SECTION 7A

HEATING AND VENTILATION SYSTEM

TABLE OF CONTENTS

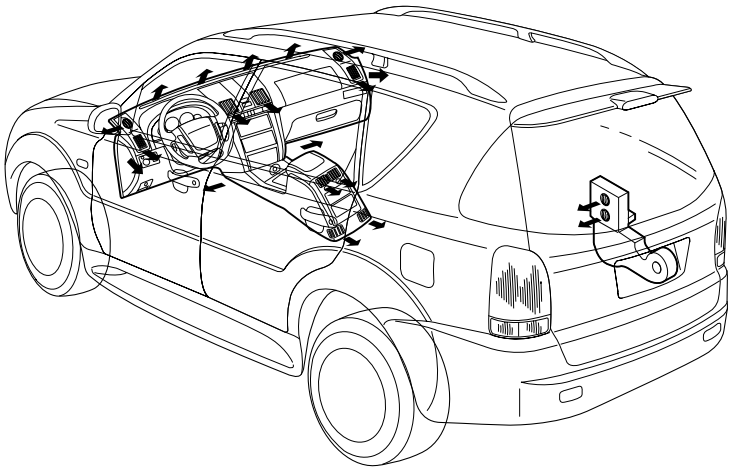
DESCRIPTION AND OPERATION

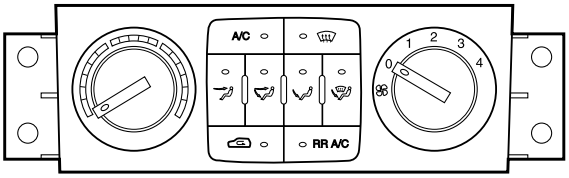
GENERAL

Heater is the system that circulate the suction air through the heater core to deliver the heat of engine coolant to the suction air and designed for heating and defrosting in the passenger room.

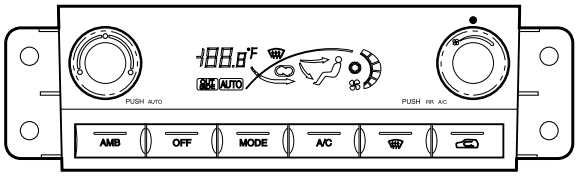
Heater system is consist of heater hose, heater module, blower motor and adjustment system.

The control switch assembly (adjustment system) equipped with the instrument panel can control the temperature, the amount and the direction of the outlet. Also this system can use the suction air as separation between ambient air and intake air on the vehicle.

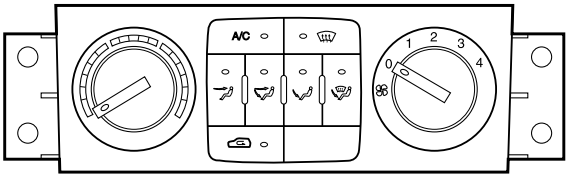




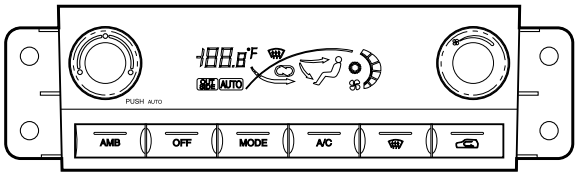
Manual Switch (Option)



Auto Switch (Option)



Manual Switch (Standard)



Auto Switch (Standard)

YAD7A010

SPECIFICATIONS

Engine Type		GSL	GSL
Blower Motor	Max. Capacity	7.425 - 9.075 kcal/h	←
Heater Core	Fin Pitch	1.52 mm	←
	Size (L x H x W)	194.6 x180 x 35 mm	←
	Heating Capacity	8,250 (Min. 4,700) kcal/h	←
Blower Motor Resistance	1st Mode	3.25 Ω	←
	2nd Mode	1.45 Ω	←
	3rd Mode	0.35 Ω	←
	4th Mode	Ω	←
Front A/C and Heater Unit	Type	Heater+Evaporator and Blower (2 pieces)	
	Heating Capacity	Min. 4600 kcal/h (5.5 m^3/Min)	
	Cooling Capacity	Min. 4700 kcal/h (7.5 m^3/Min)	
	Expansion Valve	Block Type	
	Input Power	Max. 250 W	
Rear Cooler	Type	Evaporator and Blower (only Cooler)	
	Cooling Capacity	Min. 2700 kcal/h (5 m^3/Min)	
	Expansion Valve	ANGLE Type	
	Input Power	Max. 180 W	

AIR DELIVERY AND FUNCTION

Mode Door Motor

Installation Location

It's located at the left side of heater case.

Function

It controls the open/close of the outlet at Vent, Foot or Def by the control command of automatic temperature control and then can set up the outlet mode of Vent, Bi-level, Foot, Foot/Def or Def.

Intake Door Motor

Installation Location

It's located at the upper and right side of blower housing.

Function

It operates ambient/intake door motor by the control command of automatic temperature control to set up the inlet mode of ambient/intake door.

Air Mix Door Motor

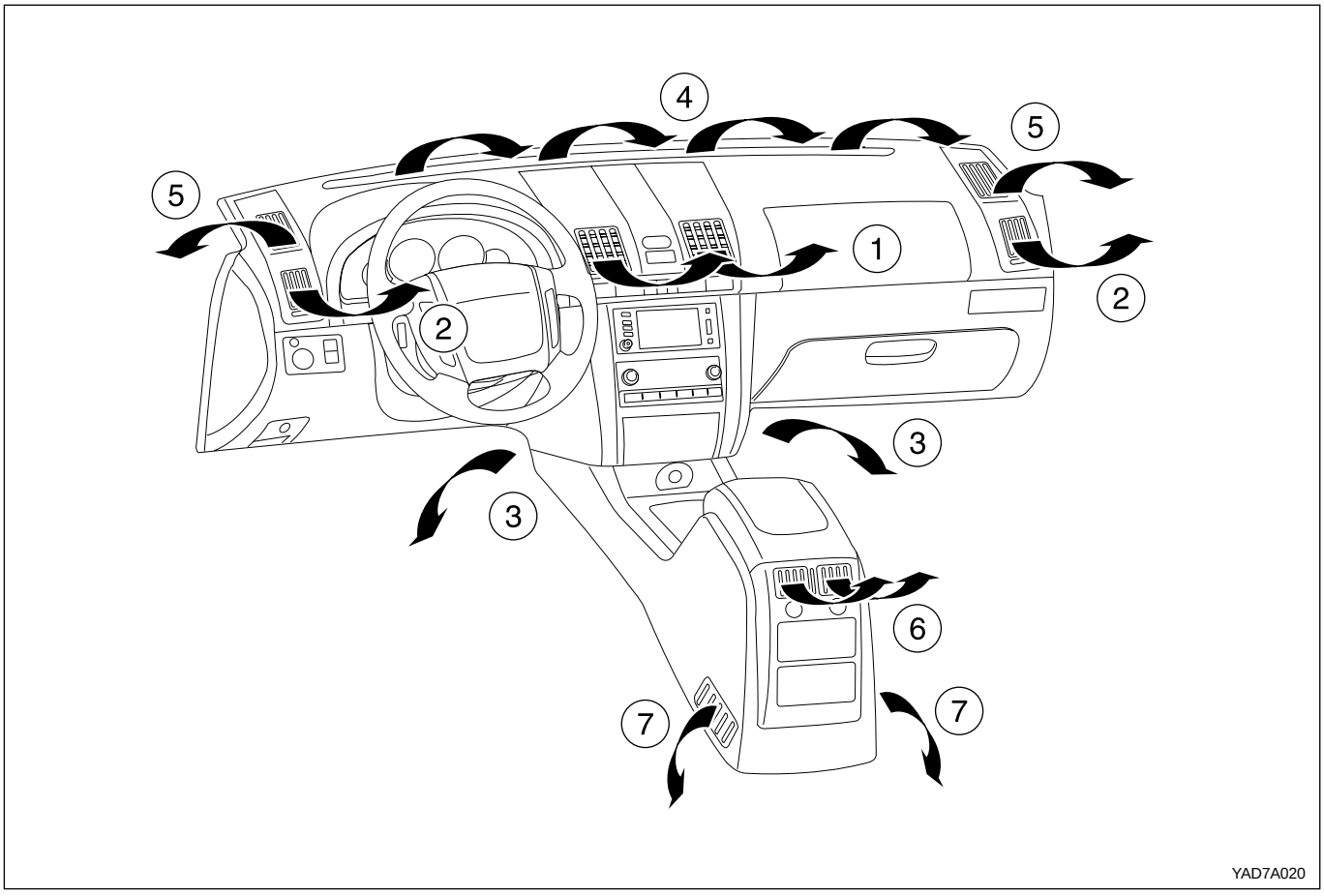
Installation Location

It's located at the lower side of heater housing

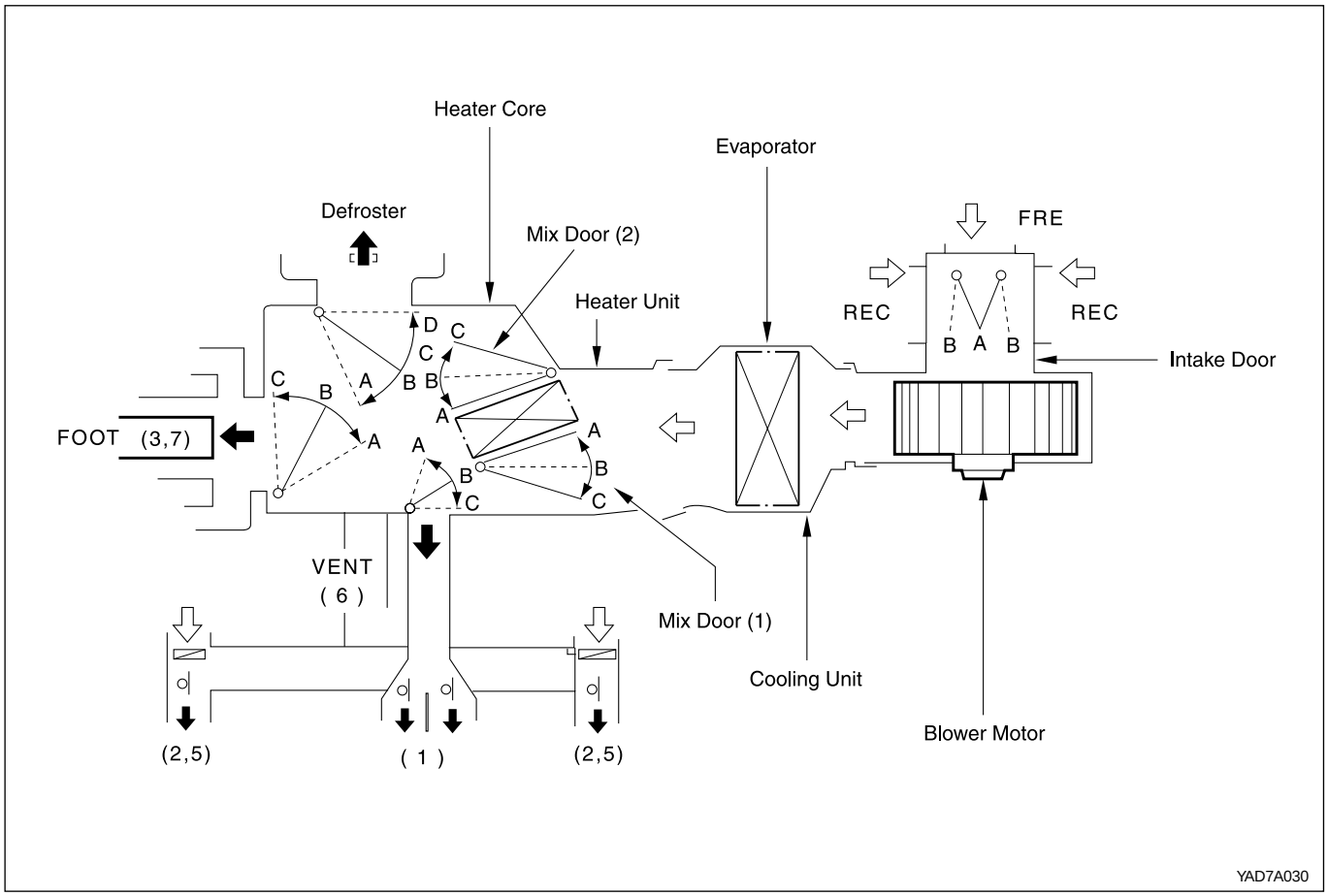
Function

It controls the open/close of damper by the control command of automatic temperature control to adjust the temperature of outlet air.

Airflow Through Vents

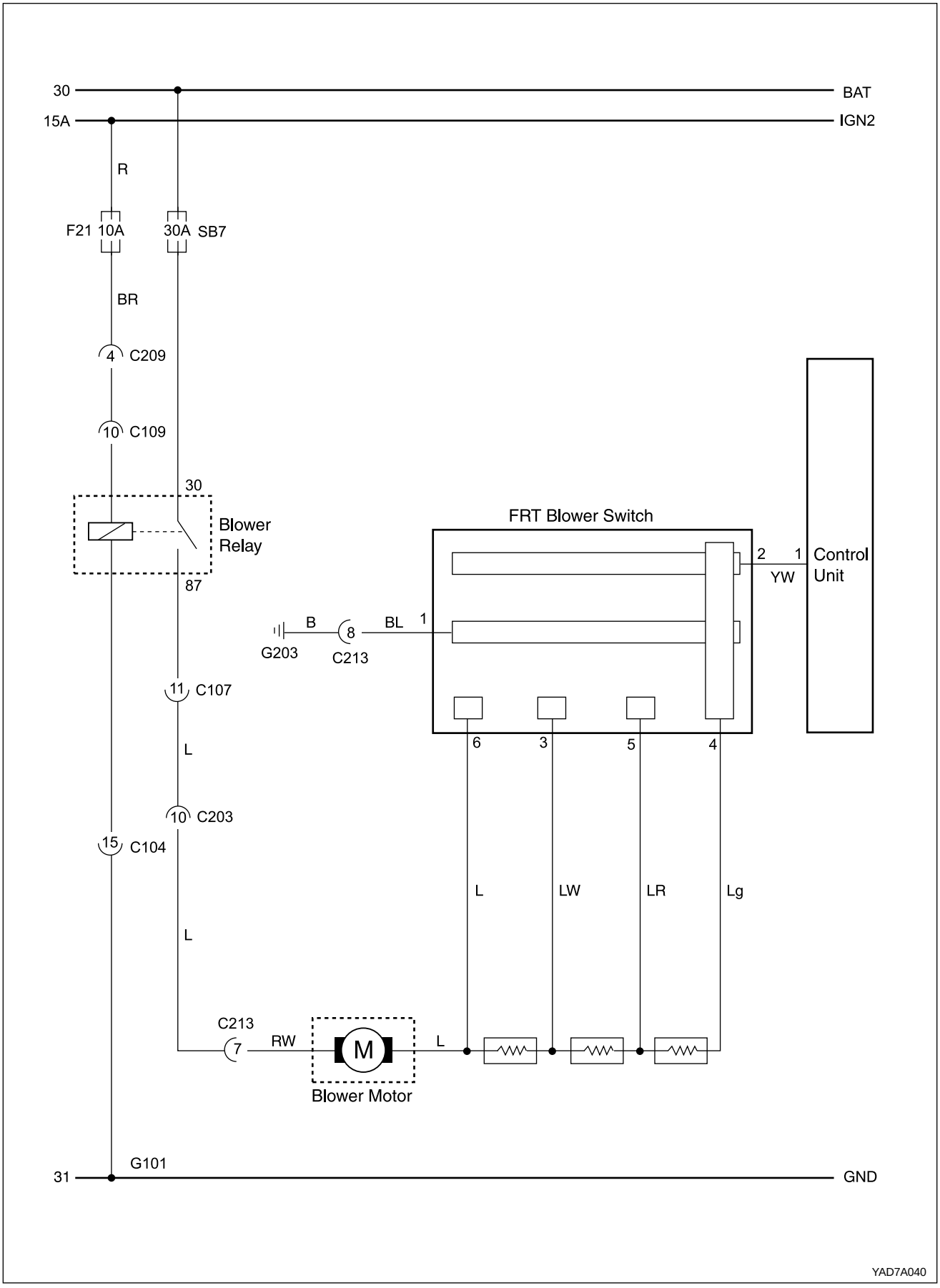


MODE		VENT	BI-LEVEL	FOOT	FOOT/DEF	DEF	Recirculation Switch		Temperature Control Lever
							REC	FRE	
Front	CENTER VENT (1)	A	B	–	–	–	–	–	–
	SIDE VENT (2)	A	B	B	B	B	–	–	–
	FOOT (3)	–	C	B	C	–	–	–	–
	DEFROSTER (4)	–	–	D	C	B	–	–	–
	SIDE DEF (5)	–	–	D	D	C	–	–	–
Rear	VENT* (6)	B	C	–	–	–	–	–	–
	FOOT (7)	–	C	B	D	–	–	–	–
INTAKE Door							(A)	(B)	–
AIR MIX Door							–	–	A B C



SCHEMATIC & ROUTING DIAGRAM

BLOWER MOTOR DIAGRAM



DIAGNOSTIC INFORMATION AND PROCEDURES

INSUFFICIENT HEATING OR DEFROSTING

Step	Action	Yes	No
1	Check the coolant level, the serpentine accessory drive belt for tension or damage, coolant hoses for leaks or kinks, coolant reservoir cap. Is the repair complete?	System OK	Go to Step 2
2	1. Set the temperature control switch to full hot. 2. Set the blower motor switch on 4. 3. Turn the ignition ON. 4. Check for the airflow from the vent outlet. Is there a heavy airflow from the vent outlet?	Go to Step 4	Go to Step 3
3	Recheck the Heater system and then repair as needed. Does the system operate properly?	System OK	Go to Step 7
4	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 5	Go to “Blower Electrical”
5	With the engine idle, remove the coolant reservoir cap and watch the flow of the coolant. Is the coolant flow visible?	Go to Step 6	Go to Step 8
6	1. Check for a restriction in the cooling system, failed water pump impeller, faulty thermostat. 2. Make repairs to the cooling system, as needed. Is the repairs complete?	System OK	-
7	Check the airflow from the Defrost and vent outlets. Is there a heavy airflow from there?	System OK	Go to Step 9
8	1. Check the vehicle for cold air leaks at the Instrument panel, Heater case and Vents. 2. Repair and replace any leaks or obstructions. Are the repairs complete?	System OK	Go to Step 15
9	Set all the selection switches to Defrost. Is there a heavy airflow from any step?	Go to Step 10	Go to Step 11
10	Check the vent outlets and repair as needed. Is the repair complete?	System OK	-
11	Check for change in the airflow at various blower speeds and then repair as needed. Is the repair complete?	Go to Step 12	Go to “Blower Electrical”
12	Check for obstructions in the system at the blower inlet and repair as needed. Is the repair complete?	System OK	Go to Step 13
13	1. Set the blower motor switch on 4. 2. Slide the temperature control knob from full hot to full cold. 3. Listen for an airflow change. Does the airflow change?	Go to Step 14	Go to Step 19
14	1. Repair the temperature door travel, cables and linkage as required. 2. Verify the accuracy of the temperature controls at full hot. Is the repair complete?	System OK	-
15	1. Turn the ignition “LOCK”. 2. Turn the temperature control knob to full cold, then rapidly to full hot. 3. Listen for the sound of the temperature door slam. Did the door slam?	Go to Step 16	Go to Step 20

Insufficient Heating or Defrosting (Cont'd)

Step	Action	Yes	No
16	1. Set the temperature switch to full hot. 2. Start the vehicle. 3. Check the temperature of the heater inlet and outlet hose by feel. Is the heater inlet hose hot and the heater outlet hose warm?	Go to Step 17	Go to Step 21
17	Inspection the heater inlet and outlet hose for proper installation. Are the heater inlet and outlet hose reserved?	Go to Step 18	Go to Step 22
18	1. Back flush 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 and outlet hose. Is the heater inlet hose hot and outlet hose warm?	System OK	Go to Step 23
19	Check the system for any obstruction between blower, heater case and airflow delivery outlet and then repair or replace as required. Is the repair complete?	System OK	-
20	1. Repair the temperature door travel, cables and linkage as required. 2. Verify the accuracy of the temperature control at full hot and full cold, and then repair as required. Is the repair complete?	System OK	-
21	Check thermostat and then repair or replace as required. Is the repair complete?	System OK	-
22	Reinstall heater hose properly. Is the replace complete?	System OK	-
23	Replace heater core. Is the replace complete?	System OK	-

BLOWER ELECTRICAL

Step	Action	Yes	No
1	1. Disconnect the power connector from the blower motor. 2. Check the resistance between the 2 terminal of the blower motor connector and each step with the blower switch place each position. Is the resistance within the specified value?	Go to Step 2	Go to Step 3
2	Replace the blower motor. Is the repair complete?	System OK	-
3	Check the fuse SB7 (30A) in the engine compartment fuse block. Is the fuse blown?	Go to Step 4	Go to Step 5
4	Replace the fuse. Is the repair complete?	System OK	-
5	1. Turn the ignition ON. 2. Use the short detector to locate the following possible short: From the fuse SB7 (30A) in engine compartment fuse block to the blower motor. From the blower motor to the blower resister block. From the blower resister block to the blower speed switch. Is there any short in the above positions?	Go to Step 6	Go to Step 7
6	Repair any short. Is the repair complete?	System OK	-
7	1. Disconnect the power connector from the blower motor. 2. Use the test lamp to locate a possible short between the terminal 1 of the blower switch connectors and the terminals 6, 3, 5, 4 of the blower switch connectors sequentially. Does the test lamp light on at any terminal?	Go to Step 8	Go to Step 9
8	Replace the A/C controller switch. Is the repair complete?	System OK	-
9	Replace the blower resistor. Is the repair complete?	System OK	Go to Step 10
10	Check the ground of the blower motor and then repair as needed. Is the repair complete?	System OK	-

IMPROPER AIR DELIVERY OR NO MODE SHIFT

This procedure provides a test of all functions of the heater/defroster unit.

1. Warm the vehicle and keep the engine running.
2. Perform the following diagnostic procedure.

Check		Action	
Check connection and the attachment of the door cable	Is the cable connected and retained properly?	Yes	Check the range of the door travel and the effort required to move it.
		No	Connect and attach the cable properly. Check the operation of the temperature control switch.
	Does the door operate properly?	Yes	If required, repair.
		No	Recheck the system using “Control setting/Correct Results” test.
	Is there a problem with the temperature control switch or wiring?	Yes	Repair or replace the temperature control switch or the cable.
		No	System OK
	Is the system OK after the repair complete?	Yes	Check the airflow from the defroster or the vent outlets.
		No	System OK
	Is the heavy airflow?	Yes	Switch the mode knob to defrost.
		No	Remove the heater outlet and then remove any obstructions in the heater outlet.
	Is the airflow proper?	Yes	Check the blower speed for change in the airflow as the control is turned 1 to 4.
		No	Repair or replace any obstructions at heater and air delivery case.
	Does the blower motor speed increase?	Yes	Go to “Blower Electrical”
		No	System OK
	Is the system OK after the repair complete?	Yes	Set the blower switch to 4th. Rotate the temperature control from full cold to full hot.
		No	Listen to an airflow change.
	Does the airflow change?	Yes	Repair or replace any obstruction between the blower and the system outlets.
		No	Check and repair the door adjustments, the cables, the linkage and the control.

TOO MUCH HEAT

Check		Action	
Mode switch to the floor position	Is there too much heat when the mode switch is in the floor position?	Yes	Set the temperature control switch to defrost position.
		No	Set the mode switch to the vent position.
	Is the airflow proper?	Yes	Set the blower speed to 4th. Set the temperature control switch to full hot. Turn the ignition “ON”. Check the airflow and attachment at the foolr outlet.
		No	Check the door travel, the cables, the controls and the linkage for the defrost position and then repair or replace as needed.
	Is the heavy airflow?	Yes	Check the door travel, the cables, the controls and the linkage for the full hot, full cold position and then adjust as needed.
		No	Check for a change in the airflow at different blower speed. Check the change.
	Does the airflow change?	Yes	System OK
		No	Go to “Blower Electrical”
	Is the airflow proper?	Yes	Turn the ignition “OFF”. Turn the temperature control knob to full hot, then rapidly to full cold.
		No	Check the system case for leaks and check the floor outlet attachment.
	Can you hear the sound of the temperature door slam?	Yes	Adjust the vent door to vent mode.
		No	Check the door travel, the cables, the controls and the linkage for the full hot, full cold position and then adjust as needed.

HEATER CONTROLS

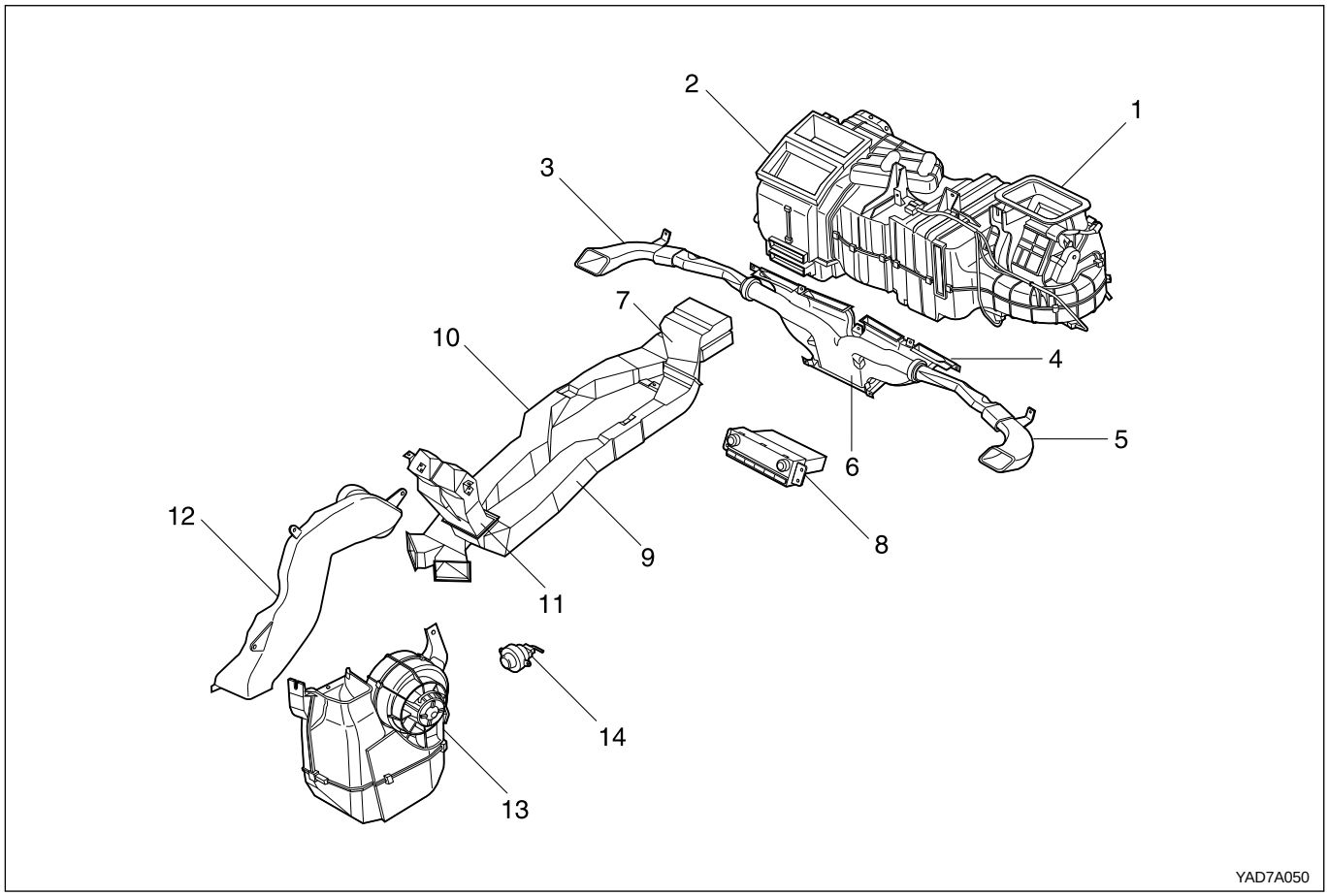
Check		Action	
Turn the temperature control switch	Is excessive effort required to move the control?	Yes	Check the cable for improper routing, kinks, wiring interference or other instrument panel interference.
		No	Set the blower switch to 4th. Repeat to turn the temperature control knob to full hot, then rapidly to full cold
	Does the control operate properly?	Yes	Remove the cable from any door that binds on the cable. Cycle the door manually. Check the door binding.
		No	Repair or replace the problem.
	Is there any door binding?	Yes	Check the door seal for proper installation.
		No	Check the control for binding.
	Does the control bind?	Yes	Reinstall the cable to the door. Repair the instrument panel interference with the cable.
		No	Remove the cable from the control. Check the control for binding.
	Does the control bind?	Yes	Replace the control switch.
		No	Replace the cable.
	Is excessive effort required to move the control?	Yes	Remove the cable from the control. Operate the control switch.
		No	System OK
	Does the control operate properly without any interference?	Yes	System OK
		No	Replace the control switch.
	Is the installation good condition?	Yes	Check a binding door for the shaft alignment, a bent shaft, a bent door or warped case and then repair as needed.
		No	Repair the door seal or replace as needed.

BLOWER NOISE

Check		Action	
Cycle through the blower speeds, the modes and the temperature settings in order to find the noise. -Close all of the doors and windows. -Turn the ignition "ON". -Set the blower switch to 4th. -Set the control switch to full hot position.	Is the blower noise constant at high blower speeds or certain modes, but absent at lower speeds or in other modes?	Yes	Remove any obstruction or foreign material of the duct. Check floor/defroster door seals. Repair or replace as needed.
		No	Check for the vibration from the blower motor and fan assembly at each blower speed by feeling the blower motor housing. Check for the foreign materials at the opening of the blower inlet.
	Did you find the excessive vibration and any foreign material?	Yes	Remove all foreign materials and repair or replace the blower motor and fan assembly.
		No	Set the blower switch to 4th. Check any noise from full hot to full cold temperature positions in the defroster, floor and vent modes.
	Is the noise constant?	Yes	Remove any obstruction or foreign material of the duct. Check the floor/defroster door seals. Repair or replace as needed.
		No	Check any noise in the floor mode.
	Is the noise constant?	Yes	Remove any obstruction or foreign material of the duct. Check the floor/defroster door seals. Repair or replace as needed.
		No	Check any noise in the vent mode.
	Is the noise constant?	Yes	Remove any obstruction or foreign material of the duct. Check the vent door seals. Repair or replace as needed.
	Is the blower noise constant at any modes but absent at all modes of temperature control lever?	Yes	Check the temperature door seals
		No	Check the system for obstructions, foreign materials between the fan and the temperature door and then repair or replace the fan as required.

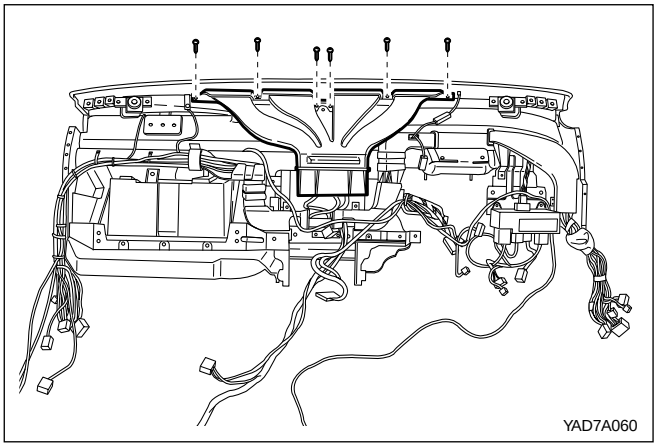
COMPONENT LOCATOR

AIRFLOW THROUGH VENTS WITH REAR HEATING DUCT



1 Blower and Evaporator Assembly
2 Heater Assembly
3 Side Defroster Duct (LH)
4 Main Defroster Nozzle
5 Side Defroster Duct (RH)
6 Side Defroster Joint
7 Console Front Ventilation Duct
8 A/C Controller
9 Console Middle Ventilation Duct
10 Console FOOT Duct
11 Console Rear Ventilation Duct
12 Rear cooler Duct
13 Rear cooler Assembly
14 Rear cooler Controller

REPAIR INSTRUCTIONS

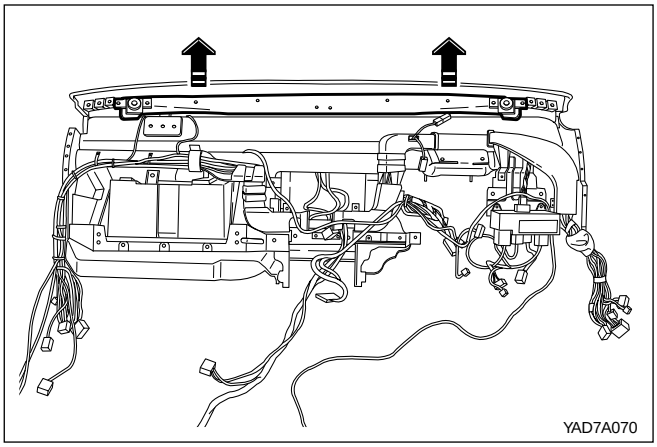


ON-VEHICLE SERVICE

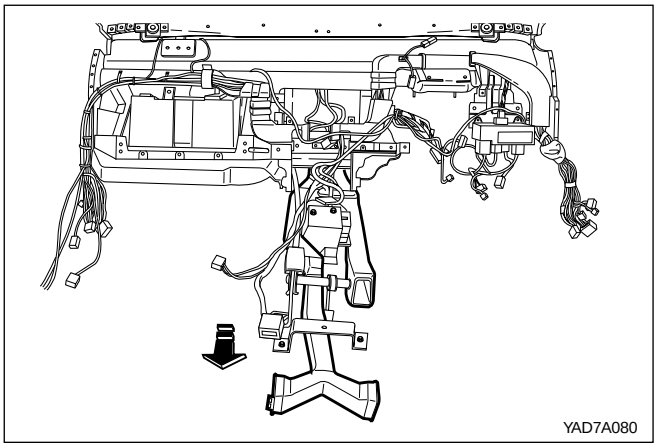
AIR DUCT ASSEMBLY

Removal & Installation Procedure

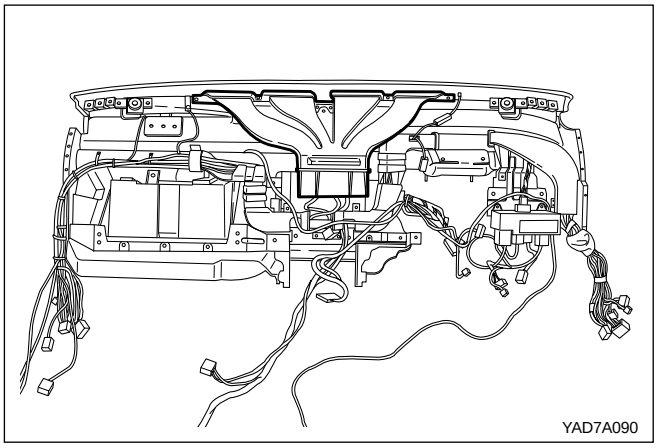
1. Remove the instrument assembly.
2. Remove the defroster nozzle retaining screws and the defroster nozzle assembly.



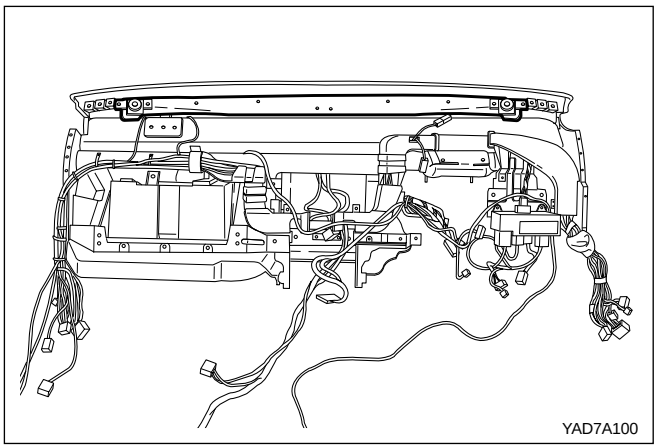
3. Remove the ventilation duct.



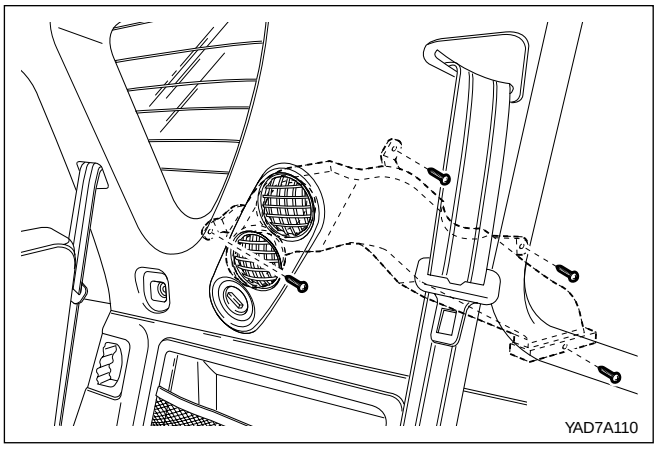
4. Remove the air distributor at console side.
   - Remove the center console.
   - Remove the parking brake lever assembly.
   - Remove the middle duct retaining bolt.
5. Remove the middle duct and the lower duct.



6. Installation should follow the removal procedure in the reverse order.
   - Install the nozzle and the ventilation duct to the instrument panel.



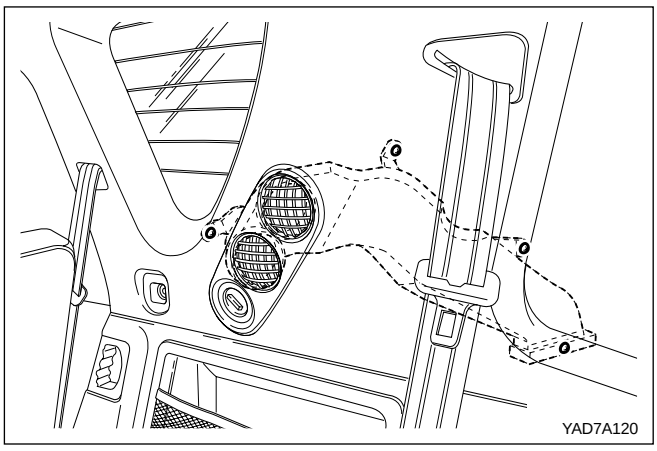
- Install the duct at console side with air duct.



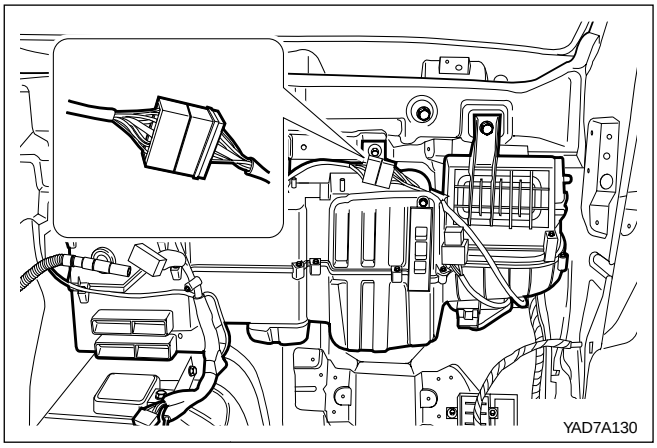
REAR COOLER DUCT

Removal & Installation Procedure

1. Remove the rear quarter inner panel.
2. Remove the tapping screw and hex screw at the duct.
3. Remove the duct.



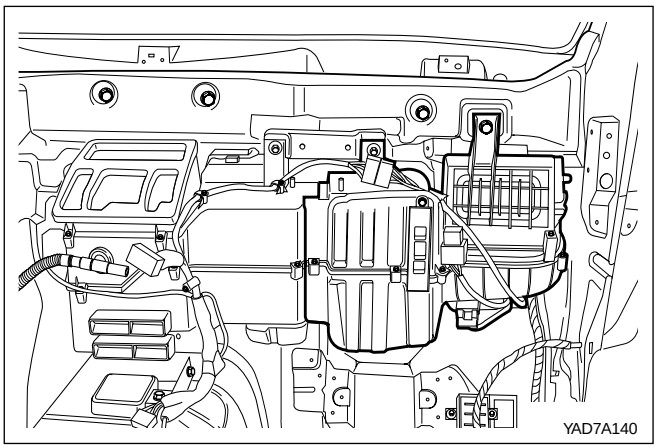
4. Installation should follow the removal procedure in the reverse order.



HEATER AND BLOWER MODULE ASSEMBLY

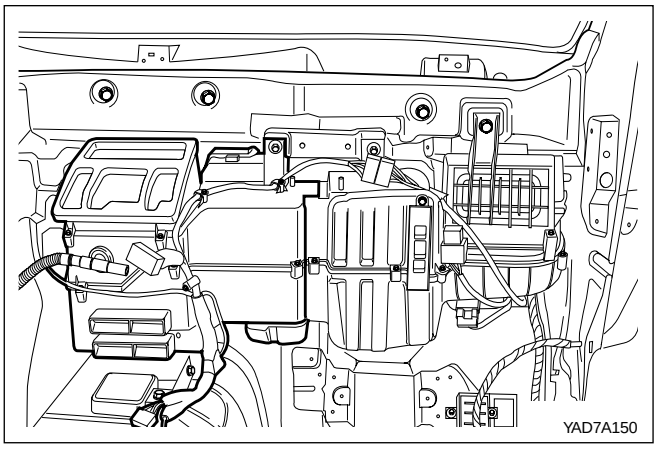
Removal & Installation Procedure

1. Disconnect the blower motor connecter.



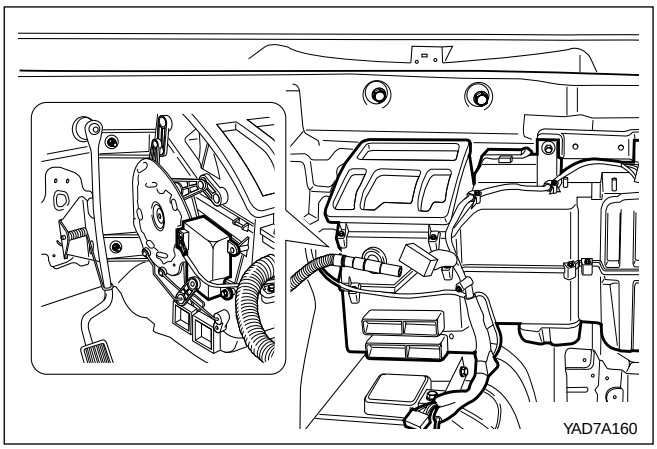
2. Remove the retaining bolts of the blower module and evaporator and then remove the blower module.

   Notice: A/C pipe should be removed previously.



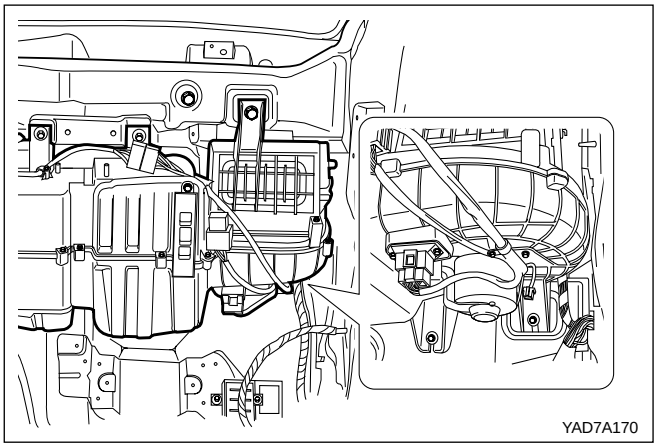
3. Remove the heater module retaining bolts and heater module assembly.

   Notice: Note that it is possible to remove the heater module only when you remove the heater hose previously.



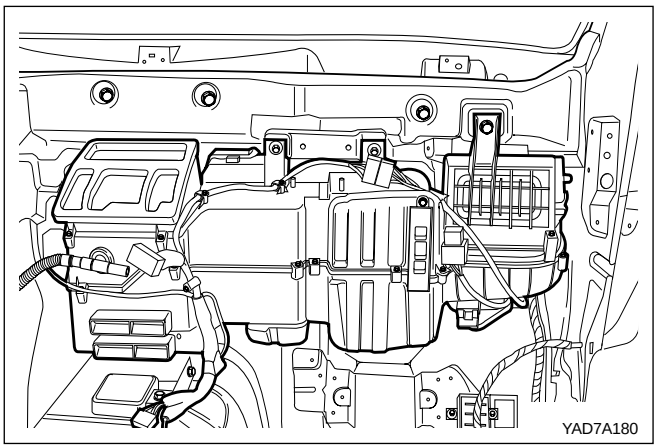
4. Installation should follow the removal procedure in the reverse order.
   - Tighten the heater module with the retaining bolts.

Retaining Bolt	5 N•m (44 lb-in)

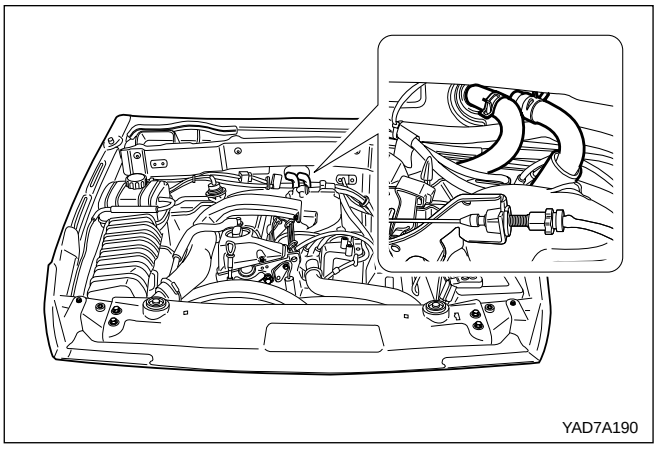


- Tighten the blower module assembly with retaining nuts.

Retaining Bolt	5 N•m (44 lb-in)



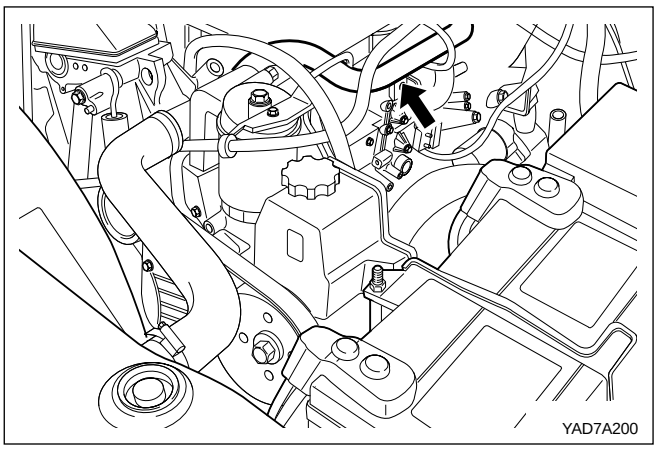
- Connect the blower motor connector and install the heater hose and A/C pipe.



HEATER SUCTION AND DISCHARGE HOSE

Removal & Installation Procedure

1. Drain the coolant.
2. Remove the clips and push back the suction heater hose clamp near the fire wall.
3. Twist the hose slowly from the left side to the right side to loosen the connection between the hose and the tube.
4. Remove the hose end from the tube.



5. Remove the clip and push back the heater suction hose at engine block side.
6. Remove the heater suction hose and discharge hose on the vehicle.
7. Installation should follow the removal procedure in the reverse order.