HEATER, AIR CONDITIONER AND VENTILATION

Click on the applicable bookmark to selected the required model year

HEATER, AIR CONDITIONER AND VENTILATION

CONTENTS

55109000140

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WARNINGS REGARDING SERVICING OF SUPPLEMENTAL RESTRAINT SYSTEM (SRS) EQUIPPED VEHICLES

WARNING!

(1) Improper service or maintenance of any component of the SRS, or any SRS-related component, can lead to personal injury or death to service personnel (from inadvertent firing of the air bag) or to the driver and passenger (from rendering the SRS inoperative).
(2) Service or maintenance of any SRS component or SRS-related component must be performed only at an authorized MITSUBISHI dealer.
(3) MITSUBISHI dealer personnel must thoroughly review this manual, and especially its GROUP 52B – Supplemental Restraint System (SRS) before beginning any service or maintenance of any component of the SRS or any SRS-related component.

NOTE
The SRS includes the following components: SRS-ECU, SRS warning lamp, air bag module, clock spring, side impact sensors and interconnecting wiring. Other SRS-related components (that may have to be removed/installed in connection with SRS service or maintenance) are indicated in the table of contents by an asterisk (*).

GENERAL INFORMATION

55200010268

The heater system uses a two-way-flow full-air-mix system that features high performance and low operating noise, and includes an independent face air blowing function. The A/C system is basically the same as the conventional system, but a new refrigerant system has been adopted as a response to restrictions on the use of chlorofluorocarbons. In addition, an air purifier which carries out fine A/C control has been included.

Items		Specifications
Heater unit	Type	Two-way-flow full-air-mix system
Heater control assembly		Dial type
Compressor	Model	Scroll type <MSC90c>
Dual pressure switch kPa	High-pressure switch	ON → OFF: 2,940, OFF → ON: 2,350
	Low-pressure switch	ON → OFF: 196, OFF → ON: 221
Refrigerant and quantity g		R-134a (HFC-134a), Approx. 660–700

SAFETY PRECAUTIONS

Because R-134a refrigerant is a hydrofluorocarbon (HFC) which contains hydrogen atoms in place of chlorine atoms, it will not cause damage to the ozone layer.
Refrigerant R-134a is transparent and colourless in both the liquid and vapour state. Since it has a boiling point of –29.8°C, at atmospheric pressure, it will be a vapour at all normal temperatures and pressures. The vapour is heavier than air, non-flammable, and nonexplosive. The following precautions must be observed when handling R-134a.

Caution
Wear safety goggles when servicing the refrigeration system.

R-134a evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts. For this reason, extreme care must be taken to prevent any liquid refrigerant from contacting the skin and especially the eyes. Always wear safety goggles when servicing the refrigeration part of the A/C system. Keep a bottle of sterile mineral oil handy when working on the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out. R-134a is rapidly absorbed by the oil. Next splash the eyes with plenty of cold water. Call your doctor immediately even though irritation has ceased after treatment.

Caution
Do not heat R-134a above 40°C

In most instances, moderate heat is required to bring the pressure of the refrigerant in its container above the pressure of the system when charging or adding refrigerant.
A bucket or large pan of hot water not over 40°C is all the heat required for this purpose. Do not heat the refrigerant container with a blow torch or any other means that would raise temperature and pressure above this temperature. Do not weld or steam clean on or near the system components or refrigerant lines.

Caution
Keep R-134a containers upright when charging the system.

When metering R-134a into the refrigeration system keep the supply tank or cans in an upright position. If the refrigerant container is on its side or upside down, liquid refrigerant will enter the system and damage the compressor.

Caution
1. **The leak detector for R-134a should be used to check for refrigerant gas leaks.**
2. **Do not allow liquid refrigerant to touch bright metal.**

Refrigerant will tarnish bright metal and chrome surfaces, and in combination with moisture can severely corrode all metal surfaces.

SERVICE SPECIFICATIONS

55200030288

Items			Standard value
Idle speed r/min		4G1	750±100
		4G9	700±100
Idle up speed r/min	When load by A/C is low	4G1	750±100
		4G9	700±100
	When load by A/C is high	4G1	850±100
		4G9	800±100
Resistor (for blower motor) Ω			LO: 2.30, ML:1.10, MH: 0.40
Air gap (Magnetic clutch)			0.40 – 0.65

LUBRICANTS

55200040113

Items	Specified lubricants	Quantity
Each connection of refrigerant line	SUN PAG 56	As required
Compressor refrigerant unit lubricant mℓ	SUN PAG 56	120

SPECIAL TOOLS

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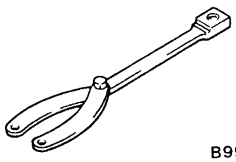
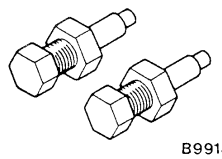
Tool	Number	Name	Use
 B991367	MB991367	Special spanner	Removal and installation of armature mounting nut of compressor
 B991386	MB991386	Pin	

TROUBLESHOOTING

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TROUBLESHOOTING PROCEDURES

Trouble symptom	Problem cause	Remedy	Reference page
When the ignition switch is "ON", the A/C does not operate	Fuse is defective	Replace the fuse	–
	Harness or connector is defective	Repair the harness or connector	–
	A/C compressor relay is defective	Replace the A/C compressor relay	55-16
	A/C compressor magnetic clutch is defective	Replace the armature plate, rotor or clutch coil	55-29
	Refrigerant leak or overfilling of refrigerant	Replenish the refrigerant, repair the leak or take out some of the refrigerant	55-15
	Dual pressure switch is defective	Replace the dual pressure switch	55-31
	A/C switch is defective	Replace the blower switch assembly	55-20
	Blower switch is defective	Replace the blower switch assembly	55-20
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-29
	Automatic compressor-ECU is defective	Replace the automatic compressor-ECU	55-25
	Engine-ECU is defective	Replace the Engine-ECU	–
When the A/C is operating, temperature inside the passenger compartment doesn't decrease (cool air is not emitted)	Refrigerant leak	Replenish the refrigerant and repair the leak	55-15
	Dual pressure switch is defective	Replace the dual pressure switch	55-31
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-29
	Automatic compressor-ECU is defective	Replace the automatic compressor-ECU	55-25
	Engine-ECU is defective	Replace the engine-ECU	–
Blower fan and motor do not turn	Fuse is defective	Replace the fuse	–
	Harness or connector is defective	Repair the harness or connector	–
	Blower relay is defective	Replace the blower relay	55-16
	Blower fan and motor are defective	Replace the blower fan and motor	55-22
	Resistor (for blower motor) is defective	Replace the resistor	55-22
	Blower switch is defective	Replace the blower switch assembly	55-20

Trouble symptom	Problem cause	Remedy	Reference page
Blower fan and motor do not stop turning	Harness or connector is defective	Repair the harness or connector	–
	Blower switch is defective	Replace the blower switch assembly	55-20
	Blower relay is defective	Replace the blower relay	55-16
When the A/C is operating condenser fan or radiator fan does not turn	Fuse is defective	Replace the fuse	–
	Harness or connector is defective	Repair the harness or connector	–
	Condenser fan motor is defective	Replace the condenser fan motor	55-34
	Radiator fan motor is defective	Replace the radiator fan motor	–
	Fan control relay is defective <4G9>	Replace the fan control relay	55-16
	Condenser fan relay is defective <4G1>	Replace the condenser fan relay	55-16
	Radiator fan relay is defective <4G1>	Replace the radiator fan relay	–
	Engine-ECU is defective	Replace the engine-ECU	–
Inside and outside changeover does not operate	Harness or connector is defective	Repair the harness or connector	–
	Inside and outside changeover switch is defective	Replace the blower switch assembly	55-20
	Inside and outside changeover damper motor is defective	Replace the inside and outside changeover damper motor	55-22

INSPECTION AT THE AUTOMATIC COMPRESSOR-ECU TERMINAL

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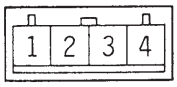

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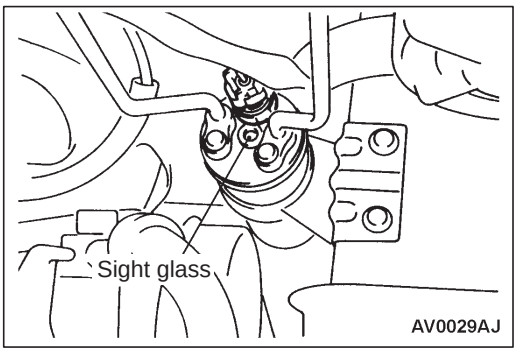
Terminal No.	Check item	Checking requirements	Normal condition
1	Input from A/C switch to ECU	A/C switch: OFF	0 V
		A/C switch: ON	Battery voltage
2	Output from ECU to A/C compressor relay	A/C compressor relay: OFF	Battery voltage
		A/C compressor relay: ON	0V
3	Output from ECU to Engine-ECU	Air thermo sensor detection temperature: 5°C or less	Battery voltage
		Air thermo sensor detection temperature: 8°C or more	0V
4	Earth	Always	0V



ON-VEHICLE SERVICE

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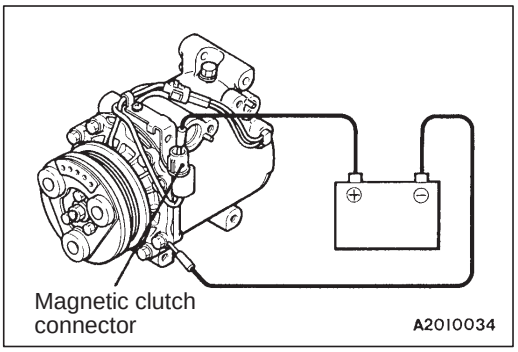
SIGHT GLASS REFRIGERANT LEVEL TEST

The sight glass is a refrigerant level indicator. To check the refrigerant level, clean the sight glass and start the vehicle engine. Push the A/C button to operate the compressor, place the blower switch to high and move the temperature control lever to max cool. After operating for a few minutes in this manner, check the sight glass.

1. If the sight glass is clear, the magnetic clutch is engaged, the compressor discharge line is warm and the compressor inlet line is cool; the system has a full charge.
2. If the sight glass is clear, the magnetic clutch is engaged and there is no significant temperature difference between compressor inlet and discharge lines; the system has lost some refrigerant.
3. If the sight glass shows foam or bubbles, the system could be low on charge. The system has to be recharged with refrigerant.



MAGNETIC CLUTCH TEST

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1. Disconnect the connector (1-pin) to the magnetic clutch.
2. Connect battery (+) voltage directly to the connector for the magnetic clutch.
3. If the magnetic clutch is normal, there will be “click”. If the pulley and armature do not make contact (‘click’), there is a malfunction.

RECEIVER DRIER TEST

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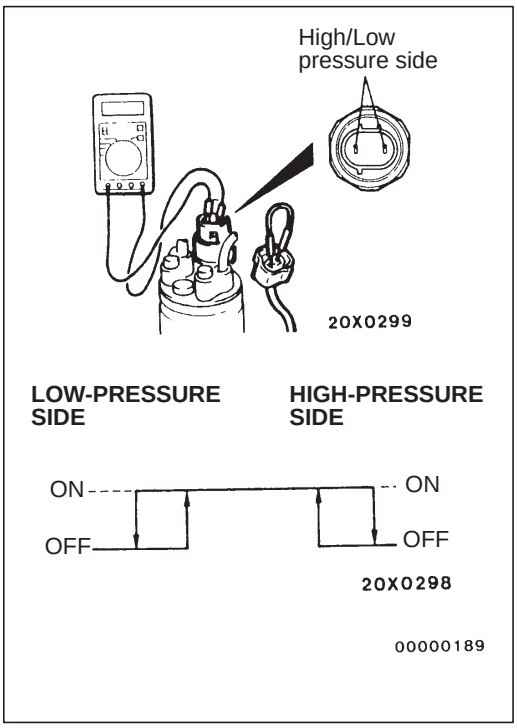
Operate the unit and check the piping temperature by touching the receiver drier outlet and inlet.
If there is a difference in the temperatures, the receiver drier is restricted.
Replace the receiver drier.



DUAL PRESSURE SWITCH CHECK

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1. Remove the dual pressure switch connector and connect the high/low pressure side terminals located on the harness side as shown in the illustration.
2. Install a gauge manifold to the high-pressure side service valve of the refrigerant line. (Refer to Performance Test.)
3. When the high/low pressure sides of the dual pressure switch are at operation pressure (ON) and there is continuity between the respective terminals, then the condition is normal. If there is no continuity, replace the switch.

Items	Switch position	
	OFF → ON	ON → OFF
Low-pressure side kPa	221	196
High-pressure side kPa	2,350	2,940

COMPRESSOR DRIVE BELT ADJUSTMENT

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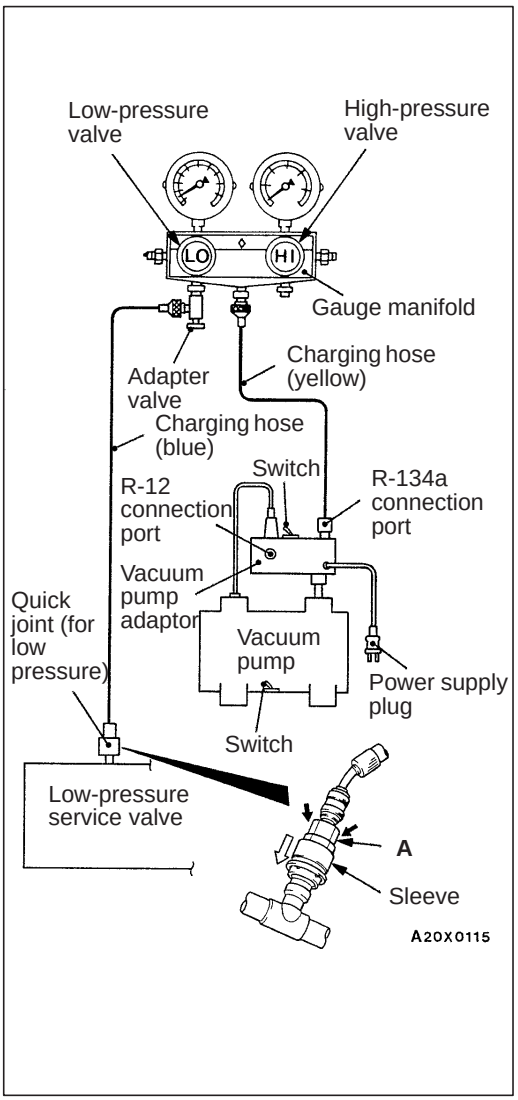
Refer to GROUP 11 – On-vehicle Service.



CHARGING

55200120237

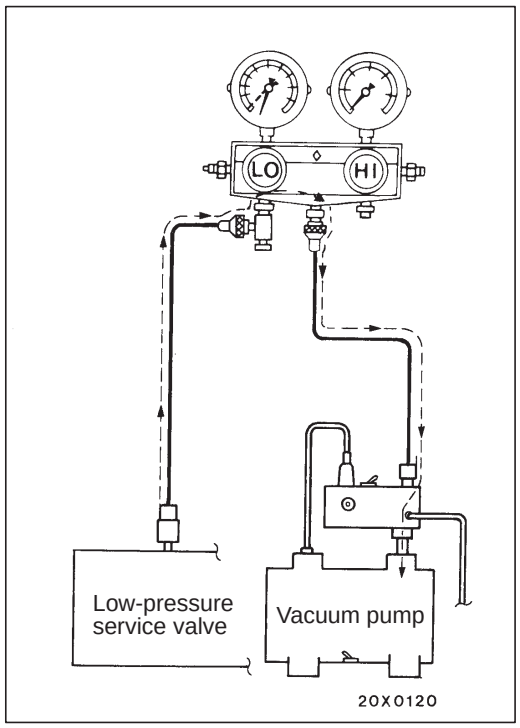
1. With the handles turned back all the way (valve closed), install the adaptor valve to the low-pressure side of the gauge manifold.
2. Connect the charging hose (blue) to the adaptor valve.
3. Connect the quick joint (for low-pressure) to the charging hose (blue).
4. Connect the quick joint (for low-pressure) to the low-pressure service valve.

   NOTE
   The low-pressure service valve should be connected to the suction hose.

   Caution
   (1) Use tools that are suited to R-134a.
   (2) To install the quick joint, press section "A" firmly against the service valve until a click is heard. When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.

5. Close the high and low-pressure valves of the gauge manifold.
6. Install the vacuum pump adaptor to the vacuum pump.
7. Connect the vacuum pump plug to the vacuum pump adaptor.
8. Connect the charging hose (yellow) to the R-134a connection port of the vacuum pump adaptor.
9. Tighten the adaptor valve handle (valve open).
10. Open the low-pressure valve of the gauge manifold.
11. Turn the power switch of the vacuum pump to the ON position.

    NOTE
    Even if the vacuum pump power switch is turned ON, the vacuum pump will not operate because of the power supply connection in step (7).



12. Turn the vacuum pump adaptor switch to the R-134a side to start the vacuum pump.

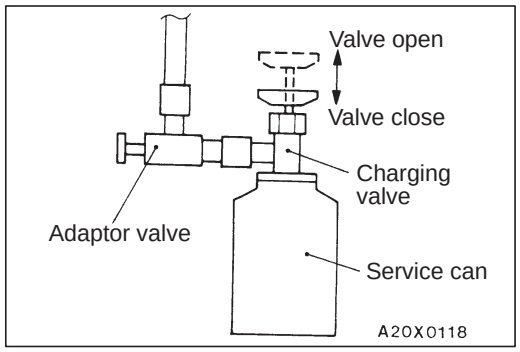
    Caution
    Do not operate the compressor for evacuation.

13. Evacuate to a vacuum reading of 100 kPa or higher (takes approx. 10 minutes).
14. Turn the vacuum pump adaptor switch OFF and allow to stand it for 5 minutes.

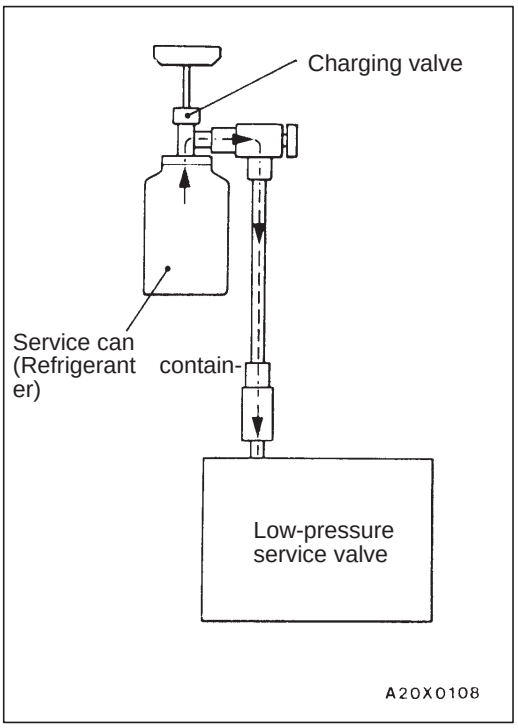
    Caution
    Do not operate the compressor in the vacuum condition; damage may occur.

15. Carry out a leak test. (Good if the negative pressure does not drop.)

    Caution
    If the negative pressure drops, increase the tightness of the connections, and then repeat the evacuation procedure from step (12).



16. With the handle turned back all the way (valve open), install the charging valve to the service can.
17. Turn the handle of the adaptor valve back all the way (valve closed), remove it from the gauge manifold and install the service can.
18. Tighten the handle of the charging valve (valve closed) to puncture the service can.



19. Turn the handle of the charging valve back (valve open) and tighten the handle of the adaptor valve (valve open) to charge the system with refrigerant.

    Caution
    If the service can is inverted, liquid refrigerant may be drawn into the compressor damaging it by liquid compression. Keep the service can upright to ensure that refrigerant is charged in gas state.

20. If the refrigerant is not drawn in, turn the handle of the adaptor valve back all the way (valve closed).
21. Check for gas leaks using a leak detector.
    If a gas leak is detected, re-tighten the connections, and then repeat the charging procedure from evacuation in step (12).

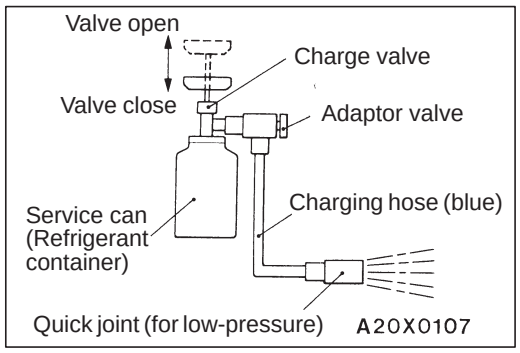
    Caution
    The leak detector for R-134a should be used.

22. Start the engine.
23. Operate the A/C and set to the lowest temperature (MAX. COOL).
24. Fix the engine speed at 1,500 r/min.
25. Tighten the handle of the adaptor valve (valve open) to charge the required volume of refrigerant.

    Caution
    If the service can is inverted, liquid refrigerant may be drawn into the compressor damaging it by liquid compression. Keep the service can upright to ensure that refrigerant is charged in gas state.

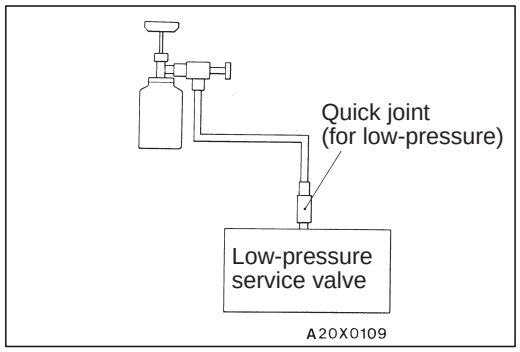
26. After charging with refrigerant, turn the handle of the adaptor valve back all the way (valve closed).
27. Tighten the charging valve handle (valve closed).
    Remove the quick joint (for low-pressure) from the low-pressure service valve.

    NOTE
    If the service can is not emptied completely, keep the handles of the charging valve and adaptor valve closed for the next charging.



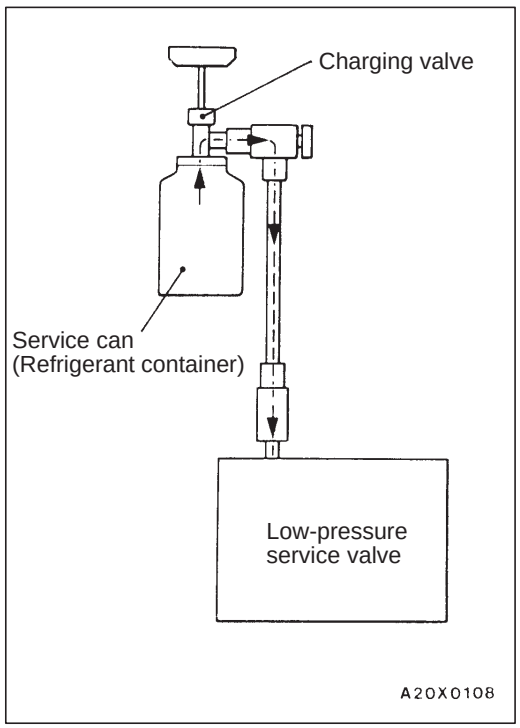
CORRECTING LOW REFRIGERANT LEVEL IN CASE THE SERVICE CAN IS USED.

1. Install the charge valve with the handle turned all the way back (valve open) to the service can.
2. Install the adaptor valve with the handle turned all the way back (valve close) to the charging valve.
3. Connect the charging hose (blue) to the adaptor valve.
4. Connect the charging hose (blue) to the quick joint (for low-pressure).
5. Tighten the handle of the charge valve (valve close), and pierce the service can.
6. Turn the handle of the adaptor valve to bleed the air.



7. Install the quick joint (for low-pressure) to the low-pressure service valve.

   NOTE
   The low-pressure service valve should be connected to the suction hose.

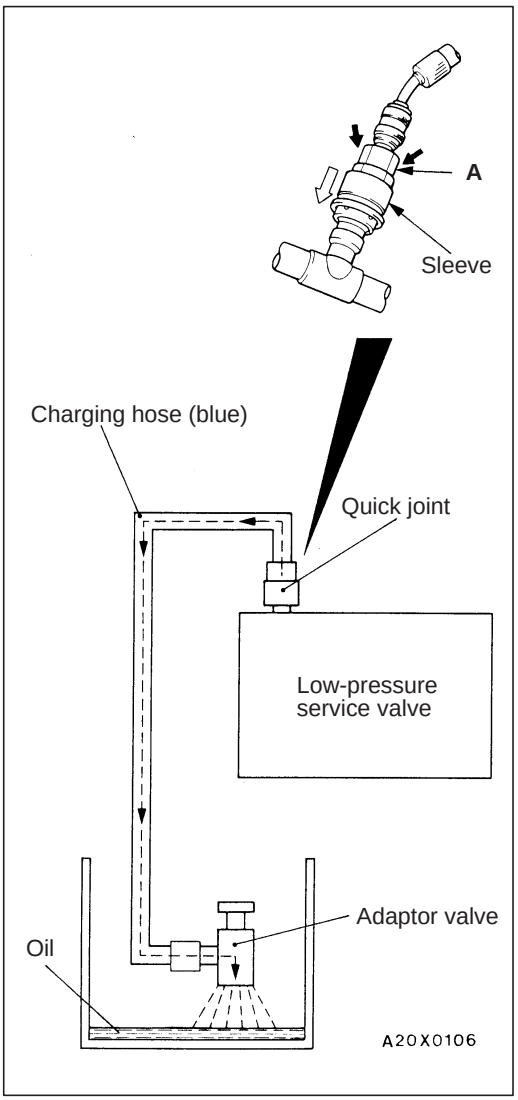


8. Start the engine.
9. Operate the air conditioner and set at the lowest temperature (MAX. COOL).
10. Fix the engine speed at 1,500 r/min.
11. Tighten the handle of the adaptor valve (valve open), and replenish refrigerant while checking the quantity through the sight glass.

    Caution
    If the service can is inverted, liquid refrigerant may be draw into the compressor damaging it by liquid compression. Keep the service can upright to ensure that refrigerant is changed in gas state.

12. After replenishing is completed, turn the handle of the adaptor valve all the way back (valve close), and remove the quick joint.

    NOTE
    When there is remainder of refrigerant in the service can, keep it for next use with the charge value and the valve of the adaptor valve being closed.



DISCHARGING SYSTEM

1. Run the engine at an engine speed of 1,200–1,500 r/min for approximately 5 minutes with the A/C operating to return to the oil.

   NOTE
   Returning the oil will be more effective if it is done while driving.

2. Stop the engine.
3. Connect the charging hose (blue) to the adaptor valve with its handle turned back all the way (valve closed).
4. Connect the quick joint to the charging hose (blue).
5. Install the quick joint to the low-pressure service valve.

   NOTE
   The low-pressure service valve should be connected to the suction hose.

   Caution
   To connect the quick joint, press section "A" firmly against the service valve until a click is heard. When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.

6. Place the adaptor valve inside the container and discharge the refrigerant by opening the handle gradually so that oil does not gush out.

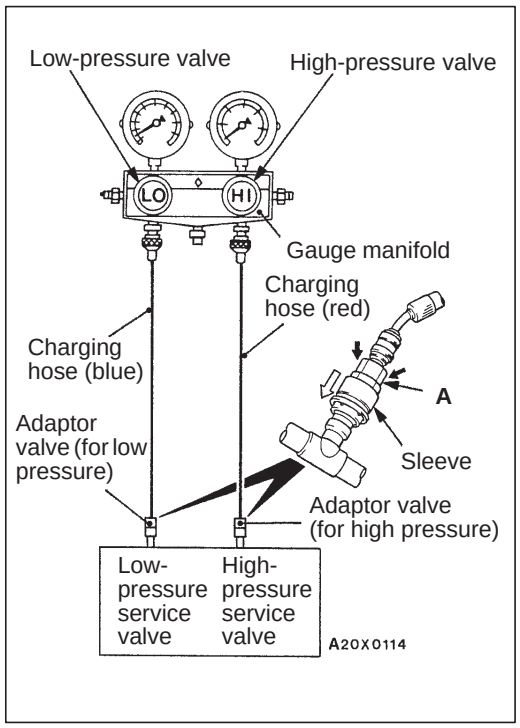
   NOTE
   Any oil remaining in the container should be returned to the A/C system.

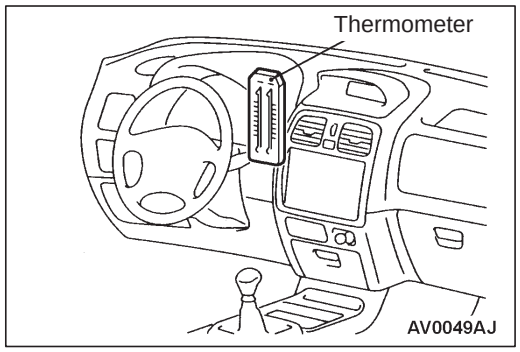
REFILLING OF OIL IN THE A/C SYSTEM

Too little oil will provide inadequate compressor lubrication and cause a compressor failure. Too much oil will increase discharge air temperature.
When a compressor is installed at the factory, it contains 120 mℓ of refrigerant oil. While the A/C system is in operation, the oil is carried through the entire system by the refrigerant. Some of this oil will be trapped and retained in various parts of the system.
When the following system components are changed, it is necessary to add oil to the system to replace the oil being removed with the component.

Compressor oil: SUN PAG 56

Quantity
Condenser: 15 mℓ
Evaporator: 60 mℓ
Suction hose: 10 mℓ
Receiver: 10 mℓ





PERFORMANCE TEST

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1. The vehicles to be tested should be in a place that is not in direct sunlight.
2. Close the high and low-pressure valve of the gauge manifold.
3. Connect the charging hose (blue) to the low-pressure valve and connect the charging hose (red) to the high-pressure valve of the gauge manifold.
4. Install the quick joint (for low-pressure) to the charging hose (blue), and connect the quick joint (for high-pressure) to the charging hose (red).
5. Connect the quick joint (for low-pressure) to the low-pressure service valve and connect the quick joint (for high-pressure) to the high-pressure service valve.

   NOTE
   The high-pressure service valve is on liquid pipe A and the low-pressure service valve is on the suction hose.

   Caution
   To connect the quick joint, press section "A" firmly against the service valve until a click is heard.
   When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.
6. Start the engine.
7. Set the controls to the A/C as follows:
   A/C switch: A/C – ON position
   Mode selection: Face position
   Temperature control: Max. cooling position
   Air selection: Recirculation position
   Blower switch: HI (Fast) position
8. Adjust engine speed to 1,000 r/min with A/C clutch engaged.
9. Engine should be warmed up with doors and windows closed.
10. Insert a thermometer in the left center A/C outlet and operate the engine for 20 minutes.
11. Note the discharge air temperature.

    NOTE
    If the clutch cycles, take the reading before the clutch disengages.

Performance Temperature Chart

Garage ambient temperature °C	20	25	35	40
Discharge air temperature °C	2.5–4.5	2.5–4.5	4.0–6.5	6.5–9.0
Compressor high-pressure kPa	765–960	765–960	1,325–1,420	1,570–1,765
Compressor low-pressure kPa	40–135	40–135	80–175	155–255

REFRIGERANT LEAK REPAIR 55200150045

LOST CHARGE

If the system has lost all charge due to a leak:
1. Evacuate the system. (See procedure.)
2. Charge the system with approximately one pound of refrigerant.
3. Check for leaks.
4. Discharge the system.
5. Repair leaks.
6. Replace receiver drier.

Caution
Replacement filter-drier units must be sealed while in storage. The drier used in these units will saturate water quickly upon exposure to the atmosphere. When installing a drier, have all tools and supplies ready for quick reassembly to avoid keeping the system open any longer than necessary.

7. Evacuate and charge system.

LOW CHARGE

If the system has not lost all of its refrigerant charge; locate and repair all leaks. If it is necessary to increase the system pressure to find the leak (because of an especially low charge) add refrigerant. If it is possible to repair the leak without discharging the refrigerant system, use the procedure for correcting low refrigerant level.

COMPRESSOR NOISE 55200870033

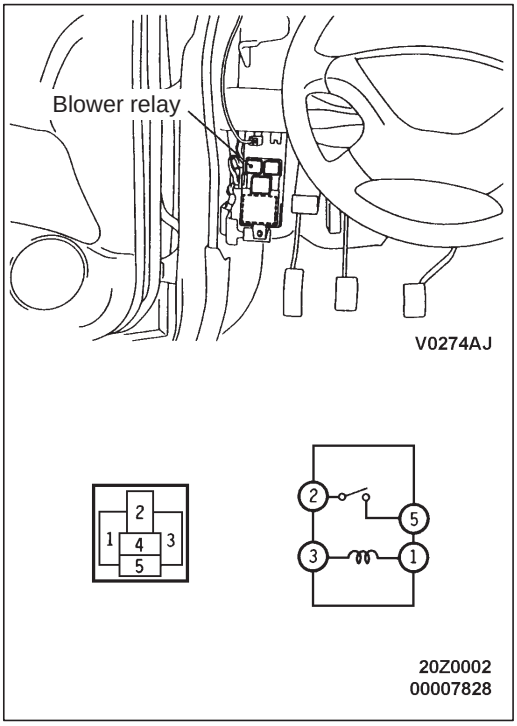
You must first know the conditions when the noise occurs. These conditions are: weather, vehicle speed, in gear or neutral, engine temperature or any other special conditions.
Noises that develop during A/C operation can often be misleading. For example: what sounds like a failed front bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets, or a loose clutch assembly. Verify accessory drive belt tension (power steering or alternator).
Improper accessory drive belt tension can cause a misleading noise when the compressor is engaged and little or no noise when the compressor is disengaged.
Drive belts are speed-sensitive. That is, at different engine speeds, and depending upon belt tension, belts can develop unusual noises that are often mistaken for mechanical problems within the compressor.

HANDLING TUBING AND FITTINGS

Kinks in the refrigerant tubing or sharp bends in the refrigerant hose lines will greatly reduce the capacity of the entire system. High pressures are produced in the system when it is operating. Extreme care must be exercised to make sure that all connections are pressure tight. Dirt and moisture can enter the system when it is opened for repair or replacement of lines or components. The following precautions must be observed. The system must be completely discharged before opening any fitting of connection in the refrigeration system. Open fittings with caution even after the system has been discharged. If any pressure is noticed as a fitting is loosened, allow trapped pressure to bleed off very slowly.
Never attempt to rebend formed lines to fit. Use the correct line for the installation you are servicing. A good rule for the flexible hose lines is keep the radius of all bends at least 10 times the diameter of the hose.
Sharper bends will reduce the flow of refrigerant. The flexible hose lines should be routed so that they are at least 80 mm from the exhaust manifold. It is good practice to inspect all flexible hose lines at least once a year to make sure they are in good condition and properly routed.
Unified plumbing connections with O-rings, these O-rings are not reusable.

ADJUSTMENT

1. Select a quiet area for testing. Duplicate conditions as much as possible. Switch compressor on and off several times to clearly identify compressor noise. To duplicate high ambient conditions (high head pressure), restrict air flow through condenser. Install manifold gauge set to make sure discharge pressure doesn't exceed 2,070 kPa.
2. Tighten all compressor mounting bolts, clutch mounting bolt, and compressor drive belt. Check to assure clutch coil is tight (no rotation or wobble).
3. Check refrigerant hoses for rubbing or interference that can cause unusual noises.
4. Check refrigerant charge. (See "Charging System".)
5. Recheck compressor noise as in Step 1.
6. If noise still exists, loosen compressor mounting bolts and retorque. Repeat Step 1.
7. If noise continues, replace compressor and repeat Step 1.

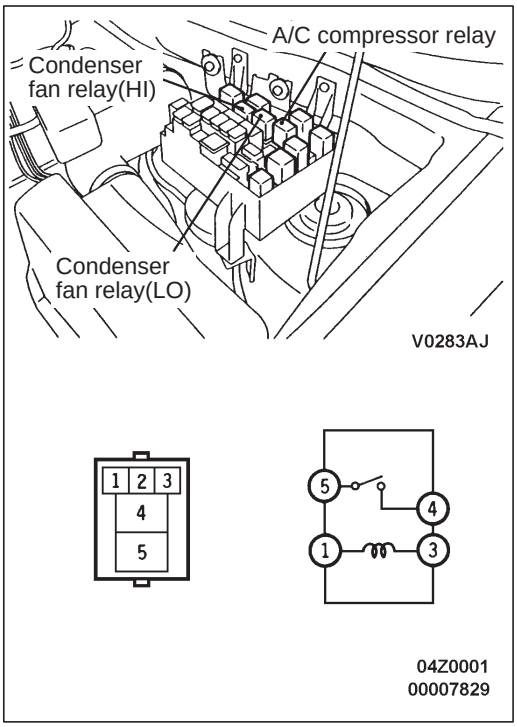


POWER RELAY CHECK

55200880272

BLOWER RELAY

Battery voltage	Terminal No.			
	1	3	2	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○



A/C COMPRESSOR RELAY/CONDENSER FAN RELAY(LO)<4G1>/CONDENSER FAN RELAY(HI)<4G1>

Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

FAN CONTROL RELAY<4G9>

Refer to GROUP 14 – Radiator.

IDLE-UP OPERATION CHECK

55200160284

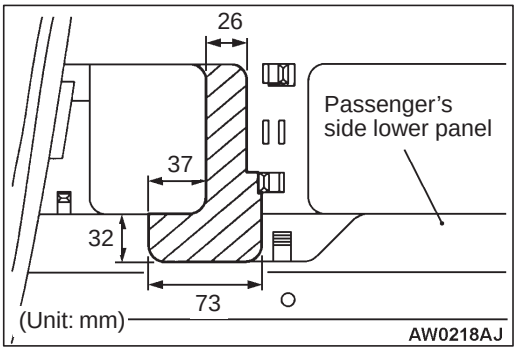
1. Before inspection and adjustment, set vehicle in the following condition:
   - Engine coolant temperature: 80 – 90°C
   - Lights, electric cooling fan and accessories: Set to OFF
   - Transmission: Neutral (N or P for vehicles with A/T)
   - Steering wheel: Straightforward
2. Check whether or not the idling speed is the standard value.

   Standard value:
   <4G1> 750 ± 100 r/min
   <4G9> 700 ± 100 r/min
3. When the A/C is running after turning the A/C switch to ON, and the blower switch to the MH or HI position, check to be sure that the idle speed is at the standard value.

   Standard value:

Engine	Idle speed r/min	
	When load by A/C is low	When load by A/C is high
4G1	750 ± 100	850 ± 100
4G9	700 ± 100	800 ± 100

NOTE
There is no necessity to make an adjustment, because the idling speed is automatically adjusted by the ISC system. If, however, there occurs a deviation from the standard value for some reason, check the ISC system. (Refer to GROUP 13A – On-vehicle Service.)

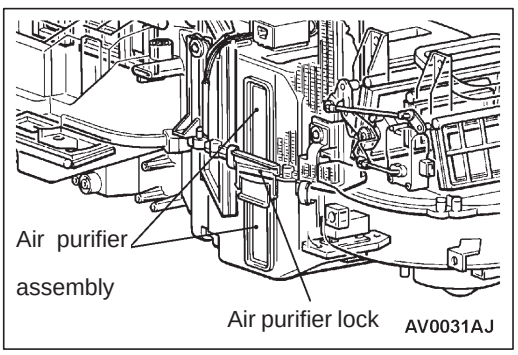


AIR PURIFIER ASSEMBLY REPLACEMENT

55501100017

1. Remove the glove box.
2. Disconnect the harness from the passenger's side lower panel. <Initial math-production model>
3. Cut the passenger's side lower panel as shown in the illustration. <Initial math-production model>

   Caution
   Take care not to damage the harness and the others parts when cutting the passenger's side lower panel.



4. Remove the air purifier lock and the air purifier assembly.
5. Install a new air purifier assembly and install the air purifier lock.

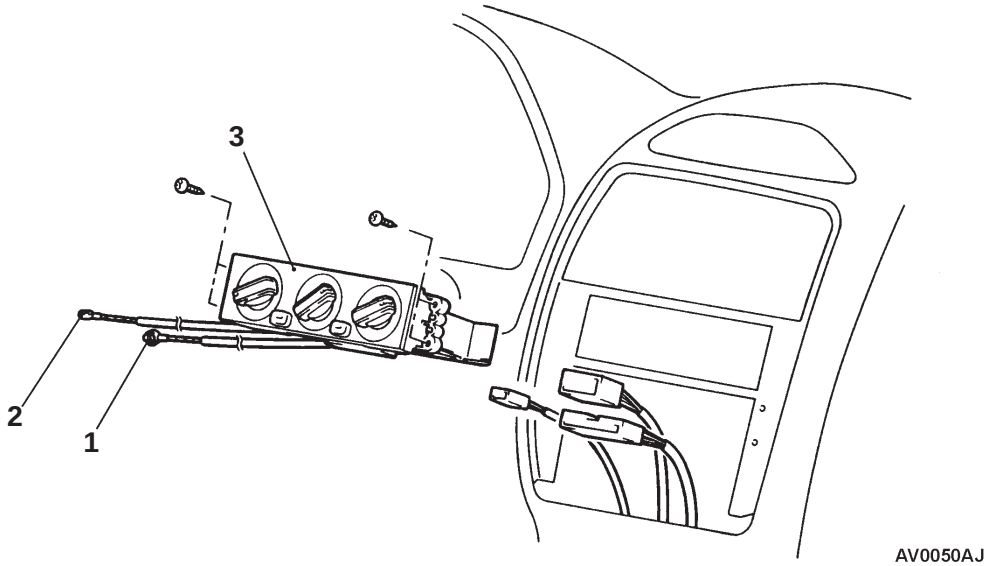
   NOTE
   On installation, it is unnecessary to replace the passenger's side lower panel because the cut portion can be left as it is. <Initial math-production model>
6. Install the glove box.

HEATER CONTROL ASSEMBLY AND A/C SWITCH

55200240124

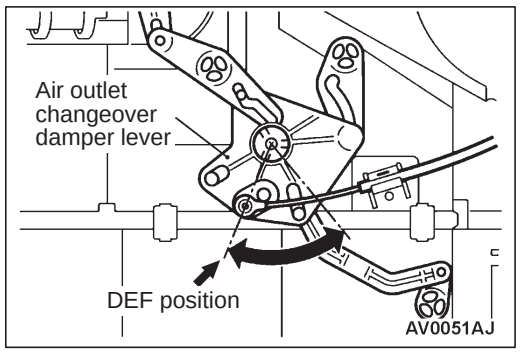
REMOVAL AND INSTALLATION

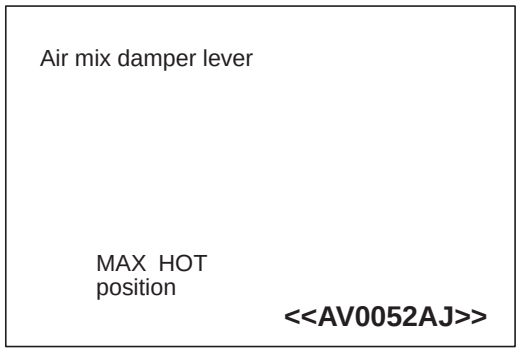
Pre-removal and Post-installation Operation
- Center Console Panel, Glove Box Removal and Installation (Refer to GROUP 52A – Instrument Panel.)
- Under Cover Removal and Installation
- Radio, Tape Player Removal and Installation (Refer to GROUP 54.)



Removal steps

▶B◀ 1. Air mix damper cable connection
▶A◀ 2. Air outlet changeover damper cable connection
3. Heater control assembly





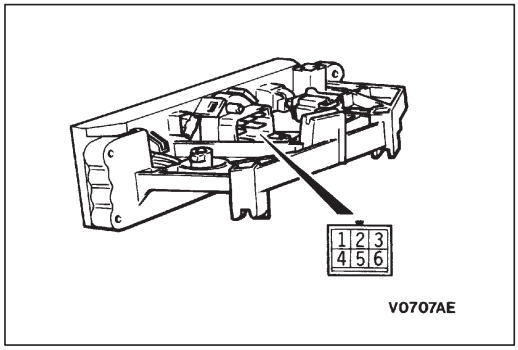
INSTALLATION SERVICE POINTS

▶A◀ AIR OUTLET CHANGEOVER DAMPER CABLE CONNECTION

1. Set the air outlet changeover control knob on the heater control assembly to the DEF position.
2. Set the air outlet changeover damper lever of the heater unit to the DEF position (turn clockwise the damper lever unit it stops), and then connect the cable to the lever.

▶B◀ AIR MIX DAMPER CABLE CONNECTION

1. Set the temperature control knob on the heater control assembly to the MAX HOT position.
2. Set the air mix damper lever of the heater unit to the MAX HOT position (turn clockwise the damper lever until it stops), and then connect the cable to the lever.

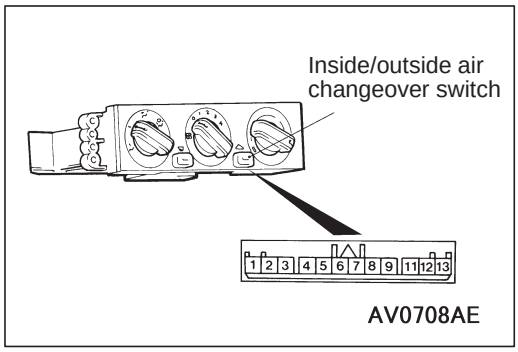


INSPECTION

55201250027

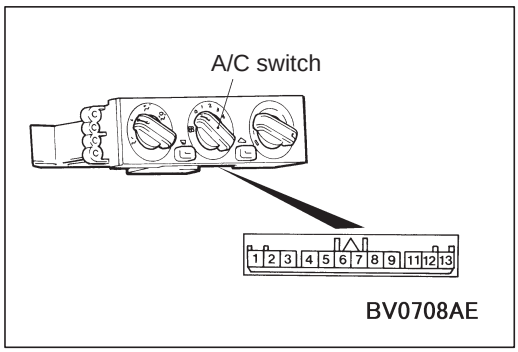
BLOWER SWITCH CONTINUITY CHECK

Switch position	Terminal No.					
	1	2	3	4	5	6
OFF						
● (LO)			○		○	
● (ML)	○		○			
● (MH)			○			○
● (HI)			○	○		



INSIDE/OUTSIDE AIR CHANGEOVER SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1	2	3	IND	4	8	9
RECIRC		○	○	⌀	○	○	⌀
FRESH	○				○		ILL

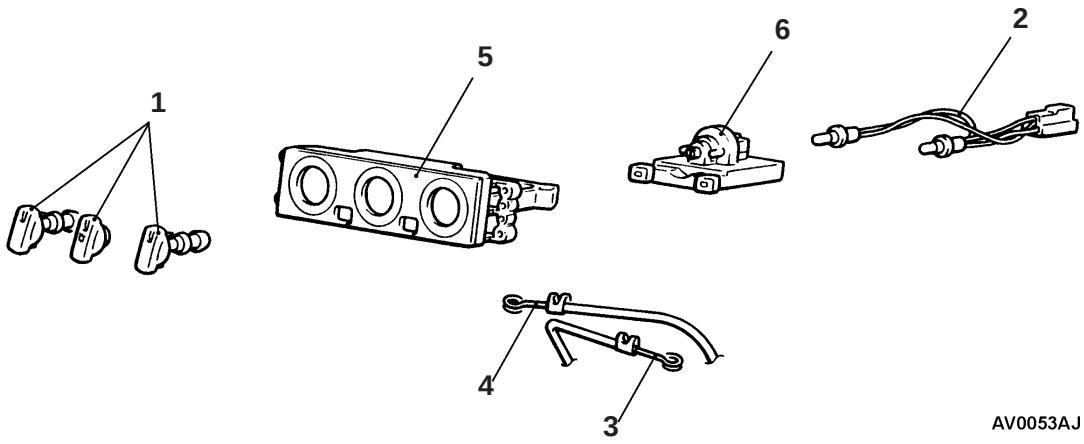


A/C SWITCH CONTINUITY CHECK

Switch position	Terminal No.					
	5	IND	6	7	8	9
OFF					○	⌀
ON	○	⌀	○	○		ILL

DISASSEMBLY AND REASSEMBLY

55100130084



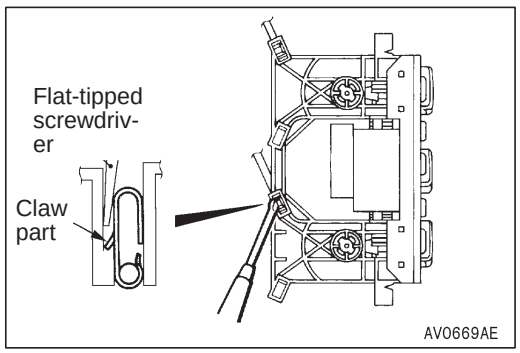
Disassembly steps

1. Knob assembly
2. Bulb harness
3. Air outlet changeover damper cable

◀A▶

◀A▶

4. Air mix damper cable
5. Heater control panel
6. Blower switch assembly



DISASSEMBLY SERVICE POINT

◀A▶ AIR OUTLET CHANGEOVER DAMPER CABLE/AIR MIX DAMPER CABLE REMOVAL

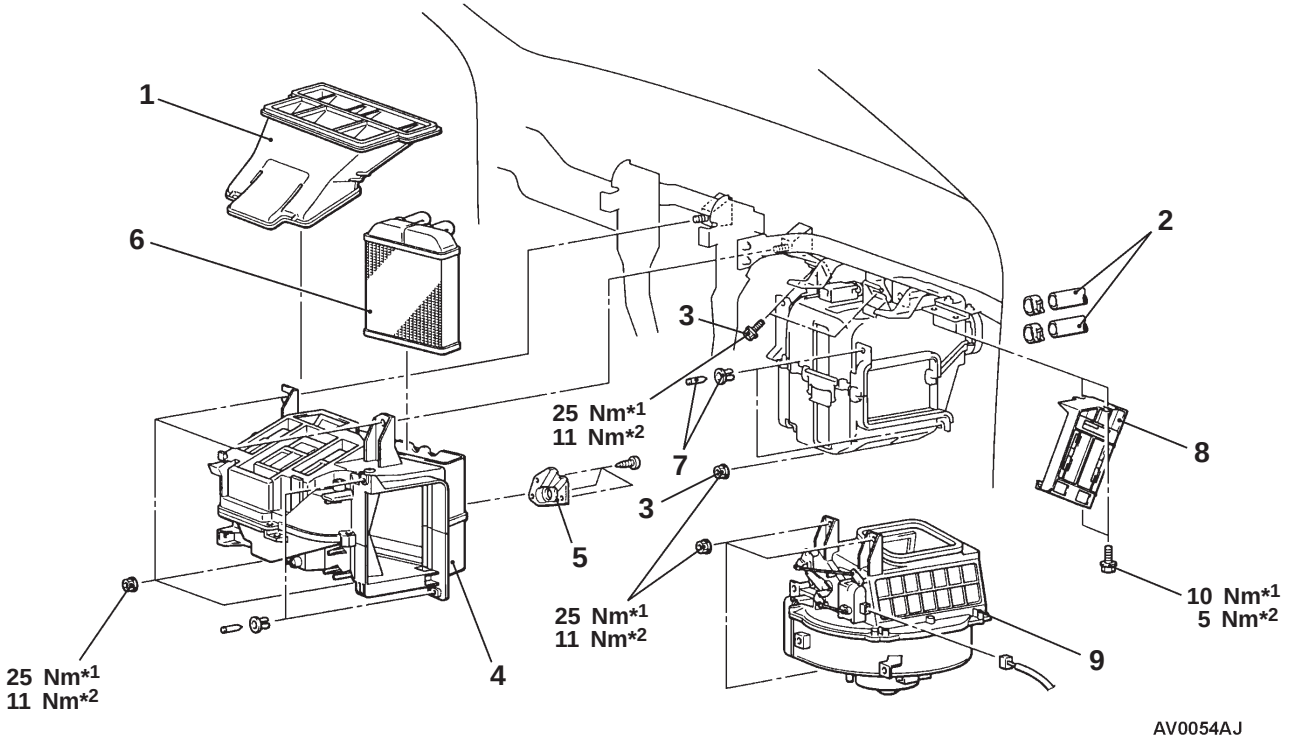
Insert a flat-tipped screwdriver into the control base clip from inner side, and then remove the cable by lifting the claw part of the clip.

HEATER UNIT, HEATER CORE, AND BLOWER UNIT

55201270047

REMOVAL AND INSTALLATION

Caution: SRS
When removing and installing the floor console assembly from vehicles equipped with SRS, do not let it bump against the SRS-ECU or the components.



NOTE
(1) *1: indicates flange bolt or flange nut
(2) *2: indicates bolt and washer assembly or nut and washer assembly

Heater unit and heater core removal steps

- Draining and refilling engine coolant (Refer to GROUP 14 – On-vehicle service.)
- Instrument panel and center reinforcement (Refer to GROUP 52A.)
- Foot distribution duct (Refer to P.55-36.)

1. Center ventilation duct
2. Heater hose connection
3. Evaporator mounting bolt and nut <Vehicle with A/C>

◀A▶ 4. Heater unit

5. Plate
6. Heater core

Blower unit removal steps

- Glove box, under cover, passenger's side lower panel (Refer to GROUP 52A – Instrument panel.)

3. Evaporator mounting bolt and nut <Vehicle with A/C>
7. Clip
8. Keyless entry receiver ECU

◀A▶ 9. Blower unit

REMOVAL SERVICE POINT

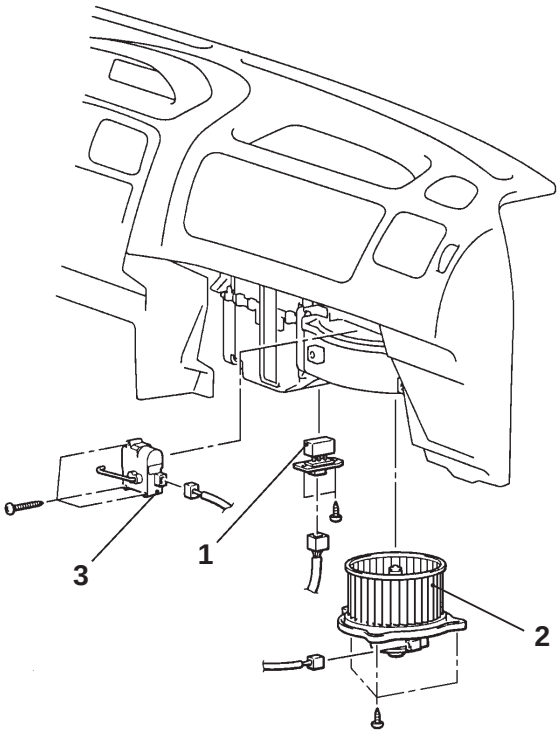
◀A▶ HEATER UNIT/BLOWER UNIT REMOVAL

After sliding the evaporator <vehicles with A/C> or joint duct <vehicles without A/C> towards you slightly, remove the heater unit or blower unit.

RESISTOR, BLOWER FAN AND MOTOR, AND INSIDE/OUTSIDE AIR CHANGEOVER DAMPER MOTOR

55100500038

REMOVAL AND INSTALLATION



AV0055AJ

Resistor removal steps

- Under cover (Refer to P.55-36.)

1. Resistor

Blower fan and motor removal steps

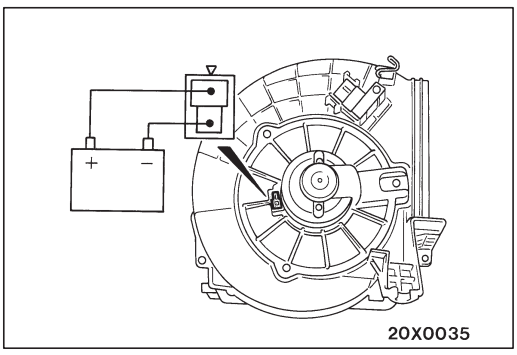
- Under cover (Refer to P.55-36.)

2. Blower fan and motor

Inside/outside air changeover damper motor removal steps

- Glove box, under cover, passenger's side lower panel (Refer to GROUP 52A – Instrument panel.)

3. Inside/outside air changeover damper motor



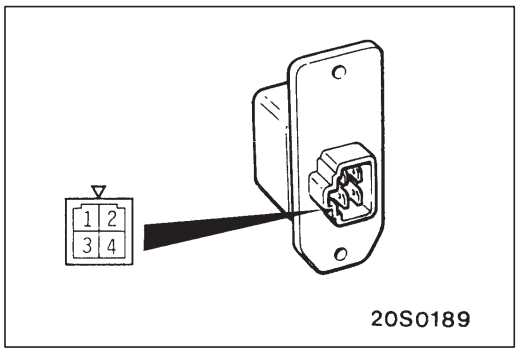
20X0035

INSPECTION

55100510024

BLOWER FAN AND MOTOR CHECK

When battery voltage is applied between the terminals, check that the motor operates. Also, check that there is no abnormal noise.

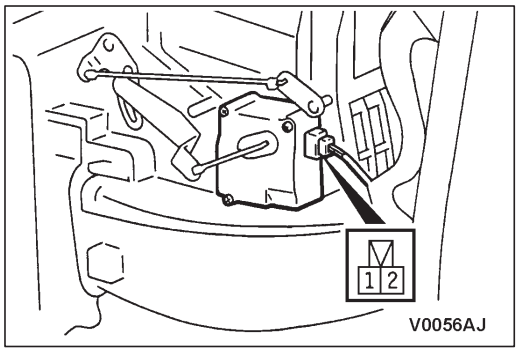


RESISTOR CHECK

Use a circuit tester to measure the resistance between the terminals as indicated below. Check that the measured value is at the standard value.

Standard value:

Measurement terminal	Standard value Ω
Between terminals 3 and 2 (LO)	2.30
Between terminals 3 and 4 (ML)	1.10
Between terminals 3 and 1 (MH)	0.40



INSIDE/OUTSIDE CHANGEOVER DAMPER MOTOR CHECK

Battery connection terminal			Lever operation
1	2	3	
⊕	⊖		Moves to the outside air position
⊖		⊕	Moves to the inside air position

Cauton

Cut off the battery voltage when the damper is in the inside air position or outside air position.

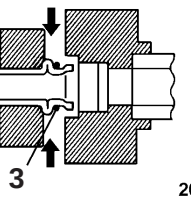
EVAPORATOR

55200360240

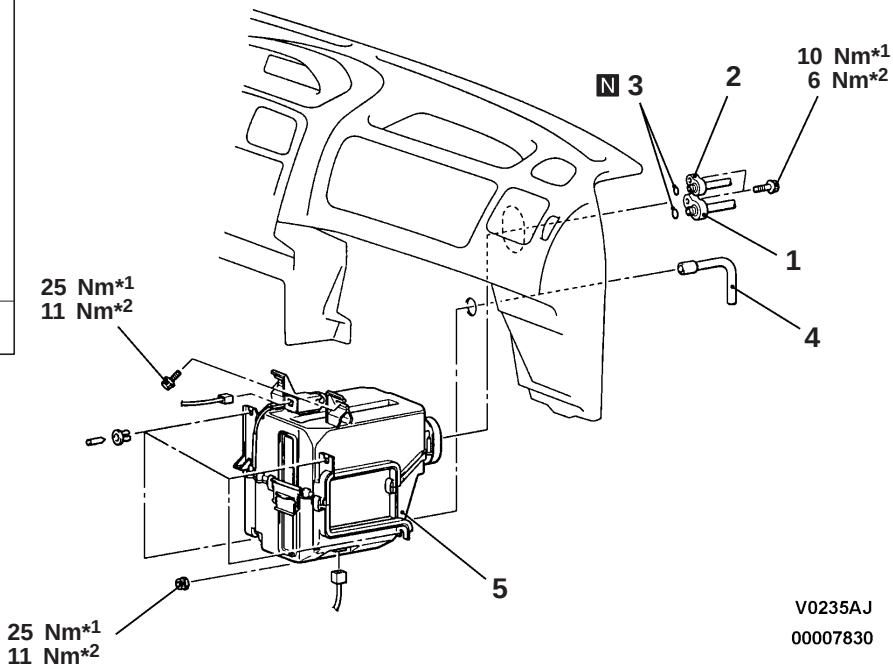
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Discharging and Charging of Refrigerant (Refer to P.55-9.)
- Air Cleaner Assembly Removal and Installation <R.H. drive vehicles>
- Glove Box, Under Cover, Passenger's Side Lower Panel Removal and Installation (Refer to GROUP 52A – Instrument Panel.)

Piping connection



Compressor oil: SUN PAG 56



NOTE
(1) *1: indicates flange bolt or flange nut
(2) *2: indicates bolt and washer assembly or nut and washer assembly

Disassembly steps

◀A▶ 1. Suction hose connection
◀A▶ 2. Liquid pipe B connection
3. O-ring
4. Drain hose
▶A◀ 5. Evaporator

REMOVAL SERVICE POINT

◀A▶ SUCTION HOSE/LIQUID PIPE B DISCONNECTION

Plug the disconnected hose and the evaporator nipple not to let foreign matter get into them.

Caution
Seal the hoses completely, otherwise the compressor oil and receiver will absorb water vapour easily.

INSTALLATION SERVICE POINT

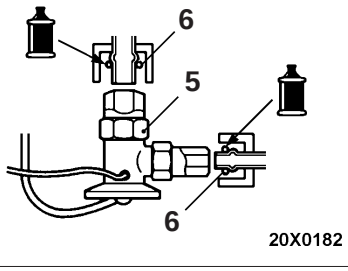
▶A◀ EVAPORATOR INSTALLATION

When replacing the evaporator, refill it with a specified amount of compressor oil and install it (to the vehicle).

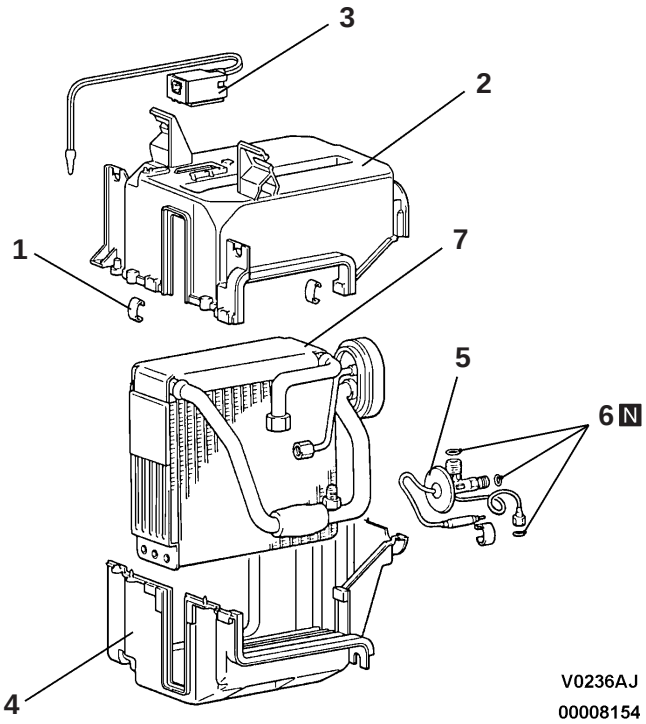
Compressor oil: SUN PAG 56
Quantity: 60 mℓ

DISASSEMBLY AND REASSEMBLY

55200380192

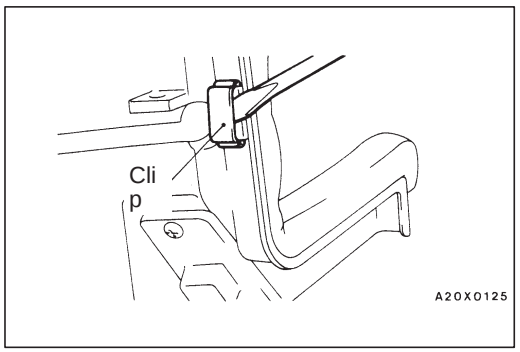


Compressor oil: SUN PAG 56



Disassembly steps

◀A▶ 1. Clip
2. Evaporator case (upper)
3. Automatic compressor-ECU
4. Evaporator case (lower)
5. Expansion valve
6. O-ring
7. Evaporator



DISASSEMBLY SERVICE POINT

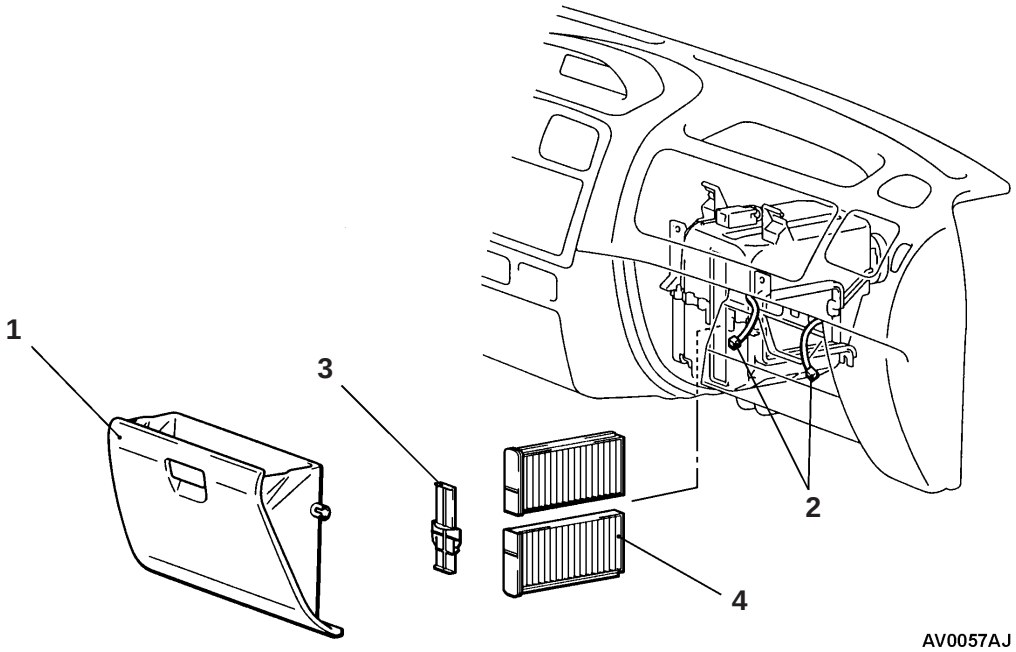
◀A▶ CLIP REMOVAL

Remove the clips with a flat-tipped screwdriver covered with a cloth to prevent damage to case surfaces.

AIR PURIFIER ASSEMBLY

55500100056

REMOVAL AND INSTALLATION

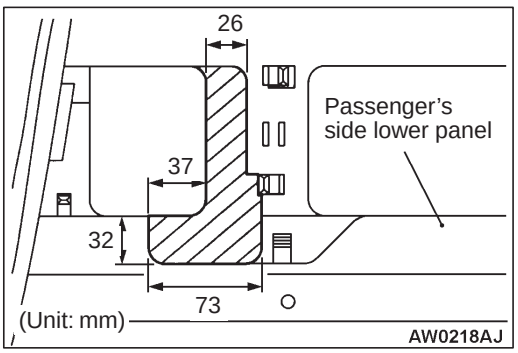


Removal steps

1. Glove box
2. Harness connector connection

◀A▶

3. Air purifier lock
4. Air purifier assembly



REMOVAL SERVICE POINT

◀A▶ AIR PURIFIER LOCK REMOVAL <INITIAL MATH-PRODUCTION MODEL>

1. Disconnect the harness from the passenger's side lower panel.
2. Cut the passenger's side lower panel as shown in the illustration.

   Caution
   Take care not to damage the harness and the others parts when cutting the passenger's side lower panel.

   NOTE
   On installation, it is unnecessary to replace the passenger's side lower panel because the cut portion can be left as it is.

3. Remove the air purifier lock.

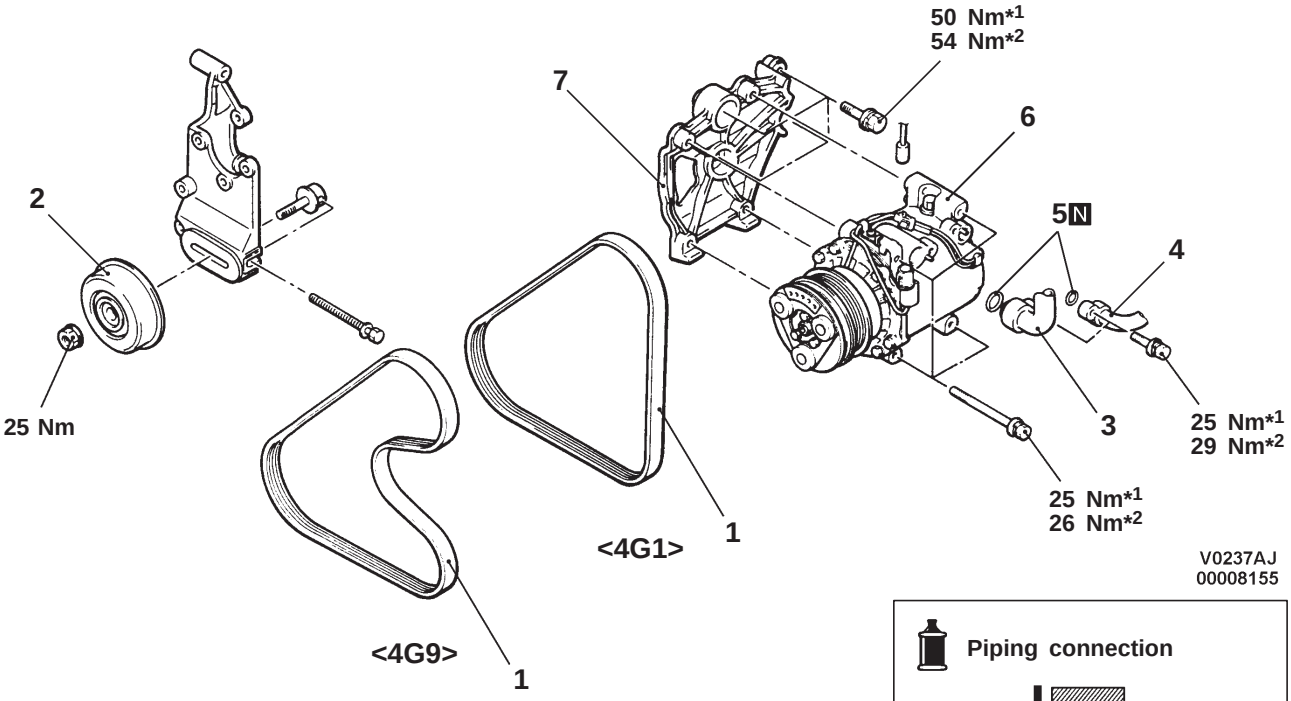
COMPRESSOR AND TENSION PULLEY

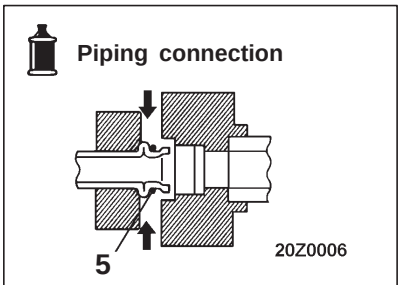
55200410358

REMOVAL AND INSTALLATION

Pre-removal Operation
- Discharging of Refrigerant (Refer to P.55-9.)
- Under Cover Removal
- Power Steering Oil Pump Removal <4G9> (Refer to GROUP 37A.)

Post-installation Operation
- Charging of Refrigerant (Refer to P.55-9.)
- Under Cover Installation
- Power Steering Oil Pump Installation <4G9> (Refer to GROUP 37A.)
- Drive Belt Tension Adjustment (Refer to GROUP 11 – On-vehicle Service.)



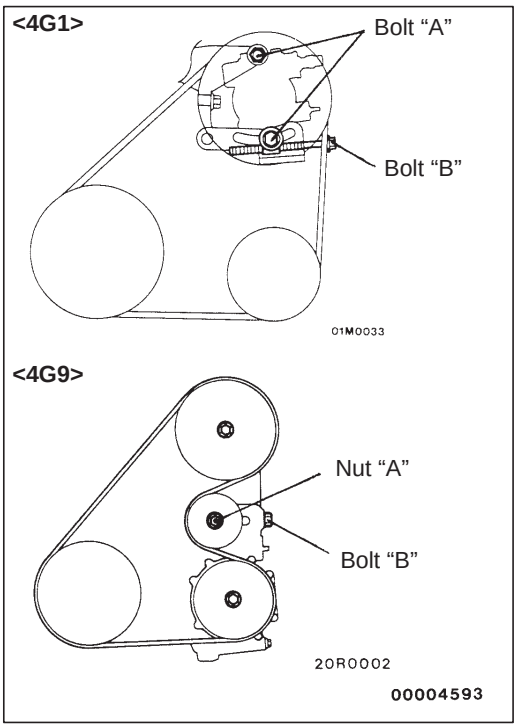


Compressor oil: SUN PAG 56

NOTE
(1) *1: indicates flange bolt
(2) *2: indicates bolt and washer assembly

Removal steps

◀A▶ 1. Drive belt
2. Tension pulley <4G9>
◀B▶ 3. Suction hose connection
◀B▶ 4. Discharge hose connection
5. O-ring
◀C▶ ▶A◀ 6. Compressor
7. Compressor bracket



REMOVAL SERVICE POINTS

◀A▶ DRIVE BELT REMOVAL

1. Loosen the bolts "A" <4G1> or nut "A" <4G9> for holding.
2. Loosen the bolt "B" for adjustment.
3. Remove the drive belt.

◀B▶ SUCTION HOSE, DISCHARGE HOSE DISCONNECTION

Plug the disconnected hose and the compressor nipple not to let foreign matter get into them.

Caution
Seal the hoses completely, otherwise the compressor oil and receiver will absorb water vapour easily.

◀C▶ COMPRESSOR REMOVAL

When doing this work, be careful not to spill the compressor oil.

INSTALLATION SERVICE POINT

▶A◀ COMPRESSOR INSTALLATION

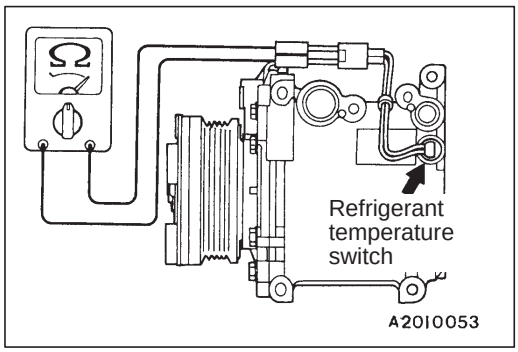
If a new compressor is installed, first adjust the amount of oil according to the procedures described below, and then install the compressor.

1. Measure the amount (X mℓ) of oil within the removed compressor.
2. Drain (from the new compressor) the amount of oil calculated according to the following formula, and then install the new compressor.
   New compressor oil amount

   120 mℓ – X mℓ = Y mℓ

   NOTE
   (1) Y mℓ indicates the amount of oil in the refrigerant line, the condenser, the evaporator etc.
   (2) When replacing the following parts at the same time as the compressor, subtract the rated oil amount of the each part from Y mℓ and discharge from the new compressor.

   Quantity
   Evaporator: 60 mℓ
   Condenser: 15 mℓ
   Suction hose: 10 mℓ
   Receiver: 10 mℓ

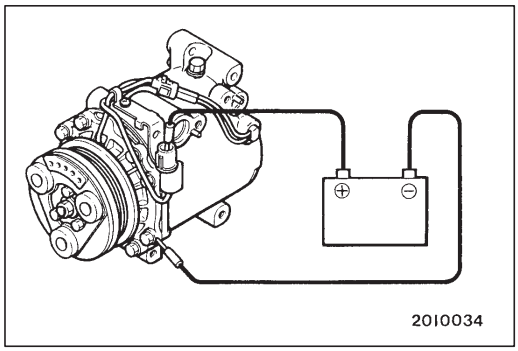


INSPECTION

55200930120

REFRIGERANT TEMPERATURE SWITCH SIMPLE CHECK

When the A/C is off, check that there is continuity between the refrigerant temperature switch terminals. If no, replace the refrigerant temperature switch.



COMPRESSOR MAGNETIC CLUTCH OPERATION INSPECTION

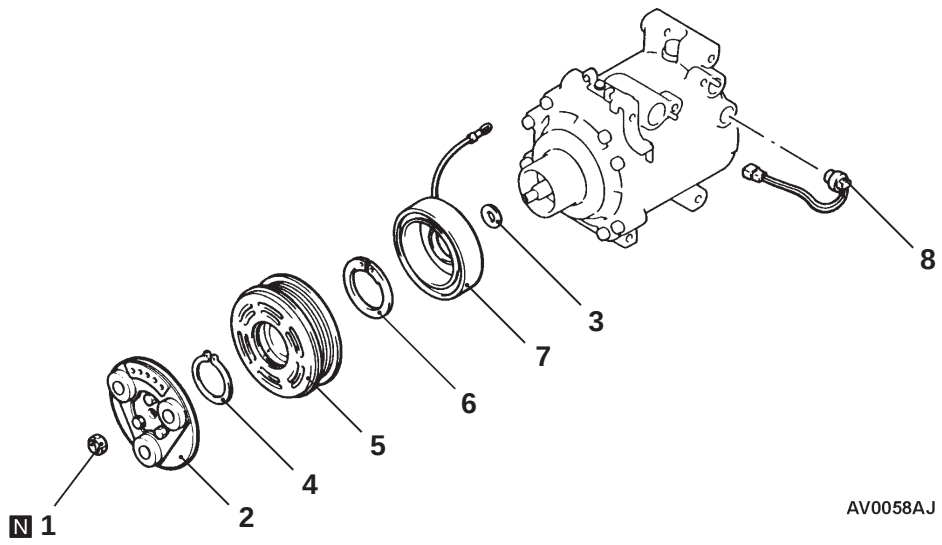
55200850266

Connect the battery (+) terminal to the compressor side terminal, and earth the battery (–) terminal to the body of the compressor. The condition is normal if the sound of the magnetic clutch (click) can be heard.

MAGNETIC CLUTCH AND REFRIGERANT TEMPERATURE SWITCH

55200460308

DISASSEMBLY AND REASSEMBLY

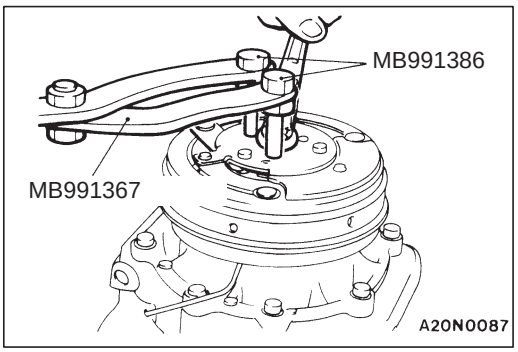


Magnetic clutch disassembly steps

- ▶E◀ ● Air gap adjustment
- ◀A▶ ▶D◀ 1. Nut
- ▶C◀ 2. Armature plate
- 3. Shims
- ▶B◀ 4. Snap ring
- 5. Rotor
- 6. Snap ring
- ▶A◀ 7. Clutch coil

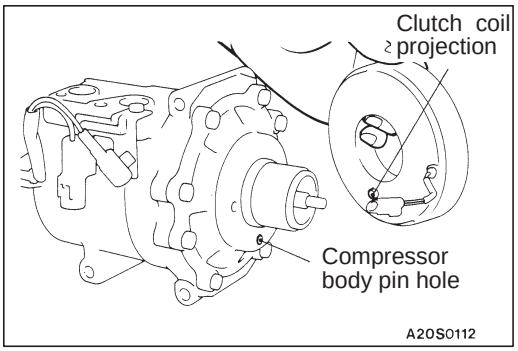
Refrigerant temperature switch removal

8. Refrigerant temperature switch



DISASSEMBLY SERVICE POINT

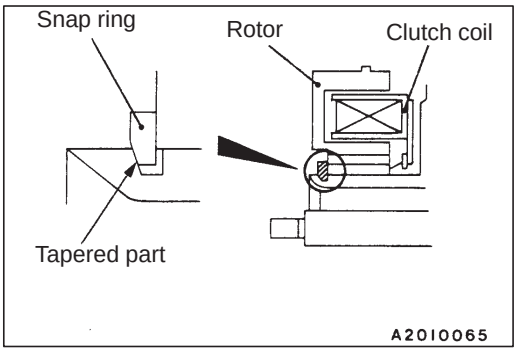
◀A▶ NUT REMOVAL



REASSEMBLY SERVICE POINTS

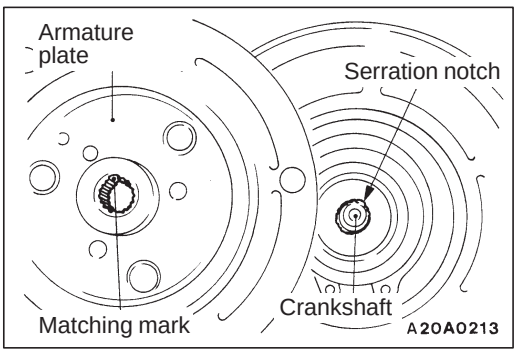
▶A◀ CLUTCH COIL INSTALLATION

When installing the clutch coil to the A/C compressor body, install so that the pin hole of the A/C compressor body and the clutch coil projection are aligned.



▶B◀ SNAP RING INSTALLATION

Install the snap ring so that the tapered surface is at the outer side.

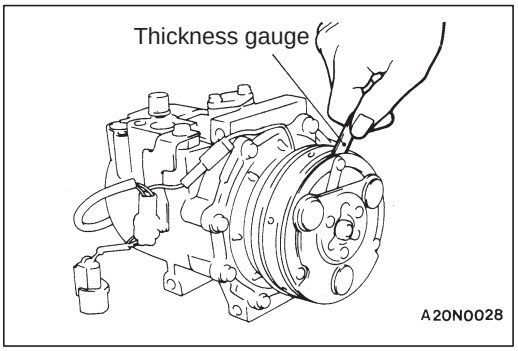


▶C◀ ARMATURE PLATE INSTALLATION

Align the mating mark of the crankshaft spline and the mating mark of the armature plate, and then fit them together.

▶D◀ NUT INSTALLATION

Use the special tool to hold the magnet clutch, and tighten the nut in the same manner as removal.



▶E◀ AIR GAP ADJUSTMENT

Check whether or not the air gap of the clutch is within the standard value.

Standard value: 0.40 – 0.65 mm

NOTE
If there is a deviation of the air gap from the standard value, make the necessary adjustment by adjusting the number of shims.

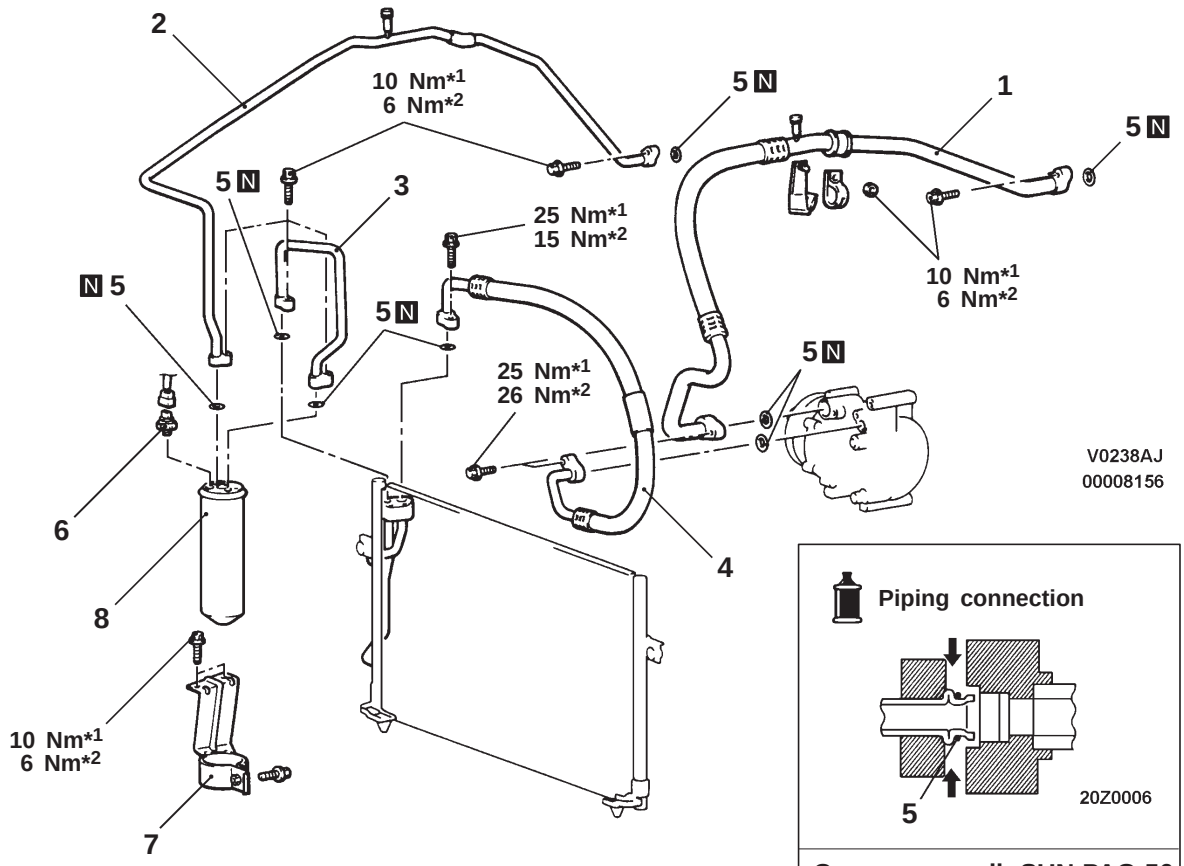
REFRIGERANT LINE

55200640337

REMOVAL AND INSTALLATION

<L.H. DRIVE VEHICLES>

Pre-removal and Post-installation Operation
Discharging and Charging of Refrigerant
(Refer to P.55-9.)



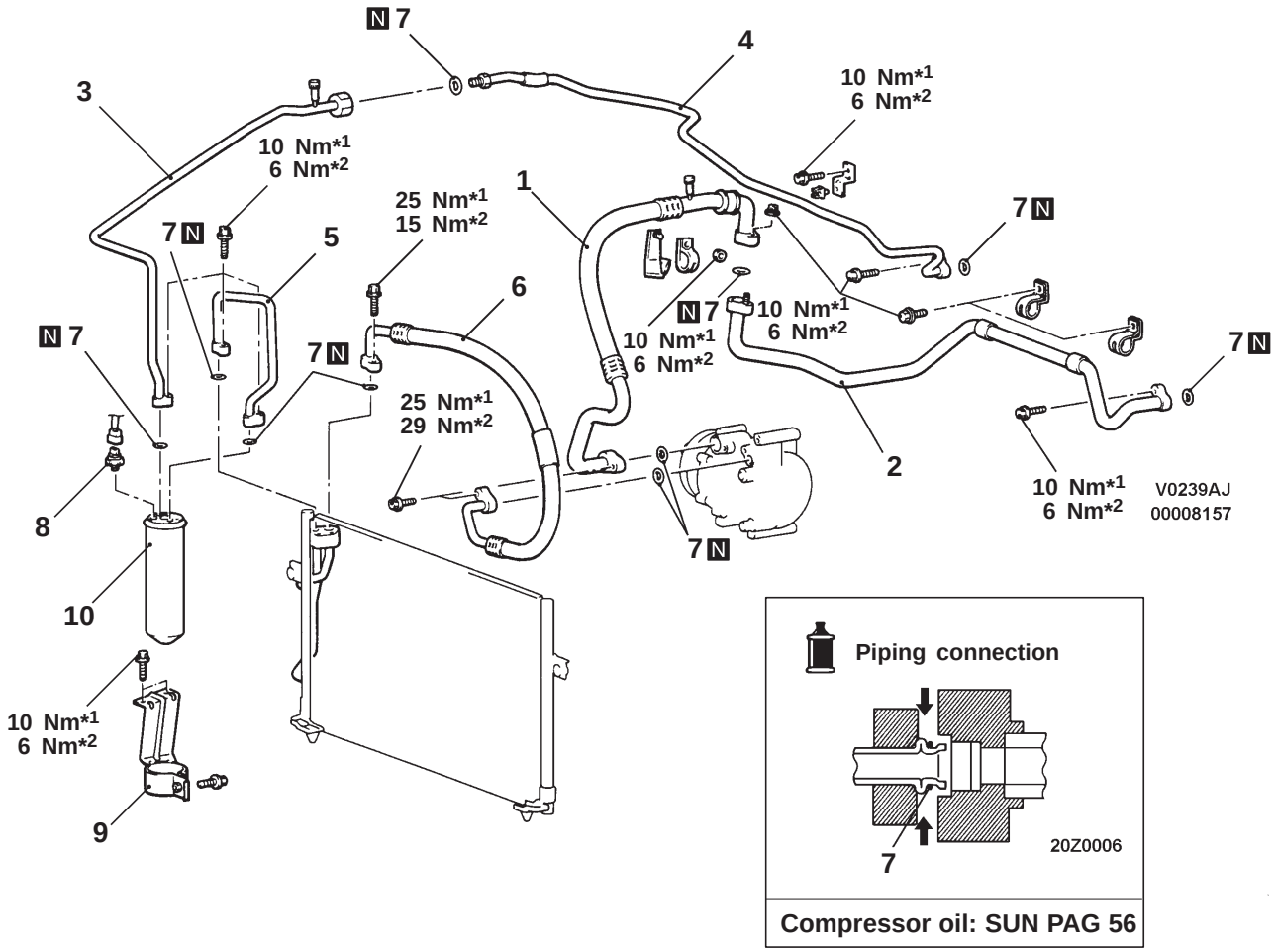
NOTE
(1) *1: indicates flange bolt or flange nut
(2) *2: indicates bolt and washer assembly or nut and washer assembly

Removal steps

◀A▶ 1. Suction hose
◀A▶ 2. Liquid pipe B
◀A▶ 3. Liquid pipe A
◀A▶ 4. Discharge hose
5. O-ring
6. Dual pressure switch
7. Receiver bracket
◀A▶ ▶A◀ 8. Receiver assembly

<R.H. DRIVE VEHICLES>

Pre-removal and Post-installation Operation
- Discharging and Charging of Refrigerant (Refer to P.55-9.)
- Air Cleaner Assembly Removal and Installation



NOTE
(1) *1: indicates flange bolt or flange nut
(2) *2: indicates bolt and washer assembly or nut and washer assembly

Removal steps

◀A▶ ▶A◀ 1. Suction hose
◀A▶ 2. Suction pipe
◀A▶ 3. Liquid pipe B
◀A▶ 4. Liquid pipe C
◀A▶ 5. Liquid pipe A
◀A▶ 6. Discharge hose
7. O-ring
8. Dual pressure switch
9. Receiver bracket
◀A▶ ▶A◀ 10. Receiver assembly

REMOVAL SERVICE POINT

◀A▶ HOSE/PIPE/RECEIVER ASSEMBLY DISCONNECTION

Plug the disconnected hose, the receiver, the evaporator and the compressor nipple not to let foreign matter get into them.

Caution
Seal the hoses completely, otherwise the compressor oil and receiver will absorb water vapour easily.

INSTALLATION SERVICE POINT

▶A◀ SUCTION HOSE/RECEIVER ASSEMBLY INSTALLATION

When replacing the suction hose or receiver assembly, refill them with a specified amount of compressor oil, and then install them.

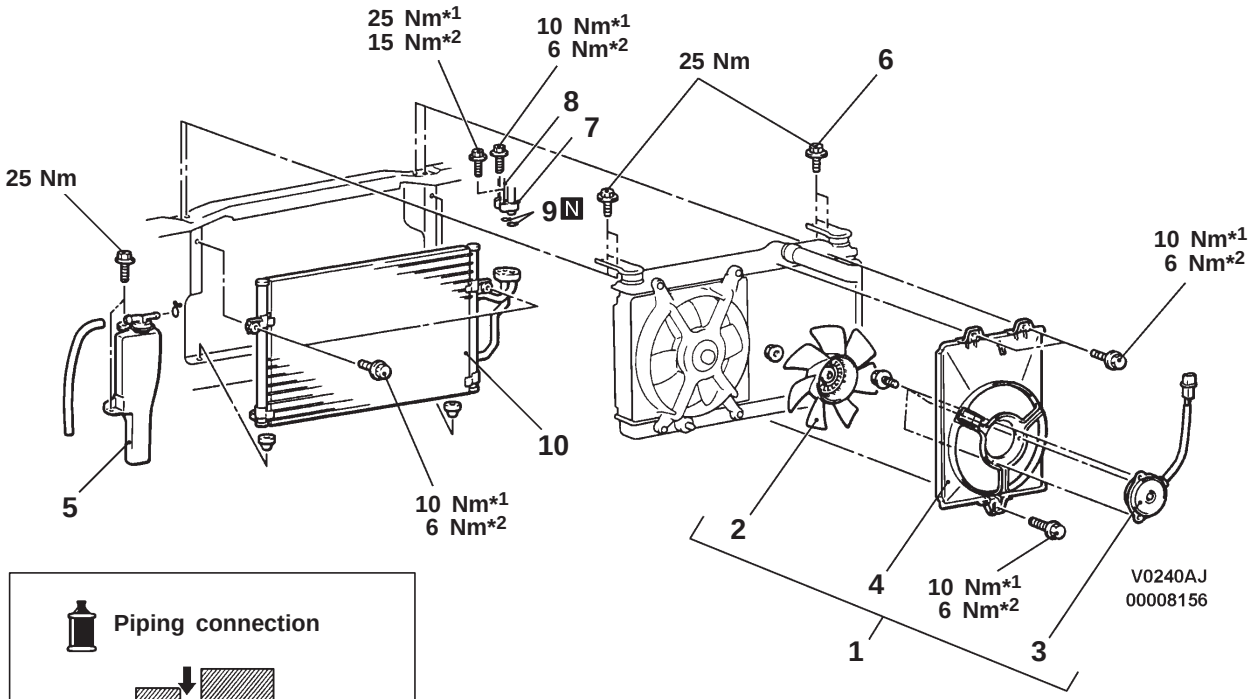
Compressor oil: SUN PAG 56

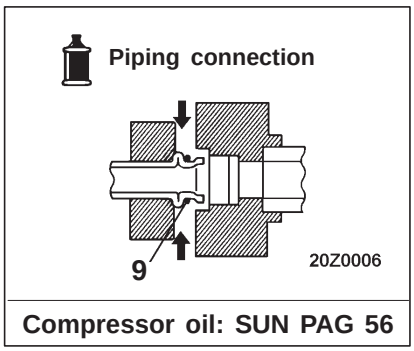
Quantity:
Suction hose: 10 mℓ
Receiver assembly: 10 mℓ

CONDENSER AND CONDENSER FAN MOTOR

55200670305

REMOVAL AND INSTALLATION





NOTE
(1) *1: indicates flange bolt
(2) *2: indicates bolt and washer assembly

Condenser fan motor removal steps

1. Condenser fan motor and shroud assembly
2. Condenser fan
3. Condenser fan motor
4. Shroud

Condenser removal steps

- Discharging and charging of refrigerant (Refer to P.55-9.)
- Air cleaner assembly

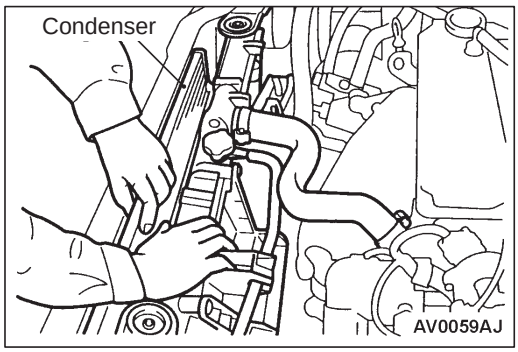
5. Reserve tank
6. Upper insulator installation bolt
7. ◀A▶ Liquid pipe A connection
8. ◀A▶ Discharge hose connection
9. O-ring
10. ◀B▶ ▶A◀ Condenser

REMOVAL SERVICE POINTS

◀A▶ LIQUID PIPE A/DISCHARGE HOSE DISCONNECTION

Plug the disconnected pipe, hose and the condenser nipple not to let foreign matter get into them.

Caution
Seal the hoses completely, otherwise the compressor oil and receiver will absorb water vapour easily.



◀B▶ CONDENSER REMOVAL

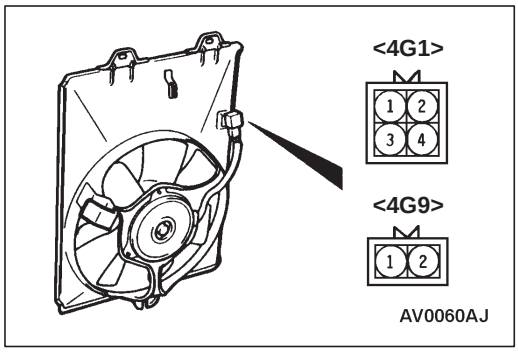
Move the radiator to the engine side and then lift up the condenser to remove it.

INSTALLATION SERVICE POINT

▶A◀ CONDENSER INSTALLATION

When replacing the condenser, refill it with a specified amount of compressor oil and install it. (to the vehicle).

Compressor oil: SUN PAG 56
Quantity: 15 mℓ



INSPECTION

55200680179

CONDENSER FAN MOTOR CHECK

Check to be sure that the condenser fan motor operates.

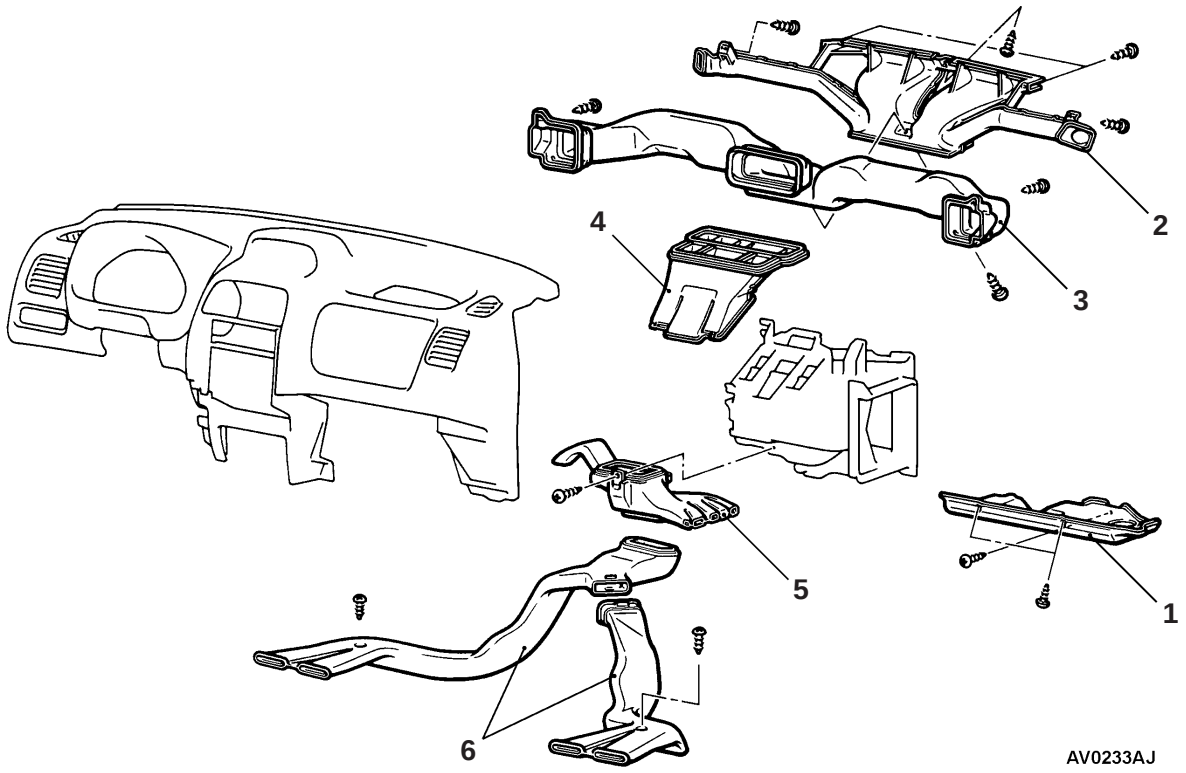
Item		Battery connection terminal			
		1	2	3	4
4G1	Lo	⊕	⊖		
	Hi			⊕	⊖
4G9		⊖	⊕		

VENTILATORS

55300160201

REMOVAL AND INSTALLATION

Caution: SRS
When removing and installing the floor console assembly from vehicles equipped with SRS, do not let it bump against the SRS-ECU or the components.



Under cover removal

1. Under cover

Defroster nozzle and distribution duct removal steps

- Instrument panel (Refer to GROUP 52A.)

2. Defroster nozzle assembly
3. Distribution duct
4. Center ventilation duct

Foot distribution duct removal steps

- Glove box, under cover, driver's side lower panel and passenger's side lower panel (Refer to GROUP 52A – Instrument panel.)

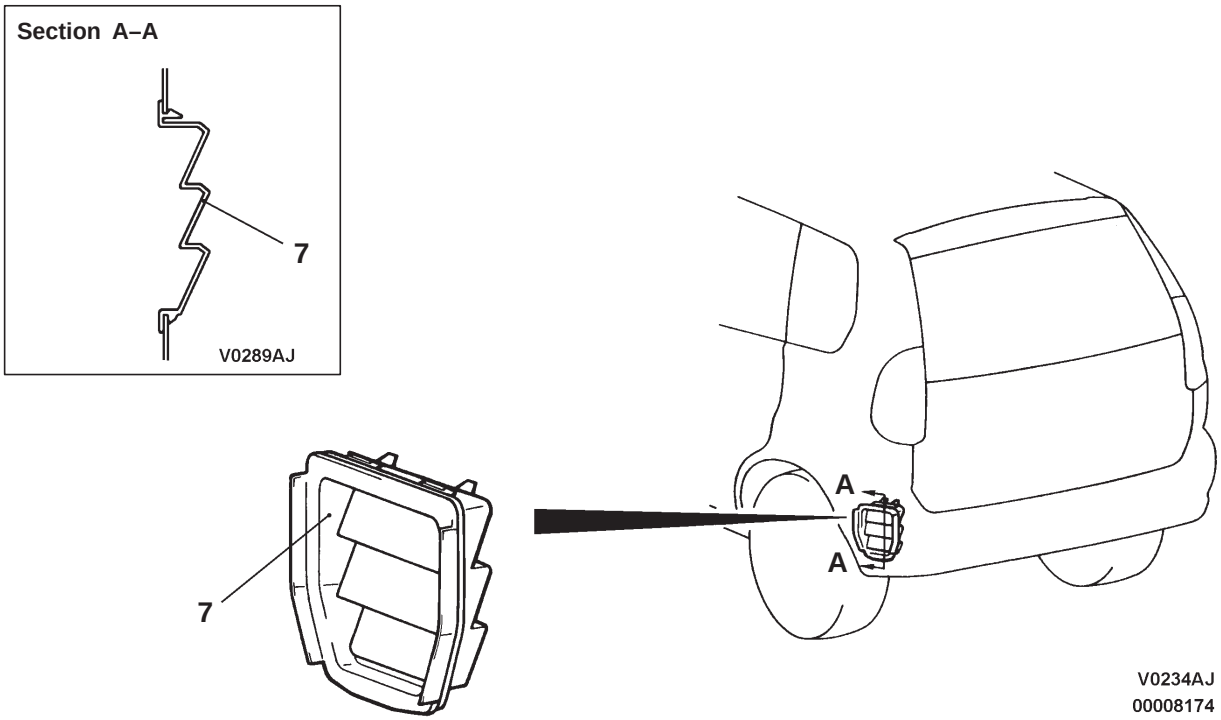
5. Foot distribution duct

Rear heater duct removal steps

- Front seat(Refer to GROUP 52A.)
- Floor console assembly (Refer to GROUP 52A.)

6. Rear heater duct

NOTE
For the center air outlet assembly and the side air outlet assembly, refer to GROUP 52A – Instrument panel.



Rear ventilation duct removal steps

- Rear bumper (Refer to GROUP 51.)

7. Rear ventilation duct

NOTE
For the front deck garnish, refer to GROUP 51 – Windshield wiper and washer.

NOTES

HEATER AND MANUAL AIR CONDITIONER

CONTENTS

GENERAL

OUTLINE OF CHANGE

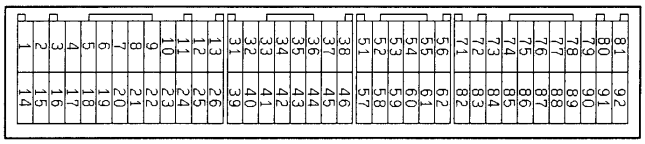
- The compressor oil capacity has been changed to correspond to the adoption of the F9Q1 engine.
- Service adjustment procedures for the condenser assembly have been added to correspond to the adoption of the F9Q1 engine.
- Service adjustment procedures for the refrigerant line have been added to correspond to the adoption of the F9Q1 engine.

LUBRICANTS

Item	Brand	Capacity
Compressor oil mL	SUN PAG 56	135
Pipe connections	SUN PAG 56	As required

TROUBLESHOOTING

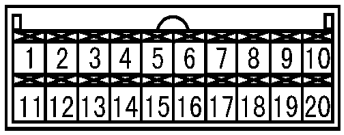
ENGINE-ECU TERMINAL CHECKS



9FU0393

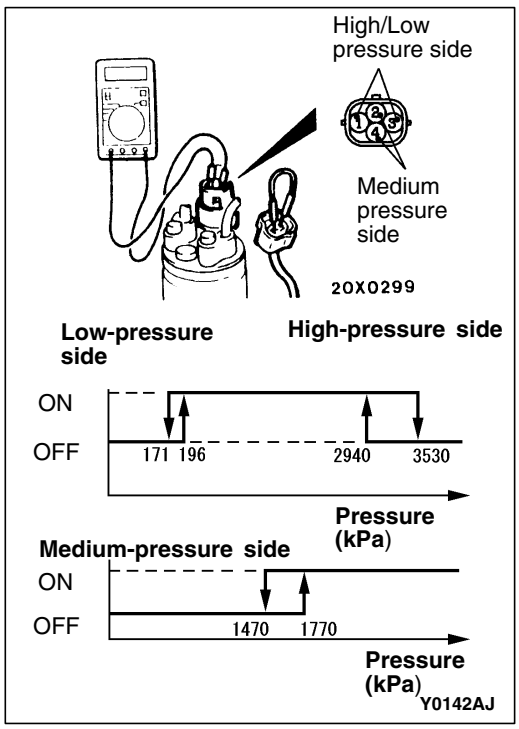
Terminal No.	Check item	Check condition	Normal condition
2	Fan controller output	A/C switch: OFF	5 V
		A/C switch: ON	0 V
3	A/C compressor relay input	A/C compressor relay: OFF	0 V
		A/C compressor relay: ON	System voltage
103	Condenser fan relay output (LO)	Condenser fan relay (LO): OFF	0 V
		Condenser fan relay (LO): ON	System voltage
128	Condenser fan relay output (HI)	Condenser fan relay (HI): OFF	0 V
		Condenser fan relay (HI): ON	System voltage

AUTO COMPRESSOR-ECU TERMINAL CHECKS



X0299AQ

Terminal No.	Check item	Check condition	Normal condition
1	A/C switch input	A/C switch: OFF	0 V
		A/C switch: ON	3 V or more
2	A/C compressor relay output	A/C switch: OFF	0 V
		A/C switch: ON	System voltage
4	Earth	At all times	0 V



ON-VEHICLE SERVICE

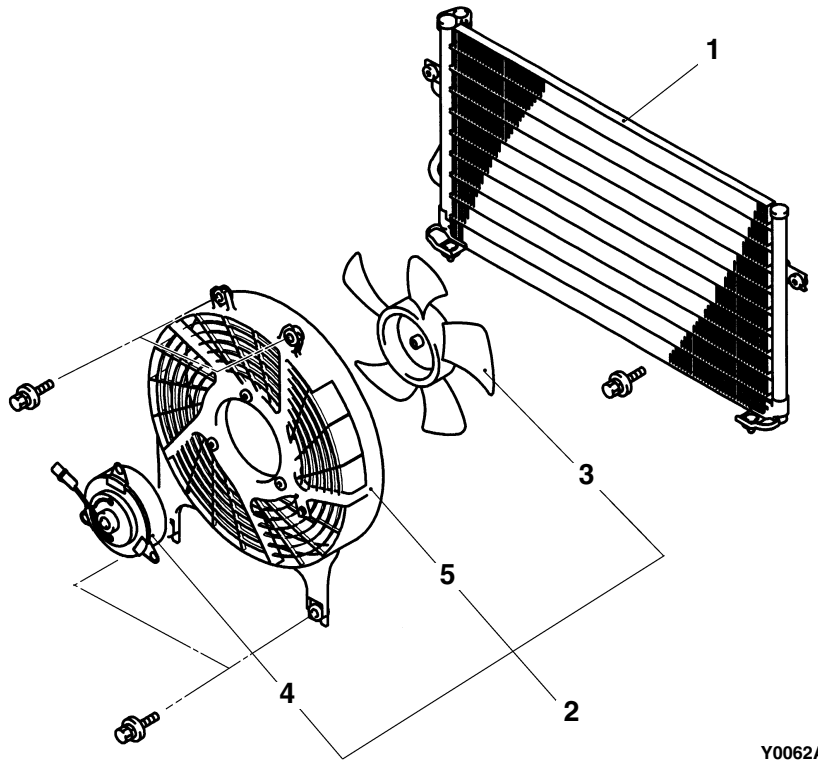
SIMPLE INSPECTION OF TRIPLE PRESSURE SWITCH

(1) Disconnect the triple pressure switch connector.
(2) Connect a gauge manifold to the refrigerant line high-pressure side service valve.
(3) There should be continuity between the terminals when the high and low pressure side and the medium side at the A/C pressure switch are under operating pressure (ON). If no continuity, replace the switch.

CONDENSER ASSEMBLY

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations
- Refrigerant draining and filling
- Hood latch lever assembly and center air guide panel removal and installation (Refer to GROUP 42.)



Condenser removal steps
- Discharge flexible hose connection
- Liquid pipe A connection

1. Condenser assembly

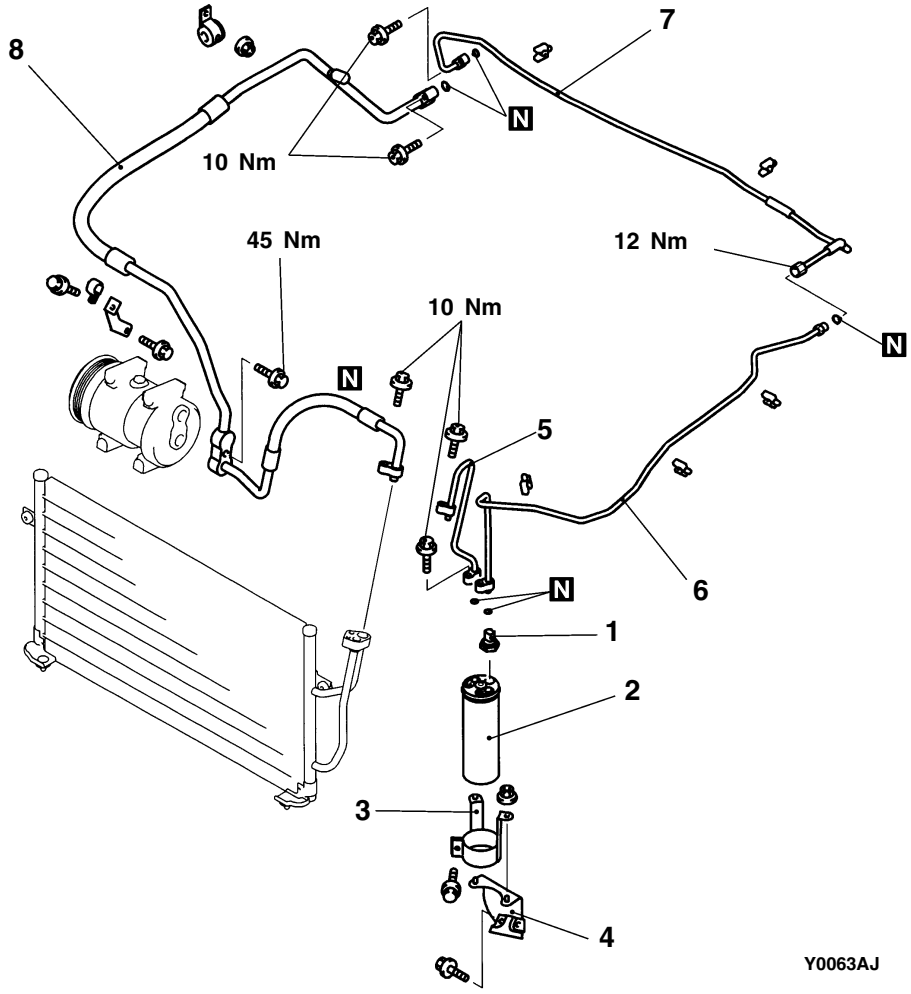
Condenser fan removal steps

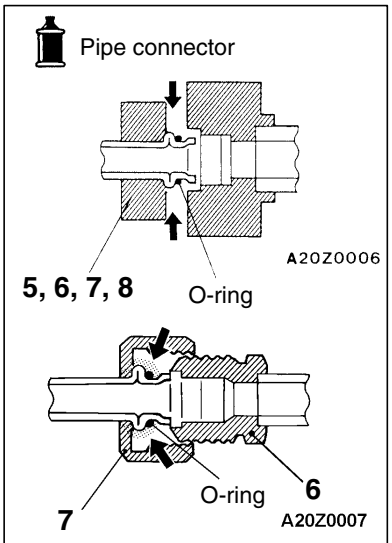
2. Shroud assembly
3. Condenser fan
4. Fan motor
5. Shroud

REFRIGERANT LINE

REMOVAL AND INSTALLATION <L.H. drive vehicles>

Pre-removal and Post-installation Operations
- Refrigerant draining and filling
- Radiator grille removal and installation
- Air cleaner removal and installation





A/C compressor oil: SUN PAG 56

Removal steps

1. A/C pressure sensor
2. Receiver
3. Receiver bracket A
4. Receiver bracket B
   - Radiator condense tank (Refer to GROUP 14.)

◀A▶ 5. Liquid pipe A
   - Battery, air cleaner engine cover, relay box (engine compartment)

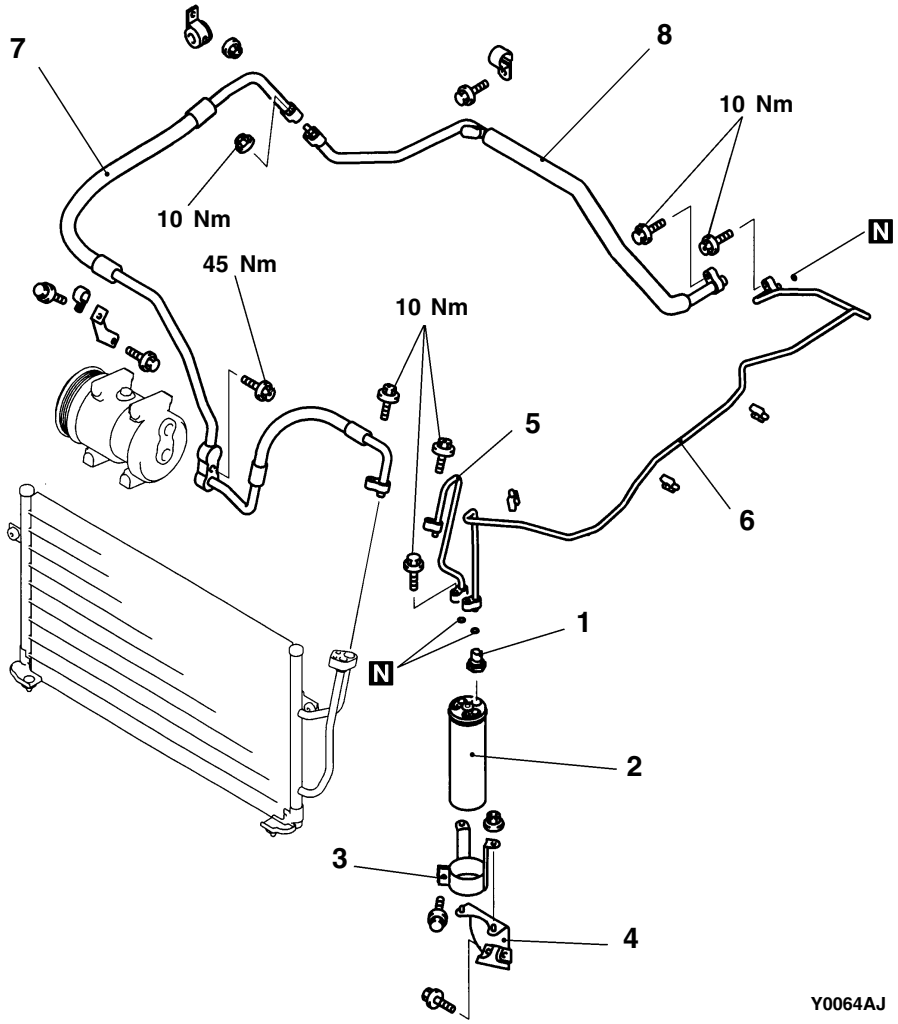
◀A▶ 6. Liquid pipe B
   - Intake manifold (Refer to GROUP 15.)
   - Engine mount (Refer to GROUP 32.)

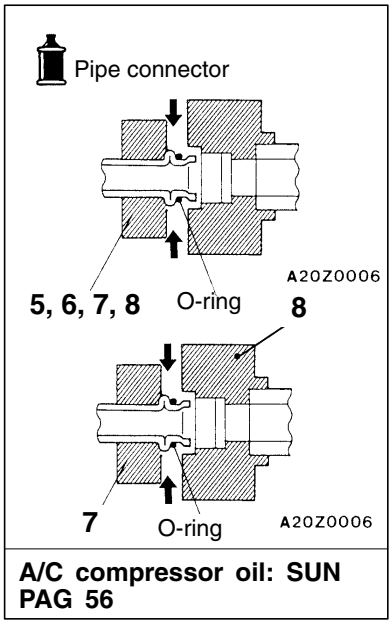
◀A▶ 7. Liquid pipe C

◀A▶ 8. Flexible hose

<R.H. drive vehicles>

Pre-removal and Post-installation Operations
- Refrigerant draining and filling
- Radiator grille removal and installation
- Air cleaner removal and installation





A/C compressor oil: SUN PAG 56

Removal steps

1. A/C pressure sensor
2. Receiver
3. Receiver bracket A
4. Receiver bracket B
- Radiator condense tank (Refer to GROUP 14.)

◀A▶ 5. Liquid pipe A
- Battery, air cleaner engine cover, relay box (engine compartment)

◀A▶ 6. Liquid pipe B
- Intake manifold (Refer to GROUP 15.)
- Engine mount (Refer to GROUP 32.)

◀A▶ 7. Flexible hose A

◀A▶ 8. Flexible hose B

REMOVAL SERVICE POINTS

◀A▶ HOSE AND PIPE REMOVAL

Plug the end of the disconnected hoses and the condenser assembly cooling unit nipple to prevent entry of dust or other foreign particles.

Caution
Because the compressor oil and receiver have strong hygroscopic properties, use a non-permeable plug.

NOTES

SERVICE BULLETIN

PUBLICATION GROUP, AFTER SALES SERVICE DEP.
MITSUBISHI MOTOR SALES EUROPE BV

SERVICE BULLETIN	No.: ESB-99E55-502	
	Date: 1999-12-30	<Model> (EC) SPACE STAR (DG1A, DG5A) <M/Y> 98-10
Subject: CORRECTION TO AIR PURIFIER REMOVAL AND INSTALLATION		
Group: HEATER, A/C & VENTILATION		
CORRECTION	O. Kai - E.V.P. & G.M. After Sales Service Dept.	

1. Description:

The incorrectness of a description of air pruifier removal and installation has been rectified.

2. Applicable Manuals:

Manual	Pub. No.	Language	Page(s)
'99 SPACE STAR Workshop Manual	CMXE99E1	(English)	55-17, 26
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	

3. Details:

IDLE-UP OPERATION CHECK

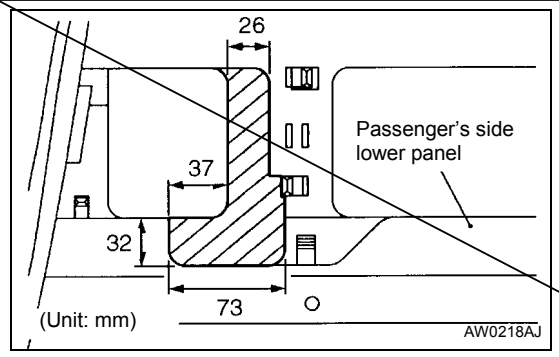
55200160284

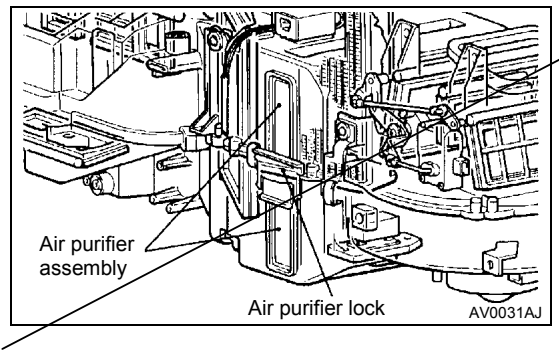
1. Before inspection and adjustment, set vehicle in the following condition:
   - Engine coolant temperature: 80 - 90°C
   - Lights, electric cooling fan and accessories: Set to OFF.
   - Transmission: Neutral (N or P for vehicles with A/T)
   - Steering wheel: Straightforward
2. Check whether or not the idling speed is the standard value.
   Standard value:
   <4G1> 750 ± 100 r/min
   <4G9> 700 ± 100 r/min
3. When the A/C is running after running the A/C switch to ON, and the blower switch to the MH or HI position, check to be sure that the idle speed is at the standard value.
   Standard value:

Engine	Idle speed r/min	
	When load by A/C is low	When load by A/C is high
4G1	750 ± 100	850 ± 100
4G9	700 ± 100	800 ± 100

NOTE
There is no necessity to make an adjustment, because the idling speed is automatically adjusted by the ISC system. If, however, there occurs a deviation from the standard value for some reason, check the ISC system. (Refer to GROUP 13A – On-vehicle Service.)

<Deleted>





AIR PURIFIER ASSEMBLY REPLACEMENT

55501100017

1. Remove the glove box
2. Disconnect the harness from the passenger's side lower panel. <Initial math-production model>
3. Cut the passenger's side lower panel as shown in the illustration. <Initial math-production model>

   Caution
   Take care not to damage the harness and the others parts when cutting the passenger's side lower panel.

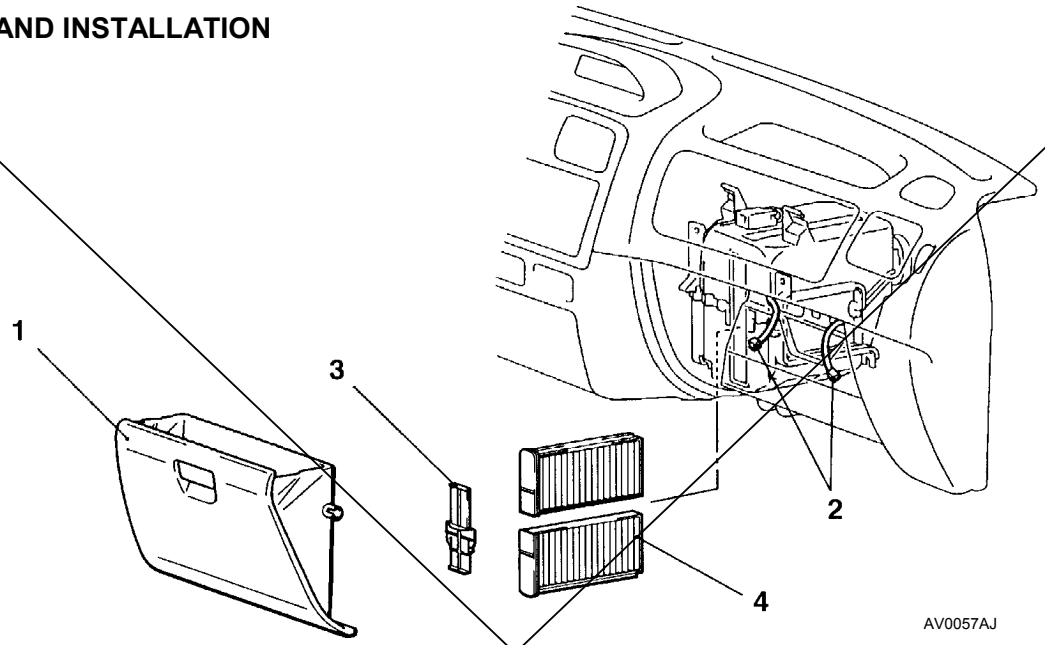
4. Remove the air purifier lock and the air purifier assembly.
5. Install a new air purifier assembly and install the air purifier lock.

   NOTE
   On installation, it is unnecessary to replace the passenger's side lower panel because the cut portion can be left as it is. <Initial math-production model>
6. Install the glove box.

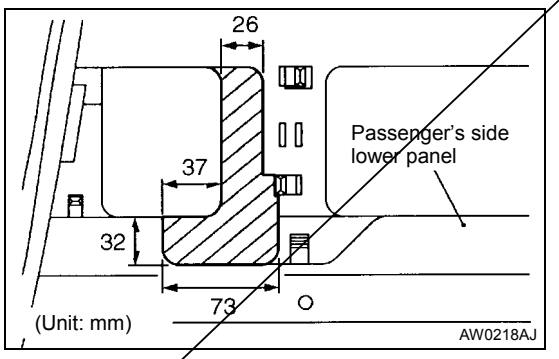
AIR PURIFIER ASSEMBLY

55500100056

REMOVAL AND INSTALLATION



Removal steps
1. Glove box
2. Harness connector connection
◀A▶ 3. Air purifier lock
4. Air purifier assembly



REMOVAL SERVICE POINT

◀A▶AIR PURIFIER LOCK REMOVAL <INITIAL MATH-PRODUCTION MODEL>

Disconnect the harness from the passenger's side lower panel.

2. Cut the passenger's side lower panel as shown in the illustration.

Caution
Take care not to damage the harness and the others parts when cutting the passenger's side lower panel.

NOTE
On installation, it is unnecessary to replace the passenger's side lower panel because the cut portion can be left as it is.

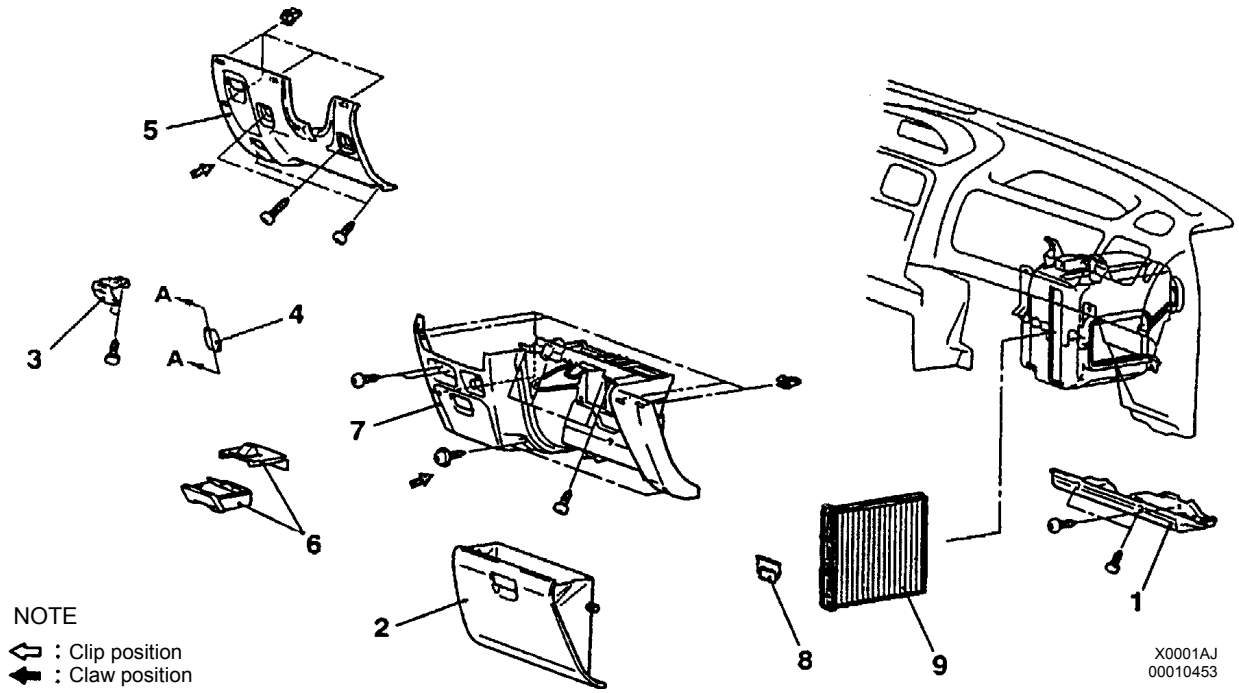
3. Remove the air purifier lock.

<To be replaced by the following and subsequent pages.>

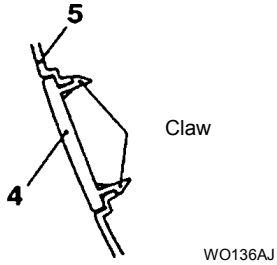
<Added>

<1-PIECE TYPE AIR PURIFIER (VEHICLES WITH A/C)>

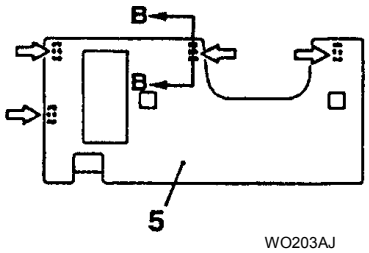
REMOVAL



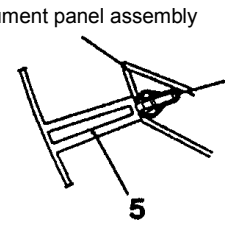
Section A-A



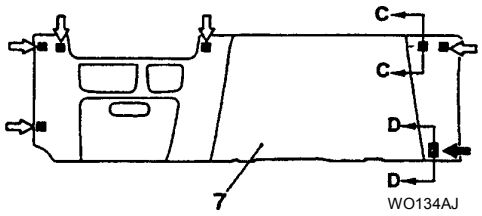
View A



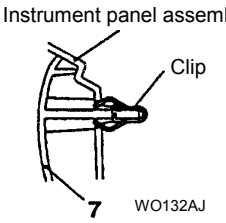
Section B-B



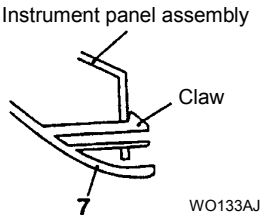
View B



Section C-C



Section D-D



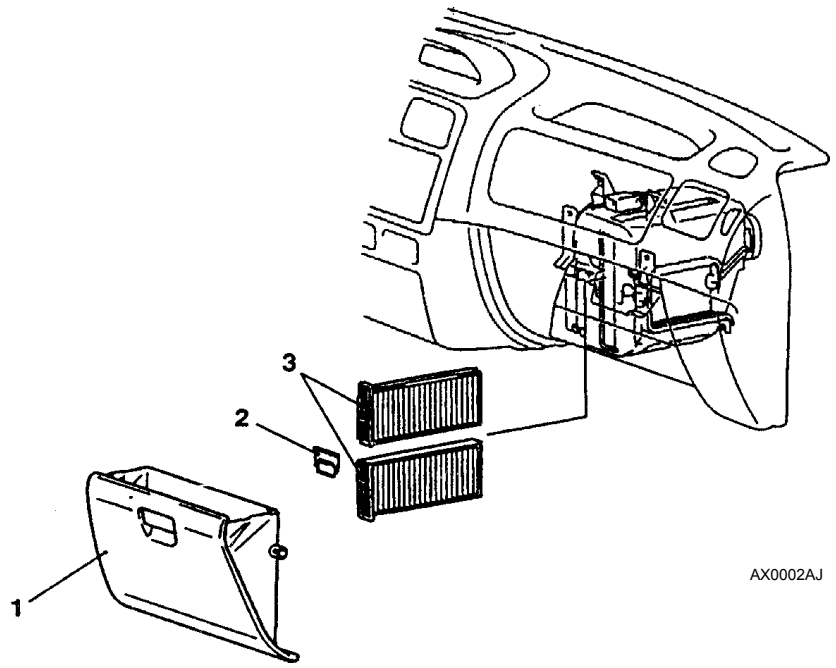
Removal steps

1. Under cover
2. Glove box
3. Hood lock release handle
4. Driver's side lower plug
5. Driver's side lower panel assembly
6. Ashtray assembly
7. Passenger's side lower panel assembly
8. Air purifier lock
9. Air purifier assembly

<Added>

<2-PIECE TYPE AIR PURIFIER (VEHICLES WITH A/C)>

REMOVAL AND INSTALLATION



Removal steps

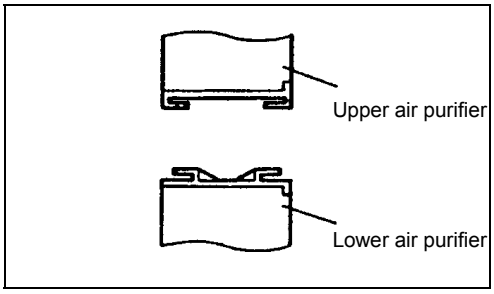
1. Glove box
2. Air purifier lock

◀A▶ ▶A◀ 3. Air purifier assembly

REMOVAL SERVICE POINT

◀A▶AIR PURIFIER ASSEMBLY REMOVAL

1. Pull out the upper air purifier horizontally.
2. Lift the lower air purifier to the position of the upper air purifier, and pull the lower air purifier out horizontally.



INSTALLATION SERVICE POINT

▶A◀AIR PURIFIER ASSEMBLY INSTALLATION

1. Install the lower air purifier.
2. Install the upper air purifier. At this time, check to ensure that the lower air purifier top surface rail and the upper air purifier bottom are properly locked.

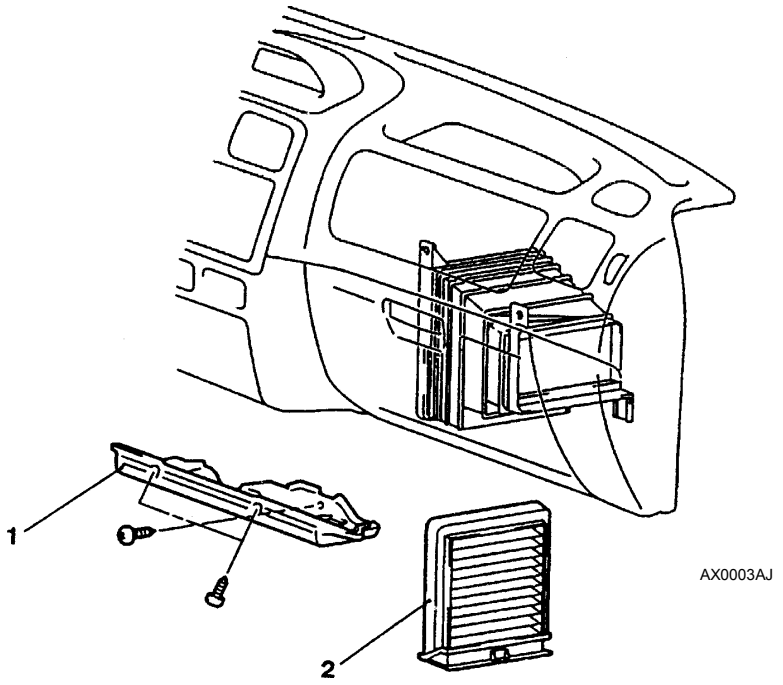
   NOTE

   On installation of the upper air purifier requires a slight force.

<Added>

<1-PIECE TYPE AIR PURIFIER (VEHICLES WITHOUT A/C)>

REMOVAL AND INSTALLATION



Removal steps

1. Under cover
2. Air purifier assembly

GROUP 55
HEATER, AIR CONDITIONER AND VENTILATION

GENERAL

OUTLINE OF CHANGES

The following service procedures have been established due to the change in the A/C-ECU. The other service procedures are the same as before.

TROUBLESHOOTING

BASIC FLOW OF TROUBLESHOOTING

Refer to GROUP 00 – How to Use Troubleshooting/Inspection Service Points.

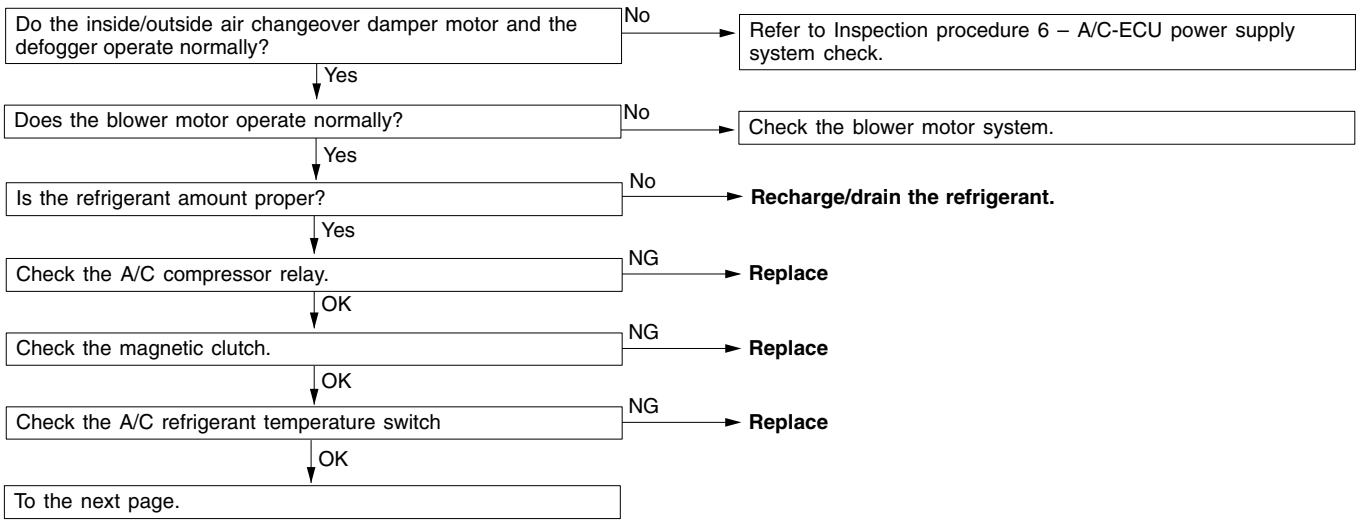
INSPECTION CHART FOR TROUBLE SYMPTOMS

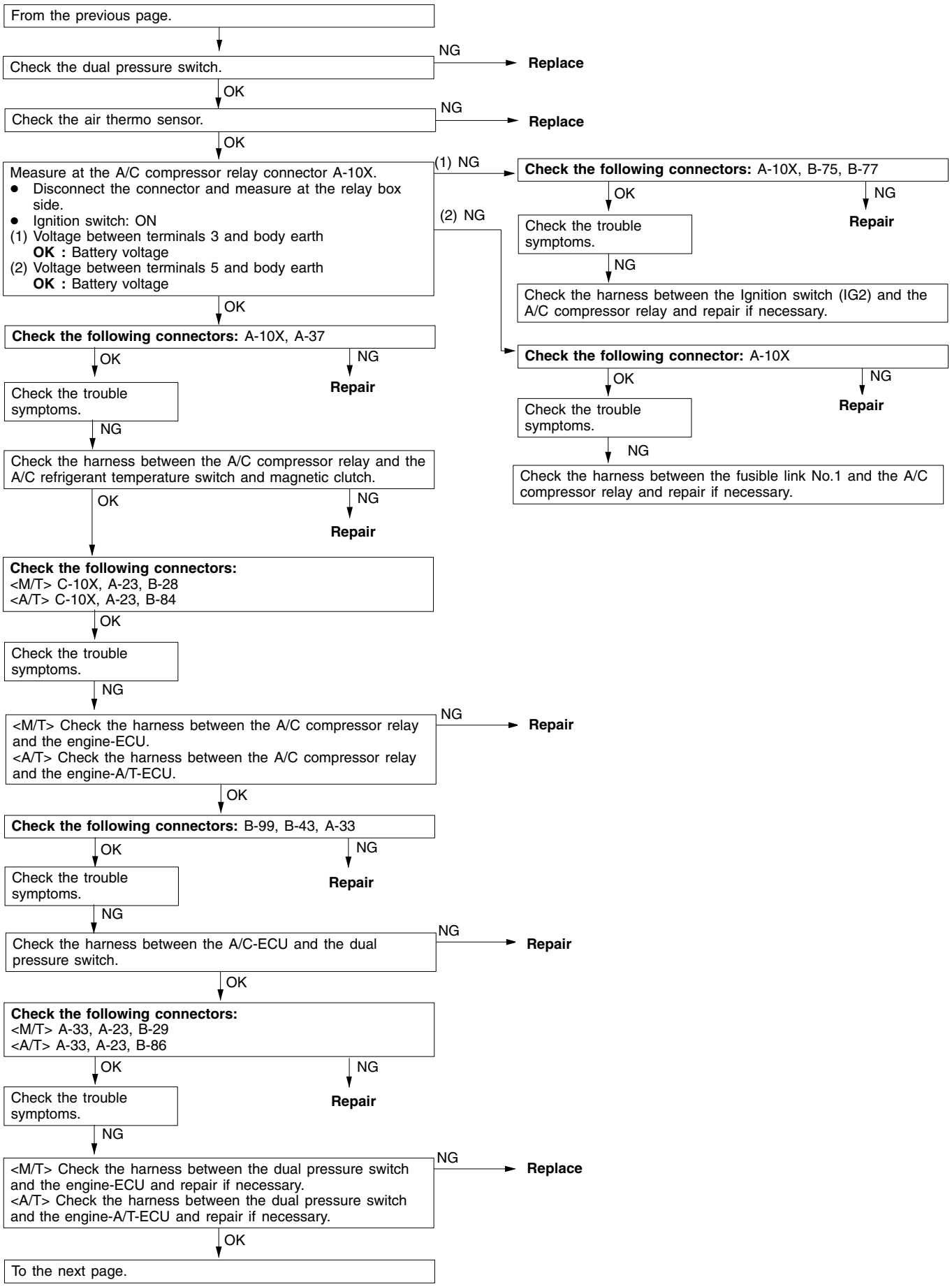
Trouble symptom	Inspection procedure	Reference page
Cool air is not distributed through the air outlets <4G1>	1	55-2
Cool air is not distributed through the air outlets <F9Q1>	2	55-4
Air cannot be switched between inside and outside	3	55-6
Rear defogger not working	4	55-7
Defogger timer not working	5	55-8
A/C-ECU power supply system check	6	55-8

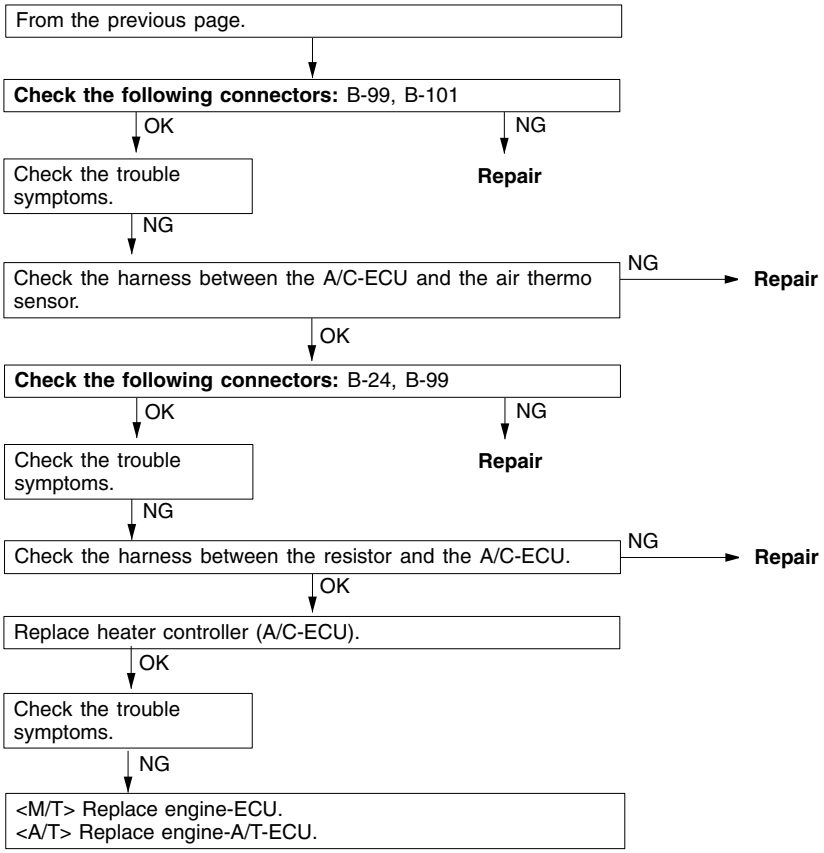
INSPECTION PROCEDURE FOR TROUBLE SYMPTOM

Inspection procedure 1

Cool air is not distributed through the air outlets <4G1>	Probable cause
If cool air is not distributed, the compressor components is suspected to be faulty.	• A/C compressor fault • A/C refrigerant temperature switch fault • A/C compressor relay fault • dual pressure switch fault • air thermo sensor fault • Improper amount of refrigerant • Harness or connector fault • A/C-ECU fault • engine-ECU or engine-A/T-ECU fault

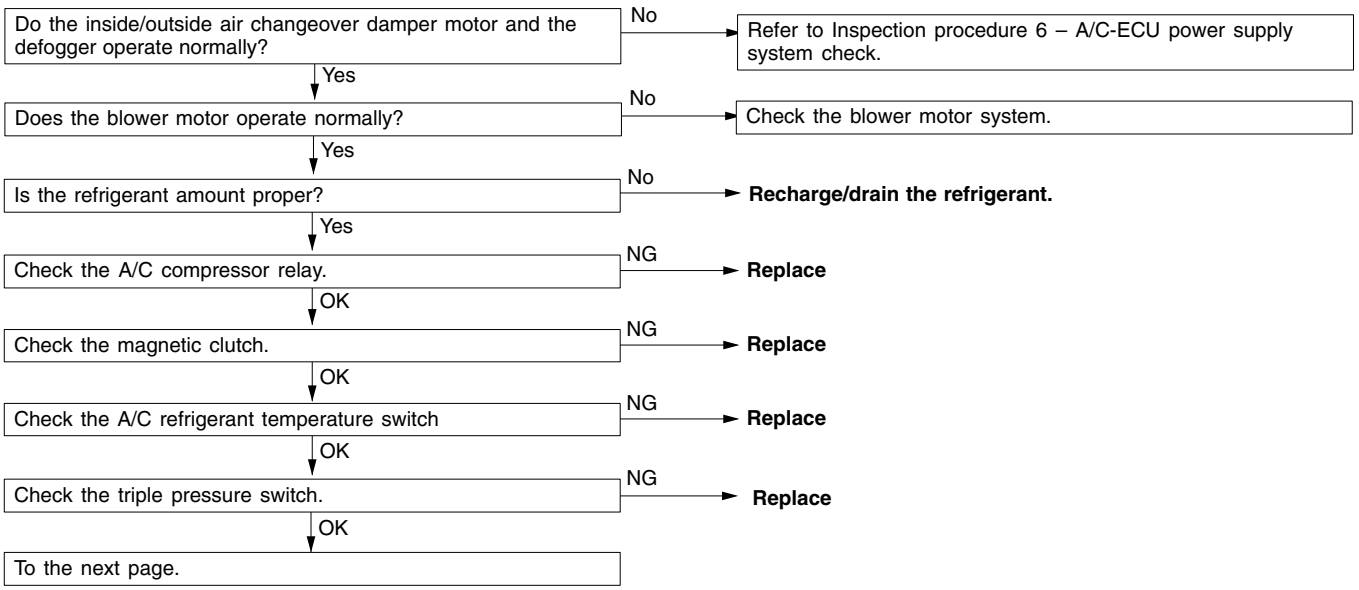


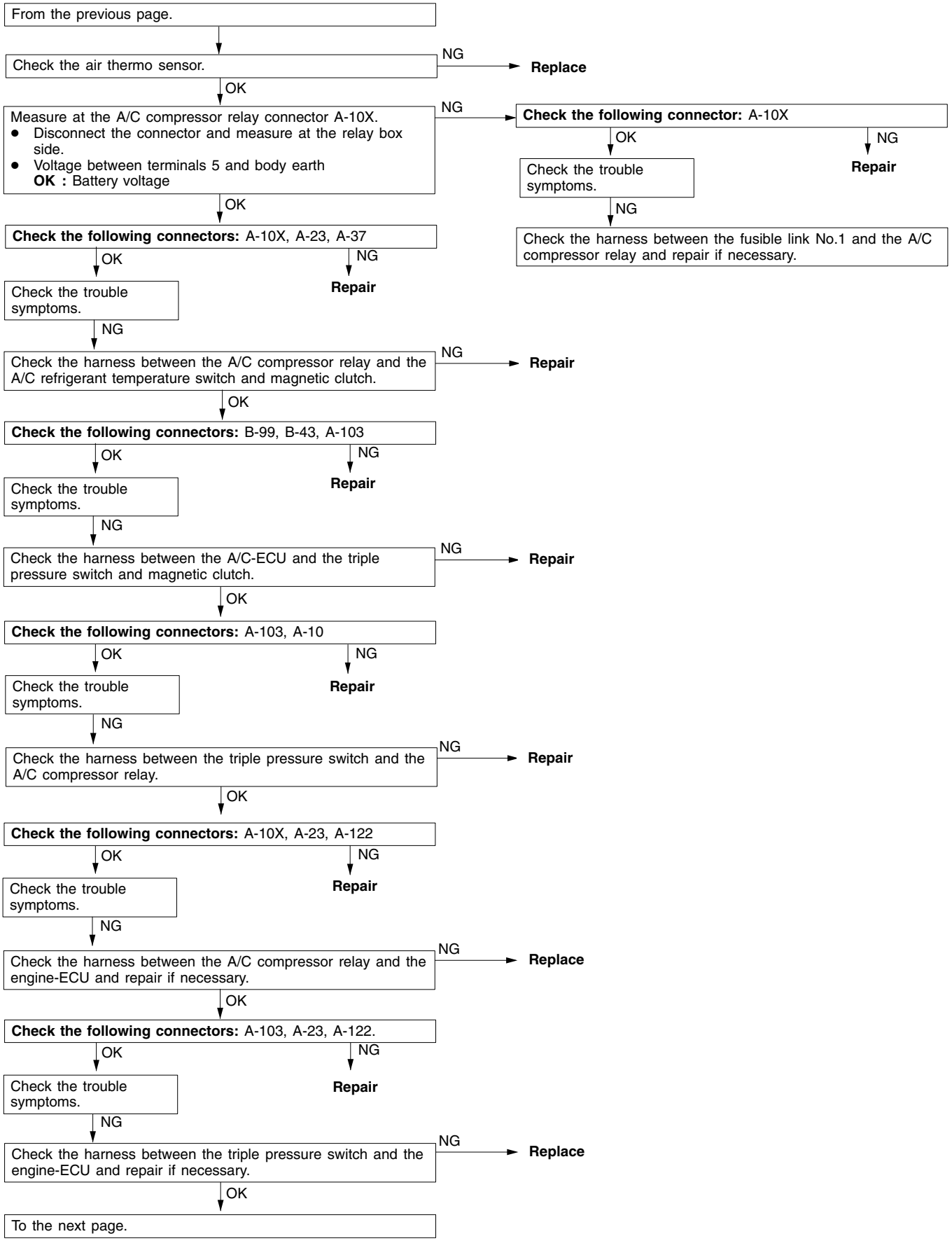

From the previous page.
Check the dual pressure switch.
NG
Replace
OK
Check the air thermo sensor.
NG
Replace
OK
Measure at the A/C compressor relay connector A-10X.
• Disconnect the connector and measure at the relay box side.
• Ignition switch: ON
(1) Voltage between terminals 3 and body earth
OK : Battery voltage
(2) Voltage between terminals 5 and body earth
OK : Battery voltage
(1) NG
Check the following connectors: A-10X, B-75, B-77
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the Ignition switch (IG2) and the A/C compressor relay and repair if necessary.
(2) NG
Check the following connector: A-10X
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the fusible link No.1 and the A/C compressor relay and repair if necessary.
OK
Check the following connectors: A-10X, A-37
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the A/C compressor relay and the A/C refrigerant temperature switch and magnetic clutch.
OK
NG
Repair
Check the following connectors:
<M/T> C-10X, A-23, B-28
<A/T> C-10X, A-23, B-84
OK
Check the trouble symptoms.
NG
<M/T> Check the harness between the A/C compressor relay and the engine-ECU.
<A/T> Check the harness between the A/C compressor relay and the engine-A/T-ECU.
NG
Repair
OK
Check the following connectors: B-99, B-43, A-33
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the A/C-ECU and the dual pressure switch.
NG
Repair
OK
Check the following connectors:
<M/T> A-33, A-23, B-29
<A/T> A-33, A-23, B-86
OK
NG
Repair
Check the trouble symptoms.
NG
<M/T> Check the harness between the dual pressure switch and the engine-ECU and repair if necessary.
<A/T> Check the harness between the dual pressure switch and the engine-A/T-ECU and repair if necessary.
NG
Replace
OK
To the next page.

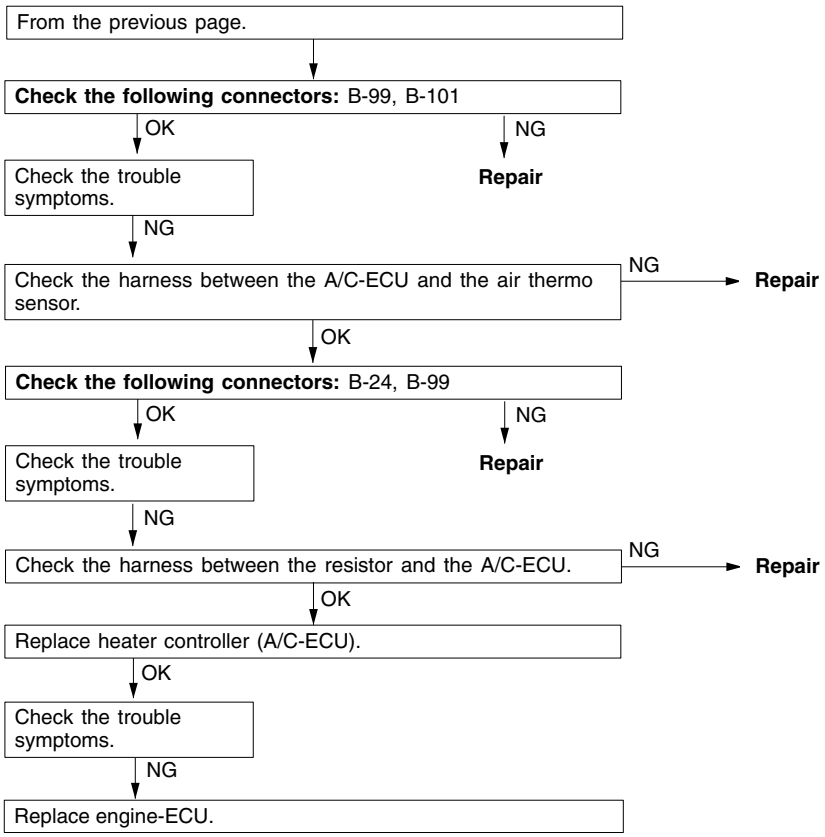


Inspection procedure 2

Cool air is not distributed through the air outlets <F9Q1>	Probable cause
If cool air is not distributed, the compressor components is suspected to be faulty.	• A/C compressor fault • A/C refrigerant temperature switch fault • A/C compressor relay fault • triple pressure switch fault • air thermo sensor fault • Improper amount of refrigerant • Harness or connector fault • A/C-ECU fault • engine-ECU or engine-A/T-ECU fault

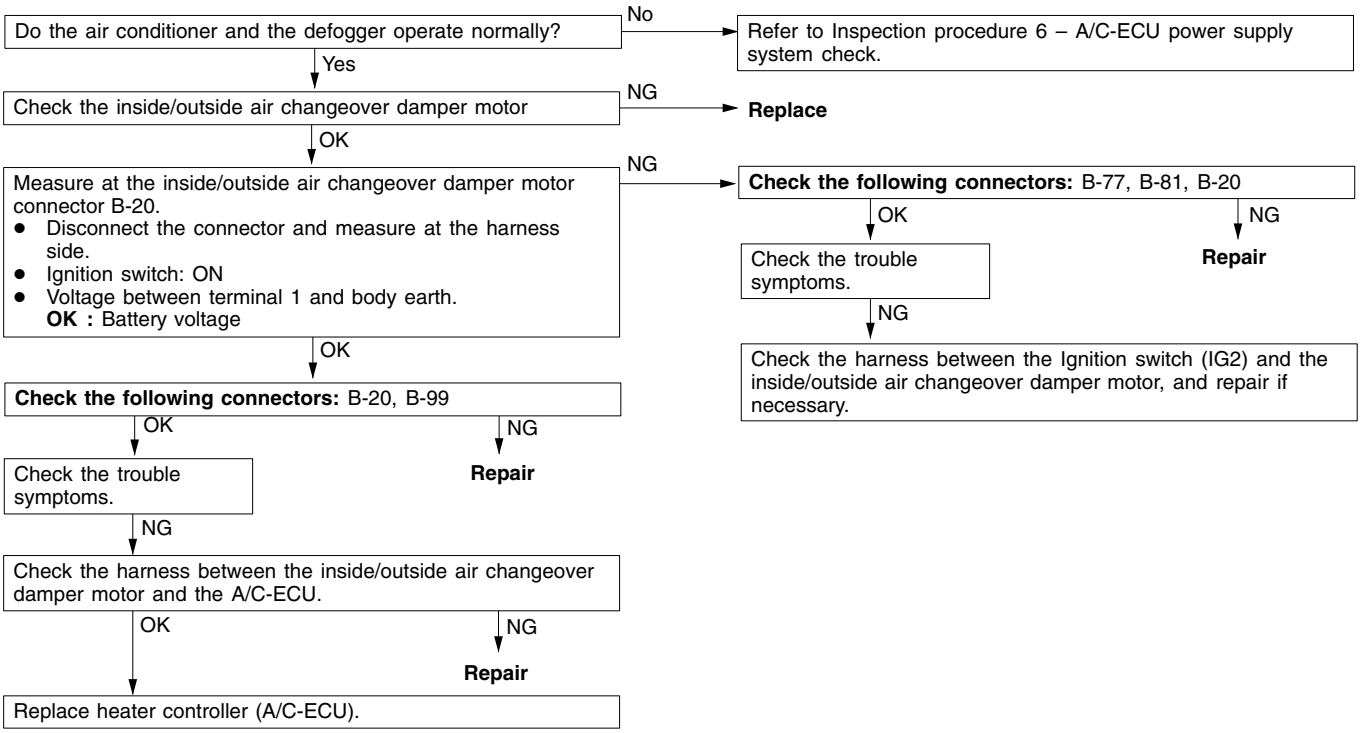



From the previous page.
Check the air thermo sensor.
NG
Replace
OK
Measure at the A/C compressor relay connector A-10X.
● Disconnect the connector and measure at the relay box side.
● Voltage between terminals 5 and body earth
OK : Battery voltage
NG
Check the following connector: A-10X
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the fusible link No.1 and the A/C compressor relay and repair if necessary.
OK
Check the following connectors: A-10X, A-23, A-37
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the A/C compressor relay and the A/C refrigerant temperature switch and magnetic clutch.
NG
Repair
OK
Check the following connectors: B-99, B-43, A-103
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the A/C-ECU and the triple pressure switch and magnetic clutch.
NG
Repair
OK
Check the following connectors: A-103, A-10
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the triple pressure switch and the A/C compressor relay.
NG
Repair
OK
Check the following connectors: A-10X, A-23, A-122
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the A/C compressor relay and the engine-ECU and repair if necessary.
NG
Replace
OK
Check the following connectors: A-103, A-23, A-122.
OK
NG
Repair
Check the trouble symptoms.
NG
Check the harness between the triple pressure switch and the engine-ECU and repair if necessary.
NG
Replace
OK
To the next page.



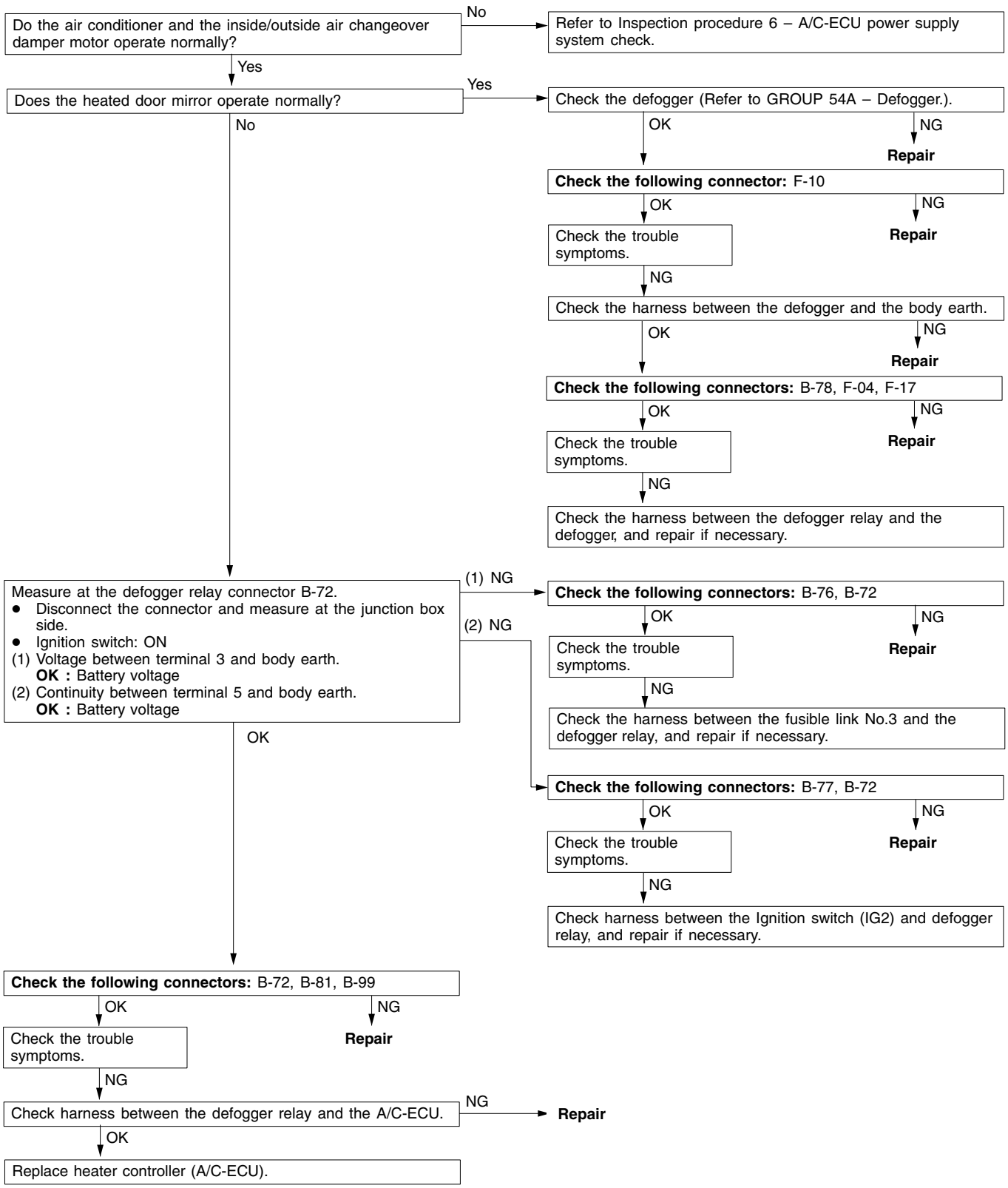
Inspection procedure 3

Air cannot be switched between inside and outside.	Probable cause
If the air cannot be switched between the inside and outside even though the inside/outside switch is ON, the inside/outside changeover damper motor system may be defective.	• Inside/outside air changeover damper motor fault • Harness or connector fault • A/C-ECU fault



Inspection procedure 4

Rear defogger not working.	Probable cause
If the rear window defogger does not work even though the rear defogger switch is ON (a 11-minute timer operates), the defogger relay system may be defective.	• Defogger relay fault • Harness or connector fault • A/C-ECU fault



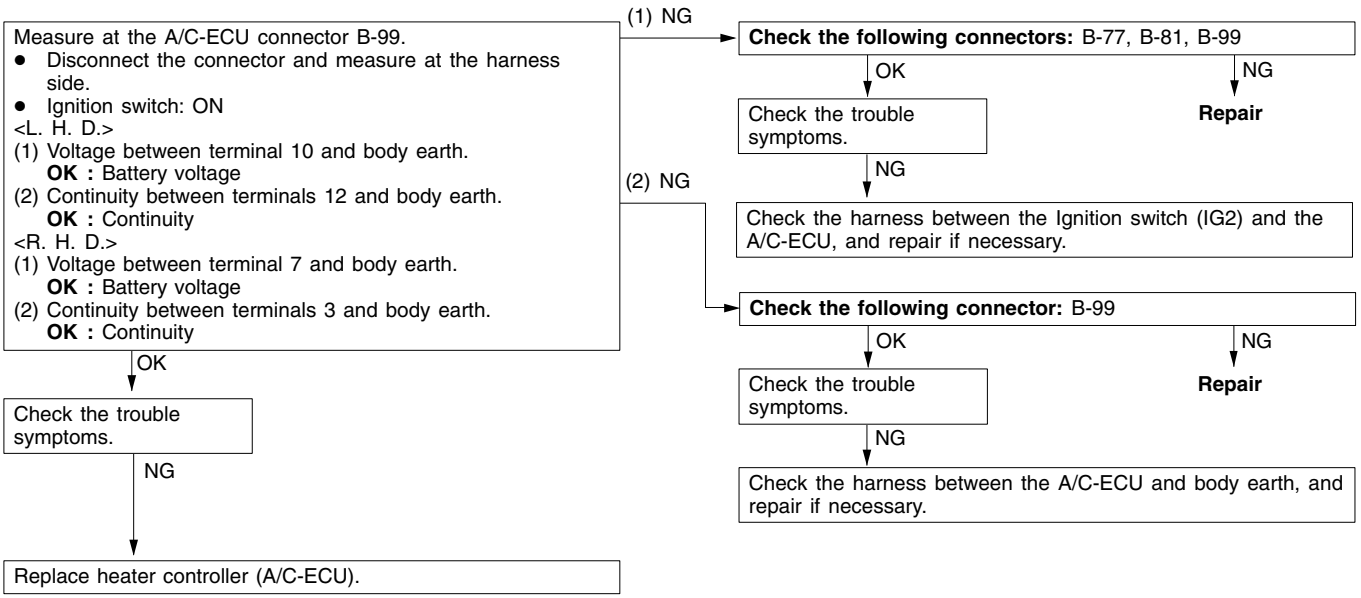
Inspection procedure 5

Defogger timer does not working.	Probable cause
The defogger timer is defective if the defogger is not deactivated in approx.11 minutes after the defogger switch is turned on.	• A/C-ECU fault

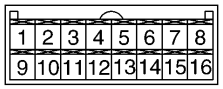
Replace heater controller (A/C-ECU).

Inspection procedure 6

A/C-ECU power supply system check	Probable cause
The A/C-ECU power supply system (including earth) may be defective.	• Harness or connector fault • A/C-ECU fault



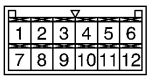
CHECK AT THE A/C-ECU TERMINAL <L.H. DRIVE VEHICLES>



AC201770

Terminal no.	Check item	Check when	Normal state
1	Rear defogger switch	Defogger switch: ON	0 V
		Defogger switch: OFF	Battery voltage
2	Inside/outside air changeover damper motor (outside air)	When damper moved to inside circulation position	0 V
		When damper moved to outside air induction position	Battery voltage
3	Inside/outside air changeover damper motor (inside air)	When damper moved to inside circulation position	Battery voltage
		When damper moved to outside air induction position	0 V
4	Engine-ECU output (A/C1)	When A/C OFF	0 V
		A/C switch: ON, blower: ON (room temperature)	Battery voltage
5	–	–	–
6	Illumination power supply	Lighting switches: ON	Battery voltage
7	–	–	–
6	Blower switch (LO)	Blower switch: LO	Battery voltage
9	–	–	–
10	Ignition switch (IG2) power supply	Ignition switch: ON	Battery voltage
11	Illumination earth	Any time	0 V
12	Earth	Any time	0 V
13	Air thermo sensor (outlet side)	When temperature around sensor 25°C (1.5kΩ)	2.2 V
14	–	–	–
15	–	–	–
16	Air thermo sensor earth	Any time	0 V

CHECK AT THE A/C-ECU TERMINAL <R.H. DRIVE VEHICLES>

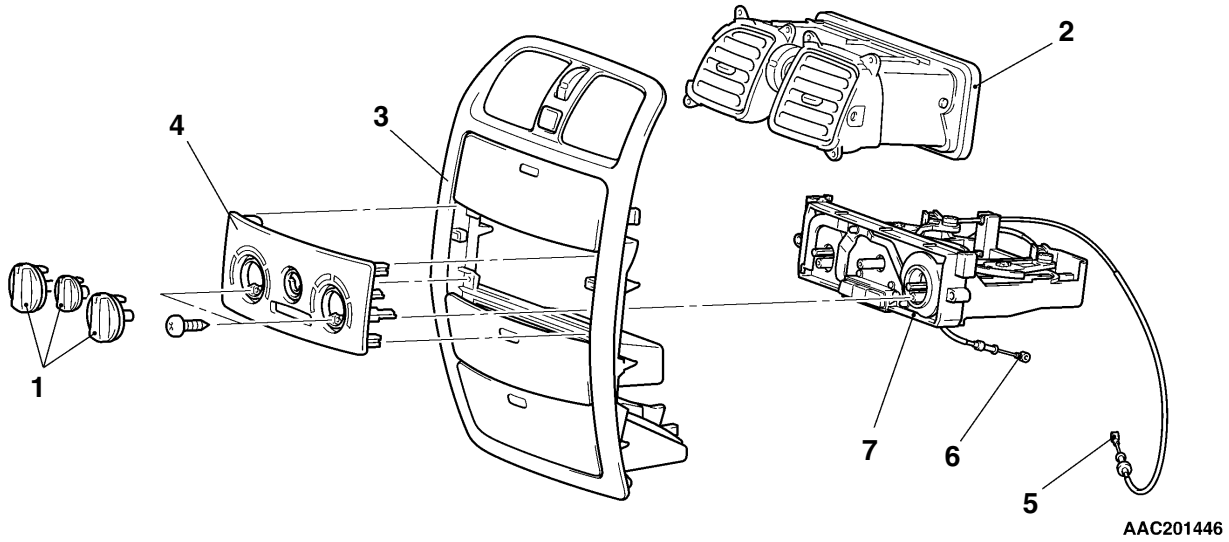


AC201771

Terminal no.	Check item	Check when	Normal state
1	Engine-ECU output (A/C1)	When A/C OFF	0 V
		A/C switch: ON, blower: ON (room temperature)	Battery voltage
2	–	–	–
3	Earth	Any time	0 V
4	Air thermo sensor earth	Any time	0 V
5	Illumination power supply	Lighting switches: ON	Battery voltage
6	Air thermo sensor (outlet side)	When temperature around sensor 25°C (1.5kΩ)	2.2 V
7	Ignition switch (IG2) power supply	Ignition switch: ON	Battery voltage
8	Blower switch (LO)	Blower switch: LO	Battery voltage
9	Rear defogger switch	Defogger switch: ON	0 V
		Defogger switch: OFF	Battery voltage
10	Inside/outside air changeover damper motor (outside air)	When damper moved to inside circulation position	0 V
		When damper moved to outside air induction position	Battery voltage
11	Inside/outside air changeover damper motor (inside air)	When damper moved to inside circulation position	Battery voltage
		When damper moved to outside air induction position	0 V
12	Illumination earth	Any time	0 V

HEATER CONTROL ASSEMBLY (A/C-ECU) AND A/C SWITCH

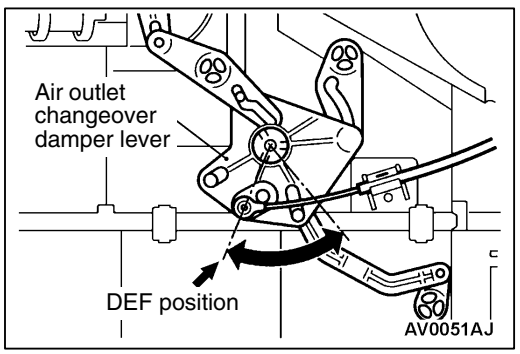
REMOVAL AND INSTALLATION



Removal steps

1. Knob
2. Air outlet
3. Center panel assembly
4. Heater control panel

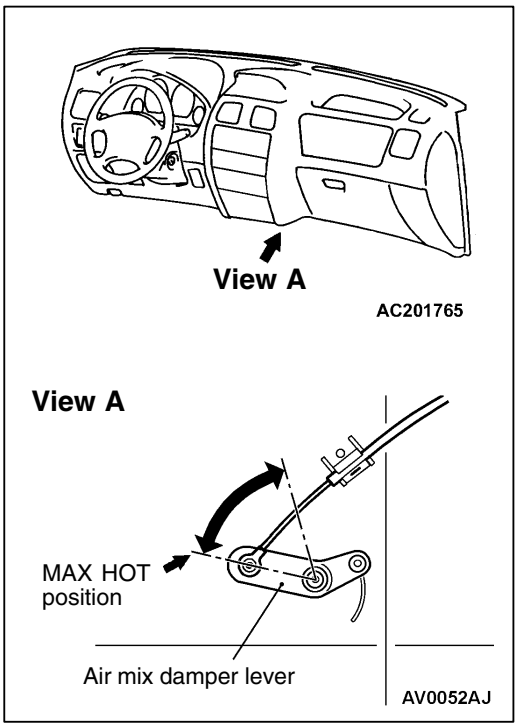
▶B◀ 5. Air mix door cable connection
▶A◀ 6. Blow vent switching damper cable connection
7. Heater controller assembly



INSTALLATION SERVICE POINTS

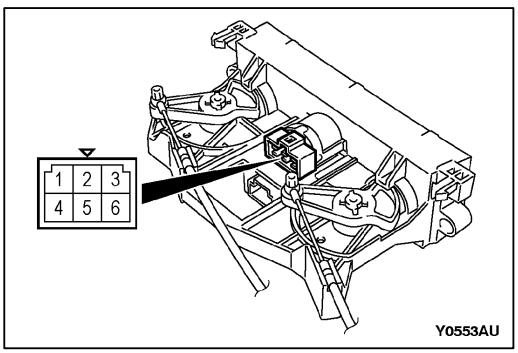
▶A◀ AIR OUTLET CHANGEOVER DAMPER CABLE CONNECTION

1. Set the air outlet changeover control knob on the heater control assembly to the DEF position.
2. Set the air outlet changeover damper lever of the heater unit to the DEF position (turn clockwise the damper lever unit it stops), and then connect the cable to the lever.



▶B◀ AIR MIX DAMPER CABLE CONNECTION

1. Set the temperature control knob on the heater control assembly to the MAX HOT position.
2. Set the air mix damper lever of the heater unit to the MAX HOT position (turn clockwise the damper lever until it stops), and then connect the cable to the lever.

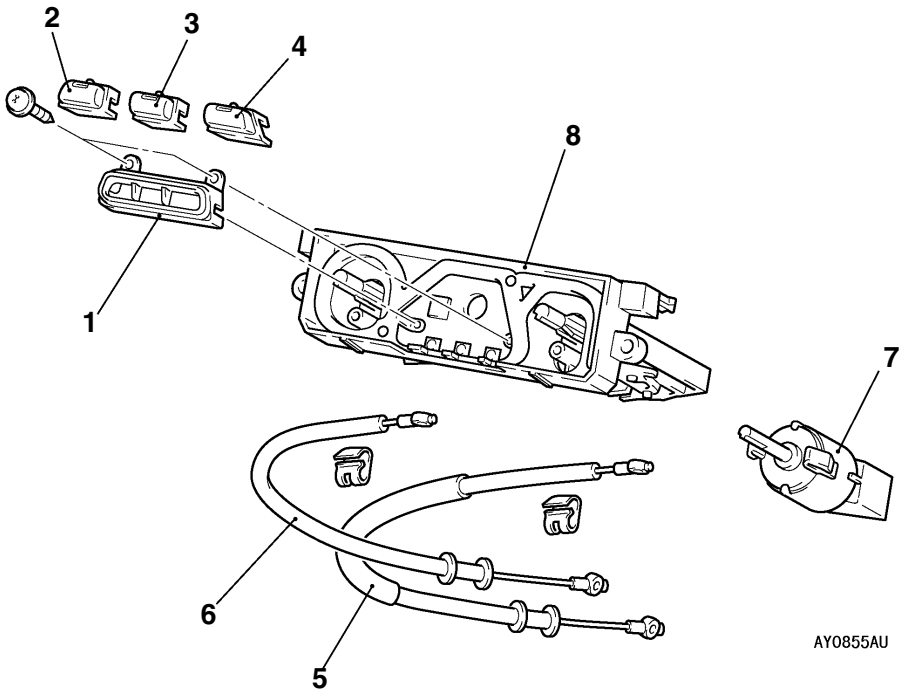


INSPECTION

Blower switch continuity check

Switch position	Terminal no.				
	1	2	4	5	6
0 (OFF)					
1	○	○			
2		○	○		
3		○		○	
4		○			○

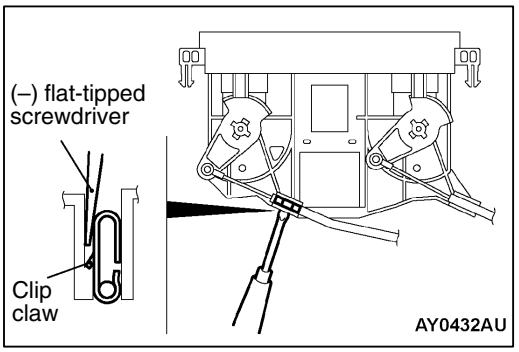
DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. Switch panel
2. Rear window defogger switch
3. Air conditioner switch
4. Inside/outside air changeover switch
5. Blow vent changeover damper cable
6. Air mix damper cable
7. Blower switch assembly
8. Heater controller (A/C-ECU)

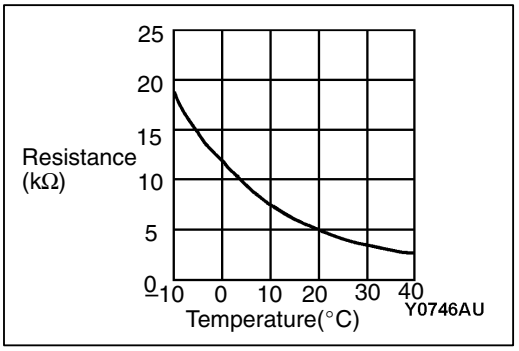
◀A▶
◀A▶



ASSEMBLY SERVICE POINT

◀A▶ BLOW VENT CHANGEOVER DAMPER CABLE AND AIR MIX DAMPER CABLE REMOVAL

Insert a flat-tipped screwdriver into the clip through the inside of the control base and prise out the clip claw to disconnect the cables.



AIR THERMO SENSOR

INSPECTION

Air thermo sensor inspection

Measure the resistance between connector terminals 1 and 2 under at least two different temperatures. The resistance values should generally match those in the graph.

NOTE
The temperature at the check should not exceed the range in the graph.

SERVICE BULLETIN

QUALITY INFORMATION ANALYSIS
OVERSEAS SERVICE DEPT. MITSUBISHI MOTORS CORPORATION

SERVICE BULLETIN	**No.:** MSB-01E55-502	
	Date: 2001-09-20	

Subject: AIR CONDITIONING REFRIGERANT PROCEDURE

Group: HEATER, A/C & VENTILATION

Draft No.: 00AL112911

CORRECTION

INTERNATIONAL CAR ADMINISTRATION OFFICE

T.MASAKI-MANAGER
TECHNICAL SERVICE PLANNING

<Model>	<M/Y>
(EC)PAJERO PININ (H60,H70)	00-10
(EC)PAJERO (V60,70)	01-10
(EC)SPACE RUNNER/SPACE WAGON(N60,80,90)	99-10
(EC)COLT/LANCER (CK01,CJ0A)	93-10
(EC)L200(K00T,K30T)	97-10
(EC)L300(P00)	95-10
(EC)L400(PA0-PD0)	95-10
(EC)PAJERO SPORT (K80W,K90W)	99-10
(EC)SPACE STAR	97-10
(EC)CARISMA	
(EC)GALANT(EA0A)	

1. Description:

The air conditioning refrigerant discharging procedure has been changed as described below.

2. Applicable Manuals:

Manual	Pub. No.	Language	Page(s)
'00 PAJERO PININ/MONTERO iO Workshop Manual	CKRE00E1	(English)	55-13
	CKRS00E1	(Spanish)	
	CKRF00E1	(French)	
	CKRG00E1	(German)	
	CKRD00E1	(Dutch)	
'99 SPACE RUNNER/SPACE WAGON Workshop Manual	PWDE9803	(English)	55-13
	PWDS9804	(Spanish)	
	PWDF9805	(French)	
	PWDG9806	(German)	
	PWDD9807	(Dutch)	
	PWDW9808	(Swedish)	
'96 COLT/LANCER Workshop Manual	PWME9511	(English)	55-13
	PWMS9512	(Spanish)	
	PWMF9513	(French)	
	PWMG9514	(German)	
	PWMD9515	(Dutch)	
	PWMW9516	(Swedish)	

Manual	Pub. No.	Language	Page(s)
'99 SPACE STAR Workshop Manual	CMXE99E1	(English)	55-13
	CMXS99E1	(Spanish)	
	CMXF99E1	(French)	
	CMXG99E1	(German)	
	CMXD99E1	(Dutch)	
	CMXW99E1	(Swedish)	
	CMXI99E1	(Italian)	
'97 L200 Workshop Manual	PWTE96E1	(English)	55-12
	PWTS96E1	(Spanish)	
	PWTF96E1	(French)	
	PWTG96E1	(German)	
'99 PAJERO SPORT/MONTERO SPORT Workshop Manual	PWJE9812	(English)	55-14
	PWJS9813	(Spanish)	
	PWJF9814	(French)	
	PWJG9815	(German)	
'96 CARISMA Workshop Manual	PWDE9502	(English)	55-12
	PWDS9503	(Spanish)	
	PWDF9504	(French)	
	PWDG9505	(German)	
	PWDD9506	(Dutch)	
	PWDW9507	(Swedish)	
'95 L400 Workshop Manual	PWWE9410	(English)	55-20
	PWWS9411	(Spanish)	
	PWWF9412	(French)	
	PWWG9413	(German)	
	PWWD9414	(Dutch)	
	PWWW9415	(Swedish)	
'97 GALANT Workshop Manual	PWDE9611	(English)	55-13
	PWDS9612	(Spanish)	
	PWDF9613	(French)	
	PWDG9614	(German)	
	PWDD9615	(Dutch)	
	PWDW9616	(Swedish)	
'93 COLT/LANCER	PWME9117-D	(English)	55-18-4
	PWMS9118-D	(Spanish)	
	PWMF9119-D	(French)	
	PWMG9120-D	(German)	
	PWMD9121-D	(Dutch)	
	PWMW9122-D	(Swedish)	

Manual	Pub. No.	Language	Page(s)
'01 PAJERO/MONTERO Workshop Manual VOL.2	PWJE00001	(English)	55A-14
	PWJS00002	(Spanish)	
'95 L300 Workshop Manual	PWWE9409	(English)	55-67-4

CD-ROM

Manual	Pub. No.	Language	Page(s)
1992-1995 COLT/LANCER Workshop Manual	PWMM0009R	(English)	55-18-4
	PWMM0009R	(French)	
	PWMM0009R	(German)	
	PWMM0009R	(Dutch)	
1996-2001 COLT/LANCER Workshop Manual	PWMH0018R	(English)	55-13
	PWMH0018R	(Spanish)	
	PWMH0018R	(Swedish)	
	PWMK0019R	(French)	
	PWMK0019R	(German)	
	PWMK0019R	(Dutch)	
2001 PAJERO/MONTERO Workshop Manual	PWJT0008R	(English)	55A-14
	PWJT0008R	(Spanish)	
	PWJT0008R	(French)	
	PWJT0008R	(German)	
1999 SPACE RUNNER/SPACE WAGON Workshop Manual	PWDH1816R	(English)	55-13
	PWDH1816R	(Spanish)	
	PWDH1816R	(Swedish)	
	PWDK9817R	(French)	
	PWDK9817R	(German)	
	PWDK9817R	(Dutch)	
2000 PAJERO PININ/MONTERO iO Workshop Manual	CKRX00E1CD	(English)	55-13
	CKRX00E1CD	(Spanish)	
	CKRZ00E1CD	(French)	
	CKRZ00E1CD	(German)	
	CKRZ00E1CD	(Dutch)	
	CKRZ00E1CD	(Italian)	
1999 PAJERO SPORT/MONTERO SPORT Workshop Manual	PWJT9818R	(English)	55-14
	PWJT9818R	(Spanish)	
	PWJT9818R	(French)	
	PWJT9818R	(German)	
1999 SPACE STAR Workshop Manual	CMXX99E1CD	(English)	55-13
	CMXX99E1CD	(Spanish)	
	CMXX99E1CD	(Swedish)	
	CMXZ99E1CD	(French)	
	CMXZ99E1CD	(German)	
	CMXZ99E1CD	(Dutch)	
	CMXZ99E1CD	(Italian)	

3. Details:

<Correct>

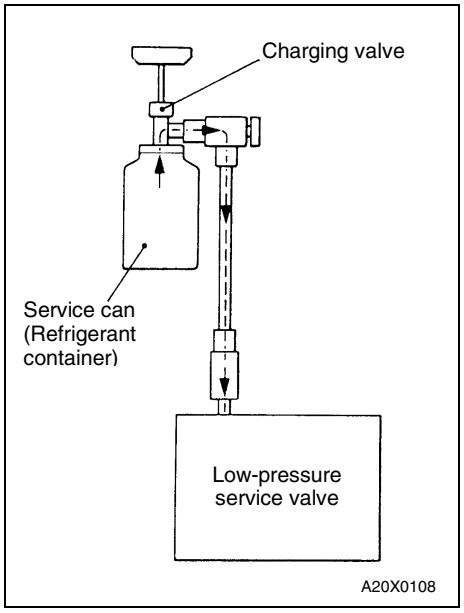
DISCHARGING SYSTEM

Use the refrigerant recovery unit to discharge refrigerant gas from the system.

NOTE

Refer to the Refrigerant Recovery and Recycling Unit Instruction Manual for operation of the unit.

HEATER, AIR CONDITIONER AND VENTILATION –On-vehicle Service



8. Start the engine.
9. Operate the air conditioner and set at the lowest temperature (MAX. COOL).
10. Fix the engine speed at 1,500 r/min.
11. Tighten the handle of the adaptor valve (valve open), and replenish refrigerant while checking the quantity through the sight glass.

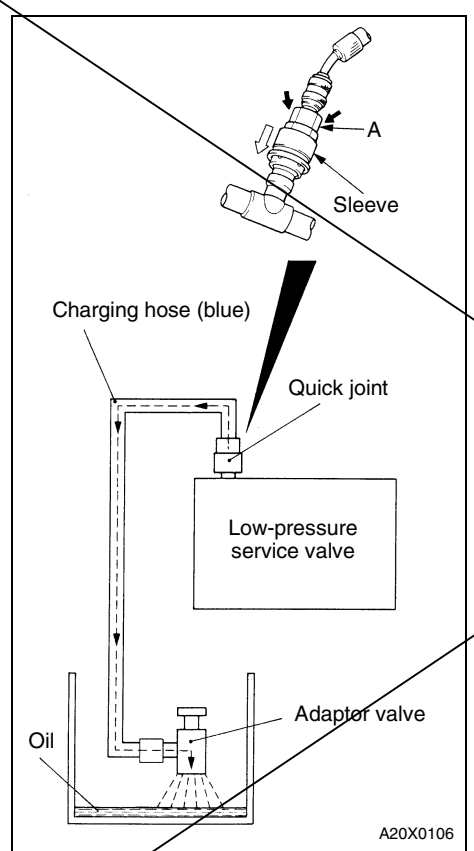
    Caution

    If the service can is inverted, liquid refrigerant may be draw into the compressor damaging it by liquid compression. Keep the service can upright to ensure the refrigerant is changed in gas state.
12. After replenishing is completed, turn the handle of the adaptor valve all the way back (valve close), and remove the quick joint.

    NOTE

    When there is remainder of refrigerant in the service can, keep it for next use with the charge value and the valve of the adaptor valve being closed.

<Incorrect>



DISCHARGING SYSTEM

1. Run the engine at an engine speed of 1,200-1,500 r/min for approximately 5 minutes with the A/C operating to return to the oil.

   NOTE

   Returning the oil will be more effective if it is done while driving.
2. Stop the engine
3. Connect the charging hose (blue) to the adaptor valve with its handle turned back all the way (valve closed).
4. Connect the quick joint to the charging hose (blue).
5. Install the quick joint to the low-pressure service valve.

   NOTE

   The low-pressure service valve should be connected to the suction hose.

   Caution

   To connect the quick joint, press section "A" firmly against the service valve until a click is heard. When connecting, run your hand along the horse while pressing to ensure that there are no bends in the hose.
6. Place the adaptor valve inside the container and discharge the refrigerant by opening the handle gradually so that oil does not gush out.

   NOTE

   Any oil remaining in the container should be returned to the A/C system.