



مدیران خودرو  
خدمات پس از فروش



# جزوه آموزشی

# سیستم برق خودرو MVM 110S



میریدت فنی و مهندسی / اداره آموزش

ریوایش یدم و

کد: ELC-80-02

# سیستم برق خودروی 110s

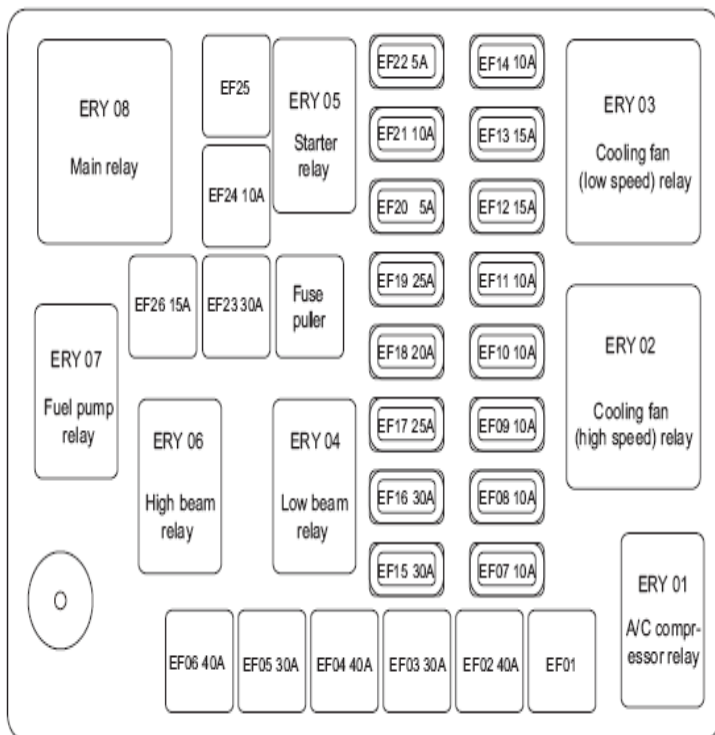
ویرایش دوم

کد : ELC-80-02

تهیه کننده : سجاد اکبری

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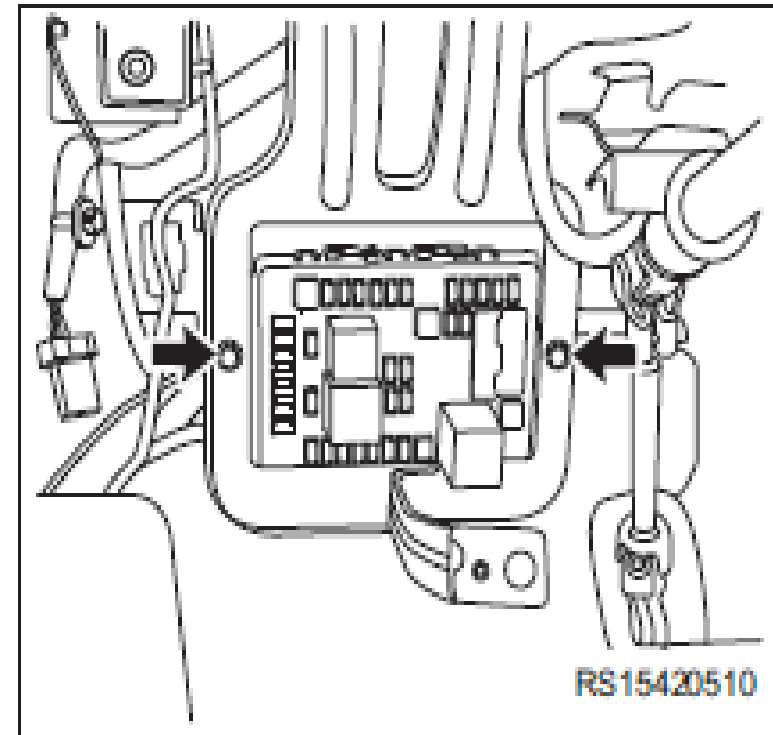
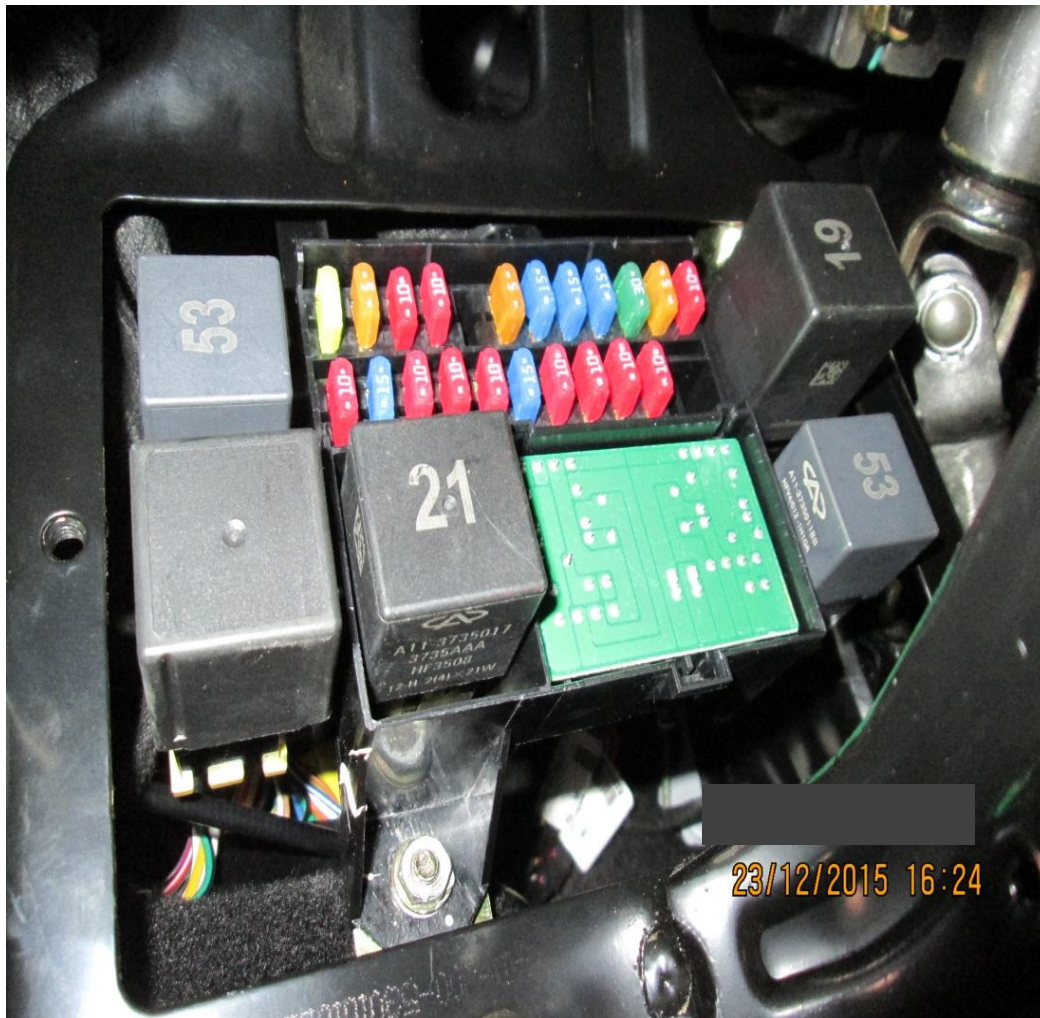
## جعبه فیوز و رله موتور



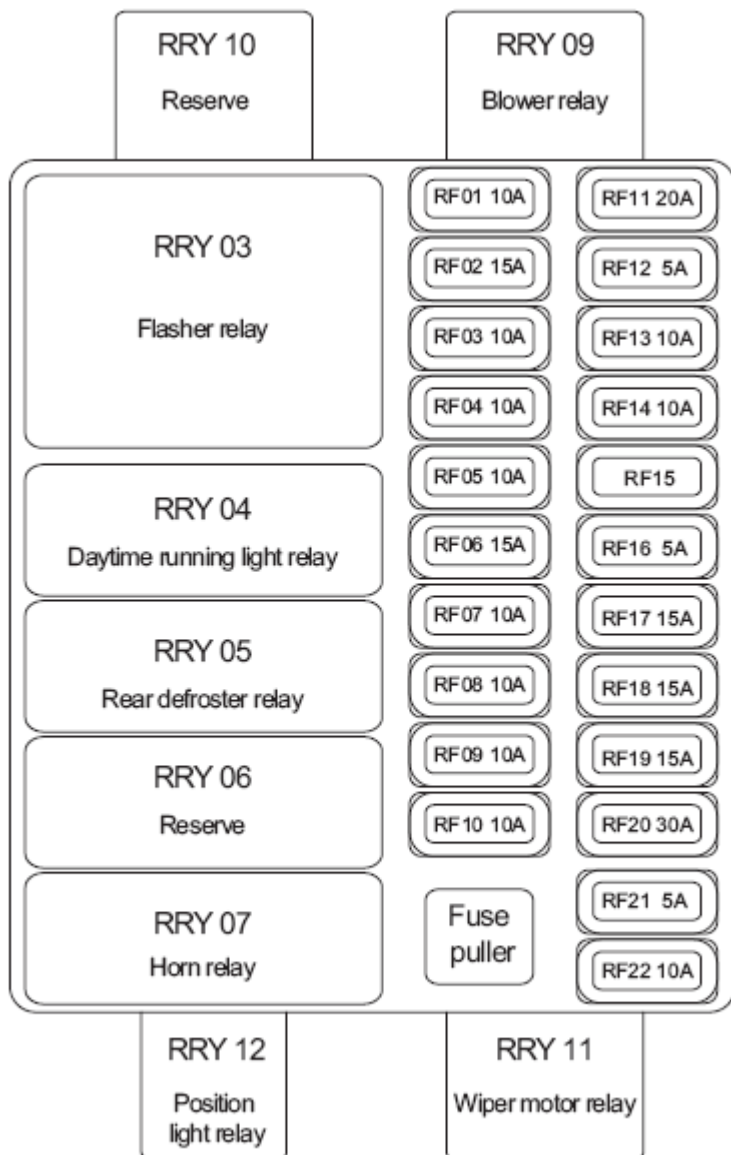
No.	Description
EF01	-
EF02	Ignition Switch
EF03	BCM
EF04	ABS
EF05	IP Fuse and Relay Box
EF06	Cooling Fan (High Speed)
EF07	Right Headlight High Beam
EF08	Left Headlight High Beam
EF09	Right Headlight Low Beam
EF10	Left Headlight Low Beam
EF11	A/C Compressor
EF12	Oxygen Sensor/Ignition Coil/Injector/ Canister Solenoid Valve
EF13	ECM
EF14	ECM
EF15	Blower
EF16	Starter Motor
EF17	ABS
EF18	Front Wiper Reset/Instrument Cluster/ Audio
EF19	Rear Defroster Relay
EF20	ABS
EF21	ECM/Blower/Headlight/Combination Switch
EF22	Back-up Light Switch/Horn Relay
EF23	Cooling Fan (Low Speed)
EF24	Alternator
EF25	-
EF26	Fuel Pump



## جعبه فیوز و رله داخل اتاق



## جعبه فیوز اتاق



No.	Description
RF01	Dome Light/Daytime Running Light Relay
RF02	Flasher Relay
RF03	Brake Light Switch
RF04	Audio
RF05	Instrument Panel Light
RF06	BCM
RF07	Horn Relay
RF08	Rear Defroster Relay
RF09	Rear Position Light/License Plate Light
RF10	Front Position Light
RF11	Alternator/Back-up Light Switch/ABS/ECM
RF12	Headlight Combination Switch/Brake Light Switch
EF13	Airbag
RF14	BCM/Instrument Cluster/Immobilizer
RF15	-
RF16	Audio/Power Mirror/Rear Defroster/Blower
RF17	Front Wiper Switch
RF18	Front/Rear Wiper
RF19	Cigarette Lighter
RF20	Starter Motor
RF21	A/C Switch
RF22	Diagnostic Interface

## حروف اختصاری تعیین کننده رنگ سیم در مدارات الکتریکی

**B: Black** 

**W: White** 

**R: Red** 


**G: Green** 

**L: Blue** 

**V: Purple** 

**P: Pink** 

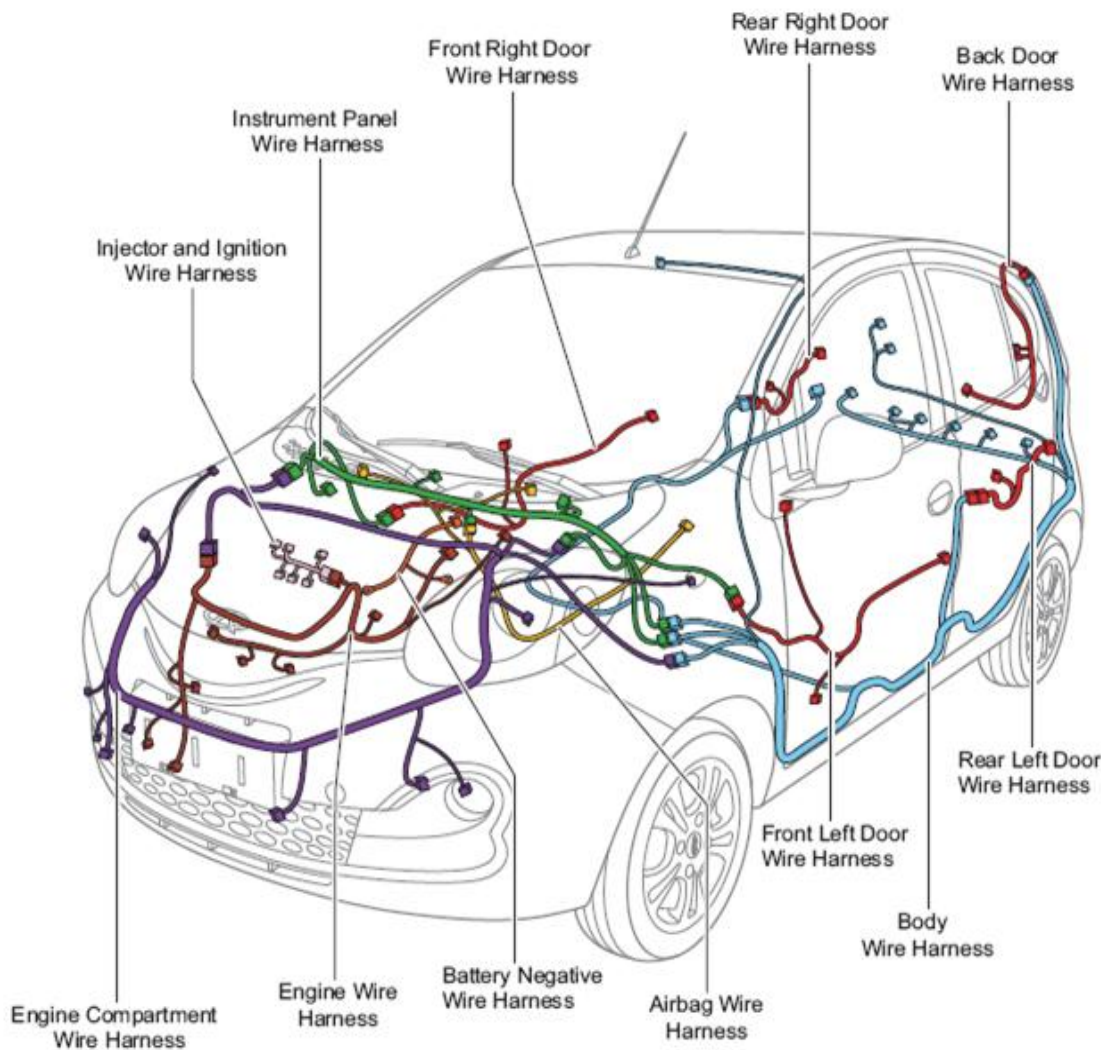
**Br: Brown** 

**Gr: Grey** 

**O: Orange** 

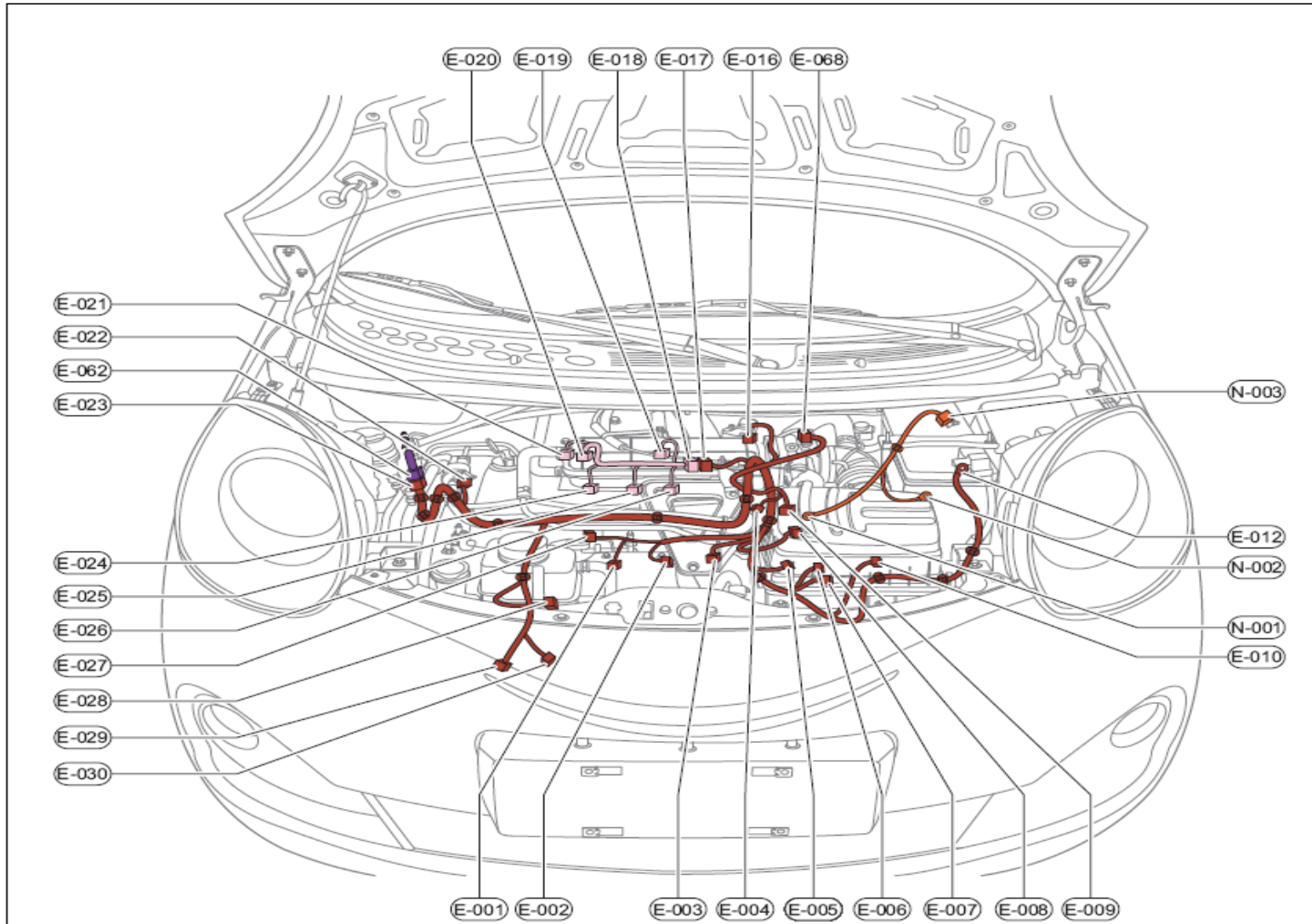
**Y: Yellow** 

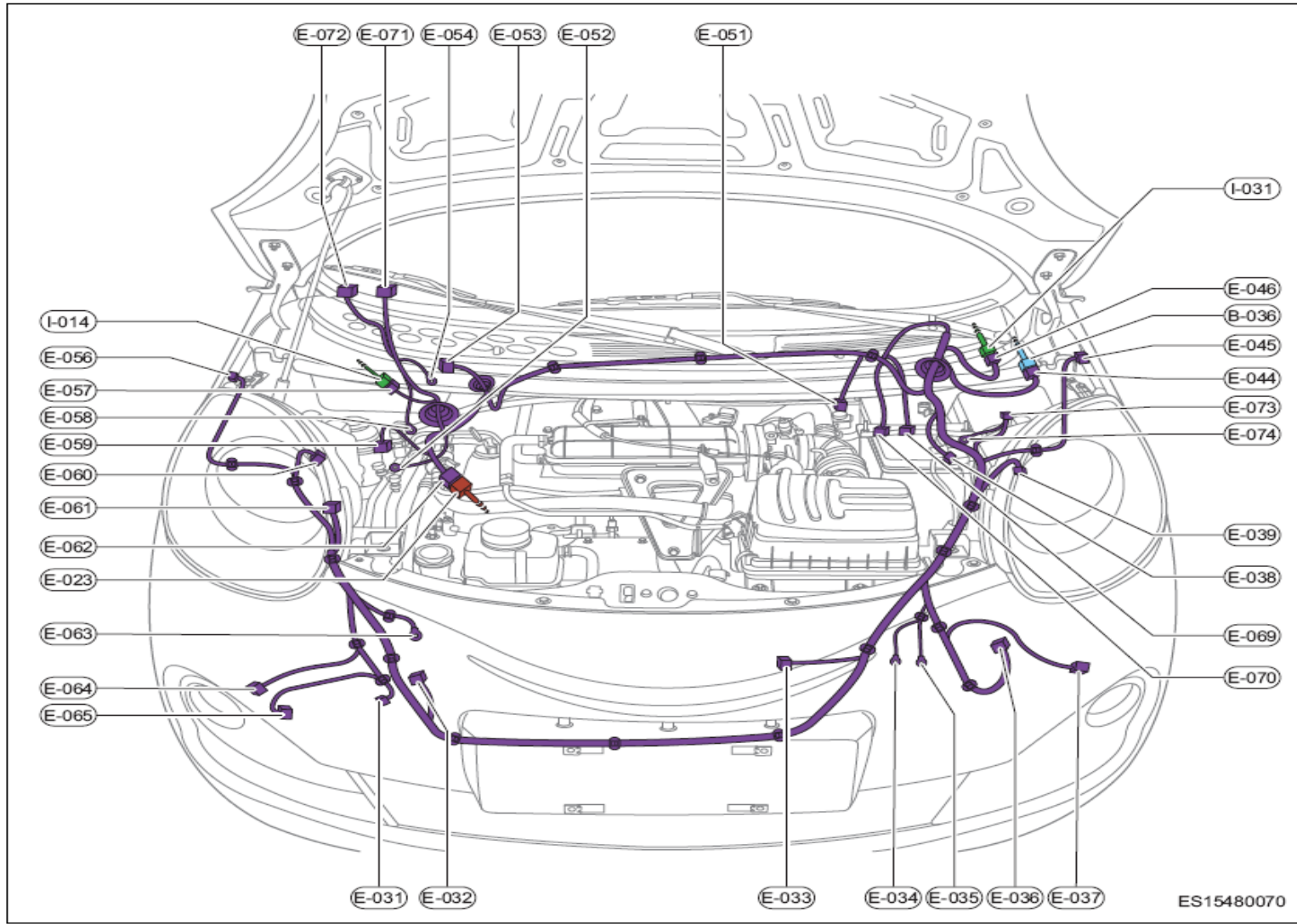
**Lg: Light green** 

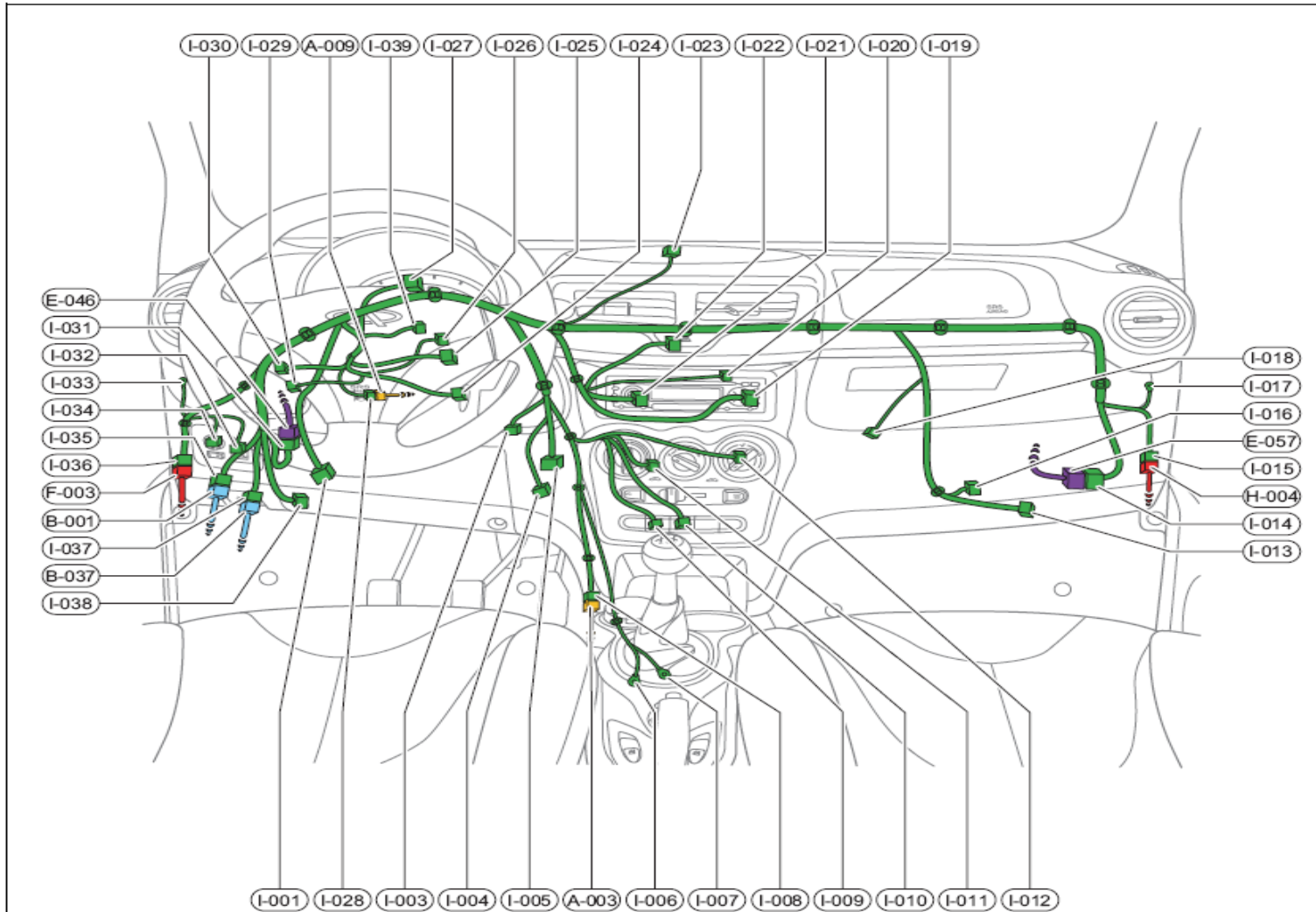


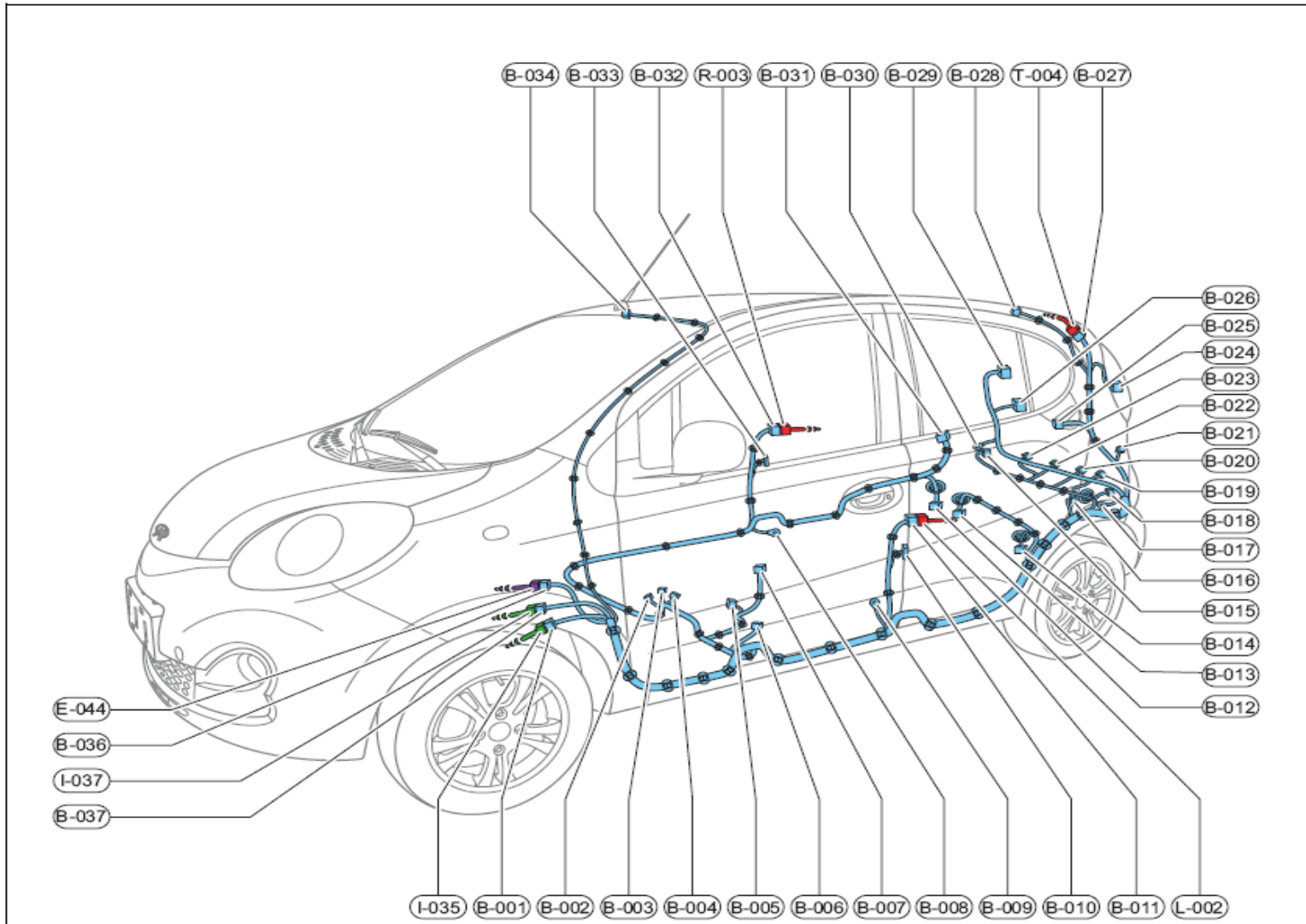
E = Engine Wire Harness, Injector and Ignition Wire Harness and Engine Compartment Wire Harness;  
 I = Instrument Panel Wire Harness;  
 B = Body Wire Harness;  
 F = Front Left Door Wire Harness;  
 H = Front Right Door Wire Harness;  
 L = Rear Left Door Wire Harness;  
 R = Rear Right Door Wire Harness;  
 T = Back Door Wire Harness;  
 A = Airbag Wire Harness;  
 N = Battery Negative Wire Harness.

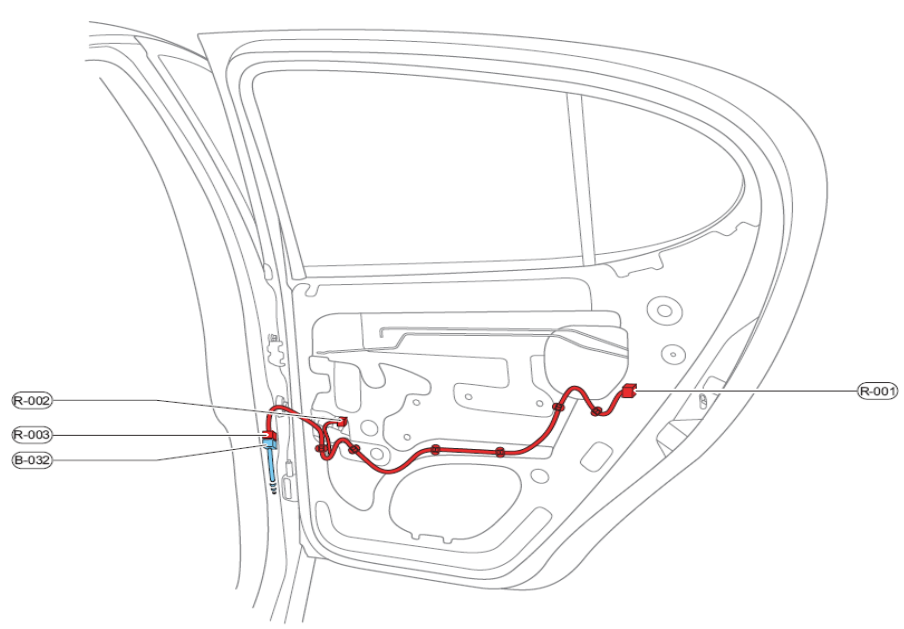
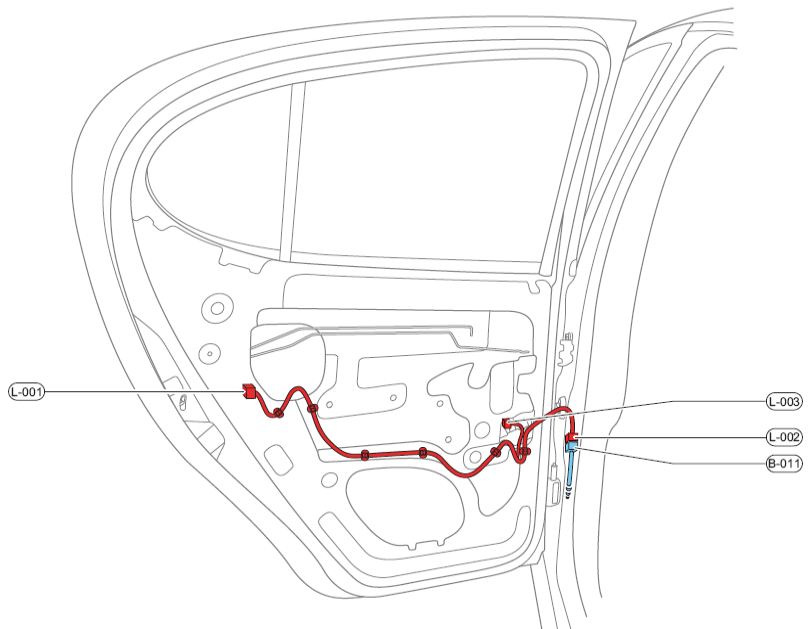
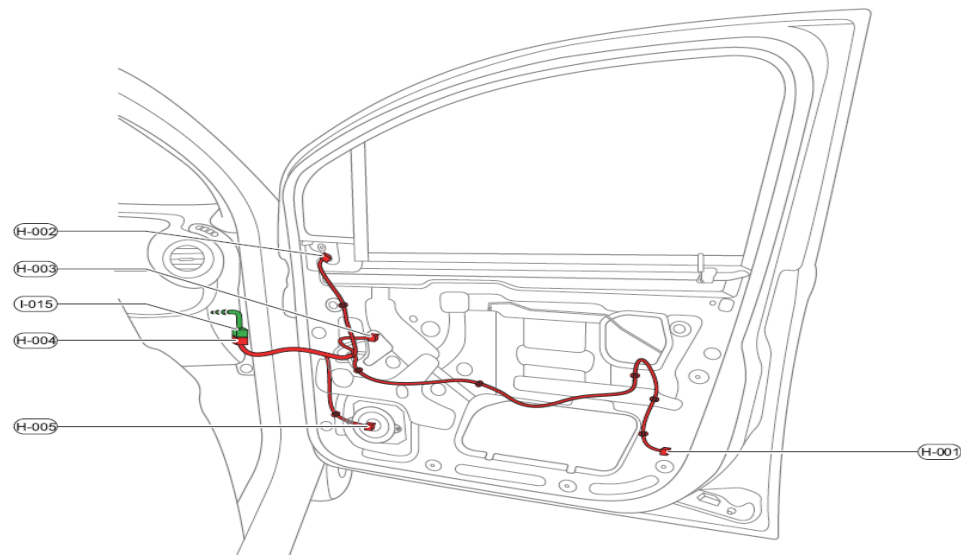
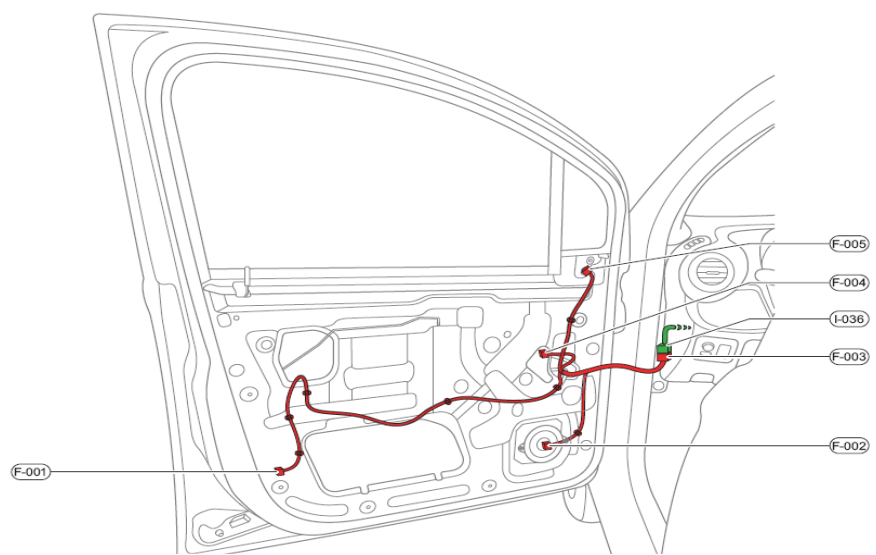


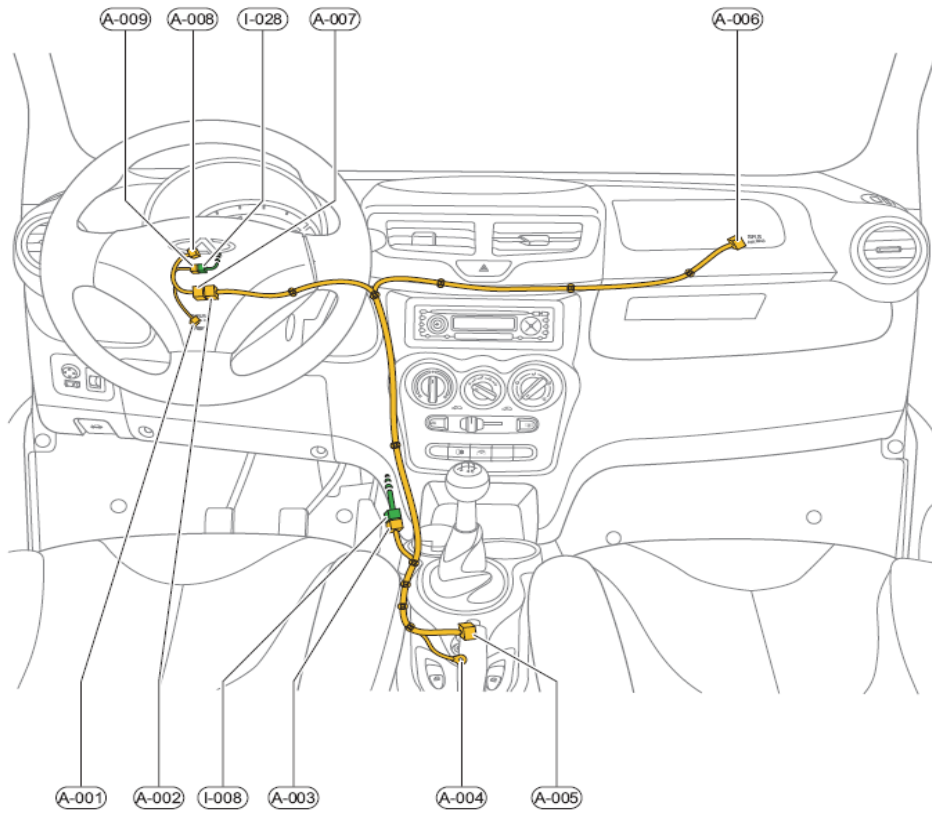
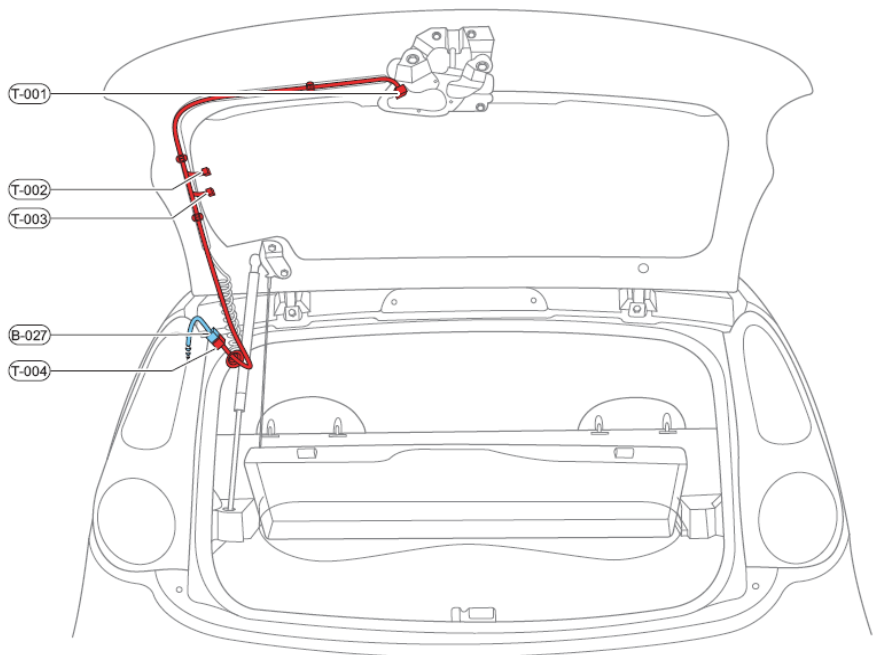


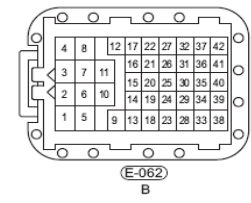
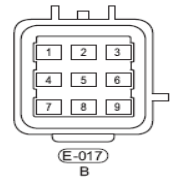
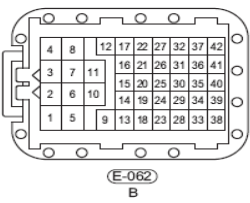
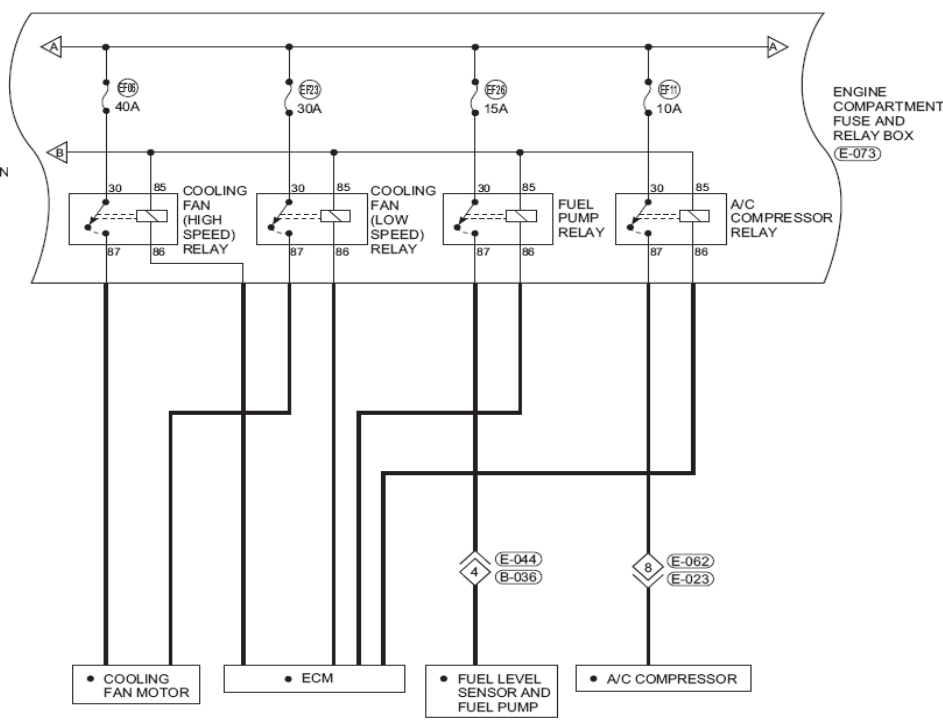
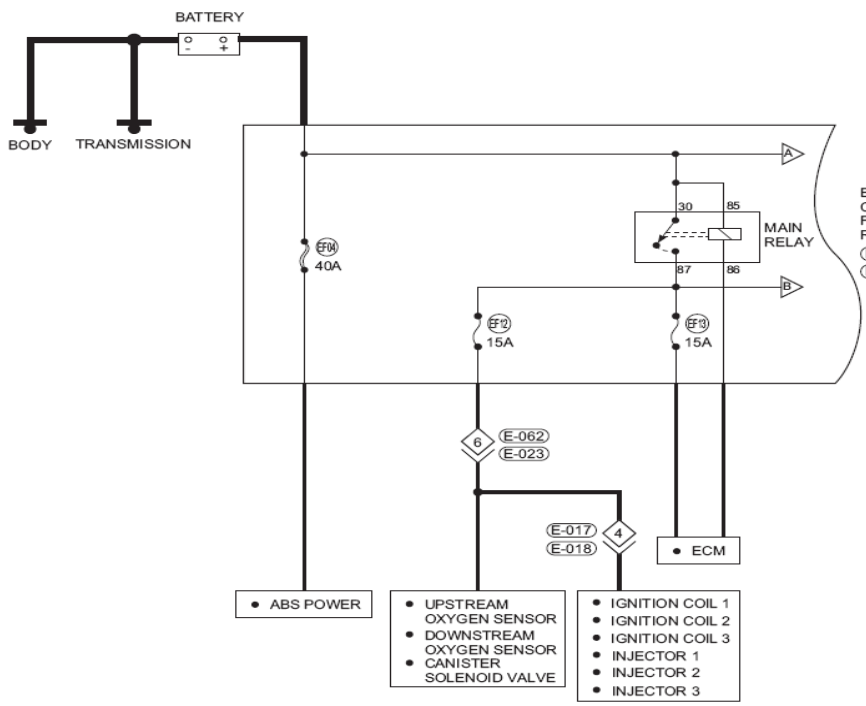




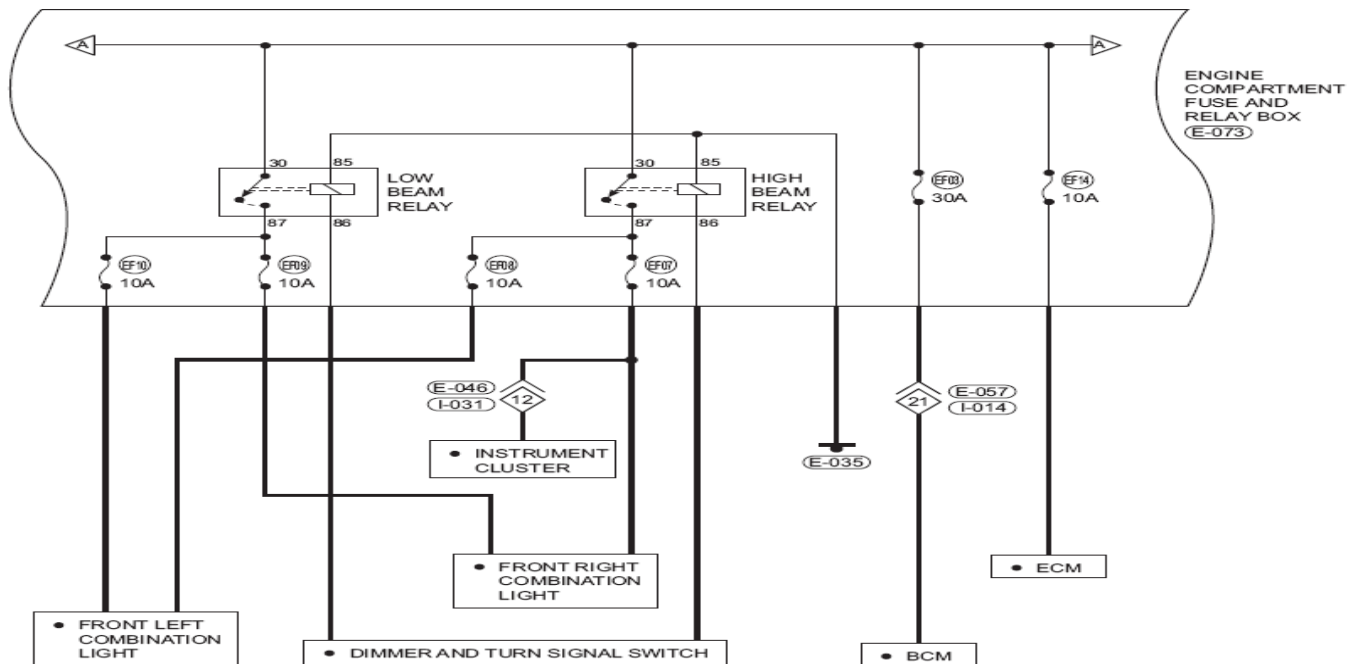




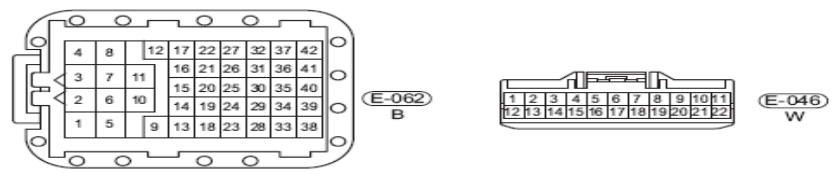
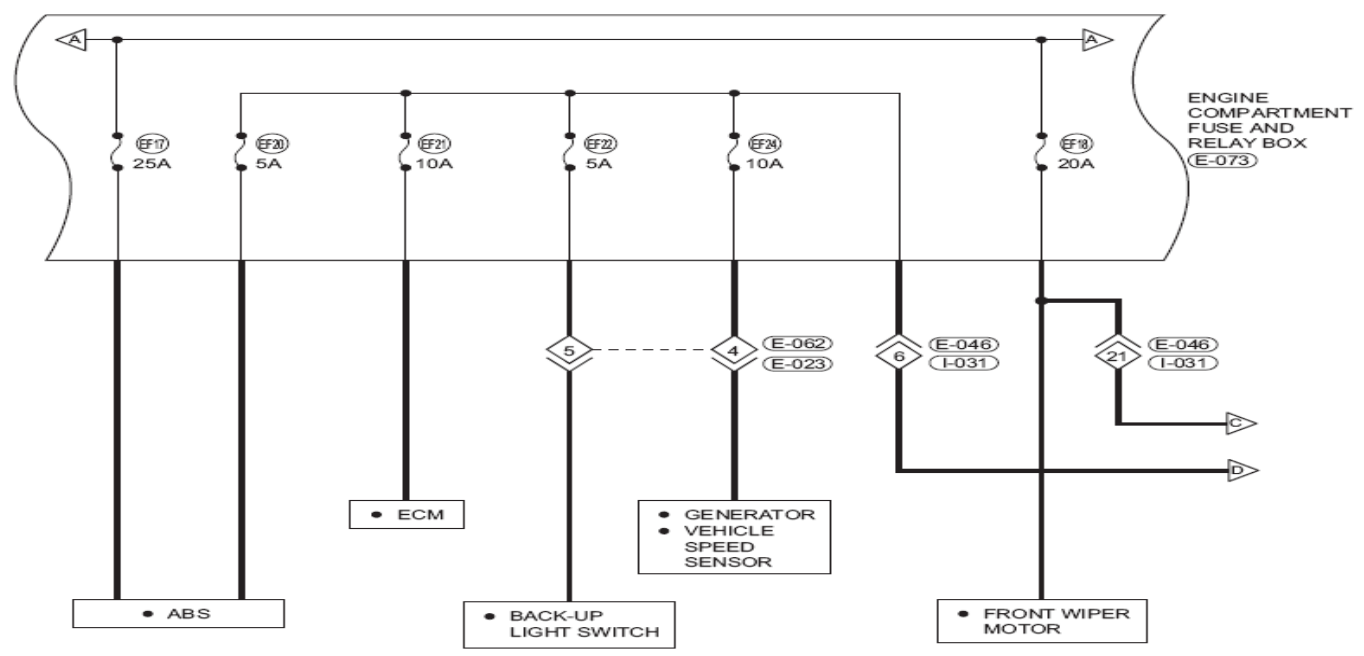


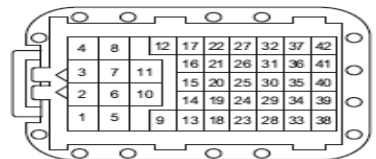
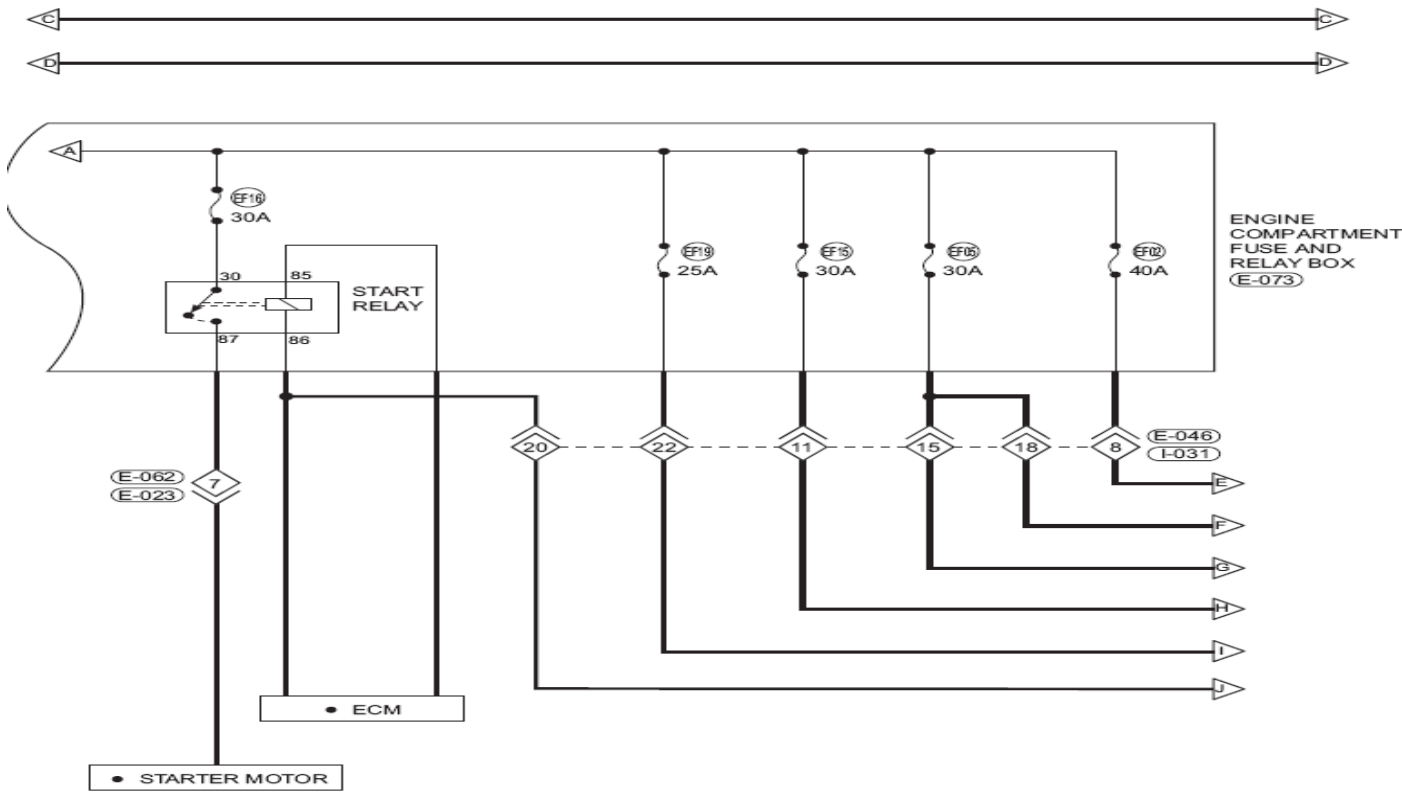


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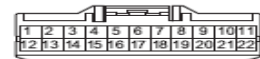




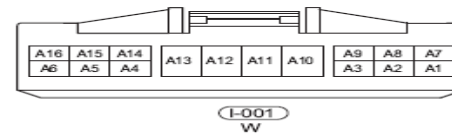
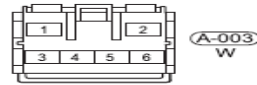
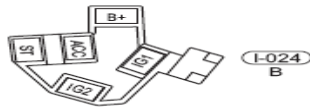
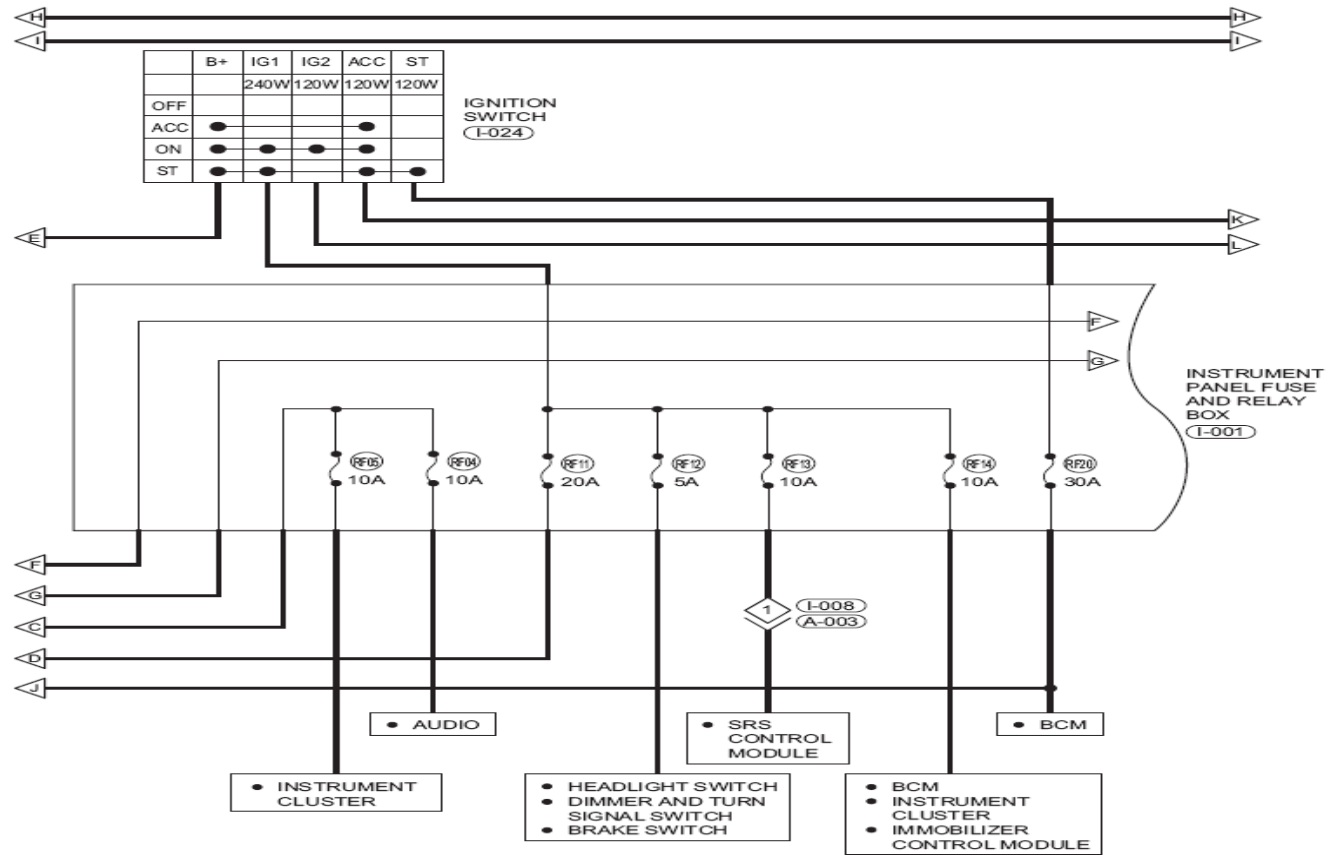


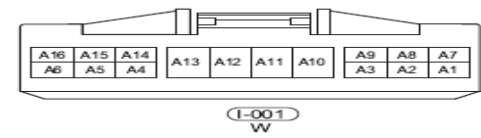
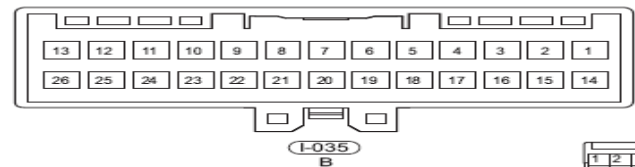
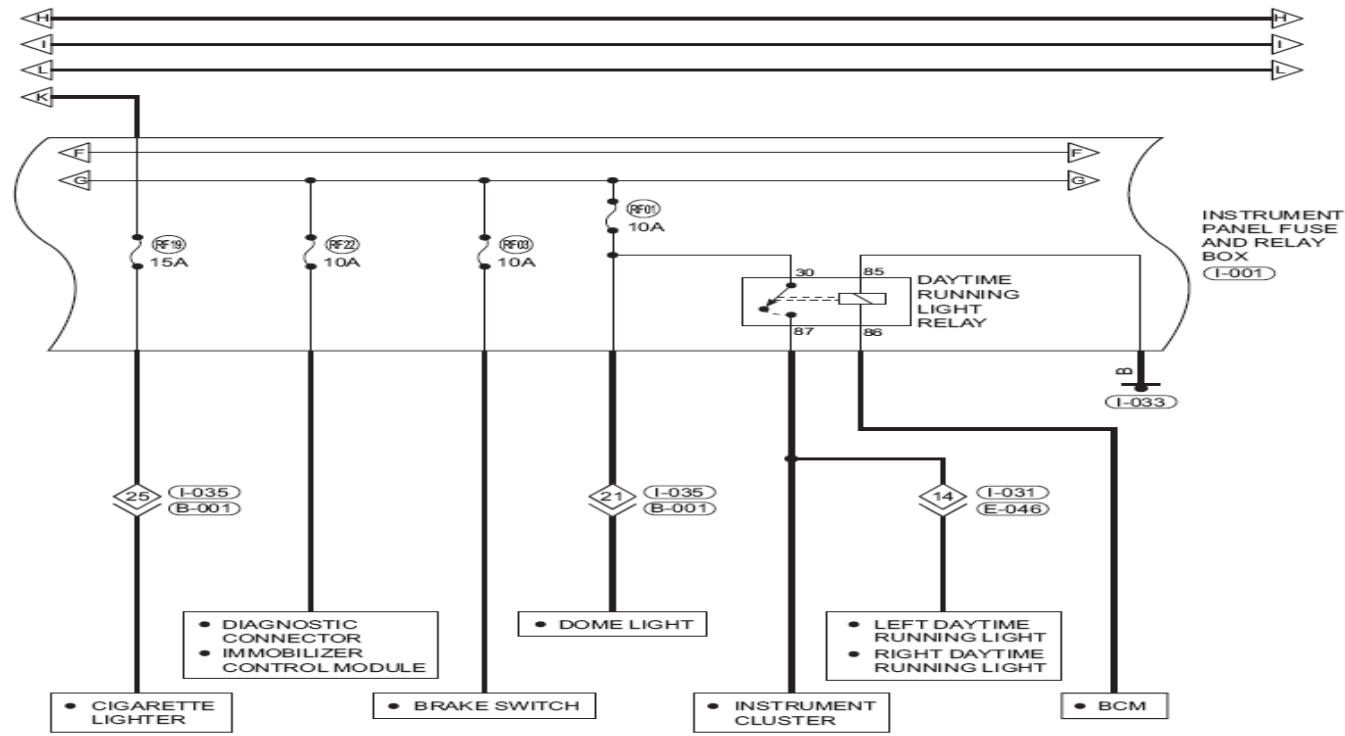


E-062 B

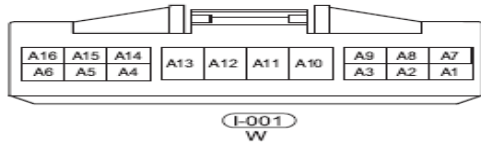
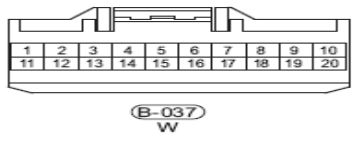
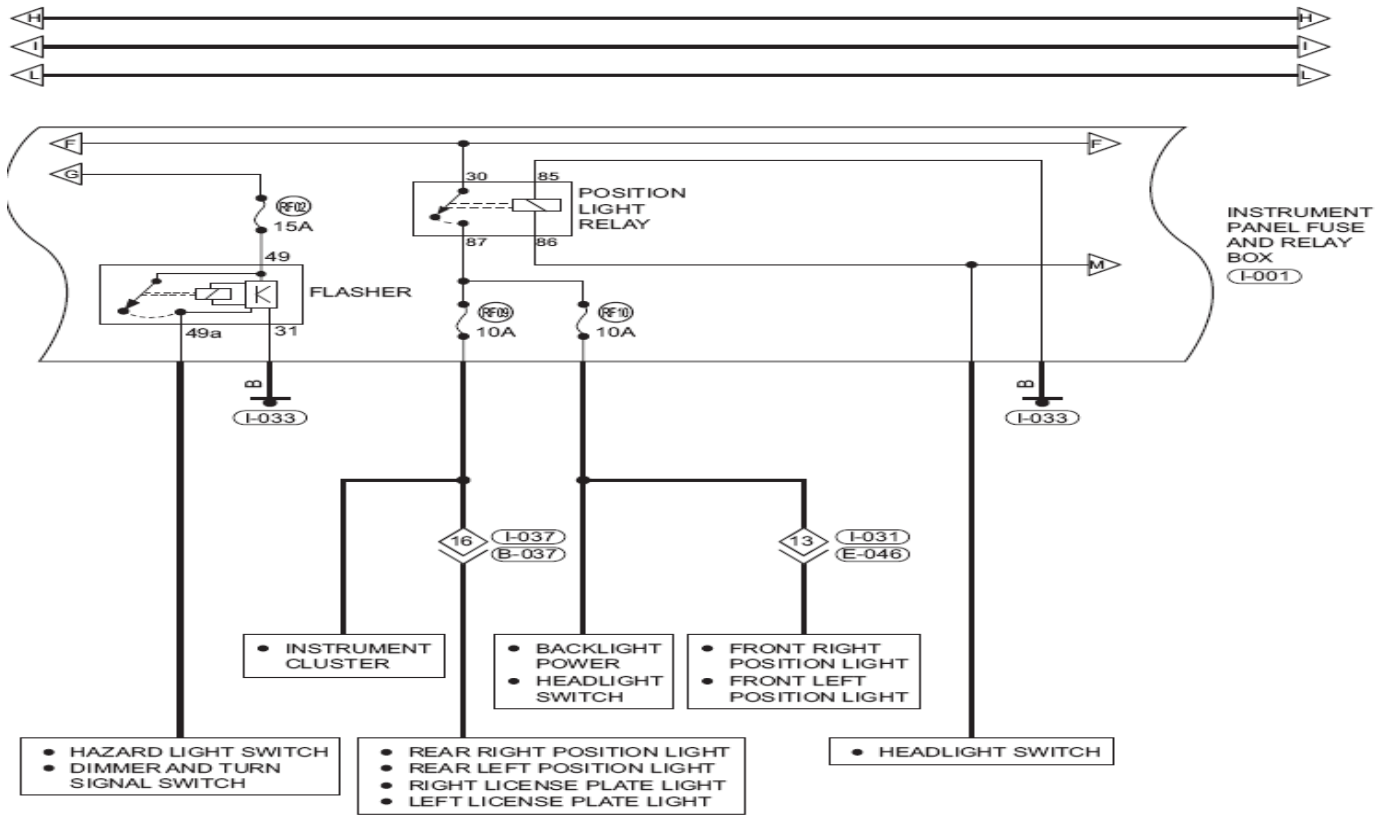


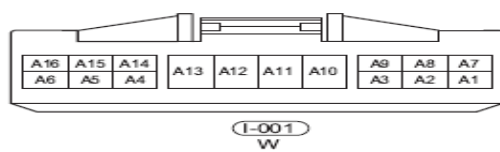
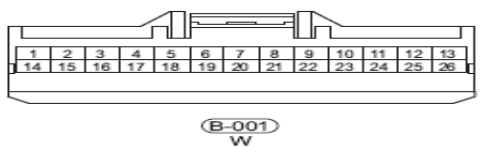
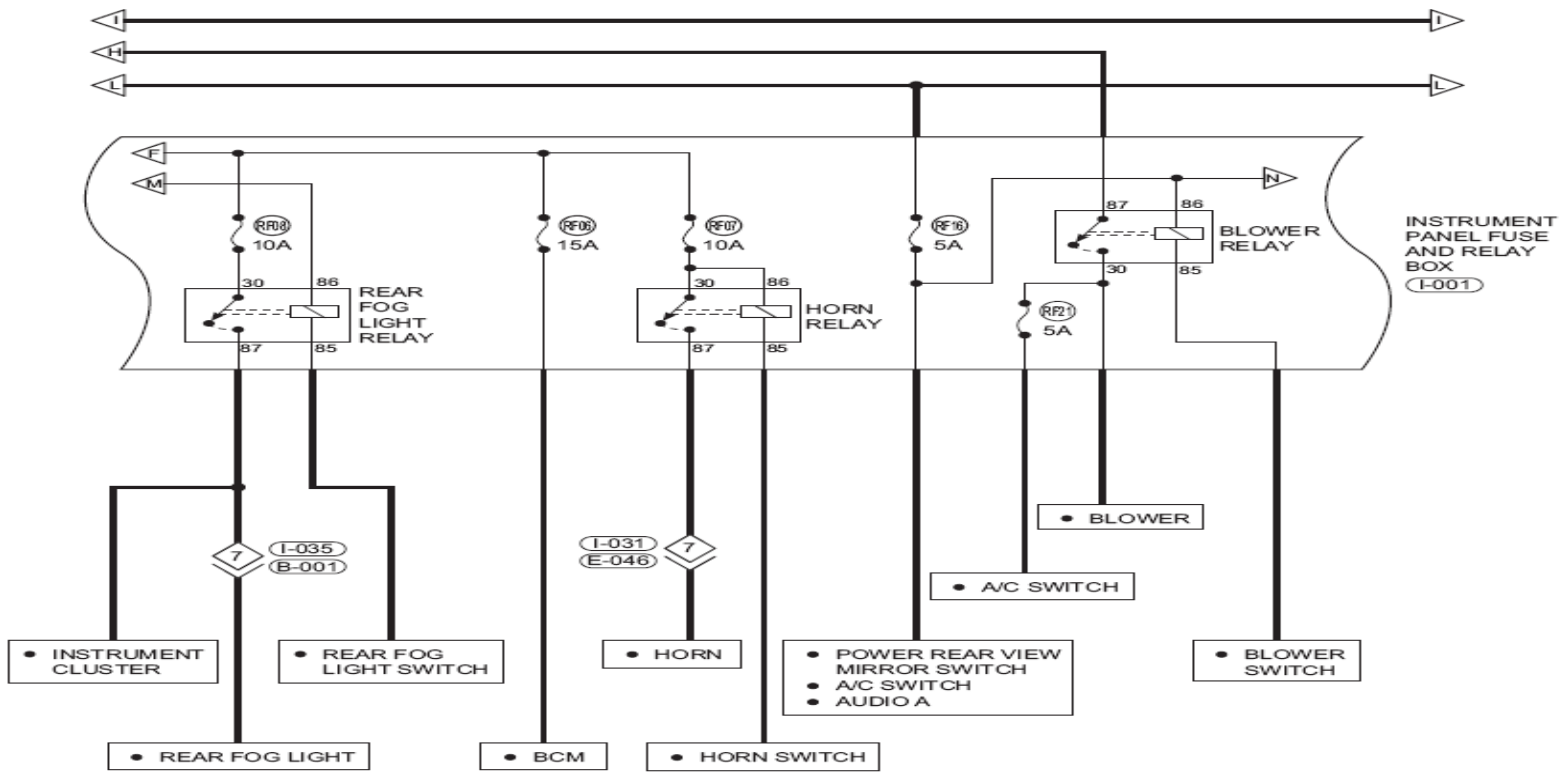
E-046 W

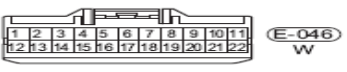
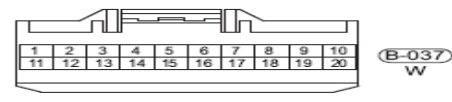
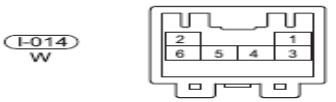
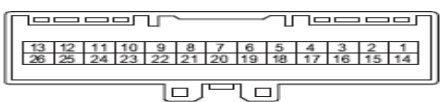
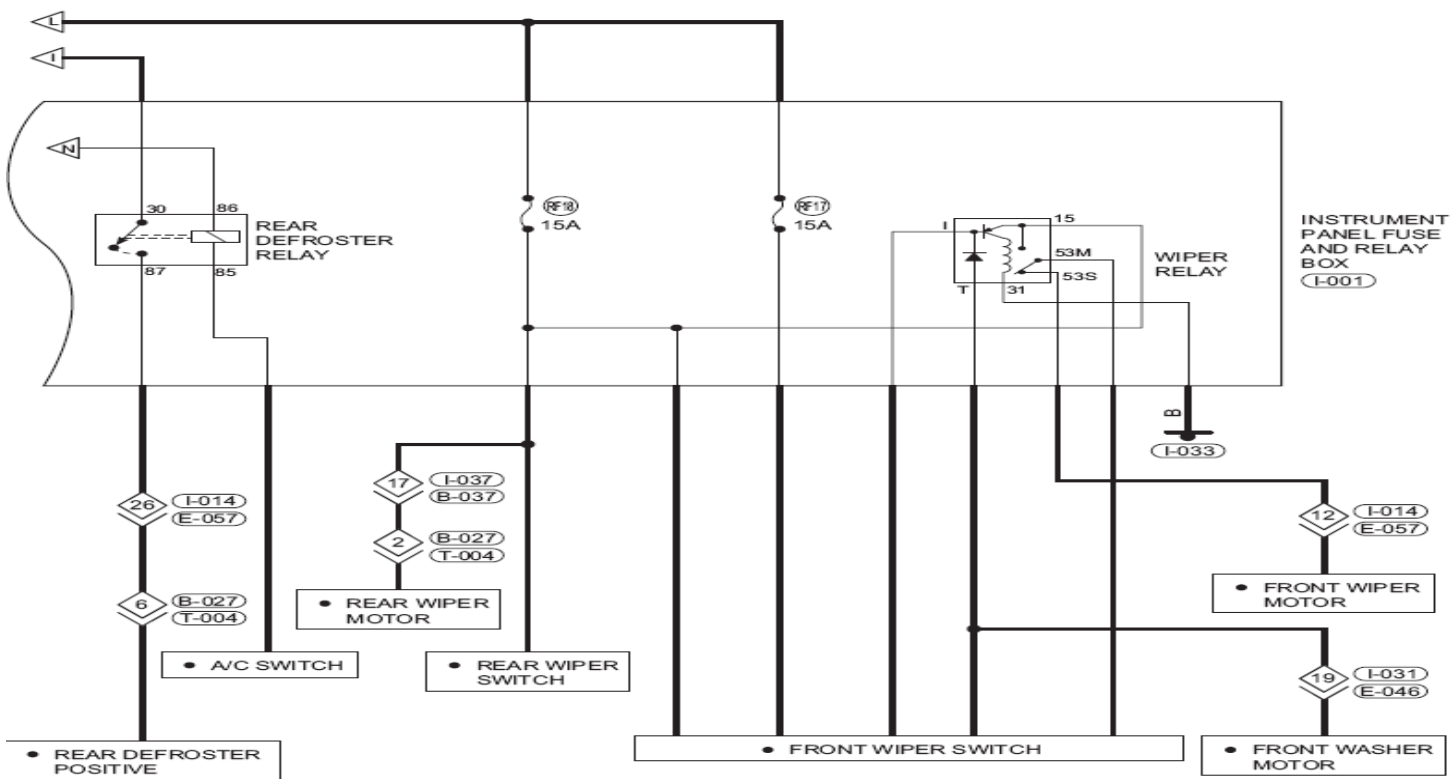


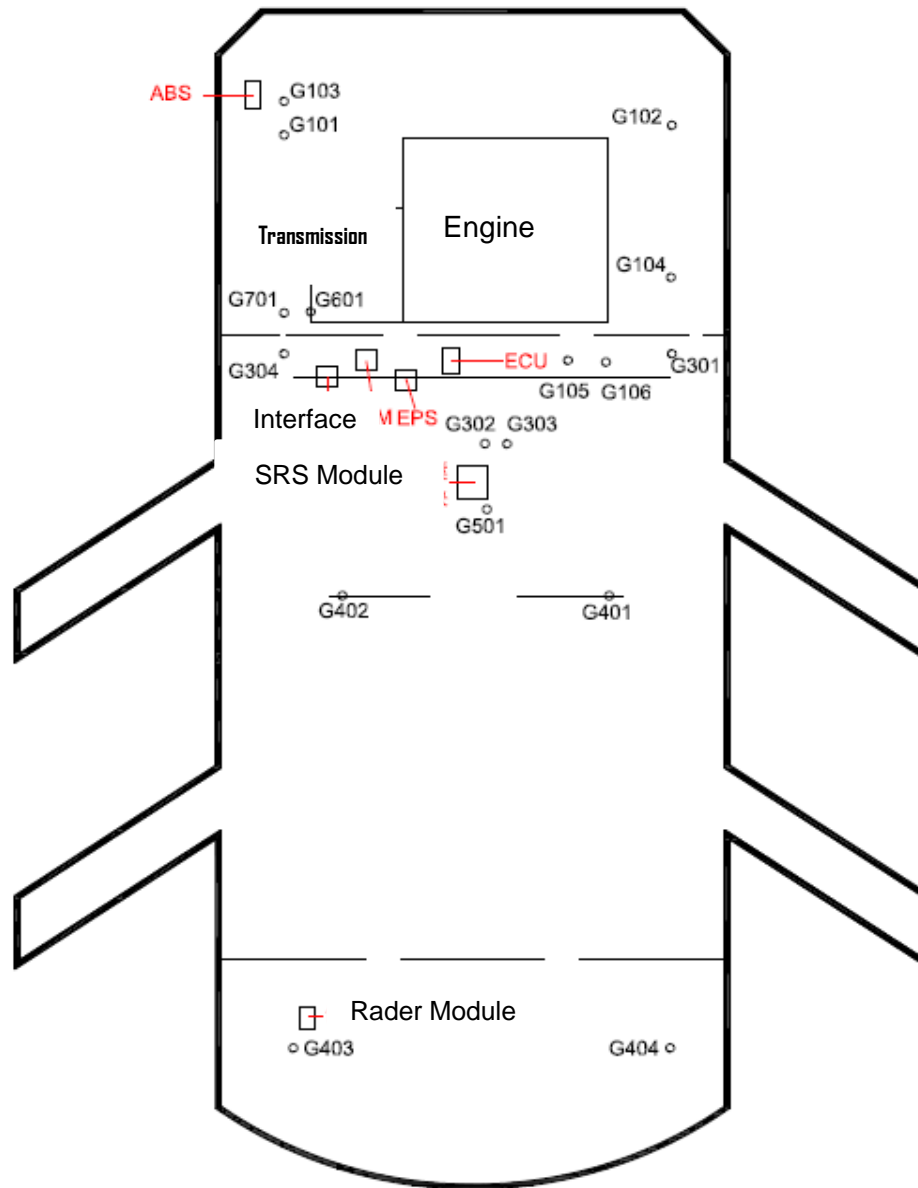


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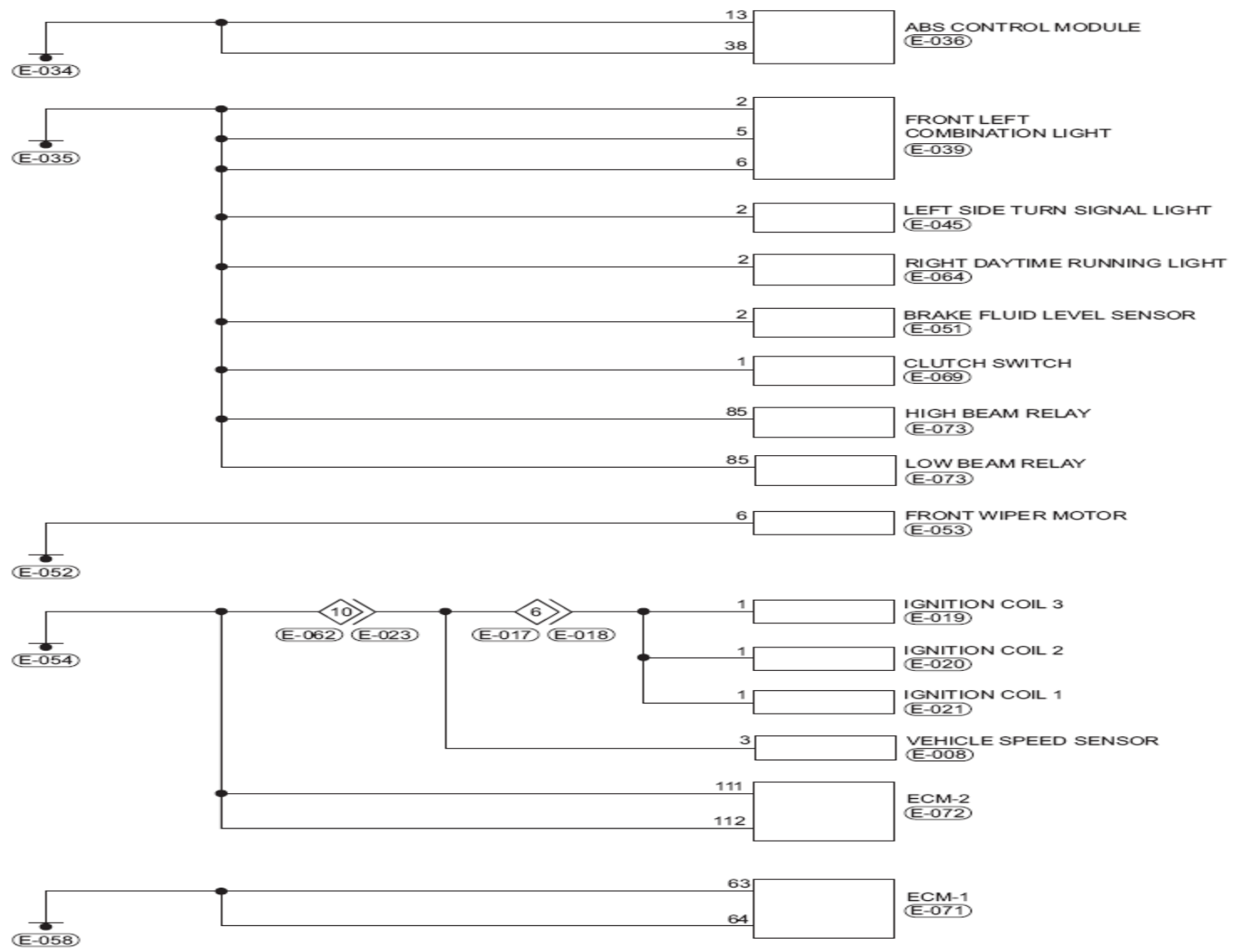


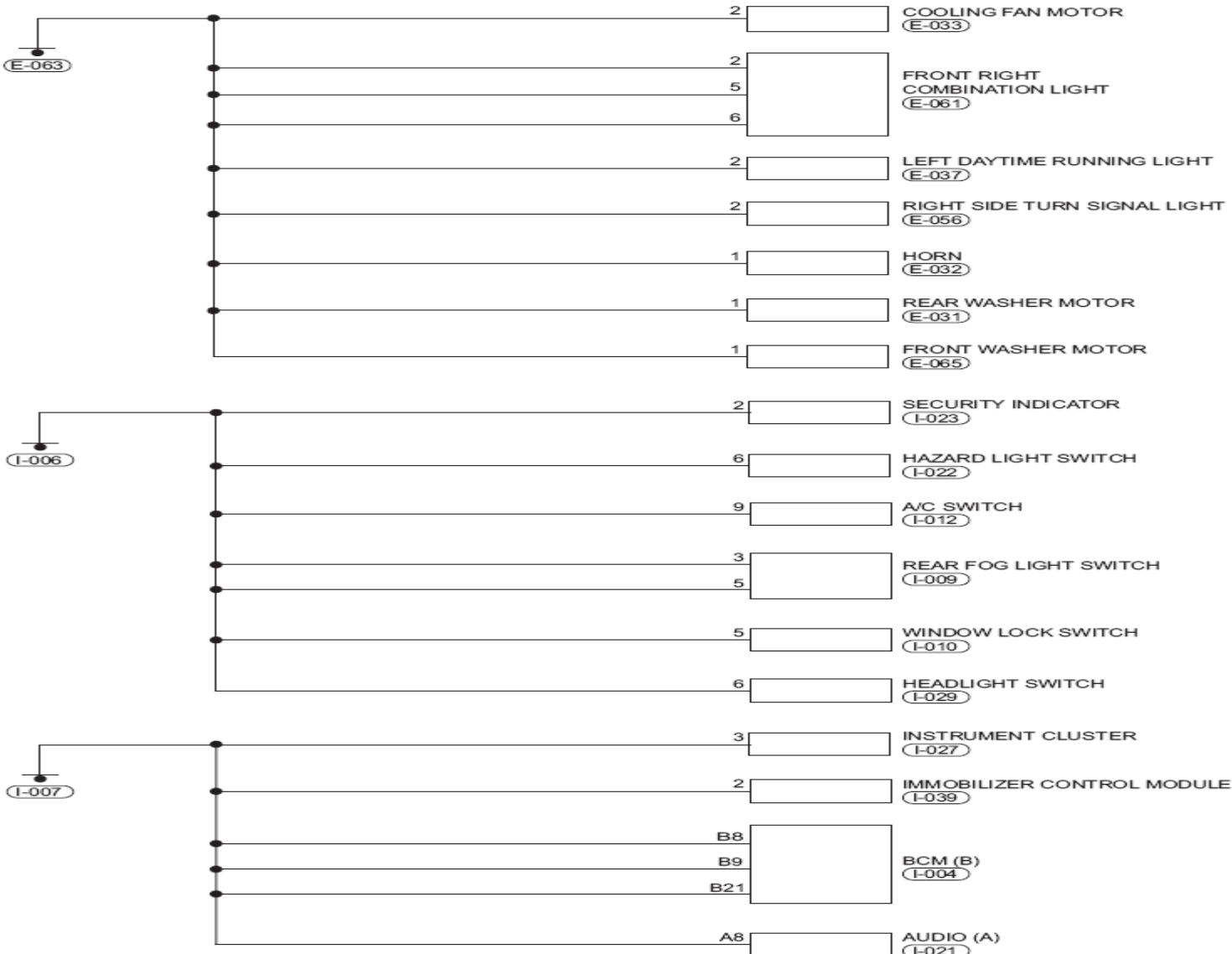


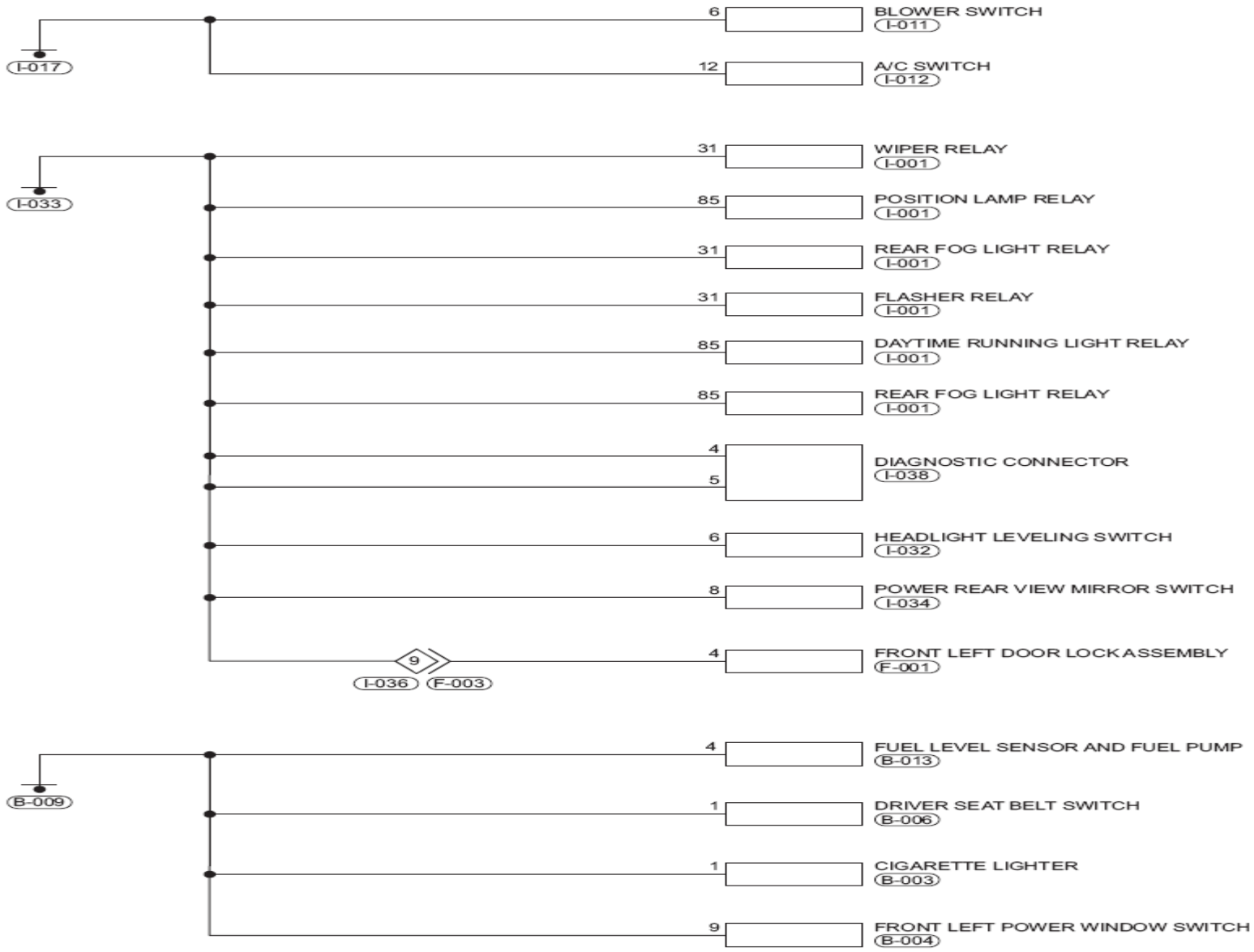


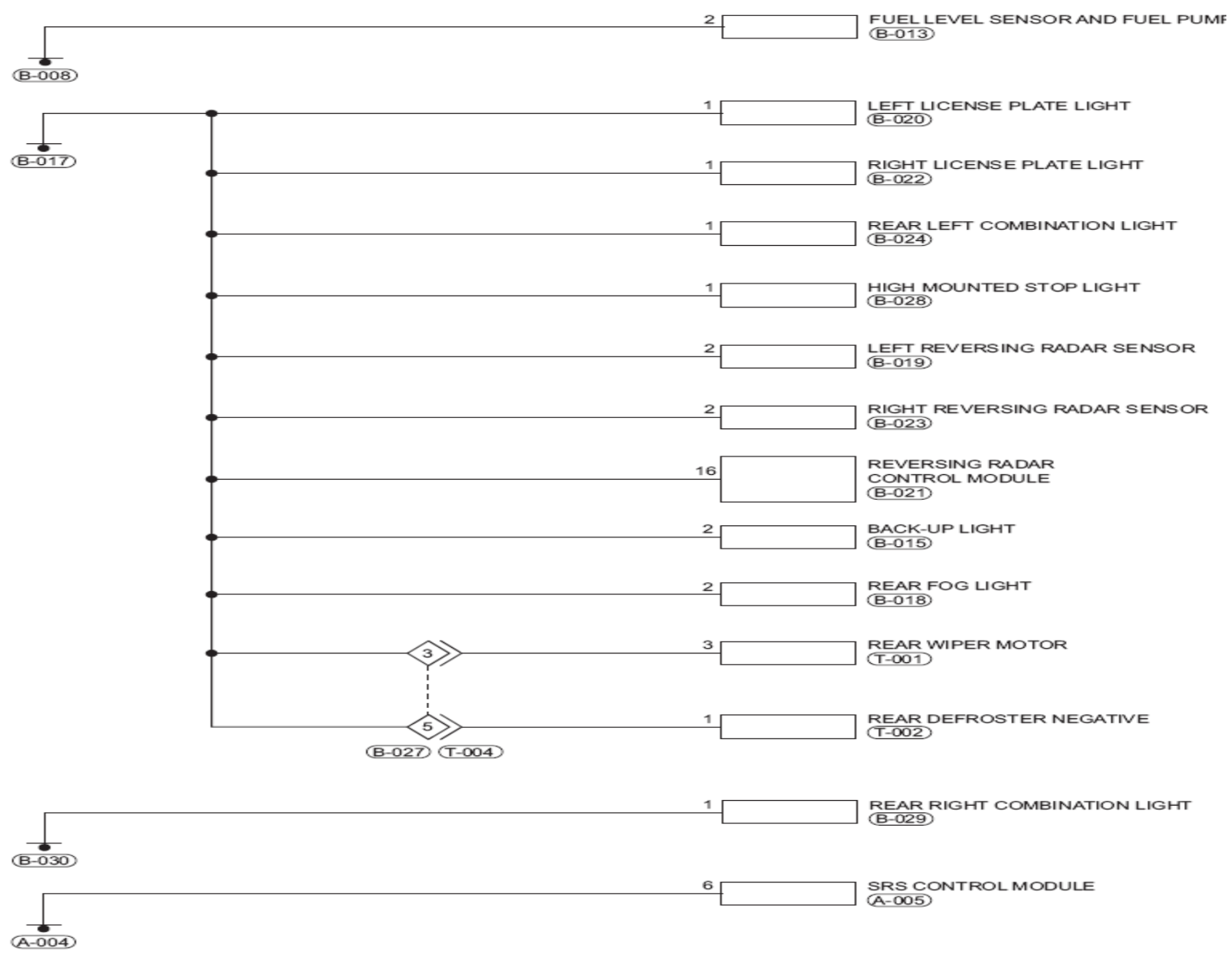












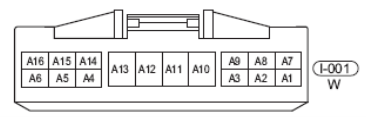
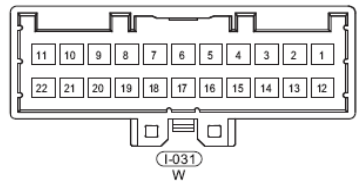
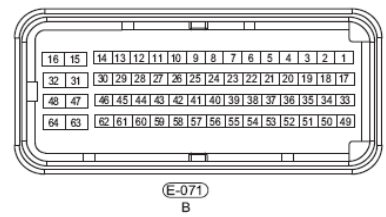
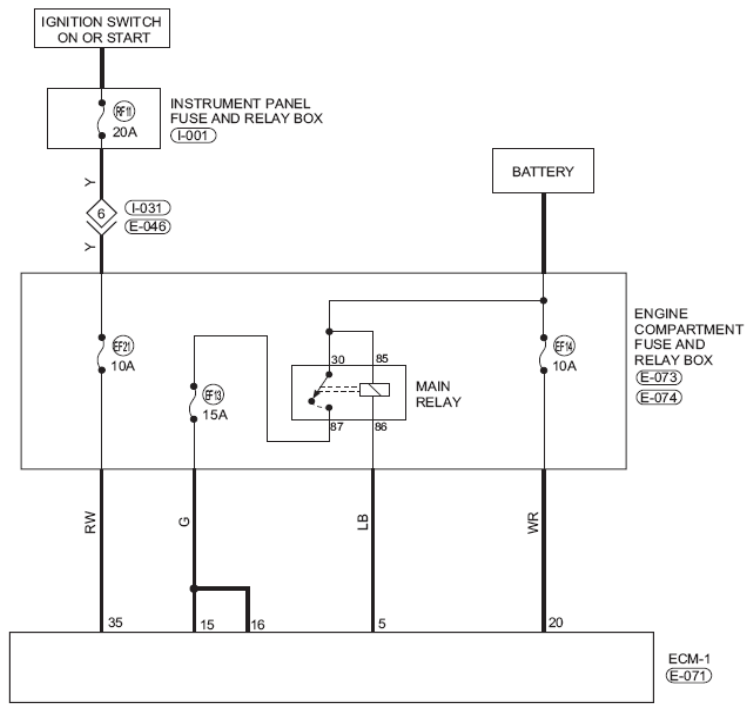
**ECM connector 1**

Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
1	-	33	Communication with ICM
2	-	34	Communication with ICM
3	-	35	Ignition switch (ON)
4	-	36	5 V Power Supply
5	Main Relay Coil	37	5 V Power Supply
6	Clutch Switch (MT)	38	-
7	Electronic Accelerator Pedal Position Sensor 1 Ground	39	-
8	-	40	Immobilizer
9	-	41	Fuel Pump Relay Coil
10	-	42	A/C Compressor Relay Coil
11	-	43	Oxygen Sensor Ground
12	-	44	-
13	Ignition Switch (Start)	45	Electronic Accelerator Pedal Position Sensor 1
14	Power Steering Pump Switch	46	-
15	Noncontinuous Power Supply	47	-
16	Noncontinuous Power Supply	48	Downstream Oxygen Sensor Heater
17	-	49	Communication with ICM
18	Immobilizer	50	-
19	-	51	-
20	Battery Continuous Power Supply	52	-
21	Downstream Oxygen Sensor	53	-
22	-	54	-
23	Brake Switch	55	-
24	-	56	Fan Control
25	Brake Light Switch	57	Communication with ICM
26	Communication with ICM	58	Start Relay Coil
27	-	59	Electronic Accelerator Pedal Position Sensor 2 Ground
28	A/C Pressure Switch	60	-
29	Headlight Switch	61	-
30	Electronic Accelerator Pedal Position Sensor 2	62	A/C Evaporator Temperature Sensor
31	Fan Control	63	ECM Ground 2
32	5 V Power Supply	64	ECM Ground 1

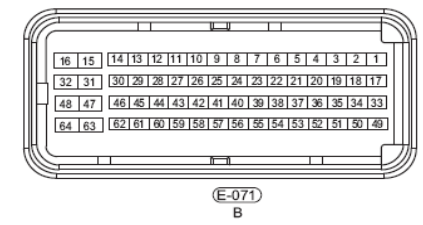
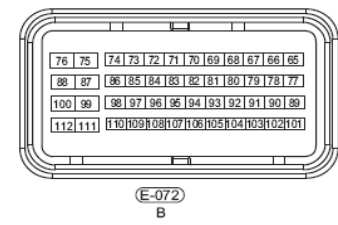
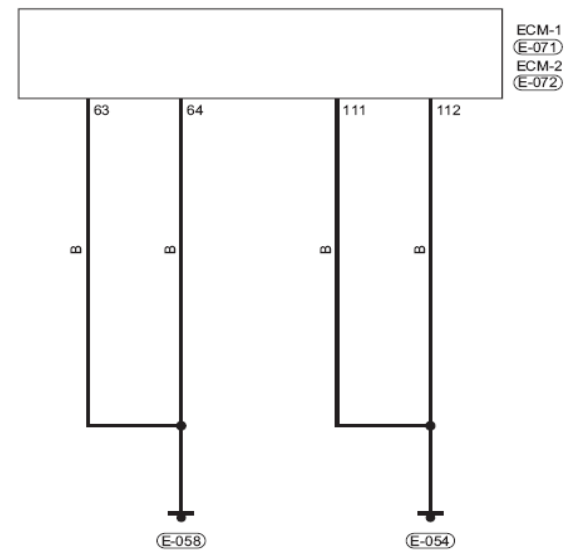
Terminal No.	Terminal Definition	Terminal No.	Terminal Definition
65	-	89	Knock Sensor B
66	-	90	Knock Sensor A
67	-	91	Intake Pressure Sensor
68	Injector 1	92	-
69	-	93	Camshaft Position Sensor
70	-	94	Canister Solenoid Valve
71	-	95	Sensor Ground
72	Injector 2	96	Crankshaft Position Sensor A
73	Upstream Oxygen Sensor Heater	97	Crankshaft Position Sensor B
74	Injector 3	98	5 V Power Supply 1
75	Throttle Actuator (+)	99	Ignition Coil 2
76	Ignition Coil 3	100	Ignition Coil 1
77	Throttle Position Sensor 1	101	Engine Coolant Temperature Sensor
78	Throttle Position Sensor 2	102	Intake Temperature Sensor
79	-	103	-
80	Oxygen Sensor Ground	104	Upstream Oxygen Sensor
81	-	105	-
82	-	106	-
83	-	107	Throttle 5 V Power Supply
84	-	108	-
85	Sensor Ground	109	5 V Power Supply
86	Throttle Ground	110	-
87	Throttle Actuator (-)	111	ECM Ground 4
88	-	112	ECM Ground 3

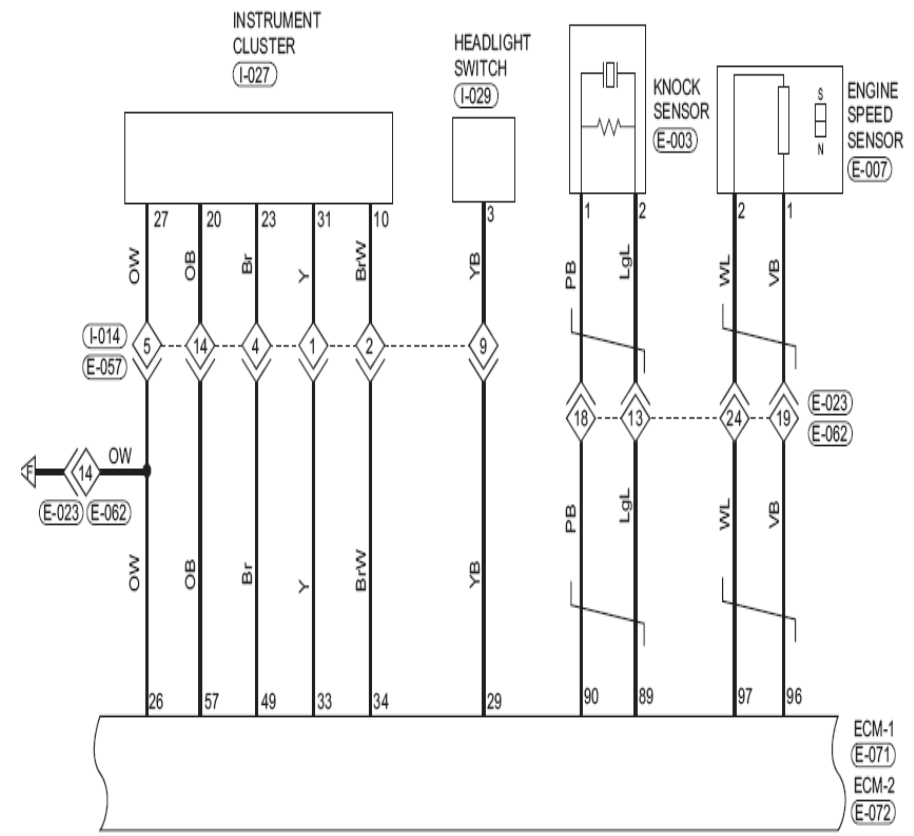
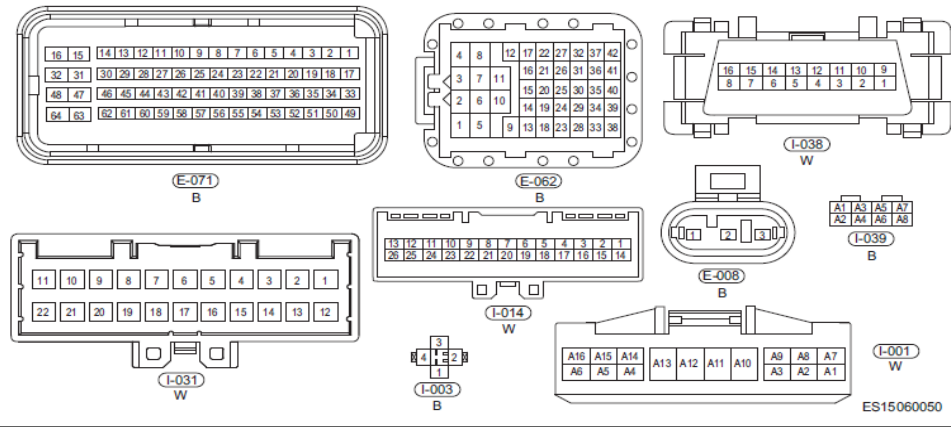
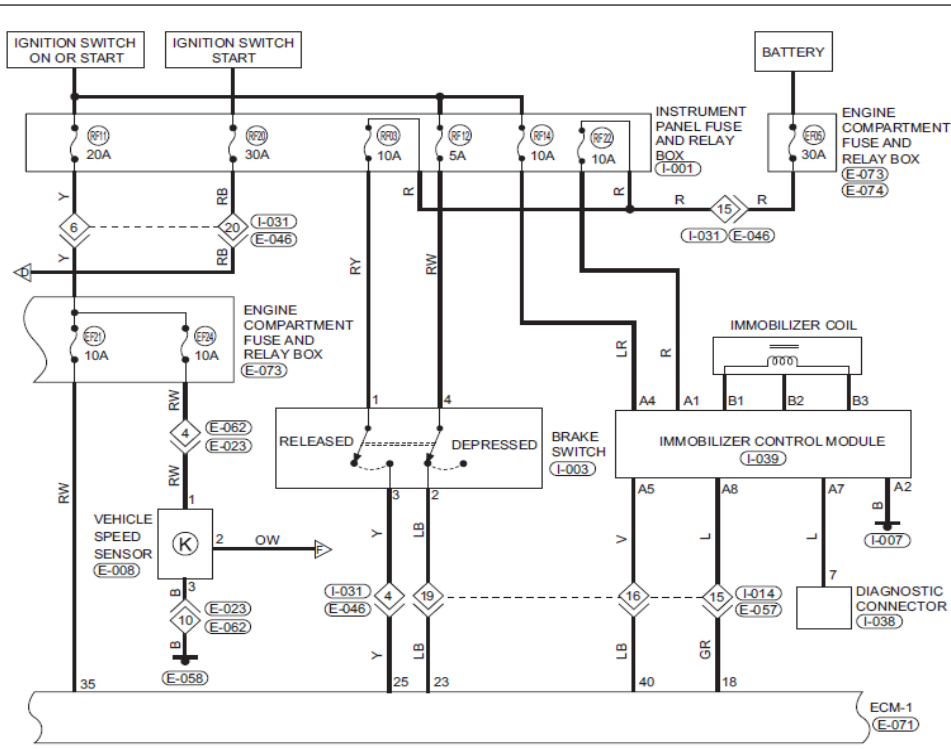
### ECM Power Supply Circuit & Ground Circuit Test

#### Power Supply Circuit

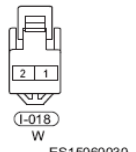
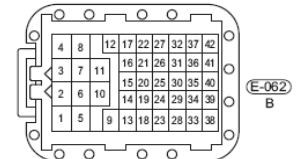
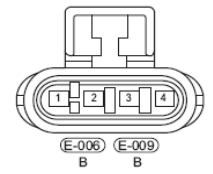
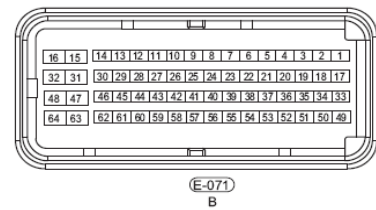
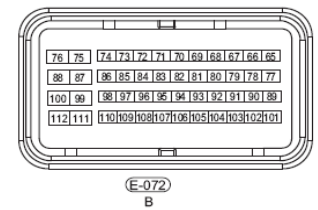
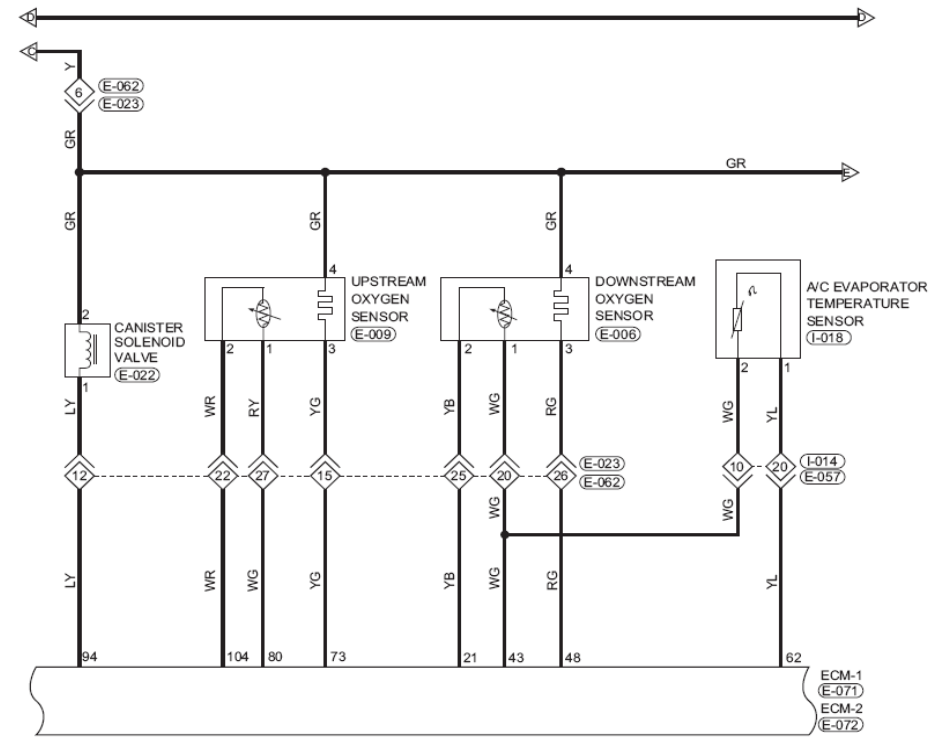
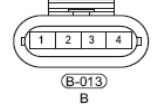
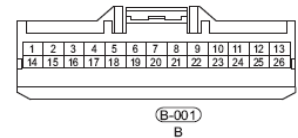
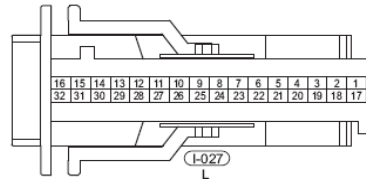
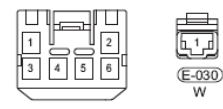
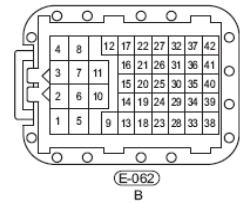
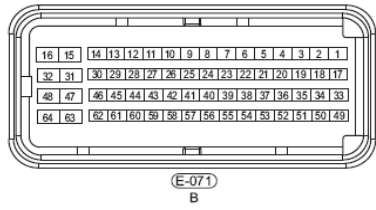
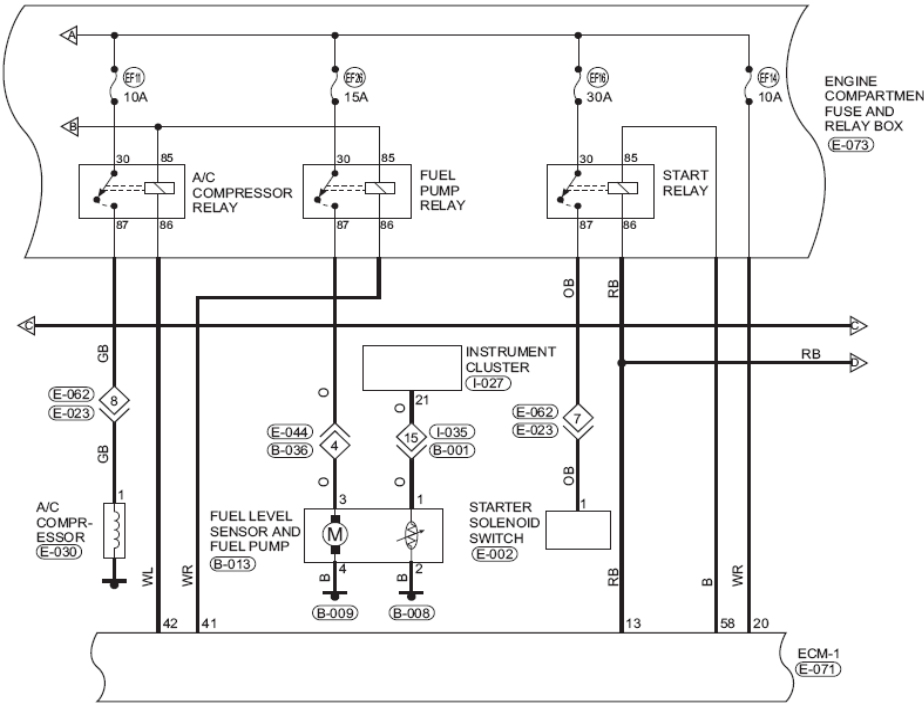


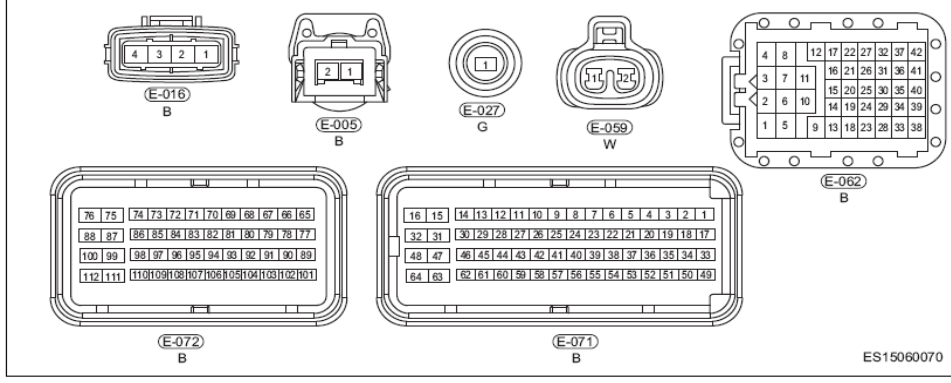
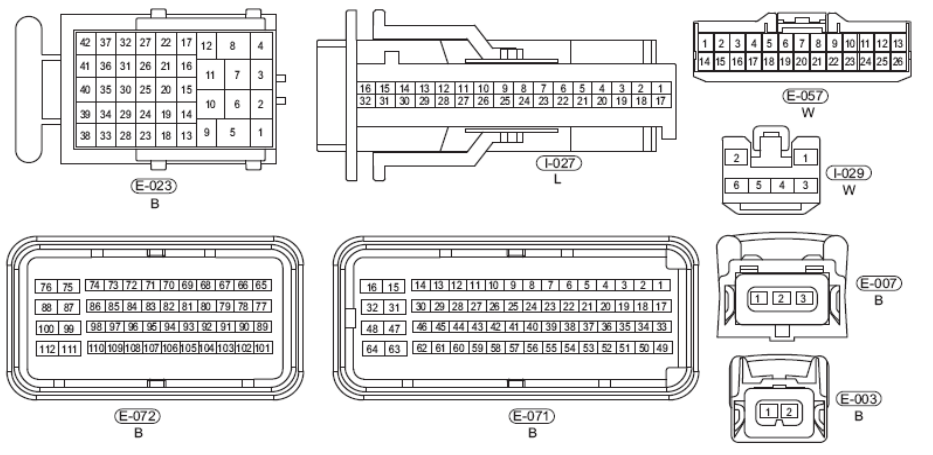
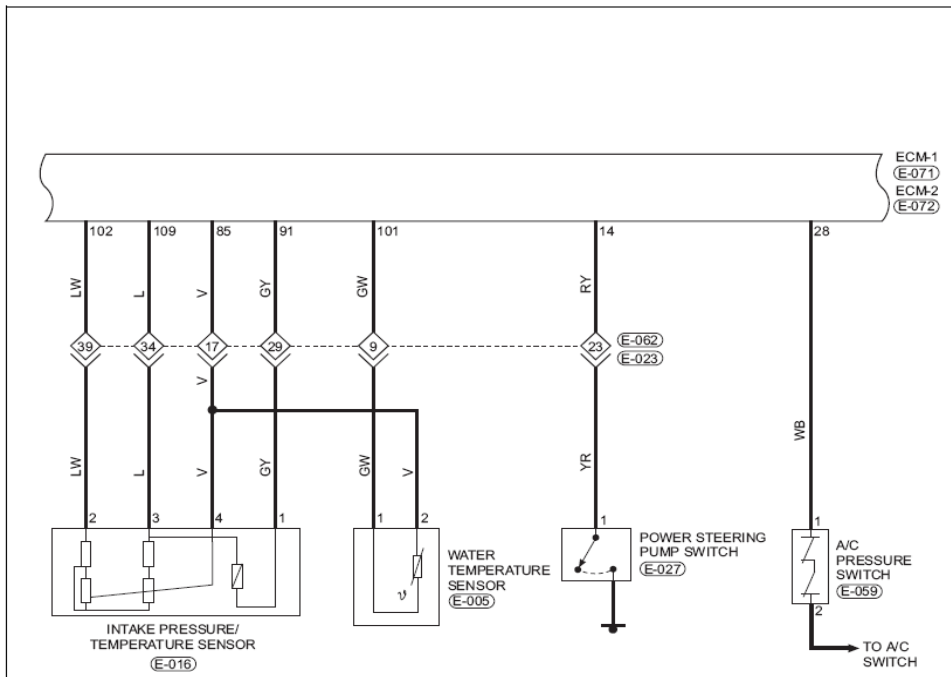
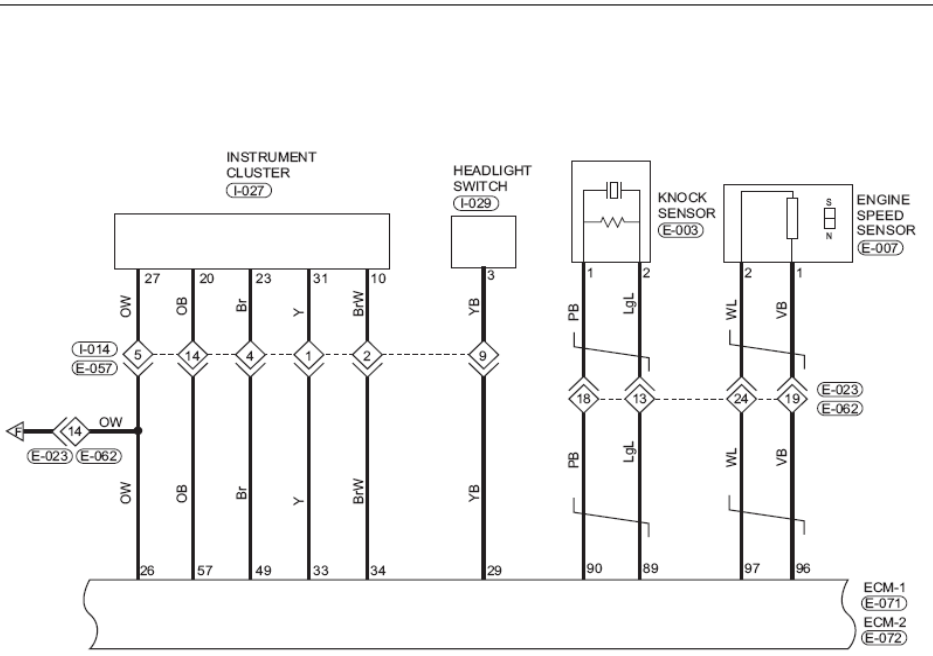
#### Ground Circuit

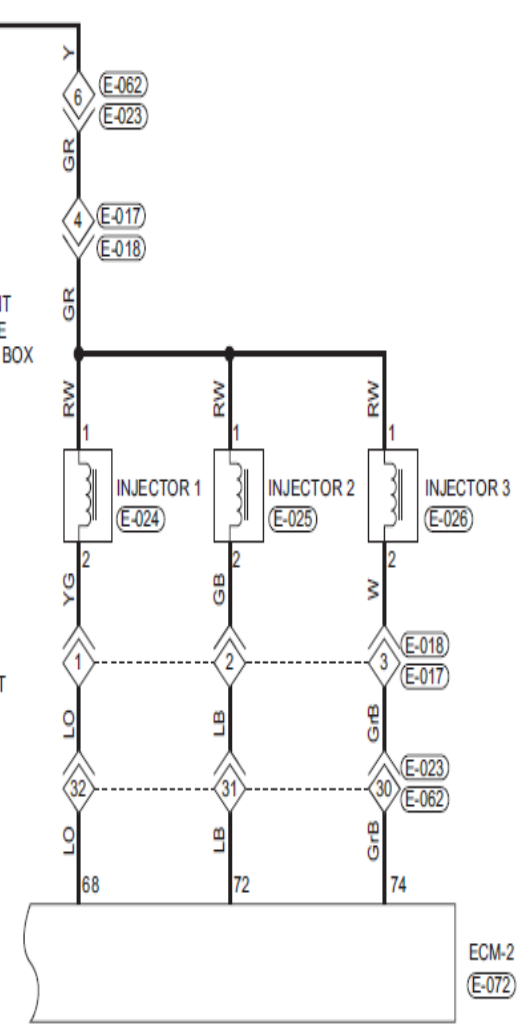
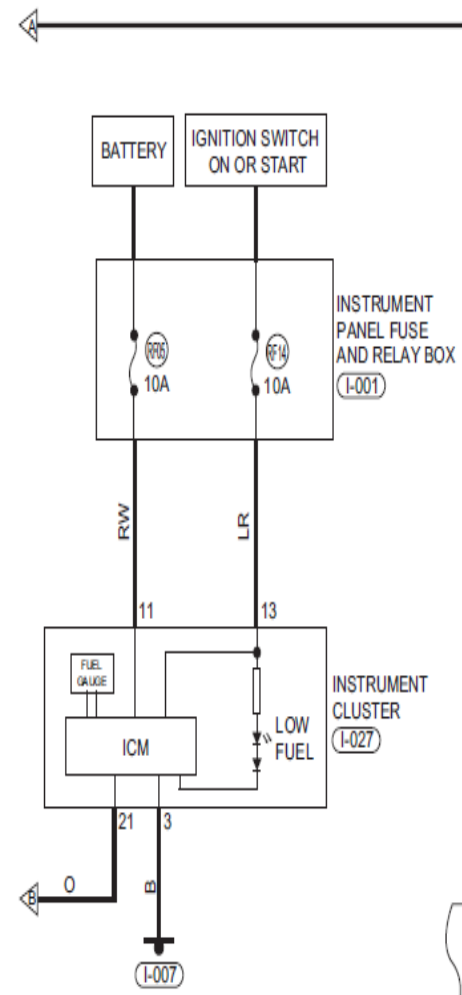
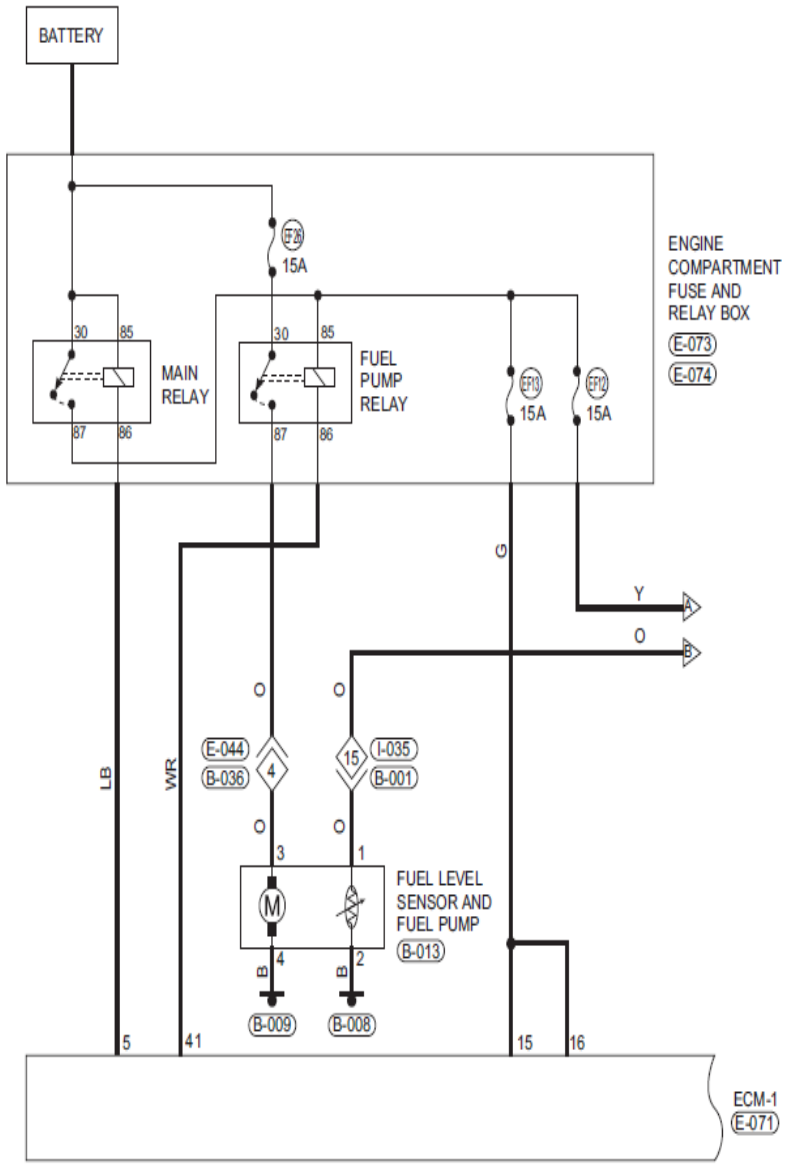














## 1.2 Fuel pump

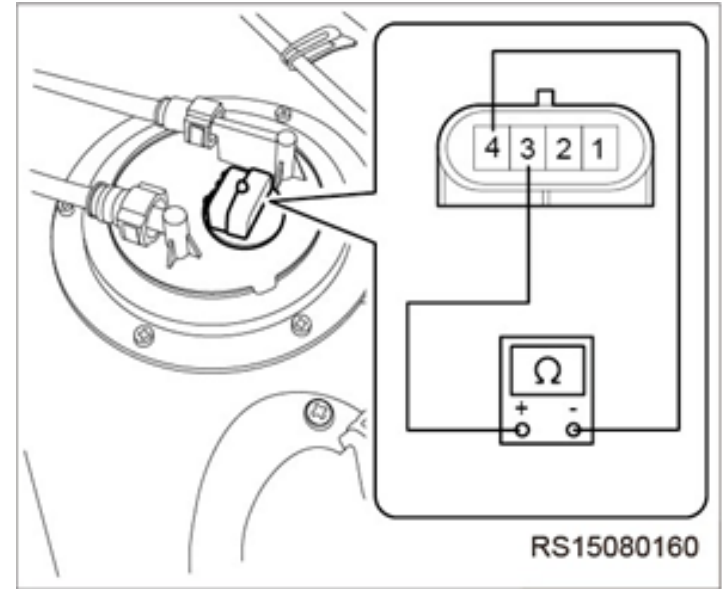
The fuel pump is installed in the fuel tank.

Measure the resistance between the terminals 3 and 4 of the connector

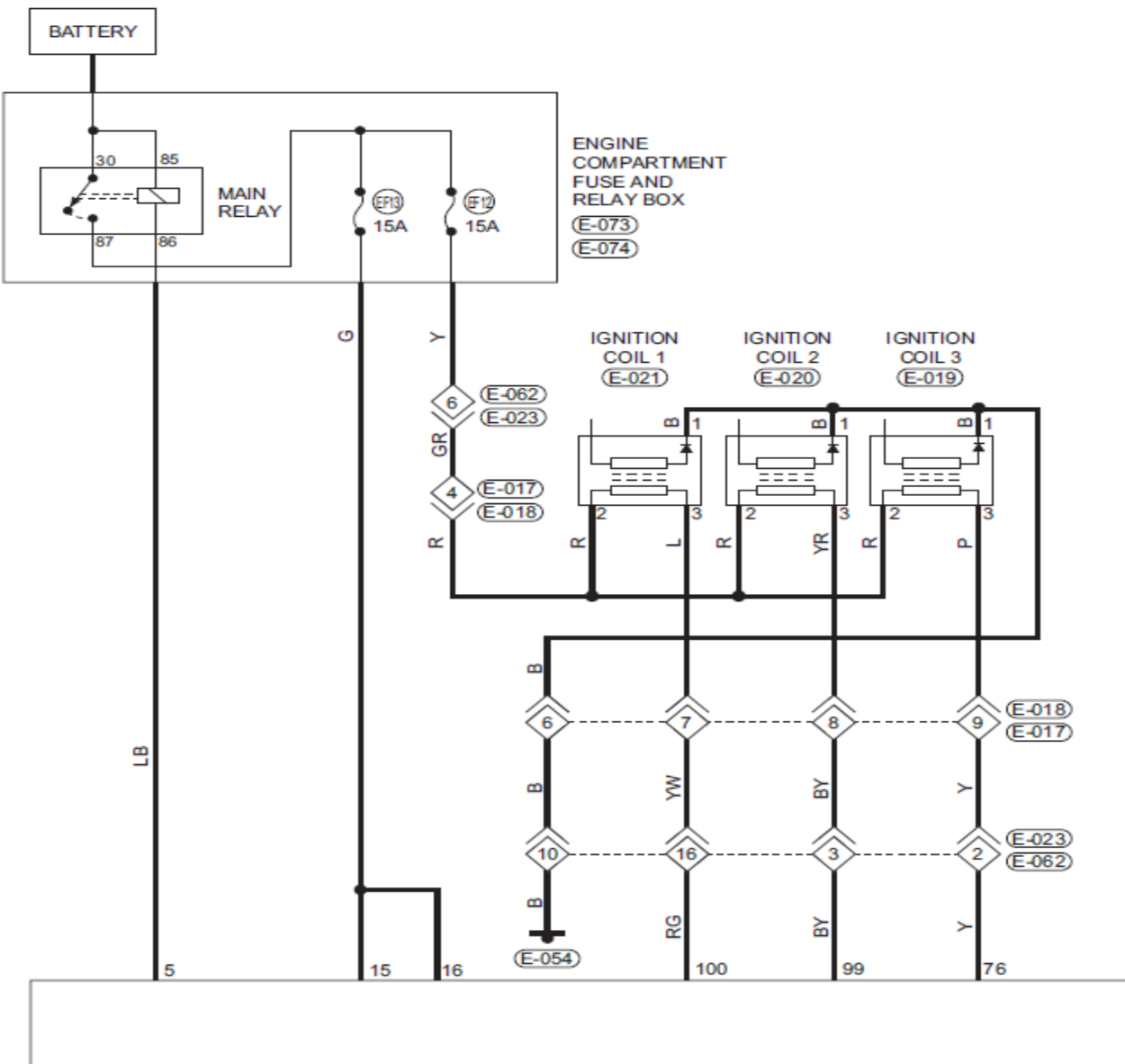
It should be approximately  $3.1 \Omega$  at  $20^{\circ} \text{C}$ .

Apply the battery voltage to the terminals 3 and 4. Check if the fuel pump operates within 10 seconds.

If it doesn't operate, replace the fuel pump.



Condition	Fuel Pressure (kPa)
Key II (ON)	350
Engine Idling	400
Key B (LOCK)	350



Turn the digital multi-meter to the ohm position; connect two probes with two pins of the primary winding, and the resistance value shall be 0.7-0.8Ω under 20°C.

The secondary coil resistance shall be between 8.8-10.8KΩ.

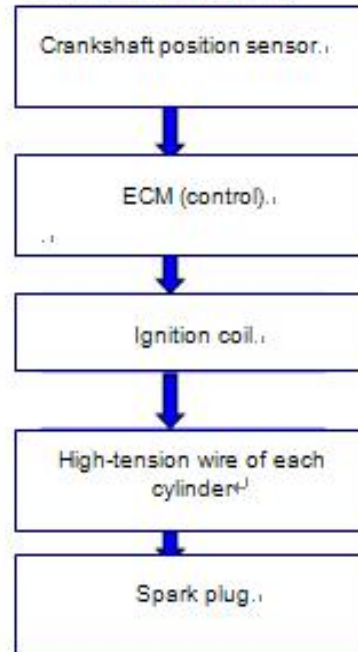
## 1.9 Ignition coil

Troubleshooting: Short circuit and open circuit inside the coil.  
Insufficient ignition electric quantity caused by coil aging.

Coil magnetizing control  
The ignition coil magnetizing time determines the spark plug ignition energy; too long magnetizing time will damage the coil or coil driver, while too short time will lead to misfire.

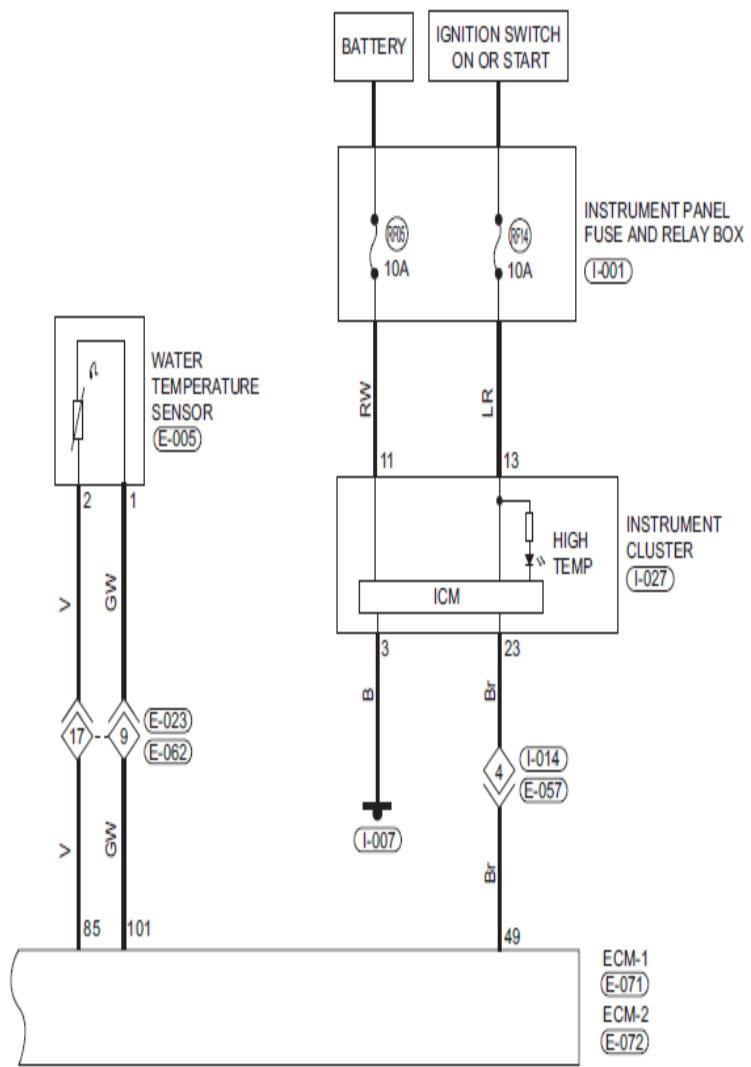
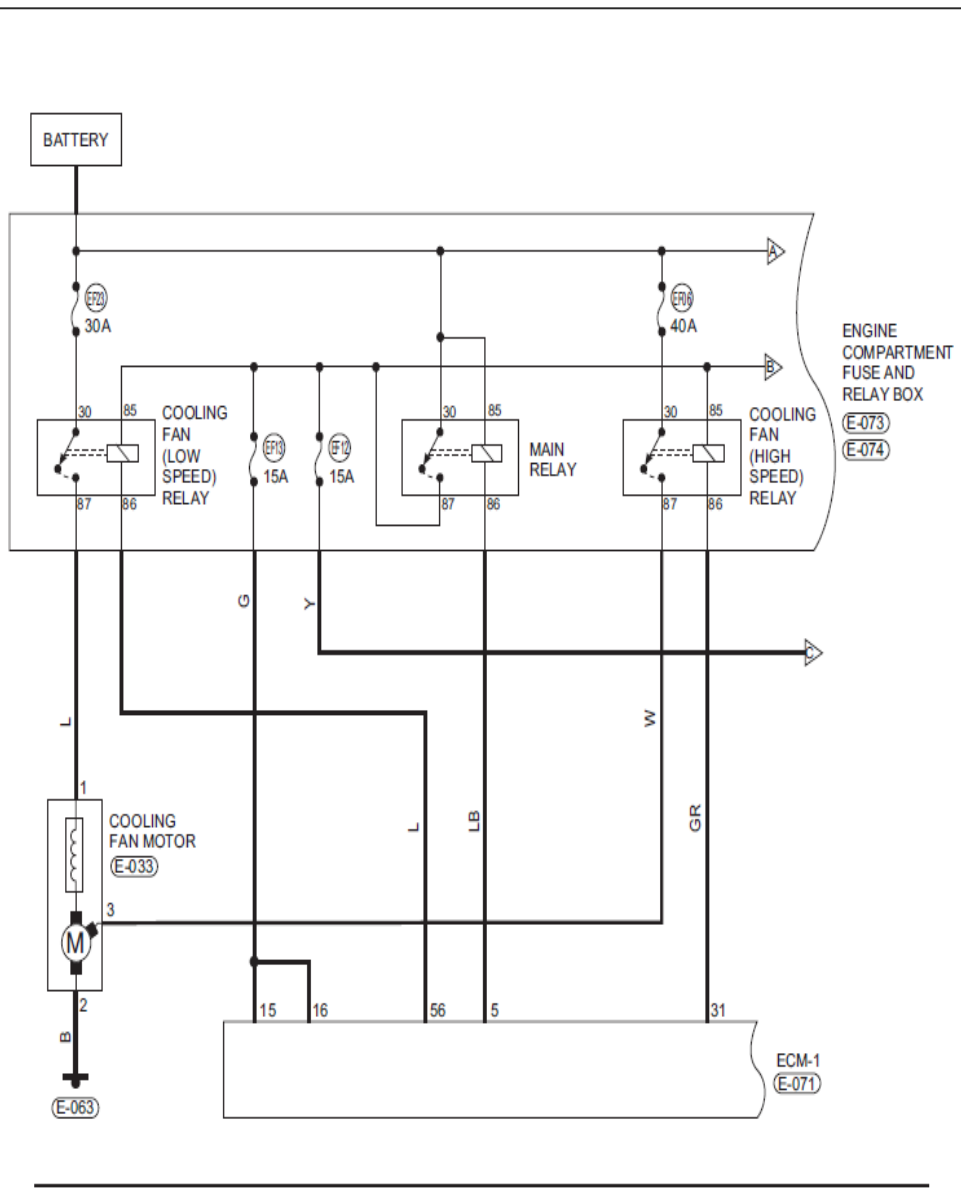
### Ignition coil working principles

The simple principle of ignition system control is as the following:

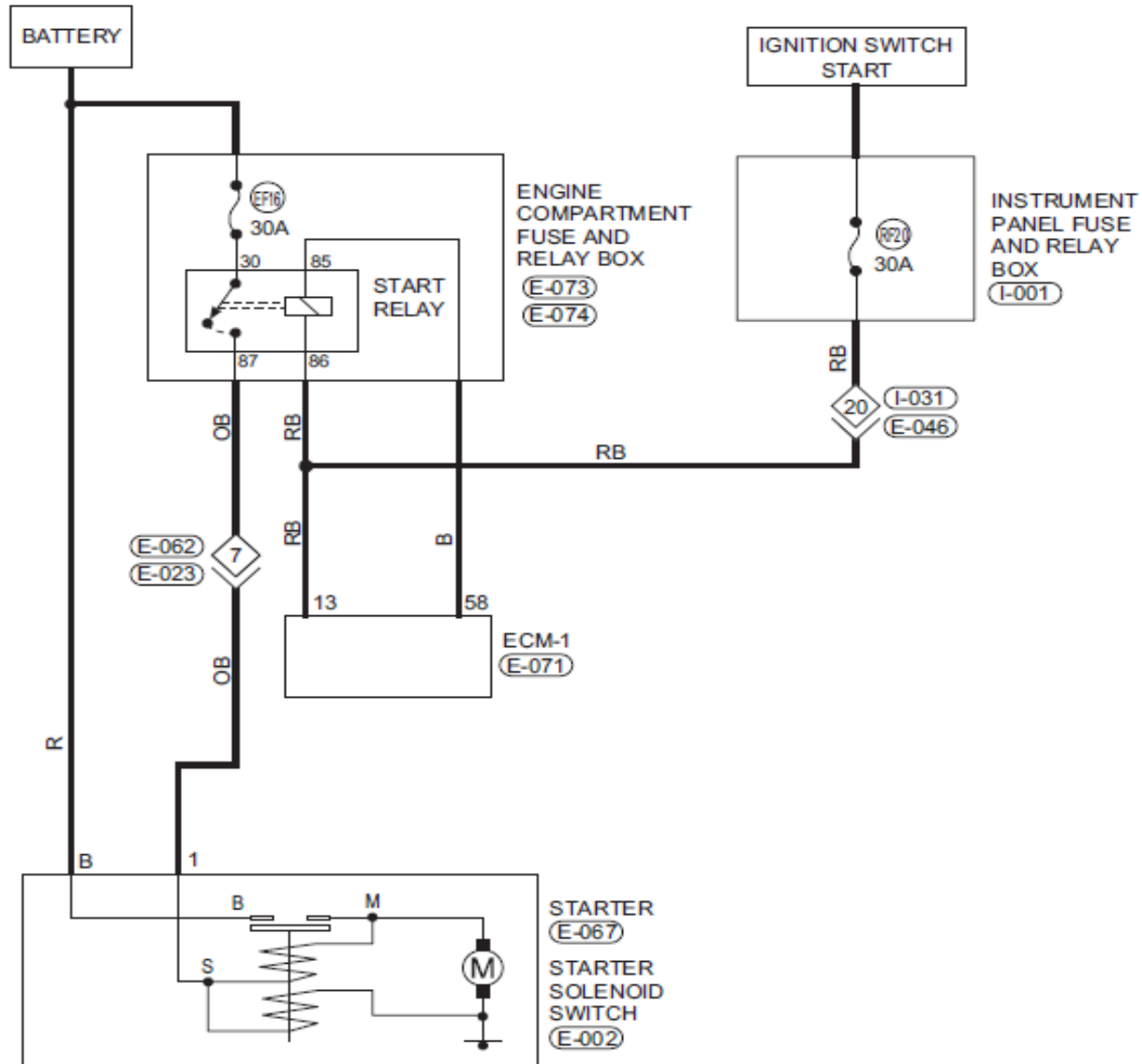


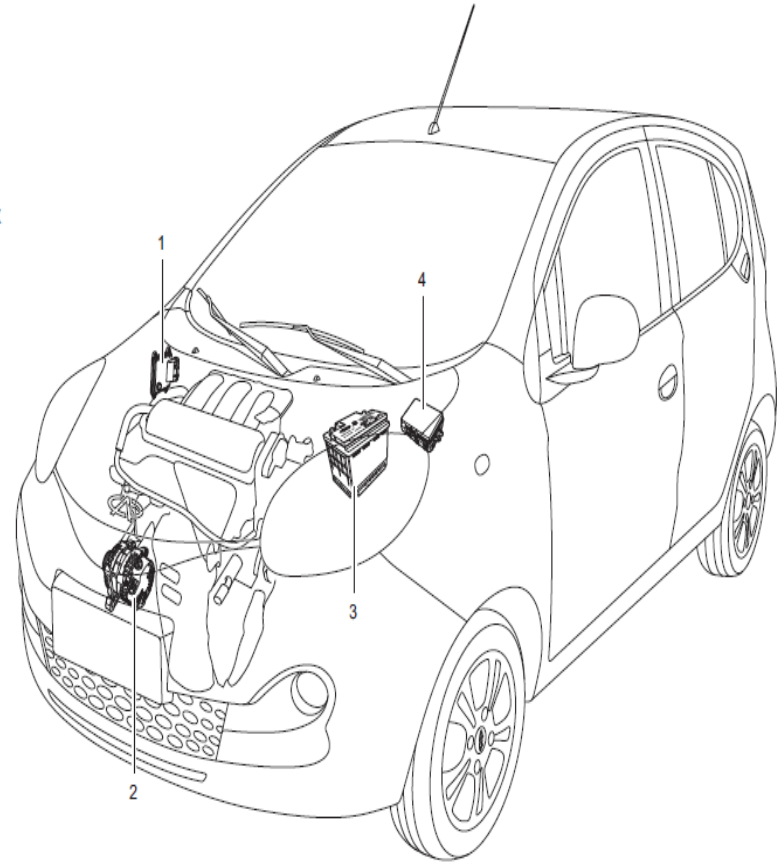
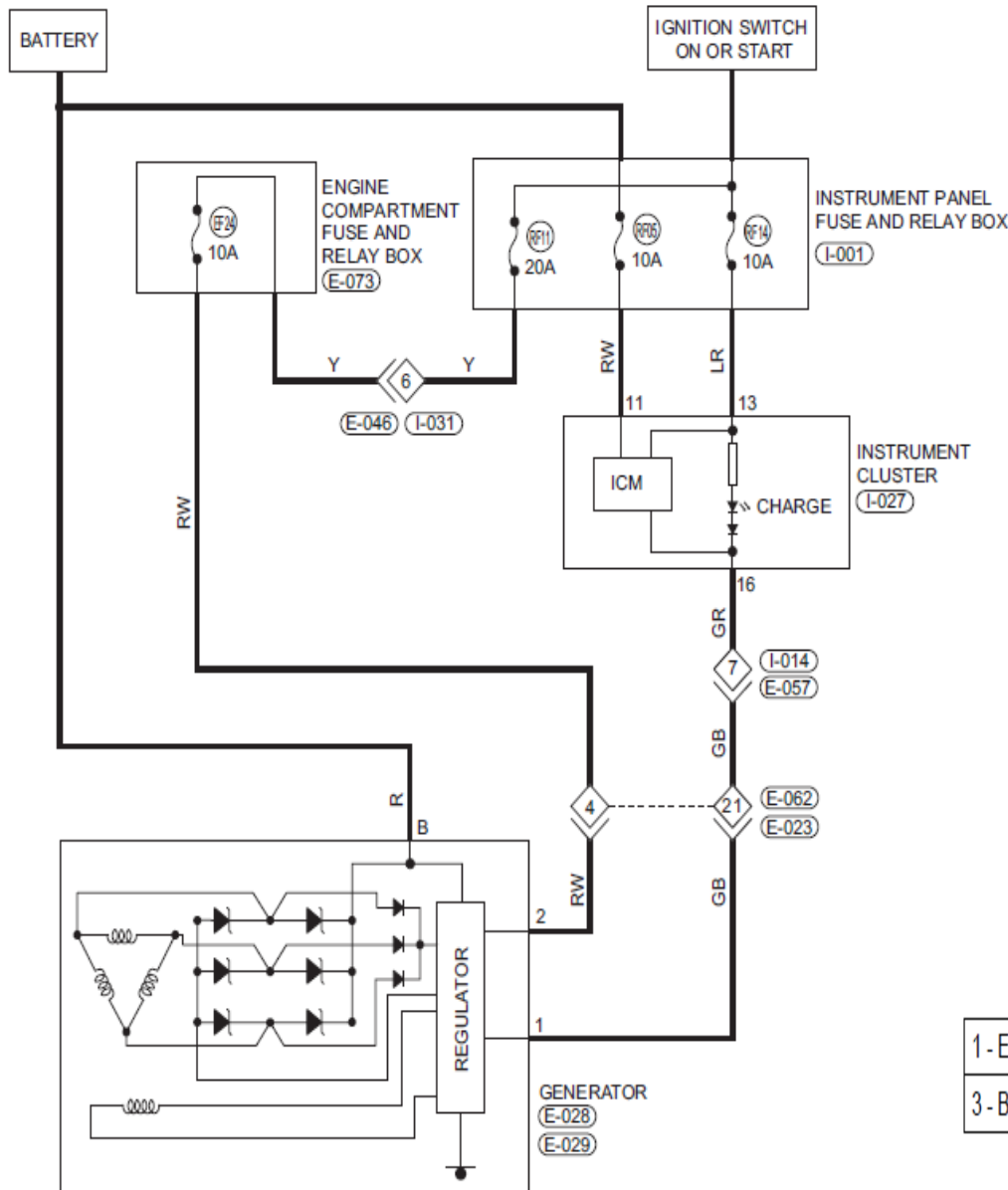
Element system fault:

- Unstable idle speed
- Insufficient engine power
- Fuel consumption increase
- Worse emission pollution
- Difficult hot start

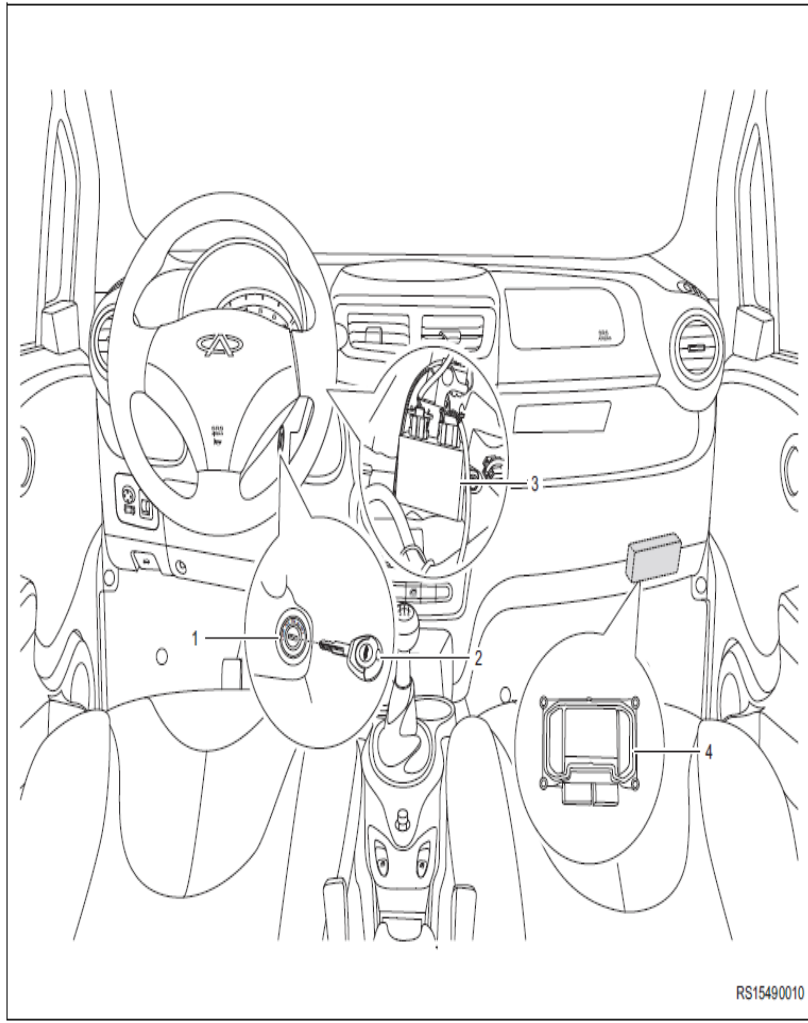
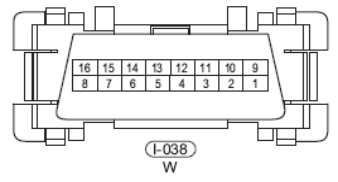
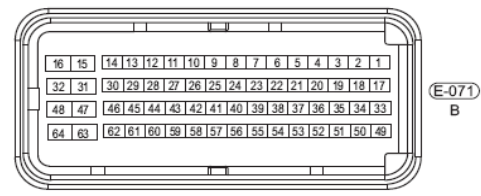
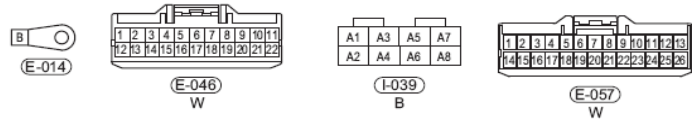
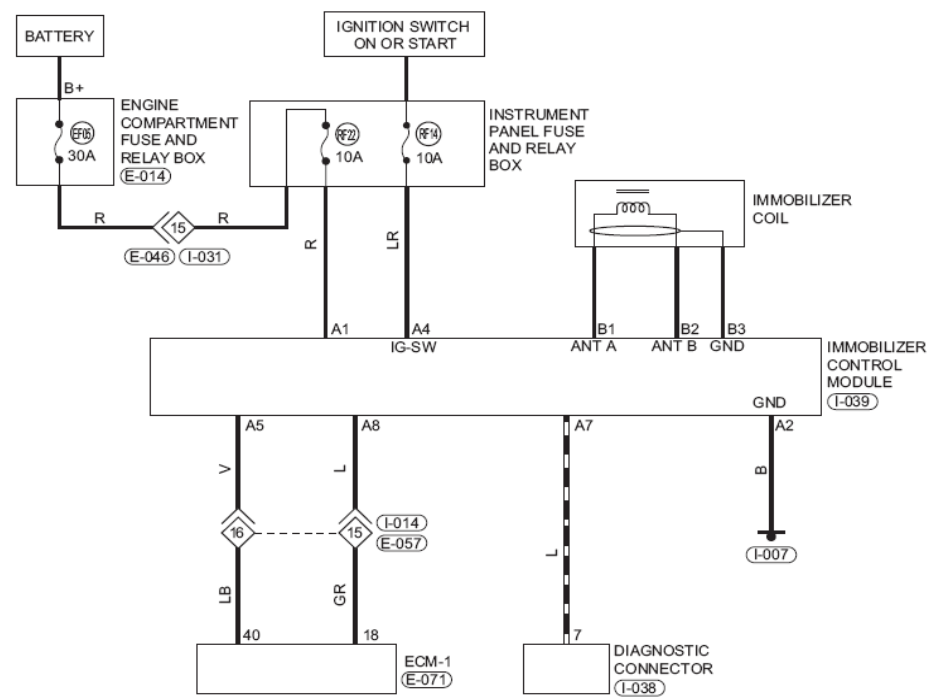






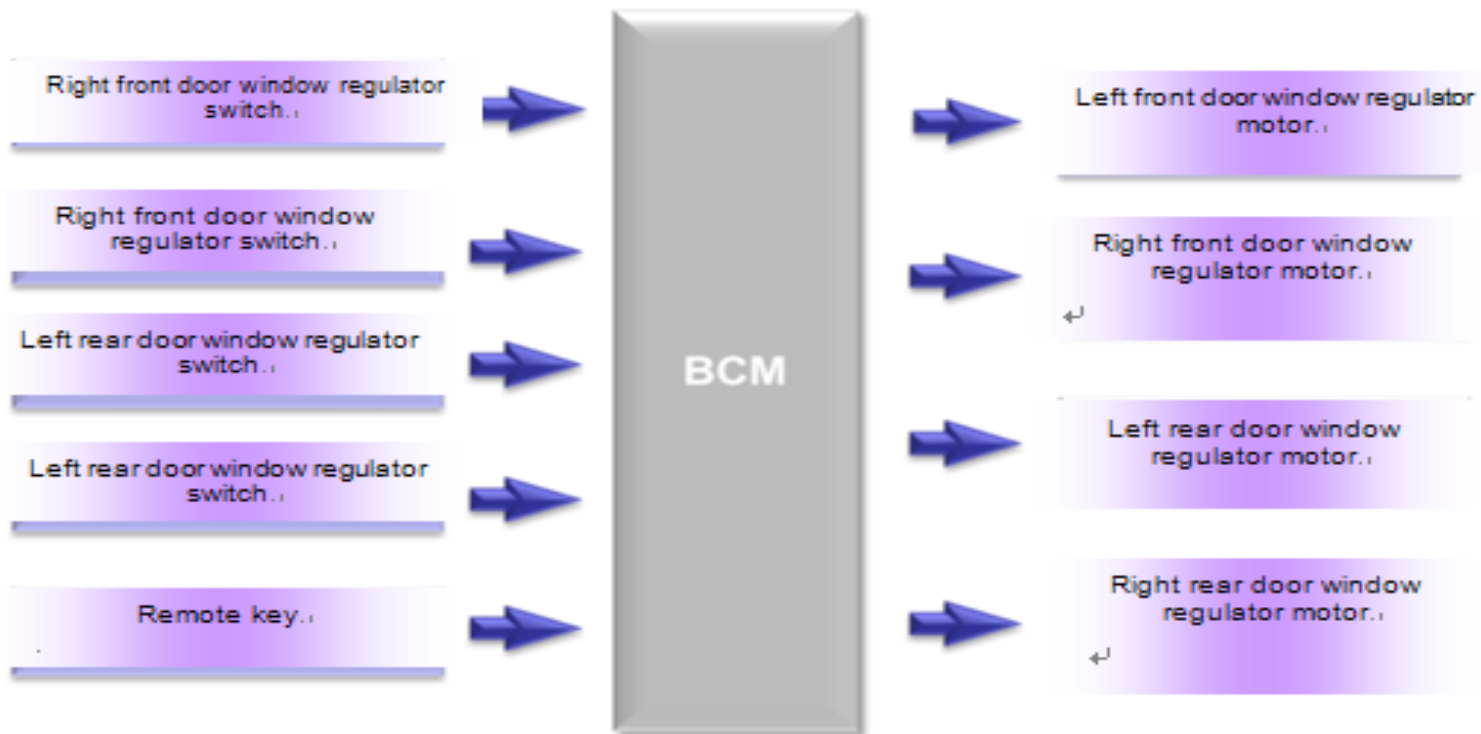
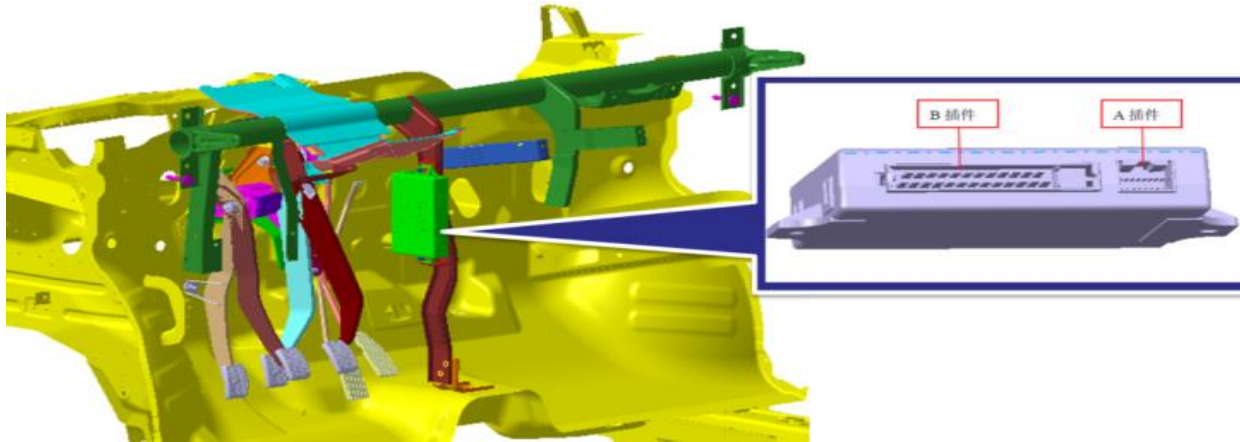


1 - ECM	2 - Generator
3 - Battery	4 - Engine Compartment Fuse and Relay Box

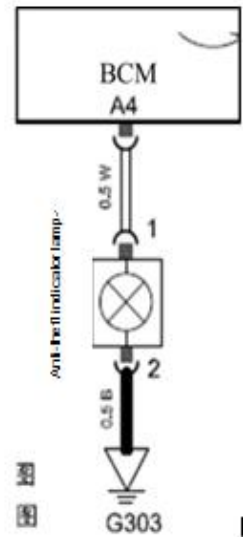
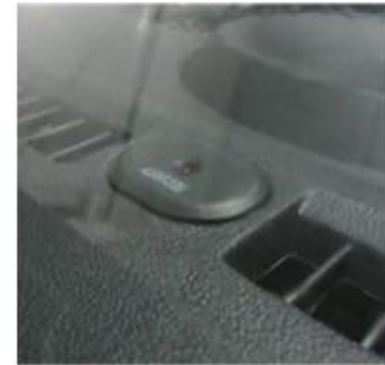
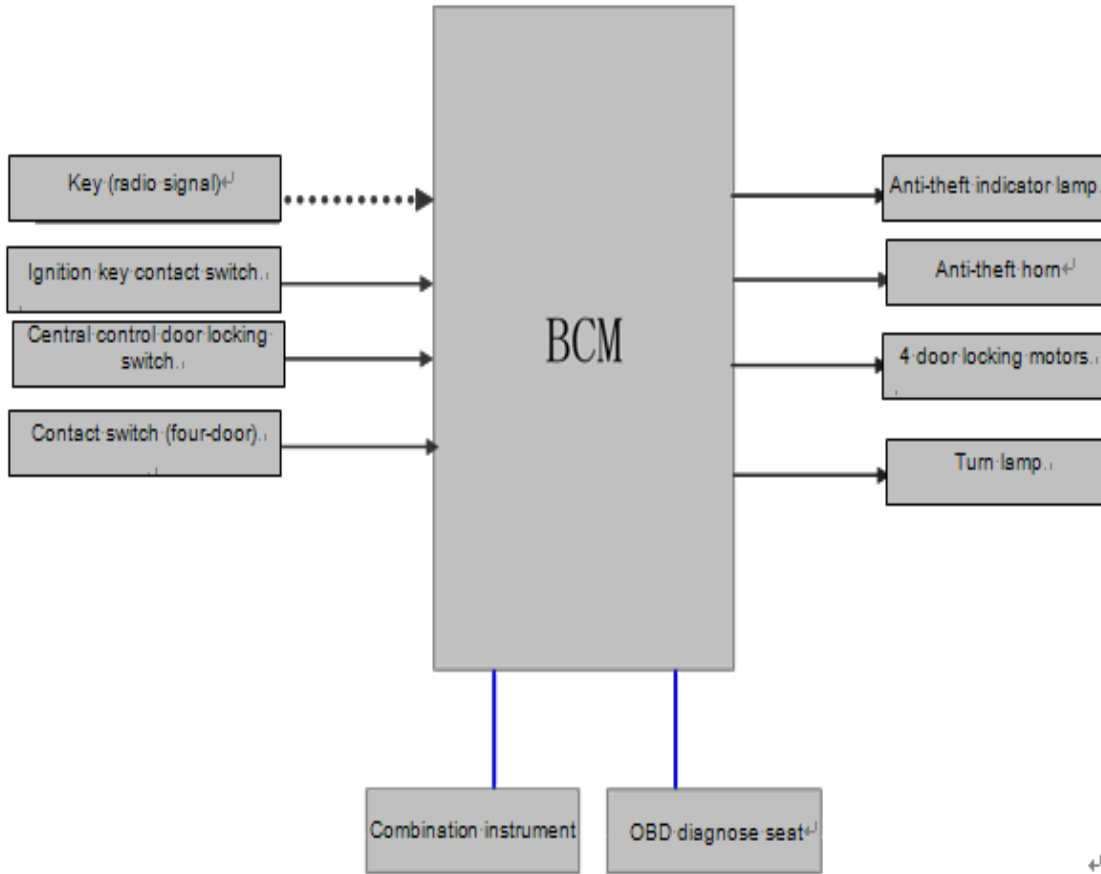


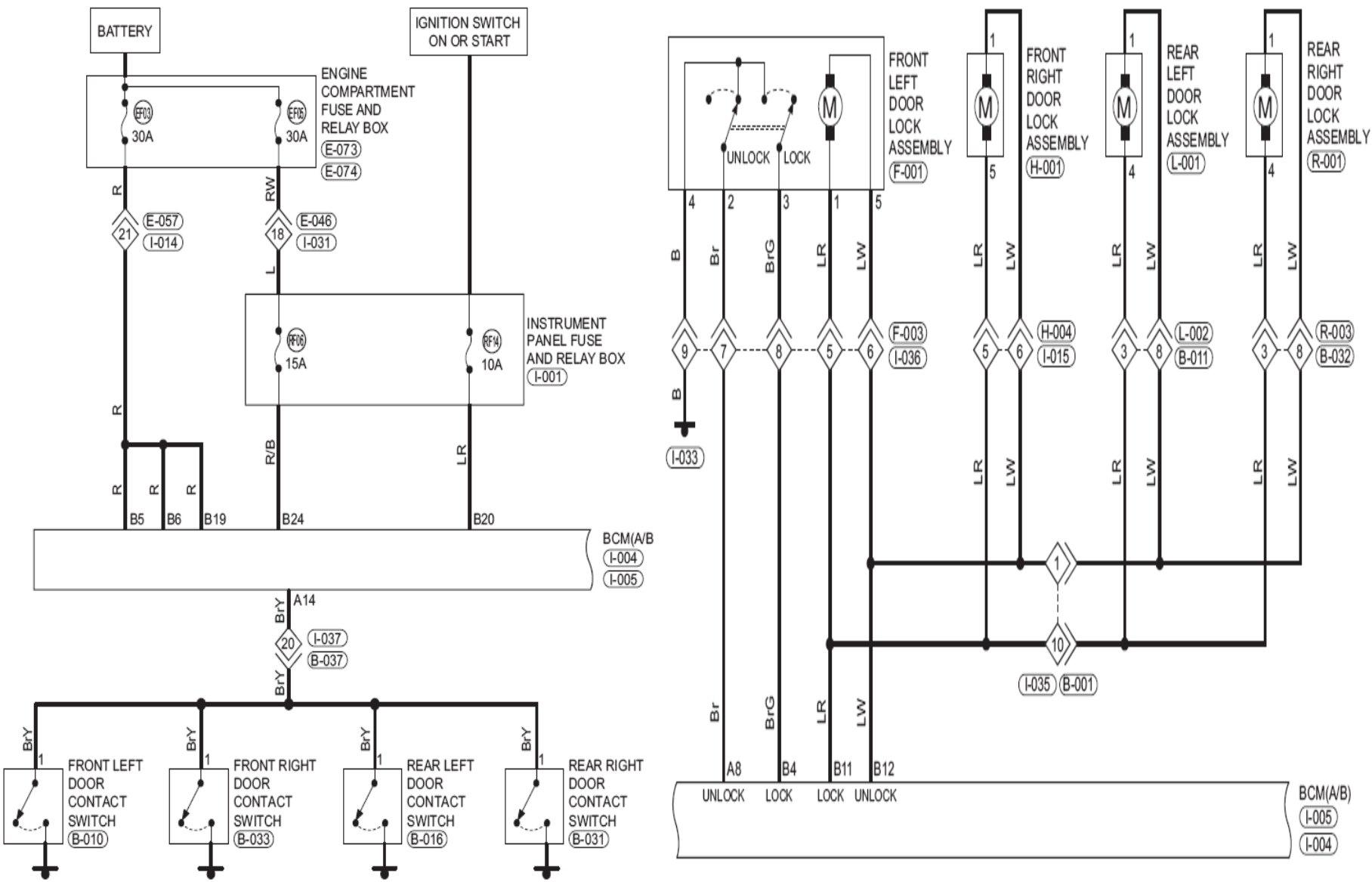
1 - Ignition Switch (Built-in Immobilizer Coil)	2 - Ignition Key (Built-in Transponder)
3 - Immobilizer Control Module	4 - Engine Control Module (ECM)

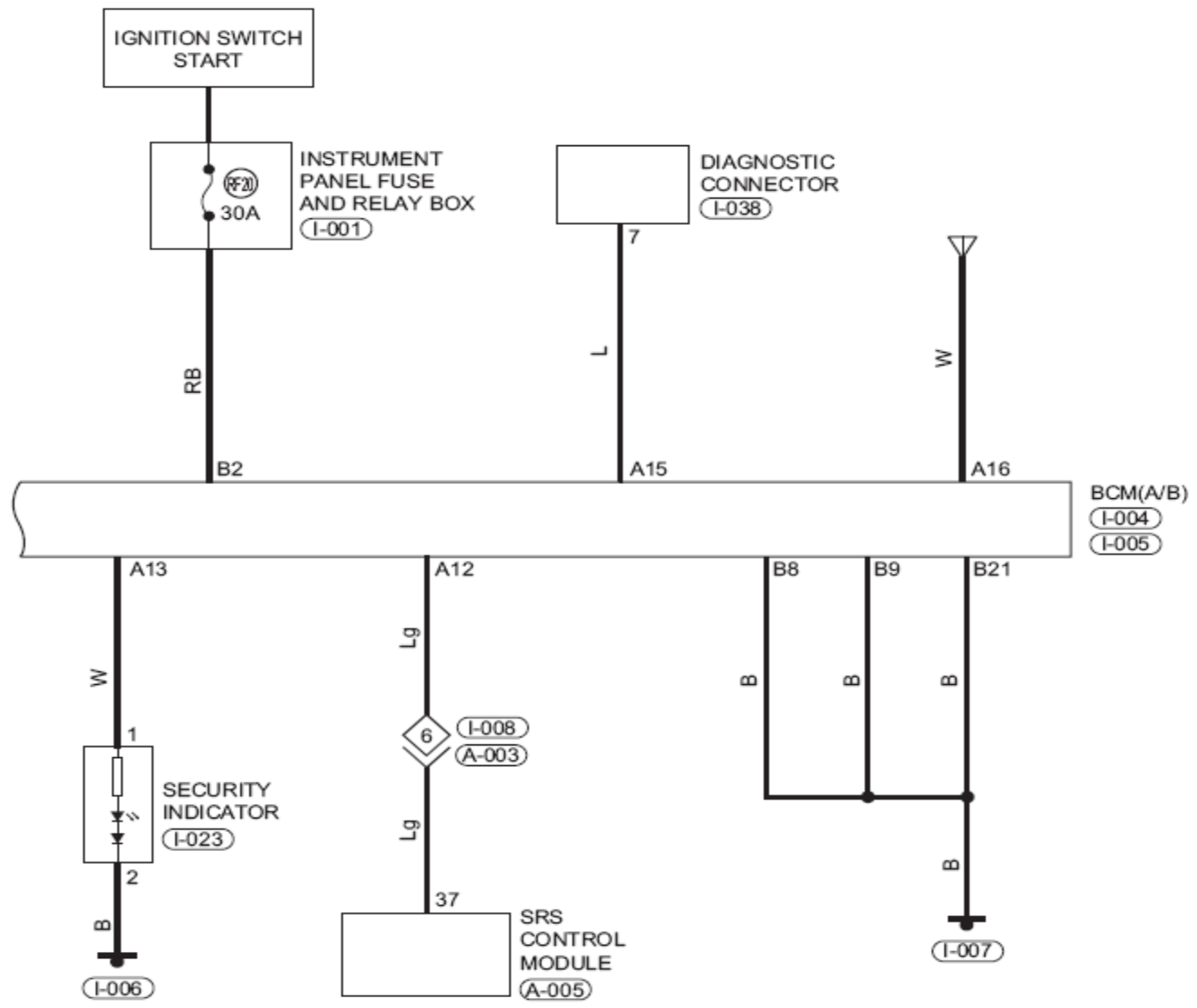
RS15490010

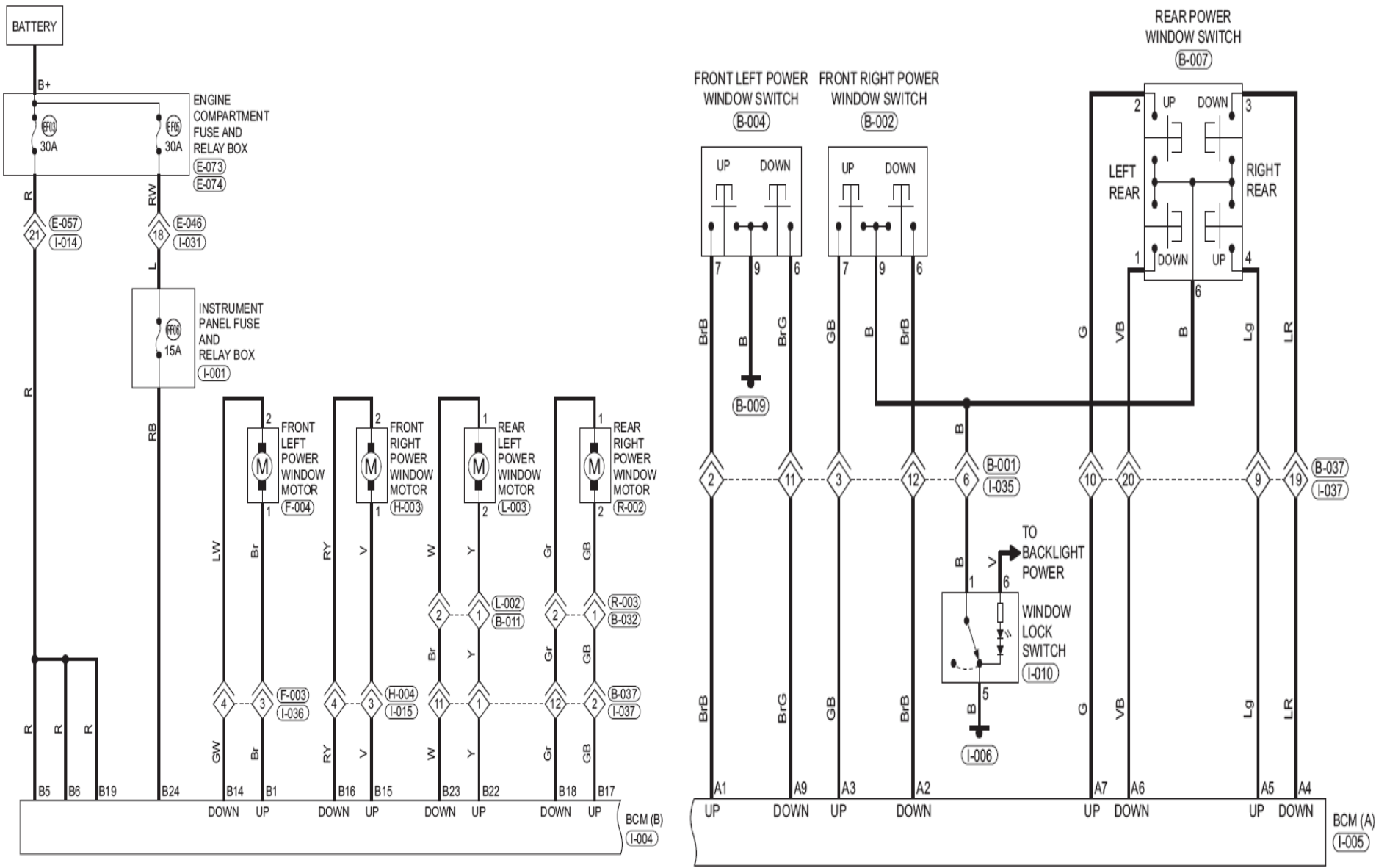


# Central Control Lock Control Diagram

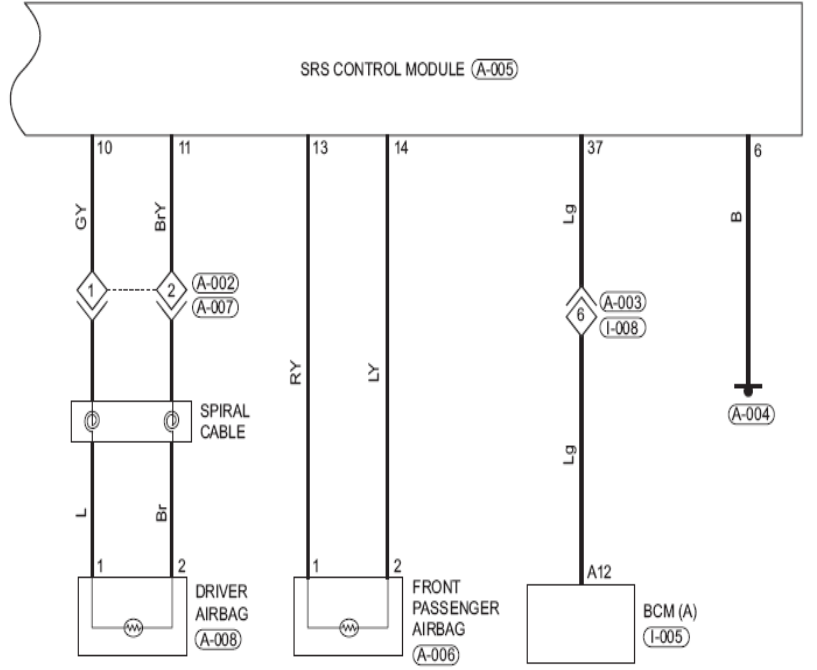
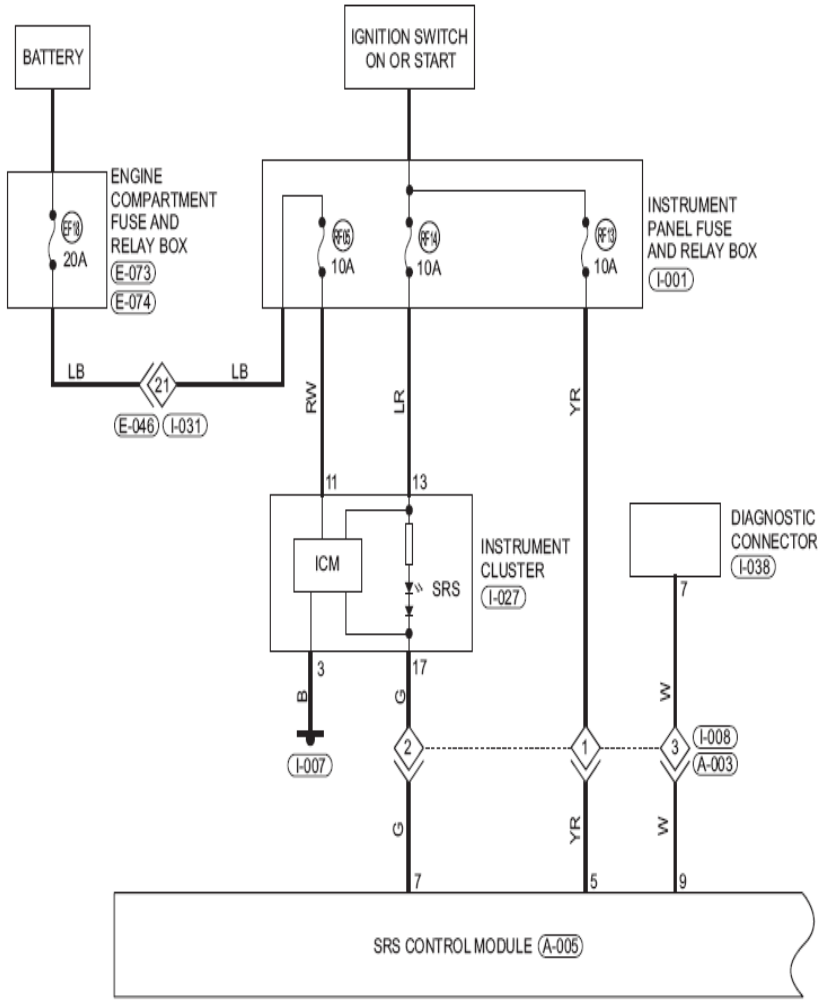


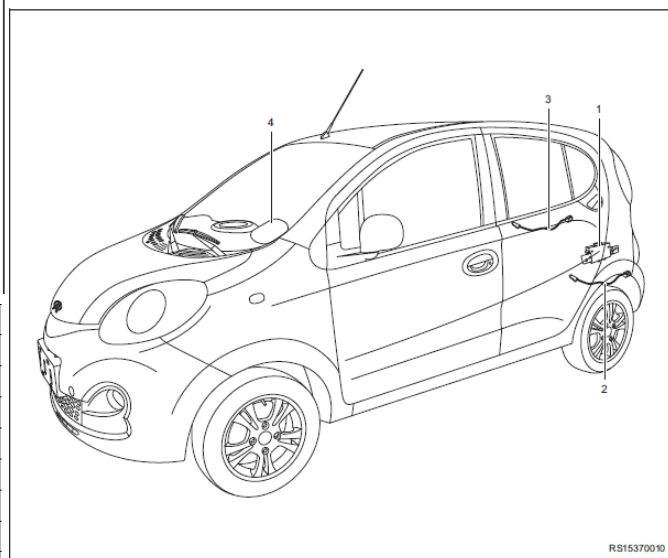
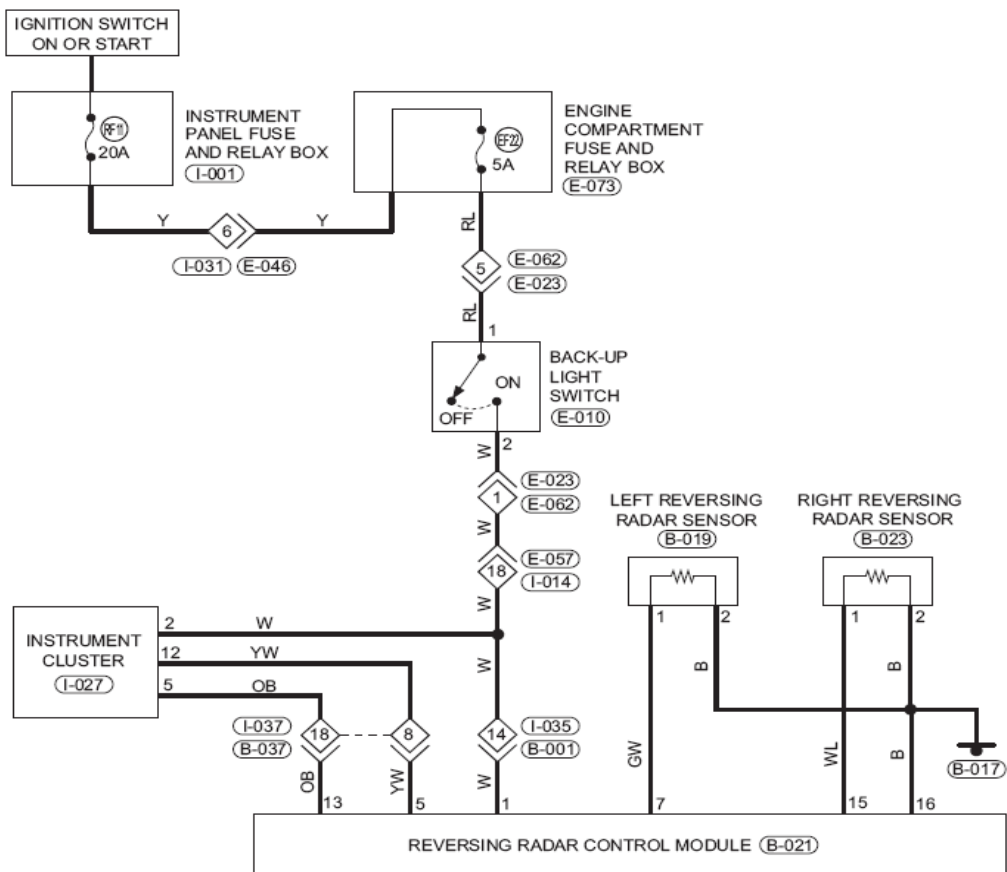




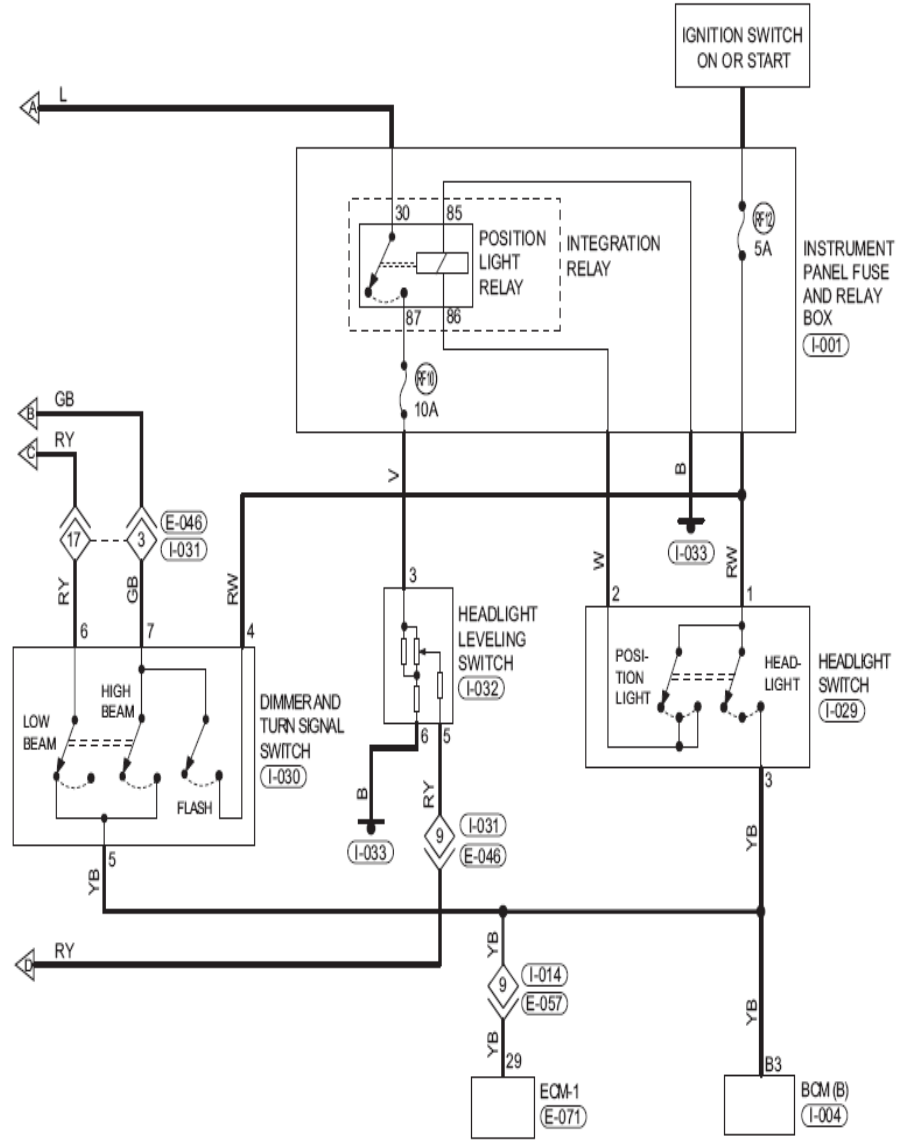
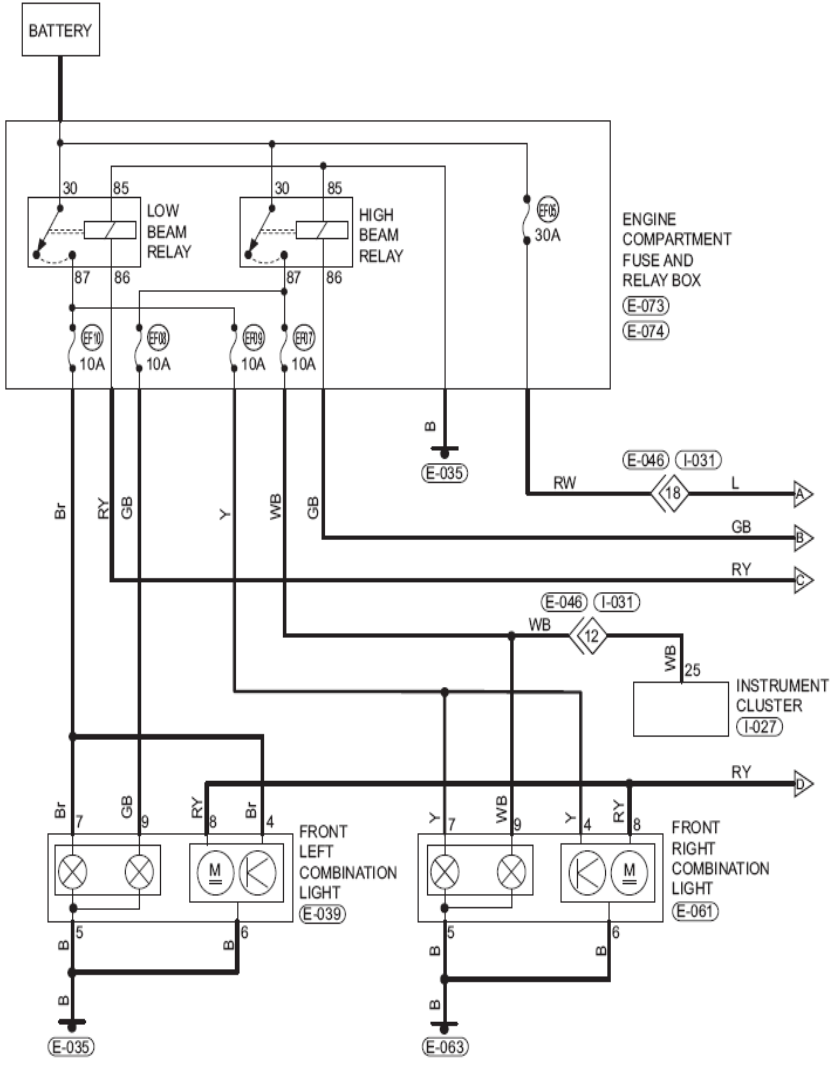


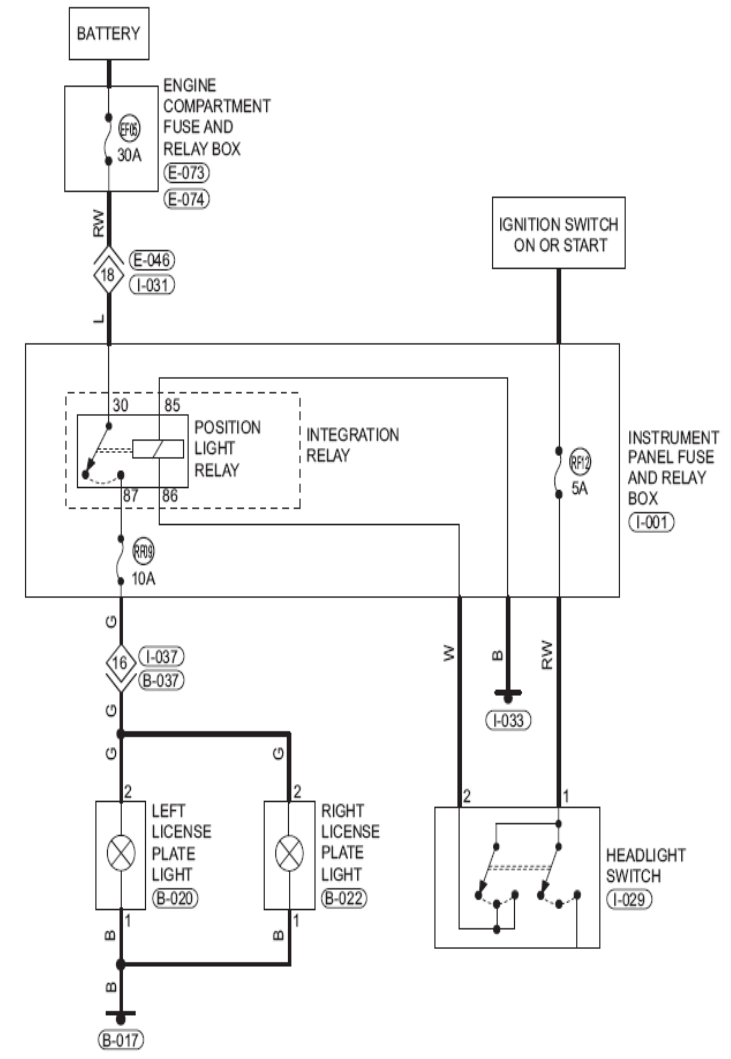
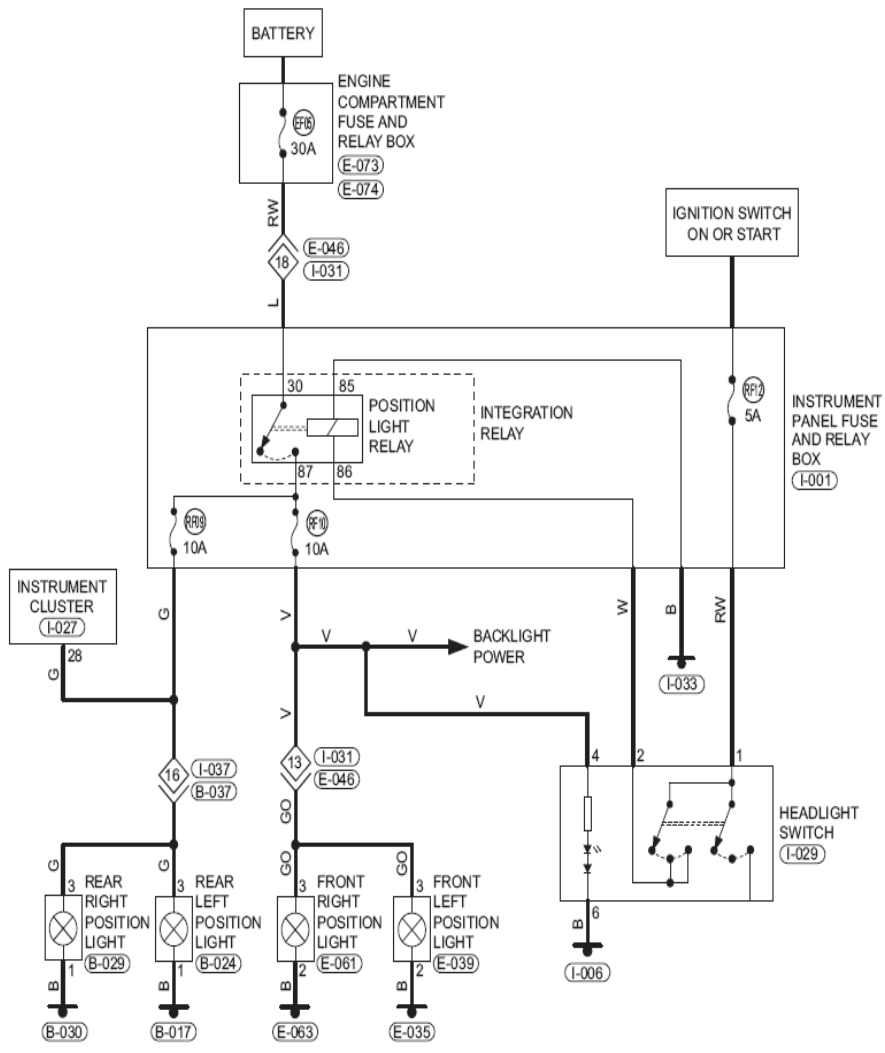


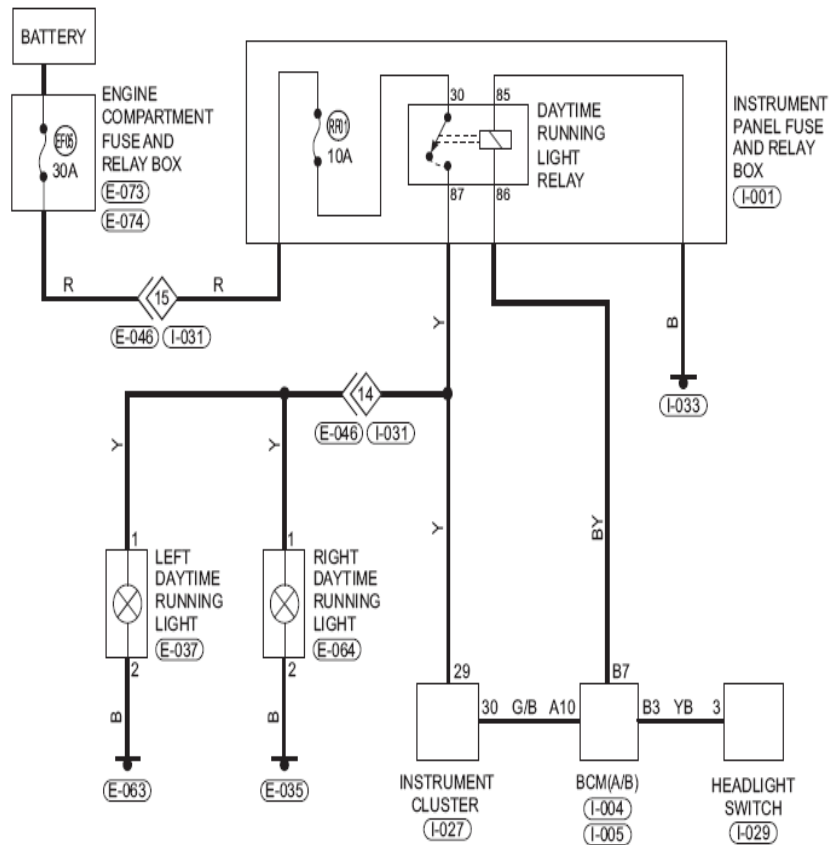




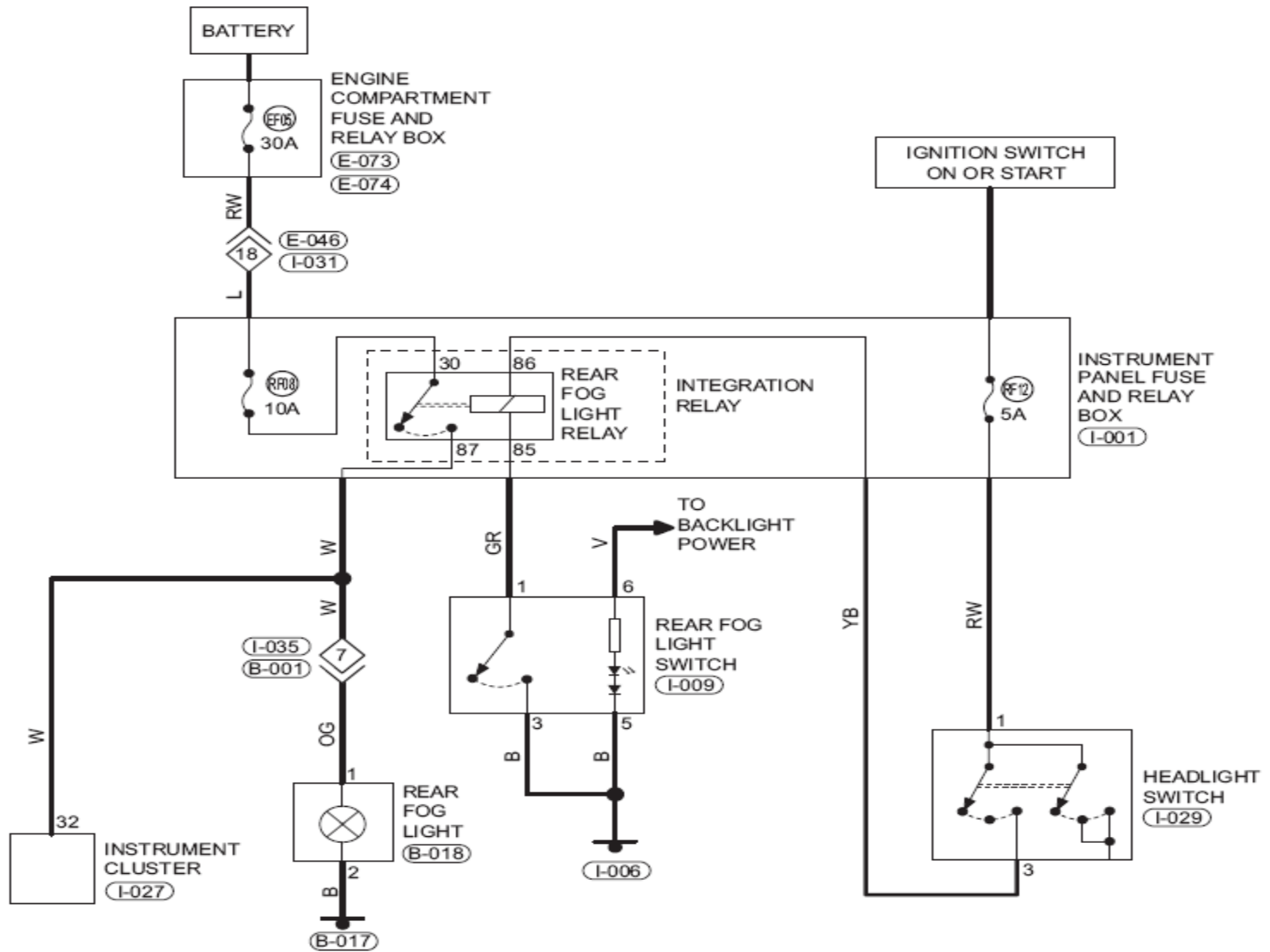
Pin No.	Terminal Definition	Pin No.	Terminal Definition
1	Power Supply (Reversing Signal)	9	-
2	-	10	-
3	-	11	-
4	-	12	-
5	Clock Signal (to Instrument Cluster)	13	Data Signal (to Instrument Cluster)
6	-	14	-
7	Left Reversing Radar Sensor Signal	15	Right Reversing Radar Sensor Signal
8	-	16	GND



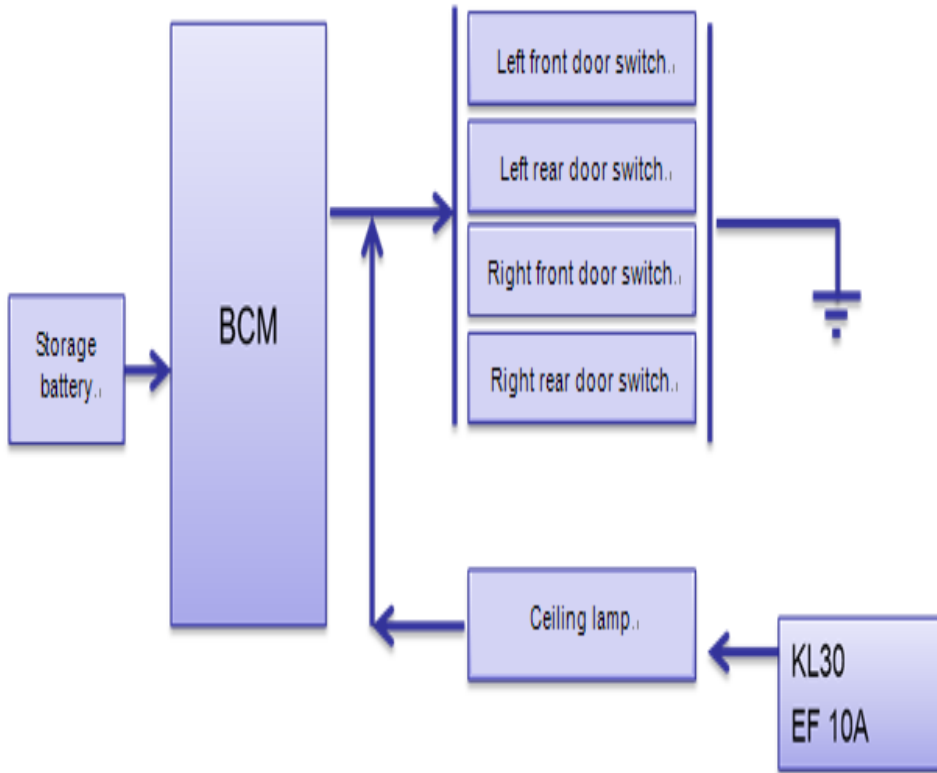
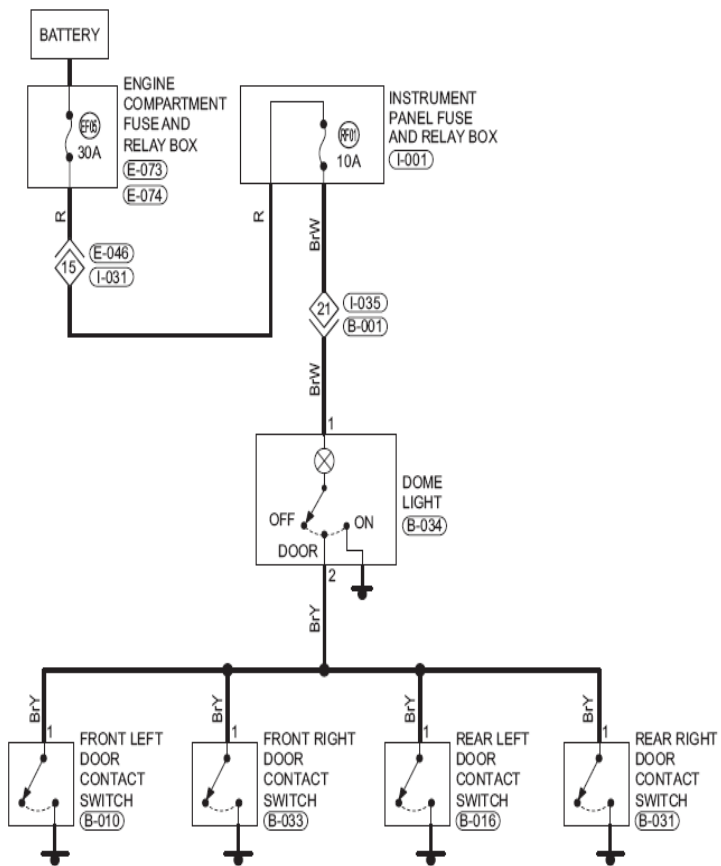




Bulb Name	Nominal Light Source (Model/Type)
Headlight	H4 60/55W
Front Position Light	W5W
Front Turn Signal Light	PY21W
Brake Light	P21/5W
Rear Fog Light	P21W
License Plate Light	C6W
High Mounted Stop Light	LED
Rear Position Light	P21/5W
Rear Turn Signal Light	P21W
Back-up Light	P21W
Side Turn Signal Light	W5W
Daytime Running Light	17W

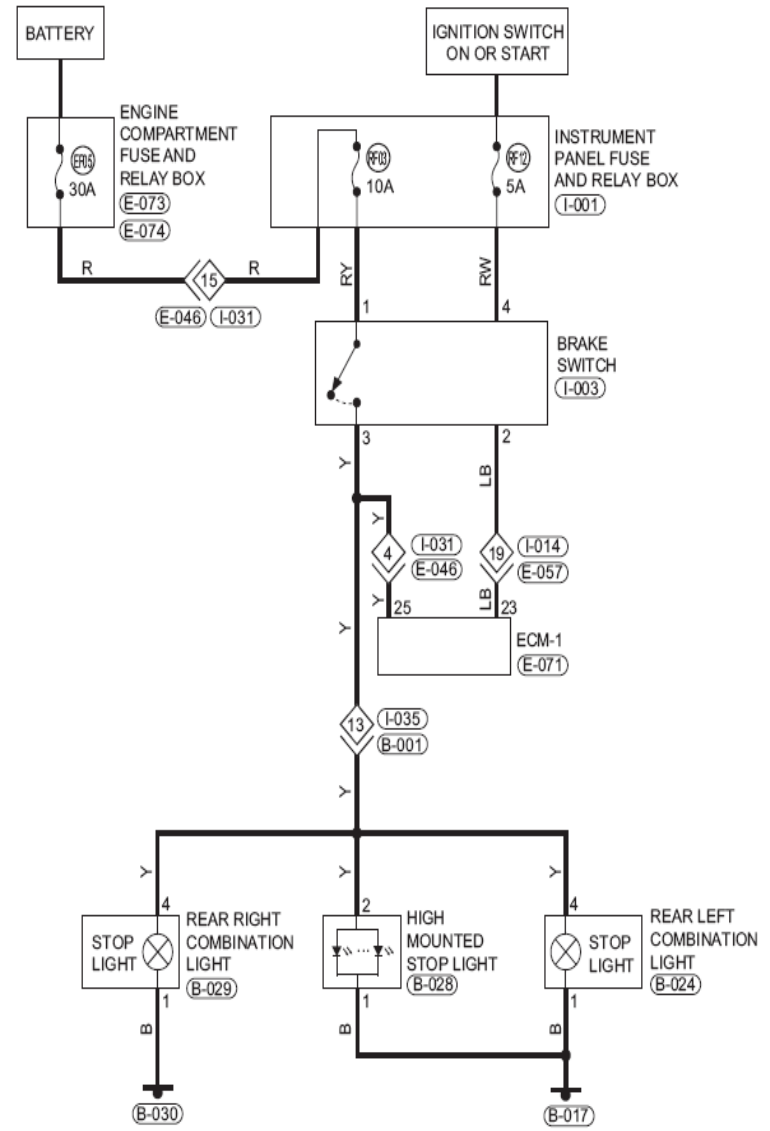
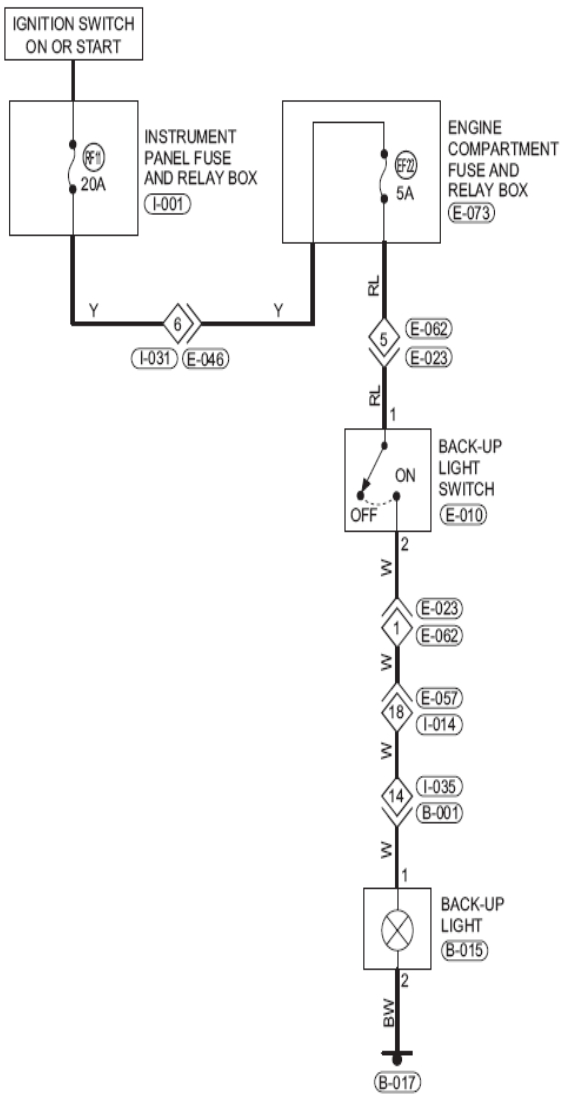


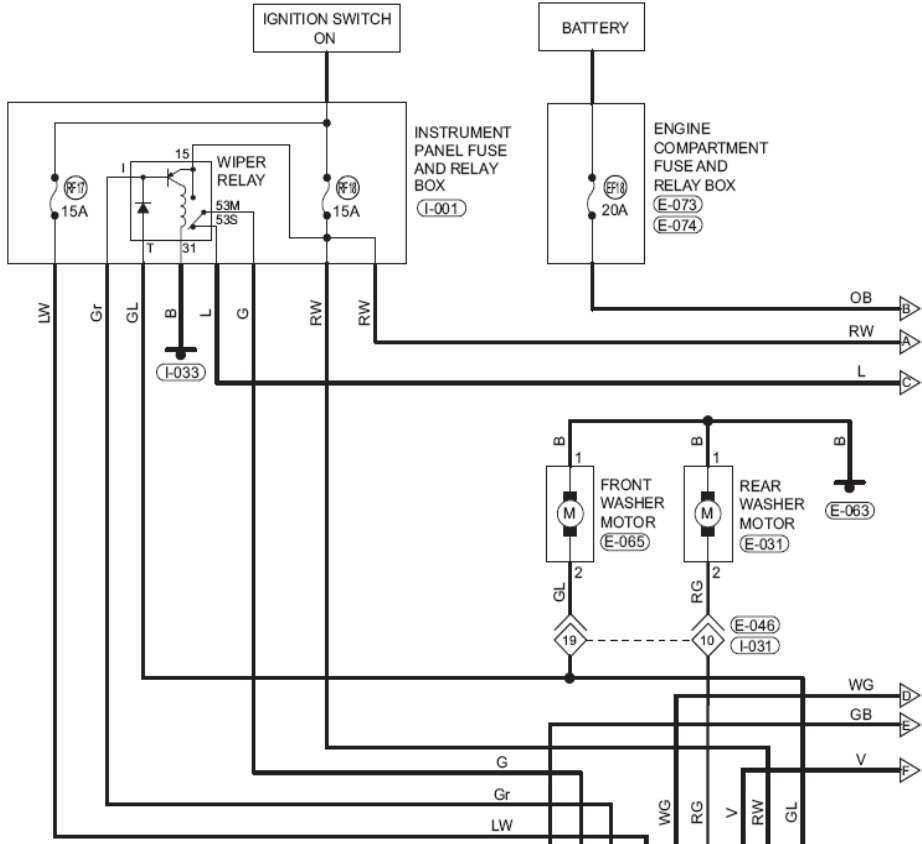
# روشنایی داخلی



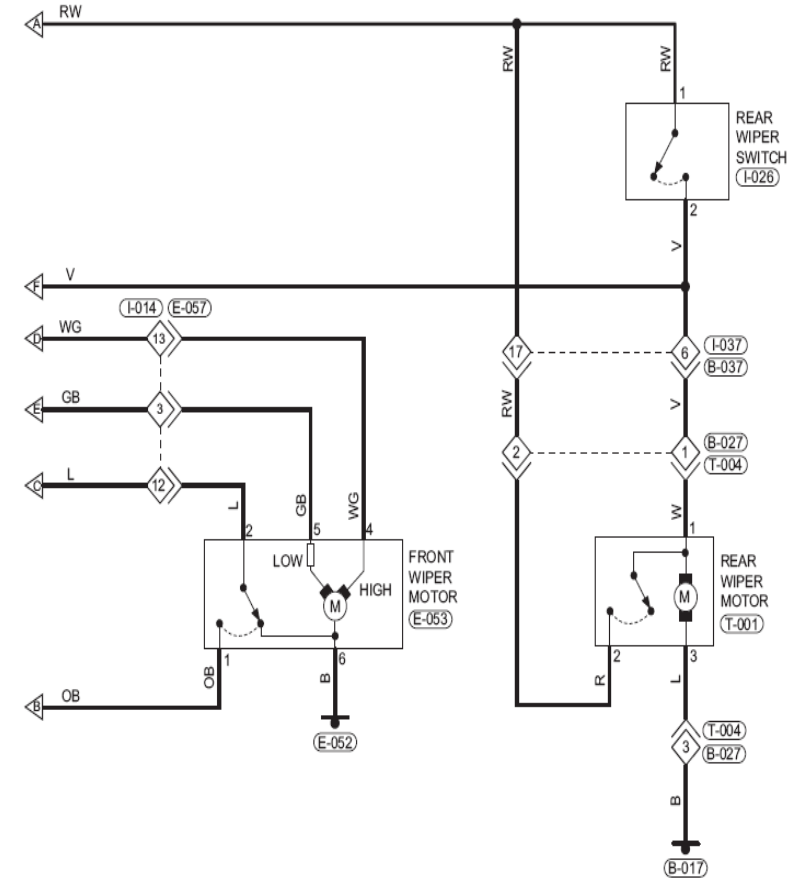


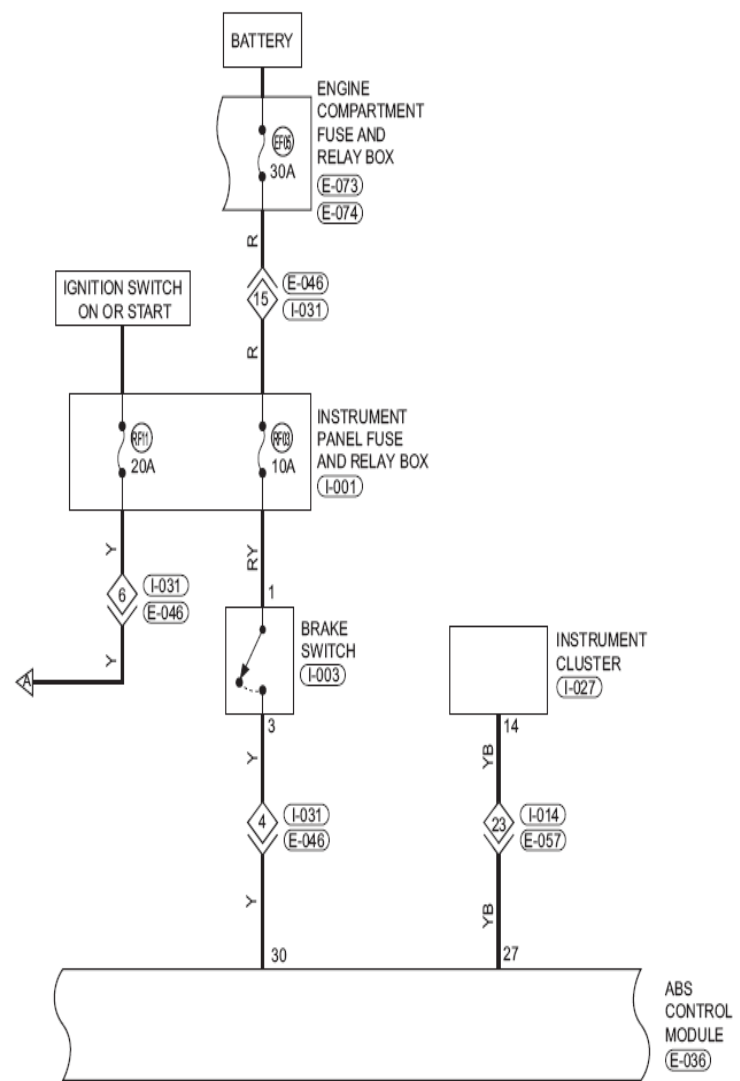
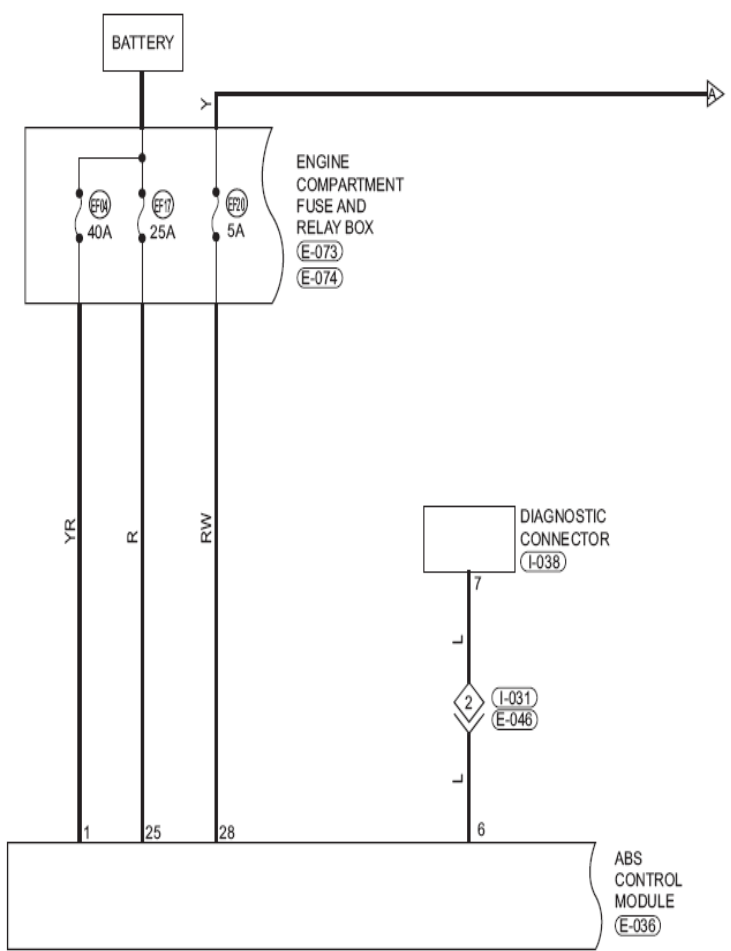


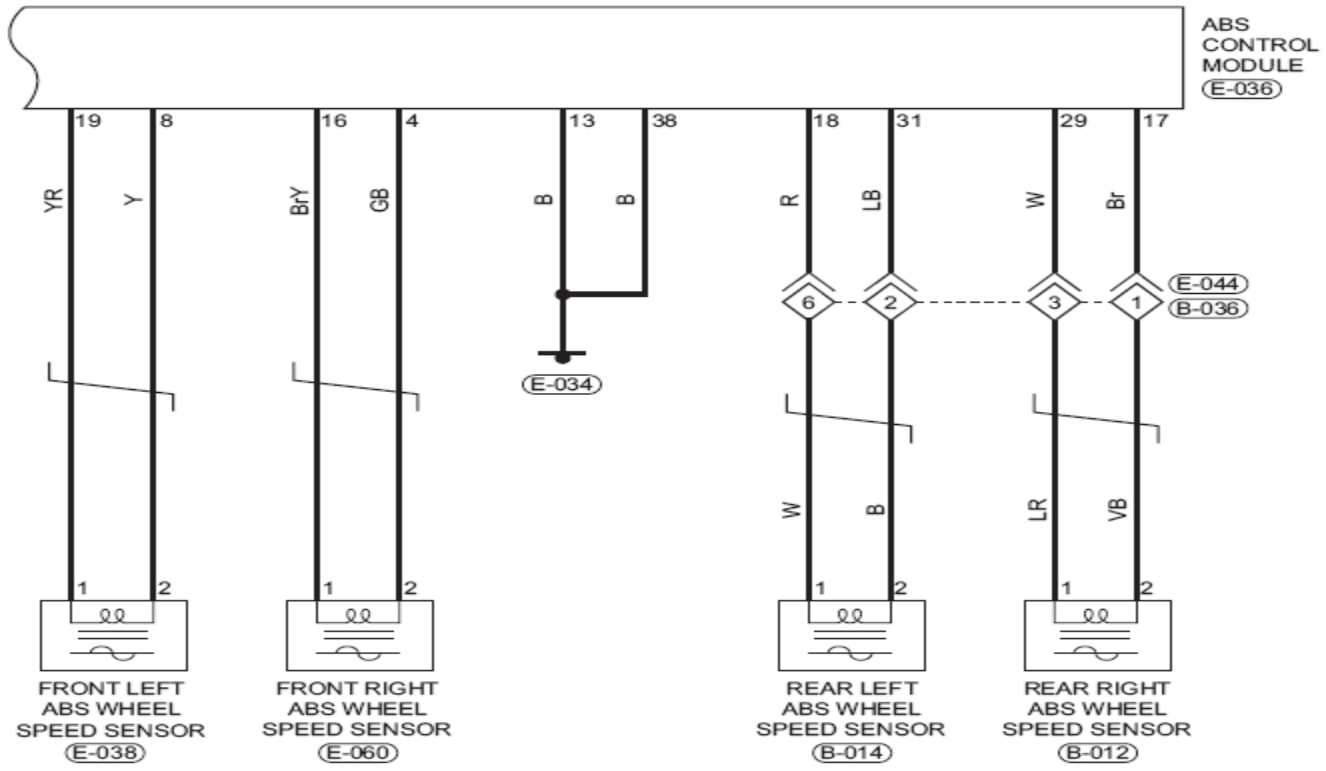


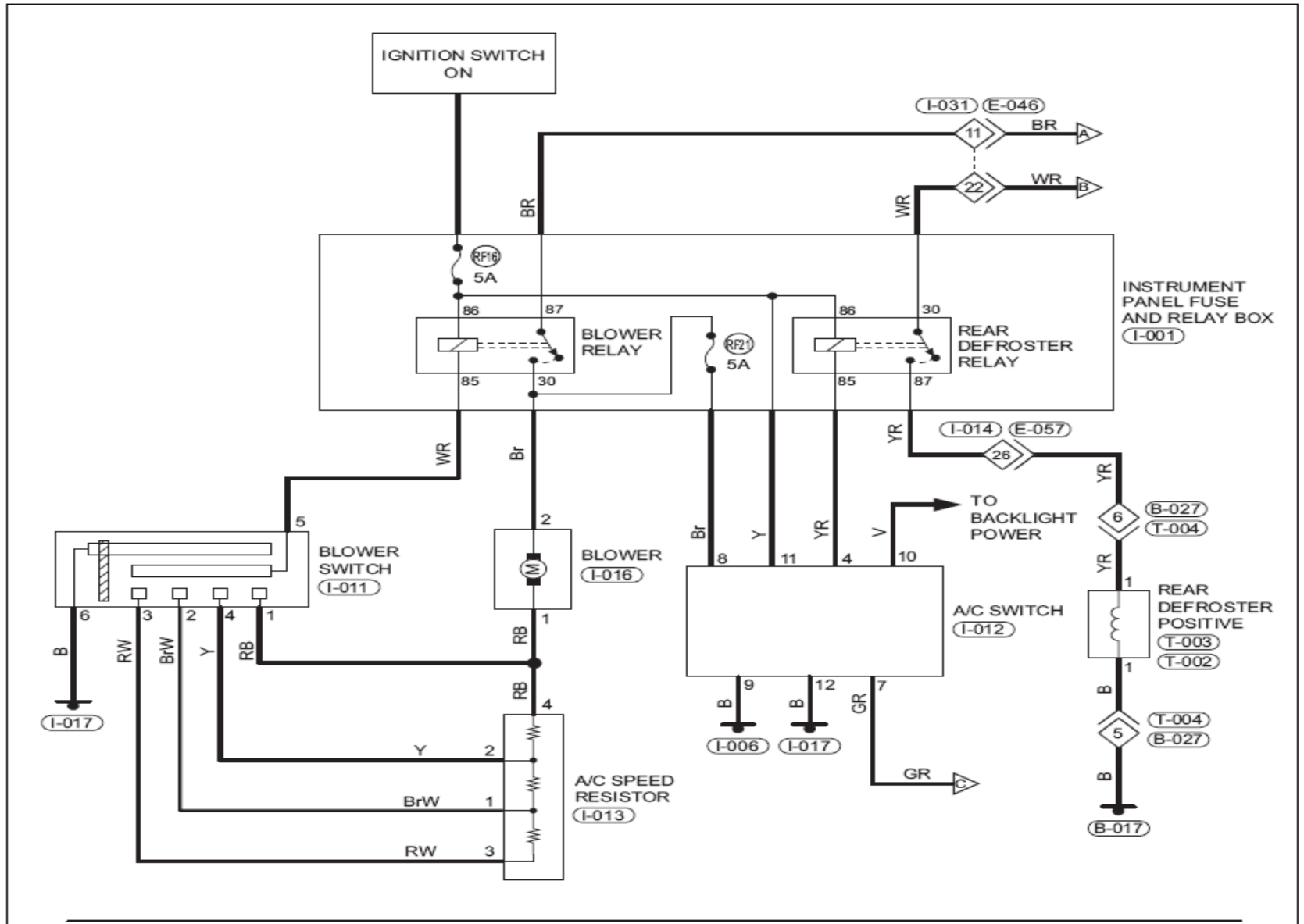


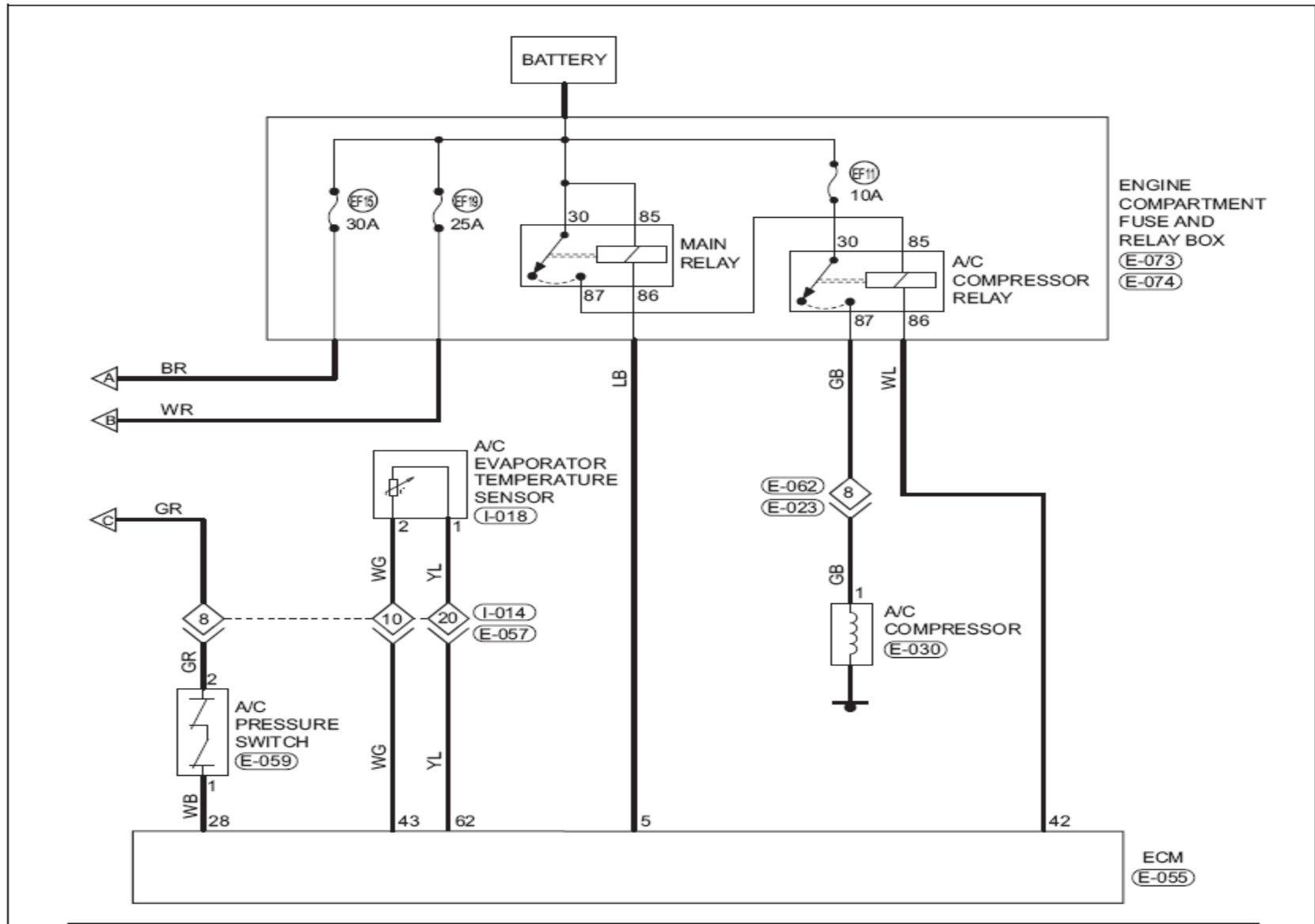
		PIN NO.								
		5	6	7	8	9	2	1	3	4
FRONT WIPER	OFF	•	•							
	INT	•	•	•						
	LO	•		•						
	HI				•	•				
WASHER	OFF								•	•
	FRONT WASHER								•	•
	REAR WASHER							•	•	•
	REAR WASHER							•	•	•







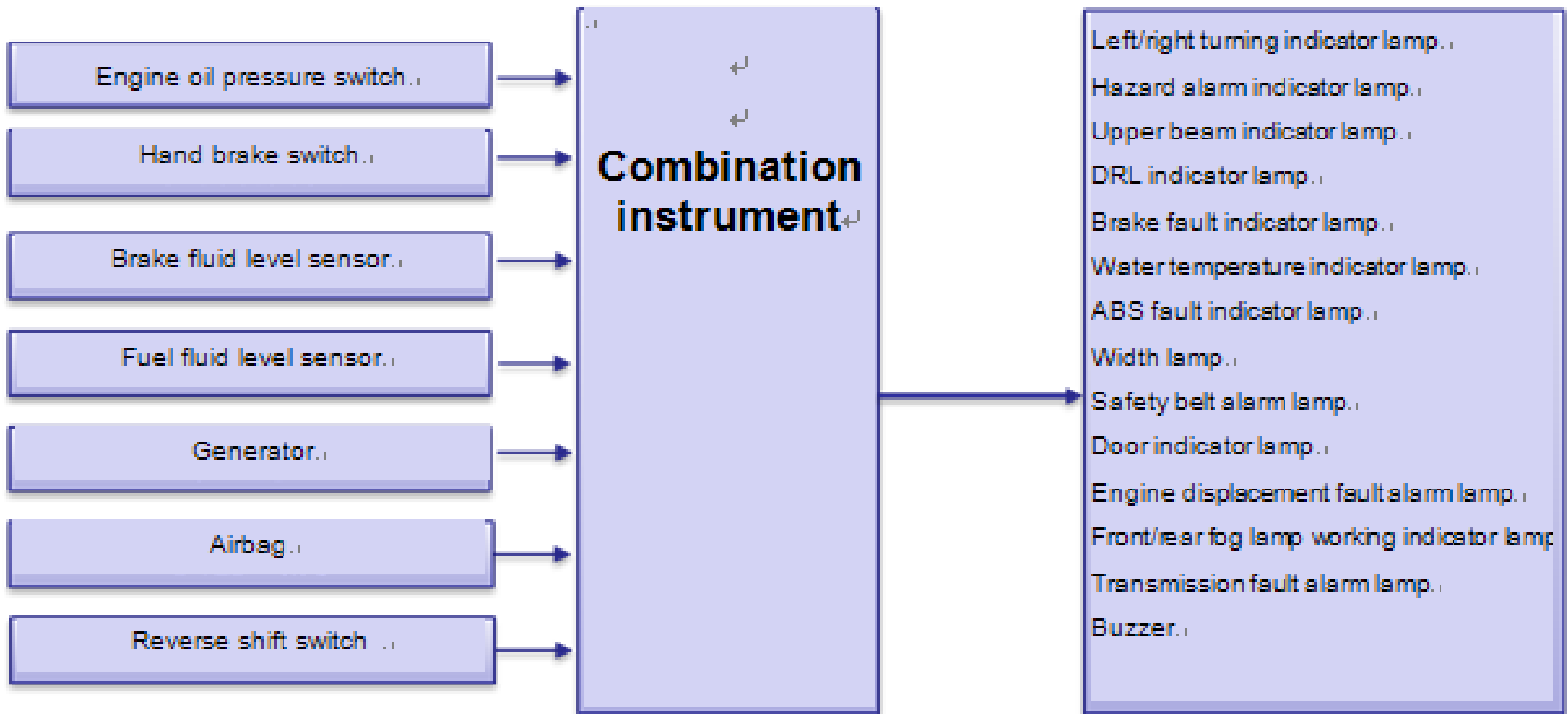




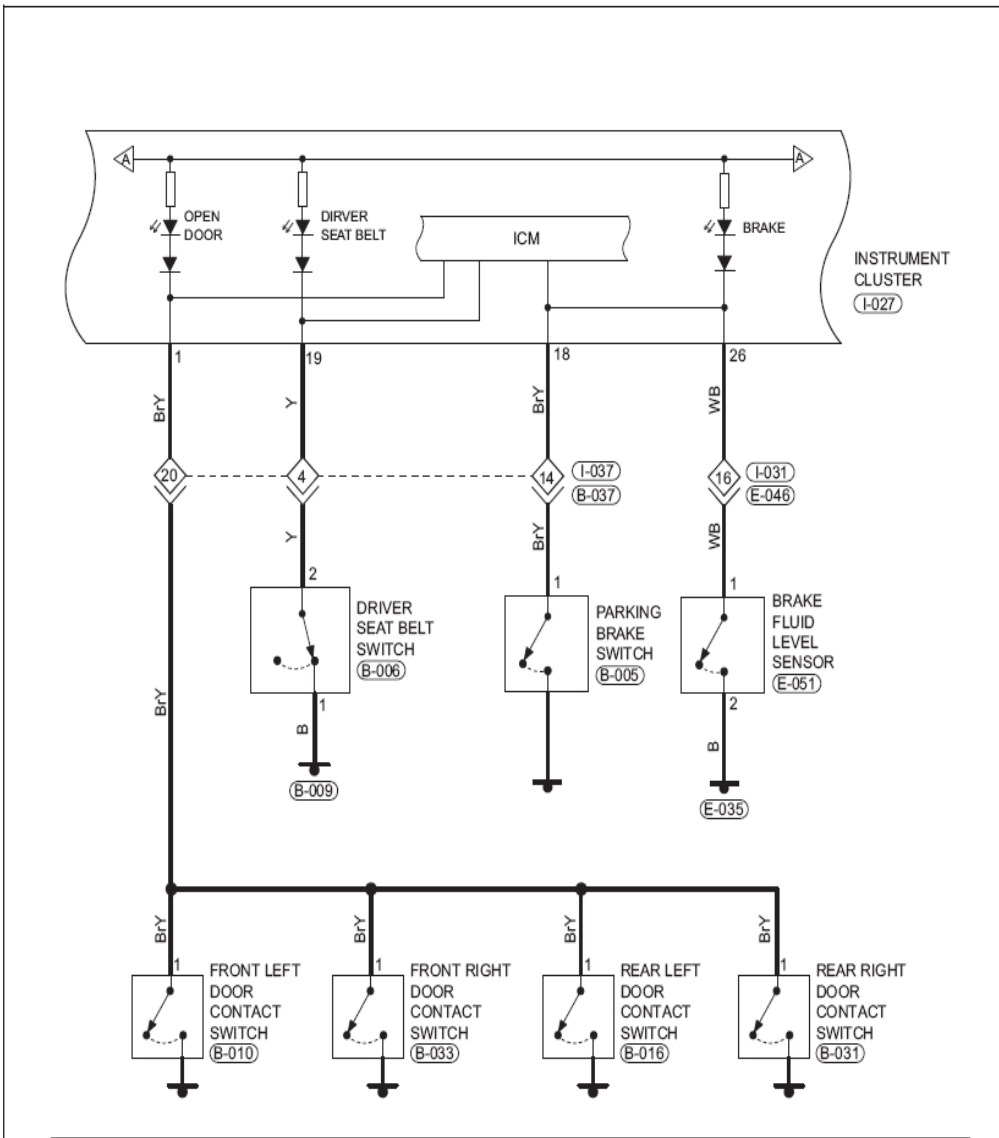
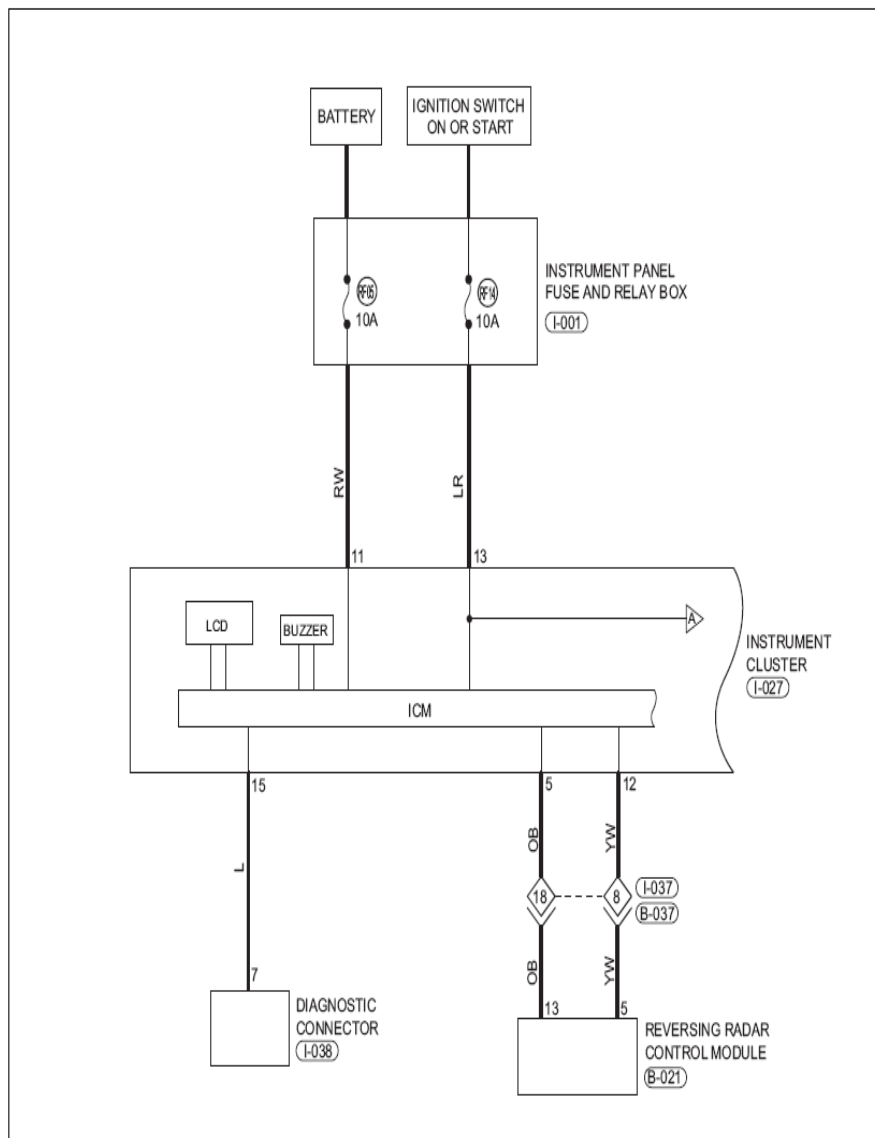
Engine oil pressure switch  
Hand brake switch  
  
Brake fluid level sensor  
Fuel fluid level sensor  
Generator  
  
Airbag  
Reverse shift switch

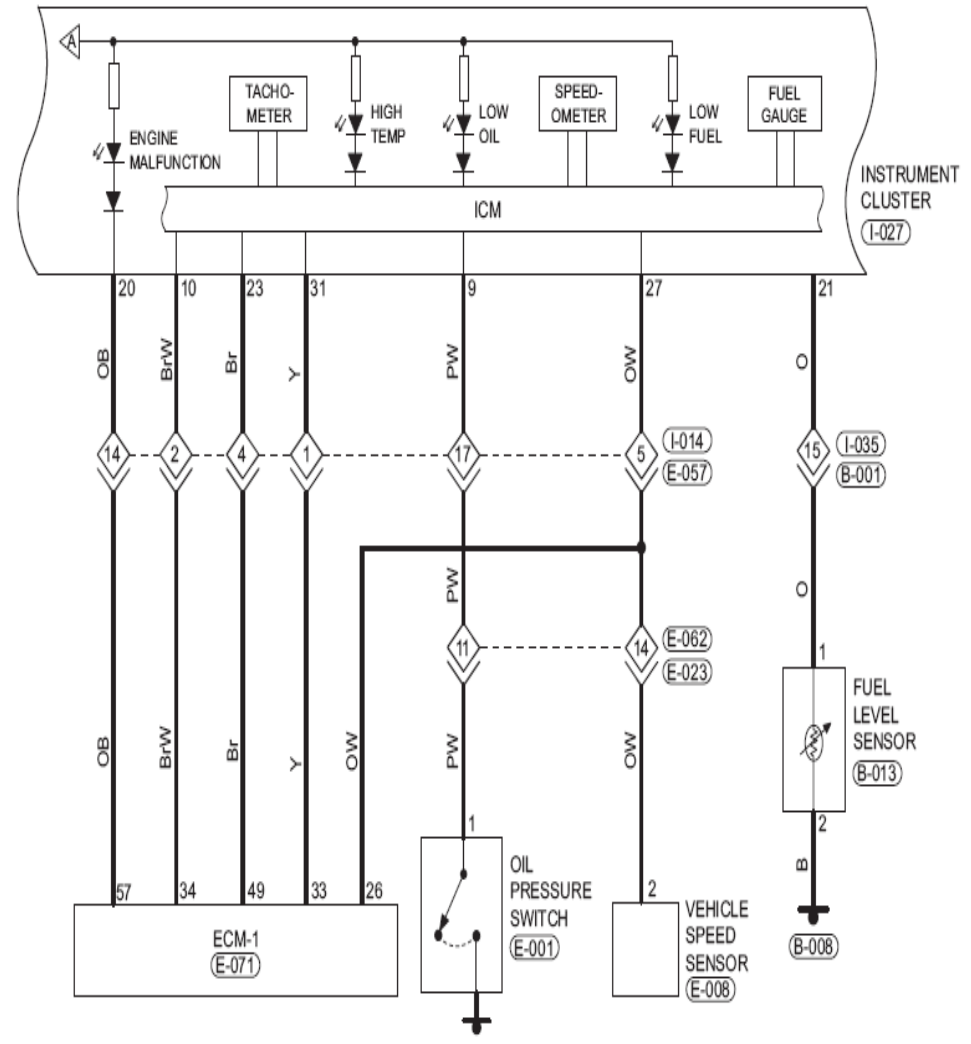
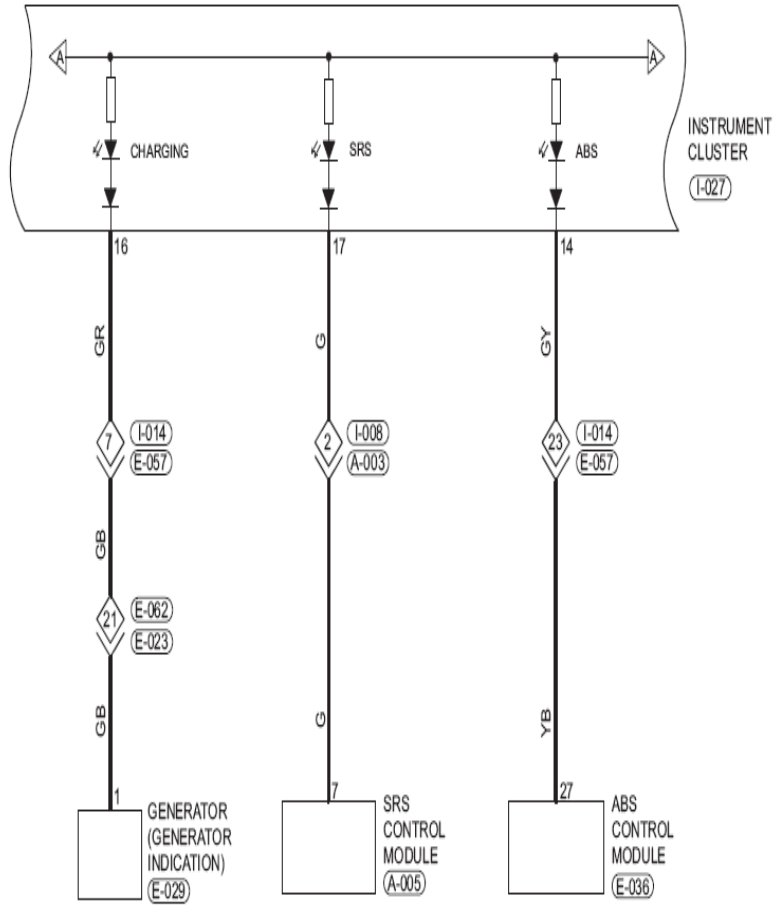
Combination instrument

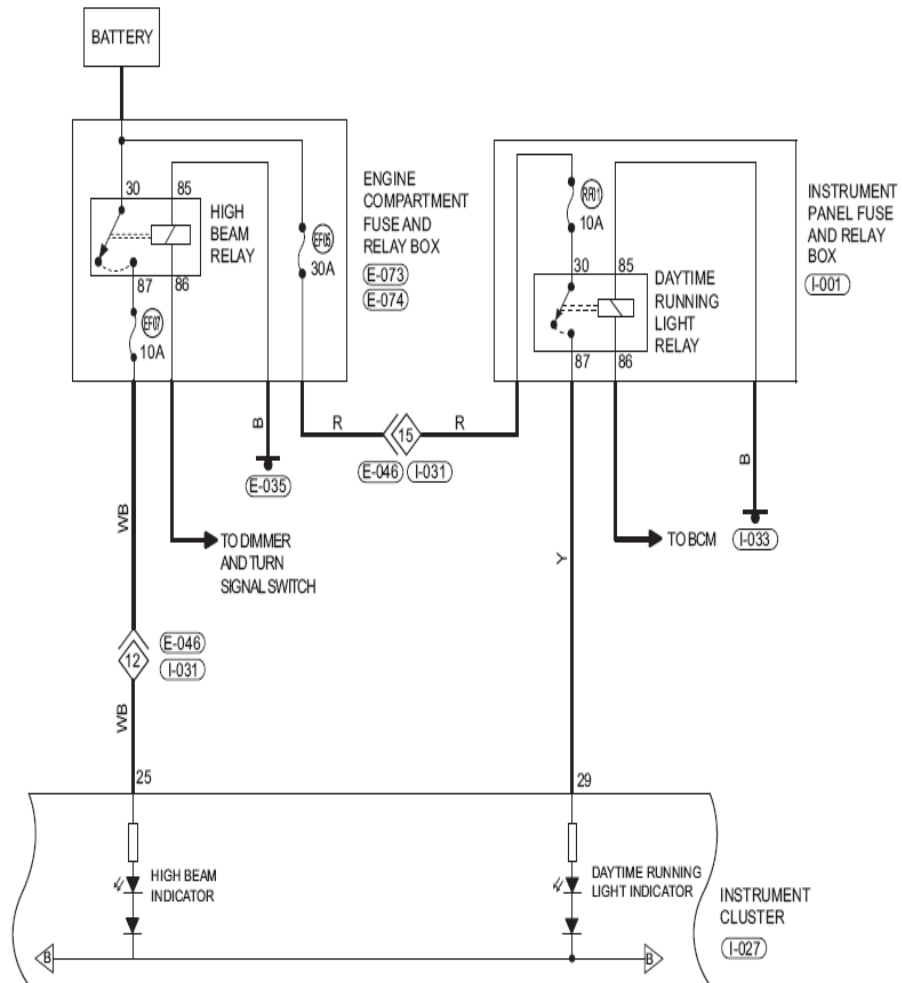
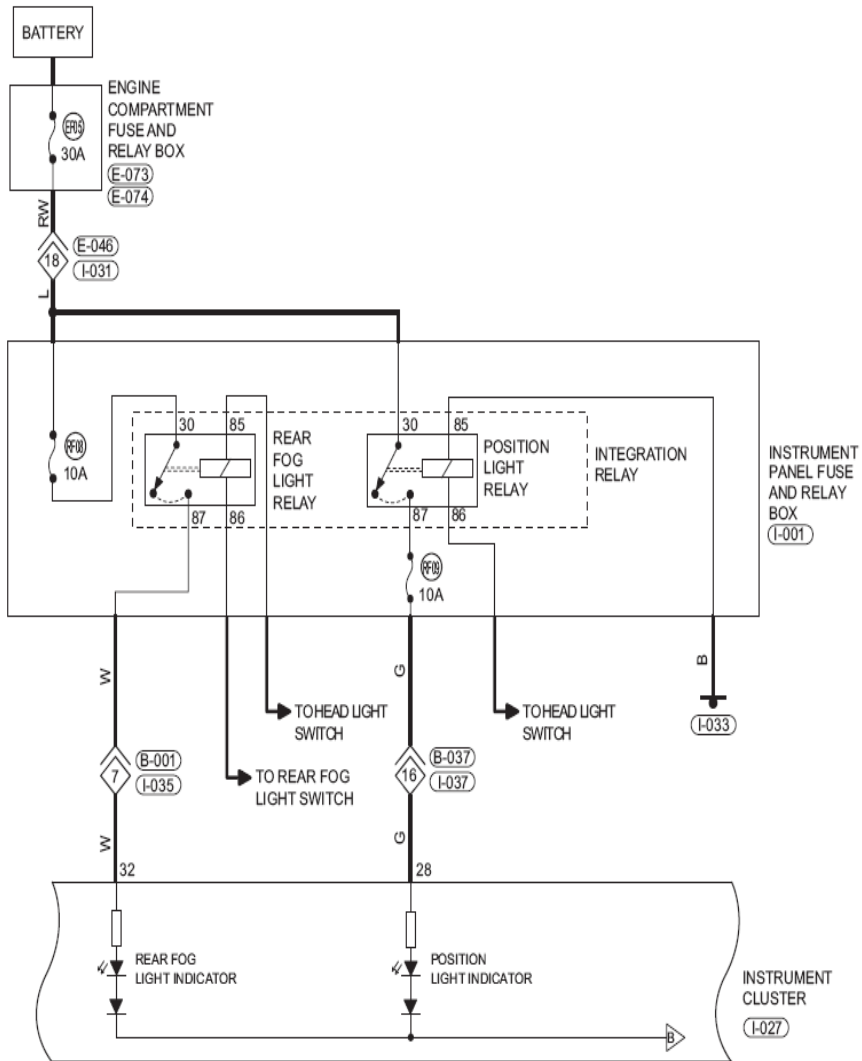
Left/right turning indicator lamp  
Hazard alarm indicator lamp  
Upper beam indicator lamp  
DRL indicator lamp  
Brake fault indicator lamp  
Water temperature indicator lamp  
ABS fault indicator lamp  
Width lamp  
Safety belt alarm lamp  
Door indicator lamp  
Engine displacement fault alarm lamp  
Front/rear fog lamp working indicator lamp  
Transmission fault alarm lamp  
Buzzer

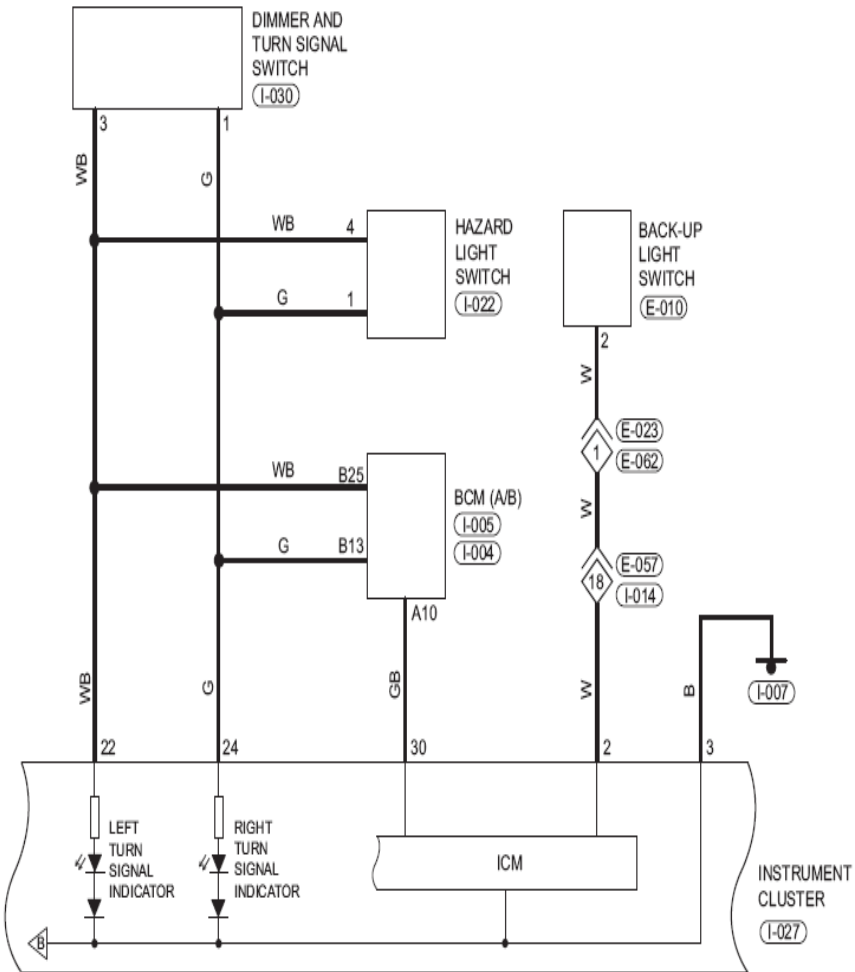




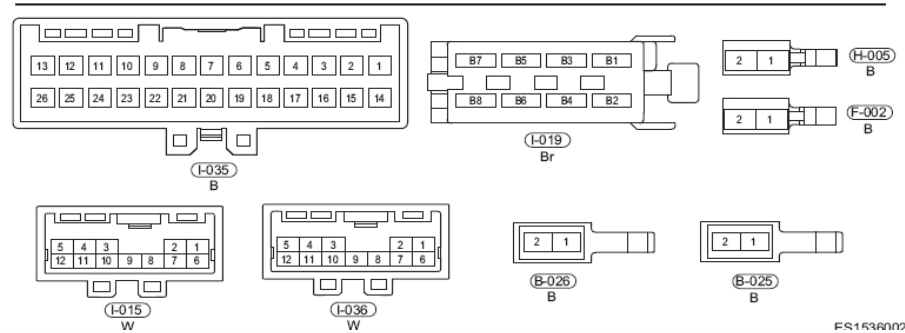
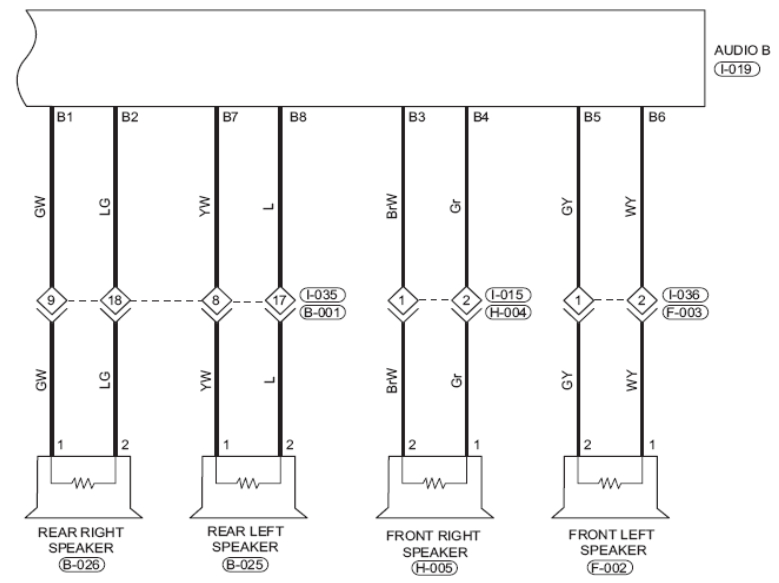
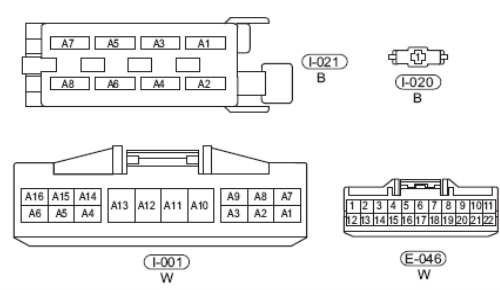
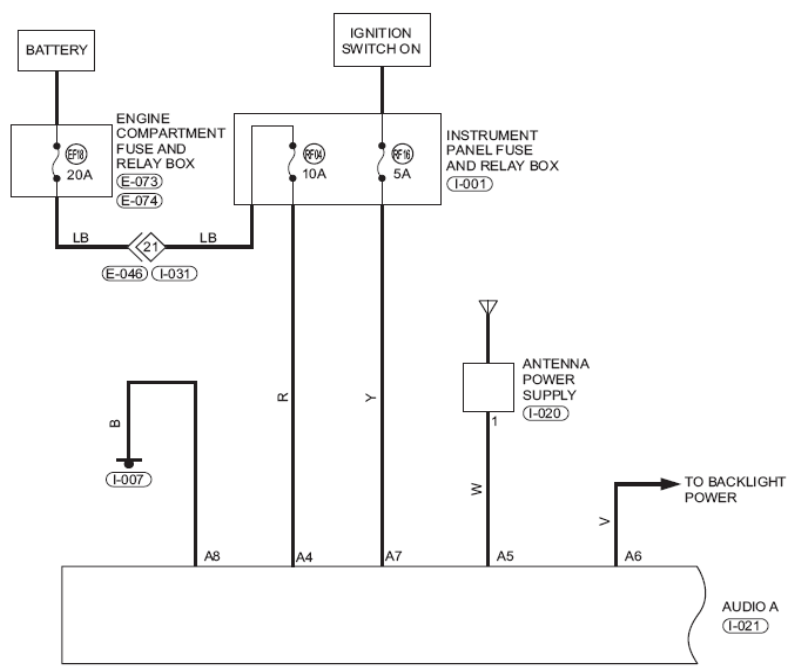


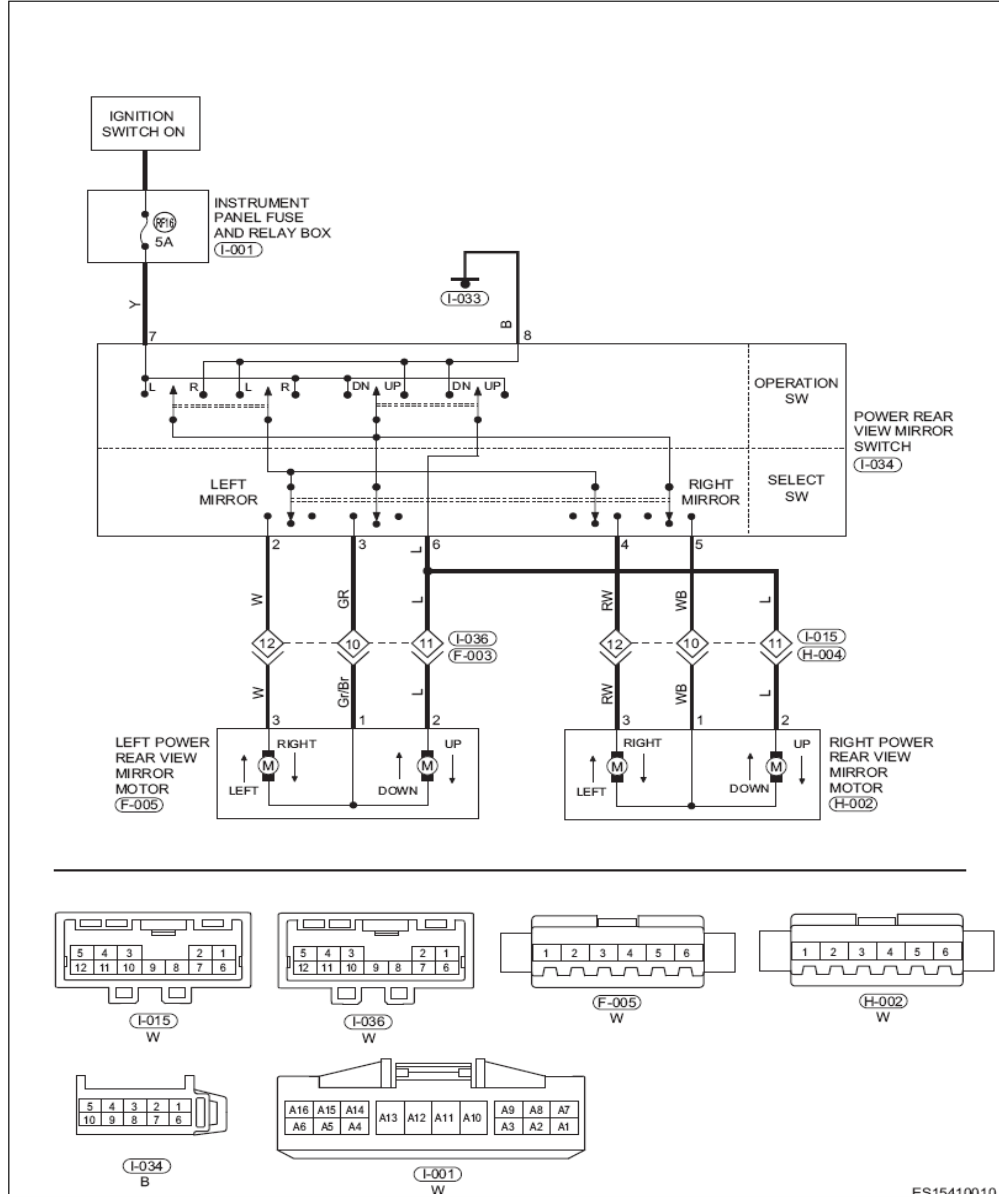
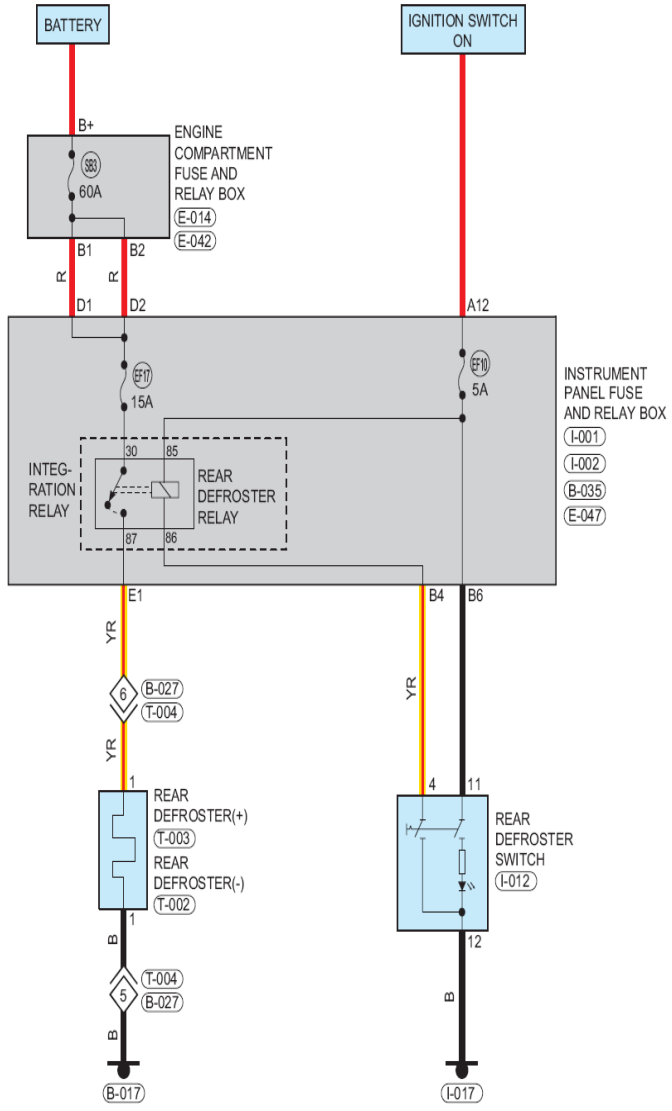




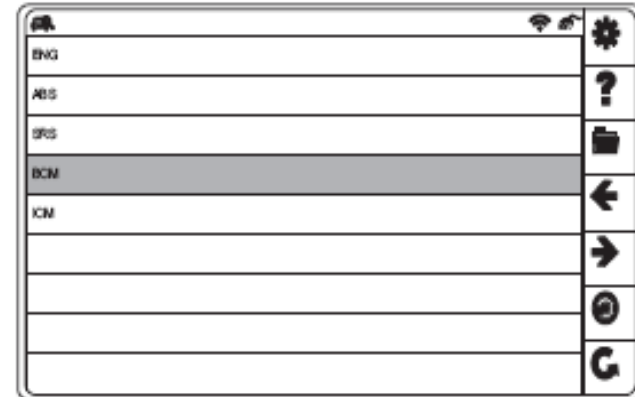


Terminal No.	Definition	Terminal No.	Definition
1	Door Open Indication Signal	17	Airbag Indication Signal
2	Back-up Light Switch Signal	18	Parking Brake Switch Signal
3	GND	19	Driver Seat Belt Unfastened Indication Signal
4	-	20	Engine Malfunction Indication Signal
5	Data Signal (Reversing Radar Control Module Assembly)	21	Fuel Level Indication Signal
6	-	22	Left Turn Signal Light Indication Signal
7	Vehicle Speed Signal Output	23	Engine Coolant Temperature Indication Signal
8	-	24	Right Turn Signal Light Indication Signal
9	Engine Oil Pressure Indication Signal	25	Headlight (High Beam) Indication Signal
10	Engine Speed Signal Input	26	Brake System Malfunction Indication Signal
11	Battery Power Supply	27	Vehicle Speed Signal Input
12	Clock Signal (Reversing Radar Control Module Assembly)	28	Position Light (Small Light) Indication Signal
13	Ignition Switch Power Supply	29	Daytime Running Light Indication Signal
14	ABS Indication Signal	30	Engine Speed Signal Output
15	Data Link Connector (Diagnosis)	31	Instantaneous Fuel Consumption Input Signal
16	Charging System Indication Signal	32	Rear Fog Light Indication Signal

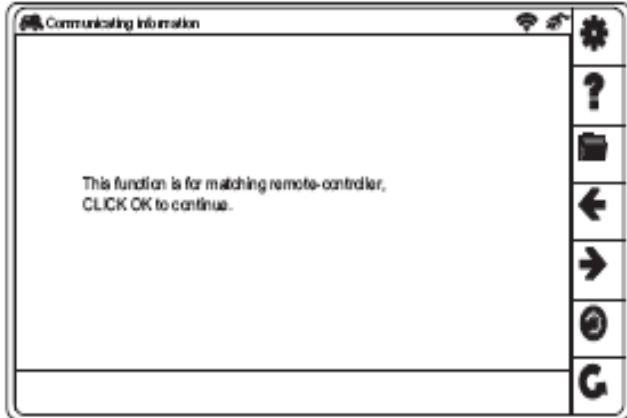




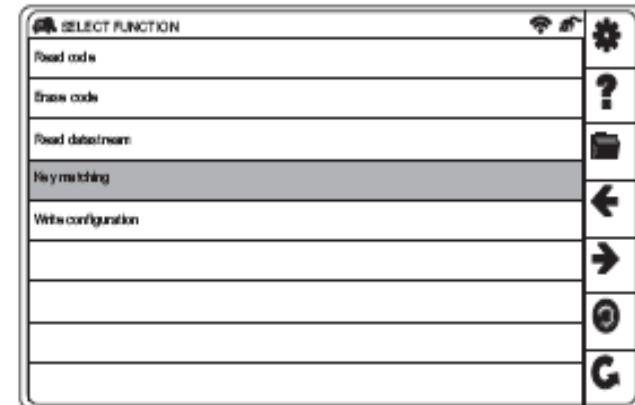
مرحله ۱



مرحله ۳



مرحله ۲



مرحله ۴

