

HEATER, AIR CONDITIONER AND VENTILATION

CONTENTS

55109000119

MANUAL AIR CONDITIONER	3	TROUBLESHOOTING	5
GENERAL INFORMATION	3	ON-VEHICLE SERVICE	7
Safety Precautions	3	Sight Glass Refrigerant Level Test	7
SERVICE SPECIFICATIONS	4	Magnetic Clutch Test	7
LUBRICANTS	4	Receiver Drier Test	7
SPECIAL TOOLS	5	Dual Pressure Switch Check	8

CONTINUED ON NEXT PAGE

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 (*).

Compressor Drive Belt Adjustment	8	AUTOMATIC AIR CONDITIONER	35
Charging	9	GENERAL INFORMATION	35
Performance Test	14	SERVICE SPECIFICATIONS	35
Refrigerant Leak Repair	15	LUBRICANTS	36
Compressor Noise	16	SPECIAL TOOLS	36
Power Relay Check	16	TROUBLESHOOTING	36
Idle-up Operation Check	18	ON-VEHICLE SERVICE	56
HEATER CONTROL ASSEMBLY, A/C SWITCH AND INSIDE/OUTSIDE AIR CHANGEOVER SWITCH	19	AIR CONDITIONER CONTROL PANEL AND ECU ASSEMBLY	57
HEATER UNIT*, HEATER CORE AND BLOWER UNIT	22	DAMPER MOTOR ASSEMBLY AND POWER TRANSISTOR	58
RESISTOR, BLOWER FAN AND MOTOR AND INSIDE/OUTSIDE AIR CHANGEOVER MOTOR	23	COMPRESSOR AND TENSION PULLEY	61
EVAPORATOR	25	PHOTO SENSOR	67
AIR PURIFIER ASSEMBLY	27	OUTSIDE AIR TEMPERATURE SENSOR	68
COMPRESSOR AND TENSION PULLEY	27	HEATER WATER TEMPERATURE SENSOR*	69
REFRIGERANT LINE	28	OTHER MAINTENANCE SERVICE POINTS	70
CONDENSER AND CONDENSER FAN MOTOR	31		
VENTILATORS	33		

MANUAL AIR CONDITIONER

55200010190

GENERAL INFORMATION

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 <MSC90>
Dual pressure switch kPa	High-pressure switch	ON → OFF: 2,942, OFF → ON: 2,353
	Low-pressure switch	ON → OFF: 196, OFF → ON: 221
Refrigerant and quantity g		R-134a (HFC-134a), Approx. 670-710

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

55200030219

Items		Standard value	
Idle speed r/min	4G6	750 ± 50	
	6A1	650 ± 50	
	4D6	800 ± 30	
Idle-up speed r/min	When load by A/C is low	4G6	750 ± 50
		6A1	650 ± 50
		4D6	850 ± 50
	When load by A/C is high	4G6	850 ± 50
		6A1	900 ± 50
		4D6	850 ± 50
Resistor (for blower motor) Ω		LO: 2.30, ML: 1.10, MH: 0.40	
Air gap (Magnetic clutch) mm		0.40 - 0.65	

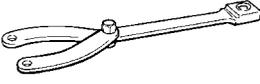
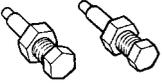
LUBRICANTS

55200040199

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

55200060133

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

TROUBLESHOOTING

55200070242

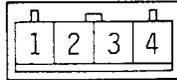
TROUBLESHOOTING PROCEDURES

Trouble symptom	Problem cause	Remedy	Reference page
When the ignition switch is "ON", the A/C does not operate.	A/C compressor relay is defective	Replace the A/C compressor relay	55-17
	Magnetic clutch is defective	Replace the armature plate, rotor or clutch coil	55-65
	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	55-28, 29
	A/C switch is defective	Replace the A/C switch	55-19
	Blower switch is defective	Replace the blower switch	55-21
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-65
	Automatic compressor-ECU is defective	Replace the automatic compressor-ECU	55-26
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	55-28, 29
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-65
	Automatic compressor ECU is defective	Replace the automatic compressor-ECU	55-26
	Engine-ECU is defective	Replace the engine-ECU	-

Trouble symptom	Problem cause	Remedy	Reference page
Blower fan and motor doesn't turn	Blower relay is defective	Replace the blower relay	55-16
	Blower fan and motor is defective	Replace the blower fan and motor	55-23
	Resistor (for blower motor) is defective	Replace the resistor	55-23
	Blower switch is defective	Replace the blower switch	55-21
Blower fan and motor doesn't stop turning.	Short circuit of the harness between the blower fan and motor and the blower switch	Repair the harness	-
	Blower switch is defective	Replace the blower switch	55-21
	Blower relay is defective	Replace the blower relay	55-16
When the A/C is operating condenser fan or radiator fan does not run	Condenser fan motor is defective	Replace the condenser fan motor	55-31
	Radiator fan motor is defective	Replace the radiator fan motor	-
	Fan control relay is defective	Replace the fan control relay	55-17
	Engine-ECU is defective	Replace the engine-ECU	-

INSPECTION AT THE AUTOMATIC COMPRESSOR-ECU TERMINAL

55201030041



2010056

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	0 V
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	0 V
4	Earth	Always	0V

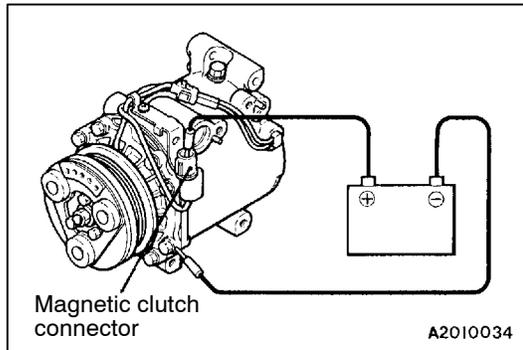
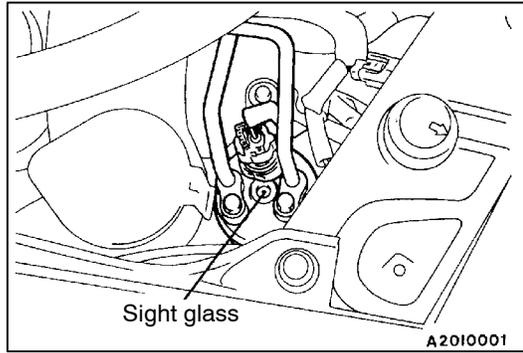
ON-VEHICLE SERVICE

55200840133

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

55200850174

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.

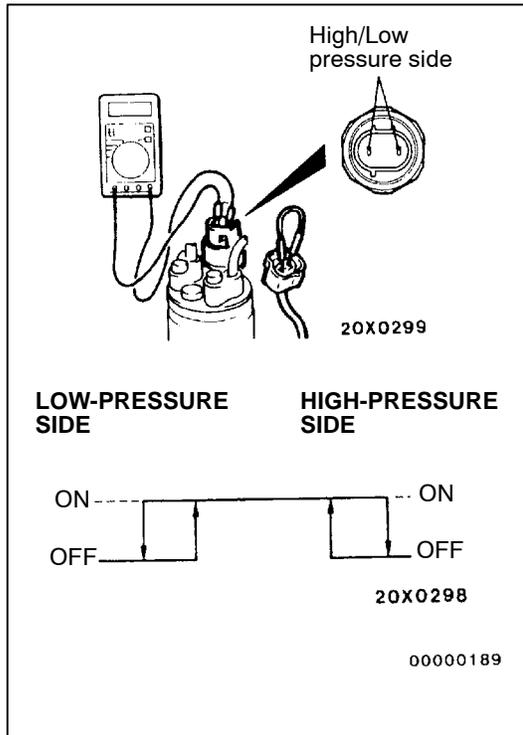
RECEIVER DRIER TEST

55200860115

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

55201040167

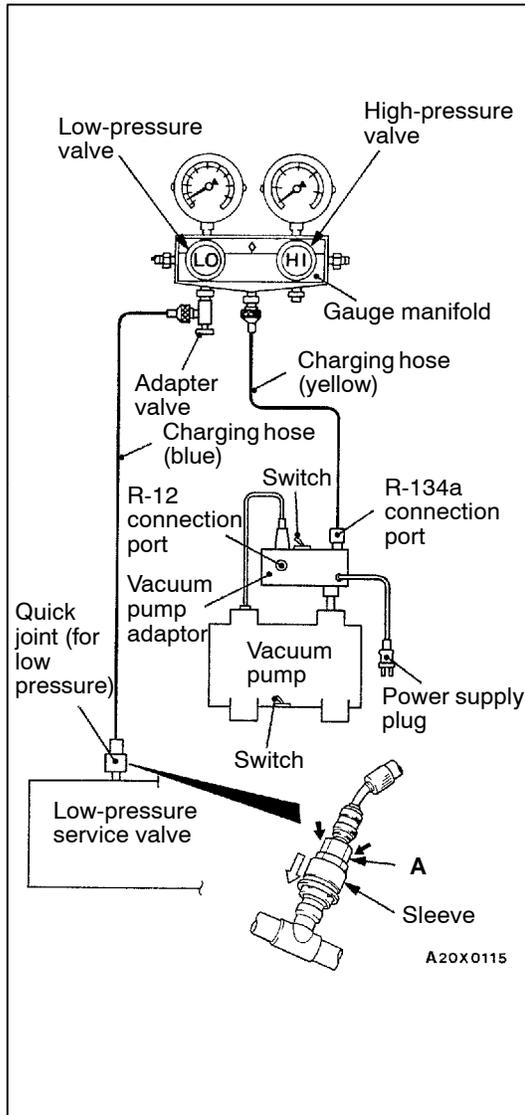
1. Remove the dual pressure switch connector and connect the high/low pressure side terminals located on the harness side as shown in the illustration.
2. Install a gauge manifold to the high-pressure side service valve of the refrigerant line. (Refer to Performance Test.)
3. When the high/low pressure 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	2,353	2,942

COMPRESSOR DRIVE BELT ADJUSTMENT

55200100101

Refer to GROUP 11 - On-vehicle Service.



CHARGING

55200120176

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

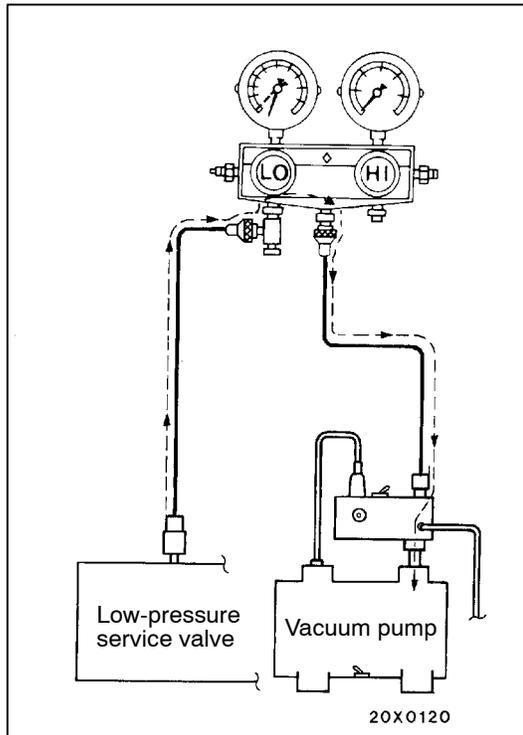
The low-pressure service valve should be connected to the suction flexible hose.

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.

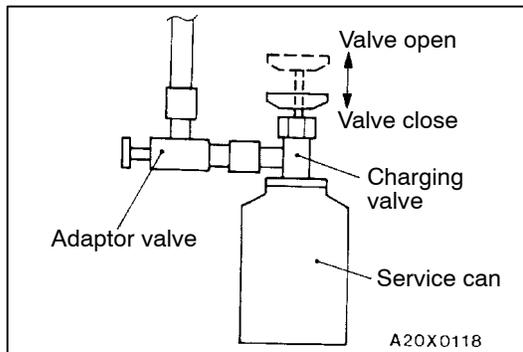
Caution

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

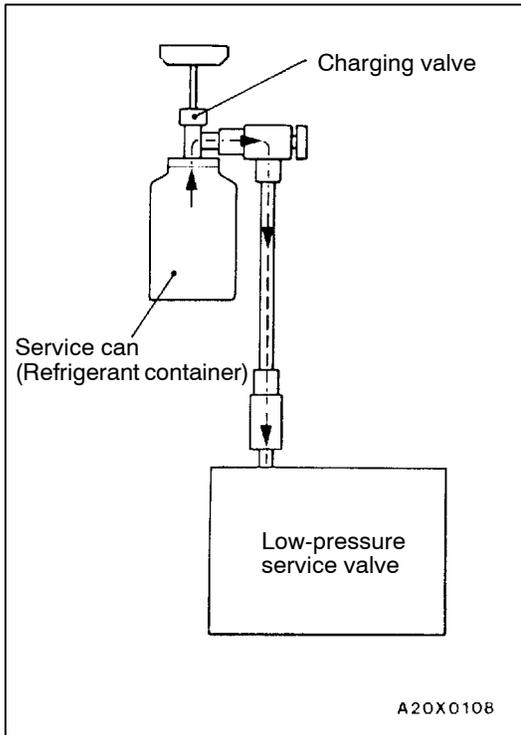
15. Carry out a leak test. (Good if the negative pressure does not drop.)

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.

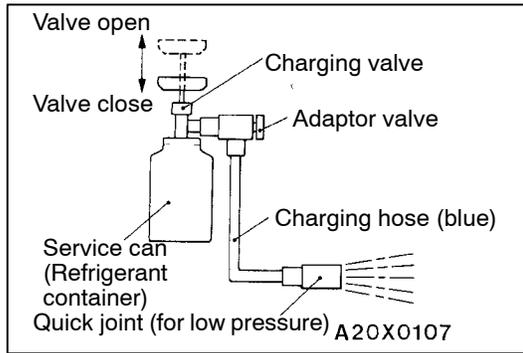
Caution

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.

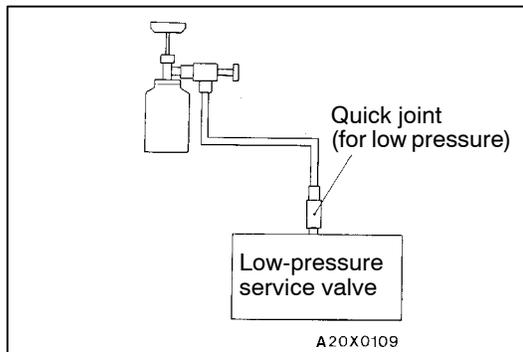
NOTE

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.

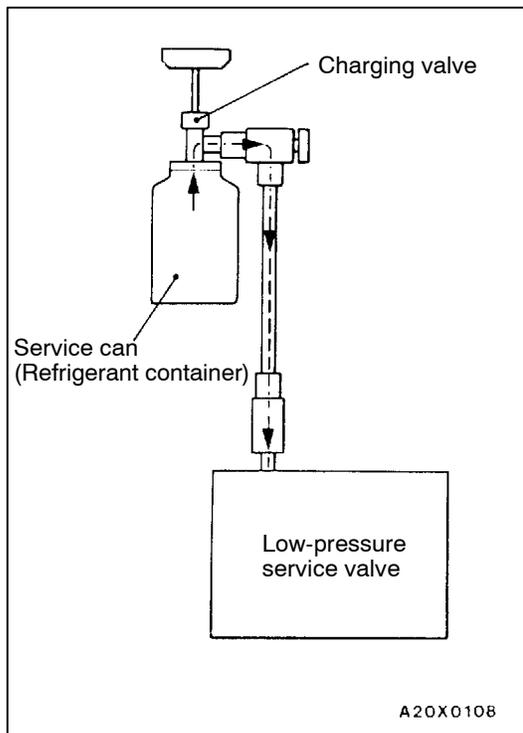
1. Install the charging valve with the handle turned all the way back (valve open) to the service can.
2. Install the adaptor valve with the handle turned all the way back (valve close) to the charging valve.
3. Connect the charging hose (blue) to the adaptor valve.
4. Connect the charging hose (blue) to the quick joint (for low pressure).
5. Tighten the handle of the charging 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 flexible 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.

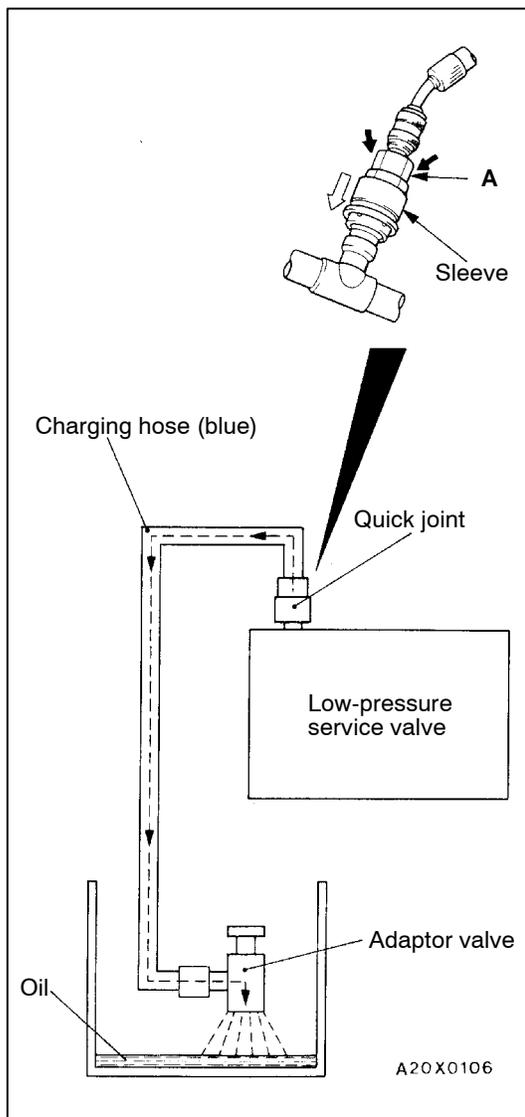
Caution

If the service can is inverted, liquid refrigerant may be drawn 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 valve 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 flexible 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

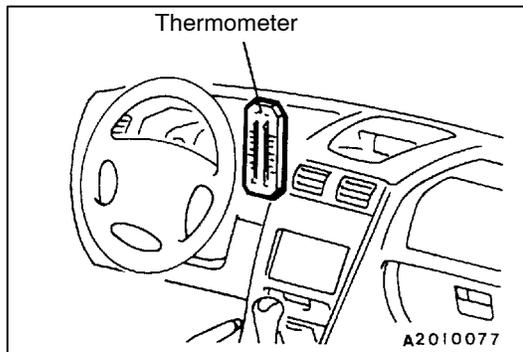
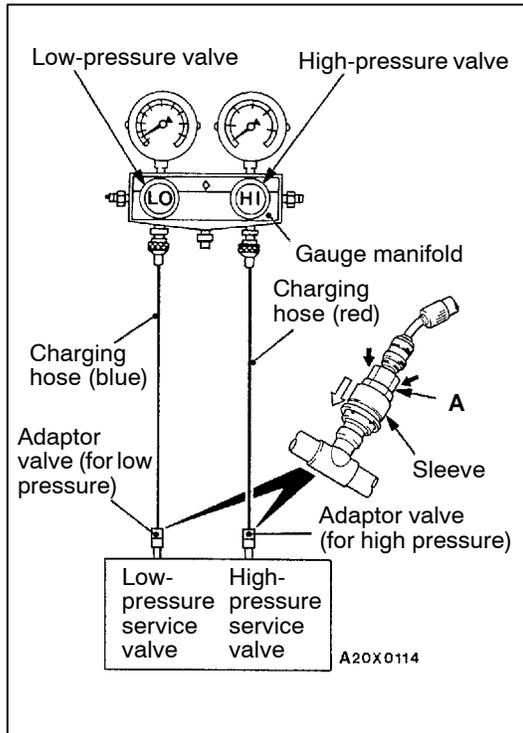
Quantity

Condenser: 15 mL

Evaporator: 60 mL

Suction hose: 10 mL

Receiver: 10 mL



PERFORMANCE TEST

55200140189

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 B and the low-pressure service valve is on the suction flexible 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.

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.

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.

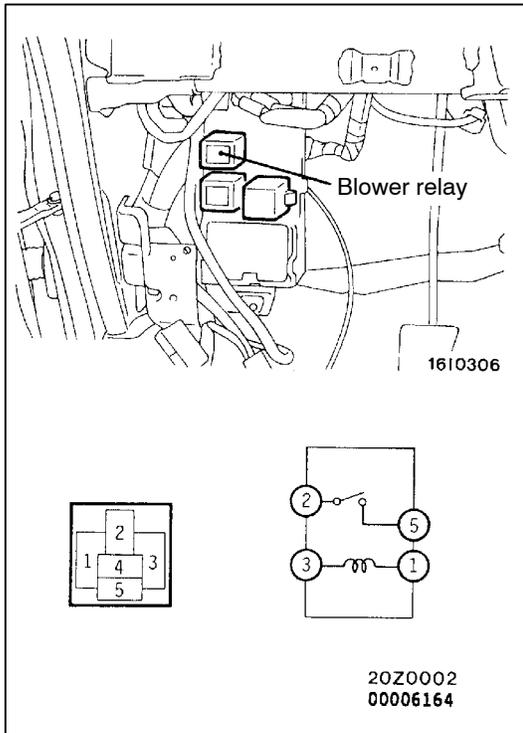
Noises that develop during A/C operation can often be misleading. For example: what sounds like a failed front bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets, or a loose clutch assembly. Verify accessory drive belt tension (power steering or alternator).

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.

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

55200880210

BLOWER RELAY

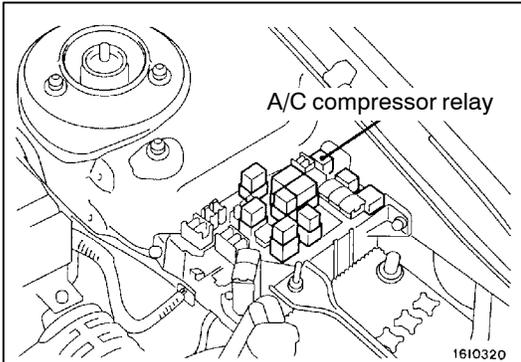
Battery voltage	Terminal No.			
	1	3	2	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

A/C COMPRESSOR RELAY

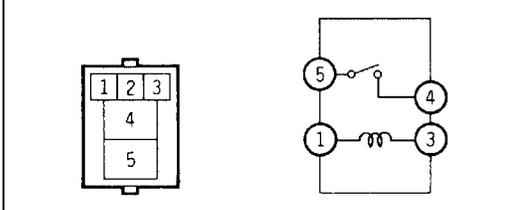
Battery voltage	Terminal No.			
	1	3	4	5
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

FAN CONTROL RELAY

Refer to GROUP 14 - Radiator.



1610320



04Z0001
00006165

IDLE-UP OPERATION CHECK

55200160208

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 idle speed is the standard value.

Standard value:

<4G6> 750 ± 50 r/min

<6A1> 650 ± 50 r/min

<4D6> 800 ± 30 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
4G6	750 ± 50	850 ± 50
6A1	650 ± 50	900 ± 50
4D6	850 ± 50	850 ± 50

NOTE

- (1) The engine-ECU determine whether the load by A/C is low or high according to the output signal from the automatic compressor-ECU <manual A/C> or the A/C-ECU <automatic A/C>.
- (2) There is no necessity to make an adjustment, because the idle 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.)

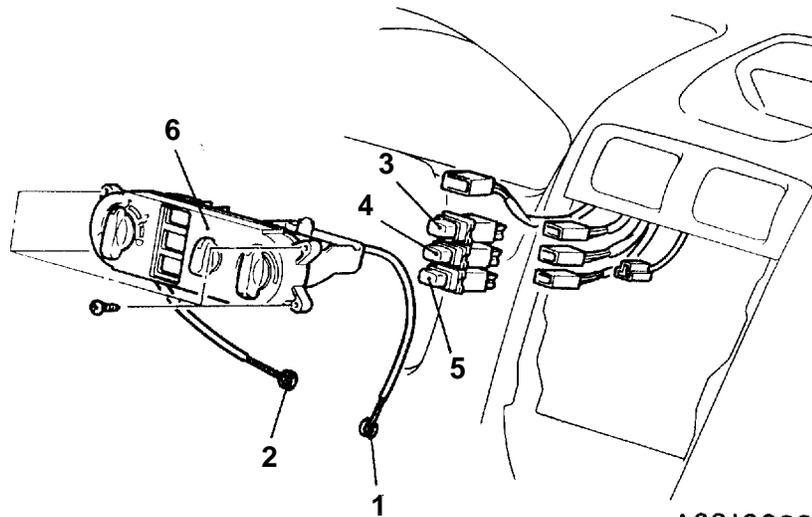
HEATER CONTROL ASSEMBLY, A/C SWITCH AND INSIDE/OUTSIDE AIR CHANGEOVER SWITCH

55201240017

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

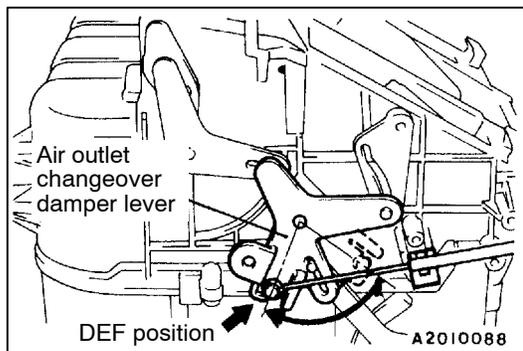
- Center Console Panel, Side Cover Removal and Installation (Refer to GROUP 52A - Instrument Panel.)
- Radio, Tape Player Removal and Installation (Refer to GROUP 54.)



A2010089

Removal steps

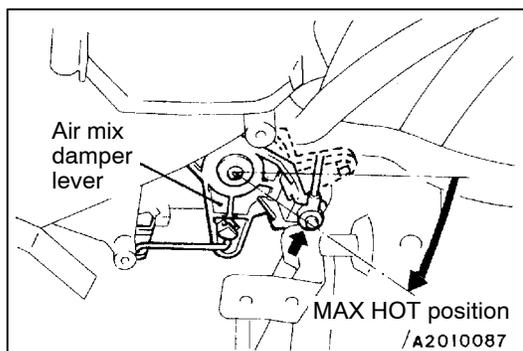
- | | | |
|-----|--|---|
| ▶B◀ | 1. Air mix damper cable connection | 4. A/C switch |
| ▶A◀ | 2. Air outlet changeover damper cable connection | 5. Inside/outside air changeover switch |
| | 3. Rear window defogger switch | 6. Heater control assembly |



INSTALLATION SERVICE POINTS

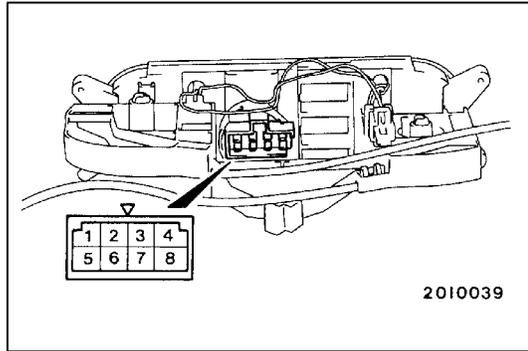
▶A◀ AIR OUTLET CHANGEOVER DAMPER CABLE CONNECTION

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 until 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.

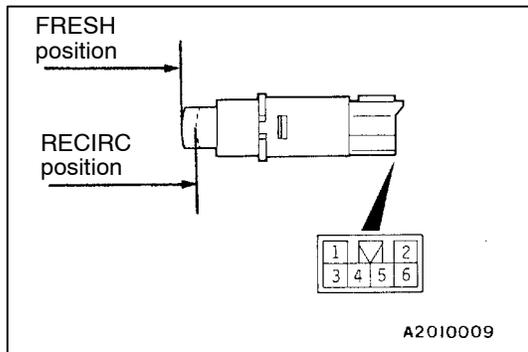


INSPECTION

55201250010

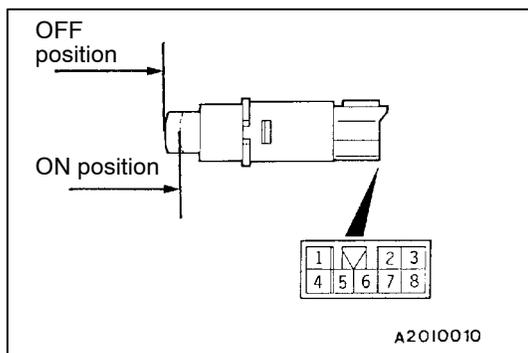
BLOWER SWITCH CONTINUITY CHECK

Switch position	Terminal No.							
	1	2	3	4	5	6	7	8
OFF								
● (LO)	○		○		○			○
● (ML)	○				○	○		○
● (MH)	○	○		○	○			○
● (HI)	○			○	○		○	○



INSIDE/OUTSIDE AIR CHANGEOVER SWITCH CONTINUITY CHECK

Switch position	Terminal No.							
	1	ILL	2	3	IND	4	5	6
RECIRC	○	⊕		○	⊕	○	○	○
FRESH	○	⊕	○	○		○	○	○

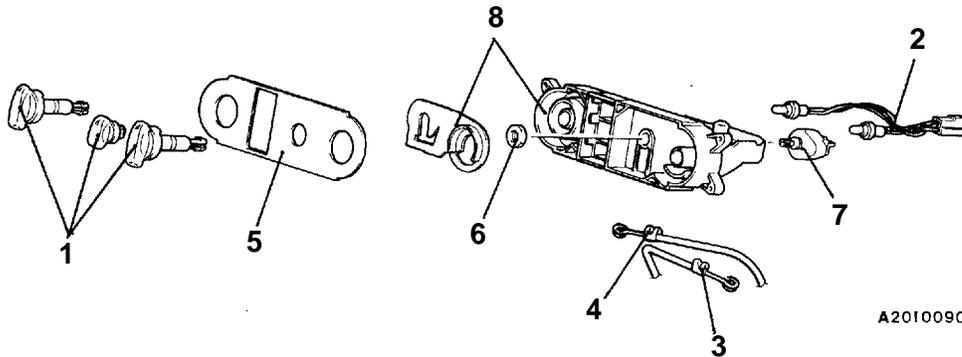


A/C SWITCH CONTINUITY CHECK

Switch position	Terminal No.						
	1	ILL	2	IND	4	5	7
OFF	○	⊕			○		
ON	○	⊕			○		
			○	⊕		○	○

**HEATER CONTROL ASSEMBLY
DISASSEMBLY AND REASSEMBLY**

55100130077



A2010090

Disassembly steps

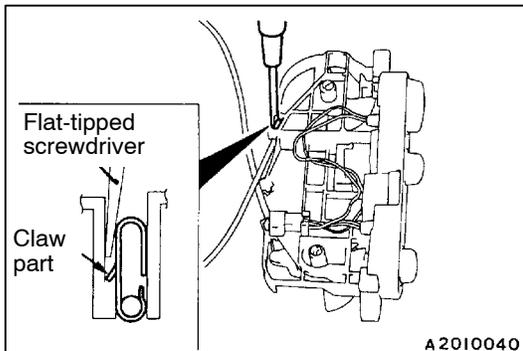
- | | |
|---------------------------------------|--------------------------|
| 1. Knob assembly | 5. Heater control panel |
| 2. Bulb harness | 6. Nut |
| 3. Air outlet changeover damper cable | 7. Blower switch |
| 4. Air mix damper cable | 8. Control base assembly |



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.



A2010040

HEATER UNIT, HEATER CORE, AND BLOWER UNIT

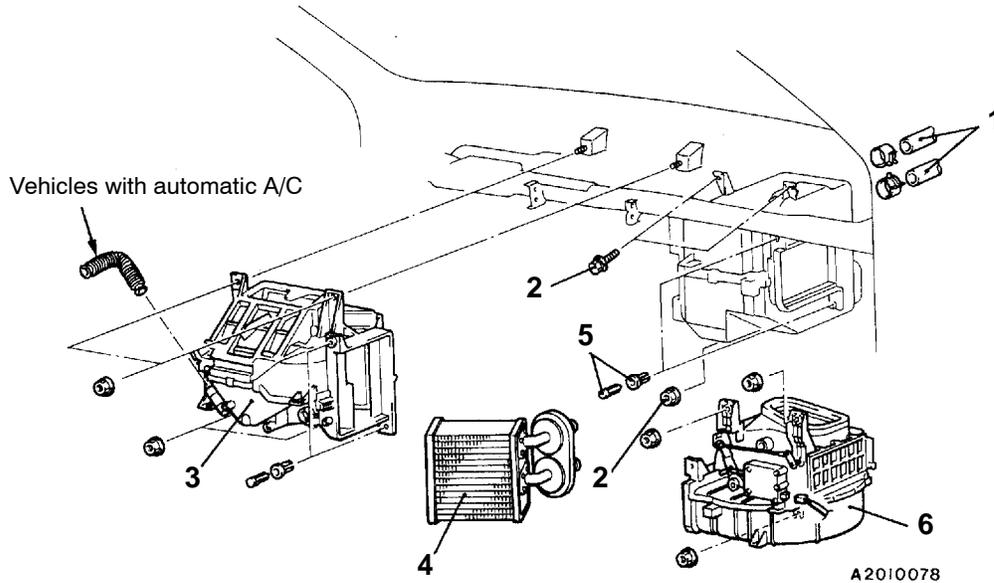
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Under Cover Removal and Installation (Refer to P.55-33.)
- Instrument Panel removal and Installation (Refer to GROUP 52A.)

Caution: SRS

When removing and installing the heater unit from vehicles equipped with SRS, do not let it bump against the SRS-ECU or the components.

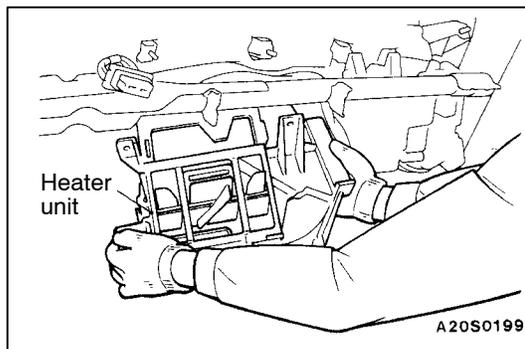


Heater unit and heater core removal steps

- Center reinforcement (Refer to GROUP 52A - Instrument panel.)
 - Center duct assembly and foot distribution duct (Refer to P.55-33.)
 - Draining and refilling engine coolant (Refer to GROUP 14 - On-vehicle service.)
1. Heater hose connection
 2. Evaporator mounting bolt and nut
 3. Heater unit
 4. Heater core

Blower unit removal steps

2. Evaporator mounting bolt and nut
5. Clip
6. Blower unit



REMOVAL SERVICE POINT

◀A▶ HEATER UNIT REMOVAL

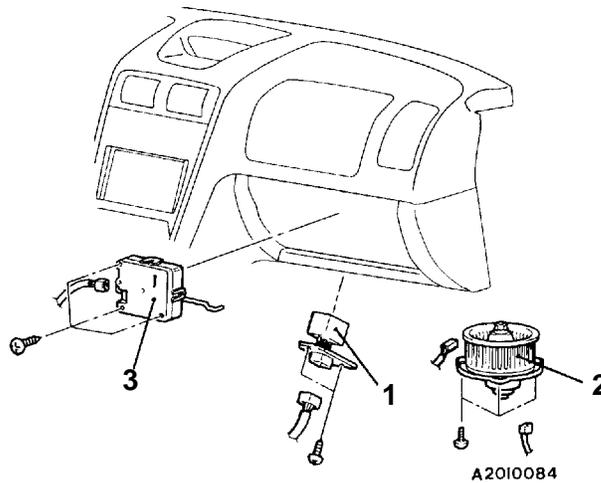
After sliding the cooling unit towards you slightly, remove the heater unit.

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

55100500014

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
 Glove Box Removal and Installation (Refer to GROUP 52A - Instrument Panel.)



Resistor removal steps

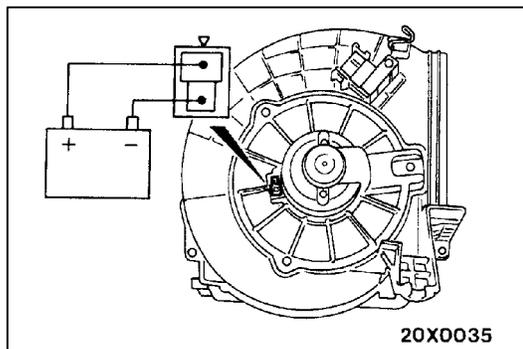
- Under cover (Refer to P.55-33.)
- 1. Resistor

Blower fan and motor removal steps

- Under cover (Refer to P.55-33.)
- 2. Blower fan and motor

Inside/outside air changeover damper motor removal

- 3. Inside/outside air changeover damper motor

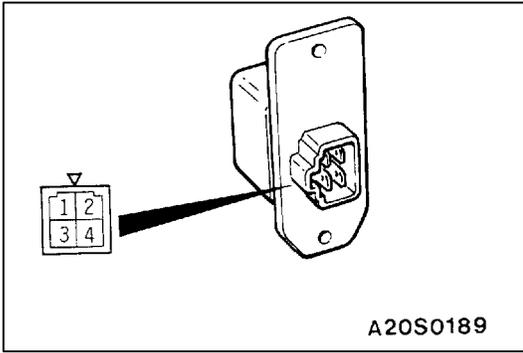


INSPECTION

55100510017

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.

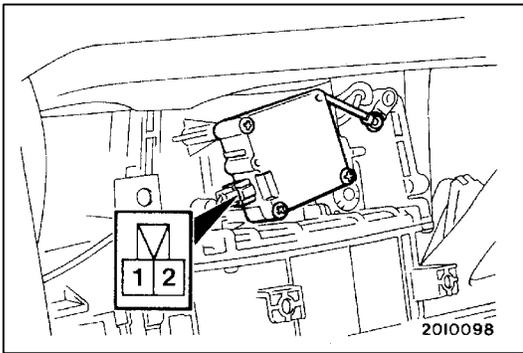


RESISTOR CHECK

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	
⊕	⊖	Moves to the outside air position
⊖	⊕	Moves to the inside air position

Caution

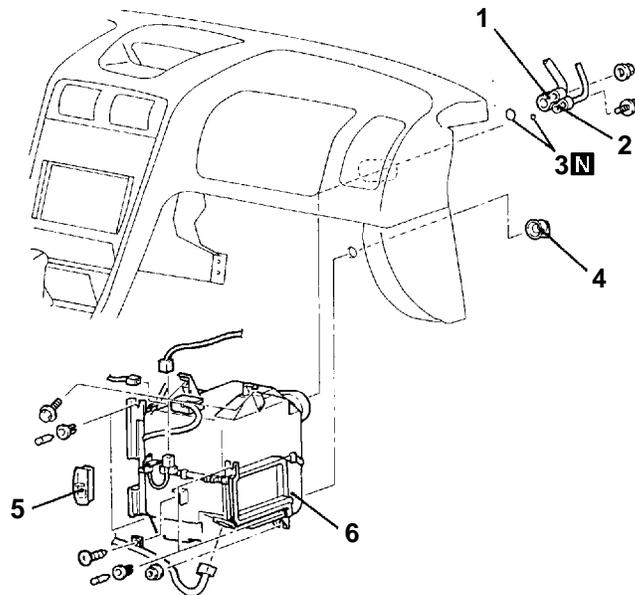
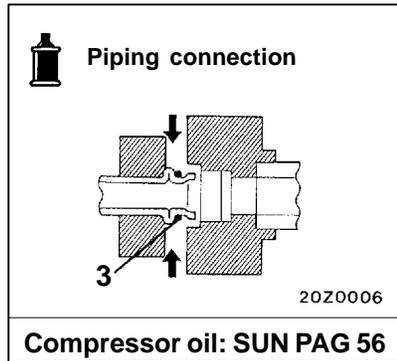
Cut off the battery voltage when the damper is in the inside air position or outside air position.

EVAPORATOR

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Discharging and Charging of Refrigerant (Refer to P.55-9.)
- Glove Box, Side Cover and Glove Box Frame Removal and Installation (Refer to GROUP 52A - Instrument Panel.)
- Under Cover Removal and Installation (Refer to P.55-33.)



20I0083
00006167

Removal steps

1. Suction hose connection
2. Discharge pipe connection
3. O-ring

4. Drain hose
5. Plate
6. Evaporator

REMOVAL SERVICE POINT

◀A▶ SUCTION HOSE, DISCHARGE PIPE 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

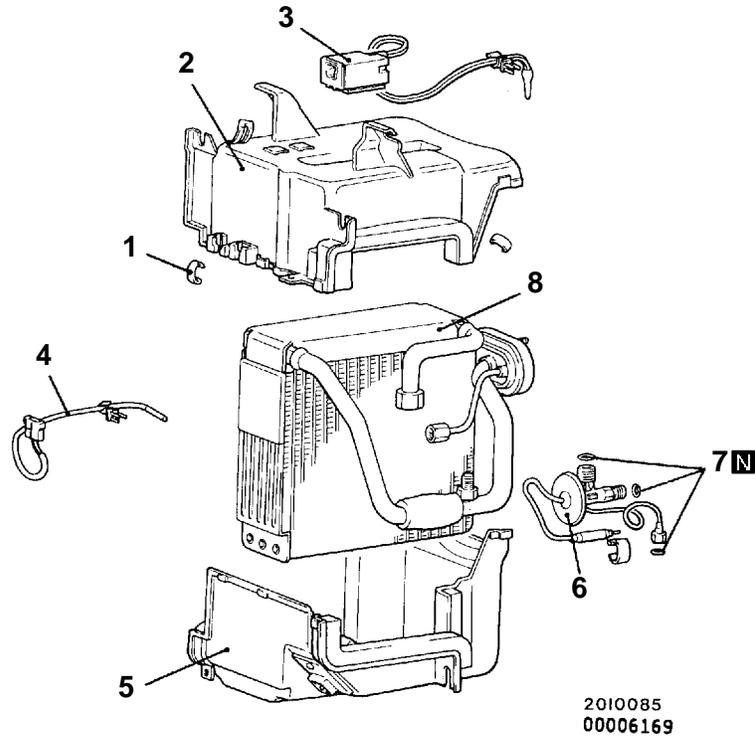
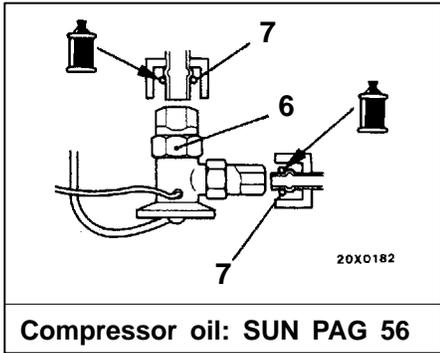
▶A◀ EVAPORATOR INSTALLATION

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

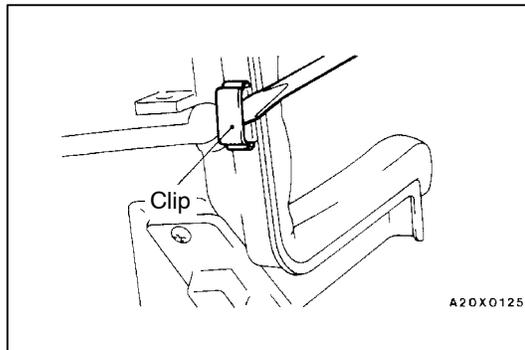


Disassembly steps



- 1. Clip
- 2. Evaporator case (upper)
- 3. Automatic compressor-ECU
<Manual A/C>
- 4. Air thermo sensor <Automatic A/C>

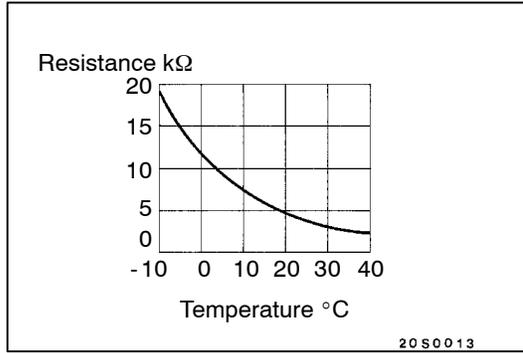
- 5. Evaporator case (lower)
- 6. Expansion valve
- 7. O-ring
- 8. Evaporator



DISASSEMBLY SERVICE POINT

◀▶ CLIP REMOVAL

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



INSPECTION

55200390058

AIR THERMO SENSOR

When the resistance value between the sensor terminals is measured under two or more temperature conditions, the resistance value should be close to the values shown in the graph.

NOTE

The temperature conditions when testing should not exceed the range of the characteristic curve in the graph.

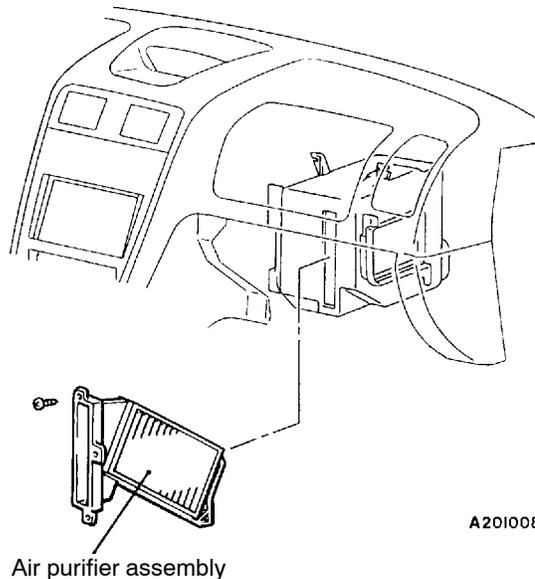
AIR PURIFIER ASSEMBLY

55500100032

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Glove Box, Side Cover and Glove Box Frame Removal and Installation (Refer to GROUP 52A - Instrument Panel.)
- Under Cover Removal and Installation (Refer to P.55-33.)



COMPRESSOR AND TENSION PULLEY

55200410266

Refer to P.55-61.

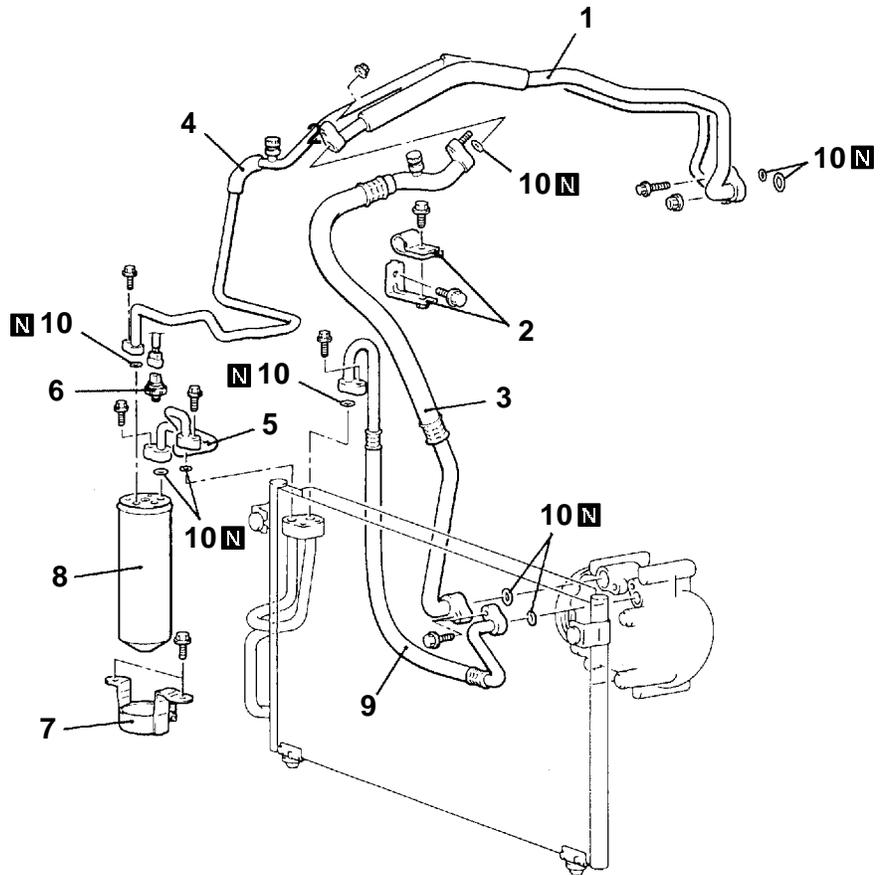
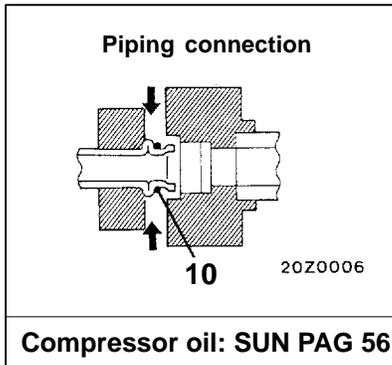
REFRIGERANT LINE

REMOVAL AND INSTALLATION

<L.H. DRIVE VEHICLES>

Pre-removal and Post-installation Operation

- Discharging and Changing of Refrigerant (Refer to P.55-9.)
- Reserve Tank Removal and Installation (Refer to GROUP 14 - Radiator.)
- Oil Reservoir Removal and Installation (Refer to GROUP 37A - Power Steering Hoses.)



2010074
00006160

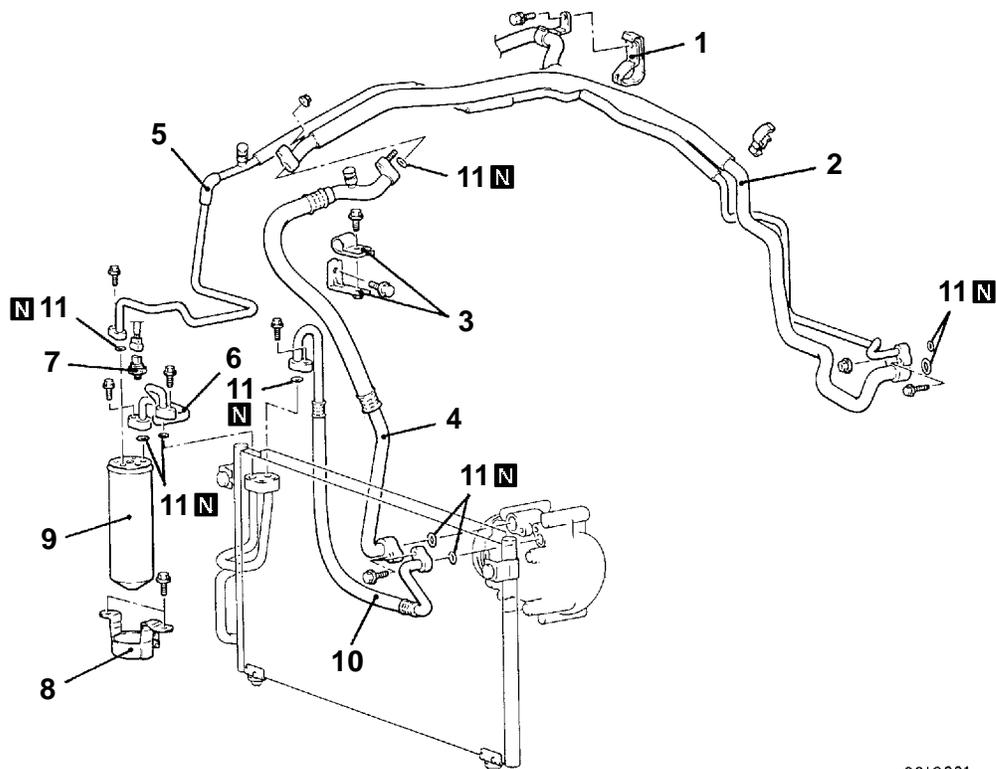
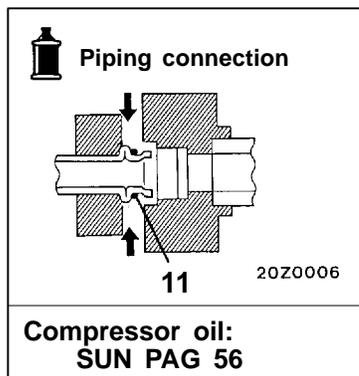
Removal steps

- | | | | |
|---|--|-----------------------|--|
| <p>◀A▶</p> <p>◀A▶</p> <p>◀A▶</p> <p>◀A▶</p> | <p>1. Suction pipe</p> <p>2. Clamp and bracket</p> <p>3. Suction flexible hose</p> <p>4. Liquid pipe A</p> <p>5. Liquid pipe B</p> | <p>▶A▶</p> <p>▶A▶</p> | <p>6. Dual pressure switch</p> <p>7. Receiver bracket assembly</p> <p>8. Receiver assembly</p> <p>9. Discharge flexible hose</p> <p>10. O-ring</p> |
|---|--|-----------------------|--|

<R.H. DRIVE VEHICLES>

Pre-removal and Post-installation Operation

- Discharging and Changing of Refrigerant (Refer to P.55-9.)
- Canister Removal and Installation (Refer to GROUP 17.)
- Reserve Tank Removal and Installation (Refer to GROUP 14 - Radiator.)
- Oil Reservoir Removal and Installation (Refer to GROUP 37A - Power Steering Hoses.)

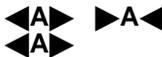


2010021
00005673

Removal steps



1. Clamp
2. Suction pipe
3. Clamp and bracket
4. Suction flexible hose
5. Liquid pipe B
6. Liquid pipe A



7. Dual pressure switch
8. Receiver bracket assembly
9. Receiver assembly
10. Discharge flexible hose
11. O-ring

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:

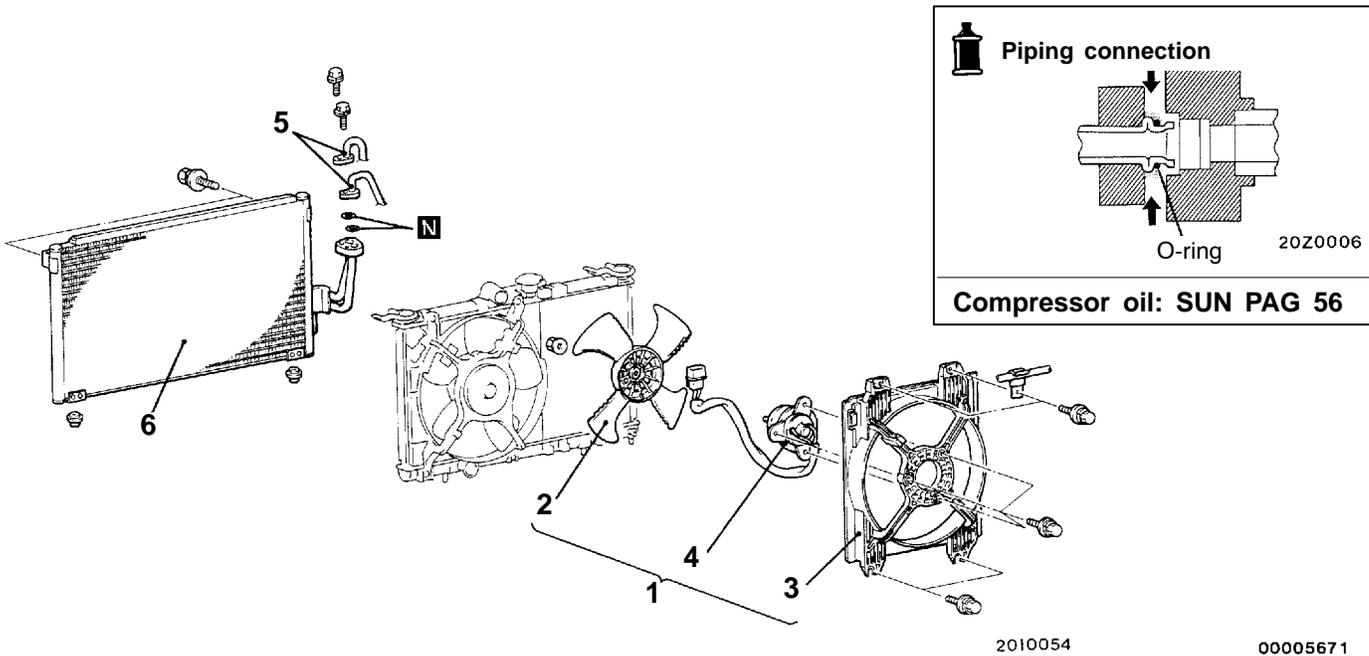
Suction hose: 10 mL

Receiver assembly: 10 mL

CONDENSER AND CONDENSER FAN MOTOR

55200670244

REMOVAL AND INSTALLATION



Condenser fan motor removal steps

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

Condenser removal steps

- Discharging and charging of refrigerant (Refer to P.55-9.)
- Air cleaner
- Engine coolant draining and supplying (Refer to GROUP 14 - On-vehicle service.)
- Radiator (Refer to GROUP 14.)
- 5. Discharge flexible hose and liquid pipe A connection
- 6. Condenser



REMOVAL SERVICE POINT

◀A▶ DISCHARGE FLEXIBLE HOSE AND LIQUID PIPE A CONNECTION

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.

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

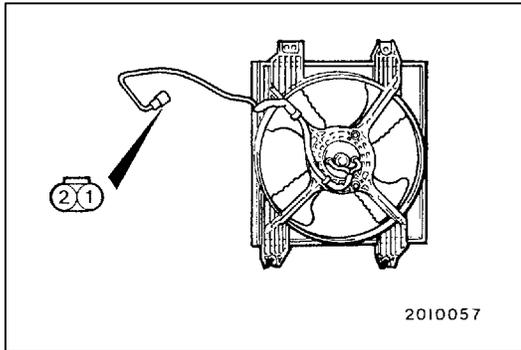
Quantity: 15 mL

INSPECTION

55200680148

CONDENSER FAN MOTOR CHECK

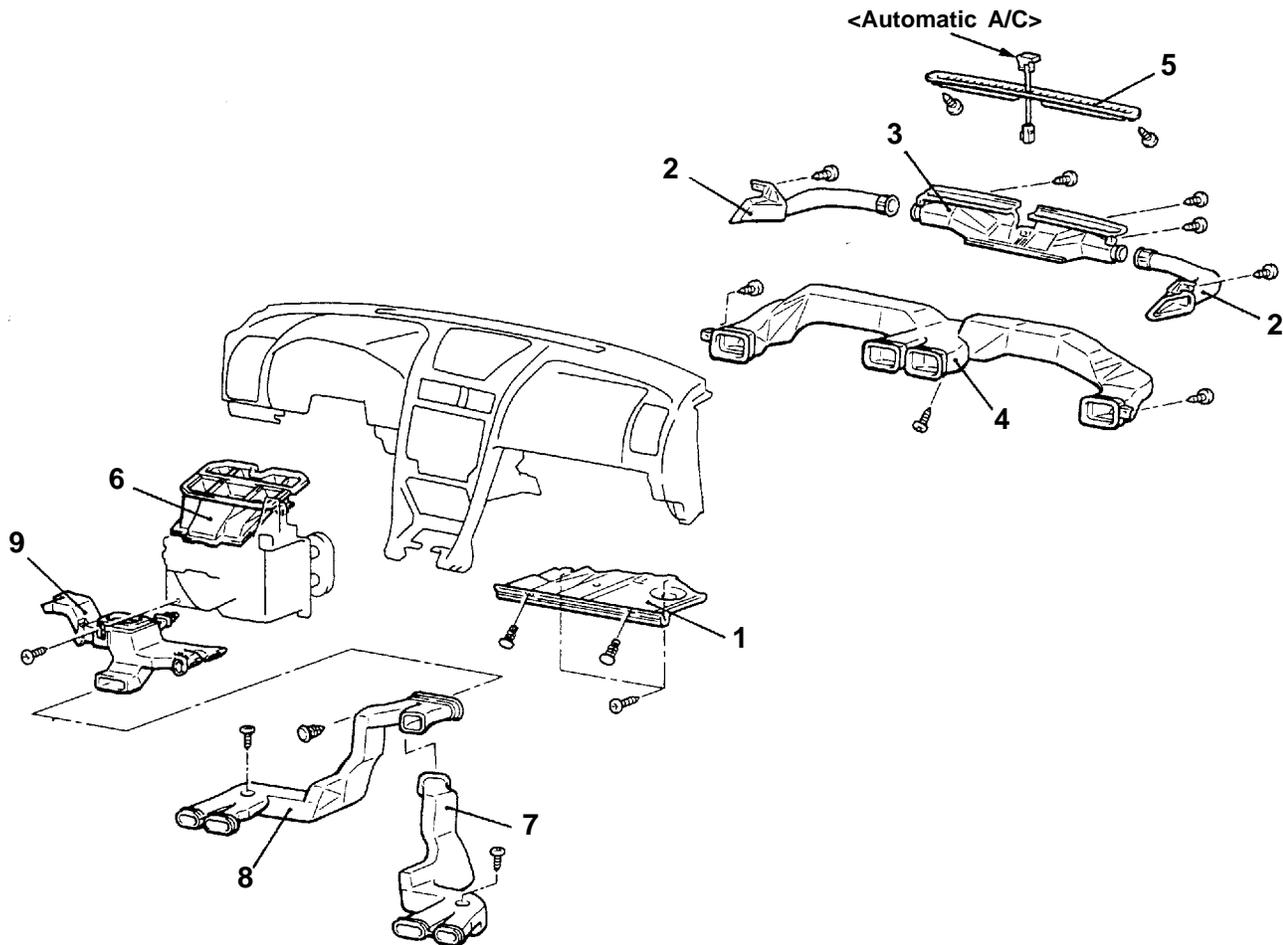
Check to be sure that the condenser fan motor operates when battery voltage is applied to terminal 1 and terminal 2 earthed.



VENTILATORS

55300160119

REMOVAL AND INSTALLATION



A2010091

Under cover removal

1. Under cover

Defroster nozzle and distribution duct removal steps

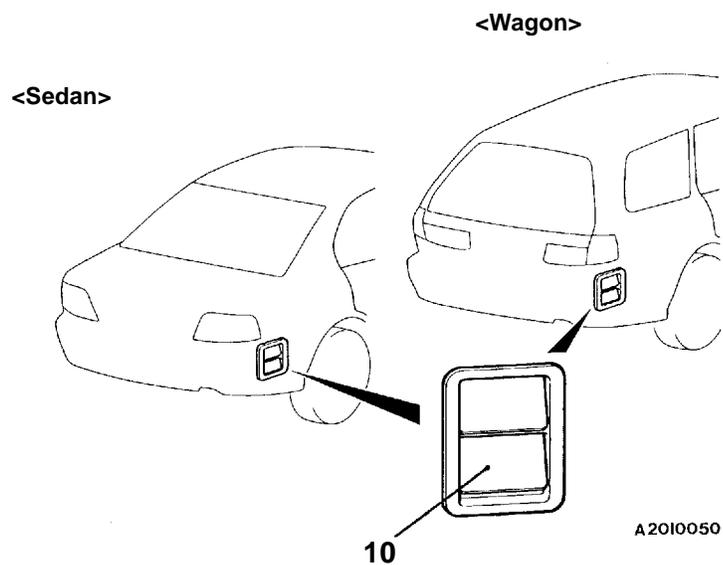
- Floor console assembly (Refer to GROUP 52A.)
 - Instrument panel (Refer to GROUP 52A.)
2. Side defroster duct
 3. Defroster nozzle assembly
 4. Distribution duct assembly
 5. Defroster garnish and photo sensor
 6. Center duct assembly

Rear heater duct and foot distribution duct removal steps

- Front seat (Refer to GROUP 52A.)
 - Floor console assembly (Refer to GROUP 52A.)
 - Instrument panel and center reinforcement (Refer to GROUP 52A.)
7. Rear heater duct (R.H.)
 8. Rear heater duct (L.H.)
 9. Foot distribution duct

NOTE

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



Rear ventilation duct assembly removal steps

- Rear bumper (Refer to GROUP 51.)
10. Rear ventilation duct assembly

NOTE

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

AUTOMATIC AIR CONDITIONER

55400010080

GENERAL INFORMATION

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-directed air flow function.

An air purifier which carries out fine A/C control has been included.

The A/C system is basically the same as the manual air conditioner in which a new refrigerant system has been adopted. However, an A/C control panel with a reduced number of buttons and more compact arrangement of necessary functions owing to more functions being assigned to each button has been adopted.

Items		Specifications
Heater unit	Type	Two-way-flow full-air-mix system
Heater control assembly		Push button type
Compressor	Model	Scroll type <MSC 90>
Dual pressure switch kPa	High-pressure switch	ON → OFF: 2,942, OFF → ON: 2,353
	Low-pressure switch	ON → OFF: 196, OFF → ON: 221
Refrigerant and quantity g		R-134a (HFC-134a), Approx. 670 - 710

SERVICE SPECIFICATIONS

55400030086

Items		Standard value	
Idle speed r/min	4G6	750 ± 50	
	6A1	650 ± 50	
	4D6	800 ± 30	
Idle-up speed r/min	When load by A/C is low	4G6	750 ± 50
		6A1	650 ± 50
		4D6	850 ± 50
	When load by A/C is high	4G6	850 ± 50
		6A1	900 ± 50
		4D6	850 ± 50
Air mix damper motor potentiometer resistance kΩ	MAX. HOT position	Approx. 4.8	
	MAX. COOL position	Approx. 0.2	
Outlet air changeover damper motor potentiometer resistance kΩ	DEF position	Approx. 4.8	
	FACE position	Approx. 0.2	
Air gap (Magnetic clutch) mm		0.40 - 0.65	

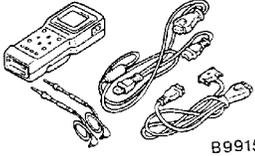
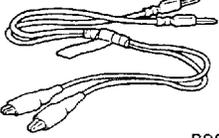
LUBRICANTS

55400040072

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

55400060061

Tool	Number	Name	Use
 B991502	MB991502	MUT-II sub-assembly	Inspection of automatic air conditioner
 B991529	MB991529	Diagnosis code check harness	Inspection of automatic air conditioner using a voltmeter

NOTE

Other special tools are the same as for the manual A/C.

TROUBLESHOOTING

55400470055

STANDARD FLOW OF DIAGNOSTIC TROUBLESHOOTING

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

DIAGNOSIS FUNCTION

55400480072

DIAGNOSIS CODES CHECK

Connect the MUT-II to the diagnosis connector (16-pin) under the instrument under cover, then check diagnosis codes.

(Refer to GROUP 00 - How to Use Troubleshooting/Inspection Service Points.)

ERASING DIAGNOSIS CODES

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

INSPECTION CHART FOR DIAGNOSIS CODES

55400490051

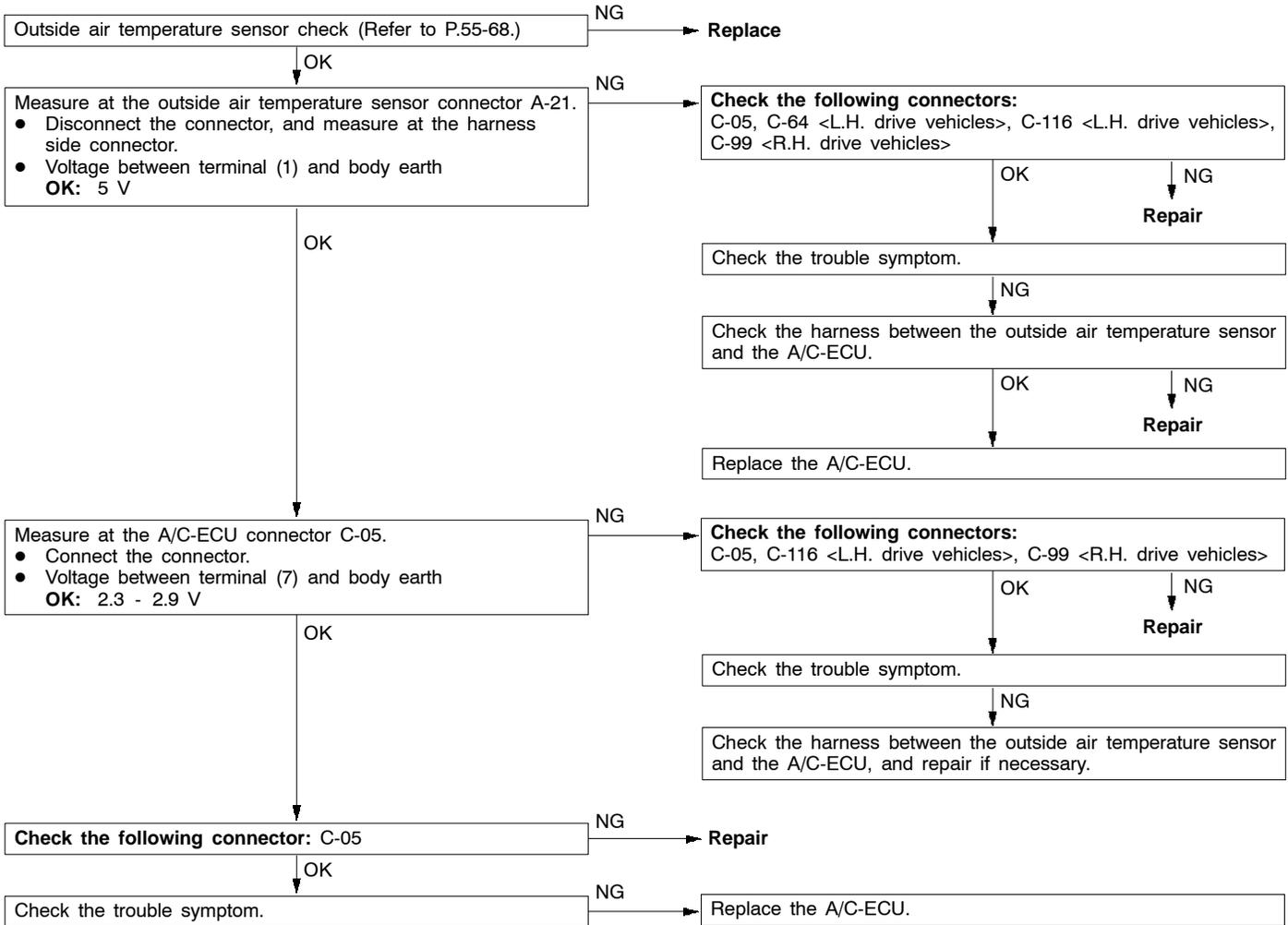
Code No.	Diagnosis item	Reference page
11	Inside air temperature sensor system (open circuit)	55-37
12	Inside air temperature sensor system (short circuit)	55-37
13	Outside air temperature sensor system (open circuit)	55-38
14	Outside air temperature sensor system (short circuit)	55-38
15	Heater water temperature sensor system (open circuit)	55-39
16	Heater water temperature sensor system (short circuit)	55-39
21	Air thermo sensor system (open circuit)	55-40
22	Air thermo sensor system (short circuit)	55-40
31	Potentiometer system of air mix damper motor assembly	55-41
32	Potentiometer system of air outlet changeover damper motor assembly	55-42
41	Drive system of air mix damper motor assembly	55-43
42	Drive system of air outlet changeover damper motor assembly	55-43

INSPECTION PROCEDURES FOR DIAGNOSIS CODES

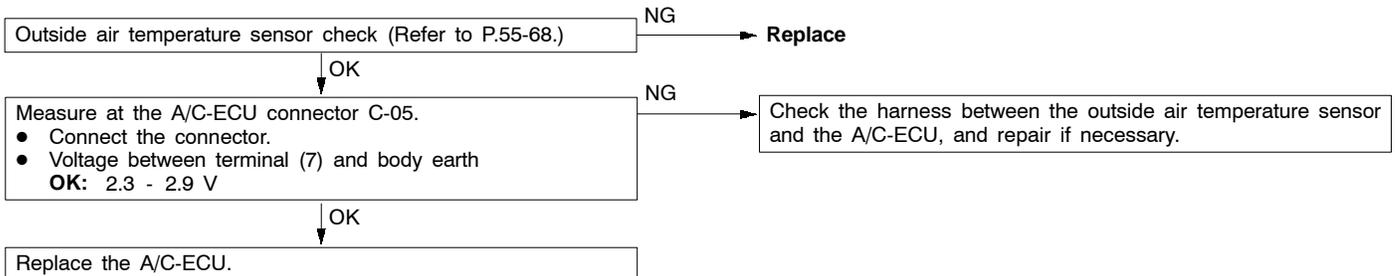
Code No.11 or 12 Inside air temperature sensor system	Probable cause
This diagnosis code is output if the inside air temperature sensor inside the A/C-ECU is defective.	<ul style="list-style-type: none"> Malfunction of the A/C-ECU

Replace the A/C-ECU.

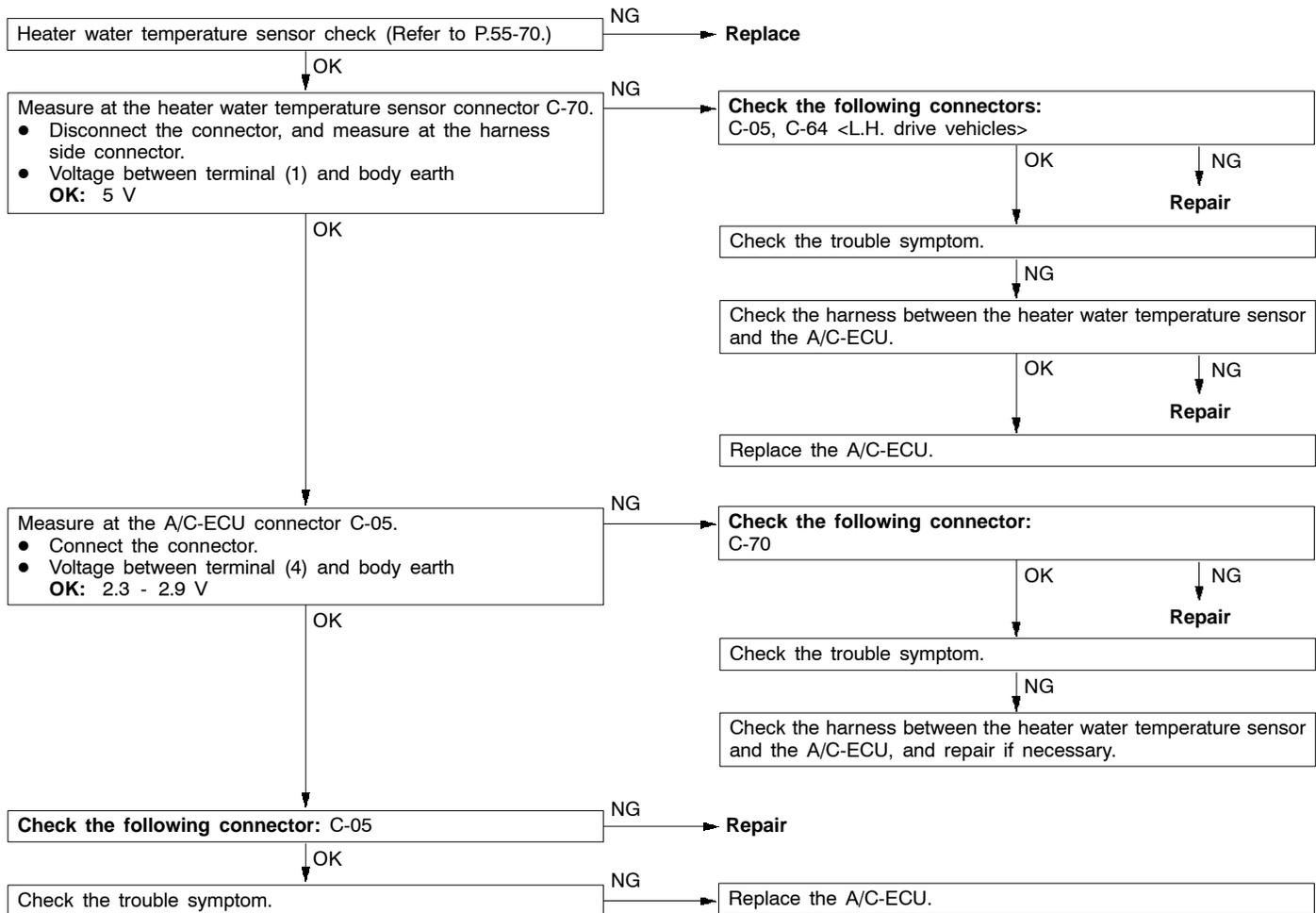
Code No.13 Outside air temperature sensor system (open circuit)	Probable cause
This diagnosis code is output if there is a defective connector connection, or if there is an open circuit in the harness.	<ul style="list-style-type: none"> ● Malfunction of connector ● Malfunction of harness ● Malfunction of the outside air temperature sensor ● Malfunction of the A/C-ECU



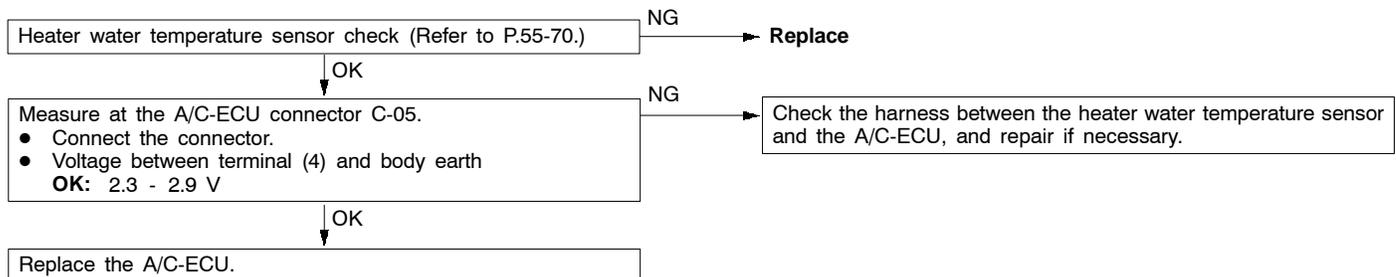
Code No.14 Outside air temperature sensor system (short circuit)	Probable cause
This diagnosis code is output if there is a short circuit in the outside air temperature sensor input circuit.	<ul style="list-style-type: none"> ● Malfunction of harness ● Malfunction of connector ● Malfunction of the outside air temperature sensor ● Malfunction of the A/C-ECU



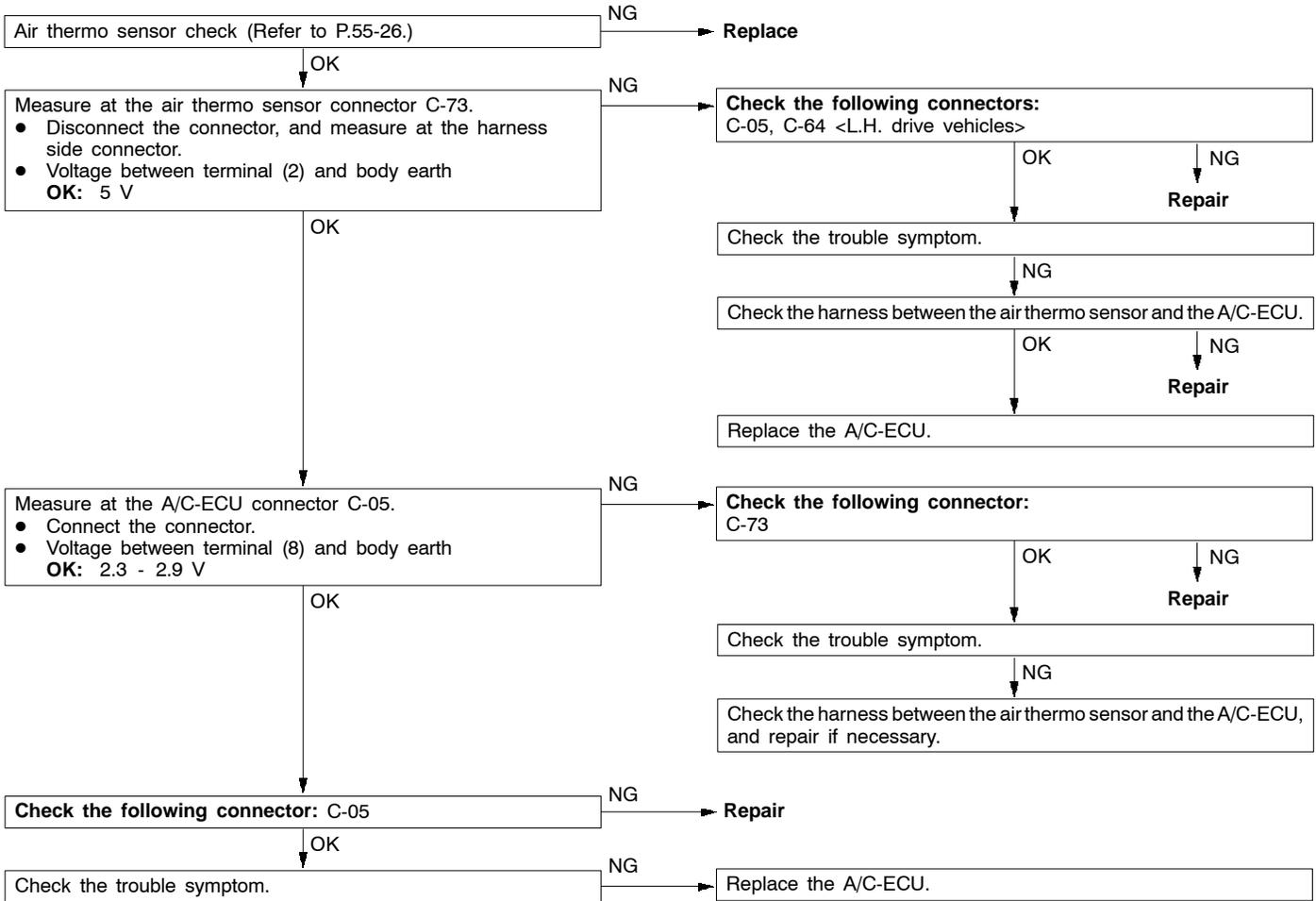
Code No.15 Heater water temperature sensor system (open circuit)	Probable cause
This diagnosis code is output if there is a defective connector connection, or if there is an open circuit in the harness.	<ul style="list-style-type: none"> ● Malfunction of connector ● Malfunction of harness ● Malfunction of the heater water temperature sensor ● Malfunction of the A/C-ECU



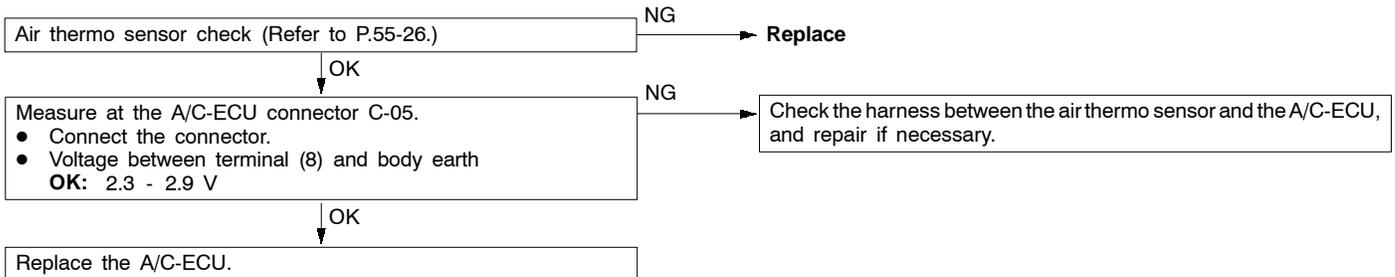
Code No.16 Heater water temperature sensor system (short circuit)	Probable cause
This diagnosis code is output if there is a short circuit in the heater water temperature sensor input circuit.	<ul style="list-style-type: none"> ● Malfunction of harness ● Malfunction of connector ● Malfunction of the heater water temperature sensor ● Malfunction of the A/C-ECU



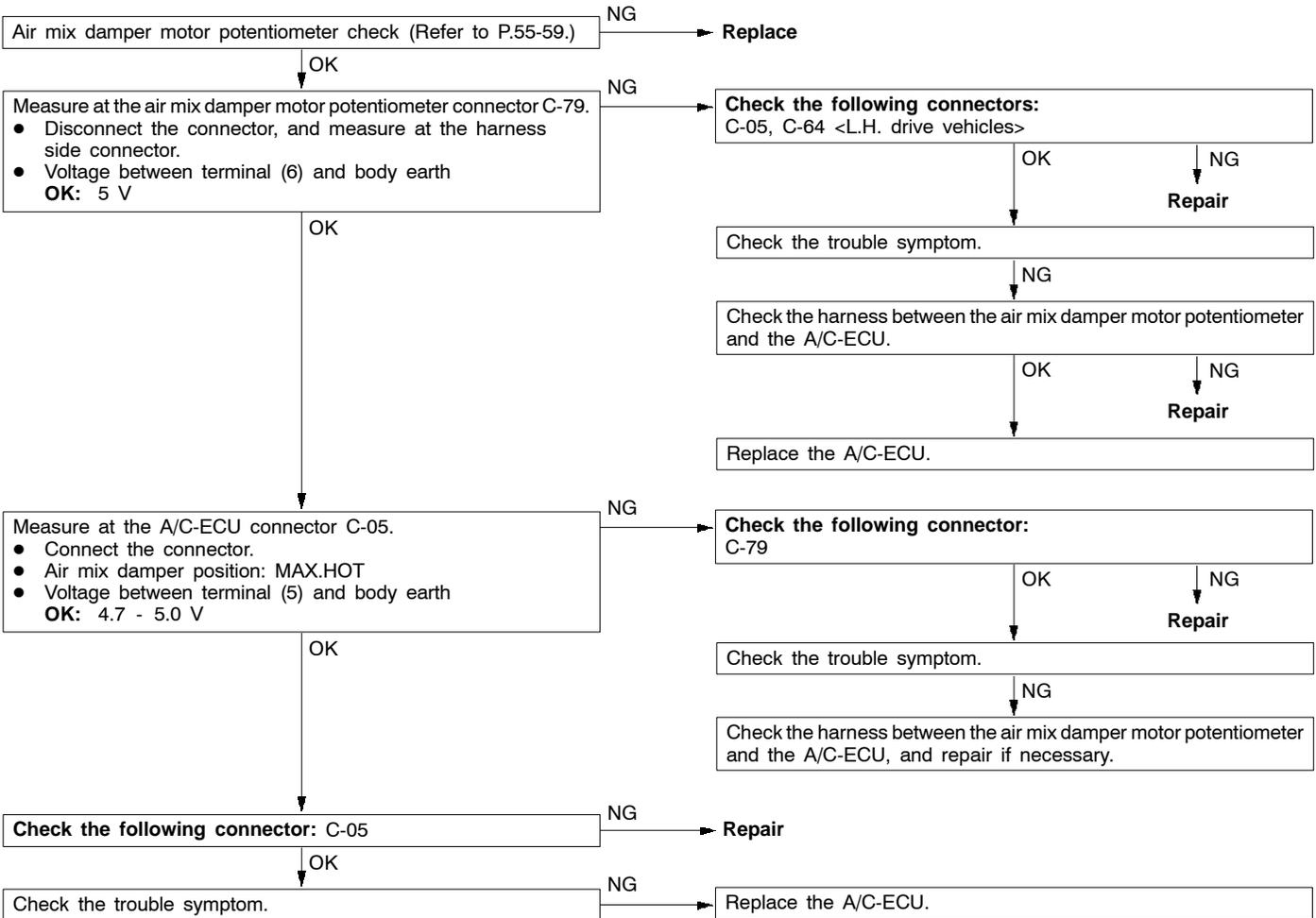
Code No.21 Air thermo sensor system (open circuit)	Probable cause
This diagnosis code is output if there is a defective connector connection, or if there is an open circuit in the harness.	<ul style="list-style-type: none"> ● Malfunction of connector ● Malfunction of harness ● Malfunction of the air thermo sensor ● Malfunction of the A/C-ECU



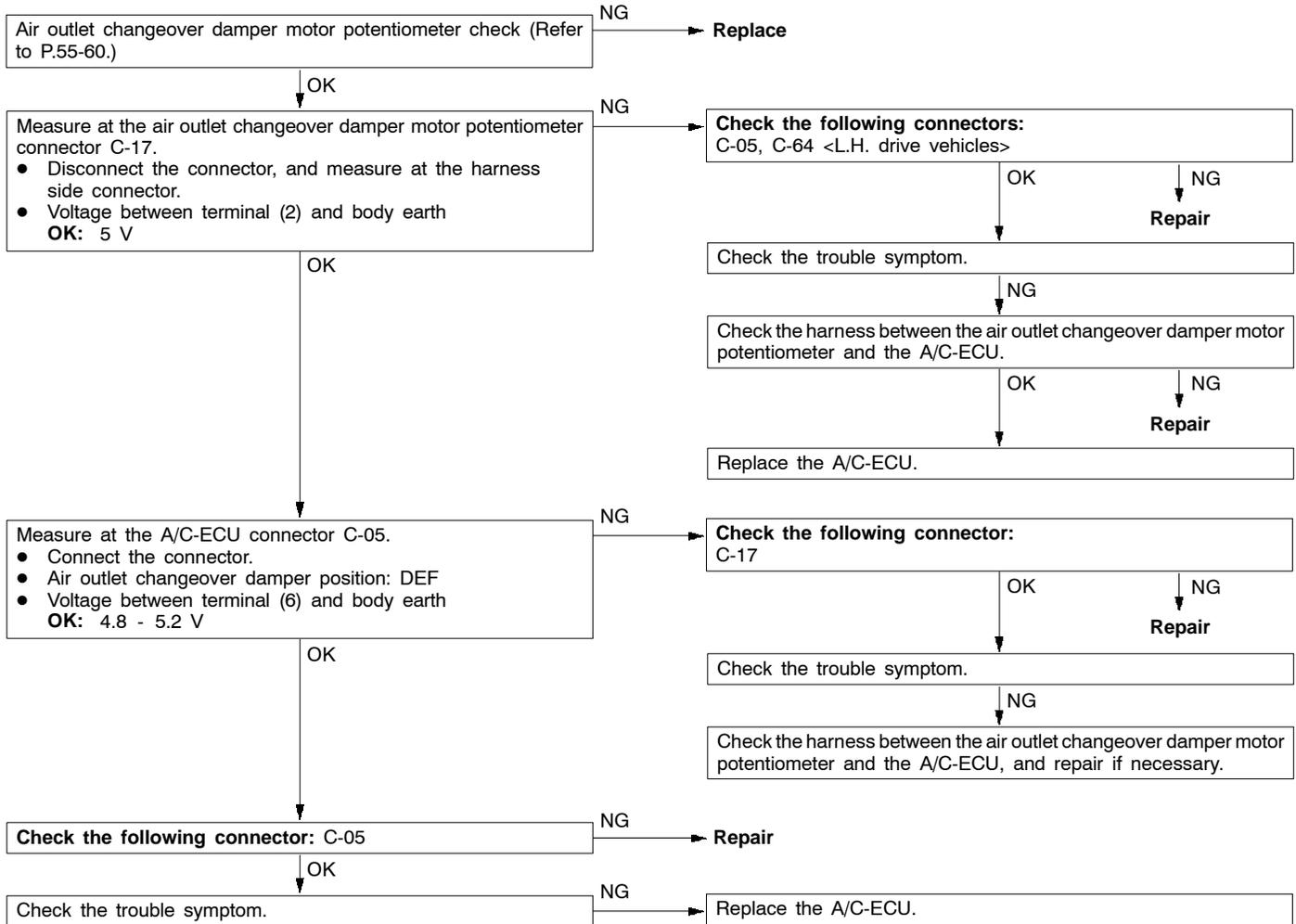
Code No.22 Air thermo sensor system (short circuit)	Probable cause
This diagnosis code is output if there is a short circuit in the air thermo sensor input circuit.	<ul style="list-style-type: none"> ● Malfunction of harness ● Malfunction of connector ● Malfunction of the air thermo sensor ● Malfunction of the A/C-ECU



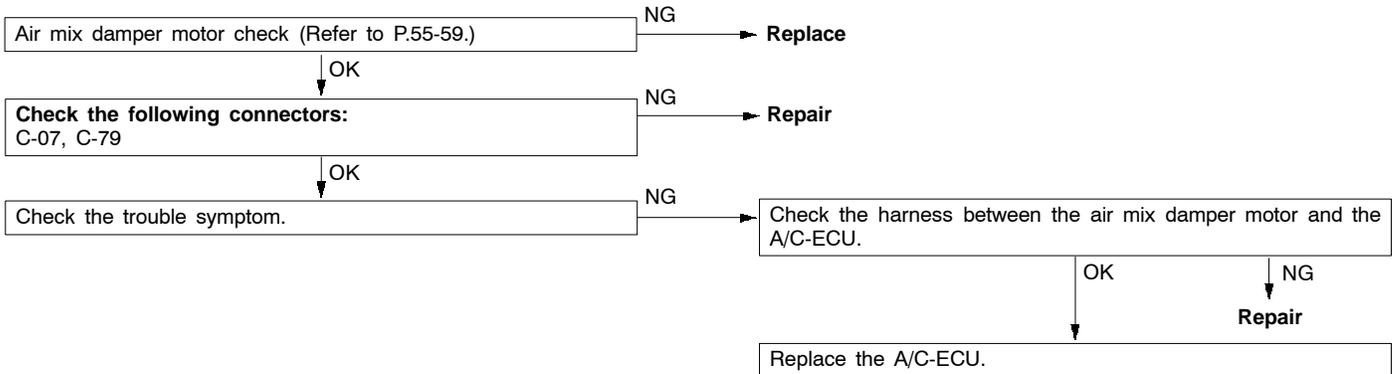
Code No.31 Potentiometer system of air mix damper motor assembly	Probable cause
This diagnosis code is output if there is an open or short circuit in the potentiometer input circuit, or if there is an open circuit in the power circuit or earth circuit.	<ul style="list-style-type: none"> ● Malfunction of the air mix damper motor assembly ● Malfunction of connector ● Malfunction of harness ● Malfunction of the A/C-ECU



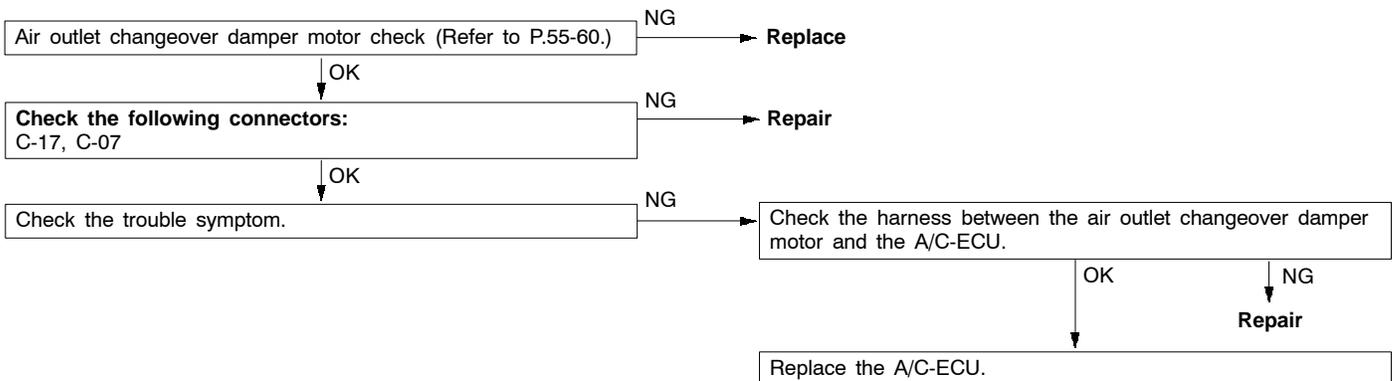
Code No.32 Potentiometer system of air outlet changeover damper motor assembly	Probable cause
This diagnosis code is output if there is an open or short circuit in the potentiometer input circuit, or if there is an open circuit in the power circuit or earth circuit.	<ul style="list-style-type: none"> ● Malfunction of the air outlet changeover damper motor assembly ● Malfunction of connector ● Malfunction of the A/C-ECU ● Malfunction of harness



Code No.41 Drive system of air mix damper motor assembly	Probable cause
This diagnosis code is output if the motor drive circuit is defective.	<ul style="list-style-type: none"> ● Malfunction of the air mix damper motor assembly ● Malfunction of connector ● Malfunction of harness ● Malfunction of the A/C-ECU



Code No.42 Drive system of air outlet changeover damper motor assembly	Probable cause
This diagnosis code is output if the motor drive circuit is defective.	<ul style="list-style-type: none"> ● Malfunction of the air outlet changeover damper motor assembly ● Malfunction of connector ● Malfunction of harness ● Malfunction of the A/C-ECU



INSPECTION CHART FOR TROUBLE SYMPTOMS

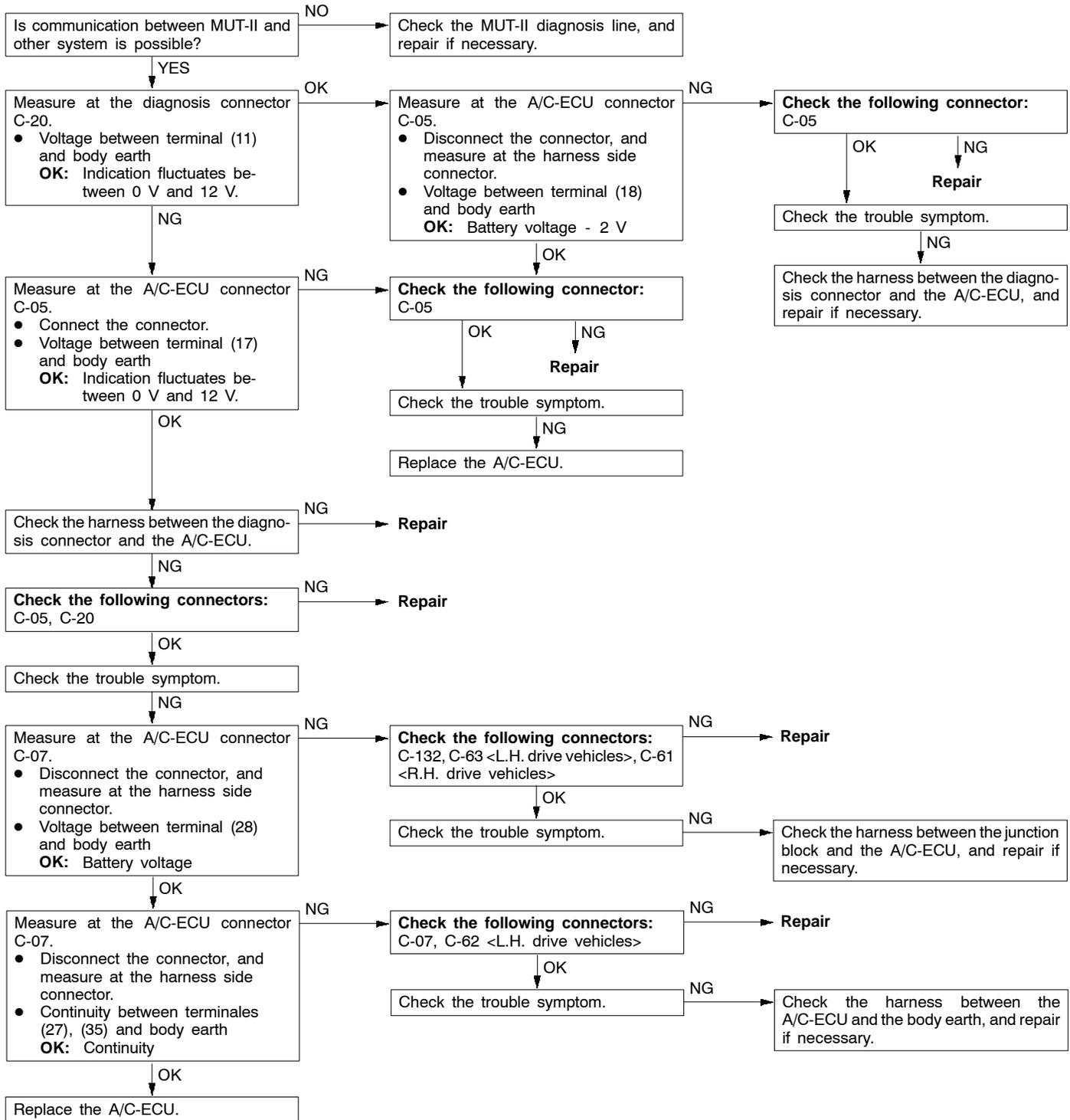
55400500068

Trouble symptom	Inspection procedure No.	Reference page
Communication with the MUT-II is not possible.	1	55-45
Air conditioner does not operate.	2	55-46
A/C graphic display on control panel is blank.	3	55-47
Temperature cannot be set.	4	55-47
A/C outlet air temperature does not increase.	5	55-47
A/C outlet air temperature does not decrease.	6	55-47
Blower does not operate.	7	55-48
Blower air amount cannot be changed.	8	55-49
Air outlet port cannot be changed.	9	55-49
Inside/outside air changeover is not possible.	10	55-50
Defroster function does not operate.	11	55-51
Rear defogger does not operate.	12	55-51
A/C-ECU power supply circuit check	13	55-52
A/C compressor control circuit check	14	55-53
Radiator fan does not operate.	15	Refer to GROUP 14 - Trouble- shooting.
Condenser fan does not operate.	16	

INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

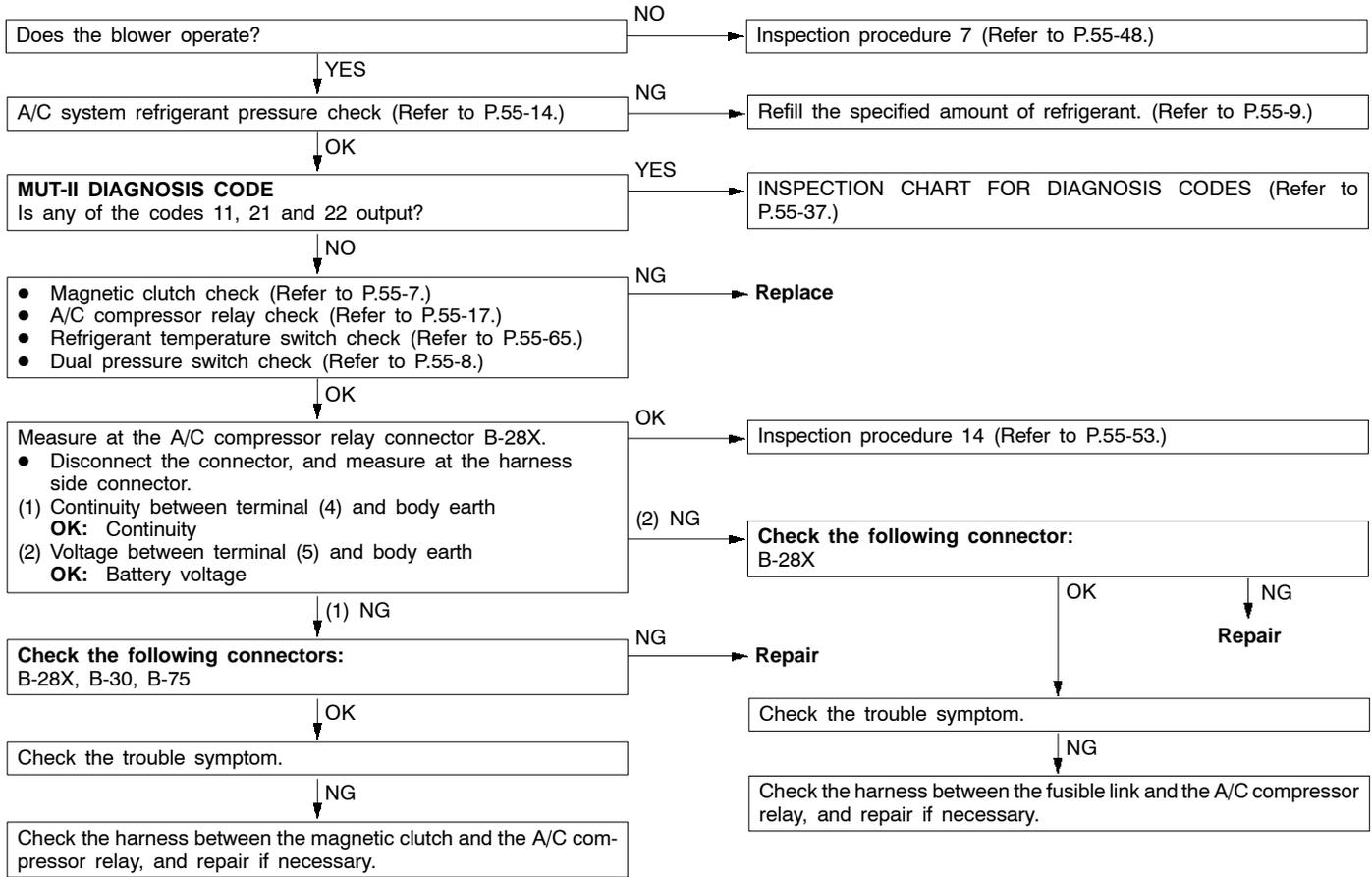
Inspection procedure 1

Communication with the MUT-II is not possible.	Probable cause
If communication with all other systems is not possible, there is a high possibility that there is a malfunction of the diagnosis line. If communication with only the A/C is not possible, the cause is probably a malfunction of the diagnosis line or of the A/C-ECU power supply system (earth).	<ul style="list-style-type: none"> ● Malfunction of connector or harness ● Malfunction of A/C-ECU



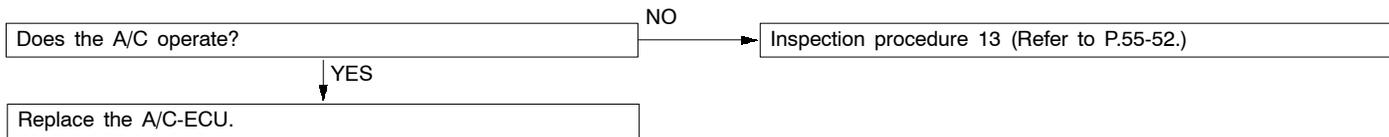
Inspection procedure 2

Air conditioner does not operate.	Probable cause
If the A/C does not operate when the A/C switch is on and the temperature setting is at 17°C, the cause is probably insufficient refrigerant, or a malfunction of the blower or of the magnet clutch power supply.	<ul style="list-style-type: none"> ● Malfunction of blower ● Insufficient refrigerant ● Malfunction of magnetic clutch ● Malfunction of air thermo sensor ● Malfunction of A/C compressor relay ● Malfunction of refrigerant temperature switch ● Malfunction of dual pressure switch ● Malfunction of connector or harness ● Malfunction of engine-ECU ● Malfunction of A/C-ECU



Inspection procedure 3

A/C graphic display on control panel is blank.	Probable cause
The cause is probably a malfunction of the A/C-ECU power supply system (earth).	<ul style="list-style-type: none"> ● Malfunction of connector or harness ● Malfunction of A/C-ECU



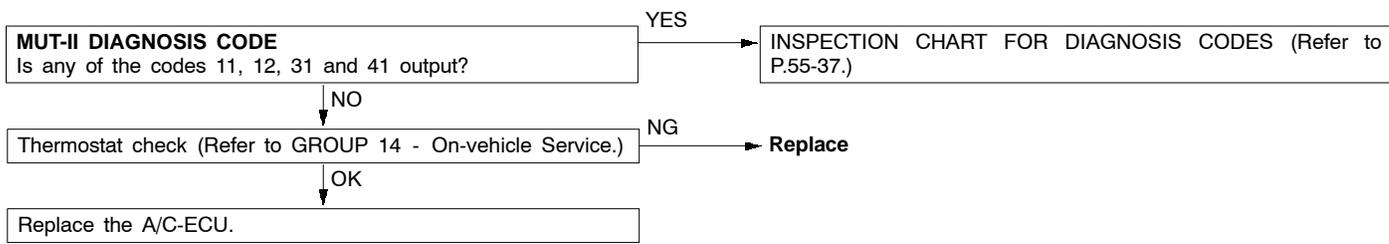
Inspection procedure 4

Temperature cannot be set.	Probable cause
The cause is probably a malfunction of the temperature setting signal input system or output system.	<ul style="list-style-type: none"> ● Malfunction of connector or harness ● Malfunction of A/C-ECU

Inspection procedure 13 (Refer to P.55-52.)

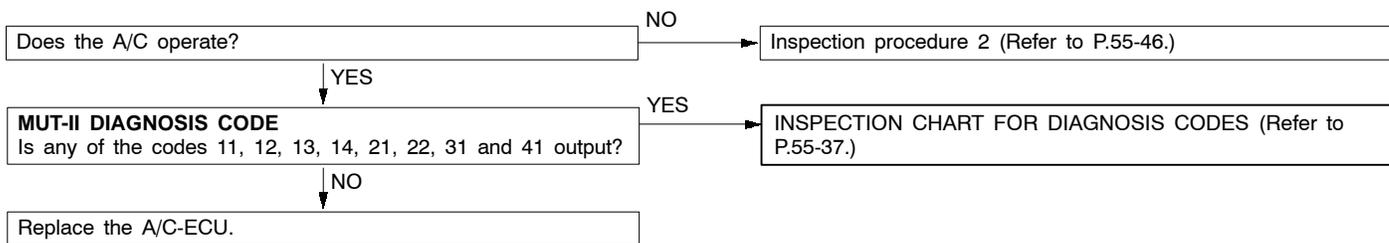
Inspection procedure 5

A/C outlet air temperature does not increase.	Probable cause
If the outlet air temperature does not increase when the temperature setting is increased, the cause is probably a sensor malfunction or a problem with operation of the air mix damper. The MUT-II can be used to check the diagnosis codes in order to check the cause of the problem for each separate system.	<ul style="list-style-type: none"> ● Malfunction of air mix damper motor potentiometer ● Malfunction of air mix damper motor ● Malfunction of air mix damper ● Malfunction of connector or harness ● Malfunction of thermostat ● Malfunction of A/C-ECU



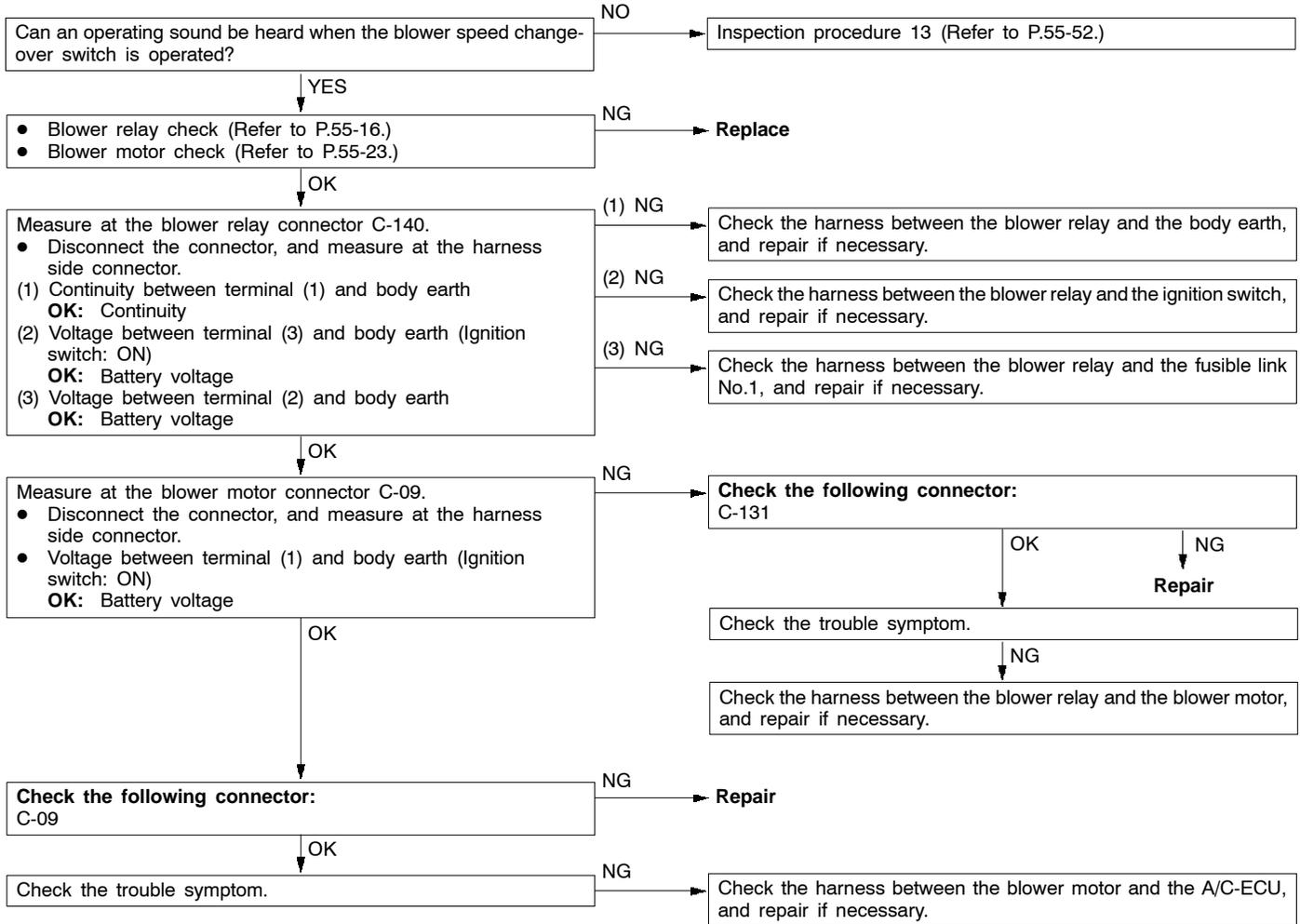
Inspection procedure 6

A/C outlet air temperature does not decrease.	Probable cause
If the outlet air temperature does not decrease when the temperature setting is decreased, the cause is probably a problem in A/C system operation due to a sensor error, or a problem with operation of the air mix damper. The MUT-II can be used to check the diagnosis codes in order to check the cause of the problem for each separate system.	<ul style="list-style-type: none"> ● Malfunction of outside air temperature sensor ● Malfunction of air mix damper motor potentiometer ● Malfunction of air mix damper motor ● Malfunction of air thermo sensor ● Malfunction of connector or harness ● Malfunction of air mix damper ● Malfunction of A/C-ECU



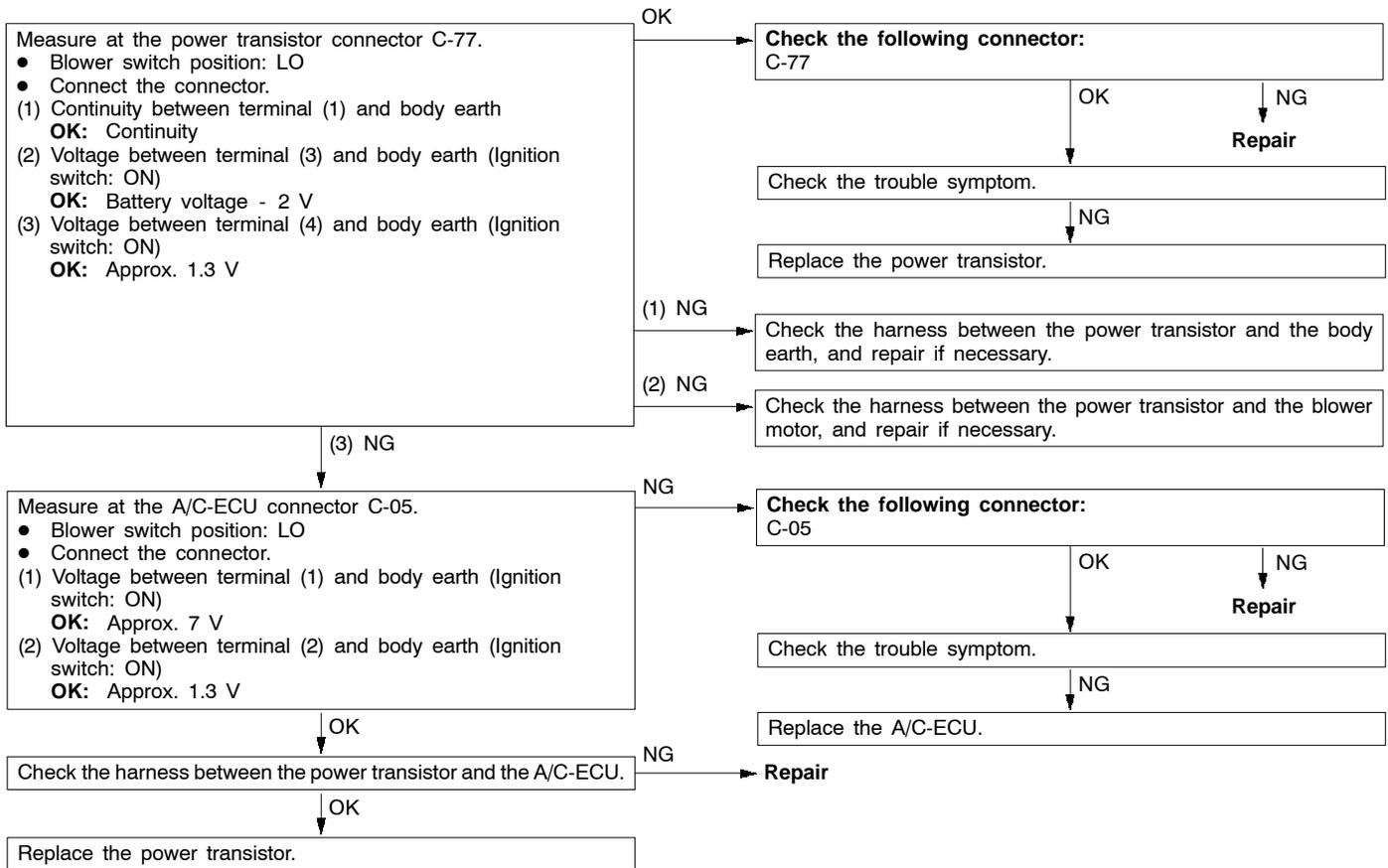
Inspection procedure 7

Blower does not operate.	Probable cause
If no air comes out of the blower even though the blower switch is on, the cause is probably a malfunction of the blower motor relay circuit.	<ul style="list-style-type: none"> ● Malfunction of blower motor relay ● Malfunction of blower motor ● Malfunction of connector or harness ● Malfunction of A/C-ECU



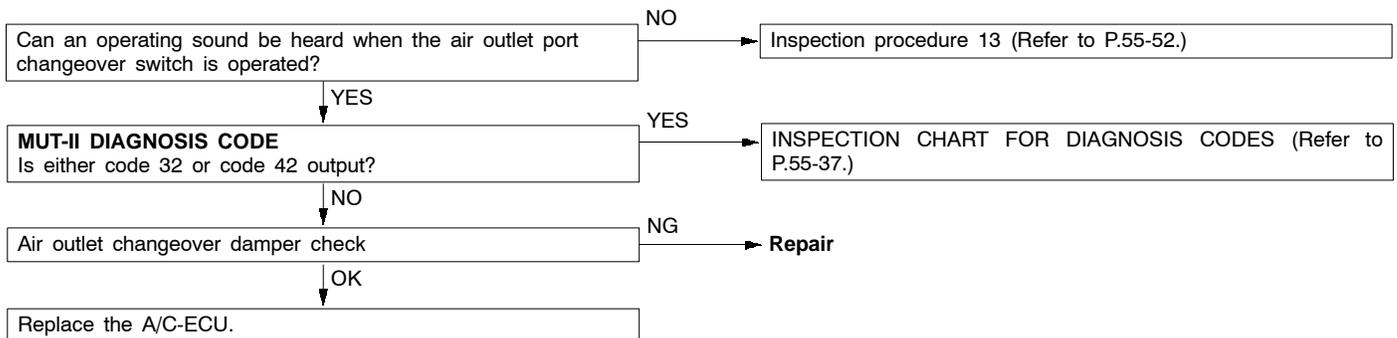
Inspection procedure 8

Blower air amount cannot be changed.	Probable cause
If the blower does not operate in any mode other than HI setting, the cause is probably a malfunction of the power transistor system.	<ul style="list-style-type: none"> • Malfunction of power transistor • Malfunction of connector or harness • Malfunction of A/C-ECU



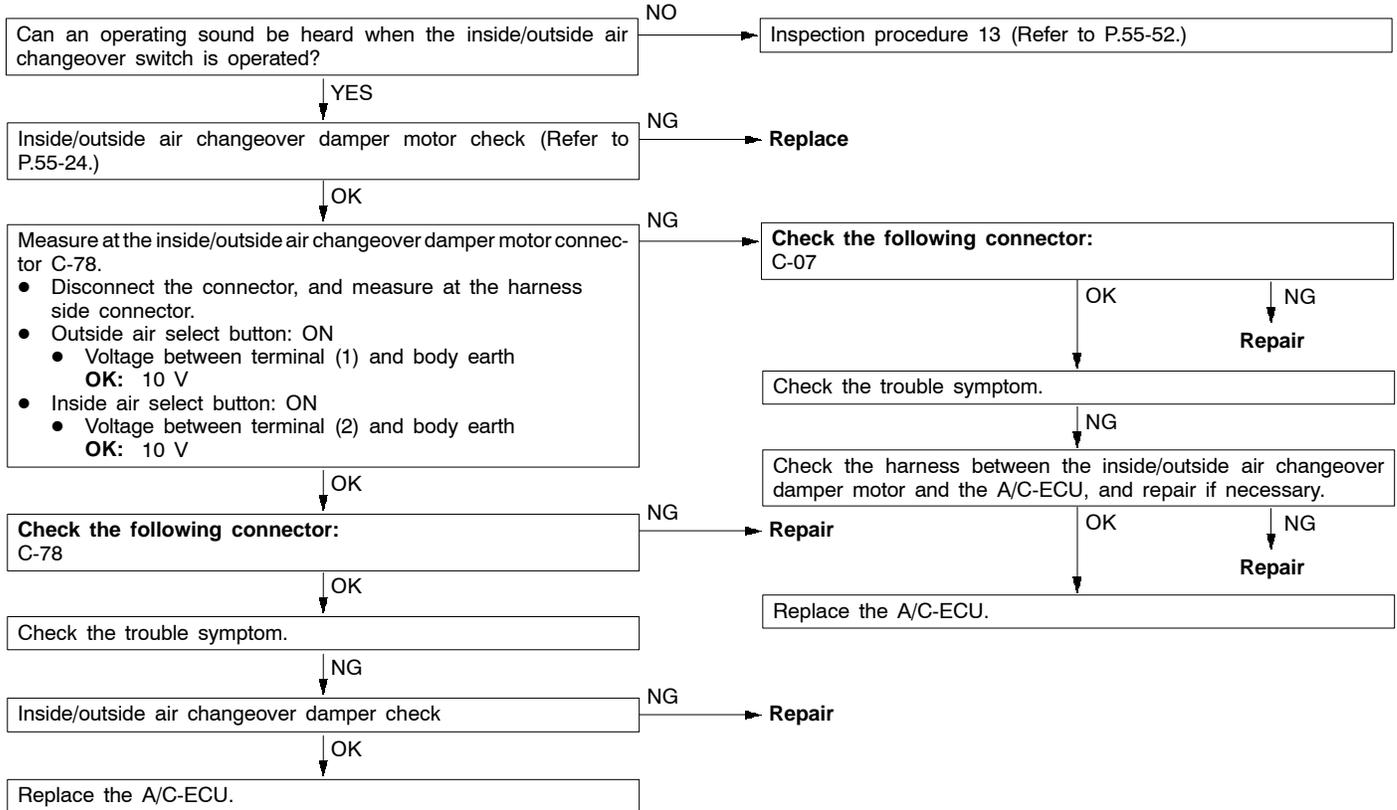
Inspection procedure 9

Air outlet port cannot be changed.	Probable cause
The cause is probably a malfunction of the air outlet port changeover signal input system or output system. The MUT-II can be used to check the diagnosis codes in order to check the cause of the problem for each separate system.	<ul style="list-style-type: none"> • Malfunction of air outlet changeover damper motor potentiometer • Malfunction of air outlet changeover damper motor • Malfunction of air outlet changeover damper • Malfunction of connector or harness • Malfunction of A/C-ECU



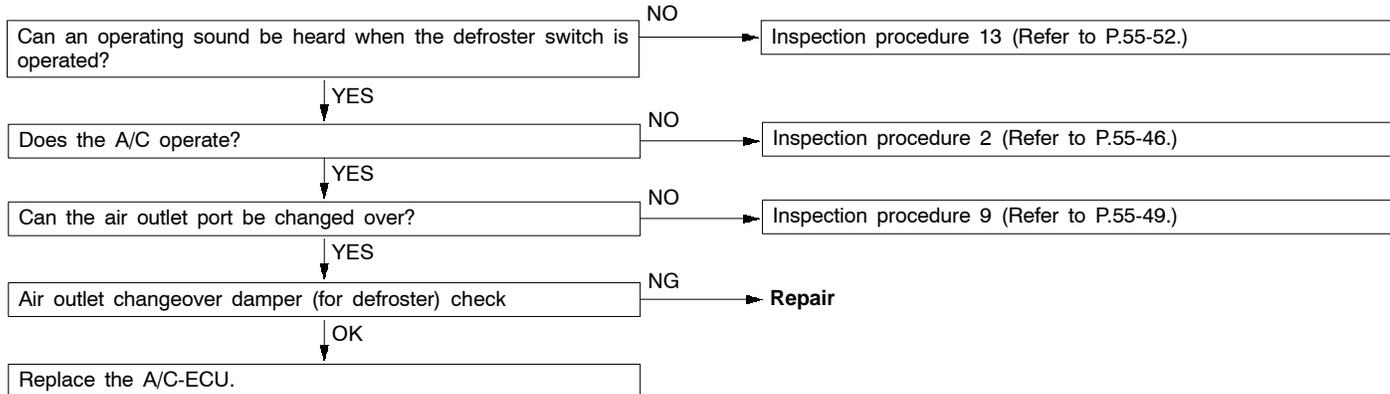
Inspection procedure 10

Inside/outside air changeover is not possible.	Probable cause
If inside/outside air changeover is not possible even when the inside/outside air changeover switch is on, the cause is probably a malfunction of the inside/outside air changeover damper motor.	<ul style="list-style-type: none"> ● Malfunction of inside/outside air changeover damper motor ● Malfunction of inside/outside air changeover damper ● Malfunction of connector or harness ● Malfunction of A/C-ECU



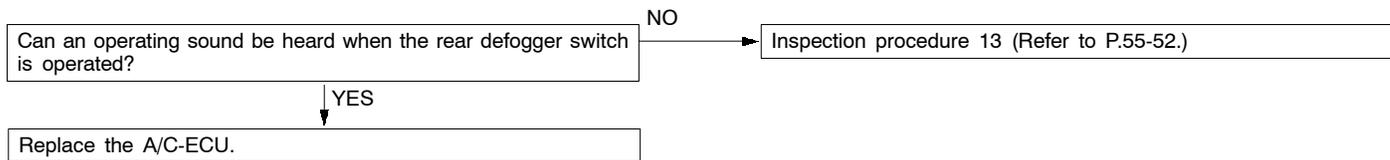
Inspection procedure 11

Defroster function does not operate.	Probable cause
If the defroster function does not operate when the defroster switch is turned on, the cause is probably a malfunction of the A/C or of the air outlet port changeover circuit.	<ul style="list-style-type: none"> ● Malfunction of air conditioner drive system ● Malfunction of air outlet changeover damper drive system ● Malfunction of connector or harness ● Malfunction of A/C-ECU



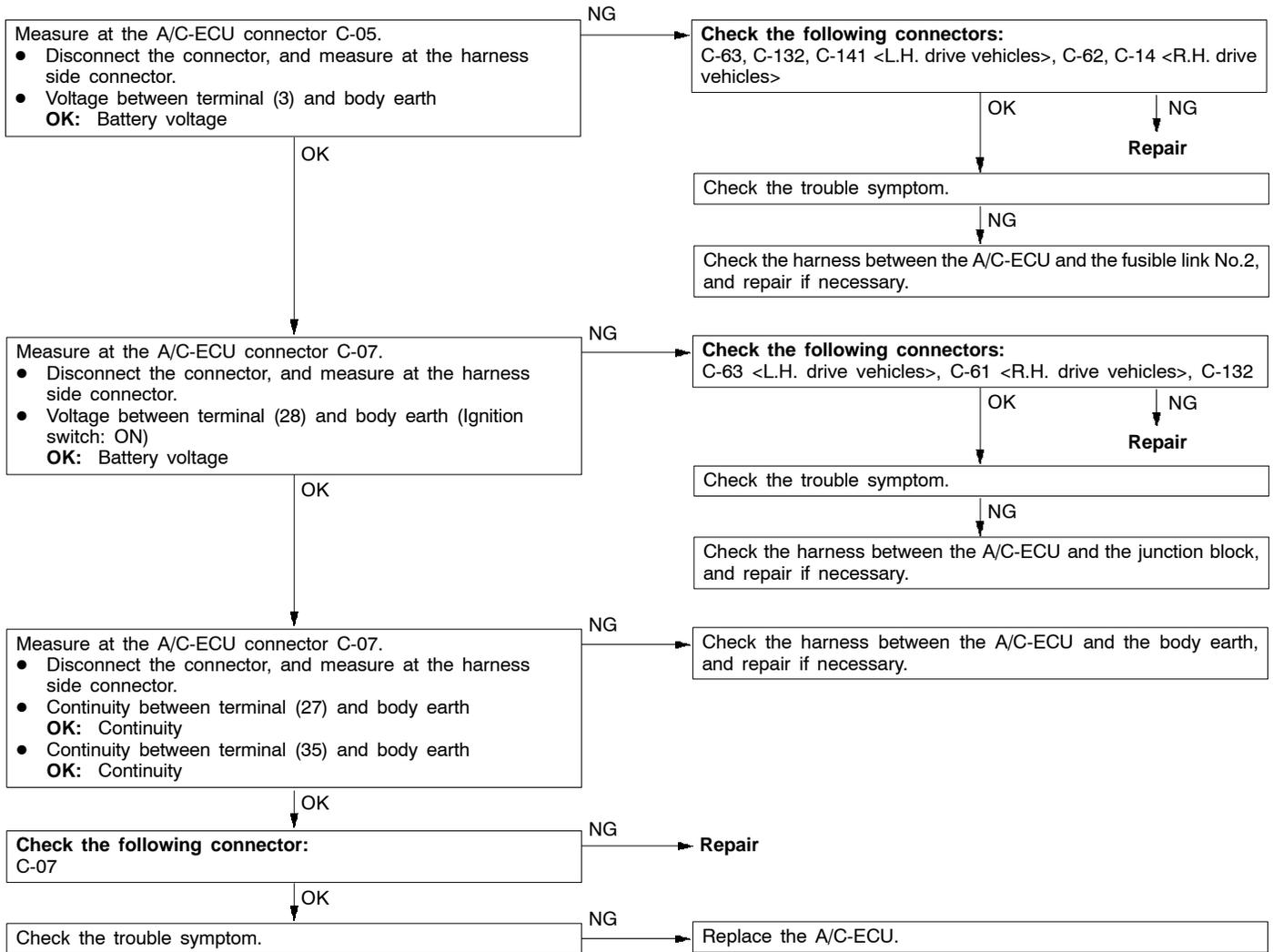
Inspection procedure 12

Rear defogger does not operate.	Probable cause
If the rear defogger does not operate when the rear defogger switch is turned on (timer operates for 20 minutes), the cause is probably a malfunction of the A/C-ECU power supply system (earth).	<ul style="list-style-type: none"> ● Malfunction of connector or harness ● Malfunction of A/C-ECU



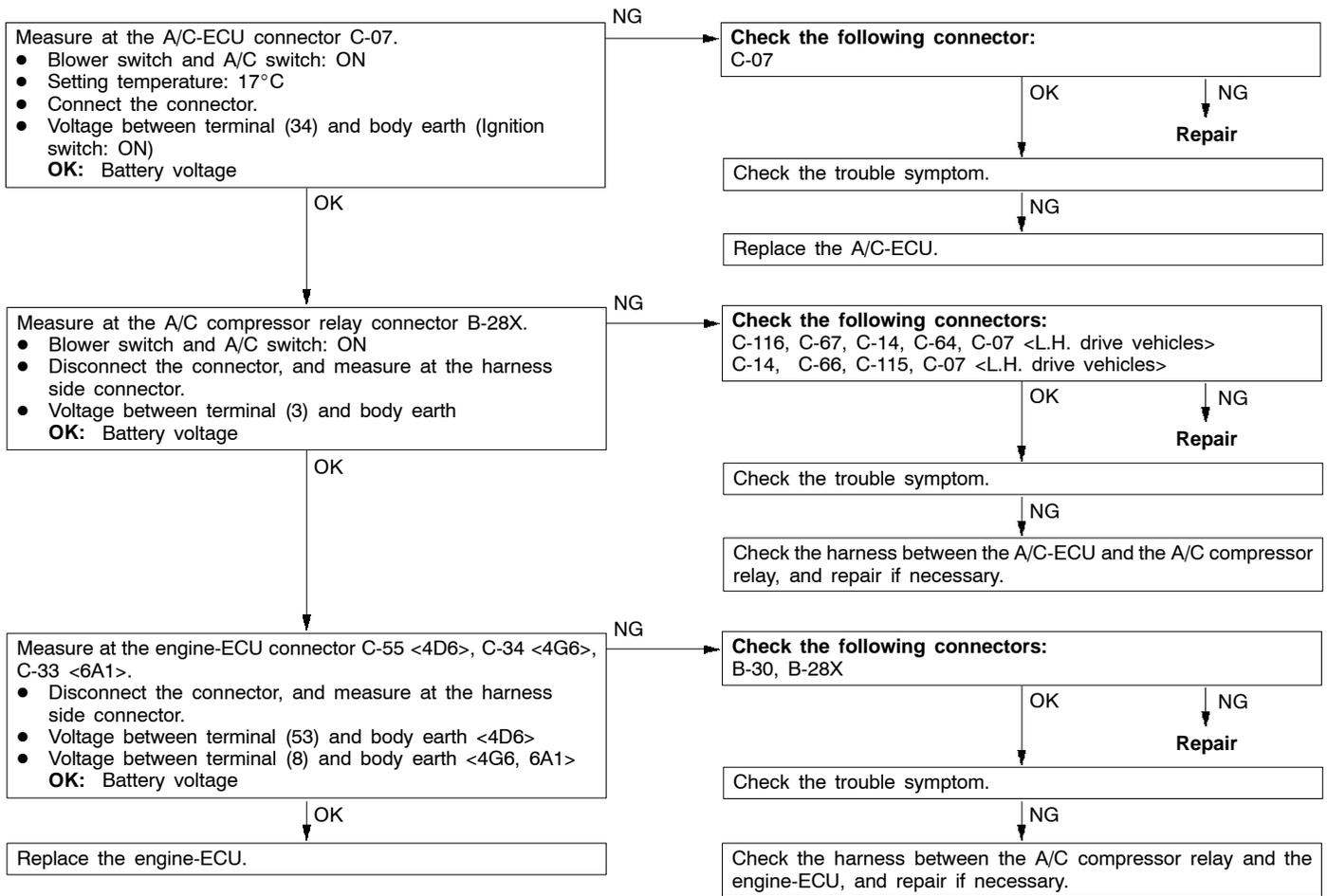
Inspection procedure 13

A/C-ECU power supply circuit check



Inspection procedure 14

A/C compressor control circuit check



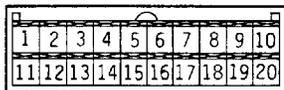
DATA LIST REFERENCE TABLE

55400510078

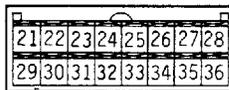
Item No.	Check item	Check condition	Normal condition	
11	Inside air temperature sensor	Ignition switch: ON	Inside air temperature and temperature displayed on the MUT-II are identical.	
13	Outside air temperature sensor	Ignition switch: ON	Outside air temperature and temperature displayed on the MUT-II are identical.	
15	Heater water temperature sensor	Ignition switch: ON	Heater core surface temperature and temperature displayed on the MUT-II are identical.	
21	Air thermo sensor	Ignition switch: ON	Evaporator surface temperature and temperature displayed on the MUT-II are identical.	
25	Photo sensor	Ignition switch: ON	Amount of incident light is proportional to voltage displayed on the MUT-II.	
31	Air mix damper motor potentiometer	Ignition switch: ON	Damper position	Opening degree (%)
			MAX. HOT	Approx. 100
			MAX. COOL	Approx. 0
32	Air outlet change-over damper motor potentiometer	Ignition switch: ON	Damper position	Opening degree (%)
			FACE	Approx. 0
			FOOT	Approx. 50
			FOOT/DEF.	Approx. 75
			DEF.	Approx. 100

CHECK AT THE A/C-ECU TERMINALS

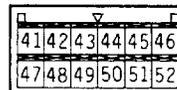
55400540077



20P0031



20P0030



20P0029

00005676

Terminal No.	Check item	Check condition	Normal condition
1	Power MOS FET drain output	When blower switch is at OFF	System voltage
		When blower switch is at LO	Approx. 9 V
		When blower switch is at HI	Almost no voltage (0 V)

Terminal No.	Check item	Check condition	Normal condition
2	Power MOS FET gate output	When blower switch is at OFF	0 V
		When blower switch is at LO	Approx. 1.3 V
		When blower switch is at HI	Approx. 2.5 V
3	A/C-ECU backup power supply	At all times	System voltage
4	Heater water temperature sensor input	When sensor section temperature is 25°C (4 kΩ)	2.3 - 2.9 V
5	Air mix damper motor potentiometer input	When damper is moved to MAX. HOT position	4.7 - 5.0 V
6	Air outlet changeover damper motor potentiometer input	When damper is moved to DEF. position	4.8 - 5.2 V
7	Outside air temperature sensor input	When sensor section temperature is 25°C (4 kΩ)	2.3 - 2.9 V
8	Air thermo sensor input	When sensor section temperature is 25°C (4 kΩ)	2.3 - 2.9 V
9	Photo sensor (-)	At luminous intensity of 100,000 lux or more	-0.1 - 0.2 V
		At luminous intensity of 0 lux	0 V
10	Sensor power supply	At all times	4.8 - 5.2 V
16	Rear defogger input	When rear defogger switch is ON	1.5 V or less
		When rear defogger switch is OFF	System voltage
17	Diagnosis date output	When ignition switch is ON	0 V ↔ System voltage
18	Diagnosis control input	When ignition switch is ON	Battery voltage - 2 V
19	Photo sensor (+)	At all times	0 V
20	Air mix damper motor and air outlet changeover damper motor potentiometers	At all times	0 V
21	Air outlet changeover damper motor (+)	Set to FACE position (OFF after 40 seconds of output)	10 V
		Set to DEF. position (OFF after 40 seconds of output)	0.5 V
22	Air mix damper motor (-)	Set the setting temperature to 17°C and set to MAX. COOL position (OFF after 40 seconds of output)	10 V
		Set the setting temperature to 32°C and set to MAX. HOT position (OFF after 40 seconds of output)	0.5 V

Terminal No.	Check item	Check condition	Normal condition
23	Inside/outside air changeover damper motor (-)	Set to inside air position (OFF after 40 seconds of output)	0.5 V
		Set to outside air position (OFF after 40 seconds of output)	10 V
24	Air outlet changeover damper motor (-)	Set to FACE position (OFF after 40 seconds of output)	0.5 V
		Set to DEF. position (OFF after 40 seconds of output)	10 V
25	Air mix damper motor (+)	Set the setting temperature to 17°C and set to MAX. COOL position (OFF after 40 seconds of output)	0.5 V
		Set the setting temperature to 32°C and set to MAX. HOT position (OFF after 40 seconds of output)	10 V
26	Inside/outside air changeover damper motor (+)	Set to inside air position (OFF after 40 seconds of output)	10 V
		Set to outside air position (OFF after 40 seconds of output)	0.5 V
27	Earth	At all times	Continuity
28	A/C-ECU power supply	When ignition switch is ON	System voltage
29	ILL earth (rheostat)	At all times	Continuity
30	ILL power supply	When lighting switch is at ON	System voltage
33	Engine-ECU output	When air mix damper is at MAX. COOL position	0 V
		When air mix damper is at MAX. HOT position	System voltage
34	A/C output	When A/C is OFF	0 V
		When A/C is ON	System voltage
35	Earth	At all times	Continuity

ON-VEHICLE SERVICE

5540080029

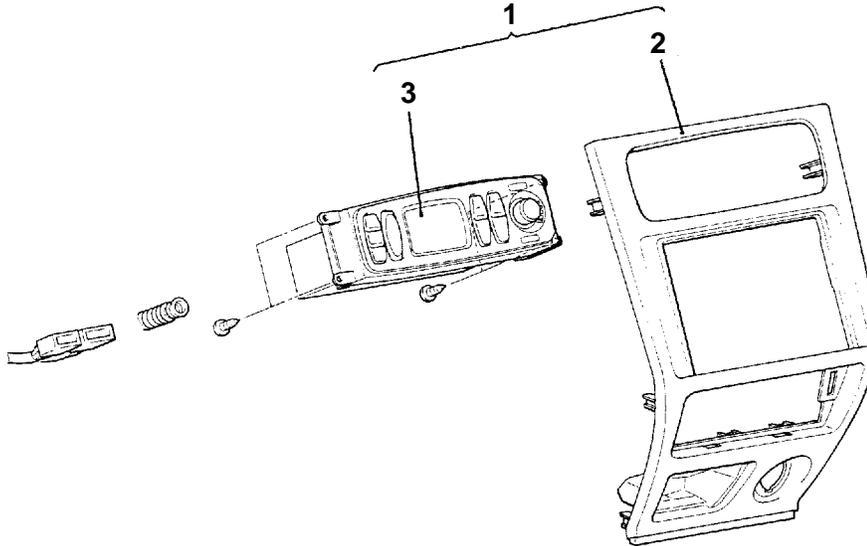
The service procedures are the same as for the manual air conditioner. (Refer to P.55-7.)

AIR CONDITIONER CONTROL PANEL AND ECU ASSEMBLY 55400100084

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Floor Console Panel Removal and Installation
(Refer to GROUP 52A - Floor Console Box.)



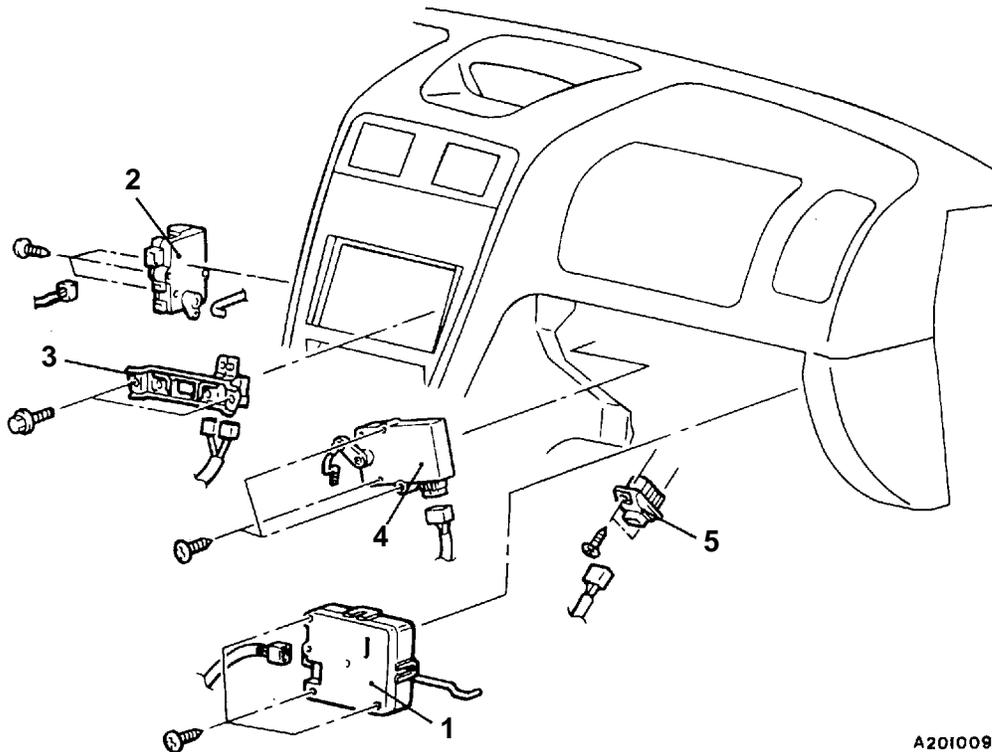
A2010093

Removal steps

1. Center console panel and air conditioner control panel assembly
2. Center console panel
3. Air conditioner control panel and ECU assembly

DAMPER MOTOR ASSEMBLY AND POWER TRANSISTOR

55400580024

REMOVAL AND INSTALLATION

A2010097

Inside/outside air changeover damper motor assembly removal steps

- Glove box (Refer to GROUP 52A - Instrument Panel.)
1. Inside/outside air changeover damper motor assembly

Outlet air changeover damper motor assembly removal steps

- Lower cover (Refer to GROUP 52A - Instrument Panel.)
2. Outlet air changeover damper motor assembly

Air mix damper motor assembly removal steps

- Glove box, side cover, glove box frame, radio, tape player (Refer to GROUP 52A - Instrument Panel.)
 - Under cover (Refer to P.55-33.)
3. Control relay bracket assembly
 4. Air mix damper motor assembly

Power transistor removal steps

- Glove box (Refer to GROUP 52A - Instrument Panel.)
 - Under cover (Refer to P.55-33.)
5. Power transistor

INSPECTION

55400590027

INSIDE/OUTSIDE AIR CHANGEOVER DAMPER MOTOR ASSEMBLY CHECK

For inspection service points, refer to P.55-24 for heater and manual A/C.

AIR MIX DAMPER MOTOR ASSEMBLY CHECK

Motor

Check that the lever moves when battery voltage is applied across terminals 1 and 3 of the motor assembly connector. Check also that the lever moves in the backward direction when polarity is changed.

Caution

1. **Cut off the voltage when the damper is in the MAX. HOT or MAX. COOL position.**
2. **Cut off the voltage if the motor does not turn when battery voltage is applied.**

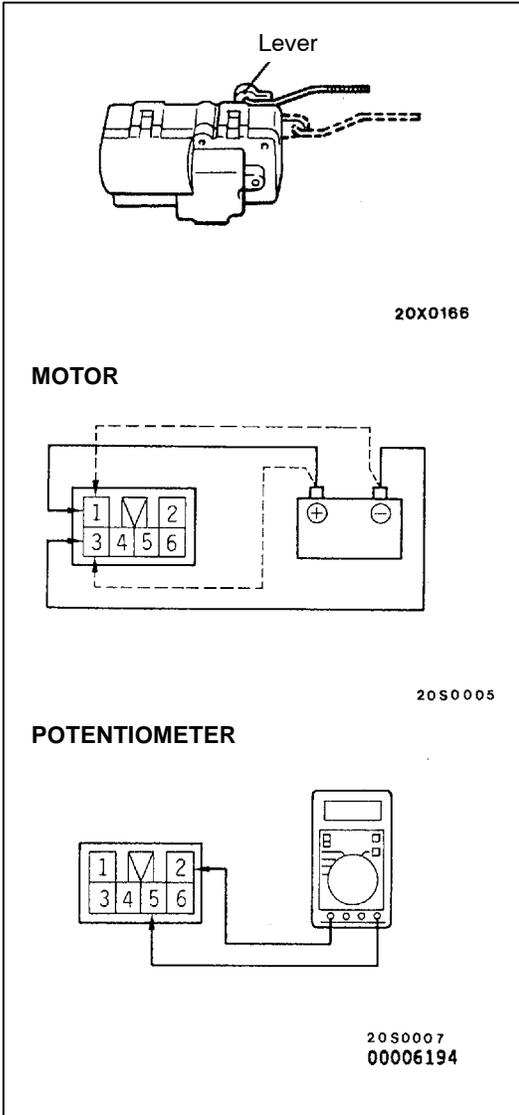
Potentiometer

Connect a circuit tester across terminals 2 and 5 of the motor assembly connector and check that resistance gradually changes as the damper is moved from MAX. HOT to MAX. COOL position.

Standard value:

MAX. HOT position: Approx. 4.8 kΩ

MAX. COOL position: Approx. 0.2 kΩ



**AIR OUTLET CHANGEOVER DAMPER MOTOR
ASSEMBLY CHECK****Motor**

Check that the lever moves when battery voltage is applied across terminals 1 and 3 of the motor assembly connector. Check also that the lever moves in the backward direction when polarity is changed.

Caution

1. Cut off the voltage when the damper is in the DEF or FACE position.
2. Cut off the voltage if the motor does not turn when battery voltage is applied.

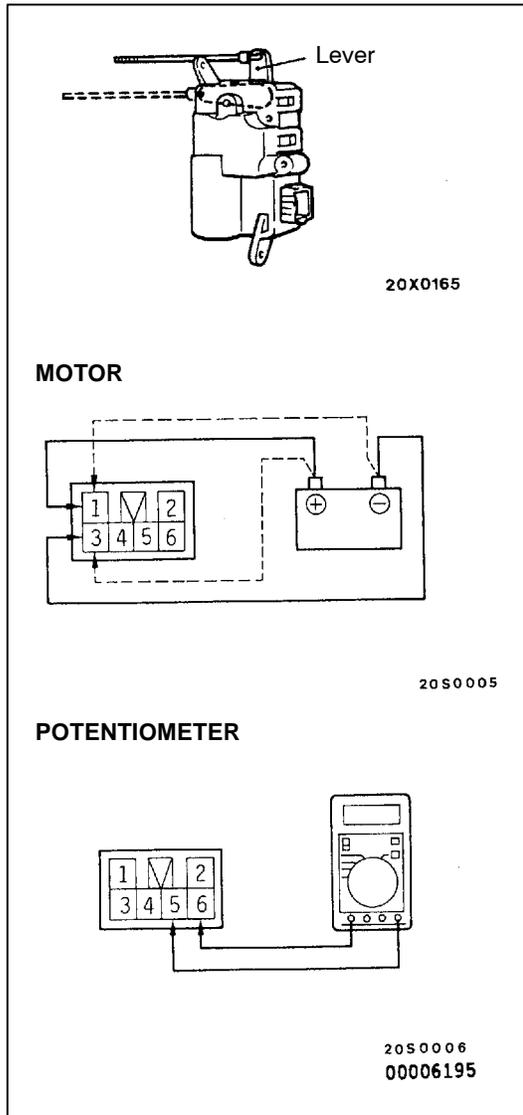
Potentiometer

Connect a circuit tester across terminals 5 and 6 of the motor assembly connector and check that resistance gradually changes as the damper is moved from DEF. to FACE position.

Standard value:

DEF. position: Approx. 4.8 k Ω

FACE position: Approx. 0.2 k Ω



COMPRESSOR AND TENSION PULLEY

REMOVAL AND INSTALLATION

Pre-removal Operation

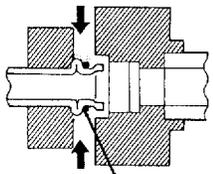
- Discharging of Refrigerant (Refer to P.55-13.)

Post-installation Operation

- Drive Belt Tension Adjustment (Refer to GROUP 11 - On-vehicle Service.)
- Charging of Refrigerant (Refer to P.55-9.)



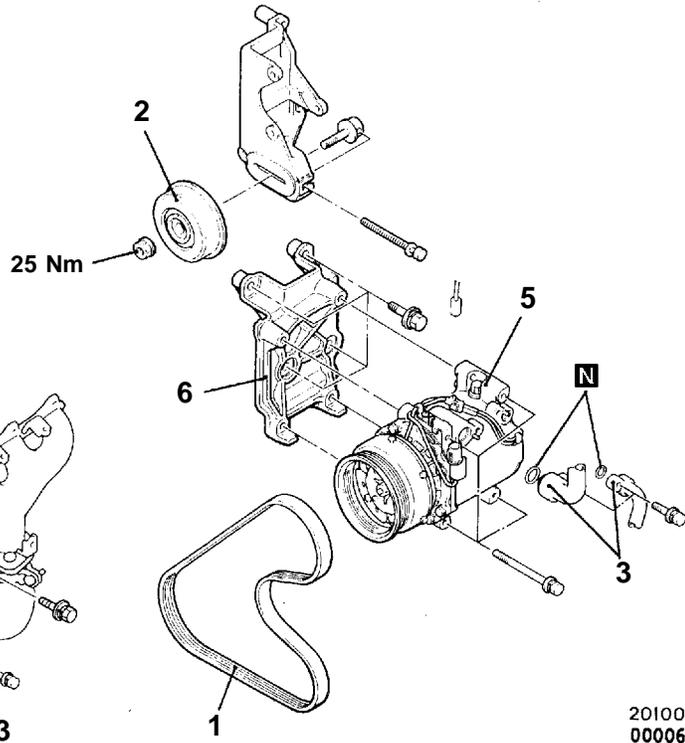
Piping connection



O-ring 20Z0006

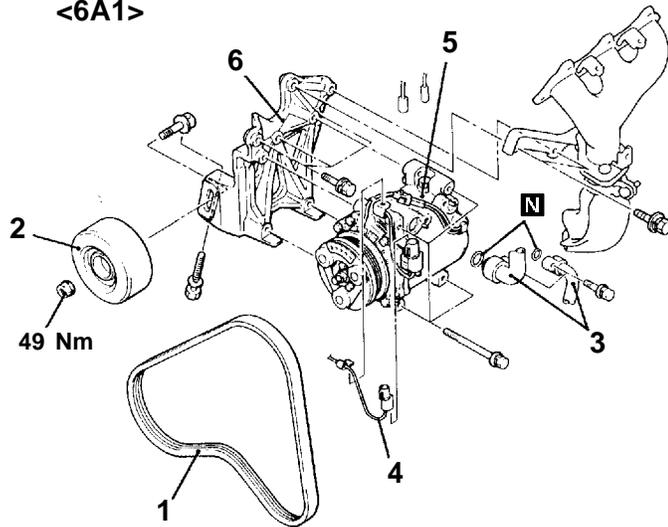
Compressor oil: SUN PAG 56

<4G6>



2010095
00006161

<6A1>



2010031

Removal steps

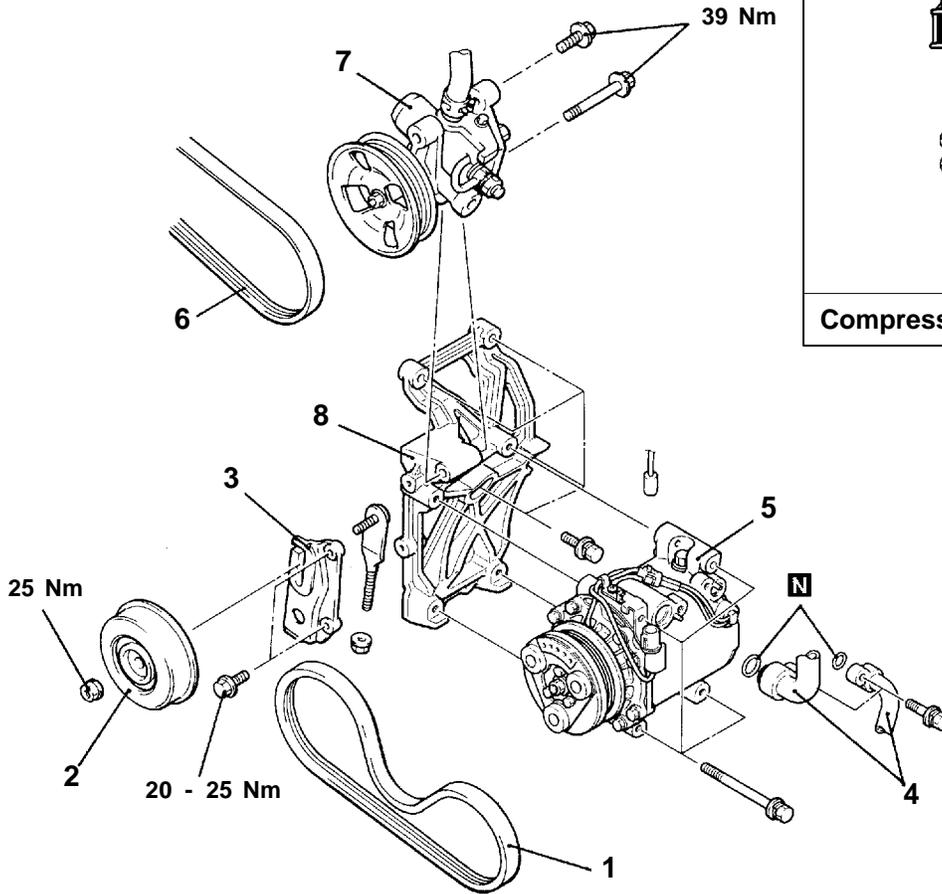
- Under cover
 - Condenser fan motor (Refer to P.55-31.)
 - Drive belt (for alternator) <6A1> (Refer to GROUP 11 - Crankshaft Pulley.)
1. Drive belt



- 2. Tension pulley
- 3. Hose connections
- 4. Power steering oil pressure switch harness <6A1>
- 5. Compressor
- 6. Compressor bracket



<4D6>



Piping connection

O-ring 20Z0006

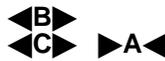
Compressor oil: SUN PAG 56

2010033

00006162

Removal steps

- Under cover
 - Condenser fan motor (Refer to P.55-31.)
1. Drive belt (for compressor)
 2. Tension pulley
 3. Tension pulley bracket



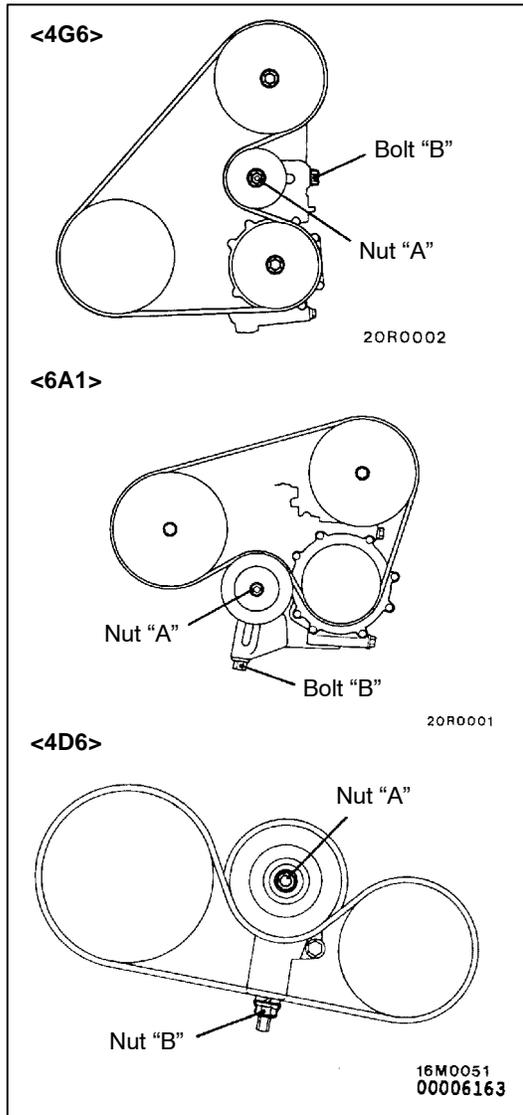
4. Hose connections
5. Compressor
6. Drive belt (for power steering oil pump)
7. Power steering oil pump
8. Compressor bracket



REMOVAL SERVICE POINTS

◀A▶ DRIVE BELT REMOVAL

1. Loosen the nut "A" for holding.
2. Loosen the bolt "B" <4G6 and 6A1> or nut "B" <4D6> for adjustment.
3. Remove the drive belt.



◀B▶ 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

$$120 \text{ mL} - X \text{ mL} = Y \text{ mL}$$

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 times as the compressor, subtract the rated oil amount of the each part from Y mL and discharge from the new compressor.

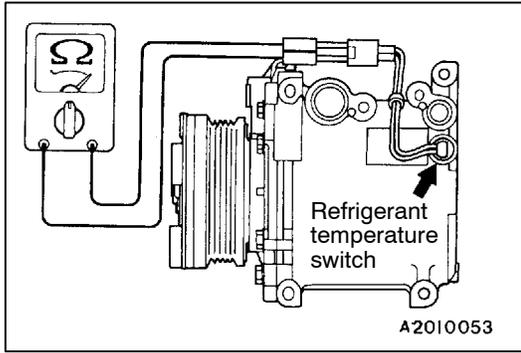
Quantity

Evaporator: 60 mL

Condenser: 15 mL

Suction hose: 10 mL

Receiver: 10 mL

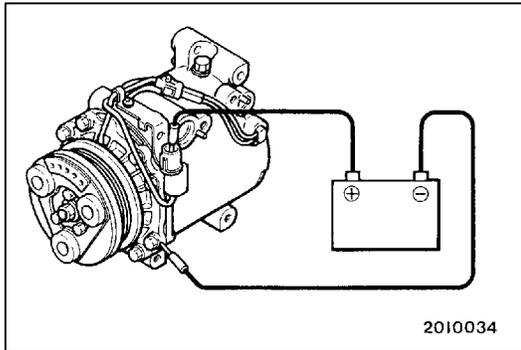


INSPECTION

55200930083

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.



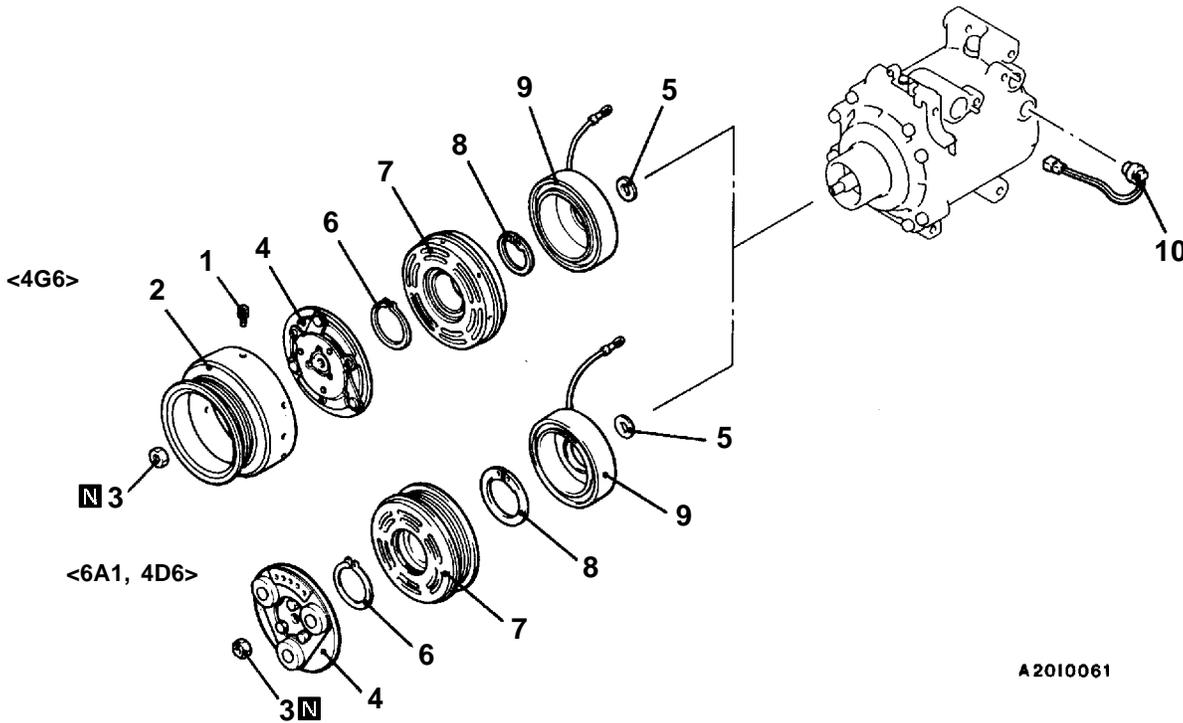
COMPRESSOR MAGNETIC CLUTCH OPERATION CHECK

55200850181

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.

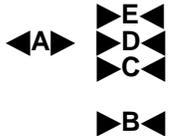
MAGNETIC CLUTCH AND REFRIGERANT TEMPERATURE SWITCH DISASSEMBLY AND REASSEMBLY

55200460216



Magnetic clutch disassembly steps

1. Bolt <4G6>
2. Pulley <4G6>
- Air gap adjustment
3. Nut
4. Armature plate
5. Shims
6. Snap ring

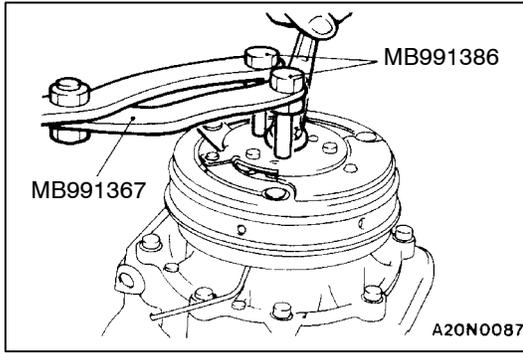
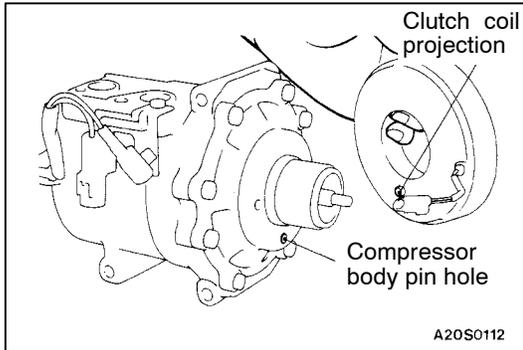


7. Rotor
8. Snap ring
9. Clutch coil

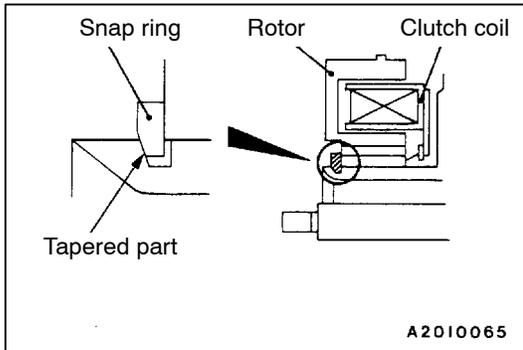


Refrigerant temperature switch removal

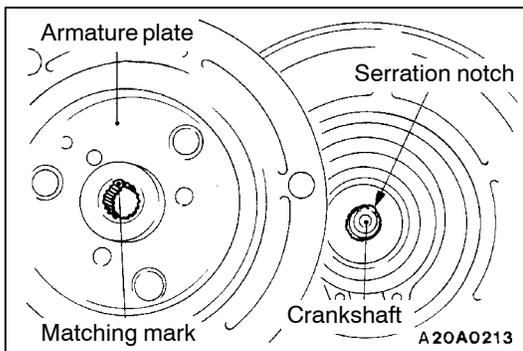
10. Refrigerant temperature switch

**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**

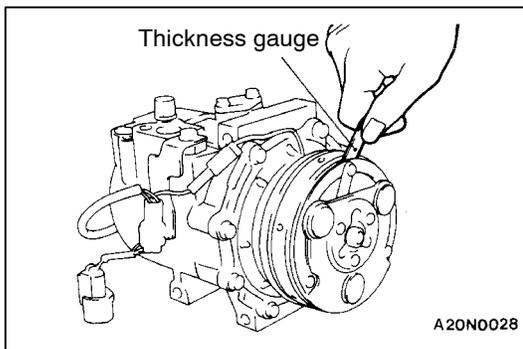
Install the snap ring so that the tapered surface is at the outer side.

**▶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

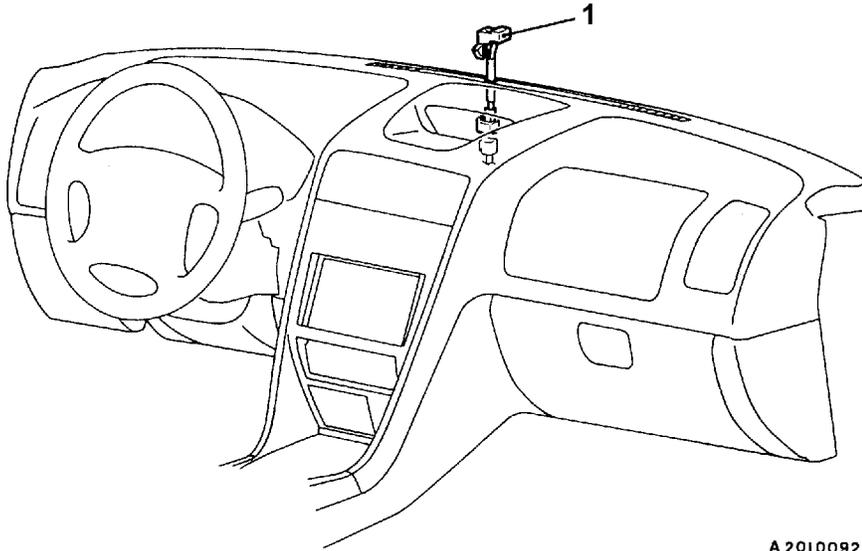
NOTE

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

PHOTO SENSOR

55400310067

REMOVAL AND INSTALLATION

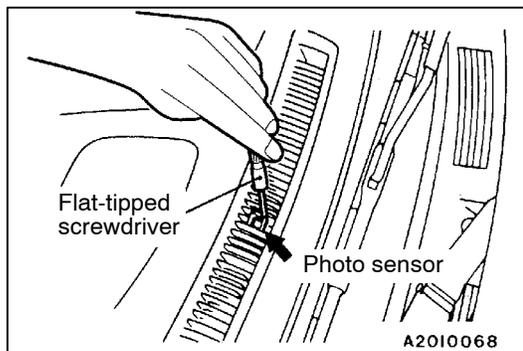


A 2010092

Removal step



1. Photo sensor



REMOVAL SERVICE POINT

◀▶ PHOTO SENSOR REMOVAL

Use a flat-tipped screwdriver (width: 3 mm or less) to remove the photo sensor.

INSPECTION

55400320046

If the blower speed drops when the receiver section of the photo sensor is covered with your hand, then the photo sensor is normal. If the speed does not drop, replace the photo sensor.

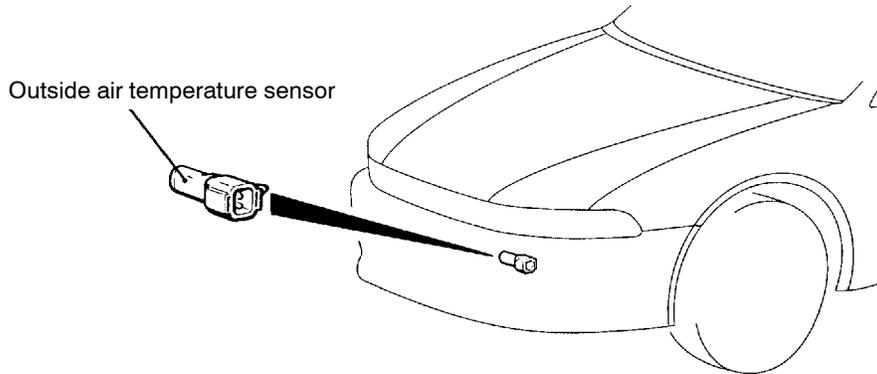
OUTSIDE AIR TEMPERATURE SENSOR

55400340042

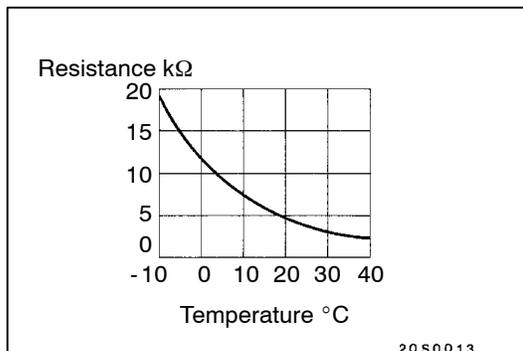
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Front Bumper Removal and Installation (Refer to GROUP 51.)



A2010015



INSPECTION

55400350021

When the resistance value between the sensor terminals is measured under two or more temperature conditions, the resistance value should be close to the values shown in the graph.

NOTE

The temperature conditions when testing should not exceed the range of the characteristic curve in the graph.

HEATER WATER TEMPERATURE SENSOR

55400450080

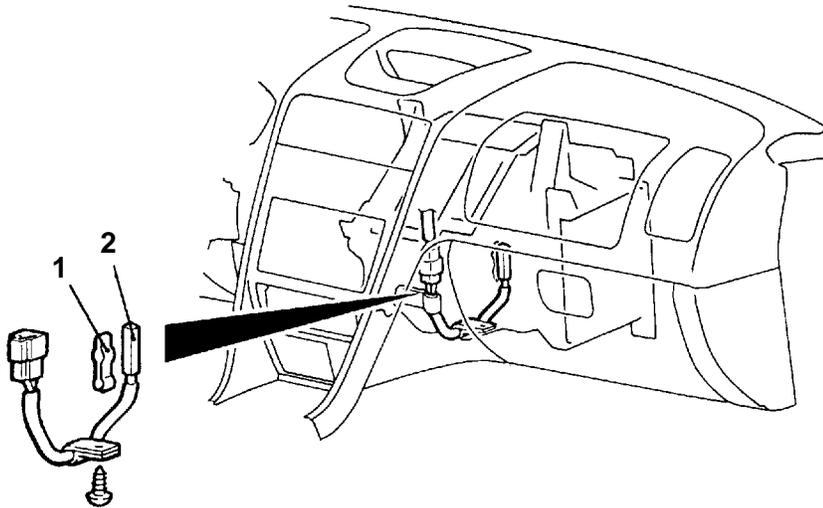
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation

- Lower Cover and Side Cover Removal and Installation (Refer to GROUP 52A - Instrument Panel.)
- Engine-ECU, A/T-ECU and A/T Control Relay Removal and Installation (Refer to GROUP 52B - SRS-ECU.)

Caution: SRS

When removing and installing the engine-ECU, A/T-ECU, A/T control relay and clip from vehicles equipped with SRS, do not let them bump against the SRS-ECU.



A2010094

Removal steps

- ◀A▶ ▶A◀ 1. Heater water temperature sensor clip
 ▶A◀ ▶A◀ 2. Heater water temperature sensor

REMOVAL SERVICE POINT

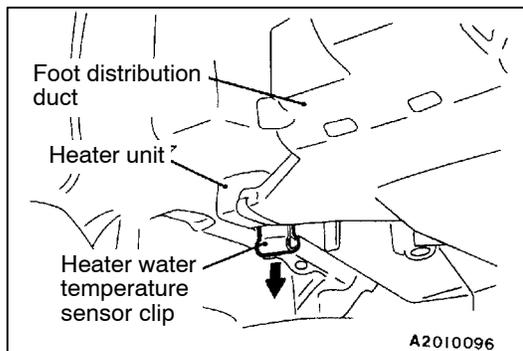
◀A▶ HEATER WATER TEMPERATURE SENSOR CLIP AND HEATER WATER TEMPERATURE SENSOR REMOVAL

Pull out the heater water temperature sensor clip which is at the bottom of the heater unit, and then remove the heater water temperature sensor from the heater unit.

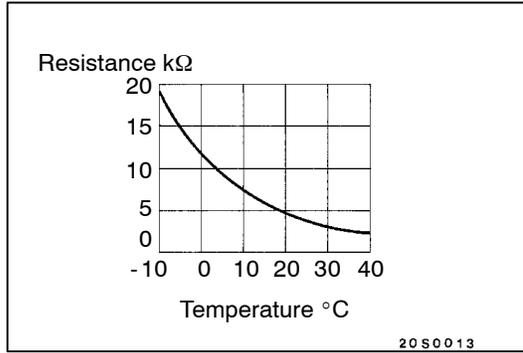
INSTALLATION SERVICE POINT

▶A◀ HEATER WATER TEMPERATURE SENSOR AND HEATER WATER TEMPERATURE SENSOR CLIP INSTALLATION

Insert the heater water temperature sensor into its mounting hole at the bottom of the heater unit, and then fix it by inserting the heater water temperature sensor clip.



A2010096

**INSPECTION**

55400460021

When the resistance value between the sensor terminals is measured under two or more temperature conditions, the resistance value should be close to the values shown in the graph.

NOTE

The temperature conditions when testing should not exceed the range of the characteristic curve in the graph.

OTHER MAINTENANCE SERVICE POINTS

55400400078

The following maintenance service points are the same as for the manual A/C.

Items		Reference page
GENERAL INFORMATIONS	Safety Precautions	55-3
ON-VEHICLE SERVICE	Sight Glass Refrigerant Level Test	55-7
	Magnetic Clutch Test	55-7
	Receiver Drier Test	55-7
	Dual Pressure Switch Check	55-8
	Compressor Drive Belt Adjustment	55-8
	Charging	55-9
	Performance Test	55-14
	Refrigerant Leak Repair	55-15
	Compressor Noise	55-16
	Power Relay Check	55-16
Idle-up Operation Check	55-18	
HEATER UNIT, HEATER CORE, AND BLOWER UNIT		55-22
BLOWER FAN AND MOTOR		55-23
EVAPORATOR		55-25
AIR PURIFIER ASSEMBLY		55-27
REFRIGERANT LINE		55-28
CONDENSER AND CONDENSER FAN MOTOR		55-31
VENTILATORS		55-33