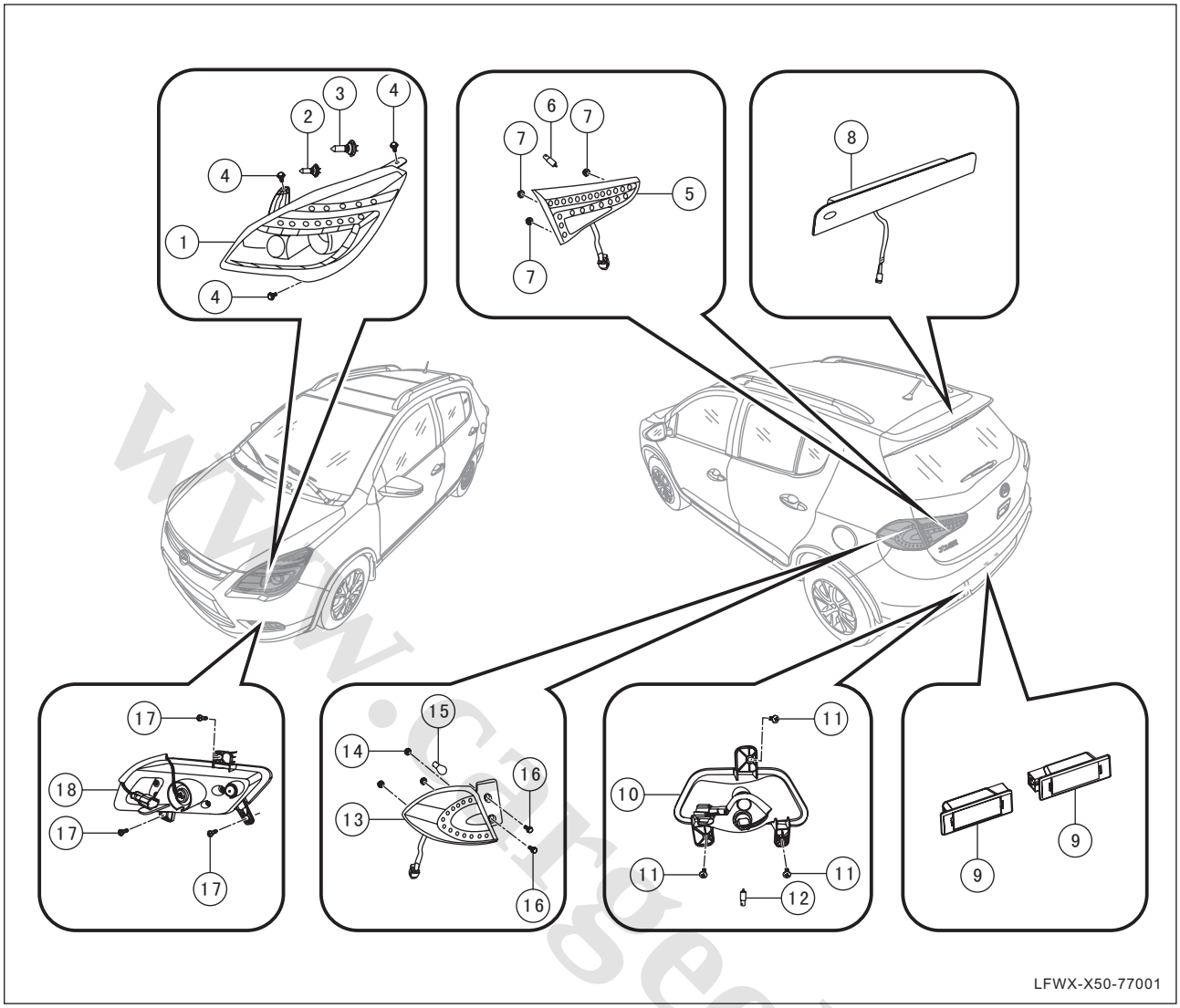
PRECAUTIONS

1. Do not keeping the positive and negative of tester probe too close when using the battery during inspection. Otherwise, it will results in short circuit.
2. When checking the voltage of the circuit, switch the ignition switch to "ON" position.
3. Always keep new bulbs for immediate replacement.
4. Be sure to replace bulbs with same wattage.
5. When replacing the bulb, if the bulb removed from the vehicle has been stored for a too long time, the lampshade may be stuck with dust and moisture, resulting in poor light or damaged earlier; clean the bulb surface with a cloth when installing it.
6. Always mount the light holder securely after replacing the bulb. Gaps around the light holder may cause fuzzy light cap and water ingress into the light chamber.

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COMPONENTS (EXTERIOR LIGHTING)



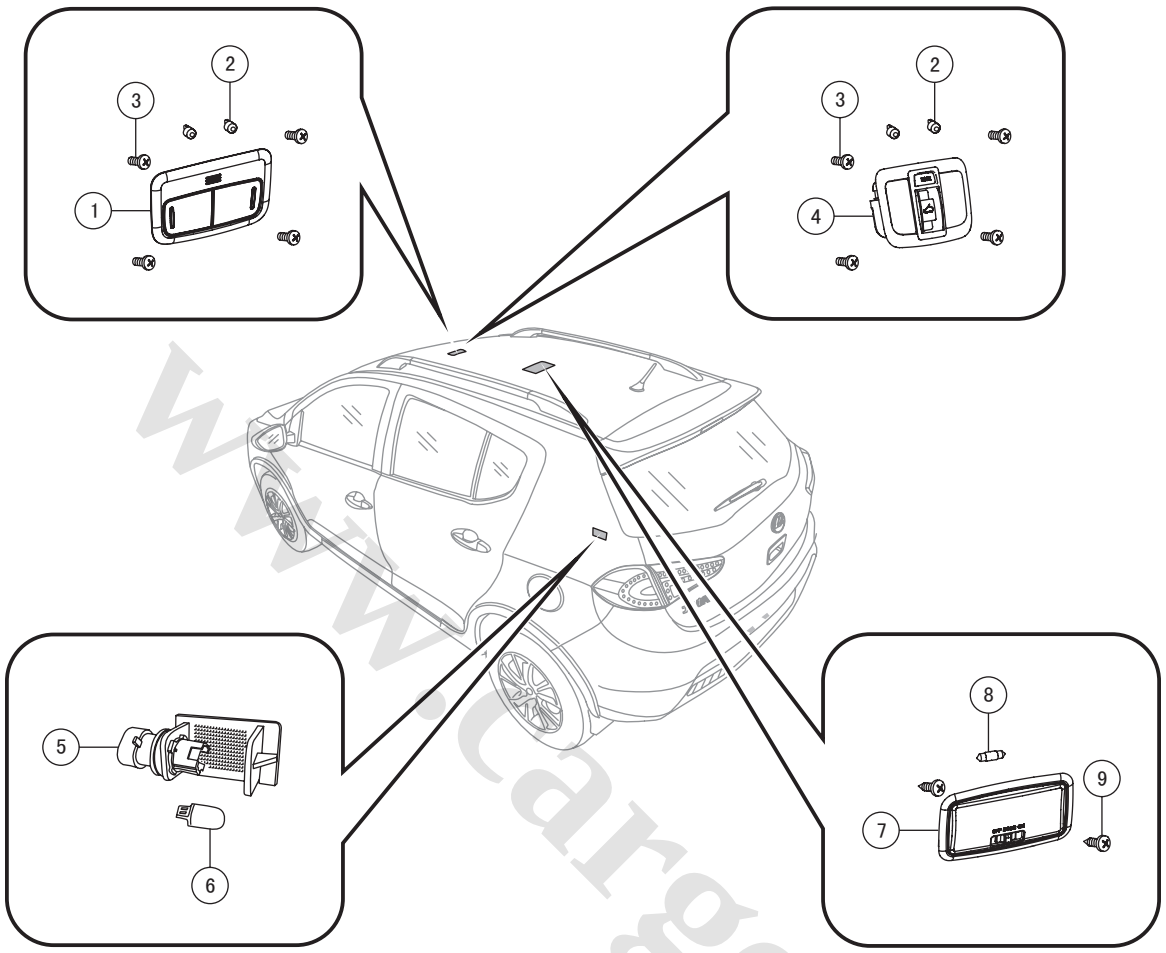
1	Headlamp assembly
2	High beam bulb
3	Low beam bulb
4	Bolt
5	Tail lamp assembly I
6	Back-up light bulb
7	Nut
8	High-mounted brake lamp
9	License plate lamp

10	Left and right rear fog lamps
11	Screw
12	Rear fog lamp bulb
13	Tail lamp assembly II
14	Nut
15	Turn signal lamp bulb
16	Bolt
17	Screw
18	Daytime running lamp assembly

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COMPONENTS (INTERIOR LIGHTING)



1	Front ceiling lamp assembly
2	Bulb
3	Cross recessed pan head screw
4	Front ceiling lamp assembly (with sun-roof version)
5	Trunk lamp assembly

6	Bulb
7	Rear ceiling lamp assembly
8	Bulb
9	Screw

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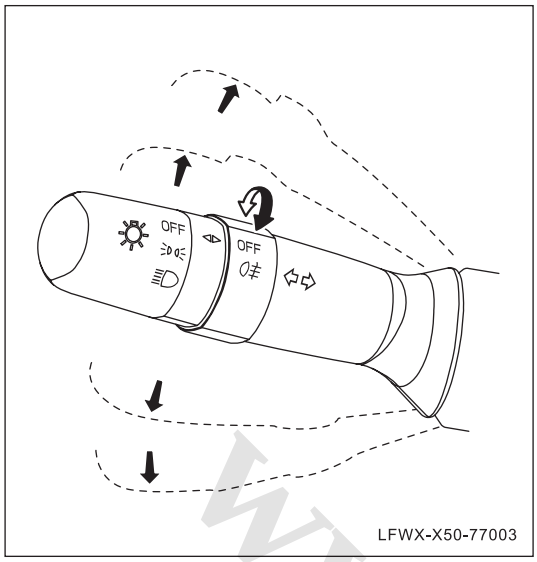
FUNCTION AND FAULT OF COMPONENTS

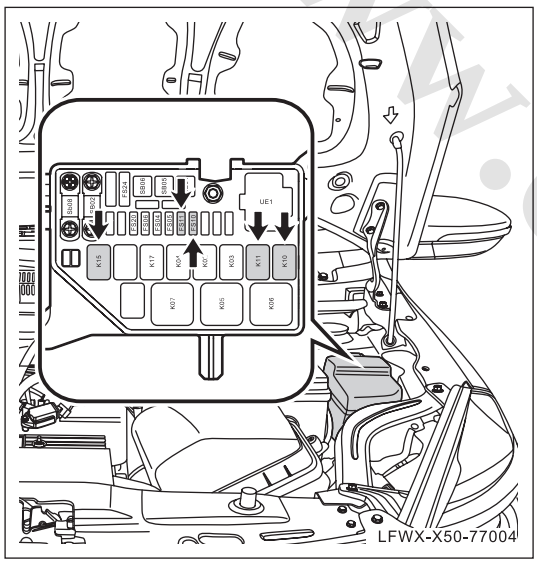
Part name	Part function	Common faults	Fault symptom
Front ceiling lamp assembly	Provide convenience for the driver and passengers	Not illuminated or always illuminated	/
Front ceiling lamp assembly (with sunroof version)		Not illuminated or always illuminated	/
Rear ceiling lamp assembly		Not illuminated or always illuminated	/
Rear fog lamp assembly	Used for illuminating the road and providing signal for the vehicle behind when driving in rain and fog weather	Not illuminated or always illuminated	/
Headlamp assembly	Used for night driving illumination	Not illuminated or always illuminated	/
Tail lamp assembly	Automotive lighting-signal system	Not illuminated or always illuminated	/
Daytime running lamp assembly	Make driving eye-catching and safe during the daytime	Not illuminated or always illuminated	/
Reverse lamp	Used for illuminating the road behind the vehicle and warning other vehicles and pedestrians when reversing, indicating that the vehicle is reversing; also it is used as a light-signal device	Not illuminated or always illuminated	/
License plate lamp	Used to illuminate the license plate	Not illuminated or always illuminated	/
Trunk lamp	Used for trunk illumination	Not illuminated or always illuminated	/

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ON-VEHICLE INSPECTION





1. FUNCTION CHECK

(a) Stop the vehicle in a safe place and use parking brake.

NOTICE:

When checking the lighting system, make sure that the battery voltage is not less than 12V.

(b) Turn the ignition switch to ON.

(c) Turn on all lamp switches of the lighting system in turn, and check all lamps of the lighting system.

Phenomenon: Lamps will illuminate or go out due to switch control.

△ HINT:

For detailed procedures of using switches and turning on/off lamps, refer to Service Manual for LIFAN X50.

2. CHECK FUSE AND RELAY OF THE ENGINE COMPARTMENT CENTRAL CONTROL BOX

(a) Open the engine hood.

(b) Open the central control box cover of the engine compartment.

(c) Check the corresponding fuses and relays of the lighting system.

Phenomenon: Fuses have good connectivity and relays work normally.

△ HINT:

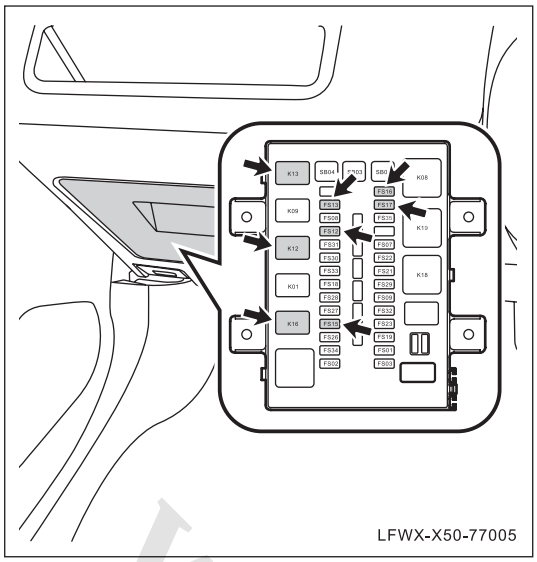
Relevant safety devices of the lighting system in the engine compartment central control box include: low beam fuse FS10, high beam fuse FS11, low beam relay K10, high beam relay K11, and daytime running lamp relay K15.

NOTICE:

The mark on the back of the engine compartment central control box cover shall prevail.

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3. CHECK FUSE OF THE CAB FUSE BOX

(a) Remove the dashboard left lower notes box.

(b) Check the corresponding fuses of the lighting system.

Phenomenon: Fuses have good connectivity.

△ HINT:

Relevant safety devices of the lighting system in the cab fuse box include:

Position lamp fuse FS12, rear fog lamp FS13, reverse lamp fuse FS15, brake lamp fuse FS16, ceiling lamp fuse FS17, position lamp relay K12, rear fog lamp relay K13, reverse lamp relay K16.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom		Suspected area	Recommended action
Low-beam headlamp	Only the low-beam headlamp on one side cannot be illuminated.	1. Bulb (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (1. Only one side of the low beam is not illuminated)
		2. Wire harness (open circuit or short circuit)	
	Neither low-beam headlamp comes on	1. Fuse FS10 (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (2. Both sides of the low beams are not illuminated)
		2. Low beam relay K10 (damaged)	
		3. Combination switch (damaged)	
		4. Bulb (damaged)	
		5. Wire harness (short circuit or open circuit)	
High-beam headlamp	Only the high-beam headlamp on one side cannot be illuminated.	1. Bulb (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (3. Only one side of the high beam is not illuminated)
		2. Wire harness (open circuit or short circuit)	
	Neither high-beam headlamp comes on	1. Fuse FS11 (blown)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (4. Both sides of the high beams are not illuminated)
		2. High beam relay K11 (damaged)	
		3. Combination switch (damaged)	
		4. Bulb (damaged)	
		5. Wire harness (short circuit or open circuit)	
Rear fog lamp	Only the rear fog lamp on one side cannot be illuminated.	1. Bulb (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (5. Only one side of the rear fog lamp is not illuminated)
		2. Wire harness (open circuit or short circuit)	
	None rear fog lamps on both sides can be illuminated.	1. Fuse FS13 (blown)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (6. Both sides of the rear fog lamps are not illuminated)
		2. Combination switch (damaged)	
		3. Rear fog lamp relay K13 (damaged)	
		4. Bulb (damaged)	
		5. Wire harness (short circuit or open circuit)	

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Symptom		Suspected area	Recommended action
Turn signal lamps, hazard warning lamps	The turn signal lamp is not working properly	1. Fuse FS15 (blown) 2. Combination switch (damaged) 3. Wire harness (open circuit or short circuit) 4. Central lock control unit (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (7. Both sides of the turn signal lamps are not illuminated)
	The hazard warning light is not working properly	1. Fuse FS16 (blown) 2. Hazard warning light switch (damaged) 3. Wire harness (open circuit or short circuit) 4. Central lock control unit (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (8. The hazard warning light is not working properly)
Brake lamp	Only one side of the brake light is not illuminated	1. Brake lamp bulb (damaged) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (9. Only one side of the brake lamp is not illuminated)
	The brake lamp is not illuminated or always illuminated	1. Fuse FS16 (blown) 2. Brake light switch (damaged) 3. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (10. The brake lamp is not illuminated or always illuminated)
Reverse lamp	Only the reverse lamps on one side cannot be illuminated.	1. Bulb (damaged) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (11. Only one side of the reverse lamp is not illuminated)
	Both sides of the reverse lamps are not illuminated (MT mode)	1. Fuse FS15 (blown) 2. Reverse lamp switch (damaged) 3. Bulb (damaged) 4. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (12. Both sides of the reverse lamps are not illuminated)
	Both sides of the reverse lamps are not illuminated (CVT mode)	1. Fuse FS15 (blown) 2. Back-up light relay K16 (damaged) 3. Bulb (damaged) 4. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (13. Both sides of the reverse lamps are not illuminated)

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Symptom		Suspected area	Recommended action
Interior lamp	The front ceiling lamp is not illuminated or always illuminated	1. Bulb (damaged) 2. Front ceiling lamp assembly (damaged) 3. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (14. The front ceiling lamp is not illuminated or always illuminated)
	The rear ceiling lamp is not illuminated or always illuminated	1. Bulb (damaged) 2. Rear ceiling lamp assembly (damaged) 3. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (15. The rear ceiling lamp is not illuminated or always illuminated)
	The trunk lamp is not illuminated or always illuminated	1. Bulb (damaged) 2. Trunk lamp switch (damaged) 3. Wire harness (open circuit or short circuit) 4. Tail door lock assembly (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (16. The trunk lamp is not illuminated or always illuminated)
	The ceiling lamp door control function is faulty	1. Door control switch (damaged) 2. Wire harness (damaged) 3. Instrument cluster (damaged)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (17. The ceiling lamp door control function is faulty)
	None of interior lamps can be illuminated.	1. Fuse FS17 (blown) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (18. All interior lights are not illuminated)
Position lamp and background lighting	Only one side of the position lamp is not illuminated	1. Bulb (damaged) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (19. Only one side of the position lamp is not illuminated)
	All position lamps and the background lights are not illuminated	1. Fuse FS12 (blown) 2. Relay (damaged) 3. Combination switch (damaged) 4. Harness (short circuit or open-circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (20. All position lamps and the background lights are not illuminated)
Daytime running lamps	Only one side of the daytime running lamp is not illuminated	1. Bulb (damaged) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (21. Only one side of the daytime running lamp is not illuminated)
	Both sides of the daytime running lamps are not illuminated	1. Daytime running lamp relay K15 (blown) 2. Wire harness (open circuit or short circuit)	See 77 - Lighting System, Diagnosis, Fault Diagnosis (22. Both sides of the daytime running lamps are not illuminated)

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FAULT DIAGNOSIS

1. ONLY THE LOW-BEAM HEADLAMP ON ONE SIDE CANNOT BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the low-beam headlamp, and observe whether it is normal or not	Diagnosis is over	Only one side of the low beam is not illuminated (taking the left low beam being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the low beam circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn the ignition switch to "ON" position, turn on the low beam, and measure the voltage between the No. 9 terminal of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the No. 9 terminal of the front left combination lamp connector clip and the low beam relay K10
3	Check the low beam grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of the front left combination lamp connector clip U26 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the Terminal 3 of the front left combination lamp and the body grounding point G13
4	Check the light combination switch	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 12 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 11 terminal of I13 and ground. **Resistance: <2Ω**	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the low-beam headlamp relay or the grounding
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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2. NEITHER LOW-BEAM HEADLAMP COMES ON

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the low-beam headlamp, and observe whether it is normal or not	Diagnosis is over	Neither low-beam headlamp comes on	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Open the central control box of the engine compartment. • Visually check whether the low beam fuse FS10 is blown	Go to Step 3	The low beam fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** FS10 15A • If the new fuse is blown again after replacing it, go to Step 2
2	Check the low beam power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the low beam power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check relay	Normal	Faulty	Instruction
	Check whether the low beam relay K10 is damaged	Go to Step 4	Relay failure	Replace the relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check the low beam circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn the ignition switch to "ON" position, turn on the low beam, and measure the voltage between the No. 9 terminal of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Check and repair the line fault between the No. 9 terminal of the front left combination lamp connector clip and the low beam relay K10
6	Check the light combination switch	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 12 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 11 terminal of I13 and ground. **Resistance: <2Ω**	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the low-beam headlamp relay or the grounding

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Steps	Inspection Item	Inspection result		
7	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

3. ONLY THE HIGH-BEAM HEADLAMP ON ONE SIDE CANNOT BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the high-beam headlamp, and observe whether the low-beam headlamp is normal	Diagnosis is over	Only one side of the high beam is not illuminated (taking the left high beam being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the high beam power circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn the ignition switch to "ON" position, turn on the high beam, and measure the voltage between the Terminal 2 of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the Terminal 2 of the front left combination lamp connector clip and the high beam relay K11
3	Check the high beam grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of the front left combination lamp connector clip U26 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the Terminal 3 of the front left combination lamp and the body grounding point G13
4	Check the light combination switch	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 9 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 11 terminal of I13 and ground. **Resistance: <2Ω**	Replace the lamp combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the high-beam headlamp relay or the grounding
5	Verification and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

4. NEITHER HIGH-BEAM HEADLAMP COMES ON

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the high-beam headlamp, and observe whether the high-beam headlamp is normal	Diagnosis is over	Neither high-beam headlamp comes on	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Open the central control box of the engine compartment. • Visually check if power window fuse FS11 is blown.	Go to Step 3	The high beam fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** FS11 15A • If the new fuse is blown again after replacing it, go to Step 2
2	Check the high beam power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the high beam power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check relay	Normal	Faulty	Instruction
	Check whether the high beam relay K11 is damaged in turn.	Go to Step 4	Relay failure	Replace the relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check the high beam circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn the ignition switch to "ON" position, turn on the high beam, and measure the voltage between the Terminal 2 of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Check and repair the line fault between the Terminal 2 of the front left combination lamp connector clip and the high beam relay K11
6	Check the light combination switch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 9 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 11 terminal of I13 and ground. **Resistance: <2Ω**	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the high-beam headlamp relay or the grounding
7	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

5. ONLY THE REAR FOG LAMP ON ONE SIDE CANNOT BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the rear fog lamp, and observe whether it is normal or not	Diagnosis is over	Only one side of the rear fog lamp is not illuminated (taking the left rear fog lamp being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the rear fog lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear fog lamp connector clip V06 • Turn on the rear fog lamp, and measure the voltage between the terminal 1 of the left rear fog lamp connector clip V06 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the left rear fog lamp connector clip and the rear fog lamp relay K13
3	Check the rear fog lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 2 of the left rear fog lamp connector clip V06 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the left rear fog lamp connector clip and the body grounding point G25
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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6. NONE REAR FOG LAMPS ON BOTH SIDES CAN BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the rear fog lamp, and observe whether it is normal or not	Diagnosis is over	None rear fog lamps on both sides can be illuminated.	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads • Remove the dashboard left lower notes box • Visually check whether the rear fog lamp fuse FS13 is blown	Go to Step 3	Rear fog lamp fuse is burned out.	• Replace the fuse with the same capacity **Rated capacity: FS13 15A** • If the new fuse is blown again after replacing it, go to Step 2
2	Check the rear fog lamp power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the rear fog lamp power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check relay	Normal	Faulty	Instruction
	Check whether the high beam relay K11 is damaged in turn.	Go to Step 4	Relay failure	Replace the relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check the rear fog lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear fog lamp connector clip V06 • Turn on the rear fog lamp, and measure the voltage between the terminal 1 of the left rear fog lamp connector clip V06 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the left rear fog lamp connector clip and the rear fog lamp relay K13
6	Check the rear fog lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 2 of the left rear fog lamp connector clip V06 and the body grounding is conducted	Go to Step 7	The wire has an open-circuit point	Check and repair the line fault between the left rear fog lamp connector clip and the body grounding point G25
7	Check the light combination switch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Check whether the position lamp is normal • Disconnect the combination lamp switch connector clip I13 • Check the voltage between the Terminal 4 of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 13 terminal of I13 and ground. **Resistance: <2Ω**	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the rear fog lamp relay or the grounding
8	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

7. THE TURN SIGNAL LAMP IS NOT WORKING PROPERLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the turn signal lamp, and observe whether it is normal or not	Diagnosis is over	The turn signal lamp is not working properly (taking the left turn signal lamp as example)	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether the rear fog lamp fuse FS15 is blown	Go to Step 2	The turn signal lamp fuse is blown	Replace the fuse with the same capacity **Rated capacity:** FS15 10A
2	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 3	Bulb damaged	Replace bulb
3	Check the front left turn signal lamp circuit	Normal	Faulty	Instruction
	• Disconnect front left combination headlamp connector U26 • Turn on the turn signal lamp, and measure the voltage between the No. 8 terminal of U26 and the grounding **Voltage: 9 - 13V**	Go to Step 4	The inspection voltage is out of the specified range	Check and repair the line fault between the No. 8 terminal of the front left combination headlamp connector clip and the central locking control unit
4	Check the front left turn signal lamp grounding line	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Measure whether the line between the terminal 3 of the front left turn signal lamp connector clip U26 and the body grounding is conducted	Go to Step 5	The wire has an open-circuit point	Check and repair the line fault between the front left turn signal lamp connector clip and the body grounding point G13
5	Check the turn signal lamp power line	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the terminal 7 of I13 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the rear fog lamp relay or the grounding
6	Check the light combination switch	Normal	Faulty	Instruction
	Turn the light combination switch to the "Left-turn" position, and check the resistance between the terminal 5 and the terminal 7 of the light combination switch **Resistance: <2Ω**	Go to Step 7	The light combination switch is damaged	Replace the light combination switch
7	Check the turn signal lamp control circuit	Normal	Faulty	Instruction
	Check whether the lines between the terminals 5 and 6 of the light combination switch connector clip I13 and the terminals 21 and 22 of the central locking control unit connector clip I16 are conducted	Go to Step 8	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the central locking control unit
8	Replacement and check	Normal	Faulty	Instruction
	Replace with a same type central locking control unit, and check whether the turn signal lamp is normal	Replace the central locking control unit	Fault still exists	Find the cause out from other fault symptoms

8. THE HAZARD WARNING LIGHT IS NOT WORKING PROPERLY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Press the hazard warning light switch, and observe whether the hazard warning light is working properly	Diagnosis is over	The hazard warning light is not working properly	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads • Remove the dashboard left lower notes box • Visually check whether the rear fog lamp fuse FS16 is blown	Go to Step 2	The hazard warning light fuse is blown	Replace the fuse with the same capacity **Rated capacity: FS16 15A**
2	Check the hazard warning light switch power line	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the hazard warning light switch connector clip I14 • Check the voltage between the No. 9 terminal of I14 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the hazard warning light switch and the cab fuse box
3	Check the hazard warning light switch	Normal	Faulty	Instruction
	Press the hazard warning light switch, and check the resistance between the No. 9 terminal and the No. 10 terminal of the hazard warning light switch **Resistance: <2Ω**	Go to Step 4	The hazard warning light switch is damaged	Replace the hazard warning light switch
4	Check the hazard warning light switch control line	Normal	Faulty	Instruction
	Check whether the lines between the No. 10 terminal of the hazard warning light connector clip I14 and the No. 14 terminal of the central locking control unit connector clip I16 is conducted	Go to Step 5	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the hazard warning light switch and the central locking control unit
5	Replacement and check	Normal	Faulty	Instruction
	Replace with a same type central locking control unit, and check whether the hazard warning light is normal	Replace the central locking control unit	Fault still exists	Find the cause out from other fault symptoms

77

9. ONLY ONE SIDE OF THE BRAKE LIGHT IS NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the turn brake lamp, and observe whether it is normal or not	Diagnosis is over	Only one side of the brake lamp is not illuminated (taking the left rear brake lamp being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check brake lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear brake lamp connector clip B17 • Depress the brake pedal, and measure the voltage between the terminal 1 of the left rear brake lamp connector clip B17 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the left rear brake lamp connector clip and the brake light switch

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Steps	Inspection Item	Inspection result		
3	Check the brake lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of the left rear brake lamp connector clip B17 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the left rear brake lamp connector clip and the body grounding point G28
4	Check the brake light switch circuit	Normal	Faulty	Instruction
	• Disconnect the brake light switch connector I19. • Check the voltage between the Terminal 1 of I19 and the grounding **Voltage: 9 - 13V** • Check for continuity between No.2 terminal of I19 and grounding	Go to Step 5	The wire has an open-circuit point	Check and repair the line fault between the brake light switch and the cab fuse box or between the brake light switch and the brake lamp
5	Check brake light switch	Normal	Faulty	Instruction
	Check whether the brake light switch is installed properly • Replace with a same type brake light switch, and check whether the brake lamp is normal	Go to Step 6	The brake light switch is not properly installed or the brake light switch is damaged	Repair or replace the brake light switch
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

10. BOTH SIDES OF THE BRAKE LAMPS ARE NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the turn brake lamp, and observe whether it is normal or not	Diagnosis is over	Both sides of the brake lamps are not illuminated	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads • Remove the dashboard left lower notes box • Visually check whether the brake lamp fuse FS16 is blown	Go to Step 3	The brake lamp fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** **FS16 15A** • If the new fuse is blown again after replacing it, go to Step 2
2	Check the brake lamp power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the brake lamp power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity

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Steps	Inspection Item	Inspection result		
3	Check the brake light switch circuit	Normal	Faulty	Instruction
	• Disconnect the brake light switch connector I19. • Check the voltage between the Terminal 1 of I19 and the grounding **Voltage: 9 - 13V** • Check for continuity between No.2 terminal of I19 and grounding	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the brake light switch and the cab fuse box or between the brake light switch and the brake lamp
4	Check brake light switch	Normal	Faulty	Instruction
	Check whether the brake light switch is installed properly • Replace with a same type brake light switch, and check whether the brake lamp is normal	Go to Step 5	The brake light switch is not properly installed or the brake light switch is damaged	Repair or replace the brake light switch
5	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 6	Bulb damaged	Replace bulb
6	Check brake lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear brake lamp connector clip B17 • Depress the brake pedal, and measure the voltage between the terminal 1 of the left rear brake lamp connector clip B17 and the grounding **Voltage: 9 - 13V**	Go to Step 7	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the left rear brake lamp connector clip and the brake light switch
7	Check the brake lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of the left rear brake lamp connector clip B17 and the body grounding is conducted	Go to Step 8	The wire has an open-circuit point	Check and repair the line fault between the left rear brake lamp connector clip and the body grounding point G28
8	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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11. ONLY THE REVERSE LAMPS ON ONE SIDE CANNOT BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, shift the gear to "R", and observe whether the reverse lamp is normal	Diagnosis is over	Only one side of the reverse lamp is not illuminated (taking the left reverse lamp being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb wire harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the reverse lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear combination tail light connector clip L10 • Shift the gear to "R", and measure the voltage between the Terminal 4 of L10 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the Terminal 4 of L10 and the reverse lamp switch
3	Check the reverse lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of L10 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Repair the line fault between the reverse lamp and the body grounding point G31
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

12. BOTH SIDES OF THE REVERSE LAMPS ARE NOT ILLUMINATED (MT MODEL)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, shift the gear to "R", and observe whether the reverse lamp is normal	Diagnosis is over	None reverse lamps on both sides can be illuminated.	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads • Remove the dashboard left lower notes box • Visually check whether the reverse lamp fuse FS15 is blown	Go to Step 3	Reverse lamp fuse is burned out.	• Replace the fuse with the same capacity **Rated capacity: FS15 10A** • If the new fuse is blown again after replacing it, go to Step 2

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Steps	Inspection Item	Inspection result		
2	Check the reverse lamp power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the reverse lamp power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually trouble-shoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the reverse lamp switch circuit	Normal	Faulty	Instruction
	• Disconnect the reverse lamp switch connector E16. • Check the voltage between the Terminal 1 of E16 and the grounding **Voltage: 9 - 13V** • Check for continuity between Terminal 2 of E16 and grounding	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the reverse lamp switch and the cab fuse box or between the reverse lamp switch and the reverse lamp
4	Check reverse lamp switch	Normal	Faulty	Instruction
	• Check whether the reverse lamp switch is properly installed • Shift the gear to "R", and check whether the line between the terminal 1 and the Terminal 2 of the reverse lamp is conducted	Go to Step 5	The reverse lamp switch is not properly installed or the reverse lamp switch is damaged	Repair or replace the reverse lamp switch
5	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 6	Bulb damaged	Replace bulb
6	Check the reverse lamp circuit	Normal	Faulty	Instruction
	• Disconnect the left rear combination tail light connector clip L10 • Shift the gear to "R", and measure the voltage between the Terminal 4 of L10 and the grounding **Voltage: 9 - 13V**	Go to Step 7	The inspection voltage is out of the specified range	Check and repair the line fault between the Terminal 4 of L10 and the reverse lamp switch
7	Check the reverse lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 3 of L10 and the body grounding is conducted	Go to Step 8	The wire has an open-circuit point	Repair the line fault between the reverse lamp and the body grounding point G31
8	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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13. BOTH SIDES OF THE REVERSE LAMPS ARE NOT ILLUMINATED (CVT MODEL)

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, shift the gear to "R", observe whether the instrument cluster is displayed normally, and check whether the reverse lamp is normal	Diagnosis is over	• The instrument cluster display is not normal • If the instrument cluster display is not normal, both sides of the brake lamps are not illuminated	• If the instrument cluster display is not normal, it indicates that the CVT shift mechanism is faulty, or the transmission control module or the wire harness is faulty • If the instrument cluster display is not normal, and both sides of the brake lamps are not illuminated, take the 1st step
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether the reverse lamp fuse FS15 is blown	Go to Step 3	Reverse lamp fuse is burned out.	• Replace the fuse with the same capacity **Rated capacity:** FS15 10A • If the new fuse is blown again after replacing it, go to Step 2
2	Check the reverse lamp power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the reverse lamp power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the reverse lamp relay	Normal	Faulty	Instruction
	• Remove the reverse lamp relay K16 • Replace with a same type relay, and check whether the reverse lamp relay is normal	Go to Step 4	Reverse lamp relay is damaged	Replace the reverse lamp relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check the reverse lamp circuit	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect the left rear combination tail light connector clip L10 • Shift the gear to "R", and measure the voltage between the terminal 4 of L10 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Repair the line fault between the left rear combination tail light and the cab fuse box
6	Check the wire harness between transmission control module and the cab fuse box	Normal	Faulty	Instruction
	• Shift the gear to "R", and measure the voltage between the two switches of reverse lamp relay control terminal • The voltages of the two switches are the battery voltage and zero respectively	Go to Step 7	The wire has an open-circuit point	Repair the line fault between the transmission control module and the reverse lamp relay
7	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

77

14. THE FRONT CEILING LAMP IS NOT ILLUMINATED OR ALWAYS ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the front ceiling lamp, and observe whether it is normal or not	Diagnosis is over	The front ceiling lamp is not illuminated or always illuminated	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the front ceiling lamp power circuit	Normal	Faulty	Instruction
	• Disconnect the front ceiling lamp connector clip R02 • Measure the voltage between the terminal 2 of R02 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Repair the line fault between Terminal 2 of R02 and the cab fuse box
3	Check the front ceiling lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the terminal 1 of R02 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the front ceiling lamp connector clip and the body grounding point G21
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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15. THE REAR CEILING LAMP IS NOT ILLUMINATED OR ALWAYS ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the rear ceiling lamp, and observe whether it is normal or not	Diagnosis is over	The rear ceiling lamp is not illuminated or always illuminated	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the power circuit of rear ceiling lamp	Normal	Faulty	Instruction
	• Disconnect rear ceiling lamp connector R04. • Measure the voltage between the Terminal 2 of R04 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Repair the line fault between Terminal 2 of R04 and the cab fuse box
3	Check the rear ceiling lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 1 of R04 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the rear ceiling lamp connector clip and the body grounding point G21
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

16. THE CEILING LAMP DOOR CONTROL FUNCTION IS FAULTY

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on ceiling lamp to "Door" position, and open the door to observe whether the ceiling lamp is normal	Diagnosis is over	The ceiling lamp door control function is faulty (taking the rear ceiling lamp without sunroof for example)	Go to Step 1
1	Check the instrument cluster indicator light display	Normal	Faulty	Instruction
	Close the door, and turn the ignition switch in "ON" position to observe whether the door indicator light on the instrument cluster is illuminated	Go to Step 2	The door is closed while the door indicator light remains lit	Replace the door control switch or repair the relevant wire harness
2	Check the power circuit of rear ceiling lamp	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	• Disconnect rear ceiling lamp connector R04. • Measure the resistance between the Terminal 1 of R04 and the grounding **Resistance: >1MΩ**	Go to Step 3	The lead wire is short-circuit to ground	Check and repair the line fault between Terminal 1 of R04 and the grounding
3	Replacement and check	Normal	Faulty	Instruction
	Replace with a same type instrument cluster, and check whether the ceiling lamp door control function is normal	Replace the instrument cluster	Fault still exists	Find the cause out from other fault symptoms

17. THE TRUNK LAMP IS NOT ILLUMINATED OR ALWAYS ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Open the tail door and observe whether the trunk lamp is normal	Diagnosis is over	The trunk lamp is not illuminated or always illuminated	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the trunk lamp circuit	Normal	Faulty	Instruction
	• Disconnect the trunk lamp connector B14. • Measure the voltage between the Terminal 1 of B14 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Repair the line fault between Terminal 1 of B14 and the cab fuse box
3	Check trunk lamp switch	Normal	Faulty	Instruction
	• Disconnect the trunk lamp switch connector clip L07 • Measure the voltage between the Terminal 1 of L07 and the grounding **Voltage: 9 - 13V** • When opening the tail door, check whether the line between the Terminal 1 and the Terminal 2 of the trunk lamp switch is conducted	Go to Step 4	The lead wire is faulty, or the tail door lock assembly is faulty	Repair the line fault between the trunk lamp switch and the trunk lamp, or replace the tail door lock assembly
4	Check the trunk lamp grounding line	Normal	Faulty	Instruction
	• Disconnect the trunk lamp switch connector clip L07 • Measure the resistance between the Terminal 2 of L07 and the grounding **Resistance: <2Ω**	Go to Step 5	The lead wire is faulty, or the tail door lock assembly is faulty	Repair the line fault between the trunk lamp switch and the grounding point G31
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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18. NONE OF INTERIOR LAMPS CAN BE ILLUMINATED.

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the ceiling lamp, and observe whether it is normal or not	Diagnosis is over	None of interior lamps can be illuminated.	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether the ceiling lamp fuse FS17 is blown	Go to Step 3	Reverse lamp fuse is burned out.	• Replace the fuse with the same capacity **Rated capacity: FS17 5A** • If the new fuse is blown again after replacing it, go to Step 2
2	Check the ceiling lamp power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the ceiling lamp power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually trouble-shoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the cab fuse box	Normal	Faulty	Instruction
	• Remove the ceiling lamp fuse • Check the voltage between the ceiling lamp fuse power stitch and the grounding **Voltage: 9 - 13V** • Check whether the line between the ceiling lamp fuse power output stitch and the grounding is conducted	Go to Step 4	The cab fuse box is faulty	Repair or replace the cab fuse box
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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19. ONLY ONE SIDE OF THE POSITION LAMP IS NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the position lamp, and observe whether it is normal or not	Diagnosis is over	Only one side of the position lamp is not illuminated (taking the front left position lamp being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the position lamp power circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn the ignition switch to "ON" position, turn on the position lamp, and measure the voltage between the No. 7 terminal of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the No. 7 terminal of the front left combination lamp connector clip and the position lamp relay K12
3	Check the position lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the No. 6 terminal of the front left combination lamp connector clip U26 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the No. 6 terminal of the front left combination lamp and the body grounding point G13
4	Check the light combination switch	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 10 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 13 terminal of I13 and ground. **Resistance: <2Ω**	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the position lamp relay or the grounding
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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20. BOTH SIDES OF THE POSITION LAMPS ARE NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn on the position lamp, and observe whether it is normal or not	Diagnosis is over	Both sides of the position lamps are not illuminated	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Open the central control box of the engine compartment. • Visually check if power window fuse FS12 is blown.	Go to Step 3	The position lamp fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** FS12 10A • If the new fuse is blown again after replacing it, go to Step 2
2	Check the position lamp power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the position lamp power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check relay	Normal	Faulty	Instruction
	Check whether the position lamp relay K12 is damaged	Go to Step 4	Relay failure	Replace the relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check position lamp circuit	Normal	Faulty	Instruction
	• Disconnect front left headlamp connector U26. • Turn on position lamp, and measure the voltage between the No. 7 terminal of the front left combination lamp connector clip U26 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Check and repair the line fault between the No. 7 terminal of the front left combination lamp connector clip and the position lamp relay K12
6	Check the light combination switch	Normal	Faulty	Instruction
	• Disconnect the combination lamp switch connector clip I13 • Check the voltage between the No. 10 terminal of I13 and the grounding **Voltage: 9 - 13V** • Check the resistance between No. 13 terminal of I13 and ground. Resistance: <2Ω	Replace the light combination switch	The connector clip terminal is open circuit or the lead wire is faulty	Check the line between the light combination switch and the position lamp relay or the grounding
7	Verification and check	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

21. ONLY ONE SIDE OF THE DAYTIME RUNNING LAMP IS NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, do not turn on the position lamp, and observe whether the daytime running lamp is normal	Diagnosis is over	Only one side of the daytime running lamp is not illuminated (taking the front left daytime running lamp being not illuminated as an example for diagnosis)	Go to Step 1
1	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 2	Bulb damaged	Replace bulb
2	Check the daytime running lamp power circuit	Normal	Faulty	Instruction
	• Disconnect the front left daylight running light connector clip U05 • Turn the ignition switch to "ON" position, turn on the daytime running lamps, and measure the voltage between the terminal 1 of the front left combination lamp connector clip U05 and the grounding **Voltage: 9 - 13V**	Go to Step 3	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the front left combination lamp connector clip and the daytime running lamp relay K12
3	Check the daytime running lamp grounding line	Normal	Faulty	Instruction
	Measure whether the line between the Terminal 2 of the front left daytime running lamp connector clip U05 and the body grounding is conducted	Go to Step 4	The wire has an open-circuit point	Check and repair the line fault between the Terminal 2 of the front left daytime running lamp and the body grounding point G13
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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22. BOTH SIDES OF THE DAYTIME RUNNING LAMPS ARE NOT ILLUMINATED

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	When the ignition switch in "ON" position, turn on the daytime running lamps, and observe whether they are normal or not	Diagnosis is over	Both sides of the daytime running lamps are not illuminated	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Open the central control box of the engine compartment. • Visually check if power window fuse FS15 is blown.	Go to Step 3	The daytime running lamp fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** FS15 10A • If the new fuse is blown again after replacing it, go to Step 2
2	Check the daytime running lamp power circuit	Normal	Faulty	Instruction
	Disconnect the battery negative cable, and check the resistance between the daytime running lamp power line and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check relay	Normal	Faulty	Instruction
	Check whether the daytime running lamp relay K15 is damaged	Go to Step 4	Relay failure	Replace the relay
4	Check bulb	Normal	Faulty	Instruction
	• Check the bulb harness for looseness or disconnection. • Remove the bulb, and check whether the bulb filament is blown	Go to Step 5	Bulb damaged	Replace bulb
5	Check the daytime running lamp circuit	Normal	Faulty	Instruction
	• Disconnect the front left daylight running light connector clip U05 • Turn on the daytime running lamps, and measure the voltage between the terminal 1 of the front left daytime running lamp connector clip U05 and the grounding **Voltage: 9 - 13V**	Go to Step 6	The inspection voltage is out of the specified range	Check and repair the line fault between the terminal 1 of the front left daytime running lamp connector clip and the daytime running lamp relay K15
7	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is over	Fault still exists	Find the cause out from other fault symptoms

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HEADLAMP

ADJUSTMENT

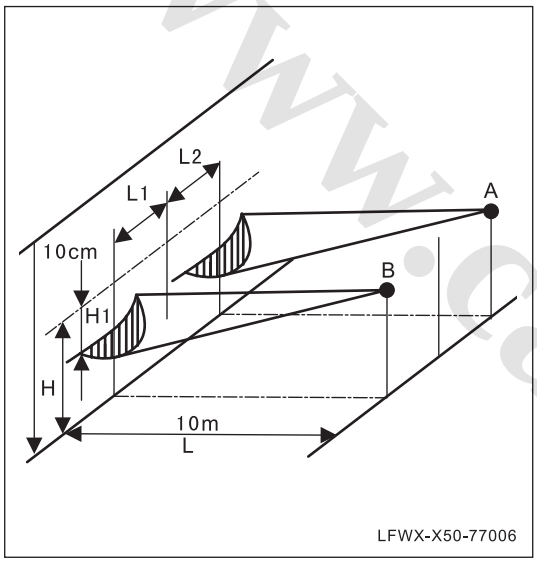
1. BEFORE ADJUSTMENT

(a) Adjust the vehicle as follows.

- Make sure there is no deformation around headlamp.
- Park the vehicle on level ground.
- Make sure the tires are inflated with the specified pressures. (See 33 - Wheel and Tire wheel and Tire, On-vehicle Inspection)
- The driver sits in the car (or with a weight of about 73kg), and the car is in no-load condition.

△ HINT:

No-load condition indicates that the fuel, engine coolant and lubricant are full, and the spare tire, jack, tool set and floor mats are at the specified locations.



2. INSPECT ILLUMINATION RANGE OF HEADLAMP

△ HINT:

This standard is the adjustment to the headlamp under the Chinese law; for the adjustment to the headlamp of other countries, refer to the local laws and regulations.

(a) Make sure the glass lens of headlamp is at a distance 10m from the screen which can be either a curtain or a flat wall.

(b) Start the engine.

(c) Turn on the headlamp low beams.

(d) Check whether the illumination range of front combination low-beam headlamp is consistent with that shown in the figure.

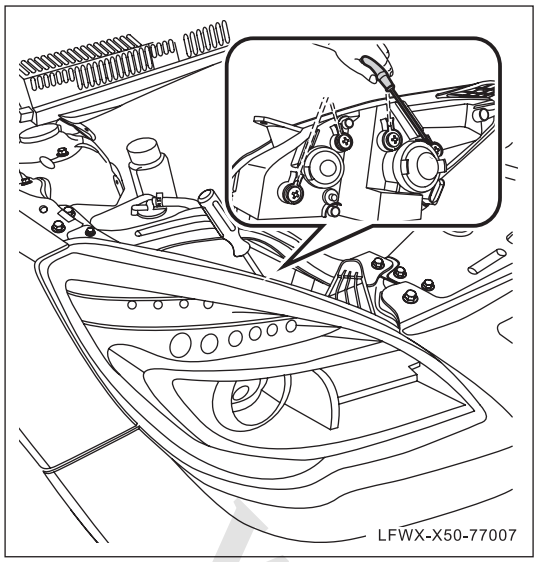
△ HINT:

A and B indicate the position of headlamp respectively. H indicates the height of headlamp. L1 and L2 indicate the distance between headlamp center and the vehicle center respectively.

(e) If not, adjust headlamp.

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3. ADJUSTMENT RANGE OF HEADLAMP

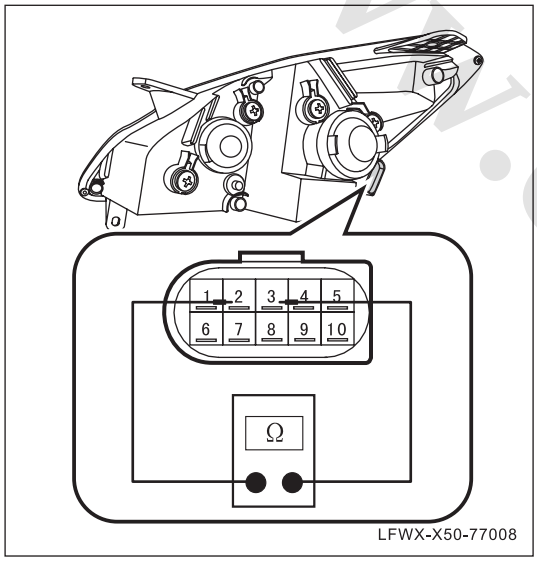
(a) Open the engine hood.

(b) Unscrew the adjusting screw, and adjust the illumination range of headlamp to the standard range.

△ HINT:

With the optical axis adjusting switch of headlamp in the driving compartment, adjust the horizontal direction of headlamp.

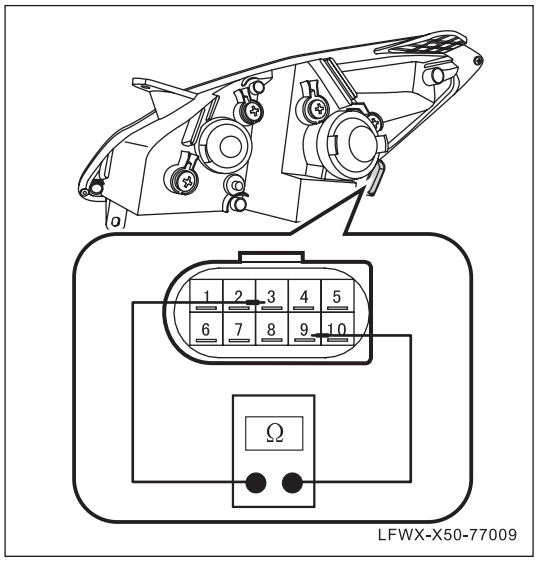
INSPECTION



1. CHECK HIGH BEAM LAMP

(a) Check the resistance of the Terminals 2 and 3 of the left and right headlamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the high beam lamp bulb.



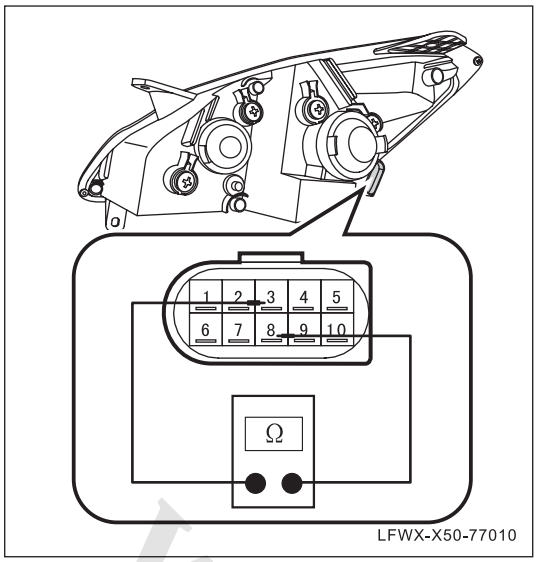
2. CHECK LOW BEAM LAMP

(a) Check the resistance of the Terminals 3 and 9 of the left and right headlamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the low beam lamp bulb.

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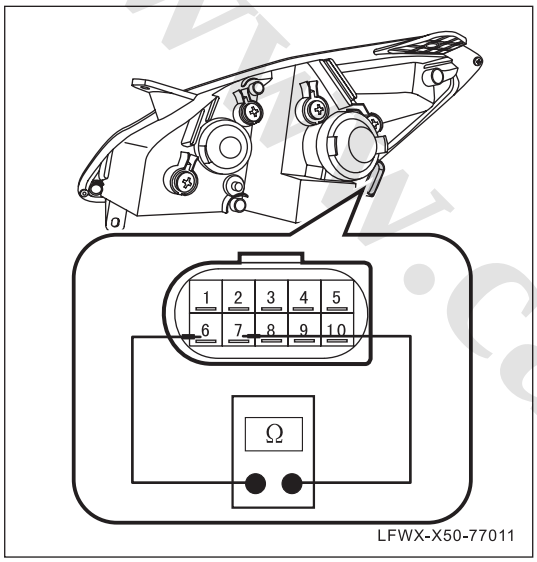
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3. CHECK FRONT TURN SIGNAL LAMP

(a) Check the resistance of the Terminals 2 and 8 of the left and right headlamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the front turn signal lamp bulb.



4. CHECK FRONT POSITION LAMP

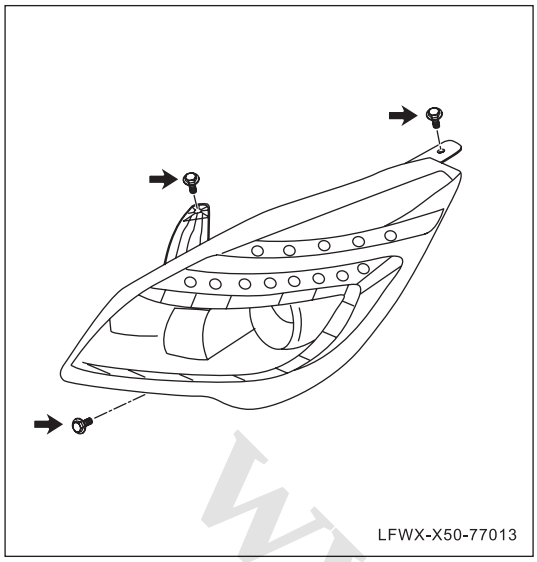
(a) Check the resistance of the Terminals 1 and 2 of the left and right headlamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the front position lamp bulb.

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REPLACEMENT



1. REPLACE HEADLAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

(b) Disconnect negative cable of battery.

(c) Remove the front bumper assembly and the jack stand. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

(d) Remove fixing bolts of headlamp assembly.

△ HINT:

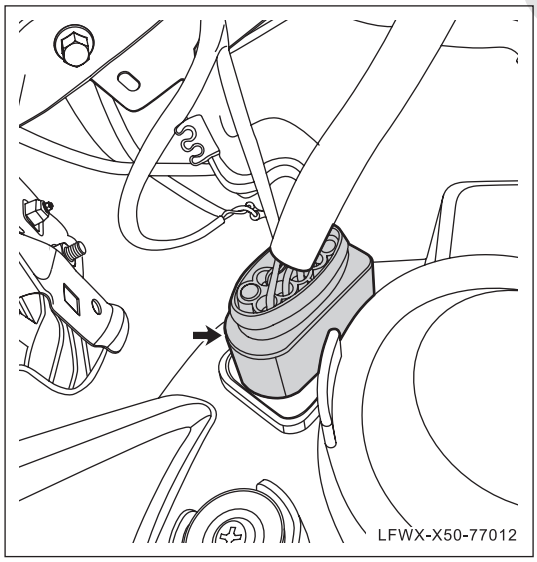
Replace the left and right headlamps in the same way.

(e) Remove the front combined light assembly, and disconnect the headlamp connector clip.

△ HINT:

Gently take out the headlamp. When the connector is fairly exposed, hold the headlamp then disconnect the connector. To avoid damage to the harness, prevent headlamp from being drawn out suddenly, resulting in pulling the harness.

(f) Take out headlamp



(g) Connect the headlamp connector clip.

(h) Install the headlamp assembly, fix the fixing bolts and screw them up. Torque: 8 - 12N•m

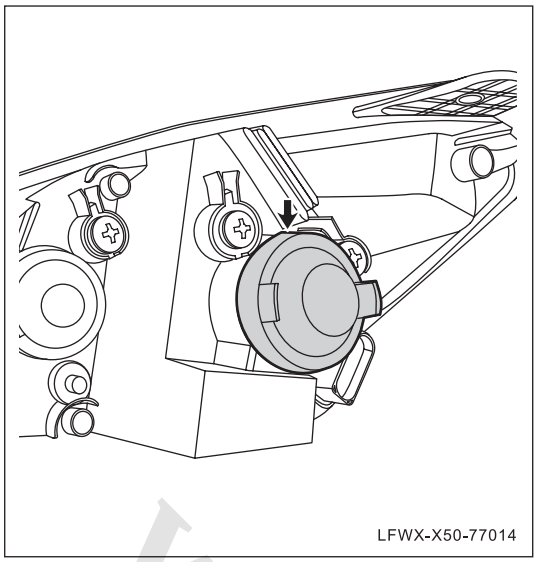
(i) Install the front bumper jack stand and the bumper assembly. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

(j) Connect the negative cable of battery.

(k) Turn on the headlamp, to check whether it operates normally.

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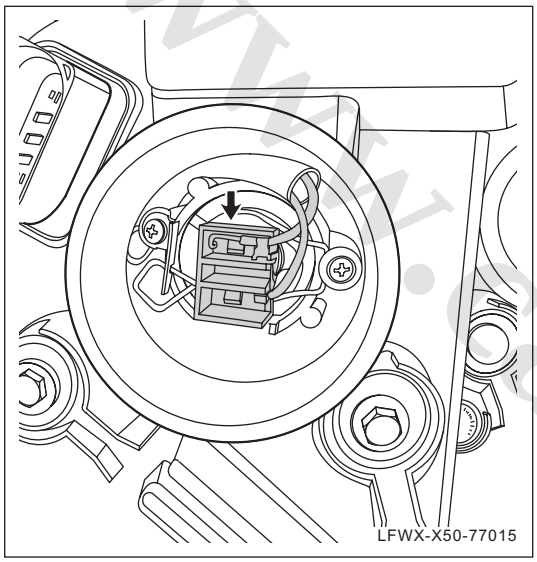


3. REPLACE BULB OF LOW-BEAM HEADLAMP

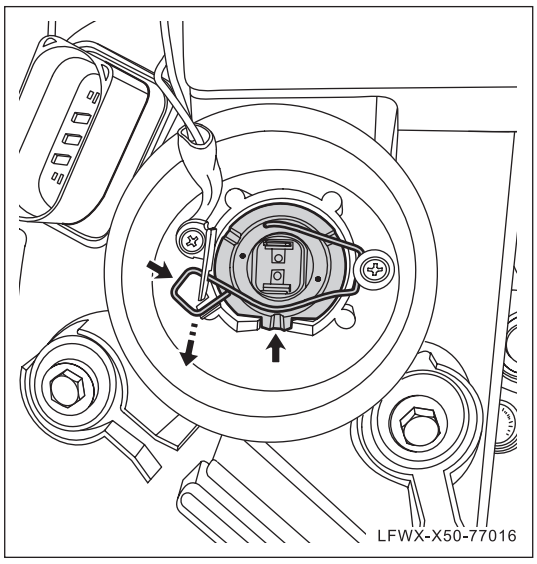
(a) Take out the low beam rubber cover.

△ HINT:

- Turn off the ignition switch and all electrical equipment switches when replacing the bulb.
- The procedures for replacing the bulb of low-beam headlight of front left headlamp are the same as those of the right one.



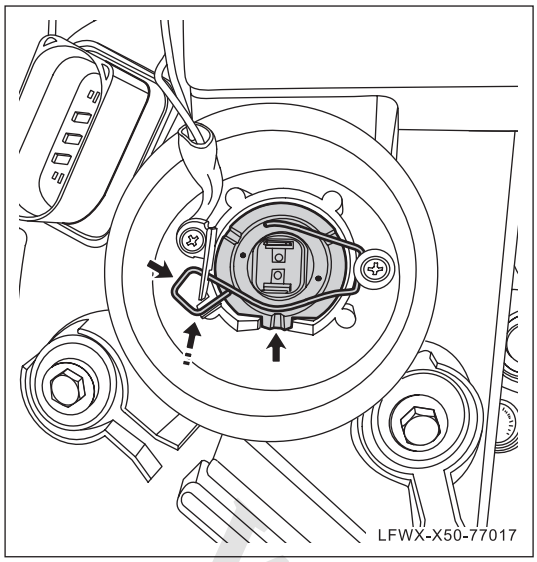
(b) Remove the low beam lamp holder.



(c) Remove the low beam bulb by pushing the locking lever outward while pressing it downwards.

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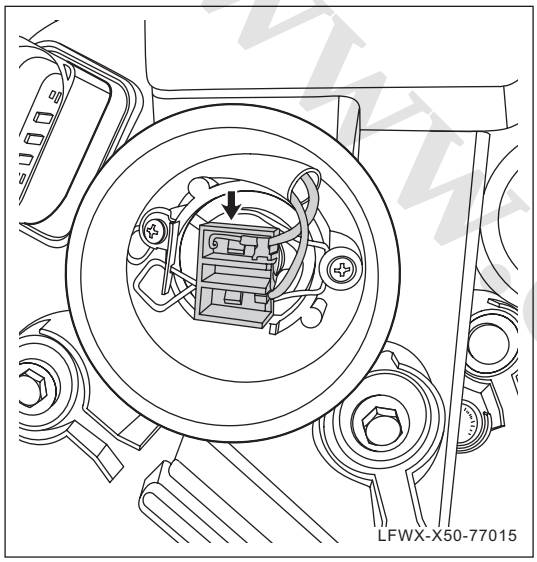
www.CarGeek.ir



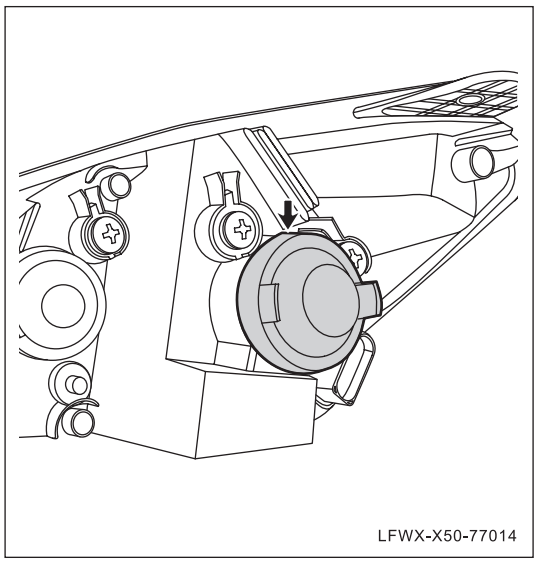
(d) Install the low beam bulb by pressing the locking lever downwards while pushing it inward.

△ HINT:

Align the bulb boss with the notch.



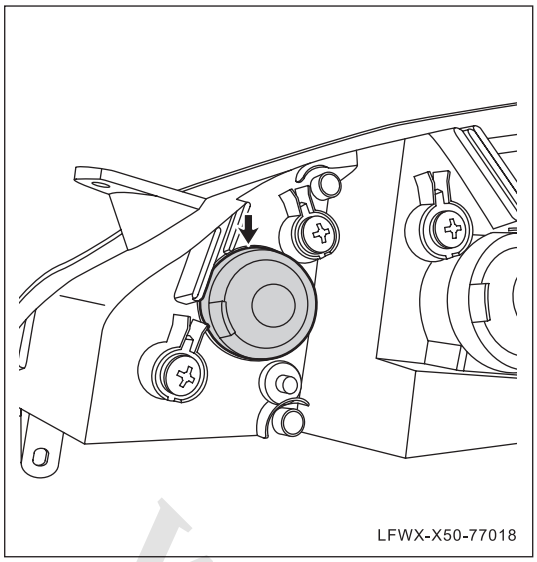
(e) Install the low beam lamp holder.



(f) Install the low beam rubber cover.

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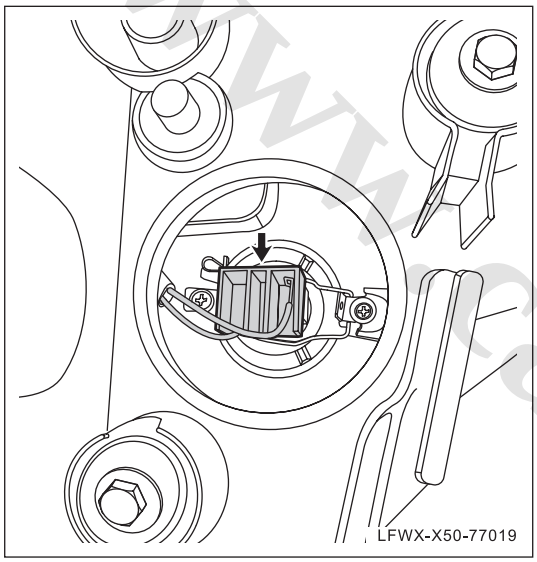


4. REPLACE BULB OF HIGH-BEAM HEADLAMP

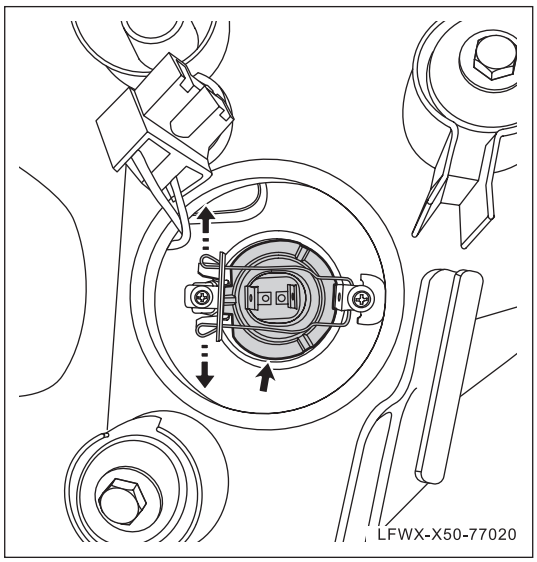
(a) Pull out the rubber shield of high-beam headlamp outward.

△ HINT:

- Turn off the ignition switch and all electrical equipment switches when replacing the bulb.
- Replacement procedure for high beam bulbs of right and left headlamps are the same.



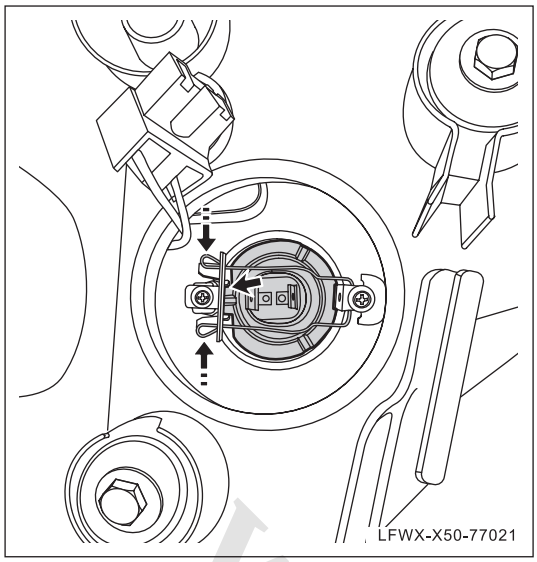
(b) Remove the high beam lamp holder.



(c) Remove the high beam bulb by pushing the locking lever outward while pressing it downwards.

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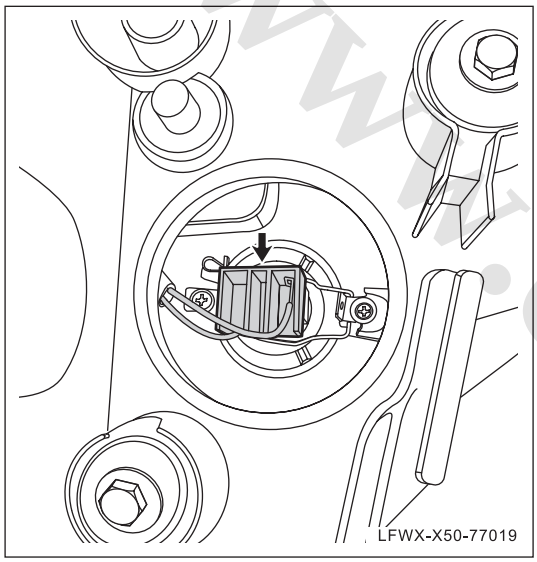
www.CarGeek.ir



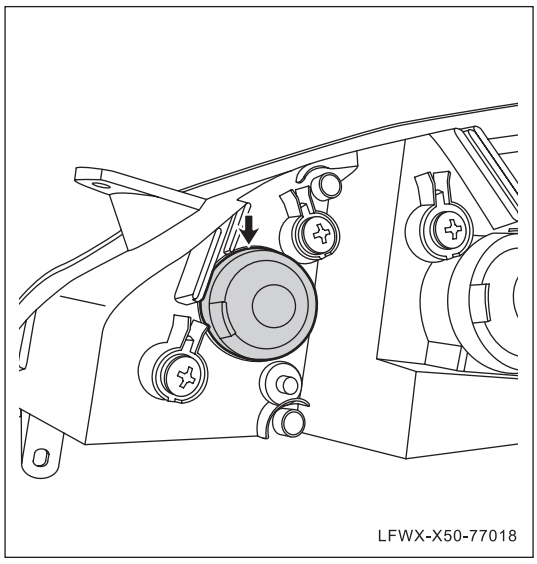
(d) Install the high beam bulb by pressing the locking lever downwards while pushing it inward.

△ HINT:

Align the bulb boss with the notch.



(e) Install the high beam lamp holder.



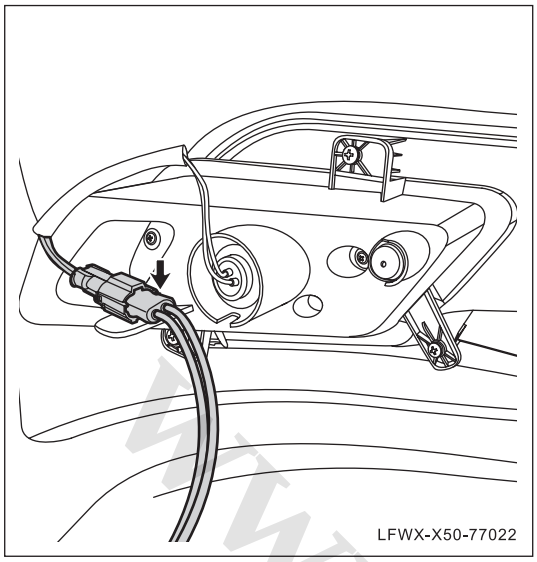
(f) Install the low beam rubber cover.

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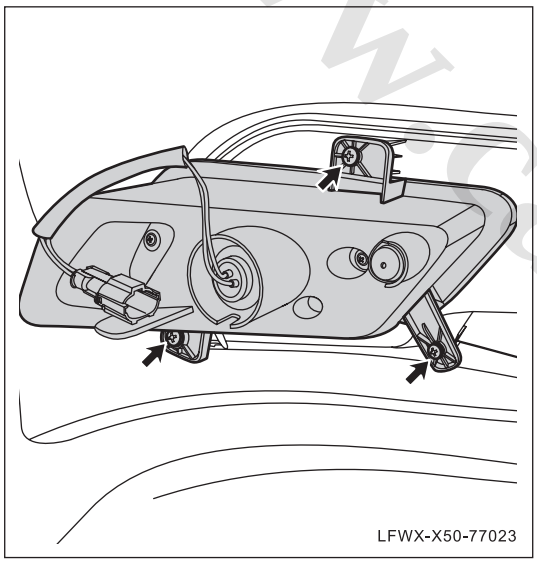
DAYTIME RUNNING LAMPS

REPLACEMENT

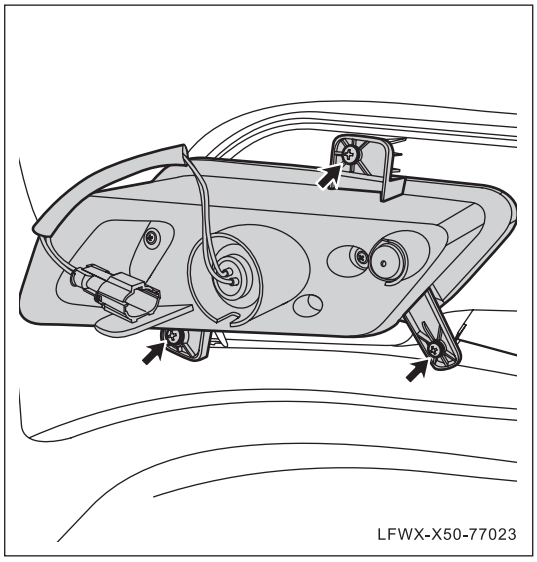


1. REMOVE DAYTIME RUNNING LAMP

(a) Remove the front bumper, and disconnect the daytime running lamp connector clip. (See 81- Interiors and Exteriors, Front Bumper, Replacement).



(b) Remove the daytime running lamp fixing screws, and remove the daytime running lamp assembly.



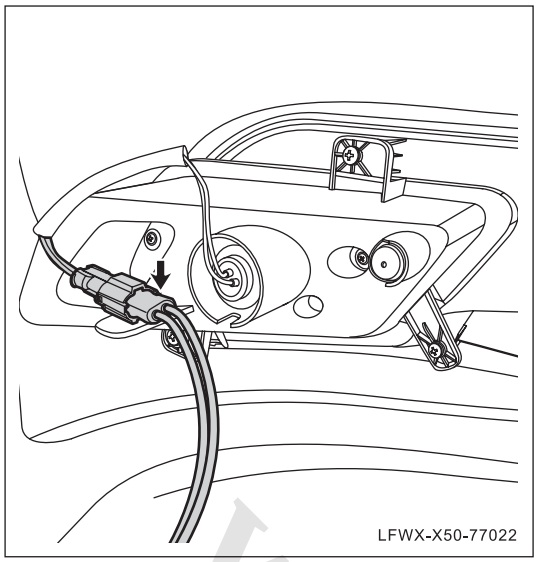
2. INSTALL DAYTIME RUNNING LAMP

(a) Install the daytime running lamp assembly, fix the fixing screws and screw them up.

Torque: 5 - 6N•m

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(b) Connect the daytime running lamp connector clip, and install the front bumper. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

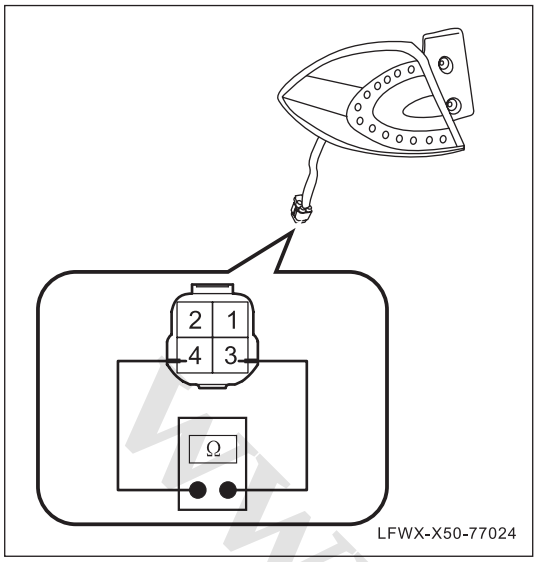
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TAIL LAMP

INSPECTION

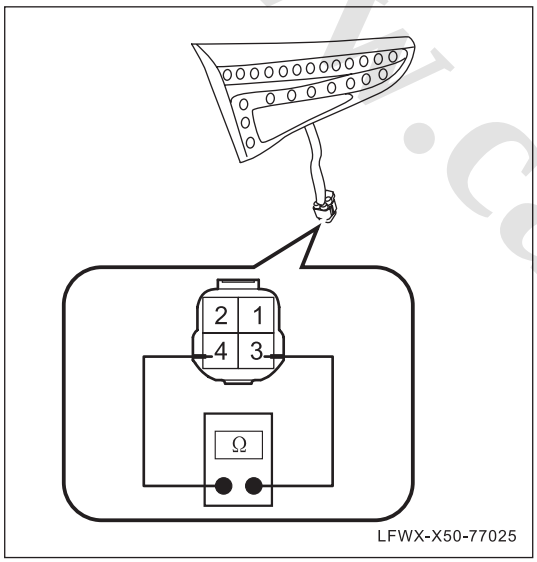


LFWX-X50-77024

1. CHECK REAR TURN SIGNAL LAMP

(a) Check the resistance of the No. 3 and Terminal 4s of the left and right tail lamp III with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the rear turn signal lamp bulb.



LFWX-X50-77025

2. CHECK REVERSE LAMP

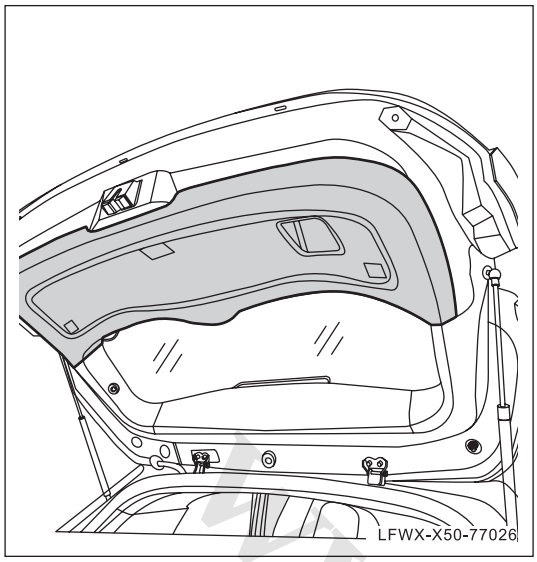
(a) Check the resistance of the No. 2 and No. 6 terminals of the left and right tail lamp I with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the reverse lamp bulb.

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REPLACEMENT



1. REPLACE TAIL LAMP I

(a) Turn off the ignition switch and all electrical equipment.

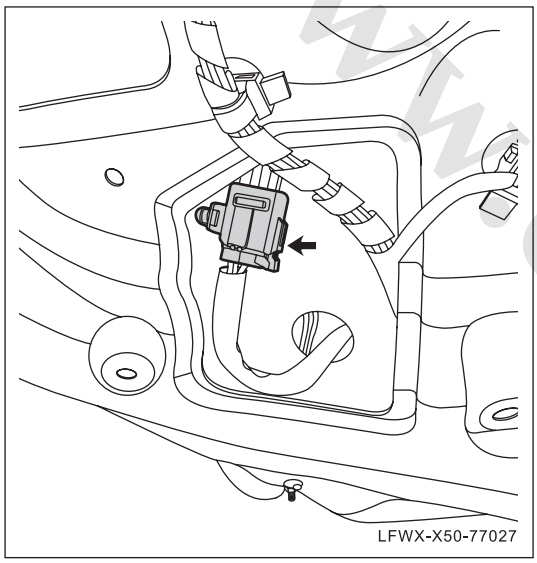
(b) Disconnect negative cable of battery.

(c) Open the tail door.

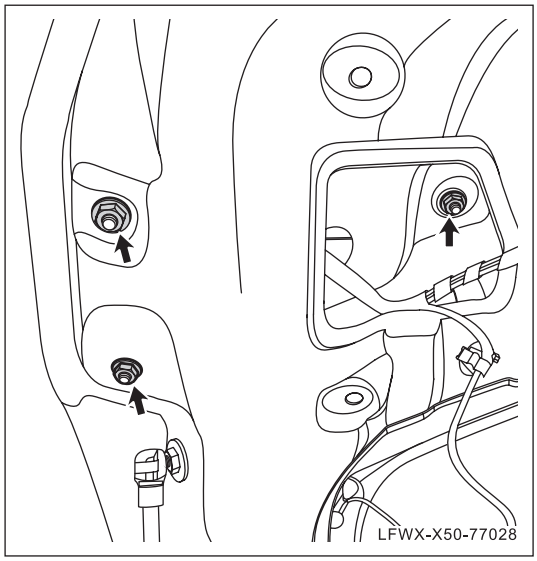
(d) Remove tail door panel. (See 81 - Interiors and Exteriors, Tail Door Interior Trim Panel, Replacement)

△ HINT:

The left and right tail lamps are replaced in the same manner.



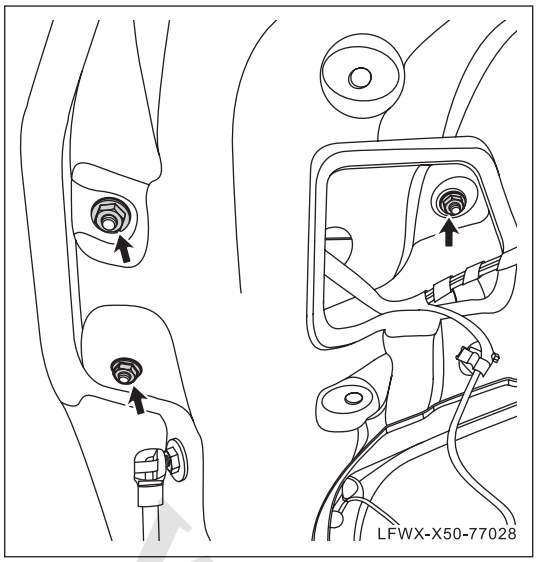
(e) Disconnect the connector from the tail lamp I.



(f) Remove the fixing nut of tail lamp, and take out the rear combination tail lamp I.

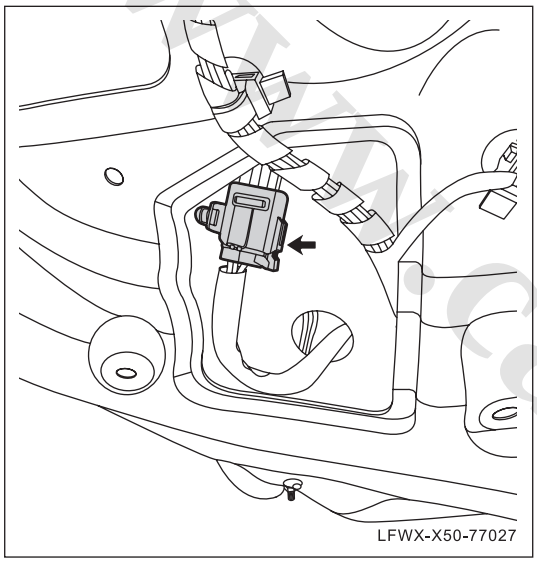
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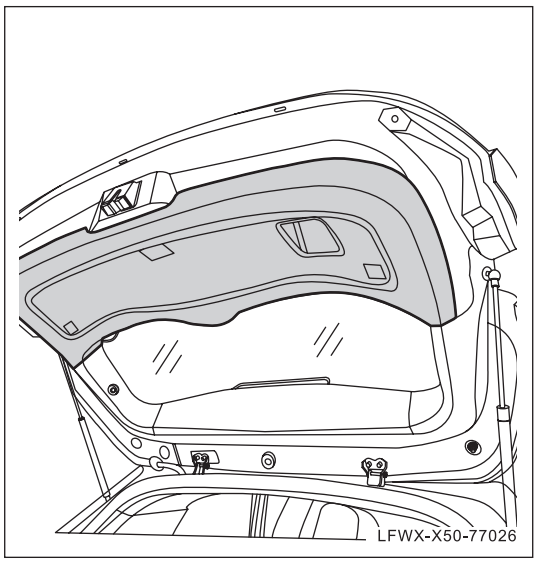


(g) Install the tail lamp l, and install & tighten the fixing nuts.

Torque: 8 - 12N•m



(h) Connect the connector to the tail lamp l.



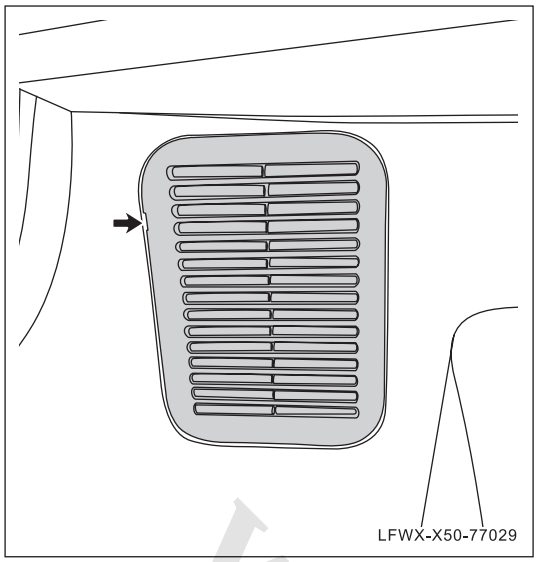
(i) Install the tail door panel. (See 81 - Interiors and Exteriors, Tail Door Interior Trim Panel, Replacement)

(j) Close the tail door.

(k) Connect the negative cable of battery.

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2. REPLACE TAIL LAMP II

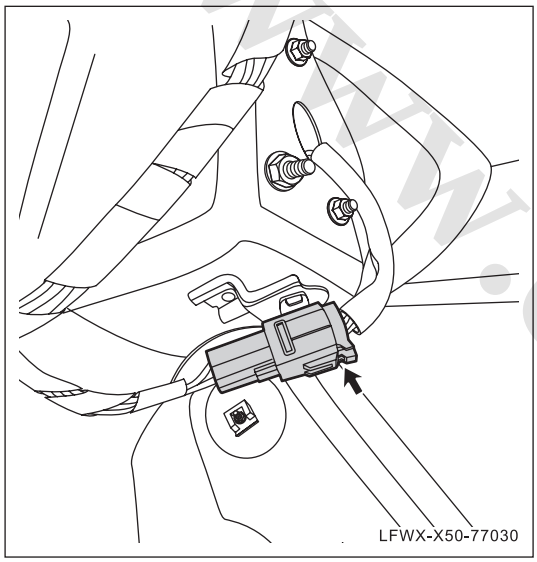
(a) Disconnect negative cable of battery.

(b) Open the tail door.

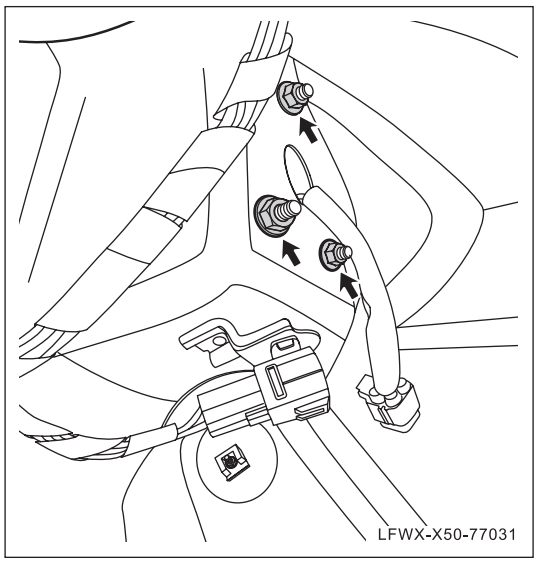
(c) Pry the taillight maintenance cover.

△ HINT:

The left and right tail lamps are replaced in the same manner.



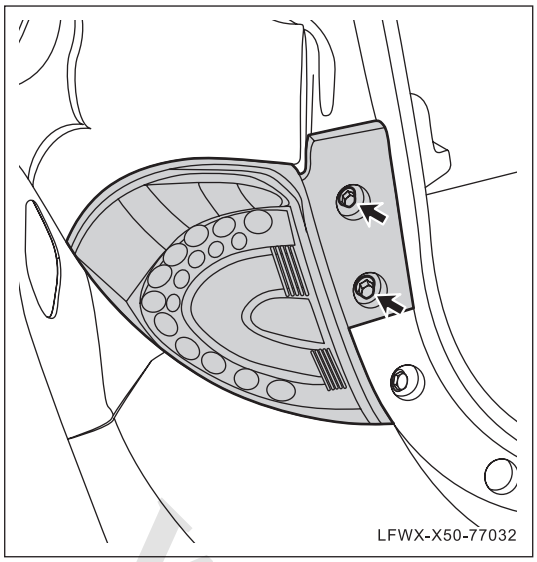
(d) Disconnect the connector from the tail lamp II.



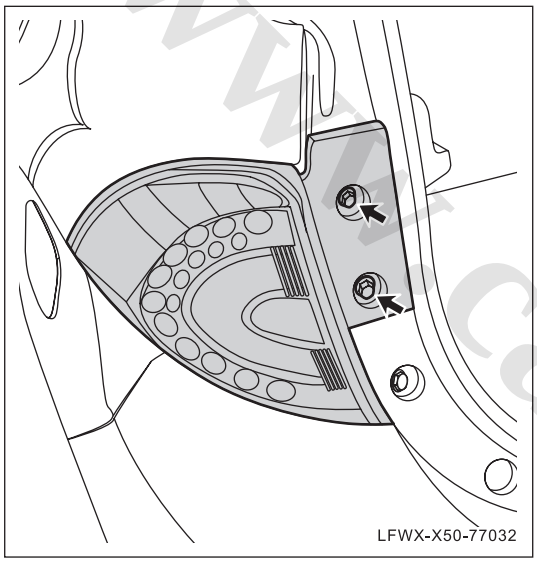
(e) Remove fixing nuts of tail lamp II.

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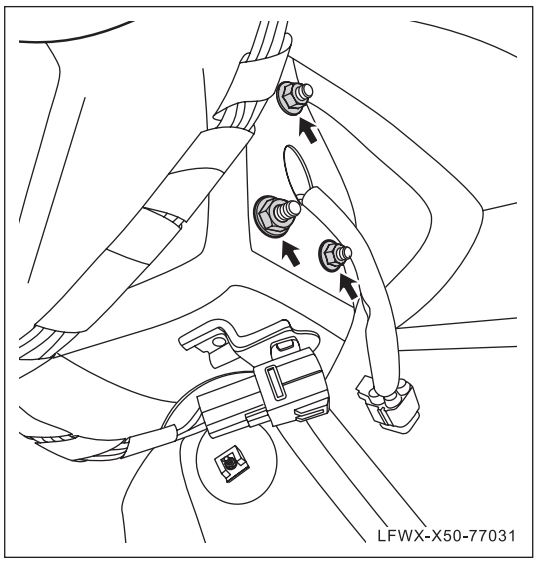


(f) Remove the fixing bolts of the tail lamp II, and remove the tail lamp II.



(g) Install the tail lamp II, then install the lateral fixing bolts and screw them up.

Torque: 8 - 12N•m

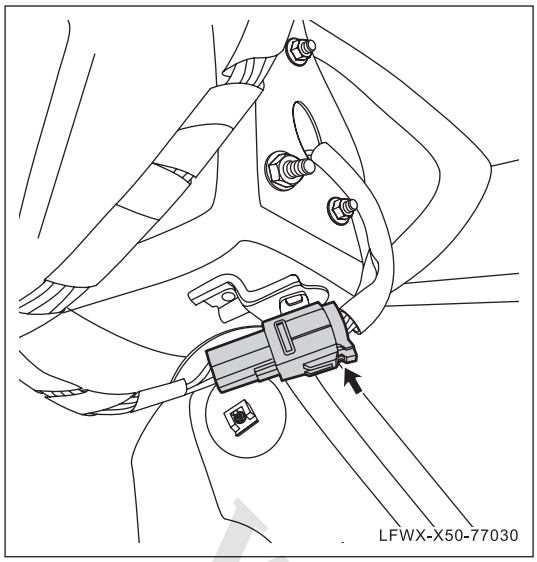


(h) Install fixing nuts and tighten them.

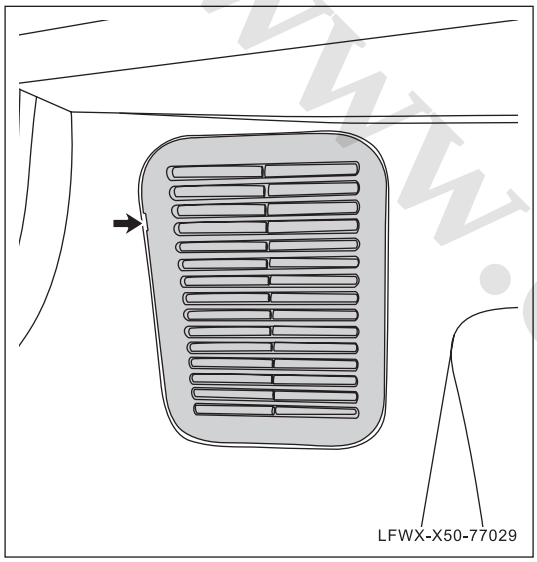
Torque: 8 - 12N•m

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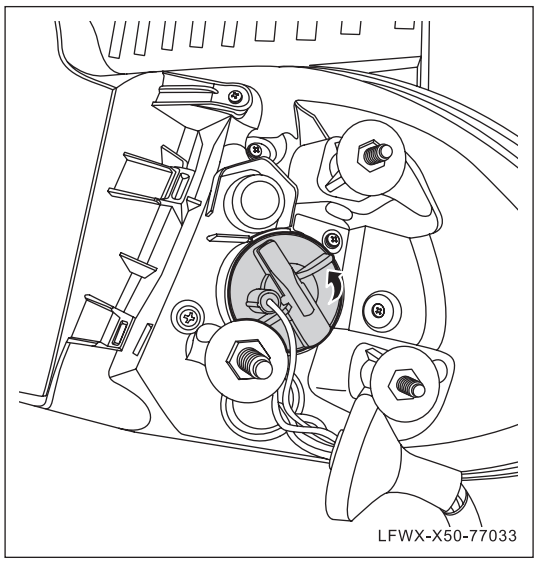
(i) Connect tail lamp II connector.



(j) Install the taillight maintenance cover.

(k) Close the tail door.

(l) Connect the negative cable of battery.



3. REPLACE REAR TURN SIGNAL LAMP BULB

(a) Remove the tail lamp II assembly.

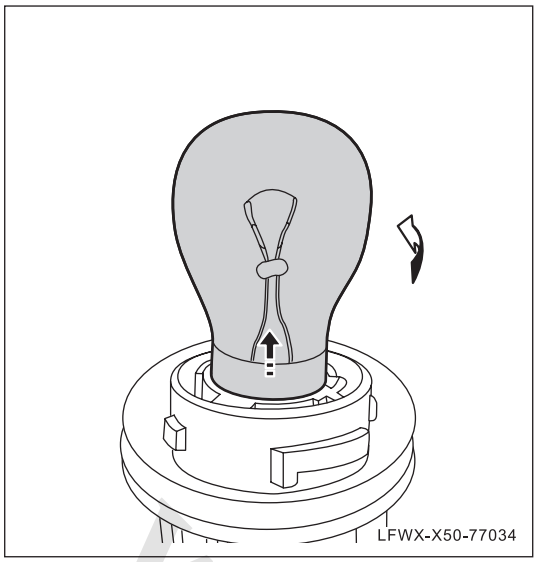
(b) Press down the turn signal lamp hold and simultaneously rotate the holder counterclockwise and take out the turn signal lamp.

△ HINT:

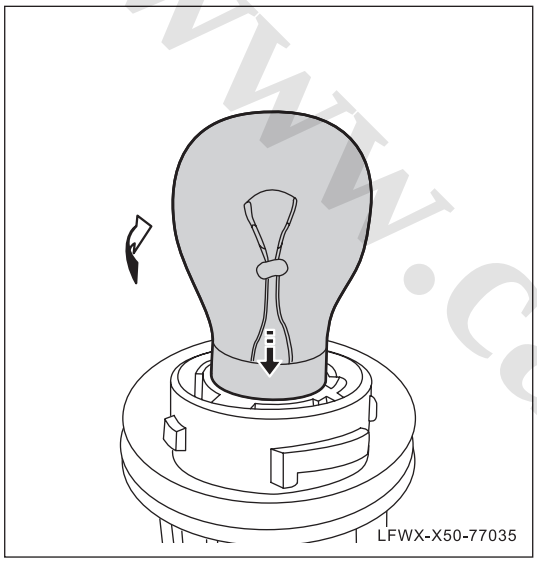
The left and right rear turn signal lamp bulbs are replaced in the same manner.

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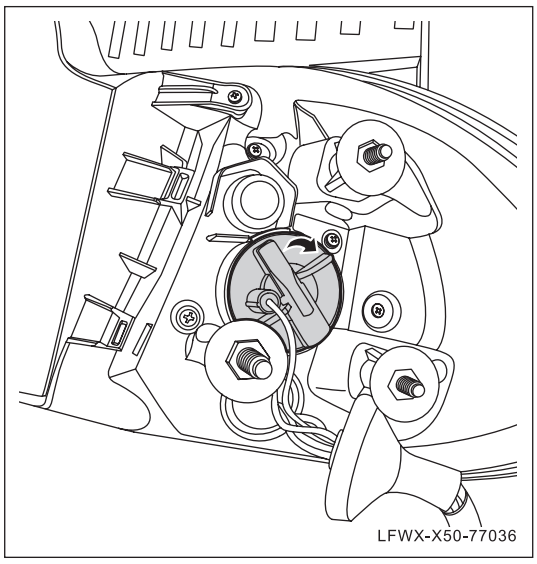
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(c) Rotate and then remove the turn signal lamp bulb.



(d) Rotate the bulb of rear turn signal lamp, and install it.

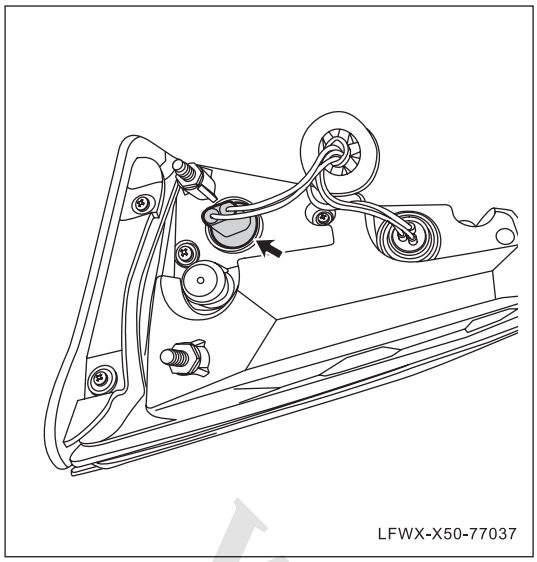


(e) Align to the mounting-hole slot, press the turn signal lamp socket downwards while rotating the socket clockwise, and then, install the turn signal lamp.

(f) Install the tail lamp II assembly.

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6. REPLACE REVERSE LAMP BULB

(a) Remove the tail lamp I assembly.

(b) Replace the bulb of reverse lamp.

△ HINT:

The procedures for replacing reverse lamp bulb are the same as those for replacing rear turn signal lamp bulb.

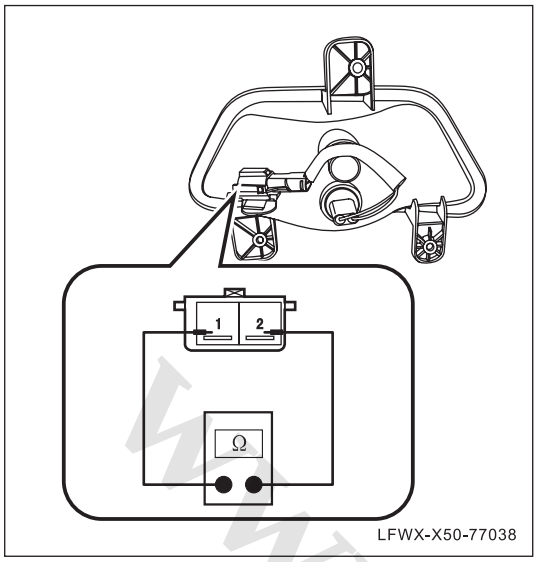
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REAR FOG LAMP

INSPECTION

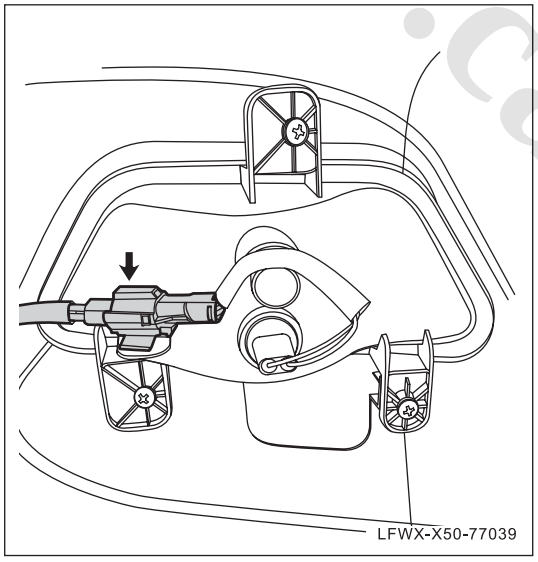


1. CHECK REAR FOG LAMP

(a) Check the resistance of the No. 1 and Terminal 2s of the left and right rear fog lamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace front fog lamp bulb.

REPLACEMENT



1. REPLACE REAR FOG LAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

(b) Disconnect negative cable of battery.

(c) Remove the rear bumper. (See 81 - Interiors and Exteriors, Rear Bumper, Replacement).

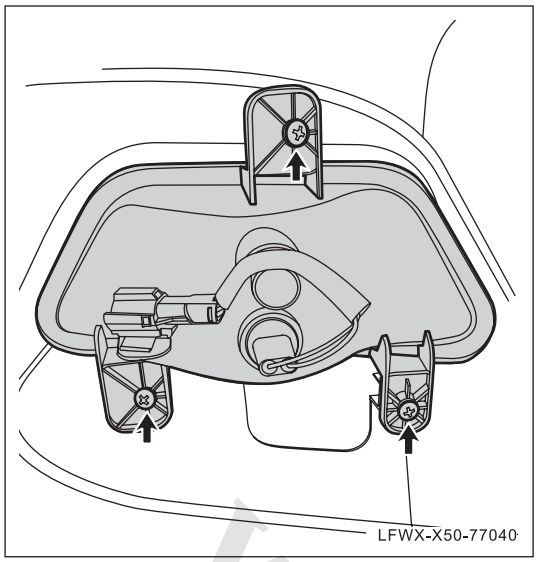
(d) Disconnect the rear fog lamp connector clip.

△ HINT:

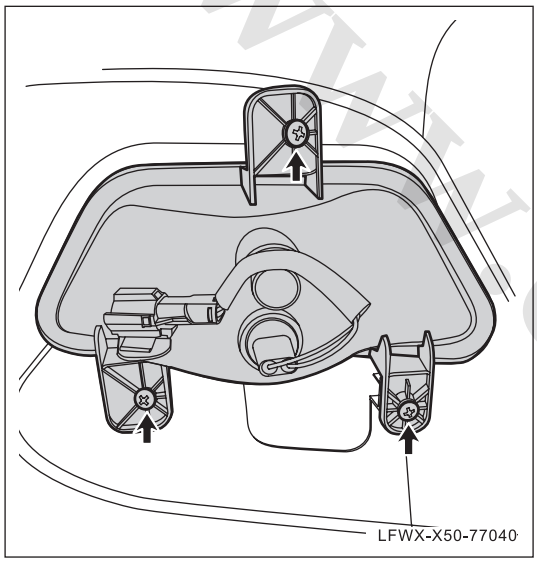
Replace procedures for left/right rear fog lamp assembly are the same.

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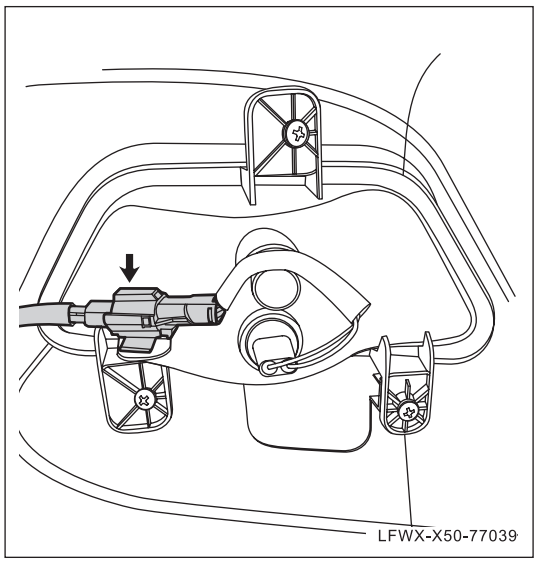


(e) Remove the rear fog lamp fixing screws, and remove the rear fog lamp assembly.



(f) Install the rear fog lamp assembly on the rear bumper, and install fixing screws and screw them up.

Torque: 5 - 6N•m



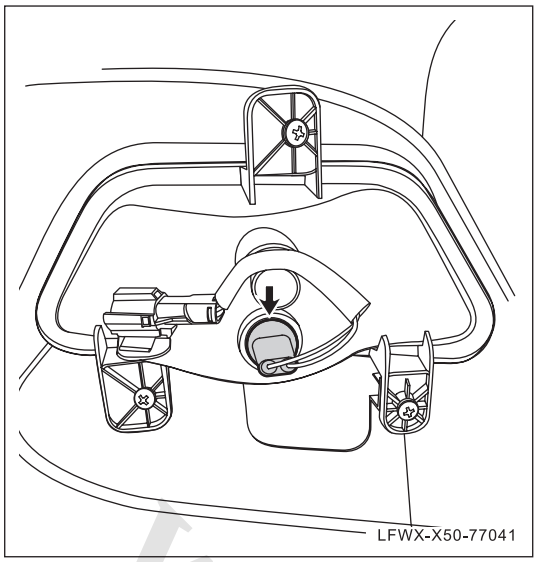
(g) Connect the rear fog lamp connector clip.

(h) Install rear bumper (See 81 - Interiors and Exteriors, Rear Bumper, Replacement).

(i) Connect the negative cable of battery.

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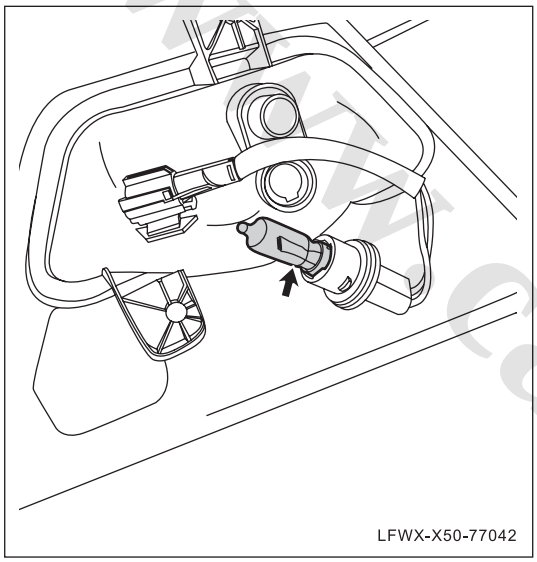
2. REPLACE REAR FOG LAMP BULB

(a) Remove the rear bumper. (See 81 - Interiors and Exteriors, Rear Bumper, Replacement).

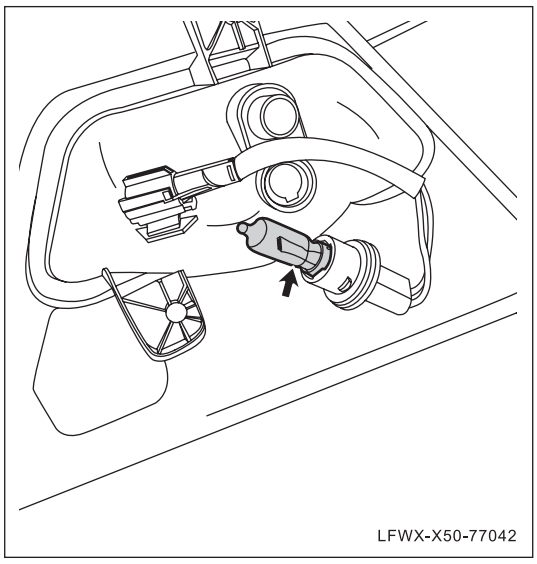
△ HINT:

The procedures for replacing front left & right fog lamp bulb are the same as those for replacing the right one.

(b) Press rear fog lamp lamp holder downwards, while rotate the lamp holder counter-clockwise, and remove the rear fog lamp.



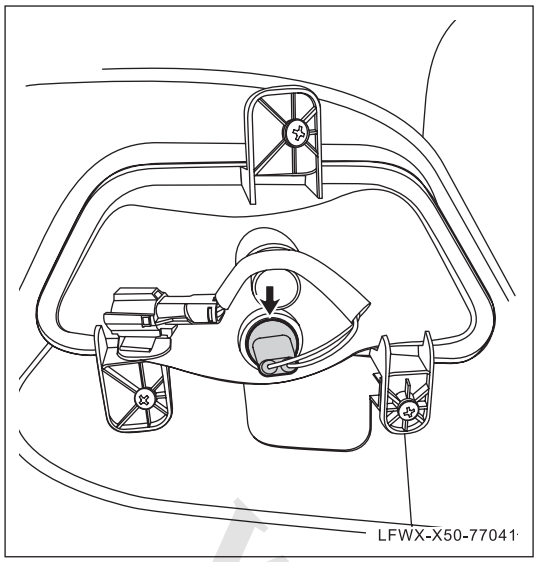
(c) Rotate and then remove the rear fog lamp bulb.



(d) Install the rear fog lamp bulb, rotate the bulb and make it locked.

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(e) Align the installation hole groove, install the rear fog lamp bulb and rotate it to be locked.

(f) Install the rear fog lamp assembly.

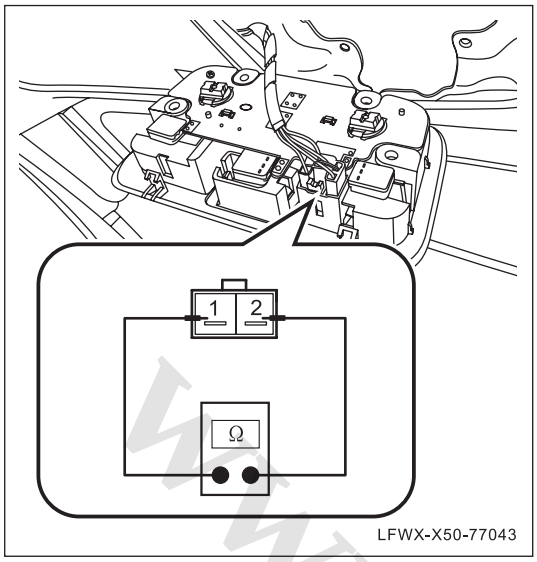
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FRONT CEILING LAMP

INSPECTION



1. CHECK FRONT CEILING LAMP

(a) Turn the front ceiling lamp switch in "ON" position, check the resistance of the No. 1 and Terminal 2s of the front ceiling lamps, and they should be conducted.

If the result does not meet the requirement, replace the front ceiling lamp or bulb.

REPLACEMENT



1. REPLACE FRONT CEILING LAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

(b) Disconnect negative cable of battery.

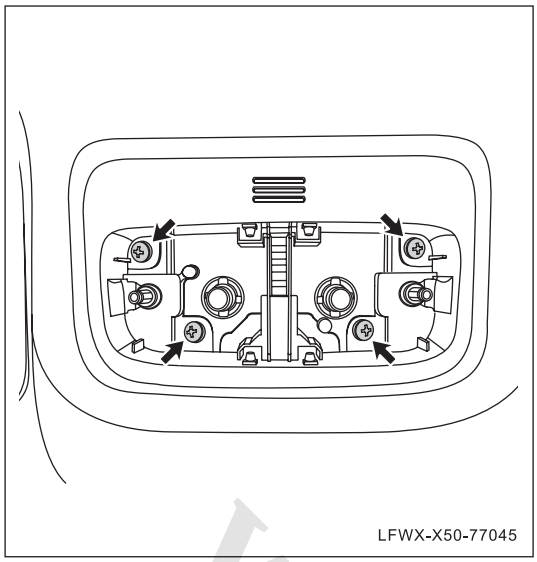
(c) Pry the front ceiling lamp lampshade with a flat-blade screwdriver.

NOTICE:

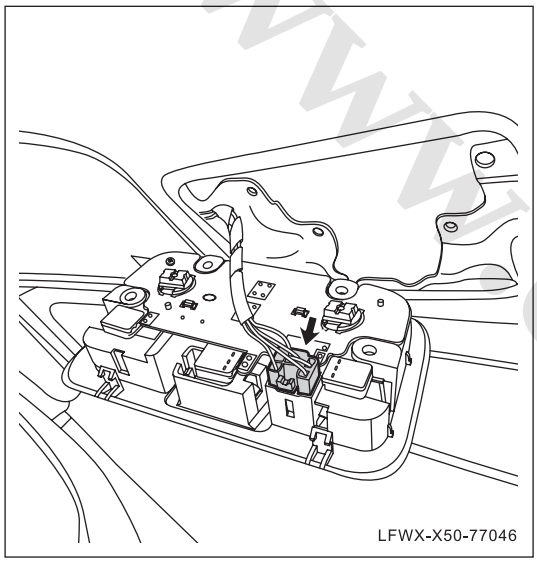
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent scratching the trim pieces.

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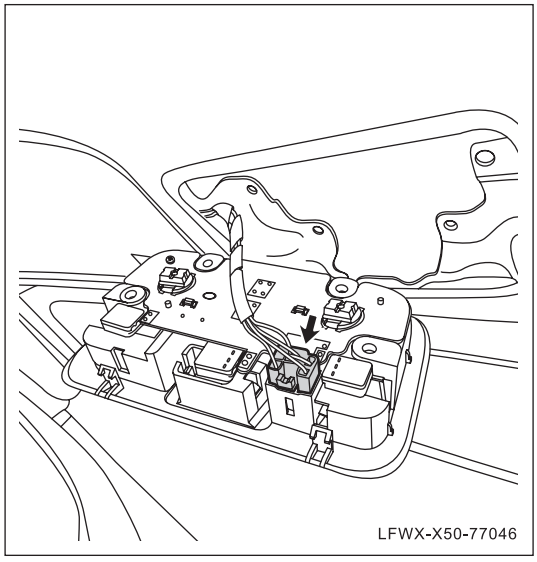
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(d) Remove the fixing screw of front ceiling lamp.



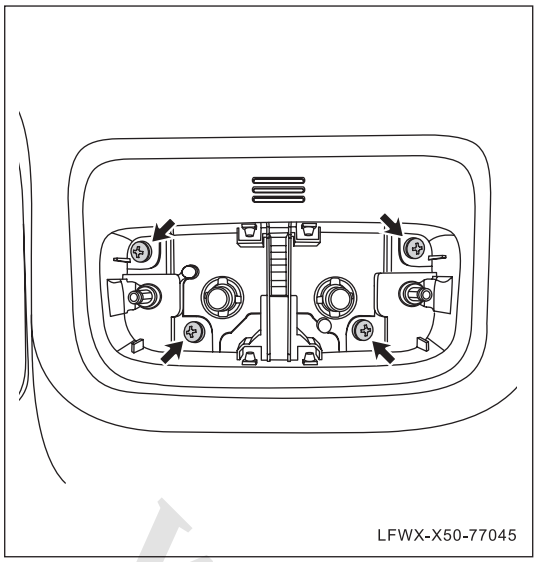
(e) Disconnect the front ceiling lamp connector clip, and remove the front ceiling lamp assembly.



(f) Connect the front ceiling lamp connector.

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(g) Install the front ceiling lamp assembly, and fix the fixing screws and screw them up.

Torque: 5 - 6N•m



(h) Install front ceiling lamp cover.

(i) Connect the negative cable of battery.



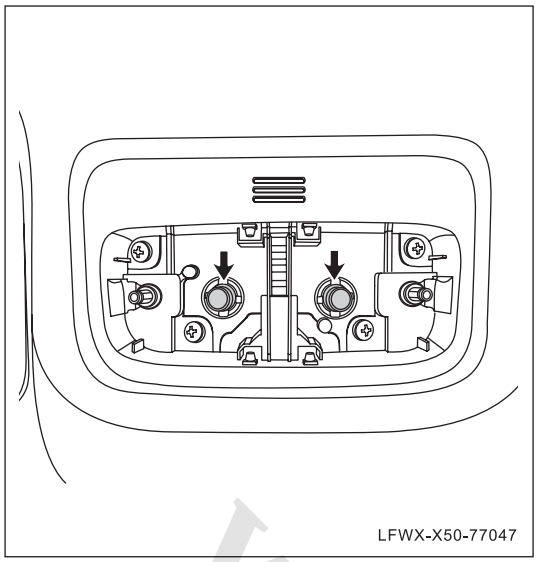
2. REPLACE FRONT CEILING LAMP BULB

(a) Turn off the ignition switch.

(b) Pry off the front ceiling lamp cover.

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(c) Remove the front ceiling lamp bulb.

(d) Install the front ceiling lamp bulb.



(e) Install front ceiling lamp cover.

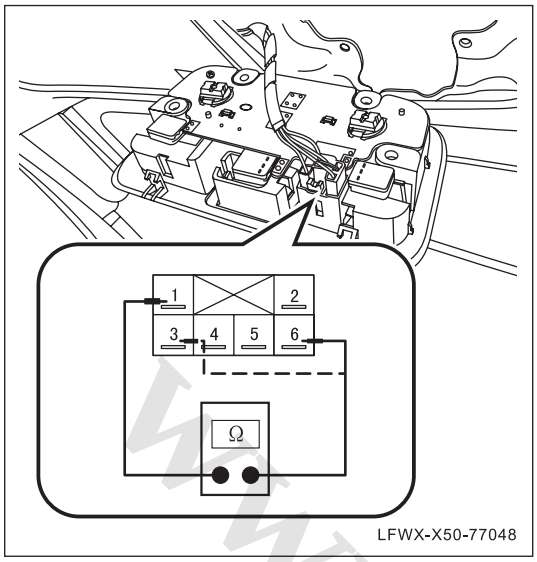
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FRONT CEILING LAMP (WITH SUNROOF VERSION)

INSPECTION

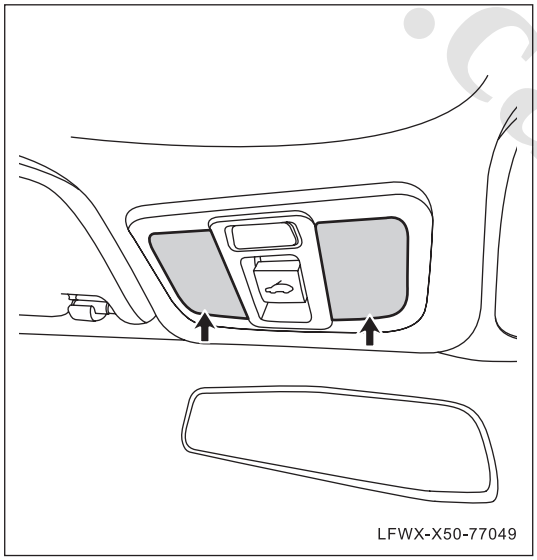


1. CHECK FRONT CEILING LAMP

(a) Turn the front ceiling lamp switch in "ON" position, check the resistance of the No. 1 and No. 3 & No. 6 terminals of the front ceiling lamps, and they should be conducted.

If the result does not meet the requirement, replace the front ceiling lamp or bulb.

REPLACEMENT



1. REPLACE FRONT CEILING LAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

(b) Disconnect negative cable of battery.

(c) Pry the front ceiling lamp lampshade with a flat-blade screwdriver.

NOTICE:

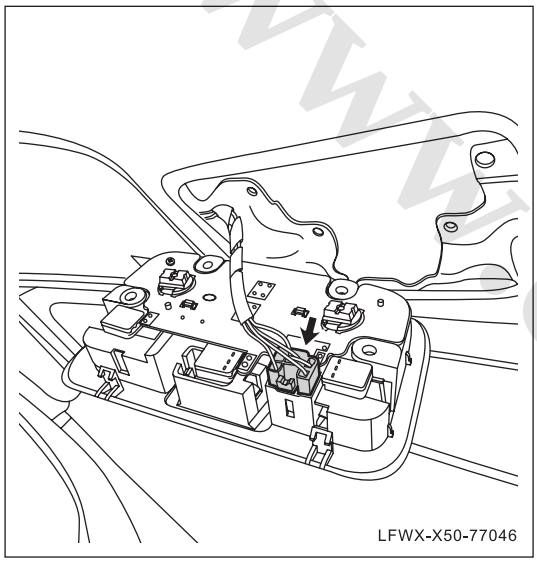
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent scratching the trim pieces.

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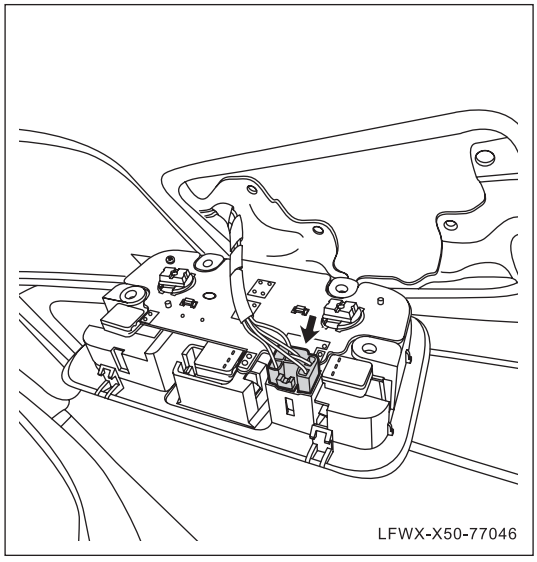
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(d) Remove the fixing screw of front ceiling lamp.



(e) Disconnect the front ceiling lamp connector clip, and remove the front ceiling lamp assembly.



(f) Connect the front ceiling lamp connector clip.

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(g) Install the front ceiling lamp assembly, fix the fixing screws and screw them up.

Torque: 5 - 6N•m



(h) Install front ceiling lamp cover.

(i) Connect the negative cable of battery.

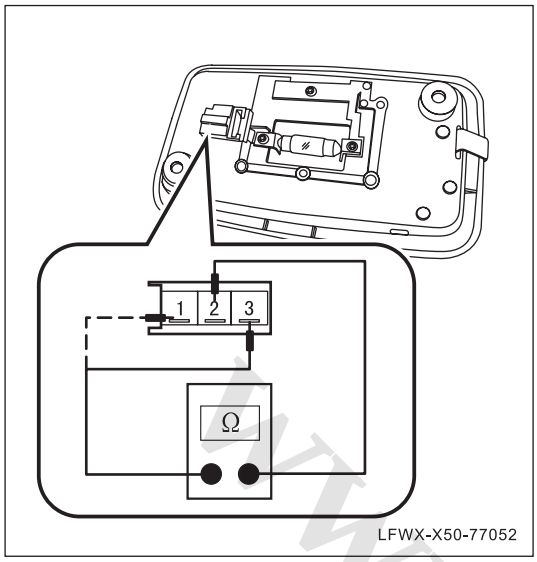
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REAR CEILING LAMP

INSPECTION



1. INSPECT REAR CEILING LAMP

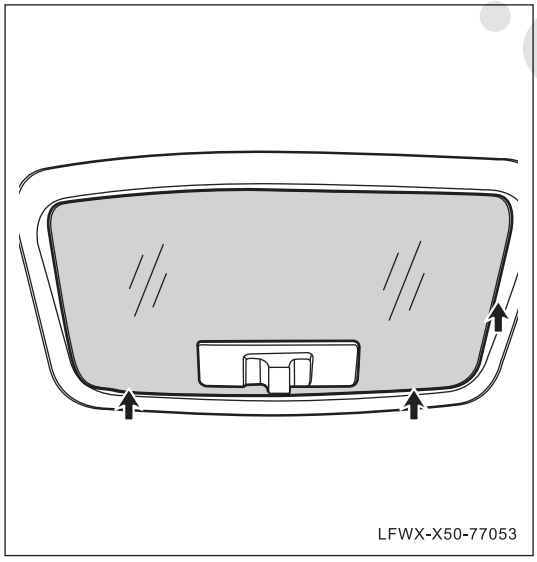
(a) Turn the rear ceiling lamp switch in "DOOR" position, check the resistance of the Terminal 2 and Terminal 1 of the rear ceiling lamps, and they should be conducted.

(b) Turn the rear ceiling lamp switch in "OFF" position, check the resistance of the No. 2, No. 1 and Terminal 3s of the rear ceiling lamps, and they should not be conducted.

(c) Turn the rear ceiling lamp switch in "ON" position, check the resistance of the No. 2 and Terminal 3s of the rear ceiling lamps, and they should be conducted.

If the result does not meet the requirement, replace the rear ceiling lamp or bulb.

REPLACEMENT



1. REPLACE REAR CEILING LAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

(b) Disconnect negative cable of battery.

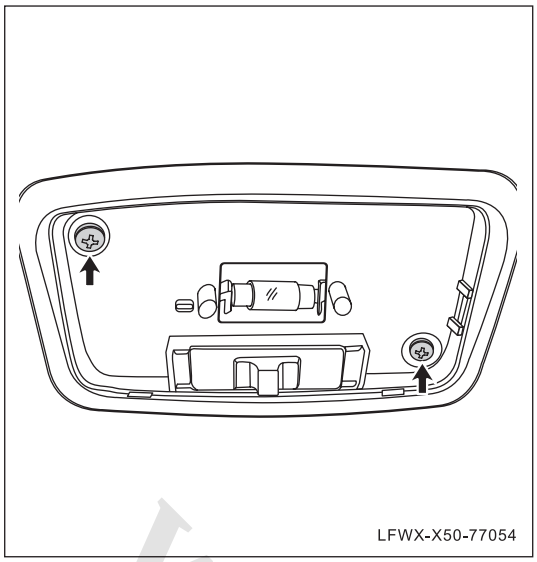
(c) Pry up rear ceiling lamp cover with a flat-blade screwdriver.

NOTICE:

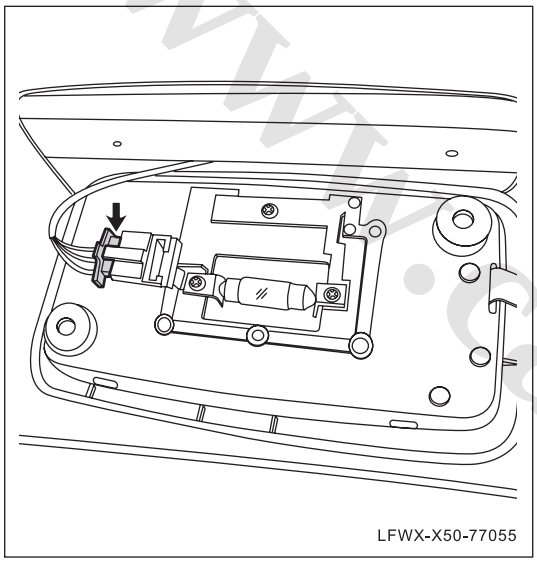
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent scratching the trim pieces.

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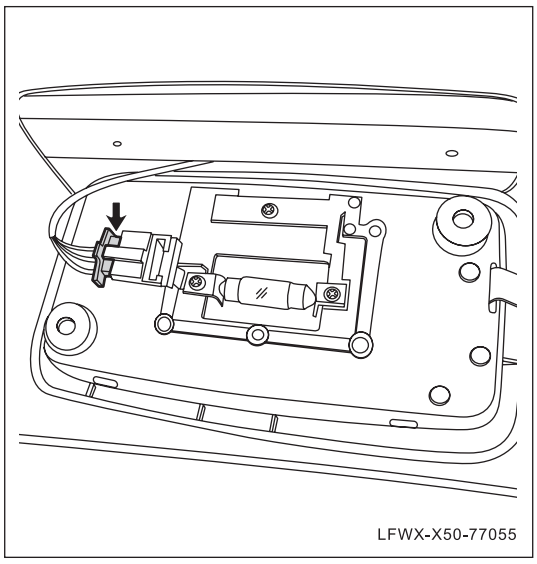
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(d) Remove the fixing screws of rear ceiling lamp.



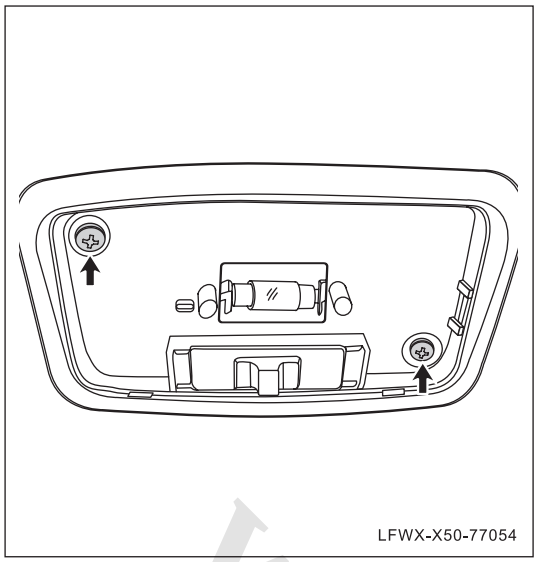
(e) Disconnect the rear ceiling lamp connector clip, and remove the rear ceiling lamp.



(f) Connect rear ceiling lamp connector.

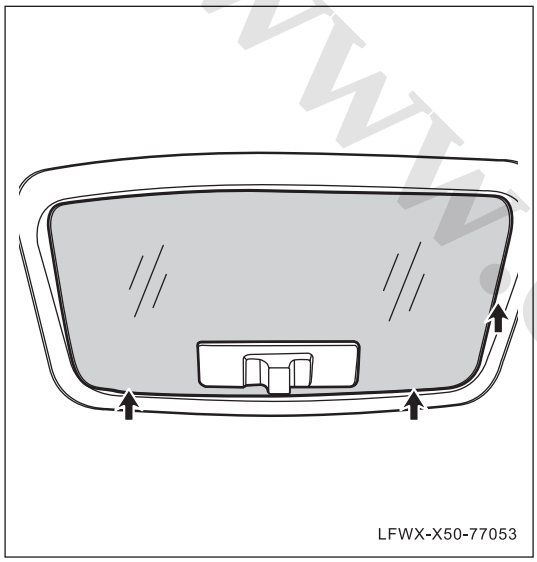
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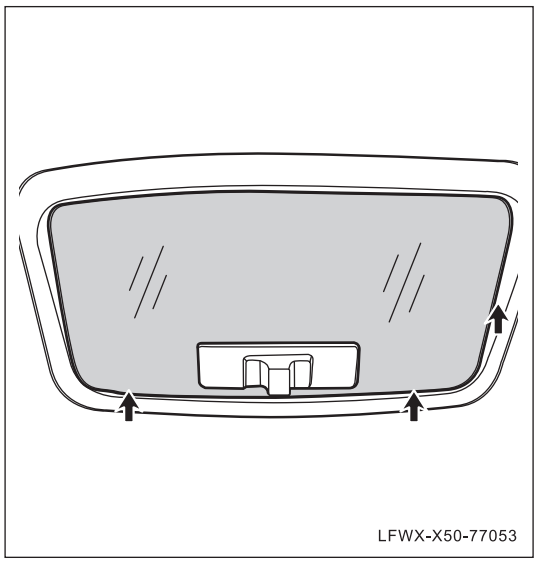
(g) Install the rear ceiling lamp assembly; install & tighten the fixing screw.

Torque: 5 - 6N•m



(h) Install rear ceiling lamp cover.

(i) Connect the negative cable of battery.



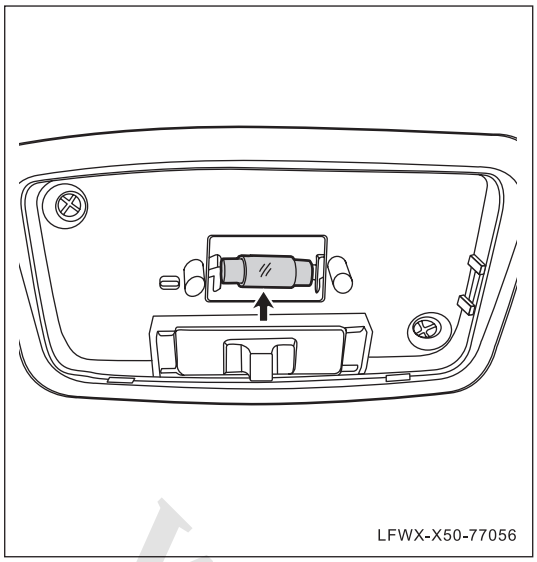
2. REPLACE REAR CEILING LAMP BULB

(a) Turn off the ignition switch.

(b) Pry the rear ceiling lamp lampshade.

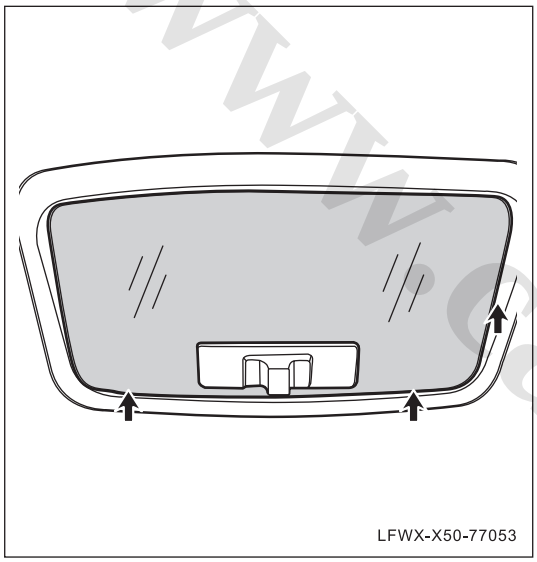
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(c) Remove rear ceiling lamp bulb.

(d) Install rear ceiling lamp bulb.



(e) Install rear ceiling lamp cover.

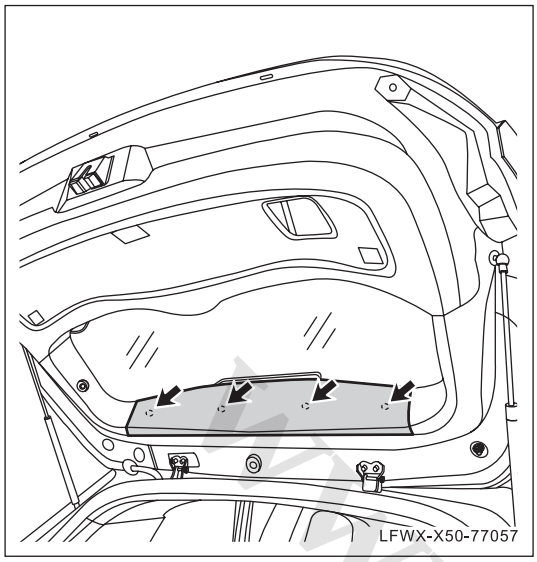
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HIGH-MOUNTED BRAKE LAMP

REPLACEMENT

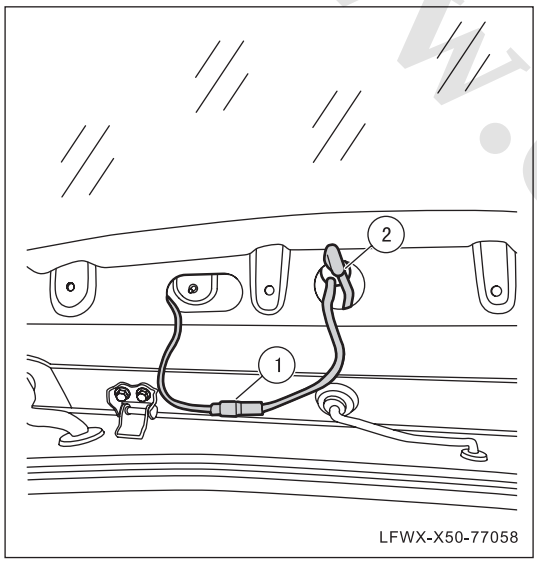


1. REMOVE HIGH-MOUNTED BRAKE LAMP ASSEMBLY

(a) Turn off the ignition switch and all electrical equipment.

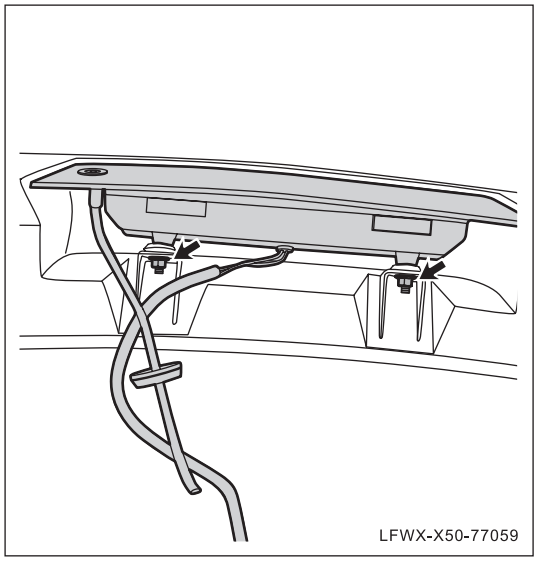
(b) Disconnect negative cable of battery.

(c) Remove the upper side trim panel of the tail door. (See 81 - Interiors and Exteriors, Tail Door Interior Trim Panel, Replacement)



(d) Disconnect the high-mounted brake lamp connector clip ① .

(e) Disconnect rear wiper spray pipe ② .

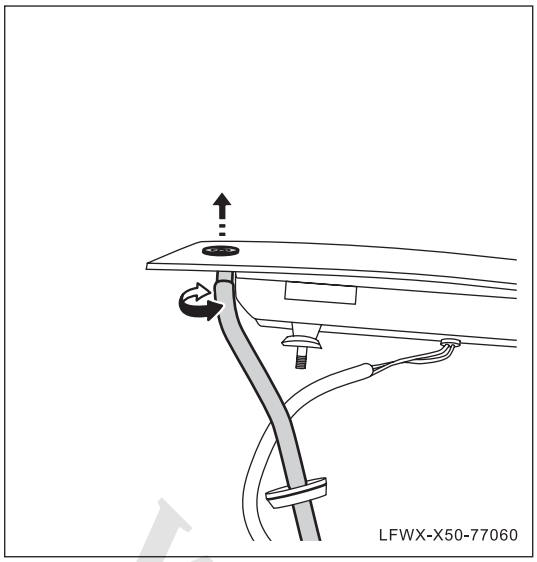


(f) Remove the deflector. (See 81-Interiors and Exteriors, Deflector, Replacement)

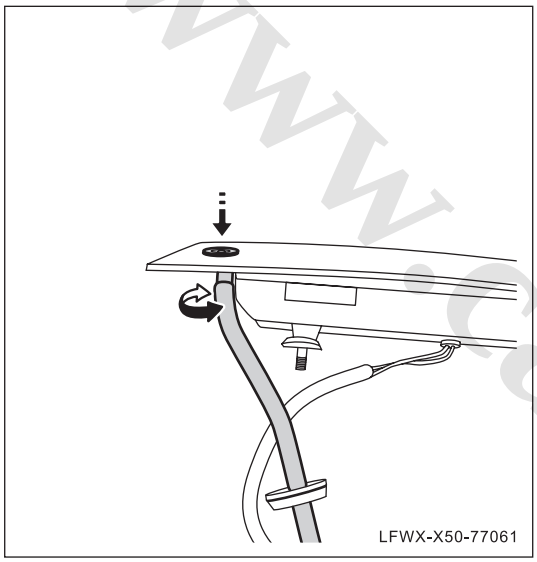
(g) Remove the high-mounted brake lamp fixing nut, and remove the high-mounted brake lamp.

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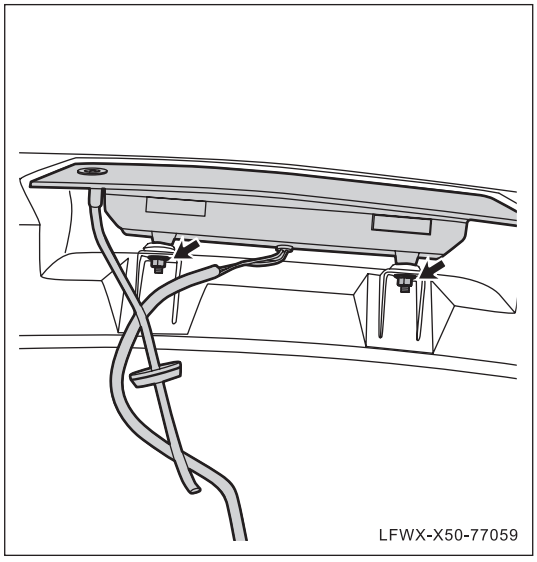


(h) Rotate the washing nozzle, and remove the washing nozzle and the pipe.



2. INSTALL HIGH-MOUNTED BRAKE LAMP ASSEMBLY

(a) Install washing nozzle.



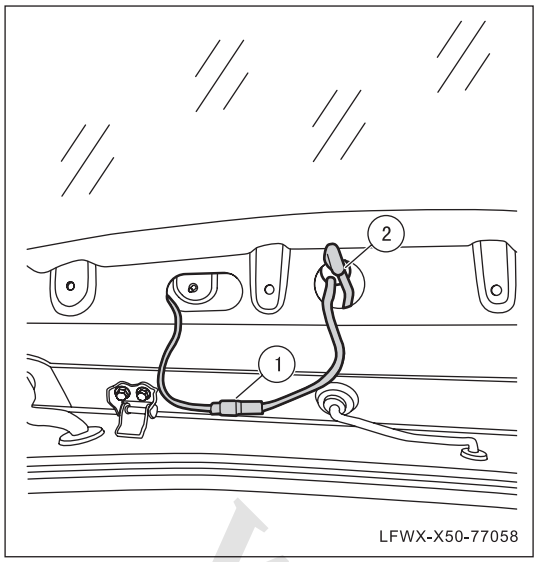
(b) Install the high-mounted brake lamp, fix the fixing nuts and screw them up.

Torque: 8 - 12N•m

(c) Install and remove the deflector. (See 81-Interiors and Exteriors, Deflector, Replacement)

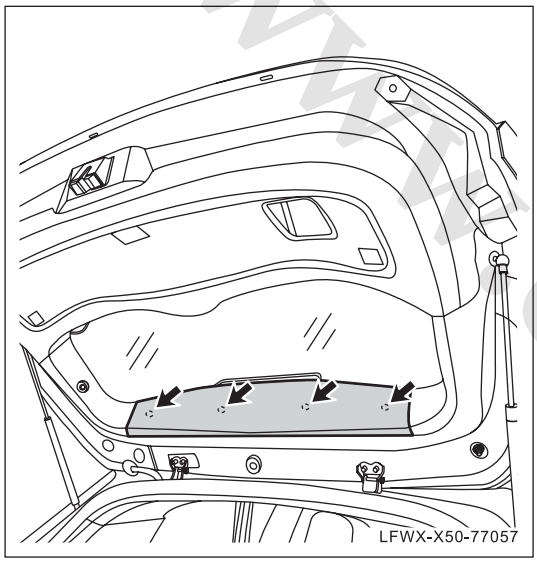
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(d) Connect the high-mounted brake lamp connector ① .

(e) Connect the rear wiper spray pipe ② .



(f) Install the upper side trim panel of the tail door. (See 81 - Interiors and Exteriors, Tail Door Interior Trim Panel, Replacement)

(g) Connect the negative cable of battery.

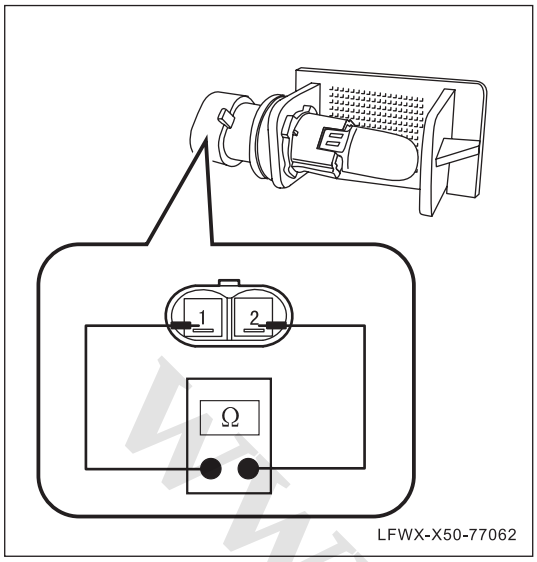
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TRUNK LAMP

INSPECTION

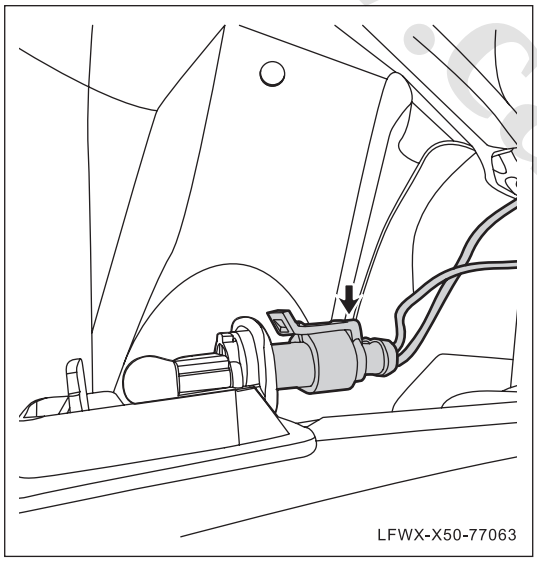


1. TEST TRUNK LAMP

(a) Check the resistance of the No. 1 and Terminal 2s of the trunk lamps with a digital multimeter, and they should be conducted.

If the result does not meet the requirement, replace the trunk lamp or bulb.

REPLACEMENT



1. REMOVE TRUNK LAMP ASSEMBLY

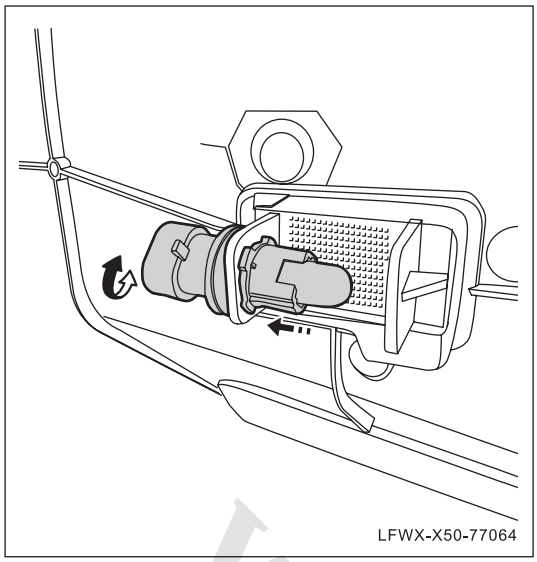
(a) Disconnect negative cable of battery.

(b) Remove C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

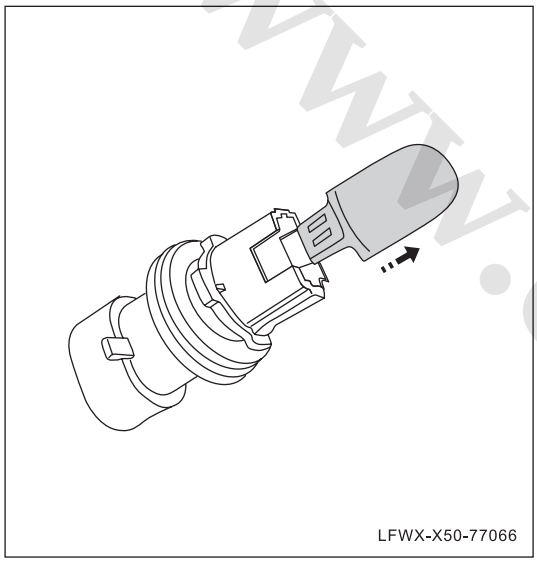
(c) Disconnect the trunk lamp connector clip

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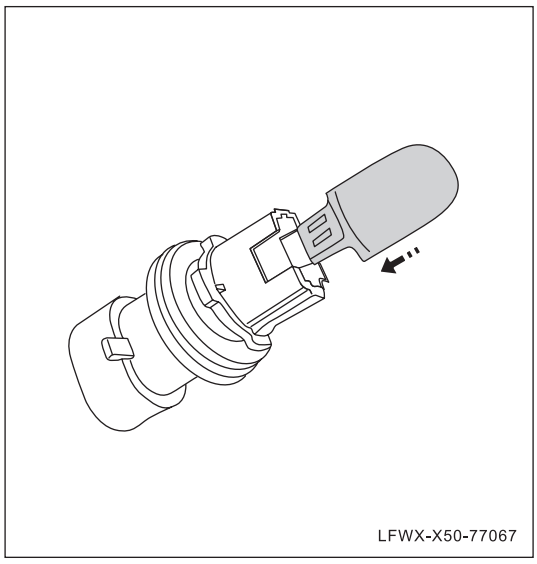
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(d) Rotate and remove the trunk lamp lamp holder, and remove the trunk lamp lampshade.



(e) Remove the trunk lamp bulb.



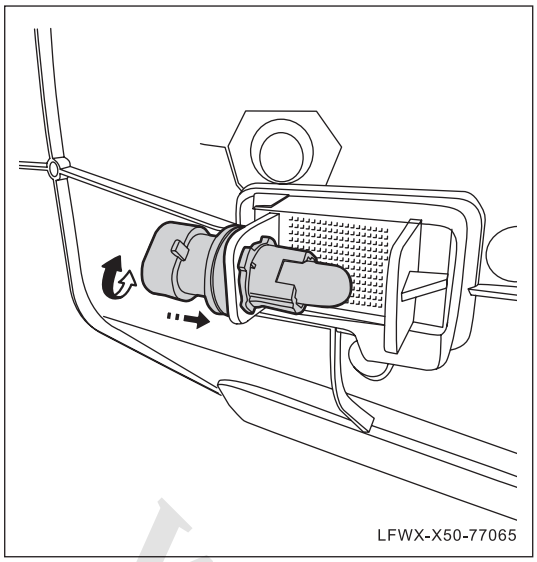
2. INSTALL TRUNK LAMP ASSEMBLY

(a) Install the trunk lamp bulb.

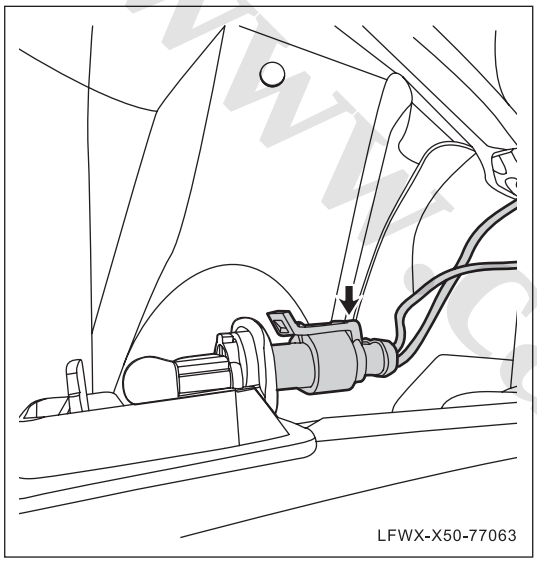
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(b) Install the trunk lamp lampshade and the trunk lamp lamp holder, and rotate and lock the trunk lamp lamp holder.



(c) Connect the trunk lamp connector clip

(d) Install C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

(e) Connect the negative cable of battery.

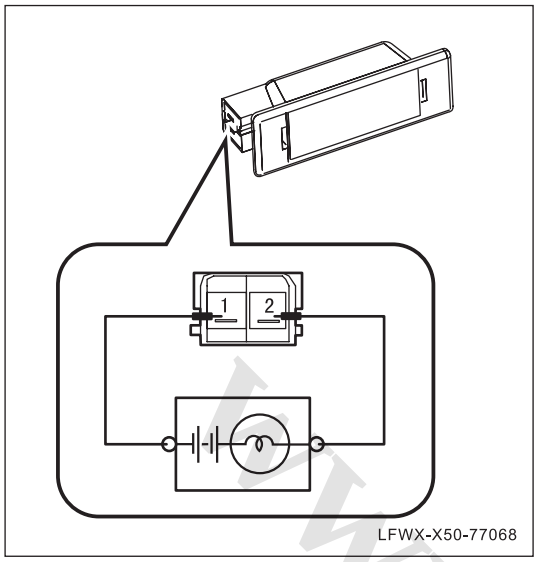
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LICENSE PLATE LAMP

INSPECTION



1. INSPECTION OF LICENSE PLATE LAMP

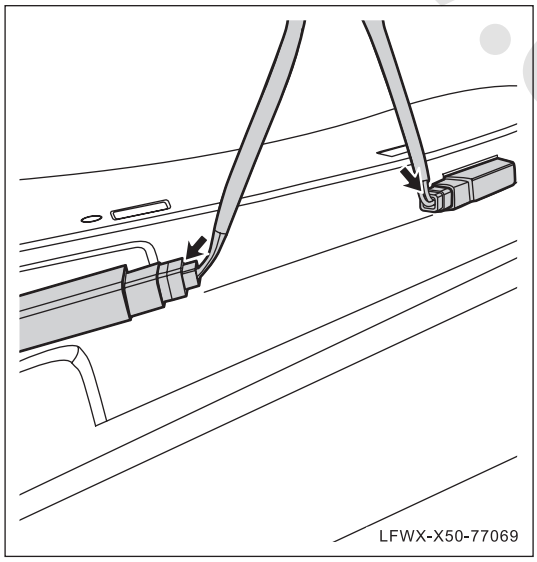
(a) Connect the Terminal 1 and 2 respectively with the positive and negative of the self-contained powered test light.

Phenomenon: License plate lamp will be illuminated.

NOTICE:

The license plate lamp is a LED one, so it cannot be measured through the resistance check method.

REPLACEMENT



1. REMOVE LICENSE PLATE LAMP ASSEMBLY

(a) Disconnect negative cable of battery.

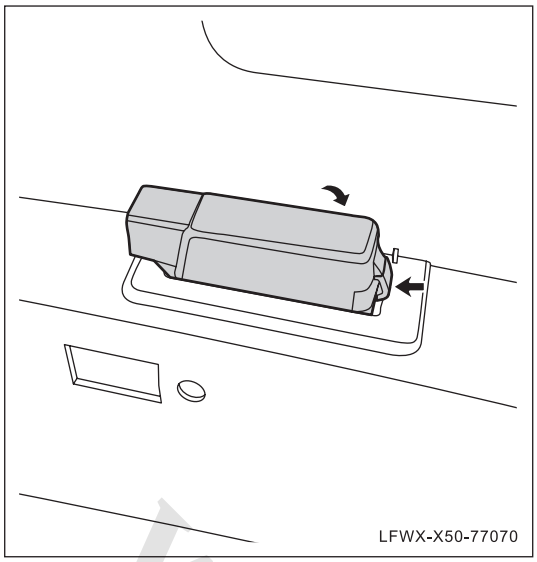
(b) Remove the rear bumper. (See 81 - Interiors and Exteriors, Rear Bumper, Replacement).

(c) Disconnect license plate lamp connector.

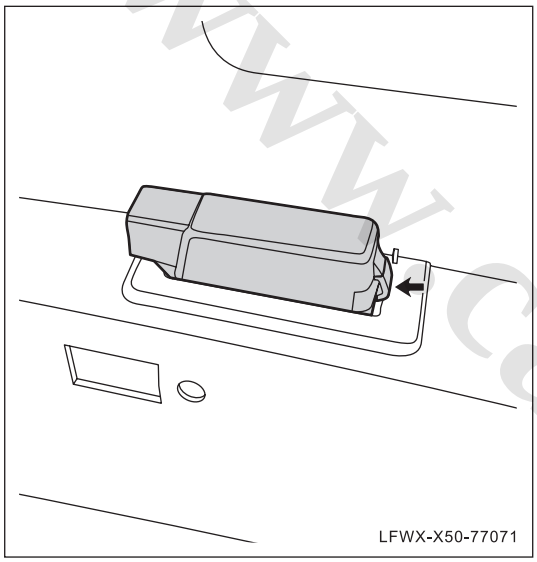
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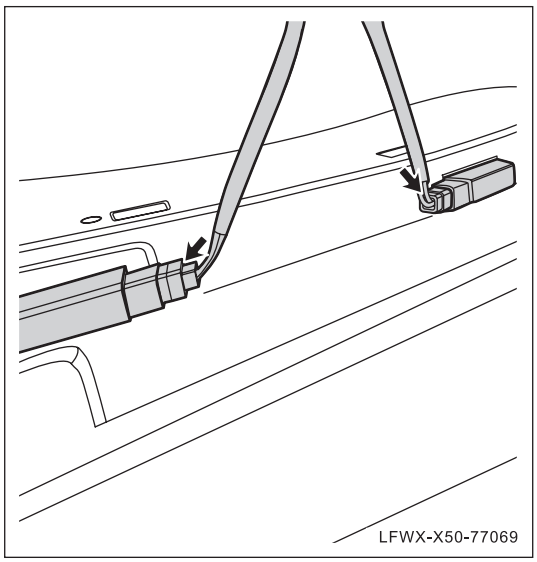
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(d) Remove license plate lamp assembly.



(e) Install the license plate lamp assembly and lock it up.



(f) Connect the license plate lamp connector.

(g) Install rear bumper (See 81 - Interiors and Exteriors, Rear Bumper, Replacement).

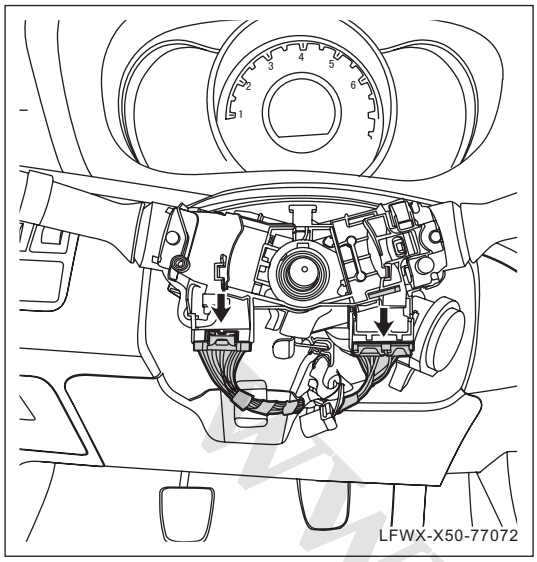
(h) Connect the negative cable of battery.

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COMBINATION SWITCH

REPLACEMENT

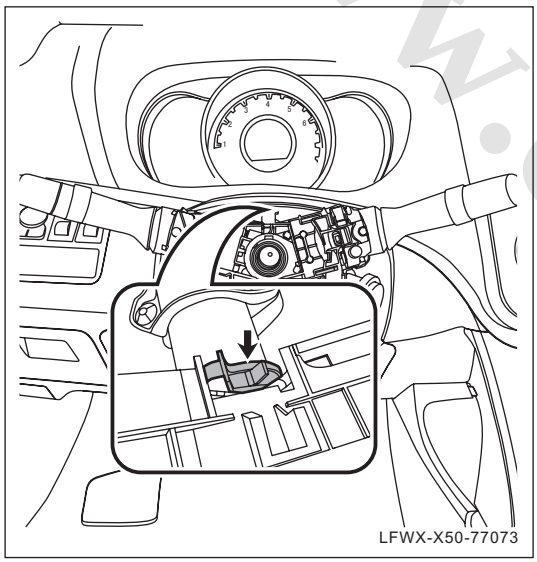


1. REMOVE COMBINATION SWITCH ASSEMBLY

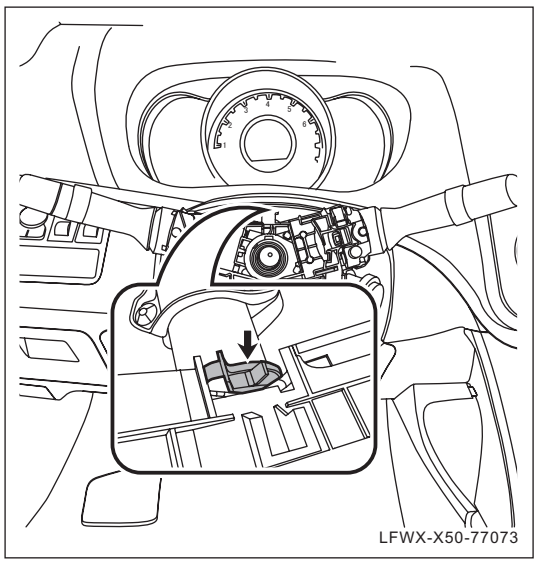
(a) Remove the steering wheel assembly. (see 61 - Electric Power Steering System, Steering Wheel, Replacement)

(b) Remove the clock spring assembly. (see 72 - safety device clock spring, replacement)

(c) Disconnect combination switch connector.



(d) Loosen the combination switch clamp with the slip joint pliers, and remove the combination switch.

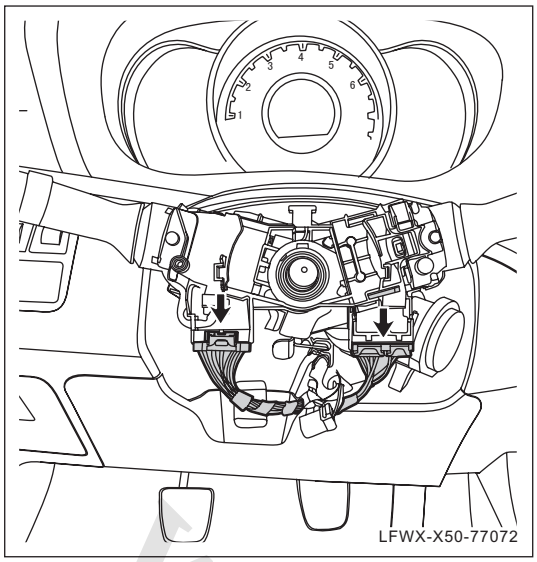


2. INSTALL COMBINATION SWITCH ASSEMBLY

(a) Loosen the combination switch clamp with the slip joint pliers, and install the combination switch.

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(b) Connect the combination switch connector clip.

(c) Remove the clock spring assembly. (see 72 - Safety Device Clock Spring, Replacement)

(d) Remove the steering wheel assembly. (see 61 - Electric Power Steering System, Steering Wheel, Replacement)

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Horn

Horn system.....78-1
System description.....78-1
Preparation.....78-2
Service data.....78-2
Components.....78-3
Function and fault of components.....78-4
On-vehicle inspection.....78-5
Diagnosis.....78-6
Fault symptom table.....78-6
Fault diagnosis.....78-6
Alt horn and bass horn.....78-10
Inspection.....78-10
Replacement.....78-11
Horn switch.....78-13
Inspection.....78-13
Replacement.....78-13

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HORN SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

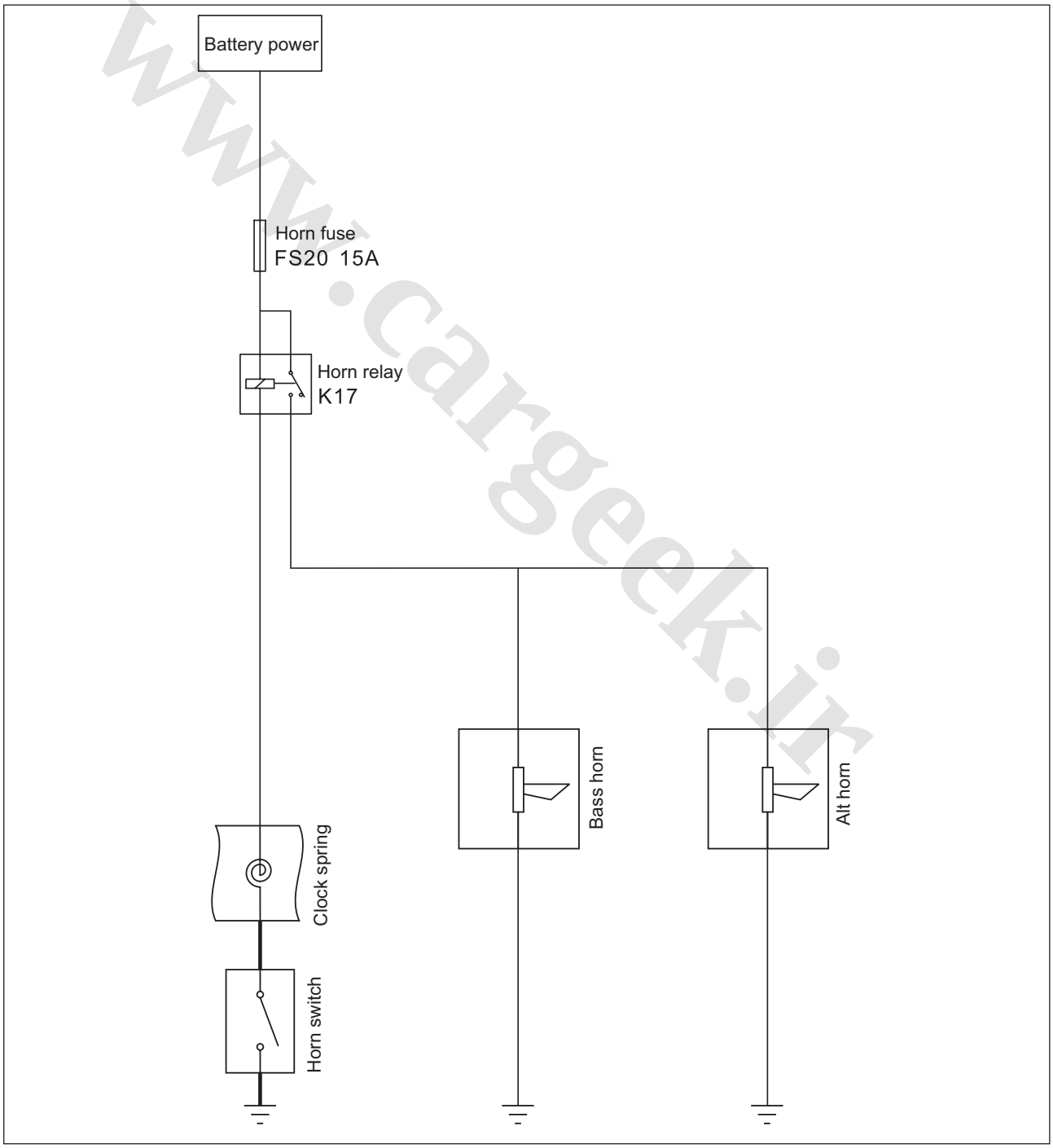
Horn system can remind pedestrians and other vehicles to pay attention to safety to avoid unexpected traffic accidents.

2. COMPONENTS

Horn system consists of alt horn, bass horn, horn switch, fuse and relay, etc.

3. WORKING PRINCIPLE

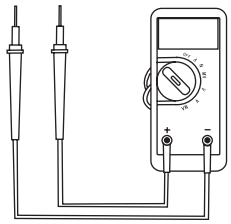
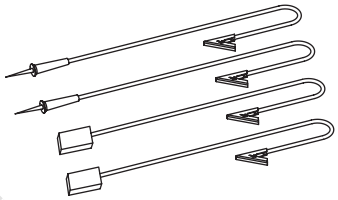
Driver presses the horn switch when necessary, and then horn relay switches on the horn circuit and the horn sounds.



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		For measuring voltage and resistance
2	Wiring set		For testing circuits

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Horn power voltage	10 - 14V

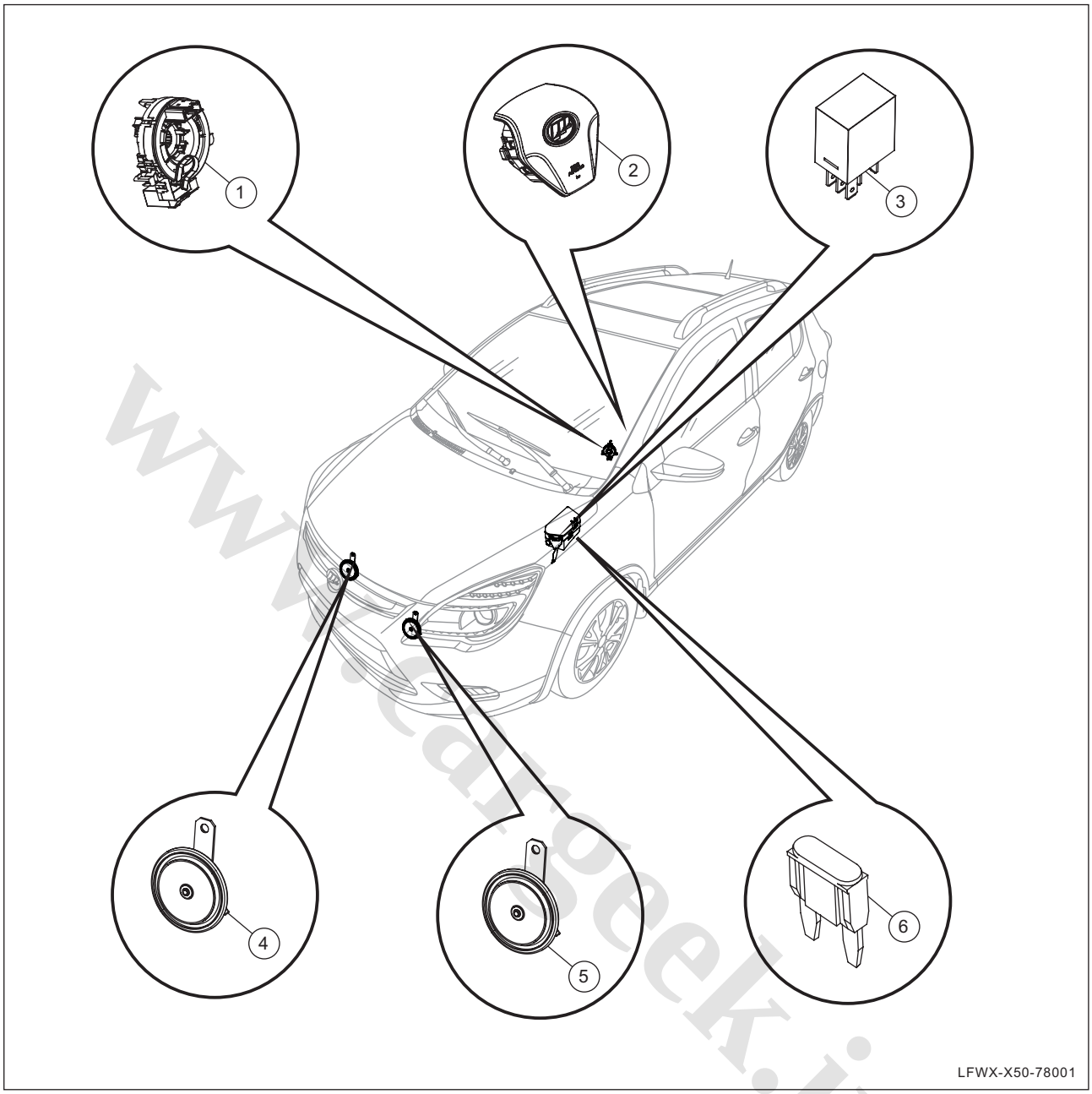
2. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolts of alt horn and bass horn	22 - 28

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COMPONENTS



1	Clock spring
2	Horn switch (driver airbag)
3	Horn relay

4	Bass horn
5	Alt horn
6	Horn fuse

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FUNCTION AND FAULT OF COMPONENTS

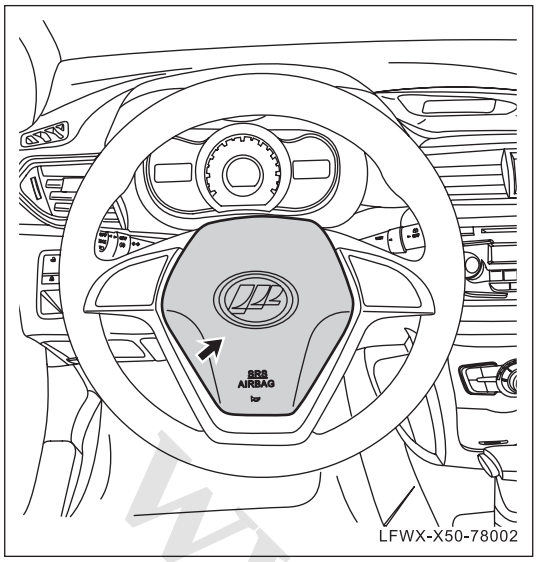
Part name	Part function	Common faults	Fault symptom
Alt horn	Provide loud horn sound	Damage	Horn sound is low and deep
Bass horn	Provide low and deep horn sound	Damage	Horn sound is harsh
Horn switch	Control components of horn	Damage	Horn does not sound or always sounds
Relay	Relay is used to switch on the horn circuit after driver presses the horn switch	Damage	Horn does not sound or always sounds
Fuse	Protective device of circuit	Blown	Horn does not sound
Wire harness	Switch on the circuit	Open circuit or short circuit	Horn does not sound or always sounds

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ON-VEHICLE INSPECTION



1. FUNCTION TESTS

(a) Park the vehicle stably, apply the parking brake and open the window glass.

(b) Click the horn switch and hear the sound from the horn.

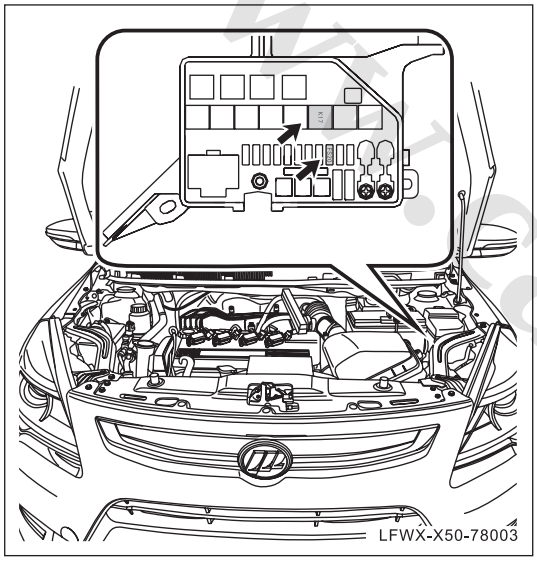
Symptom: Intermittent beep is heard.

(c) Press the horn switch long and hear the sound from the horn.

Symptom: Continuous beep are heard

△ HINT:

If the sound is abnormal, troubleshoot according to the fault symptom table.



2. CHECK THE FUSE AND RELAY

(a) Open the engine hood.

(b) Open the fuse box cover of the engine compartment.

(c) Check whether the horn fuse is blown out.

(d) Check the horn relay for damage.

△ HINT:

If the horn fuse or relay is damaged, replace it.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Horn does not sound	1. Fuse (blown) 2. Relay (damaged) 3. Horn switch (damaged) 4. Clock spring (damaged) 5. Horn (damaged) 6. Wire harness (open circuit or short circuit)	See 78 - Horn, Diagnosis, Fault Diagnosis (1. Horn does not sound)
Horn always sounds	1. Relay (damaged) 2. Horn switch (short circuit) 3. Wire harness (short circuit)	See 78 - Horn, Diagnosis, Fault Diagnosis (2. Horn always sounds)
Only one side horn sounds	1. Horn (damaged) 2. Wire harness (open circuit)	See 78 - Horn, Diagnosis, Fault Diagnosis (3. Only one side horn sounds)

FAULT DIAGNOSIS

1. HORN DOES NOT SOUND

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Ensure normal working of power supply system 2. Press and hold the horn switch to check whether the horn sounds	Diagnosis is completed	Go to Step 1	
1	Check fuse	Normal	Faulty	Instruction
	1. Open the engine hood 2. Open the fuse box of the engine compartment 3. Check whether the fuse FS20 of horn is blown out	Go to Step 2	Horn fuse is blown out	Replace the fuse with the same capacity **Rated capacity:** **FS20 15A**
2	Check horn power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between horn power circuit and the grounding	Go to Step 3	If the resistance is too small, it indicates that there is short circuit in the power circuit or the horn is damaged	Gradually trouble-shoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the relay	Normal	Faulty	Instruction
	Check if the horn relay K17 works normally	Go to Step 4	Horn relay is damaged	Replace the horn relay
4	Check the horn switch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	1. Remove driver airbag 2. Check whether the horn switch contact is normal	Go to Step 5	Horn contact is dirty and bent, etc.	Repair or replace
5	Check the clock spring.	Normal	Faulty	Instruction
	1. Disconnect clock spring wire harness and horn switch wire harness 2. Check whether the circuit between the Terminal 8 of clock spring connector I21 and the horn switch terminal has good connectivity by switching the digital multimeter to the resistance function.	Go to Step 6	Clock spring is damaged	Replace the clock spring
6	Check the wire harness	Normal	Faulty	Instruction
	1. Check whether the circuit between the Terminal 8 of dashboard wire harness I21 and front compartment central control box K17 has good connectivity 2. Check whether the circuit between the Terminal 1 of front compartment wire harness U15 and front compartment central control box K17 has good connectivity	Go to Step 7	The circuit has open circuit	Gradually troubleshoot to identify the open-circuit point
7	Inspect the grounding circuit.	Normal	Faulty	Instruction
	1. Check the resistance between Terminal 1 of U16 and grounding **Resistance: < 2Ω** 2. Check the resistance between Terminal 1 of U28 and grounding **Resistance: <2Ω**	Go to Step 8	The resistance is out of the specified range	Check and repair the wire harness between U16 and grounding point G13, U28 and grounding point G11 and grounding point
8	Check the horn	Normal	Faulty	Instruction
	Check whether the horn works normally	Go to Step 9	Horn is damaged	Replace the horn
9	Verification and check	Normal	Faulty	Instruction
	Check whether horn sounds after installing the horn	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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2. HORN ALWAYS SOUNDS

Steps	Inspection Item	Inspection result		
0	Check the relay	Normal	Faulty	Instruction
	Check if the horn relay K17 works normally	Go to Step 1	Horn relay is damaged	Replace the horn relay
1	Check the horn switch	Normal	Faulty	Instruction
	1. Remove driver airbag 2. Check whether the horn switch contacts work normally	Go to Step 2	Check whether the horn switch contacts are always on	Repair or replace
2	Check the horn power supply	Normal	Faulty	Instruction
	1. Disconnect the horn relay 2. Check the voltage between the Terminal 1 of front compartment wire harness U15 and the grounding **Voltage: 0V** 3. Check the voltage between the Terminal 1 of front compartment wire harness U27and the grounding **Voltage: 0V**	Go to Step 3	If there is voltage, it indicates the horn wire harness is short circuited to power supply	Gradually troubleshoot to identify the open-circuit point
3	Verification and check	Normal	Faulty	Instruction
	Check whether horn always sounds after installing the horn	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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3. ONLY ONE SIDE HORN SOUNDS

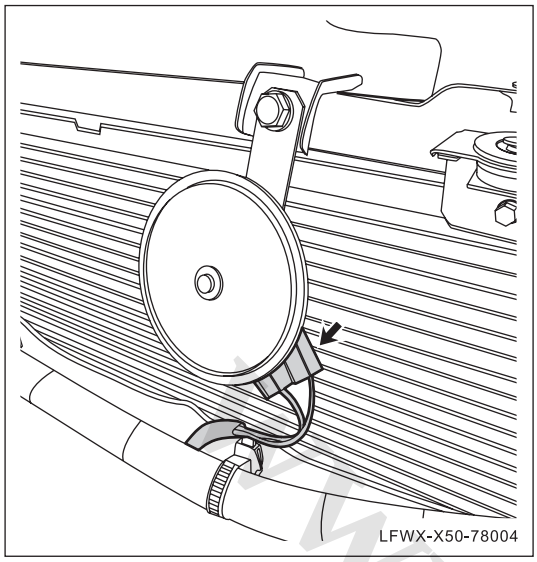
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Ensure normal working of power supply system 2. Press and hold the horn switch to check whether only one side horn sounds	Horns on both sides sound, and then diagnosis is over	Only one side horn sounds, then go on Step 1	
1	Check the horn power supply circuit	Normal	Faulty	Instruction
	1. Disconnect horn connector U27 2. Press the horn switch down, and check the voltage between Terminal 1 of U27 and grounding **Voltage: 9 - 13V**	Go to Step 2	If the voltage is out of the specified range, the circuit is open-circuited	Check and repair the circuit between horn and horn relay
2	Check the horn grounding circuit	Normal	Faulty	Instruction
	1. Disconnect horn connector U28 2. Check the resistance between Terminal 1 of U28 and grounding **Resistance: <2Ω**	Go to Step 3	The grounding circuits have open circuit points	Check and repair the circuit between front compartment wire harness connector and grounding point
3	Verification and check	Normal	Faulty	Instruction
	Check whether horn sounds normally after installing the horn	Diagnosis is completed	Fault still exists	Find the cause out from other fault symptoms

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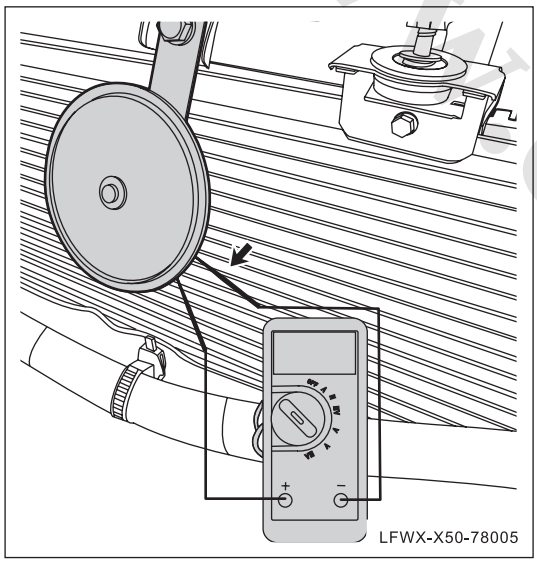
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ALT HORN AND BASS HORN

INSPECTION



1. **REMOVE THE FRONT BUMPER (SEE 81 - INTERIORS AND EXTERIORS, FRONT BUMPER, REPLACEMENT)**
2. **DISCONNECT THE HORN CONNECTOR**



3. **CHECK THE HORN**

(a) Check the two terminals of horn using a digital multimeter which is switched to "200Ω" position.

Resistance: continuity

(b) Or connect two terminals of the horn wire harness to the battery positive and negative terminals respectively.

Sign: beeps

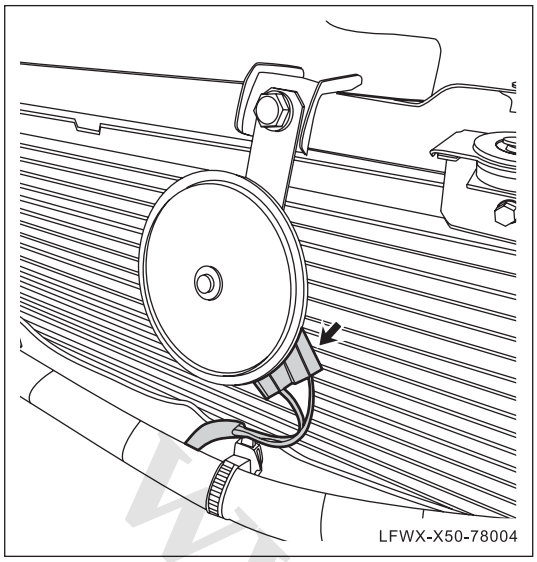
△ HINT:

If no continuity exists between the two terminals of the horn, or the horn does not sound, replace the horn.

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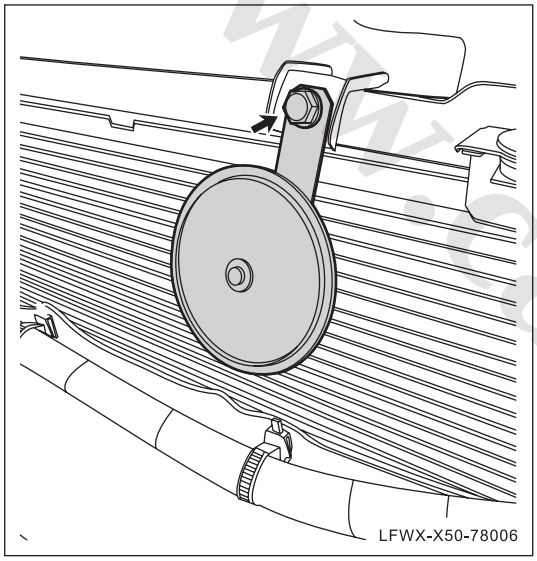
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REPLACEMENT



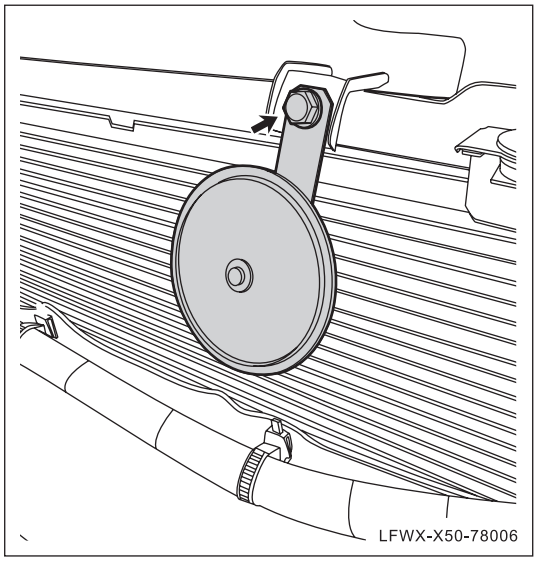
1. **REMOVE THE FRONT BUMPER (SEE 81 INTERIORS AND EXTERIORS, FRONT BUMPER, REPLACEMENT)**
2. **REMOVE THE HORN**

(a) Disconnect the horn connector.



(b) Remove the fixing bolt of horn.

(c) Remove the horn.



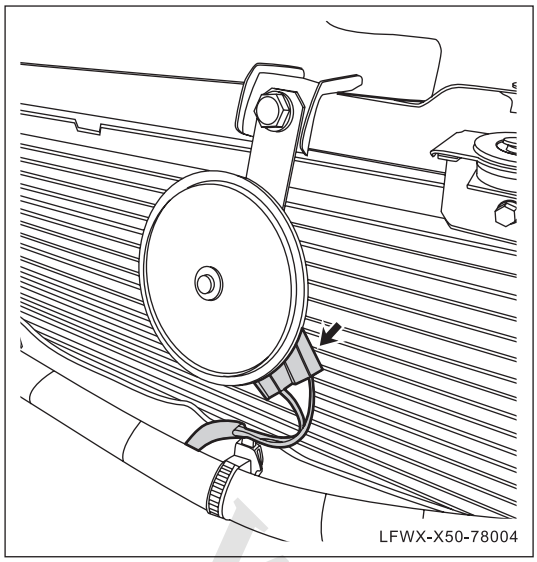
3. **INSTALL THE HORN**

(a) Install the horn and tighten its fixing bolts.

Torque: 22 - 28N•m

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(b) Connect the horn connector.

NOTICE:

When connecting the connectors, if you hear clack sound clearly, it indicates that the connector is in its place.

4. **PRESS THE HORN SWITCH AND CHECK WHETHER THE HORN WORKS NORMALLY**
5. **INSTALL THE FRONT BUMPER (SEE 81 INTERIORS AND EXTERIORS, FRONT BUMPER, REPLACEMENT)**

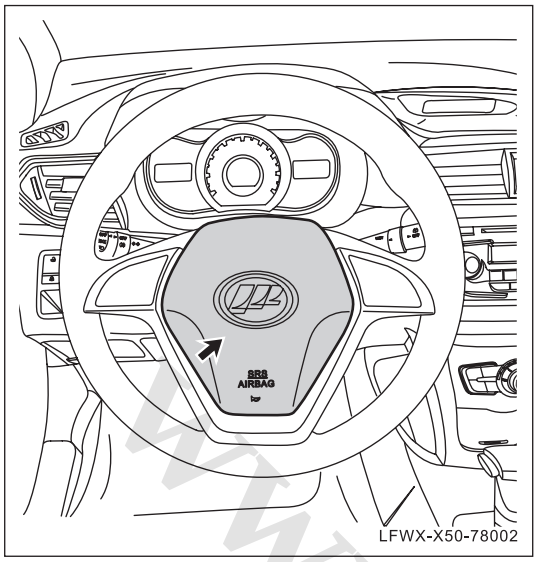
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HORN SWITCH

INSPECTION



1. **PRESS AND HOLD THE HORN SWITCH**
2. **SLOWLY RELEASE THE HORN SWITCH**

   Sign: resistance is felt

△ HINT:

The horn switch made of copper plate, which is riveted to the driver airbag, is difficult to be corrupted or damaged. Generally, the horn switch failure is caused by the damaged return spring. Therefore, horn check is mainly to check whether the return spring is damaged.

REPLACEMENT

△ HINT:

If horn switch is damaged, have the airbag assembly replaced. (See 72 - Safety Protection Device, Driver Airbag, Replacement)

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Cigarette Lighter

Cigarette lighter 79-1
System description 79-1
Schematic diagram.....79-2
Preparation.....79-3
Service data 79-3
Precautions 79-3
Components 79-4
Function and fault of components 79-4
On-vehicle inspection 79-5
Diagnosis 79-6
Fault symptom table 79-6
Fault diagnosis 79-6
Cigarette lighter 79-8
Replacement 79-8
Ashtray 79-11
Replacement 79-11

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CIGARETTE LIGHTER

SYSTEM DESCRIPTION

1. FUNCTION

Except for lighting cigarette, cigarette lighter can be equipped with an on-board inverter, which can convert the 12V DC to AC power supply of 220V/50Hz for common electric appliance application.

2. COMPONENTS

Cigarette lighter consists of case, positioning seat, resistance wire, mica, resistance dish, spring, spring cover, draw knob. A pilot hole is set on the positioning seat bottom, and in said hole, a steel column linkage in movable fit is arranged in pilot fit; positioning structure is matched with center hole of resistance disc on the front section of said linkage; said resistance wire is installed into the resistance disc before being fixed onto one end of linkage and draw knob and spring cover are fixed onto the other end of linkage.

3. SYSTEM PRINCIPLE

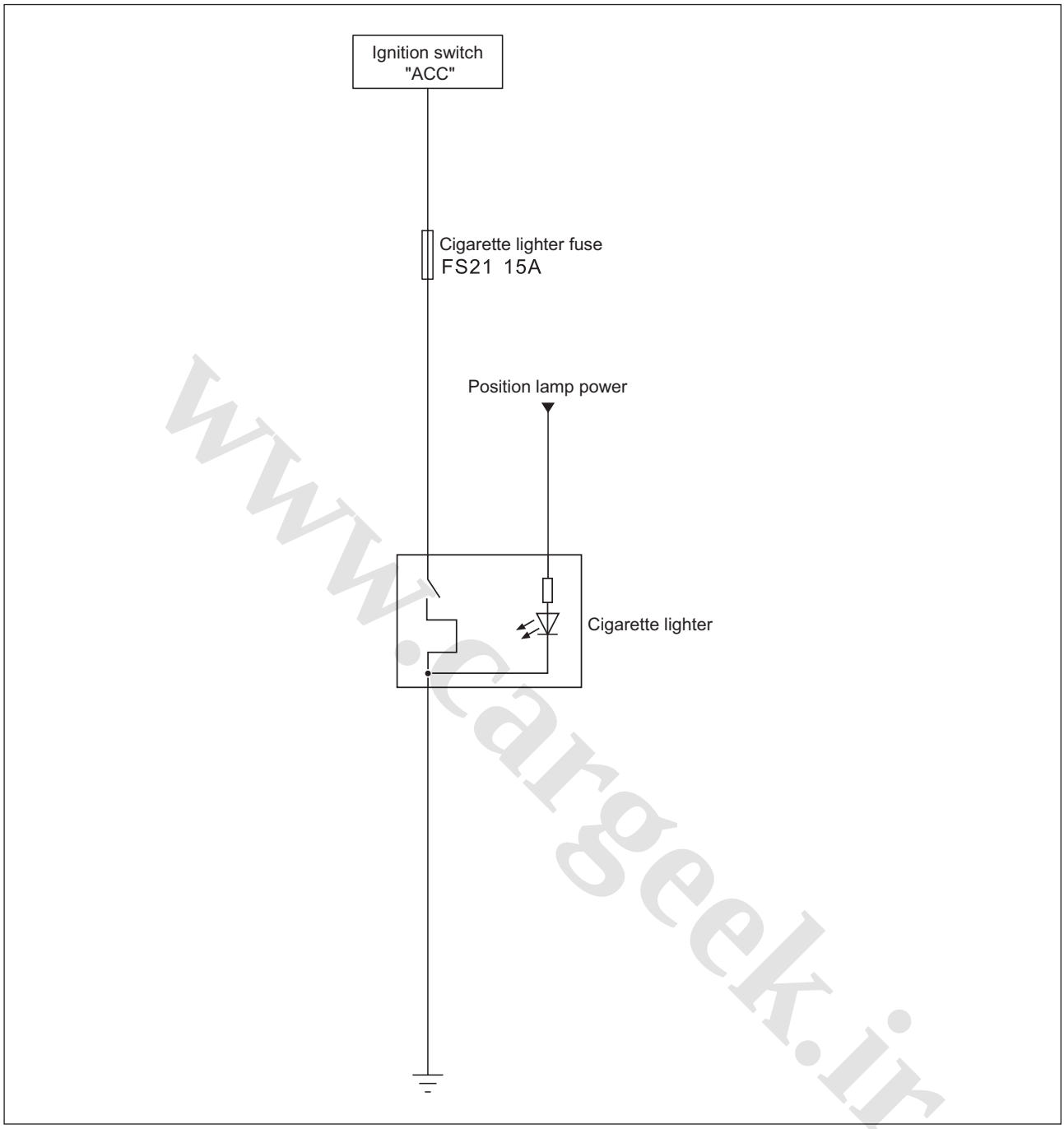
Cigarette lighter is heated through resistance; when the cigarette lighter is pressed into, a circle metal and inner wall outside the lighter contact with each other to form a circuit. For the tapered inlet expands with heat and contracts with cold, the cigarette lighter ejects after energization heating.

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SCHEMATIC DIAGRAM

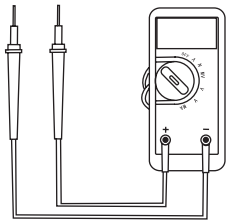
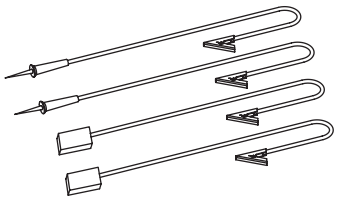


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PREPARATION

S/N	Tools	Outline diagram	Description
1	Digital multimeter		For measuring voltage and resistance
2	Wiring set		For testing circuits

SERVICE DATA

1. TECHNICAL SPECIFICATIONS

Cigarette lighter power supply	12V

2. TIGHTENING TORQUE TABLE

Item	N•m
Ashtray assembly fixing screws	5 - 6

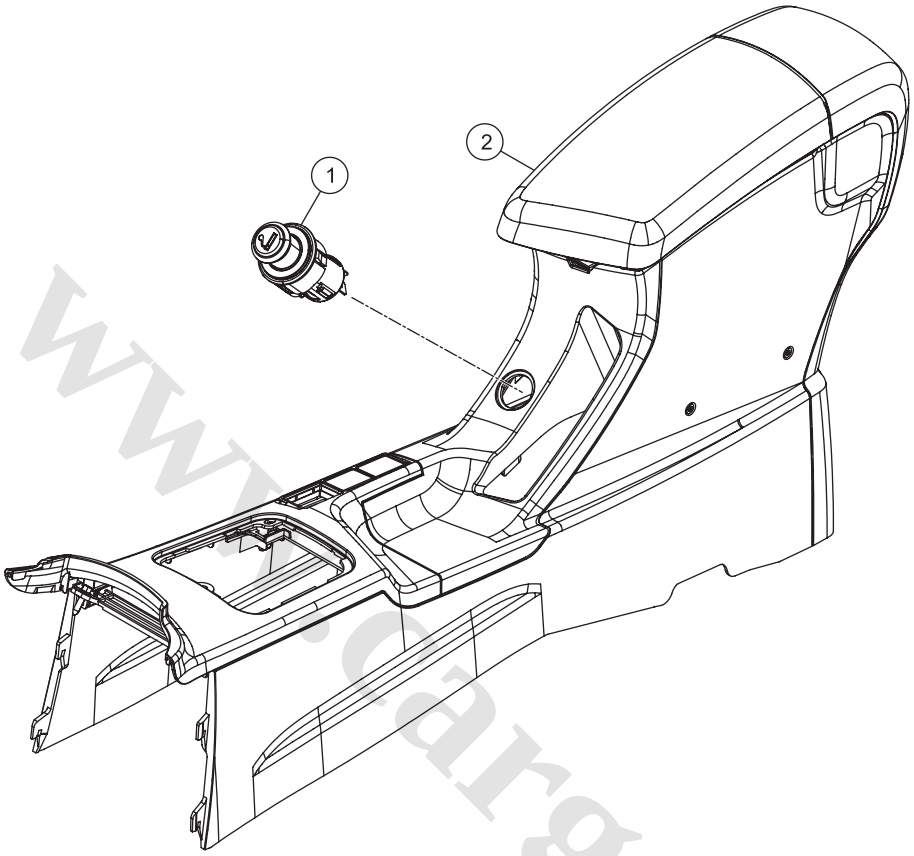
PRECAUTIONS

1. Correct operation method is to insert and pull out vertically with mounting hole of the cigarette lighter. Do not shake the cigarette lighter, otherwise, looseness, short-circuit, fuse blow and external equipment will be caused.
2. If the cigarette lighter can not be plugged back to socket, fire may be caused.
3. Being used for a long time, repeated pulling out and inserting will cause looseness of snap ring, which enable the cigarette lighter to determine position after being depressed and heat the heating elements of cigarette lighter.
4. Consistent with the voltage of vehicle battery, voltage of cigarette lighter power supply is 12V. There is a single power wire connected with the cigarette lighter with single fuse and it can not be mixed with other wires.
5. Repeated pulling out and inserting and unreasonable application will cause short-circuit and damage to fuse.

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COMPONENTS



LFWX-X50-79001

1	Cigarette lighter assembly	2	Console body assembly

FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Cigarette lighter assembly	Used for lighting cigarette for driver and passenger	Can not bounce and heat	/

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ON-VEHICLE INSPECTION

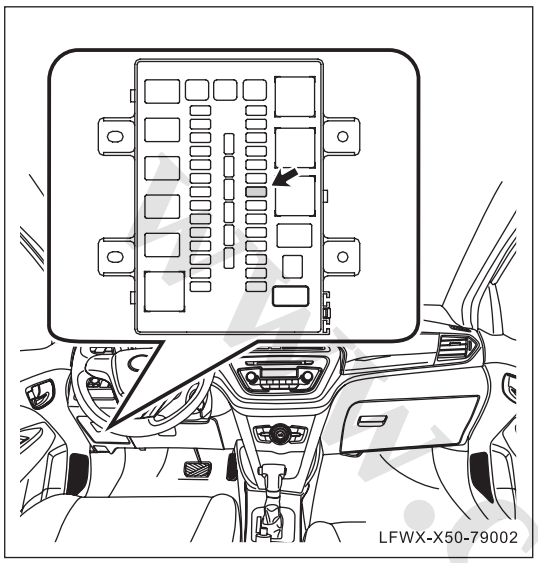
1. CHECK THE CIGARETTE LIGHTER ASSEMBLY

(a) Turn the ignition switch to "ACC".

(b) Press down the cigarette lighter and check whether the lighter works normally and bounce normally.

△ Hint:

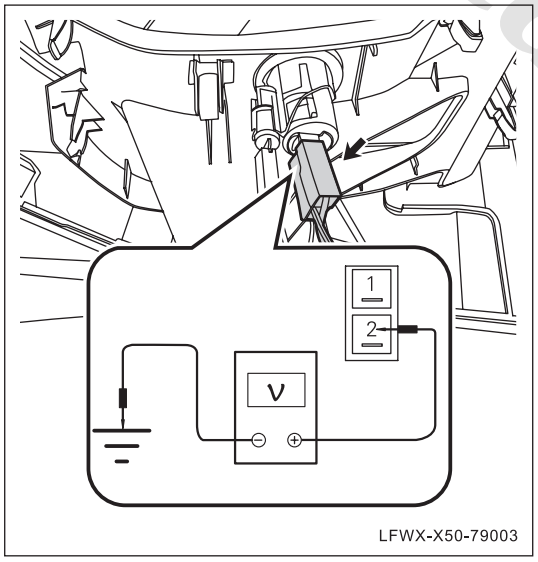
If the cigarette lighter can not be pressed down or bounce normally, check whether the snap ring is damaged and have the cigarette lighter assembly replaced if the snap ring is damaged.



2. CHECK THE FUSE

(a) Remove the dashboard left lower notes box.

(b) Check the cigarette lighter fuse for disconnection.



3. CHECK THE CIGARETTE LIGHTER POWER SUPPLY

(a) Disconnect the cigarette lighter B03 connector.

(b) Turn the ignition switch to ON.

(c) Check the voltage between the Terminal 2 of B03 connector and grounding by switching the digital multimeter to the voltage function.

Voltage value: 10 - 14V

△ Hint:

If the voltage is normal but the cigarette lighter does not operate, just replace the cigarette lighter. If the voltage is abnormal, check the fuse and power supply circuit of cigarette lighter.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Cigarette lighter does not work	1. Fuse (blown) 2. Cigarette lighter (damaged) 3. Wire harness (open circuit or short circuit)	See 79 - Cigarette Lighter, Diagnosis, Fault Diagnosis (1. Cigarette lighter does not work)
Illuminating lamps of cigarette lighter do not work	1. Position lamp circuit (faulty) 2. Illuminating lamps of cigarette lighter (damaged) 3. Wire harness (open circuit or short circuit)	See 79 - Cigarette Lighter, Diagnosis, Fault Diagnosis (2. Illuminating lamps of cigarette lighter do not work)

FAULT DIAGNOSIS

1. CIGARETTE LIGHTER DOESN'T WORK

Step	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Make sure power supply works normally 2. Press down the cigarette lighter to check whether it works.	Diagnosis is completed	Go to Step 1	
1	Check the fuse	Normal	Faulty	Instruction
	1. Switch off all electrical loads 2. Remove the dashboard left lower notes box 3. Check visually whether the cigarette lighter fuse FS21 is blown out	Go to Step 2	Cigarette lighter fuse is blown out	Replace the fuse with the same capacity **Rated capacity:** FS21 15A
2	Check the cigarette lighter power supply circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between cigarette lighter power supply circuit and the grounding	Go to Step 3	There is short circuit in the power supply circuit or the cigarette lighter is damaged	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the cigarette lighter power supply circuit	Normal	Faulty	Instruction
	1. Disconnect the cigarette lighter connector B03 2. Turn the ignition switch to ACC 3. Check voltage between Terminal 2 of B03 and the grounding with a multimeter switching to voltage position **Voltage: 9 - 13V**	Go to Step 4	The power circuit of cigarette lighter has open circuit points	Check and repair circuit between the body wire harness connector and cigarette lighter fuse
4	Check the cigarette lighter grounding circuit	Normal	Faulty	Instruction

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Step	Inspection Item	Inspection result		
	1. Disconnect the cigarette lighter connector B03 2. Check the resistance between Terminal 1 of B03 and grounding **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Check and repair the circuit between the body wire harness connector and grounding point G24
5	Check the cigarette lighter.	Normal	Faulty	Instruction
	Check whether the cigarette lighter and lighter seat are damaged	Go to Step 6	Cigarette lighter is damaged or the lighter seat is damaged	Replace the cigarette lighter or the lighter seat
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is completed.	Fault still exists	Find the cause out from other fault symptoms

2. ILLUMINATING LAMPS OF CIGARETTE LIGHTER DO NOT WORK

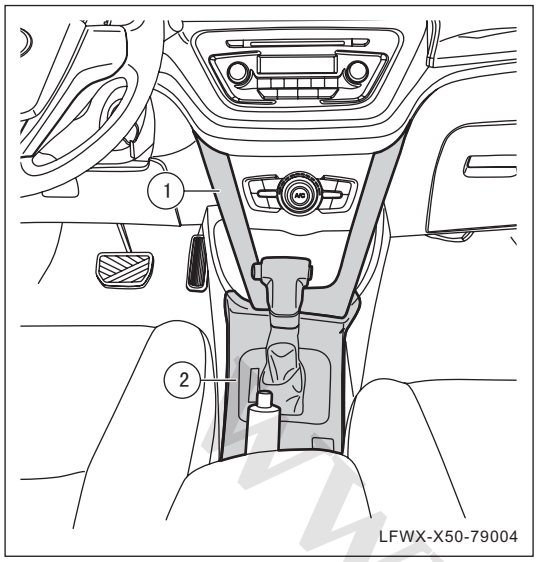
Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Make sure power supply works normally 2. Turn on position lamps to check whether illuminating lamps of cigarette lighter are lighted up	Diagnosis is completed.	Go to Step 1	
1	Check the cigarette lighter illuminating power supply	Normal	Faulty	Instruction
	1. Remove the console 2. Disconnect illuminating connector from cigarette lighter 3. Turn on position lamps to check voltage between body wire harness B04 and the grounding **Voltage: 9 - 13V**	Go to Step 2	If the voltage is out of the specified range, it indicates the circuit has open-circuit points	Check and repair position lamp power circuit
2	Check the illuminating lamps of cigarette lighter	Normal	Faulty	Instruction
	Check whether illuminating lamps of cigarette lighter are damaged	Go to Step 3	Illuminating lamps of cigarette lighter are damaged	Replace the illuminating lamps of cigarette lighter
3	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diagnosis is complated	Fault still exists	Find the cause out from other fault symptoms

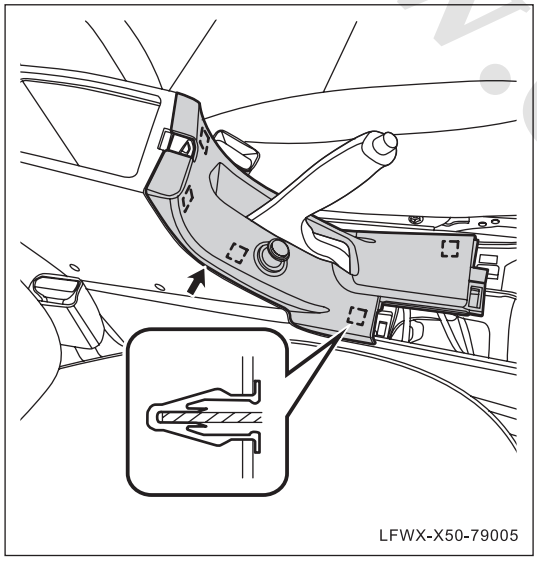
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CIGARETTE LIGHTER

REPLACEMENT





1. DISCONNECT THE NEGATIVE CABLE OF BATTERY

2. REMOVE THE CIGARETTE LIGHTER ASSEMBLY

(a) Remove the lower center trim frame cluster ① of dashboard.

△ Hint:

Pry up the lower center trim frame cluster of dashboard with a screwdriver, and remove the lower center trim frame cluster of dashboard.

NOTICE:

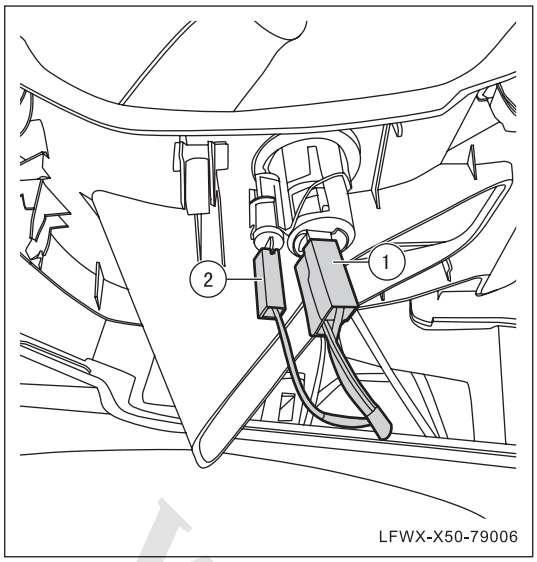
The screwdriver tip is sharp, so it is necessary to wrap it with a cloth or equivalent .

(b) Remove the shift panel assembly ② (See 85 - Dashboard and Console, Console, Replacement)

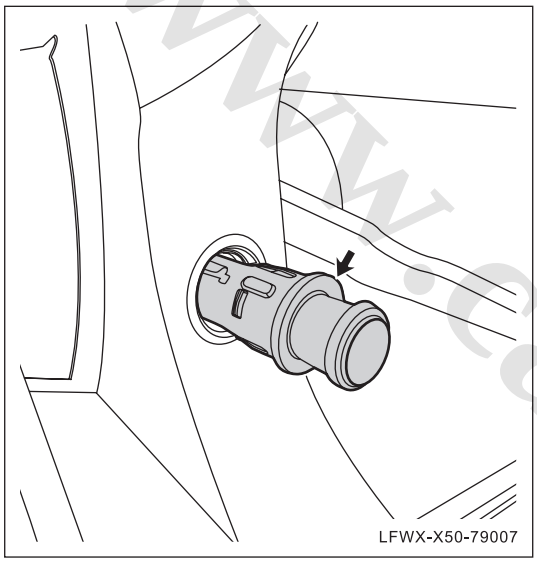
(c) Open the console glove box cover and remove parking brake trim panel cluster.

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(d) Overturn the parking brake trim panel cluster, and disconnect the cigarette lighter connector ① and illuminating lamps connector ② .



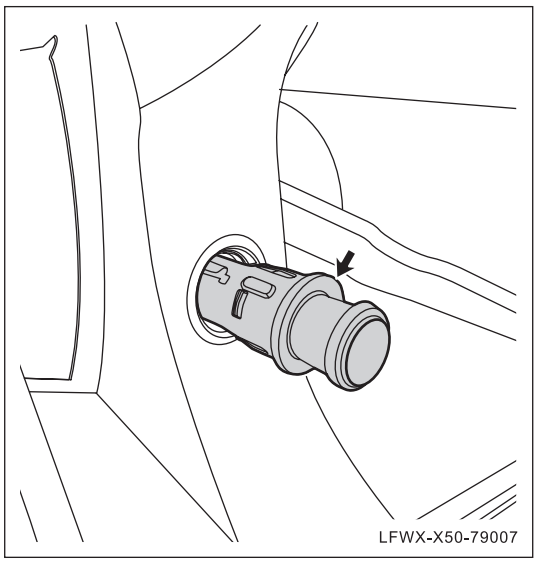
(e) Remove the cigarette lighter assembly.

△ Hint:

Rotate the cigarette lighter seat. Align the fixed jaw of the cigarette lighter seat to the notch of the parking brake trim panel cluster, and remove the cigarette lighter assembly.

NOTICE:

Don't pull out the cigarette lighter forcibly.



3. INSTALL THE CIGARETTE LIGHTER ASSEMBLY

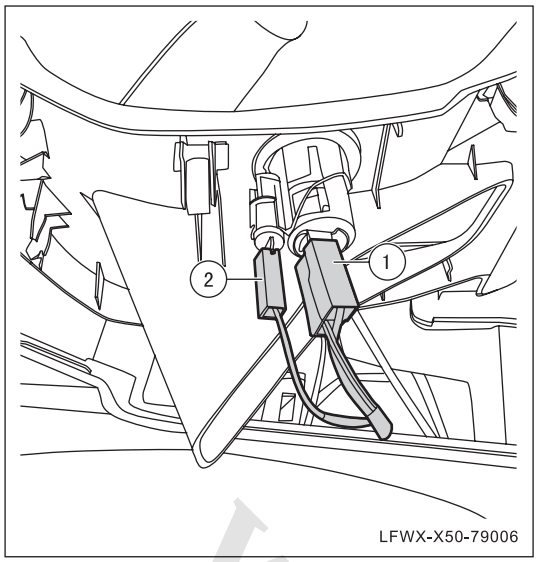
(a) Reinstall the cigarette lighter assembly back to the parking brake trim panel cluster.

△ Hint:

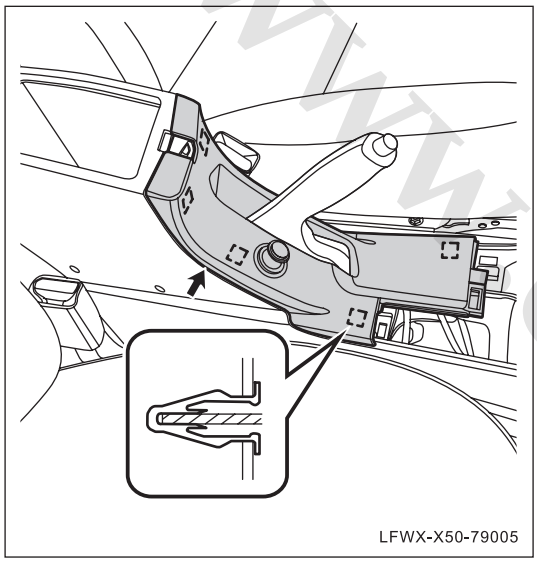
During installation, align the fixed jaw of the cigarette lighter seat to the notch of the ashtray. After entering the mounting notch, rotate the cigarette lighter assembly to any position.

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(b) Connect cigarette lighter connector ① and illuminating lamps connector ② .

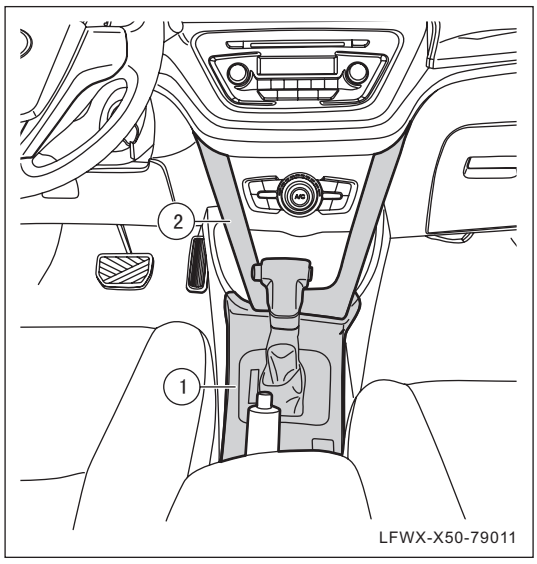


(c) Install the parking brake trim panel cluster.

△ Tip:

Be sure to install all mounting snap-fits into the grooves.

(d) Close the console glove box cover.



(e) Install the shift panel assembly ① .

△ Hint:

Be sure to connect USB wire harness before installing the shift panel assembly.

(f) Install the lower center trim frame cluster ② of dashboard. (See 85 - Dashboard and Console, Console, Replacement)

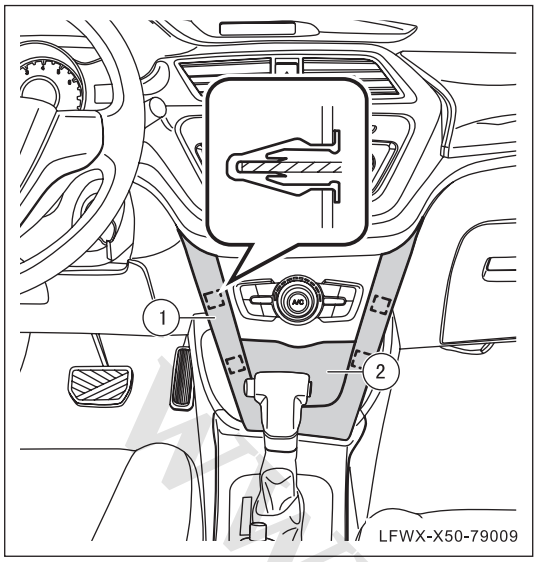
4. CONNECT THE NEGATIVE CABLE OF BATTERY

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ASHTRAY

REPLACEMENT



1. REMOVE THE ASHTRAY

(a) Remove the lower center trim frame cluster ① of dashboard.

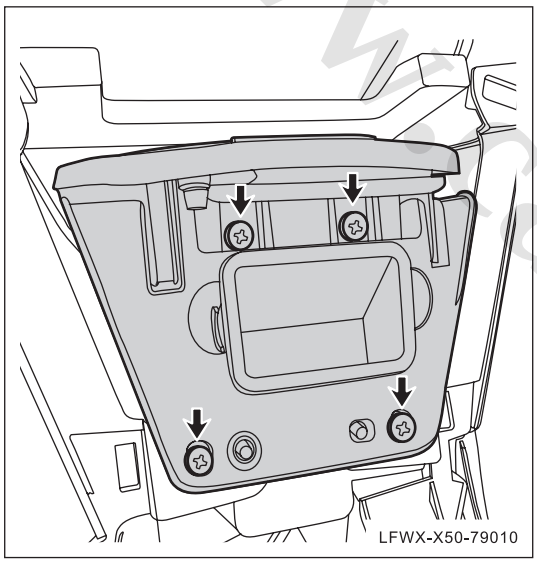
△ Hint:

Pry up the lower center trim frame cluster of dashboard with a screwdriver, and remove the lower center trim frame cluster of dashboard.

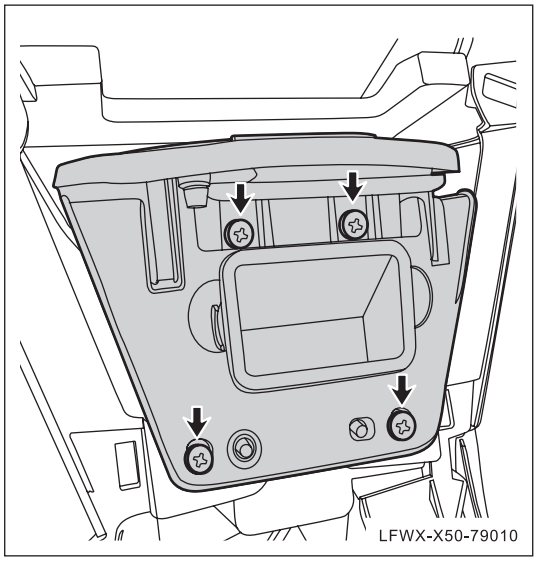
NOTICE:

The screwdriver tip is sharp, so it is necessary to wrap it with a cloth or equivalent .

(b) Press front ashtray cover ② to make it bounce so as to expose its fixing screws.



(c) Remove fixing screws of ashtray and take the ashtray down.



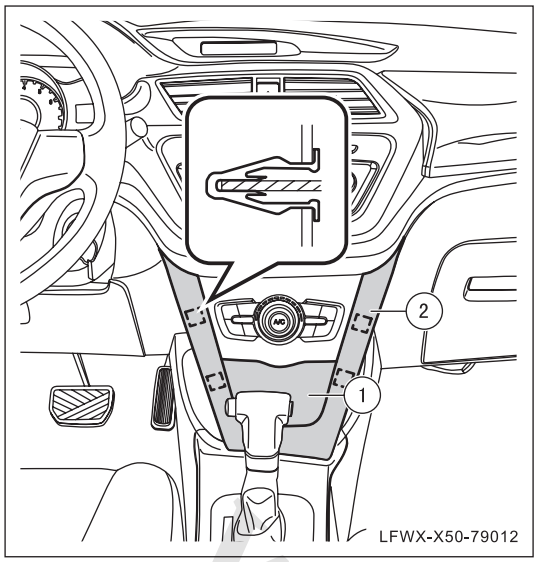
2. INSTALL THE ASHTRAY

(a) Install the ashtray to mounting position, and install fixing screws and tighten them.

Torque: 5 - 6N•m

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(b) Overturn the ashtray cover ① and button it up.

(c) Install the lower center trim frame cluster ② of dashboard.

NOTICE:

When installing the dashboard lower center trim frame cluster, be sure to set its snap-fits in place.

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Interiors and Exteriors

Interiors and exteriors.....81-1
System description.....81-1
Preparation.....81-1
Service data.....81-2
Precautions.....81-3
Sun visor.....81-4
Replacement.....81-4
Front doorsill trim panel.....81-7
Replacement.....81-7
Rear doorsill trim panel.....81-8
Replacement.....81-8
A pillar trim panel.....81-9
Replacement.....81-9
B pillar trim panel.....81-12
Replacement.....81-12
C pillar trim panel.....81-16
Replacement.....81-16
Front door trim panel.....81-22
Replacement.....81-22
Rear door trim panel.....81-29
Replacement.....81-29
Tail door trim panel.....81-35
Replacement.....81-35
Rear apron trim panel.....81-38
Replacement.....81-38
Rear shelf panel.....81-39
Replacement.....81-39
Assist grip and roof.....81-40
Replacement.....81-40
Floor carpet.....81-43
Replacement.....81-43
Front bumper.....81-46
Replacement.....81-46
Rear bumper.....81-49
Replacement.....81-49
Windshield glass.....81-53
Replacement.....81-53
Tail door glass.....81-56
Replacement.....81-56

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Front wall cowl top grille 81-60
Replacement 81-60
Fender.....81-62
Replacement 81-62
Mudguard 81-65
Replacement 81-65
Fuel filler door.....81-69
Replacement 81-69
Deflector 81-70
Replacement 81-70

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INTERIORS AND EXTERIORS

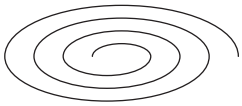
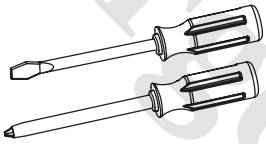
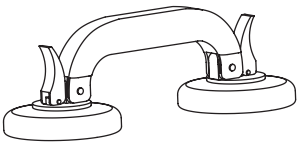
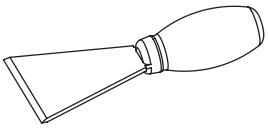
SYSTEM DESCRIPTION

1. COMPONENTS

Interior and exterior trimming mainly consists of the interior trimming and the exterior trimming.

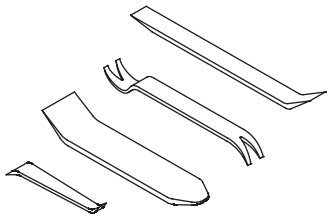
- The interior trimming mainly includes: sun visor, front doorsill trim panel, rear doorsill trim panel, A pillar trim panel, B pillar trim panel, C pillar trim panel, rear shelf panel, front door trim panel, rear door trim panel, tail door trim panel, rear apron trim panel, assist grip, roof and floor carpet, etc.
- The exterior trimming mainly includes: front bumper, rear bumper, windshield glass, tail door glass, mudguard, fuel filler door, fender, front wall cowl top grille, and deflector, etc.

PREPARATION

S/N	Tool	Outline diagram	Description
1	Thin steel wire		Cutting off the sealant of windshield glass and tail door glass
2	Screwdriver		Removing and installing the fixing screw & inlay clip, and pry the trim panel
3	Glass sucker		Sucked onto the glass surface and used as the handle when installing the glass
4	Scraper knife		Scraping the residual glass sealant

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S/N	Tool	Outline diagram	Description
5	Interior trimming crow plate		Removing the interior & exterior trims and snap-fits

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Bottom fixing bolts of driver and front passenger seat belt	65 - 85
Fixing screw of lower grille and bumper	5 - 6
Fixing screw of front grille and bumper	5 - 6
Fixing screw of daytime running lamp	5 - 6
Connecting bolt of LH /RH mounting bracket of front bumper and vehicle body	8 - 10
Fixing bolt of front bumper	8 - 10
Fixing screw of left and right front mudguard housing	5 - 6
Fixing screw of rear fog lamp	5 - 6
Connecting bolt of LH/RH large bracket of rear bumper and vehicle body	8 - 10
Connecting bolt of LH/RH small bracket of rear bumper and vehicle body	8 - 10
Fixing bolts of rear bumper	8 - 10
Fixing screw of left and right rear mudguard	8 - 10
Fixing bolt of tail door glass grounding wire harness	8 - 12
Fixing bolt of fender	8 - 12
Fixing screw of front wheel mudguard	8 - 10
Fixing screw of front wheel mudguard tail plate	8 - 10
Fixing nut of rear wheel front mudguard	8 - 10
Fixing screw of rear wheel mudguard tail plate	8 - 10
Fixing bolt of fuel filler door	8 - 12
Fixing nut of high-mounted brake lamp	8 - 10
Fixing nut of deflector	8 - 12
Fixing bolt of upper bracket of driver seat belt	65 - 85
Fixing screw of C pillar lower trim panel	5 - 6
Fixing bolt of rear seat backrest	30 - 40
Fixing screw of front door panel armrest mounting bracket	8 - 10
Fixing screw of window lifter control box	5 - 6
Fixing screw of front door inner handle	5 - 6

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Item	N•m
Fixing screw of rear door panel armrest mounting bracket	8 - 10
Fixing screw of rear door inner handle	5 - 6
Fixing bolt of tail door trim panel	8 - 12

PRECAUTIONS

1. If operation should be conducted in vehicle, cover the seats, the steering wheel and other parts to avoid oil stains.
2. Remove the interior trimming with special remover. If the special remover is not available, the screwdriver or equivalent can also be used after being wrapped.
3. When using the sharp tools to remove the components, it is necessary to wrap the tools with adhesive tape to prevent components from being scratched.
4. Do not remove forcedly the components which can not be removed easily, check if there is fixing screw unscrewed.
5. Snap-fit can be damaged easily, so check the snap-fit removed for damage. If any, replace it.
6. When installing the components, check if their fixing snap-fits are absent.

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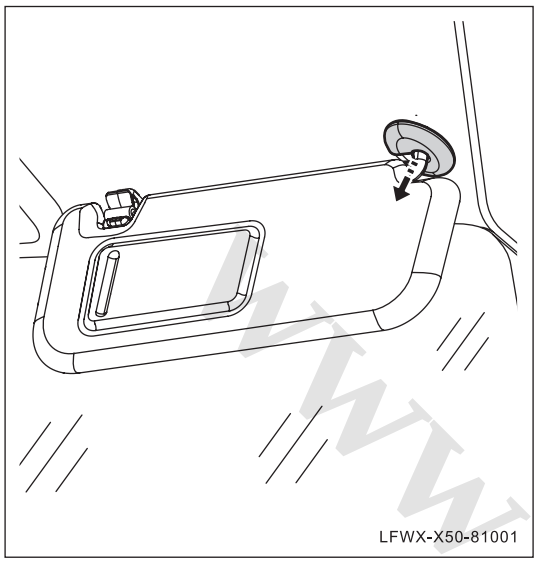
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SUN VISOR

REPLACEMENT

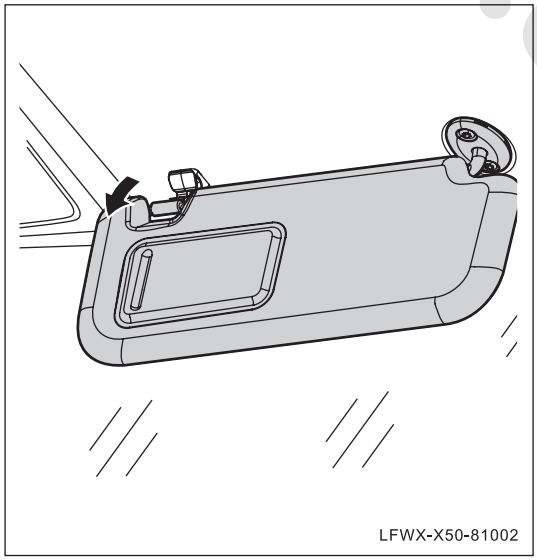
△ HINT:

The installation and removal method of left sun visor is same as that of right sun visor. Therefore, the installation and removal of right sun visor is only taken as an example in this chapter.



1. REMOVE SUN VISOR

(a) Open the sun visor and take out the sun visor fixing screw trim cover.

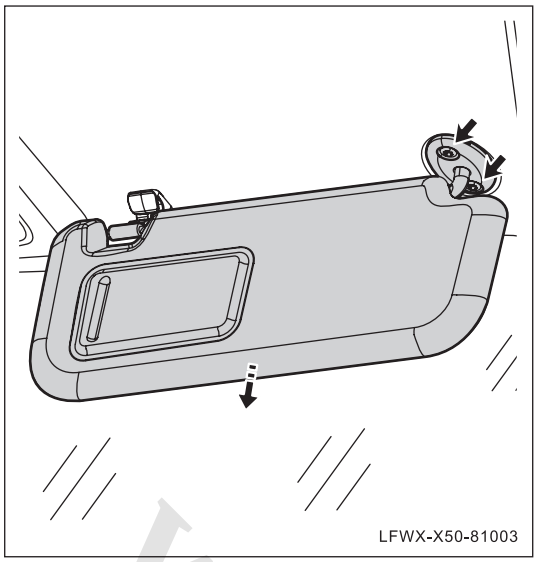


(b) Take out one side of the sun visor from the sun visor support.

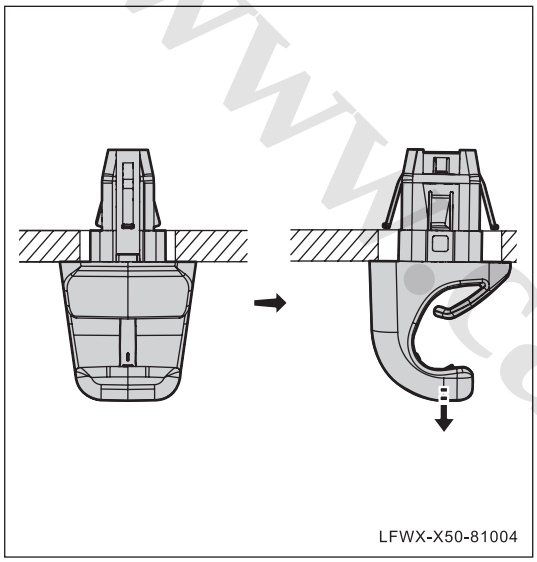
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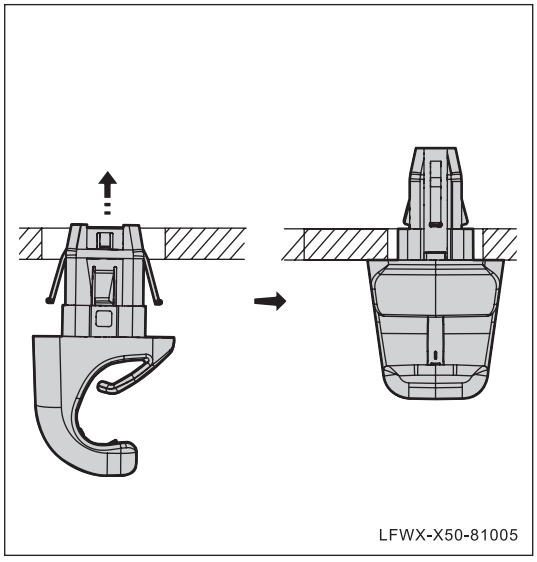
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(c) Remove the fixing screws of sun visor and take out the sun visor assembly.



(d) Rotate the sun visor support by 90º, and take down the sun visor support downwards.



2. INSTALL SUN VISOR ASSEMBLY

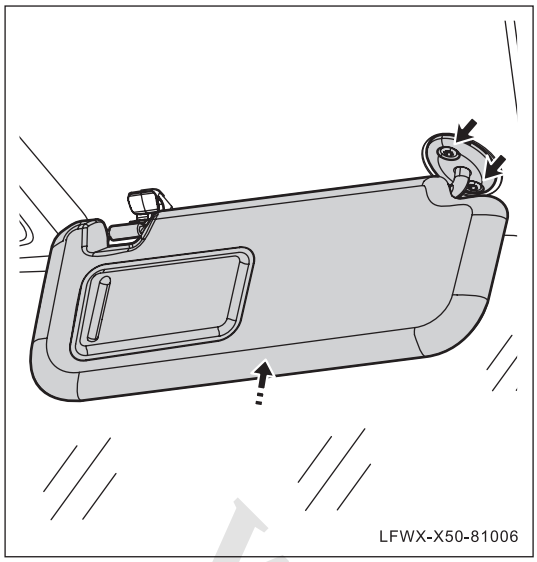
(a) Press the sun visor support into mounting-hole and rotate it by 90º.

△ HINT:

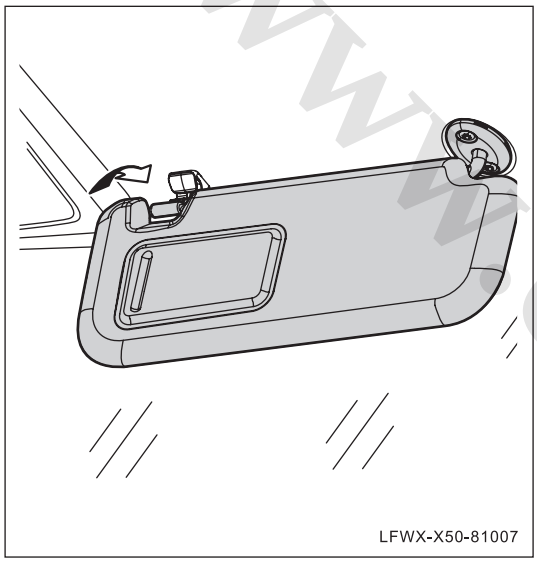
Refer to the removal steps of the sun visor support.

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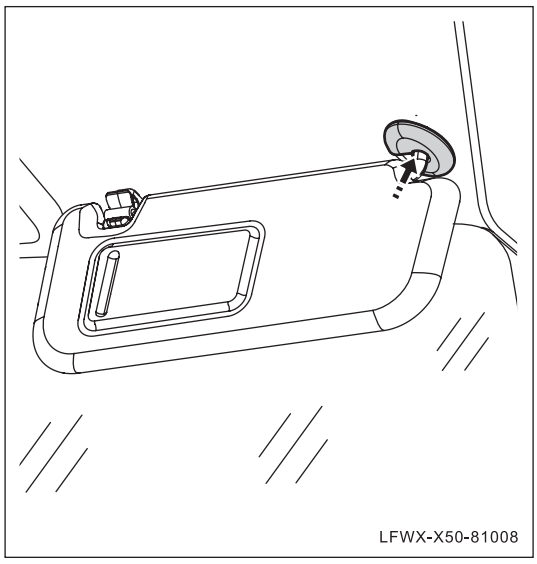
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(b) Install the sun visor to top trim panel, and then install & tighten the fixing screws of sun visor.



(c) Install the sun visor onto its support.



(d) Install the sun visor fixing screw trim cover.

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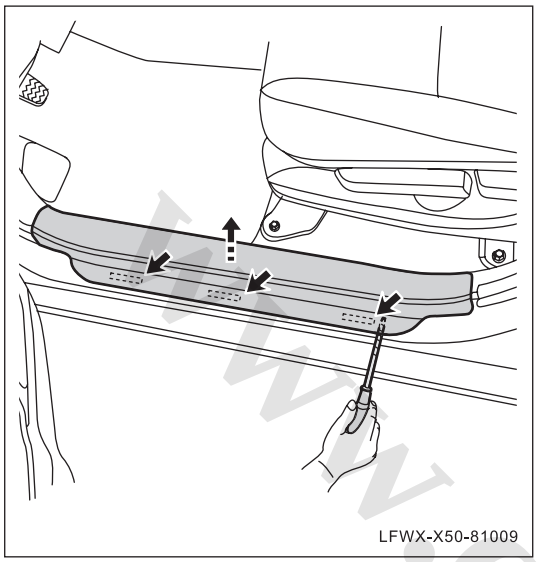
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FRONT DOORSILL TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of front left doorsill trim panel is the same as that of front right doorsill trim panel. Therefore, the installation and removal of front left doorsill trim panel is only taken as an example in this chapter.

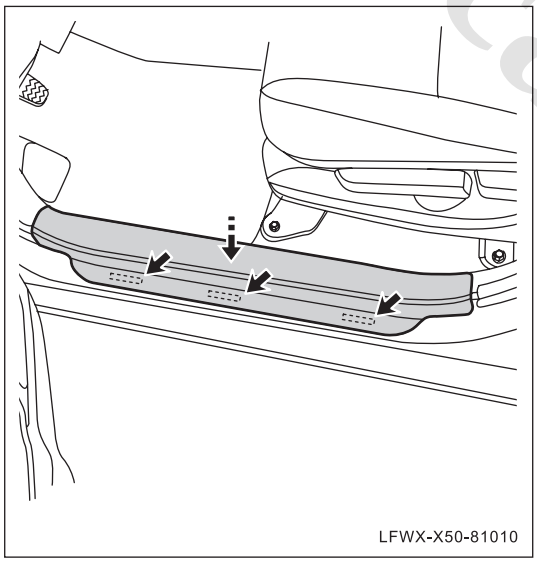


1. REMOVE FRONT DOORSILL TRIM PANEL

(a) Use a flat-blade screwdriver to pry the snap-fit on front doorsill trim panel, and take out front doorsill trim panel.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



2. INSTALL FRONT DOORSILL TRIM PANEL

(a) Install the front doorsill trim panel onto front doorsill aligning front doorsill trim panel snap-fit with the mounting-hole. Press the front doorsill trim panel snap-fit forcedly to install the front doorsill trim panel in place.

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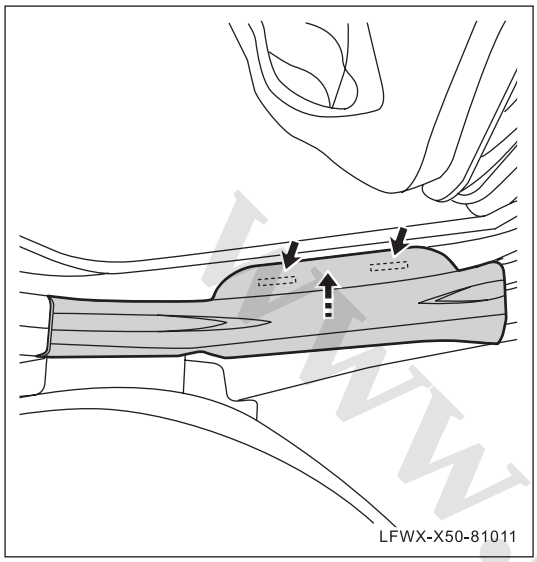
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REAR DOORSILL TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of rear left doorsill panel is the same as that of rear right doorsill panel. Therefore, the installation and removal of rear leaf doorsill panel is only taken as an example in this chapter.

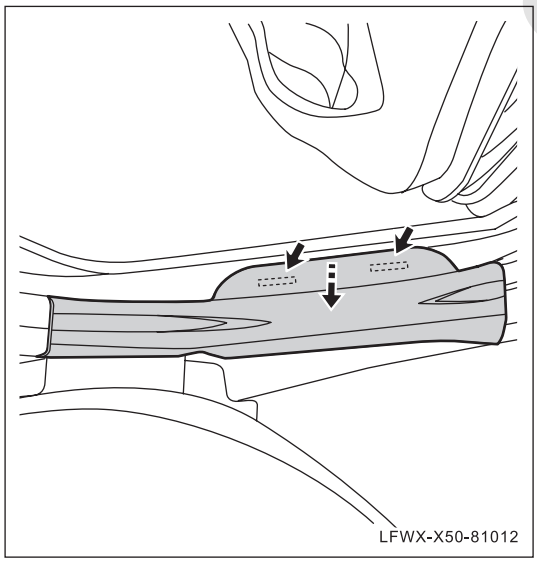


1. REMOVE REAR DOORSILL TRIM PANEL

(a) Use a flat-blade screwdriver to pry the snap-fit on rear doorsill trim panel, and take out rear doorsill trim panel.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



2. INSTALL REAR DOORSILL TRIM PANEL

(a) Install the rear doorsill trim panel onto rear doorsill aligning rear doorsill trim panel snap-fit with the mounting-hole. Press the rear doorsill trim panel snap-fit forcedly to install the rear doorsill trim panel in place.

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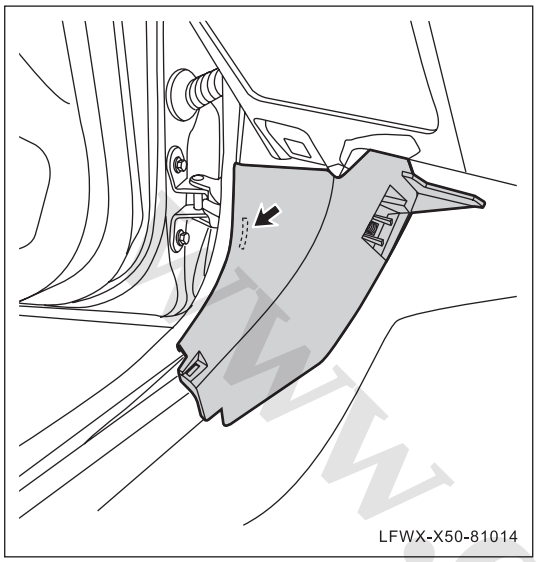
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A PILLAR TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of left A pillar trim panel is the same as that of right A pillar trim panel. Therefore, the installation and removal of left A pillar trim panel is only taken as an example in this chapter.



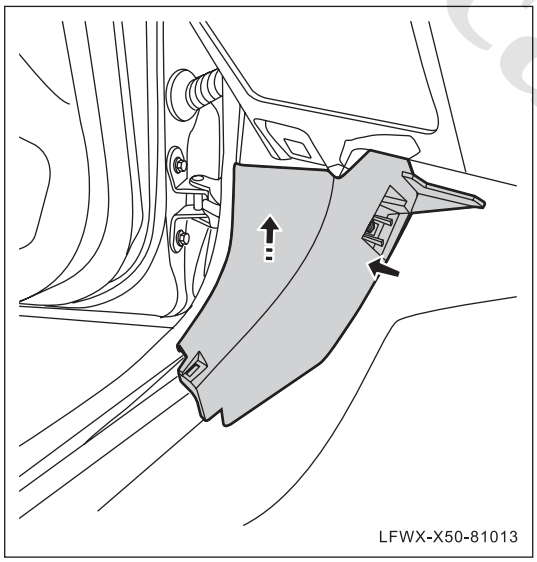
1. REMOVE A PILLAR LOWER TRIM PANEL

(a) Remove front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

(b) Pry fixing snap-fits of A pillar lower trim panel with a flat-blade screwdriver.

NOTICE:

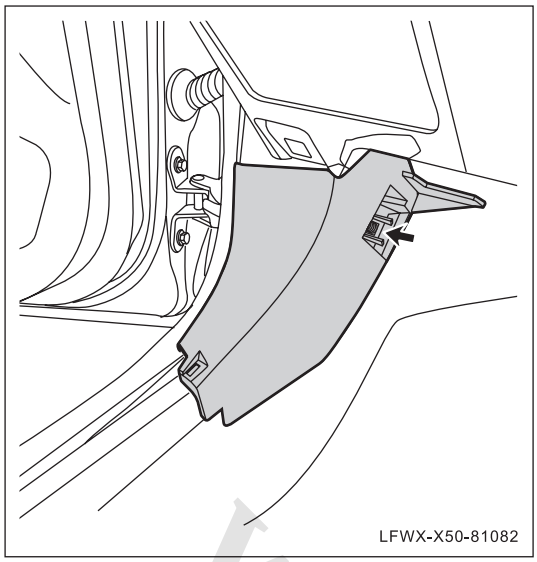
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



(c) Press A pillar inside lower trim panel and take out the A pillar lower trim panel.

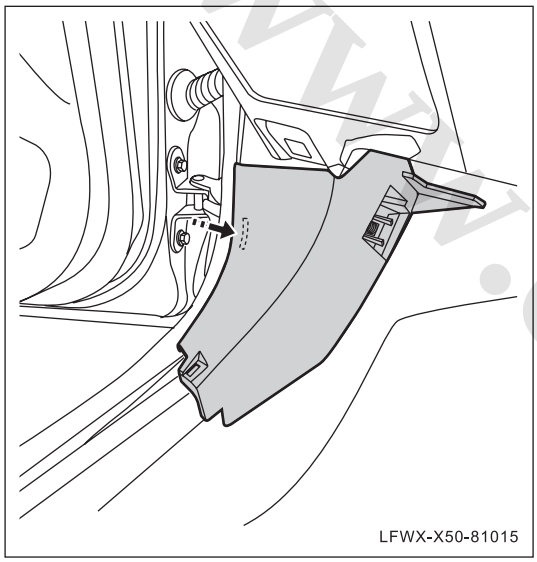
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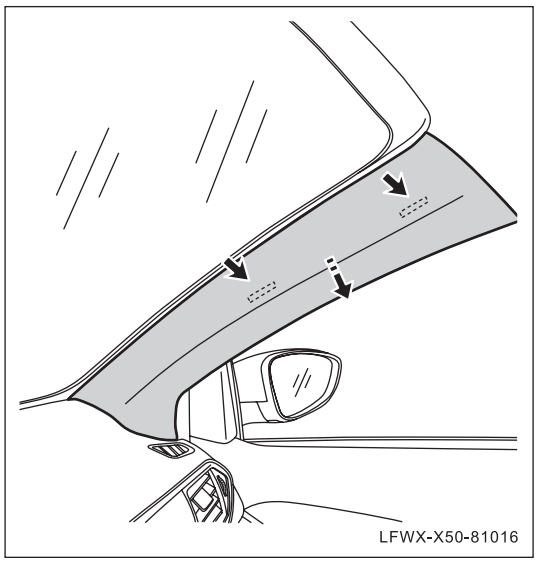
2. INSTALL A PILLAR LOWER TRIM PANEL

(a) Install the A pillar lower trim panel in place aligning the locating bolts of A pillar lower trim panel with mounting hole.



(b) Align the fixing snap-fit of A pillar lower trim panel with the mounting hole, and press the fixing snap-fit of A pillar lower trim panel forcedly to install the A pillar lower trim panel in place.

(c) Install front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)



3. REMOVE A PILLAR UPPER TRIM PANEL

(a) Remove front door weatherstrips near A pillar upper trim panel.

(b) Pry A pillar upper trim panel edge with a flat-blade screwdriver and loosen A pillar upper trim panel.

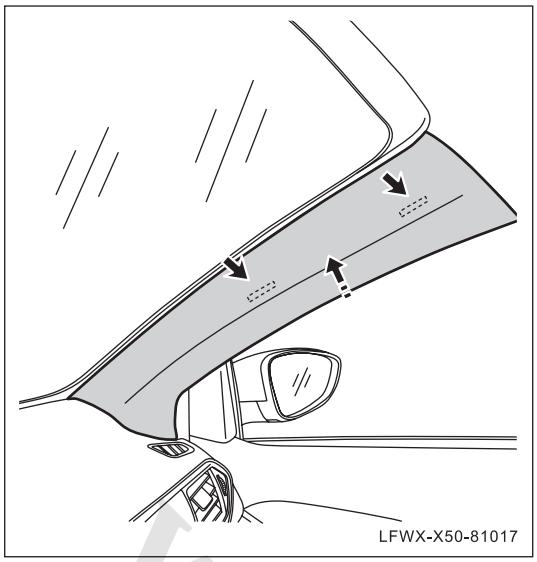
(c) Search the snap-fit location of A pillar upper trim panel,and pry plastic snap-fits of A pillar upper trim panel with a flat-blade screwdriver and take out A pillar upper trim panel.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

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4. INSTALL A PILLAR UPPER TRIM PANEL

(a) Install A pillar upper trim panel onto the vehicle body A pillar, align the snap-fit mounting hole and press A pillar upper trim panel forcedly to install the A pillar upper trim panel in place.

(b) Install front door weatherstrips near A pillar upper trim panel

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B PILLAR TRIM PANEL

REPLACEMENT

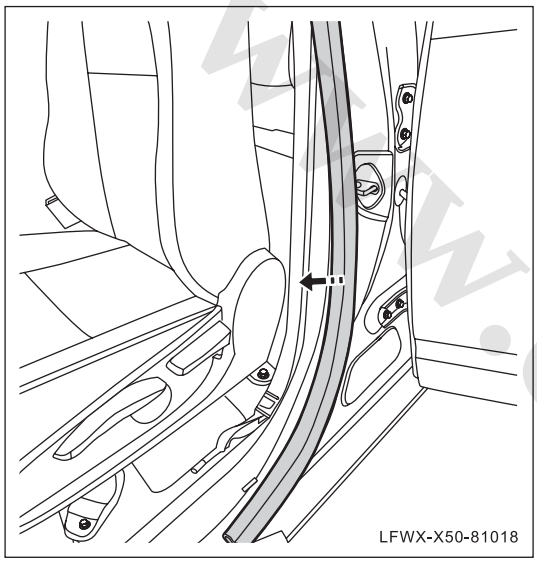
△ HINT:

The installation and removal method of left B pillar trim panel is the same as that of right B pillar trim panel. Therefore, the installation and removal of left B pillar trim panel is only taken as an example in this chapter.

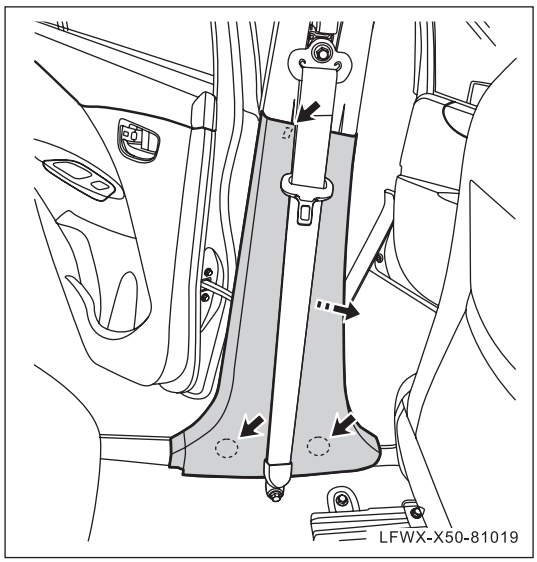
1. REMOVE B PILLAR LOWER TRIM PANEL

(a) Remove front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

(b) Remove rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)



(c) Remove front and rear door weatherstrips near B pillar lower trim panel.



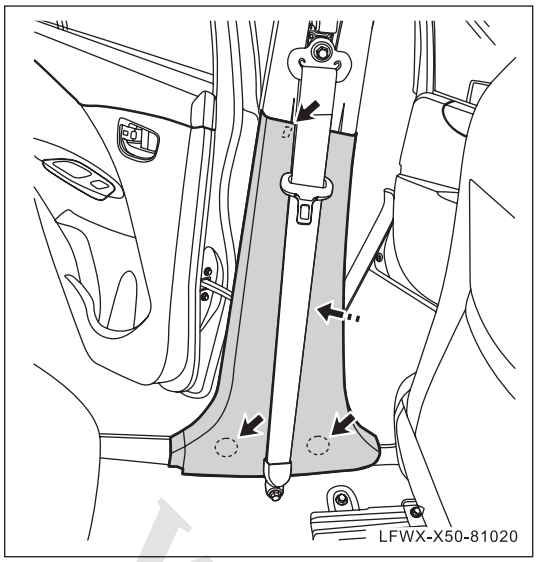
(d) Pry fixing snap-fits of B pillar lower trim panel with a flat-blade screwdriver and remove B pillar lower trim panel.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

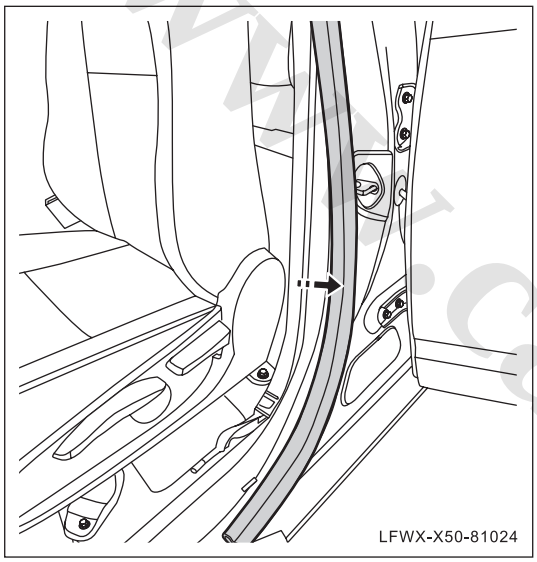
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2. INSTALL B PILLAR LOWER TRIM PANEL

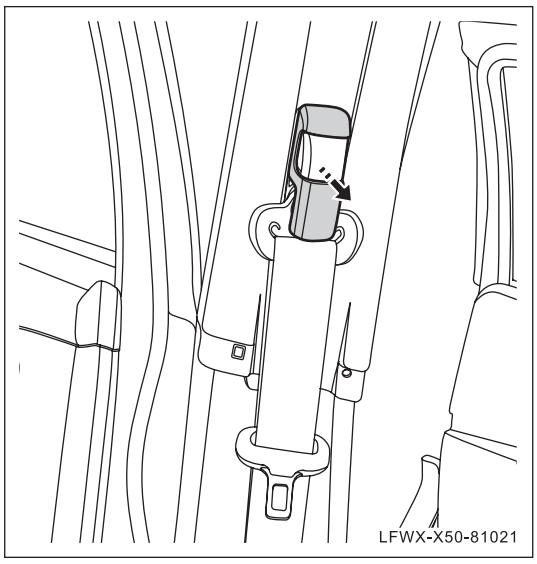
(a) Install B pillar lower trim panel onto B pillar, align the snap-fit mounting hole and press the fixing snap-fits of B pillar lower trim panel forcedly to install the B pillar lower trim panel in place.



(b) Install front and rear door weatherstrips near B pillar lower trim panel.

(c) Install front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

(d) Install rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)



3. REMOVE B PILLAR UPPER TRIM PANEL

(a) Remove B pillar lower trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

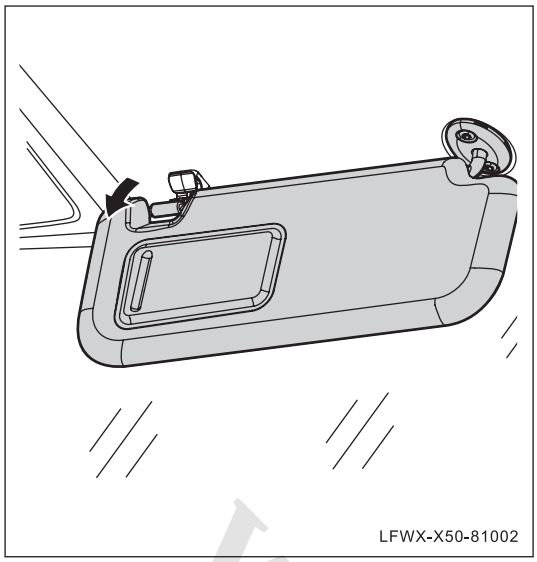
(b) Pry off height adjuster cover of driver seat belt with a flat-blade screwdriver.

NOTICE:

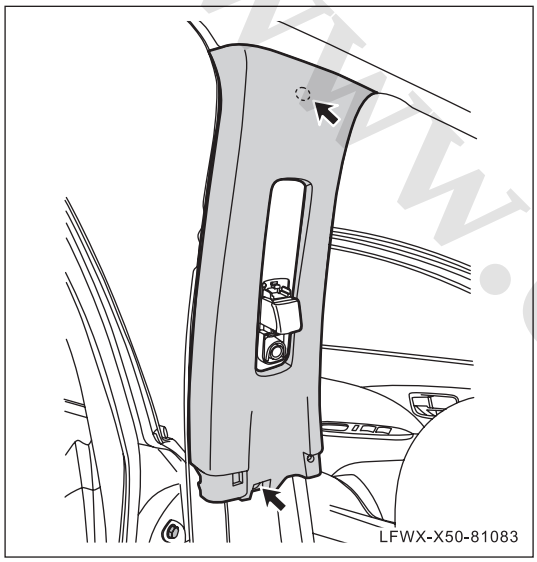
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

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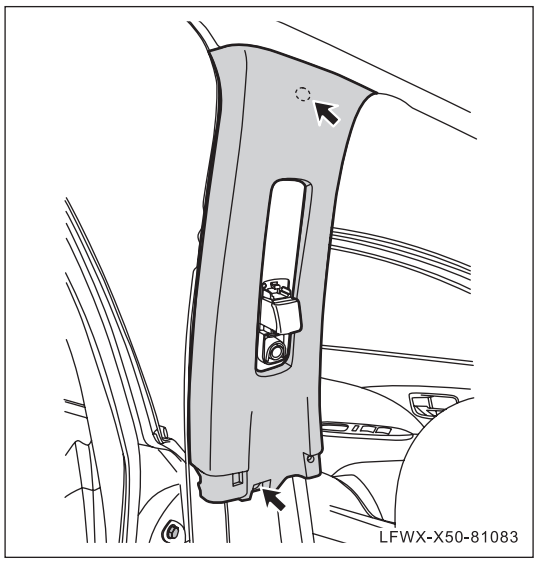
(c) Remove the fixing bolts of upper bracket of driver seat belt, and disconnect the seat belt.



(d) Pry fixing snap-fits of B pillar upper trim panel with a flat-blade screwdriver, and take out B pillar upper trim panel.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



4. INSTALL B PILLAR UPPER TRIM PANEL

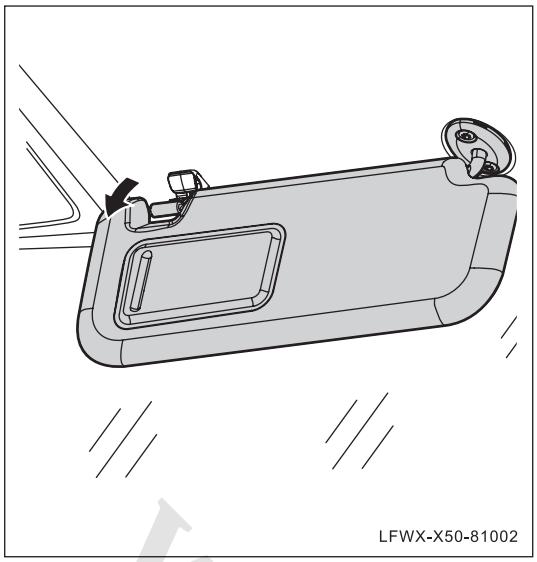
(a) Install B pillar upper trim panel onto B pillar, align the snap-fit mounting hole and press the snap-fits of B pillar upper trim panel to install the B pillar upper trim panel in place.

△ HINT:

After installing B pillar upper trim panel, move height adjuster of driver seat belt up and down to make sure height adjuster works normally.

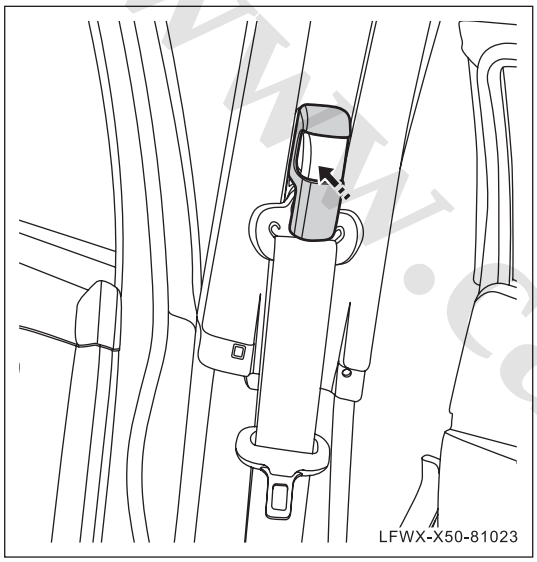
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(b) Install upper bracket of driver seat belt onto height adjuster of seat belt, and then install & tighten the fixing bolts.

Torque: 65 - 85 N•m



(c) Install height adjuster cover of seat belt and press its snap-fit forcedly to install the height adjuster cover in place.

(d) Install B pillar lower trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

(e) Install front and rear door weatherstrips near B pillar lower trim panel.

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C PILLAR TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of left C pillar trim panel is the same as that of right C pillar trim panel. Therefore, the installation and removal of left C pillar trim panel is only taken as an example in this chapter.

1. REMOVE C PILLAR LOWER TRIM PANEL

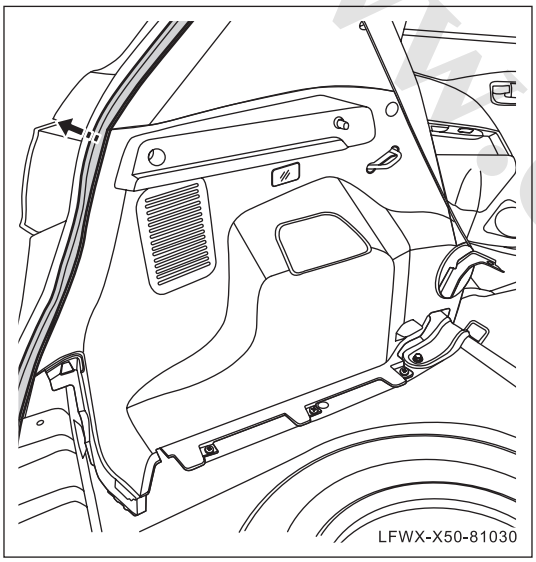
(a) Remove the rear shelf panel assembly. (See 81 - Interiors and Exteriors, Rear Shelf Panel, Replacement)

(b) Remove the trunk carpet. (See 81 - Interiors and Exteriors, Floor Carpet, Replacement)

(c) Remove rear apron trim panel. (See 81 - Interiors and Exteriors, Rear Apron Trim Panel, Replacement)

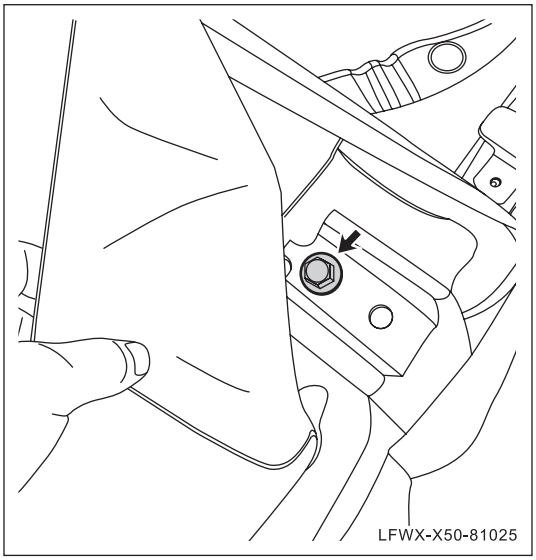
(d) Remove rear door weatherstrips near C pillar trim panel.

(e) Remove rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)



(f) Remove tail door weatherstrips near C pillar trim panel.

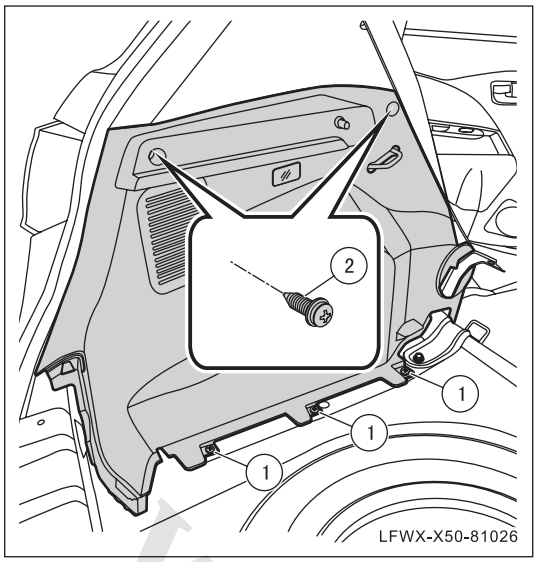
(g) Remove rear seat cushion. (See 84 - Seat, Rear Seat, Replacement)



(h) Press the switch to fold the rear seat backrest. Remove the left fixing bolts of rear seat backrest bracket and then move away the rear seats.

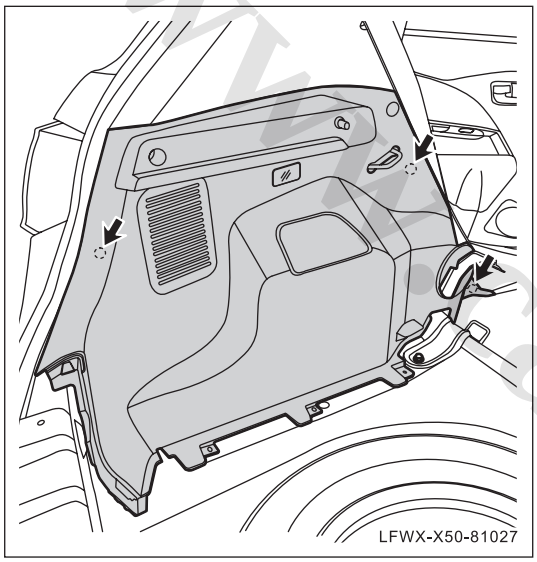
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(i) Remove inlay clip ① of C pillar lower trim panel.

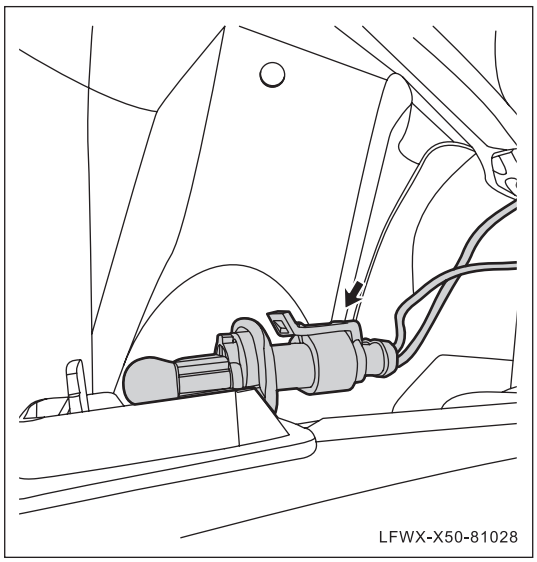
(j) Remove fixing screw ② of C pillar lower trim panel.



(k) Pry the fixing snap-fits of C pillar lower trim panel with a flat-blade screwdriver and open C pillar lower trim panel gently.

NOTICE:

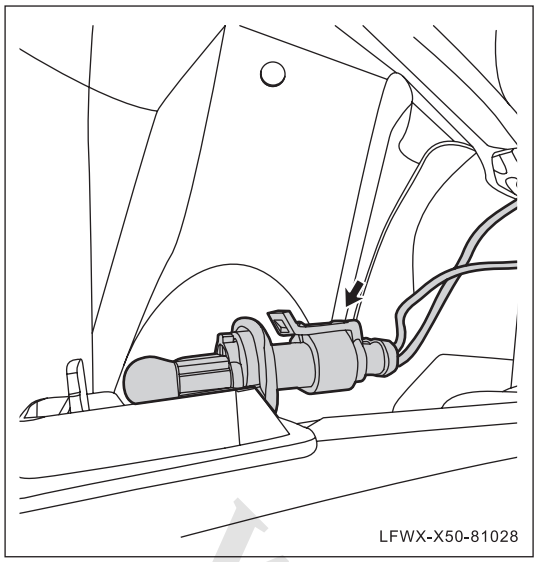
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



(l) Disconnect the trunk lamp connectors, and take out C pillar lower trim panel.

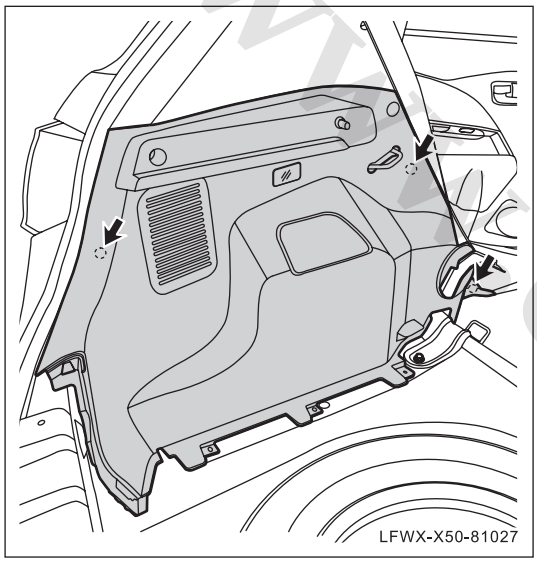
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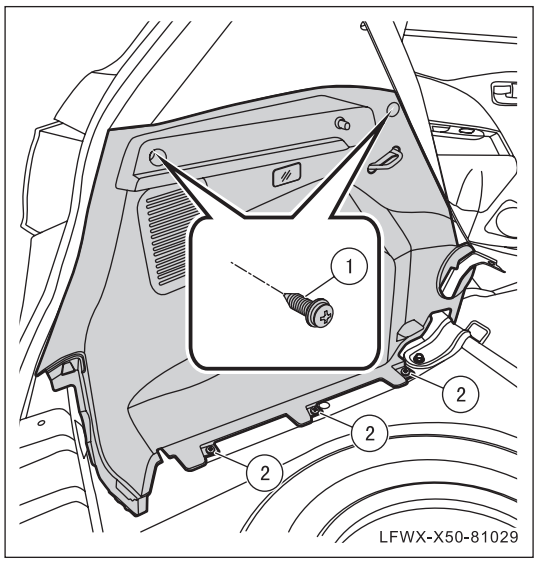


2. INSTALL C PILLAR LOWER TRIM PANEL

(a) Connect the trunk lamp connectors.



(b) Install C pillar lower trim panel onto C pillar, align the snap-fit mounting hole and press the snap-fits of C pillar lower trim panel forcedly to install the C pillar lower trim panel in place.



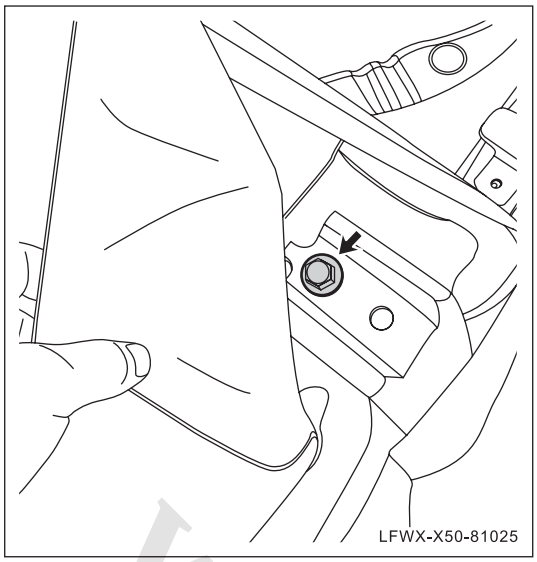
(c) Install and tighten fixing screw ① of C pillar lower trim panel.

Torque: 5 - 6 N•m

(d) Install and tighten inlay clip ② of C pillar lower trim panel.

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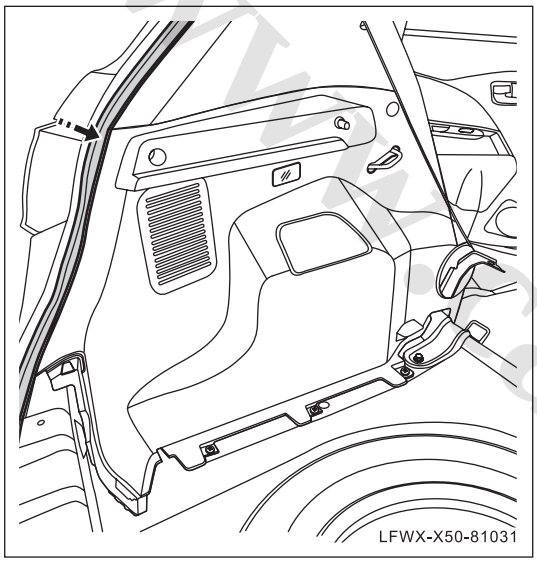


(e) Reset rear seats, and install & tighten the fixing bolts of rear seat backrest.

Torque: 30 - 40 N•m

(f) Install rear seat cushion. (See 84 - Seat, Rear Seat, Replacement)

(g) Install rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)



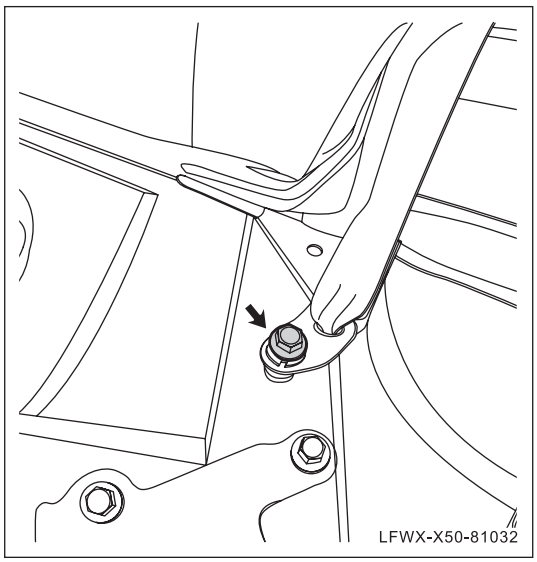
(h) Install rear door weatherstrips near C pillar trim panel.

(i) Install rear apron trim panel. (See 81 - Interiors and Exteriors, Rear Apron Trim Panel, Replacement)

(j) Install tail door weatherstrips near C pillar trim panel.

(k) Install the trunk carpet. (See 81 - Interiors and Exteriors, Floor Carpet, Replacement)

(l) Install the rear shelf panel assembly. (See 81 - Interiors and Exteriors, Rear Shelf Panel, Replacement)



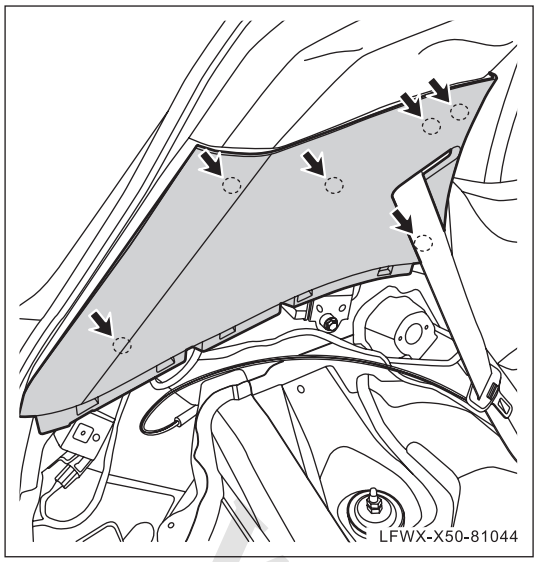
3. REMOVE C PILLAR UPPER TRIM PANEL

(a) Remove C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

(b) Remove the fixing bolts of lower bracket of seat belt, and disconnect the seat belt.

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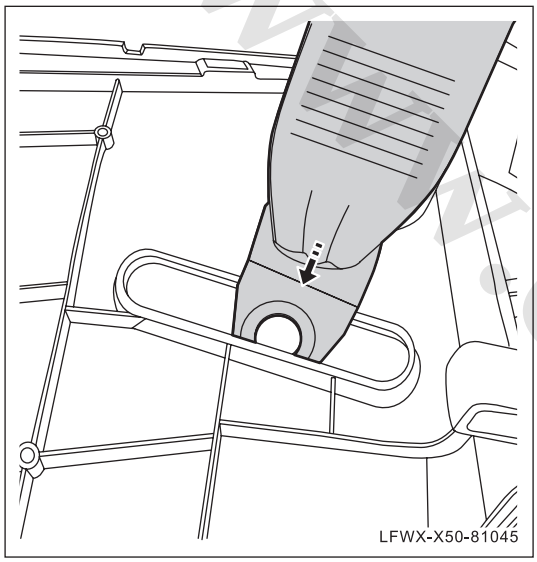
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(c) Pry plastic snap-fits of C pillar upper trim panel with a flat-blade screwdriver and take out C pillar upper trim panel.

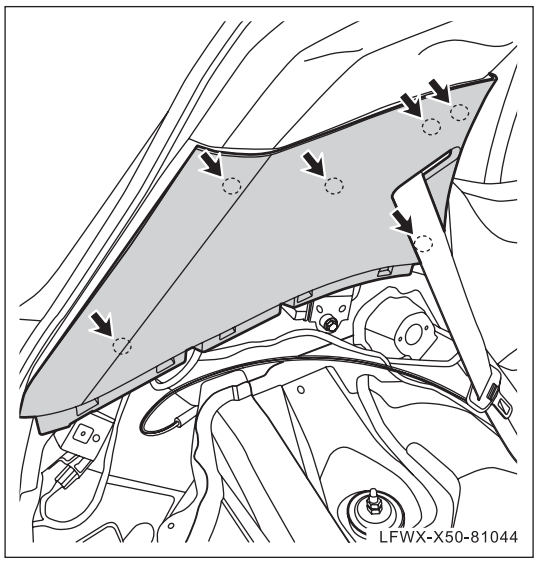
NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



4. INSTALL C PILLAR UPPER TRIM PANEL

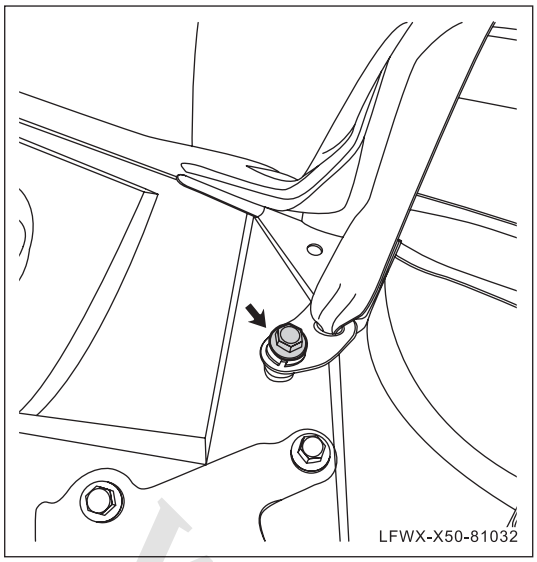
(a) Insert the bottom of the seat belt and the latching tongue of the seat belt through C pillar upper trim panel.



(b) Install C pillar upper trim panel onto C pillar, align the snap-fit mounting hole and press the snap-fits of C pillar upper trim panel forcedly to install the C pillar upper trim panel in place.

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(c) Install and tighten the bottom fixing bolts of seat belt.

Torque: 65 - 85 N•m

(d) Install C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

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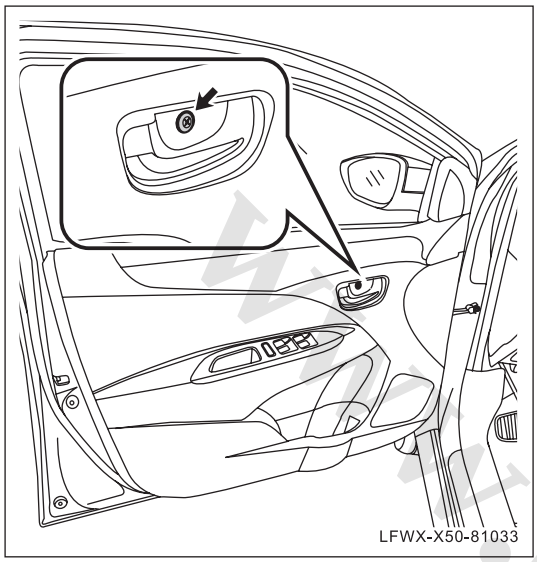
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FRONT DOOR TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of front left door trim panel is the same as that of front right door trim panel. Therefore, the installation and removal of front left door trim panel is only taken as an example in this chapter.

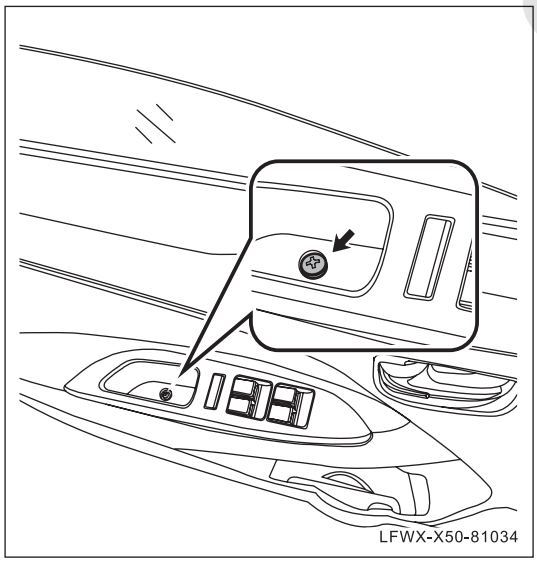


1. REMOVE FRONT DOOR TRIM PANEL

(a) Remove the fixing screws of front door inner handle.

△ HINT:

In order to remove fixing screws of front door inner handle, pull up inner handle and then remove it.



(b) Remove the fixing screws of front door window lifter control box.

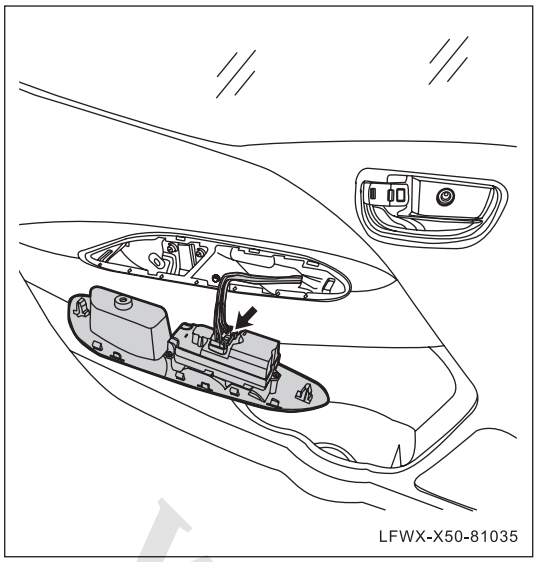
(c) Pry window lifter control box with a flat-blade screwdriver.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

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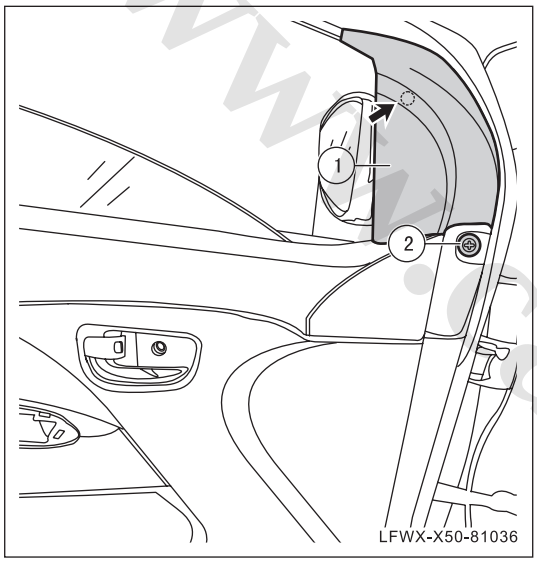
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(d) Disconnect window lifter control switch wire harness connector and take out window lifter control box.

NOTICE:

When disconnecting the connector, do not pull wire harness to prevent wire harness from being damaged.

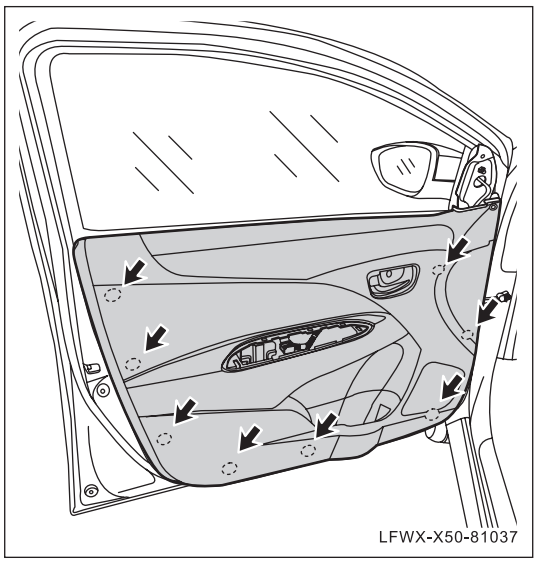


(e) Pry front door triangle trim panel ① with a flat-blade screwdriver and take out front door triangle trim panel ① .

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

(f) Remove the front door trim panel inlay clip ② .



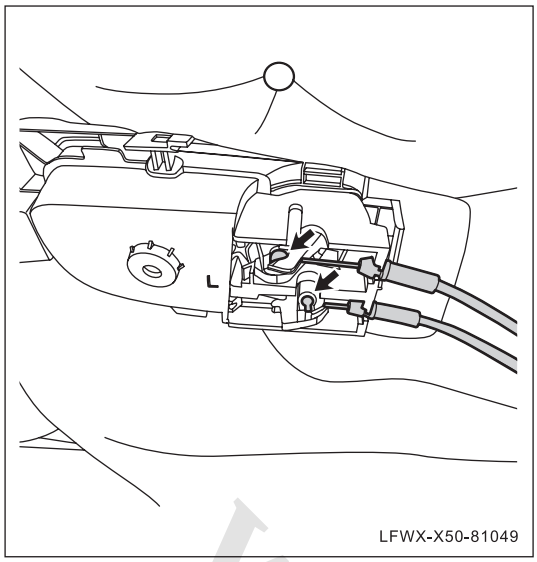
(g) Pry plastic snap-fits around front door trim panel with a flat-blade screwdriver, but do not take out front door trim panel.

NOTICE:

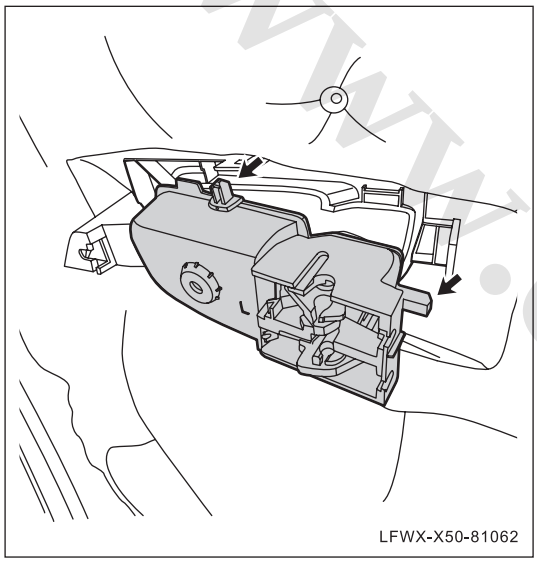
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

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(h) Open the front door trim panel gently, and disconnect the front door inner handle cable and then take out the front door trim panel.

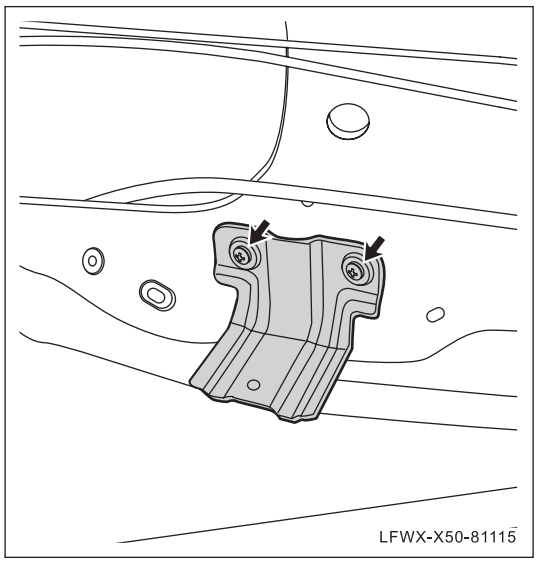


2. DISASSEMBLE THE FRONT DOOR TRIM PANEL

(a) Remove front door inner handle.

△ HINT:

Pay attention to the location of front door inner handle snap-fit when removing.

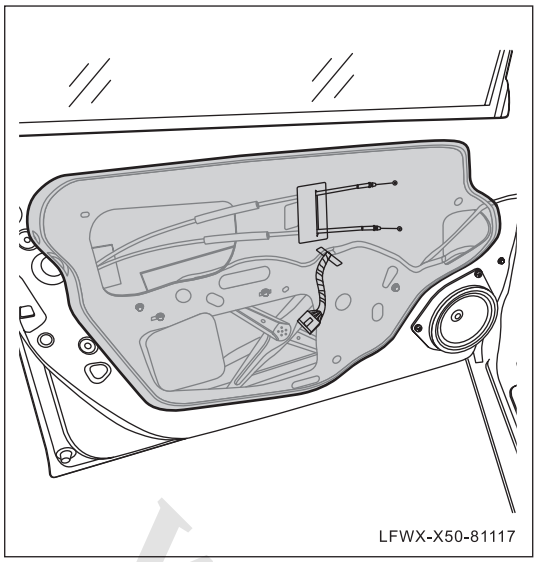


3. REMOVE THE WATERPROOF MEMBRANE OF FRONT DOOR

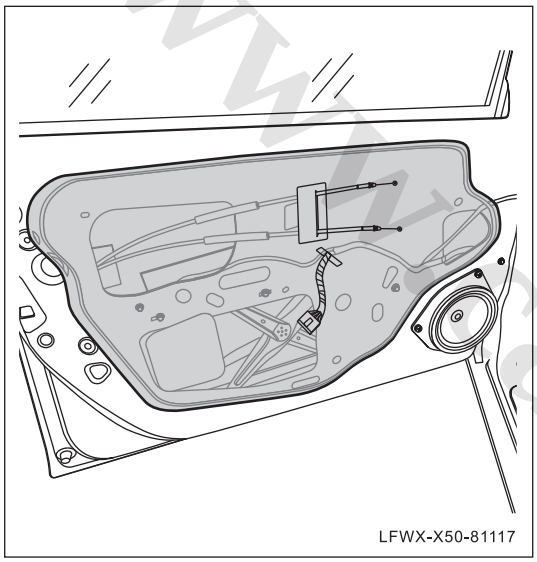
(a) Remove the mounting bracket of front door panel armrest.

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(b) Take out the waterproof membrane of front door.

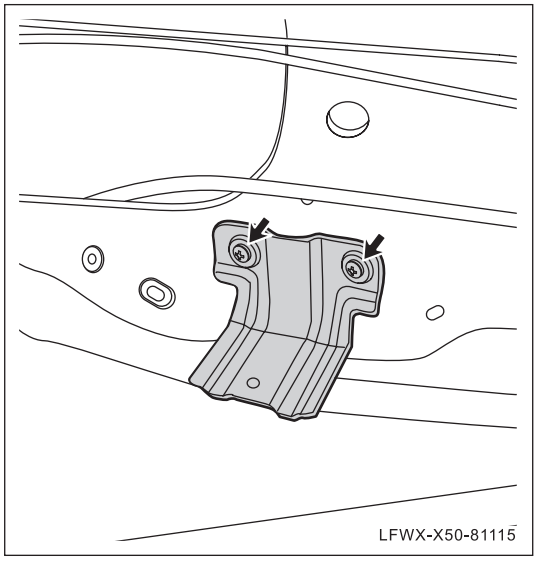


4. INSTALL THE WATERPROOF MEMBRANE OF FRONT DOOR

(a) Apply waterproof membrane sealant onto waterproof membrane, and paste the waterproof membrane onto the front door.

△ HINT:

- If the waterproof membrane of front door is worn excessively, replace it.
- Arrange the wire harnesses of connectors neatly and pull out the wire harnesses of door inner handle cable and window lifter control switch.

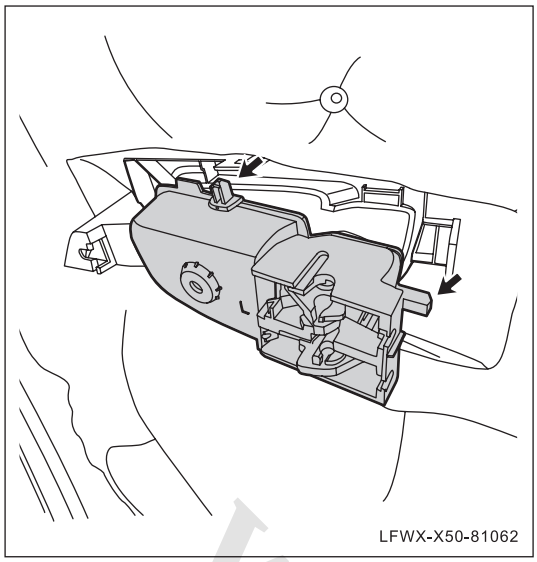


(b) Install the mounting bracket of front door panel armrest onto the door, and then install & tighten the fixing screws.

Torque: 8 - 10 N•m

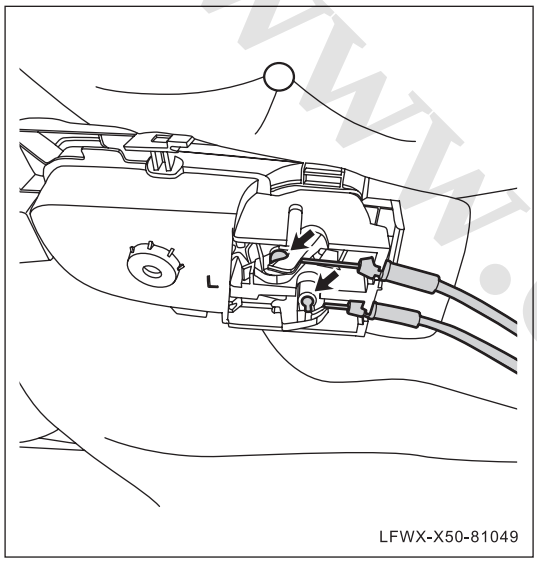
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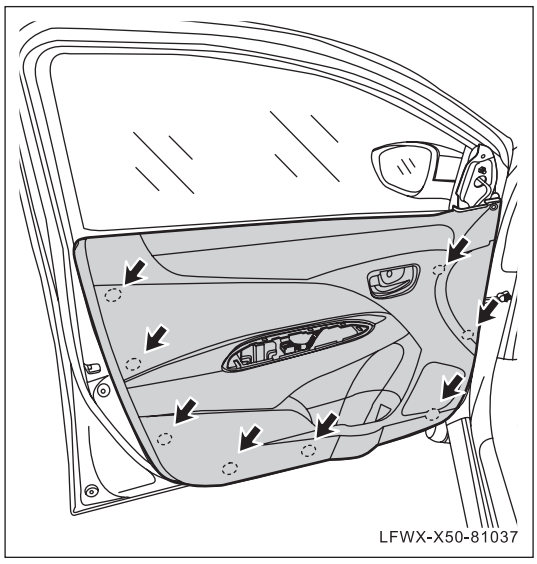
5. ASSEMBLE THE FRONT DOOR TRIM PANEL

(a) Install the front door inner handle.



6. INSTALL FRONT DOOR TRIM PANEL

(a) Let the front door trim panel close to mounting location of the front door, and connect the front door inner handle cable.



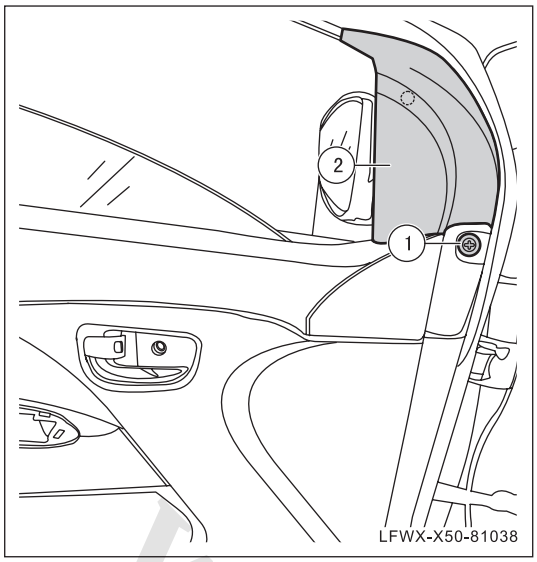
(b) Install front door trim panel onto the front door to align fixing snap-fits of front door trim panel with mounting-hole of front door, and then press front door trim panel forcedly to install front door trim panel in place.

△ HINT:

Arrange the window lifter connectors neatly when installing the front door trim panel.

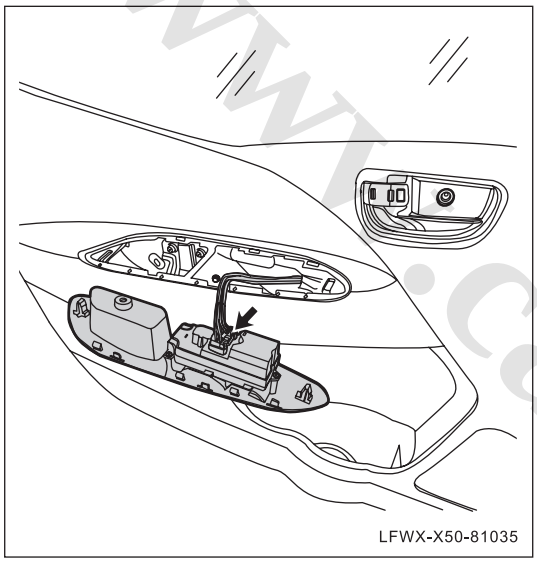
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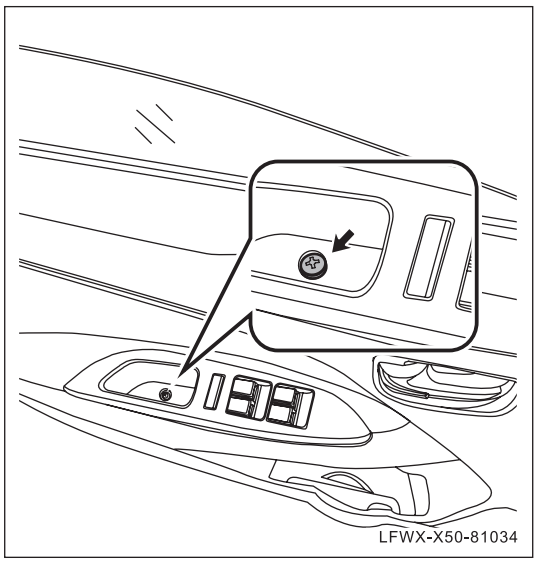


(c) Install the front door trim panel inlay clip ① .

(d) Install front door triangle trim panel ② .



(e) Install window lifter control switch wire harness connector.

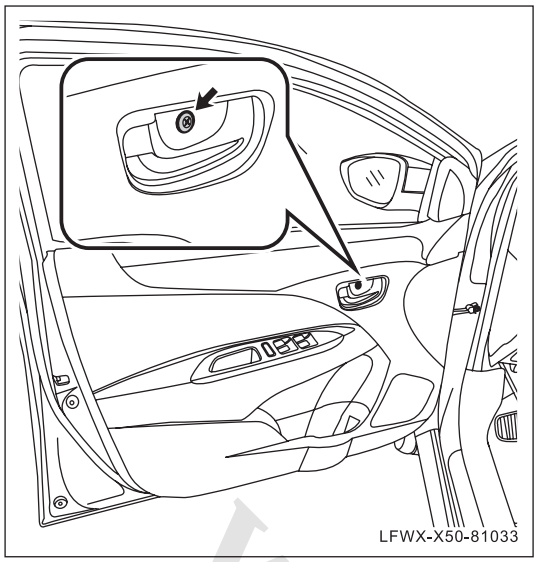


(f) Install the window lifter control box onto front door, and then install & tighten the fixing screws of front door window lifter control box.

Torque: 5 - 6 N•m

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(g) Install and tighten the fixing screws of front door inner handle.

Torque: 5 - 6 N•m

△ HINT:

In order to install fixing screws of front door inner handle, first pull up inner handle and then install them.

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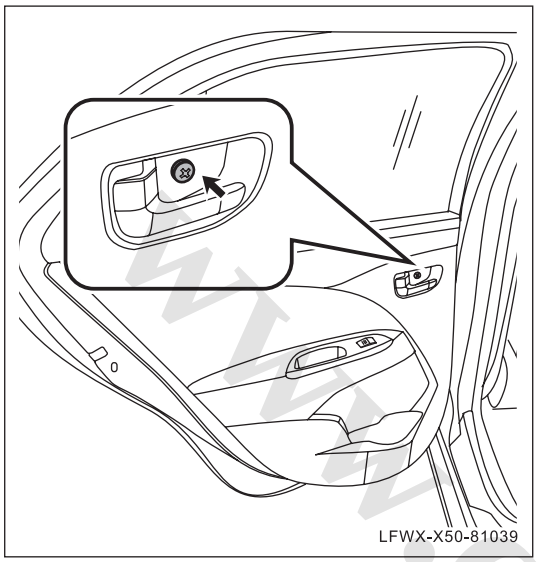
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REAR DOOR TRIM PANEL

REPLACEMENT

△ HINT:

The installation and removal method of rear left door trim panel is the same as that of rear right door trim panel. Therefore, the installation and removal of left rear door trim panel is only taken as an example in this chapter.

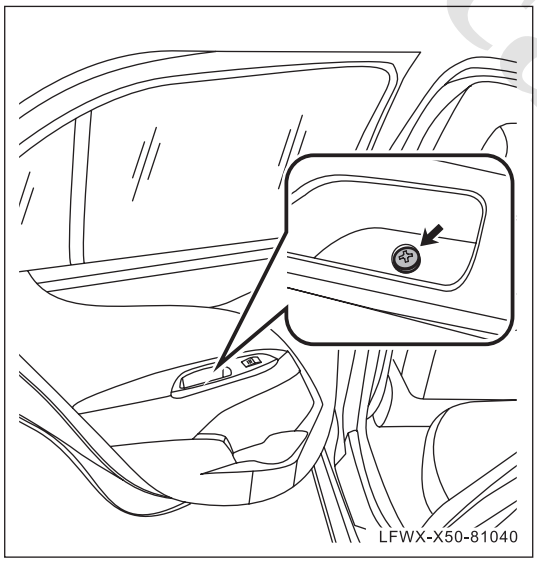


1. REMOVE REAR DOOR TRIM PANEL

(a) Remove the fixing screws of rear door inner handle.

△ HINT:

In order to remove fixing screws of rear door inner handle, first pull up inner handle and then remove it.



(b) Remove the fixing screws of rear door window lifter control box.

(c) Pry window lifter control box with a flat-blade screwdriver.

ⓘ NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.

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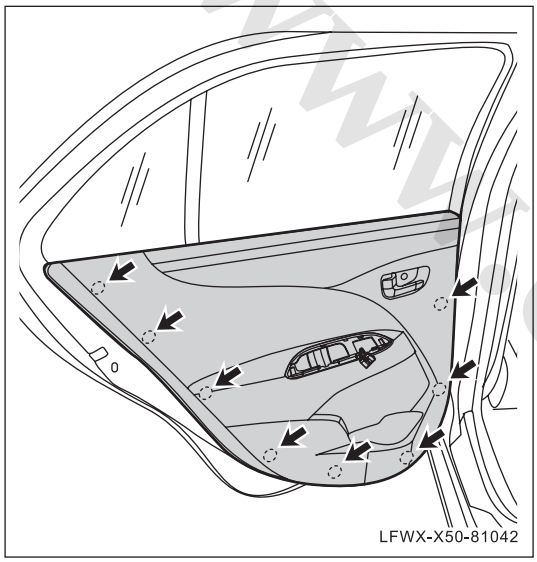
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(d) Disconnect window lifter control switch wire harness connector and take out window lifter control box.

NOTICE:

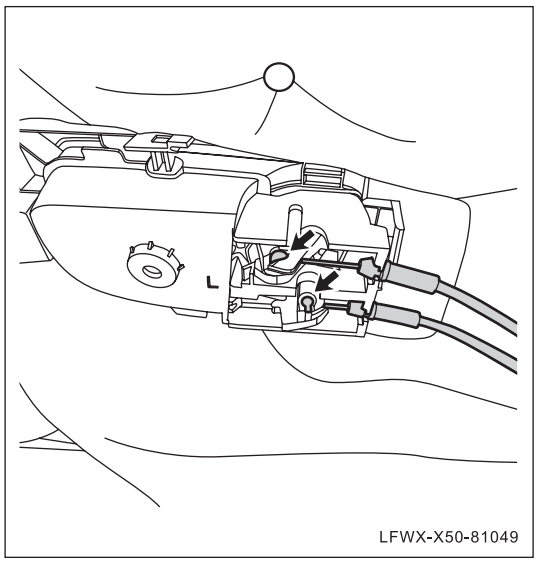
When disconnecting the connector, do not pull wire harness to prevent wire harness from being damaged.



(e) Pry plastic snap-fits around rear door trim panel with a flat-blade screwdriver, but do not take out rear door trim panel.

NOTICE:

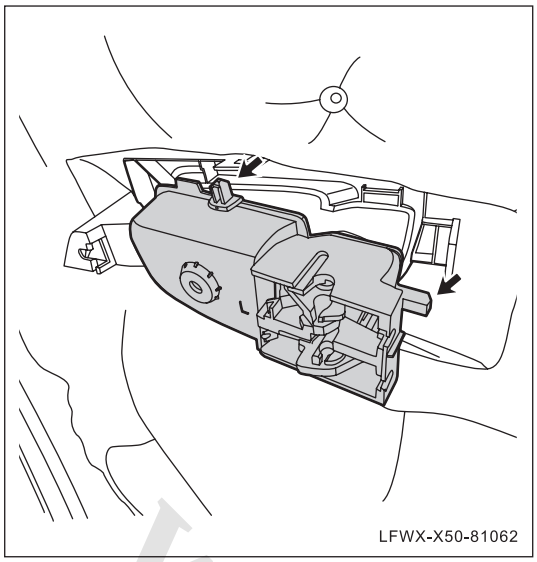
Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



(f) Open the rear door trim panel gently, and disconnect the rear door inner handle cable and then take down the rear door trim panel.

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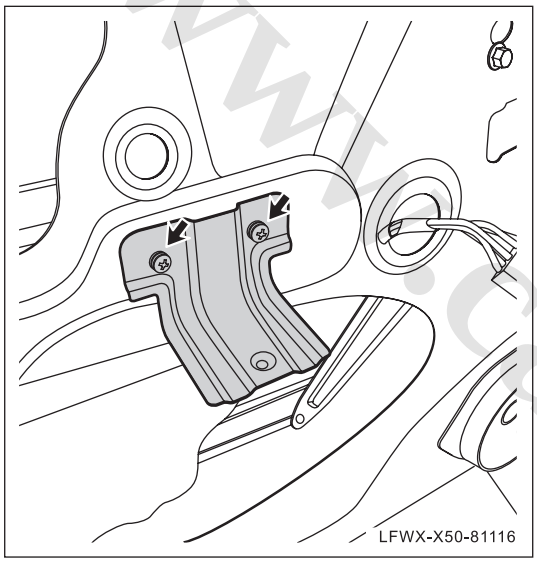


2. DISASSEMBLE THE REAR DOOR TRIM PANEL

(a) Remove rear door inner handle.

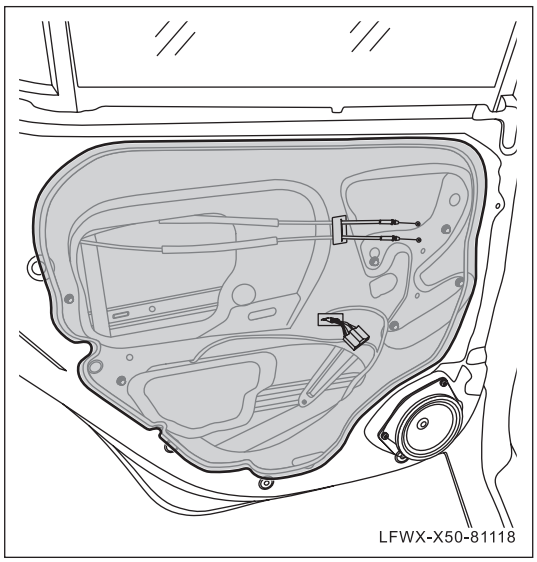
△ HINT:

Pay attention to the location of rear door inner handle snap-fit when removing.



3. REMOVE THE WATERPROOF MEMBRANE OF REAR DOOR

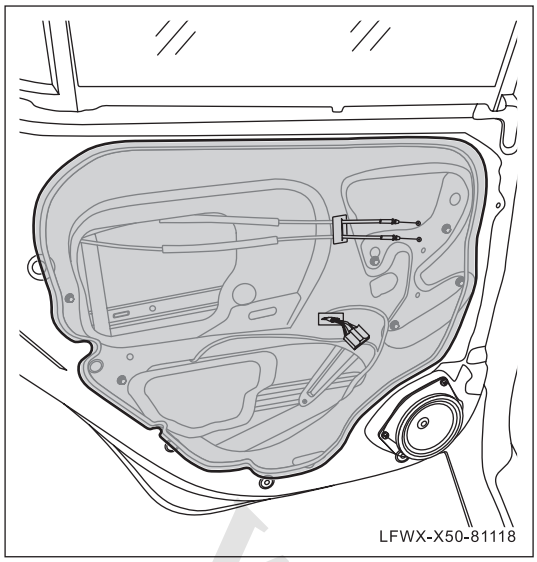
(a) Remove the mounting bracket of rear door panel armrest.



(b) Remove the waterproof membrane of rear door .

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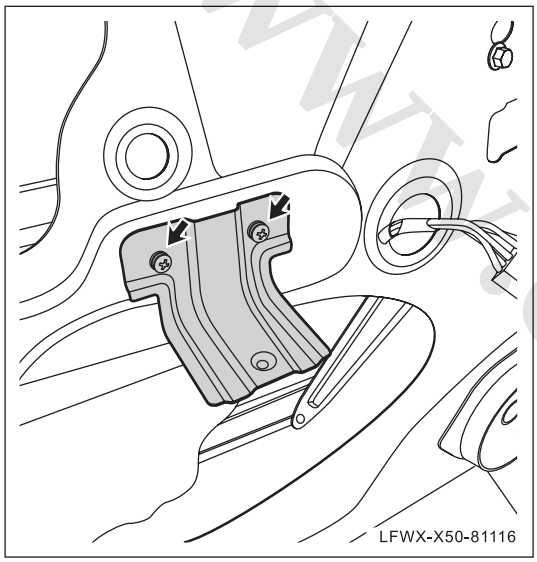
4. INSTALL THE WATERPROOF MEMBRANE OF REAR DOOR

(a) Apply waterproof membrane sealant onto waterproof membrane, and paste the waterproof membrane onto the rear door.

Waterproof membrane sealant:

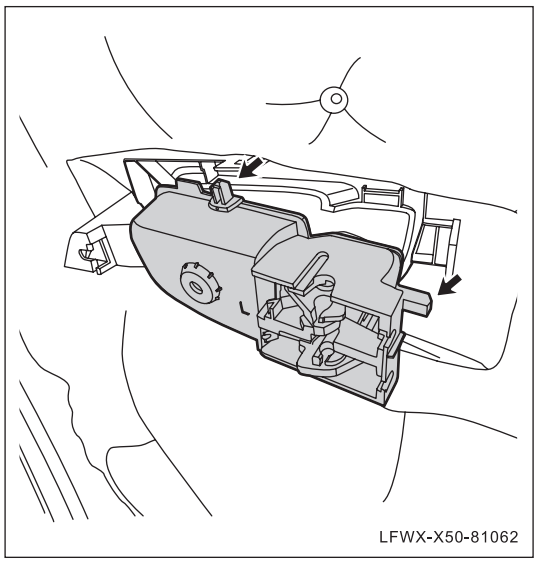
△ HINT:

- If the waterproof membrane of rear door is worn excessively, replace it.
- Arrange the wire harnesses of connectors neatly and pull out the wire harnesses of door inner handle cable and window lifter control switch.



(b) Install the mounting bracket of rear door panel armrest onto the door, and then install & tighten the fixing screws.

Torque: 8 - 10 N•m

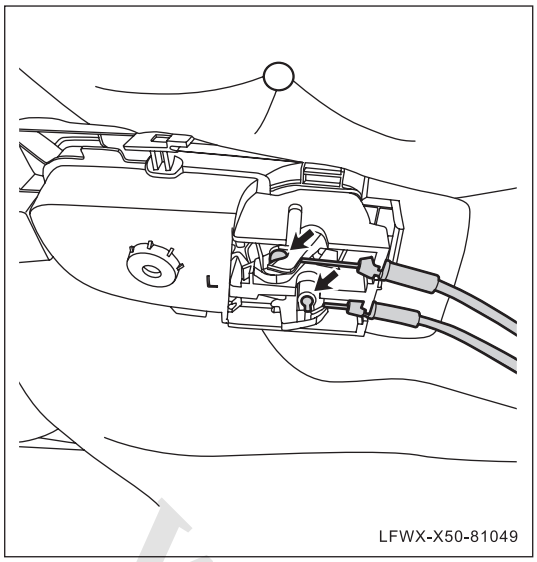


5. ASSEMBLE THE REAR DOOR TRIM PANEL

(a) Install the rear door inner handle.

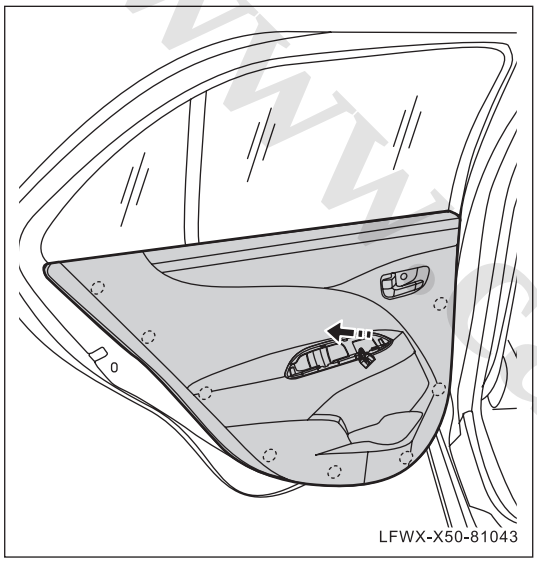
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6. INSTALL REAR DOOR TRIM PANEL

(a) Let the rear door trim panel close to mounting location of the rear door, and connect the rear door inner handle cable.



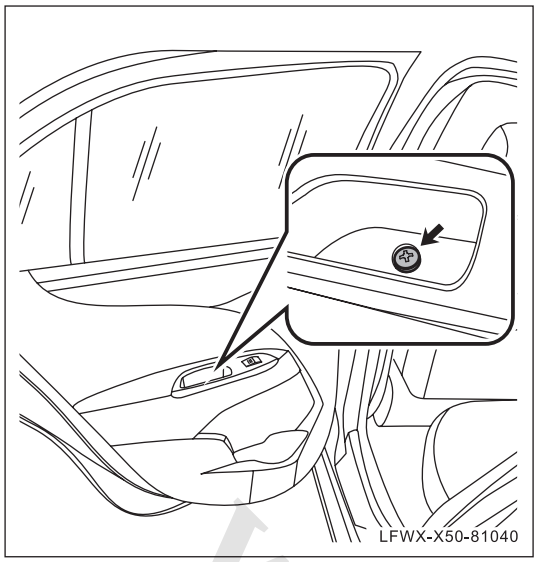
(b) Install rear door trim panel onto the rear door aligning fixing snap-fits of rear door trim panel with mounting-hole of rear door, and then press rear door trim panel forcedly to install rear door trim panel in place.



(c) Install window lifter control switch wire harness connector.

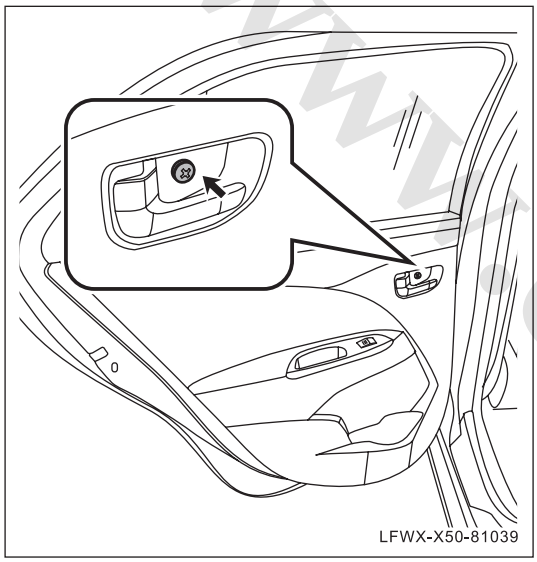
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(d) Install the window lifter control box onto rear door, and then install & tighten the fixing screws of rear door window lifter control box.

Torque: 5 - 6 N•m



(e) Install and tighten the fixing screws of rear door inner handle.

Torque: 5 - 6 N•m

△ HINT:

In order to install fixing screws of rear door inner handle, first pull up inner handle and then install them.

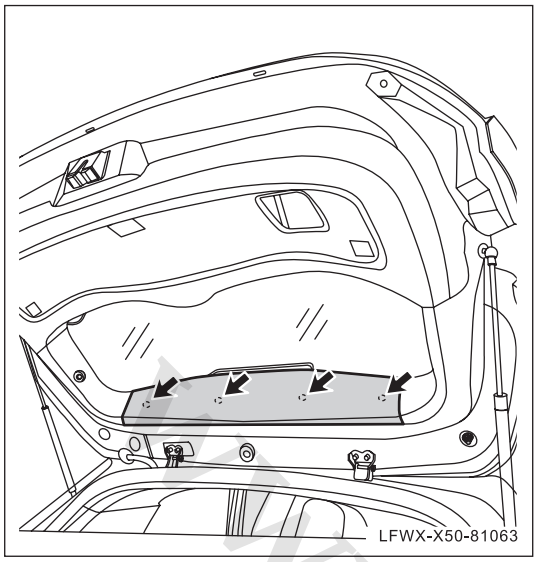
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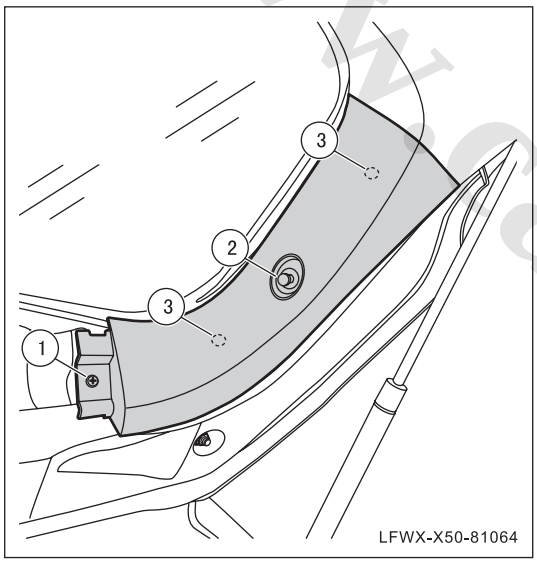
TAIL DOOR TRIM PANEL

REPLACEMENT

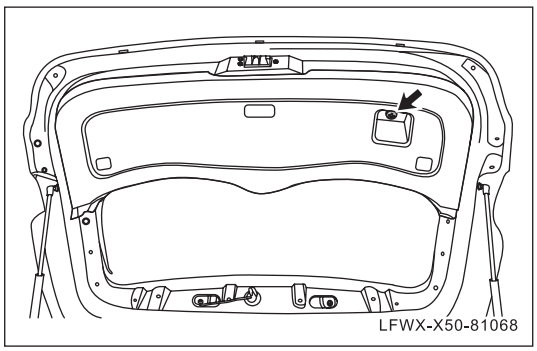


1. REMOVE THE TAIL DOOR TRIM PANEL

(a) Open the tail door, and pry tail door upper trim panel with a flat-blade screwdriver, and then take out tail door upper trim panel.



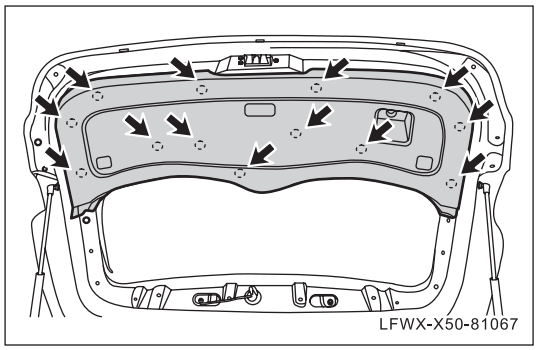
(b) Remove the fixing snap-fit ① and snap-fit ② of tail door LH/RH trim panel, pry tail door LH/RH trim panel plastic snap-fit ③ with a flat-blade screwdriver, and then take out tail door LH/RH trim panel.



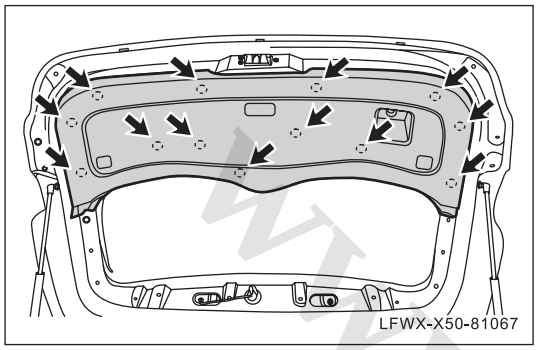
(c) Remove the fixing bolts of tail door trim panel assembly.

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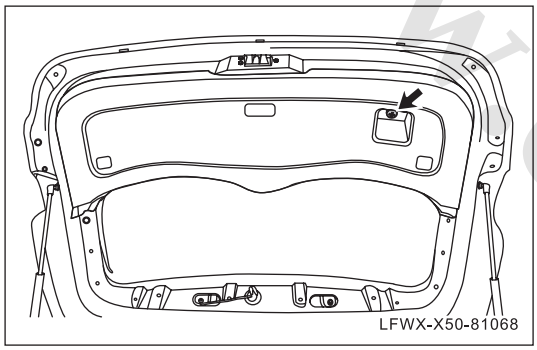


(d) Pry the tail door trim panel assembly using a flat-blade screwdriver, and then take out the tail door trim panel assembly.



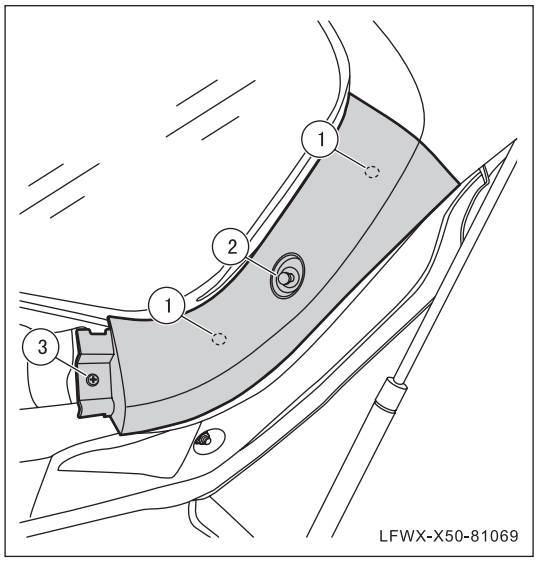
2. INSTALL THE TAIL DOOR TRIM PANEL

(a) Open the tail door, and install tail door trim panel assembly onto tail door aligning the fixing snap-fits of tail door trim panel assembly with the mounting hole on tail door, and then press the tail door trim panel assembly forcedly to install it in place.



(b) Install & tighten the fixing bolts of tail door trim panel assembly.

Torque: 8 - 12 N•m

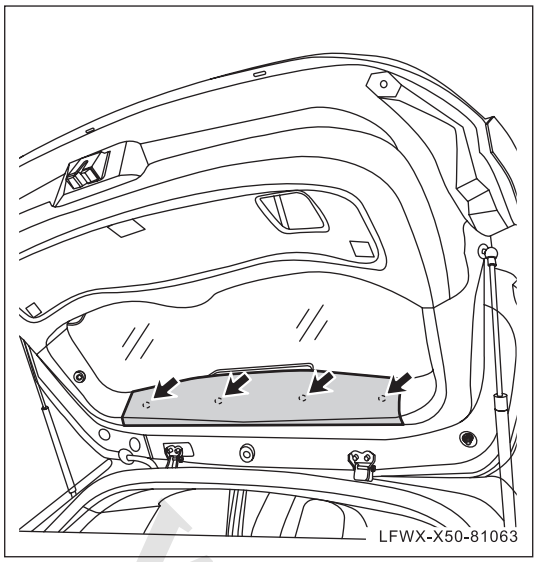


(c) Install tail door LH/RH trim panel onto tail door aligning the plastic snap-fit ① on tail door LH/RH trim panel with the mounting hole on tail door, and then press tail door LH/RH trim panel forcedly to install it in place.

(d) Install the fixing snap- fit ② and snap-fit ③ of tail door LH/RH trim panel.

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(e) Install tail door upper trim panel onto tail door aligning the plastic snap-fit on tail door upper trim panel with the mounting hole on tail door, and then press tail door upper trim panel forcedly to install it in place.

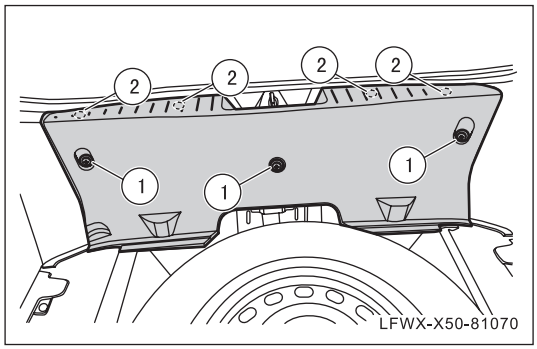
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REAR APRON TRIM PANEL

REPLACEMENT

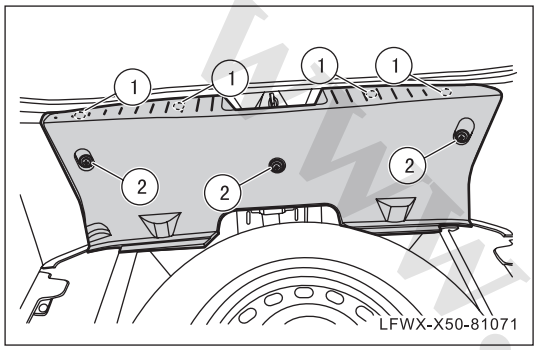


1. REMOVE REAR APRON TRIM PANEL

(a) Remove the trunk carpet. (See 81 - Interiors and Exteriors, Floor Carpet, Replacement)

(b) Remove the fixing snap-fit ① of rear apron trim panel.

(c) Pry plastic snap-fit ② of rear apron trim panel with a flat-blade screwdriver, and take out rear apron trim panel.



2. INSTALL REAR APRON TRIM PANEL

(a) Install rear apron trim panel onto rear apron aligning the plastic snap-fit ① on rear apron trim panel with the mounting hole on rear apron, and then press rear apron trim panel forcedly to install tail door left trim panel in place.

(b) Install the fixing snap-fit ② of rear apron trim panel.

(c) Install the trunk carpet. (See 81 - Interiors and Exteriors, Floor Carpet, Replacement)

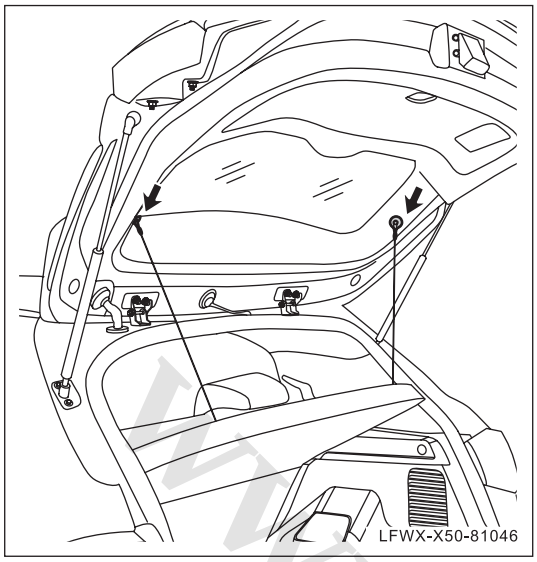
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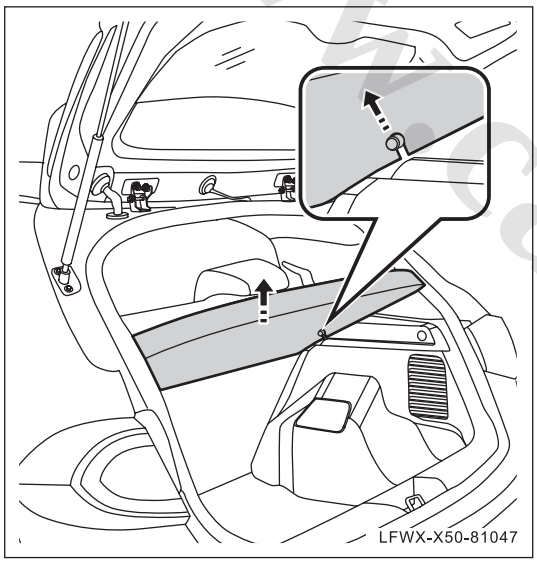
REAR SHELF PANEL

REPLACEMENT

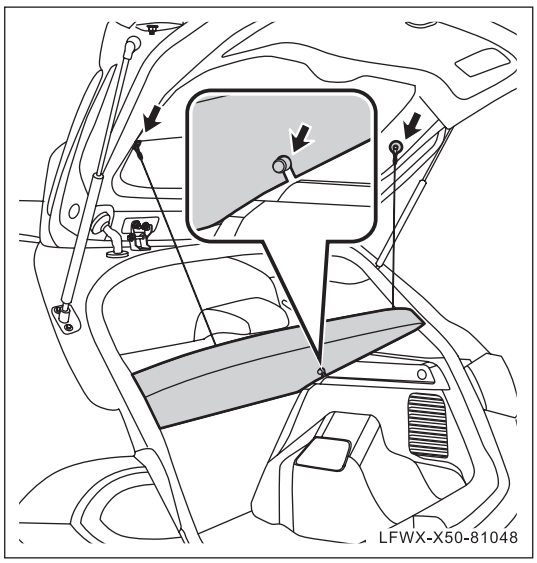


1. REMOVE REAR SHELF PANEL.

(a) Open the tail door and take out the tethers fixing two sides of rear shelf panel.



(b) Lift rear shelf panel upwards, disconnect the rear shelf panel and the locating pins, and then take out rear shelf panel assembly horizontally.



2. INSTALL REAR SHELF PANEL

(a) Open the tail door, install rear shelf panel onto C pillar lower trim panel and align rear shelf panel slotting position with locating pin.

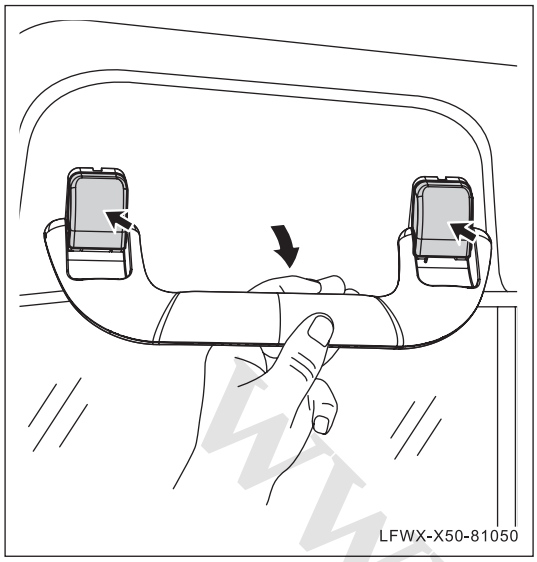
(b) Connect the tethers fixing two sides of rear shelf panel.

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ASSIST GRIP AND ROOF

REPLACEMENT

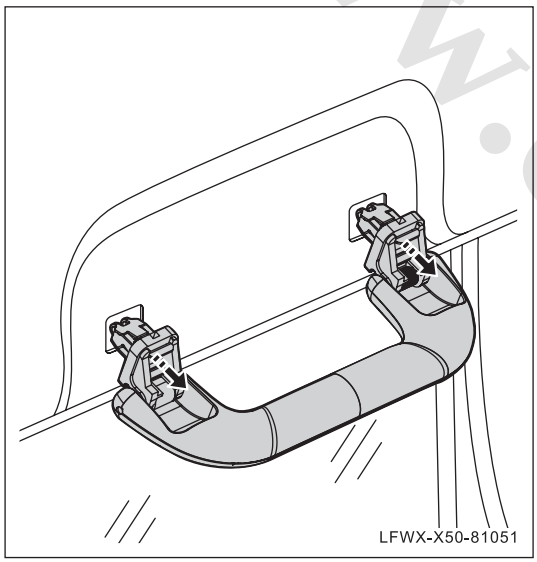


1. REMOVE ASSIST GRIP

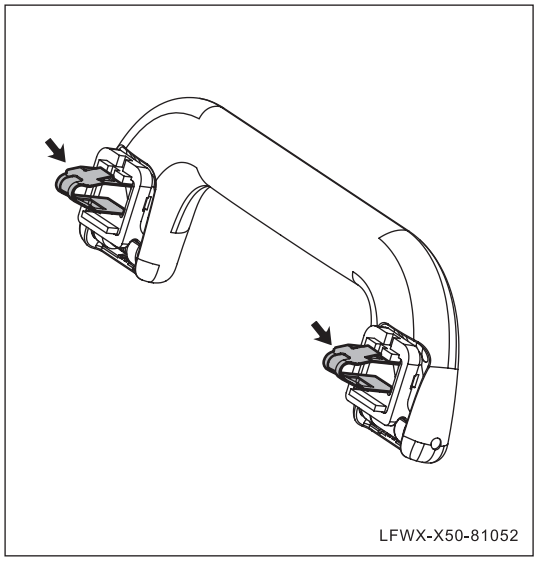
(a) Pull down assist grip and pry fixing snap-fits cover of assist grip with a flat-blade screwdriver.

NOTICE:

Make sure to wrap the head of the flat-blade screwdriver with the adhesive tape to prevent the trim from being scratched.



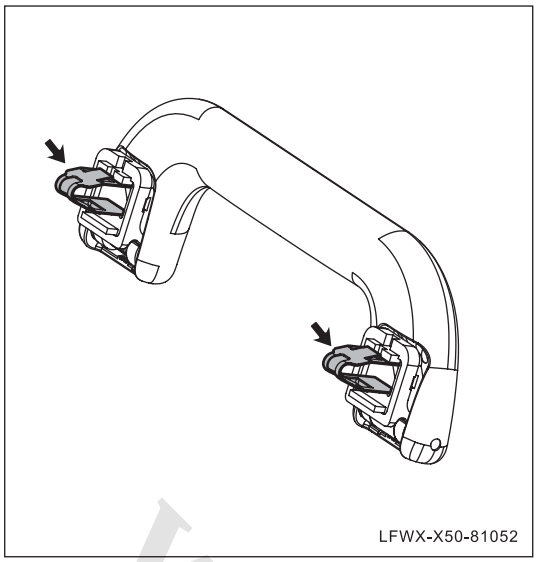
(b) Take out assist grip.



(c) Take out assist grip card.

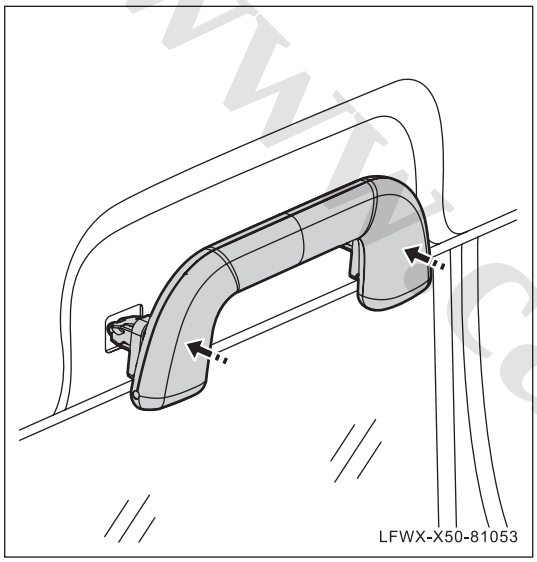
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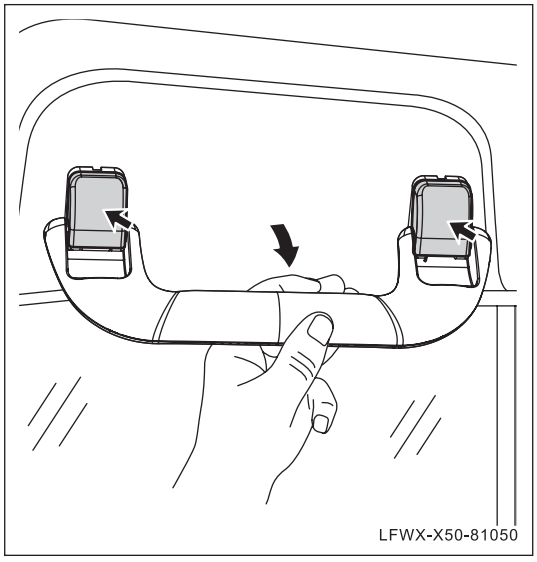


2. INSTALL ASSIST GRIP

(a) Install fixing card of assist grip to assist grip.



(b) Install assist grip to mounting position on roof to install fixing snap-fits in place.



(c) Install fixing snap-fits cover of assist grip.

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3. REMOVE ROOF

(a) Remove the sun visor. (See 81 - Interiors and Exteriors, Sun Visor, Replacement)

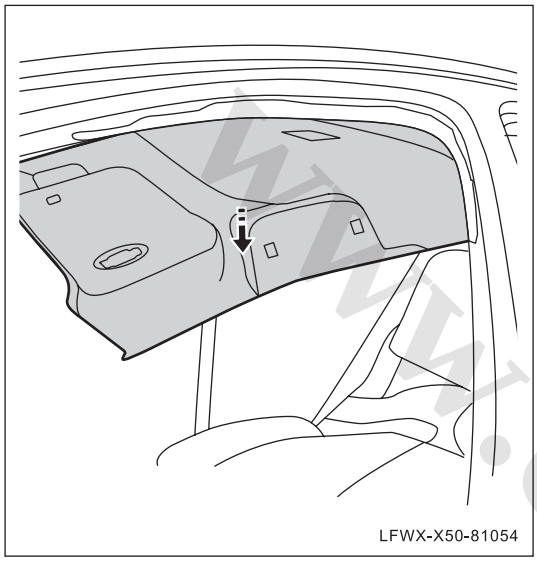
(b) Remove assist grip. (See 81 - Interiors and Exteriors, Assist Grip and Roof, Replacement)

(c) Remove dome lamp. (See 77 - Lighting System, Front/Rear Dome Lamp, Replacement)

(d) Remove A pillar upper trim panel (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

(e) Remove B pillar upper trim panel (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

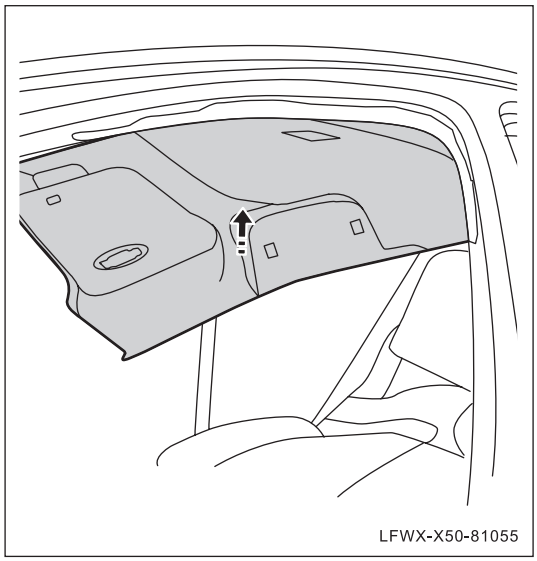
(f) Remove C pillar upper trim panel (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)


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(g) Remove roof fixing snap-fits, and take out roof from tail door.

△ HINT:

It is difficult for a single person to complete it. An assistant is required.


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4. INSTALL THE ROOF

(a) Install the roof onto the ceiling, and then install roof fixing snap-fits.

NOTICE:

Before installing plastic snap-fits, interior dome lamp wire harness must be straightened, to avoid wire harness being pressed inside the roof.

(b) Install A pillar upper trim panel. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

(c) Install B pillar upper trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

(d) Install C pillar upper trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

(e) Install dome lamp. (See 77 - Lighting System, Front/Rear Dome Lamp, Replacement)

(f) Install assist grip (See 81 - Interiors and Exteriors, Assist Grip and Roof, Replacement)

(g) Install the sun visor. (See 81 - Interiors and Exteriors, Sun Visor, Replacement)

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FLOOR CARPET

REPLACEMENT

1. REMOVE FLOOR CARPET

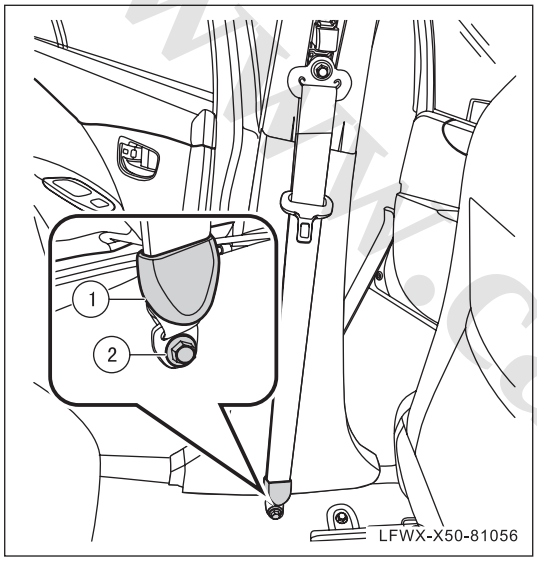
(a) Remove console assembly. (See 85 - Dashboard and Console, Console, Replacement)

(b) Remove front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

(c) Remove A pillar lower trim panel. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

(d) Remove rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)

(e) Remove B pillar lower trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)



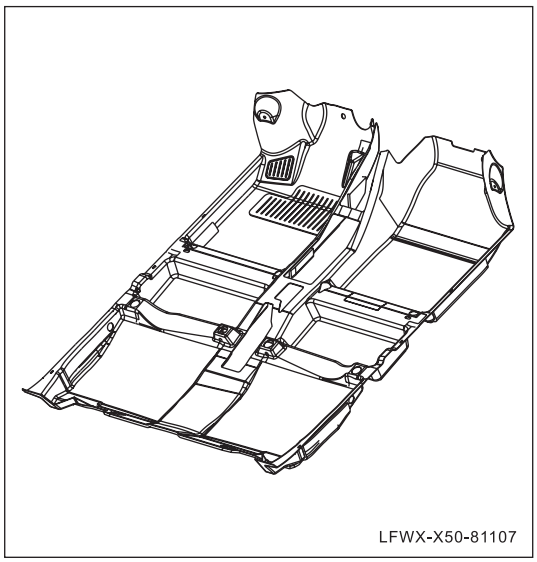
(f) Open seat belt lower bracket trim cover ① , and then remove the fixing bolt ② of driver and front passenger seat belt lower bracket.

(g) Remove rear seat cushion. (See 84 - Seat, Rear Seat, Replacement)

(h) Remove rear seat cushion bracket. (See 84 - Seat, Rear Seat, Replacement)

(i) Remove driver seat. (See 84 - Seats, Driver Seat, Replacement)

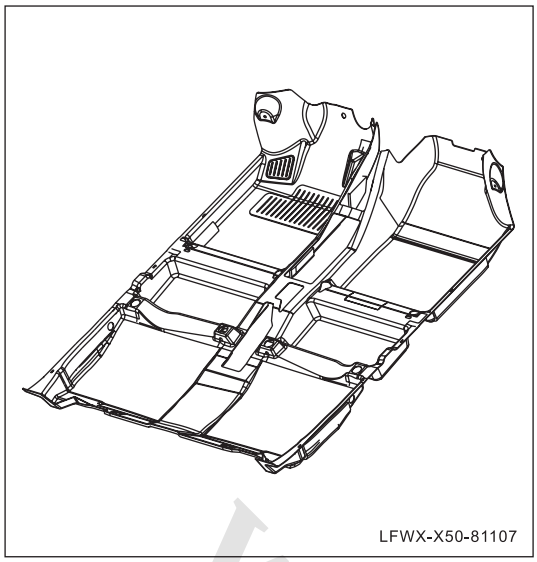
(j) Remove front passenger seat. (See 84 - Seats, Front Passenger Seat, Replacement)



(k) Raise and take out the floor carpet.

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2. INSTALL THE FLOOR CARPET

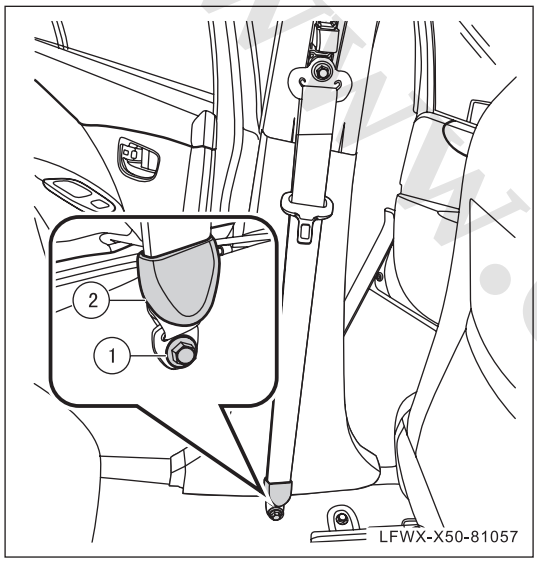
(a) Lay out the floor carpet onto the in-vehicle floor.

(b) Install front passenger seat. (See 84 - Seats, Front Passenger Seat, Replacement)

(c) Install driver seat. (See 84 - Seats, Driver Seat, Replacement)

(d) Install rear seat cushion bracket. (See 84 - Seat, Rear Seat, Replacement)

(e) Install rear seat cushion. (See 84 - Seat, Rear Seat, Replacement)



(f) Install lower bracket of driver and front passenger seat belt onto floor, and then install & tighten fixing bolt ① .

Torque: 65 - 85 N•m

(g) Install seat belt lower bracket trim cover ② .

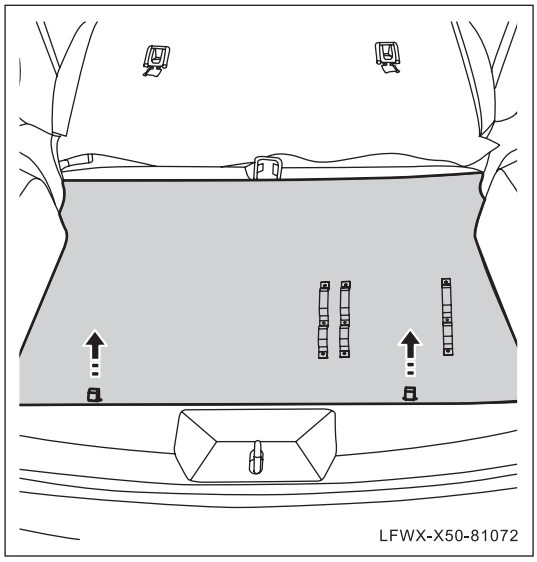
(h) Install B pillar lower trim panel. (See 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

(i) Install rear doorsill trim panel. (See 81 - Interiors and Exteriors, Rear Doorsill Trim Panel, Replacement)

(j) Install A pillar lower trim panel. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

(k) Install front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

(l) Install the console assembly. (See 85 - Dashboard and Console, Console, Replacement)

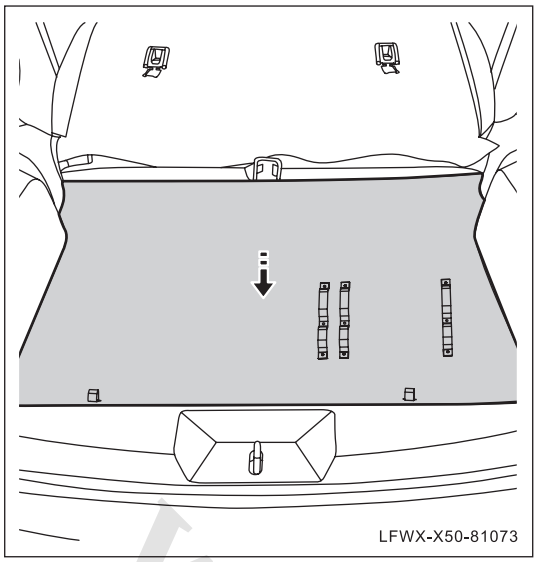


3. REMOVE THE TRUNK CARPET

(a) Hold trunk floor carpet tether with hands, and take out the trunk floor carpet.

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4. INSTALL THE TRUNK CARPET.

(a) Lay out the trunk floor carpet onto the trunk floor.

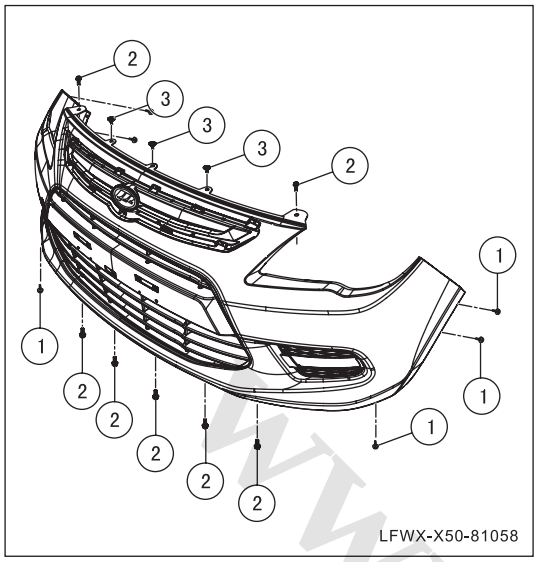
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FRONT BUMPER

REPLACEMENT

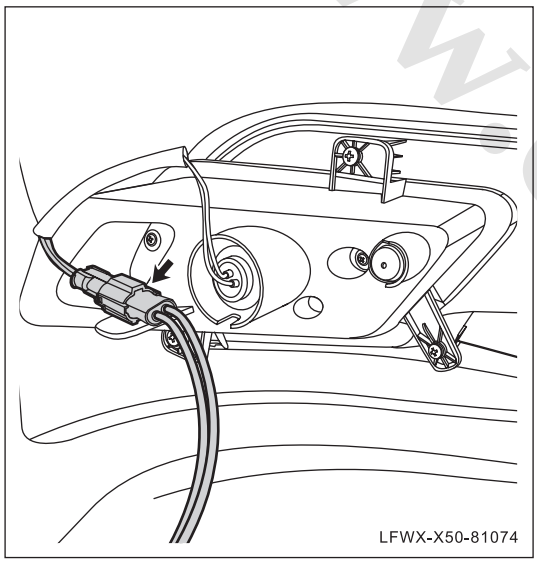


1. REMOVE FRONT BUMPER

(a) Remove the fixing screw ① of left and right front mudguard housing and the bumper.

(b) Remove fixing bolt ② of front bumper.

(c) Remove inlay clip ③ of front bumper.



(d) Open the front bumper gently, and disconnect wire harness connectors of left and right daytime running lamps to take out the front bumper.

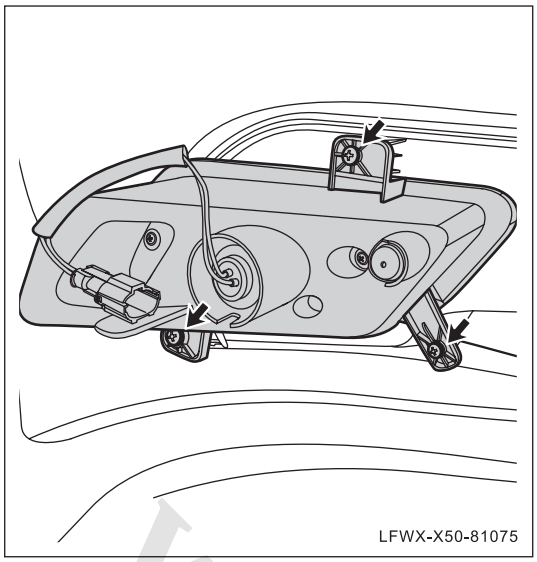
NOTICE:

- **Recheck if the surrounding fixing bolts, fixing screws and fixing snap-fits of front bumper are disconnected before opening the front bumper.**
- **When disconnecting the connector, do not pull wire harness to prevent wire harness from being damaged.**

(e) Remove the fixing bolts of front bumper left and right mounting bracket assembly, and then take out the front bumper left and right mounting bracket assembly.

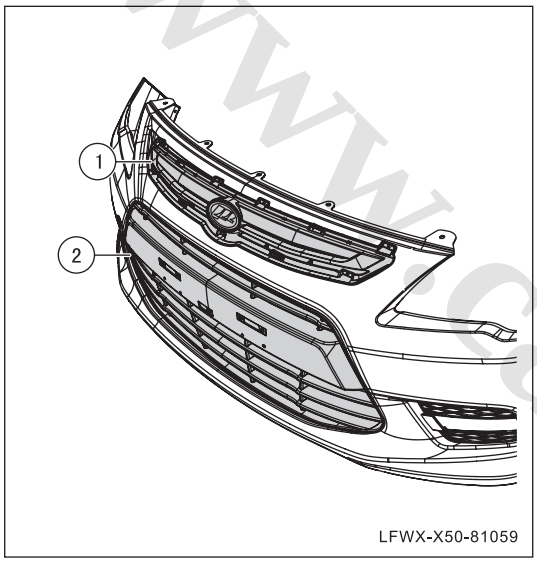
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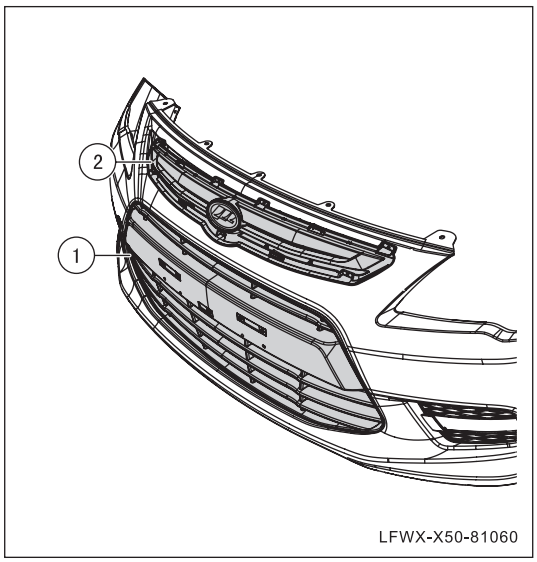
2. DISASSEMBLE THE FRONT BUMPER

(a) Remove fixing screws of daytime running lamp, and take out the daytime running lamp.



(b) Remove fixing screws of front grille assembly, and take out front grille assembly ① .

(c) Remove fixing screws of lower grille body assembly, and take out the lower grille body assembly ② .



3. ASSEMBLE FRONT BUMPER

(a) Install lower grille body assembly ① onto the front bumper, and install & tighten the fixing screws.

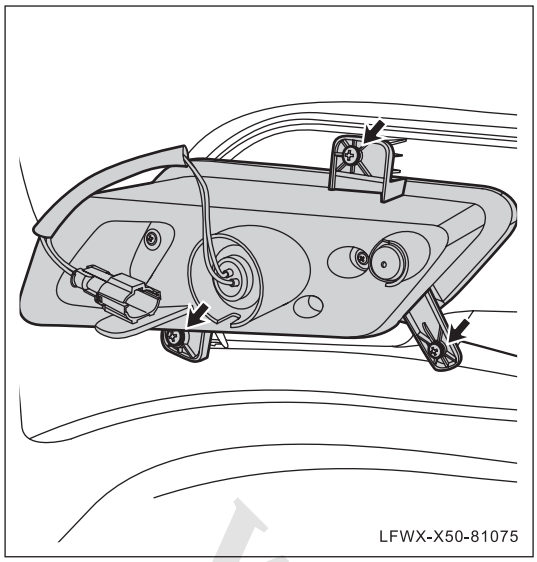
Torque: 5 - 6 N•m

(b) Install front grille assembly ② onto the front bumper, and install & tighten the fixing screws.

Torque: 5 - 6 N•m

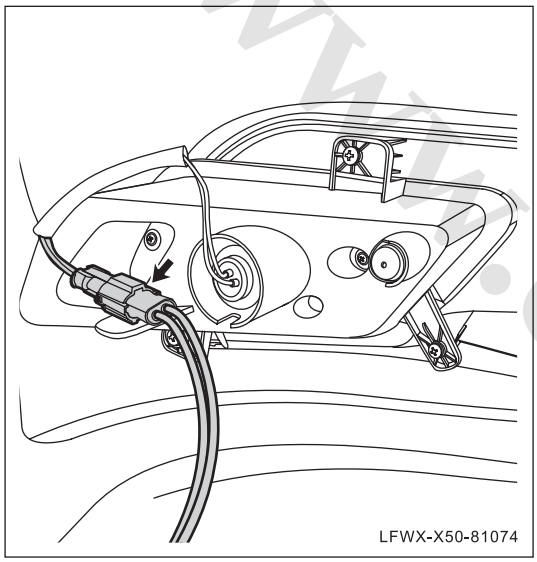
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(c) Install daytime running lamp onto the front bumper, and install & tighten the fixing screws.

Torque: 5 - 6 N•m

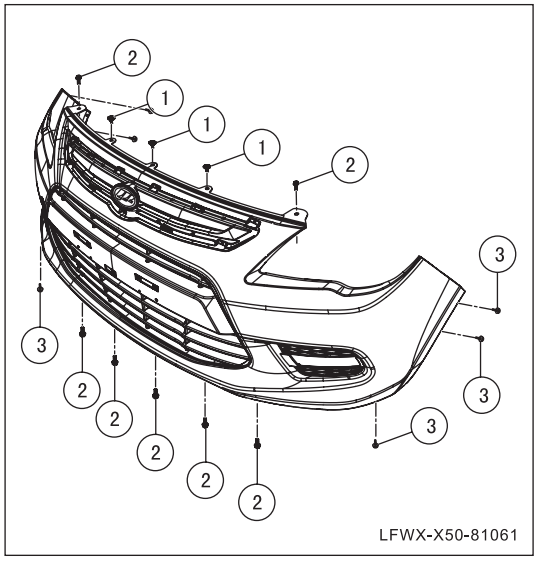


4. INSTALL FRONT BUMPER

(a) Install LH/RH mounting bracket assembly of front bumper onto the vehicle body, and install & tighten the fixing bolts.

Torque: 8 - 10 N•m

(b) Connect the wire harness connectors of left and right daytime running lamps, and install the front bumper.



(c) Install inlay clip ① of front bumper.

(d) Install and tighten the fixing bolt ② of front bumper.

Torque: 8 - 10 N•m

(e) Install and tighten fixing screw ③ of left and right front mudguard housing.

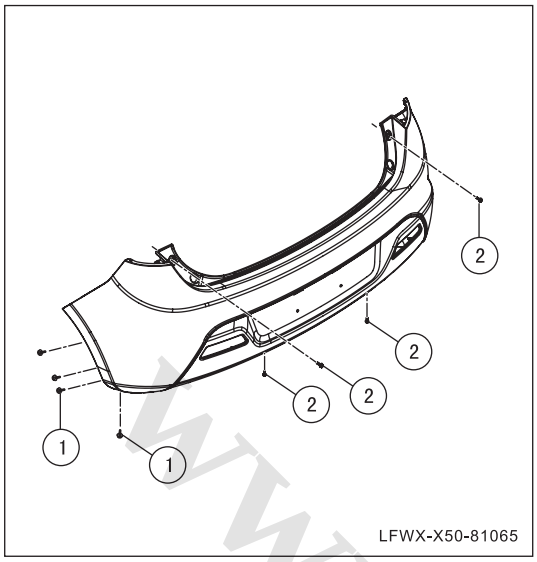
Torque: 5 - 6 N•m

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REAR BUMPER

REPLACEMENT

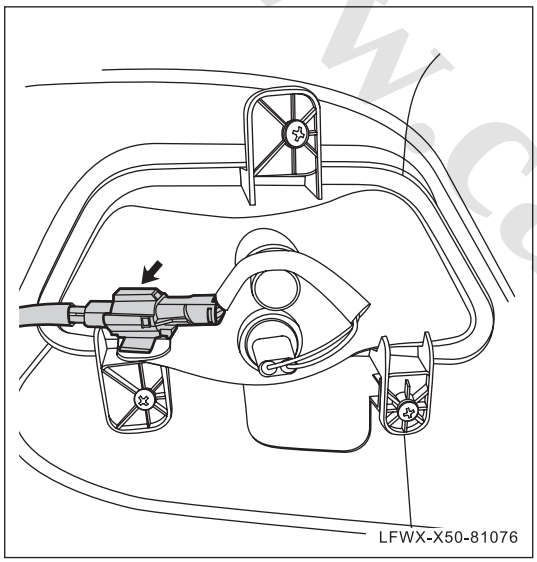


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1. REMOVE THE REAR BUMPER

(a) Remove fixing screw ① of left and right rear mudguard.

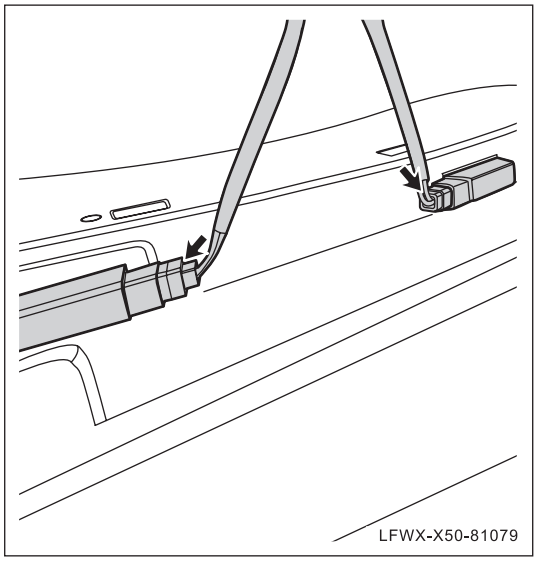
(b) Remove fixing bolt ② of rear bumper.


LFWX-X50-81076

(c) Open rear bumper gently, and disconnect the wire harness connectors of left and right rear fog lamps.

NOTICE:

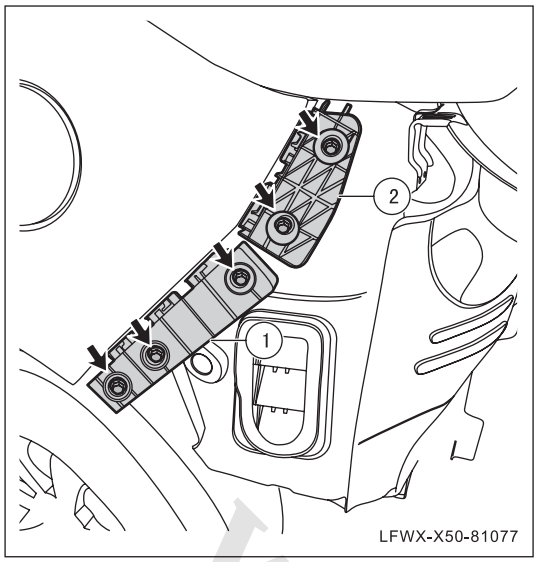
- **Recheck if the surrounding fixing bolts, fixing screws and fixing snap-fits of rear bumper are disconnected before opening the rear bumper.**
- **When disconnecting the connector, do not pull wire harness to prevent wire harness from being damaged.**


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(d) Disconnect the wire harness connectors of left and right rear license lamps, and take out rear bumper.

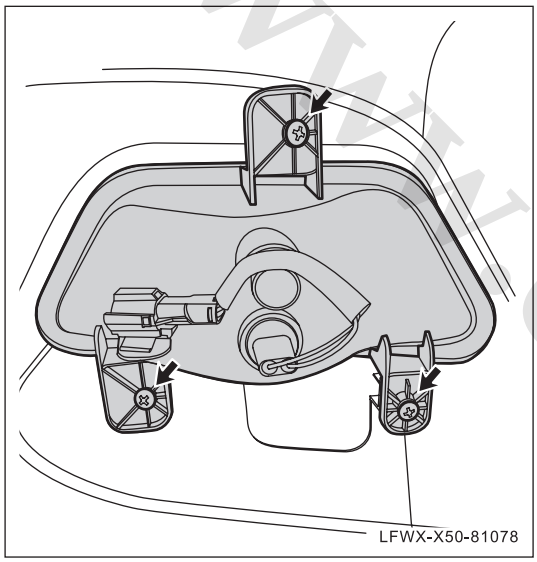
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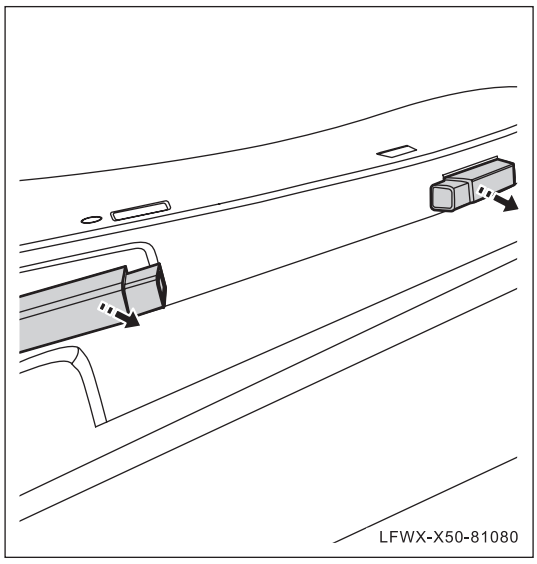
(e) Remove fixing bolts of rear bumper left and right large bracket assembly ① , and take out rear bumper left and right large bracket assembly ① .

(f) Remove fixing bolts of rear bumper left and right small bracket assembly ② , and take out rear bumper left and right small bracket assembly ② .



2. DISASSEMBLE REAR BUMPER

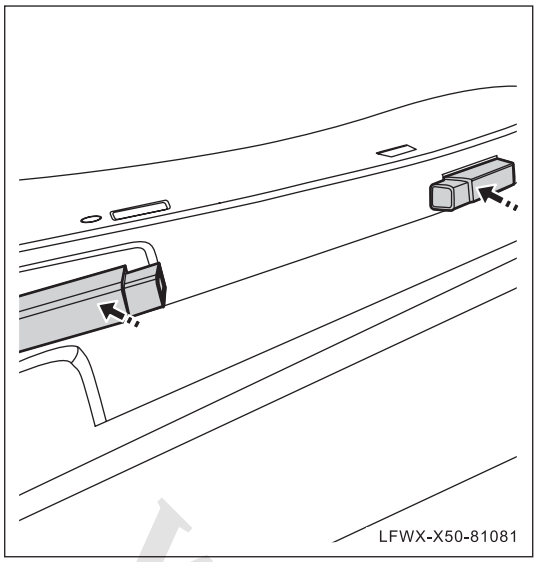
(a) Remove fixing screws of rear fog lamp, and take out the rear fog lamp.



(b) Take out license lamp.

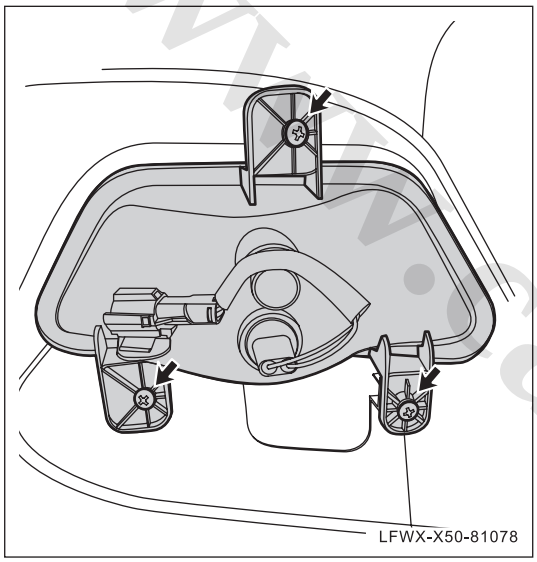
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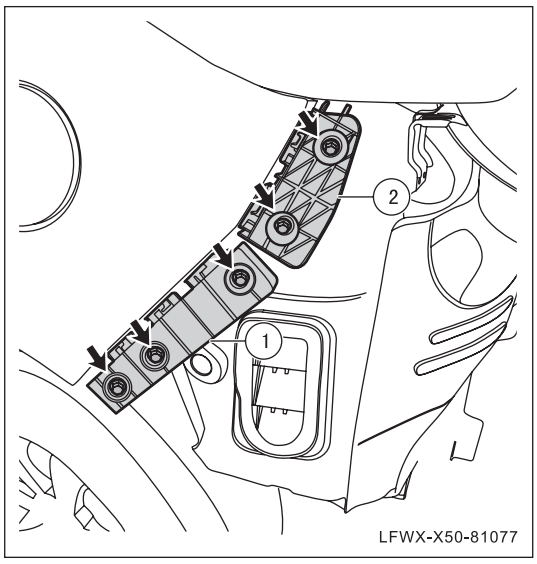
3. ASSEMBLE REAR BUMPER

(a) Install license lamp onto rear bumper.



(b) Install rear fog lamp onto rear bumper, and install & tighten the fixing screws.

Torque: 5 - 6 N•m



4. INSTALL REAR BUMPER

(a) Install rear bumper left and right large bracket assembly ① onto the vehicle body, and install & tighten the fixing bolts.

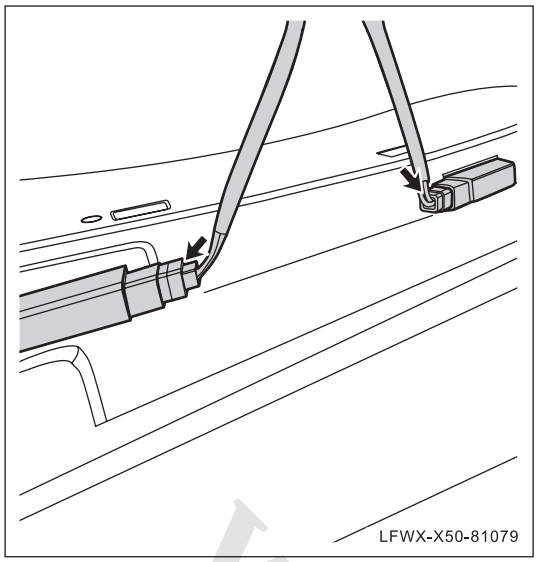
Torque: 8 - 10 N•m

(b) Install rear bumper left and right small bracket assembly ② onto the vehicle body, and install & tighten the fixing bolts.

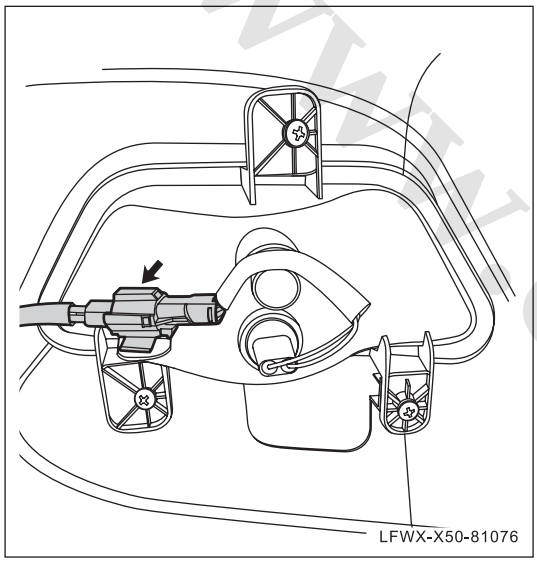
Torque: 8 - 10 N•m

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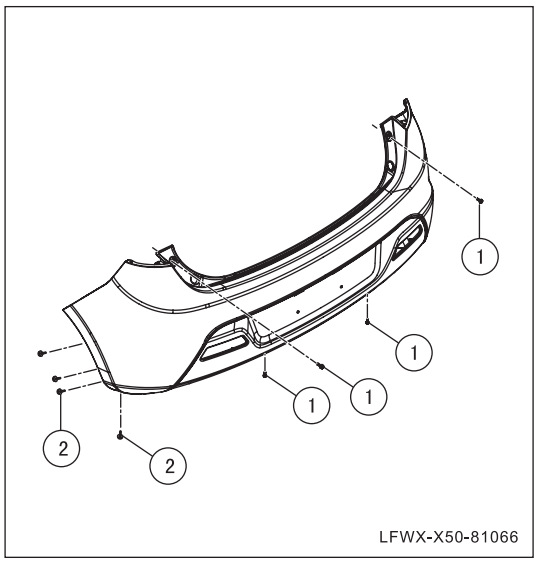
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(c) Connect the license lamp wire harness connector.



(d) Connect the wire harness connectors of left and right rear fog lamps, and install the rear bumper.



(e) Install and tighten fixing bolt ① of rear bumper

Torque: 8 - 10 N•m

(f) Install and tighten fixing screw ② of left and right rear mudguard.

Torque: 8 - 10 N•m

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WINDSHIELD GLASS

REPLACEMENT

1. REMOVE WINDSHIELD GLASS

(a) Remove A pillar upper trim panel (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

(b) Remove interior rear view mirror. (See 83 - Power Window and Rear View Mirror, Interior Rear View Mirror, Replacement)

(c) Remove front wiper arm. (See 86 - Wiper and Washer System, Front Wiper Arm, Replacement)

(d) Remove front wall cowl top grille. (See 81 - Interiors and Exteriors, Front Wall Cowl Top Grille, Replacement)



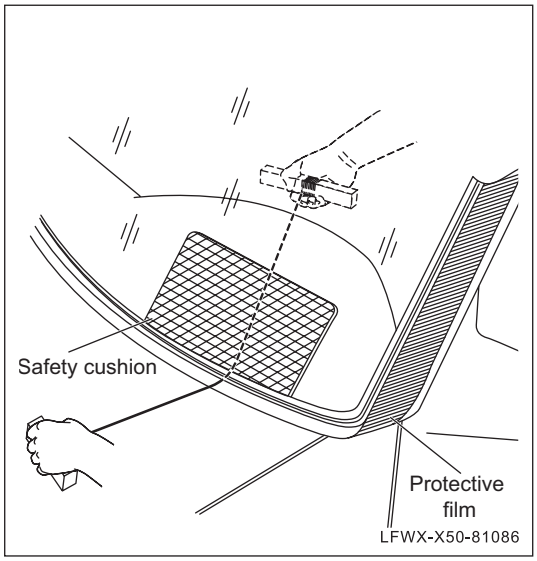
(e) Cover defroster port.

NOTICE:

If glass fragment falls into defroster port, it may be blown into passenger room when the defroster works. As a result, it may hurt passengers. Therefore, it is necessary to cover defroster port to prevent glass fragment from going into the port.

(f) Remove windshield glass sealant.

(g) Using a pricker, pierce a hole through the windshield glass sealing material.



(h) Insert the thin steel wire through the gap between vehicle body and windshield glass, and tie wood blocks or similar objects on both ends of thin steel wire used as handle.

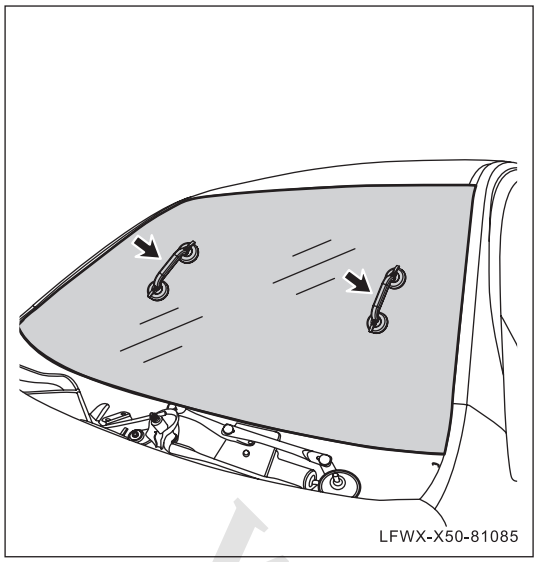
(i) Pull thin steel wire along the glass edge and cut off windshield glass sealant.

△ HINT:

- It is difficult for a single person to complete it. An assistant is required.
- Before pulling thin steel wire, it is necessary to attach protective film on the vehicle body surface around windshield glass. At the same time, safety pad is placed on the dashboard to prevent vehicle body surface and dashboard from being scratched.

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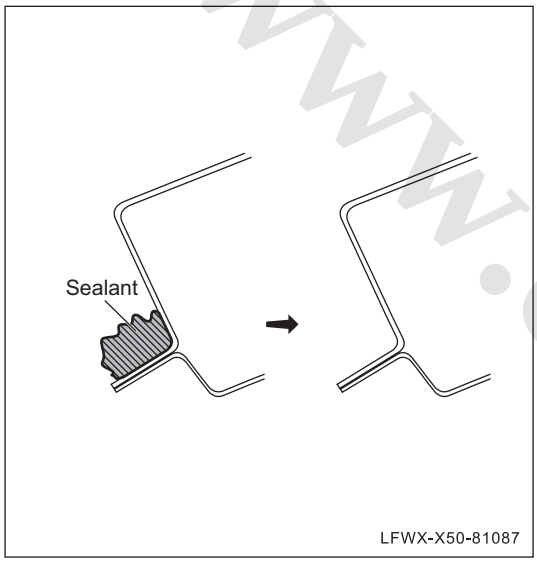
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(j) Take out the windshield glass using the glass sucker.

△ HINT:

It is difficult for a single person to complete it. An assistant is required.



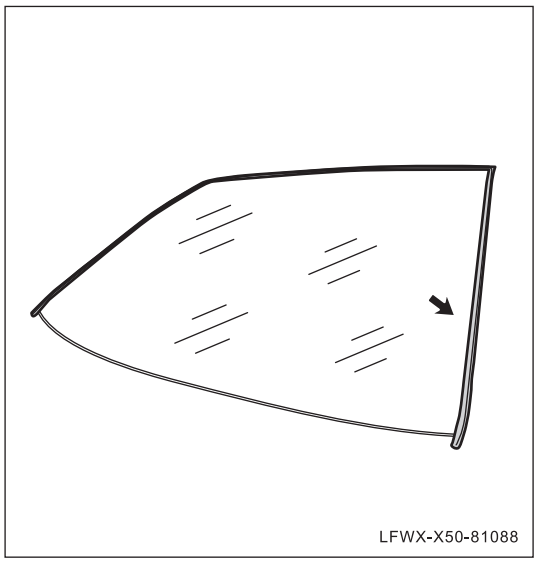
2. INSTALL WINDSHIELD GLASS

(a) Use a cutter to scrape adhesive on contact surface between the vehicle body and windshield glass, and use a cleaning cloth with detergent to clean contact surface between the vehicle body and windshield glass.

(b) Control heat gun temperature at 25 °C, and remove the moisture on the contact surface between the vehicle body and windshield glass.

NOTICE:

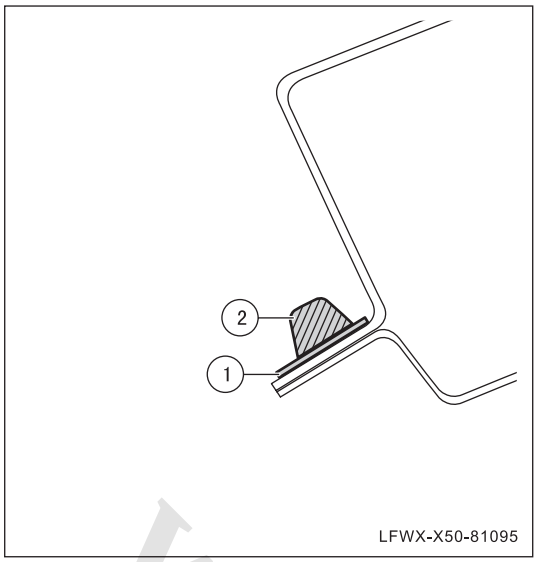
- **Remove the moisture on adhesive surface to keep the adhesive effect.**
- **Do not contact the cleaned surface to keep the adhesive effect.**



(c) Install windshield glass sealant strip onto the windshield glass.

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(d) Use a brush to apply priming paint ① on the vehicle body exposed surface and windshield glass edge.

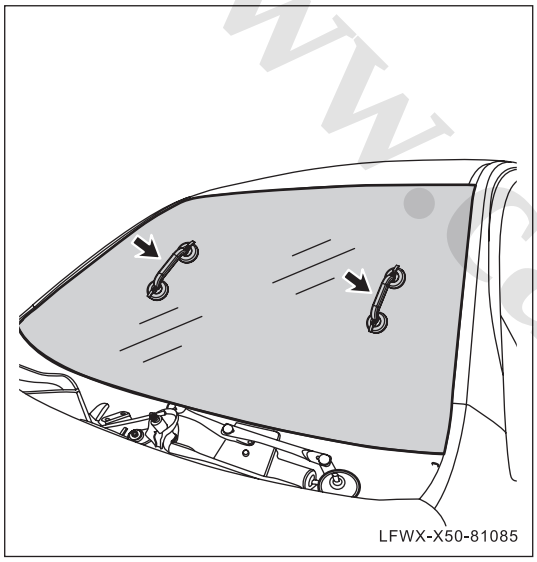
△ HINT:

If other areas are applied by priming paint unexpectedly, wipe it off immediately to prevent it from solidifying.

(e) Apply the adhesive ② onto the installing contact surface of windshield glass evenly.

NOTICE:

- **When using the adhesive, open the doors. The closed doors will increase the pressure inside the vehicle so that influences the adhesive effect.**
- **Install the windshield glass on vehicle within 10 min. Otherwise, adhesive capacity of glass adhesive will be influenced.**



(f) Install the windshield glass to windshield.

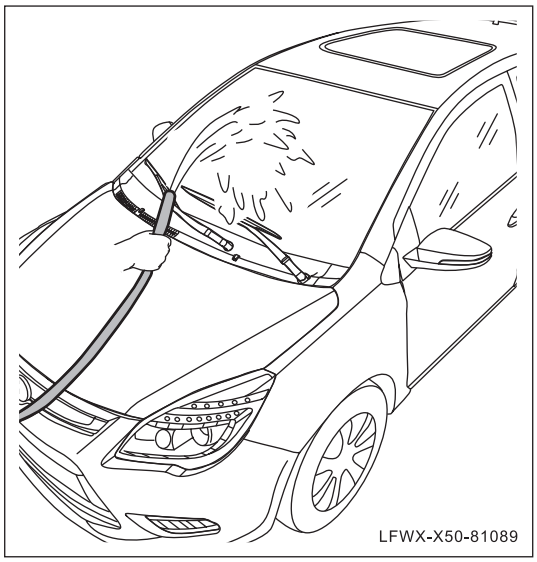
(g) Press along the edge of windshield glass slightly to make sure that the windshield glass is installed properly without clearance.

(h) Install cowl top grille (See 81 - Interiors and Exteriors, Front Wall Cowl Top Grille, Replacement)

(i) Install front wiper arm. (See 86 - Wiper and Washer System, Front Wiper Arm, Replacement)

(j) Install the interior rear view mirror. (See 83 - Power Window and Rear View Mirror, Interior Rear View Mirror, Replacement)

(k) Install A pillar upper trim panel. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)



3. RAINFALL TEST

NOTICE:

After windshield glass is installed, do not make rainfall test at once. It is necessary to wait for 3 - 4 h (room temperature 20°C).

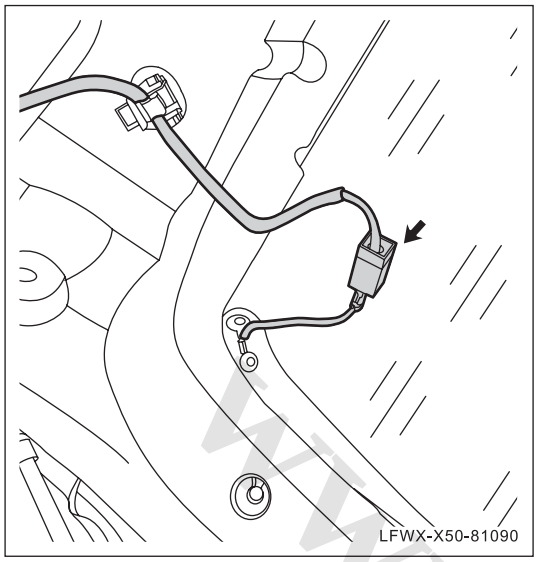
(a) Make rainfall test, and then seal leaking positions by sealant.

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TAIL DOOR GLASS

REPLACEMENT

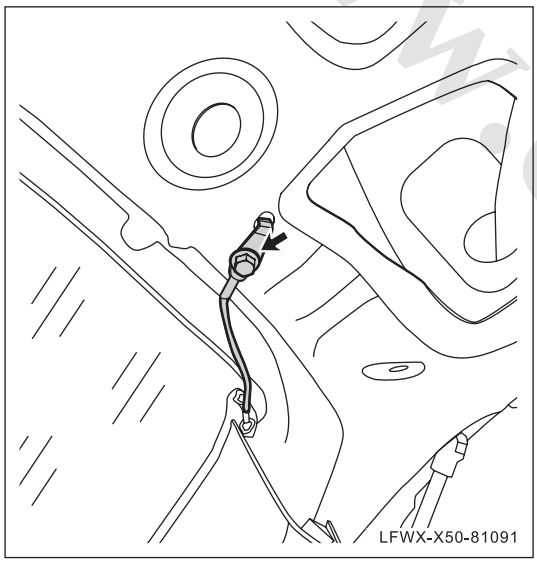


1. REMOVE THE TAIL DOOR GLASS

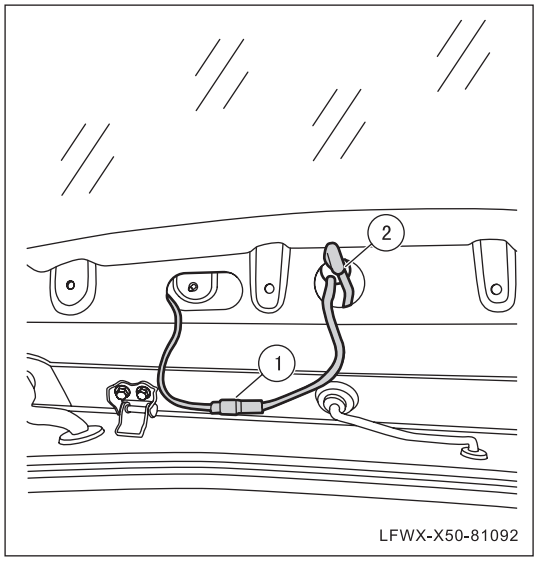
(a) Remove rear wiper arm. (See 86 - Wiper and Washer System, Rear Wiper Arm, Replacement)

(b) Remove tail door trim panel. (See 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

(c) Disconnect the tail door glass connector.



(d) Remove the tail door glass grounding fixing bolts, and disconnect tail door glass grounding.



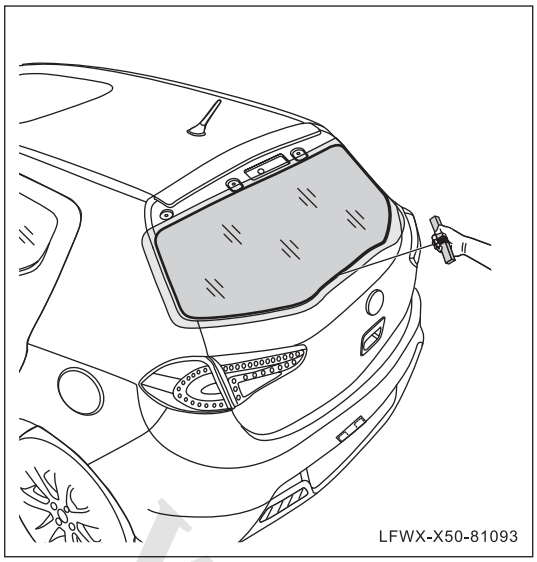
(e) Disconnect the high-mounted brake lamp connector ① .

(f) Disconnect rear wiper spray pipe ② .

(g) Remove the fixing nuts of deflector, and take out the deflector. (See 81 - Interiors and Exteriors, Deflector, Replacement)

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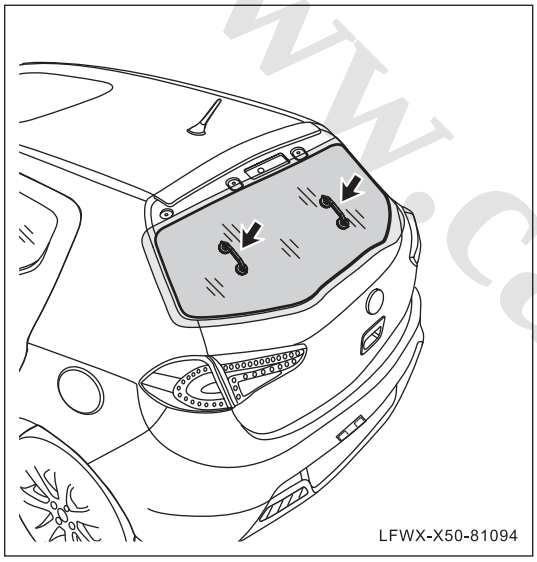
(h) Using a pricker, pierce a hole through the tail door glass sealing material.

(i) Insert the thin steel wire through the gap between vehicle body and tail door glass, and tie wood blocks or similar objects can be tied on both ends of thin steel wire used as handle.

(j) Pull thin steel wire along the glass edge to cut off tail door glass sealant.

△ HINT:

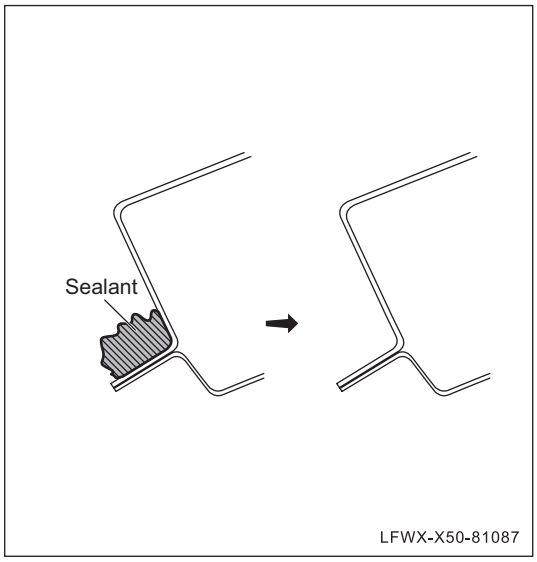
- It is difficult for a single person to complete it. An assistant is required.
- Before pulling thin steel wire, it is necessary to attach protective film on the body surface around tail door glass to prevent body surface from being scratched.



(k) Remove the tail door glass using the glass sucker.

△ HINT:

It is difficult for a single person to complete it. An assistant is required.



2. INSTALL THE TAIL DOOR GLASS

(a) Use a cutter to scrape adhesive on contact surface between the vehicle body and tail door glass, and use a cleaning cloth with detergent to clean contact surface between the vehicle body and tail door glass.

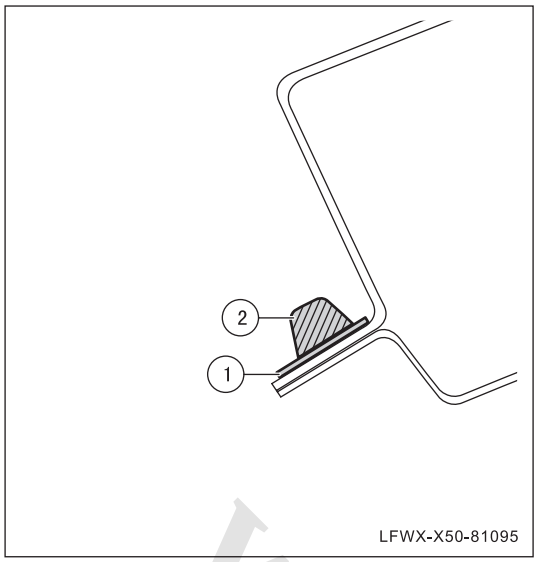
(b) Control heat gun temperature at 25 °C, and remove the moisture on the contact surface between the vehicle body and tail door glass.

ⓘ NOTICE:

- **Remove the moisture on adhesive surface to keep the adhesive effect.**
- **Do not contact the cleaned surface to keep the adhesive effect.**

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(c) Use a brush to apply priming paint ① on the vehicle body adhesive surface and windshield glass edge.

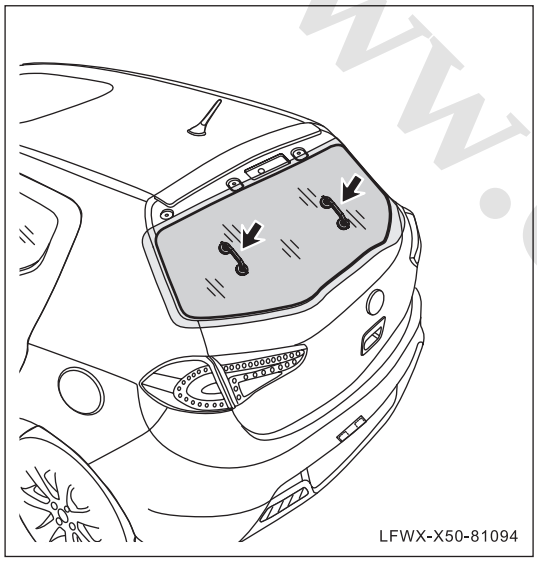
△ HINT:

If other areas are applied by priming paint unexpectedly, wipe it off immediately to prevent it from solidifying.

(d) Apply the adhesive ② onto the installing contact surface of tail door glass evenly.

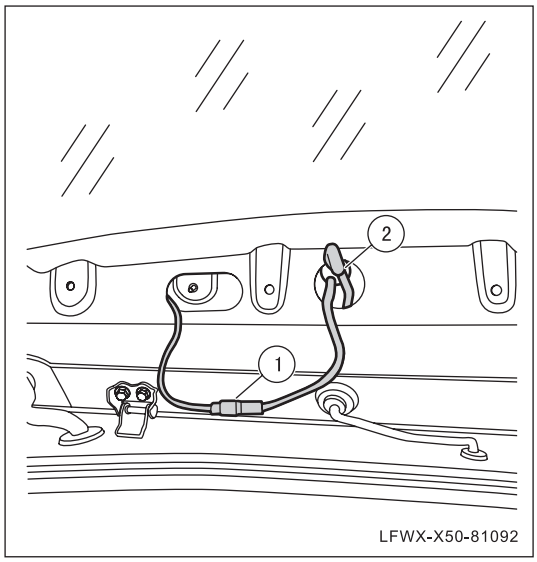
NOTICE:

- **When using the adhesive, open the doors. The closed doors will increase the pressure inside the vehicle so that influences the adhesive effect.**
- **Install the tail door glass on vehicle within 10 min. Otherwise, adhesive capacity of glass adhesive will be influenced.**



(e) Install the tail door glass onto the tail door using sucker.

(f) Press along the edge of tail door glass slightly to make sure that tail door glass is installed properly without clearance.



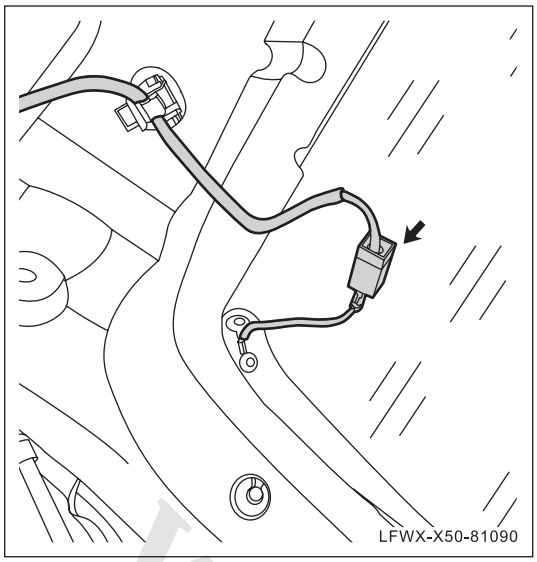
(g) Install the deflector onto tail door, and then install & tighten the fixing nuts. (See 81 - Interiors and Exteriors, Deflector, Replacement)

(h) Connect the high-mounted brake lamp connector ① .

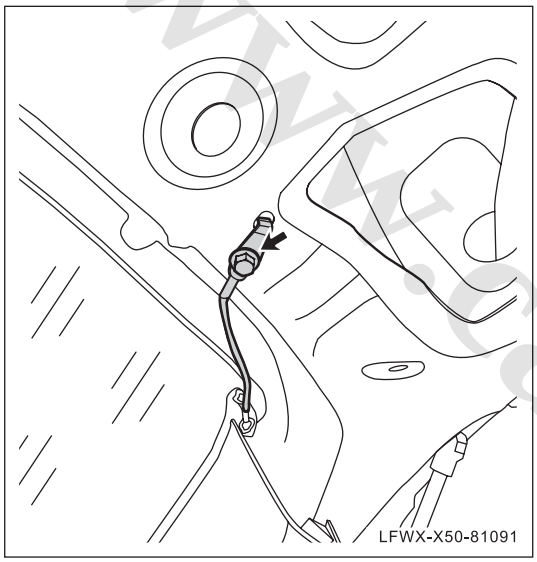
(i) Connect the rear wiper spray pipe ② .

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(j) Connect the tail door glass connector.

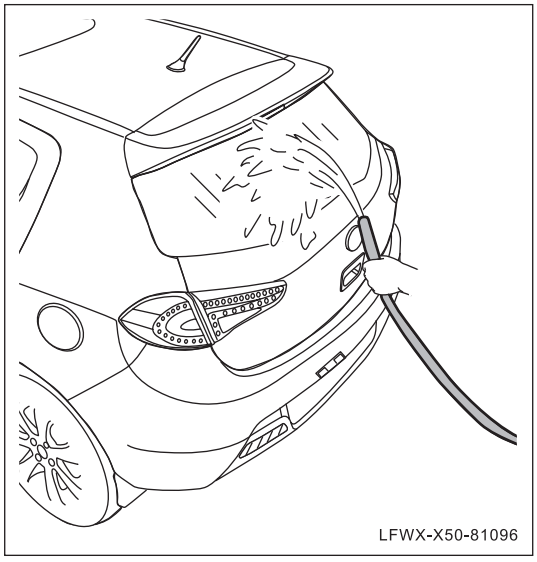


(k) Connect tail door glass grounding to tail door, and then install & tighten the fixing bolts.

Torque: 8 - 12 N•m

(l) Remove tail door trim panel. (See 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

(m) Remove rear wiper arm. (See 86 - Wiper and Washer System, Rear Wiper Arm, Replacement)



3. RAINFALL TEST

NOTICE:

After tail door glass is installed, do not make rainfall test at once. It is necessary to wait for 3 - 4 h (room temperature 20°C).

(a) Make rainfall test, and then seal leaking positions by sealant.

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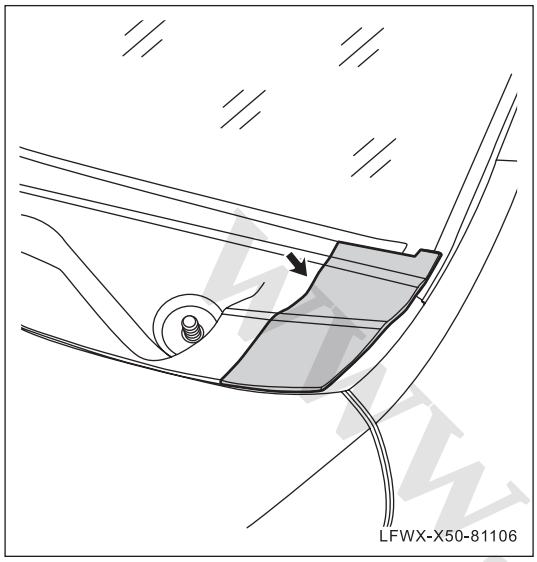
FRONT WALL COWL TOP GRILLE

REPLACEMENT

1. REMOVE FRONT WALL COWL TOP GRILLE

(a) Remove front wiper arm. (See 86 - Wiper and Washer System, Front Wiper Arm, Replacement)

(b) Remove the front nozzle. (See 86 - Wiper and Washer System, Front Nozzle, Replacement)

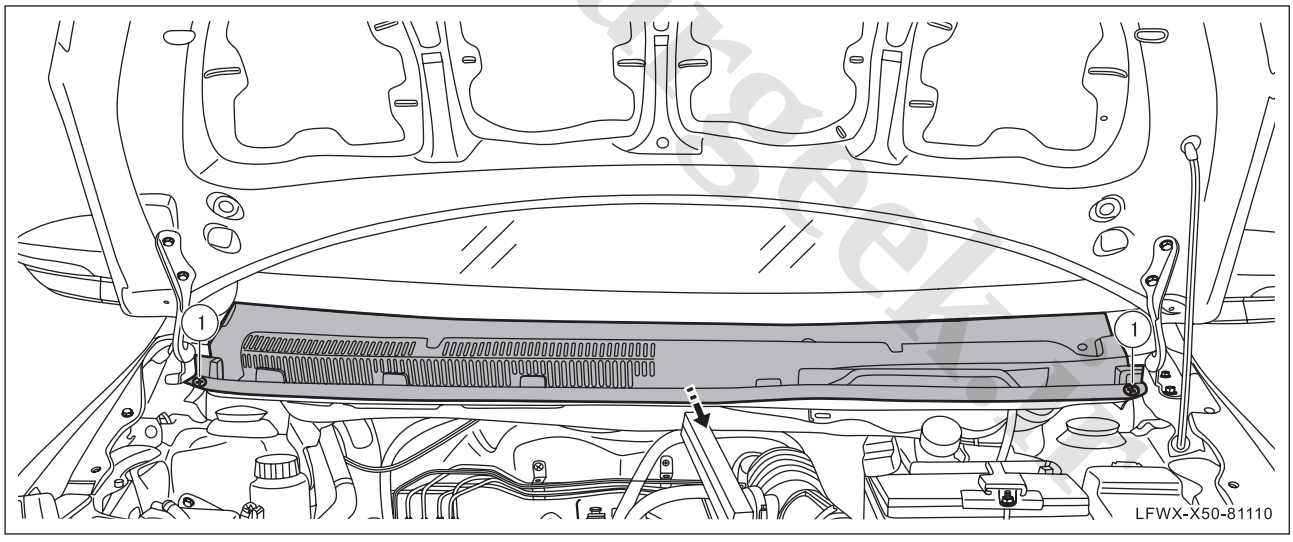


(c) Pry the left and right top grille assembly of front wall cowl top grille with a flat-blade screwdriver, and then take out left and right top grille of front wall cowl top grille.

NOTICE:

When using a flat-blade screwdriver, it is necessary to wrap the head with adhesive tape to prevent the vehicle body from being scratched.

(d) Remove the front wall cowl top grille inlay clip ① , and take out the front wall cowl top grille.

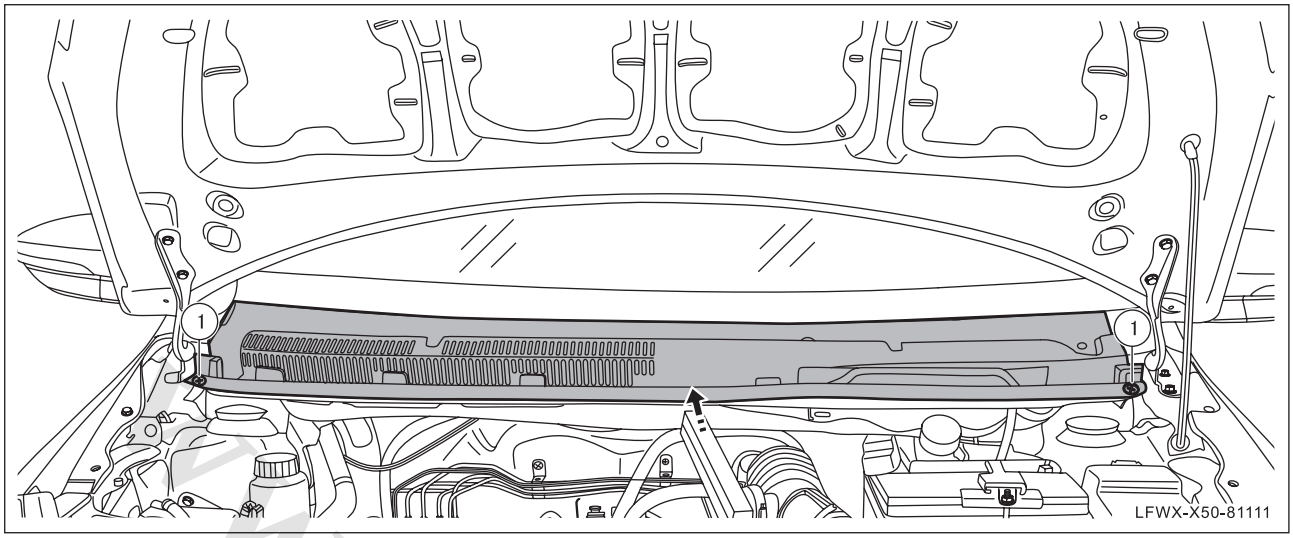


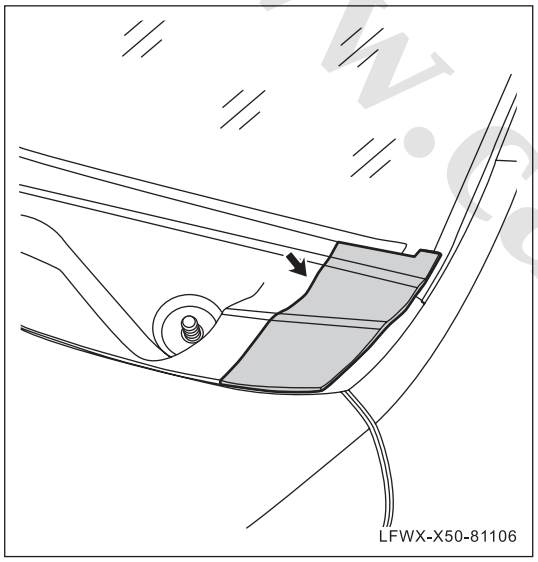
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2. INSTALL THE FRONT WALL COWL TOP GRILLE

(a) Install the front wall cowl top grille to vehicle body, and install & tighten the front wall cowl top grille inlay clip ① .





(b) Install the left and right top grille assembly of front wall cowl top grille onto the vehicle body aligning left and right top grille snap-fits of front wall cowl top grille with the mounting holes. Press left and right top grille snap-fits of front wall cowl top grille forcedly to install the left and right top grille assembly of front wall cowl top grille in place.

(c) Install the front nozzle. (See 86 - Wiper and Washer System, Front Nozzle, Replacement)

(d) Install front wiper arm. (See 86 - Wiper and Washer System, Front Wiper Arm, Replacement)

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FENDER

REPLACEMENT

△ HINT:

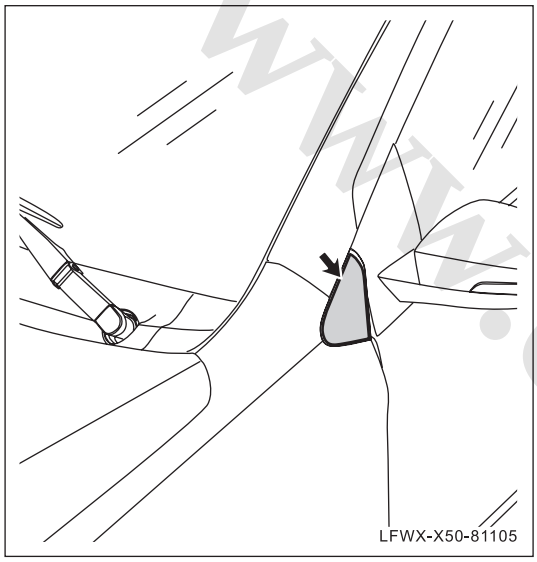
The installation and removal method of left fender is the same as that of right fender. Therefore, the installation and removal of left fender is only taken as an example in this chapter.

1. REMOVE FENDER

(a) Remove the front bumper and its bracket. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

(b) Remove the front left combination lamp. (See 77 - Lighting System, Front Combination Lamp, Replacement)

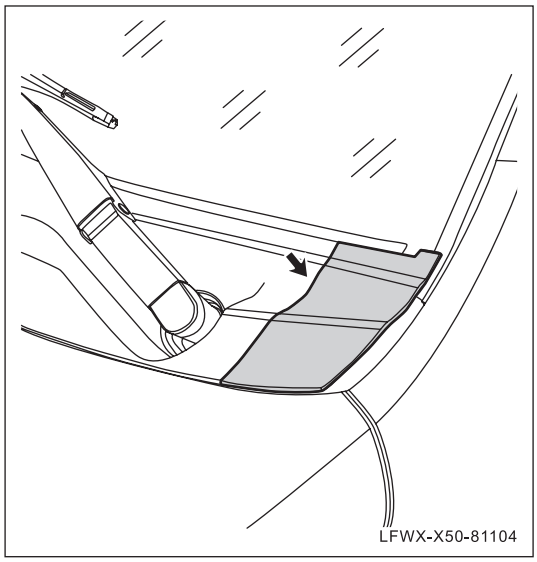
(c) Remove front left wheel mudguard. (See 81 - Interiors and Exteriors, Mudguard, Replacement)



(d) Pry plastic snap-fit of front door outer triangle trim panel with a "flat-blade" screwdriver to take out front door outer triangle trim panel.

NOTICE:

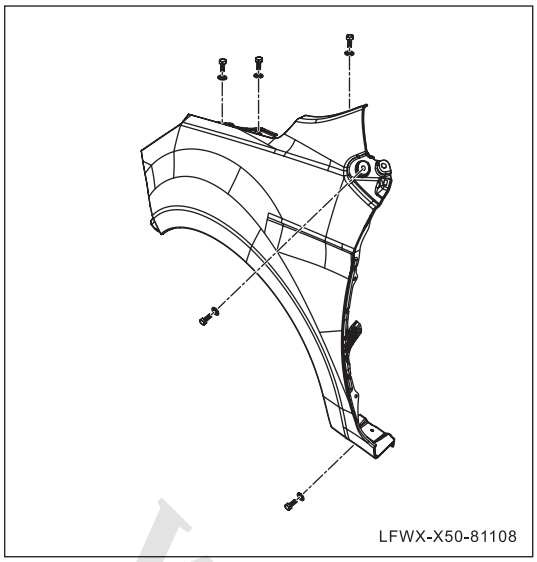
When using a flat-blade screwdriver, it is necessary to wrap the head with adhesive tape to prevent the vehicle body from being scratched.



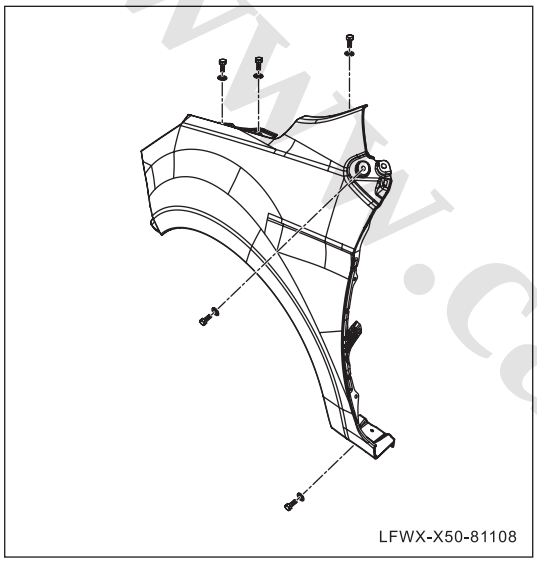
(e) Remove the left top grille assembly of front wall cowl top grill.

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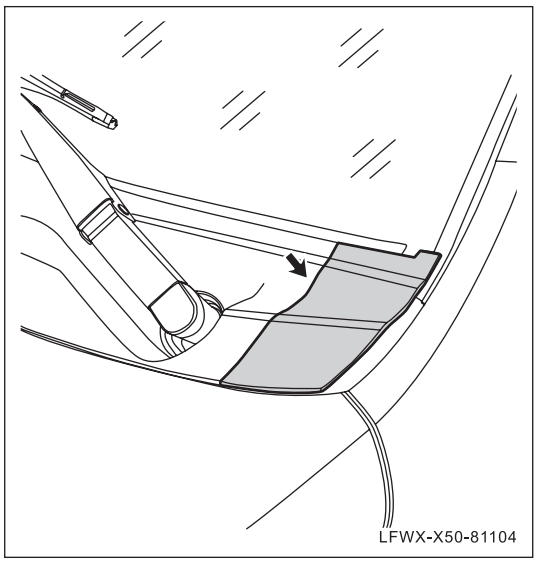
(f) Remove fixing bolts of the fender, and take out the fender.



2. INSTALL FENDER

(a) Install the fender onto the vehicle body, and then install & tighten the fixing bolts.

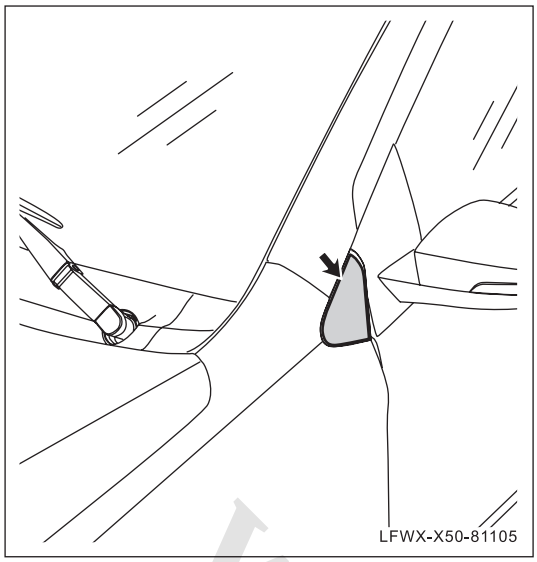
Torque: 8 - 12 N•m



(b) Install the left top grille assembly of front wall cowl top grille onto the vehicle body aligning left top grille snap-fits of front wall cowl top grille with the mounting holes. Press left top grille snap-fits of front wall cowl top grille forcedly to install the left top grille of front wall cowl top grille in place.

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(c) Install the front door outer triangular trim panel onto vehicle body aligning front door outer triangular trim panel snap-fit with the mounting-hole. Press the front door outer triangular trim panel snap-fit forcedly to install A pillar lower trim panel in place.

(d) Install front left wheel mudguard. (See 81 - Interiors and Exteriors, Mudguard, Replacement)

(e) Install the front left combination lamp. (See 77 - Lighting System, Front Combination Lamp, Replacement)

(f) Install the front bumper and the front bumper bracket. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

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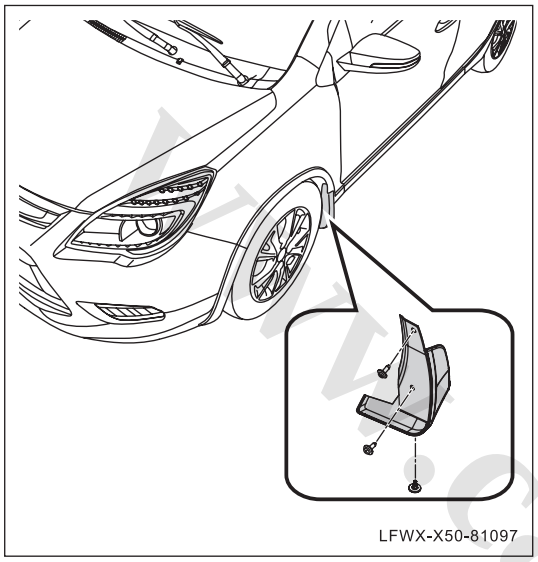
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MUDGUARD

REPLACEMENT

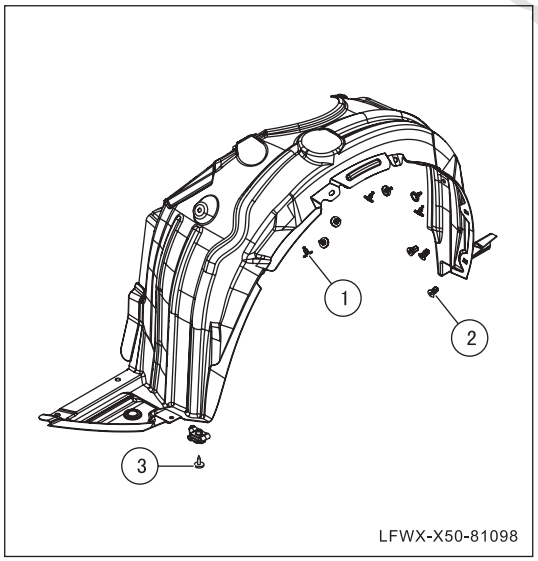
△ HINT:

- The installation and removal method of left wheel mudguard is the same as that of right wheel mudguard. Therefore, the installation and removal of left wheel mudguard is only taken as an example in this chapter.
- Remove the wheels firstly to make it convenient to remove the mudguard. Reinstall the wheels after replacing the mudguard. (See 33 - Wheel and Tire, Wheel Assembly, Replacement)



1. REMOVE FRONT WHEEL MUDGUARD COMPONENT

(a) Remove fixing screws of front wheel mudguard tail plate component, and take out front wheel mudguard tail plate component.

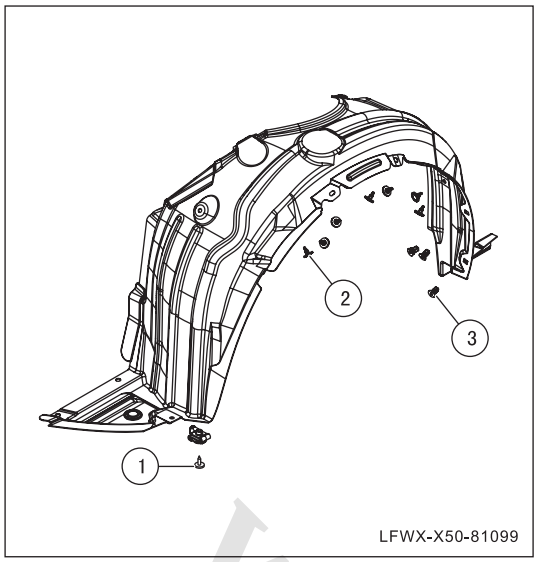


(b) Remove inlay clip ① and plastic snap-fit ② of front wheel mudguard component.

(c) Remove fixing screw ③ of front wheel mudguard component, and take out front wheel mudguard.

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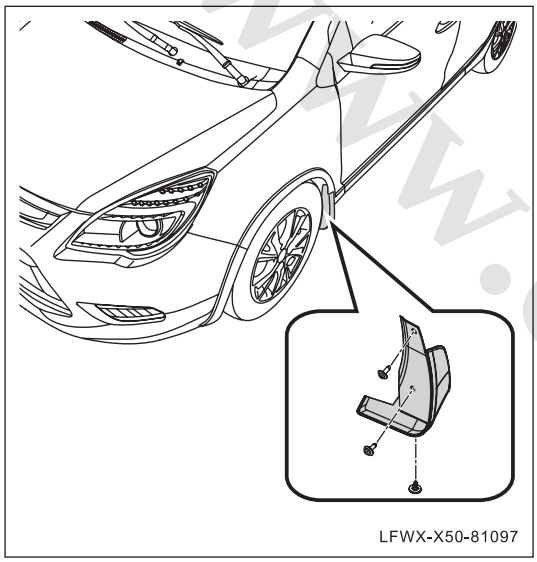


2. INSTALL FRONT WHEEL MUDGUARD COMPONENT

(a) Install front wheel mudguard component onto vehicle body, and install & tighten the fixing screw ① .

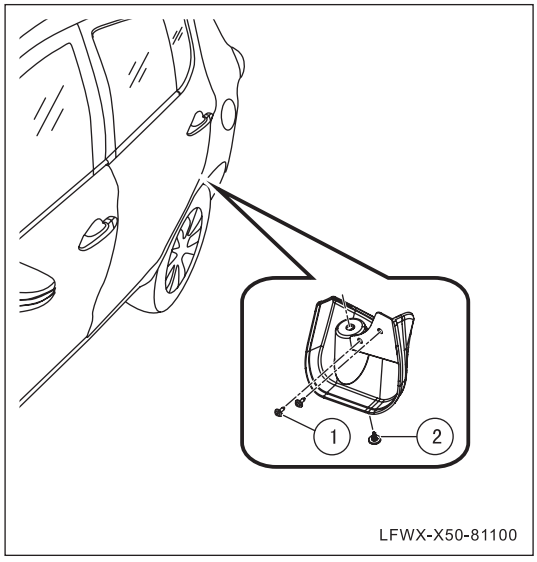
Torque: 8 - 10 N•m

(b) Install inlay clip ② and plastic snap-fit ③ of front wheel mudguard component.



(c) Install front wheel mudguard tail plate component onto front wheel mudguard, and install & tighten the fixing screws.

Torque: 8 - 10 N•m

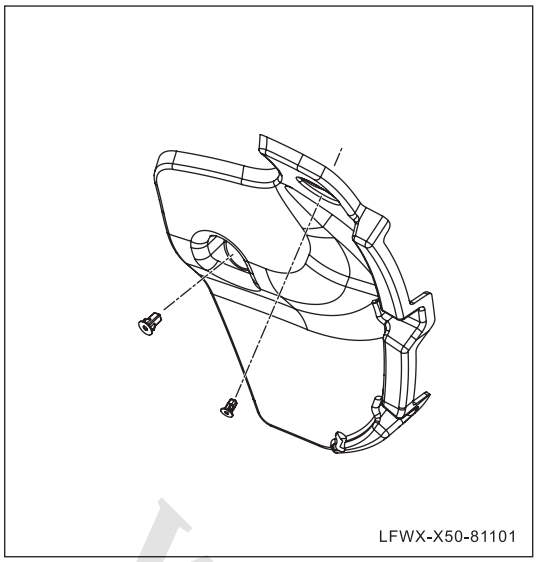


3. REMOVE REAR WHEEL MUDGUARD COMPONENT

(a) Remove fixing screw ① and inlay clip ② of rear wheel mudguard tail plate component, and take out rear wheel mudguard tail plate component.

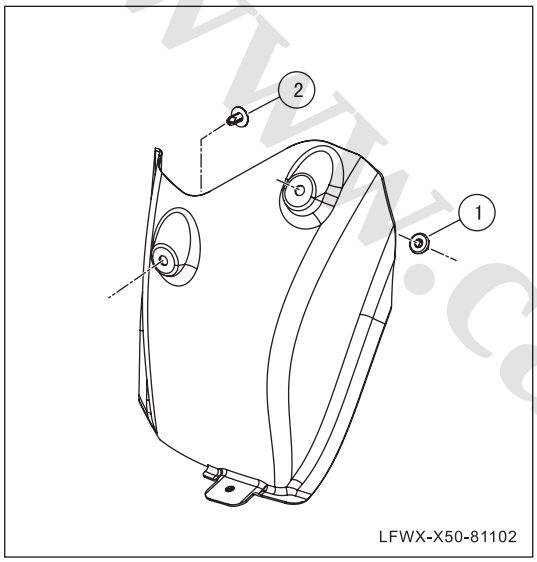
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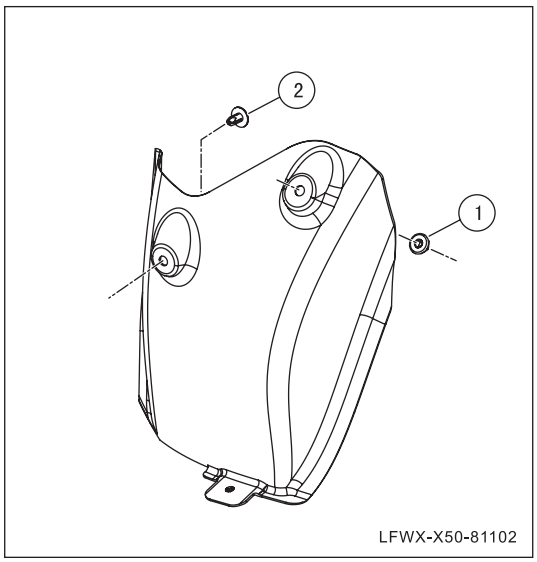
LFWX-X50-81101

(b) Remove the plastic snap-fits of rear wheel mudguard component, and take out the rear wheel mudguard.



LFWX-X50-81102

(c) Remove fixing nut ① and inlay clip ② of rear wheel front mudguard component, and take out rear wheel front mudguard component.



LFWX-X50-81102

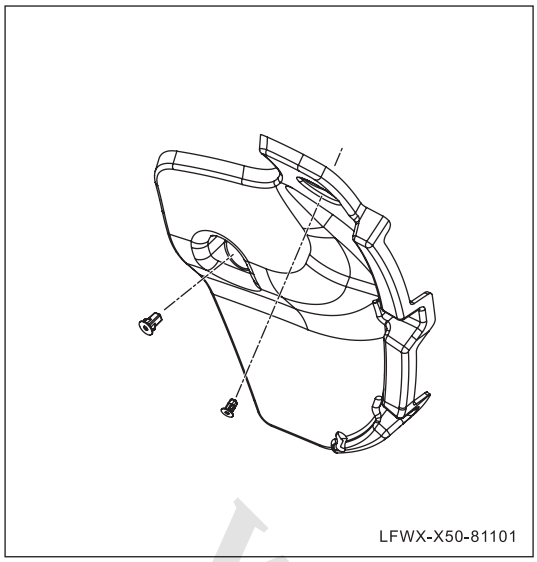
4. INSTALL REAR WHEEL MUDGUARD COMPONENT

(a) Install rear wheel front mudguard component onto vehicle body, and install & tighten the fixing nut ① and inlay clip ② .

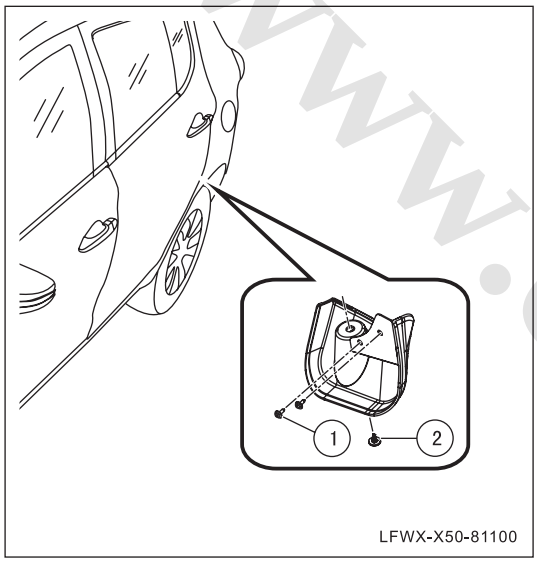
Torque: 8 - 10 N•m

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LFWX-X50-81101

(b) Install rear wheel mudguard component onto vehicle body, and install the plastic snap-fits.



LFWX-X50-81100

(c) Install rear wheel mudguard tail plate component to rear wheel mudguard, and install & tighten the fixing screw ① and inlay clip ② .

Torque: 8 - 10 N•m

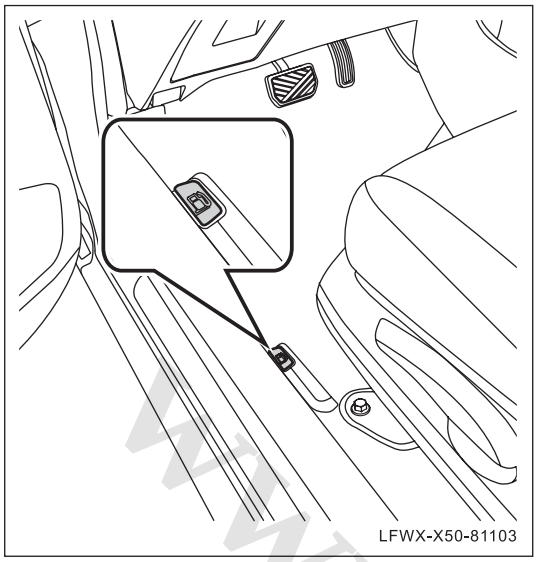
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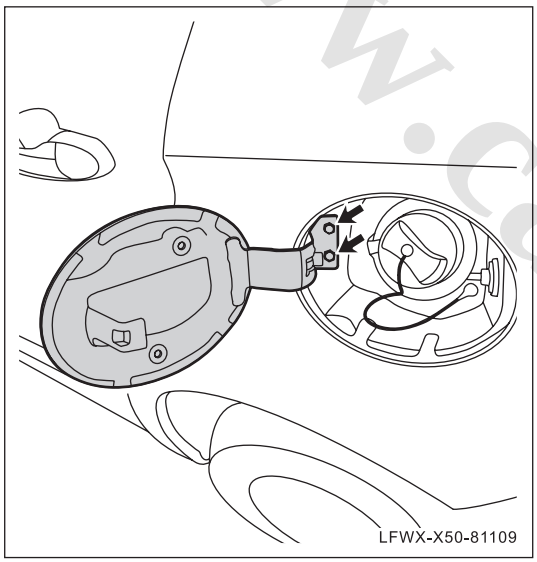
FUEL FILLER DOOR

REPLACEMENT

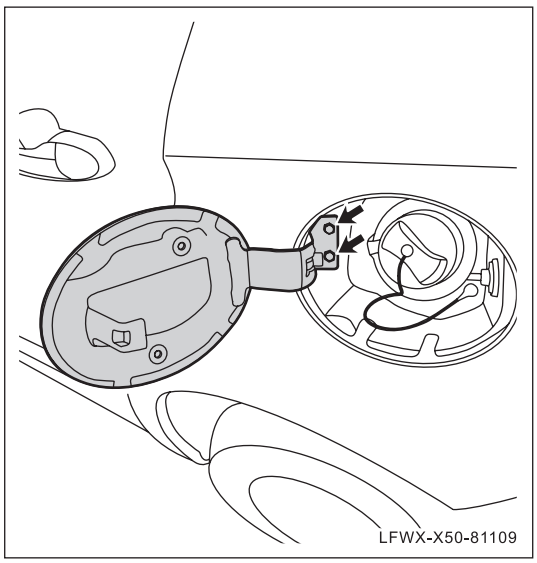


1. REMOVE FUEL FILLER DOOR

(a) Pull fuel filler door opener to open the fuel filler door.



(b) Remove fixing bolts of fuel filler door, and take out fuel filler door.



2. INSTALL FUEL FILLER DOOR

(a) Install fuel filler door on fuel filler, and install & tighten the fixing bolts.

Torque: 8 - 12 N•m

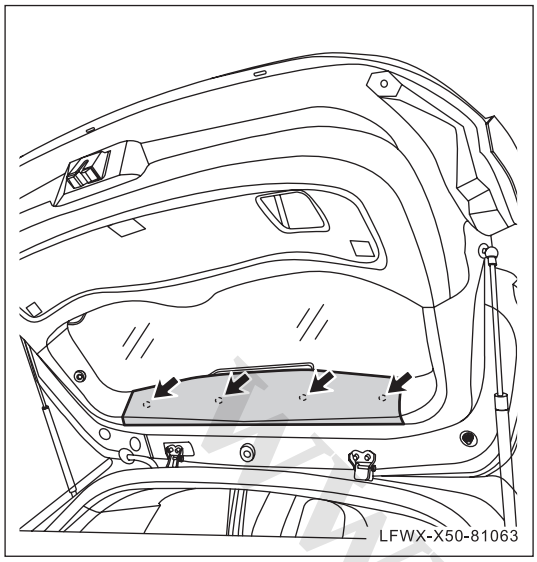
(b) Close the fuel filler door.

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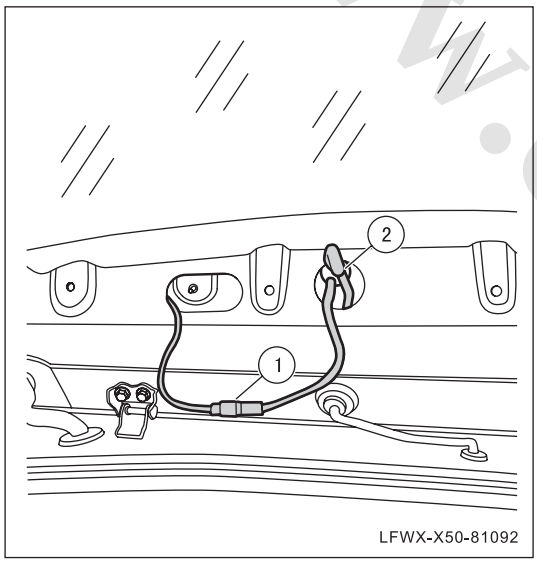
DEFLECTOR

REPLACEMENT



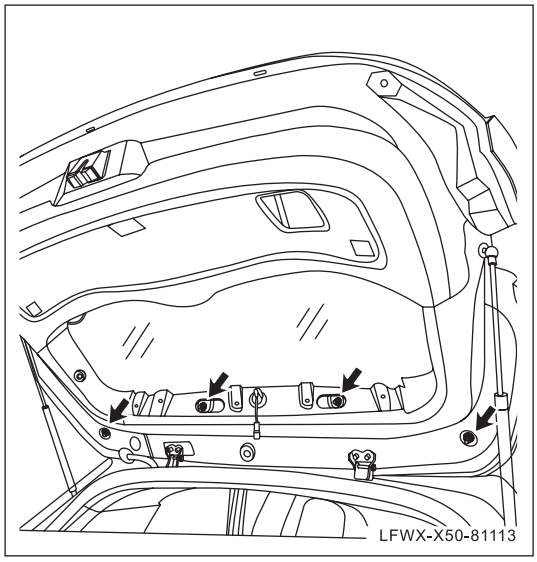
1. REMOVE THE DEFLECTOR.

(a) Remove tail door upper trim panel. (See 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)



(b) Disconnect the high-mounted brake lamp connector ① .

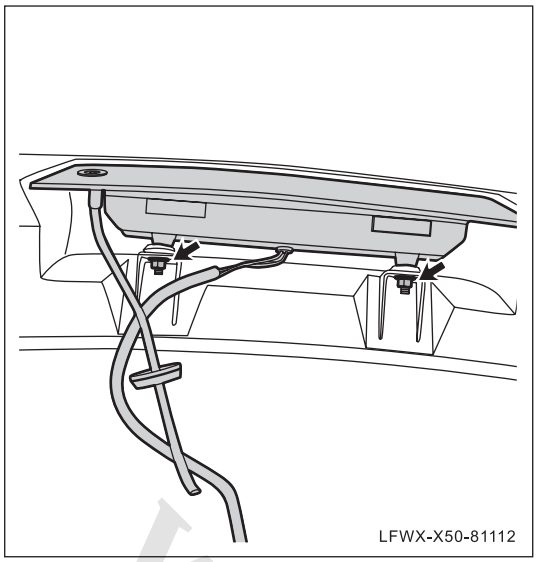
(c) Disconnect rear wiper spray pipe ② .



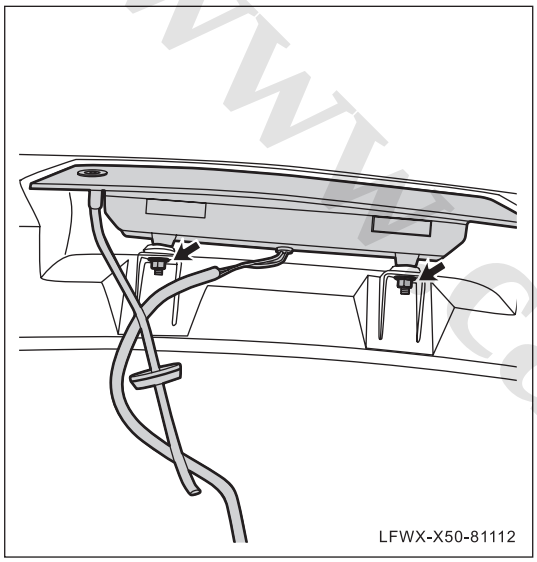
(d) Remove the fixing nuts of deflector, and take out the deflector.

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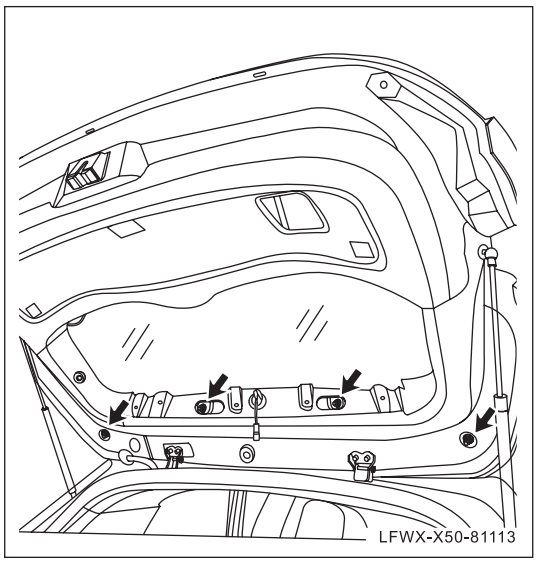
(e) Install the fixing nuts of high-mounted brake lamp, and take out the high-mounted brake lamp from the deflector.



2. INSTALL THE DEFLECTOR.

(a) Install the high-mounted brake lamp onto deflector, and then install & tighten the fixing nuts.

Torque: 8 - 10 N•m



(b) Install the deflector onto tail door, and then install & tighten the fixing nuts.

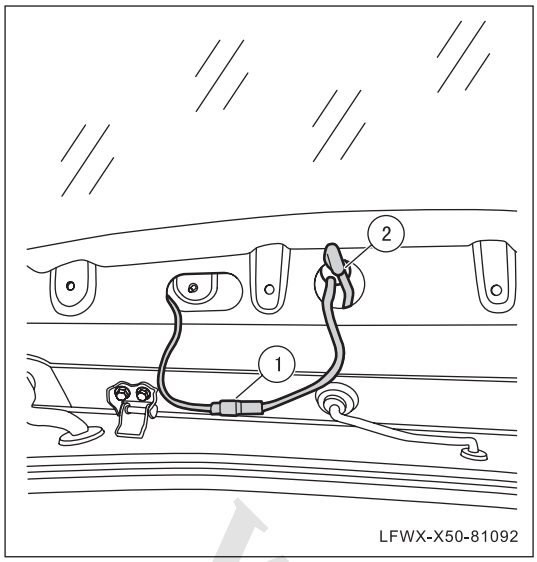
Torque: 8 - 12 N•m

△ HINT:

When installing the deflector, insert high-mounted brake lamp wire harness and rear wiper spray pipe through tail door firstly.

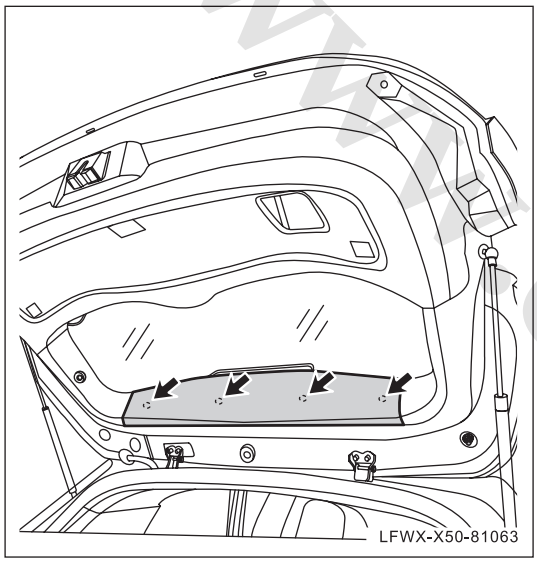
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(c) Connect the high-mounted brake lamp connector ① .

(d) Connect the rear wiper spray pipe ② .



(e) Install the tail door upper trim panel. (See 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

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Door and Door Lock

Door and door Lock 82-1
System description 82-1
Preparation 82-1
Service data 82-2
Precautions 82-2
Function and fault of components 82-3
Diagnosis 82-4
Fault symptom table 82-4
Door 82-5
Adjustment 82-5
Replacement 82-6
Door hinge and check 82-9
Replacement 82-9
Door lock buckle.....82-12
Adjustment 82-12
Replacement 82-13
Front door Lock 82-14
Replacement 82-14
Rear door lock 82-20
Replacement 82-20
Engine hood.....82-25
Adjustment 82-25
Replacement 82-26
Engine hood lock.....82-28
Replacement 82-28
Tail door.....82-29
Replacement 82-29
Tail door lock 82-34
Replacement 82-34

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DOOR AND DOOR LOCK

SYSTEM DESCRIPTION

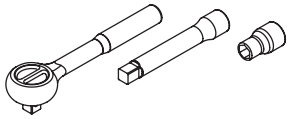
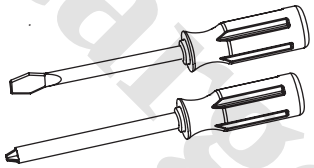
1. FUNCTION

The door is one of the important parts of the vehicle body. Door and door lock forms a safe and closed space while the vehicle running.

2. COMPONENTS

Doors consist of front and rear doors, tail door and engine hood, and they are connected with the vehicle body by hinges and locked to the vehicle body through door locks and lock buckles.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Quick wrench, connecting rod and sleeve		Removing and installing the fixing bolts
2	Screwdriver		Removing and installing the fixing screws

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SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Connecting bolt of front door hinge and the vehicle body	28 - 32
Connecting bolt of front door hinge and the door	28 - 32
Fixing bolt of front door check and the vehicle body	8 - 12
Fixing bolt of front door check and the door	8 - 12
Fixing screw of door lock buckle	8 - 12
Fixing screw of front door lock body	8 - 12
Fixing bolt of front door lock body bracket	8 - 12
Fixing bolt of front door outer handle base	8 - 12
Fixing screw of front door lock cylinder	8 - 12
Fixing bolt of rear door outer handle base	8 - 12
Fixing bolt of rear door outer handle cap	8 - 12
Fixing screw of rear door lock body	8 - 12
Fixing bolt of rear door lock body bracket	8 - 12
Connecting bolt of engine hood hinge and the vehicle body	22 - 28
Connecting bolt of engine hood hinge and engine hood	22 - 28
Fixing bolt of engine hood lock	8 - 12
Fixing bolt of tail door pneumatic rod lower bracket	8 - 12
Fixing bolt of tail door hinge	22 - 28
Tail door pneumatic rod upper nut	22 - 28
Fixing bolt of tail door lock assembly	8 - 12
Fixing bolt of tail door outer handle bracket	8 - 12
Fixing nut of tail door outer handle	8 - 12

PRECAUTIONS

1. Before operation, turn off the ignition switch and pull up the parking brake handle lever.
2. Do not remove interiors and exteriors with sharp tools to avoid damaging interiors and exteriors.
3. When disconnecting the connector, do not pull the wire harness to avoid damaging the wire harness.

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FUNCTION AND FAULT OF COMPONENTS

Component name	Component function	Common faults	Fault symptom
Door lock	Locking door	Damaged	Can not be locked or opened
Lock buckle	Locking door	Screw loosened	Tightness of the closed door does not meet the requirements or the door can not be locked
Hinge and check	Connecting door with the vehicle body	Damaged	Tightness of the closed door does not meet the requirements or the door can not be locked

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Tightness of the closed door does not meet the requirement.	1. Lock buckle (improper adjustment)	Adjust the lock buckle
	2. Door lock assembly (door lock assembly is damaged)	Replace the door lock
	3. Door hinge (damaged)	Replace the door hinge
Door cannot be locked or opened from inside	1. Inner handle (damaged)	Replace the inner handle
	2. Door lock assembly (damaged)	Replace the door lock
	3. Door hinge (damaged)	Replace the door hinge
Door cannot be locked or opened with a key	1. Lock cylinder (damaged)	Replace the lock cylinder
	2. Door lock assembly (damaged)	Replace the door lock
Key cannot turn	1. Lock cylinder (damaged)	Replace the lock cylinder

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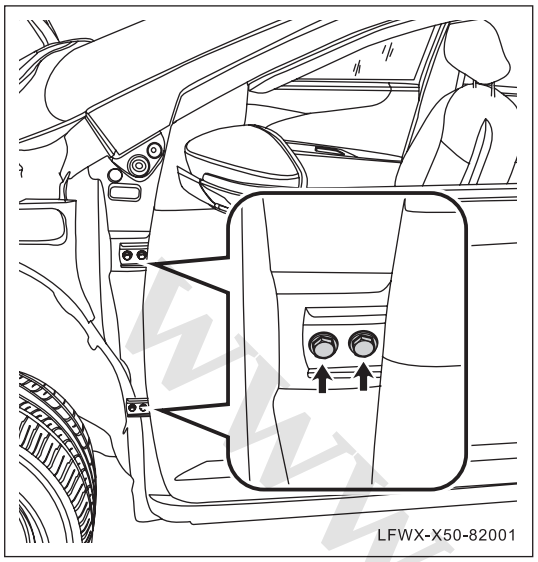
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DOOR

ADJUSTMENT

△ HINT:

Adjusting methods for each door are the same. Set the front left door as an example.



1. ADJUST FRONT LEFT DOOR

(a) Remove the fender. (see 81 - Interiors and Exteriors, Fender, Replacement)

(b) Loosen the fixing bolts connecting the upper/lower hinge for the front left door and the vehicle body, and adjust the front left door.

(c) After adjusting, tighten the fixing bolts connecting the upper/lower hinge of the front left door and the vehicle body.

Torque: 28 - 32 N•m

(d) Loosen the fixing bolts connecting the upper/lower hinge for the front left door and the front left door, and adjust the front left door.

(e) After adjusting, tighten the fixing bolts connecting the upper/lower hinge for the front left door and the front left door.

Torque: 28 - 32 N•m

△ HINT:

Adjust the door clearance with wedges (the clearance at upper segment of front door and rear door is 4.5 ± 0.5 mm; the clearance at door outer plate is 4.5 ± 0.5 mm, the clearance between front door and A pillar is 4.5 ± 0.5 mm, the clearance between front/rear door and doorsill 6 ± 0.5 mm, surface difference is 0 - 0.5 mm) and keep level with the magnet.

NOTICE:

- **Check if there are scratches during the course of assembling, and bolts and nuts are assembled properly and fixedly.**
- **Check if front/rear door clearance and surface clearance conform to the above requirements, and the checking line height is 0 - 0.5 mm.**

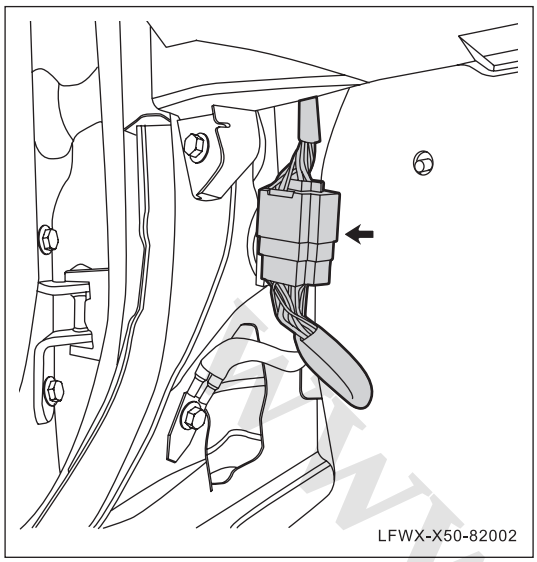
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REPLACEMENT

△ HINT:

Replacement method for each door is the same. Set the front left door as an example. If there is any difference, detailed specification will be provided.



1. REMOVE FRONT LEFT DOOR ASSEMBLY

(a) Remove A pillar lower trim panel. (see 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

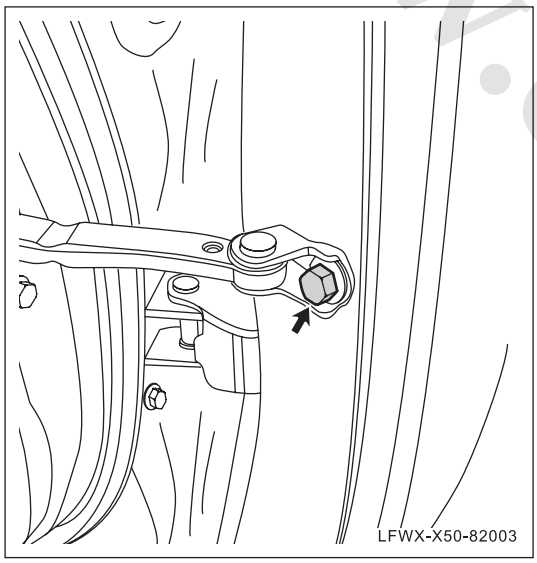
△ HINT:

B pillar lower trim panel shall be removed when replacing the rear door. (see 81 - Interiors and Exteriors, B Pillar Trim Panel, Replacement)

(b) Disconnect the total wire harness connector of the front left door.

NOTICE:

When disconnecting the connector, do not pull the wire harness to prevent damaging the wire harness.

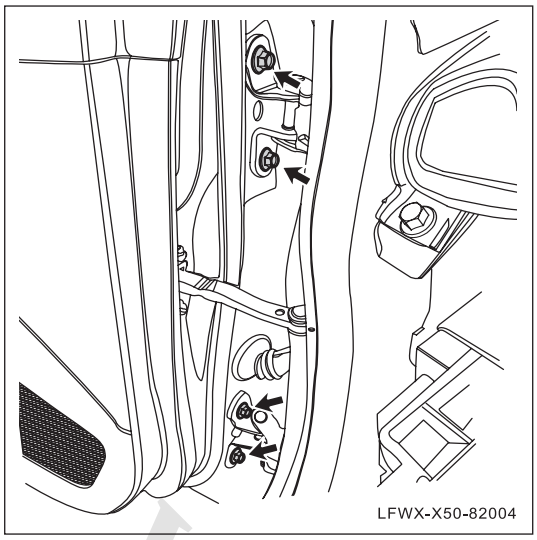


(c) Remove the fixing bolts connecting the front left door check and the vehicle body.

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(d) Remove the fixing bolts connecting the upper/lower hinge of the front left door and the front left door.

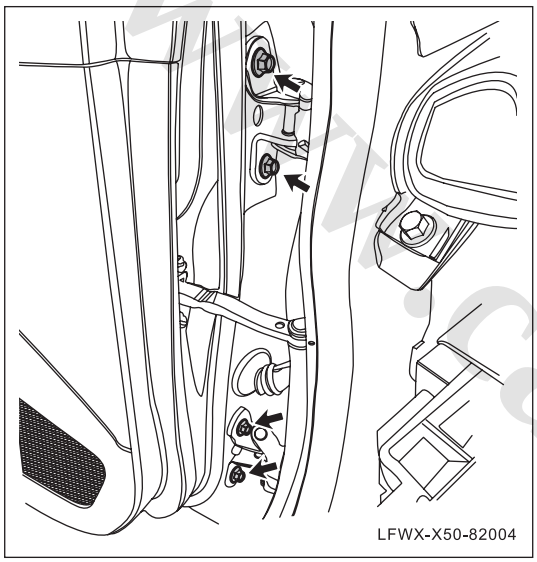
△ HINT:

When removing, it is necessary to make marks on the matching surface of the front left door hinge and the front left door for easy installation in the future.

NOTICE:

When operating, an assistant is required to fix the front left door, or use lifting tools to fix the front left door to prevent it from falling or shaking when removing.

(e) Remove the front left door.



2. INSTALL THE FRONT DOOR ASSEMBLY

(a) Install the fixing bolts connecting the upper/lower hinge of the front left door and the front left door.

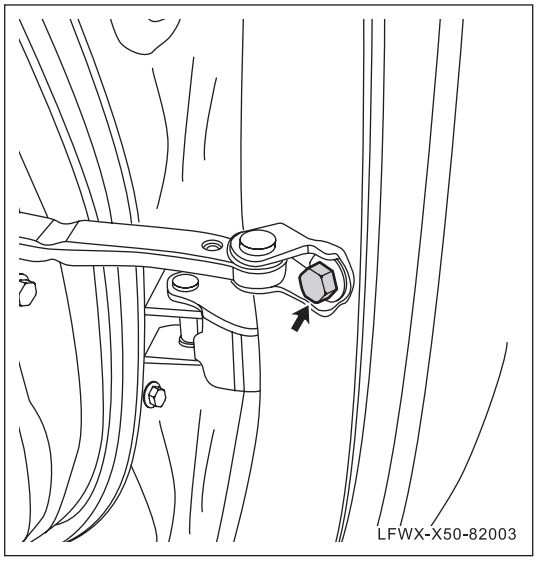
Torque: 28 - 32 N•m

△ HINT:

When installing the front left door, align the marks to install it.

NOTICE:

It is difficult for a single person to complete it. An assistant is required to fix the front left door, or use lifting tools to fix the front left door to prevent it from falling or shaking when installing.

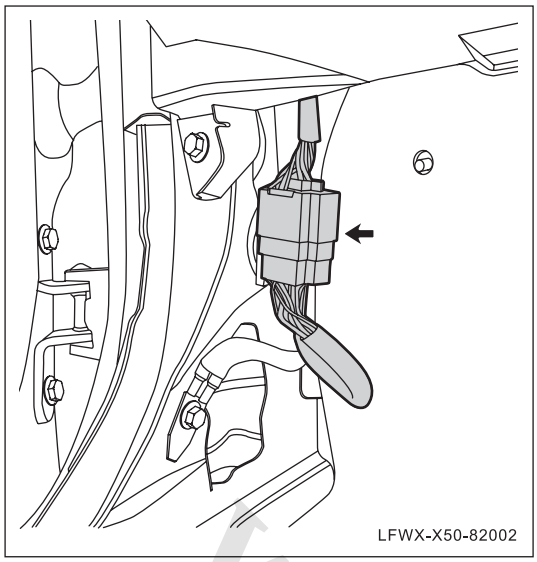


(b) Install the fixing bolts connecting the front left door check and the vehicle body.

Torque: 8 - 12 N•m

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(c) Connect the wire harness connector of the front left door assembly.

(d) Install A pillar lower trim panel. (see 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

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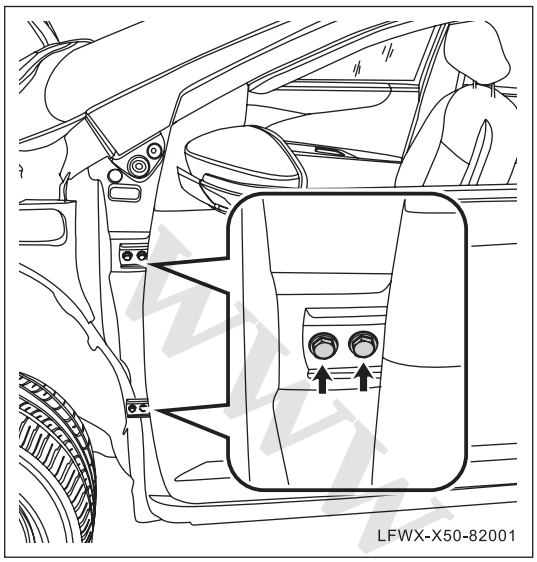
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DOOR HINGE AND CHECK

REPLACEMENT

△ HINT:

Replacement methods of door hinges and check are the same. Set the front left door as an example. If there is any difference, detailed specification will be provided.



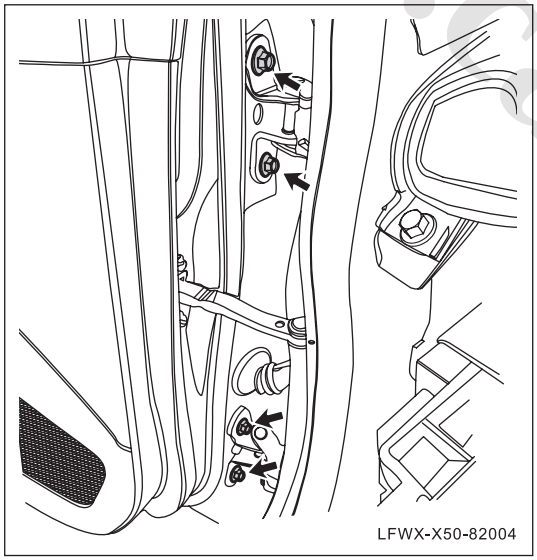
1. REMOVE FRONT LEFT DOOR HINGE

NOTICE:

In order to avoid relocating doors, do not remove two door hinges at the same time. It is better to remove the doors one by one.

(a) Remove the fender. (see 81 - Interiors and Exteriors, Fender, Replacement)

(b) Remove the fixing bolts connecting the front left door hinge and the vehicle body.



(c) Remove the fixing bolts connecting the front left door and its hinges.

△ HINT:

When removing, it is necessary to make marks on the matching surface of the front left door and its hinges for easy installation in the future.

(d) Remove the upper hinge of the front left door.

2. INSTALL THE FRONT LEFT DOOR HINGE

(a) Install the front left door hinges, and install and tighten the fixing bolts between the upper hinge and the front left door.

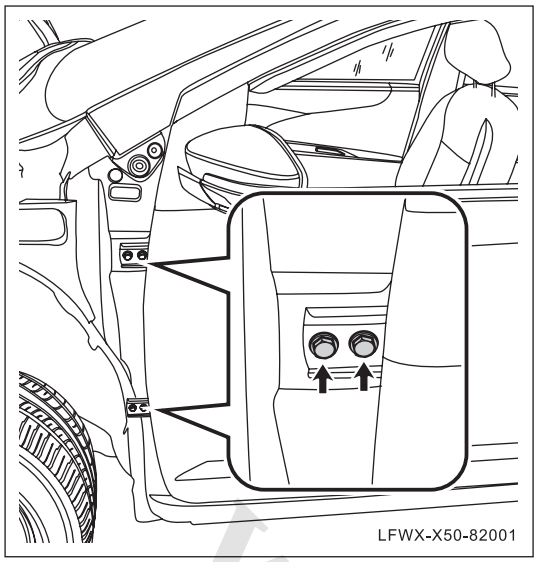
Torque: 28 - 32 N•m

△ HINT:

When installing the upper hinge of the front left door, align the marks made at the time of removing.

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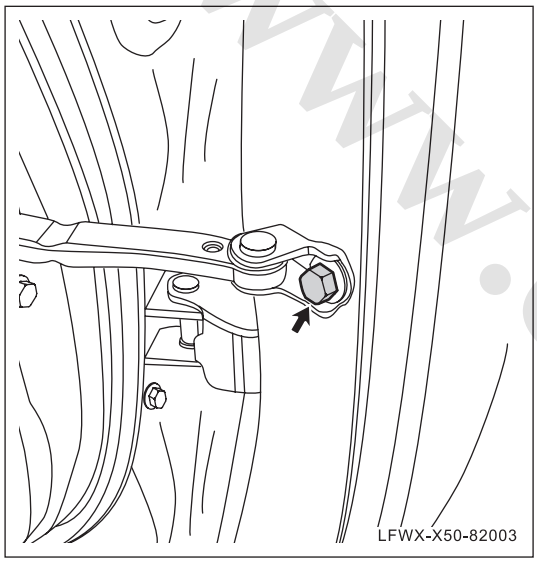
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(b) Install the fixing bolts between the upper hinge of the front left door and the vehicle body, and tighten them.

Torque: 28 - 32 N•m

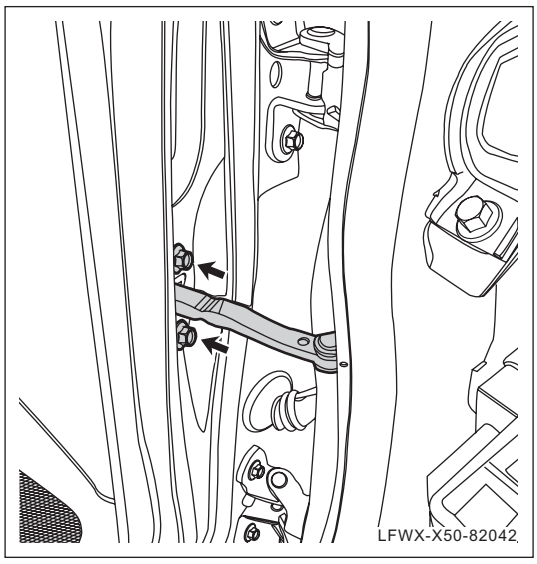
(c) Install the fender. (see 81 - Interiors and Exteriors, Fender, Replacement)



3. REMOVE FRONT LEFT DOOR CHECK

(a) Remove the front left door trim panel. (see 81- Interiors and Exteriors, Front Door Trim Panel, Replacement)

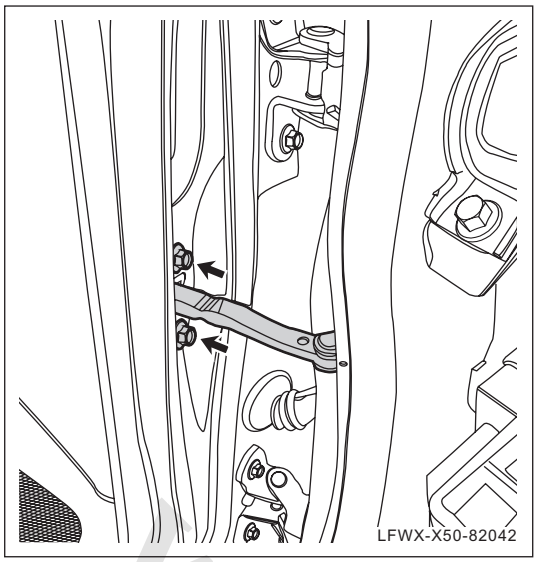
(b) Remove the fixing bolts of the front left door check and the vehicle body.



(c) Remove the fixing bolts of the front left door check and the front left door and take down the front left door check.

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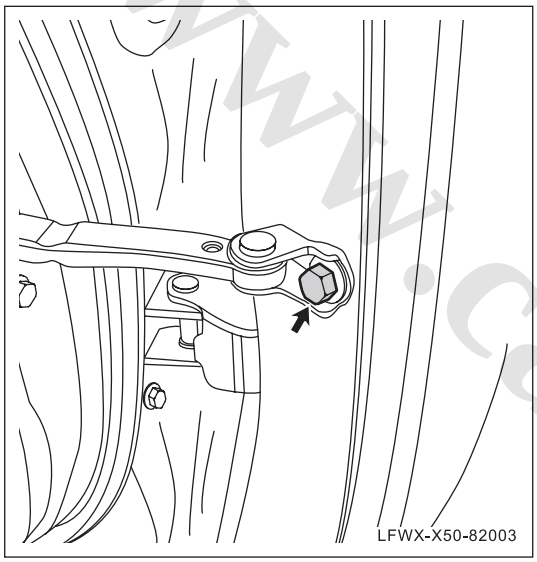
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4. INSTALL THE FRONT LEFT DOOR CHECK

(a) Install the front left door check, and install and tighten the fixing bolts of the front left door check and the front left door.

Torque: 8 - 12 N•m



(b) Install the fixing bolts of the front left door check and the vehicle body, and tighten them.

Torque: 8 - 12 N•m

(c) Install the left front door trim panel. (See 81- Interiors and Exteriors, Front Door Trim Panel, Replacement)

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DOOR LOCK BUCKLE

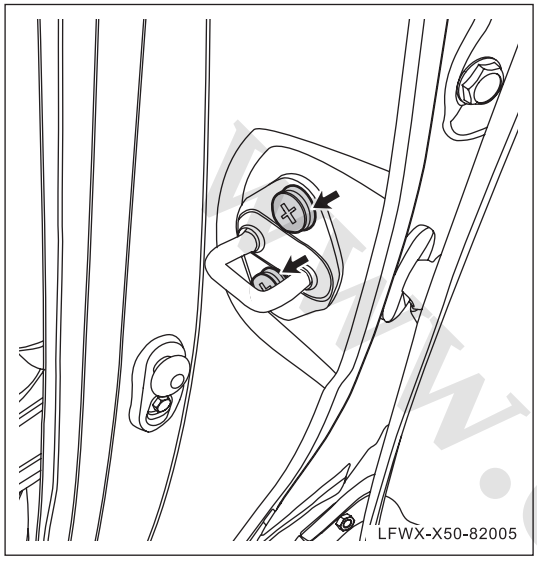
ADJUSTMENT

△ HINT:

Adjusting method for each door lock buckle is the same. Set the front left door as an example. If there is any difference, detailed specification will be provided.

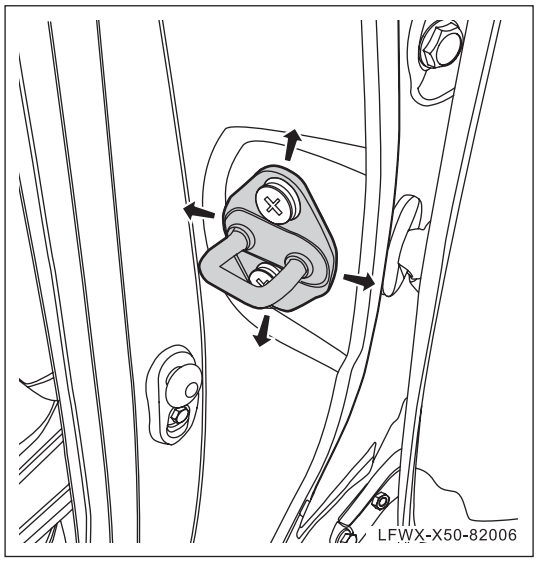
NOTICE:

Before adjusting the lock buckle, the door shall be located properly.



1. ADJUST DOOR LOCK BUCKLE

(a) Unscrew the fixing screws of the door lock buckle.



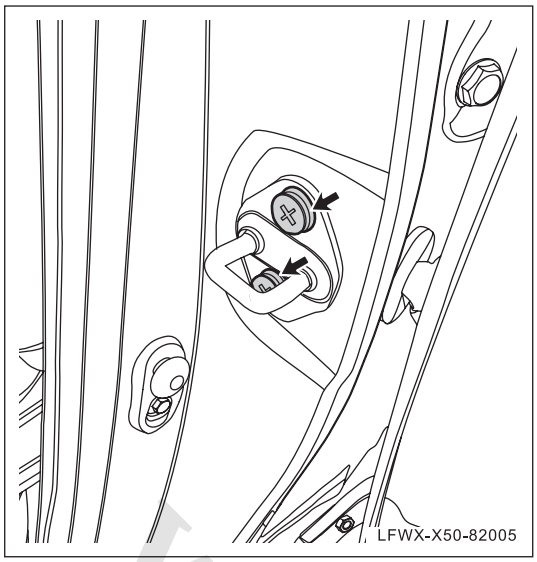
(b) Using a rubber hammer, tap the door lock buckle, adjusting it in left/right and up/down directions.

△ HINT:

- Adjust left/right to change the clearance between the door and the vehicle body.
- Adjust up/down to under the condition that the door can not be locked.

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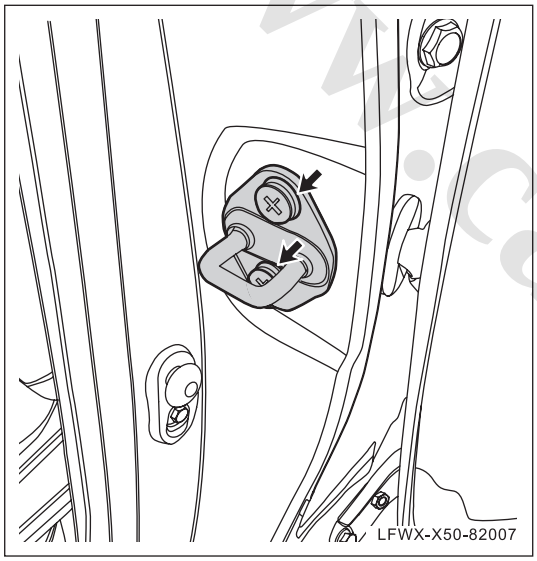
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(c) Tighten the fixing screw of the door lock buckle.

Torque: 8 - 12 N•m

REPLACEMENT



1. REMOVE DOOR LOCK BUCKLE

(a) Remove the fixing screws of the door lock buckle, and take down the door lock buckle.

△ HINT:

Rear apron plate trim plate shall be removed when replacing the tail door buckle. (see 81 - Interiors and Exteriors, Rear Apron Plate Trim Panel, Replacement)

2. INSTALL DOOR LOCK BUCKLE

(a) Install the door lock buckle, and install and pretighten the fixing screws.

(b) Adjust the installation position of the door lock buckle, and tighten the fixing screws of the door lock buckle.

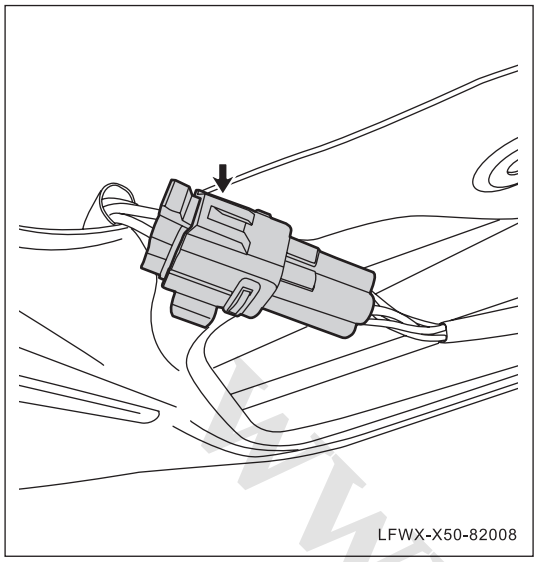
Torque: 8 - 12 N•m

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FRONT DOOR LOCK

REPLACEMENT



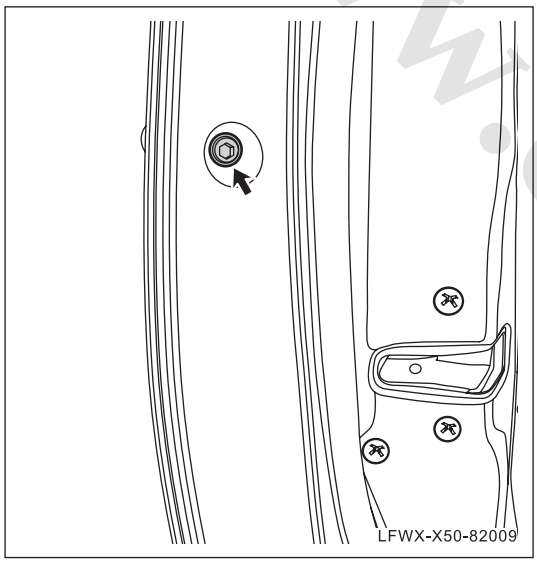
1. REMOVE THE FRONT DOOR LOCK

(a) Remove the front door trim panel. (see 81 - Interiors and Exteriors, Front Door Trim Panel, Replacement)

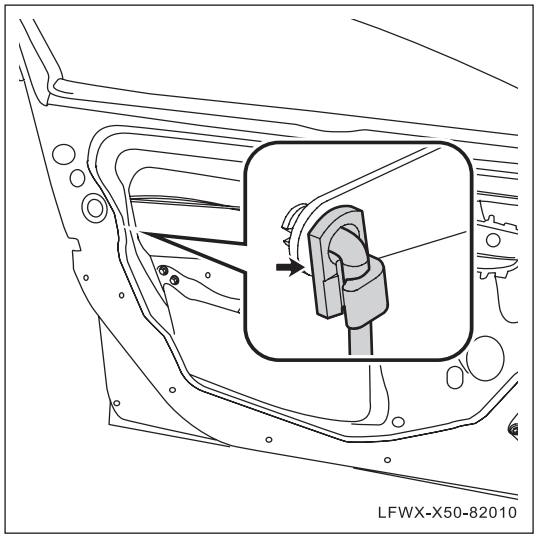
(b) Disconnect the front door locking device wire harness connector.

NOTICE:

When disconnecting the connector, do not pull the wire harness to prevent damaging the wire harness.



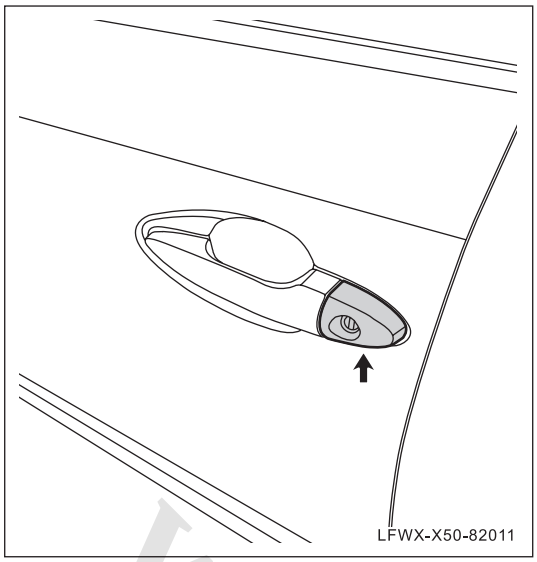
(c) Pry the cover, and remove the fixing screws of the front door lock cylinder.



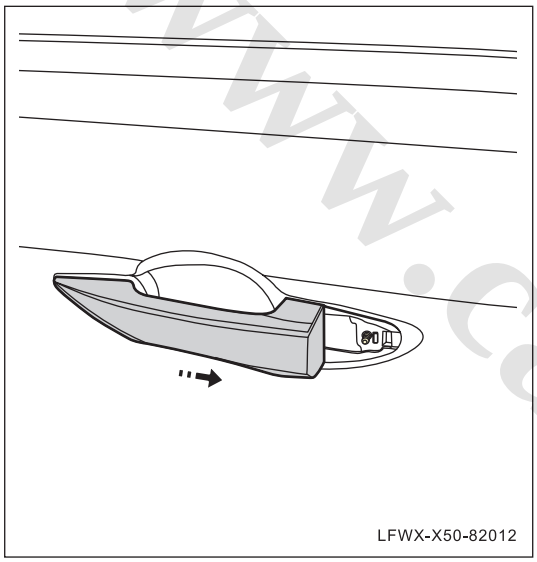
(d) Disengage the pull rod snap-fit between the lock cylinder and the lock body using a flat-blade screwdriver, and disconnect the pull rod and the lock cylinder.

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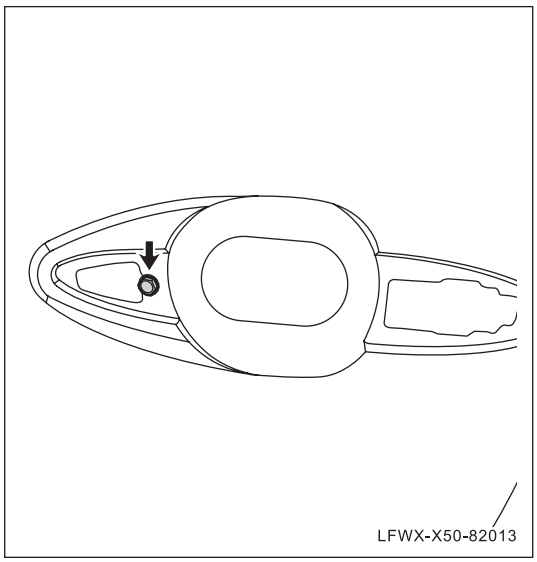
(e) Take down the front door outer handle cap.



(f) Remove the front door outer handle and the front door outer handle gasket.

△ HINT:

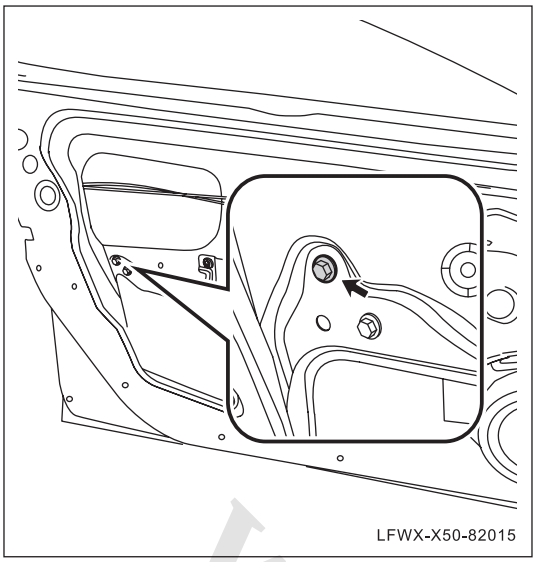
Push the front door outer handle to the direction of the door lock cylinder, and then remove the front door outer handle.



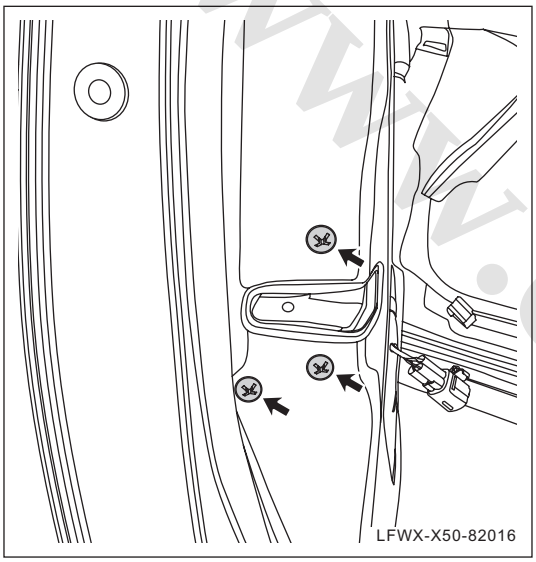
(g) Remove the fixing bolts of the front door outer handle base, and take down the front door outer handle base.

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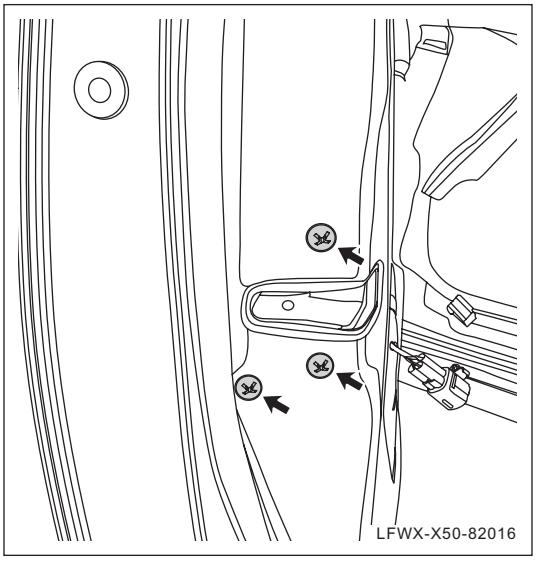


(h) Remove the fixing bolts of the front door lock body bracket.



(i) Remove the fixing screws of the front door lock body.

(j) Remove the front door lock body.



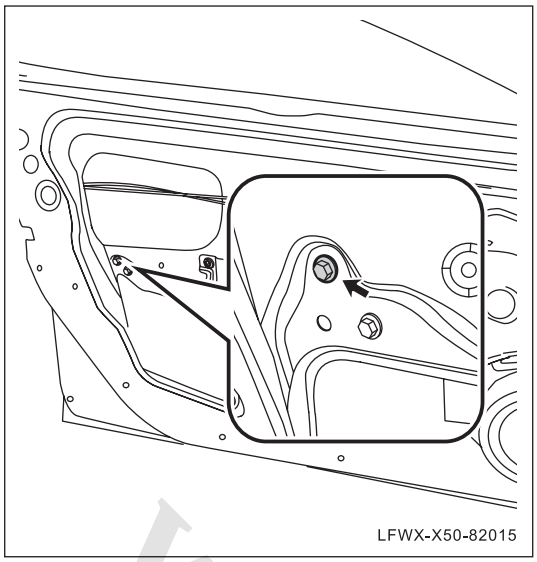
2. INSTALL THE FRONT DOOR LOCK

(a) Install the front door lock body, and install and tighten the fixing screws.

Torque: 8 - 12 N•m

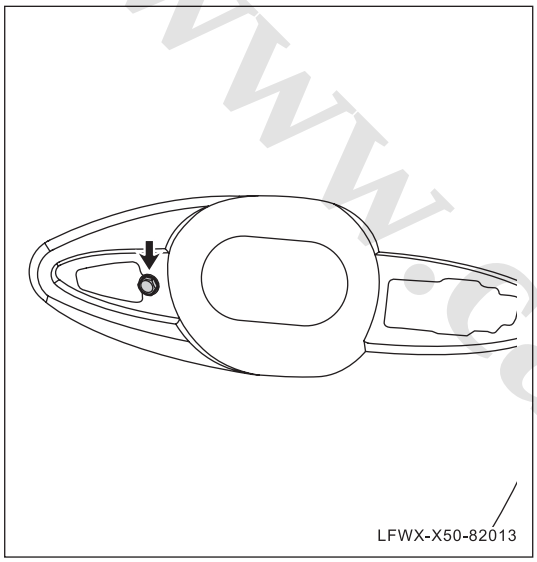
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(b) Install the fixing bolts of the front door lock body bracket and tighten them.

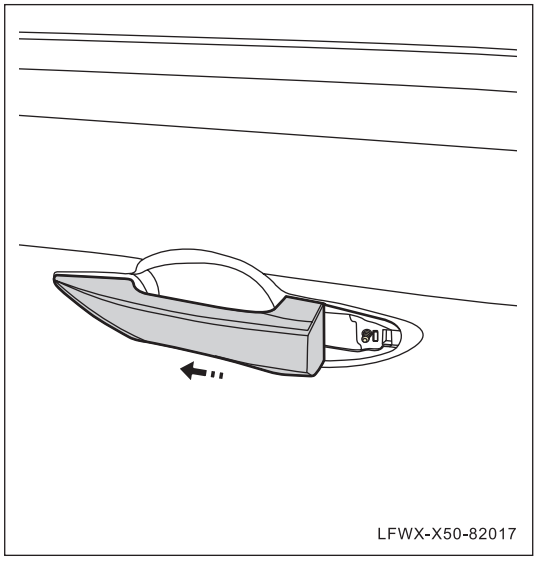
Torque: 8 - 12 N•m



(c) Install the front door outer handle base, and install and tighten the fixing bolts.

Torque: 8 - 12 N•m

(d) Install the front door outer handle connecting rod to the lock body.



(e) Install the front door outer handle gasket.

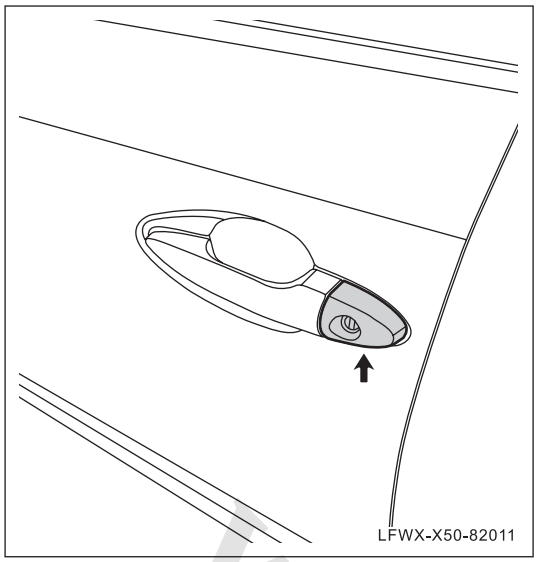
(f) Pass the front door outer handle through the mounting hole, and then pull forwards to install on its base.

△ HINT:

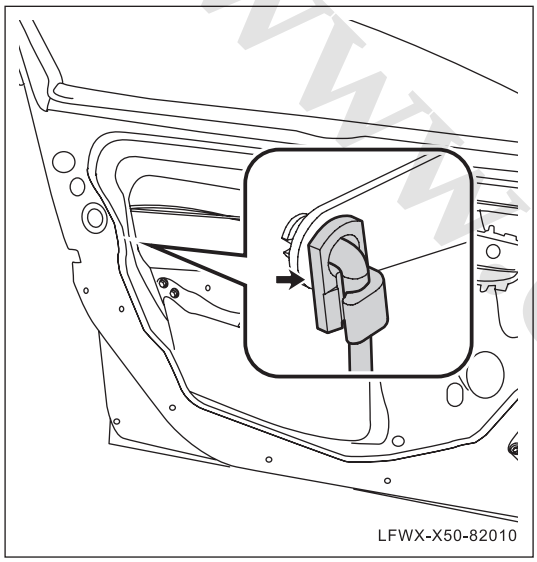
Pull the front door outer handle outwards and check if the front door outer handle is installed in place visually. If it is not installed in place, reinstall it.

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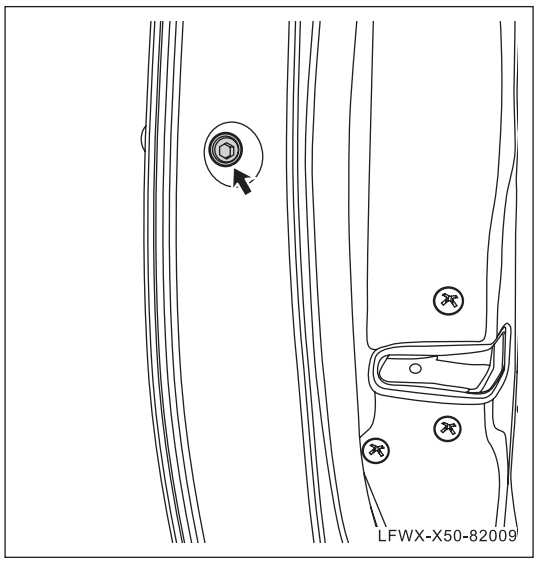
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(g) Install the front door outer handle cap.



(h) Install the lock cylinder tie rod and fix it using its snap-fits.

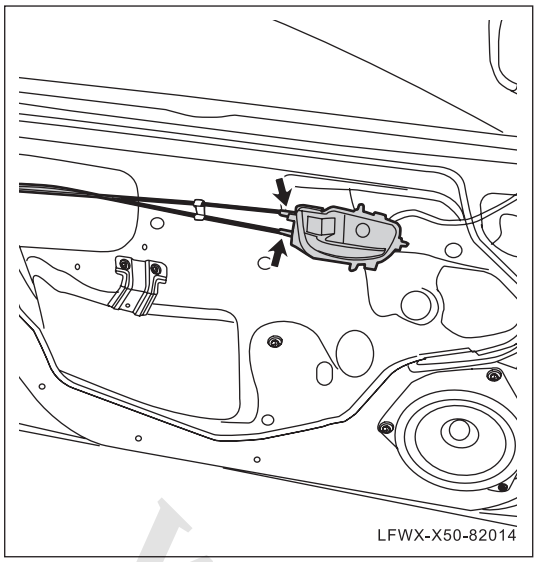


(i) Install the fixing screws of the front door lock cylinder and tighten them.

Torque: 8 - 12 N•m

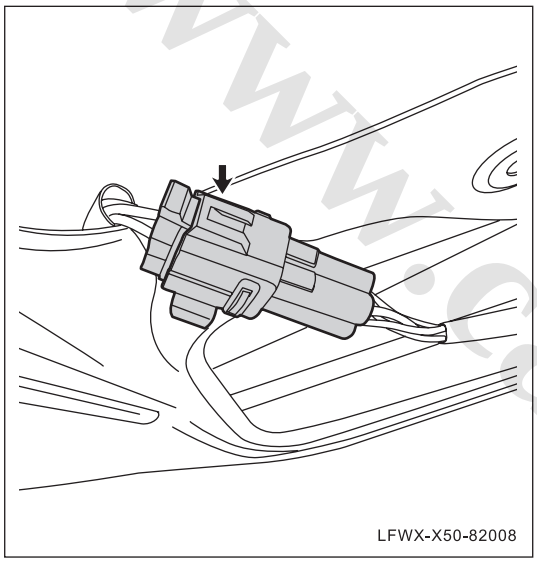
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(j) Install the front door inner handle cable to the inner handle.

(k) Install the front door lock cable to the inner handle.



(l) Connect the front door locking device wire harness connector, and fix it onto the door.

(m) Install the front door trim panel. (see 81- Interiors and Exteriors, Front Door Trim Panel, Replacement)

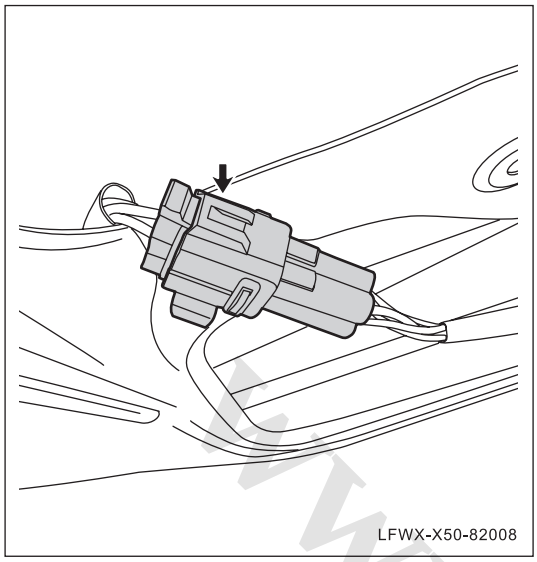
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REAR DOOR LOCK

REPLACEMENT



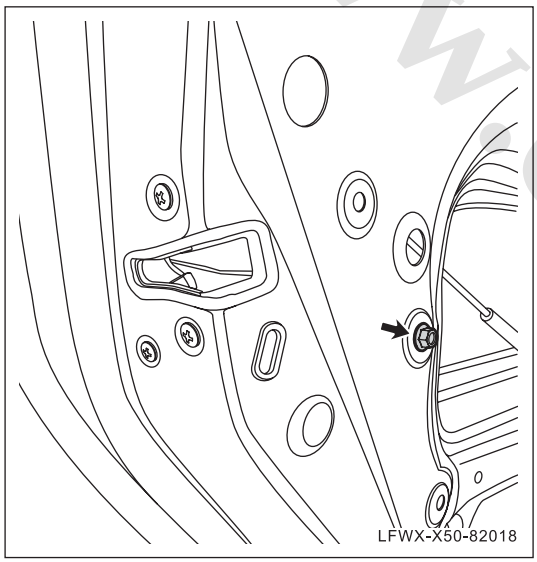
1. REMOVE THE REAR DOOR LOCK

(a) Remove the rear door trim panel. (see 81 - Interiors and Exteriors, Rear Door Trim Panel, Replacement)

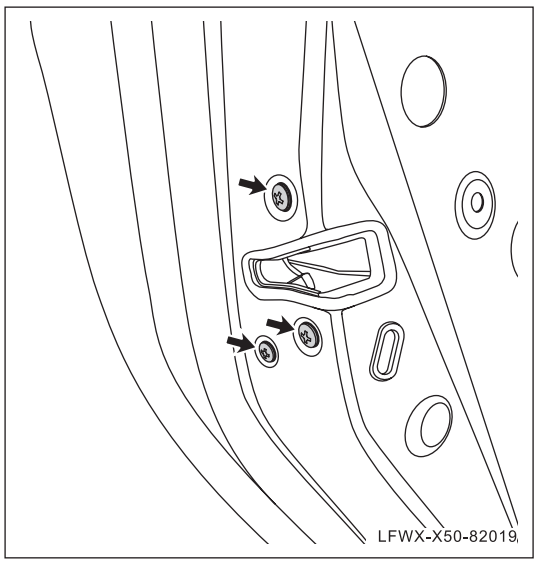
(b) Disconnect the rear door locking device wire harness connector.

NOTICE:

When disconnecting the connector, do not pull the wire harness to prevent damaging the wire harness.



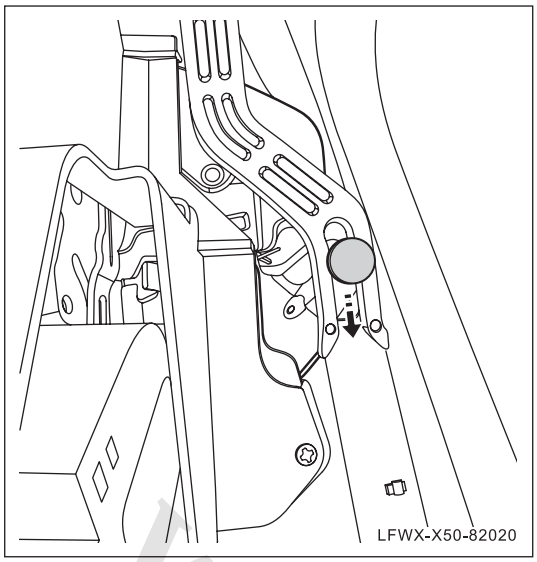
(c) Remove the fixing bolts of the rear door lock body bracket.



(d) Remove the fixing screws of the rear door lock body.

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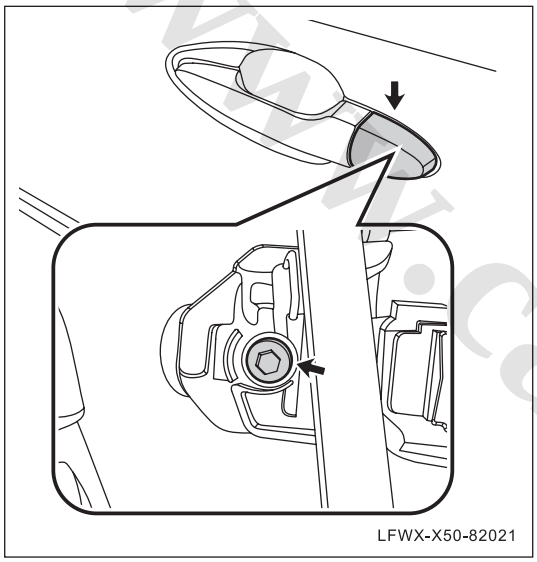
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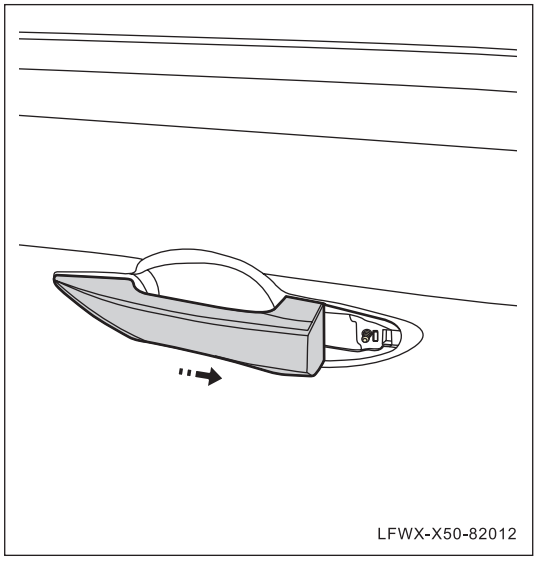
(e) Remove the rear door lock body.

△ HINT:

Dismantle the rear door lock body from the outer handle linkage fork, and remove the rear door lock body.



(f) Remove the fixing bolts of the rear door outer handle cap, and take down the rear door outer handle cap.



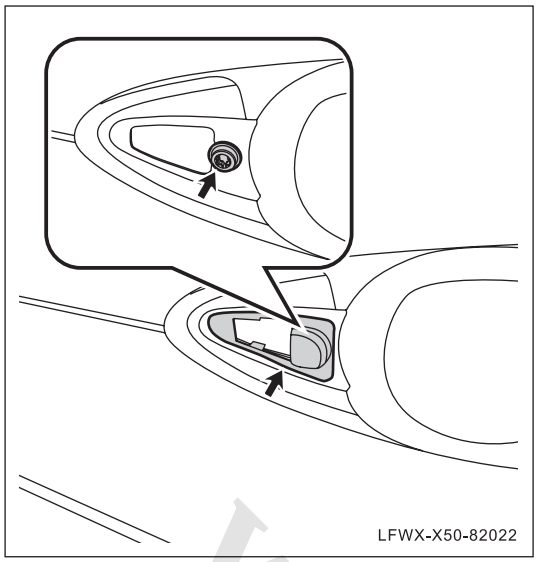
(g) Remove the rear door outer handle and the rear door outer handle gasket.

△ HINT:

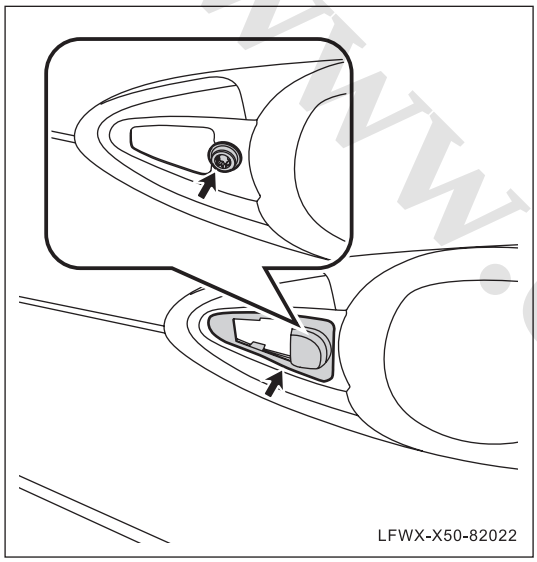
Push the rear door outer handle to the rear door handle cap and remove the rear door outer handle.

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(h) Take down the fixing bolts cover of the rear door handle base, and then remove the fixing bolts of the rear door outer handle base.

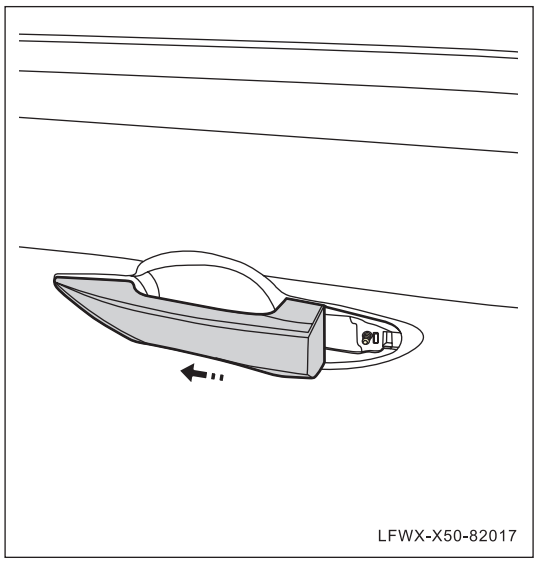


2. INSTALL REAR DOOR LOCK

(a) Install the rear door outer handle base, and install and tighten the fixing bolts.

Torque: 8 - 12 N•m

(b) Install the fixing bolts cover of the rear door outer handle base.



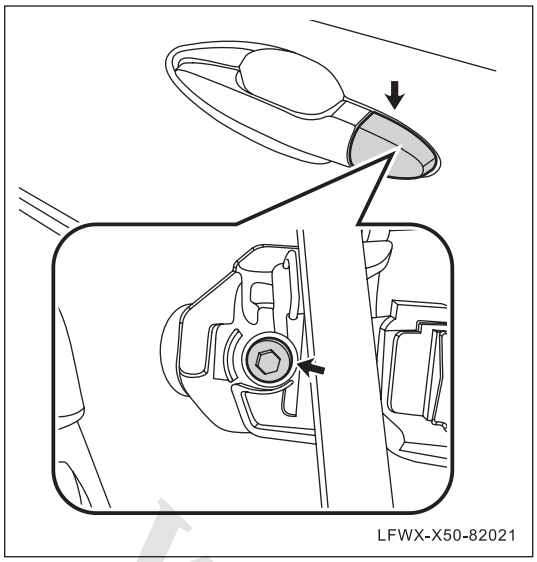
(c) Install the door outer handle by pushing it forwards to install it to the outer handle base through mounting-hole.

△ HINT:

Pull the rear door outer handle outwards, and check if the rear door outer handle is installed in place visually. If it is not installed in place, reinstall it.

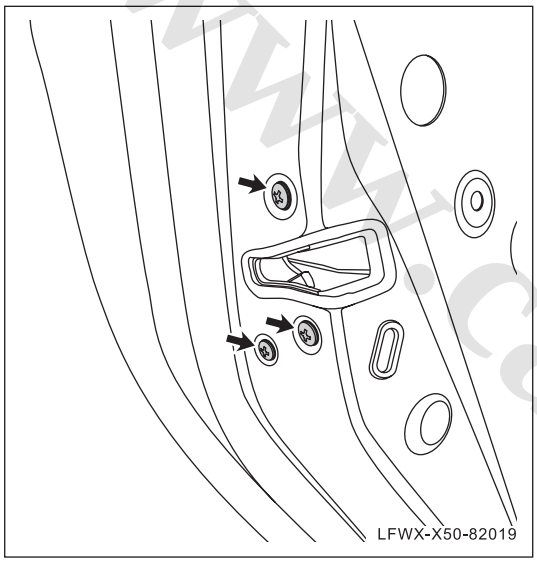
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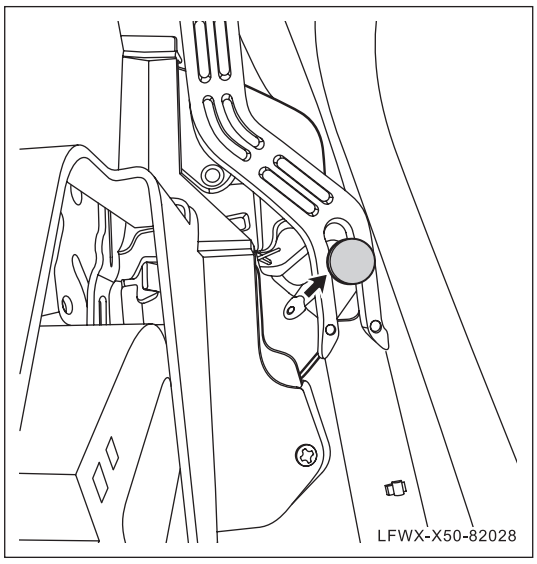
(d) Install the rear door outer handle cap, and install and tighten the fixing bolts.

Torque: 8 - 12 N•m



(e) Install the rear door lock body, and install and tighten the fixing screws.

Torque: 8 - 12 N•m

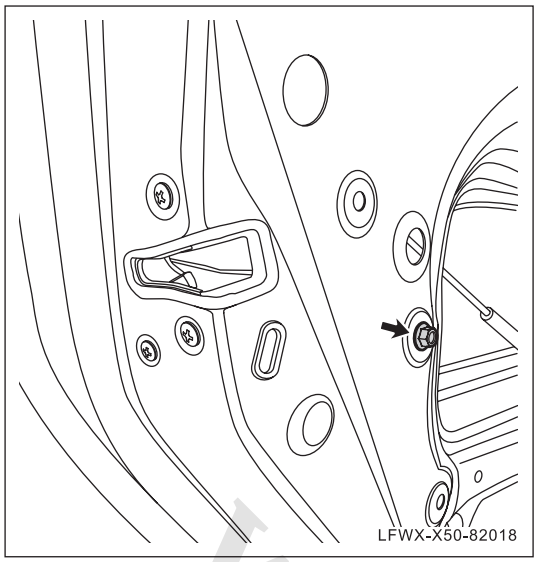


△ HINT:

First, install the rear door lock body to the outer handle linkage fork and then tighten the fixing screws.

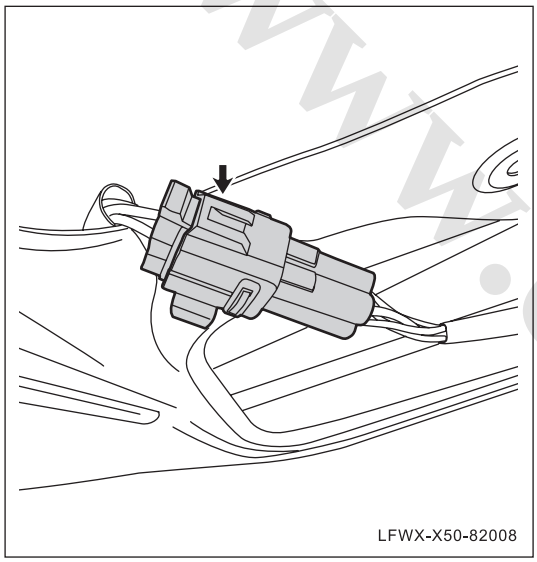
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(f) Install the fixing bolts of the rear door lock body bracket and tighten them.

Torque: 8 - 12 N•m



(g) Connect the rear door locking device wire harness connector.

(h) Install the rear door trim panel. (see 81 - Interiors and Exteriors, Rear Door Trim Panel, Replacement)

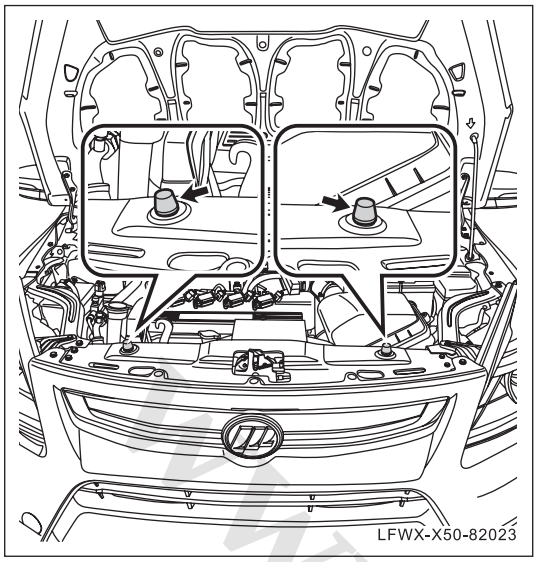
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ENGINE HOOD

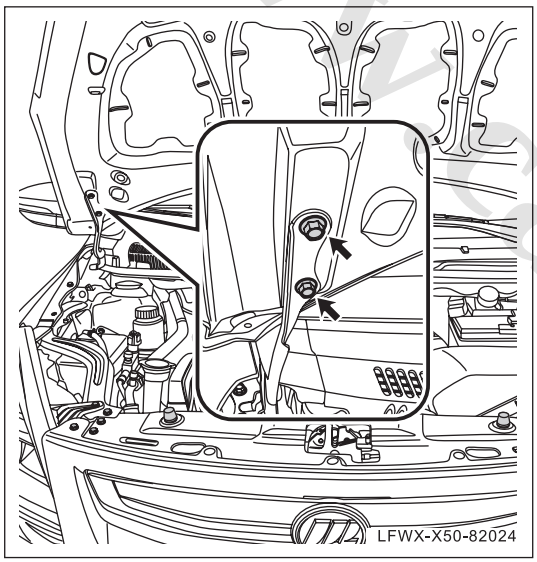
ADJUSTMENT



1. **OPEN ENGINE HOOD**
2. **ROTATE THE 2 RUBBER BOLTS OF ENGINE HOOD ON THE VEHICLE BODY, ADJUST THE POSITION OF ENGINE HOOD RUBBER BOLTS UP AND DOWN TO ADJUST ENGINE HOOD HEIGHT**

△ HINT:

Clearance tolerance is 4.0 ± 1.5 mm, parallel and level tolerance is 1.5 ± 1.5 mm.



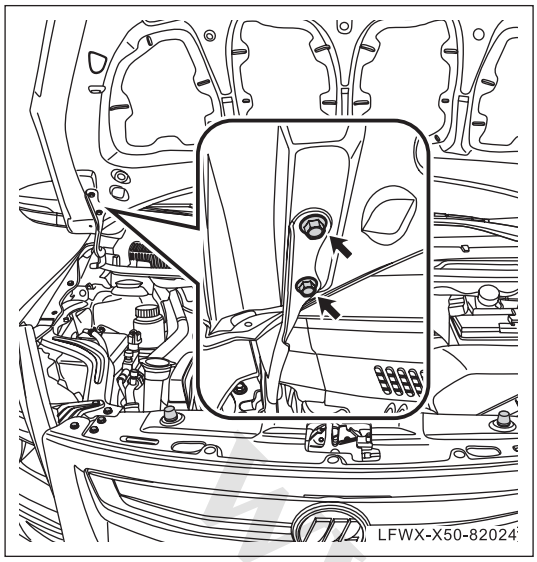
3. **ADJUST THE FIXING BOLTS BETWEEN THE ENGINE HOOD AND THE ENGINE HOOD HINGE TO ADJUST THE ENGINE HOOD IN FRONT AND REAR DIRECTION.**
4. **CLOSE THE ENGINE HOOD**

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REPLACEMENT



1. REMOVE ENGINE HOOD

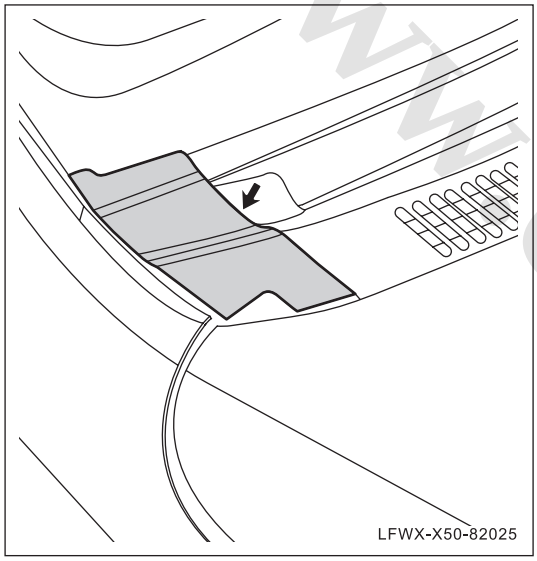
(a) Open the engine hood and use a support bar to support the engine hood.

(b) Use lifting tools to lift the engine hood.

(c) Remove the fixing bolts between the engine hood and the engine hood hinge and remove the engine hood.

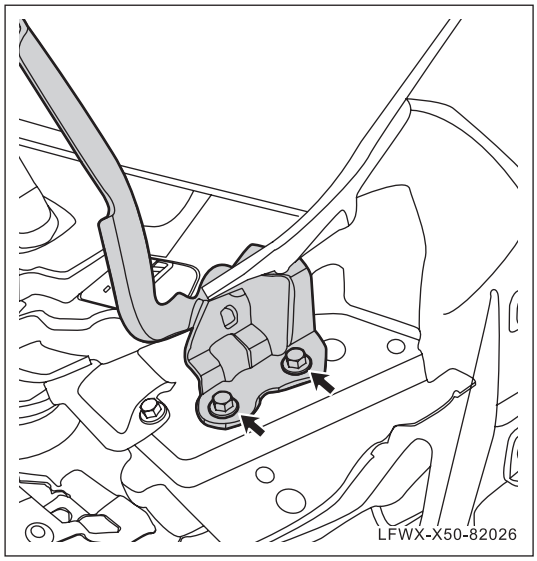
△ HINT:

It is difficult for a single person to complete it. An assistant is required.



(d) Remove left and right side cover plates of cowl top grille.

(e) Remove the fender. (see 81 - Interiors and Exteriors, Fender, Replacement)



(f) Remove the fixing bolts of the engine hood hinge, and take down the engine hood hinge.

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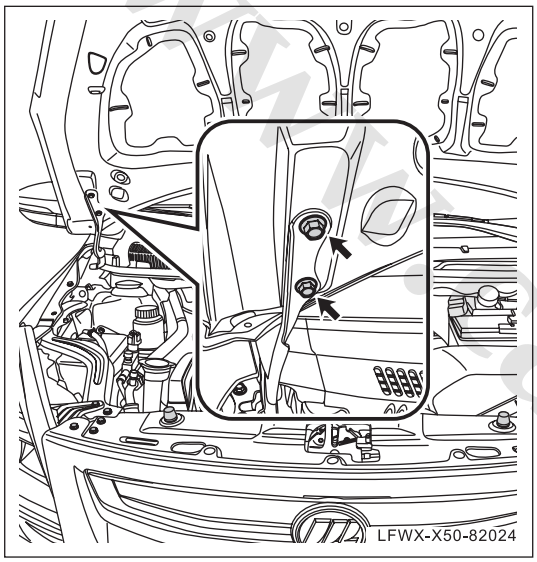
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2. INSTALL ENGINE HOOD

(a) Install the engine hood hinge, and install and tighten the fixing bolt.

Torque: 22 - 28 N•m



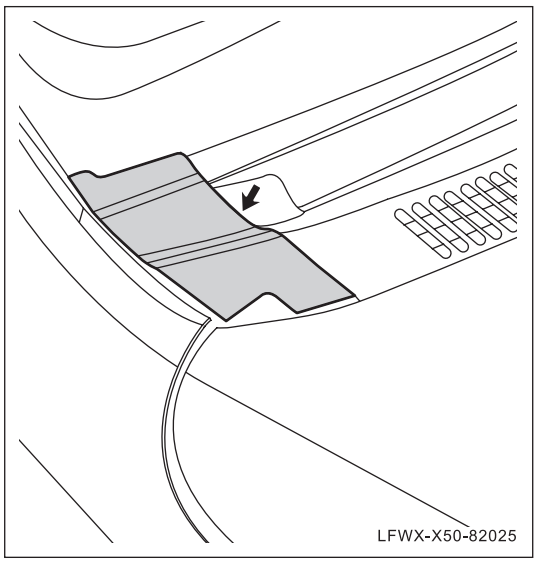
(b) Install the engine hood in place using lifting tools, and install and tighten the fixing bolts of the engine hood and the engine hood hinge.

Torque: 22 - 28 N•m

△ HINT:

It is difficult for a single person to complete it. An assistant is required.

(c) Install the fender. (see 81 - Interiors and Exteriors, Fender, Replacement)



(d) Install left and right side cover plates of cowl top grille.

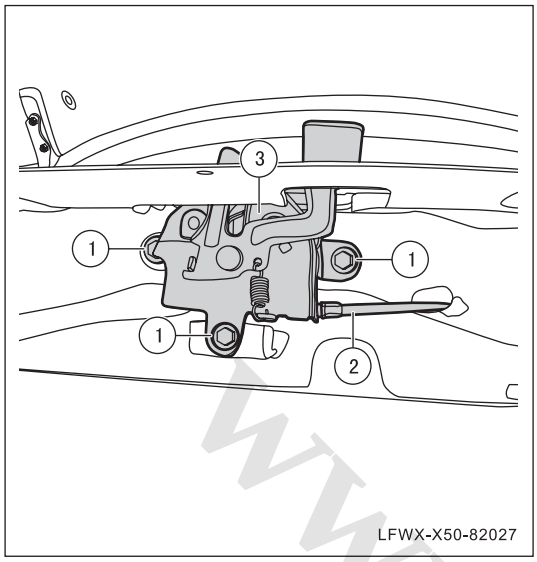
(e) Close the engine hood.

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ENGINE HOOD LOCK

REPLACEMENT



1. REMOVE ENGINE HOOD LOCK

(a) Remove the front bumper assembly. (see 81- Interiors and Exteriors, Front Bumper, Replacement).

(b) Remove fixing bolts ① of the engine hood lock.

(c) Disconnect the engine hood lock cable ② and the engine hood lock.

(d) Remove engine hood lock ③ .

2. INSTALL ENGINE HOOD LOCK

(a) Install engine hood lock cable ① and ② to the engine hood lock.

(b) Install engine hood lock ③ , and install and tighten fixing bolt ① .

Torque: 8 - 12 N•m

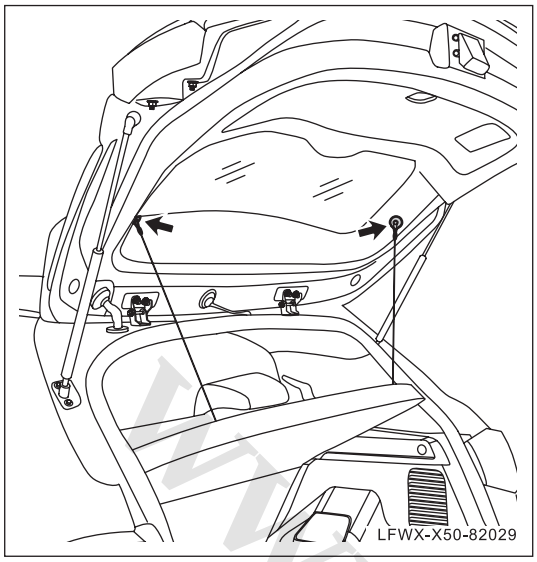
(c) Install the front bumper assembly. (see 81- Interiors and Exteriors, Front Bumper, Replacement).

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TAIL DOOR

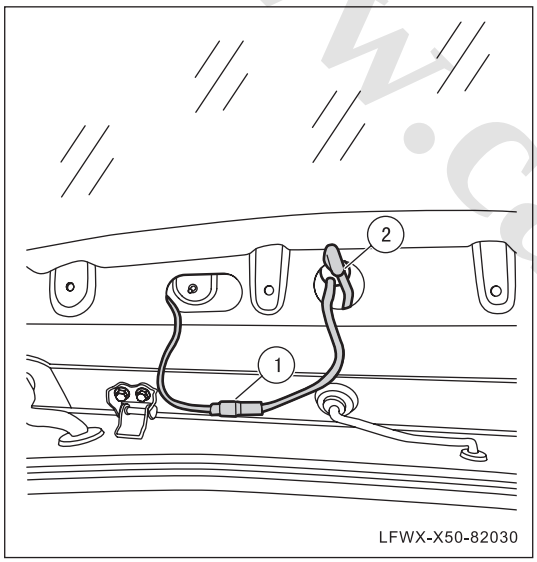
REPLACEMENT



1. REMOVE THE TAIL DOOR

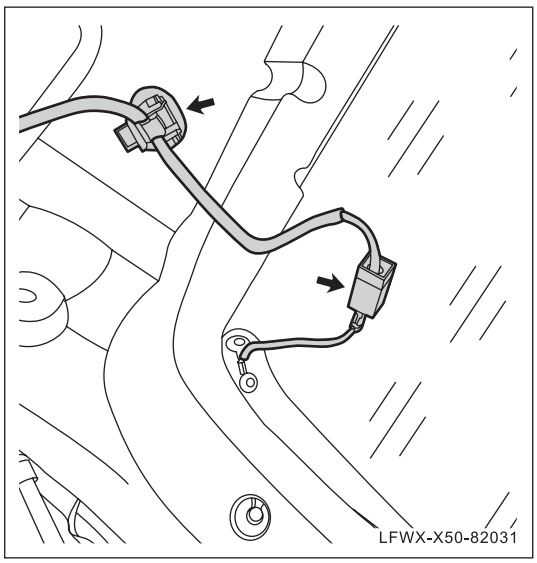
(a) Open the tail door and take down the tethers fixing the two sides of the rear shelf panel.

(b) Remove the tail door trim panel. (see 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)



(c) Disconnect the high-mounted brake lamp connector clip ① .

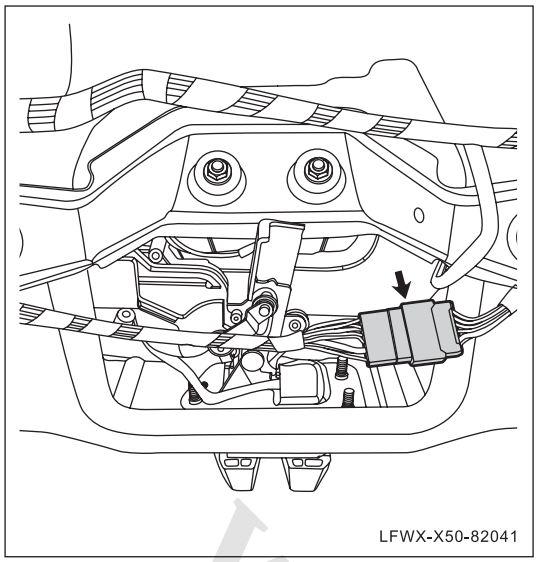
(d) Disconnect the washer fluid hose ② , and pull it out.



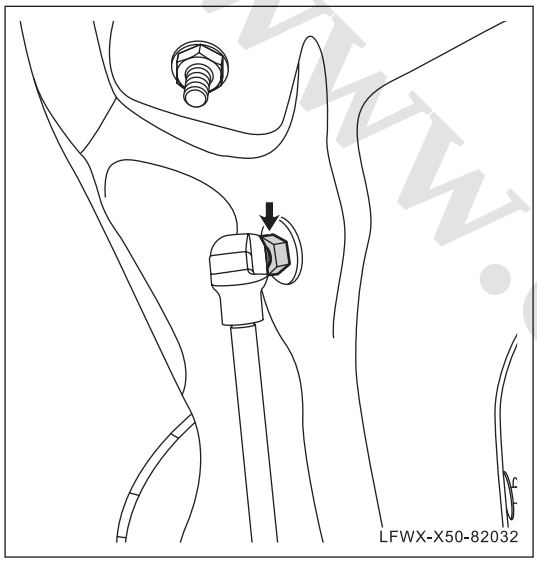
(e) Disconnect the tail door glass connector, and remove the wire harness snap-fit.

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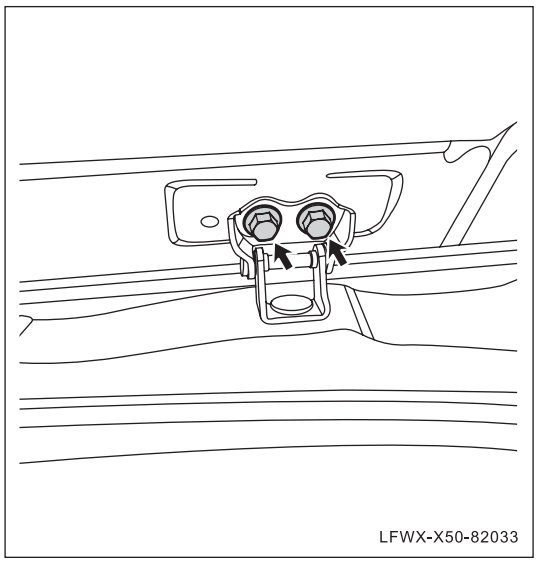
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(f) Disconnect the tail door wire harness connector, and remove the wire harness snap-fit to take down the tail door wire harness.



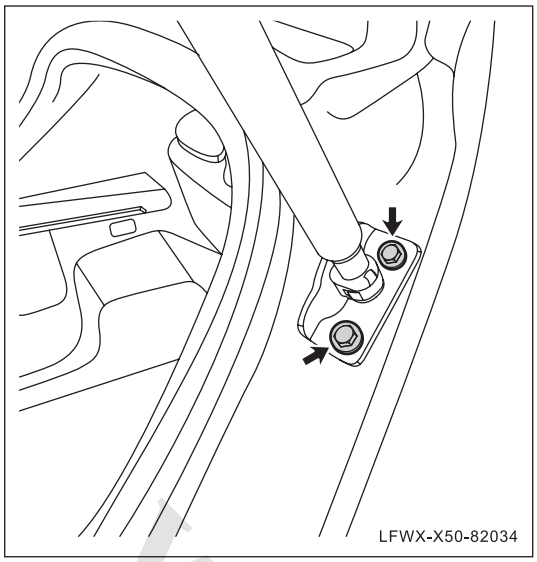
(g) Support or lift the tail door, remove the tail door pneumatic rod upper lock nut and take down the tail door pneumatic rod.



(h) Make assembling marks on the installation position of the tail door hinge, and then remove the hinge fixing bolts to take down the tail door assembly.

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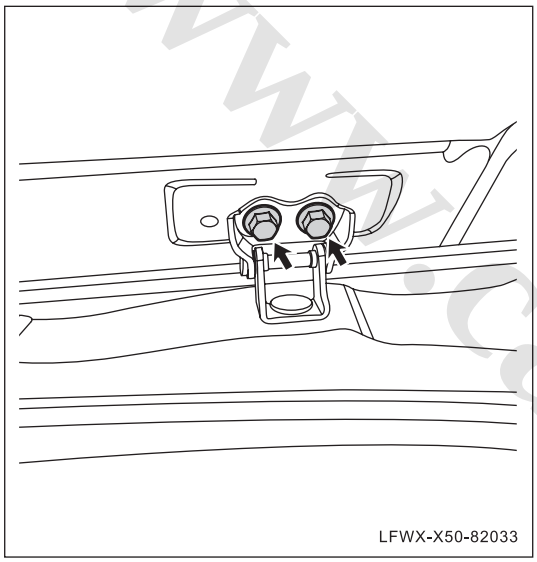
2. REMOVE THE TAIL DOOR PNEUMATIC ROD

(a) Remove the fixing bolts of the tail door pneumatic rod lower bracket and take down the tail door pneumatic rod.

3. INSTALL THE TAIL DOOR PNEUMATIC ROD

(a) Install the tail door pneumatic rod lower bracket, and install and tighten the fixing bolts.

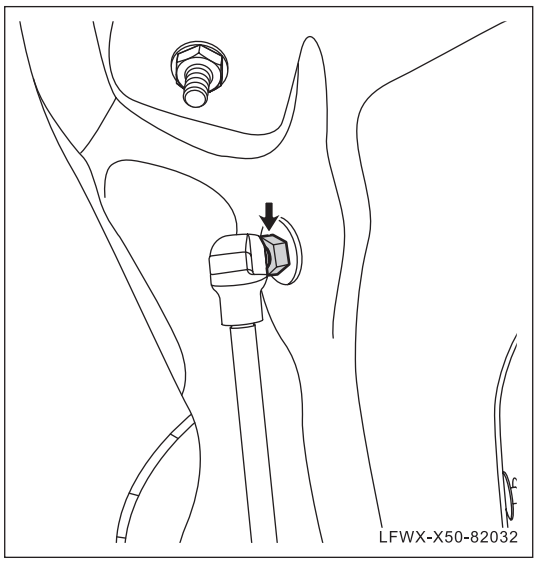
Torque: 8 - 12 N•m



4. INSTALL THE TAIL DOOR

(a) Align with the original installation position of the hinge to install the tail door, and install and tighten the fixing bolts.

Torque: 22 - 28 N•m

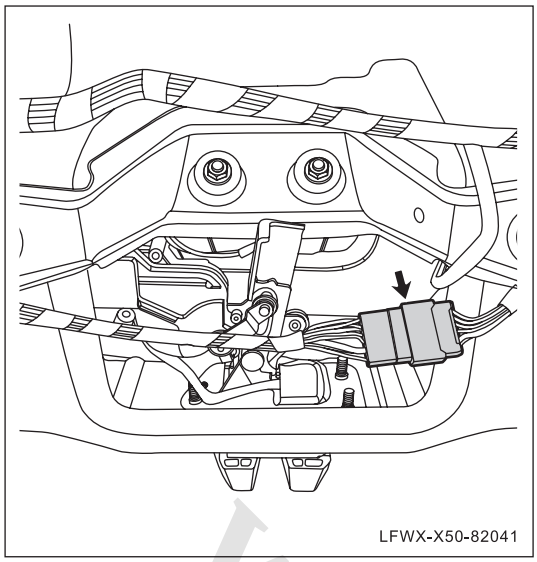


(b) Support or lift the tail door, install the upper end of the tail door pneumatic rod, and tighten the lock nut.

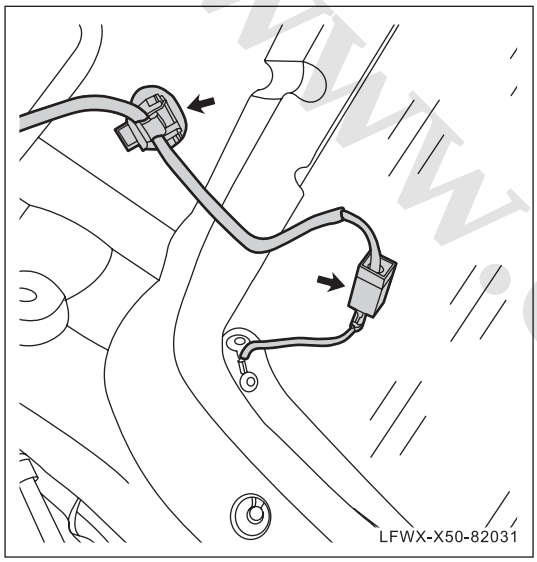
Torque: 22 - 28 N•m

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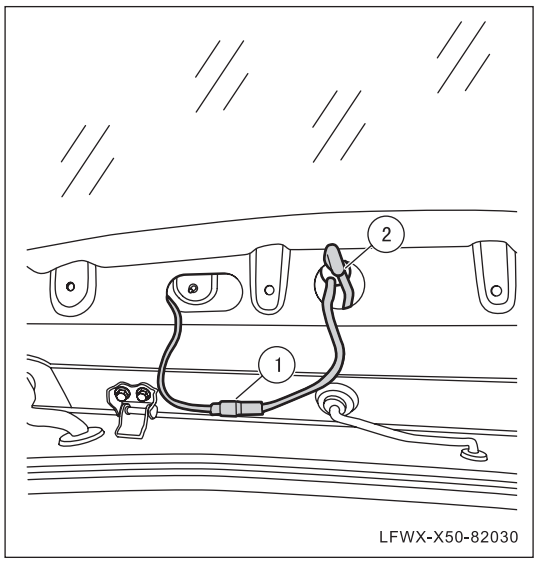
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(c) Install the tail door wire harness, connect the tail door wire harness connector, and then fix the wire harness using wire harness snap-fit.



(d) Connect the tail door glass connector, and fix the wire harness snap-fit.

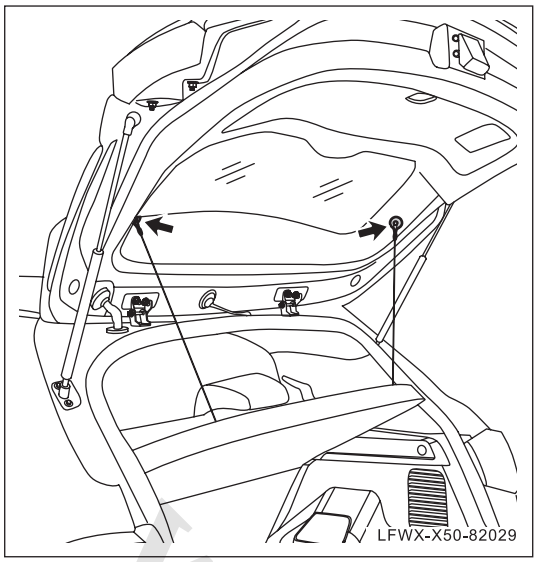


(e) Connect the high-mounted brake lamp connector ① .

(f) Connect washer fluid hose ② .

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(g) Install the tail door trim panel. (see 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

(h) Connect the tethers fixing the two sides of the rear shelf panel.

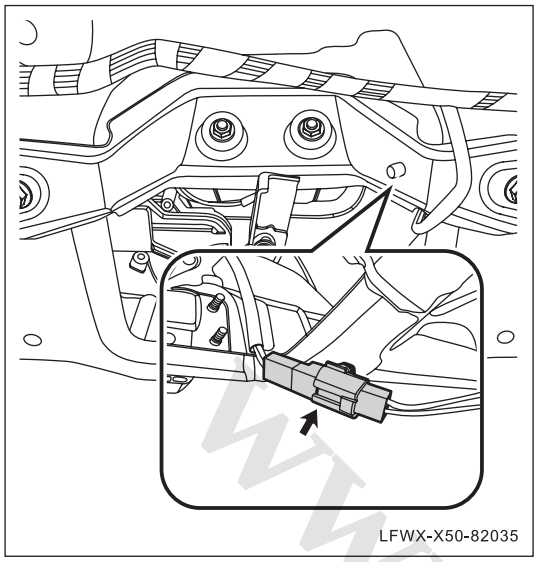
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TAIL DOOR LOCK

REPLACEMENT

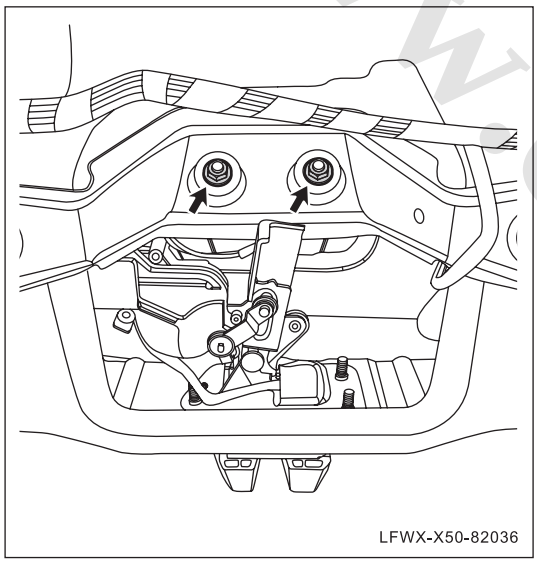


1. REMOVE THE TAIL DOOR OUTER HANDLE

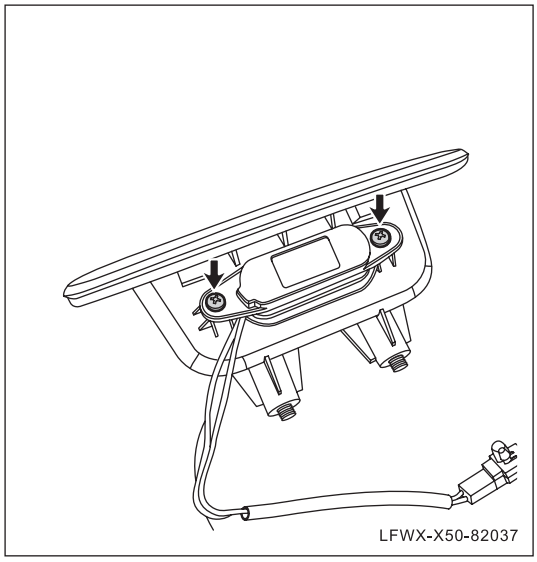
(a) Remove the tail door trim panel. (see 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

(b) Take down the sensitive switch connector from the tail door outer handle bracket.

(c) Disconnect the sensitive switch connector.



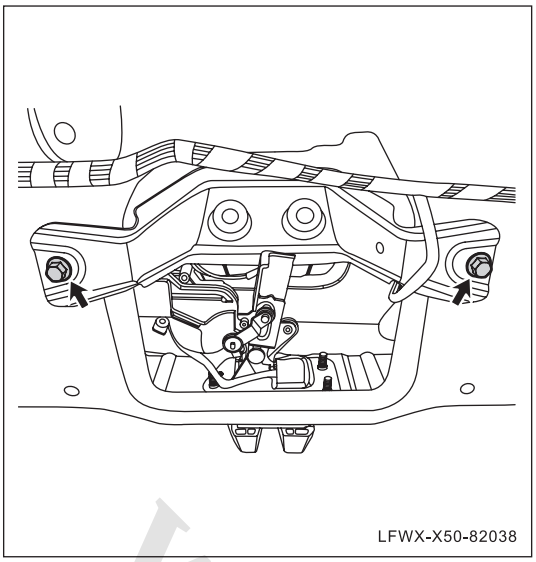
(d) Remove the fixing nuts of the tail door outer handle, and take down the tail door outer handle outward.



(e) Remove the sensitive switch fixing screws, and take down the sensitive switch.

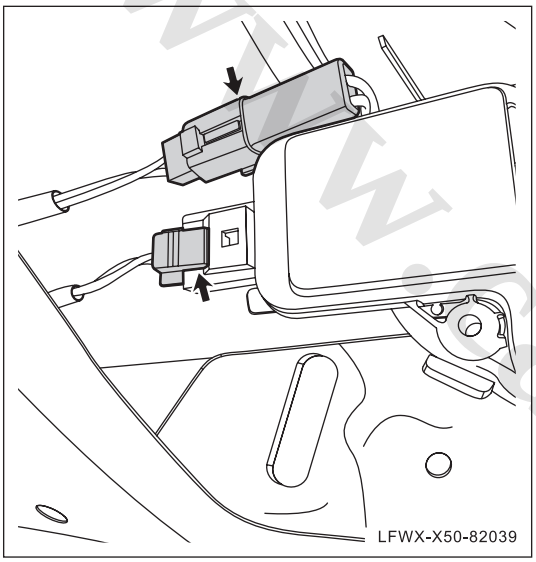
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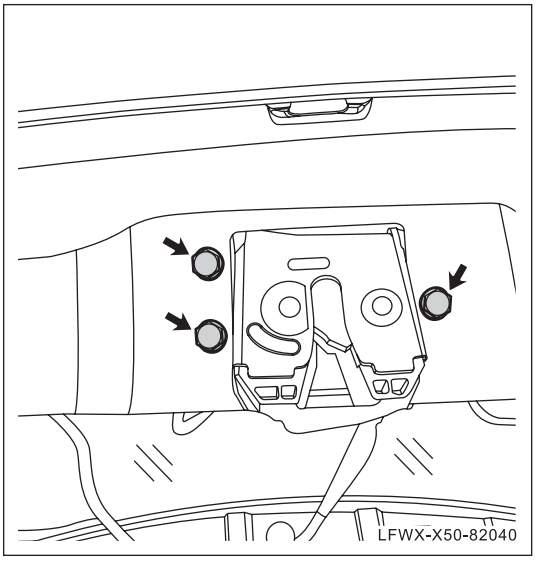


2. REMOVE THE TAIL DOOR LOCK

(a) Remove the fixing bolts of the tail door outer handle bracket, and then remove the bracket.



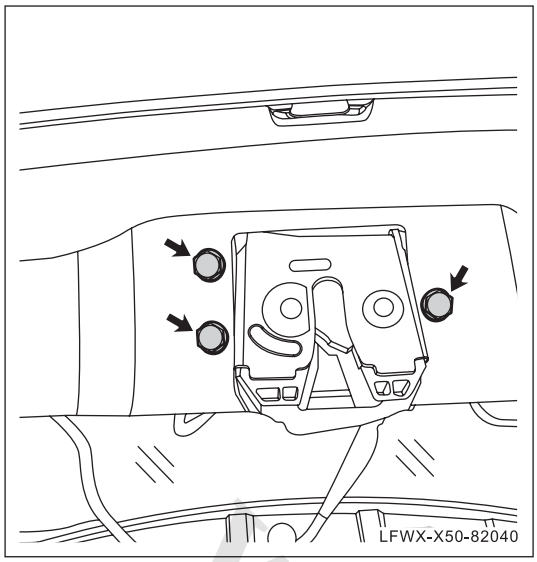
(b) Disconnect the tail door lock connector.



(c) Remove the fixing bolts of the tail door lock, and take out down the tail door lock assembly.

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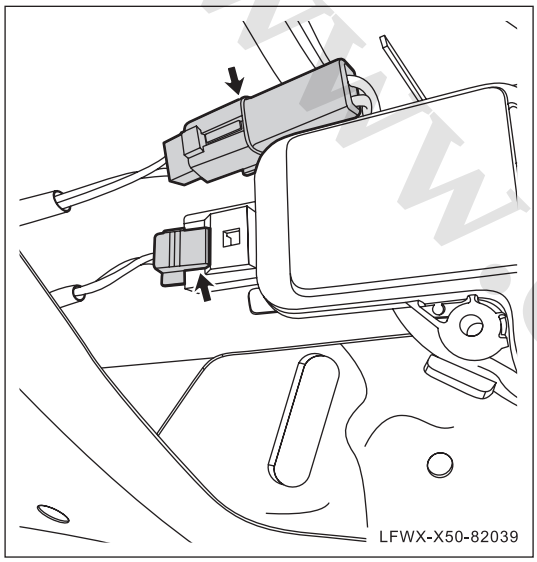
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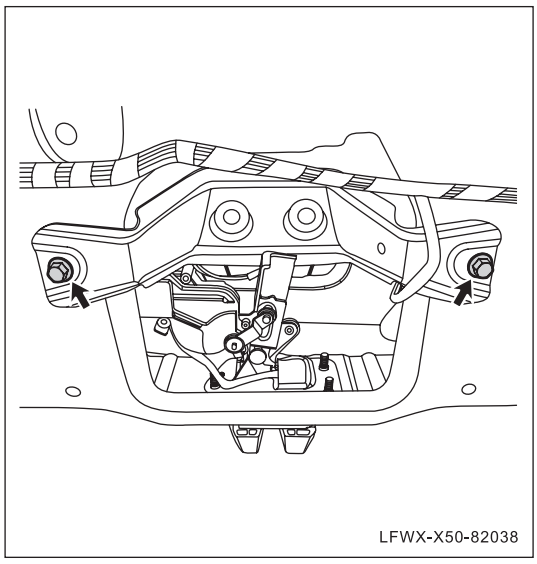
3. INSTALL THE TAIL DOOR LOCK

(a) Install the tail door lock assembly, and install and tighten the fixing bolt.

Torque: 8 - 12 N•m



(b) Connect the tail door lock connector.

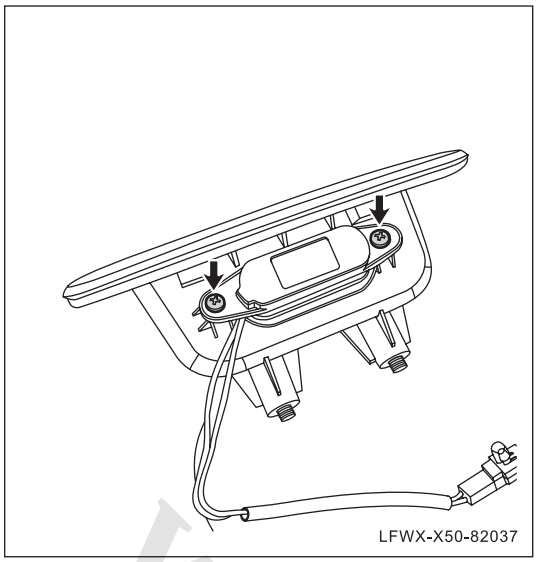


(c) Install the tail door outer handle bracket, and install and tighten the fixing bolt.

Torque: 8 - 12 N•m

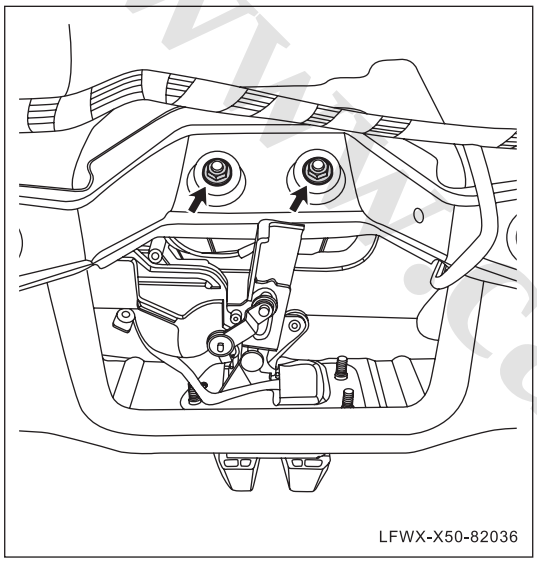
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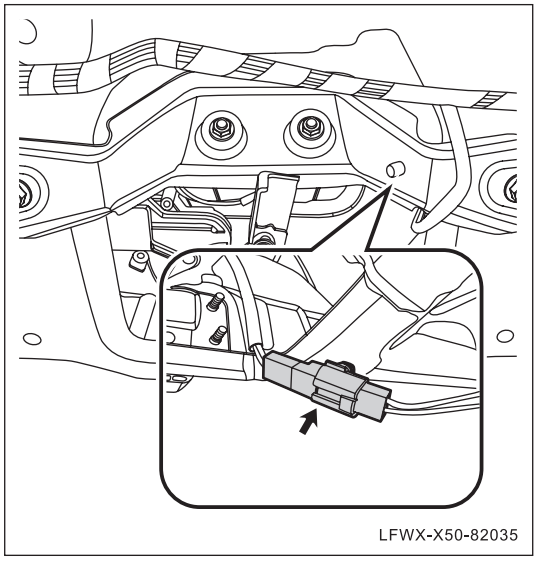
4. INSTALL THE TAIL DOOR OUTER HANDLE

(a) Install the sensitive switch, and install and tighten its fixing screws.



(b) Install the tail door outer handle, and install and tighten the fixing nuts.

Torque: 8 - 12 N•m



(c) Connect the sensitive switch connector, and fix it on the tail door outer handle bracket.

(d) Install the tail door trim panel. (see 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

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Power Window and Rear View Mirror

Power window and rear view mirror....83-1
System description....83-1
Schematic diagram (power window)....83-2
Schematic diagram (power rear view mirror) 83-3
Schematic diagram (sunroof)....83-4
Preparation....83-5
Service data....83-5
Precautions....83-6
Function and fault of components....83-6
On-vehicle inspection....83-7
Diagnosis....83-11
Fault symptom table....83-11
Fault diagnosis....83-13
Front power window....83-27
Components....83-27
Replacement....83-28
Rear power window....83-33
Components....83-33
Replacement....83-34
Interior rear view mirror....83-39
Components....83-39
Adjustment....83-40
Replacement....83-41
Exterior rear view mirror....83-42
Adjustment....83-42
Replacement....83-42
Sunroof....83-45
Components....83-45
Replacement....83-46

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POWER WINDOW AND REAR VIEW MIRROR

SYSTEM DESCRIPTION

1. FUNCTION

For the convenience of drivers or passengers, power windows have been installed on the vehicle. Use a motor to drive the regulator to make the windows go up and down.

For the convenience of drivers, power rear view mirrors have been installed on the vehicle. Drivers can adjust the angle of the left and rear right view mirrors easily through adjusting the regulator switch.

2. COMPONENTS

The power window mainly consists of a window regulator, motor, guide rail and control circuits, etc.

The rear view mirror consists of an adjustment switch, a motor, a drive and a actuator, etc.

3. WORKING PRINCIPLE

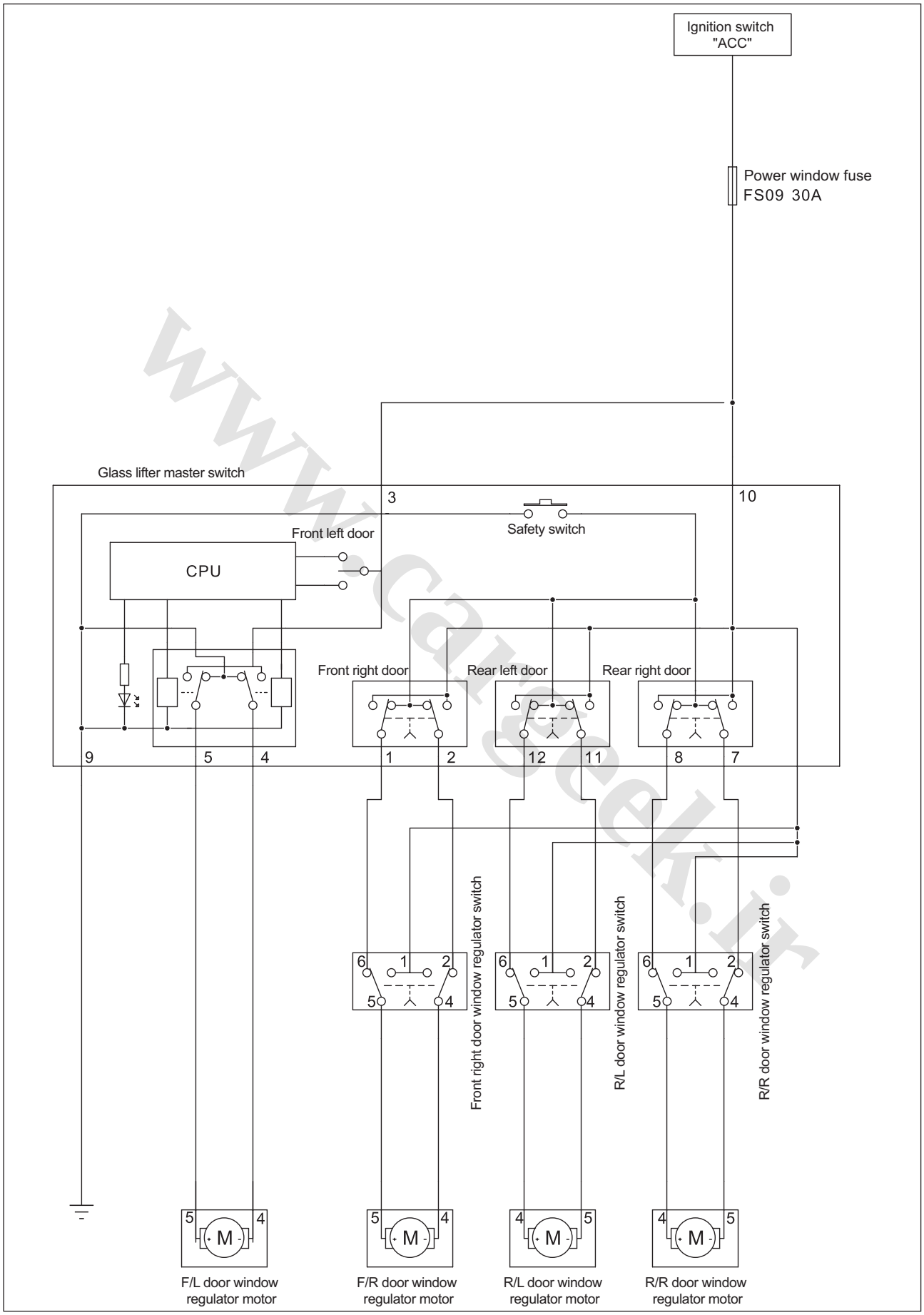
The vehicle uses gear and geared sector type regulator and the geared sector connects with coil springs. When the window goes up, the coil spring stretches and releases power to relieve load of the motor; when the window goes down, the coil spring will be compressed and absorb power to keep the window motor having almost the same load no matter going up or down.

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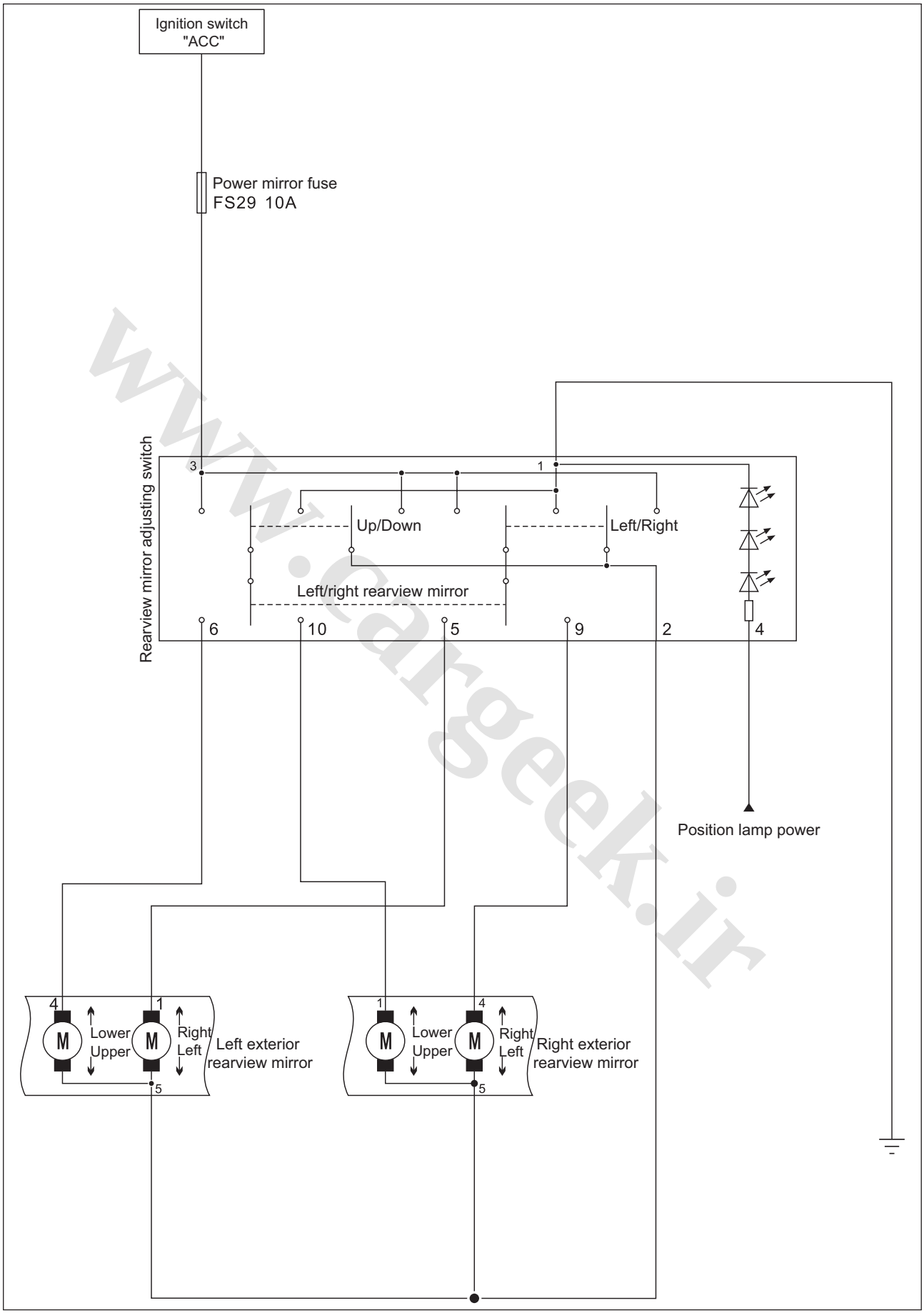
SCHEMATIC DIAGRAM (POWER WINDOW)



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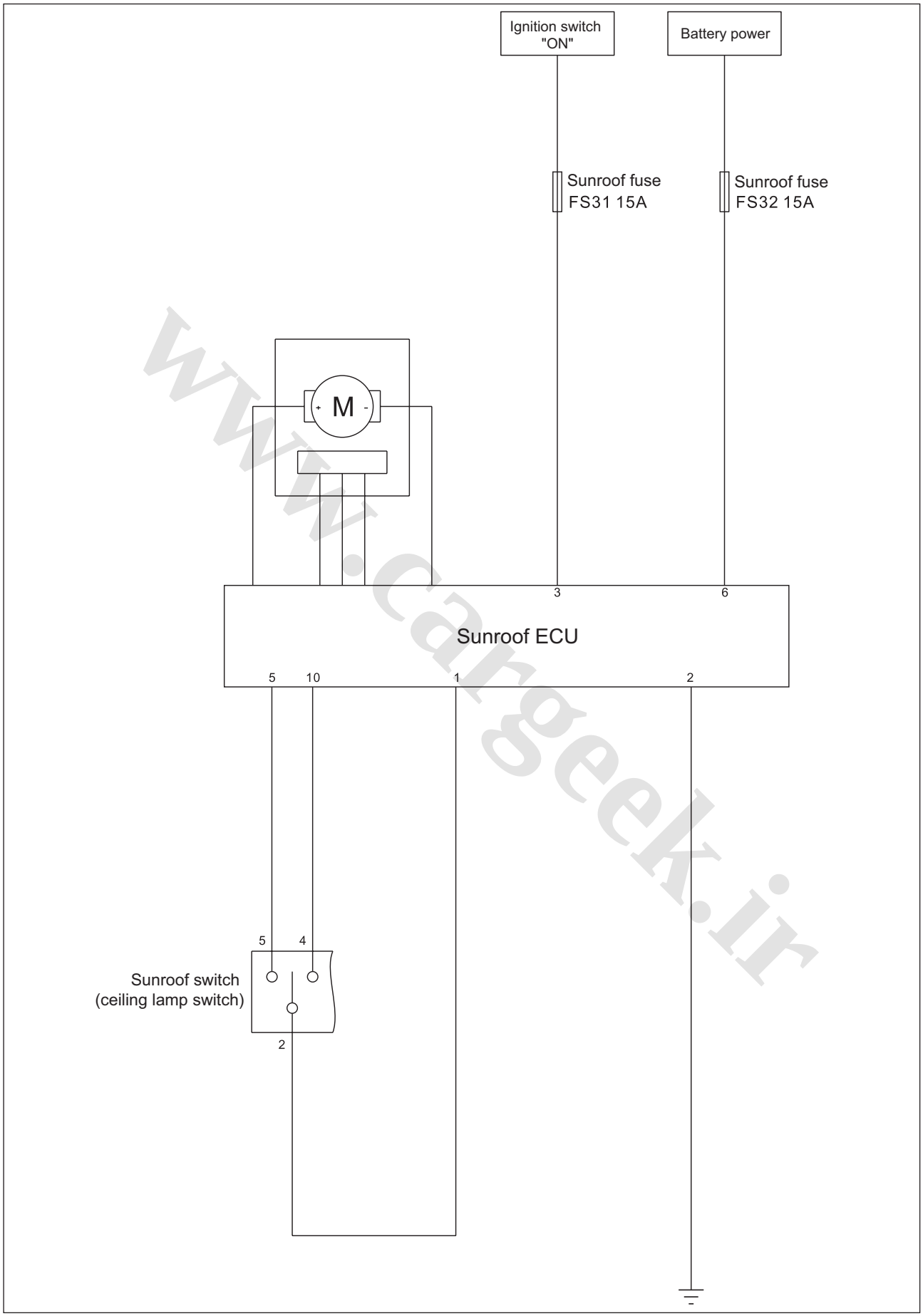
SCHEMATIC DIAGRAM (POWER REAR VIEW MIRROR)



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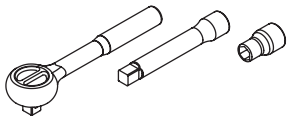
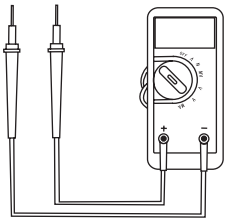
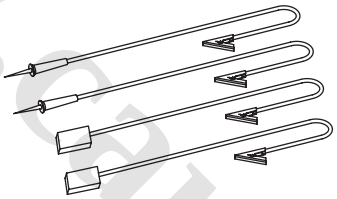
SCHEMATIC DIAGRAM (SUNROOF)



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PREPARATION

S/N	Tools	Outline diagram	Description
1	Quick wrench, extension rod and sleeve		Used for removing fixing bolts and nuts
2	Digital multimeter		Used for measuring voltage or resistance.
3	Wiring set		Assist to measure voltage or resistance

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of front door window regulator motor	8 - 12
Fixing bolt of front door window regulator assembly	8 - 12
Fixing bolt of front door window glass assembly	8 - 12
Fixing bolt of front door window guide rail	8 - 12
Fixing bolt of rear door window regulator motor	8 - 12
Fixing bolt of rear door window regulator assembly	8 - 12
Fixing bolt of rear door window glass assembly	8 - 12
Fixing bolt of rear door window guide rail	8 - 12
Fixing nut of power rear view mirror	8 - 12
Fixing nut of sunroof rear bracket	8 - 12
Fixing nut of sunroof assembly	8 - 12

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PRECAUTIONS

1. If it is necessary to dismantle and repair the circuit during the course of maintenance, disconnect the negative cable of battery.
2. If it is required to open the door for removal during maintenance, support the door with a rod.
3. Do not use a sharp tool to remove any trim panel or other vulnerable parts.

FUNCTION AND FAULT OF COMPONENTS

Part name	Part function	Common faults	Fault symptom
Guide rail	Window guide rail	/	/
Regulator assembly	To lift the window glass up and down	Electric motor is damaged	Power window does not work
Door glass assembly	/	Damaged	/
Rear door quarter glass	/	Damaged	/
Exterior rear view mirror body	It is very convenient to see the vehicle behind for drivers	Damaged	/
Interior rear view mirror assembly	/	/	/
Sunroof	For ventilation	/	/
Sunroof motor	Closing or opening the sunroof	Damaged	Sunroof does not work

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ON-VEHICLE INSPECTION

1. CHECK POWER WINDOW

(a) Turn the ignition switch to "ACC" position and move each door window switch forward and backward to check the working conditions of the power window. Check the regulator and motor if any door window does not operate.

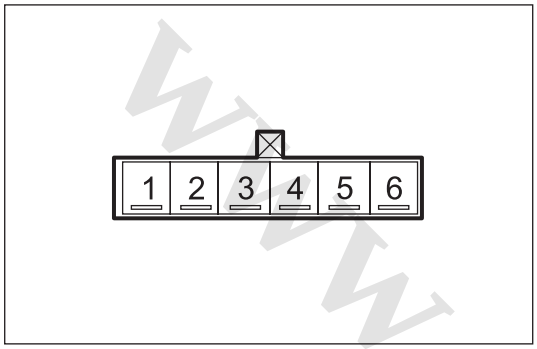
2. CHECK SUNROOF

(a) Check the sealing condition and corrosion and damage condition of the sunroof.

(b) Open and close the sunroof to check the sunroof functions.

(c) Clean the guide rail of the sunroof and apply lubrication grease to the guide rail if necessary.

(d) Check the working conditions of the sunroof and look out for friction residues.



3. CHECK FRONT RIGHT DOOR WINDOW REGULATOR SWITCH

(a) Disconnect the connector of the front right door window regulator switch.

(b) Check the continuity among all the terminals of the front right door window regulator switch.

Inspection condition	Terminal	Resistance
The switch is not pulled up or pressed down	6-5	<2Ω
	2-4	
Pull up the front right door window regulator switch	1-5	<2Ω
	2-4	
Press down the front right door window regulator switch	6-5	<2Ω
	1-4	

△ HINT:

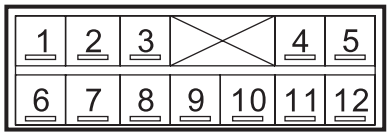
Replace the front right door window regulator switch if the inspection result does not conform with the standard.

4. CHECK REAR LEFT AND REAR RIGHT DOOR WINDOW REGULATOR SWITCHES

(a) Check the rear left and rear right door window regulator switches and refer to the inspection of the front right door window regulator switch.

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5. CHECK FRONT LEFT DOOR WINDOW REGULATOR MASTER SWITCH

(a) Disconnect the connector of the front left door window regulator master switch.

(b) Check the continuity among all the terminals of the front left door window regulator switch using a digital multimeter.

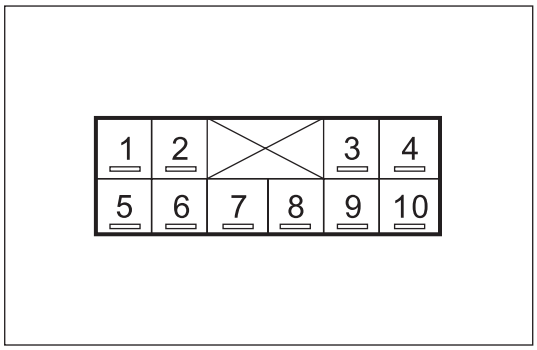
Inspection condition		Terminal	Resistance
Connect terminal 10 of D04 to the battery positive electrode and terminal 9 to the battery negative electrode	Pull up the front left door window regulator switch	10-5	<2Ω
	Press down the front left door window regulator switch	10-4	<2Ω
Pull up the regulator switch that the front left door controls the front right door window		3-1	<2Ω
Press down the regulator switch that the front left door controls the front right door window		3-2	<2Ω
Pull up the regulator switch that the front left door controls the rear left door window		3-12	<2Ω
Press down the regulator switch that the front left door controls the rear left door window		3-11	<2Ω
Pull up the regulator switch that the front left door controls the rear right door window		3-8	<2Ω
Press down the regulator switch that the front left door controls the rear right door window		3-7	<2Ω

△ HINT:

Replace the front left door window regulator master switch if the inspection result does not conform with the standard.

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6. CHECK REAR VIEW MIRROR ADJUSTMENT SWITCH

(a) Disconnect the connector of the rear view mirror adjustment switch.

(b) Check the continuity among all the terminals of the rear view mirror adjustment switch.

Select "'L" on the L/R adjustment switch

Terminal	Switch position	Resistance
3-2	Adjust upward	<2Ω
6-1		
3-6	Adjust downward	<2Ω
2-1		
3-2	Adjust to left	<2Ω
1-5		
3-5	Adjust to right	<2Ω
1-2		

Select "'R" on the L/R adjustment switch

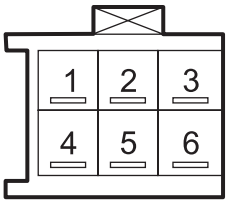
Terminal	Switch position	Resistance
3-10	Adjust upward	<2Ω
1-2		
3-2	Adjust downward	<2Ω
1-10		
1-9	Adjust to left	<2Ω
2-3		
1-2	Adjust to right	<2Ω
3-9		

△ HINT:

Replace the rear view mirror adjustment switch if the inspection result does not conform with the standard.

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7. CHECK MOTOR OF THE POWER REAR VIEW MIRROR

(a) Check the performance of the exterior rear view mirror motor

Inspection condition	Power rear view mirror
• Exert battery positive voltage to terminal 5 • Exert battery negative voltage to terminal 4	Turn upward
• Exert battery positive voltage to terminal 4 • Exert battery negative voltage to terminal 5	Turn downward
• Exert battery positive voltage to terminal 5 • Exert battery negative voltage to terminal 1	Turn to left
• Exert battery positive voltage to terminal 1 • Exert battery negative voltage to terminal 5	Turn to right

△ HINT:

Replace the power rear view mirror assemblyif the inspection result does not conform with the standard.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
All power windows do not work	1. Fuse (blown) 2. Power circuit (open circuit or short circuit)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (1. All power windows do not work)
Front left door power window does not work	1. Motor (damaged) 2. Wire harness (open circuit) 3. Window regulator (damaged or stuck) 4. Front left door window regulator switch (damaged)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (2. Front left door power window does not work)
Front right door power window does not work	1. Motor (damaged) 2. Wire harness (open circuit) 3. Window regulator (damaged or stuck) 4. Front right door window regulator switch (damaged)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (3. Front right door power window does not work)
Rear left door power window does not work	1. Motor (damaged) 2. Wire harness (open circuit) 3. Window regulator (damaged or stuck) 4. Rear left door window regulator switch (damaged)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (4. Rear left door power window does not work)
Rear right door power window does not work	1. Motor (damaged) 2. Wire harness (open circuit) 3. Window regulator (damaged or stuck) 4. Rear right door window regulator switch (damaged)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (5. Rear right door power window does not work)
Power windows go up and down slowly	1. Battery voltage (too low) 2. Window regulator (damaged or stuck) 3. Window guide rail (bad installation) 4. Door weatherstrip (aging, deformed or bad installation) 5. Door (deformed)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (6. Power windows go up and down slowly)
Power windows move away from the installation position when going up and down or do not in place after going up and down	1. Window regulator (damaged or stuck) 2. Window guide rail (deformed or bad installation) 3. Door weatherstrip (bad installation) 4. Door (deformed)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (7. Power windows move away from the installation position when going up and down or do not in place after going up and down)
Neither of power rear view mirrors on both sides works	1. Fuse (blown) 2. Rear view mirror adjustment switch (damaged) 3. Power rear view mirror power supply and grounding wire (open circuit or short circuit)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (8. Neither of power rear view mirrors on both sides works)

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Symptom	Suspected area	Recommended action
Left side power rear view mirrors does not work	1. Rear view mirror adjustment switch (damaged) 2. Rear view mirror adjustment motor (damaged) 3. Wire harness (open circuit or short circuit)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (9. Right side power rear view mirrors does not work)
Right side power rear view mirrors does not work	1. Rear view mirror adjustment switch (damaged) 2. Rear view mirror adjustment motor (damaged) 3. Wire harness (open circuit or short circuit)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (10. Right side power rear view mirrors does not work)
Sunroof does not work	1. Fuse (blown) 2. Sunroof switch (damaged) 3. Sunroof control module (damaged)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (11. Sunroof does not work)
Water permeation or leakage on the sunroof	1. Drain pipe (blocked) 2. Weatherstrip (cracked)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (12. Water permeation or leakage on the sunroof)
Noise and high vibration of sunroof	1. Slide way (with dust or poor lubrication) 2. Mechanical components (interference)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (13. Noise and high vibration of sunroof)
Slow and hindered movements of sunroof	1. Mechanical components (short of lubrication grease) 2. Sunroof motor (overheated)	See 83 - Power Window and Rear View Mirror, Diagnosis, Fault Diagnosis (14. Slow and hindered movements of sunroof)

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FAULT DIAGNOSIS

1. ALL POWER WINDOWS DO NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the power window works	Diognosis is over	Power window does not work	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check if power window fuse FS09 is blown.	Go to Step 3	Electrical window fuse is blown.	• Replace the fuse with the same capacity **Rated capacity: FS09 30A** • If the new fuse is blown again after replacing it, go to Step 2
2	Check the circuit of the power window power supply	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the power window power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the circuit of the power window power supply	Normal	Faulty	Instruction
	• Disconnect front left door window regulator master switch connector D04. • Turn the ignition switch to "ACC" position • Check the voltage between the No. 3 and Terminal 10s of D04 and the grounding **Voltage: 9 - 13V**	Go to Step 4	The circuit of the power window power supply has open circuit points	Inspect and repair the circuits between the front left door wire harness connectors and the power window fuses
4	Check the power window grounding circuit	Normal	Faulty	Instruction
	• Disconnect front left door window regulator master switch connector D04. • Check the voltage between the terminal 9 of front left door wire harness D04 and the grounding **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Inspect and repair the circuit between front left door wire harness connectors and grounding point G22.
5	Check the window regulator master switch	Normal	Faulty	Instruction
	Check the window regulator master switch for damage	Go to Step 6	The window regulator master switch is damaged	Replace the window regulator master switch

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Steps	Inspection item	Inspection result		
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

2. FRONT LEFT DOOR POWER WINDOW DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the front door power window works	Diognosis is over	Go to Step 1	
1	Check the circuit of the power window power supply	Normal	Faulty	Instruction
	• Disconnect front left door window regulator master switch connector D04. • Turn the ignition switch to "ACC" position • Check the voltage between the terminal 10 of D04 and the grounding **Voltage: 9 - 13V**	Go to Step 2	The circuit of the power window power supply has open circuit points	Inspect and repair the circuit between terminal 10 of connector D04 and terminal 12 of connector DI1 of the front left door wire harness
2	Check the window regulator master switch	Normal	Faulty	Instruction
	Check the window regulator master switch for damage	Go to Step 3	The window regulator master switch is damaged	Replace the window regulator master switch
3	Check the front left door window regulator motor and regulator	Normal	Faulty	Instruction
	• Remove the front left door power window regulator • Check the front left door power window regulator for damage or stagnation • Connect Terminals 4 and 5 of the motor to the battery positive and negative electrodes, and check if the motor works normally.	Go to Step 4	The front left door window regulator motor is damaged	Replace the front left door window regulator motor
4	Check front left door window regulator motor circuit	Normal	Faulty	Instruction
	• Check the resistance between terminal 4 of D01 and terminal 4 of D04 and between terminal 5 of D01 and terminal 5 of D04. **Resistance: <2Ω**	Go to Step 5	The front left door window regulator motor circuit has open circuit points	Inspect and repair the front left door window regulator motor circuit
5	Verification and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

3. FRONT RIGHT DOOR POWER WINDOW DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Turn the ignition switch to "ACC" position 2. Check whether the front right door power window works	Diognosis is over	Go to Step 1	Hint: Pressing the safety switch on the front left door window regulator master switch can also cause malfunction of the front right door window regulator switch
1	Check the window regulator master switch	Normal	Faulty	Instruction
	Check the window regulator master switch for damage	Go to Step 2	The window regulator master switch is damaged	Replace the window regulator master switch
2	Check front right door window regulator switch	Normal	Faulty	Instruction
	Check the front right door window regulator master switch for damage	Go to Step 3	The front right door window regulator switch is damaged	Replace the front right door window regulator switch
3	Check the front right door window regulator motor and regulator	Normal	Faulty	Instruction
	• Remove front right door power window lifter. • Check the front left door power window regulator for damage or stagnation • Connect No. 4 and Terminal 5s of the motor to the battery positive and negative electrodes, and check if the motor works normally.	Go to Step 4	The window regulator is installed wrongly or stuck, or the front left door window regulator motor is damaged	Replace the front left door window regulator motor or regulator
4	Check front right door window regulator motor circuit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect front right door window regulator switch connector K04. • Check the voltage between the Terminal 1 of K04 and the grounding **Voltage: 9 - 13V** • Check the voltage between the terminal 2, terminal 6 of K04 and the grounding, respectively **Resistance: <2Ω** • Connect front right door window regulator switch connector K04, disconnect front right door window regulator motor connector K01. • Adjust the front right door window glass upward and check the voltage between the Terminal 5 of K01 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 4 of K01 and grounding **Resistance: <2Ω**	Go to Step 5	If the inspection result does not meet the requirements, then the corresponding circuit has open circuit points	Inspect and repair the corresponding circuit open circuit points
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

4. THE REAR LEFT DOOR POWER WINDOW DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the front left door power window works	Diognosis is over	Go to Step 1	Hint: Pressing the safety switch on the front left door window regulator master switch can also cause malfunction of the rear left door window regulator switch
1	Check the window regulator master switch	Normal	Faulty	Instruction
	Check the window regulator master switch for damage	Go to Step 2	The window regulator master switch is damaged	Replace the window regulator master switch
2	Check rear left door window regulator switch	Normal	Faulty	Instruction
	Check the rear left window regulator switch for damage	Go to Step 3	The rear left door window regulator switch is damaged	Replace the rear left door window regulator switch

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Steps	Inspection item	Inspection result		
3	Check the rear left door window regulator motor and regulator	Normal	Faulty	Instruction
	• Remove the rear left door power window regulator • Check whether the rear left door power window regulator is damaged or stagnated • Connect No. 4 and Terminal 5s of the motor to the battery positive and negative electrodes, and check if the motor works normally.	Go to Step 4	The window regulator is installed wrongly or stuck, or the rear left door window regulator motor is damaged	Replace the rear left door window regulator motor or regulator
4	Check rear left door window regulator motor circuit	Normal	Faulty	Instruction
	• Disconnect rear left door window regulator switch connector M01. • Check the voltage between the Terminal 1 of D04 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 2 of M01 and grounding **Resistance: <2Ω** • Check the resistance between Terminal 6 of M01 and grounding **Resistance: <2 Ω** • Connect rear left door window regulator switch connector M01, disconnect rear left door window regulator motor connector M03. • Turn rear left door window regulator switch to upshift • Check the voltage between the Terminal 5 of M03 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 4 of M03 and grounding **Resistance: <2Ω**	Go to Step 5	If the inspection result does not meet the requirements, then the corresponding circuit has open circuit points	Inspect and repair the corresponding circuit open circuit points

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Steps	Inspection item	Inspection result		
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

5. REAR RIGHT DOOR POWER WINDOW DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the rear right door power window works	Diognosis is over	Go to Step 1	Hint: Pressing the safety switch on the front left door window regulator master switch can also cause malfunction of the rear right door window regulator switch
1	Check the window regulator master switch	Normal	Faulty	Instruction
	Check the window regulator master switch for damage	Go to Step 2	The window regulator master switch is damaged	Replace the window regulator master switch
2	Check rear right door window regulator switch	Normal	Faulty	Instruction
	Check the rear right window regulator switch for damage	Go to Step 3	The rear right door window regulator switch is damaged	Replace the rear right door window regulator switch
3	Check the rear right door window regulator motor and regulator	Normal	Faulty	Instruction
	• Remove the rear right door power window regulator • Check whether the rear right door power window regulator is damaged or stagnated • Connect No. 4 and Terminal 5s of the motor to the battery positive and negative electrodes, and check if the motor works normally.	Go to Step 4	The window regulator is installed wrongly or stuck, or the rear right door window regulator motor is damaged	Replace the rear right door window regulator motor or regulator
4	Check rear right door window regulator motor circuit	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect rear right door window regulator switch connector N01. • Check the voltage between the Terminal 1 of N01 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 2 of N01 and grounding **Resistance: <2Ω** • Check the resistance between Terminal 6 of N01 and grounding **Resistance: <2Ω** • Connect rear right door window regulator switch connector N01, disconnect rear right door window regulator motor connector N03. • Turn rear right door window regulator switch to upshift. • Check the voltage between the Terminal 5 of N03 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 4 of N03 and grounding **Resistance: <2Ω**	Go to Step 5	If the inspection result does not meet the requirements, then the corresponding circuit has open circuit points	Inspect and repair the corresponding circuit open circuit points
5	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

6. POWER WINDOWS GO UP AND DOWN SLOWLY

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check the working conditions of the power window	Diognosis is over	Power windows go up and down slowly	Go to Step 1
1	Check the battery voltage	Normal	Faulty	Instruction
	Check the battery voltage after starting the engine **Voltage: 13 - 15V**	Go to Step 2	Battery voltage is too low	Inspect and repair the charging system

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Steps	Inspection item	Inspection result		
2	Check the door	Normal	Faulty	Instruction
	Check the door for deformation	Go to Step 3	The door is deformed	Repair or replace the vehicle metal panel
3	Check the door weatherstrip	Normal	Faulty	Instruction
	• Check the door weatherstrip for aging and deformation • Check whether the weatherstrip has been moved during regulating the glass	Go to Step 4	The glass weatherstrip is deformed or bad installed	Reinstall or replace the glass weatherstrip
4	Check the window guide rail	Normal	Faulty	Instruction
	Remove the door trim panel and check whether the window guide rail is installed in place and the guide rail fixing bolt is fixed	Go to Step 5	Glass is not installed in place or glass guide is broken	Reinstall or replace the window guide rail
5	Check the window regulator	Normal	Faulty	Instruction
	Adjust the power window upward slowly and check the working conditions of the window regulator	Go to Step 6	The window regulator is in poor lubrication or damaged and loosens	Apply more lubrication grease to the window regulator or replace it
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

7. POWER WINDOWS MOVE AWAY FROM THE INSTALLATION POSITION WHEN GOING UP AND DOWN OR DO NOT IN PLACE AFTER GOING UP AND DOWN

Steps	Inspection item	Inspection result		
0	Check the door	Normal	Faulty	Instruction
	Check the door for deformation	Go to Step 1	The door is deformed	Repair or replace the vehicle metal panel
1	Check the door weatherstrip	Normal	Faulty	Instruction
	• Check the door weatherstrip for aging and deformation • Check whether the weatherstrip has been moved during regulating the glass	Go to Step 2	The glass weatherstrip is deformed or bad installed	Reinstall or replace the glass weatherstrip
2	Check the window guide rail	Normal	Faulty	Instruction
	Remove the door trim panel and check whether the window guide rail is installed in place and the guide rail fixing bolt is fixed	Go to Step 3	Glass is not installed in place or glass guide is broken	Reinstall or replace the window guide rail
3	Check the window regulator	Normal	Faulty	Instruction
	Adjust the power window upward slowly and check the working conditions of the window regulator	Go to Step 4	The window regulator is in poor lubrication or damaged and loosens	Apply more lubrication grease to the window regulator or replace it
4	Verification and check	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

8. NEITHER OF POWER REAR VIEW MIRRORS ON BOTH SIDES WORKS

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	1. Turn the ignition switch to "ACC" position 2. Check whether the power rear view mirror works	Diognosis is over	Go to Step 1	
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visual check if power rear view mirror fuse FS29 is blown.	Go to Step 2	The power rear view mirror fuse is blown	1. Replace the fuse with the same capacity **Rated capacity: FS29 10A** 2. If the new fuse is blown again after replacing it, go to Step 2
2	Check power rear view mirror power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the power rear view mirror power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that there is short-circuit in the rear view mirror power supply circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check power rear view mirror power circuit	Normal	Faulty	Instruction
	• Disconnect connector I05 of the rear view mirror adjustment switch on the dashboard wire harness • Turn the ignition switch to "ACC" position • Check the voltage between the Terminal 3 of I05 and the grounding **Voltage: 9 - 13V**	Go to Step 4	The circuit of the power rear view mirror power supply has open circuit points	Check and repair the circuit between the dashboard wire harness connector and the power rear view mirror fuse
4	Check the grounding circuit of the power rear view mirror	Normal	Faulty	Instruction
	• Disconnect connector I05 of the rear view mirror adjustment switch on the dashboard wire harness • Check the resistance between Terminal 1 of I05 and grounding **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Check and repair the circuit between dashboard wire harness connector and grounding point G21
5	Check the rear view mirror adjustment switch	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	Check the rear view mirror adjustment switch for damage	Go to Step 6	The rear view mirror adjustment switch is damaged	Replace the rear view mirror adjustment switch
6	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

9. LEFT SIDE POWER REAR VIEW MIRRORS DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the left side power rear view mirror works	Diognosis is over	Go to Step 1	
1	Check the rear view mirror adjustment switch	Normal	Faulty	Instruction
	Check the rear view mirror adjustment switch for damage	Go to Step 2	The rear view mirror adjustment switch is damaged	Replace the rear view mirror adjustment switch
2	Check the left side power rear view mirror motor circuit	Normal	Faulty	Instruction
	• Disconnect left side power rear view mirror motor connector D02 • Turn on the left power rear view mirror control switch to adjust the power rear mirror to left • Check the voltage between the Terminal 1 of D03 and the grounding **Voltage: 9 - 13V** • Check for continuity between Terminal 5 of D02 and grounding • Adjust the rear view mirror upward and check the voltage between the Terminal 4 of D02 and the grounding **Voltage: 9 - 13V**	Go to Step 3	If the inspection result does not meet the requirements, then the corresponding circuit has open circuit points	Inspect and repair the corresponding circuit open circuit points
3	Check the left side rear view mirror adjustment motor	Normal	Faulty	Instruction
	Check the left side rear view mirror adjustment motor for damage	Go to Step 4	Left side rear view mirror adjustment motor is damaged	Replace the left side rear view mirror adjustment motor
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

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10. RIGHT SIDE POWER REAR VIEW MIRRORS DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to "ACC" position • Check whether the right side power rear view mirror works	Diognosis is over	Go to Step 1	
1	Check the rear view mirror adjustment switch	Normal	Faulty	Instruction
	Check the rear view mirror adjustment switch for damage	Go to Step 2	The rear view mirror adjustment switch is damaged	Replace the rear view mirror adjustment switch
2	Check the right side power rear view mirror motor circuit	Normal	Faulty	Instruction
	• Disconnect right side power rear view mirror motor connector K02 • Turn on the left power rear view mirror control switch to adjust the power rear mirror to left • Check the voltage between the Terminal 1 of K02 and the grounding **Voltage: 9 - 13V** • Check the resistance between Terminal 5 of K02 and grounding **Resistance: <2Ω** • Adjust the rear view mirror upward and check the voltage between the Terminal 4 of K02 and the grounding **Voltage: 9 - 13V**	Go to Step 3	If the inspection result does not meet the requirements, then the corresponding circuit has open circuit points	Inspect and repair the corresponding circuit open circuit points
3	Check the right side rear view mirror adjustment motor	Normal	Faulty	Instruction
	Check the right side rear view mirror adjustment motor for damage	Go to Step 4	Right side rear view mirror adjustment motor is damaged	Replace the right side rear view mirror adjustment motor
4	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

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11. SUNROOF DOES NOT WORK

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Turn the ignition switch to ON. • Check whether the sunroof works	Diognosis is over	Sunroof does not work	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	• Turn off all electrical loads. • Remove the dashboard left lower notes box. • Visually check whether sunroof fuse FS31 and FS32 are blown	Go to Step 2	The sunroof fuse is blown	• Replace the fuse with the same capacity **Rated capacity:** **FS31 15A** **FS32 15A** • If the new fuse is blown again after replacing it, go to Step 2
2	Check the sunroof power supply circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of the battery, and check the resistance between the the circuit of the sunroof power supply and the grounding	Go to Step 3	If the resistance is too small, it indicates that the power supply line has a short circuit	Gradually troubleshoot to identify the short-circuit point, and then replace the fuse with the same capacity
3	Check the sunroof power supply circuit	Normal	Faulty	Instruction
	• Disconnect sunroof connector R01 • Turn the ignition switch to ON • Check the voltage between the No. 3 and Terminal 6s of R01 and the grounding **Voltage: 9 - 13V**	Go to Step 4	The circuit of the sunroof power supply has open circuit points	Inspect and repair the circuits between the roof wire harness connectors and the sunroof fuses
4	Check the sunroof grounding circuit	Normal	Faulty	Instruction
	• Disconnect sunroof connector R01 • Check the resistance between Terminal 2 of R01 and the grounding **Resistance: <2Ω**	Go to Step 5	The grounding circuits have open circuit points	Check and repair the circuit between roof wire harness connector and the grounding point G21.
5	Check the sunroof switch (ceiling lamp switch)	Normal	Faulty	Instruction

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Steps	Inspection item	Inspection result		
	• Disconnect ceiling lamp switch connector R02 • Press the sunroof opening button and check the resistance between the terminal 2 and terminal 5 of ceiling lamp switch **Resistance: <2Ω** • Press the sunroof closing button and check the resistance between the terminal 2 and terminal 4 of ceiling lamp switch **Resistance: <2Ω**	Go to Step 6	The sunroof switch (ceiling lamp switch) is damaged	Replace front ceiling light assembly
6	Check the sunroof control module circuit	Normal	Faulty	Instruction
	• Disconnect sunroof control module connector R01 and ceiling lamp connector R02 • Check the resistance between terminal 5 of R01 and terminal 5 of R02, between terminal 10 of R01 and terminal 4 of R02 and between terminal 1 of R01 and terminal 2 of R02 **Resistance: <2Ω**	Replace the sunroof control module	The circuits have open circuit points	Inspect and repair the corresponding circuit
7	Verification and check	Normal	Faulty	Instruction
	Test whether the fault is eliminated	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

12. WATER PERMEATION OR LEAKAGE ON THE SUNROOF

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Conduct rain test and check the sunroof for water permeation and leakage	Diognosis is over	Water permeation or leakage on the sunroof	Go to Step 1
1	Check the sunroof drain pipe	Normal	Faulty	Instruction
	Check the sunroof drain pipe for blockage	Go to Step 2	The sunroof drain pipe is blocked	Dredge the drain pipe and replace it as necessary.
2	Check the sunroof weatherstrip	Normal	Faulty	Instruction
	Check whether the clearance between the drain weatherstrip and the ceiling roof is too big	Go to Step 3	Clearance exists	Adjust the sunroof glass or reinstall the weatherstrip
3	Verification and check	Normal	Faulty	Instruction
	Conduct rain test and check the sunroof for water permeation and leakage	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

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13. NOISE AND HIGH VIBRATION OF SUNROOF

Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON" and check the sunroof for noise and high vibration	Diognosis is over	The sunroof has noise and vibrate heavily	Go to Step 1
1	Check the sunroof slide way	Normal	Faulty	Instruction
	Check the sunroof slide way for dust and poor lubrication	Go to Step 2	The sunroof slide way has dust or is in poor lubrication	Clean the slide way and apply some lubrication grease after being wrapped to dry
2	Check sunroof mechanical components	Normal	Faulty	Instruction
	Check sunroof mechanical components for interference	Go to Step 3	The sunroof mechanical components are interfered	Replace the interfered sunroof mechanical components
3	Verification and check	Normal	Faulty	Instruction
	After correct performing, check whether the faults appear again	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

14. SLOW AND HINDERED MOVEMENTS OF SUNROOF MOTOR

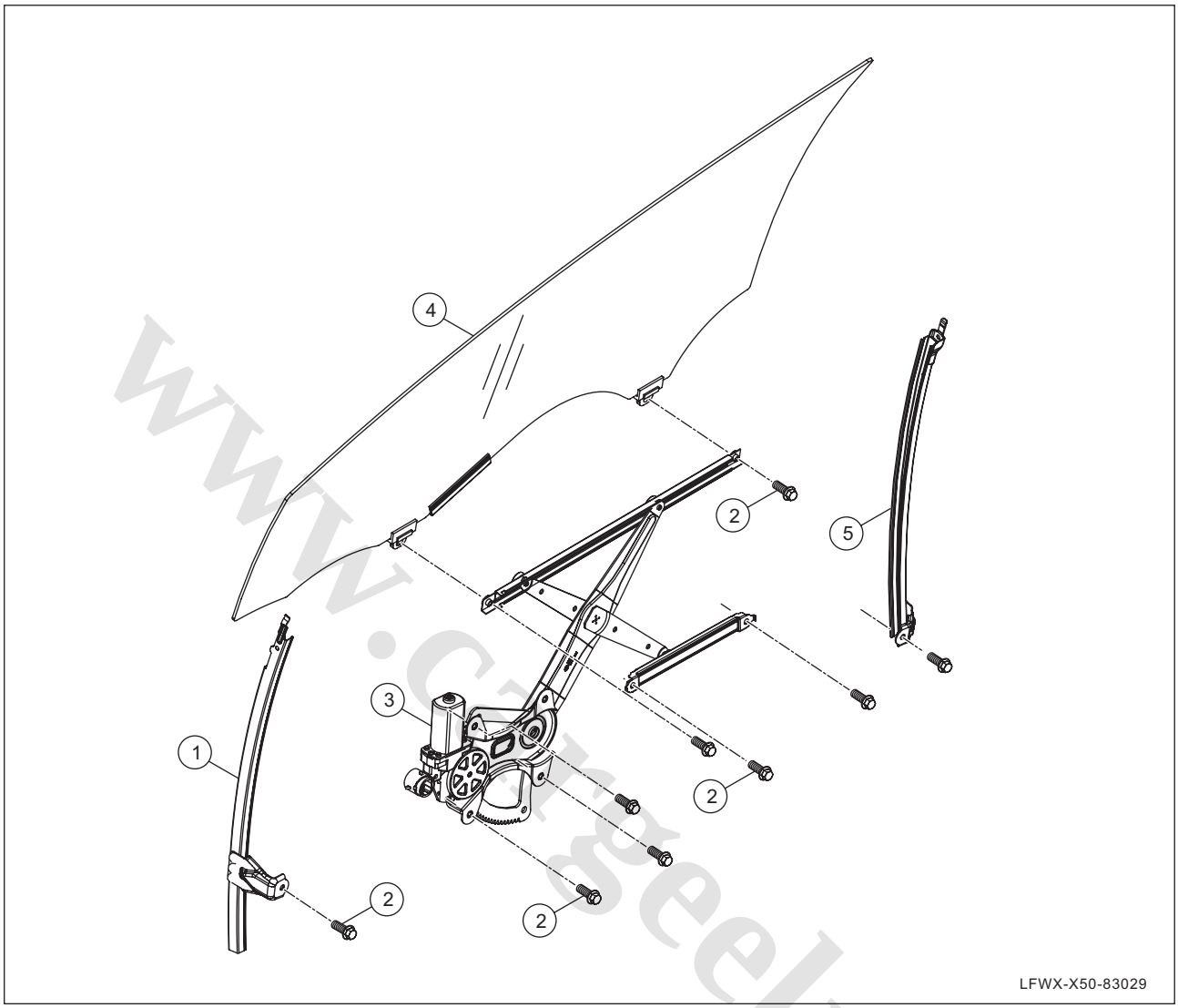
Steps	Inspection item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	Turn the ignition switch to "ON" and check whether the sunroof movement is slow and hindered	Diognosis is over	Slow and hindered movements of sunroof	Go to Step 1
1	Check the sunroof slide way	Normal	Faulty	Instruction
	Check sunroof mechanical components for poor lubrication	Go to Step 2	Check sunroof mechanical components are poorly lubricated	Clean the mechanical components and apply some lubrication grease after being wrapped to dry
2	Check the sunroof motor	Normal	Faulty	Instruction
	Check the sunroof motor for being overheated	Go to Step 3	The sunroof motor is overheated	Perform the sunroof after the sunroof motor cools down
3	Verification and check	Normal	Faulty	Instruction
	After correct performing, check whether the faults appear again	Diognosis is over	Fault still exists	Find the cause out from other fault symptoms

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FRONT POWER WINDOW

COMPONENTS



LFWX-X50-83029

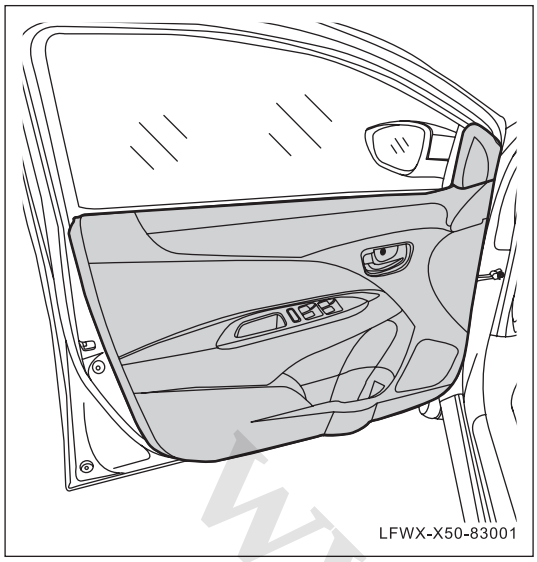
1	Front door front guide rail assembly
2	Hexagon bolt with flange
3	Front door glass regulator assembly

4	Front door glass assembly
5	Front door rear guide rail assembly

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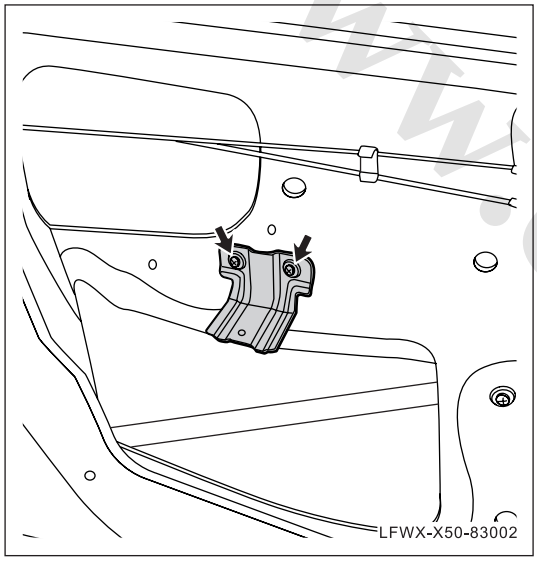
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REPLACEMENT

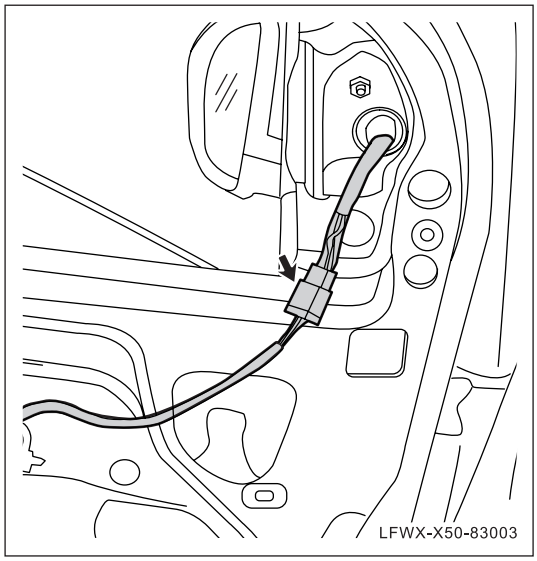


1. REMOVE FRONT POWER WINDOW

(a) Remove the front door trim panel. (See 81- Interiors and Exteriors, Front Door Interior Trim Panel, Replacement)



(b) Remove door handle bracket.

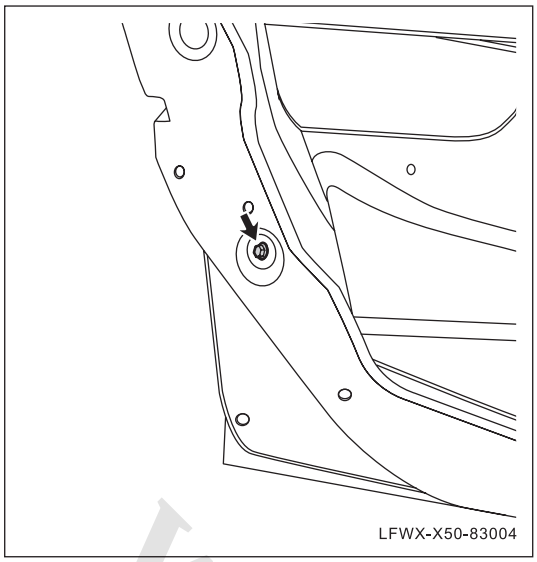


(c) Disconnect rear view mirror connector

(d) Remove door rain-proof curtain.

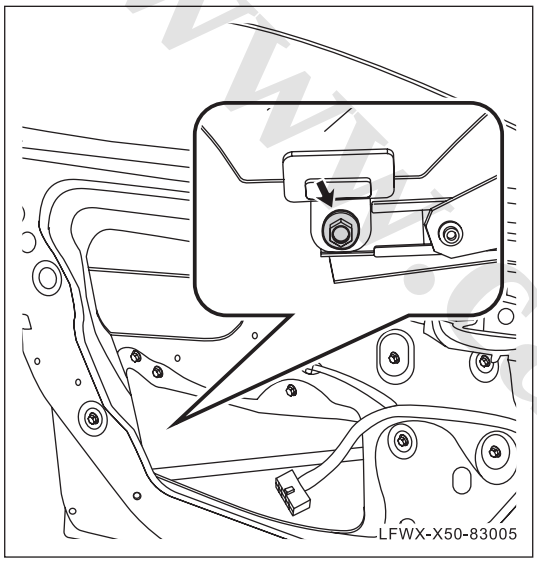
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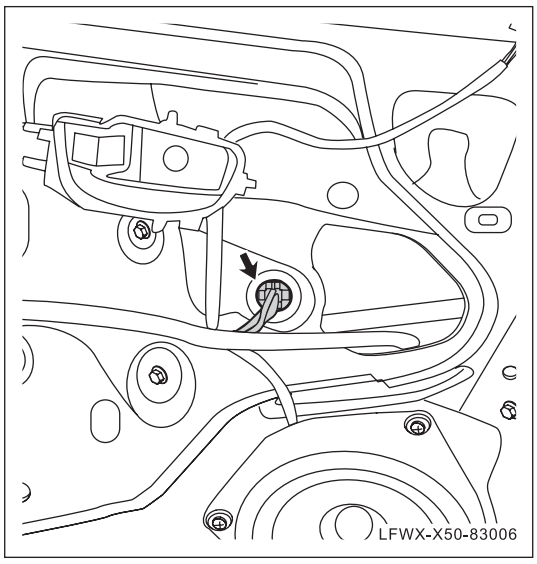


(e) Remove fixing bolts of glass guide rail, and take out the left glass guide rail.

(f) Lift and lower the glass to the appropriate position by external power supply.



(g) Remove connecting bolts of the glass and regulator and rotate to take out the glass.

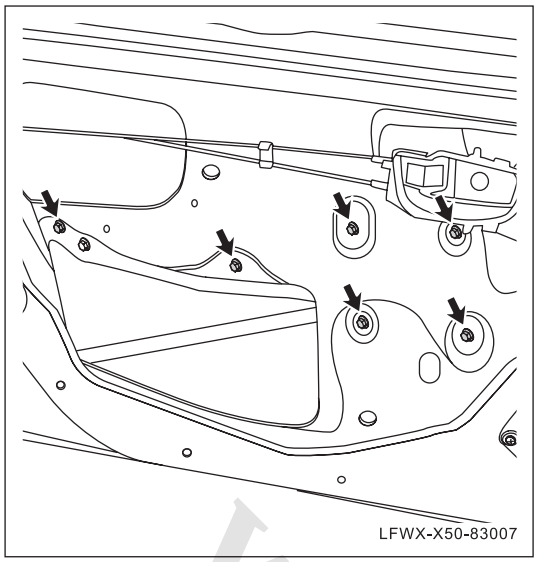


(h) Disconnect window regulator motor connector.

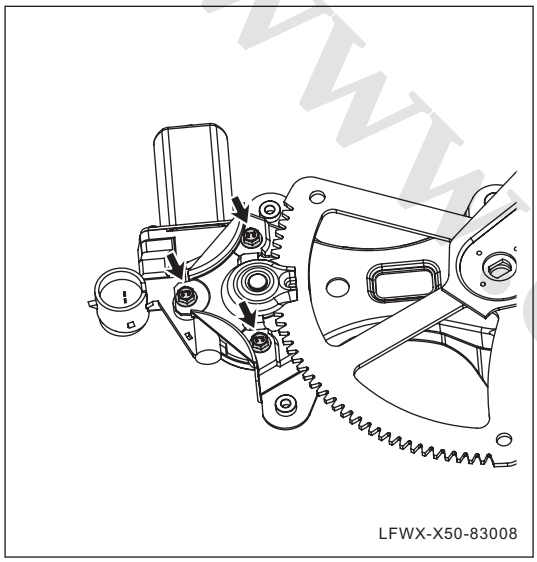
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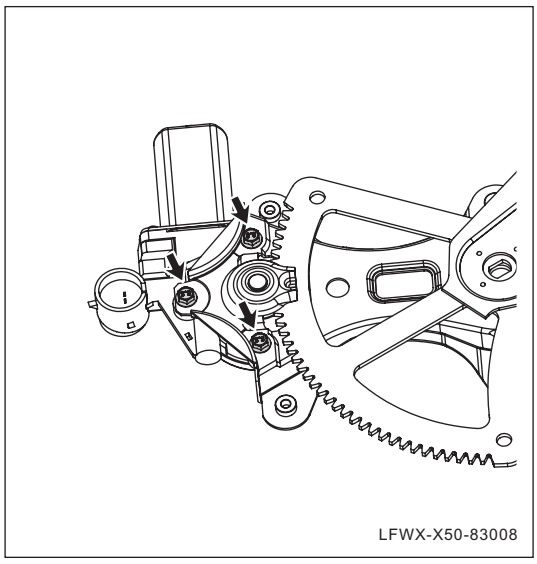
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LFWX-X50-83007

(i) Remove fixing bolts of window regulator motor, and take out the window regulator assembly.


LFWX-X50-83008

(j) Remove fixing bolts of window regulator motor, and remove window regulator motor.


LFWX-X50-83008

2. INSTALL FRONT POWER WINDOW

(a) Place the window regulator motor in position. Install and tighten the fixing bolts.

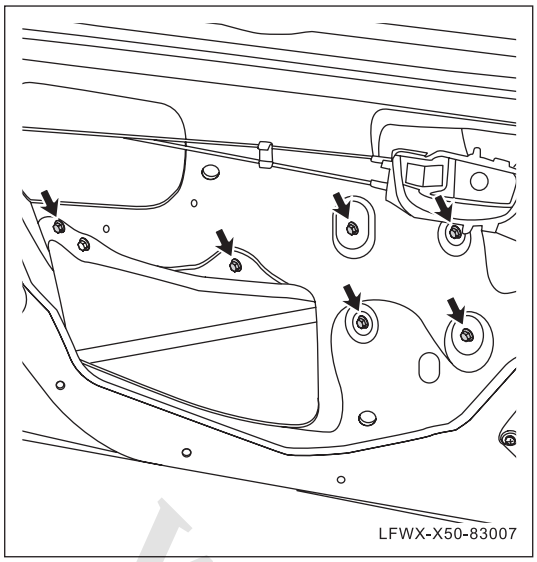
Torque: 8 - 12N•m

△ HINT:

- Before installing window regulator motor, it is necessary to inspect whether window regulator tooth is damaged. If it is, replace it.
- Uniformly apply lubricating grease to sliding and rotating section of window regulator assembly.

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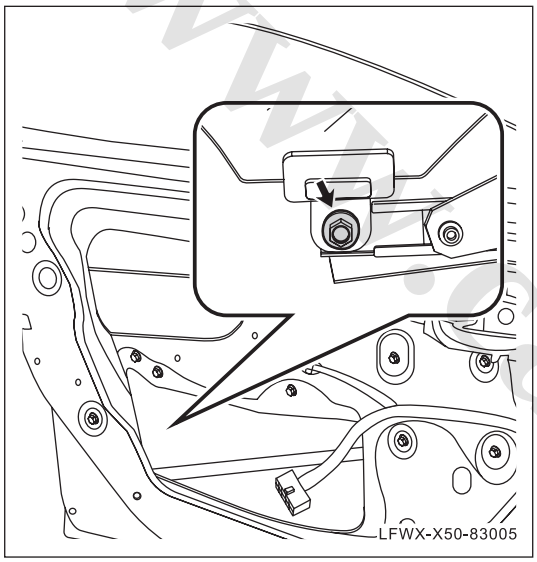


(b) Install the window regulator switch. Mount and tighten the fixing bolts.

Torque: 8 - 12N•m

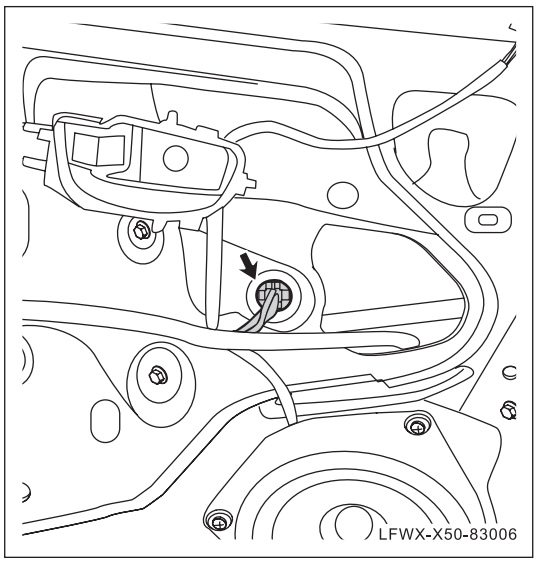
△ HINT:

Do not tighten fixing bolts of window lifter immediately. First connect front door window lifter control box wire harness connector, and the glass can lift freely. Then tighten fixing bolts of window lifter.



(c) Install the window glass and install fixing bolts and tighten them.

Torque: 8 - 12N•m

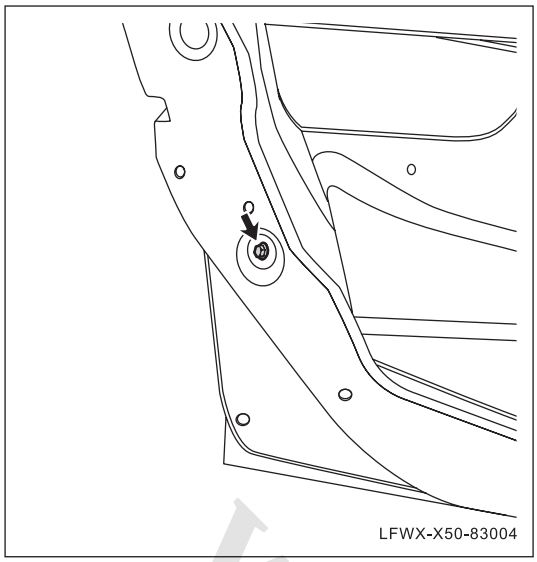


(d) Connect window regulator motor connector.

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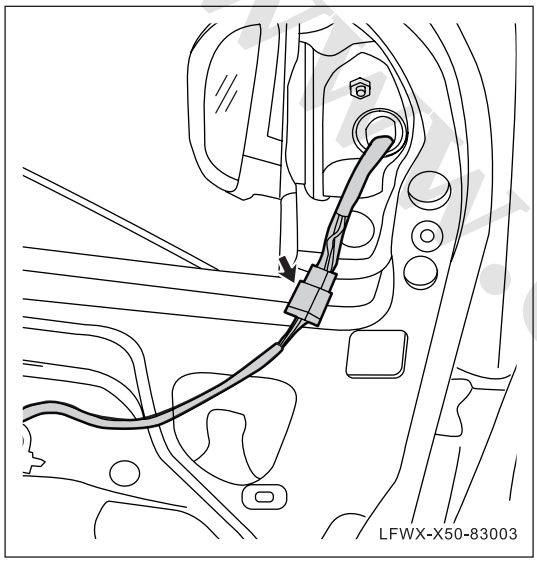


(e) Lift window glass to the highest point by external power supply.

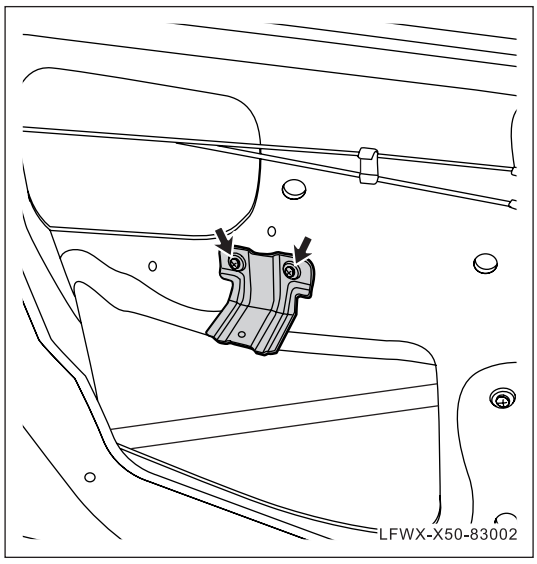
(f) Install the window guide rail and install fixing bolts and tighten them.

Torque: 8 - 12N•m

(g) Attach door rain-proof curtain.



(h) Connect rear view mirror connector.



(i) Install the door armrest bracket and install fixing screws of door lock and tighten them.

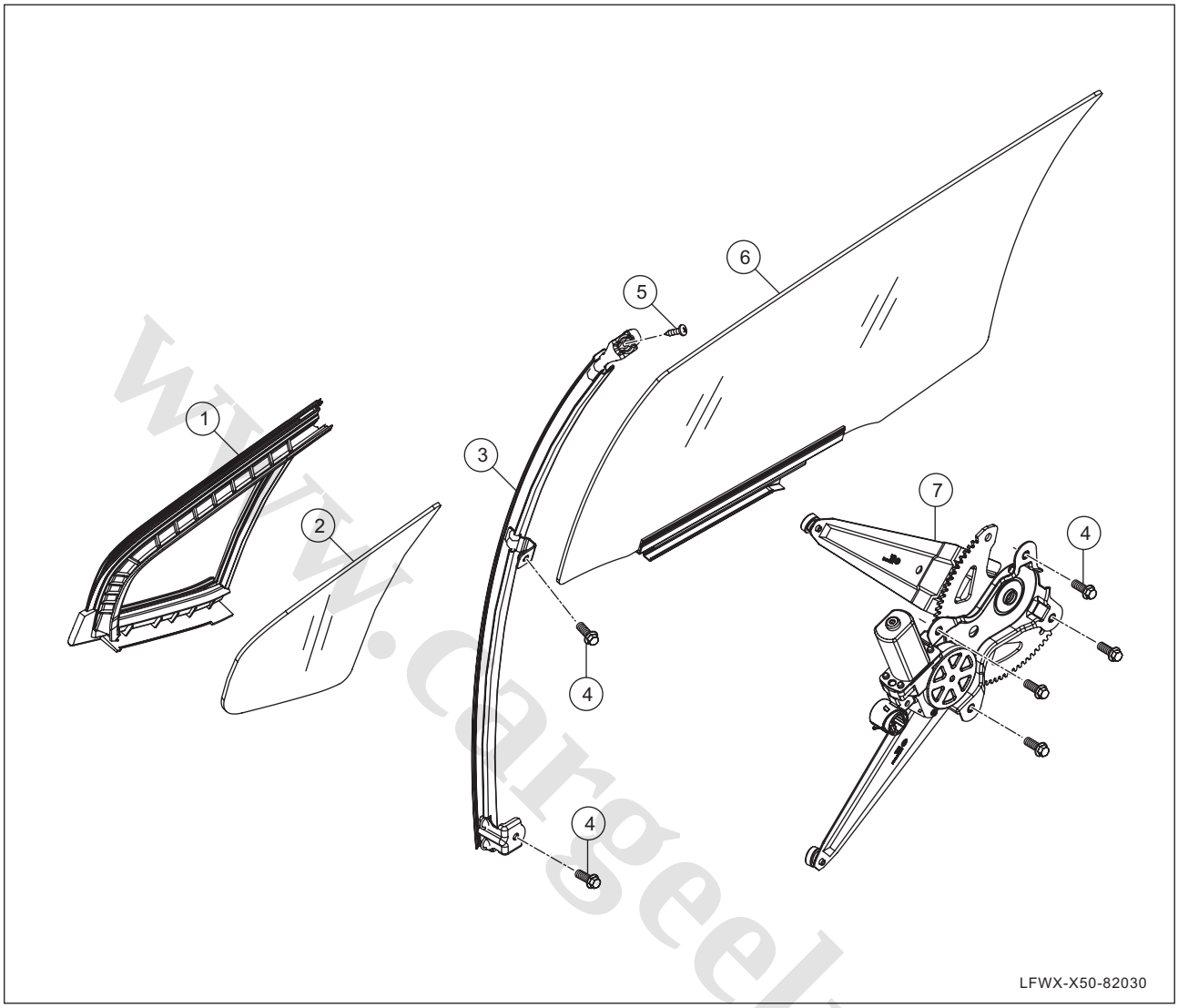
(j) Install the front door trim panel. (See 81- Interiors and Exteriors, Front Door Interior Trim Panel, Replacement)

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REAR POWER WINDOW

COMPONENTS



1	Quarter glass weatherstrip of rear door
2	Rear door glass assembly
3	Rear door guide rail assembly
4	Hexagon bolt with flange

5	Cross recessed countersunk head screw
6	Rear door glass assembly
7	Rear door window regulator assembly

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REPLACEMENT



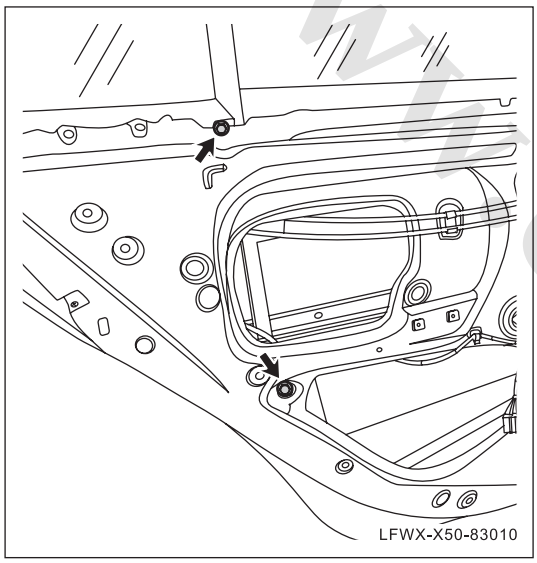
1. REMOVE REAR POWER WINDOW

(a) Remove rear door trim panel (See 81-Interiors and Exteriors, Rear Door Interior Trim Panel, Replacement)

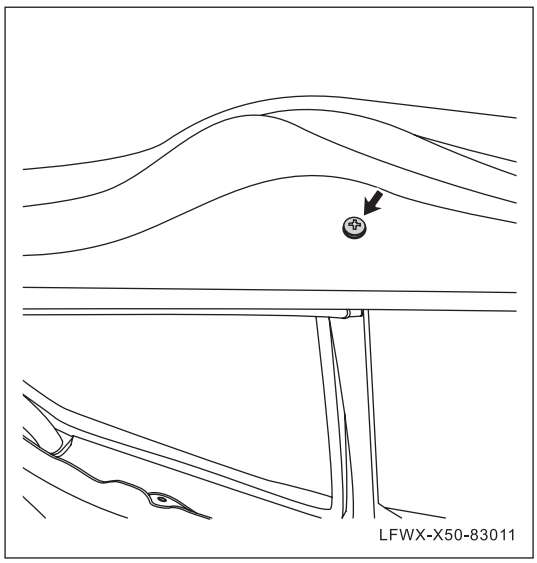
(b) Remove door handle bracket.

(c) Remove door rain-proof curtain.

(d) Lift and lower the glass to the appropriate position by external power supply.



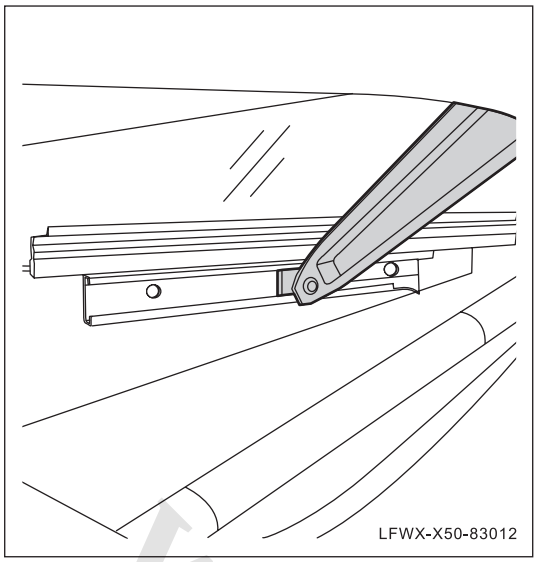
(e) Remove the fixing bolts below glass guide rail.



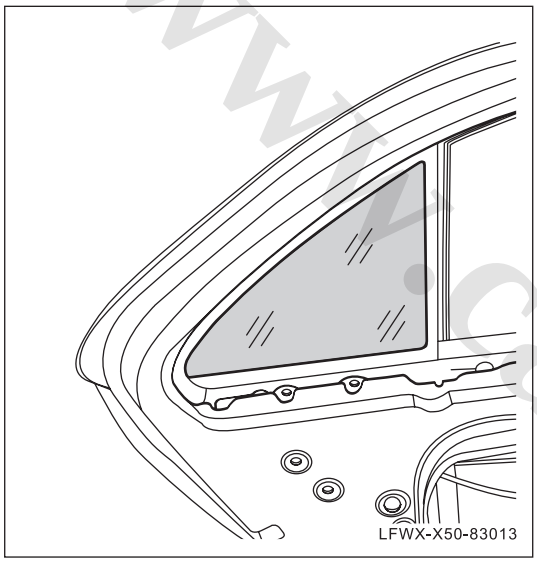
(f) Remove fixing screws of upper end of door guide rail.

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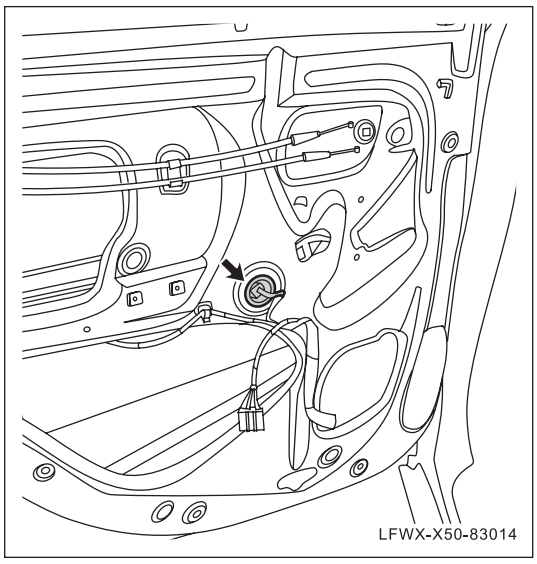
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(g) Rotate the glass and disengage the glass run and window lifter, then take out the glass.



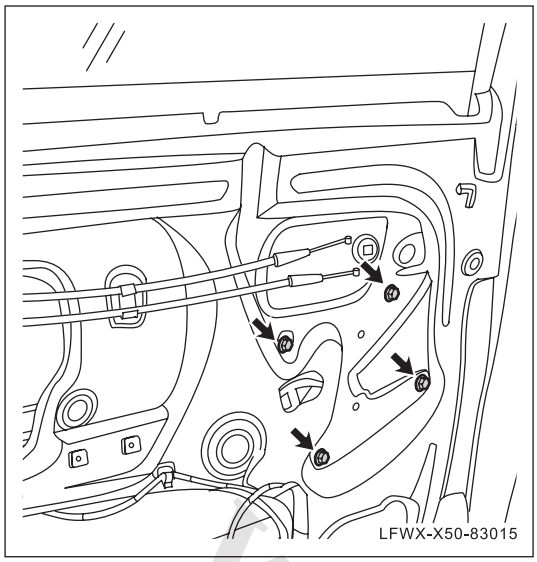
(h) Take out glass guide rail, remove rear door quarter glass and quarter glass seal.



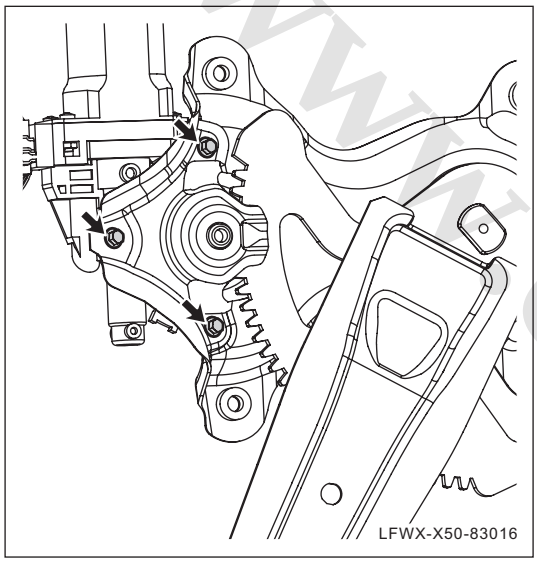
(i) Disconnect window regulator motor connector.

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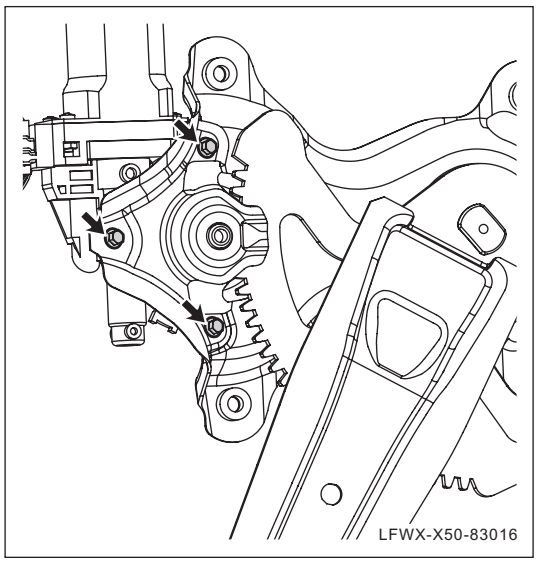
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(j) Remove fixing bolts of window regulator motor, and take out the window regulator assembly.



(k) Remove fixing bolts of window regulator motor, and remove window regulator motor.



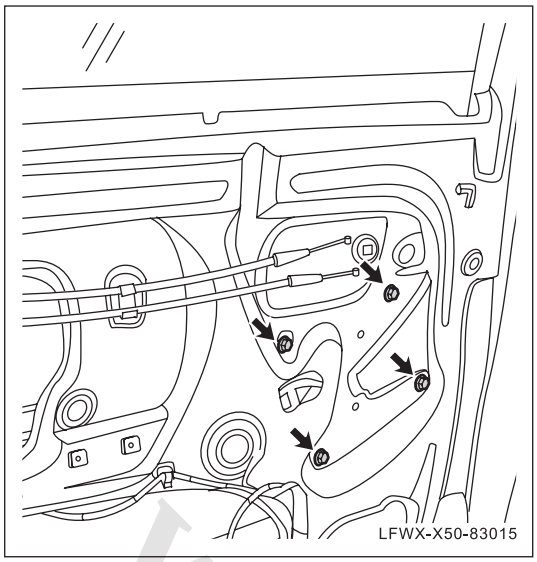
2. INSTALL REAR POWER WINDOW

(a) Install the window regulator motor and install fixing bolts and tighten them.

Torque: 8 - 12N•m

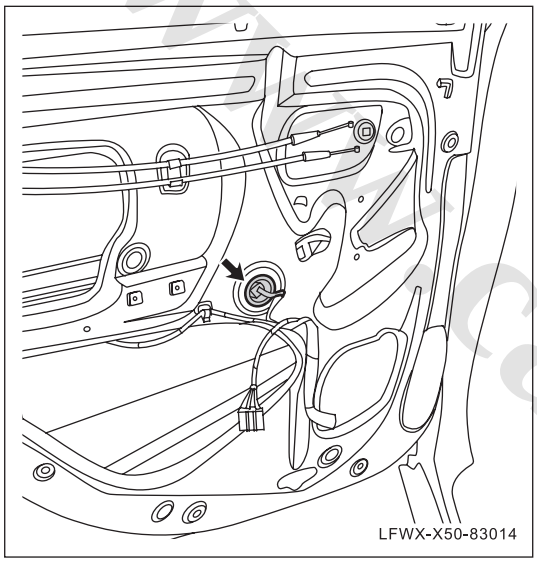
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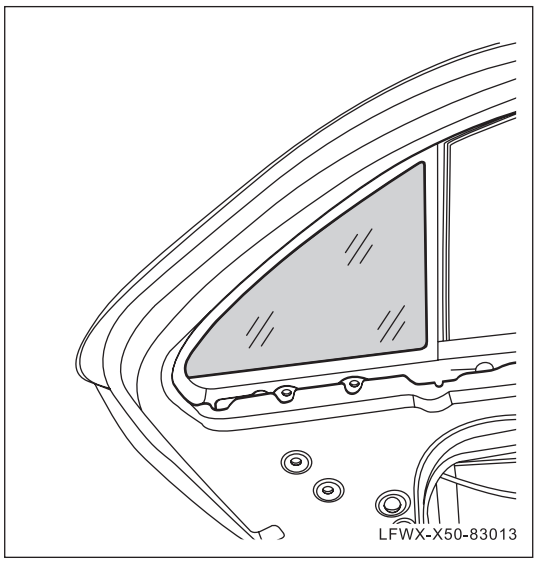


(b) Install the window regulator assembly and install the fixing bolts and tighten them.

Torque: 8 - 12N•m



(c) Connect window regulator motor connector.

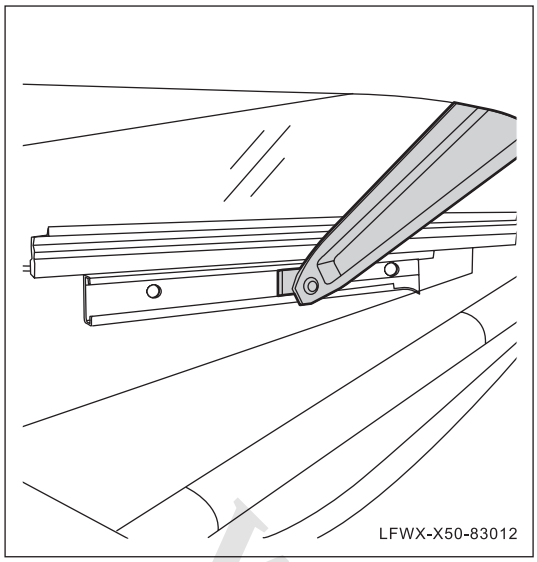


(d) Install quarter glass seal of rear door and rear door quarter glass.

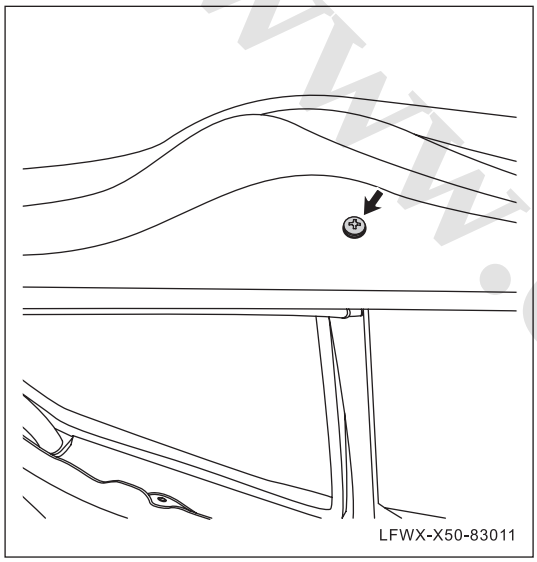
(e) Place glass guide rail to mounting position.

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(f) Rotate the glass, and install window lifter sliding block into glass sliding groove.

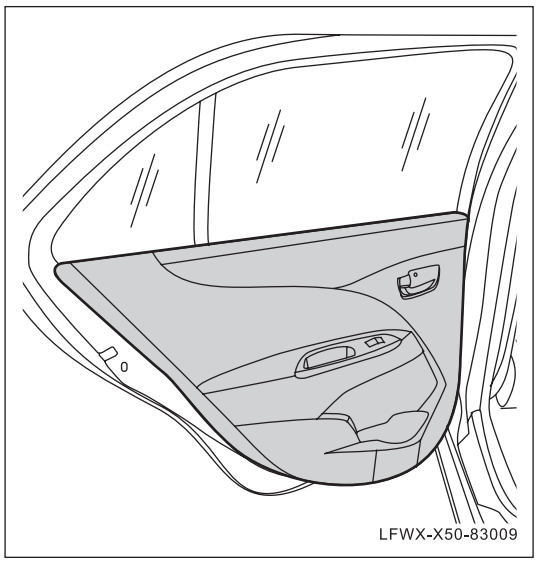


(g) Install fixing bolts and screws of rear door glass guide rail, and tighten fixing bolts and screws of glass guide rail.

Torque: 8 - 12N•m(bolt)

(h) Install rear door rain-proof curtain.

(i) Install the door armrest bracket and install fixing screws of door lock and tighten them.



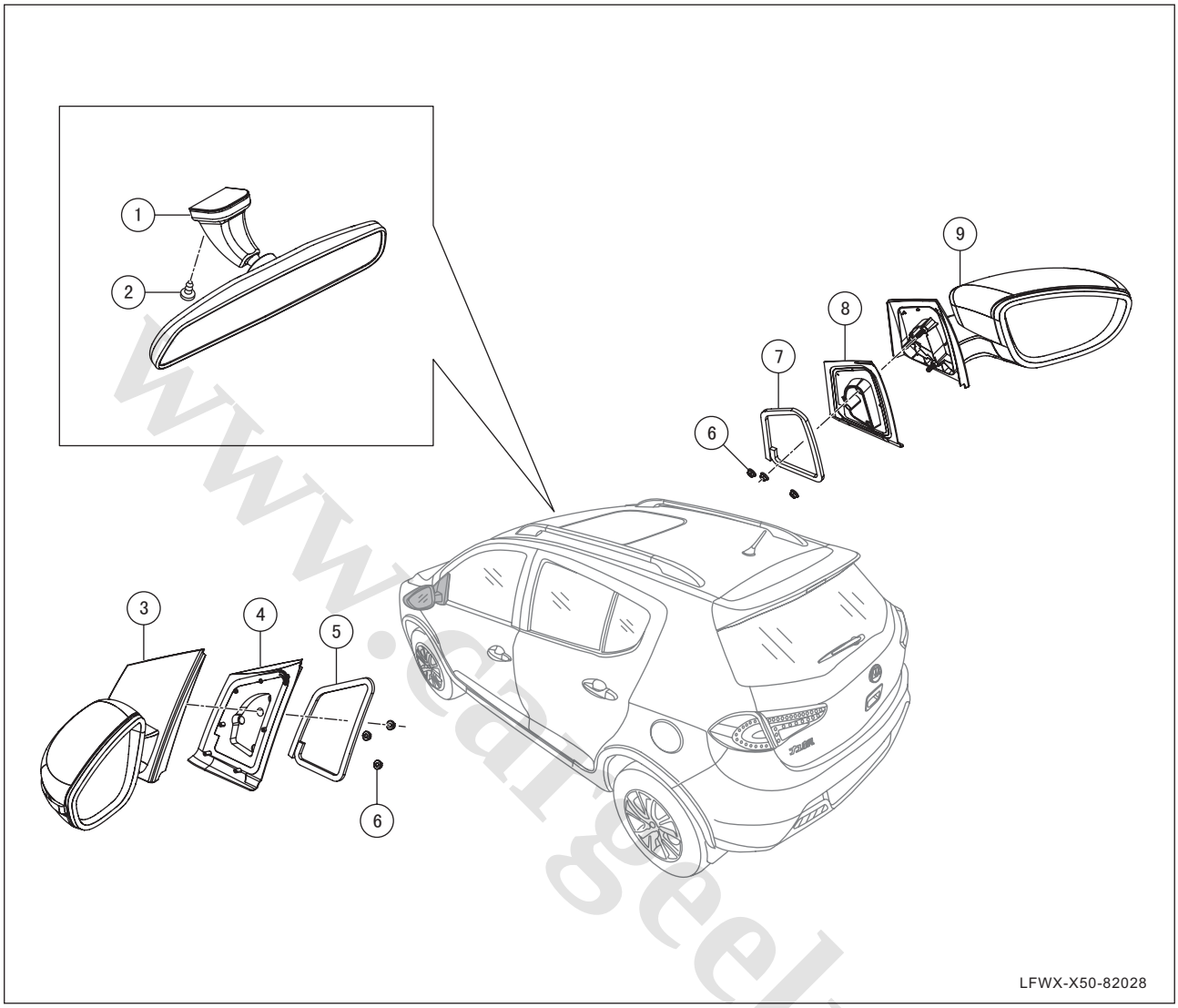
(j) Install the rear door trim panel. (See 81-Interiors and Exteriors, Rear Door Trim Panel, Replacement)

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INTERIOR REAR VIEW MIRROR

COMPONENTS



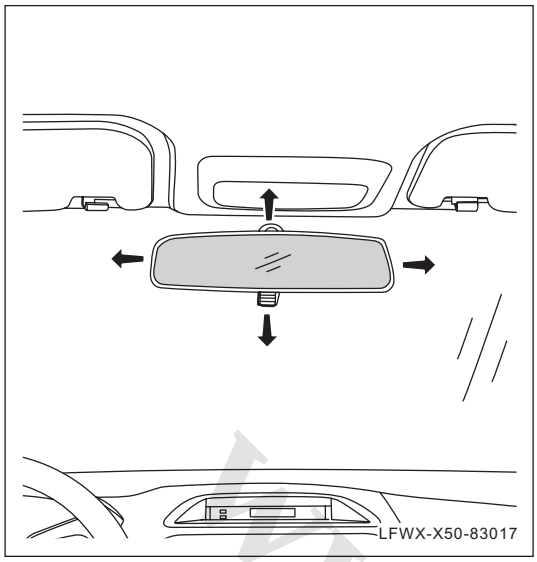
1	Interior rear view mirror
2	Cross recessed screw
3	Left installation body of exterior rear view mirror
4	Left installation cushion of exterior rear view mirror
5	Left sealing strip of exterior rear view mirror

6	Hexagon nut with flange
7	Right sealing strip of exterior rear view mirror
8	Right installation cushion of exterior rear view mirror
9	Right installation body of exterior rear view mirror

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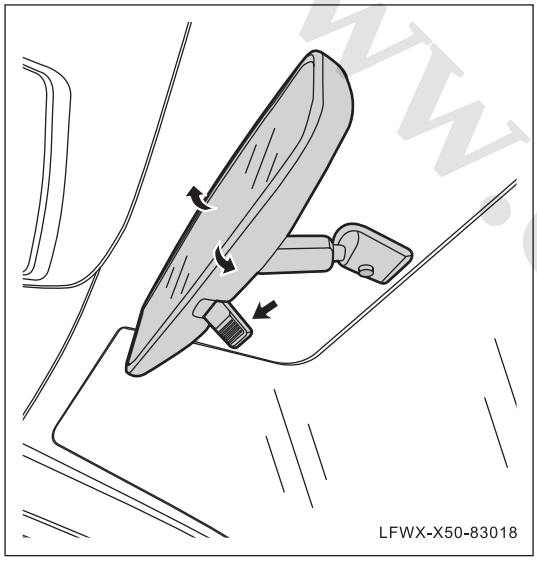
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ADJUSTMENT



1. ADJUST INTERIOR REAR VIEW MIRROR

(a) Manually adjust the interior rear view mirror angle.



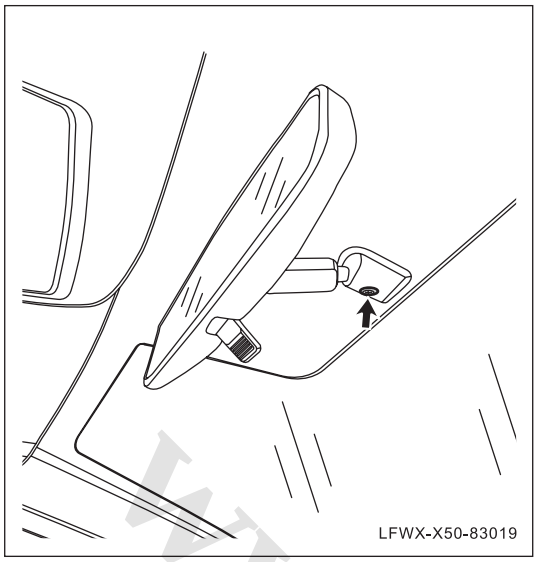
(b) Adjust view angle of interior rear view mirror finely through fine-adjusting handle.

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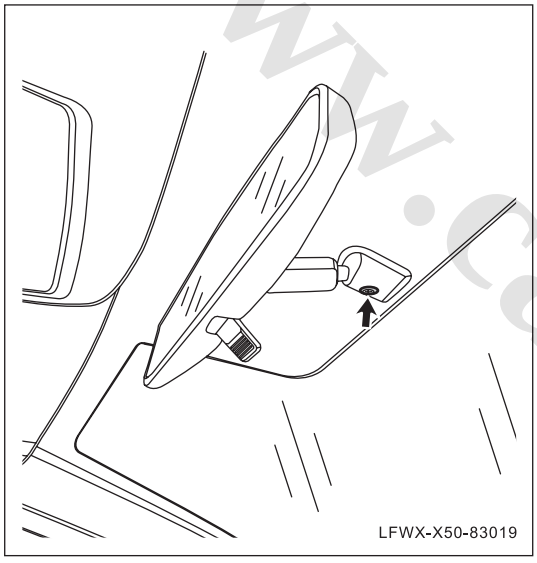
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REPLACEMENT



1. REMOVE INTERIOR REAR VIEW MIRROR

(a) Remove the interior rear view mirror assembly fixing screw and take out the interior rear view mirror assembly.



2. INSTALL INTERIOR REAR VIEW MIRROR

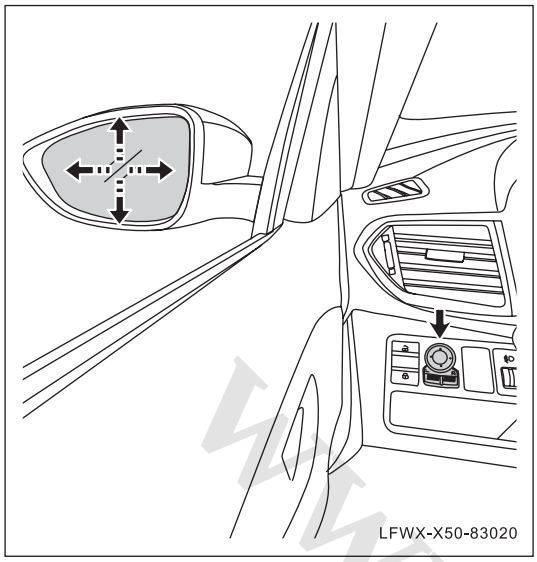
(a) Install the interior rear mirror assembly and install the fixing bolts and tighten them.

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EXTERIOR REAR VIEW MIRROR

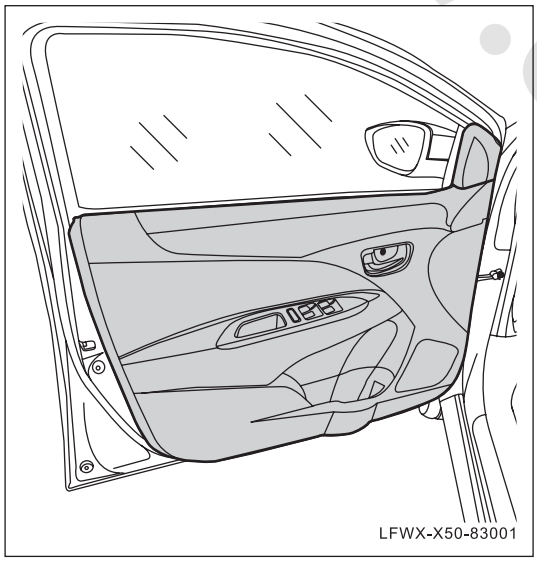
ADJUSTMENT



1. ADJUST EXTERIOR REAR VIEW MIRROR

(a) Adjust view angle of interior rear view mirror through adjusting switch of exterior rear view mirror.

REPLACEMENT



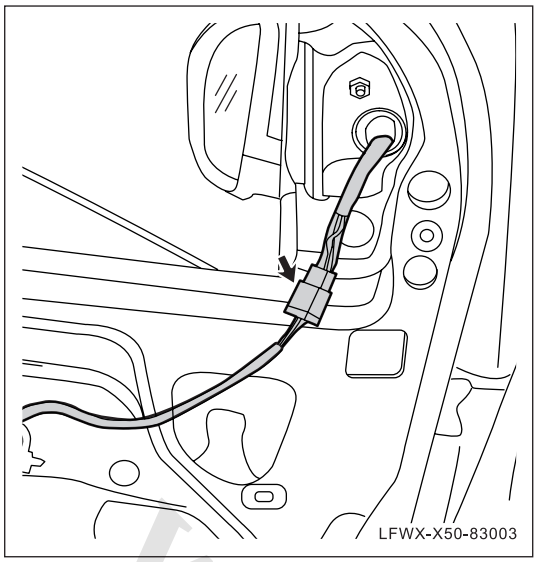
1. REMOVE EXTERIOR REAR VIEW MIRROR

(a) Remove the front door cover panel. (See 81- Interiors and Exteriors, Front Door Interior Trim Panel, Replacement)

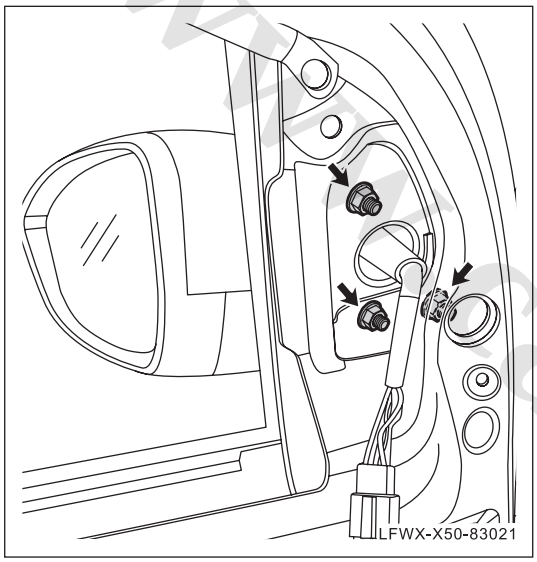
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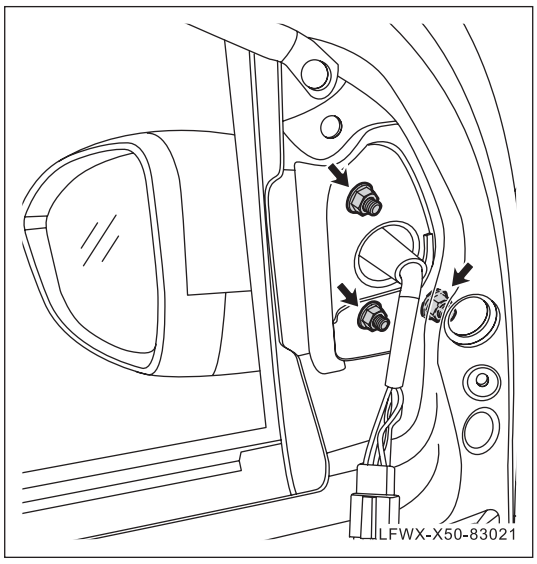
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(b) Disconnect exterior rear view mirror connector.



(c) Remove the exterior rear view mirror retaining nut. Remove the exterior rear view mirror.



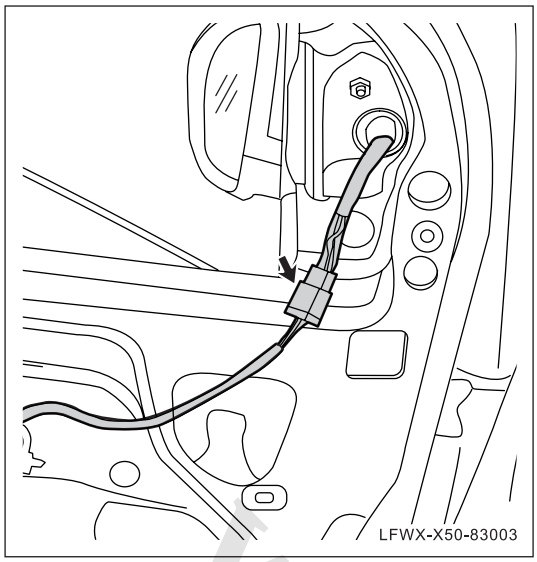
2. INSTALL EXTERIOR REAR VIEW MIRROR

(a) Install exterior rear view mirror assembly, and then install & tighten the fixing nut.

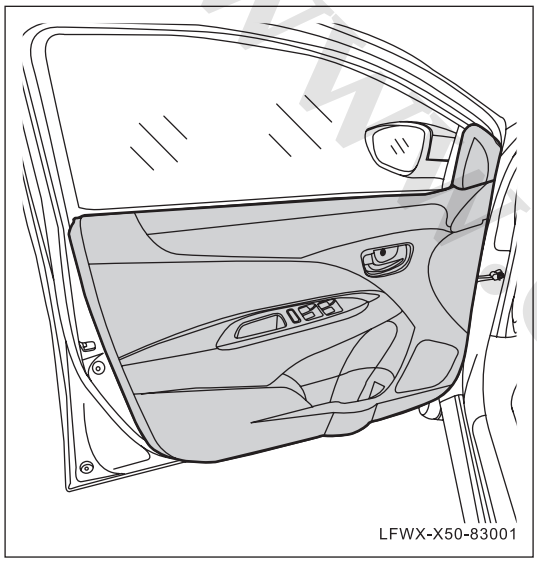
Torque: 8 - 12N•m

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(c) Connect exterior rear view mirror connector.



(d) Install front door trim panel. (See 81- Interiors and Exteriors, Front Door Interior Trim Panel, Replacement)

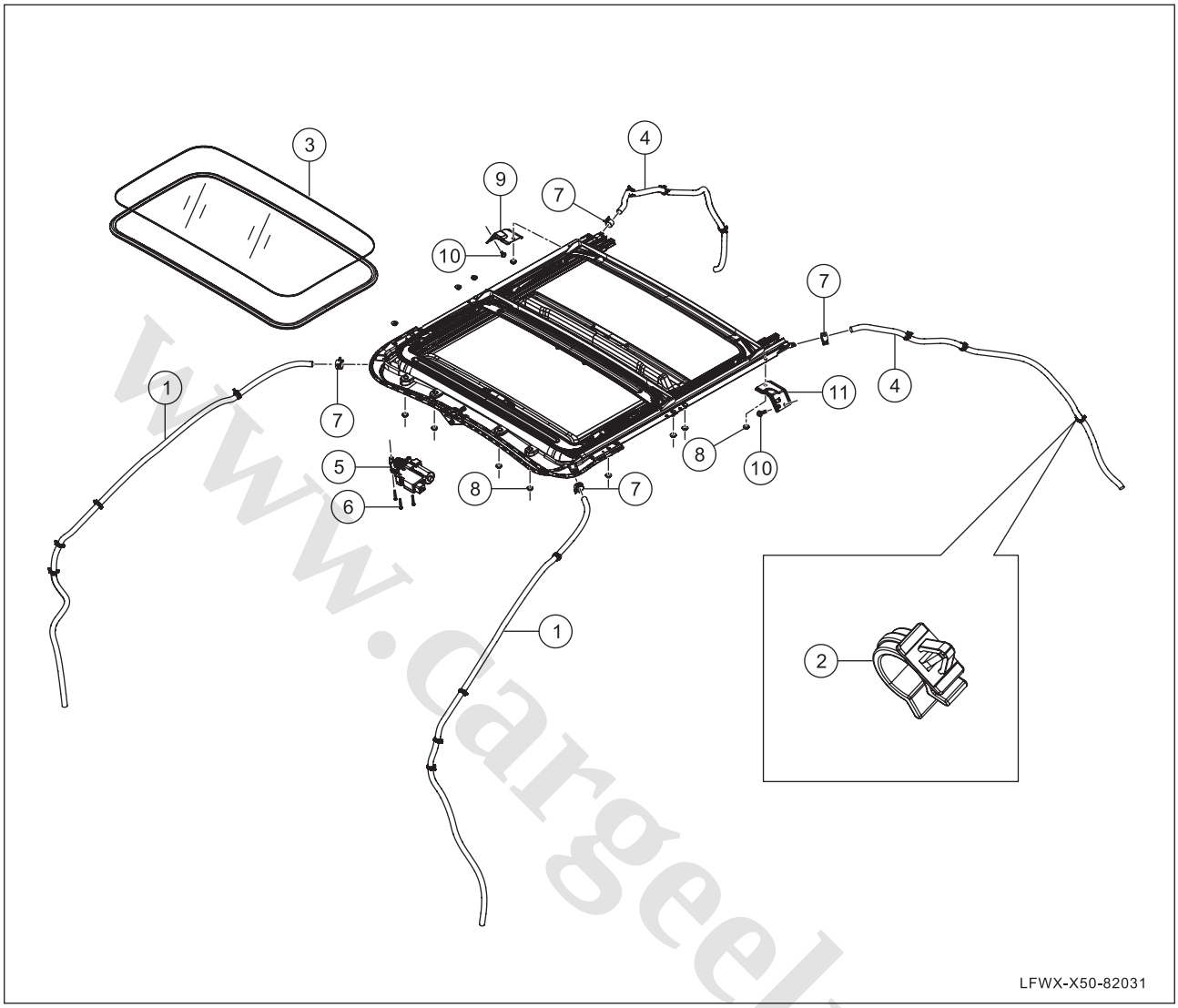
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SUNROOF

COMPONENTS



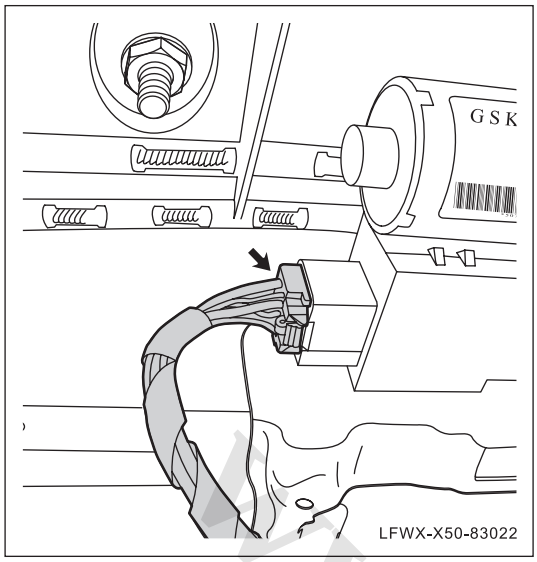
1	Sunroof front drain pipe
2	Clip
3	Sunroof glass
4	Sunroof rear drain pipe
5	Motor
6	Bolt

7	Steel belt type elastic hoop
8	Hexagon nut with flange
9	Rear right bracket of sunroof
10	Bolt
11	Rear left bracket of sunroof

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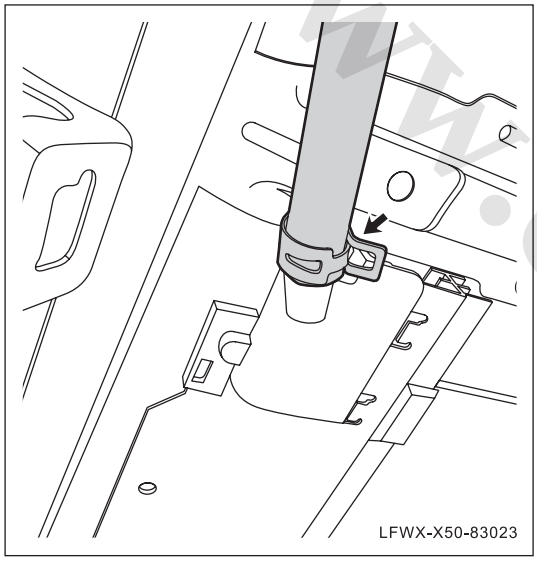
REPLACEMENT



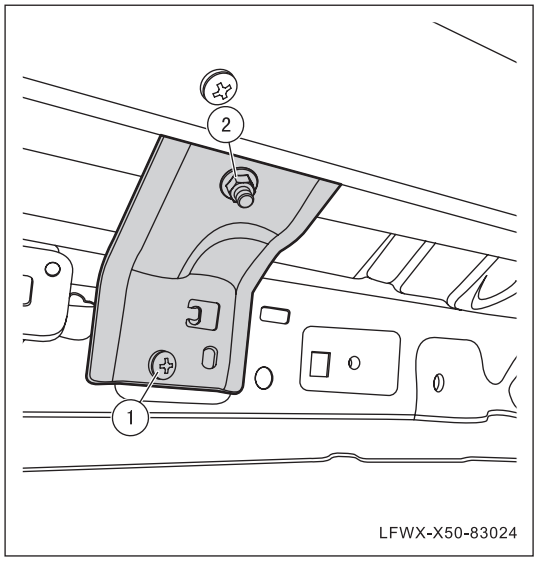
1. REMOVE SUNROOF BODY ASSEMBLY

(a) Remove the roof. (see 81 - Interiors and Exteriors, Assist Grip and Roof, Replacement)

(b) Disconnect the sunroof motor connector.



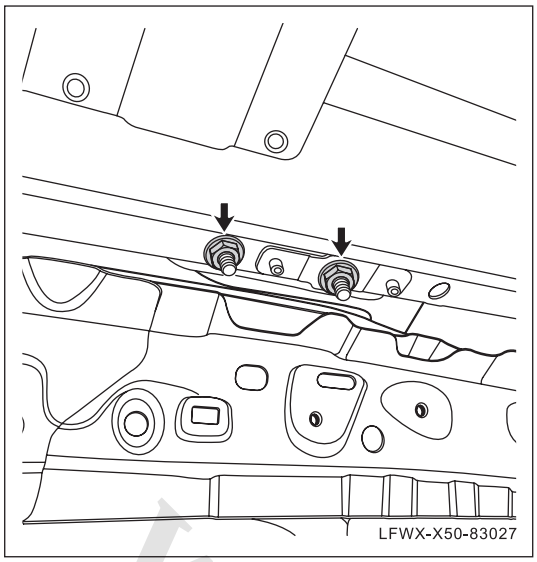
(c) Remove the fixing clamps of sunroof front and rear drain pipes and pull off the drain pipes.



(d) Remove fixing bolt ① and fixing nut ② of sunroof left and rear right brackets and take off the bracket.

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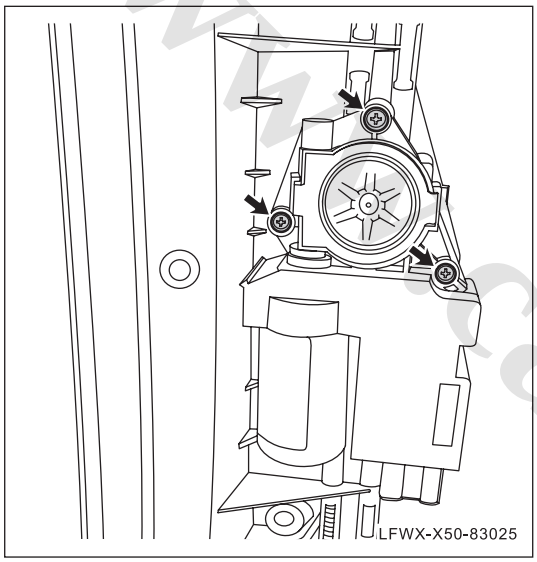
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(e) Remove the fixing nut of the sunroof body assembly, take off the sunroof body assembly and move it out from the tail door.

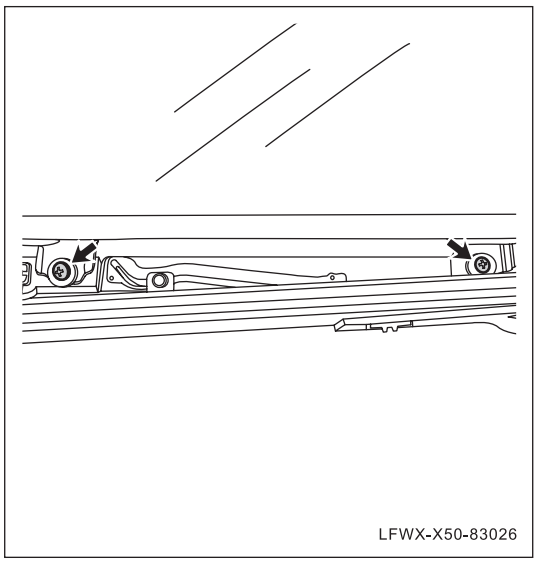
△ HINT:

When removing or installing, it is required two persons to support the sunroof body assembly to avoid damage caused by the falling of sunroof body assembly .



2. REMOVE THE SUNROOF MOTOR ASSEMBLY

(a) Remove the fixing screws of the sunroof motor. Remove the sunroof motor assembly.



3. REMOVE SUNROOF GLASS

(a) Open the sunroof sunvisor by sliding.

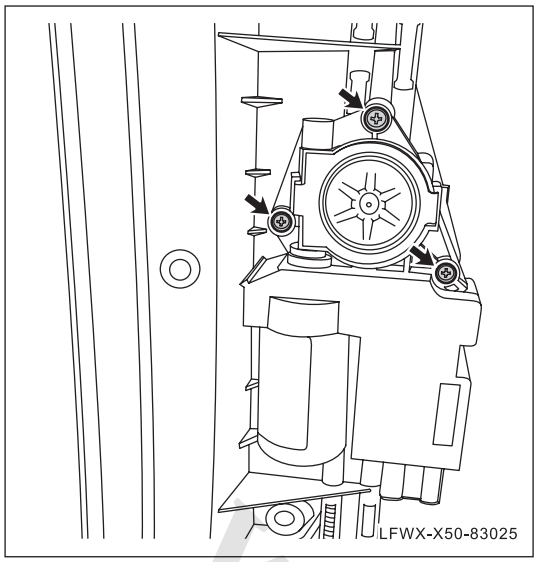
(b) Remove the fixing screws of the sunroof glass. Remove the sunroof glass.

4. INSTALL SUNROOF GLASS

(a) Install the sunroof glass in the sunroof slide way and install the fixing screws and tighten them.

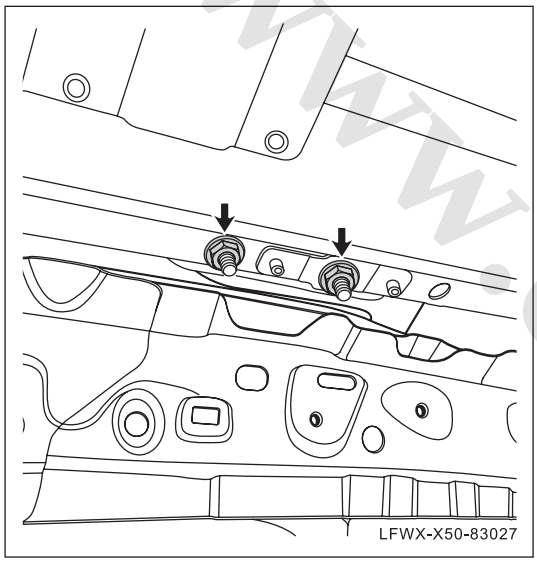
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5. INSTALL SUNROOF MOTOR ASSEMBLY

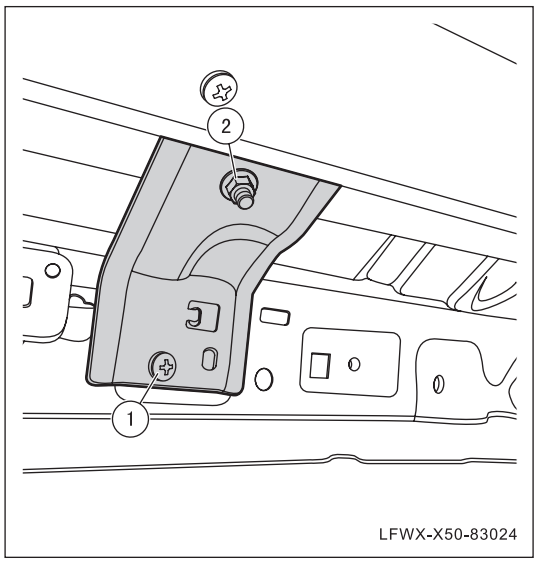
(a) Install the sunroof motor assembly and install the fixing bolts and tighten them.



6. INSTALL SUNROOF BODY ASSEMBLY

(a) Install the sunroof body assembly through the tail door and install the fixing bolts and tighten them.

Torque: 8 - 12N•m

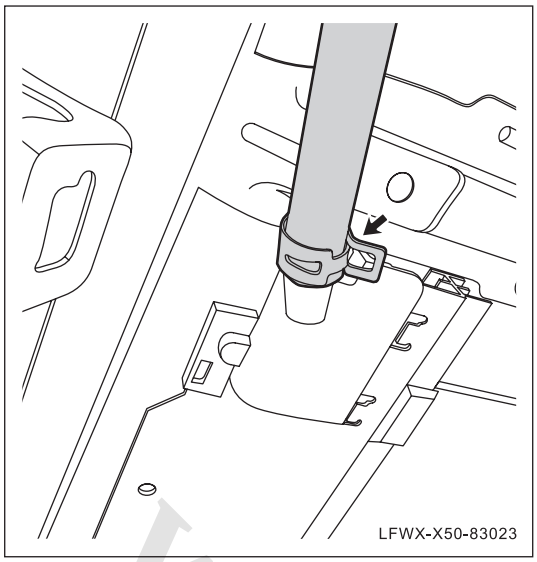


(b) Install the left and right brackets of the sunroof and install fixing bolt ① and fixing nut ② and tighten them.

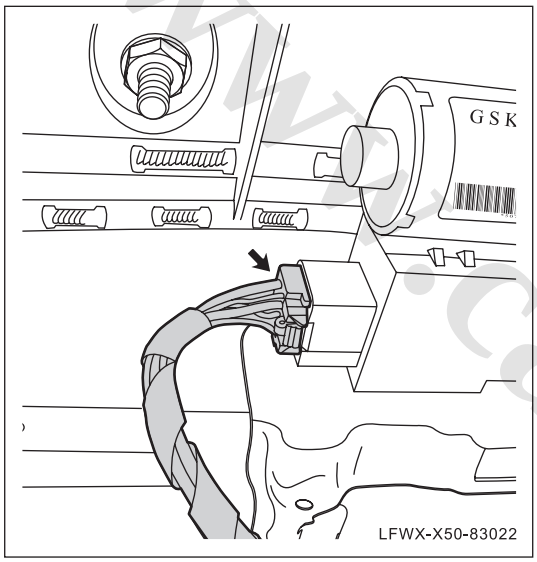
Torque: 8 - 12N•m

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(c) Install the front and rear drain pipes of the sunroof and fix them with clamps.



(d) Connect sunroof motor connector.

(e) Install the roof. (see 81 - Interiors and Exteriors, Assist Grip and Roof, Replacement)

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Seat

Seat 84-1
System description 84-1
Preparation 84-1
Service data 84-1
Precautions 84-1
On-vehicle inspection 84-2
Driver's seat 84-4
Components 84-4
Adjustment 84-5
Replacement 84-7
Front passenger's seat 84-15
Adjustment 84-15
Replacement 84-15
Rear seats 84-16
Components 84-16
Adjustment 84-17
Replacement 84-18

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SEAT

SYSTEM DESCRIPTION

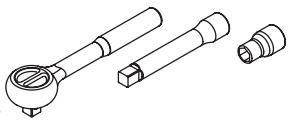
1. FUNCTION

Two rows of seats are installed in this model. The front seats can slid backward and forward, and seat-back angle & head restraint height can also be adjusted. The height of driver seat of the luxury model is adjustable, providing a comfortable driving position for the driver; the complete rear seats can be reclined to increase the the truck space making it convenient to ride and to transport goods.

2. COMPONENTS

Seats mainly consist of driver seat, front passenger's seat and rear seats.

PREPARATION

S/N	Tools	Outline diagram	Description
1	Quick wrench		For removing the seat bolt

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolts of seat belt buckle	65 - 85
Fixing bolts of driver and front passenger's seat	30 - 40
Fixing bolts of rear seatback mounting bracket	30 - 40
Connecting bolt of rear seatback and mounting bracket	30 - 40
Fixing bolt of rear seat cushion mounting bracket	30 - 40

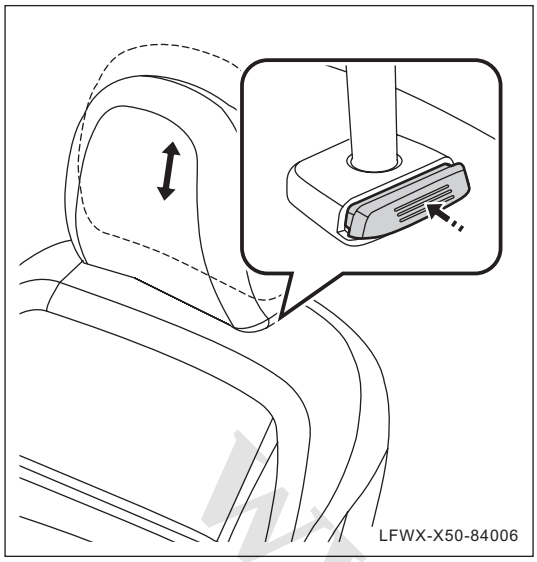
PRECAUTIONS

1. When removing the seats, do not place the tool on them to prevent the seats from being contaminated by oil stain.
2. The fixing bolts removed should be placed together to avoid loss.
3. When taking out or installing seats, prevent the seat brackets from clashing other interior parts and the vehicle body.

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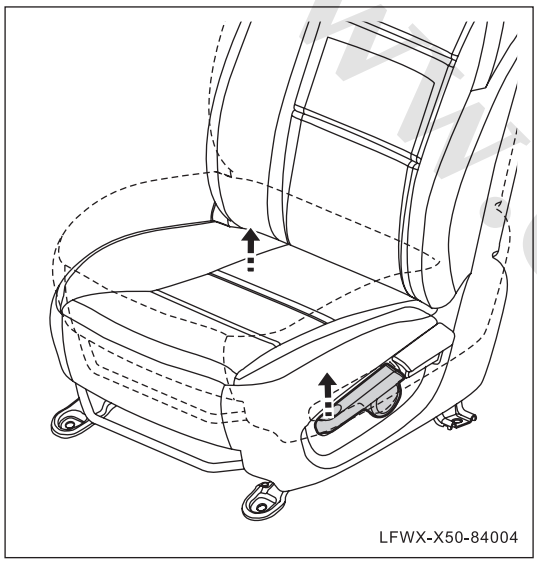
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ON-VEHICLE INSPECTION



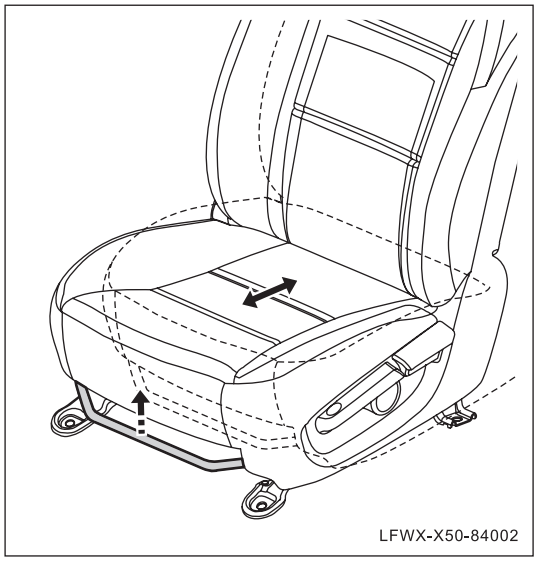
1. CHECK IF THE SEAT HEAD RESTRAINTS CAN BE ADJUSTED FREELY

- If the seat head restraints can not be adjusted or are adjusted difficultly, replace the head restraint plastic unlock socket.



2. CHECK IF THE HEIGHT OF FRONT SEATS CAN BE ADJUSTED FREELY

- If the height of front seats can not be adjusted or are adjusted difficultly, replace the seats.



3. CHECK IF FRONT SEATS CAN BE ADJUSTED BACKWARD AND FORWARD FREELY

- If front seats can not be adjusted backward and forward or are adjusted difficultly, replace the seat guide rail.

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4. CHECK IF FRONT SEATBACK ANGLE CAN BE ADJUSTED FREELY

- If front seatback angle can not be adjusted or is adjusted difficultly, replace the seats.

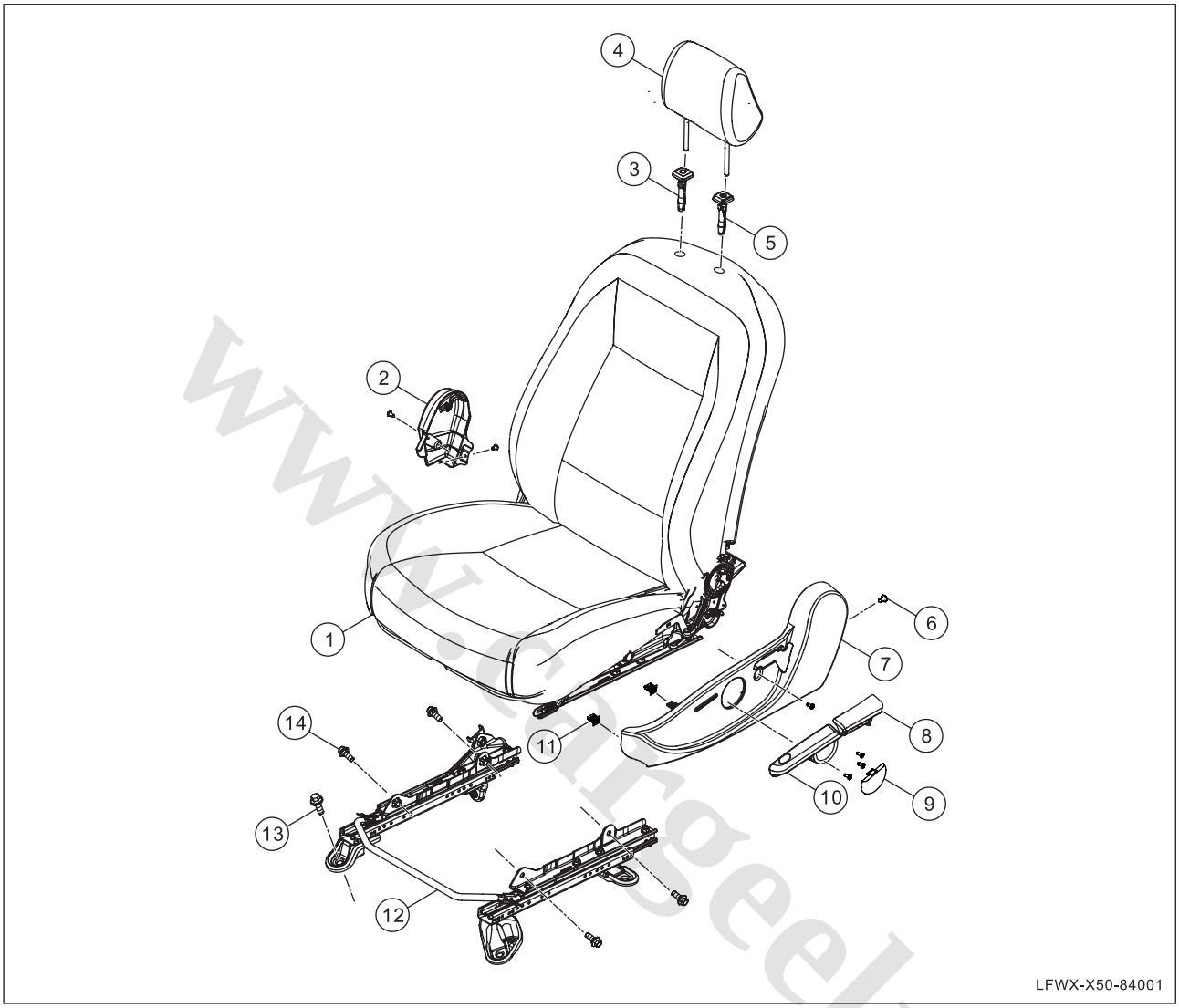
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DRIVER'S SEAT

COMPONENTS



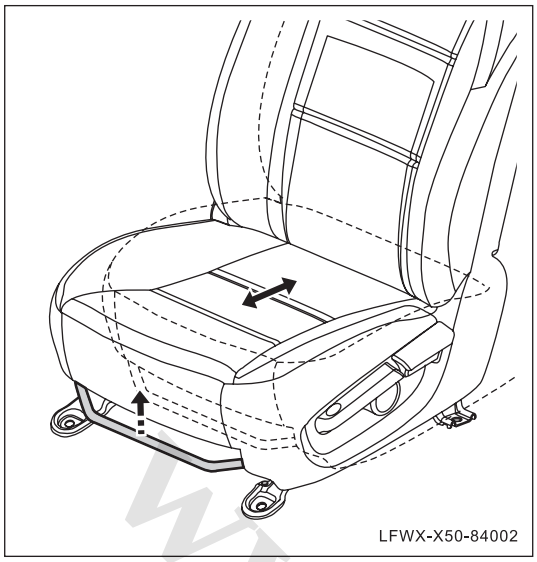
1	Driver's seat assembly
2	Right inner cover
3	Head restraint plastic socket
4	Head restraint
5	Head restraint unlock socket
6	Screw
7	Left outer cover

8	Left recliner adjuster handle
9	Height adjuster handle cover
10	Height adjuster handle
11	Spring snap-fit
12	Seat guide rail assembly
13	Bolt
14	Bolt, spring washer and plain washer assembly

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ADJUSTMENT



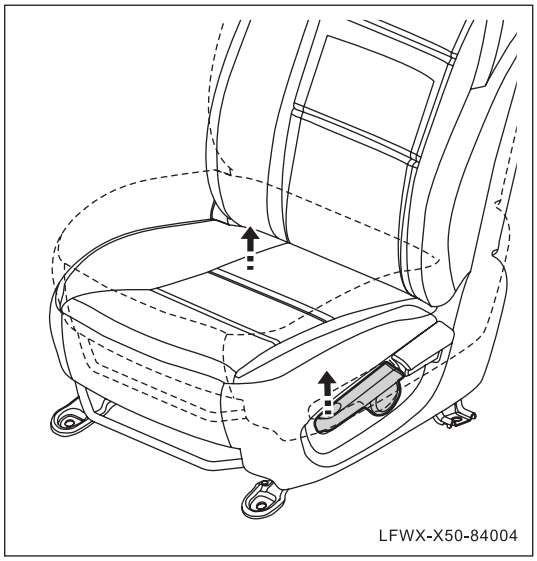
1. BACKWARD AND FORWARD ADJUSTMENT OF DRIVER'S SEAT

(a) Pull upward and hold the driver seat front adjusting levert, slide the seat to a proper position, and then release the adjusting lever.



2. RECLINER ADJUSTMENT OF DRIVER'S SEAT-BACK

(a) Upward pull and hold the recliner adjuster handle of driver's seat, adjust the seat backrest to a proper position, and release the handle.



3. HEIGHT ADJUSTMENT OF DRIVER'S SEAT

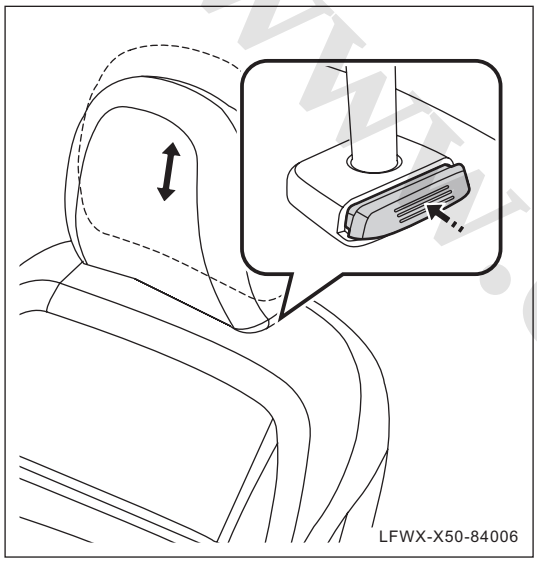
(a) If the driver's seat height is low, you can pull up the height adjuster handle constantly to lift the seat to the desired position.

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(b) If the driver's seat is too high, you can pull down the height adjuster handle constantly to drop the seat to the desired position.



4. HEAD RESTRAINT ADJUSTMENT OF DRIVER'S SEAT

(a) When adjusting upward, hold two sides of head restraint and pull it upward to the desired position.

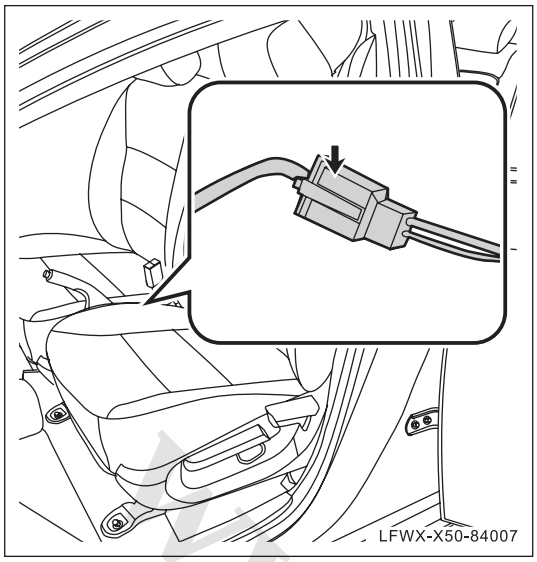
(b) When adjusting downward, press the head restraint plastic unlock socket, meanwhile, press downward the head restraint to the desired position, and then release the head restraint plastic unlock socket.

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REPLACEMENT



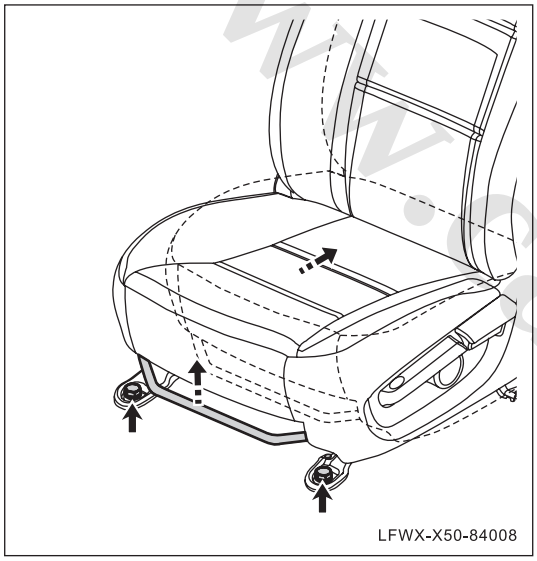
1. REMOVE THE DRIVER'S SEAT

(a) Disconnect negative cable of battery.

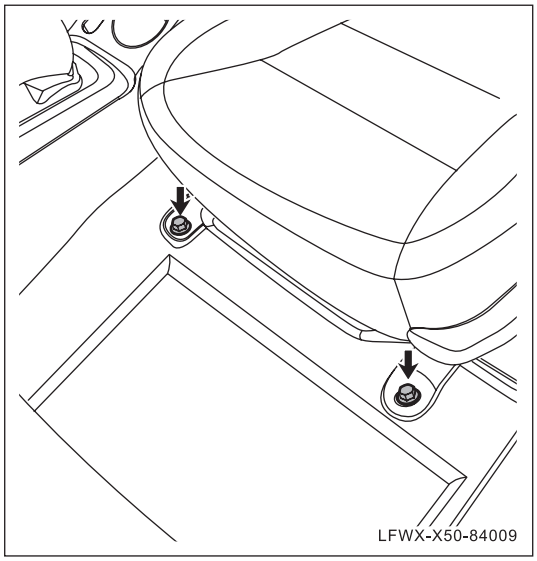
(b) Disconnect the connector of the driver's seat belt indicator lamp.

△ HINT:

Driver's seat belt connector is located under the seat.



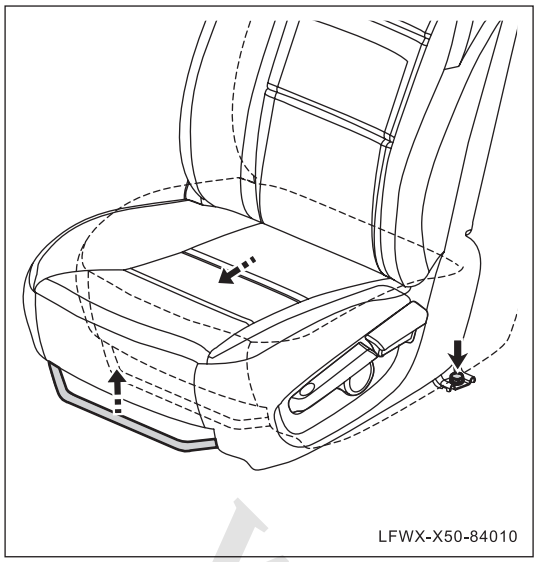
(c) Adjust the driver seat backwards to the maximum position so as to expose the fixing bolts at the front end of the seat.



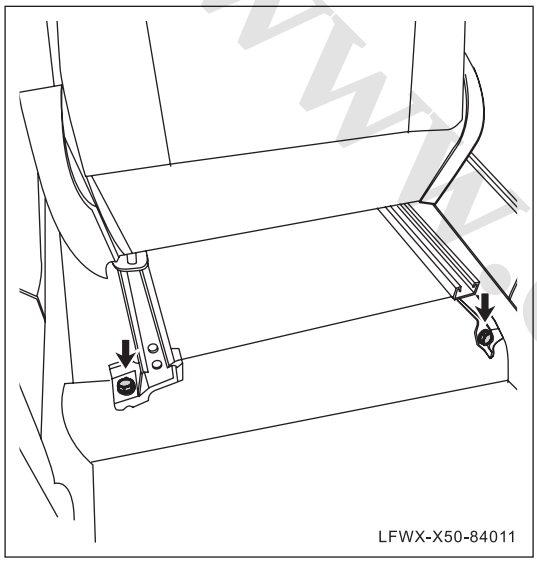
(d) Unscrew the fixing bolts at the front end of the seat by a wrench.

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(e) Adjust the driver's seat forwards to the maximum position so as to expose the fixing bolts at the rear end of the seat.



(f) Unscrew the fixing bolts at the rear end of the seat, and remove four fixing bolts on the front & rear end of the seat.



(g) Adjust the seatback to the desired position for removal.

(h) Remove the driver seat.

NOTICE:

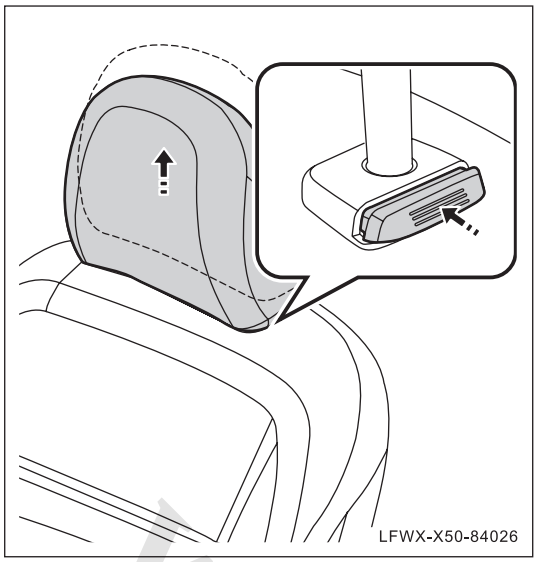
When moving the seat out, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.

2. DISASSEMBLE THE DRIVER'S SEAT

(a) Remove fixing bolts of seat belt buckle, and take down the seat belt buckle.

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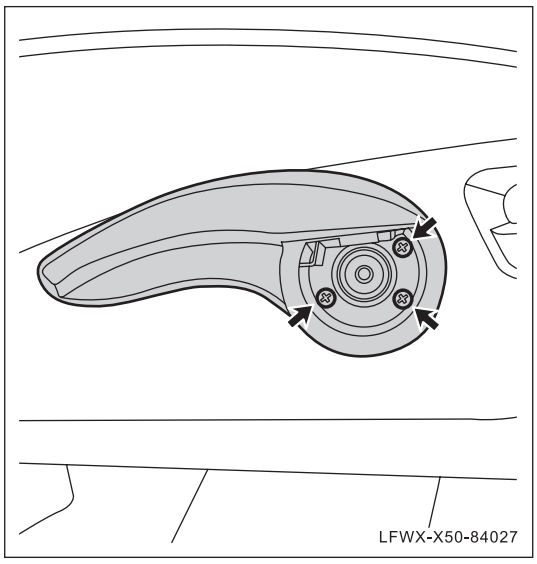
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(b) Press the head restraint plastic unlock socket, and take out the head restraint upward.



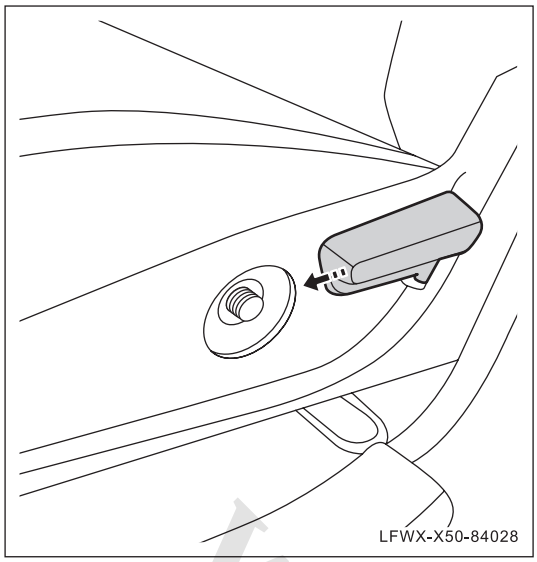
(c) Pry the height adjuster handle cover out.



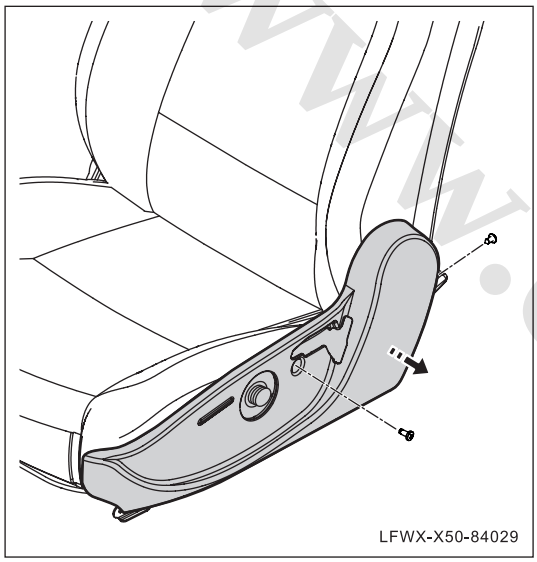
(d) Remove the fixing bolts of height adjuster handle, and pry the height adjuster handle out.

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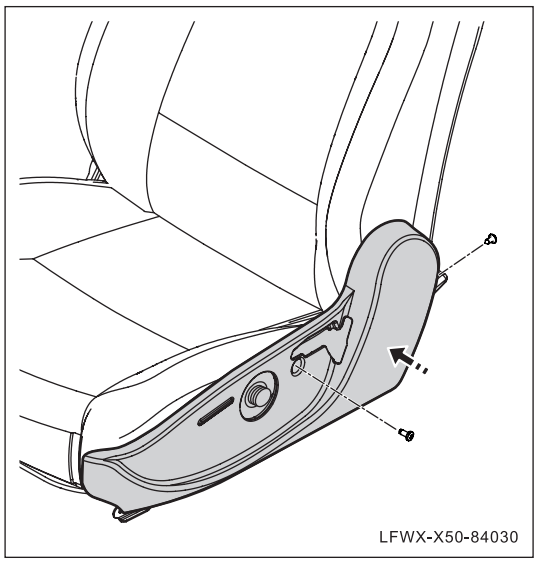


(e) Pull out the left recliner adjuster handle.



(f) Remove the fixing screws of left outer cover, and pry the front seat left outer cover out.

(g) Remove the fixing bolts on both sides of seat guide rail, and take down the seat guide rail assembly.



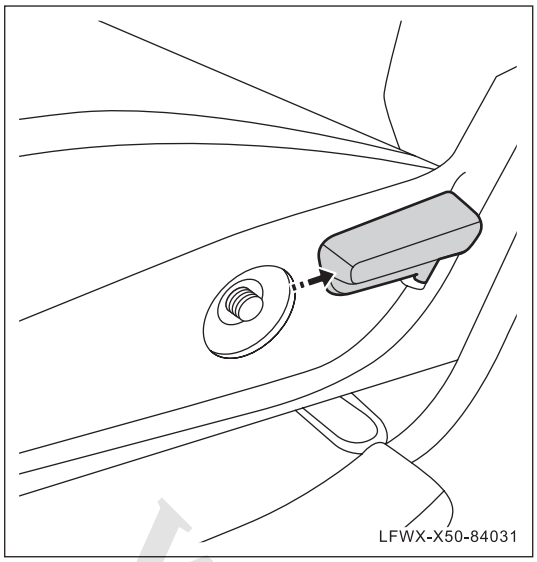
3. DISASSEMBLE THE DRIVER'S SEAT

(a) Install the seat assembly onto the seat guide rail, and install the fixing bolts and tighten them.

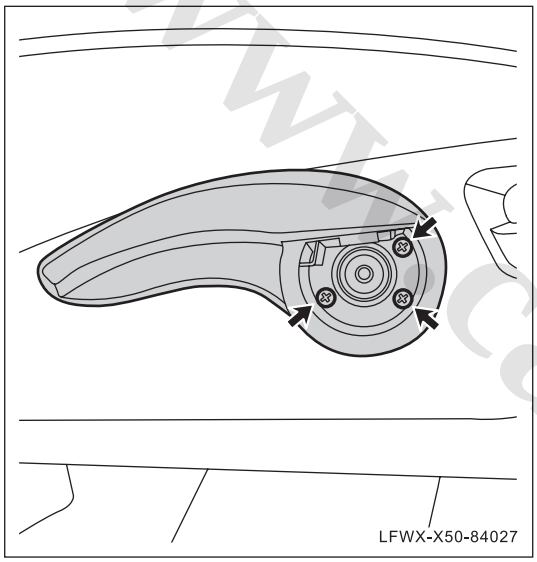
(b) Install the left outer cover onto the seat, and install the fixing bolts and tighten them.

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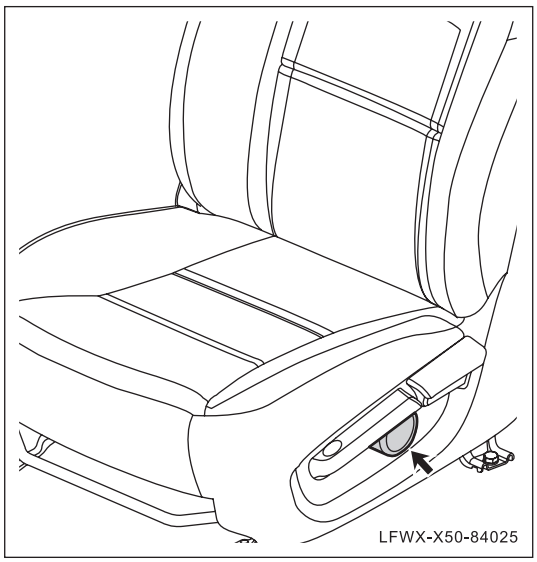
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(c) Install left recliner adjuster handle onto the seat.



(d) Install height adjuster handle onto the seat, and install the fixing screws and tighten them.

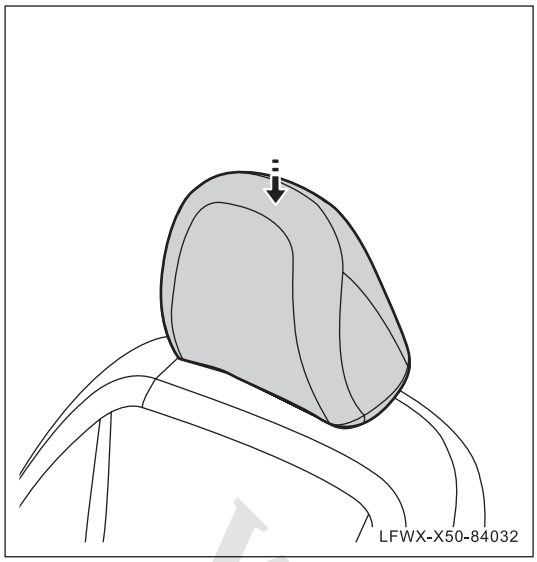


(e) Install height adjuster handle cover onto the seat.

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(f) Install the head restraint into the seat restraint guide pipe.

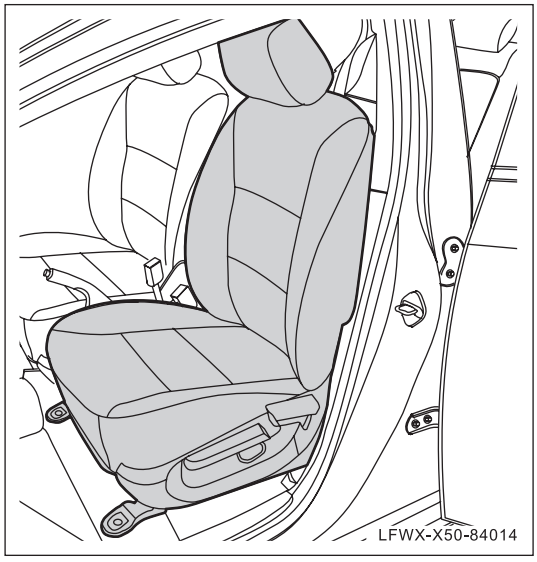
(g) Install the seat belt buckle onto the seat, and install the fixing bolts and tighten them.

Torque: 65 - 85N•m



4. INSTALL THE DRIVER'S SEAT

(a) Adjust the seatback to its desired position in order to fit the seat in car.



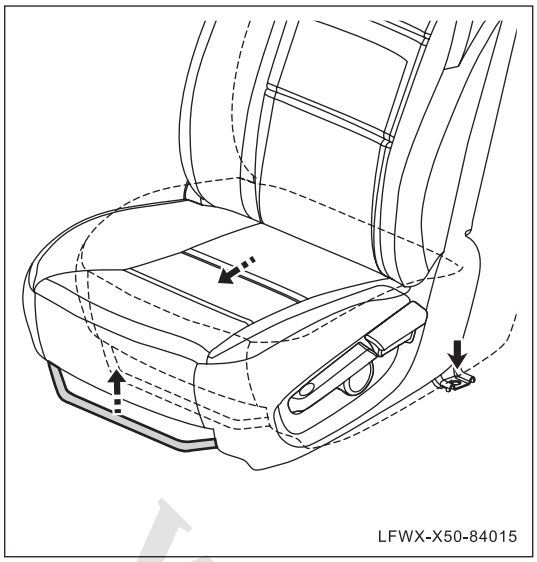
(b) Fit the driver's seat.

NOTICE:

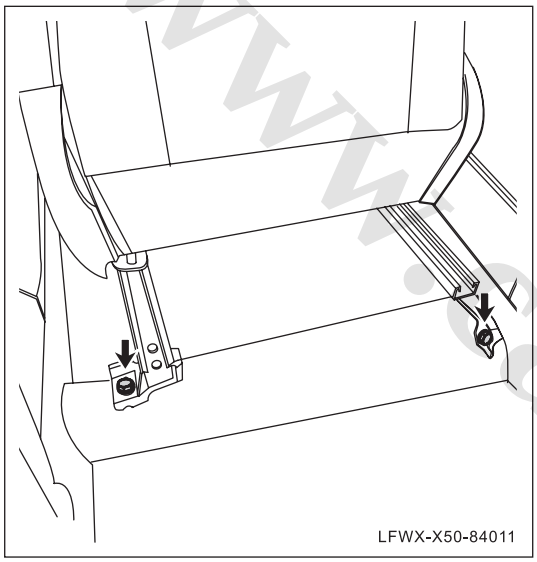
When fitting the seats, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.

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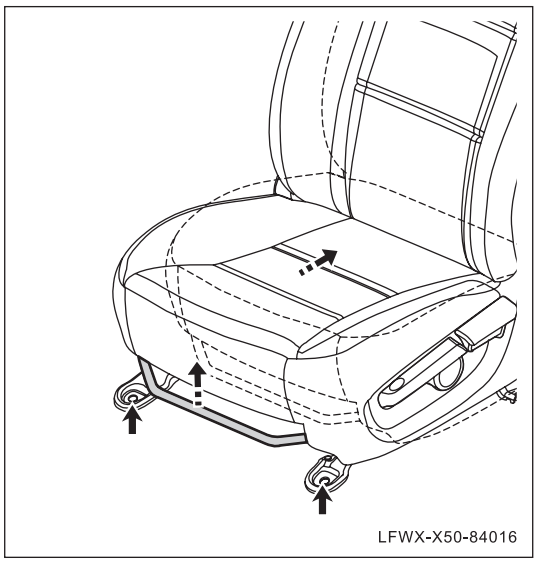
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(c) Adjust the driver's seat forwards to the maximum position for aligning the mounting hole of the fixing bolt at the rear end of the driver's seat with the mounting hole of the bolt of body.



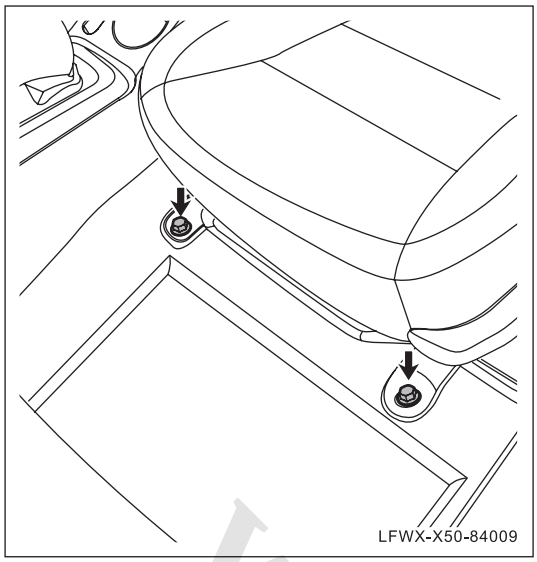
(d) Install the fixing bolts on the rear end of seat and pre-tighten them.



(e) Adjust the seat backwards to the maximum position for aligning the mounting holes of the fixing bolt at the front end of the driver's seat with the mounting hole of the bolt of vehicle body.

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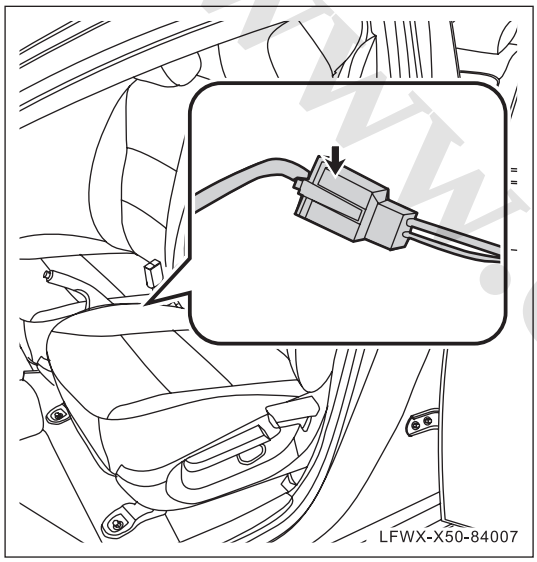
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(f) Install the fixing bolts at the front end of seat and pre-tighten them.

(g) Tighten seat fixing bolts.

Torque: 30 - 40N•m



(h) Connect the connector of the driver's seat belt indicator lamp.

(i) Connect the negative cable of battery.

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FRONT PASSENGER'S SEAT

ADJUSTMENT

△ HINT:

Adjustment method of front passenger's seat are the same as that of driver's seat (see 84 - Seat, Driver's Seat, Adjustment).

REPLACEMENT

△ HINT:

Replacement procedure of front passenger's seat are the same as that of the driver's seat (see 84 Seat, Driver's Seat, Replacement).

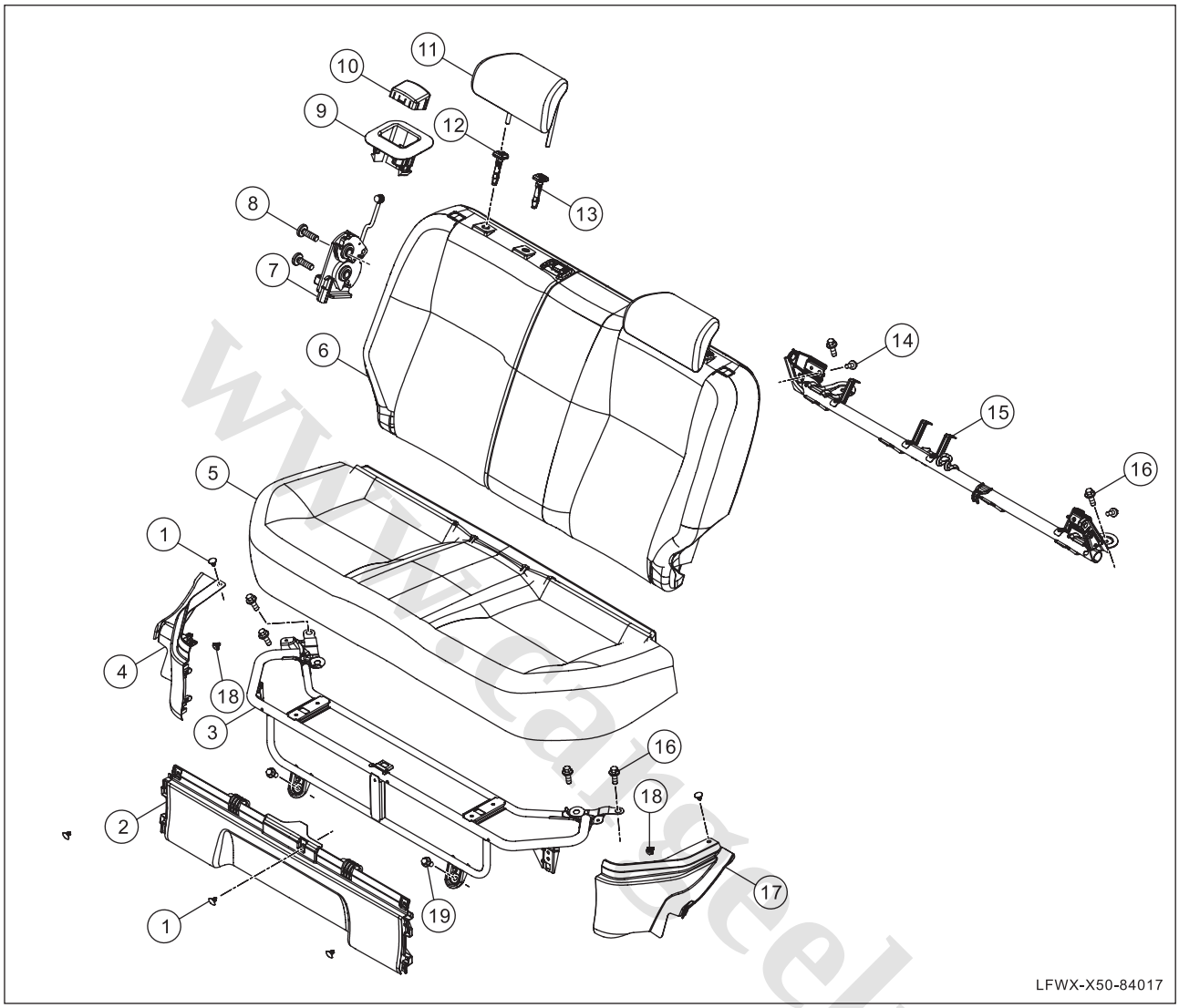
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REAR SEATS

COMPONENTS



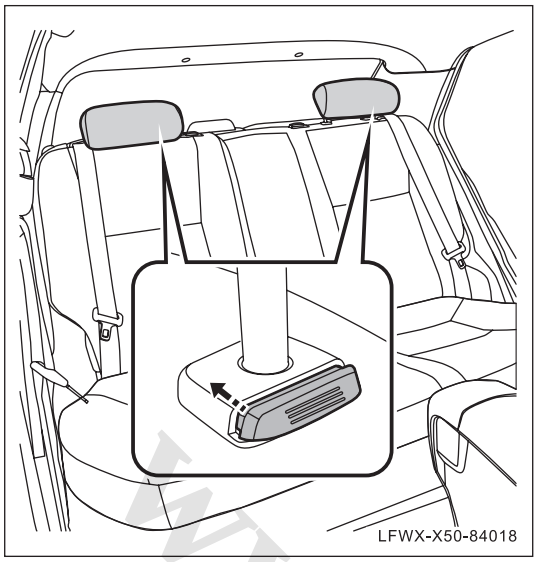
1	Inlay clip
2	Rear seat lower center trim panel
3	Rear seat cushion mounting bracket
4	Rear seat lower & right trim panel
5	Rear seat cushion assembly
6	Rear seatback assembly
7	Lock buckle body assembly
8	Bolt
9	Seatback unlock pressing block cap
10	Seatback unlock pressing block

11	Rear seat head restraint assembly
12	Head restraint guide pipe
13	Head restraint guide unlock pipe
14	Hexagon bolt with flange
15	Rear seatback mounting bracket
16	Hexagon bolt with flange
17	Rear seat lower left trim panel
18	Plastic snap-fit
19	Hexagon bolt with flange

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ADJUSTMENT



1. Adjust the rear seat head restraint

(a) When adjusting upward, hold two sides of head restraint and pull it upward to the desired position.

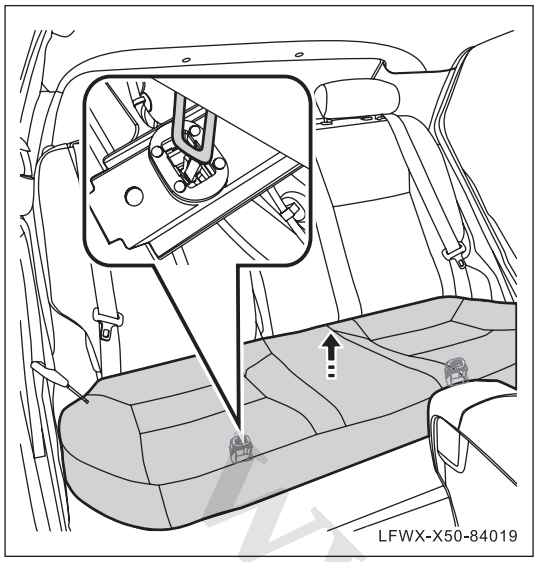
(b) When adjusting downward, press the head restraint plastic unlock socket, meanwhile, press downward the head restraint to the desired position, and then release the head restraint plastic unlock socket.

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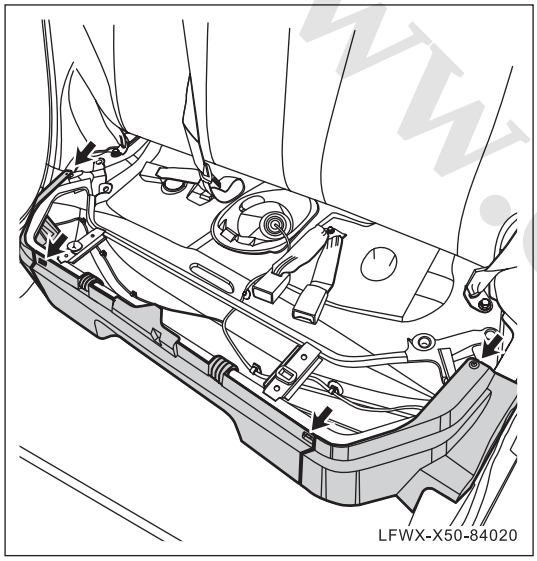
REPLACEMENT



1. REMOVE THE REAR SEAT

(a) Remove the seat cushion.

- Lift the seat cushion upward to disconnect it from its snap-fits, and take out the cushion.

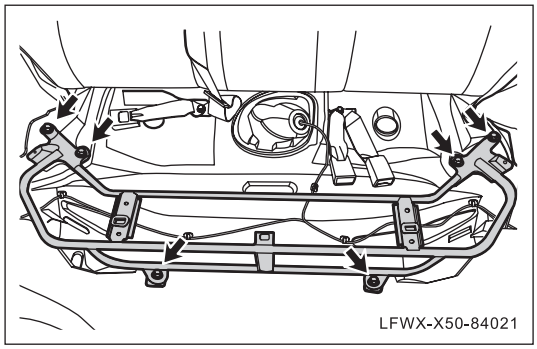


(b) Remove the left and right rear doorsill trim panel (See 81 - Interiors and Exteriors, Doorsill Trim Panel, Replacement)

(c) Remove rear seat lower left trim panel inlay clips, and then take out the rear seat lower left trim panel.

(d) Remove rear seat lower right trim panel inlay clips, and then take out the rear seat lower right trim panel.

(e) Remove rear seat lower center trim panel inlay clips, and then take out the rear seat lower center trim panel upward.



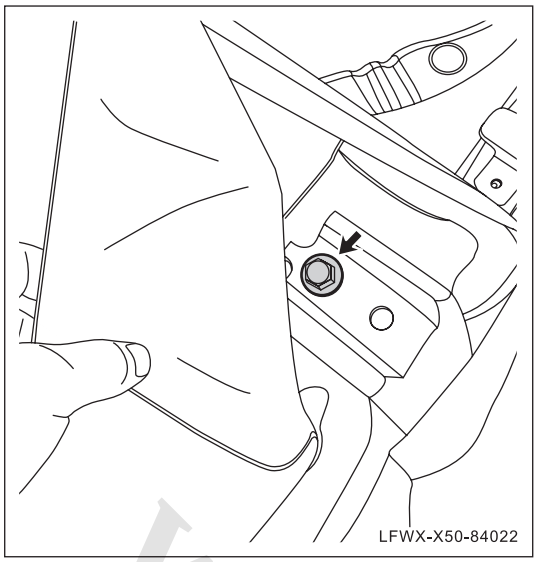
(f) Remove fixing bolts of rear seat cushion mounting bracket, and then take out rear seat cushion mounting bracket.

NOTICE:

When taking out rear seat cushion mounting bracket, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.

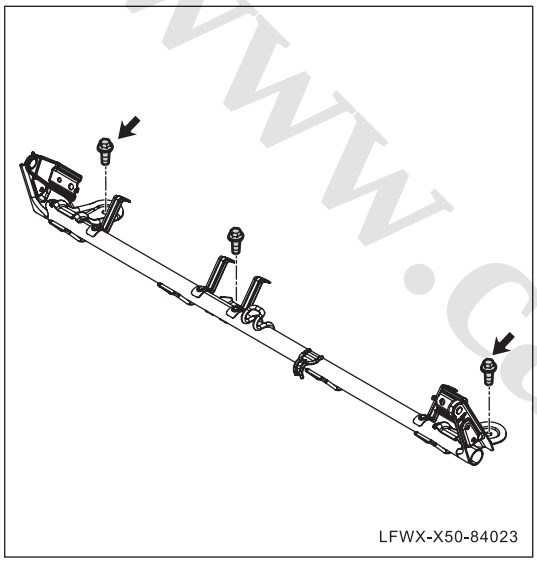
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(g) Press the seatback unlock pressing block, meanwhile, pull the seat seatback forward to level position.

(h) Remove the fixing bolts of rear seat seatback, and then take out the rear seat seatback.

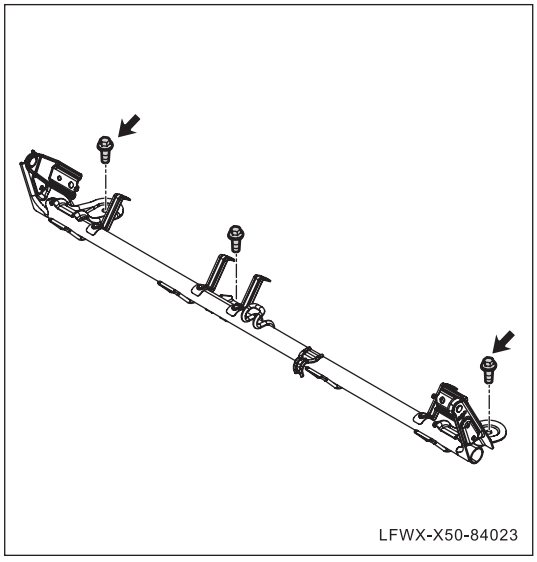


(i) Remove C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

(j) Remove fixing bolts of rear seatback mounting bracket, and then take out rear seatback mounting bracket.

NOTICE:

When taking out rear seatback mounting bracket, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.



2. INSTALL THE REAR SEAT

(a) Remove rear seatback mounting bracket onto the floor, and then install the fixing bolts and tighten them

Torque: 30 - 40N•m

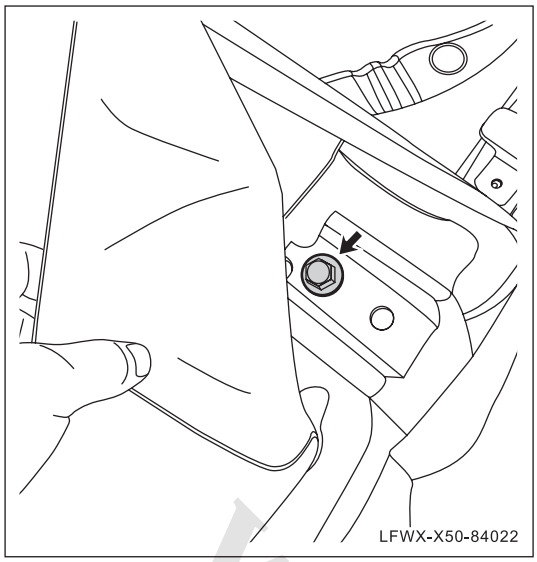
NOTICE:

When installing rear seatback mounting bracket, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.

(b) Install C pillar lower trim panel. (See 81 - Interiors and Exteriors, C Pillar Trim Panel, Replacement)

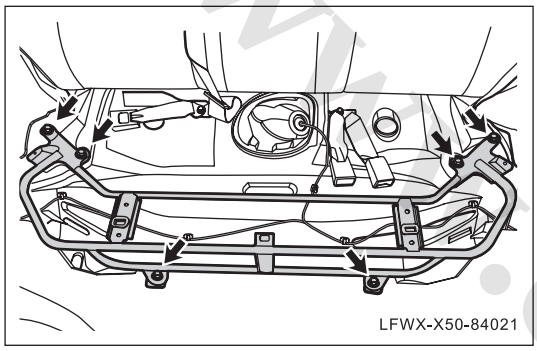
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(c) Install rear seatback onto rear seatback mounting bracket, and then install the fixing bolts and tighten them.

Torque: 30 - 40N•m

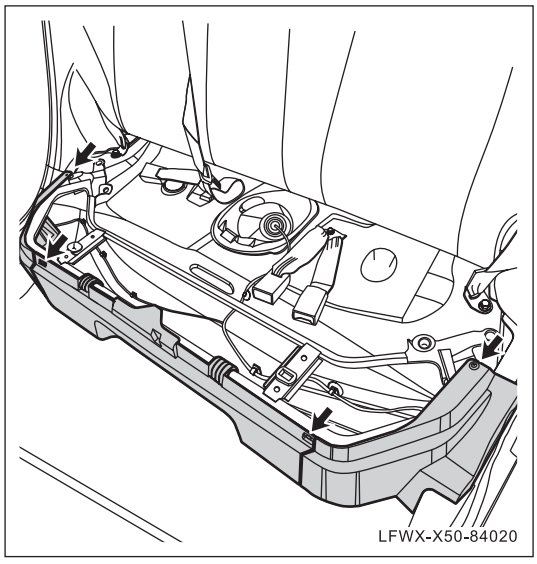


(d) Install rear seat cushion mounting bracket onto the floor, and then mount & tighten the fixing bolts.

Torque: 30 - 40N•m

NOTICE:

When installing rear seat cushion mounting bracket, take care not to contact the paint on surface of vehicle body to prevent the vehicle body from scraping.



(e) Install rear seat lower center trim panel onto rear seat cushion mounting bracket, and then install the inlay clips and tighten them.

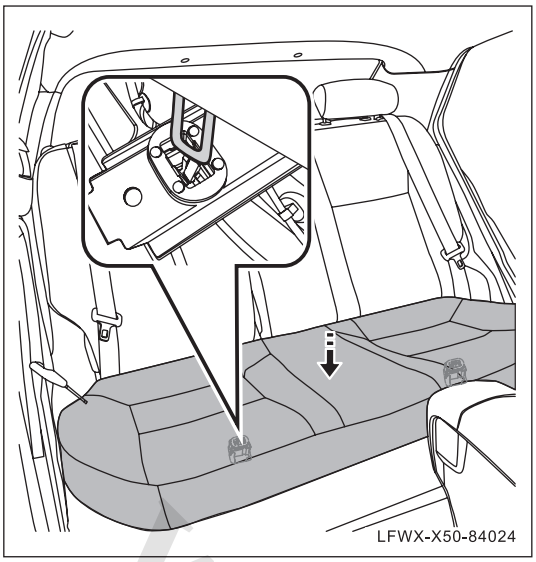
(f) Install rear seat lower right trim panel onto rear seat cushion mounting bracket, and then install the inlay clips and tighten them.

(g) Install rear seat lower & left trim panel onto rear seat cushion mounting bracket, and then mount & tighten the inlay clips.

(h) Install left and right rear doorsill trim panel. (See 81, Interiors and Exteriors, Doorsill Trim Panel, Replacement)

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(i) Install the seat cushion onto rear seat cushion mounting bracket to align the seat cushion buckle with the mounting hole on the seat cushion mounting bracket, and then press the seat cushion forcefully.

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Dashboard and Console

Dashboard and console.....85-1
System description.....85-1
Preparation.....85-1
Service data.....85-1
Precautions.....85-1
Components (dashboard i).....85-2
Components (dashboard II).....85-3
Components (console).....85-4
Dashboard upper panel.....85-5
Replacement.....85-5
Dashboard lower panel.....85-11
Replacement.....85-11
Left air vent.....85-21
Replacement.....85-21
Right air vent.....85-22
Replacement.....85-22
Central air vent.....85-23
Replacement.....85-23
Instrument cluster cowl.....85-24
Replacement.....85-24
Glove box.....85-25
Replacement.....85-25
Console.....85-26
Replacement.....85-26

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DASHBOARD AND CONSOLE

SYSTEM DESCRIPTION

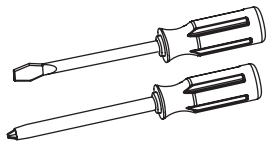
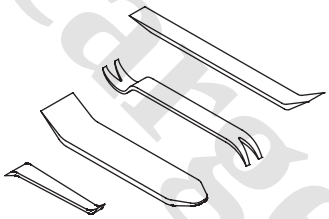
1. FUNCTION

Dashboard and console are carriers to display various information and realize control function of vehicle. Adjust interior space and supply convenient operation combination and amazing visual enjoyment for driver.

2. COMPONENTS

Dashboard and console mainly consist of dashboard upper panel, dashboard lower panel, air vent, instrument cluster cowl, glove box and console, etc.

PREPARATION

S/N	Tool	Outline diagram	Description
1	Screwdriver		Removing the trims
2	Interior trimming crow plate		Remove the trims and snap-fits

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing bolt of dashboard lower panel	8 - 12
Fixing bolt of console assembly	8 - 12

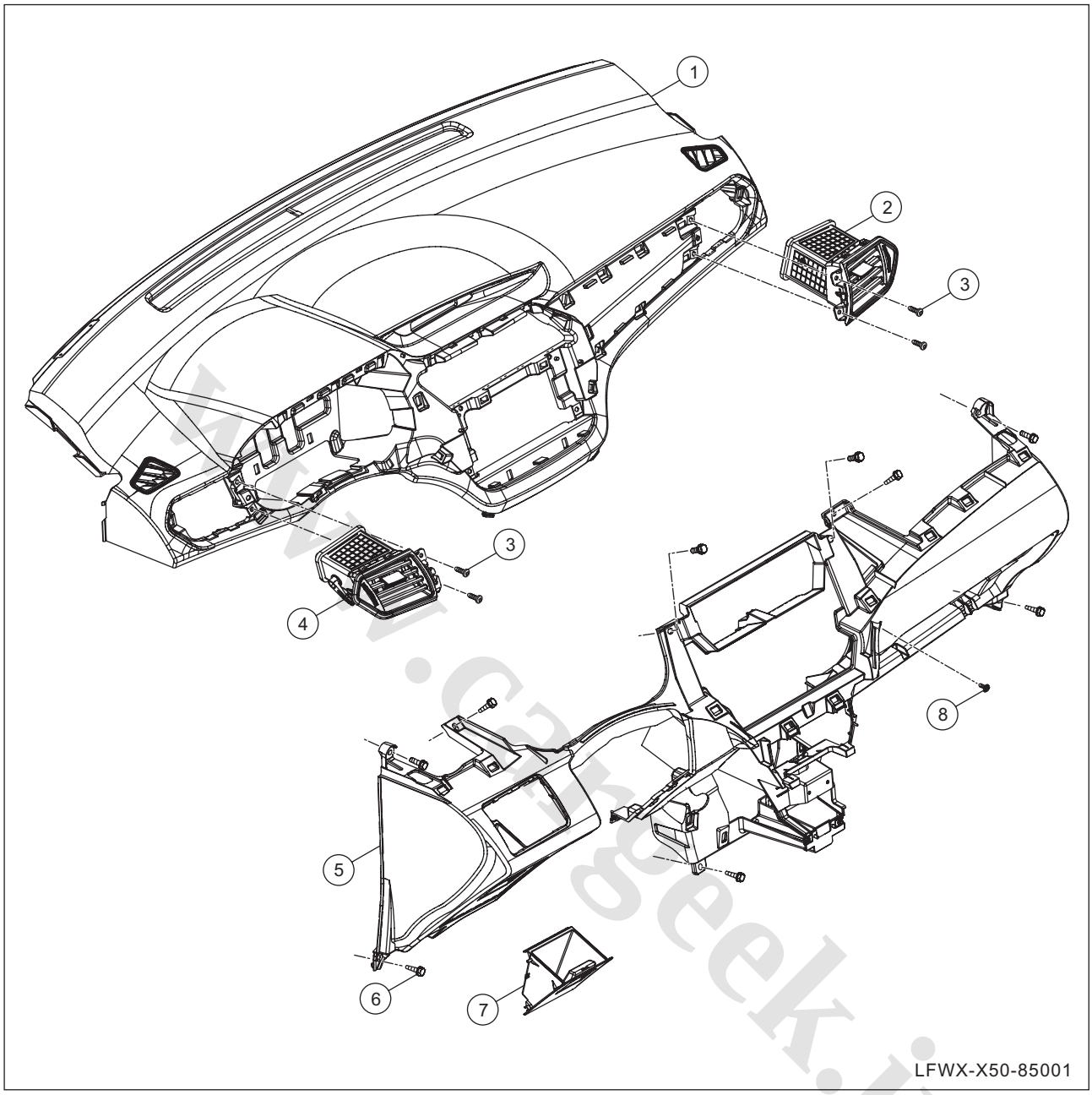
PRECAUTIONS

1. Before maintenance, put protective sleeve onto seats and steering wheel.
2. When removing dashboard, use cloth or adhesive tape to wrap the head of flat-head screwdriver to avoid scratching the dashboard surface.
3. Before disconnecting a connector, disconnect the battery negative electrode.
4. After removing dashboard or console, check whether fixing snap-fit of dashboard or console is damaged and have it replaced if necessary.
5. Oil or chemical is avoided to touch with dashboard or console to prevent corrosion.

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COMPONENTS (DASHBOARD I)



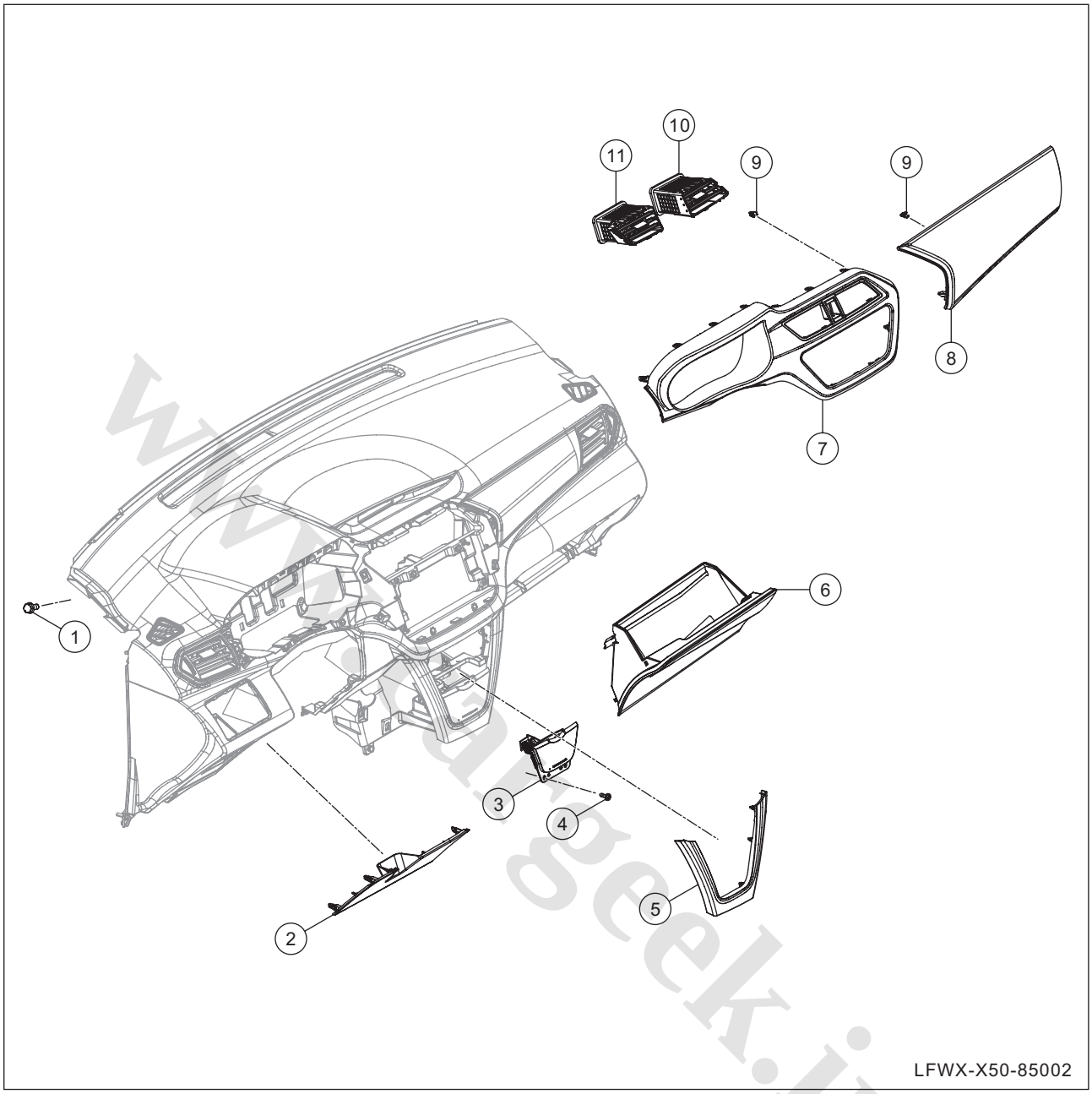
1	Dashboard upper panel
2	Dashboard right air vent assembly
3	Cross recessed pan head self-tapping screw
4	Dashboard left air vent assembly

5	Dashboard lower panel
6	Hexagon head bolt
7	Dashboard notes box body
8	Cross recessed pan head self-tapping screw and big washer assembly

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COMPONENTS (DASHBOARD II)



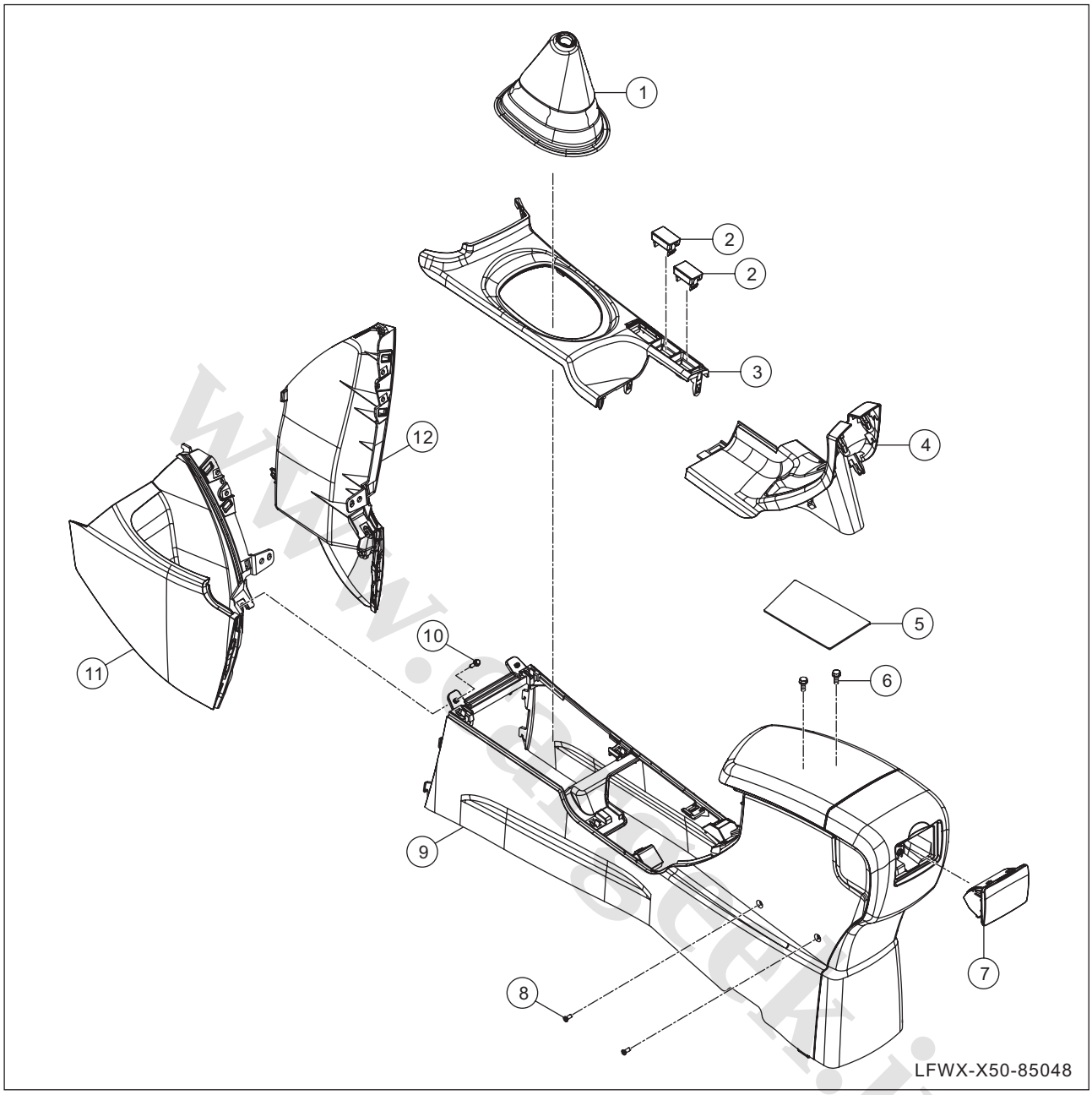
1	Hexagon head bolt
2	Dashboard access cover plate
3	Front ashtray
4	Cross recessed pan head self-tapping screw and washer assembly
5	Dashboard lower center trim frame cluster
6	Glove box

7	Instrument cluster cowl
8	Abaciscus plate
9	Plastic card
10	Dashboard central right air vent assembly
11	Dashboard central left air vent assembly

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COMPONENTS (CONSOLE)



1	Leather sheath
2	Reserved covering cap
3	Shifting trim panel
4	Parking brake trim panel
5	Console glove box bottom gasket
6	Hexagon head bolt and plain washer assembly

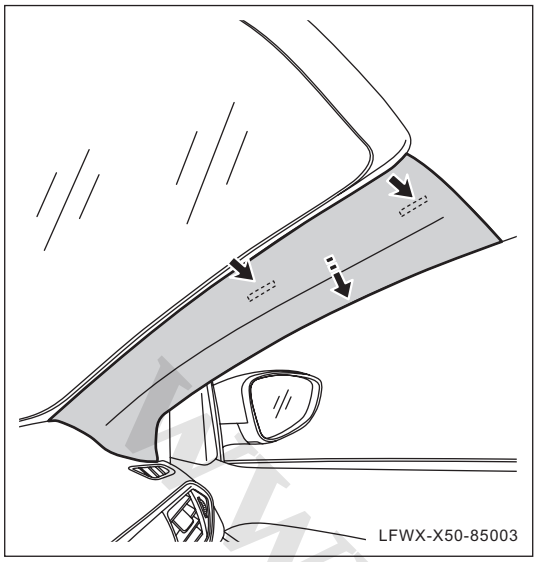
7	Rear ashtray
8	Cross recessed pan head self-tapping screw
9	Console body assembly
10	Cross recessed pan head self-tapping screw
11	Console front left deposit box assembly
12	Console front right deposit box assembly

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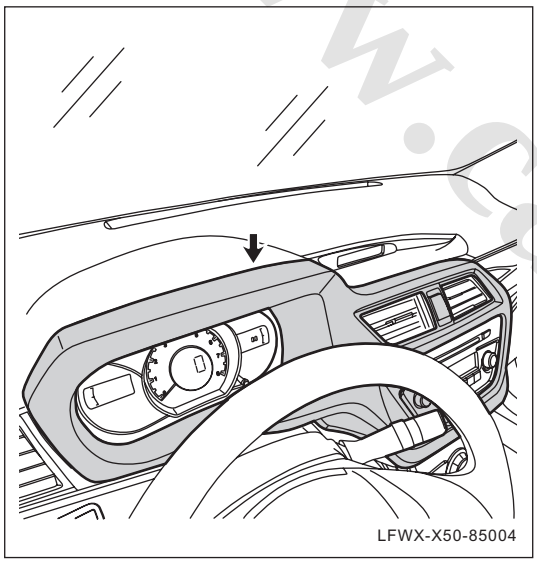
DASHBOARD UPPER PANEL

REPLACEMENT



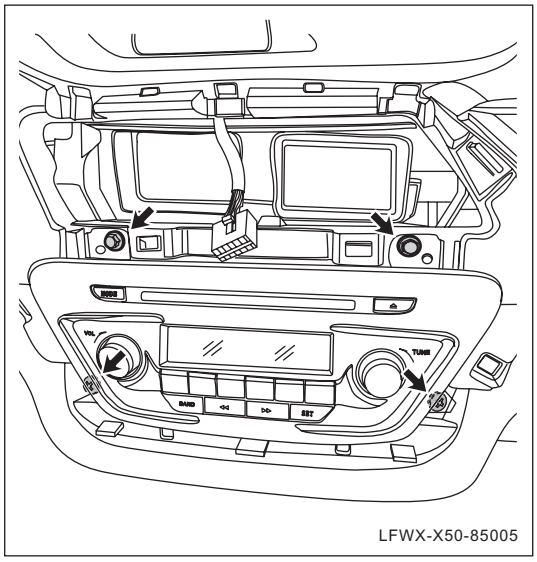
1. REMOVE A PILLAR UPPER TRIM PANEL

(a) Remove A pillar upper panel on both sides of dashboard. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)



2. REMOVE INSTRUMENT CLUSTER AND SHIELD

(a) Remove instrument cluster and shield. (See 75 - Driver Information System, Instrument Cluster, Replacement)

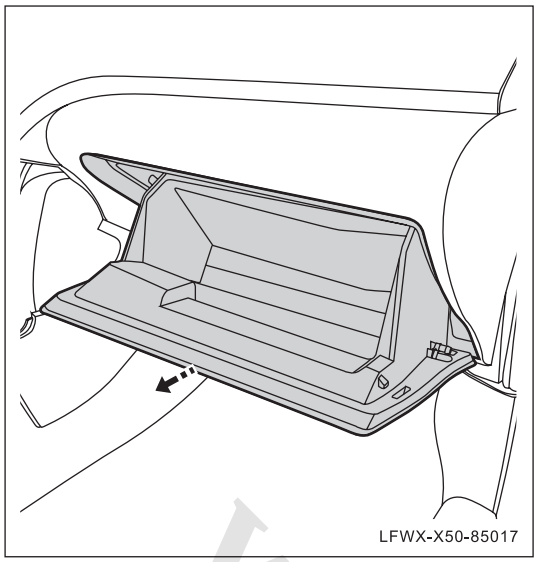


3. REMOVE THE RADIO/CD PLAYER

(a) Remove Radio/CD Player assembly. (See 74 - Audio System, Radio/CD Player, Replacement)

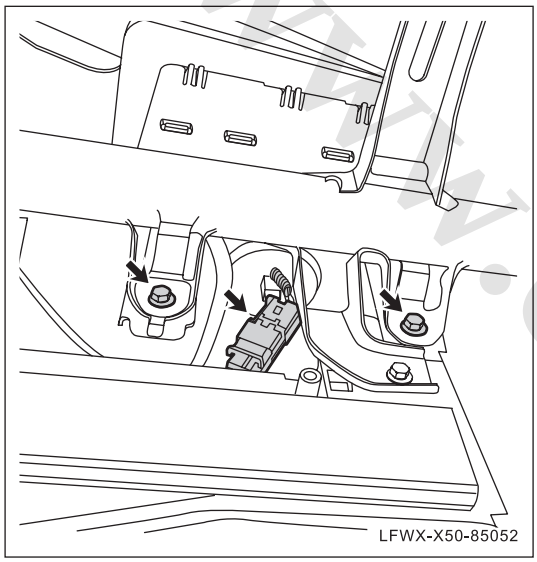
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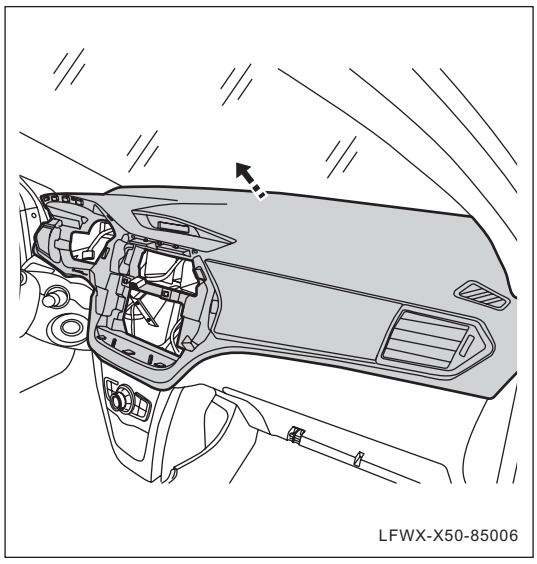
4. REMOVE DASHBOARD UPPER PANEL

(a) Remove dashboard glove box.



(b) Disconnect passenger airbag connector.

(c) Remove connecting bolts of passenger airbag and dashboard bracket.

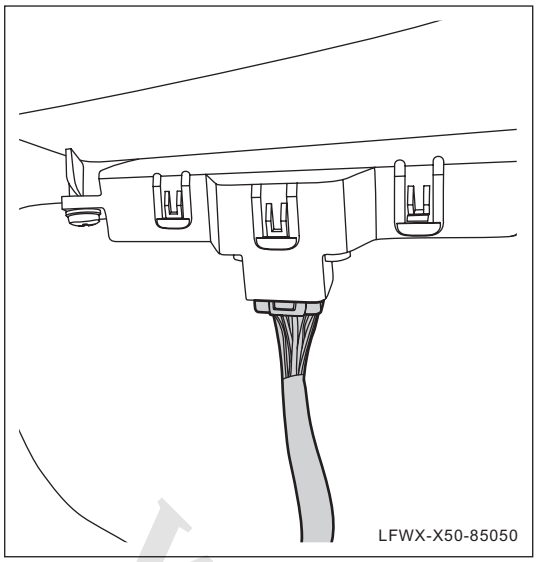


(d) Pry the snap-fits of the dashboard upper panel.

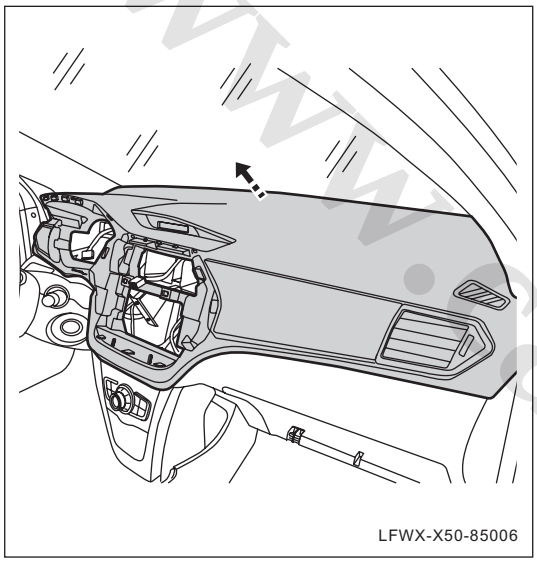
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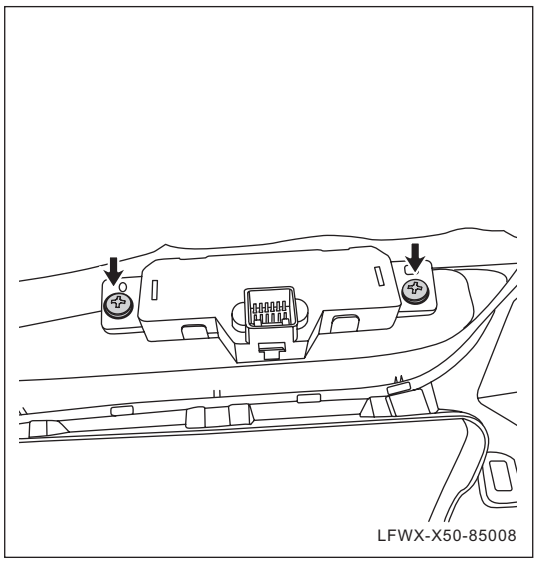
(e) Lift dashboard slightly and disconnect multimedia display connector.



(f) Remove the dashboard upper panel assembly.

△ HINT:

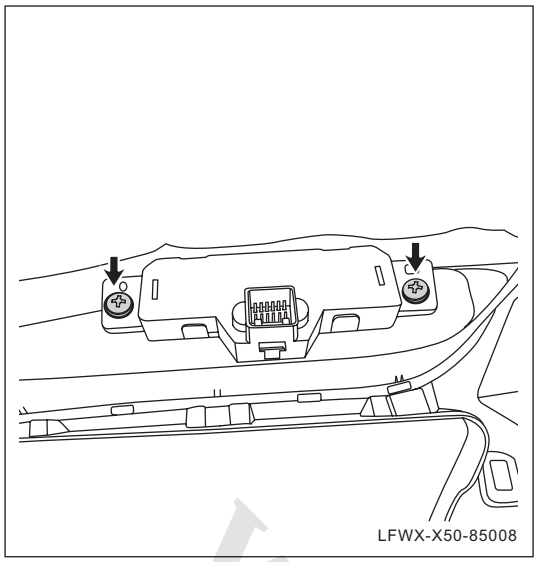
Due to the large dashboard upper panel volume, an assistant is needed to help to remove the dashboard upper panel assembly to avoid breaking the upper panel.



(g) Remove fixing screws of multimedia display and the take out the multimedia display.

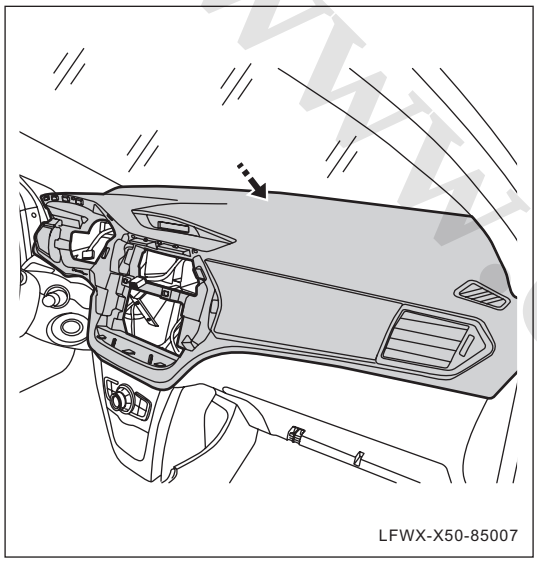
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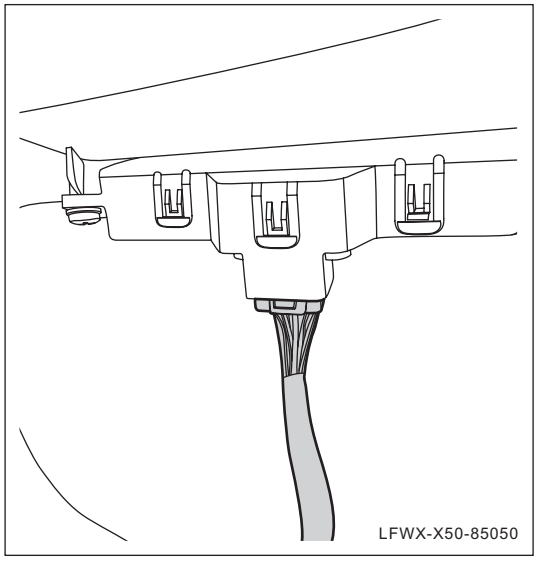


5. INSTALL DASHBOARD UPPER PANEL

(a) Install multimedia display onto dashboard upper panel, and then install & tighten fixing screws of the multimedia display.



(b) Arrange dashboard wire harness, and install the dashboard upper panel in place, with the help of assistant.

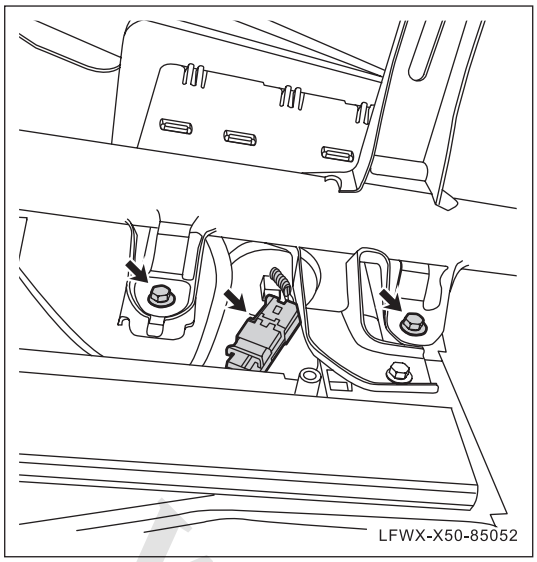


(c) Connect multimedia display connector.

(d) Fasten the snap-fits of the dashboard upper panel into the grooves.

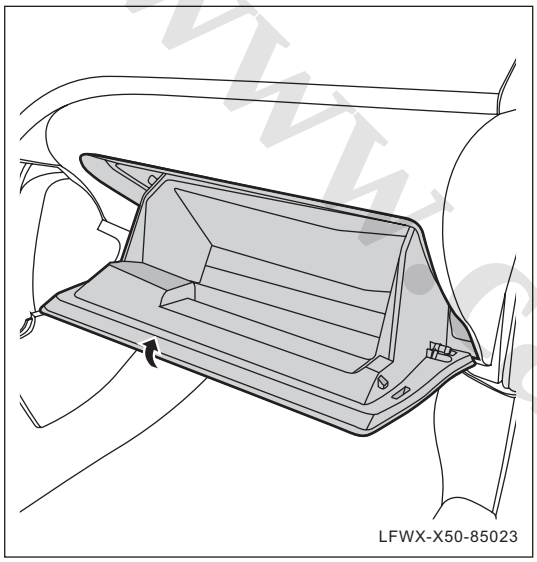
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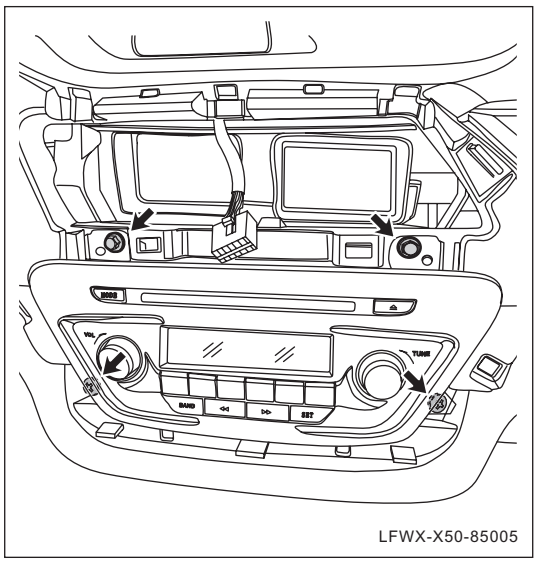


(e) Connect passenger airbag connectors.

(f) Install connecting bolts of passenger airbag and dashboard bracket.



(g) Install dashboard glove box.

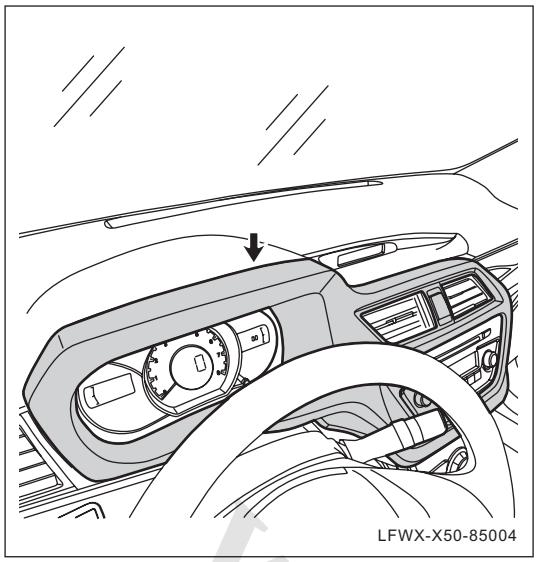


6. INSTALL RADIO/CD PLAYER

(a) Install Radio/CD Player assembly. (See 74 - Audio System, Radio/CD Player, Replacement)

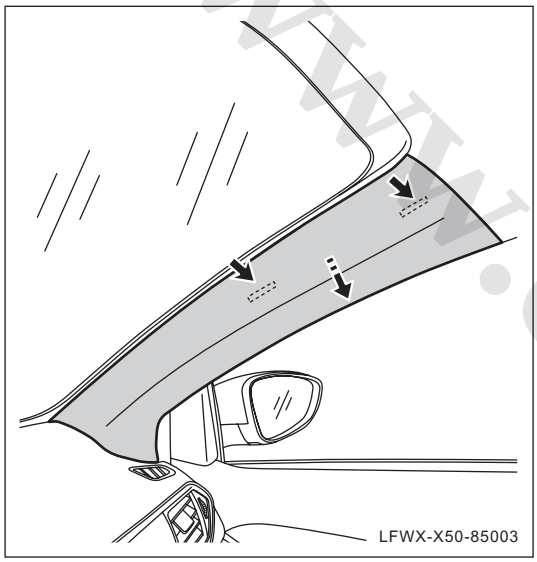
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7. INSTALL INSTRUMENT CLUSTER AND SHIELD

(a) Install instrument cluster and shield. (See 75 - Driver Information System, Instrument Cluster, Replacement)



8. INSTALL A PILLAR UPPER TRIM PANEL

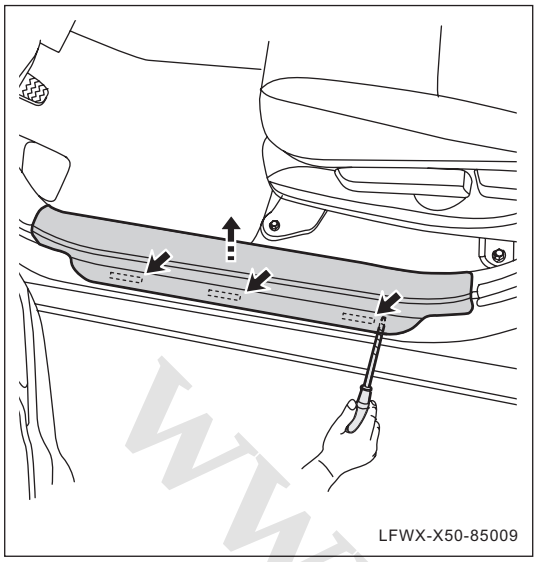
(a) Install A pillar upper panel on both sides of dashboard. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

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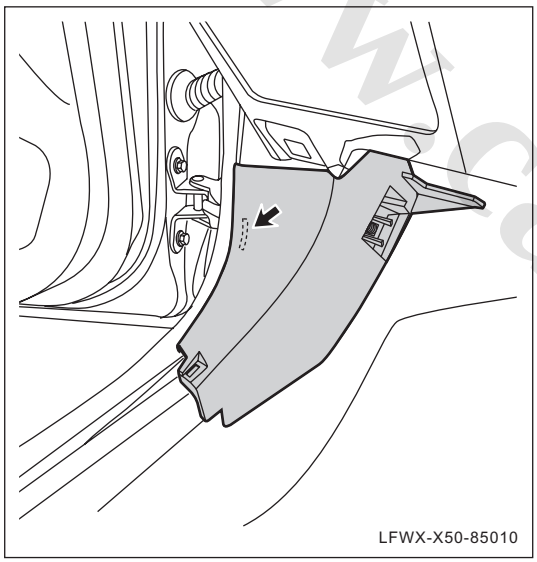
DASHBOARD LOWER PANEL

REPLACEMENT

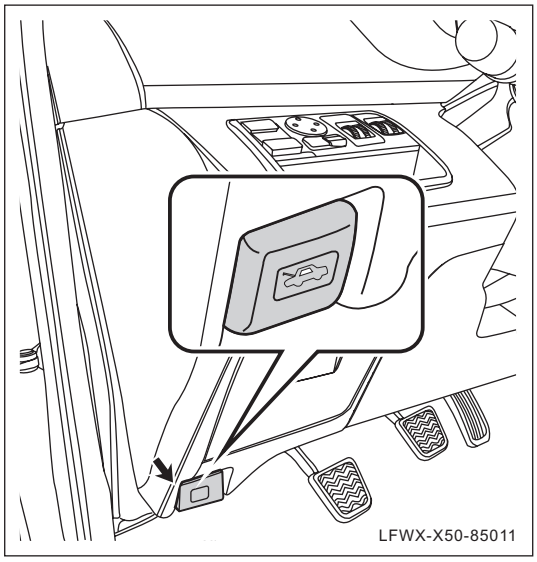


1. REMOVE A PILLAR LOWER TRIM PANEL ON BOTH SIDES

(a) Remove front doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)



(b) Remove A pillar lower trim panel on both sides. (See 81 - Interiors and Exteriors, A Pillar Trim Panel, Replacement)

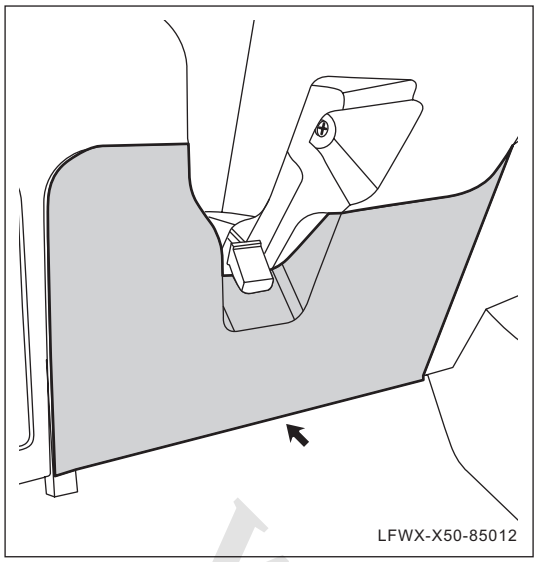


2. REMOVE OPENING HANDLE OF ENGINE COMPARTMENT CABLE

(a) Pull the handle lower end outward and take out the opening handle of engine compartment cable downward.

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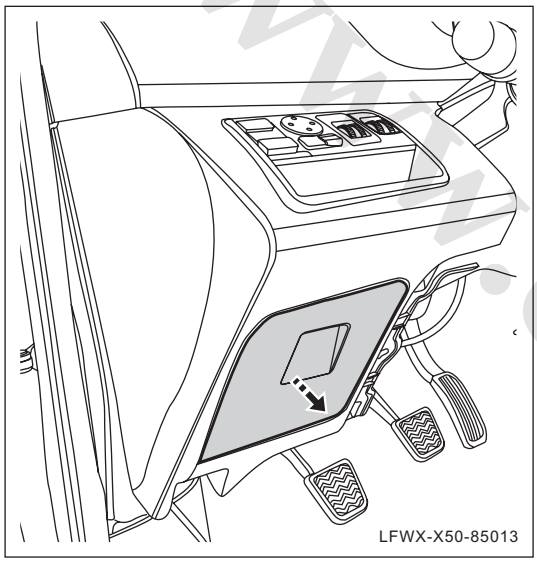


3. REMOVE LOWER DASHBOARD ACCESS COVER PLATE

(a) Remove the lower dashboard access cover plate.

△ HINT:

To avoid damage to the cover fixed jaw, be sure to remove dashboard access cover plate slantingly and upwards.



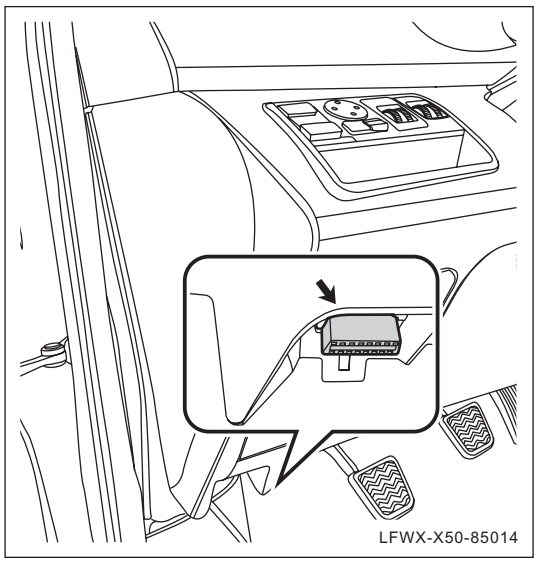
4. REMOVE LEFT LOWER NOTES BOX

(a) Open the left lower notes box.

(b) Take out the left lower notes box.

△ HINT:

Grasp both sides of left lower notes box and draw it outward, and then take out the notes box.



5. REMOVE DIAGNOSIS INTERFACE CONNECTOR

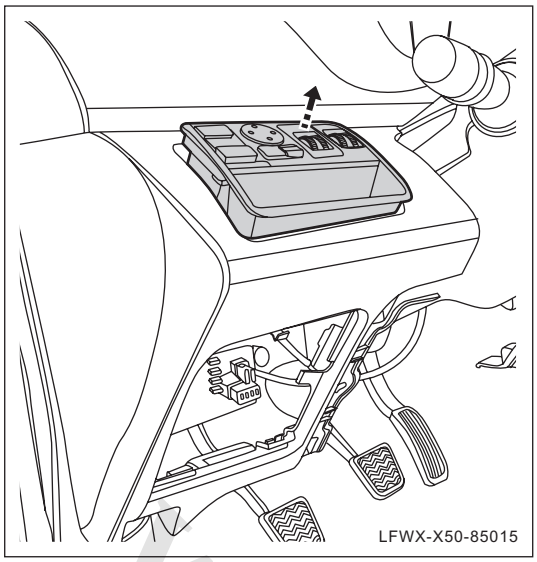
(a) Press snap-fit on both sides of diagnosis interface connector and take out the connector.

NOTICE:

Don't pull the wire harness when removing the diagnosis interface connector.

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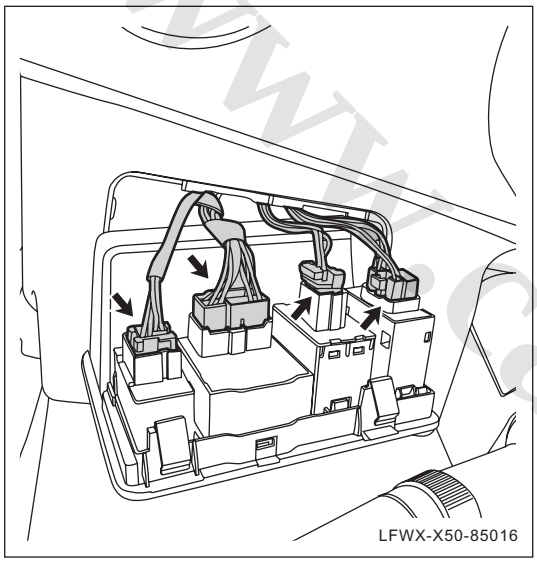


6. REMOVE SWITCH ASSEMBLY

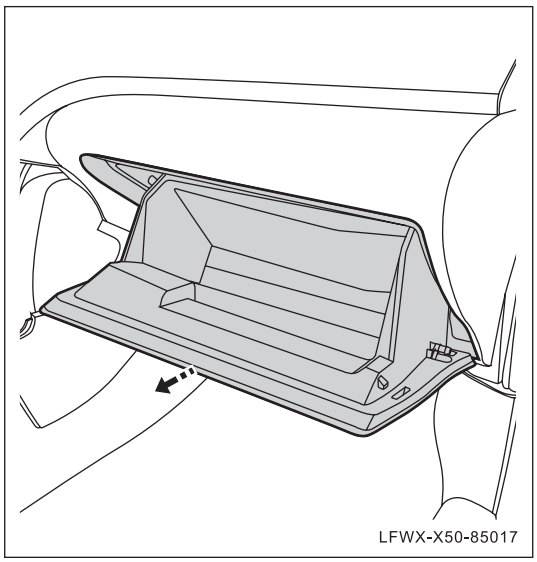
(a) Pry the snap-fits of the switch assembly.

NOTICE:

Wrap adhesive tape around the head of flat-blade screwdriver to avoid damage to the dashboard panel.



(b) Overturn the switch assembly and disconnect the connector of the switch assembly.



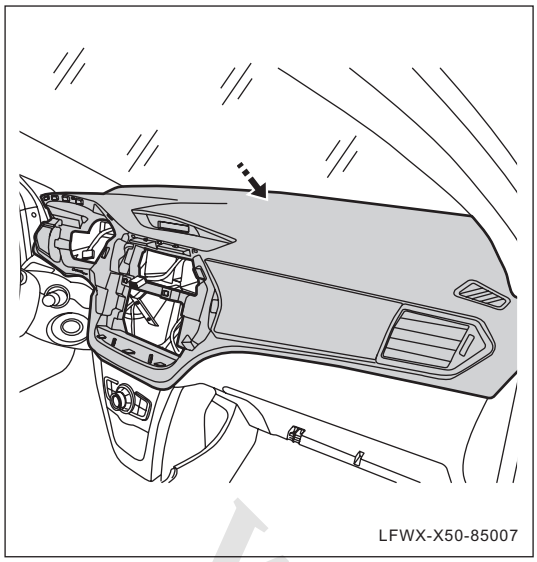
7. REMOVE THE GLOVE BOX

(a) Remove the glove box. (See 85 - Dashboard and Console, Glove Box, Replacement)

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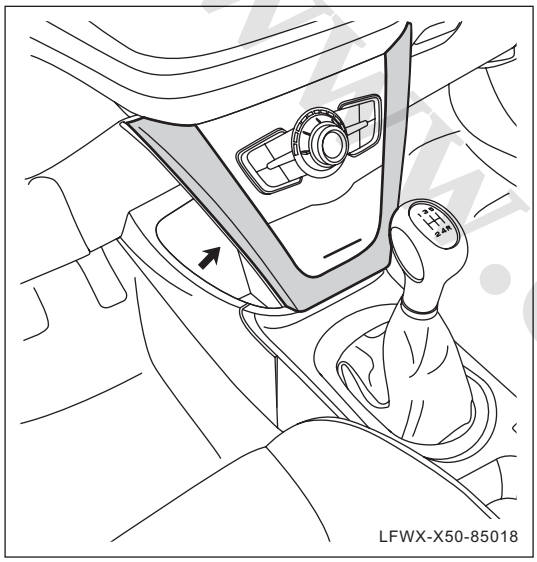
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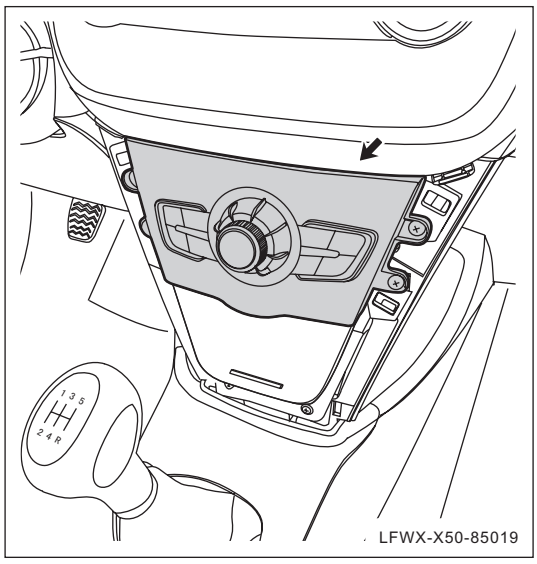
8. REMOVE DASHBOARD UPPER PANEL

(a) Remove dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)



9. REMOVE AIR-CONDITIONER CONTROL PANEL ASSEMBLY

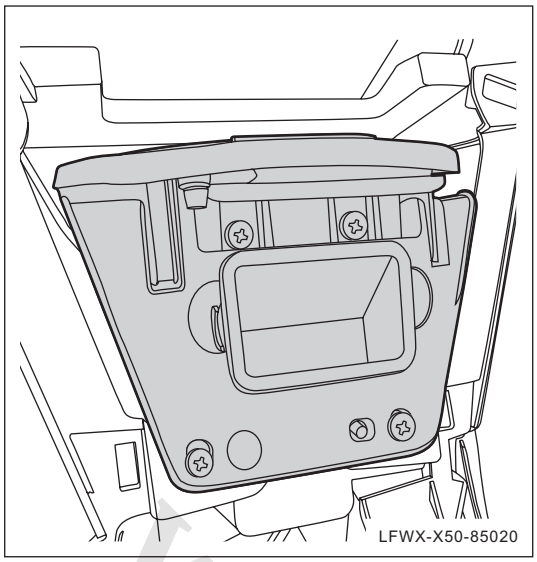
(a) Remove the dashboard lower center trim frame cluster.



(b) Remove the air-conditioner controller. (See 71 - Air Conditioner, Air-Conditioner Controller, Replacement)

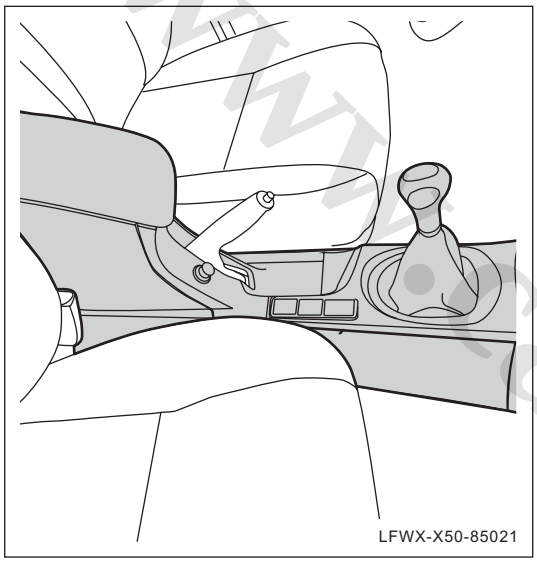
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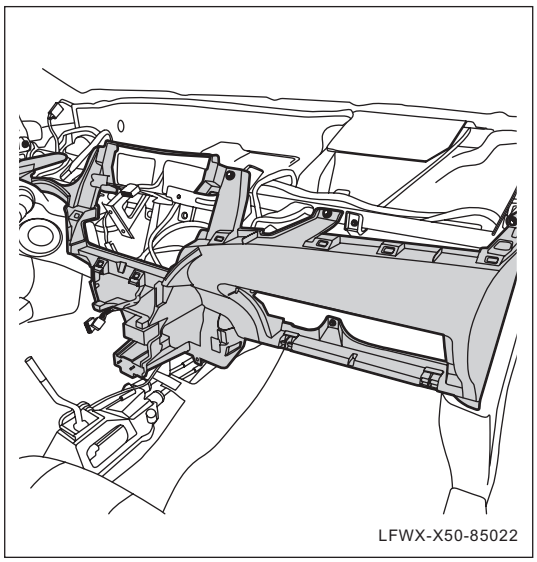
10. REMOVE FRONT ASHTRAY ASSEMBLY.

(a) Remove front ashtray assembly. (See 79 - Cigarette Lighter, Front Ashtray, Replacement)



11. REMOVE CONSOLE PANEL ASSEMBLY

(a) Remove console assembly. (See 85 - Dashboard and Console, Console, Replacement)



12. REMOVE DASHBOARD LOWER PANEL

(a) Adjust steering wheel downward to the lowest position.

(b) Remove fixing bolts of the dashboard lower panel.

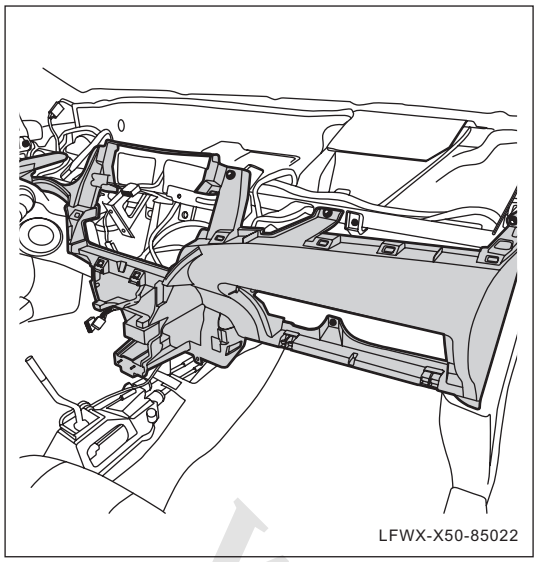
(c) Remove the dashboard lower panel.

△ HINT:

Due to the large dashboard lower panel volume, an assistant is needed to help to remove the dashboard lower panel to avoid breaking the lower panel.

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13. INSTALL DASHBOARD LOWER PANEL

(a) Arrange dashboard wire harness well.

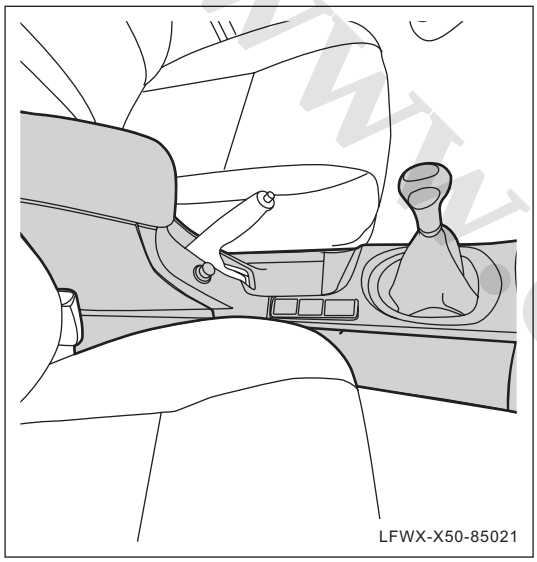
(b) Install dashboard lower panel.

△ HINT:

When installing dashboard lower panel, an assistant is needed to help to install the dashboard lower panel to avoid breaking the lower panel.

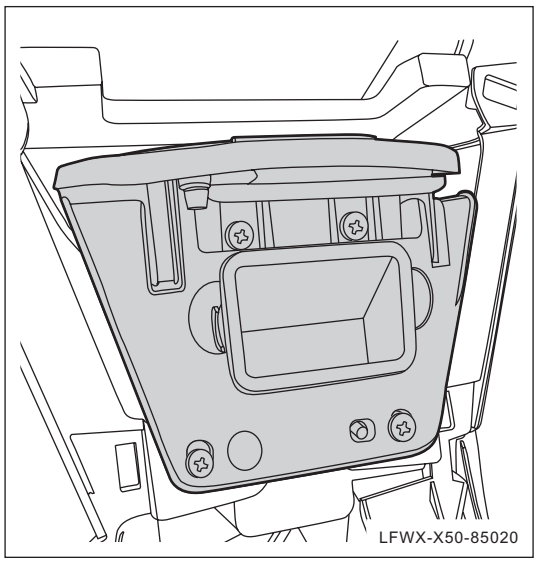
(c) Align every mounting hole of dashboard lower panel and ensure there is no obstacle, and install and tighten fixing bolts and screws.

Torque: 8 - 12 N•m



14. INSTALL CONSOLE ASSEMBLY

(a) Install the console assembly. (See 85 - Dashboard and Console, Console, Replacement)

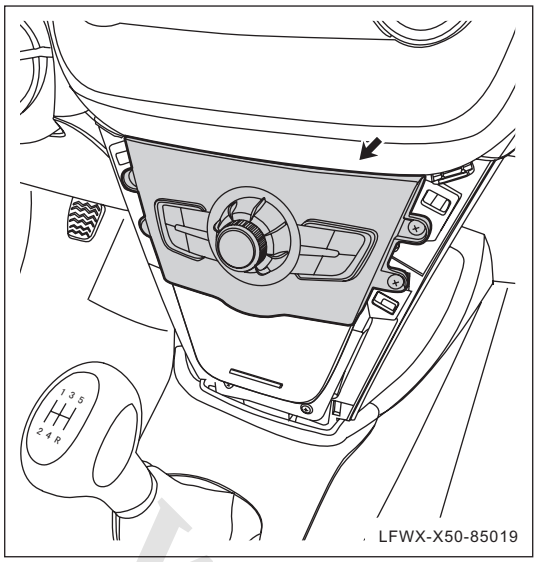


15. INSTALL FRONT ASHTRAY ASSEMBLY.

(a) Install front ashtray assembly. (See 79 - Cigarette Lighter, Front Ashtray, Replacement)

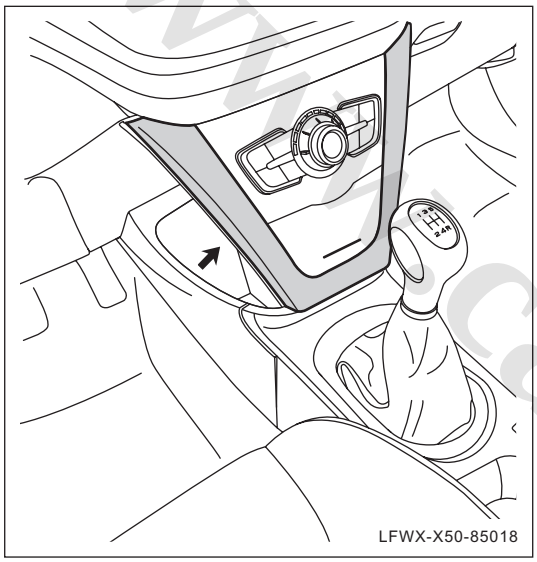
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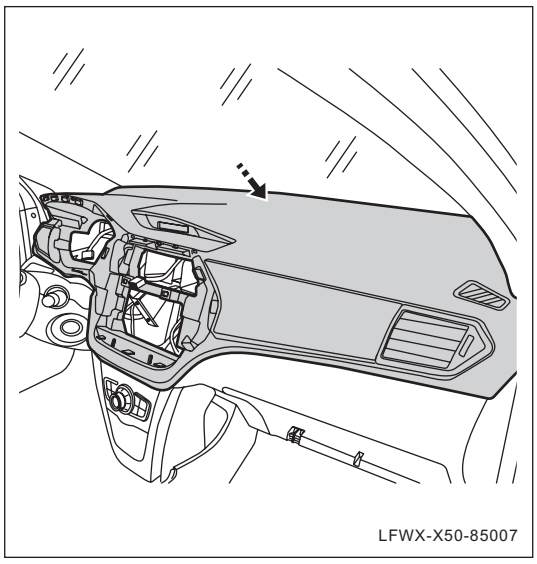


16. INSTALL THE AIR-CONDITIONER CONTROLLER

(a) Install the air-conditioner controller. (See 71 - Air Conditioner, Air-Conditioner Controller, Replacement)



(b) Install dashboard lower center trim frame cluster.

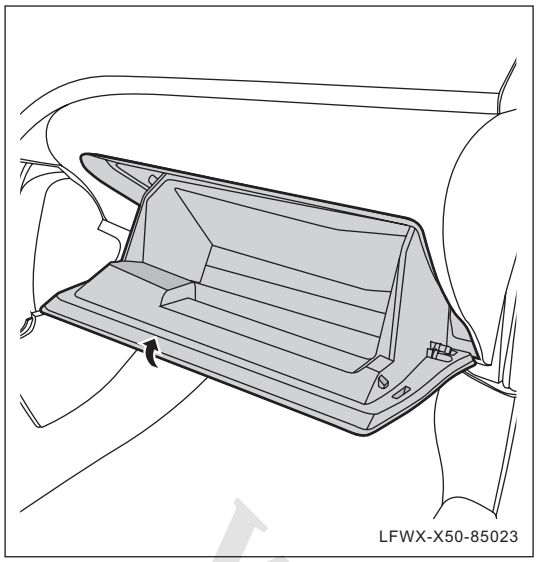


17. INSTALL DASHBOARD UPPER PANEL

(a) Install dashboard upper panel. (See 85 - Dashboard and Console, Dashboard Upper Panel, Replacement)

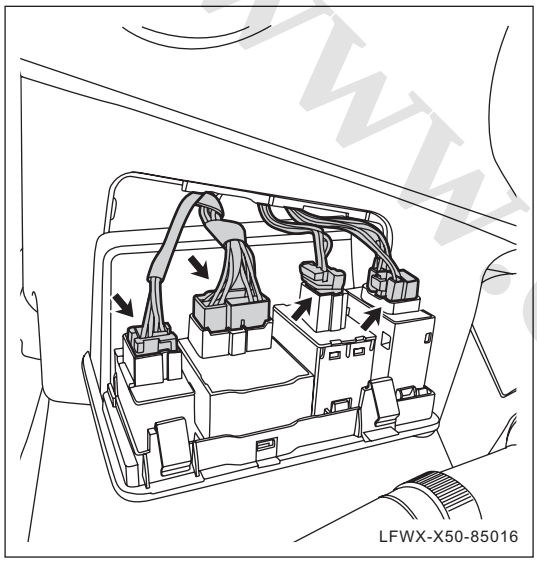
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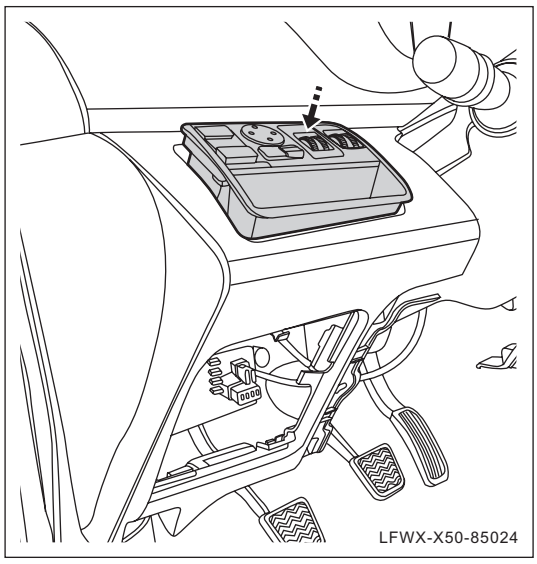
18. INSTALL GLOVE BOX

(a) Install glove box. (See 85 - Dashboard and Console, Glove Box, Replacement)



19. INSTALL SWITCH ASSEMBLY.

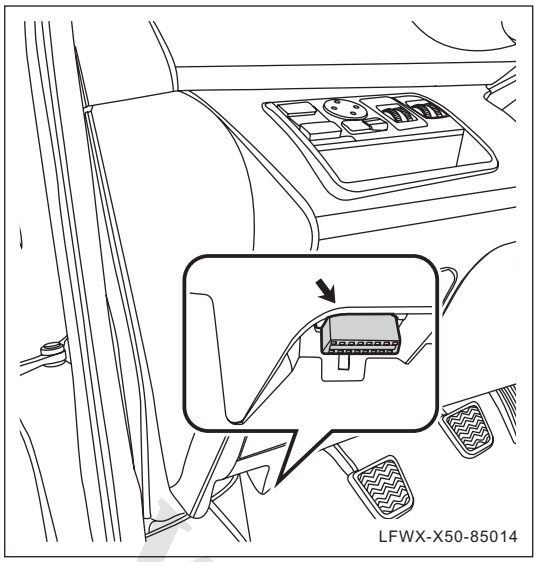
(a) Connect the connectors of the switch assembly



(b) Buckle switch assembly onto the dashboard.

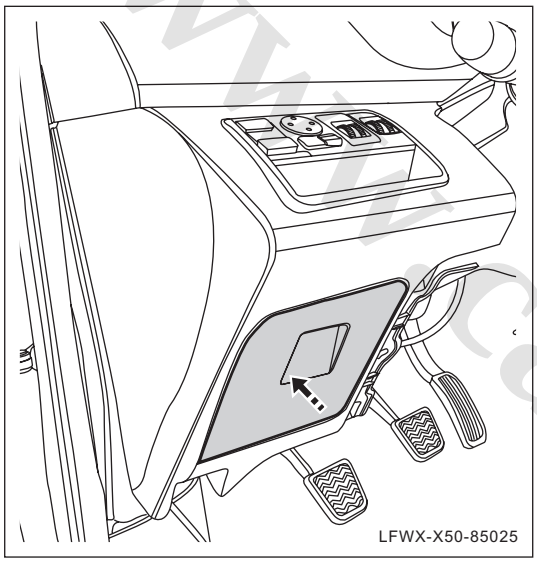
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20. INSTALL DIAGNOSIS INTERFACE CONNECTOR

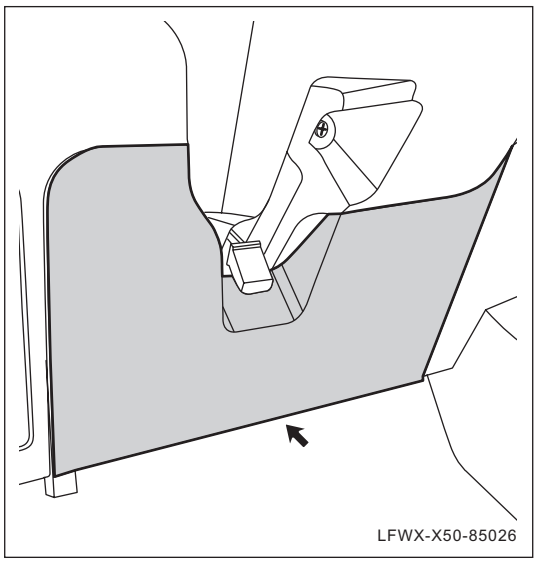
(a) Install the diagnosis interface connector in place.



21. INSTALL LEFT LOWER NOTES BOX

(a) Install the left lower notes box in place.

(b) Close the left lower notes box.



22. INSTALL LOWER DASHBOARD ACCESS COVER PLATE

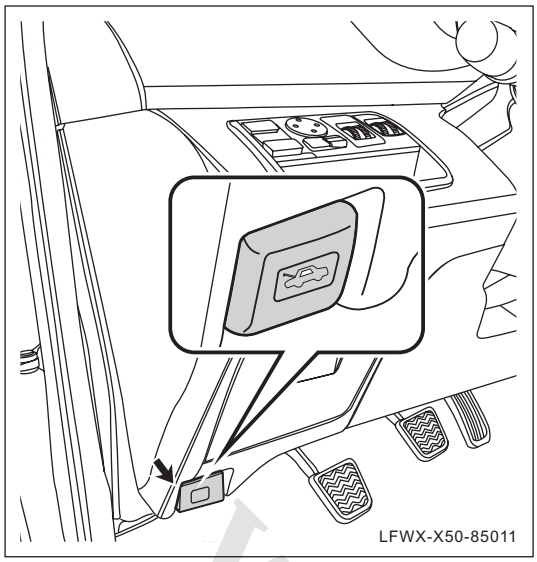
(a) Install lower dashboard access cover plate.

△ HINT:

When installing lower dashboard access cover plate, be sure to insert its fixed jaw into the grooves.

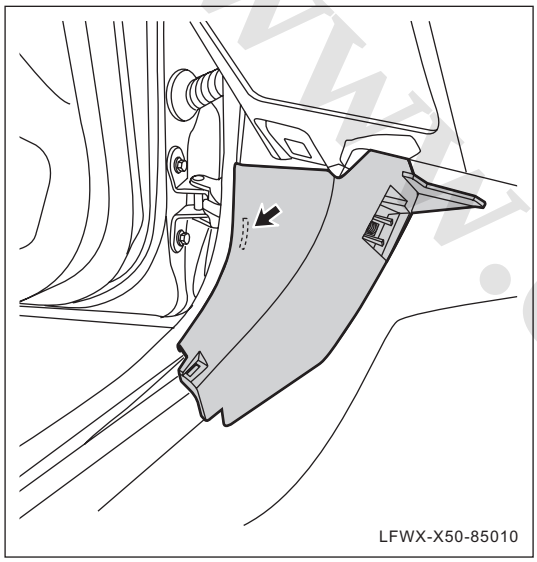
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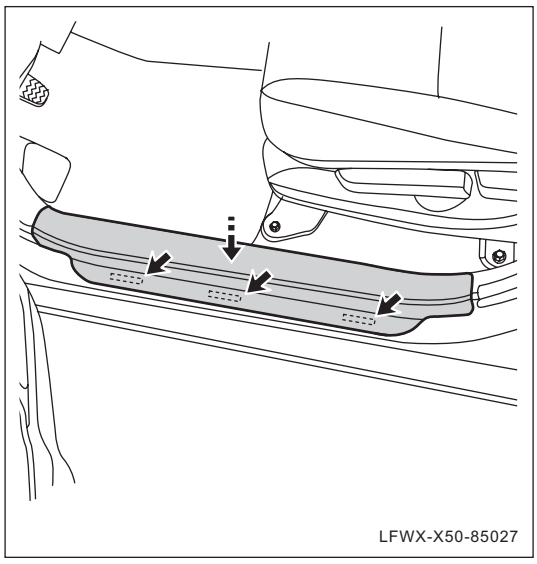
23. INSTALL OPENING HANDLE OF ENGINE COMPARTMENT CABLE

(a) Install the opening handle of engine compartment in place.



24. INSTALL A PILLAR LOWER TRIM PANEL ON BOTH SIDES

(a) Install A pillar lower trim panel on both sides. (See 81- Interiors and Exteriors, A Pillar Trim Panel, Replacement)



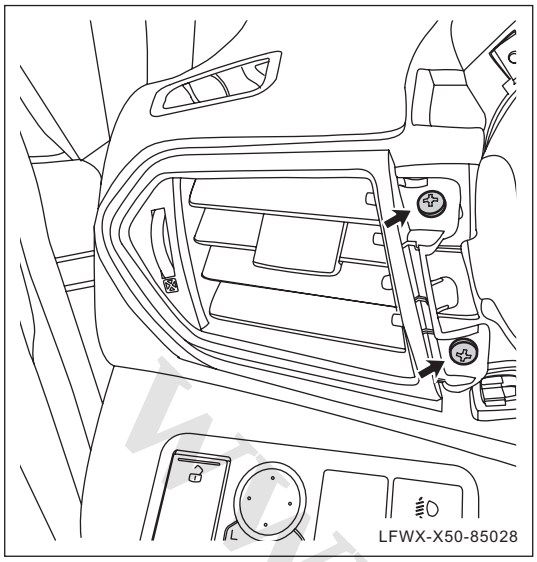
(b) Remove rear doorsill trim panel. (See 81 - Interiors and Exteriors, Front Doorsill Trim Panel, Replacement)

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LEFT AIR VENT

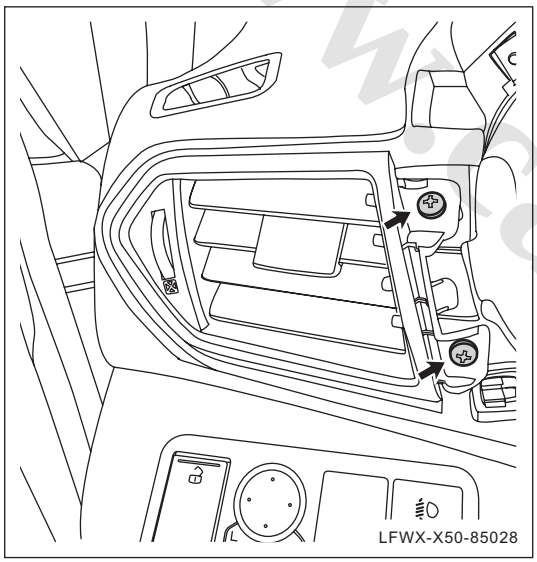
REPLACEMENT



1. REMOVE LEFT AIR VENT ASSEMBLY

(a) Pry the instrument cluster cowl. (See 85 - Dashboard and Console, Instrument Cluster Cowl, Replacement)

(b) Remove fixing screws of left air vent assembly and take out left air vent assembly.



2. INSTALL LEFT AIR VENT ASSEMBLY

(a) Install left air vent assembly in place, and install and tighten fixing screws.

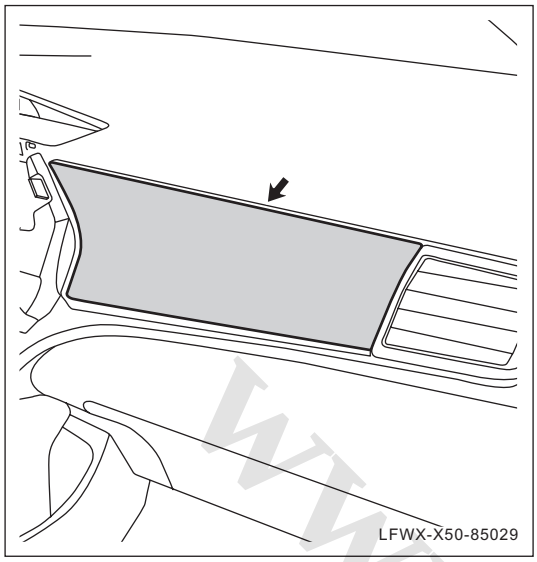
(b) Install instrument cluster cowl. (See 85 - Dashboard and Console, Instrument Cluster Cowl, Replacement)

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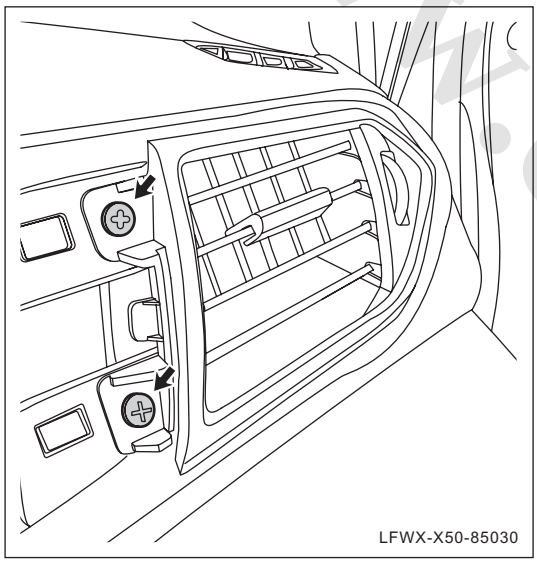
RIGHT AIR VENT

REPLACEMENT

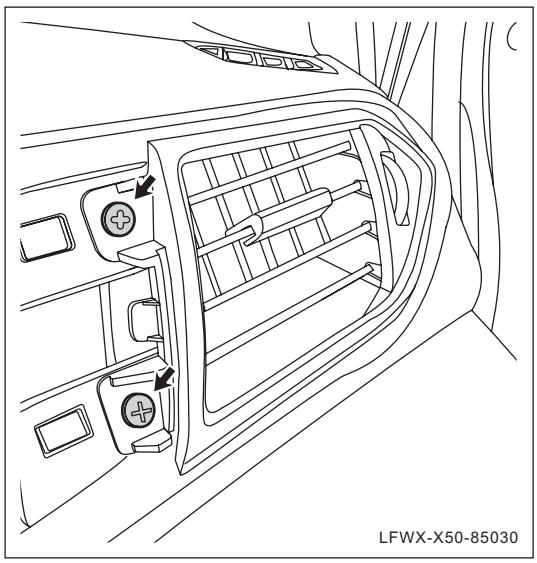


1. REMOVE RIGHT AIR VENT ASSEMBLY

(a) Pry abaciscus plate components.



(b) Remove fixing screws of right air vent assembly, and take out right air vent assembly.



2. INSTALL RIGHT AIR VENT ASSEMBLY

(a) Install right air vent in place, and install and tighten fixing screws.

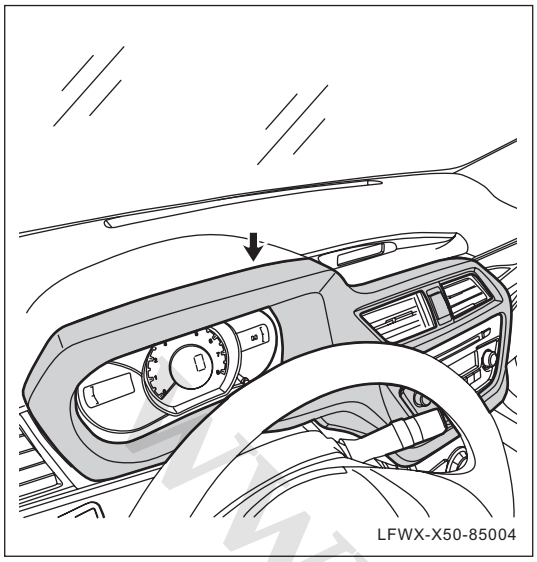
(b) Install abaciscus plate components.

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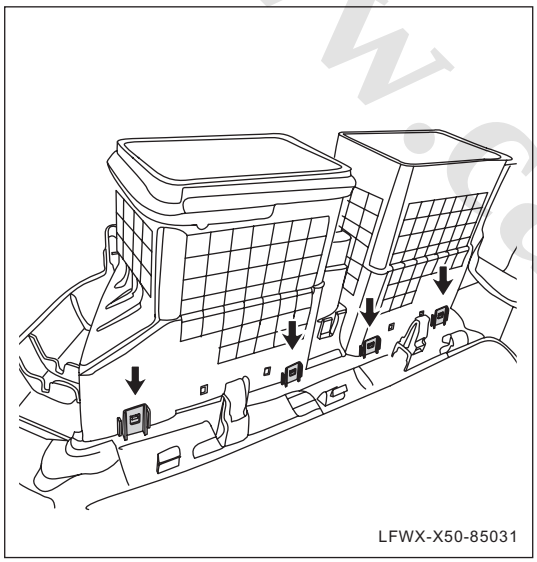
CENTRAL AIR VENT

REPLACEMENT

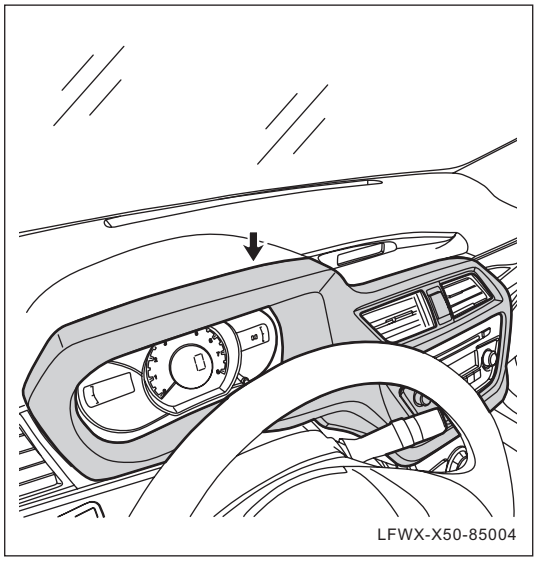


1. REMOVE CENTRAL AIR VENT

(a) Remove instrument cluster cowl. (See 85 - Dashboard and Console, Instrument Cluster Cowl, Replacement)



(b) Pry snap-fit and take out central air vent.



2. INSTALL CENTRAL AIR VENT

(a) Align central air vent with snap-fit position of instrument cluster cowl and install it in place.

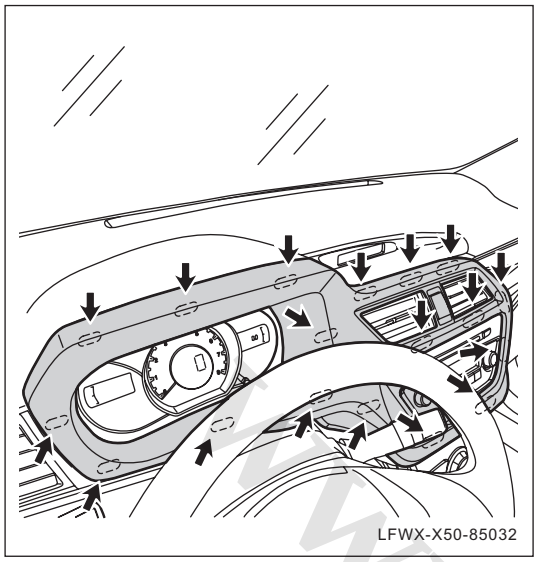
(b) Install instrument cluster cowl. (See 85 - Dashboard and Console, Instrument Cluster Cowl, Replacement)

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INSTRUMENT CLUSTER COWL

REPLACEMENT


LFWX-X50-85032

1. REMOVE INSTRUMENT CLUSTER COWL

(a) Pry the fixing snap-fit of instrument cluster cowl as the position shown in the figure.


LFWX-X50-85033

(b) Take out instrument cluster cowl slightly and disconnect the warning lamp switch connector.

(c) Take out central air vent and warning lamp switch.


LFWX-X50-85033

2. INSTALL INSTRUMENT CLUSTER COWL

(a) Assemble central air vent and warning lamp switch onto instrument cluster cowl.

(b) Connect warning lamp switch connector.

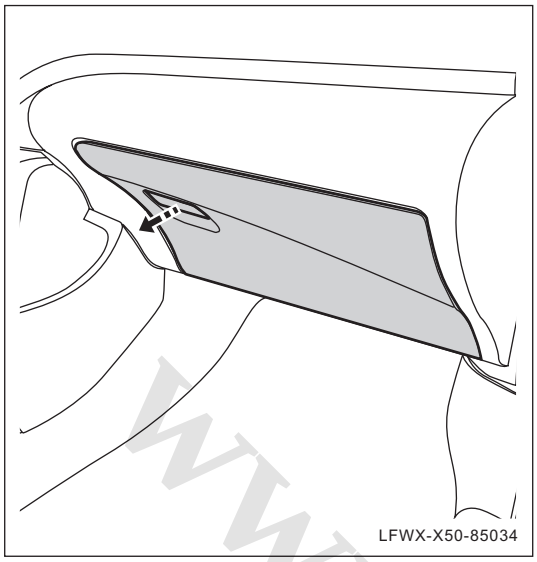
(c) Align instrument cluster cowl with snap-fit mounting hole and install it in place.

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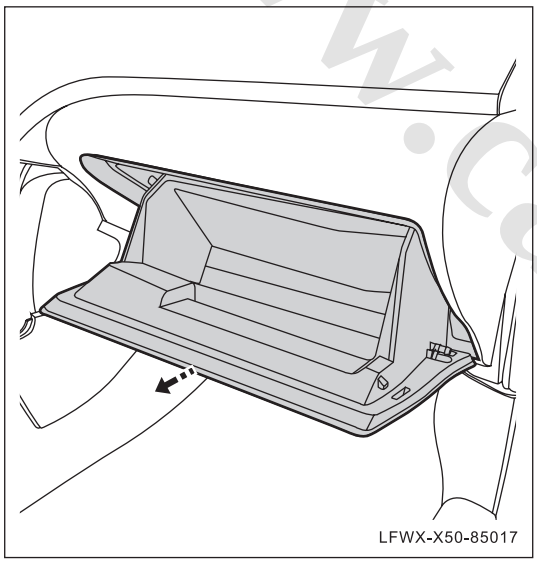
GLOVE BOX

REPLACEMENT

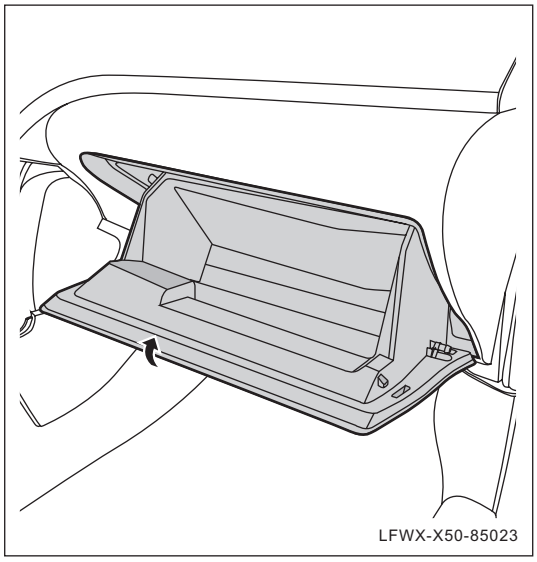


1. REMOVE THE GLOVE BOX

(a) Open the glove box.



(b) Take out the glove box outward.



2. INSTALL GLOVE BOX

(a) Align both sides of the glove box with its mounting holes, and then install the glove box.

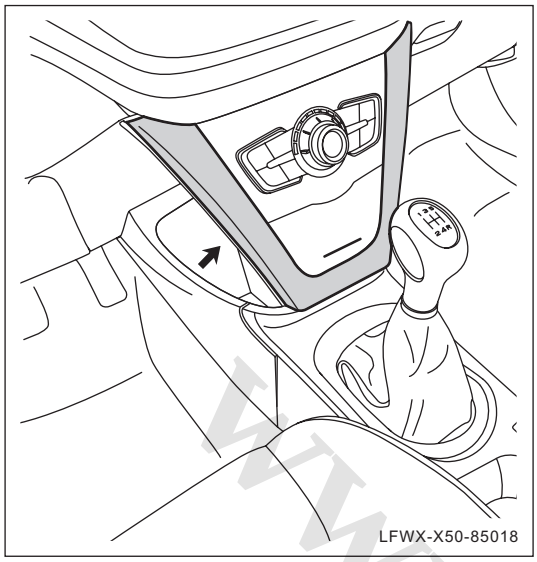
(b) Close the glove box and check whether it works normally.

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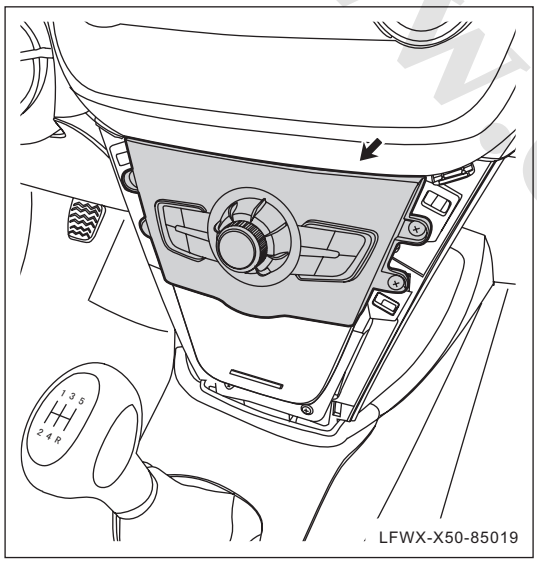
CONSOLE

REPLACEMENT

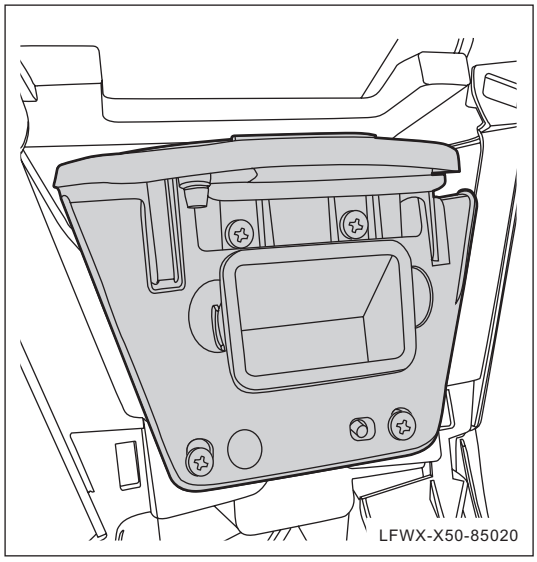


1. REMOVE CONSOLE ASSEMBLY

(a) Remove the dashboard lower center trim frame cluster.



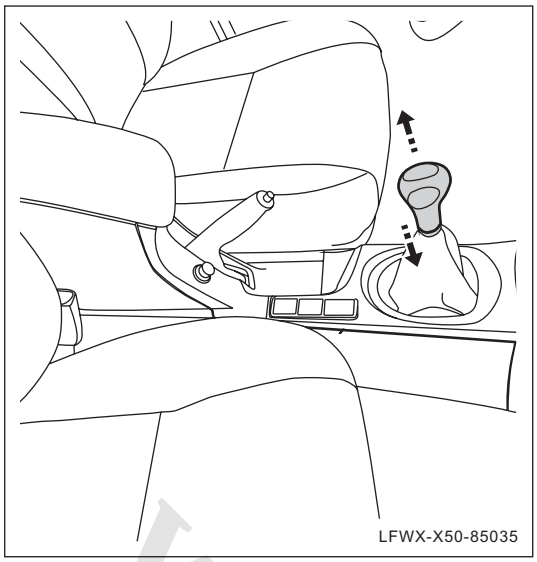
(b) Remove the air-conditioner controller. (See 71 - Air Conditioner, Air-Conditioner Control, Replacement)



(c) Remove front ashtray. (See 79 - Cigarette Lighter, Front Ashtray, Replacement)

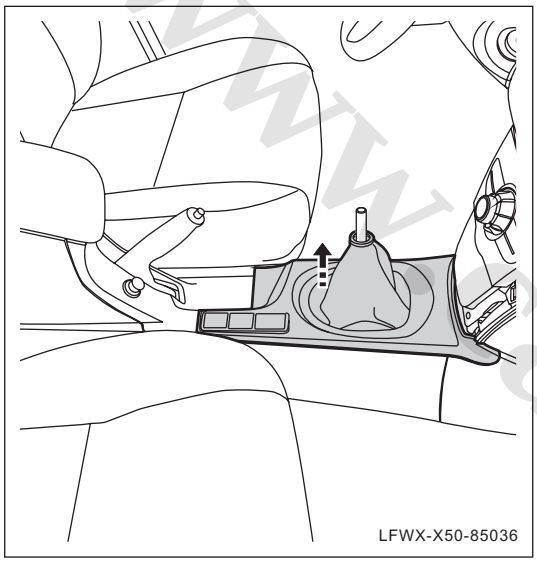
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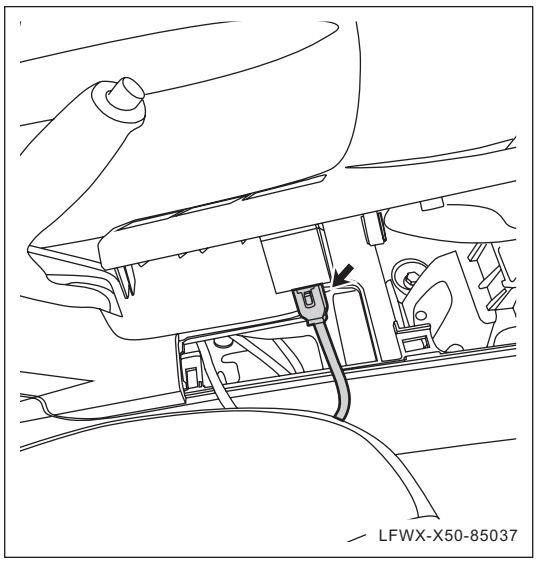


(d) Remove the gear shift panel assembly. (Manual transmission only)

- Press fixing sleeve of hear shift panel down and pull gear shift lever knob out.



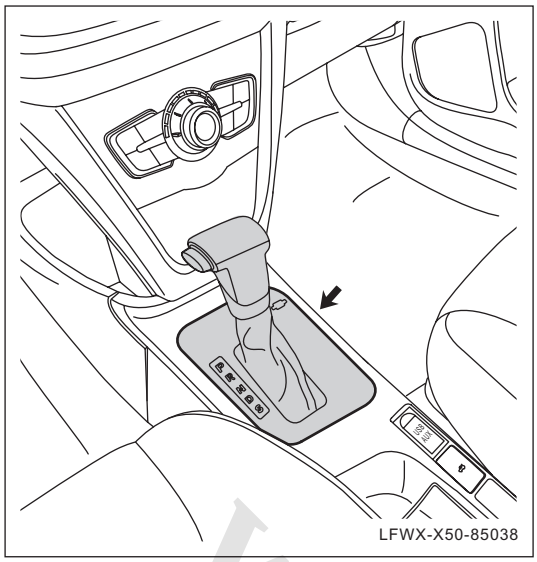
- Pry the gear shift panel assembly.



- Overturn gear shift panel assembly, disconnect USB connector, tail door switch connector, and take the gear shift panel assembly out.

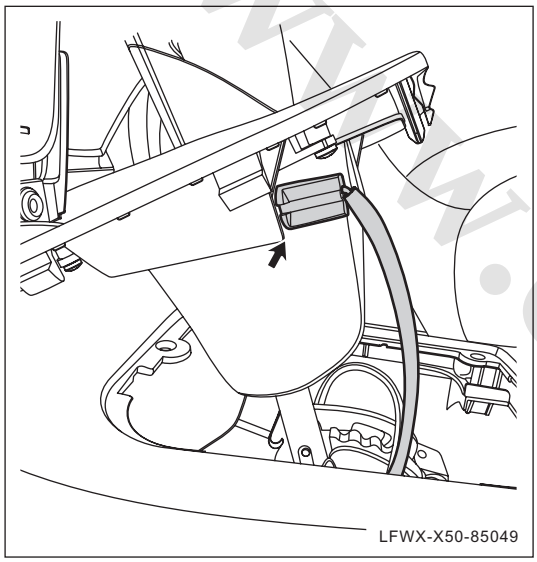
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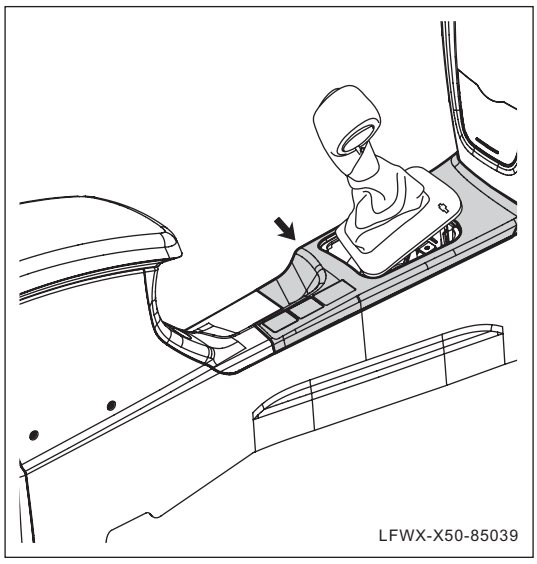


(e) Remove the gear shift panel assembly. (Automatic transmission only)

- Pry control gear lever trim cover.



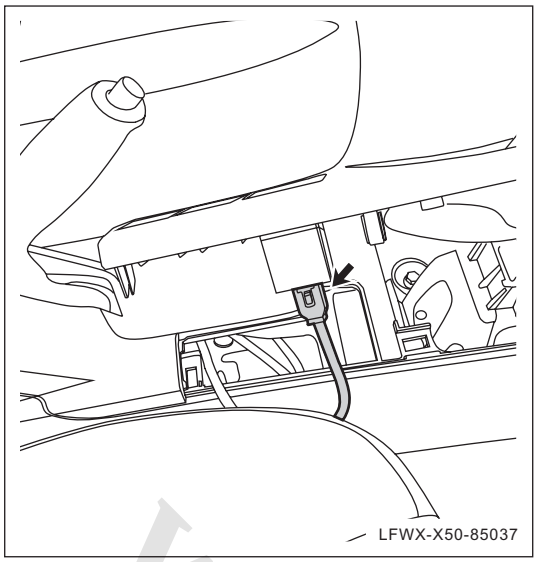
- Remove shift illuminating lamp.



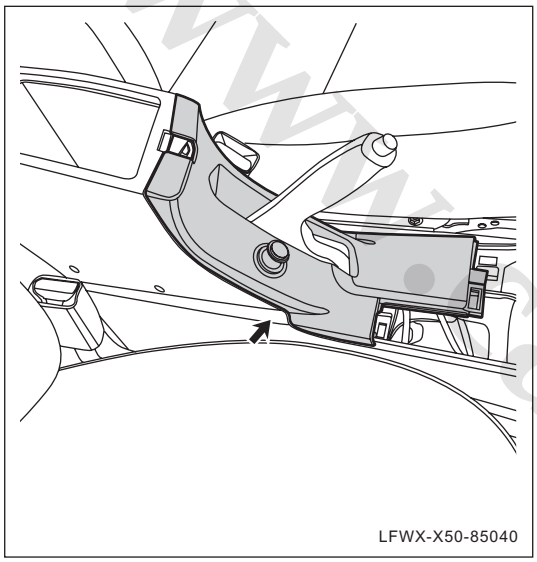
- Pry the gear shift panel assembly.

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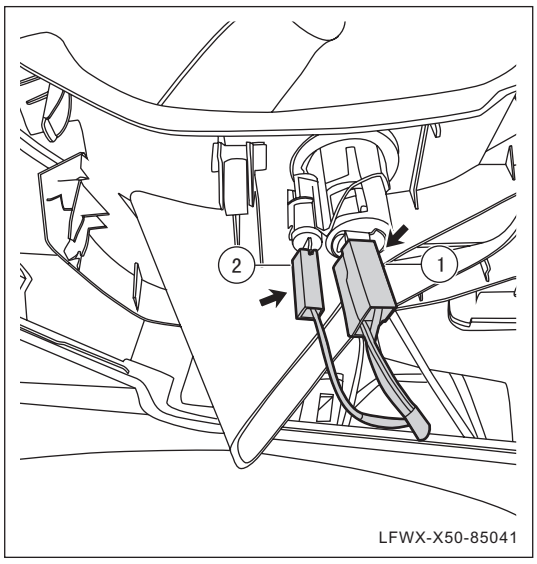


- Overturn gear shift panel assembly, disconnect USB connector, tail door switch connector, and take the gear shift panel assembly out.



(f) Open the console glove box cover.

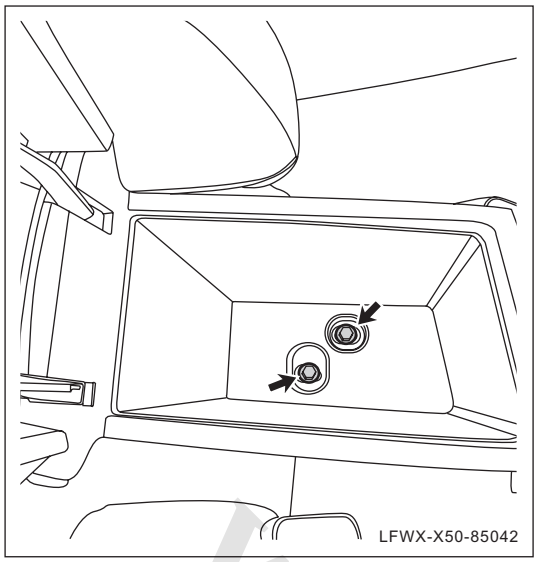
(g) Pry the parking brake trim panel cluster.



(h) Overturn the parking brake trim panel cluster, and disconnect the cigarette lighter connector ① and illuminating lamp connector ② .

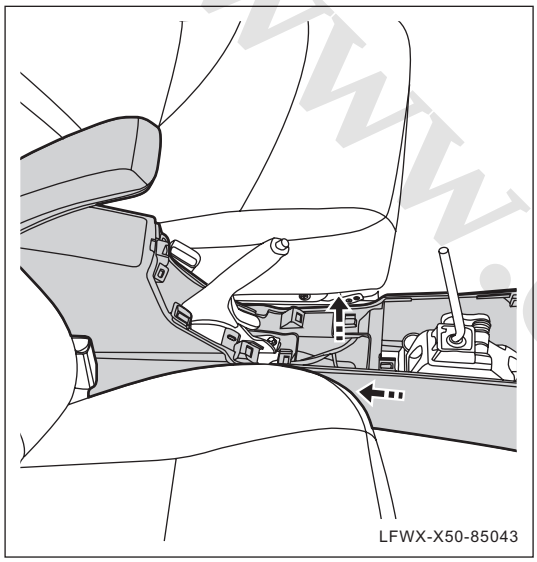
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(i) Remove the console glove box shim.

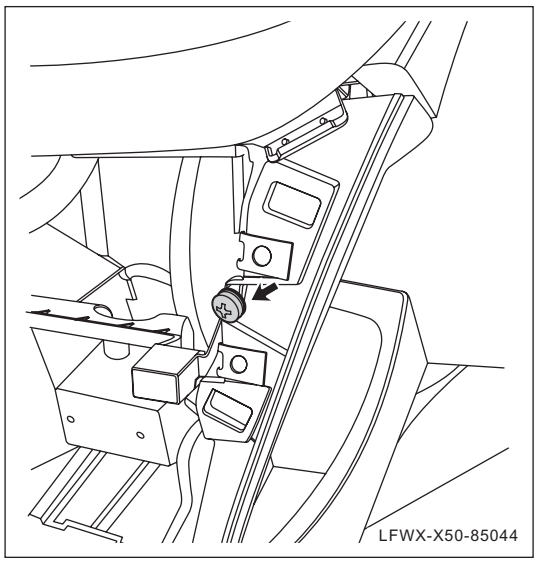
(j) Remove the fixing bolts of the console assembly.



(k) Remove the console body.

△ HINT:

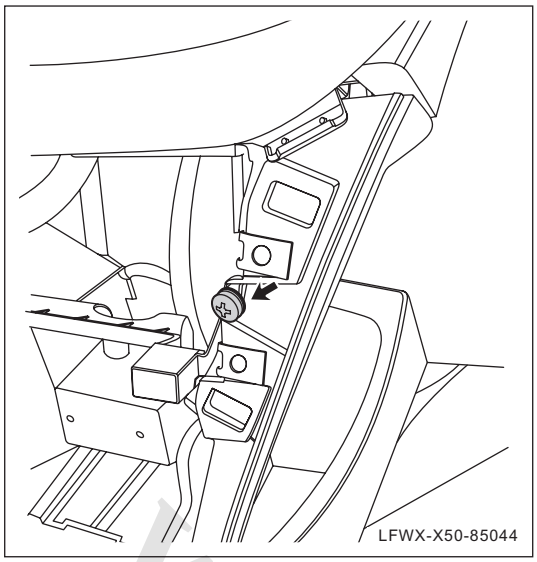
Move the console body backwards to make its front fixed jaw disengage the console front deposit box cluster. Take out the console upwards.



(l) Remove fixing screws of console front deposit box cluster and take out the left and right front deposit box cluster.

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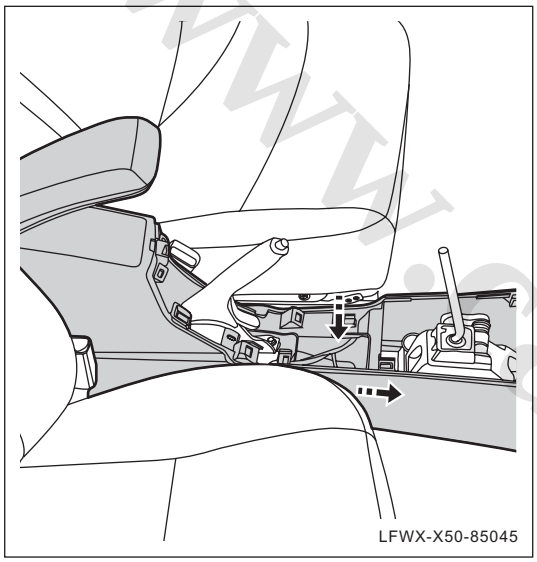
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2. INSTALL CONSOLE ASSEMBLY

(a) Install left and right front deposit box cluster in place, and install and tighten fixing screws.

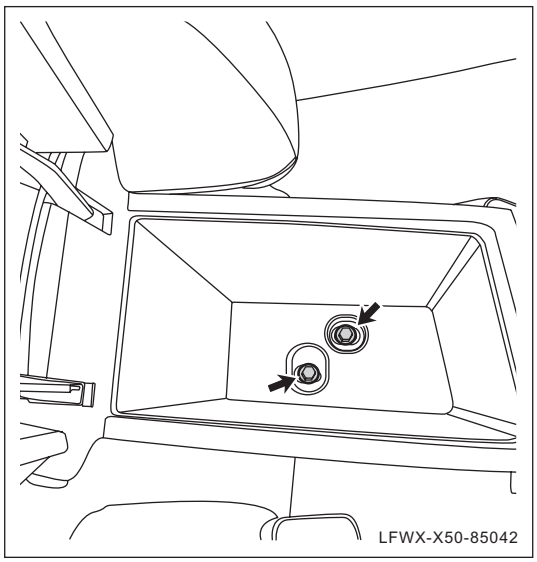
(b) Install the console front left deposit box cluster.



(c) Install the console body.

△ HINT:

When installing the console body, be sure to insert its front fixed jaws into the grooves of the console front deposit box cluster.



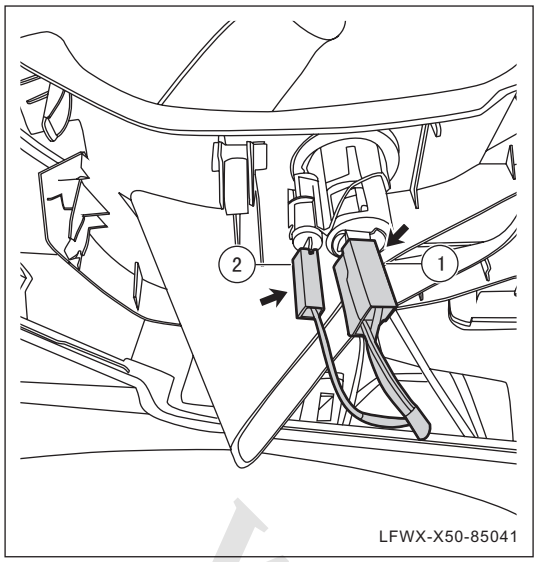
(d) Align fixing hole of console assembly with bracket mounting hole, and install and tighten fixing bolts.

Torque: 8 - 12 N•m

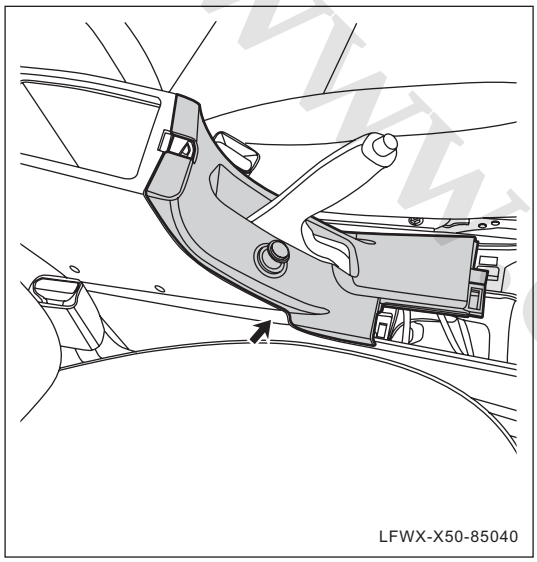
(e) Install the console glove box shim.

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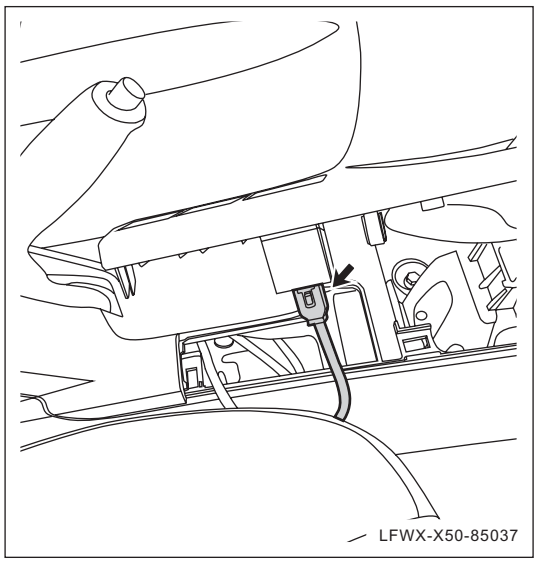


(f) Connect the cigarette lighter connector ① and illuminating lamp connector ② .



(g) Install the parking brake trim panel cluster.

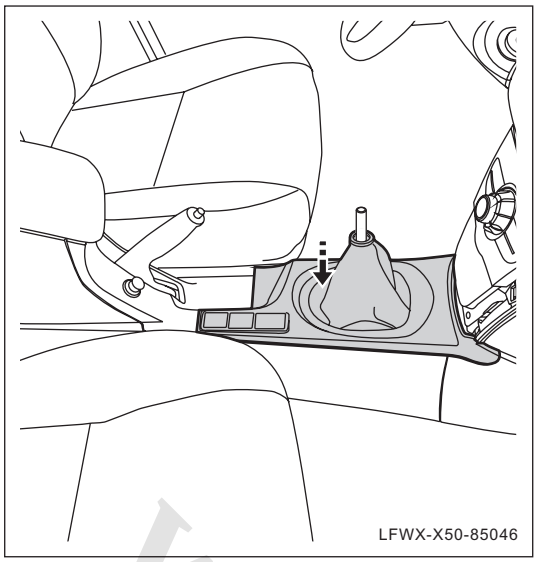
(h) Close the console glove box cover.



(i) Connect USB connector and tail door switch connector.

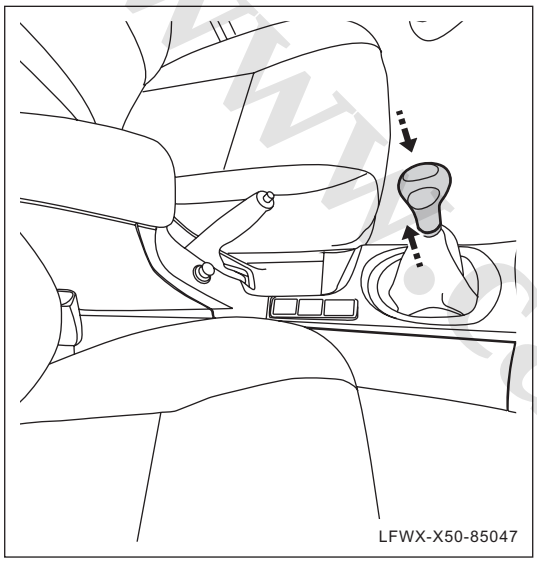
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(j) Install the gear shift panel assembly. (Manual transmission only)

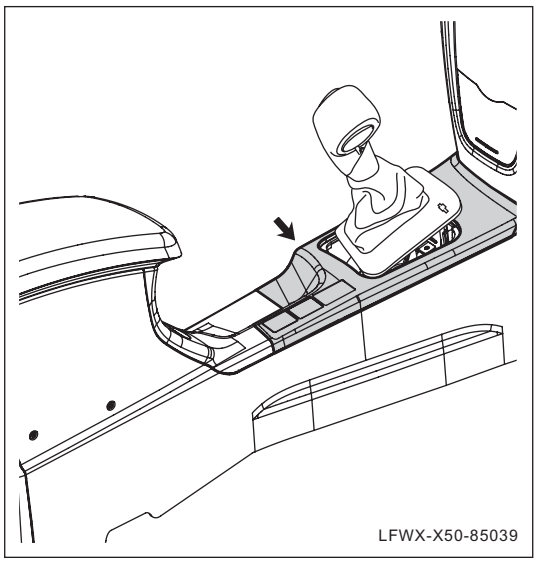
- Close gear shift panel.



- Install the gear shift lever knob.

△ HINT:

Install the gear shift lever knob downwards. Set the fixed sleeve of the gear shift panel boot onto the lower end of the gear shift lever knob.

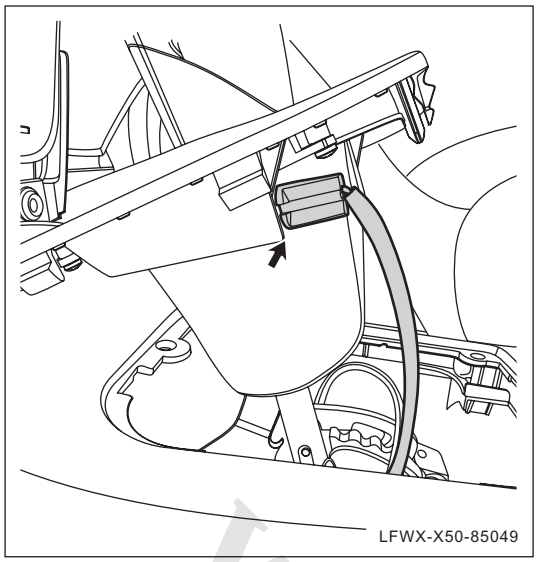


(k) Install the gear shift panel. (Automatic transmission only)

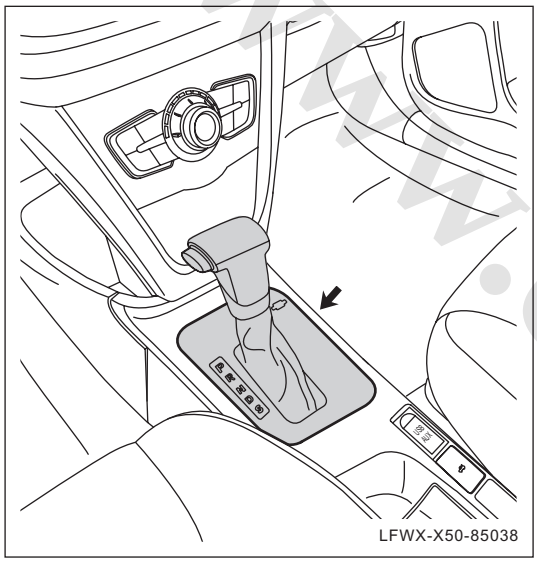
- Close gear shift panel.

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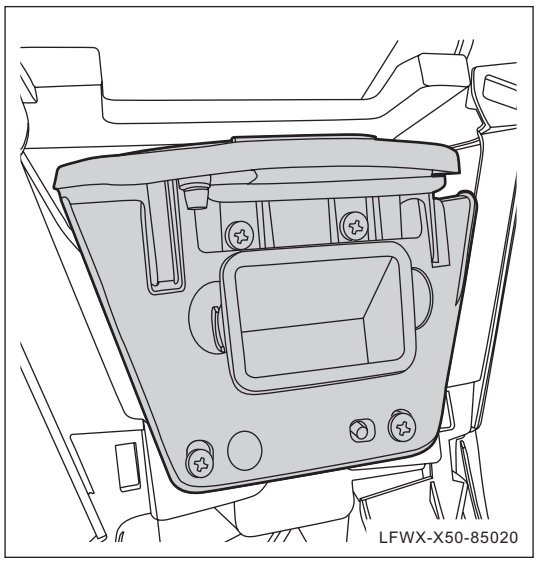
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- Install shift illuminating lamp.



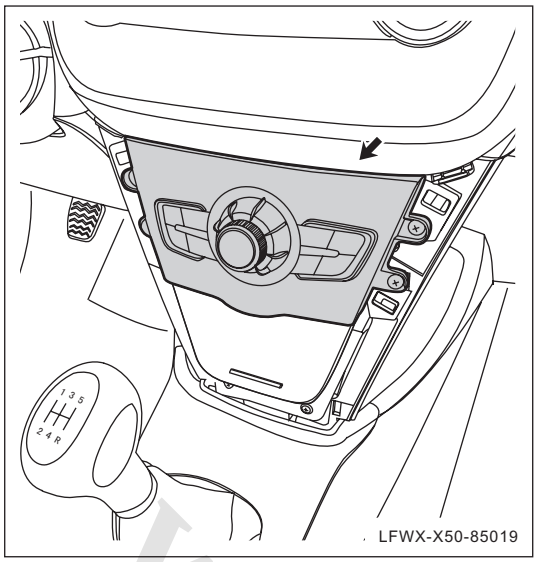
- Close control gear lever trim cover.



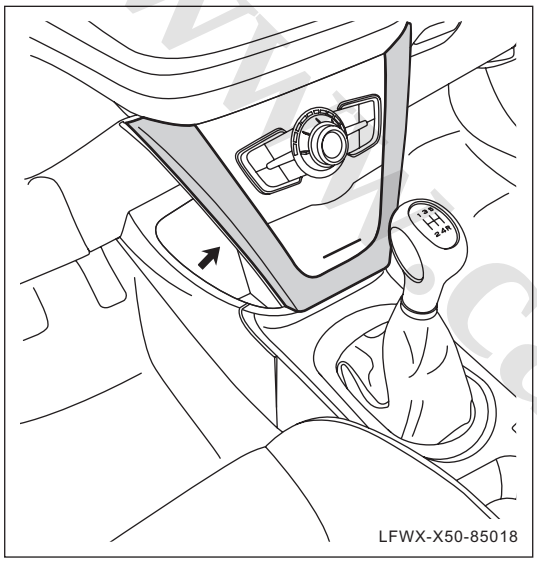
(l) Install front ashtray assembly. (See 79 - Cigarette Lighter, Ashtray, Replacement)

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(m) Install the air-conditioner controller. (See 71 - Air Conditioner, Air-Conditioner Controller, Replacement)



(n) Install dashboard lower center trim frame cluster.

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Wiper and Washer System

Wiper and washer system 86-1
System description 86-1
Preparation 86-3
Service data 86-3
Precautions 86-3
Components (wiper) 86-4
Components (washer) 86-5
On-vehicle inspection 86-6
Diagnosis 86-9
Fault symptom table 86-9
Fault diagnosis 86-10
Front wiper arm 86-19
Replacement 86-19
Rear wiper arm.....86-22
Replacement 86-22
Wiper blade 86-23
Replacement 86-23
Wiper connecting rod mechanism and motor assembly 86-24
Replacement 86-24
Tail door wiper motor assembly.....86-27
Replacement 86-27
Washer fluid reservoir assembly 86-28
Replacement 86-28
Front nozzle 86-31
Adjustment 86-31
Replacement 86-31
Rear nozzle.....86-33
Replacement 86-33
Replacement 86-33
Rear window defroster.....86-35
Inspection 86-35

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WIPER AND WASHER SYSTEM

SYSTEM DESCRIPTION

1. FUNCTION

- Functions of wiper are: In rainy and snowy days, raindrop or snow falling on the windshield will seriously block the driver's view. Opening the wiper will scrape the water or snow away, widening the driver's sight and improving driving safety. The wiper speed is also adjustable according to rain or snow amount to ensure driving safety. In case of windshield covered with dust, washer will spray water and wiper will clean in cooperation.
- Function of washer is: to spray water with washer in case of windshield covered with dust or dirt.

NOTICE:

In stormy days, rapid and huge raindrop falling onto the windshield, it is difficult to remove the raindrop even in the event that the wiper moves fast, blocking the driver's view. To ensure driving safety, stop driving immediately.

Function of washer is: to spray washer fluid onto the windshield and remove dust and dirt on the windshield under the action of the wiper so as to ensure a good vision for driver.

2. COMPONENTS

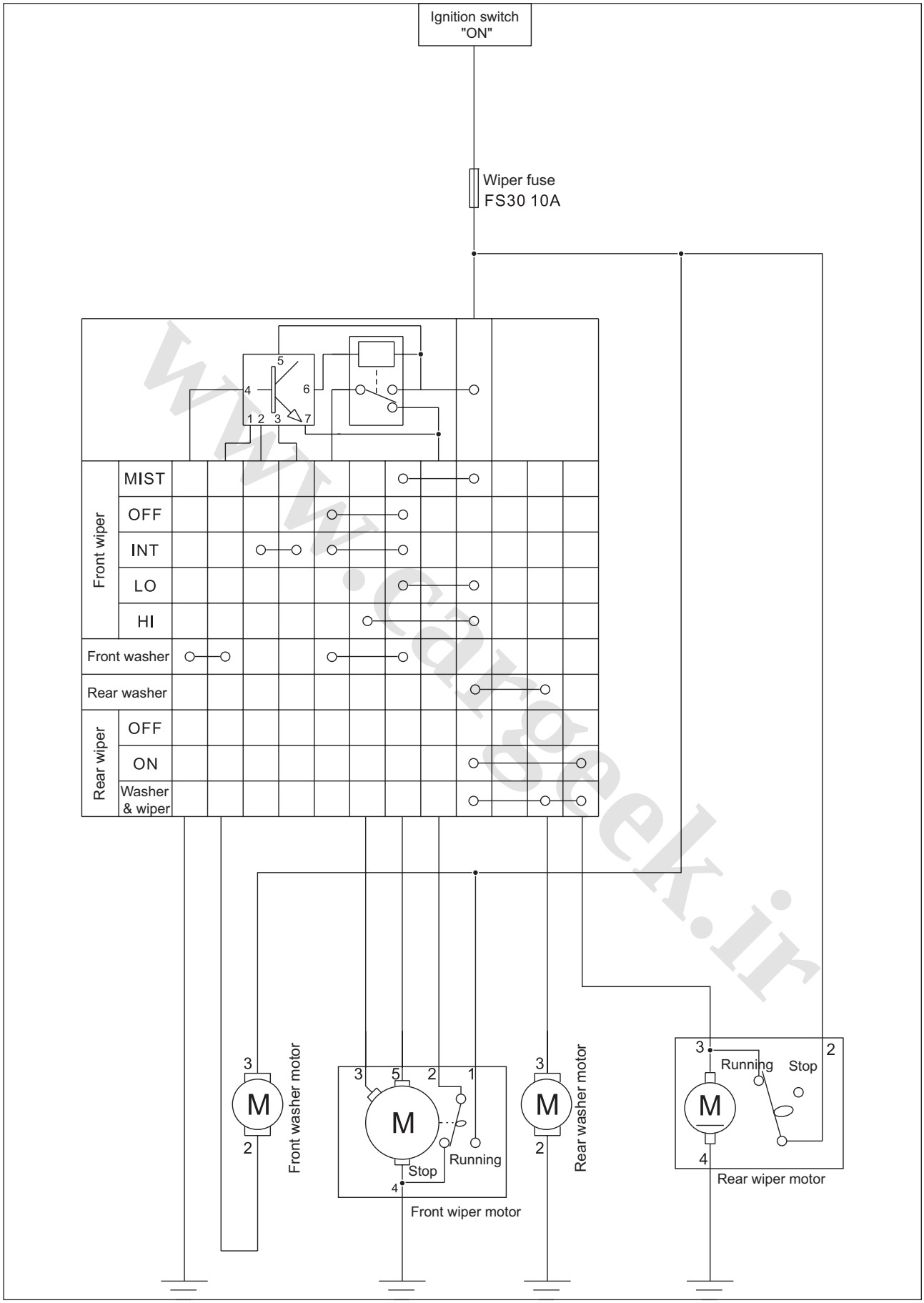
Wiper mainly consists of wiper motor, wiper connecting rod, wiper arm, wiper blade, etc.

Washer mainly consists of washer motor, washer fluid reservoir, spray hose, etc.

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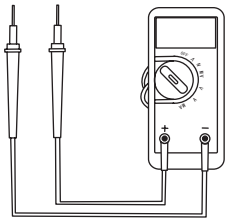
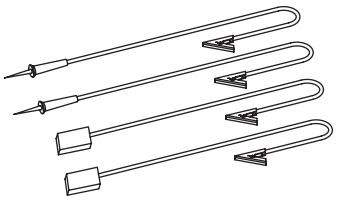
3. WORKING PRINCIPLE



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PREPARATION

S/N	Tool	Outline diagram	Description
1	Digital multimeter		Measuring the voltage, resistance, current and the circuit
2	Wiring set		Inspecting the line

SERVICE DATA

1. TIGHTENING TORQUE TABLE

Item	N•m
Fixing nut of front wiper arm	6 - 12
Fixing bolt of front wiper motor and connecting bracket	6 - 12
Fixing nut of wiper motor and connecting rod swing arm	6 - 12
Fixing bolt of wiper connecting rod mechanism and motor assembly	6 - 12
Fixing bolt of washer fluid reservoir assembly	6 - 12
Fixing bolt of tail door wiper motor	6 - 12

PRECAUTIONS

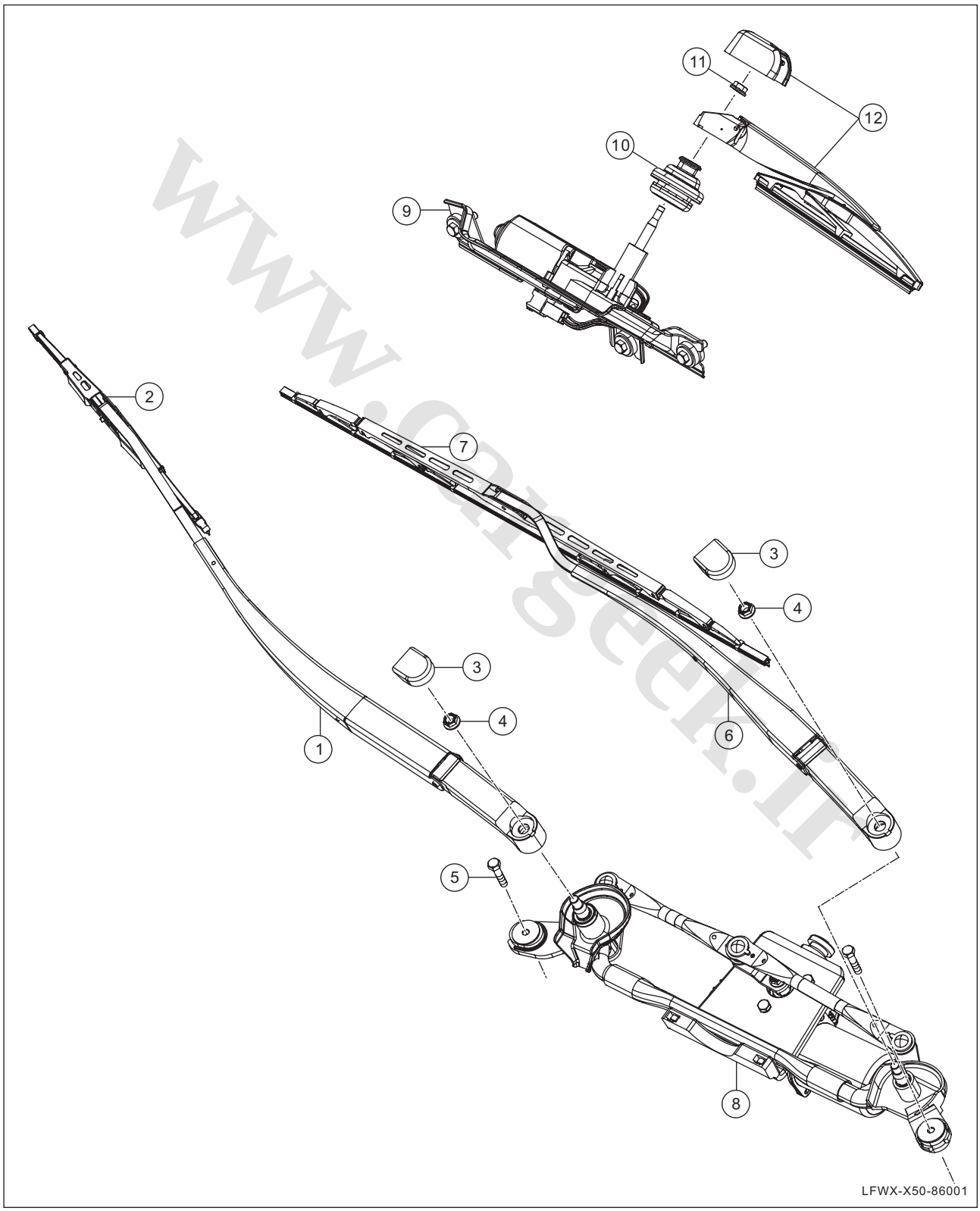
1. Before disconnecting the connector, remove the battery negative electrode and wait for at least 1 min. Otherwise, it may cause personal injury.
2. During the course of using, if the wiper is blocked unexpectedly, shut off the power immediately to prevent wiper motor from being burnt out.
3. In the process of using, wiper blade shall keep close to the window glass, without any clearance. Otherwise, the wiper cannot clean the glass.
4. In the course of using, it is forbidden to wipe the glass off in a dry state. If you touch the wiper switch carelessly, turn it off immediately. Pay attention to maintain and clean windshield glass and wiper to prevent dust accumulation.
5. The washer may not operate for a long duration. The duration of each operation should not exceed 5 seconds Every time, the wiper pauses for at least 10s. It is forbidden to turn on washer motor without washer fluid.
6. The spray hose should be securely fixed. It is strictly prohibited to randomly move the spray hose. When washing your vehicle, do not aim the water jet at the spray hose joint for a long duration. This helps prevent corrosion and ages.

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7. In chilly regions, be sure to use the corresponding washer fluid.
8. Do not use engine antifreeze or another fluid as a substitute, to avoid damaging the window glass or vehicle body paint.
9. As washer fluid is easy-consumable, check it regularly (two weeks or one month). If insufficient, refill washer fluid.

COMPONENTS (WIPER)



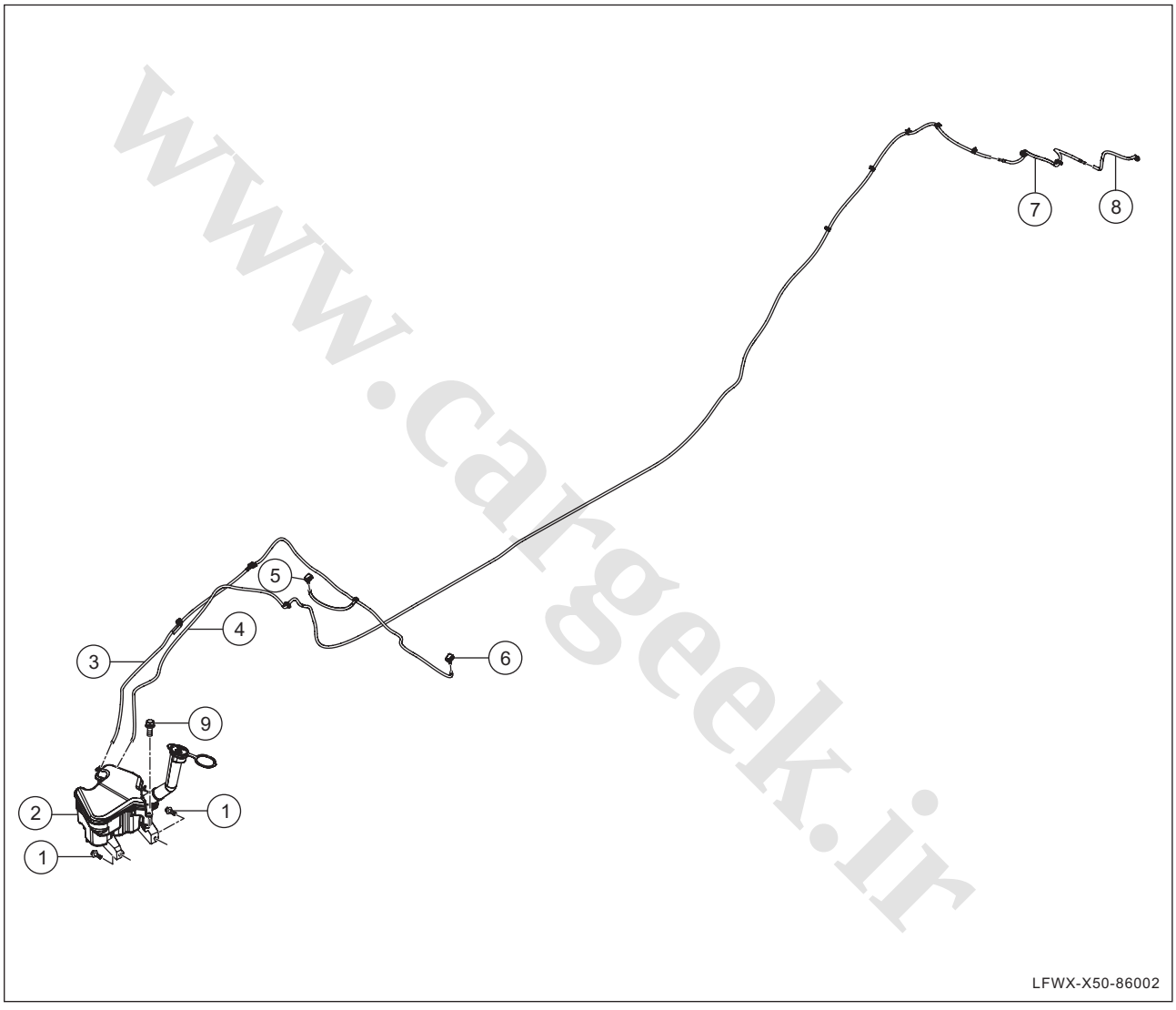
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1	Right wiper assembly
2	Right wiper blade
3	Front wiper arm installation plug
4	Hexagon nut with flange
5	Hexagon bolt with flange
6	Left wiper assembly

7	Left wiper blade
8	Wiper connecting rod mechanism and motor assembly
9	Tail door wiper motor assembly
10	Rotor shaft shield of tail door wiper motor
11	Rear wiper arm mounting nut
12	Tail door wiper blade assembly

COMPONENTS (WASHER)



LFWX-X50-86002

1	Hexagon bolt with flange
2	Washer fluid reservoir assembly
3	Windshield hose assembly
4	Tail door hose front section assembly
5	Front nozzle

6	Windshield left nozzle assembly
7	Tail door hose rear section assembly
8	Rear nozzle
9	Hexagon bolt with flange

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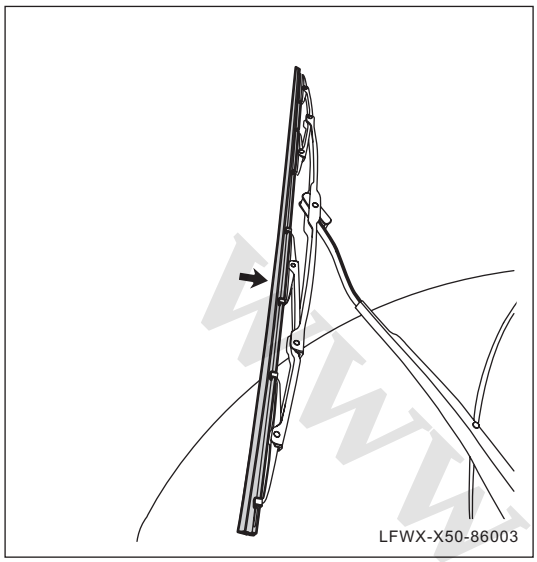
ON-VEHICLE INSPECTION

1. CHECK THE WIPER SWITCH AND WASHER SWITCH

(a). Open the wiper switch and washer switch to check whether they operate normally.

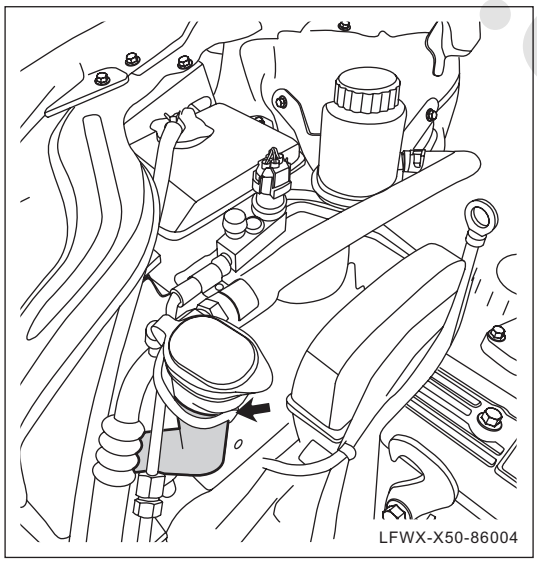
△ HINT:

See Lifan X50 Automobile Manual for specific operating method.



2. CHECK THE WIPER BLADE

(a). Check the wiper blade strip for crack, cut, deformation, wear, etc. Replace with new ones if necessary.



3. CHECK WASHER FLUID LEVEL

(a). Check if washer fluid is sufficient.

△ HINT:

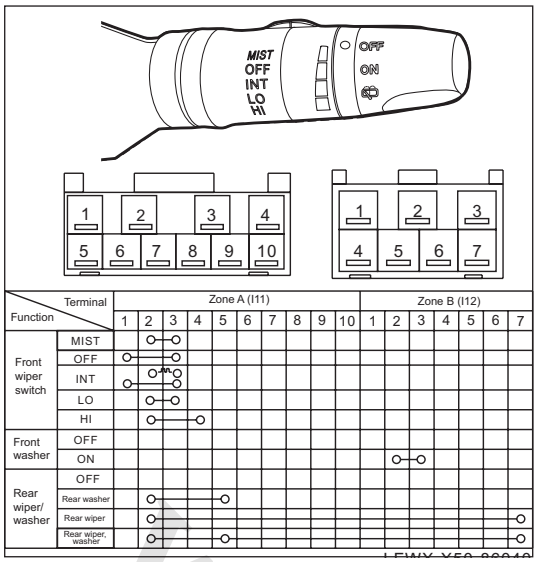
- As washer fluid is easy-consumable, check it regularly (two weeks or one month). If insufficient, refill washer fluid.
- Washer fluid can prevent the nozzle, fluid reservoir and connecting hose from freezing.
- In warm weather, it is also necessary to refill washer fluid. Strong washing capacity can help remove the wax and oil residues from the windshield.
- Make sure the washing device of windshield will not freeze in the lowest temperature of approximately -25℃ (in certain area with extreme weather, the temperature is approximately -35℃).
- Open the filling cap and refill the washer fluid to visual area below diameter bend. Do not refill too much!

Windshield washer fluid model: NFC-60

Filling amount: 3L

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Function \ Terminal		Zone A (I11)										Zone B (I12)						
		1	2	3	4	5	6	7	8	9	10	1	2	3	4	5	6	7
Front wiper switch	MIST		○	○														
	OFF	○		○														
	INT	○		○														
	LO		○	○														
	HI		○		○													
Front washer	OFF																	
	ON												○	○				
Rear wiper/ washer	OFF																	
	Rear washer		○			○												
	Rear wiper		○															○
	Rear wiper, washer		○			○												○

LFWX-X50-86035

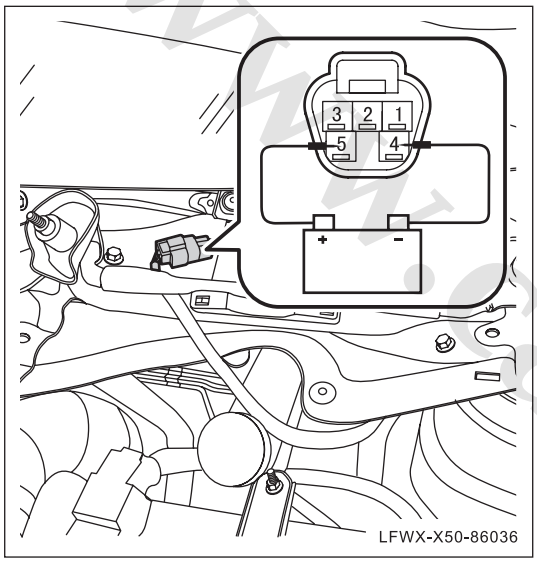
4. CHECK THE WIPER AND WASHER COMBINATION SWITCH

(a). Disconnect combination switch connector of wiper and washer.

(b). As illustrated in the left figure, check the conductivity between each terminal of combination switch with digital multimeter

△ HINT:

Under the corresponding wiper switch status, if the corresponding terminal is of poor conductivity, replace the wiper and washer combination switch.

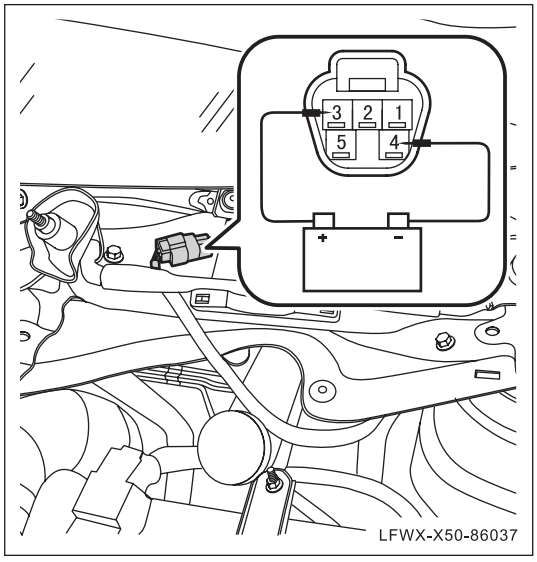


LFWX-X50-86036

5. CHECK FRONT WIPER MOTOR

(a). Disconnect the front wiper motor connector.

(b). Connect the battery positive wire to the No. 5 terminal of wiper motor connector U02 and connect the battery negative wire to the No. 4 terminal. Check whether the wiper motor runs at a low speed.

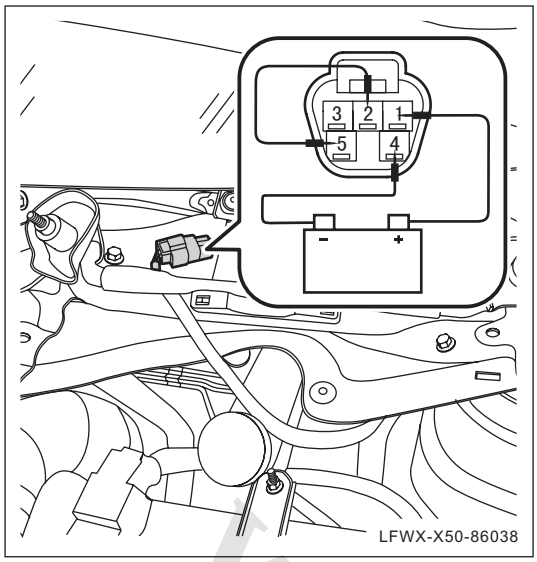


LFWX-X50-86037

(c). Connect the battery positive wire to the No. 3 terminal of wiper motor connector and connect the battery negative wire to the No. 4 terminal. Check whether the wiper motor runs at a high speed.

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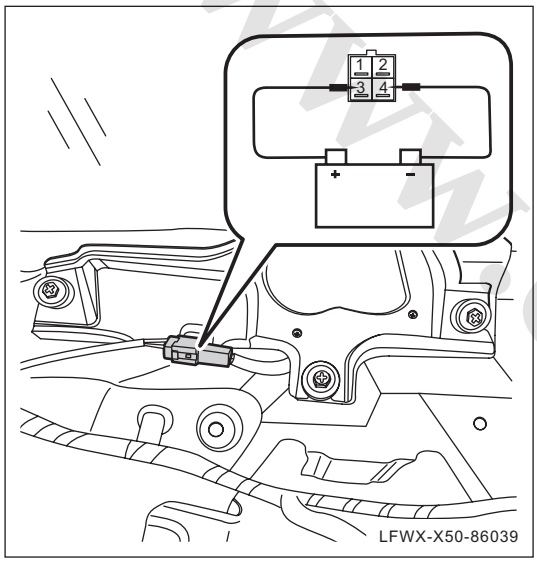
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(d). Connect the No. 2 and No. 5 terminals with wire and rotate the wiper motor away from its original position. Connect the battery positive wire to the No. 1 terminal of wiper motor connector U02 and connect the battery negative wire to the No. 4 terminal. Check whether the wiper motor runs at a low speed and stop running after it returns to the original position.

△ HINT:

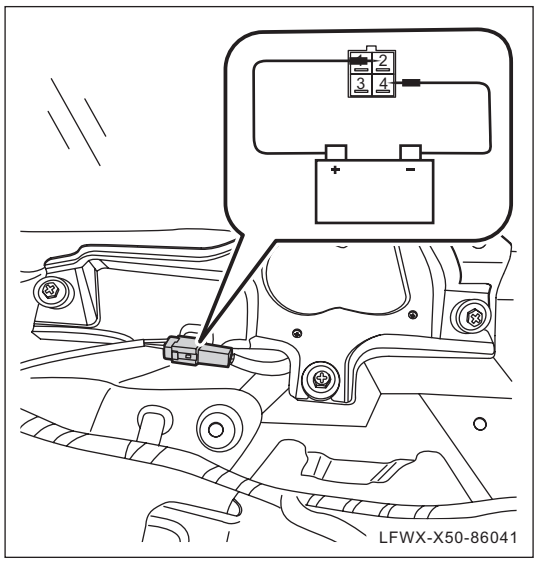
Replace front wiper motor in the event the inspection result is unacceptable.



6. CHECK REAR WIPER MOTOR

(a). Disconnect the rear wiper motor connector.

(b). Connect the battery positive wire to the No. 3 terminal of wiper motor connector L05 and connect the battery negative wire to the No. 4 terminal of L05. Check whether the wiper motor runs.



(c). Rotate the wiper motor away from its original position. Connect the battery positive wire to the No. 2 terminal of wiper motor connector L05 and connect the battery negative wire to the No. 4 terminal of L05. Check whether the wiper motor runs at a low speed and stop running after it returns to the original position.

△ HINT:

Replace rear wiper motor in the event the inspection result is unacceptable.

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DIAGNOSIS

FAULT SYMPTOM TABLE

The following table will help you to locate the fault information needed.

Symptom	Suspected area	Recommended action
Whole wiper and washer system does not operate	1. Fuse (blown) 2. Wire harness (open circuit or short circuit) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (1. Whole wiper and washer system does not operate)
Only front wiper HI position does not work	1. Wire harness (open circuit or short circuit) 2. Front wiper motor (damaged) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (2. Only front wiper HI position does not work)
Only front wiper LO position does not work	1. Wire harness (open circuit or short circuit) 2. Front wiper motor (damaged) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (3. Only front wiper LO position does not work)
Only front wiper INT position does not work	1. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (4. Only front wiper LO position does not work)
Only front wiper washing position does not work	1. Wire harness (open circuit or short circuit) 2. Front washing motor (damaged) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (5. Only front wiper washing position does not work)
Only rear wiper washing position does not work	1. Wire harness (open circuit or short circuit) 2. Rear washer motor (damaged) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (6. Only rear wiper washing position does not work)
Only rear wiper does not work	1. Wire harness (open circuit or short circuit) 2. Rear wiper motor (damaged) 3. Combination switch (damaged)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (7. Only rear wiper does not work)
Wiper arm cannot return to its original position or the position is not correct (after the wiper switch is turned off)	1. Wire harness (open circuit or short circuit) 2. Front wiper motor (damaged) 3. Combination switch (damaged) 4. Wiper arm (incorrect installation)	See 86 - Wiper and Washer system, Diagnosis, Fault Diagnosis (8. Wiper arm cannot return to its original position or the position is not correct (after the wiper switch is turned off))
Poor water scraping effect (cannot wipe the water off completely or vibrates)	1. Windshield glass (oil stain or wax) 2. Washer fluid (poor quality) 3. Wiper blade (wrong model) 4. Wiper blade (rubber aged or cracked) 5. Wiper arm (deformed or damaged) 6. Wiper arm (spring force decreases)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (9. Poor water scraping effect (cannot wipe the water off completely or vibrates))
Washer fluid is not injected, injected weakly or injected in the wrong direction	1. Washer fluid (insufficient) 2. Washer fluid (frozen) 3. Washing hose (damaged or blocked) 4. Nozzle (blocked or installed incorrectly) 5. Washing motor (damaged)	See 86 - Wiper and Washer system Diagnosis, Fault Diagnosis (10. Washer fluid is not injected, injected weakly or injected in the wrong direction)

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Symptom	Suspected area	Recommended action
Abnormal noise of wiper	1. Worm (rust or insufficient lubrication)	See 86 - Wiper and Washer System, Diagnosis, Fault Diagnosis (11. Abnormal noise of wiper)
	2. Connecting rod (worn or deformed)	
	3. Wiper blade (rubber aged or cracked)	

FAULT DIAGNOSIS

1. THE WHOLE FRONT WIPER AND WASHER SYSTEM DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if wiper and washer system works normally when the ignition switch is in the "ON" position	Diagnosis end	Wiper and washer system does not work	Go to Step 1
1	Check fuse	Normal	Faulty	Instruction
	Check whether wiper fuse FS30 of cab fuse box is blown out	Go to Step 3	Fuse is blown	Replace the fuse. If the fuse is blown again, go to Step 2
2	Check wiper power circuit	Normal	Faulty	Instruction
	Disconnect the negative cable of battery, and check the resistance between wiper power circuit and the grounding with digital multimeter.	Go to Step 3	Small resistance indicates short circuit in the power circuit or short circuit to ground in the wiper and washer system components.	Gradually identify the short circuit point, and then replace the fuse with the same capacity after troubleshooting Rated capacity: FS30 10A
3	Check wiper power circuit	Normal	Faulty	Instruction
	• Disconnect the connector of wiper combination switch when the ignition switch is in "LOCK" position • When the ignition switch is in "ON" position, measure the voltage between No. 2 terminal of I11 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 4	The inspection voltage is out of the specified range	The abnormal voltage indicates that there is open circuit in the wiper power circuit. Check and fix the circuit between the connectors of combination switch and fuse
4	Check wiper grounding circuit	Normal	Faulty	Instruction
	• Disconnect front wiper motor connector U02 • Check the resistance between No. 4 terminal of U02 and the grounding with a digital multimeter **Resistance: <2Ω**	Go to Step 5	The inspection resistance is out of the specified range	The abnormal resistance indicates that there is open circuit in the wiper motor grounding circuit. Check and fix the circuit between wiper motor connector and grounding point G14.
5	Check the wiper combination switch	Normal	Faulty	Instruction

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Steps	Inspection Item	Inspection result		
	Check the wiper combination switch for damage according to the inspection method for combination switch in on-vehicle inspection.	Go to Step 6	Combination switch is damaged	Replace wiper combination switch
6	Check wiper motor	Normal	Faulty	Instruction
	Check whether wiper connecting rod is in good condition and check whether the wiper motor operates normally according to on-vehicle inspection.	Find the cause out from other fault symptoms	Connecting rod is damaged or wiper motor fails	Maintain or replace wiper connecting rod or wiper motor

2. ONLY FRONT WIPER HI POSITION DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only wiper HI position does not work when the ignition switch in the "ON" position	Diagnosis end	Front wiper HI position does not work	Go to Step 1
1	Check the wiper combination switch	Normal	Faulty	Instruction
	Check the wiper combination switch for damage according to the inspection method for combination switch in on- vehicle inspection.	Go to Step 2	Combination switch is damaged	Replace wiper combination switch
2	Check wiper motor circuit	Normal	Faulty	Instruction
	• Disconnect front wiper motor connector U02 • When the ignition switch is in "ON" position and the wiper motor is in HI position, measure the voltage between No. 3 terminal of U02 and the grounding with a multimeter Voltage: 9 - 13V	Go to Step 3	Improper voltage indicates open point in the circuit between wiper combination switch and front wiper motor.	Maintain the wire harness open circuit between the wiper combination switch and wiper motor
3	Check front wiper motor	Normal	Faulty	Instruction
	Check whether the front wiper motor works normally according to on-vehicle inspection	Find the cause out from other fault symptoms	Wiper motor fault	Maintain or replace wiper motor

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3. ONLY FRONT WIPER LO POSITION DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only wiper LO position does not work with the ignition switch in the "ON" position	Diagnosis end	Front wiper LO position does not work	Go to Step 1
1	Check the wiper combination switch	Normal	Faulty	Instruction
	Check the wiper combination switch for damage according to the inspection method for combination switch in on-vehicle inspection.	Go to Step 2	Combination switch is damaged	Replace wiper combination switch
2	Check wiper motor circuit	Normal	Faulty	Instruction
	• Disconnect front wiper motor connector U02 • When the ignition switch is in "ON" position and the wiper motor is in HI position, measure the voltage between No. 5 terminal of U02 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 3	Improper voltage indicates open point in the circuit between wiper combination switch and front wiper motor.	Maintain the wire harness open circuit between the wiper combination switch and wiper motor
3	Check front wiper motor	Normal	Faulty	Instruction
	Check whether the front wiper motor works normally according to on-vehicle inspection	Find the cause out from other fault symptoms	Wiper motor fault	Maintain or replace wiper motor

4. ONLY FRONT WIPER INT POSITION DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only wiper INT position does not work when the ignition switch in the "ON" position	Diagnosis end	Front wiper INT position does not work	Go to Step 1
1	Check the wiper combination switch	Normal	Faulty	Instruction
	Replace with the combination switch of the same model and check whether wiper system works normally	Find the cause out from other fault symptoms	Combination switch is damaged	Replace wiper combination switch

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5. ONLY FRONT WIPER WASHING POSITION DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only wiper washing position does not work when the ignition switch is in the "ON" position	Diagnosis end	Front wiper washing position does not work	Go to Step 1
1	Check front washer motor power circuit	Normal	Faulty	Instruction
	• Disconnect front washer motor connector U09 • When the ignition switch is in "ON" position, measure the voltage between No. 3 terminal of U09 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 2	Improper voltage indicates open point in the front washer motor power circuit	Maintain the circuit between the wiper fuse and front washer motor
2	Check front washer motor	Normal	Faulty	Instruction
	Check the resistance between the No. 2 terminal and No. 3 terminal of washer motor with multimeter. **Resistance: <5Ω**	Go to Step 3	Washer motor is damaged	Replace front washing motor
3	Check the wiper combination switch	Normal	Faulty	Instruction
	Replace with the combination switch of the same model and check whether wiper system works normally	Go to Step 4	Combination switch is damaged	Replace wiper combination switch
4	Check the grounding circuit of wiper combination switch	Normal	Faulty	Instruction
	• Disconnect wiper combination switch connector I12 • Check the resistance between No. 2 terminal of I12 and the grounding. **Resistance: <2Ω**	Find the cause out from other fault symptoms	The circuits have open points	Check and fix the wire harness open circuit between wiper combination switch connector and grounding point G21

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6. ONLY REAR WIPER WASHING POSITION DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only rear wiper washing position does not work when the ignition switch is in the "ON" position	Diagnosis end	Rear wiper washing position does not work	Go to Step 1
1	Check rear washer motor power circuit	Normal	Faulty	Instruction
	• Disconnect rear washer motor connector U10 • When the ignition switch is in "ON" position, measure the voltage between No. 3 terminal of U10 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 2	Improper voltage indicates open point in the front washer motor power circuit	Maintain the circuit between the wiper fuse and front washer motor
2	Check rear washer motor	Normal	Faulty	Instruction
	Check the resistance between the No. 2 terminal and No. 3 terminal of washer motor with multimeter. **Resistance: <5Ω**	Go to Step 3	Washer motor is damaged	Replace front washing motor
3	Check rear washer motor grounding circuit	Normal	Faulty	Instruction
	• Disconnect rear washer motor connector U10 • Check the voltage between No. 2 terminal of U10 and the grounding with a multimeter **Resistance: <2Ω**	Go to Step 4	The grounding circuit of rear washer motor has open points	Maintain the wire harness open circuit between rear washer motor and grounding point G11
4	Check the wiper combination switch	Normal	Faulty	Instruction
	Check the wiper combination switch for damage according to the inspection method for combination switch in on-vehicle inspection.	Diagnosis end	Combination switch is damaged	Replace wiper combination switch

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7. ONLY REAR WIPER DOES NOT WORK

Steps	Inspection Item	Inspection result		
0	Preliminary inspection	Normal	Faulty	Instruction
	• Ensure normal working of power supply system • Check if only rear wiper does not work when the ignition switch is in the "ON" position	Diagnosis end	Only rear wiper does not work	Go to Step 1
1	Check the wiper combination switch	Normal	Faulty	Instruction
	Check the wiper combination switch for damage according to the inspection method for combination switch in on-vehicle inspection.	Go to Step 2	Combination switch is damaged	Replace wiper combination switch
2	Check rear wiper motor power circuit	Normal	Faulty	Instruction
	• Disconnect the rear wiper motor connector L05 • Check the rear wiper motor connector for looseness or damage • When the ignition switch is in "ON" position, measure the voltage between No. 3 terminal of L05 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 3	The rear wiper motor power circuit has open points	Maintain the wire harness open circuit between the wiper combination switch and rear wiper motor
3	Check rear wiper motor grounding circuit	Normal	Faulty	Instruction
	• Disconnect the rear wiper motor connector L05 • Check the resistance between No. 4 terminal of L05 and the grounding with a multimeter **Resistance: <2Ω**	Go to Step 4	The rear wiper motor grounding circuit has open points	Maintain the wire harness open circuit between rear washer motor and grounding point G31
4	Check rear wiper motor	Normal	Faulty	Instruction
	Check the rear wiper motor for damage according to the inspection method for rear wiper motor in on-vehicle inspection	Diagnosis end	Wiper motor is damaged	Replace rear wiper motor

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8. WIPER ARM CANNOT RETURN TO ITS ORIGINAL POSITION OR THE POSITION IS NOT CORRECT (AFTER THE WIPER COMBINATION SWITCH IS TURNED OFF)

Steps	Inspection Item	Inspection result		
0	Check wiper arm	Normal	Faulty	Instruction
	Check if wiper arm is installed correctly	Go to Step 1	Wiper arm is incorrectly installed	Re-adjust the installation position of wiper arm
1	Check wiper motor return power circuit	Normal	Faulty	Instruction
	• Disconnect front wiper motor connector U02 • When the ignition switch is in "ON" position, measure the voltage between No. 1 terminal of U02 and the grounding with a multimeter **Voltage: 9 - 13V** • Disconnect the rear wiper motor connector L05 • When the ignition switch is in "ON" position, measure the voltage between No. 2 terminal of L05 and the grounding with a multimeter **Voltage: 9 - 13V**	Go to Step 2	The wiper motor return power circuit has open points	Maintain the wire harness open circuit between the fuse and wiper motor
2	Check the wiper combination switch	Normal	Faulty	Instruction
	Replace with combination switch of the same model and check whether the front wiper arm can return to its original position correctly	Go to Step 3	Combination switch is damaged	Replace wiper combination switch
3	Check front wiper motor	Normal	Faulty	Instruction
	Check whether the front wiper motor works normally according to on-vehicle inspection	Go to Step 4	Wiper motor fault	Maintain or replace wiper motor
4	Check rear wiper motor	Normal	Faulty	Instruction
	Check the rear wiper motor for damage according to the inspection method for rear wiper motor in on-vehicle inspection	Find the cause out from other fault symptoms	Wiper motor is damaged	Replace rear wiper motor

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9. POOR WATER SCRAPING EFFECT (CANNOT WIPE THE WATER OFF COMPLETELY OR VIBRATES)

Steps	Inspection Item	Inspection result		
0	Check windshield glass	Normal	Faulty	Instruction
	• Check if the windshield glass has oil stain, dirt or wax.	Go to Step 1	The vehicle glass has dirt	Clean vehicle glass
1	Check windshield glass	Normal	Faulty	Instruction
	Check whether the washer fluid is sufficient and whether there is impurity or oil in washer fluid	Go to Step 2	Washer fluid is insufficient or impure	Refill or replace washer fluid
2	Check wiper blade	Normal	Faulty	Instruction
	• Check if wiper blade model matches with the windshield glass • Check if wiper blade rubber is aging or cracked.	Go to Step 3	The wiper blade do not conform to the regulation or is damaged	Replace wiper blade
3	Check wiper arm	Normal	Faulty	Instruction
	• Check if wiper arm is deformed or damaged • Check if wiper arm spring force decreases	Go to Step 4	Wiper arm fault	Adjust or replace wiper arm
4	Check the wiper connecting rod mechanism	Normal	Faulty	Instruction
	Check the wiper mechanism for deformation and damage	Find the cause out from other fault symptoms	The wiper connecting rod is deformed or damaged	Adjust the installation position of wiper connecting rod mechanism, repair the deformed parts and replace the damaged wiper mechanism

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10. WASHER FLUID IS NOT INJECTED, INJECTED WEAKLY OR INJECTED IN THE WRONG DIRECTION

Steps	Inspection Item	Inspection result		
0	Check washer fluid	Normal	Faulty	Instruction
	• Check if washer fluid in washer fluid reservoir is insufficient • Check if washer fluid in washer fluid reservoir is frozen	Go to Step 1	Washer fluid is insufficient or frozen	Replace with the washer fluid conforming to specification
1	Check washer hose	Normal	Faulty	Instruction
	• Check if washing hose is damaged or blocked	Go to Step 2	Washer fluid is insufficient or impure	Refill or replace washer fluid
2	Check nozzle	Normal	Faulty	Instruction
	• Check if nozzle is blocked?	Go to Step 3	The wiper blade does not conform to the regulation or is damaged	Replace wiper blade
3	Check nozzle installation	Normal	Faulty	Instruction
	• Check if the installation direction of nozzle is correct • Check if wiper arm spring force decreases	Find the cause out from other fault symptoms	Wiper arm fault	Adjust or replace wiper arm

11. DIAGNOSIS OF ABNORMAL NOISE OF WIPER

Steps	Inspection Item	Inspection result		
0	Check windshield glass	Normal	Faulty	Instruction
	• Check the windshield glass and remove the foreign matters on the windshield glass. If there is thick scratch or crack, replace the windshield glass • Check the wiper blade or wiper arm for deformation or damage area	Go to Step 1	There are foreign matters on the windshield glass or the wiper blade and wiper arm are damaged	• Clean the windshield glass with specified windshield glass washing agent • After cleaning the windshield glass, if the water evenly distributes on it other than forming drops, it indicates that the windshield glass is clean
1	Check washer fluid	Normal	Faulty	Instruction
	Replace with specified washer fluid and check whether wiper blade works properly	Go to Step 2	Washer fluid is insufficient or impure	Refill or replace washer fluid
2	Check wiper blade and wiper arm	Normal	Faulty	Instruction
	Lift the wiper blade and arm off the windshield glass and re-carry out the scraping operation of wiper. Judge whether the strange noise is from contact of wiper and windshield glass or wiper system malfunction	Find the cause out from other fault symptoms	Confirm the part generating noise and check corresponding malfunction part	Clean the foreign matters on the wiper blade or replace the malfunction wiper system components

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FRONT WIPER ARM

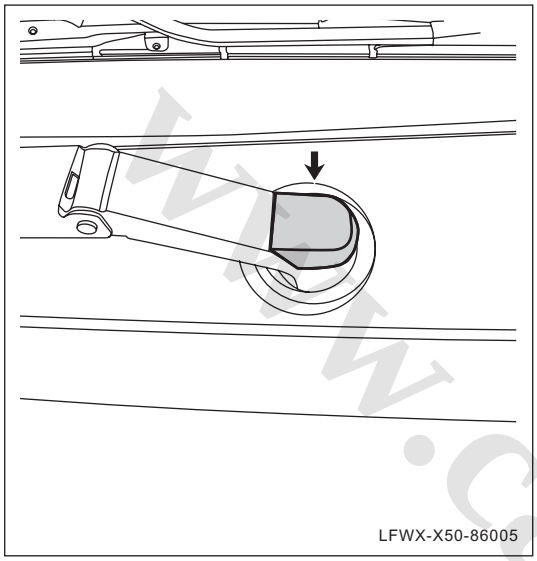
REPLACEMENT

1. REMOVE WIPER ARM ASSEMBLY

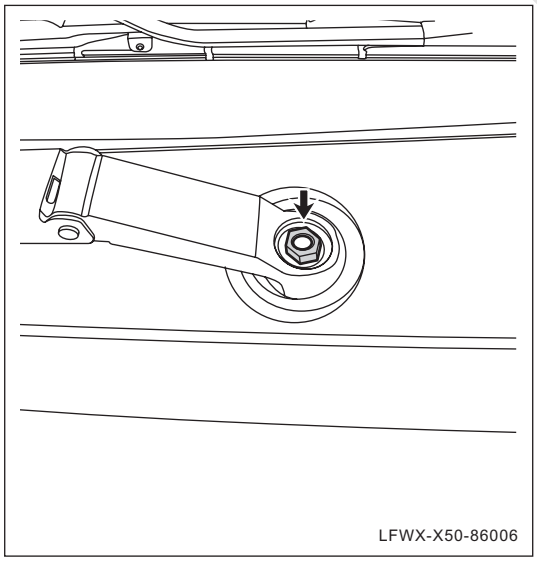
(a). Open the wiper switch and close it immediately to have the wiper return to its original position automatically

NOTICE:

DO NOT TURN ON WIPER SWITCH WHEN WINDSHIELD GLASS ASSEMBLY IS DRY TO AVOID DAMAGING WINDSHIELD GLASS ASSEMBLY.



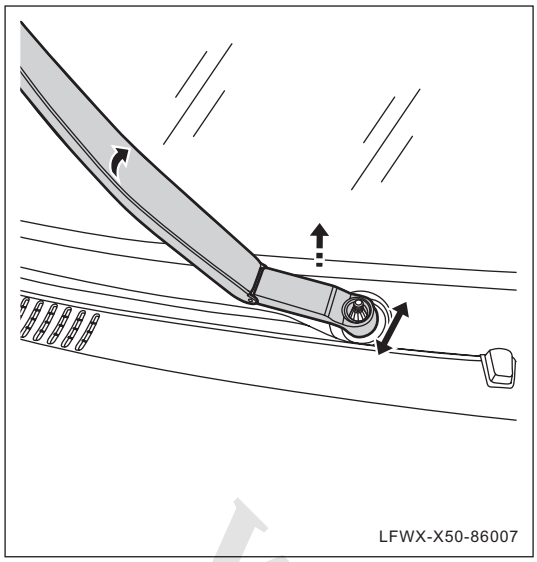
(b). Pry the wiper arm installation plug.



(c). Remove the fixing nuts of wiper arm.

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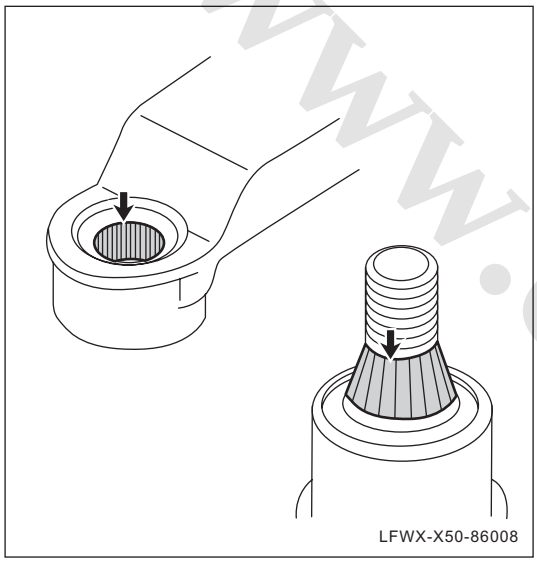
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(d). Take out the wiper arm assembly.

△ HINT:

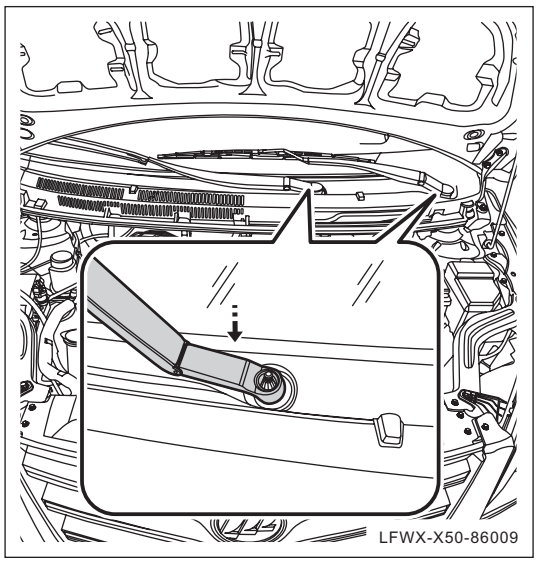
- Before removing the wiper arm, it is recommended to mark wiper arm position on windshield glass, facilitating the installation.
- Turn up the wiper arm assembly, shake it up and down and take out the wiper arm assembly



2. INSTALL WIPER ARM ASSEMBLY

(a). Clean the splined hole of wiper arm with a round file or equivalent.

(b). Using a steel wire, clean the spline shaft of the wiper linkage.



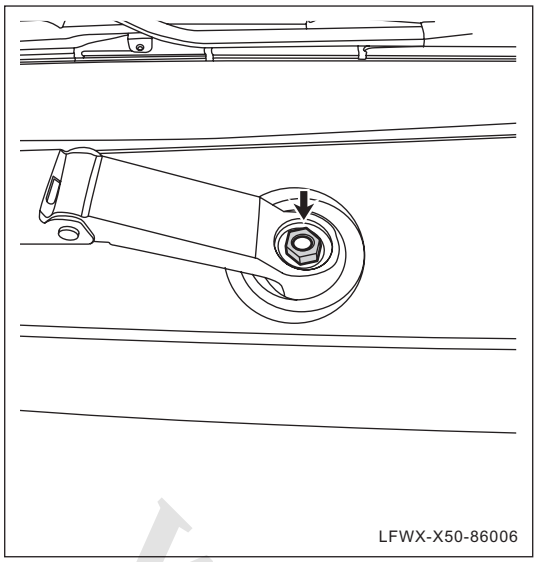
(c). Place wiper assembly in the installation place.

△ HINT:

Install according to the mark made during removal

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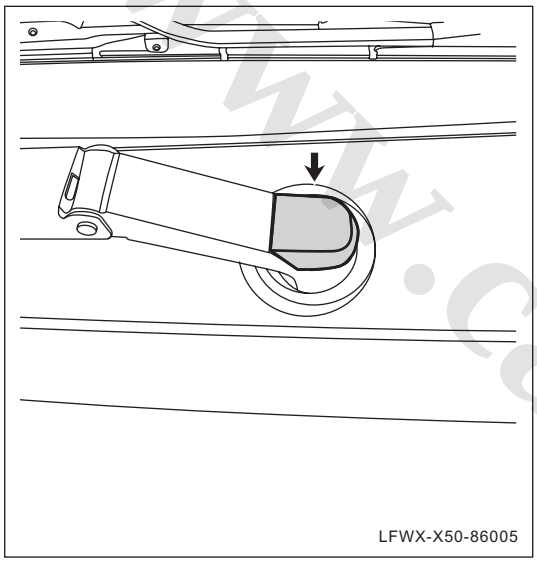
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LFWX-X50-86006

(d). Install and tighten fixing nuts of wiper arm.

Torque: 6 - 12 N•m



LFWX-X50-86005

(e). Install the wiper arm installation plug.

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REAR WIPER ARM

REPLACEMENT

△ HINT:

Replacement method of rear wiper arm is the same with that of front wiper arm

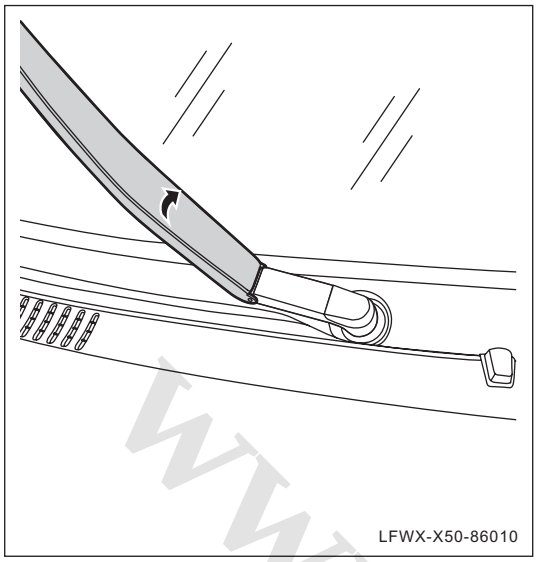
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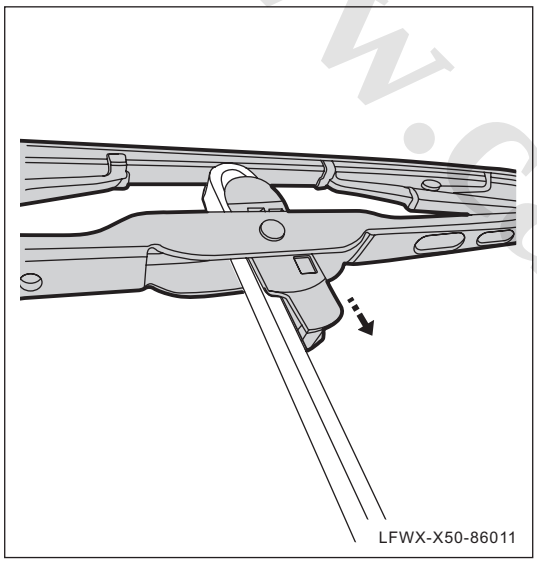
WIPER BLADE

REPLACEMENT

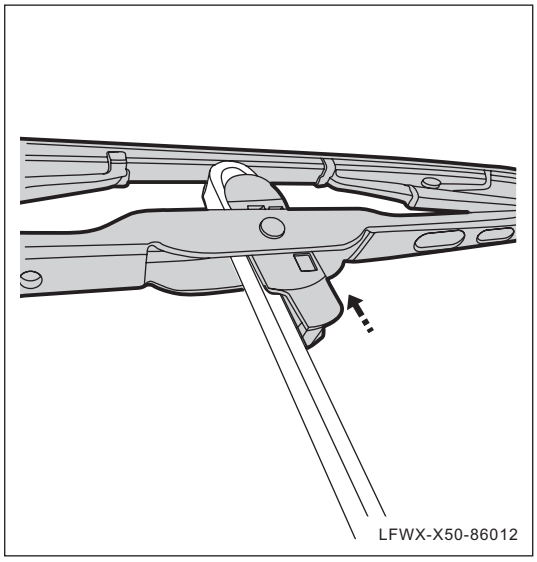


1. REMOVE WIPER BLADE

(a). Turn up wiper arm assembly.



(b). Rotate the wiper blade, push out the wiper arm connecting part, and remove the wiper blade.



2. INSTALL WIPER BLADE

(a). Install wiper blade.

△ HINT:

If you hear a click, it indicates the wiper blade assembly is installed in place.

(b). Turn over the wiper blade and turn down wiper arm assembly.

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WIPER CONNECTING ROD MECHANISM AND MOTOR ASSEMBLY

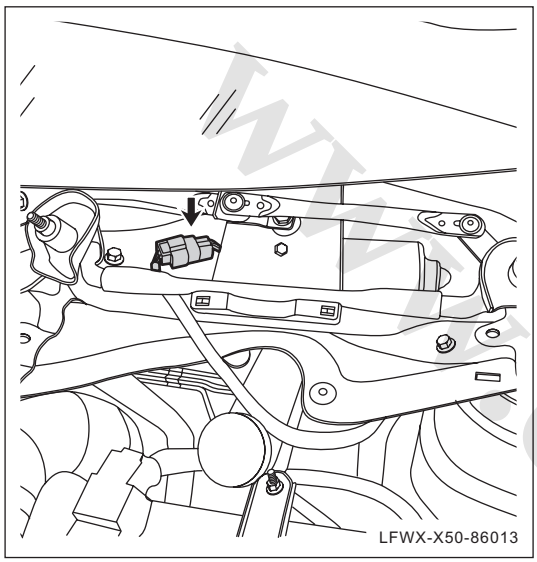
REPLACEMENT

1. REMOVE THE WIPER CONNECTING ROD MECHANISM AND MOTOR ASSEMBLY

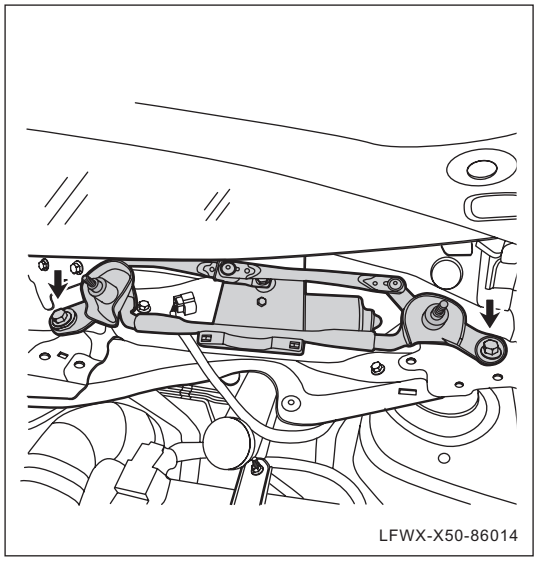
(a). Disconnect negative cable of battery.

(b). Remove front wiper arm assembly. (See 86 - Wiper and Washer System, Wiper Arm, Replacement)

(c). Remove front wall cowl top grille assembly. (See 81 - Interiors and Exteriors, Front Wall Cowl Top Grille, Replacement)



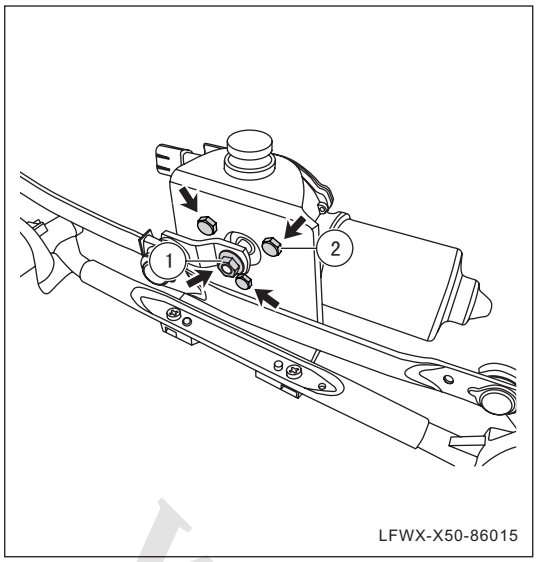
(d). Disconnect wiper motor assembly wire harness connector.



(e). Remove the fixing bolts of wiper connecting rod mechanism and motor assembly and take down the wiper connecting rod mechanism and motor assembly.

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2. DISASSEMBLE THE WIPER CONNECTING ROD MECHANISM AND MOTOR ASSEMBLY

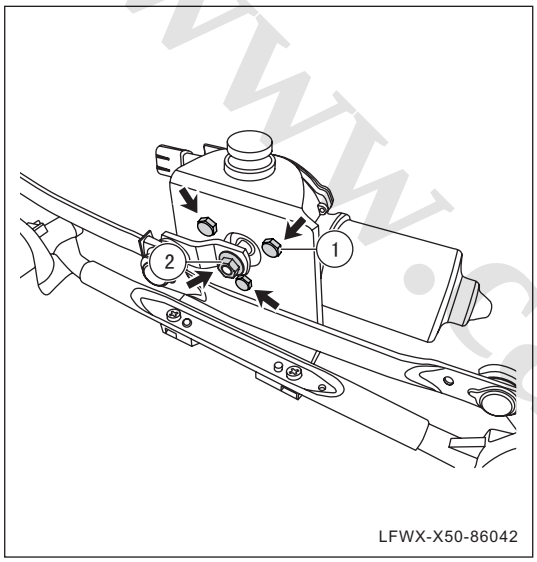
(a). Remove fixing nut ① of wiper motor and connecting rod swing arm.

△ HINT:

Do not rotate the wiper motor during removal and mark for assembly on connecting rod swing arm. Make sure to install according to the original position.

(b). Remove fixing bolts ② of wiper motor and connecting rod bracket.

(c). Take out wiper motor assembly.



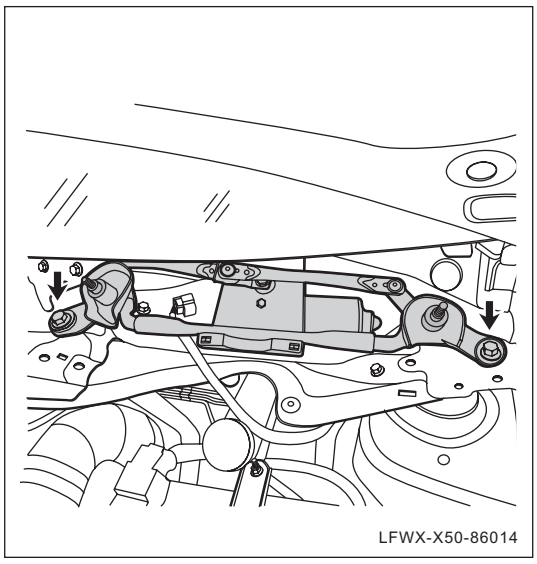
3. ASSEMBLE WIPER CONNECTING ROD MECHANISM AND MOTOR ASSEMBLY

(a). Install fixing bolts of wiper motor and connecting rod bracket.

Torque: 6 - 12 N•m

(b). Install fixing nuts of wiper motor and connecting rod swing arm.

Torque: 6 - 12 N•m



4. INSTALL WIPER CONNECTING ROD MECHANISM AND MOTOR ASSEMBLY

(a). Install wiper connecting rod mechanism and motor assembly to the installation position.

△ HINT:

Install the locating pin of wiper connecting rod mechanism and motor assembly in place when installing

(b). Install and tighten the fixing bolts of wiper connecting rod mechanism and motor assembly.

Torque: 6 - 12 N•m

(c). Connect wiper motor assembly wire harness connector.

NOTICE:

WHEN CONNECTING THE CONNECTOR, IF YOU HEAR CLICK SOUND CLEARLY, IT INDICATES THAT THE CONNECTOR IS CONNECTED IN PLACE.

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(d). Install the front wall cowl top grille. (See 81 - Interiors and Exteriors, Front Wall Cowl Top Grille, Replacement)

(e). Install the negative cable of battery, set the ignition key in "ON" position, turn on the wiper switch and then turn it off to have the wiper motor return to the original position automatically.

(f). Install wiper arm assembly (See 86 - Wiper and Washer System, Front Wiper Arm, Replacement)

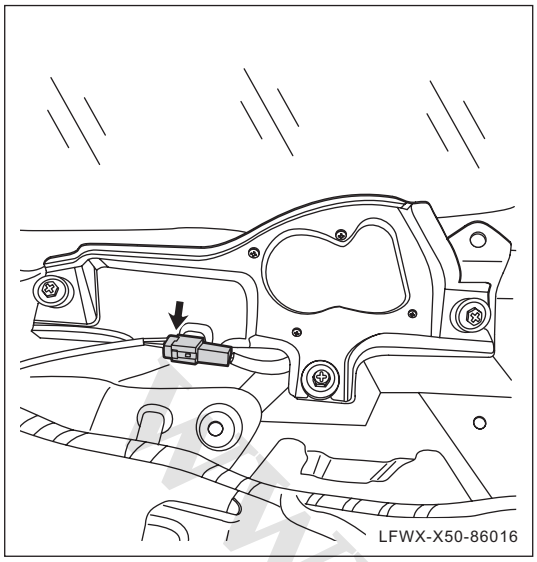
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TAIL DOOR WIPER MOTOR ASSEMBLY

REPLACEMENT



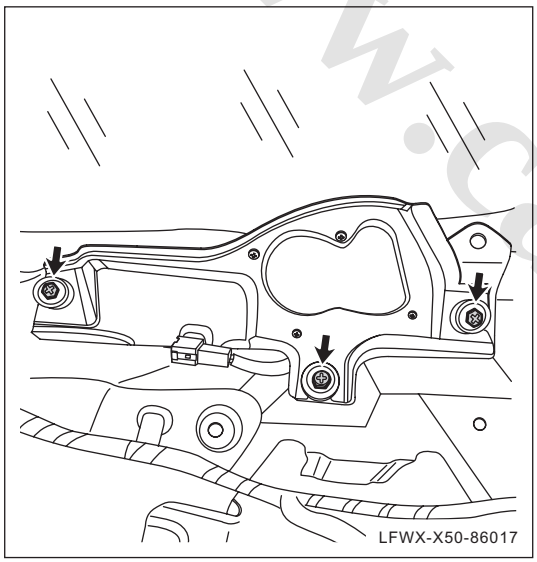
1. REMOVE TAIL DOOR WIPER MOTOR ASSEMBLY

(a). Disconnect negative cable of battery.

(b). Remove rear wiper arm. (See 86 - Wiper and Washer System, Rear Wiper Arm, Replacement)

(c). Remove tail door panel. (See 81 - Interiors and Exteriors, Tail Door Interior Trim Panel, Replacement)

(d). Disconnect the tail door wiper motor connector.



(e). Remove the fixing bolts of tail door wiper motor and take out the tail door wiper motor.

△ HINT:

Check the rotor shaft shield of tail door wiper motor for aging and damage. Replace it if any.

2. INSTALL TAIL DOOR WIPER MOTOR ASSEMBLY

(a). Align the tail door wiper motor with installation position, and install and tighten the fixing bolts.

Torque: 6 - 12 N•m

(b). Connect the tail door wiper motor connector.

(c). Install the tail door panel. (See 81 - Interiors and Exteriors, Tail Door Trim Panel, Replacement)

(d). Install the rear wiper arm. (See 86 - Wiper and Washer System, Rear Wiper Arm, Replacement)

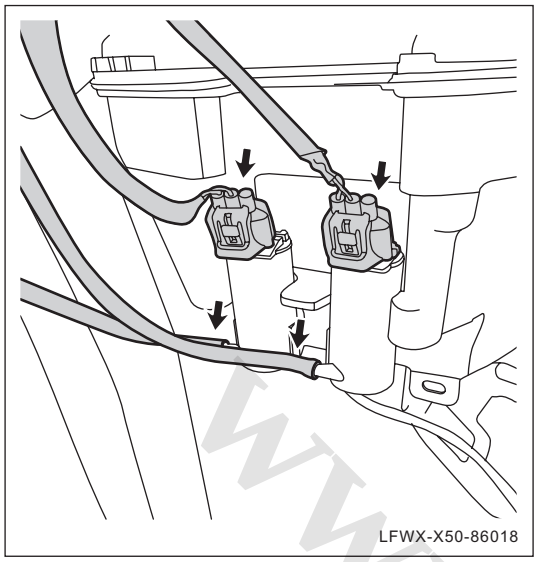
(e). Install the negative cable of battery.

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WASHER FLUID RESERVOIR ASSEMBLY

REPLACEMENT



1. REMOVE WINDSHIELD WASHER ASSEMBLY

(a). Disconnect negative cable of battery.

(b). Remove front bumper assembly. (See 81- Interiors and Exteriors, Front Bumper, Replacement).

(c). Remove front combination light assembly. (See 77 - Lighting System, Front Combination Lamp, Replacement)

(d). Disconnect front and rear washer motor connector.

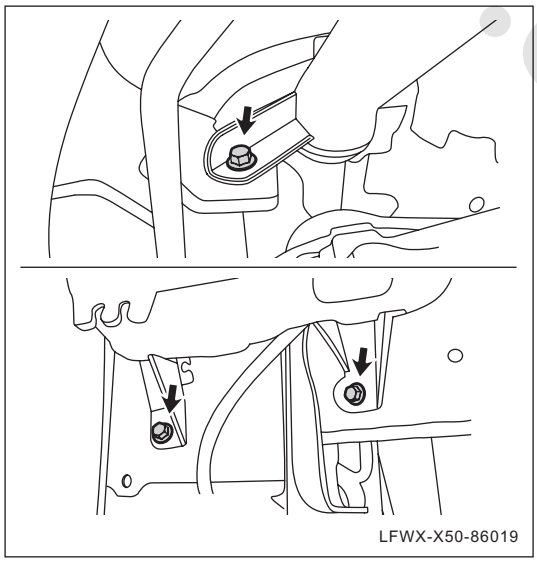
△ HINT:

Before disconnecting the connector, it is recommended to mark on the connector to avoid wrong installation.

(e). Pull out the front and rear washer motor water outlet hose.

△ HINT:

Before disconnecting the hose, place a container under the hose to collect washer fluid.



(f). Remove fixing bolts of washer fluid reservoir assembly.

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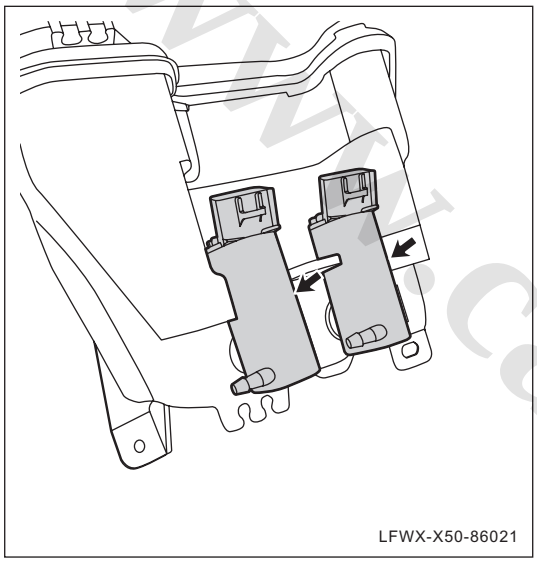
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LFWX-X50-86020

(g). Take out the wire harness fixing clamp and washer fluid reservoir assembly.

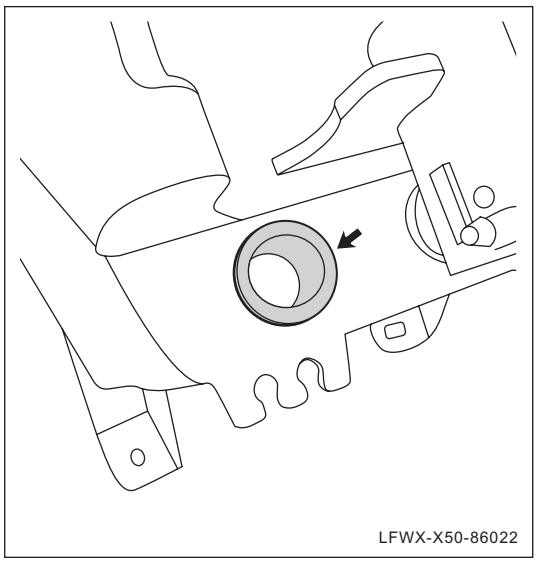
△ HINT:

If there is still washer fluid in the washer fluid reservoir, pour the washer fluid into the specified reusable container.


LFWX-X50-86021

2. REMOVE WASHER MOTOR

(a). Pull out washer motor.


LFWX-X50-86022

3. INSTALL WASHER MOTOR

(a). Install washer motor.

△ HINT:

If the sealing sleeve falls off during removal, install the sleeve into the mounting hole of washer fluid reservoir to facilitate the motor installation.

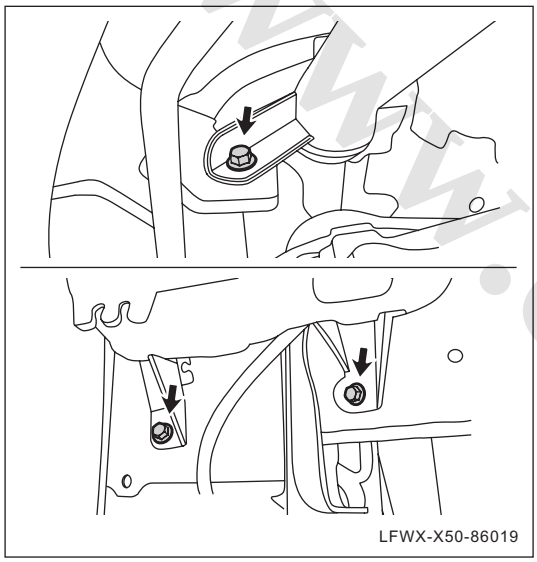
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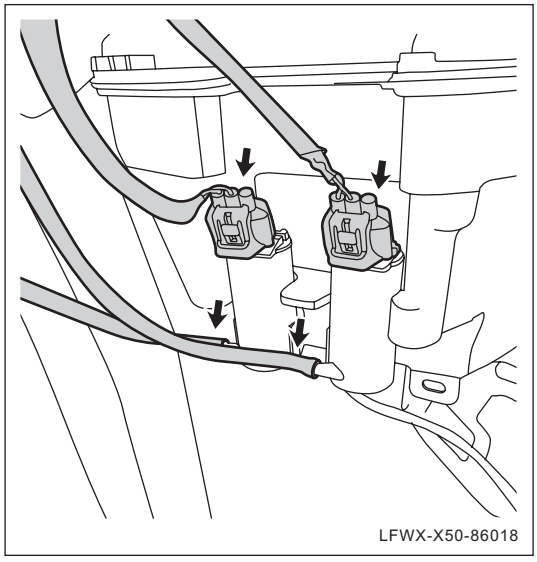
4. INSTALL WASHER FLUID RESERVOIR ASSEMBLY

(a). Place the washer fluid reservoir assembly in the installation position and install the wire harness fixing clamp on the washer fluid reservoir.



(b). Install and tighten fixing bolts of washer fluid reservoir assembly.

Torque: 6 - 12 N•m



(c). Install the front and rear washer motor water outlet hose according to the mark.

(d). Connect front and rear washer motor connector according to the mark.

(e). Install front combination lamp assembly. (See 77 - Lighting System, Front Combination Lamp, Replacement)

(f). Install front bumper assembly. (See 81 - Interiors and Exteriors, Front Bumper, Replacement).

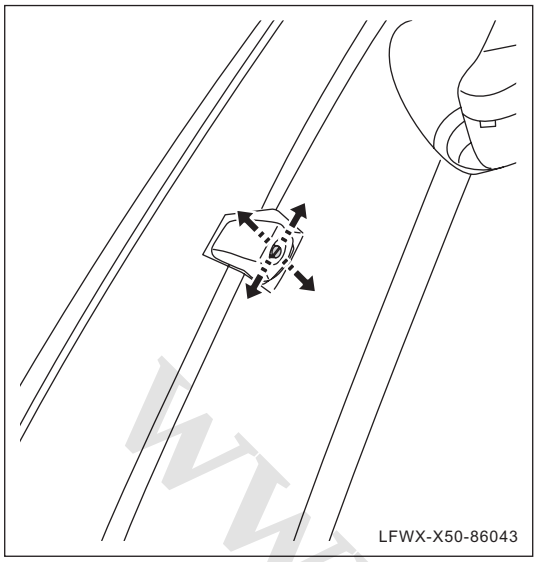
(g). Install the negative cable of battery.

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FRONT NOZZLE

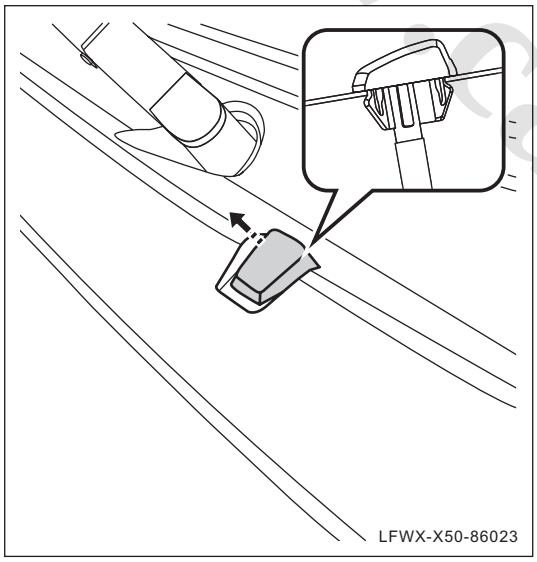
ADJUSTMENT



1. ADJUST NOZZLE

(a). Adjust the injection position of nozzle with flat-blade screwdriver.

REPLACEMENT



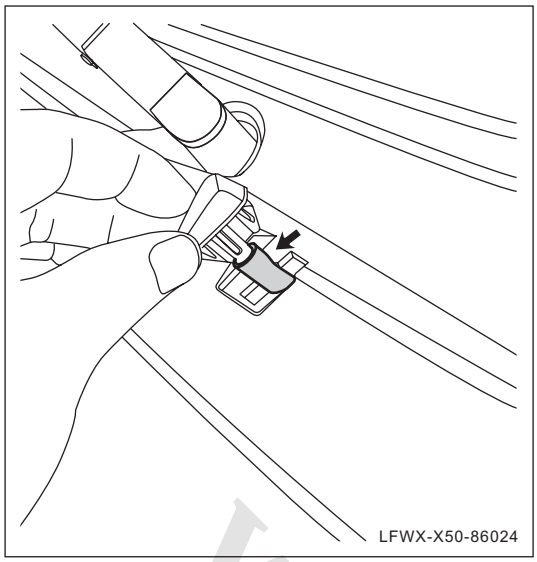
1. REMOVE NOZZLE

(a). Pull out the nozzle.

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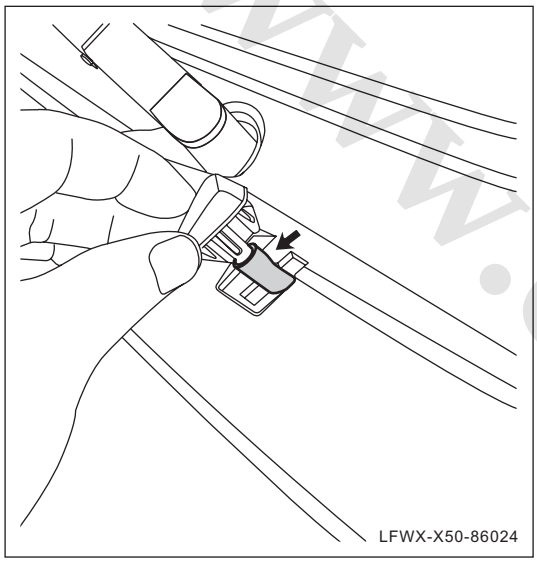
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(b). Pull out the washer hose and take out the nozzle.

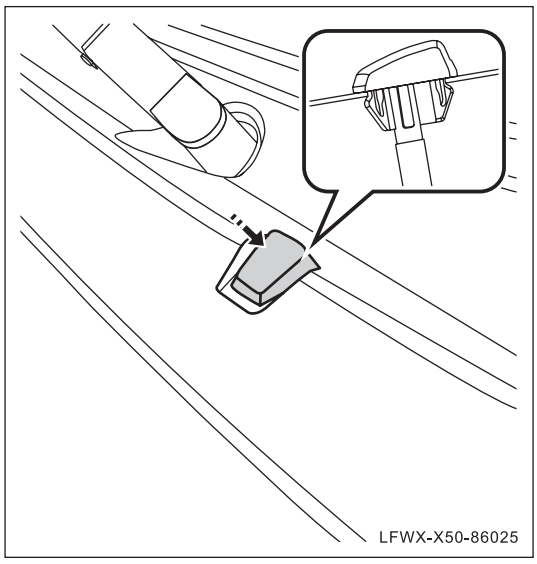
NOTICE:

AFTER PULLING OUT THE HOSE, FIX THE HOSE TO AVOID THE HOSE FALLING IN THE COWL TOP GRILLE.



2. INSTALL NOZZLE

(a). Connect the nozzle and washer hose.



(b). Install washer nozzle.

△ HINT:

Press washer nozzle into installation slot directly. When you hear the clack sound, it means washer nozzle is installed in place.

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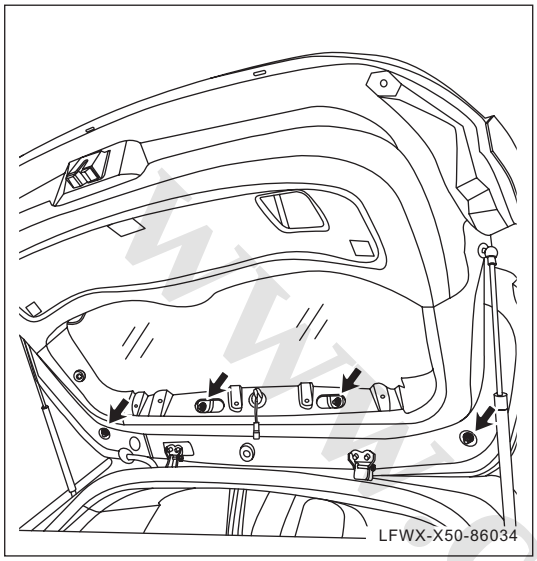
REAR NOZZLE

REPLACEMENT

△ HINT:

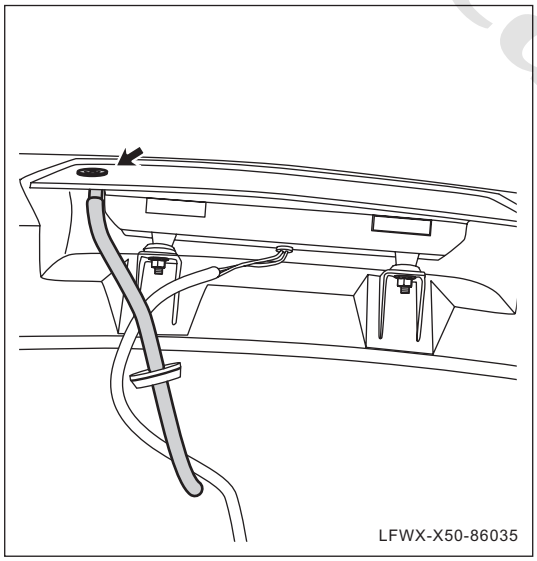
Adjustment method of rear nozzle is the same with that of front nozzle.

REPLACEMENT



1. REMOVE NOZZLE

(a). Remove the deflector. (See 81 - Interiors and Exteriors, Deflector, Replacement)

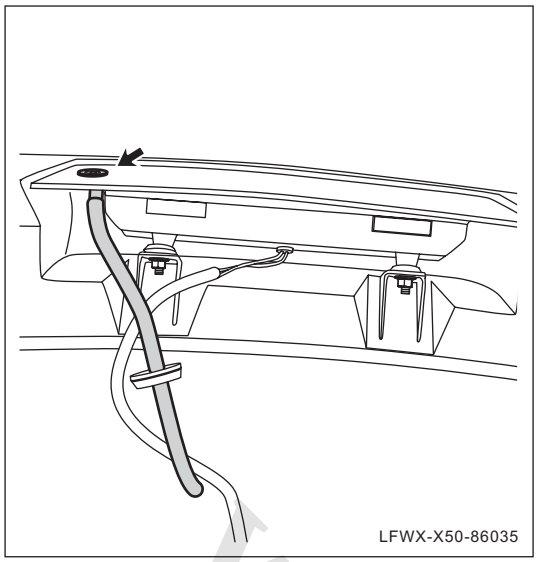


(b). Pull out the washer hose and take out the nozzle outward.

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2. INSTALL NOZZLE

(a). Connect the nozzle and the washer hose.

(b). Install the deflector. (See 81 - Interiors and Exteriors, Deflector, Replacement)

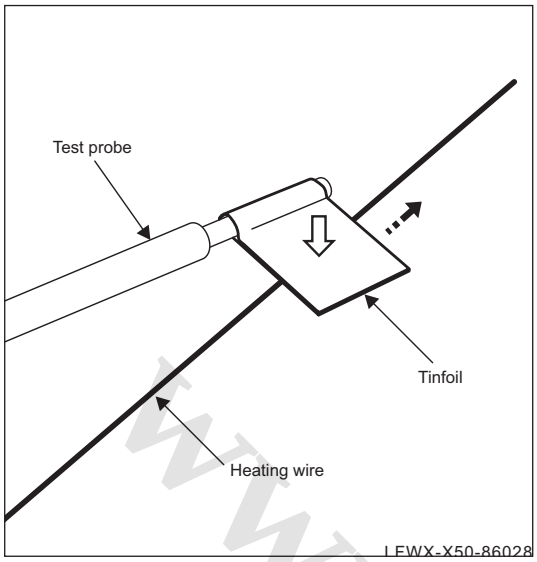
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REAR WINDOW DEFROSTER

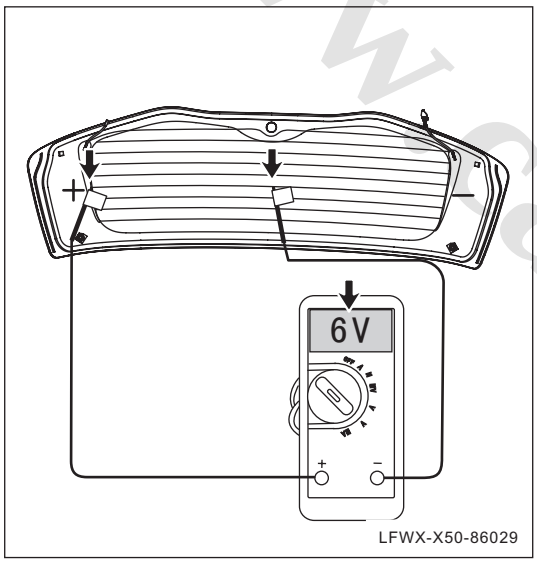
INSPECTION



1. CHECK METHOD

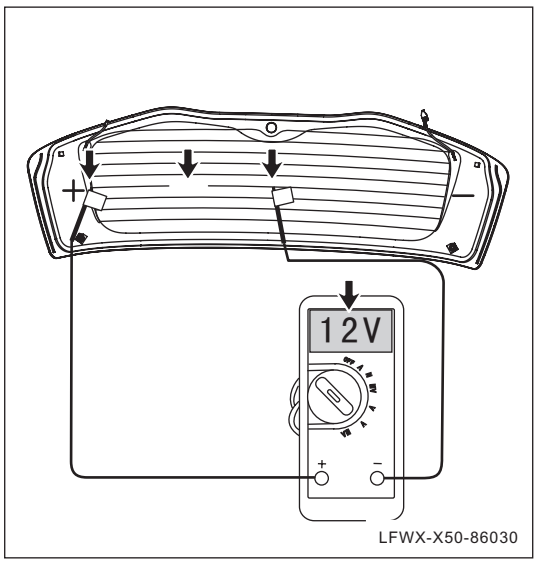
(a). Wind tinfoil on one end of multimeter wire harness to prevent from damaging heating wire.

(b). Press tinfoil by finger and move the tinfoil along heating wire. The other end of multimeter wire harness is pressed on checked heating wire. Check if heating wire has open circuit. If any, repair it. If necessary, replace it .



2. CHECK HEATING WIRE OF REAR WINDOW DEFROSTER

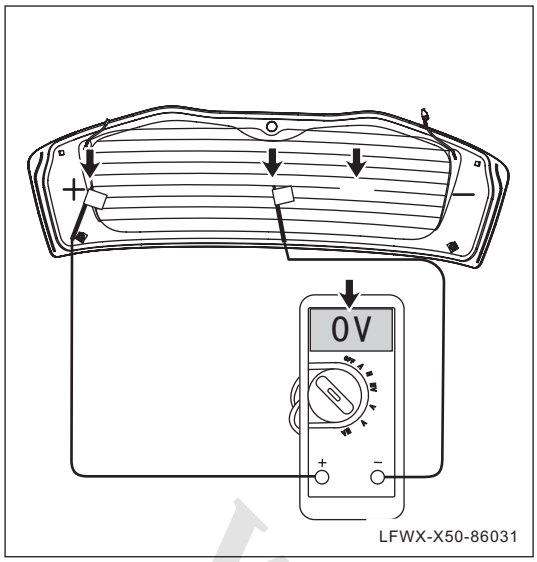
(a). Turn on defroster switch and measure the voltage of each heating wire at the middle of the glass with a multimeter. If the voltage is about 6 V, it means heating wire of rear window is normal.



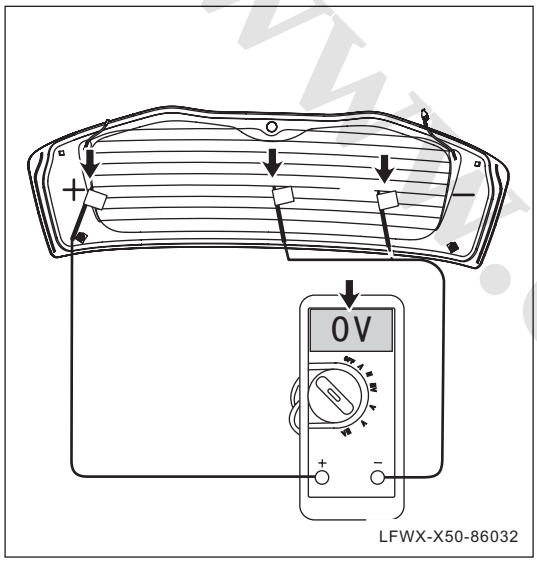
(b). If there is open circuit between central point and positive electrode, the voltage will be displayed as 12 V.

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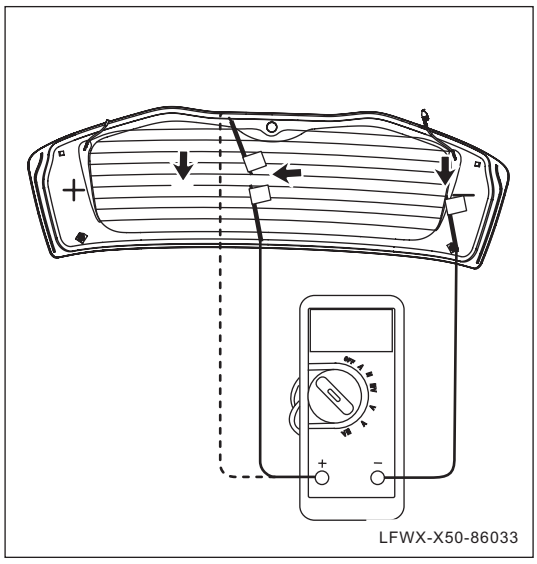
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(c). If there is open circuit between central point and negative electrode, the voltage will be displayed as 0 V.



(d). After it is confirmed which side has open circuit, you can move test probe along this direction until you find that voltage occurs or the voltage changes to 0 V at a certain point. This point is open point.



(e). Measure the resistance between the terminal and grille wire center, the terminal and adjacent heating wire with an ohmmeter. The resistance of the circuit with breaking point is twice of other circuit resistance. Move test probe on affected part until the resistance at a certain point changes sharply.

3. REPAIR HEATING WIRE OF REAR WINDOW DEFROSTER

(a). Prepare repairing materials:

Conductor paint, the paint thinner, masking tape, silicon resin remover.

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(b). Repairing method:

Use a fine brush to remove the glass near heating wire with breaking point and clean it with silicon resin remover and attach masking tape. Shake conducting paint container to mix conducting paint uniformly, brush it once every 15 min. Brush three times totally. Before power on, tear down the tape and ensure the paint becomes dry. It is better to use a knife to scrape off excessive sediment (about 24 h) after the paint becomes dry completely.

NOTICE:

AFTER REPAIRING, CLEAN THE GLASS WITH DRY AND SOFT CLOTH OR WIPE ALONG GRILLE WIRE DIRECTION WITH A WET CLOTH.

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