



HEATING AND VENTILATION SYSTEM

KORRM2I/1/1

Korando

SERVICE MANUAL

SECTION 7A

HEATING AND VENTILATION SYSTEM

CAUTION: The cooling system is pressurized when hot. Injury can result from removing the coolant reservoir cap before the engine is sufficiently cool.

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DESCRIPTION AND OPERATION

HEATING AND VENTILATION SYSTEM

The base heater system is designed to provide heating, ventilation, windshield defrosting, side wind defogging and rear seat area.

The heater and fan assembly blower regulates the air-flow from the air inlet for further processing and distribution.

The heater core transfers the heater from the engine coolant to the inlet air.

The temperature door regulates the amount of the air that passes through the heater core. The temperature door also controls the temperature of the air by controlling mix of heated air with the ambient air.

The mode door regulates the flow and distribution of the processed air to the heater ducts and to the defroster ducts.

The console mounted heating and ventilation control panel contains one rotary control knob, one sliding control lever and six push control knobs, which operate as follows:

Sliding Temperature Control Lever

- Actuates by cable.
- Raise the temperature of the air entering the vehicle by sliding to the right, or the red portion of the knob.

Five Mode Control Knob

- Actuates by electricity.
- Regulates the air distribution between the windshield, the instrument panel, and the floor vents.

Rotary Blower Control Knob

- Turns on to operate the blower motor at four speeds.
- Turns OFF to stop the blower.
- Operates completely independently from both the mode control knob and temperature control knob.
- Changes the fan speed in any mode and at any speed.

Intake Air Control Knob

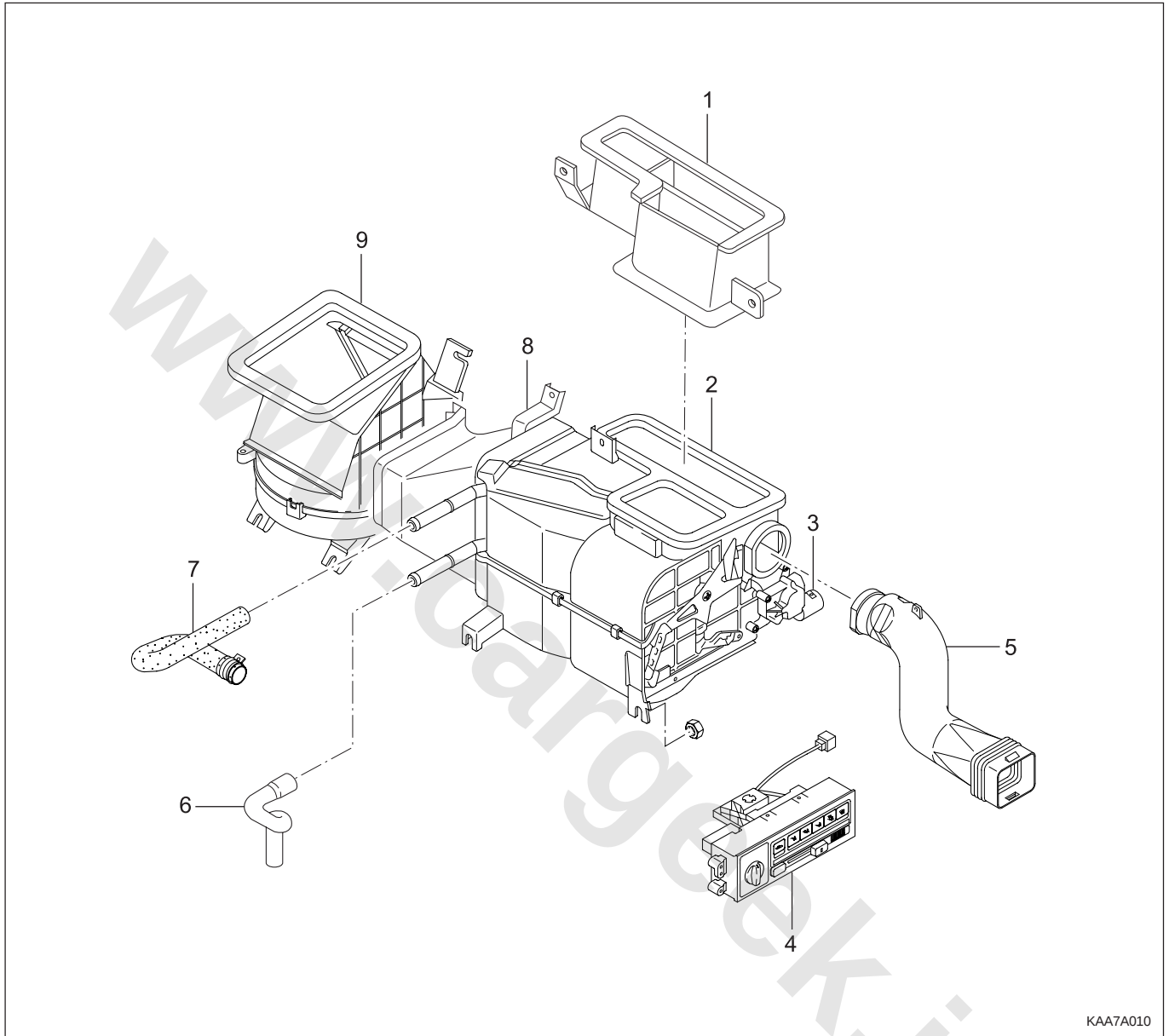
- Operates by electricity.
- Switches between recirculating the passenger compartment air and bringing outside air into the passenger compartment.
- Is normally in fresh air mode.
- Illuminates the indicator lamp when in the recirculating mode.

Heater Core

The heater core heats the air before enters the vehicle. Engine coolant is circulated through the core to heat the outside air passing over the fins of the core. The core is functional at all times and may be used to temper conditioned air in the A/C mode as well as in the heat or the vent mode.

COMPONENTS LOCATOR

HEATER SYSTEM



KAA7A010

- 1 Heater-to-Defrost Duct
- 2 Heater Unit
- 3 Mode Actuator Assembly
- 4 Heater Controller
- 5 Side Air Vent

- 6 Coolant Outlet Hose
- 7 Coolant Inlet Hose
- 8 Heater-to-Blower Duct
- 9 Blower Unit

DIAGNOSTIC INFORMATION AND PROCEDURES

HEATER SYSTEM

Insufficient Heating or Defrosting

CAUTION: The cooling system is pressurized when hot. Injury can result from removing the coolant reservoir cap before the engine is sufficiently cool.

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Check the coolant level. Is the coolant level correct?		Go to Step 4	Go to Step 3
3	Add coolant as needed Is the repair complete?		System OK	Go to Step 4
4	Check the serpentine accessory drive belt for tension or damage. Is the 'serpentine accessory drive belt OK?		Go to Step 5	Go to Step 6
5	Correct any problem with serpentine accessory drive belt. Is the repair complete?		System OK	Go to Step 6
6	Check the coolant hoses for leaks or kinks. Are the coolant hoses OK?		Go to Step 8	Go to Step 7
7	Repair any problem with the coolant hoses. Is the repair complete?		System OK	Go to Step 8
8	Check the coolant reservoir cap. Refer to <i>Section 1D</i> , Engine Cooling. Is the coolant reservoir cap OK?		Go to Step 10	Go to Step 9
9	Repair or replace the coolant reservoir cap as needed. Is the repair complete?		System OK	Go to Step 10
10	1. Set the A/C switch OFF on the vehicles equipped with air conditioning. 2. Set the temperature control lever to full hot. 3. Set the blower motor switch on 4. 4. Turn the ignition ON. 5. Check for the airflow from the vent outlet. Is there a heavy airflow from the vent outlet?		Go to Step 11	Go to Step 25
11	Check for change in the airflow at various blower speeds. Does the blower speed increase as the switch is turned from 1 to 4?		Go to Step 12	Go to "Blower Electrical"
12	1. With the engine sufficiently cool, remove the coolant reservoir cap. 2. Set the blower motor switch on 4. 3. Set the temperature control lever to full hot. 4. Start the engine and idle the engine. 5. Watch for the flow of the coolant. Is the coolant flow visible?		Go to Step 16	Go to Step 13

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
13	Check the thermostat. Refer to <i>Section 1D, Engine Cooling</i> . Is the thermostat installed and seated properly?		Go to Step 14	Go to Step 15
14	Replace the thermostat. Refer to <i>Section 1D, Engine Cooling</i> . Is the repair complete?		System OK	-
15	Reinstall the thermostat. Is the repair complete?		System OK	-
16	1. Install the coolant reservoir cap. 2. With the ignition ON, allow the engine to warm up for about 20 minutes. Drive the vehicle at 48 km/h (30 mph). 3. Use a thermometer to measure the ambient air temperature and the discharge air temperature at the heater outlet. Does the heater output meet the minimum value given?		Go to Step 17	Go to Step 18
17	1. Check the vehicle for cold air leaks at the following locations: • Dash. • Heater case. • Vents. 2. Check under the seat for obstructions. 3. Repair any leaks or obstructions. Are the repairs complete?		System OK	-
18	1. Turn the ignition OFF. 2. Turn the temperature control lever to full cold, then rapidly to full hot. 3. Listen for a second of the end of travel range of the control lever Does the door slam?		Go to Step 20	Go to Step 19
19	1. Check the following aspects of the temperature door: • Travel • Heater case • Vents 2. Verify the accuracy of the temperature controls at full hot. 3. Verify the accuracy of the temperature controls at full cold. Is the repair complete?		System OK	-
20	1. Set the temperature door to full hot. 2. Start the vehicle 3. Check the temperature of the heater inlet hose and the heater outlet hose by feel. The air temperature around the hoses should be at least 29 °C (84 °F) Is the heater inlet hose hot and heater outlet hose warm?		Go to Step 26	Go to Step 21

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
21	Inspect heater hoses for proper installation. Are heater hoses reversed?		Go to Step 22	Go to Step 23
22	Reinstall the heater hoses properly. Is the repair complete?		System OK	-
23	1. Back flushes the heater core. 2. Drain the cooling system. 3. Replace the coolant. 4. Warm the engine to an average operating temperature. 5. Feel the heater inlet hose and outlet hose. Are the heater inlet hose hot and the heater outlet hose warm?		System OK	Go to Step 24
24	Replace heater core. Is the repair complete?		System OK	-
25	Recheck the system using the "Control setting/ Correct Results" tests. Refer to "Improper Air Delivery or No Mode Shift" in this section. Is the repair complete?		System OK	Go to Step 26
26	Check for airflow from the defroster or the vent outlets. Is there high airflow from the defroster or vent outlets?		Go to Step 27	Go to Step 28
27	Check the heater door at the floor and the vent door to get proper airflow, verify proper operation, and repair as required. Is the repair complete?		System OK	-
28	Push the defroster knob Is the defroster airflow OK?		Go to Step 29	Go to Step 30
29	1. Remove the heater outlet and check for obstructions. 2. Remove any obstructions in the heater outlet. Is the repair complete?		System OK	-
30	Check for obstructions in the system at blower inlet and the air filter, if the vehicle equipped with one. Are there any obstructions?		Go to Step 31	Go to Step 32
31	Remove the obstructions in the system at the blower inlet or replace a clogged filter. Are the repairs complete?		System OK	-
32	1. Set the blower on 4. 2. Slide the temperature control lever from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?		Go to Step 33	Go to Step 34

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Value(s)	Yes	No
33	1. Check the following aspects of the temperature door: • Travel. • Cable. • Linkage. 2. Verify the accuracy of the temperature controls at full hot. 3. Verify the accuracy of the temperature controls at full cold. Is the repair complete?		Go to Step 1	-
34	1. Check the system for any obstruction between the blower and the system outlets. 2. Remove any obstructions. Is the repair complete?		Go to Step 1	-

BLOWER ELECTRICAL

Refer to "Non A/C Diagrams" for electrical schematic diagram of the circuits described in this procedure.

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Does the blower run at any speed?		Go to Step 16	Go to Step 3
3	1. Disconnect the power connector from the blower motor under the dashboard on the passenger side of the vehicle. 2. Turn the ignition ON. 3. Turn the blower ON. 4. Test the voltage on the connector. The terminal connected to the BLK/WHT wire is positive and the terminal connected to the BLU/YEL wire is negative. Is the voltage within the specified range?	11 - 14 v	Go to Step 4	Go to Step 5
4	Replace the blower motor. Is the repair complete?		System OK	-
5	Check fuse EF2 in the engine fuse block and F19 in the I/P fuse block. Is the fuse blown?		Go to Step 6	Go to Step 7
6	1. Turn the ignition ON. 2. Use a short detector to locate the following possible short: - From the fuse EF2 to terminal 30 of blower motor relay. - From the fuse F19 to terminal 86 of blower motor relay. - From the terminal 87 of blower motor relay to blower motor. 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?		System OK	-
7	1. Turn the ignition ON. 2. Remove the blower motor relay. 3. Using test light check the continuity between following terminals and ground: - Terminal 30 of blower motor relay. - Terminal 86 of blower motor relay. Does the test light come on?		Go to Step 9	Go to Step 8
8	Repair the open circuit. Is the repair complete?		System OK	-
9	1. Turn the ignition OFF. 2. Set the blower motor switch at 4. 3. Using ohmmeter, measure the resistance between terminal 85 of blower motor relay and ground. Is the resistance within specified value?	$\approx 0 \Omega$	Go to Step 11	Go to Step 10
10	Repair open circuit. Is the repair complete?		System OK	-

Blower Electrical (Cont'd)

Step	Action	Value(s)	Yes	No
11	Using ohmmeter, measure the resistance between terminal 87 of blower motor relay. Is the resistance within specified value?	$\approx 0 \Omega$	Go to Step 12	Go to Step 13
12	Replace the blower motor relay. Is the repair complete?		System OK	-
13	1. Disconnect blower motor switch connector. 2. Turn the ignition switch ON. 3. Jump terminal 5 and terminal 1 of the blower motor switch connector with jump wire. Does the blower motor run?		Go to Step 15	Go to Step 7
14	Repair open circuit between terminal 87 of blower motor relay to ground G203. Is the repair complete?		System OK	-
15	Replace the blower motor switch. Is the repair complete?		System OK	-
16	1. Disconnect the blower motor switch connector. 2. Turn the ignition switch ON. 3. Using test light, check the power feed between terminal 2, 3, 4, and 5 of the blower motor switch connector and ground. Does the light come on?		Go to Step 15	Go to Step 17
17	Repair open circuit or replace the blower resistor. Is the repair complete?		System OK	-

MODE CONTROLS DO NOT WORK

Refer to “Non A/C Diagrams” for electrical schematic diagram of the circuits described in this procedure.

Mode Controls Do Not Work

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Measure the voltage between terminal 8 of heating and ventilation control (HVC) controller and ground. Is the voltage within the specified value?	11 - 14 v	Go to Step 6	Go to Step 3
3	Check fuse F19 in the I/P fuse block. Is the fuse blown?		Go to Step 4	Go to Step 5
4	1. Turn the ignition ON. 2. Use a short detector to locate the following possible short: - From the fuse F24 to terminal 8 of C204. - From the terminal 8 of the C212 to terminal 8 of HVC controller. 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?		System OK	-
5	Repair open circuits from fuse F19 to terminal 8 of the HVC controller. Is the repair complete?		System OK	-
6	1. Turn the ignition switch to OFF. 2. Disconnect the mode actuator connector. 3. Using Motor Control Table, measure the resistance between the specified terminals of the specified motor connector. 4. Change the mode settings and observe the resistance change. Are the resistance equal to specified value?	See the “Motor Control Table”	Go to Step 10	Go to Step 7
7	1. Disconnect the HVC controller. 2. Using Motor Control Table, measure the resistance between the specified terminals of the specified HVC controller. 3. Change the mode settings and observe the resistance change. Are the resistance equal to specified value?	See the “Motor Control Table”	Go to Step 9	Go to Step 8
8	Replace the HVC controller. Is the repair complete?		System OK	-
9	Repair open or short circuits between HVC controller and mode motor actuator. Is the repair complete?		System OK	-
10	Replace mode control motor. Is the repair complete?		System OK	Go to Step 11
11	1. Examine the affected door in the unit for proper attachment to the actuator. 2. Check the actuator connection to the door. 3. Check that the connector is properly connected. Is everything connected properly?		Go to Step 13	Go to Step 12

Mode Controls Do Not Work (Cont'd)

Step	Action	Value(s)	Yes	No
12	Repair as necessary. Is the repair complete?		System OK	-
13	1. Disconnect the actuator at the door. 2. Check the range of the door travel and the effort required moving it. Does the door move freely through its entire range of travel so that it can close at both ends of the range?		Go to Step 5	Go to Step 12
14	Adjust the door travel and repair as necessary. Is the repair complete?		System OK	-

Motor Control Table

Mode Setting	Connector Terminal (Controller / Motor)				
	14/8	6/7	15/6	7/5	16/4
Defrost (Terminal 5/9)	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω
Defrost/Foot (Terminal 5/9)	$\approx 0 \Omega$	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω
Foot (Terminal 5/9)	$\approx 0 \Omega$	$\approx 0 \Omega$	3.9 - 4.1 Ω	3.9 - 4.1 Ω	3.9 - 4.1 Ω
Bi-Level (Terminal 5/9)	$\approx 0 \Omega$	$\approx 0 \Omega$	$\approx 0 \Omega$	3.9 - 4.1 Ω	3.9 - 4.1 Ω
Vent (Terminal 5/9)	$\approx 0 \Omega$	$\approx 0 \Omega$	$\approx 0 \Omega$	$\approx 0 \Omega$	3.9 - 4.1 Ω

AIR SOURCE SELECTION NOT CONTROLLED

Refer to “Non A/C Diagrams” for electrical schematic diagram of the circuits described in this procedure.

Air Source Selection Not Controlled

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Measure the voltage between terminal 8 of heating and ventilation control (HVC) controller and ground. Is the voltage within the specified value?	11 - 14 v	Go to Step 6	Go to Step 3
3	Check fuse F19 in the I/P fuse block. Is the fuse blown?		Go to Step 4	Go to Step 5
4	1. Turn the ignition ON. 2. Use a short detector to locate the following possible short: - From the fuse F19 to terminal 8 of C212. - From the terminal 8 of the C212 to terminal 8 of HVC controller. 3. Repair any short. 4. Replace any blown fuse. Is the repair complete?		System OK	-
5	Repair open circuits from fuse F19 to terminal 8 of the HVC controller. Is the repair complete?		System OK	-
6	1. Turn the ignition switch to OFF. 2. Disconnect the intake air control actuator connector. 3. Measure the voltage at terminal 3 of the connector. Is the voltage within the specified value?	11 - 14 v	Go to Step 8	Go to Step 7
7	Repair open circuit from terminal 8 of C212 to terminal 3 of the intake air actuator. Is the repair complete?		System OK	-
8	Measure the resistance between terminal 2 and 3 of the actuator. Is the resistance within the specified value?	$\approx 2 \text{ k } \Omega$	Go to Step 10	Go to Step 9
9	Replace the intake air door actuator. Is the repair complete?		System OK	-
10	1. Disconnect the HVC controller. 2. Measure the resistance between following point: - Terminal 9 of HVC controller and terminal 1 of actuator. - Terminal 10 of HVC controller and terminal 2 of actuator. Is the resistance within the specified value?	$\approx 0 \text{ } \Omega$	Go to Step 12	Go to Step 11
11	Repair open or short circuit. Is the repair complete?		System OK	-
12	Replace the HVC controller. Is the repair complete?		System OK	-

TEMPERATURE CONTROLS DO NOT WORK

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Move the temperature control lever. Is an excessive effort required to move the control lever?		Go to Step 5	Go to Step 3
3	Move the blower control switch on 4. Does the temperature door move too easily?		Go to Step 4	System OK
4	Remove the temperature control cable from the controller. Does the control knob slide freely, without the click stops?		Go to Step 14	System OK
5	Check the cable for improper routing, kinks, wiring interference, or other instrument panel interference. Is there a problem.		Go to Step 6	Go to Step 7
6	Repair as needed. Is the repair complete?		System OK	-
7	1. Remove the cable from temperature door. 2. Circle the door manually. 3. Check for door binding. Is there any door binding?		Go to Step 8	Go to Step 11
8	Check the door seal for proper installation. Is the door seal OK?		Go to Step 9	Go to Step 10
9	1. Check a binding door for shaft alignment, a bent shaft, a bent door, or a warped case. 2. Repair as need. Is the repair complete?		System OK	-
10	Repair the door seal, as needed. Is the repair complete?		System OK	-
11	Check the control binding. Does the control bind?		Go to Step 13	Go to Step 12
12	1. Reinstall the cable to the door. 2. Check the clearance for the cable to dash compartments. 3. Repair any interface. Is the repair complete?		System OK	-
13	1. Remove the cable from the control. 2. Check the control for binding. Does the control bind?		Go to Step 14	Go to Step 15
14	Replace the control. Is the repair complete?		System OK	-
15	Replace the cable. Is the repair complete?		System OK	-

TOO MUCH HEAT

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	Is there too much heat when the mode switch is in the floor position?		Go to Step 3	Go to Step 9
3	Is there objectionable defroster bleed?		Go to Step 4	Go to Step 5
4	1. Check the door travel, the cable, the actuator, and the linkage for the heater and the defroster. 2. Adjust or repair, as required. Is the repair complete?		System OK	-
5	1. In vehicles equipped with A/C, set the A/C switch OFF. 2. Set the blower speed to 4. 3. Set the temperature control lever to full hot. 4. Turn the ignition switch to ON. 5. Start the engine. 6. Check for airflow from the floor outlets. 7. Check the floor outlet attachment. Is the airflow high?		Go to Step 6	Go to Step 8
6	Check for a change in airflow at different blower speeds. Does the airflow change as the setting for the blower speed switch is changed?		Go to Step 7	Go to "Blower Electrical"
7	1. Check the temperature door travel, the cable, and the linkage. 2. Adjust to full hot. 3. Check for full hot. Is the repair complete?		System OK	-
8	Adjust or repair the floor/defroster and/or the vent/floor mode. Is the repair complete?		System OK	-
9	In the vent position. Is the problem objectionable bleed?		Go to Step 10	Go to Step 15
10	1. Check the system case for leaks. 2. Check the floor outlet attachment. Are there problems?		Go to Step 11	Go to Step 12
11	Repair the system case or the floor outlet attachment as required. Is the repair complete?		System OK	Go to Step 12
12	1. Turn the ignition switch OFF. 2. Turn the temperature control lever to full hot, then rapidly to full cold. Did you hear the door slam just before you reached the end of the control travel?		Go to Step 13	Go to Step 14
13	Adjust the vent door to vent mode. Is the repair complete?		System OK	-

Too Much Heat (Cont'd)

Step	Action	Value(s)	Yes	No
14	1. Check the temperature door travel, the cable, and the linkage. 2. Verify the temperature door goes to full cold. 3. Check the temperature door for full hot. Is the temperature door travel correct?		System OK	-
15	Set the intake air control to fresh air (indicator lamp OFF). 2. Set the temperature control to full cold. 3. Start the vehicle and allow the engine to warm up. 4. Measure the air temperature at the blower inlet, or cowl, and at the vent air outlet inside the vehicle. Is the outlet air more than 1 °C (41 °F) warmer than the inlet air?		Go to Step 16	System OK
16	1. Check for hot air leaks from the engine compartment to the blower inlet. 2. Repair as needed. Is the repair complete?		System OK	-

BLOWER NOISE

Step	Action	Value(s)	Yes	No
1	Verify the customer's complaint. Are the customer's concerns verified?	-	Go to Step 2	System OK
2	1. Sit inside the vehicle. 2. Close the doors and windows. 3. Turn the ignition ON. 4. Start the engine. 5. Set the temperature to full cold. 6. Cycle through the blower speeds, the modes, and the temperature settings in order to find the noise. Is the blower noise constant at high blower speeds or in other modes?		Go to Step 11	Go to Step 3
3	Check for vibrations from the blower motor and fan assembly at each blower speed by feeling the blower motor housing. Did you find excessive vibration?		Go to Step 6	Go to Step 4
4	1. Remove the blower motor and fan assembly. Refer to "Blower Motor" in this section. 2. Check for foreign materials at the opening of the blower inlet. Did you find any foreign materials at the blower inlet?		Go to Step 5	Go to Step 6
5	Remove all foreign materials. Is the repair complete?		System OK	Go to Step 6
6	1. Examine the blower fan for wear spots, cracked blades, a cracked hub, a loose fan retaining nuts, or bad alignment. 2. Examine the blower case for sports. Did you find any problem?		Go to Step 7	Go to Step 9
7	Repair as required. Is the repair complete?		System OK	Go to Step 8
8	Replace the motor and fan assembly. Is the repair complete?		System OK	Go to Step 9
9	If the noise is a click/tick or whine, replace the motor. Is the repair complete?		System OK	Go to Step 10
10	Reinstall the original motor. Is the problem still present?		Go to Step 11	System OK
11	1. Set the blower speed on 4. 2. Check full hot to full cold temperature positions in the defroster, floor, and vent modes. Is the noise present in the defrost mode only?		Go to Step 12	Go to Step 14
12	1. Check the ducts for obstructions for foreign materials. 2. Remove any obstructions or foreign materials. 3. Check floor /defroster door seals. 4. Repair or replace as needed. Is the repair complete?		System OK	-
13	Is the noise present in the floor mode only?		Go to Step 12	Go to Step 14
14	Is the noise present in the vent mode only?		Go to Step 15	Go to Step 16

Blower Noise (Cont'd)

Step	Action	Value(s)	Yes	No
15	1. Check the ducts for obstruction or foreign materials. 2. Remove any obstructions or foreign materials. 3. Check the vent door seals. 4. Repair or replace as needed. Is the repair complete?		System OK	-
16	Is the noise present in all modes, but not all temperature positions?		Go to Step 16	Go to Step 18
17	1. Check the temperature door seals. 2. Repair or replace as needed. Is the repair complete?		System OK	-
18	1. Check the system for obstructions for foreign materials between the fan and the temperature door. 2. Repair or replace as needed. Is the repair complete?		System OK	Go to Step 2

MAINTENANCE AND REPAIR

ON-VEHICLE SERVICE

TEMPREATURE CONTROL CABLE ADJUSTMENT

Because the cable and the cable housing have fixed lengths, it is impossible to make a temperature cable adjustment.

The heater/air distributor case linkage also cannot be adjusted.

If a malfunction is suspected, verify the proper operation of the controller and the mechanical doors for heater/air distributor case assembly.

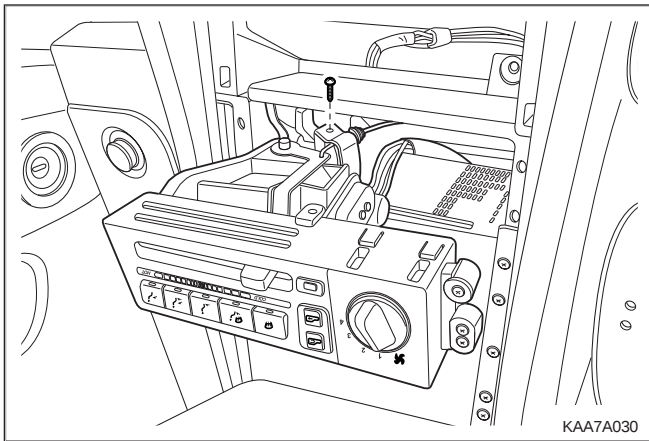
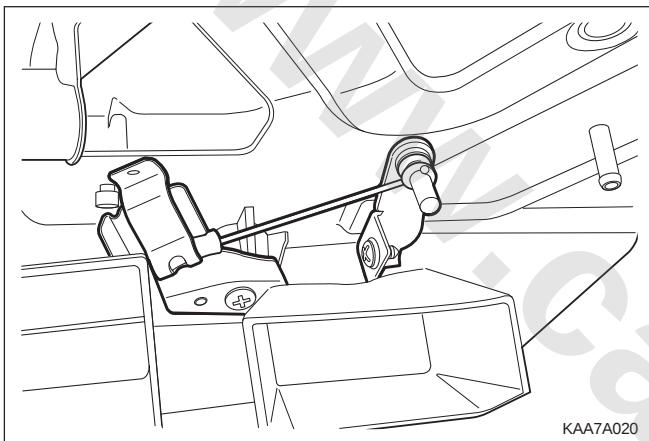
CONTROLLER ASSEMBLY AND TEMPERATURE CONTROL CABLE

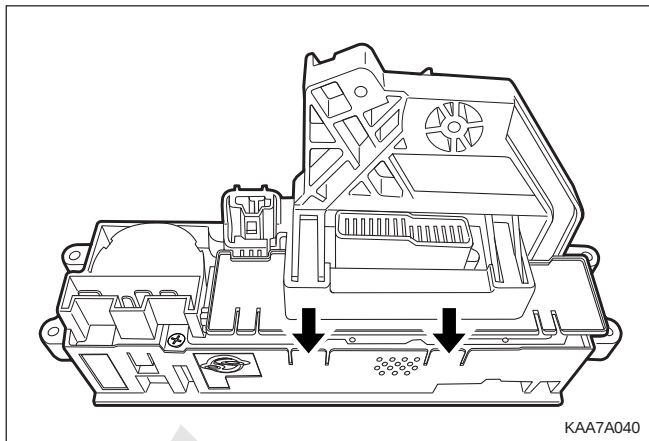
Removal and installation Procedure

1. Disconnect the negative battery cable.
2. Slide the cable eyelet off the post on the temperature door lever (under the I/P center).
3. Unsnap the clip that securing temperature control cable.

Notice: Do not remove the bracket.

4. Remove the I/P center trim plate.
5. Remove four controller retaining screws.
6. Disconnect the electrical connectors.
7. Remove one screw that securing the temperature control cable.
8. Disconnect the temperature control cable by gently unsnapping the temperature control cable.
9. Remove and replace temperature control cable as required.
10. Remove the controller assembly.
11. Installation should follow the removal procedure in the reverse order.

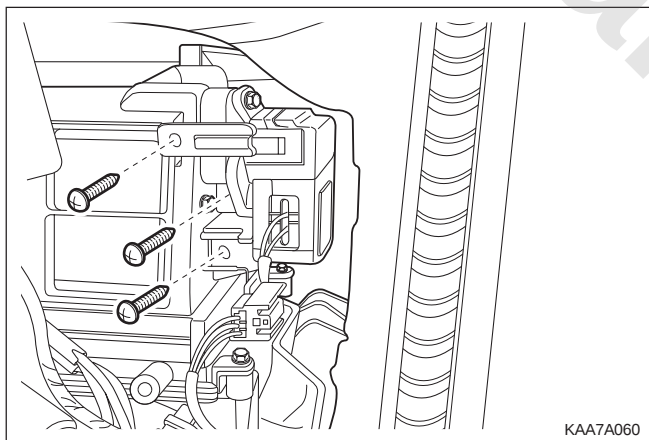
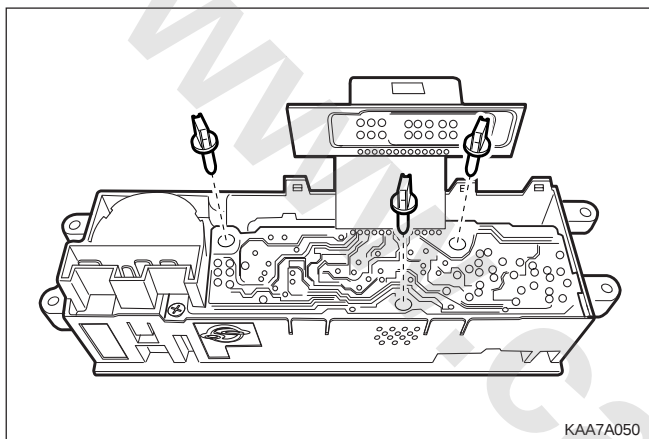




CONTROL ASSEMBLY KNOB LIGHTING

Removal and installation Procedure

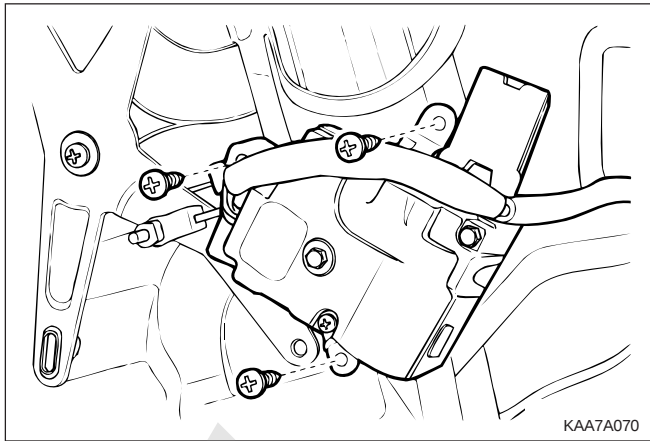
1. Disconnect the negative battery cable.
2. Remove the heating and ventilation control (HVC) controller assembly. Refer to "Controller Assembly and Temperature Control Cable" in this section.
3. Remove the connector cover by sliding away.
4. Remove the connector from the temperature control cable control mechanism.
5. Separate the temperature control cable control mechanism.
6. Turn the bulb holder to the left and pull out the bulb.
7. Installation should follow the removal procedure in the reverse order.



AIR INTAKE DOOR ACTUATOR

Removal and Installation Procedure

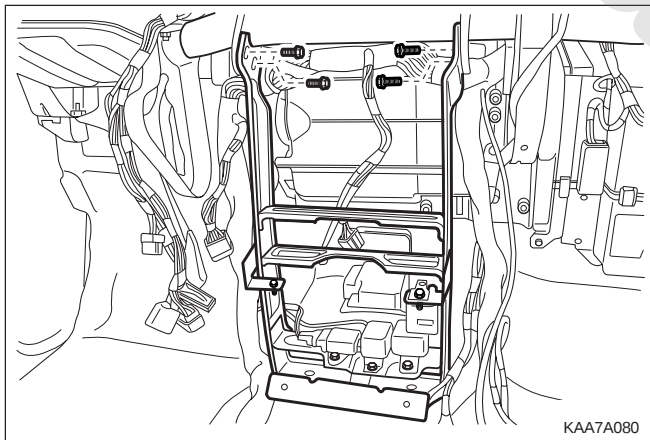
1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the connector to intake air control door actuator.
4. Remove three screws that securing mode control door actuator to heater/air distributor case.
5. Remove the mode control door actuator by gently snapping the actuator.
6. Installation should follow the removal procedure in the reverse order.



MODE CONTROL DOOR ACTUATOR

Removal and installation Procedure

1. Disconnect the negative battery cable.
2. Remove the driver knee bolster. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the connector to mode control door actuator.
4. Remove three screws that securing mode control door actuator to heater/air distributor case.
5. Remove the mode control door actuator by gently snapping the actuator.
6. Installation should follow the removal procedure in the reverse order.



HEATER/AIR DISTRIBUTOR CASE ASSEMBLY

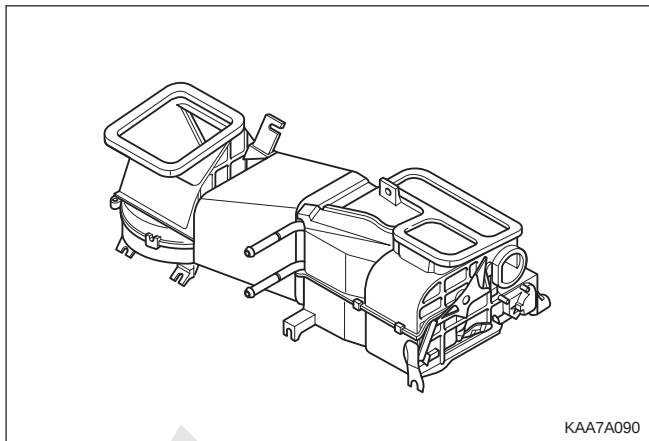
Removal and installation Procedure

1. Disconnect the negative battery cable.
2. Drain the cooling system. Refer to *Section 1D, Engine Cooling*.
3. Remove the inlet and outlet heater hoses from the firewall.
4. Remove the instrument panel carrier assembly. Refer to *Section 9E, Instrumentation/Driver Information*.
5. Remove upper four bolts and lower two bolts on I/P centers bracket.

Installation Notice

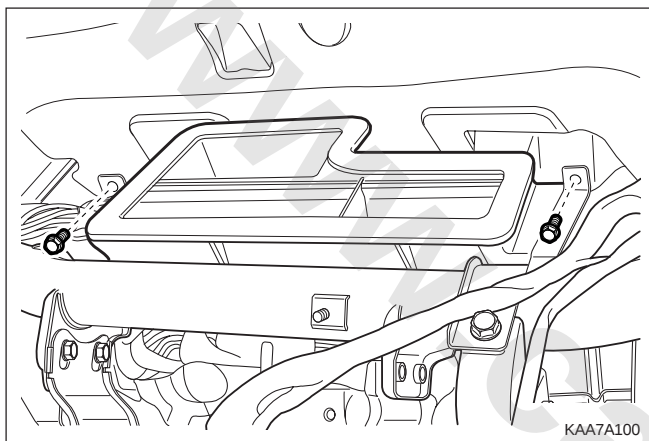
Tightening Torque	5 N•m (44 lb-in)
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6. Remove the I/P center bracket.
7. Remove one screw and the joint duct for heater/air distributor-to-rear heater duct.



KAA7A090

8. Remove one bolt, one nut and two screws that securing the heater/air distributor case-to-blower unit duct.
9. Remove the heater/air distributor case-to-blower unit duct.

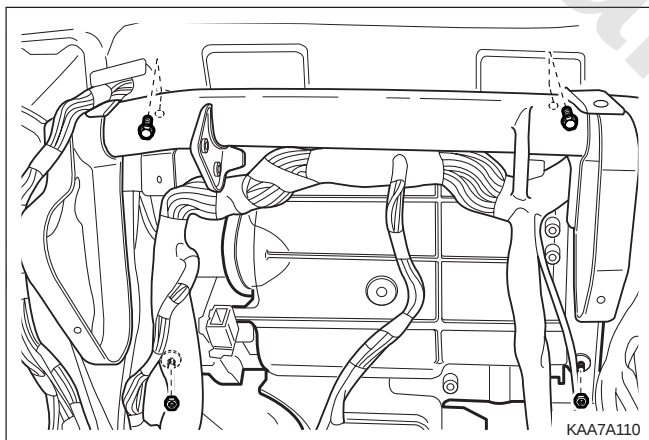


KAA7A100

10. Remove two bolts and the heater/air distributor case-to-defroster duct.

Installation Notice

Tightening Torque	5 N•m (44 lb-in)
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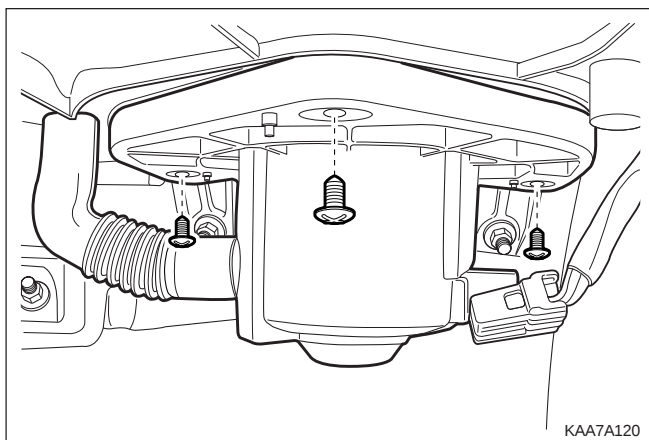
KAA7A110

11. Remove electrical connector to the mode control actuator.
12. Remove one bolt and two nuts that securing heater/air distributor case.

Installation Notice

Tightening Torque	Bolt 5 N•m (44 lb-it)
	Nut 5 N•m (44 lb-it)

13. Remove the heater/air distributor case.
14. Installation should follow the removal procedure in the reverse order.



KAA7A120

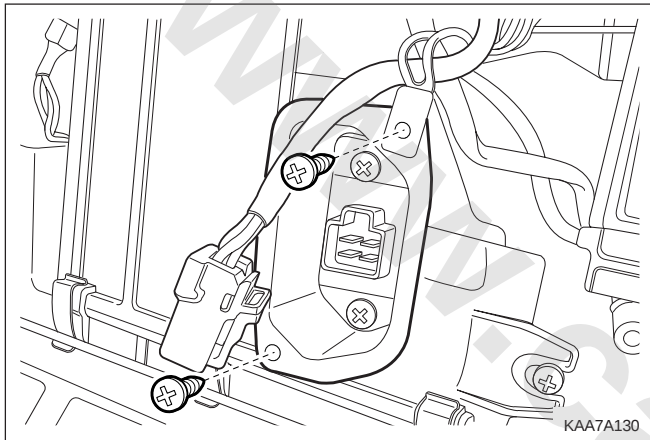
BLOWER MOTOR

Removal and Installation Procedures

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the blower motor electrical connector.
4. Remove the blower motor cooling hose.
5. Remove the screws that secure the motor to the heater/air distributor case.
6. Remove the blower motor from the blower unit by gently pulling the motor straight down and out.

7. Installation should follow the removal procedure in the reverse order.

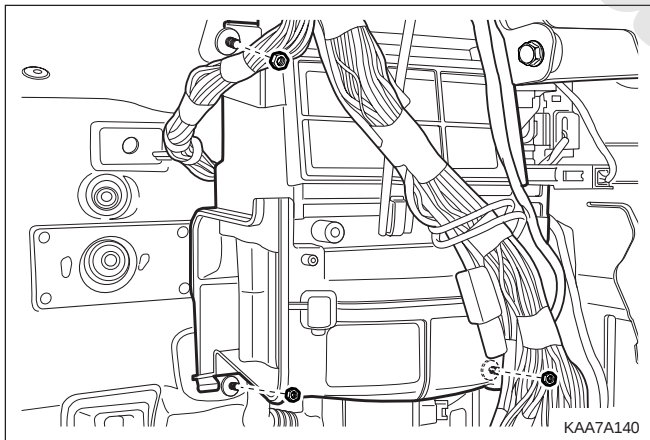
Installation Notice: After install the blower motor confirm that the blower motor operates properly.



BLOWER RESISTOR

Removal and Installation Procedures

1. Disconnect the negative battery cable.
2. Remove the glove box. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Disconnect the electrical connector at the resistor.
4. Remove two screws from the resistor.
5. Remove the resistor from the heater/air distributor case by gently pulling the resistor.
6. Installation should follow the removal procedure in the reverse order.



BLOWER UNIT

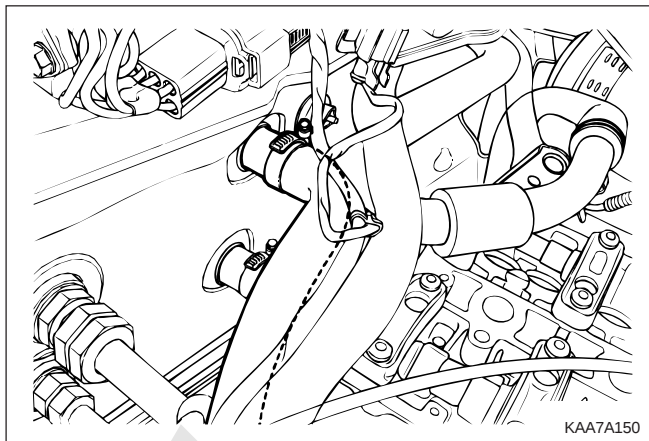
Removal and Installation Procedures

1. Disconnect the negative battery cable.
2. Remove the instrument panel carrier assembly. Refer to *Section 9E, Instrumentation/Driver Information*.
3. Remove one nut, one bolt and two screws that securing the heater/air distributor case-to-blower unit duct.
4. Remove the heater/air distributor case-to-blower unit duct.
5. Disconnect the connector for air intake door actuator and the connector for blower motor.
6. Remove three nuts that securing the blower unit.

Installation Notice

Tightening Torque	5 N•m (44 lb-it)
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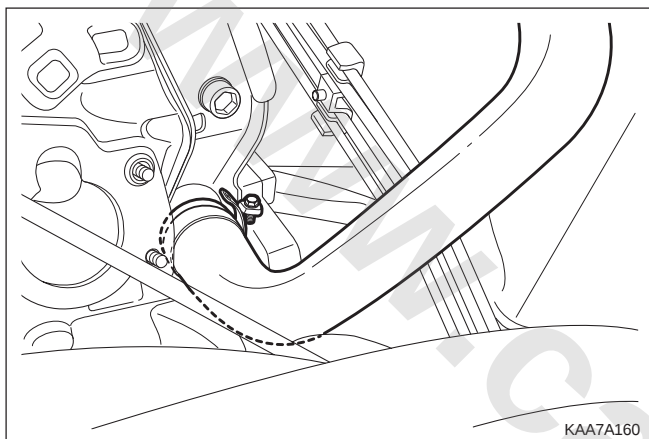
7. Remove the blower unit.
8. Installation should follow the removal procedure in the reverse order.



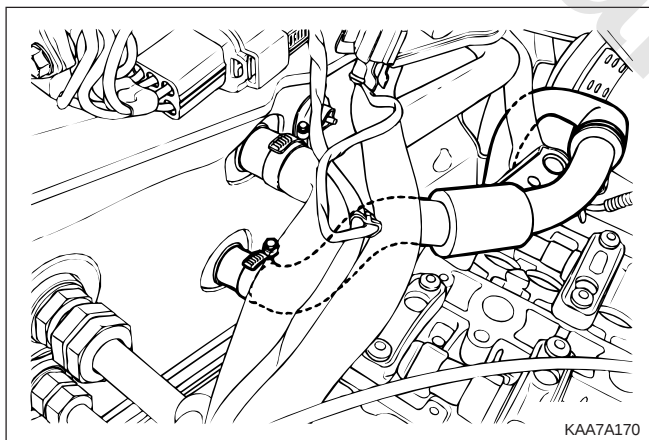
HEATER INLET HOSE

Removal and Installation Procedures

1. Partially drain the cooling system. Refer to *Section 1D, Engine Cooling*.
2. Remove the clip and slide rearward the inlet heater hose clamp at the firewall.
3. Gently twist the hose from the left to right and back again to loosen the bond between the hose and the tube.
4. Remove the end of the hose from the tube.



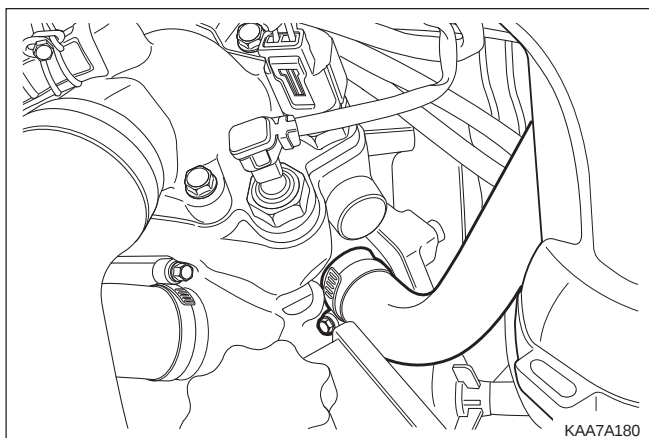
5. Remove the clip and slide rearward the inlet heater hose at the engine block.
6. Remove the inlet heater hose from the vehicle.
7. Installation should follow the removal procedure in the reverse order.



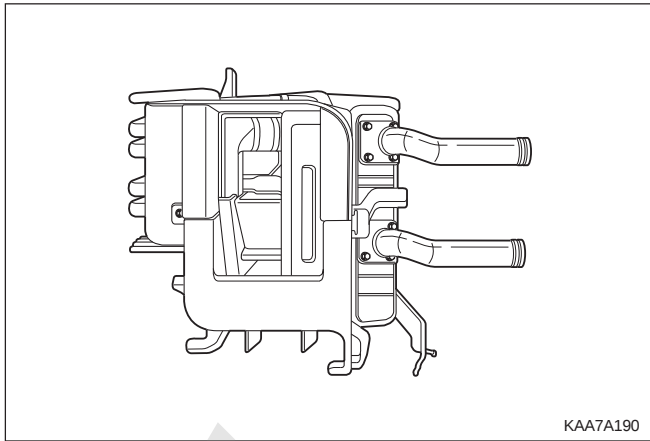
HEATER OUTLET HOSE

Removal and Installation Procedures

1. Partially drain the cooling system. Refer to *Section 1D, Engine Cooling*.
2. Remove the clip and slide rearward the outlet heater hose clamp at the firewall.
3. Gently twist the hose from the left to right and back again to loosen the bond between the hose and the tube.
4. Remove the end of the hose from the tube.



5. Remove the intake manifolds. Refer to *Section 1C, DOHC Engine Mechanical*.
6. Remove the clip and slide rearward the outlet heater hose at the thermostat housing.
7. Remove the outlet heater hose from the vehicle.
8. Installation should follow the removal procedure in the reverse order.



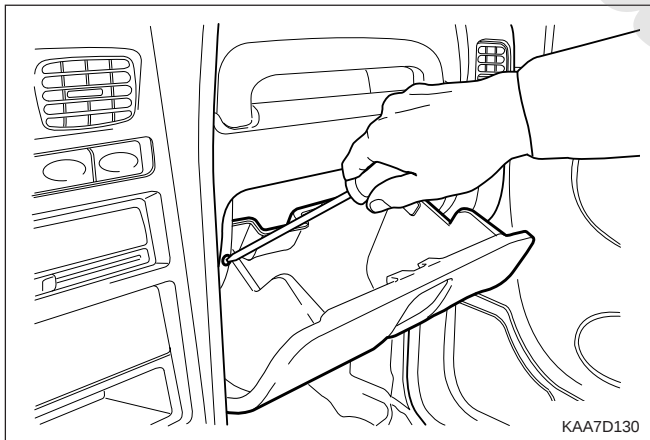
HEATER CORE

Removal and Installation Procedures

1. Disconnect the negative battery cable.
2. Remove the heater/air distribution case from the vehicle. Refer to "Heater/Air Distribution Case Assembly" in this section.
3. Remove the plastic holder and two screws that secure the heater core to heater/air distributor case assembly.
4. Slowly separate the heater/air distributor case assembly and remove the heater core.
5. Installation should follow the removal procedure in the reverse order.

REAR HEATER DUCT

This vehicle is equipped with rear seat heater ducts. Should there be no airflow to the rear, look for any obstructions, such as items on the floor under the front seats. Also check for air leaks between the heater/air distributor assembly and the rear ducts.



AIR FILTER

Removal and Installation Procedures

Replacement Interval	Every 10,000 km
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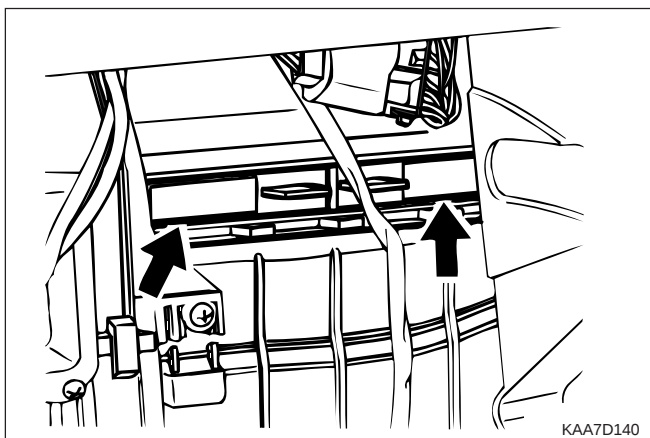
Notice: Replace earlier if air pollution is heavy.

1. Open the glove box and pull it inward to release the upper left and right locking portion.

Notice: Remove the glove box by unscrewing lower 2 screws, if necessary.

2. Press the 2 filter cover holds and remove the air filter cover.
3. Remove the 2 air filters.

Notice: For installation, remember the installed direction of the air filter before removal.



SPECIFICATIONS

HEATER TEMPERATURE SPECIFICATION

Ambient Air Temperature	Heater Outlet Air Temperature
-18 °C (0 °F)	54 °C (129 °F)
-4 °C (25°F)	59 °C (138 °F)
10 °C (50 °F)	64 °C (147 °F)
24 °C (75 °F)	68 °C (154 °F)

HEATER UNIT

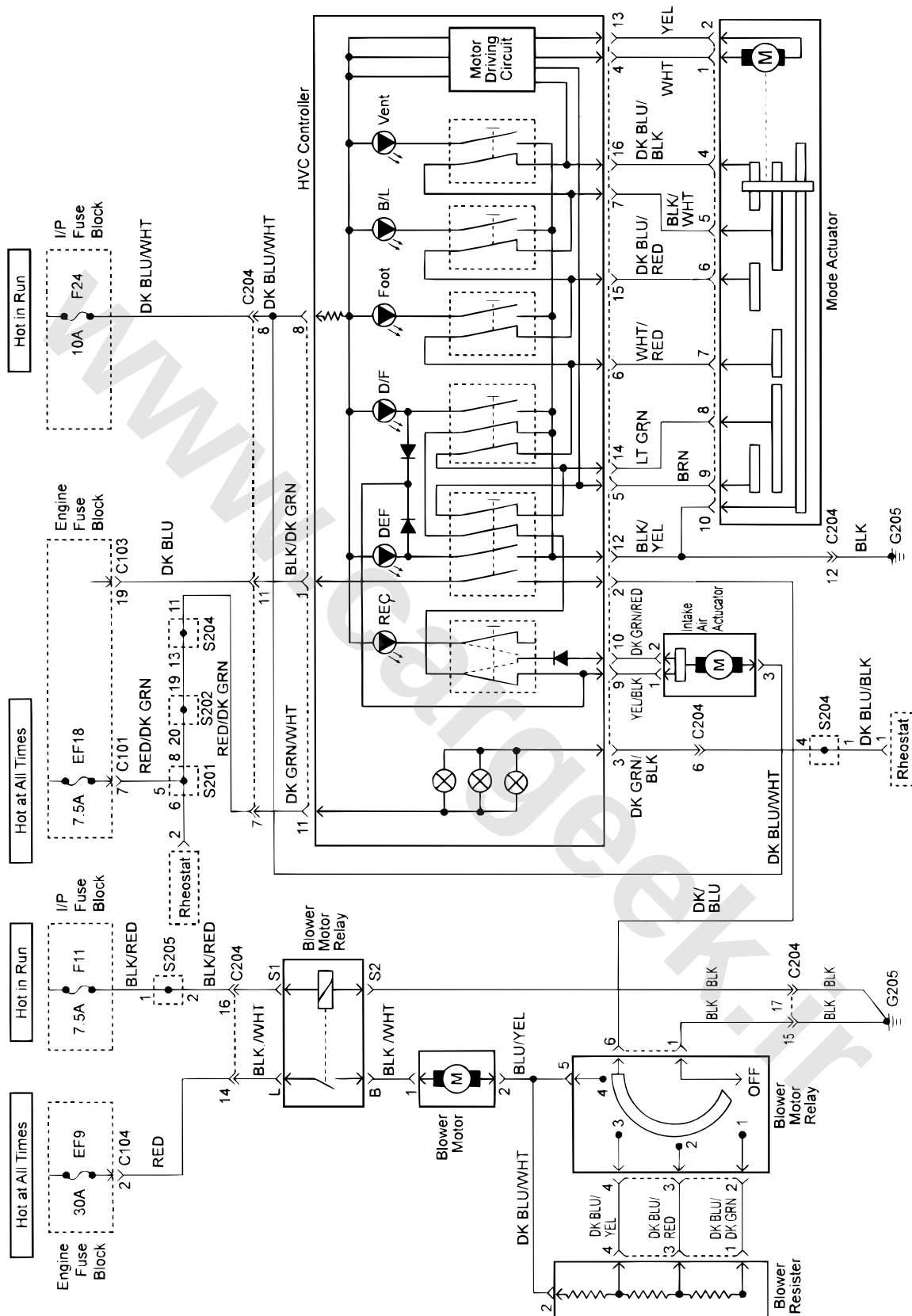
Application	Description
-18 °C (0 °F)	54 °C (129 °F)
-4 °C (25°F)	59 °C (138 °F)
10 °C (50 °F)	64 °C (147 °F)
24 °C (75 °F)	68 °C (154 °F)

FASTENER TIGHTENING SPECIFICATIONS

Application	N•m	Lb-Ft	Lb-In
Heater/Air Distributor Case Retaining Bolt	5	-	44
Heater/Air Distributor Case-to-Blower Unit Connecting Duct Nut	5	-	44
Heater/Air Distributor Case-to-Defroster Connecting Duct Retaining Bolts	5	-	44
I/P Center Bracket Bolts	5	-	44

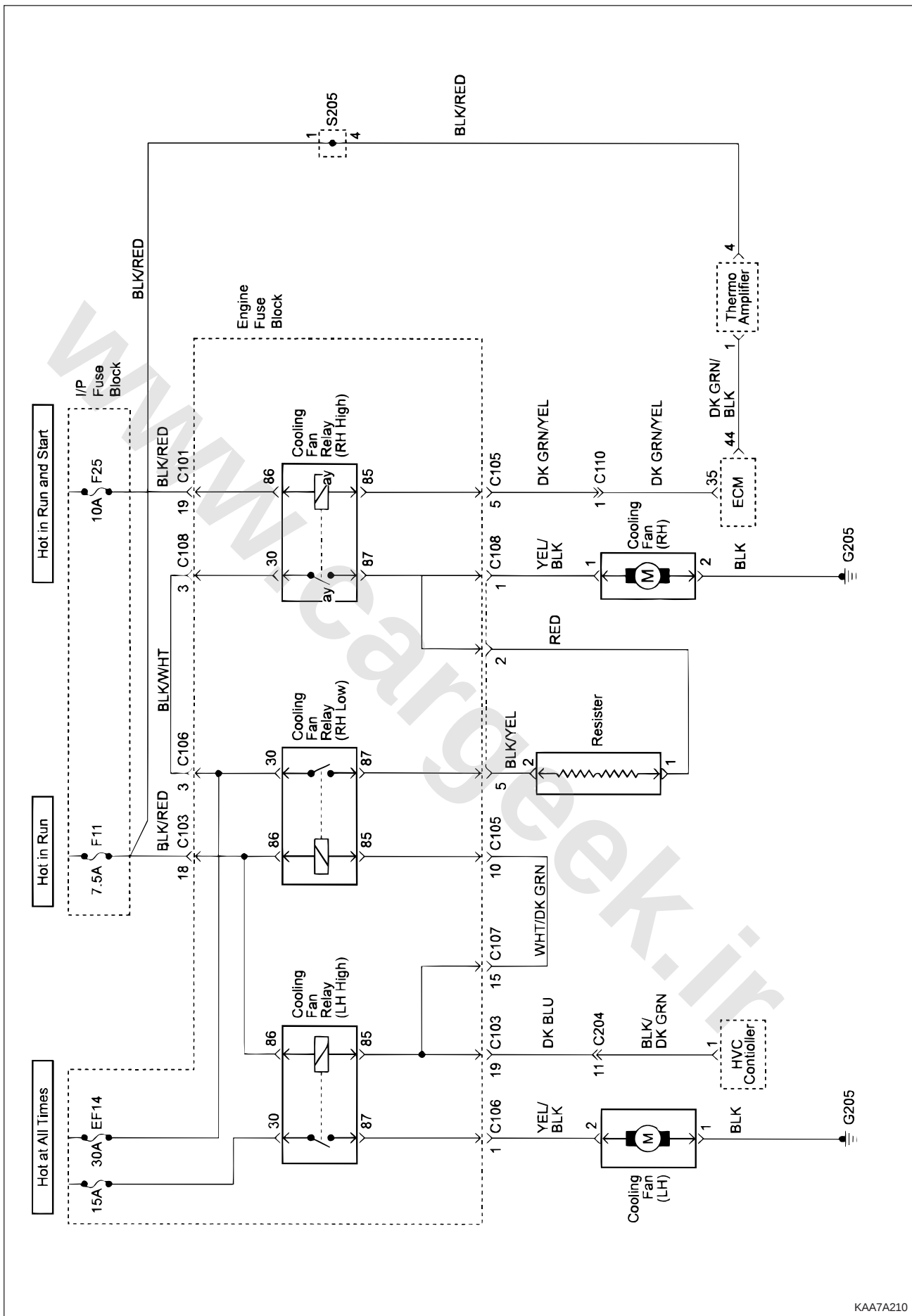
SCHEMATIC AND ROUTING DIAGRAMS

NON-A/C WIRING DIAGRAMS (1 OF 2)

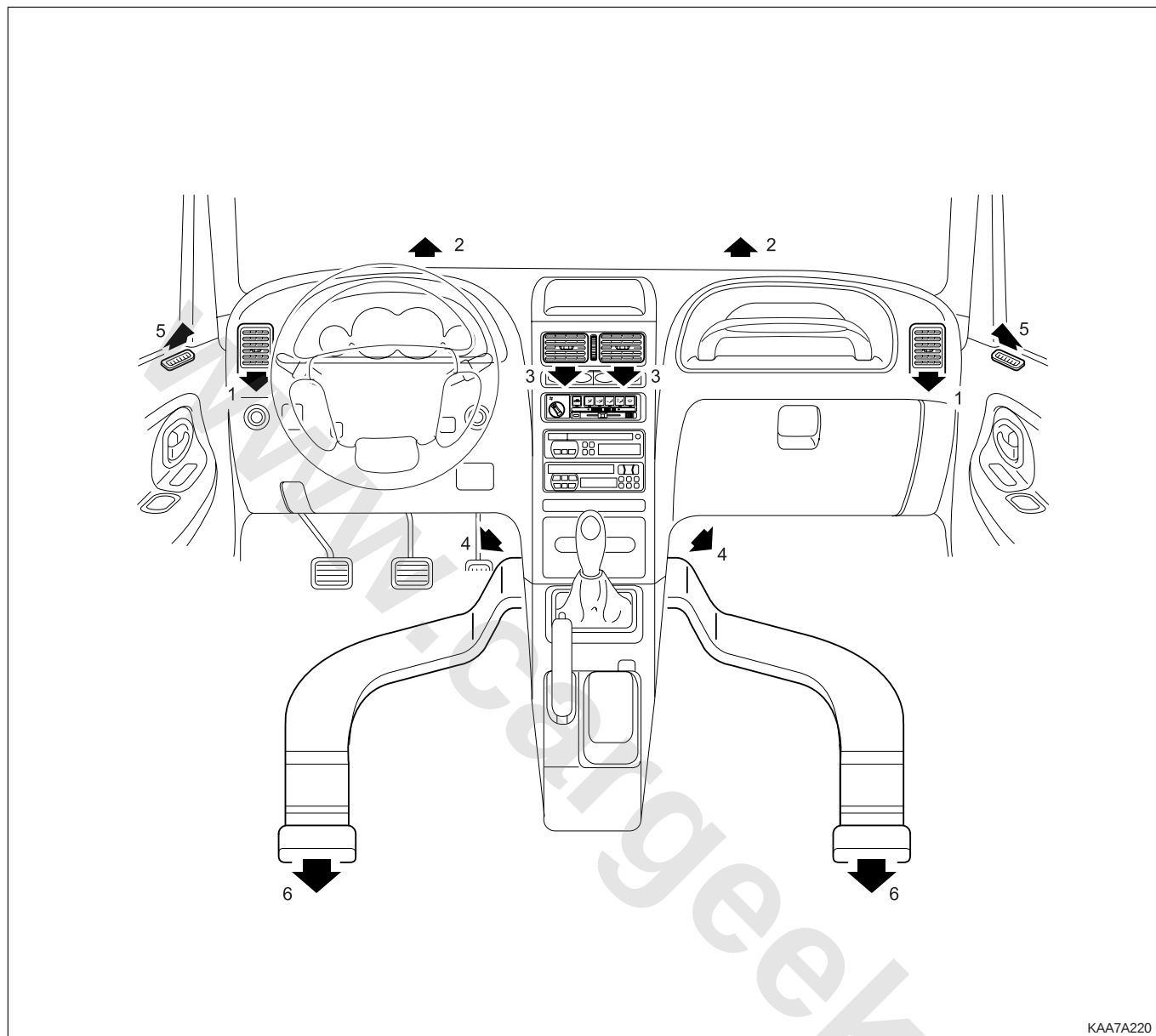


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NON-A/C WIRING DIAGRAMS (2 OF 2)



AIRFLOW THROUGH VENTS



- 1 Side Ventilation Vents (Face Position)
- 2 Front windshiel Defroster Vents
- 3 Conter Ventilation Vents (Face Position)

- 4 Ventilation Vents (Face Position)
- 5 Side Door Window Defroster Vents
- 6 Rear Ventilation Vents