

# HEATER, AIR CONDITIONER AND VENTILATION

## CONTENTS

55109000034

<b>MANUAL AIR CONDITIONER</b> .....	<b>3</b>	<b>TROUBLESHOOTING</b> .....	<b>6</b>
<b>GENERAL INFORMATION</b> .....	<b>3</b>	<b>ON-VEHICLE SERVICE</b> .....	<b>9</b>
Safety Precautions .....	3	Sight Glass Refrigerant Level Test .....	9
<b>SERVICE SPECIFICATIONS</b> .....	<b>4</b>	Magnetic Clutch Test .....	9
<b>LUBRICANTS</b> .....	<b>5</b>	Receiver Drier Test .....	9
<b>SPECIAL TOOLS</b> .....	<b>5</b>	Dual Pressure Switch Check .....	10

**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 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 (\*).

55-2

Compressor Drive Belt Adjustment .....	10	GENERAL INFORMATION .....	42
Charging .....	11	SERVICE SPECIFICATIONS .....	42
Performance Test .....	16	LUBRICANTS .....	42
Refrigerant Leak Repair .....	17	SPECIAL TOOLS .....	43
Compressor Noise .....	18	TROUBLESHOOTING .....	43
Power Relay Check .....	19	ON-VEHICLE SERVICE .....	63
Idle-up Operation Check .....	20	Power Relay Check .....	63
HEATER CONTROL ASSEMBLY AND A/C SWITCH .....	21	Idle-up Operation Check .....	63
HEATER UNIT AND HEATER CODE* ....	23	AIR CONDITIONER CONTROL PANEL AND ECU ASSEMBLY .....	64
BLOWER ASSEMBLY AND RESISTOR* .....	24	DAMPER MOTOR ASSEMBLY .....	65
EVAPORATOR .....	26	AIR PURIFIER ASSEMBLY .....	68
COMPRESSOR AND TENSION PULLEY .....	29	PHOTO SENSOR .....	72
REFRIGERANT LINE .....	36	OUTSIDE AIR TEMPERATURE SENSOR .....	72
CONDENSER AND CONDENSER FAN MOTOR .....	39	HEATER WATER TEMPERATURE SENSOR .....	73
VENTILATORS .....	41	OTHER MAINTENANCE SERVICE POINTS .....	75
FULLY AUTOMATIC AIR CONDITIONER .....	42		

## MANUAL AIR CONDITIONER

55200010046

### 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 and a cool air bypass 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: 2,354
	Low pressure switch	ON → OFF: 196, OFF → ON: 221
Refrigerant and quantity g		R-134a (HFC-134a), Approx. 680–720

### 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  $-29.8^{\circ}\text{C}$ , 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.

**55-4 HEATER, AIR CONDITIONER AND VENTILATION <MANUAL AIR CONDITIONER> – General Information/Service Specifications**

**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**

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Items		Standard value
Idle speed r/min	4G92	750±50
	4G93	800±50
Idle up speed r/min		850±50
Resistor (for blower motor) Ω	LO	2.30
	ML	1.10
	MH	0.40
Refrigerant temperature switch	ON (continuity) temperature	Approx. 155°C or less
	OFF (no continuity) temperature	Approx. 155°C or more (until the temperature drops to approx. 125°C when OFF)
Air gap (Magnetic clutch) mm		0.4–0.65

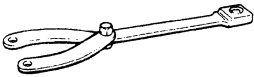
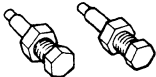

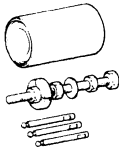
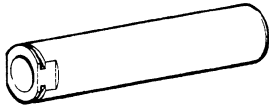
## LUBRICANTS

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

## SPECIAL TOOLS

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Tool	Number	Name	Use
	MB991367	Special spanner	Removal and installation of armature mounting nut of compressor
	MB991386	Pin	
	MB991459	Lip seal installer guide	Installation of lip seal
	MB991456	Bearing puller	Removal of compressor bearing
	MB991458	Lip seal installer and remover	Removal and installation of lip seal

## TROUBLESHOOTING

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### TROUBLESHOOTING PROCEDURES

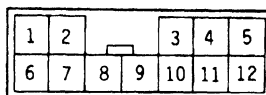
Trouble symptom	Problem cause	Remedy	Reference page
When the ignition switch is "ON", the A/C does not operate.	A/C compressor relay is defective	Replace A/C compressor relay	55-19
	Magnetic clutch is defective	Replace the armature plate, rotor or clutch coil	55-31
	Refrigerant leak or overfilling of refrigerant	Replenish the refrigerant, repair the leak or take out some of the refrigerant	55-17
	Dual pressure switch is defective	Replace the dual pressure switch	55-36
	A/C switch is defective	Replace the A/C switch	55-21
	Blower switch is defective	Replace the blower switch	55-21
	Air thermo sensor is defective	Replace the sensor	55-28
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-31
	Engine coolant temperature sensor is defective	Replace the engine coolant temperature sensor	—*
	Automatic compressor-ECU is defective	Replace the automatic compressor-ECU	55-24
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	55-17
	Dual pressure switch is defective	Replace the dual pressure switch	55-36
	Air thermo sensor is defective	Replace the sensor	55-28
	Refrigerant temperature switch is defective	Replace the refrigerant temperature switch	55-31
	Engine coolant temperature sensor is defective	Replace the engine coolant temperature sensor	—*
	Automatic compressor ECU is defective	Replace the automatic compressor-ECU	55-24

#### NOTE

\*: Refer to GROUP 13A – On-vehicle Service.

Trouble symptom	Problem cause	Remedy	Reference page
Blower fan and motor doesn't turn	Blower relay is defective	Replace the blower relay	55-19
	Blower fan and motor is defective	Replace the blower fan and motor	55-24
	Resistor (for blower motor) is defective	Replace the resistor	55-24
	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	55-19
When the A/C is operating condenser fan does not turn.	Condenser fan motor is defective	Replace the condenser fan motor	55-39
	Condenser fan relay (LOW) is defective	Replace the condenser fan relay (LOW)	55-19
	Condenser fan relay (HIGH) is defective	Replace the condenser fan relay (HIGH)	55-19
	Dual pressure switch is defective	Replace the dual pressure switch	55-36

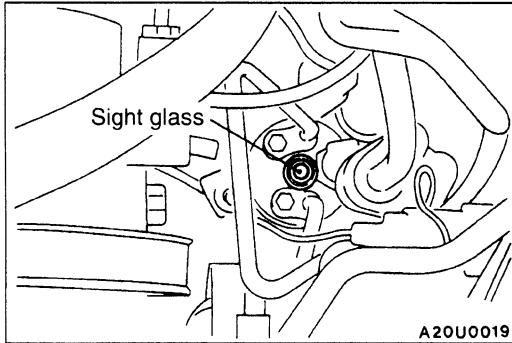
## INSPECTION AT THE AUTOMATIC COMPRESSOR-ECU TERMINAL



20U0014

Terminal No.	Name of Signal	Condition	Terminal voltage
2	Automatic compressor-ECU power supply (ECONO mode)	When the ignition switch and the blower switch are ON, and the A/C switch has been turned to the first level	System voltage
5	Air thermo sensor	Sensor temperature is 25°C [1.0 kΩ]	Approx. 4V
6	A/C compressor relay	When the compressor ON conditions are satisfied	System voltage
7	Automatic compressor-ECU power supply (DRY mode)	When the ignition switch and the blower switch are ON, and the A/C switch has been turned to the second level	System voltage
8, 9	Automatic compressor ECU earth	At all time	0V
12	Air thermo sensor power supply	The ignition switch, blower switch and A/C switch are all ON	5V





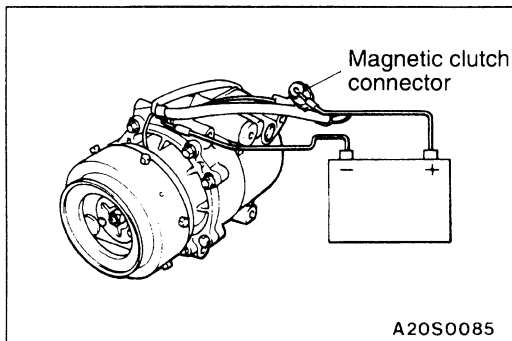
## ON-VEHICLE SERVICE

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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

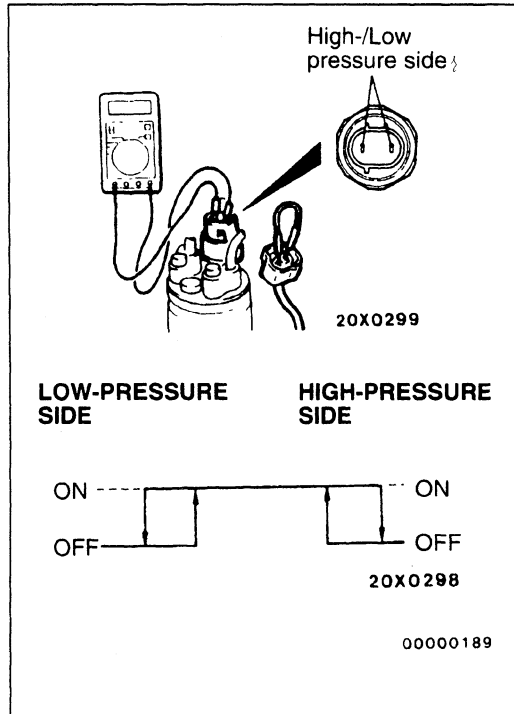
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1. Disconnect the connector (1P) to the magnetic clutch.
2. Connect battery (+) voltage directly to the connector for the magnetic clutch.
3. If the magnetic clutch is normal, there will be "click". If the pulley and armature do not make contact ('click'), there is a malfunction.

### RECEIVER DRIER TEST

55200860047

1. 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

55201040068

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.

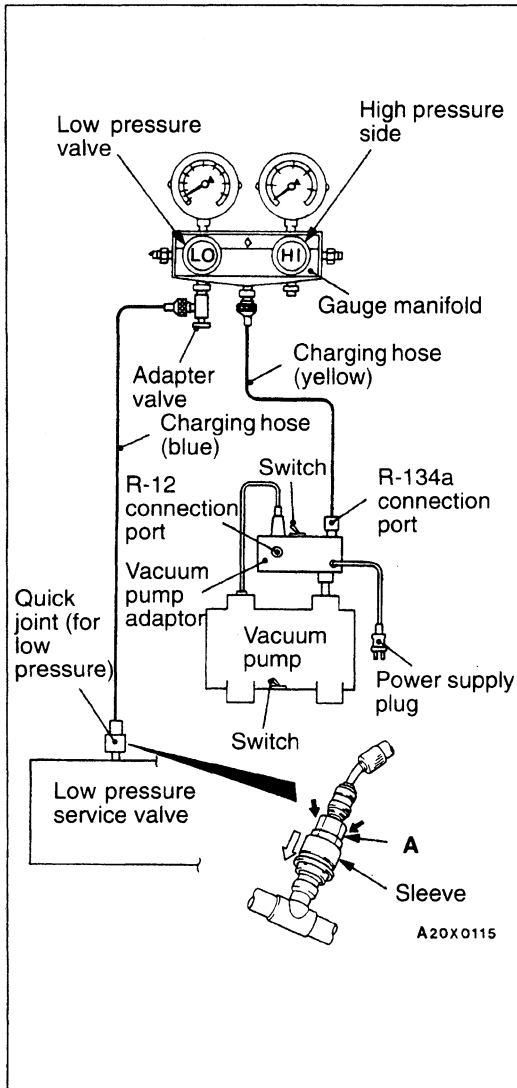
Unit: kPa

Items	Switch position	
	OFF → ON	ON → OFF
Low-pressure side	221	196
High-pressure side	2,354	2,942

## COMPRESSOR DRIVE BELT ADJUSTMENT

55200100040

Refer to GROUP 11A – On-vehicle Service.



## CHARGING

55200120046

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

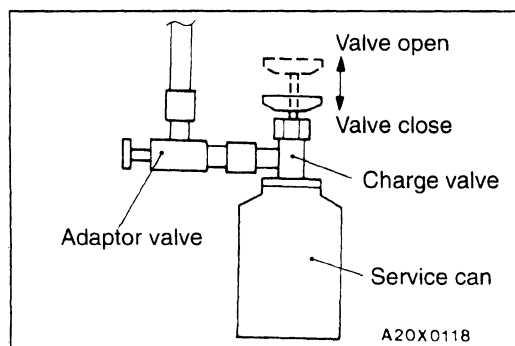
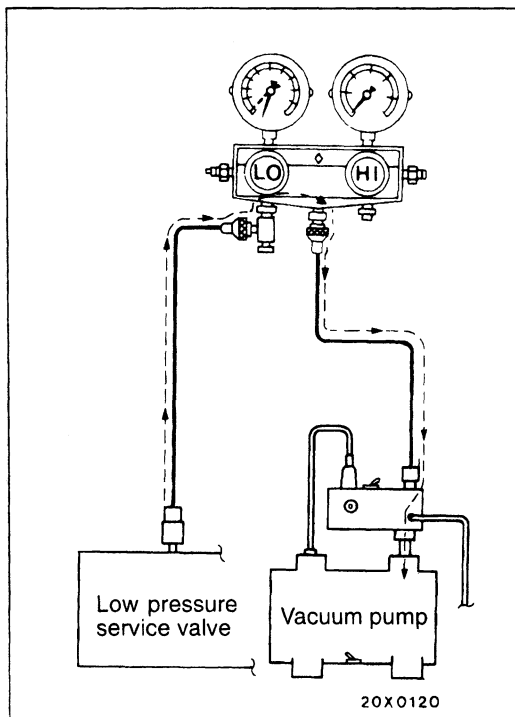
The low-pressure service valve should be connected to the suction hose.

### 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**

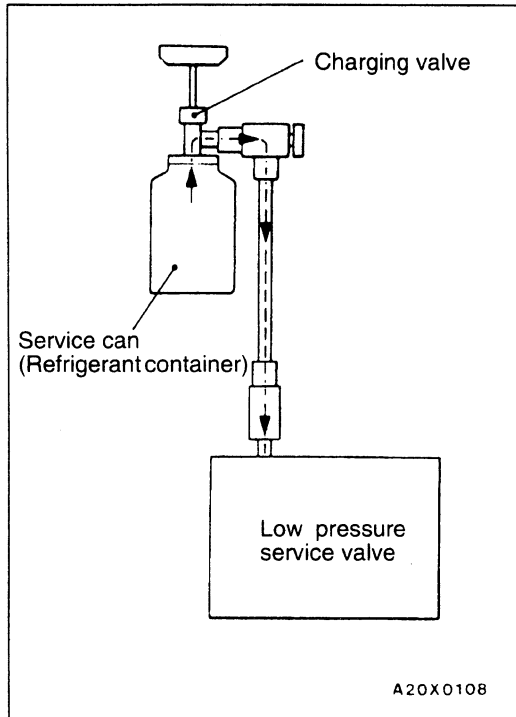
**Do not operate the compressor in the vacuum condition; damage may occur.**

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 van.
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.

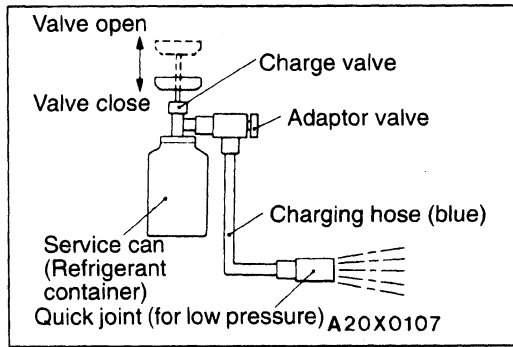
**Caution**

**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.

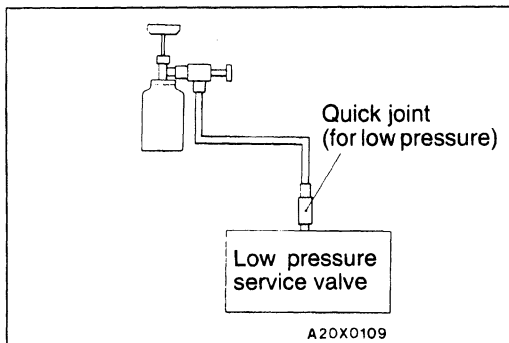
**NOTE**

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.**

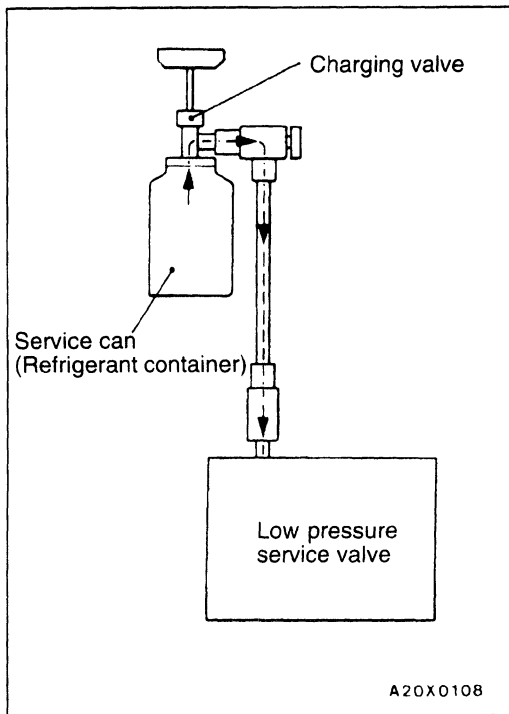
1. Install the charge valve with the handle turned all the way back (valve open) to the service can.
2. Install the adaptor valve with the handle turned all the way back (valve close) to the charging valve.
3. Connect the charging hose (blue) to the adaptor valve.
4. Connect the charging hose (blue) 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.

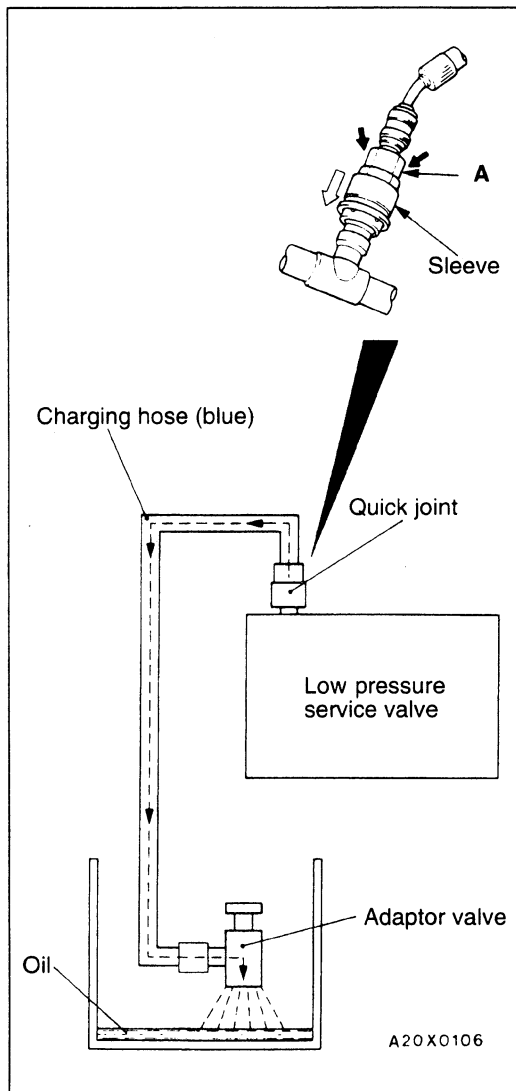
**Caution**

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.

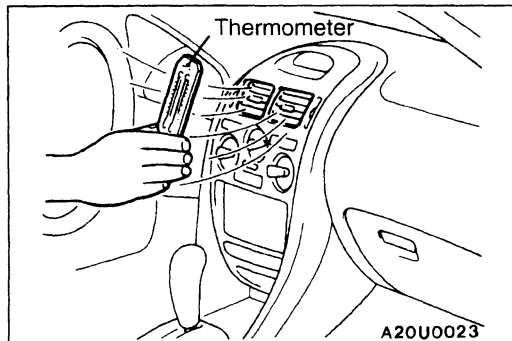
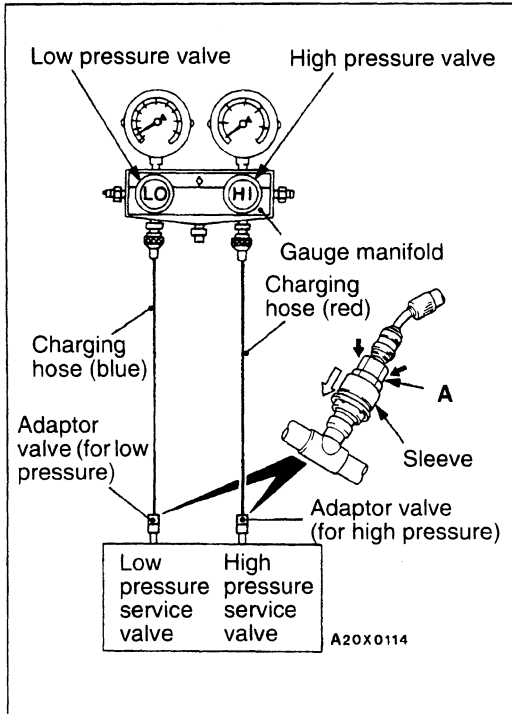
When the following system components are changed, it is necessary to add oil to the system to replace the oil being removed with the component.

**Compressor oil: SUN PAG 56**

### Quantity

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





## PERFORMANCE TEST

55200140042

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 discharge 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.

### 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 or 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.

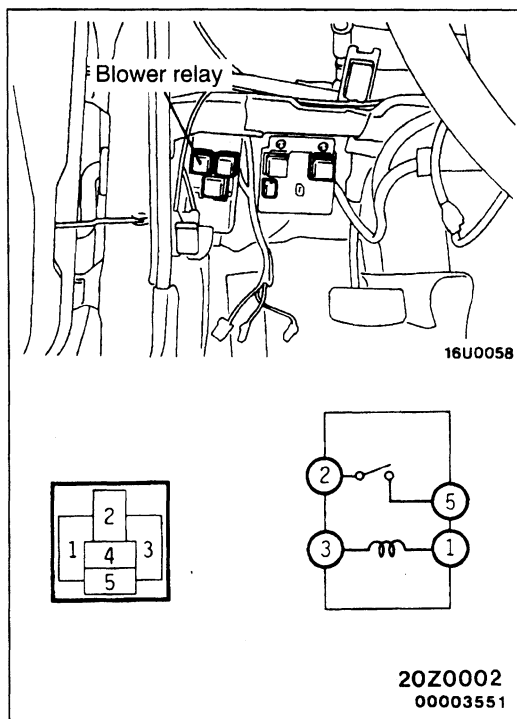
Noises that develop during A/C operation can often be misleading. For example: what sounds like a failed front bearing or connecting rod, may be caused by loose bolts, nuts, mounting brackets, or a loose clutch assembly. Verify accessory drive belt tension (power steering or alternator).

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

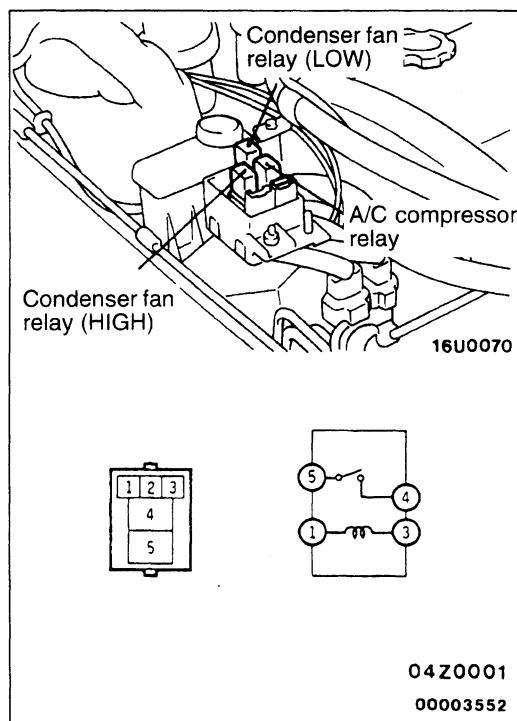
1. Select a quiet area for testing. Duplicate conditions as much as possible. Switch compressor on and off several times to clearly identify compressor noise. To duplicate high ambient conditions (high head pressure), restrict air flow through condenser. Install manifold gauge set to make sure discharge 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 BLOWER RELAY

55200880043

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



## A/C COMPRESSOR RELAY, CONDENSER FAN RELAY (LOW) AND (HIGH)

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

### IDLE-UP OPERATION CHECK

55200160048

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:**

**750 ± 50 r/min <4G92>, 800 ± 50 r/min <4G93>**

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.

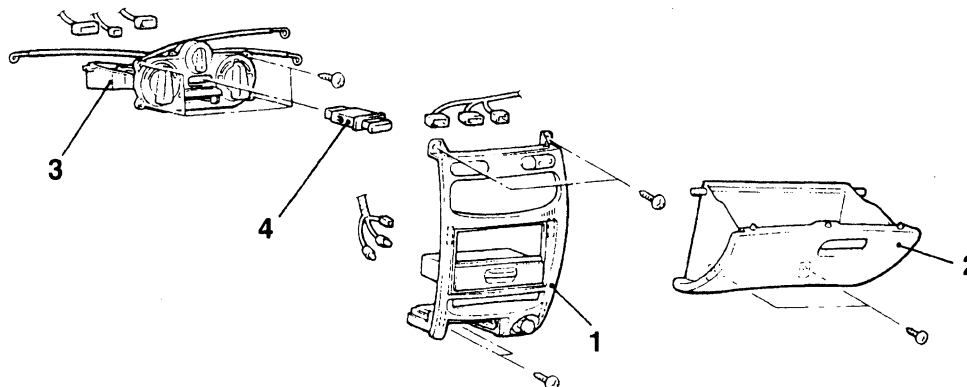
**Standard value: 850 ± 50 r/min**

**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.)

## HEATER CONTROL ASSEMBLY AND A/C SWITCH REMOVAL AND INSTALLATION

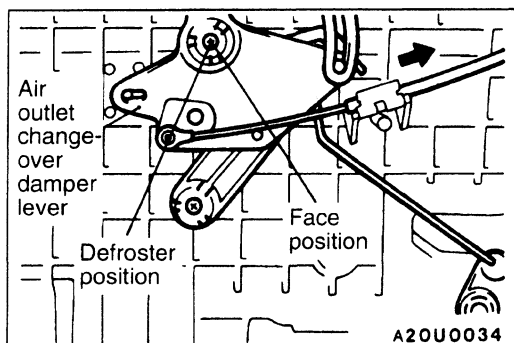
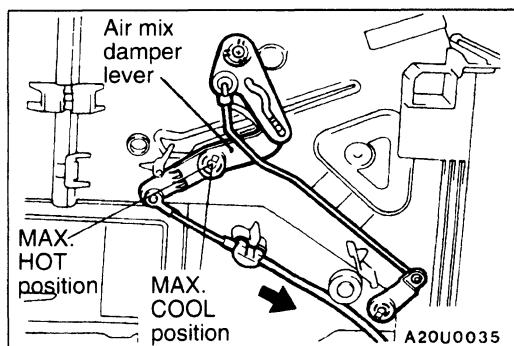
55200240018



A20U0020

### Removal steps

1. Center console panel (Refer to GROUP 52A – Floor Console.)
2. Glove box (Refer to GROUP 52A – Instrument Panel.)
3. Heater control assembly
4. A/C switch

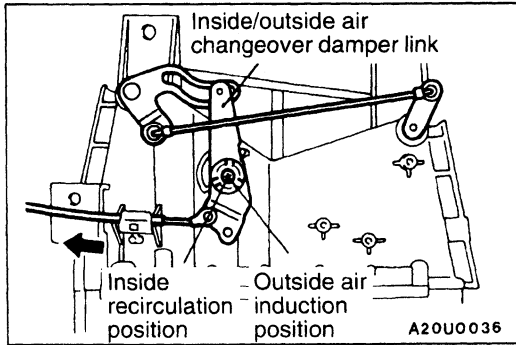


### INSTALLATION SERVICE POINT

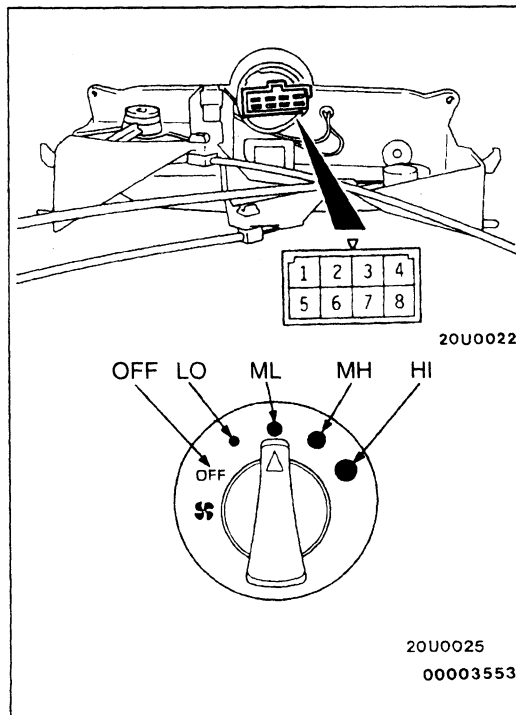
#### ►A◄ HEATER CONTROL ASSEMBLY INSTALLATION

- (1) Set the temperature control knob on the heater control assembly to MAX HOT.
- (2) Set the air mix damper lever of the heater unit to the MAX HOT position as shown in the illustration, and then connect the cable to the lever pin.
- (3) Push the outer cable in the direction of the arrow so that there is no looseness, and then secure it with the clip.
- (4) Set the air outlet changeover control knob on the heater control assembly to the DEF position.
- (5) Set the air outlet changeover damper lever of the heater unit to DEF position and install the cable to the lever pin.
- (6) Push the outer cable in the direction of the arrow so that there is no looseness, and then secure it with the clip.

**55-22 HEATER, AIR CONDITIONER AND VENTILATION <MANUAL AIR CONDITIONER> - Heater Control Assembly and A/C Switch**



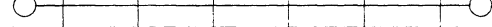

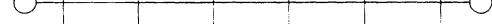



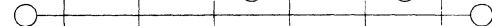
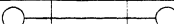
- (7) Set the inside/outside air changeover control knob on the heater control assembly to the **INSIDE** position.
- (8) Set the inside/outside air changeover damper lever of the heater unit to **INSIDE** position and install the cable to the lever pin.
- (9) Push the outer cable in the direction of the arrow so that there is no looseness, and then secure it with the clip.

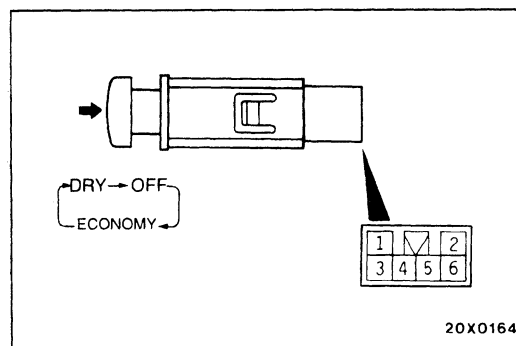


**INSPECTION**

55200250011

**BLOWER SWITCH CONTINUITY CHECK**

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



**A/C SWITCH CONTINUITY CHECK**

Switch position	Terminal No.							
	1	2	4	IND	5	3	ILL	6
OFF								
ECON-OMY	○	○	○	○	○	○	○	○
DRY	○	○	○	○	○	○	○	○

## HEATER UNIT AND HEATER CORE

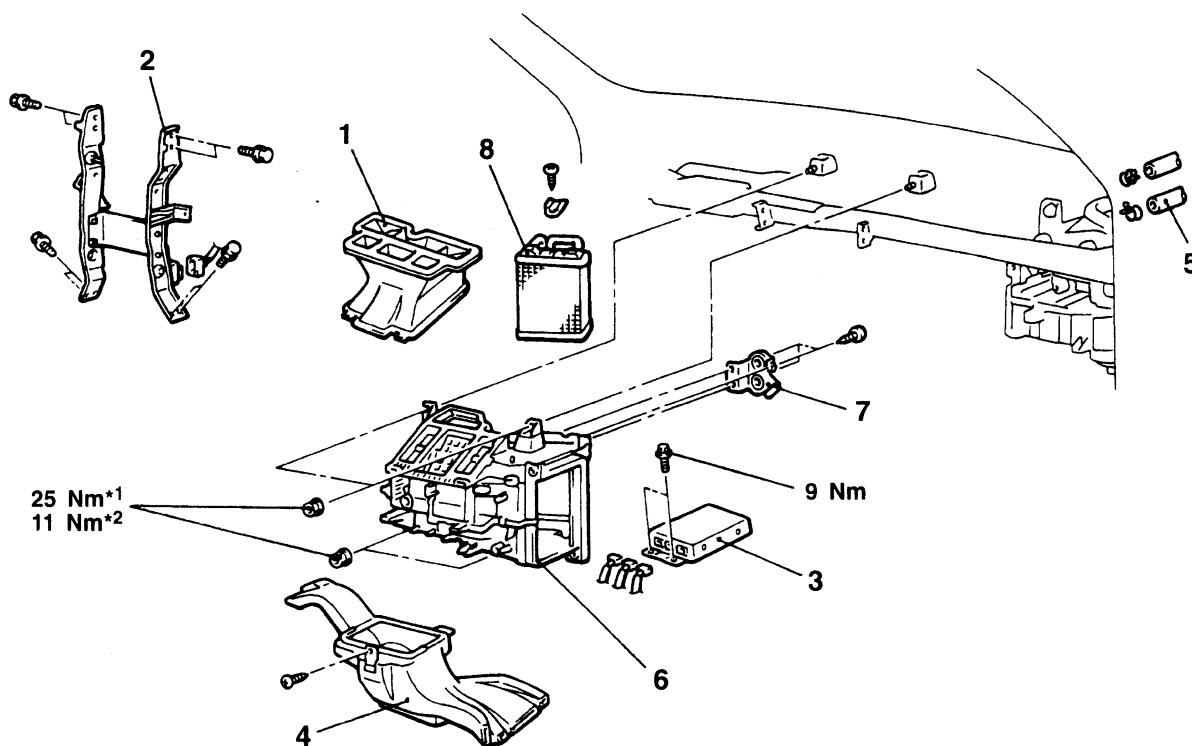
### REMOVAL AND INSTALLATION

#### Pre-removal and Post-installation Operation

- Draining and refilling coolant (Refer to GROUP 14 – On-vehicle Service.)
- Instrument Panel Removal and Installation (Refer to GROUP 52A.)
- Evaporator Removal and Installation (Refer to P.55-26.)

#### 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.



A20U0038

#### NOTE

- (1) \*1: indicates flange nut  
(2) \*2: indicates nut and washer assembly

#### Removal steps

1. Center ventilation duct
2. Center reinforcement
3. A/T-ECU
4. Foot distribution duct
5. Heater hose connection
6. Heater unit
7. Plate
8. Heater core



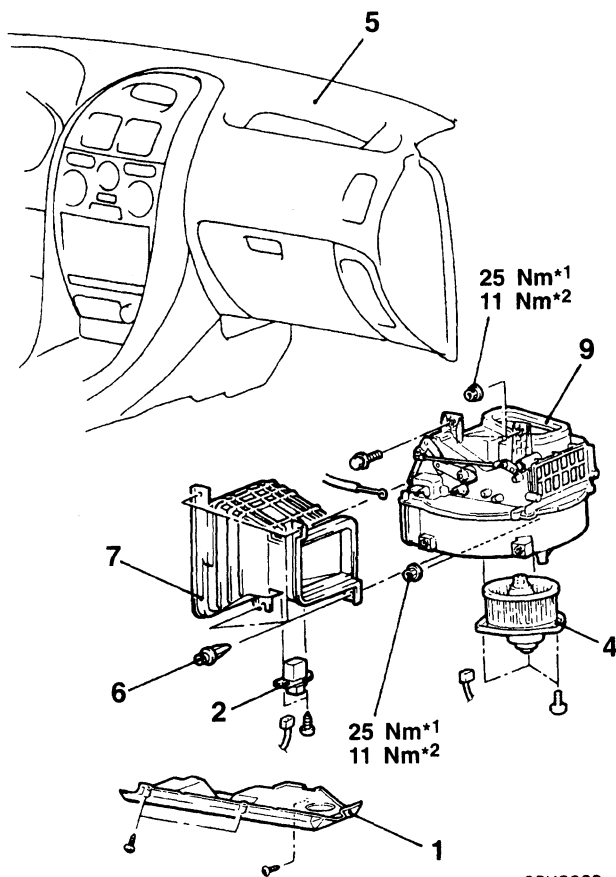
## BLOWER ASSEMBLY AND RESISTOR

55100280048

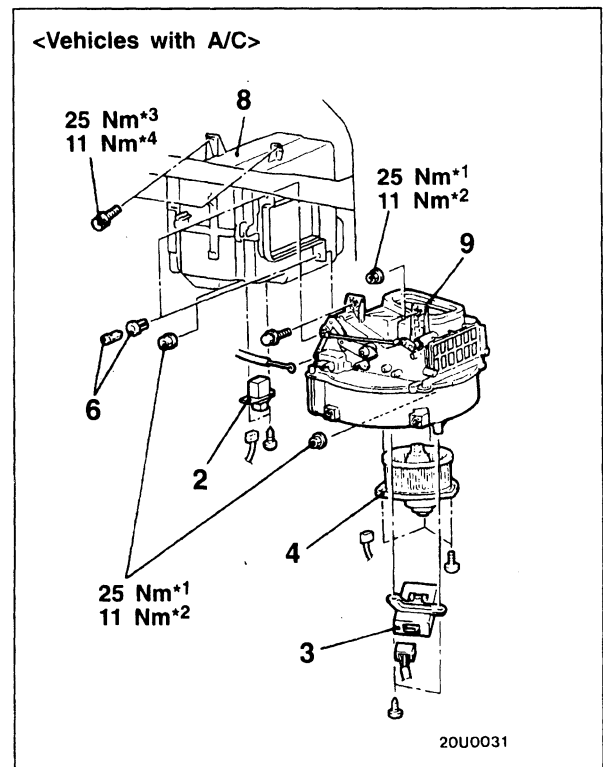
### REMOVAL AND INSTALLATION

#### 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.



20U0030



20U0031

00003554

#### NOTE

- (1) \*1: indicates flange nut
- (2) \*2: indicates nut and washer assembly
- (3) \*3: indicates flange bolt
- (4) \*4: indicates bolt and washer assembly

#### Resistor removal steps

1. Under cover
2. Resistor

#### Blower fan and motor removal steps

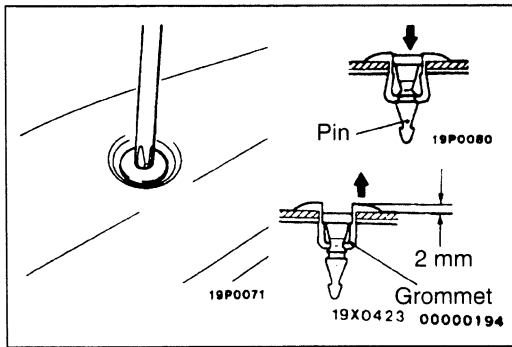
1. Under cover
2. Automatic compressor-ECU  
<Vehicles with A/C>
4. Blower fan and motor

#### Blower unit removal steps

5. Instrument panel  
(Refer to GROUP 52A.)
6. Clip
7. Joint duct <Vehicles without A/C>
8. Evaporator <Vehicles with A/C>  
(Refer to P.55-26.)
9. Blower unit assembly







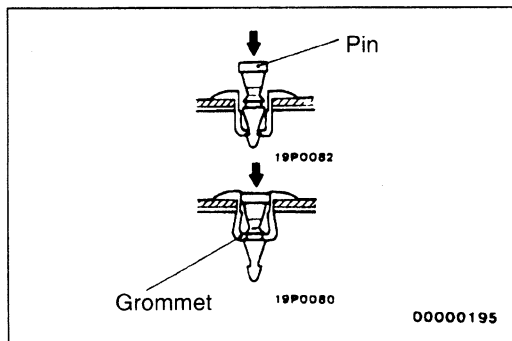
## REMOVAL SERVICE POINT

### ◀A▶ CLIP REMOVAL

- (1) Use a cross-tip (+) screwdriver to push inward the pin (at the centre of the clip) to a depth of about 2 mm.
- (2) Pull the clip outward to remove it.

#### Caution

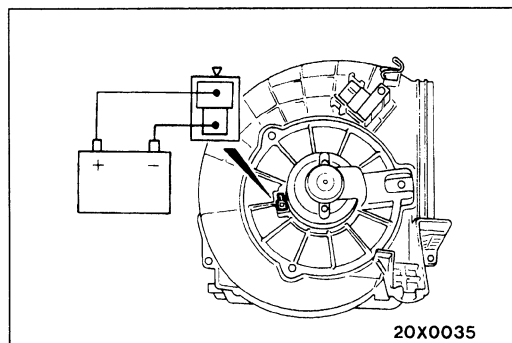
Do not push the pin inward more than necessary because it may damage the grommet, or the pin may fall in, if pushed too far.



## INSTALLATION SERVICE POINT

### ▶A◀ CLIP INSTALLATION

- (1) With the pin pulled out, insert the clip into the hole.
- (2) Push the pin inward until the pin's head is flush with the grommet.

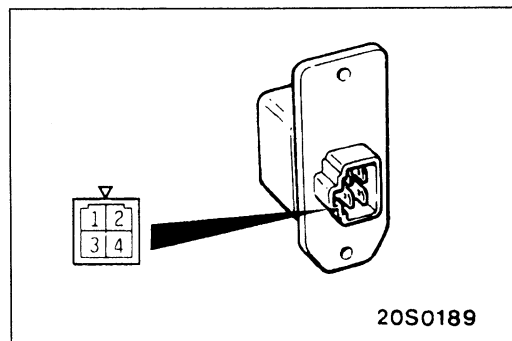


## INSPECTION

55100290034

### 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 $\Omega$
Between terminals 3-2 (LO)	2.30
Between terminals 3-4 (ML)	1.10
Between terminals 3-1 (MH)	0.40

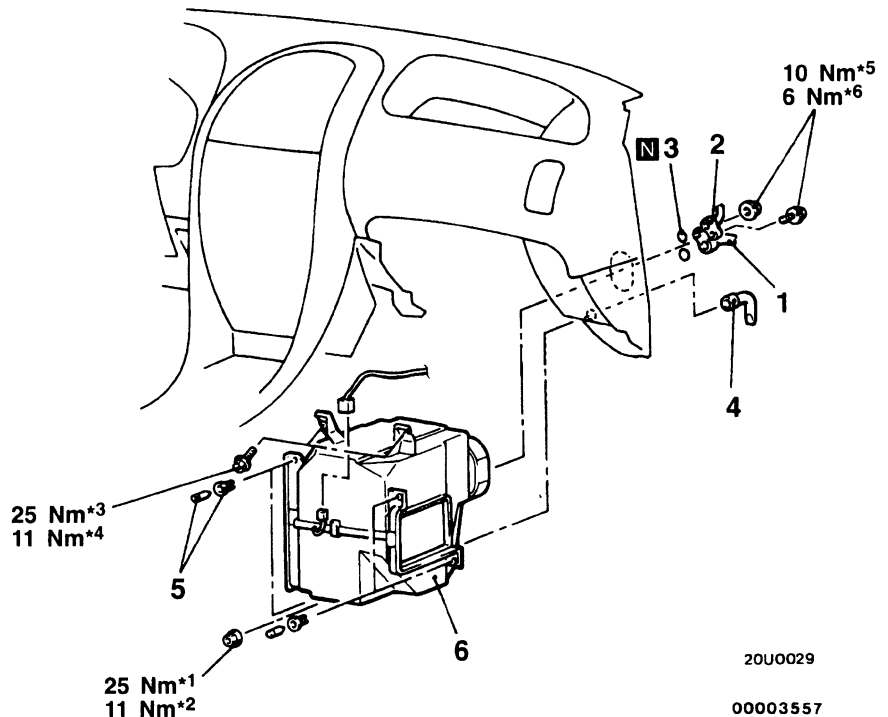
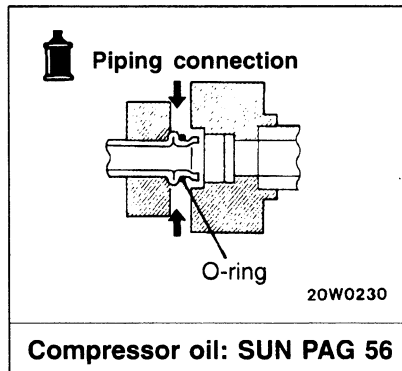
## EVAPORATOR

55200360042

### REMOVAL AND INSTALLATION

#### Pre-removal and Post-installation Operation

- Discharging and Charging of Refrigerant (Refer to P.55-11.)
- Air Cleaner Cover and Hose Removal and Installation <R.H. drive vehicles>
- Under Cover, Corner Panel, Glove Box and Glove Box Frame Removal and Installation (Refer to GROUP 52A - Instrument Panel.)
- Console Side Cover (passenger side) Removal and Installation (Refer to GROUP 52A - Floor Console.)



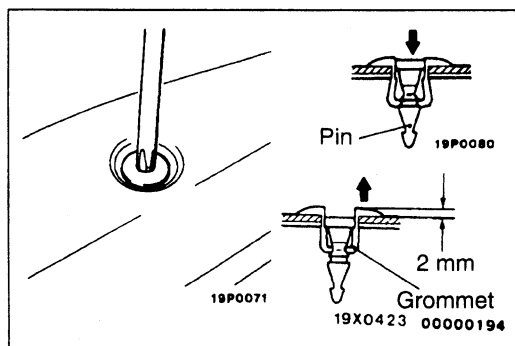
#### Removal steps

1. Suction hose connection
2. Discharge pipe connection
3. O-ring
4. Drain hose
5. Clip
6. Evaporator



#### NOTE

- (1) \*1: indicates flange nut  
(2) \*2: indicates nut and washer assembly  
(3) \*3: indicates flange bolt  
(4) \*4: indicates bolt and washer assembly  
(5) \*5: indicates flange nut or flange bolt  
(6) \*6: indicates nut and washer assembly or bolt and washer assembly



## REMOVAL SERVICE POINT

### ◀A▶ CLIP REMOVAL

- (1) Use a cross-tip (+) screwdriver to push inward the pin (at the centre of the clip) to a depth of about 2 mm.
- (2) Pull the clip outward to remove it.

#### Caution

Do not push the pin inward more than necessary because it may damage the grommet, or the pin may fall in, if pushed too far.

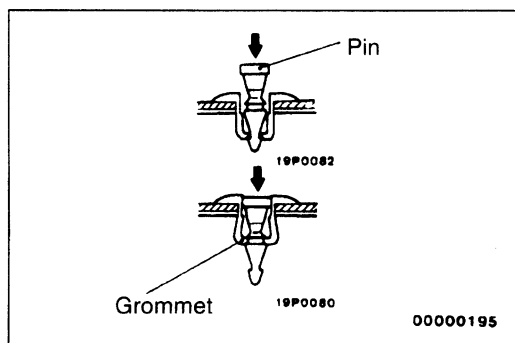
## INSTALLATION SERVICE POINTS

### ▶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**

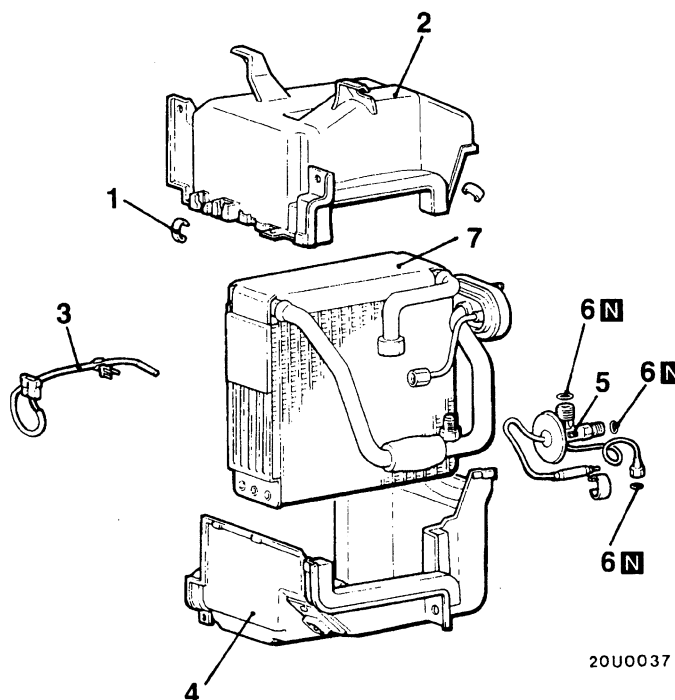
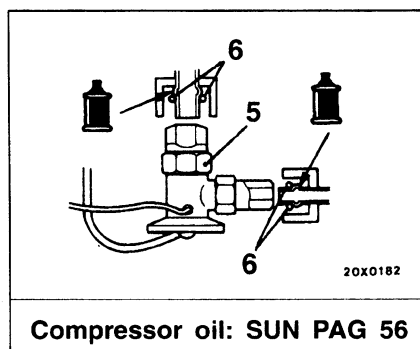


### ▶B◀ CLIP INSTALLATION

- (1) With the pin pulled out, insert the clip into the hole.
- (2) Push the pin inward until the pin's head is flush with the grommet.

## DISASSEMBLY AND REASSEMBLY

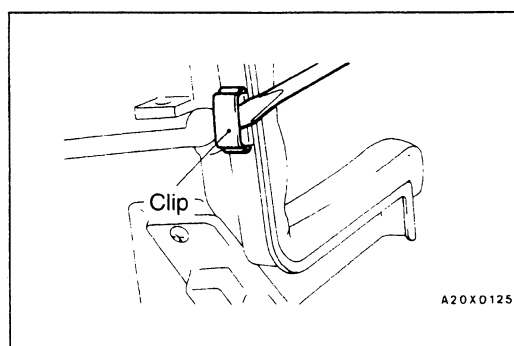
55200380048



### Disassembly steps



1. Clip
2. Evaporator case (upper)
3. Air thermo sensor
4. Evaporator case (lower)
5. Expansion valve
6. O-ring
7. 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

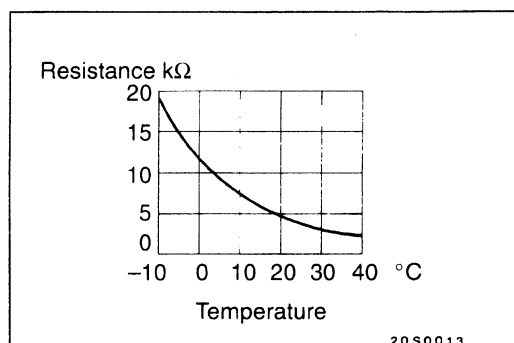
55200390010

#### AIR THERMO SENSOR CHECK

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.



## COMPRESSOR AND TENSION PULLEY

55200410068

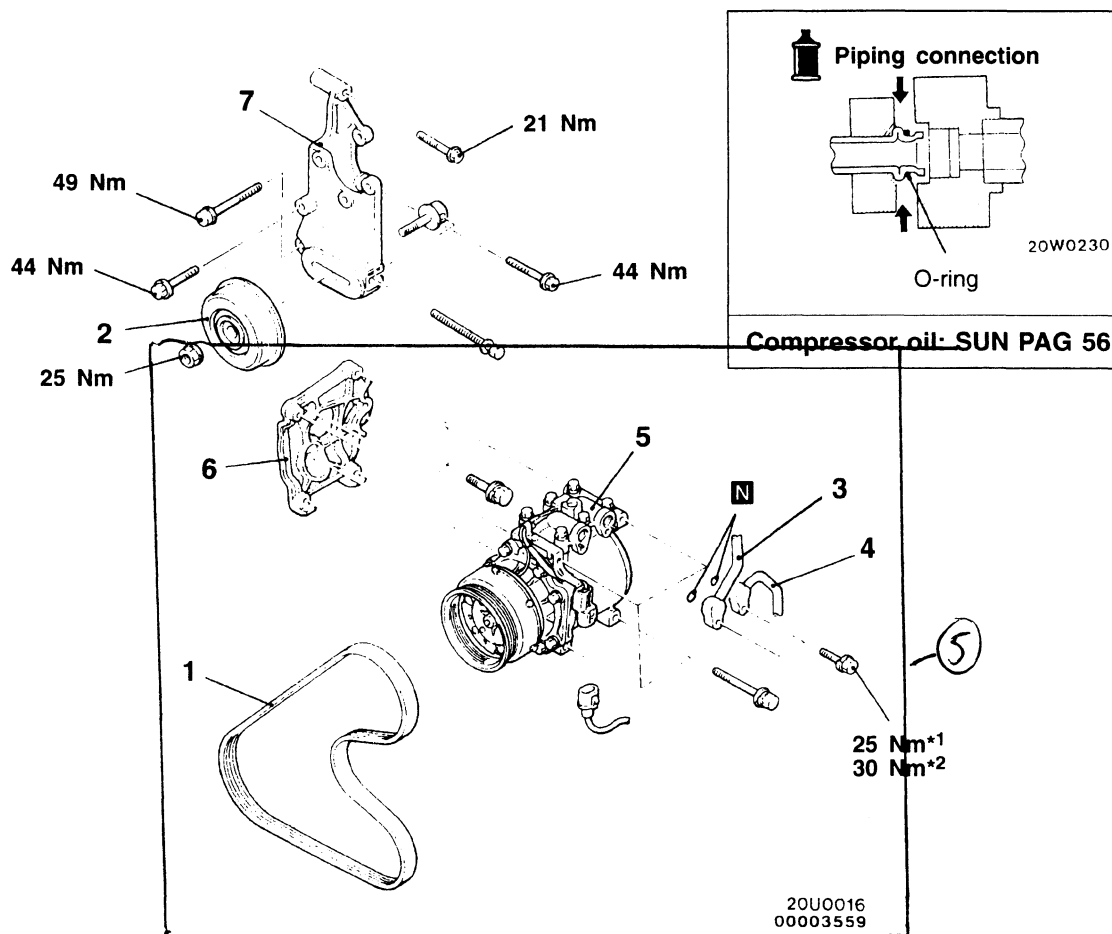
### REMOVAL AND INSTALLATION

#### Pre-removal Operation

- Discharging of Refrigerant (Refer to P.55-15.)
- Under Cover Removal (R.H. side)
- Power Steering Oil Pump Removal (Refer to GROUP 37A.)

#### Post-installation Operation

- Charging of Refrigerant (Refer to P.55-11.)
- Under Cover Installation (R.H. side)
- Power Steering Oil Pump Installation (Refer to GROUP 37A.)
- A/C Compressor Drive Belt Tension Adjustment (Refer to GROUP 11A – On-vehicle Service.)



#### Removal steps

◀A▶

◀B▶

◀B▶

◀C▶

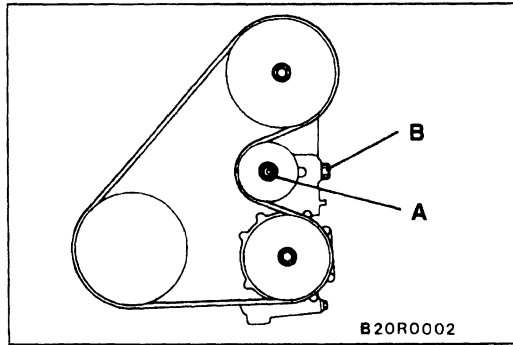
▶A◀

1. A/C compressor drive belt
2. Tension pulley
3. Suction hose connection
4. Discharge pipe connection
5. Compressor
6. Compressor bracket
7. Power steering oil pump bracket

#### NOTE

(1) \*1: indicates flange bolt

(2) \*2: indicates bolt and washer assembly



A 6

## REMOVAL SERVICE POINTS

### ◀A▶ COMPRESSOR DRIVE BELT REMOVAL

- (1) Loosen nut "A" or bolt "A" for holding the tension pulley.
- (2) Loosen bolt "B" or nut "B" for adjustment.
- (3) Remove the compressor 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

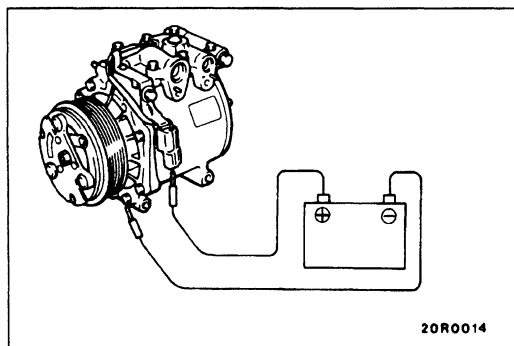
$$120 \text{ ml} - X \text{ ml} = Y \text{ ml}$$

#### 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

55200420030

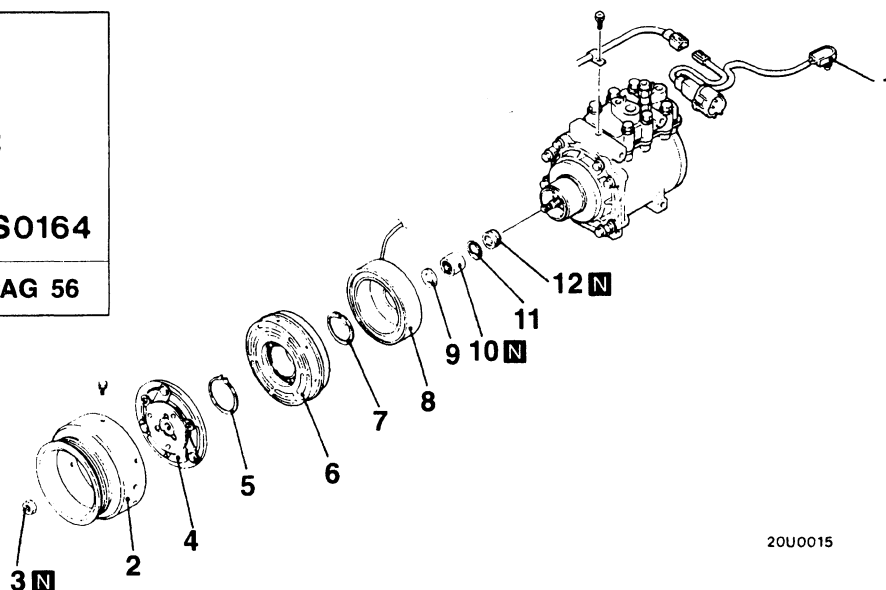
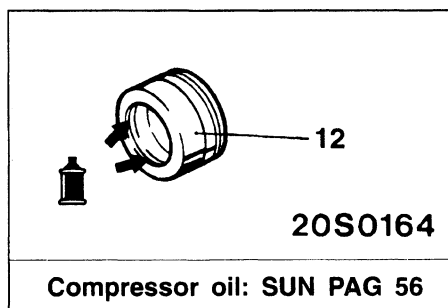
### COMPRESSOR MAGNETIC CLUTCH OPERATION INSPECTION

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

55200460049

### DISASSEMBLY AND REASSEMBLY



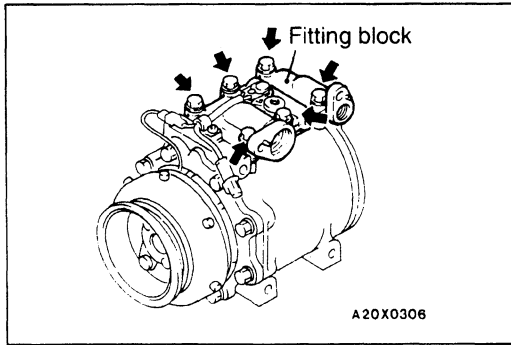
20U0015

00003560

### DISASSEMBLY STEPS

- ◀A▶ 1. Refrigerant-temperature switch  
2. Pulley  
● Air gap adjustment  
◀B▶ 3. Nut  
◀G▶ 4. Armature plate  
◀F▶ 5. Snap ring  
◀E▶ 6. Rotor

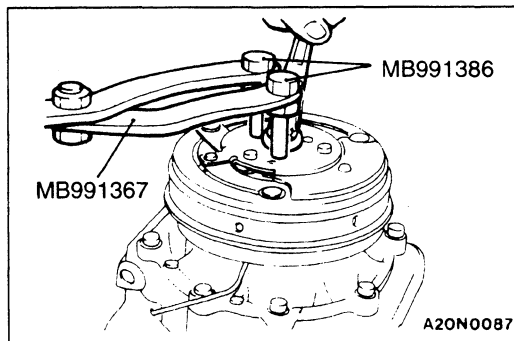
- ◀D▶ 7. Snap ring  
◀C▶ 8. Clutch coil  
◀C▶ 9. Shims  
◀B▶ 10. Bearing  
◀D▶ 11. Snap ring  
◀A▶ 12. Lip seal



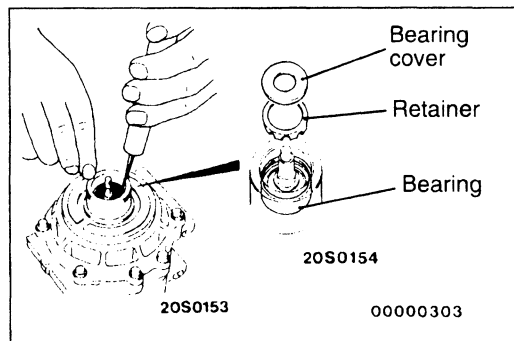
## DISASSEMBLY SERVICE POINTS

### ◀A▶ REFRIGERANT-TEMPERATURE SWITCH REMOVAL

- (1) Remove the fitting block of the compressor.
- (2) Remove the snap ring from inside the fitting block, and then remove the refrigerant-temperature switch.

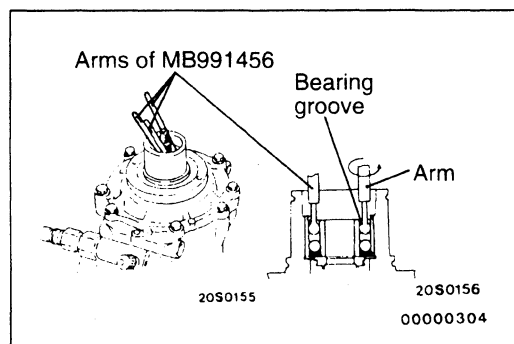


### ◀B▶ NUT REMOVAL

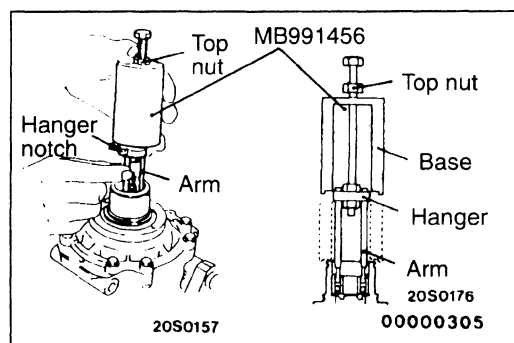


### ◀C▶ BEARING REMOVAL

- (1) Use a pointed tool such as an awl to remove the bearing cover and retainer.

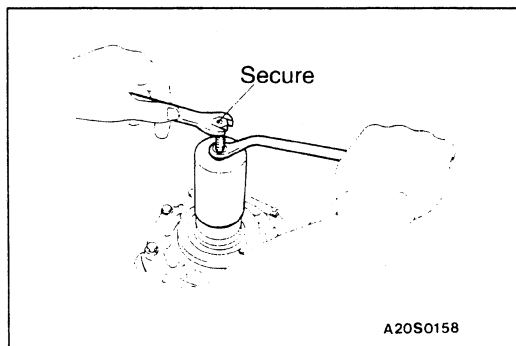


- (2) Insert the arms (3) of the special tool into the bearing groove at regular intervals.
- (3) Turn the arms 90° to secure the arms to the bearing.

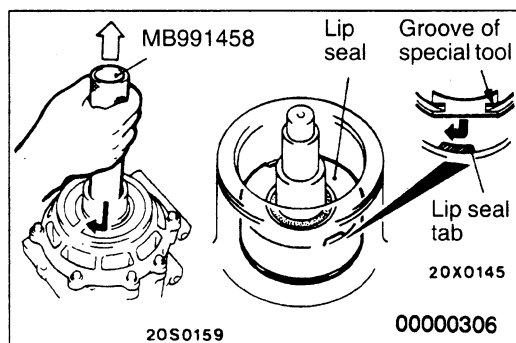


- (4) Set the 3 arms installed to the bearing into the notches (3 places) located on the hanger of the special tool.
- (5) Lower the base of the special tool to cover the hanger, and tighten the top nut until it touches the base.



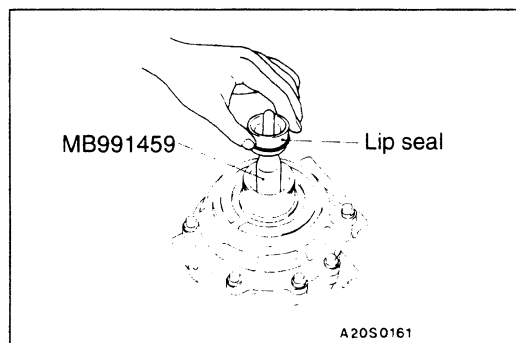


- (6) Next, with the bolt of the special tool secured, tighten the nut, and remove the bearing from the compressor.



### ◀D▶ LIP SEAL REMOVAL

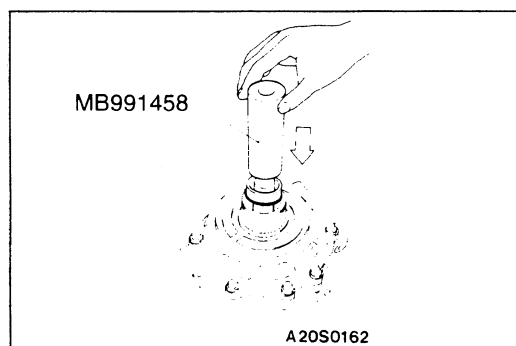
Catch the groove of the special tool on the lip seal tab, and slowly pull the lip seal straight upwards.



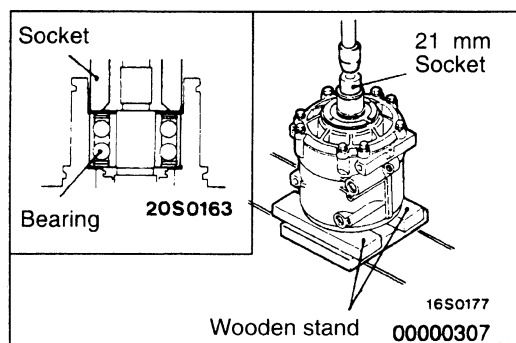
### REASSEMBLY SERVICE POINTS

#### ▶A◀ LIP SEAL INSTALLATION

- (1) Install the special tool to the compressor crank shaft.
- (2) Apply compressor oil to the sliding surface of the lip seal and the O-ring, and insert the lip seal.

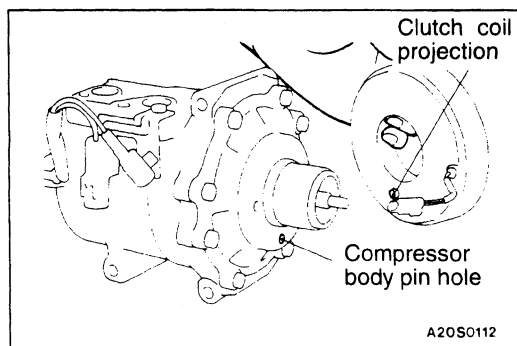


- (3) Use the special tool to insert the lip seal.



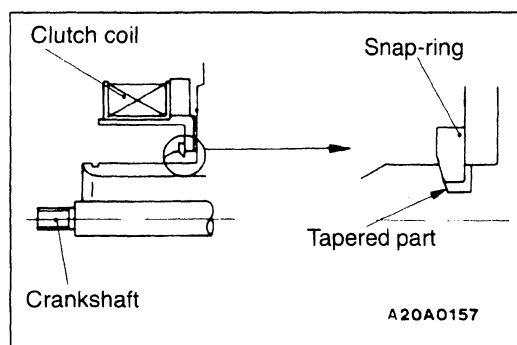
#### ▶B◀ BEARING INSTALLATION

Use a wooden stand and a 21 mm socket to insert the bearing into the compressor.



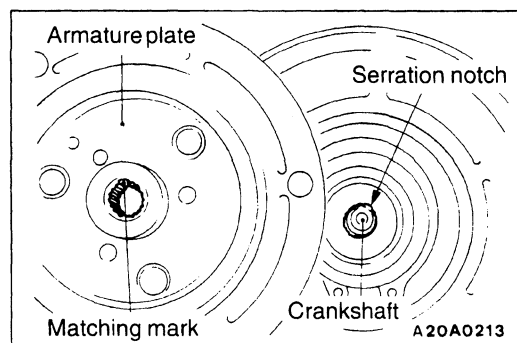
### ►C◄ CLUTCH COIL INSTALLATION

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.



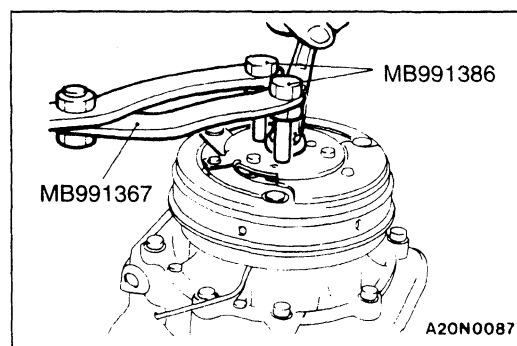
### ►D◄ SNAP RING INSTALLATION

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

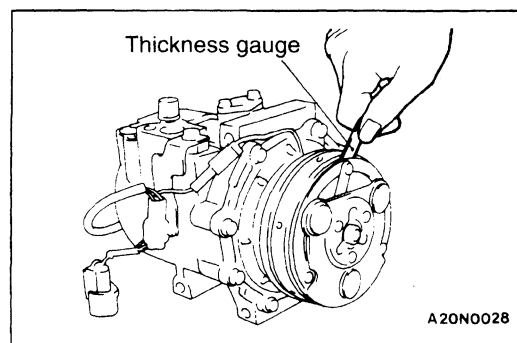


### ►E◄ ARMATURE PLATE INSTALLATION

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



### ►F◄ NUT INSTALLATION



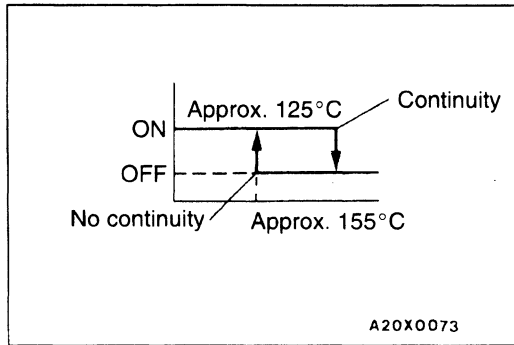
### ►G◄ AIR GAP ADJUSTMENT

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

**Standard value: 0.4–0.65 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.



## INSPECTION

55200470035

### REFRIGERANT-TEMPERATURE SWITCH

- (1) Immerse the refrigerant-temperature switch in engine oil.
- (2) Use a circuit tester to confirm the continuity condition when the engine oil has become heated.

#### Standard value:

Item	Temperature
Continuity (ON)	Less than approx. 155°C
No continuity (OFF)	Approx. 155°C or more (until the temperature drops to approx. 125°C when OFF)

#### Caution

Do not heat the oil more than necessary.

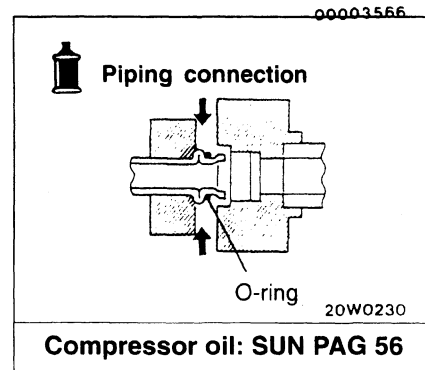
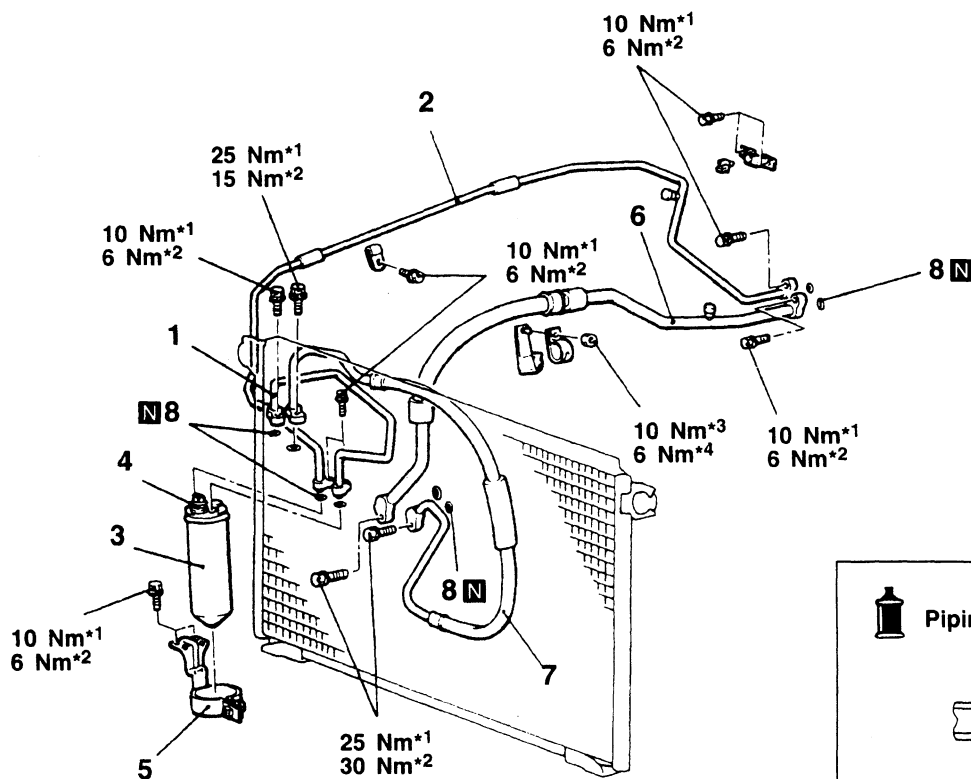
## REFRIGERANT LINE

### REMOVAL AND INSTALLATION

#### <L.H. DRIVE VEHICLES>

##### Pre-removal Operation

- Discharging and Charging of Refrigerant  
(Refer to P.55-11.)



##### Removal steps

- Discharge pipe A
- Discharge pipe B
- Receiver assembly
- Dual pressure switch
- Receiver bracket
- Suction hose
- Discharge hose
- O-ring

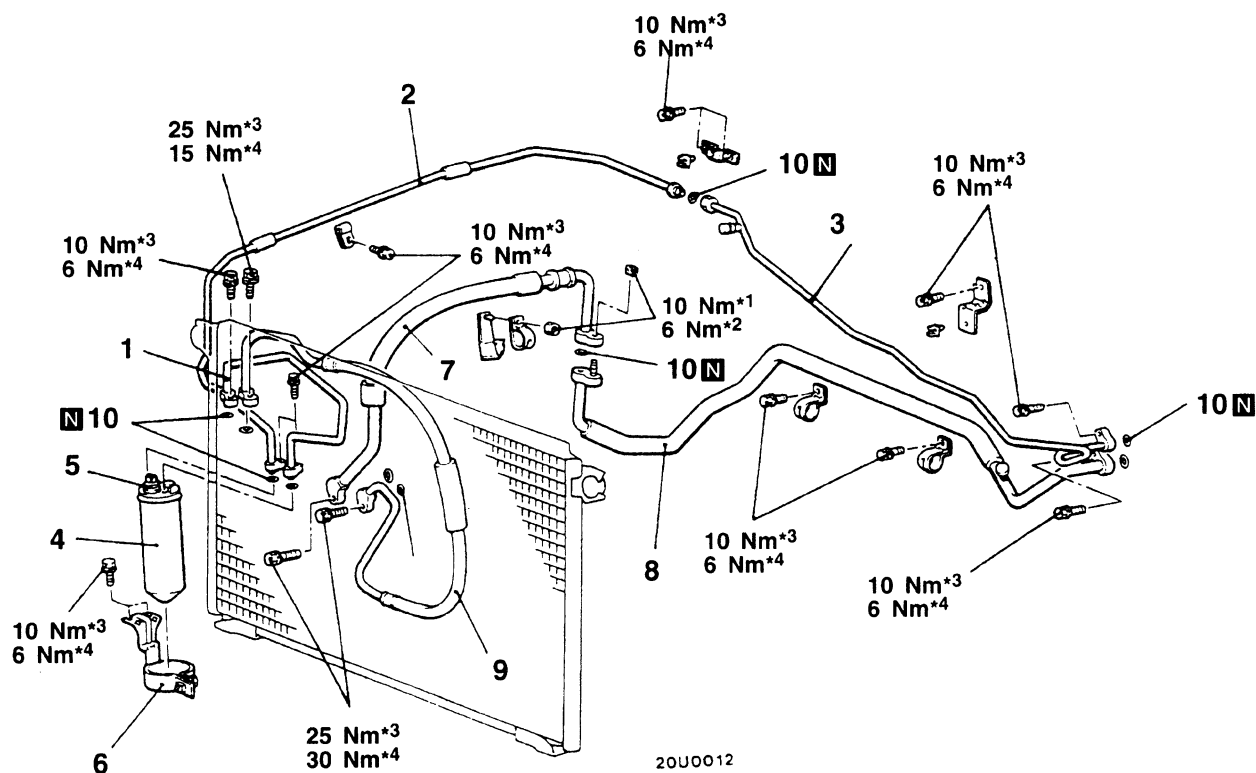
##### NOTE

- \*1: indicates flange bolt
- \*2: indicates bolt and washer assembly
- \*3: indicates flange nut
- \*4: indicates nut and washer assembly

### <R.H. DRIVE VEHICLES>

#### Pre-removal Operation

- Discharging and Charging of Refrigerant (Refer to P.55-11.)

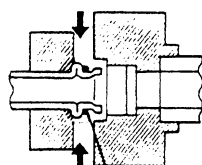


20U0012

00003567

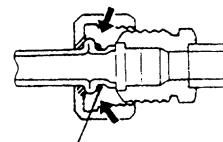


#### Piping connection



20W0230

O-ring



20W0231

O-ring

Compressor oil: SUN PAG 56

#### Removal steps

- Discharge pipe A
- Discharge pipe B
- Discharge pipe C
- Receiver assembly
- Dual pressure switch
- Receiver bracket
- Suction hose
- Suction pipe
- Discharge hose
- O-ring

#### NOTE

- \*1: indicates flange nut
- \*2: indicates nut and washer assembly
- \*3: indicates flange bolt
- \*4: indicates bolt and washer assembly

### INSTALLATION SERVICE POINT

#### ▶A◀ SUCTION HOSE, PIPE, RECEIVER ASSEMBLY INSTALLATION

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

**Compressor oil: SUN PAG 56**

**Quantity:**

**Suction hose, pipe: 10 ml**

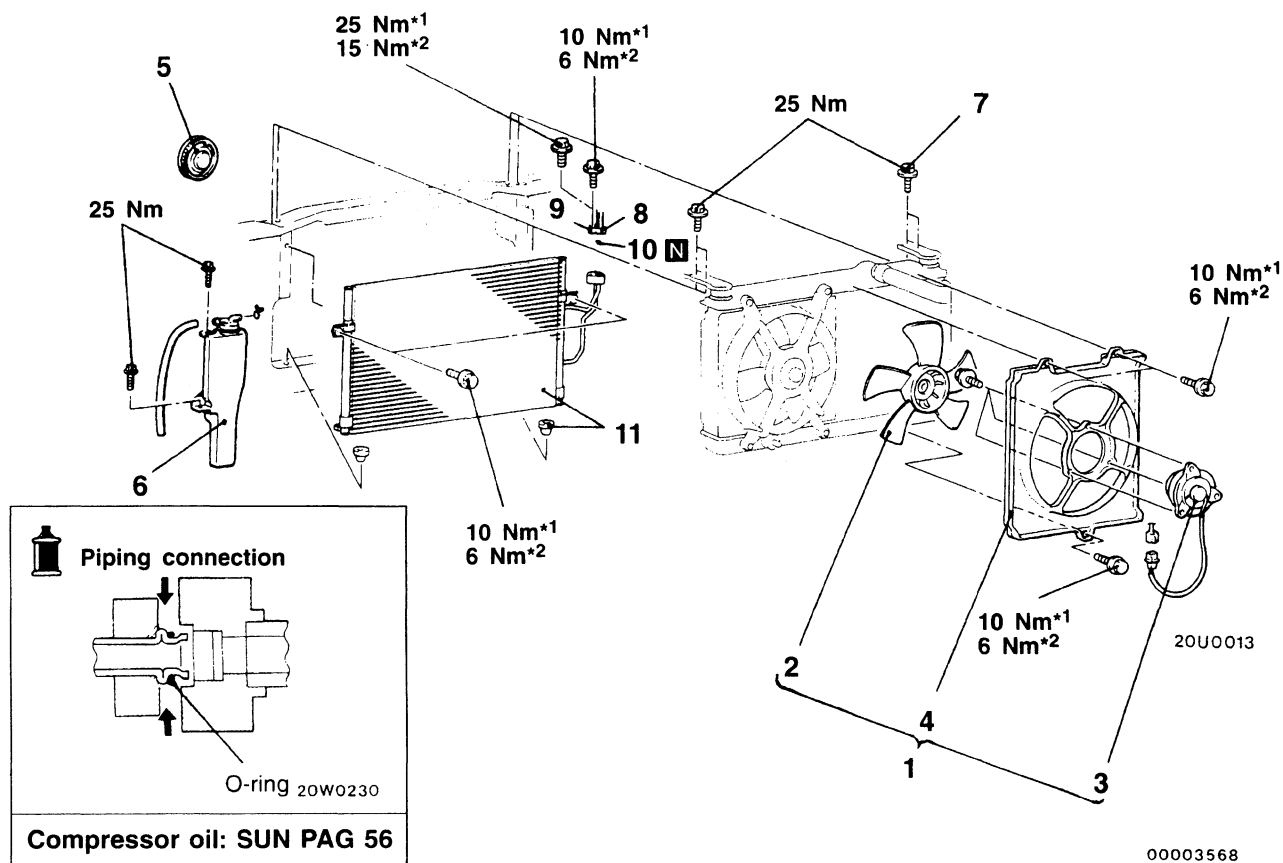
**Receiver assembly: 10 ml**

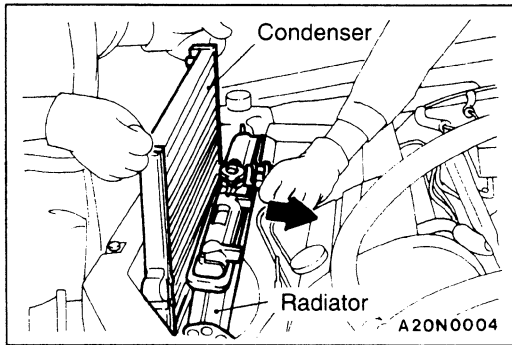
## CONDENSER AND CONDENSER FAN MOTOR

### REMOVAL AND INSTALLATION

#### Pre-removal Operation

- Discharging and Charging of Refrigerant (Refer to P.55-11.)





## REMOVAL SERVICE POINT

### ◄A► CONDENSER REMOVAL

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

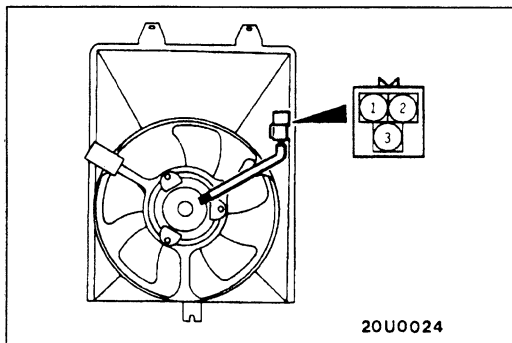
## INSTALLATION SERVICE POINT

### ►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

55200680032

### CONDENSER FAN MOTOR CHECK

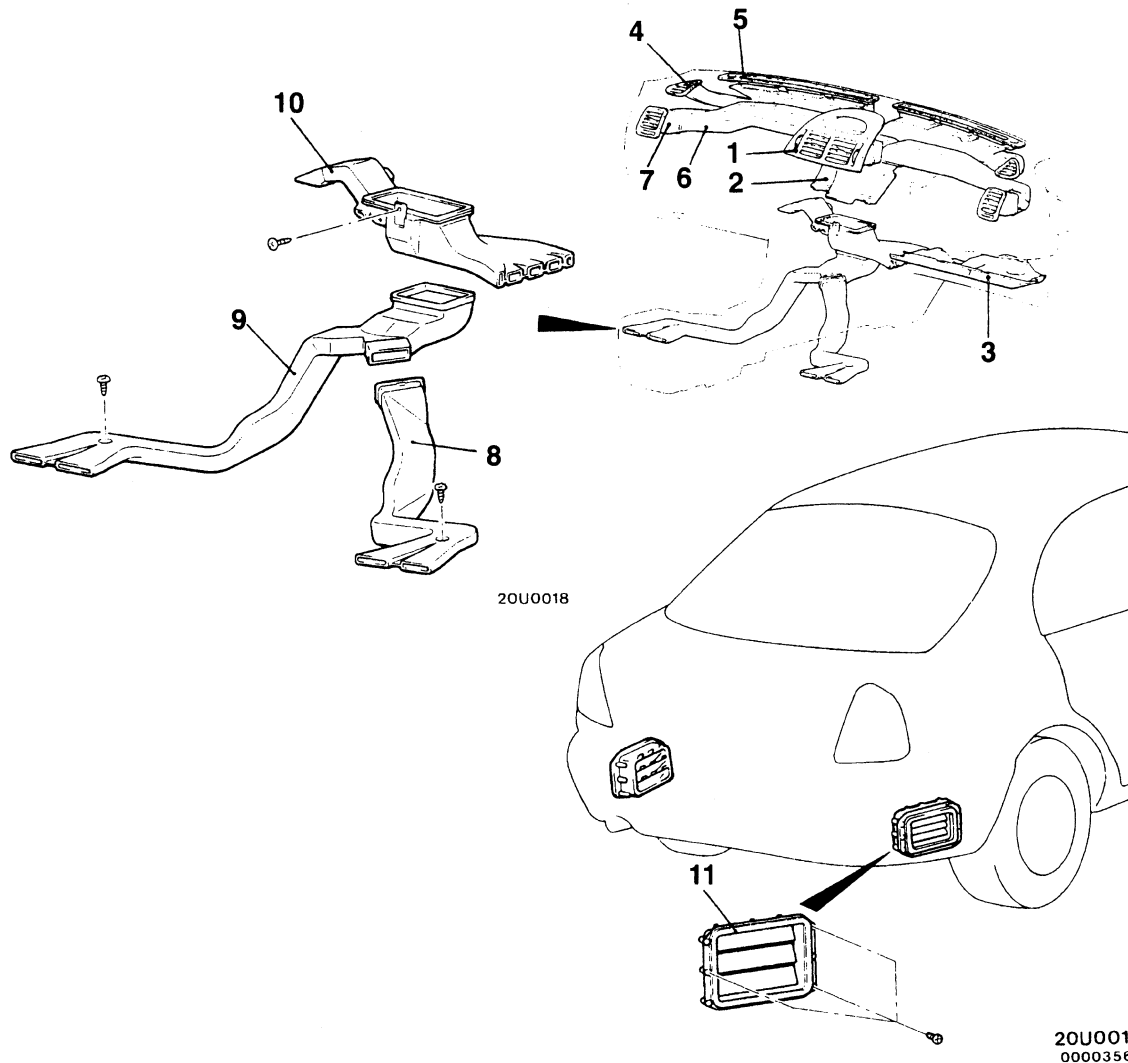
- (1) Check to be sure that the condenser fan motor operates when battery voltage is applied to terminal 1 and terminal 2 earthed.
- (2) In this same condition, apply battery voltage to terminal 3 and earth terminal 2. Check that the condenser fan motor operates faster at this time.



## VENTILATORS

55200160055

### REMOVAL AND INSTALLATION



1. Center air outlet assembly  
(Refer to GROUP 52A – Floor Console.)
2. Center ventilation duct  
(Refer to P.55-23.)
3. Under cover (Refer to GROUP 52A – Instrument Panel.)
4. Side defroster grille (Refer to GROUP 52A – Instrument Panel.)
5. Defroster nozzle assembly  
(Refer to GROUP 52A – Instrument Panel.)
6. Distribution duct  
(Refer to GROUP 52A – Instrument Panel.)
7. Side air outlet assembly  
(Refer to GROUP 52A – Instrument Panel.)

#### Rear heater duct, foot distribution duct removal steps

- Front seat assembly  
(Refer to GROUP 52A.)
- Floor console assembly (Refer to GROUP 52A.)
- 8. Rear heater duct (L.H.)
- 9. Rear heater duct (R.H.)
- Radio and tape player  
(Refer to GROUP 54.)
- 10. Foot distribution duct

#### Rear ventilation duct removal steps

- Rear bumper (Refer to GROUP 51.)
- Rear side trim (Refer to GROUP 52A.)
- 11. Rear ventilation duct

## FULLY AUTOMATIC AIR CONDITIONER

55400010028

### 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 and a cool air bypass 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 a 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 <MSC90>
Dual pressure switch kPa	High-pressure switch	ON → OFF: 2,942, OFF → ON: 2,354
	Low-pressure switch	ON → OFF: 196, OFF → ON: 221
Refrigerant and quantity g		R-134a (HFC-134a), Approx. 680–720

### SERVICE SPECIFICATIONS

55400030024

Items		Standard value
Idle speed r/min		800±50
Idle up speed r/min		850
Air mix damper motor potentiometer kΩ	MAX. HOT position	Approx. 4.82
	MAX. COLD position	Approx. 0.18
Outlet air changeover damper motor potentiometer kΩ	DEF position	Approx. 4.82
	FACE position	Approx. 0.18

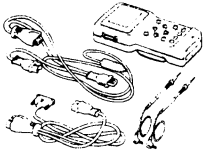
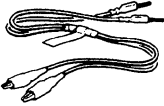
### LUBRICANTS

55400040027

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

55400060023

Tool	Number	Name	Use
	MB991502	MUT-II sub-assembly	<ul style="list-style-type: none"> <li>• Checking of diagnosis codes</li> <li>• Read-out of service data</li> <li>• Testing of the actuator</li> </ul>
	MB991529	ABS check harness	Check of the fully automatic air conditioner when using a voltmeter

### NOTE

Other special tools are the same as for the manual A/C. (Refer to P.55-5.)

## TROUBLESHOOTING

55400070026

### STANDARD FLOW OF DIAGNOSIS TROUBLESHOOTING

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

### DIAGNOSIS FUNCTION

#### METHOD OF READING THE DIAGNOSIS CODES

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

#### METHOD OF ERASING THE DIAGNOSIS CODES

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

**INSPECTION CHART FOR DIAGNOSIS CODES**

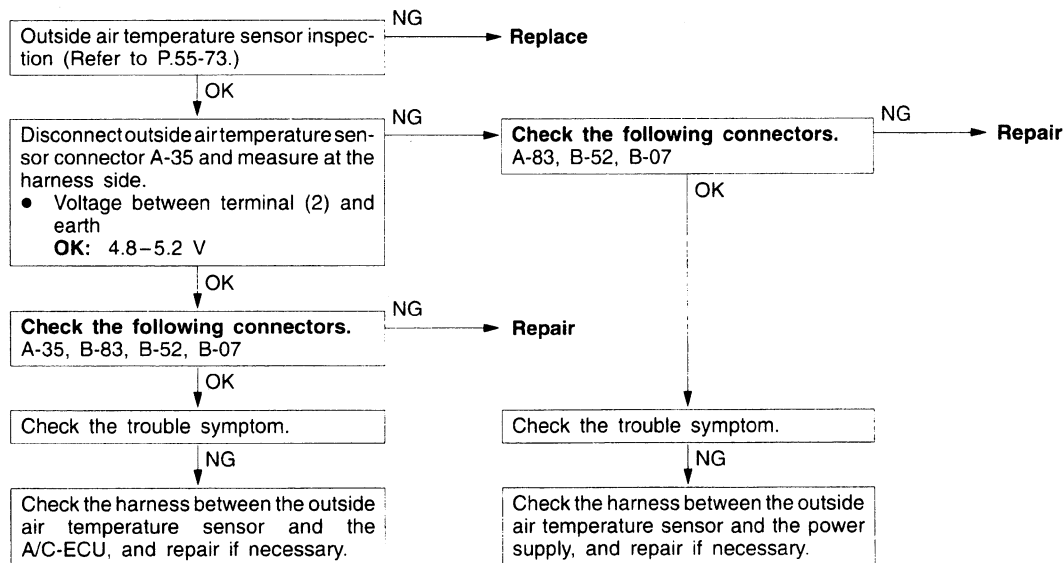
Code No.	Diagnosis item	Reference page
11	Inside air temperature sensor system (open circuit)	55-45
12	Inside air temperature sensor system (short circuit)	55-45
13	Outside air temperature sensor system (open circuit)	55-45
14	Outside air temperature sensor system (short circuit)	55-45
15	Heater water temperature sensor system (open circuit)	55-46
16	Heater water temperature sensor system (short circuit)	55-46
21	Air thermo sensor system (open circuit)	55-46
22	Air thermo sensor system (short circuit)	55-46
31	Potentiometer system of air mix damper motor assembly	55-47
32	Potentiometer system of air outlet changeover damper motor assembly	55-47
41	Drive system of air mix damper motor assembly	55-48
42	Drive system of air outlet changeover damper motor assembly	55-48

## 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"> <li>• Malfunction of A/C-ECU</li> </ul>

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"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> </ul>

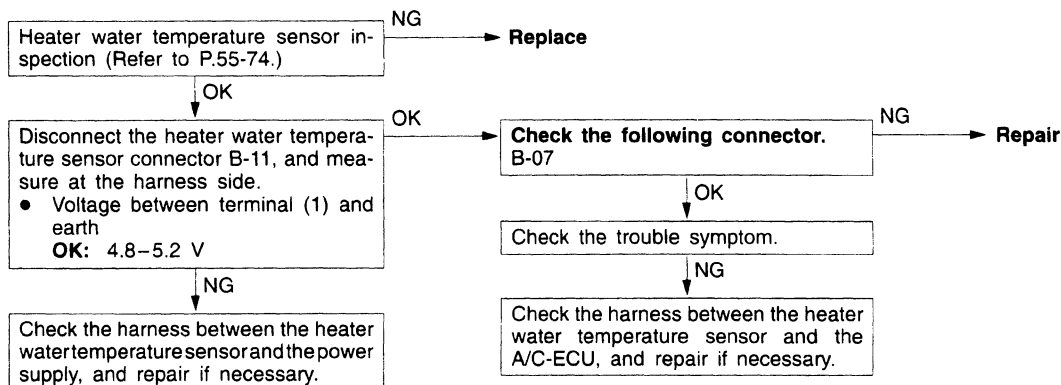


Code No. 14 Outside air temperature sensor system (short circuit)	Probable cause
This diagnosis code is output if there is a short circuit in the outside air temperature sensor input circuit.	<ul style="list-style-type: none"> <li>• Malfunction of harness</li> </ul>

Check the harness between the outside air temperature sensor and the A/C-ECU, and repair if necessary.

**55-46 HEATER, AIR CONDITIONER AND VENTILATION <FULLY AUTOMATIC AIR CONDITIONER> – Troubleshooting**

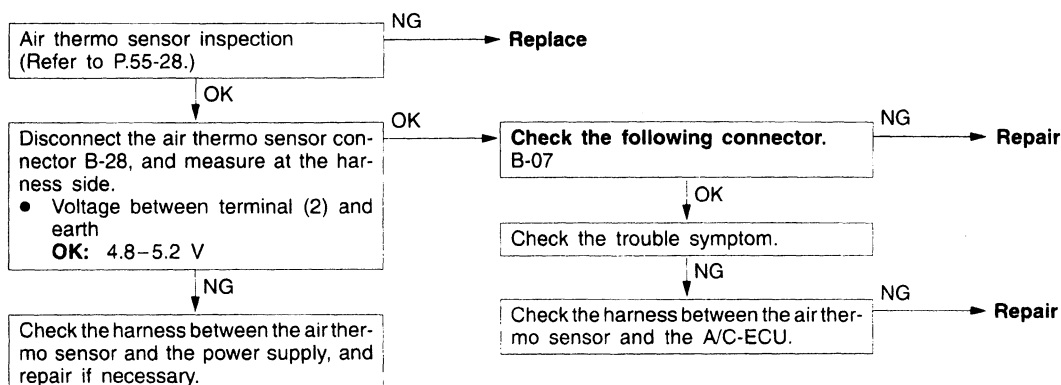
Code No. 15 Heater water temperature sensor system (open circuit)	Probable Cause
This diagnosis code is output if there is a defective connector connection or an open circuit in the harness.	<ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> </ul>



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"> <li>• Malfunction of harness</li> </ul>

Check the harness between the heater water temperature sensor input circuit.

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



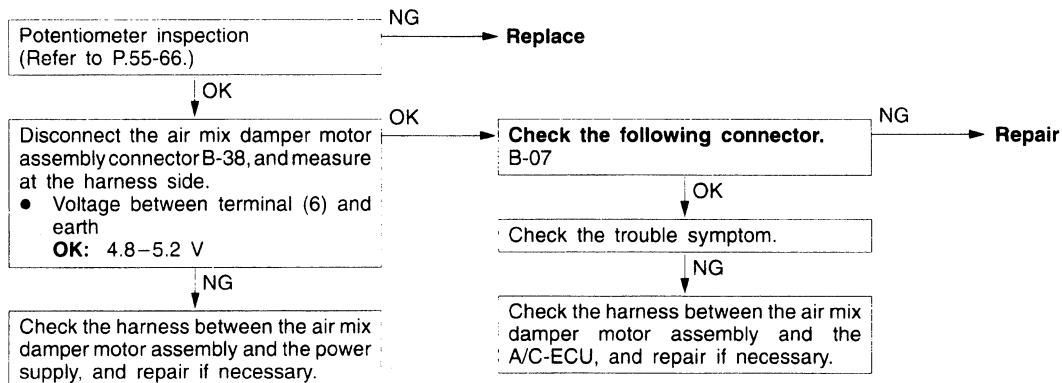
Code No. 22 Air thermo sensor system (short circuit)	Probable cause
This diagnosis code is output if there is a short circuit in the air thermo sensor input circuit.	<ul style="list-style-type: none"> <li>• Malfunction of harness</li> </ul>

Check the harness between the air thermo sensor and the A/C-ECU, and repair if necessary.

### 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.

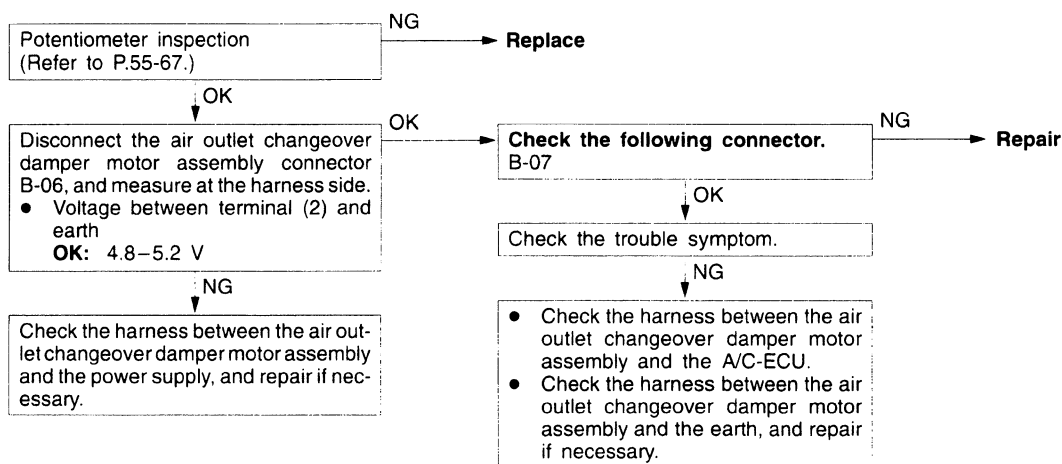
- Malfunction of air mix damper motor assembly
- Malfunction of connector
- Malfunction of harness



### 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.

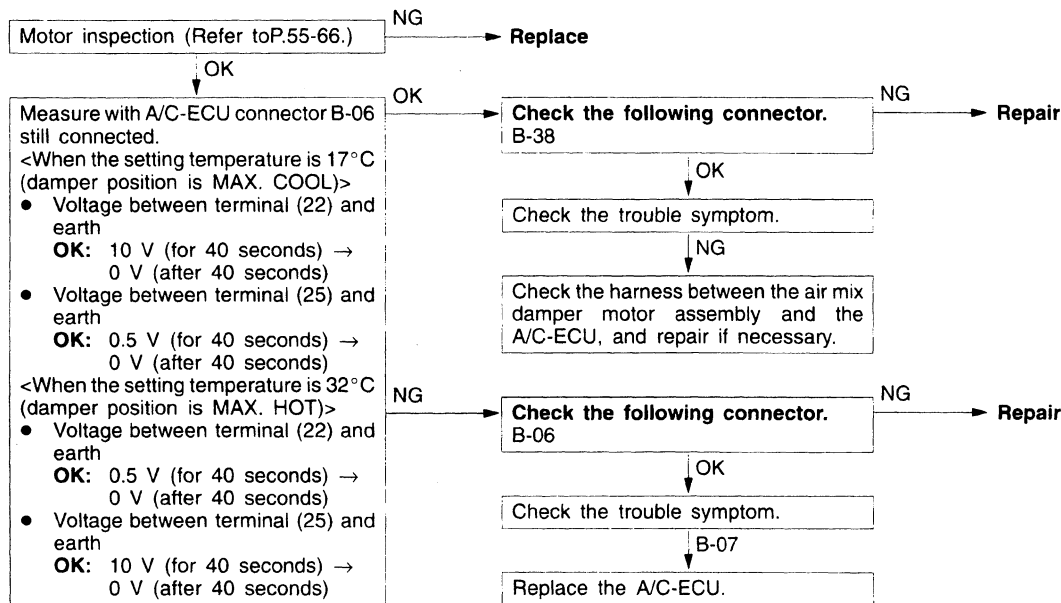
- Malfunction of air outlet changeover damper motor assembly
- Malfunction of connector
- Malfunction of harness



**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.

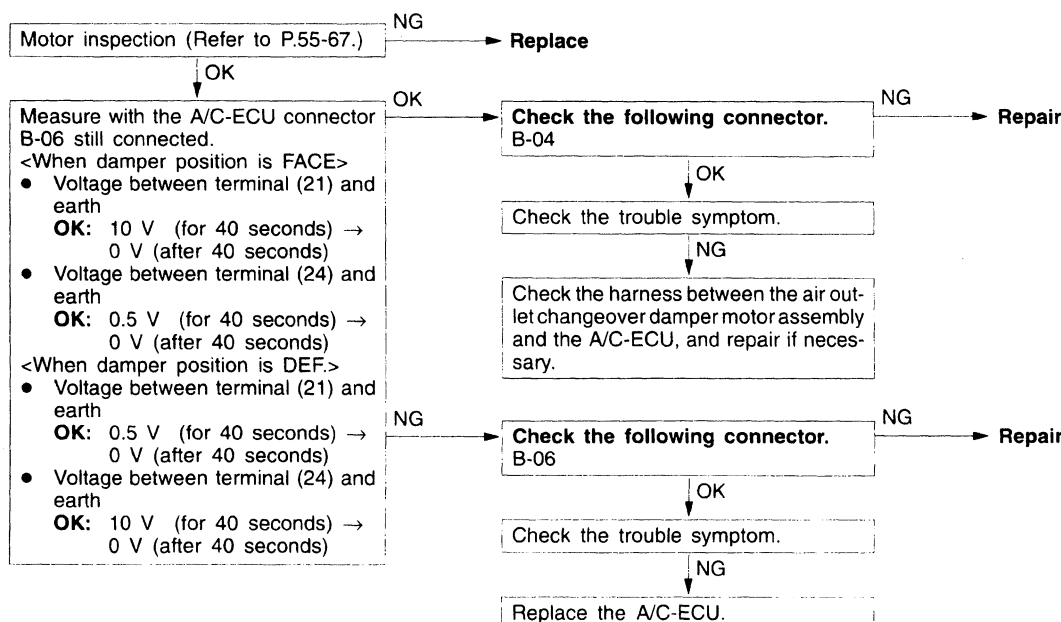
- Malfunction of air mix damper motor assembly
- Malfunction of connector
- Malfunction of harness
- Malfunction of the A/C-ECU



**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.

- Malfunction of air outlet changeover damper motor assembly
- Malfunction of connector
- Malfunction of harness
- Malfunction of A/C-ECU





## INSPECTION CHART FOR TROUBLE SYMPTOMS

Troubles Symptom		Inspection procedure No.	Reference Page
Communication with the MUT-II is not possible.	Communication with all systems is not possible.	1	55-50
	Communication with A/C system only is not possible.	2	55-50
Blowing of air does not stop even if blower switch is OFF.		3	55-50
No air is blown out from the air outlet even if blower switch is ON.		4	55-51
Inside/outside air changeover is not possible.		5	55-52
Air outlet is not changed over even if air outlet changeover switch is pressed.		6	55-52
When ignition switch and fan switch are ON, A/C does not operate even if A/C switch is turned to ON.		7	55-53
A/C is operated but inside air temperature is not lowered.		8	55-54
Setting display temperature returns to 25°C when ignition switch is turned ON or OFF.		9	55-55
Setting temperature is increased but inside air temperature does not rise.		10	55-55
Window glass becomes cloudy although operation is in AUTO mode.		11	55-56
Outside air temperature display does not change from 20°C.		12	55-57
Condenser fan does not operate.		13	55-57
Air purifier does not operate.		14	55-59
Air purifier indicator lamp (A/P) does not illuminate.		15	55-59
A/C compressor (magnetic clutch) circuit inspection		16	55-60

## INSPECTION PROCEDURE FOR DIAGNOSIS TROUBLE SYMPTOMS

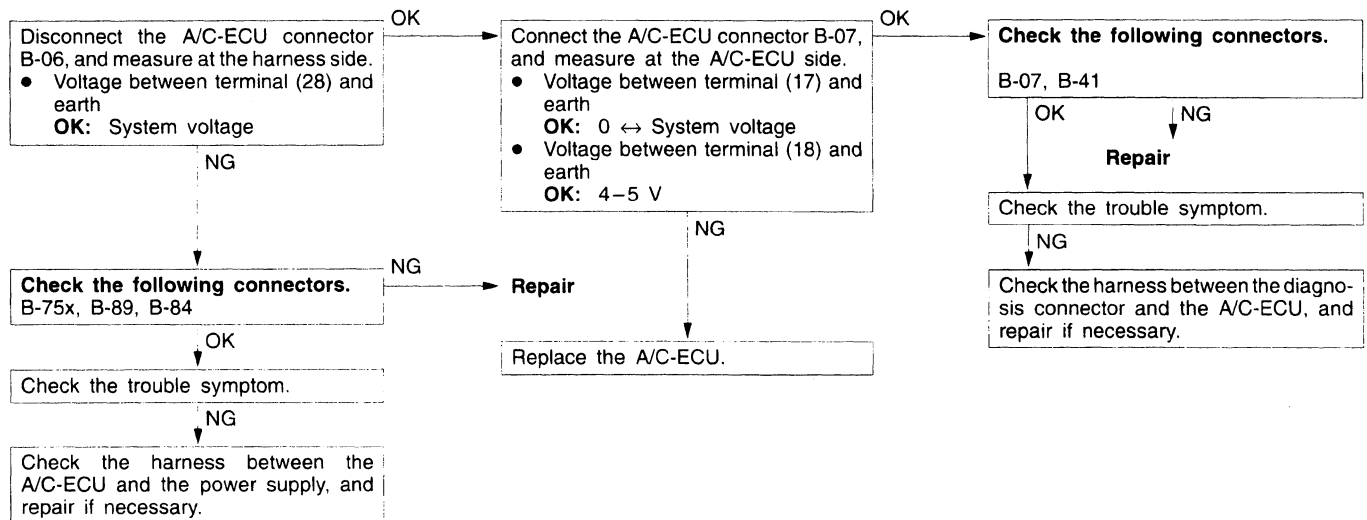
### Inspection procedure 1

Communication with the MUT-II is not possible. (Communication with all systems is not possible.)	Probable Cause
The cause is probably a defect in the power supply system (including earth) for the diagnosis line.	<ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> </ul>

Refer to GROUP 13A – Troubleshooting.

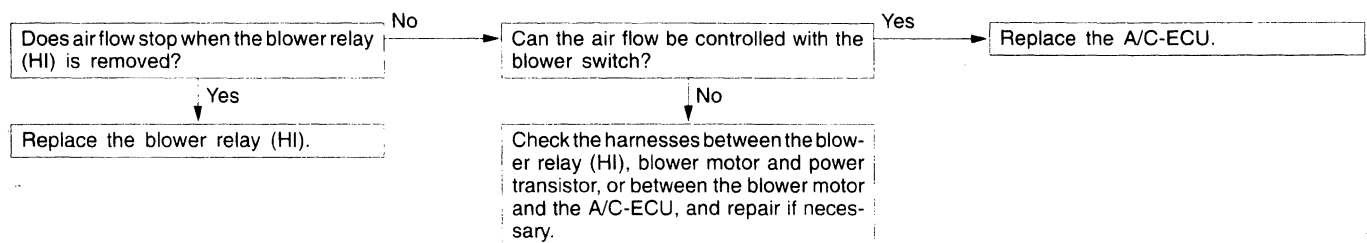
### Inspection procedure 2

Communication with A/C system only is not possible.	Probable cause
The cause is probably a defective A/C-ECU power supply circuit or earth circuit, or a defective diagnosis line circuit.	<ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>



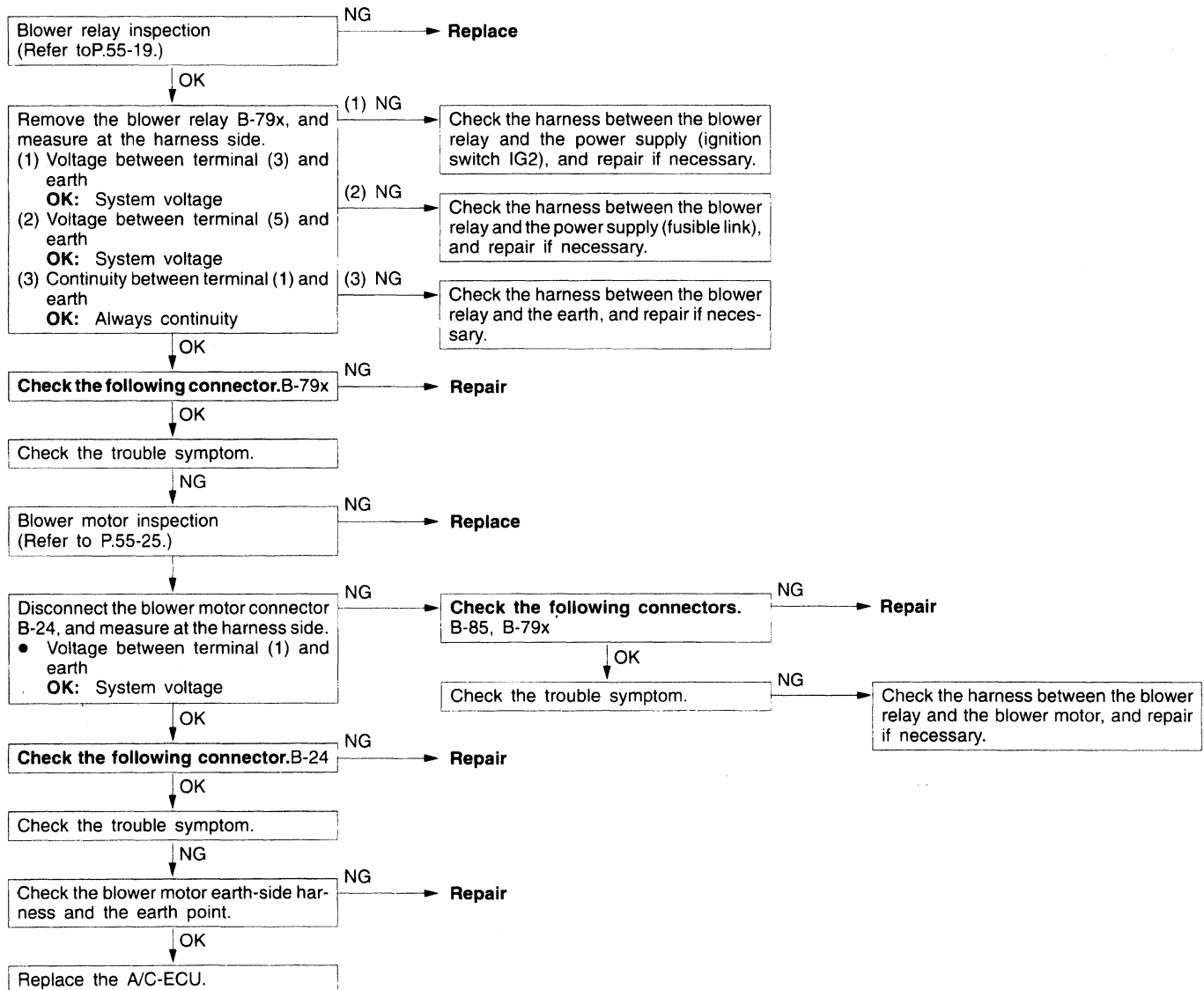
### Inspection procedure 3

Blowing of air does not stop even if blower switch is OFF.	Probable cause
There is a high possibility that the blower relay (HI) is defective or there is a defective harness. If the airflow volume can be controlled with the blower switch, the cause is probably a defective A/C-ECU.	<ul style="list-style-type: none"> <li>• Malfunction of blower relay (HI)</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>



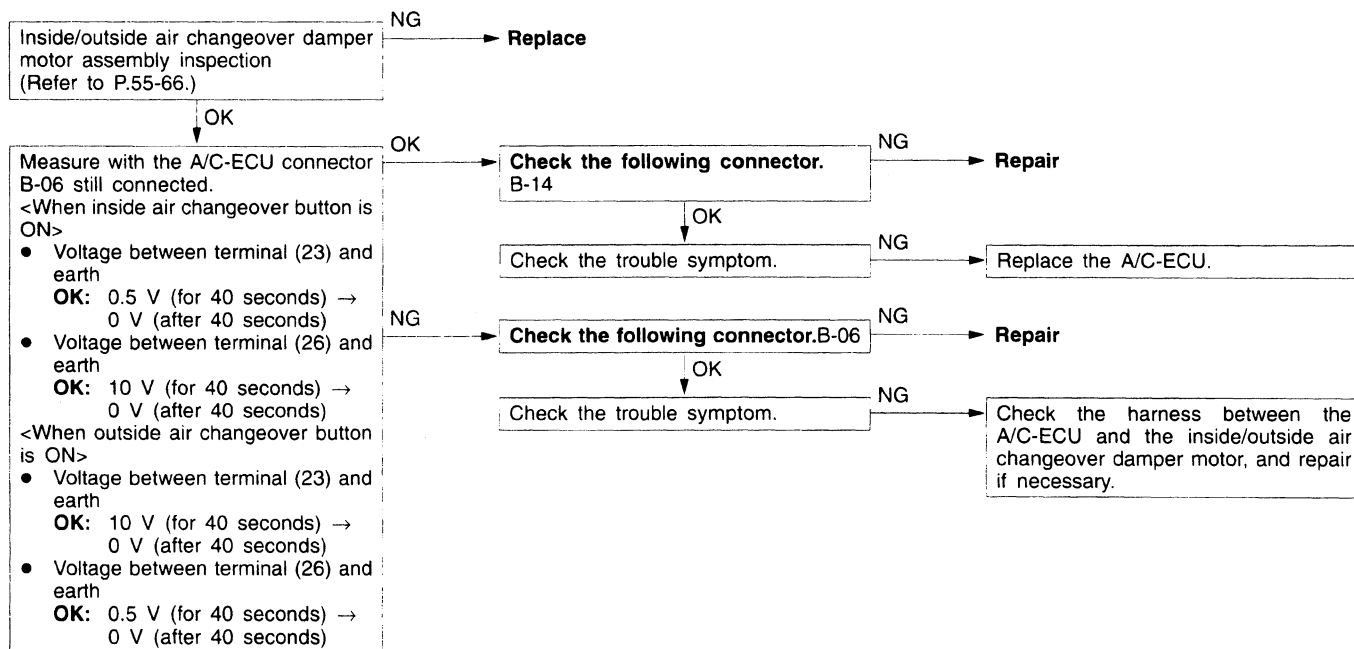
Inspection procedure 4

No air is blown out from the air outlet even if blower switch is ON.	Probable cause
The cause is probably a defective blower motor or a defective blower relay.	<ul style="list-style-type: none"> <li>• Malfunction of blower motor</li> <li>• Malfunction of blower relay</li> <li>• Malfunction of A/C-ECU</li> </ul>



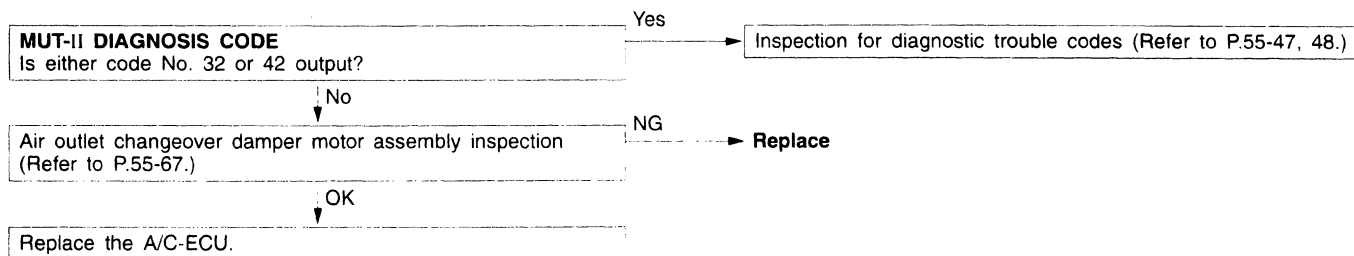
### Inspection procedure 5

Inside/outside air changeover is not possible.	Probable cause
The cause is probably a defective inside/outside air changeover damper motor assembly or a defective connector or harness.	<ul style="list-style-type: none"> <li>• Malfunction of inside/outside air changeover damper motor assembly</li> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>



### Inspection procedure 6

Air outlet is not changed over even if air outlet changeover switch is pressed.	Probable cause
The cause is probably a defective air outlet changeover damper motor assembly or a defective connector or harness. In this case, the MUT-II can be used to check the trouble symptoms in each system by inspecting the diagnosis codes.	<ul style="list-style-type: none"> <li>• Malfunction of air outlet changeover damper motor assembly</li> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>

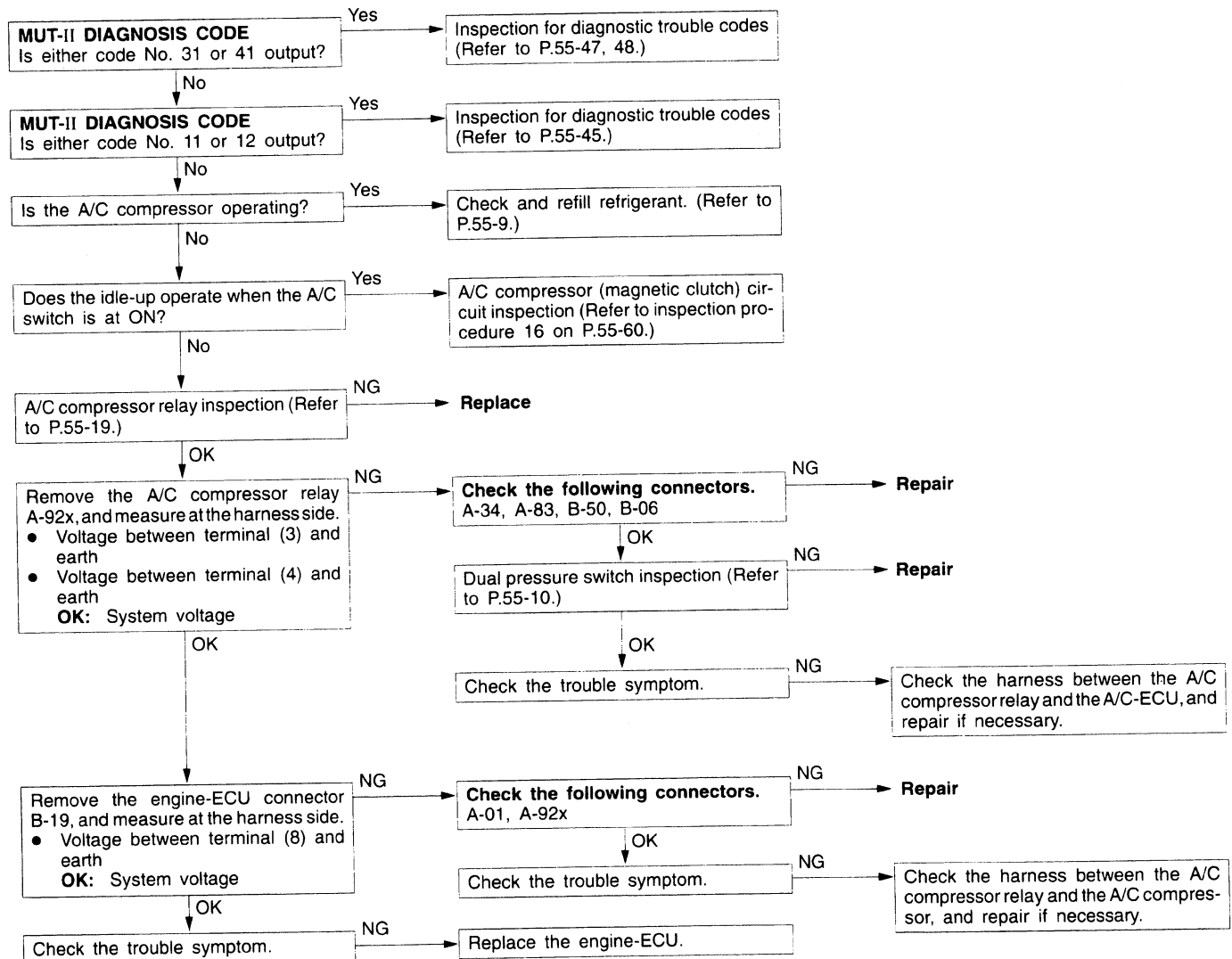


- Malfunction of connector
- Malfunction of harness
- Malfunction of A/C-ECU



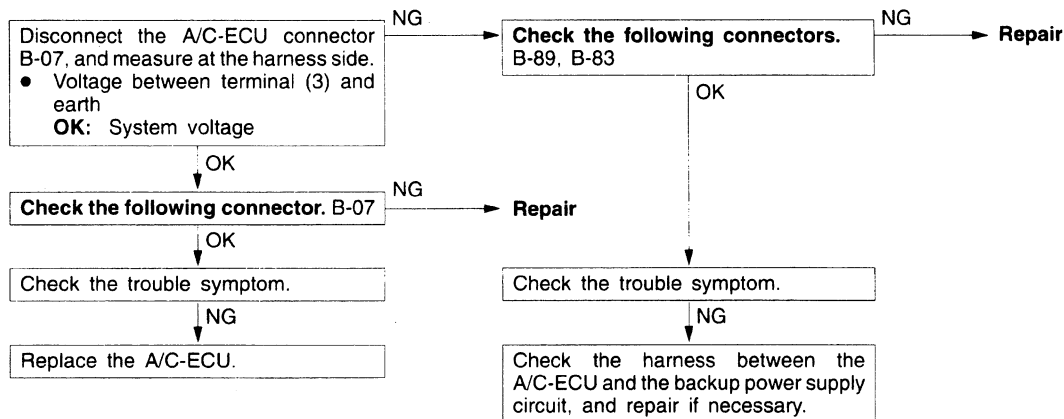
Inspection procedure 8

A/C is operated but inside air temperature is not lowered (cool air does not blow out).	Probable cause
The cause is probably a defective A/C compressor (magnetic clutch), a defective air mix damper motor assembly or a defective sensor. In this case, the MUT-II can be used to check the trouble symptoms in each system by inspecting the diagnosis codes.	<ul style="list-style-type: none"> <li>• Malfunction of A/C compressor (magnetic clutch)</li> <li>• Malfunction of refrigerant temperature switch</li> <li>• Malfunction of A/C compressor relay</li> <li>• Malfunction of dual pressure switch</li> <li>• Malfunction of air mix damper motor assembly</li> <li>• Malfunction of air thermo sensor</li> <li>• Malfunction of A/C-ECU</li> <li>• Malfunction of engine-ECU</li> </ul>



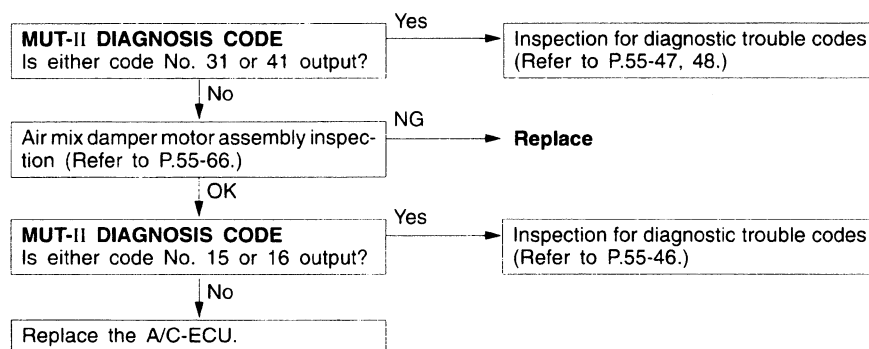
### Inspection procedure 9

Setting display temperature returns to 25°C when ignition switch is turned ON or OFF.	Probable cause
The cause is probably a defective A/C-ECU or a defective connector or harness.	<ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>



### Inspection procedure 10

Setting temperature is increased but inside air temperature does not rise (warm air does not blow out).	Probable cause
The cause is probably a defective air mix damper motor assembly, or a defective engine coolant temperature sensor. In this case, the MUT-II can be used to check the trouble symptoms in each system by inspecting the diagnosis codes.	<ul style="list-style-type: none"> <li>• Malfunction of air mix damper motor assembly</li> <li>• Malfunction of engine coolant temperature sensor</li> <li>• Malfunction of A/C control unit</li> </ul>



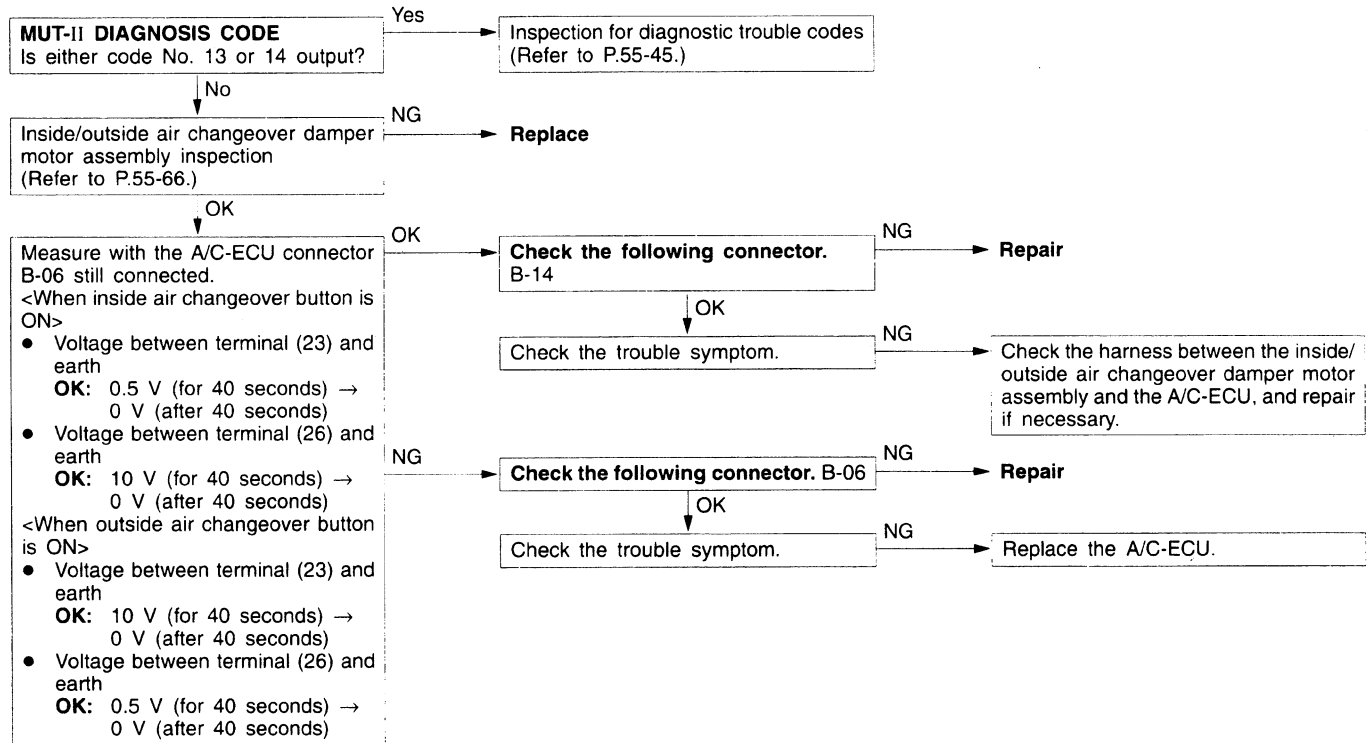
### Inspection procedure 11

#### Window glass becomes cloudy although operation is in AUTO mode.

#### Probable cause

If the diagnosis codes are investigated and the outside air temperature sensor code is output, the cause is probably a defective outside air temperature sensor system. Alternatively, the cause may also be a defective inside/outside air changeover damper motor assembly system.

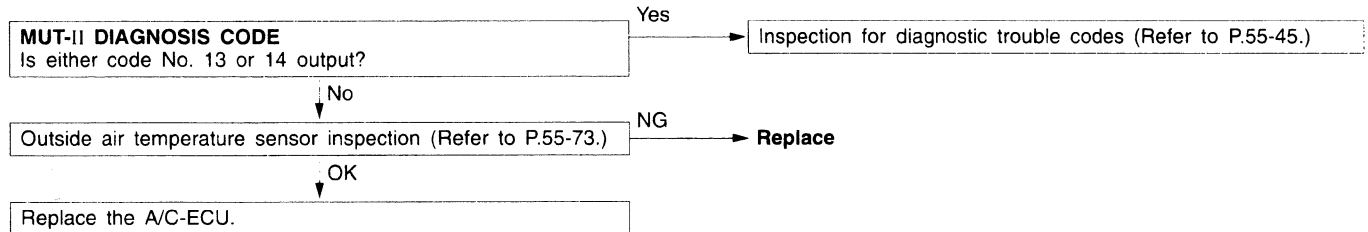
- Malfunction of outside air temperature sensor
- Malfunction of inside/outside air changeover damper motor assembly
- Malfunction of connector
- Malfunction of harness
- Malfunction of A/C-ECU





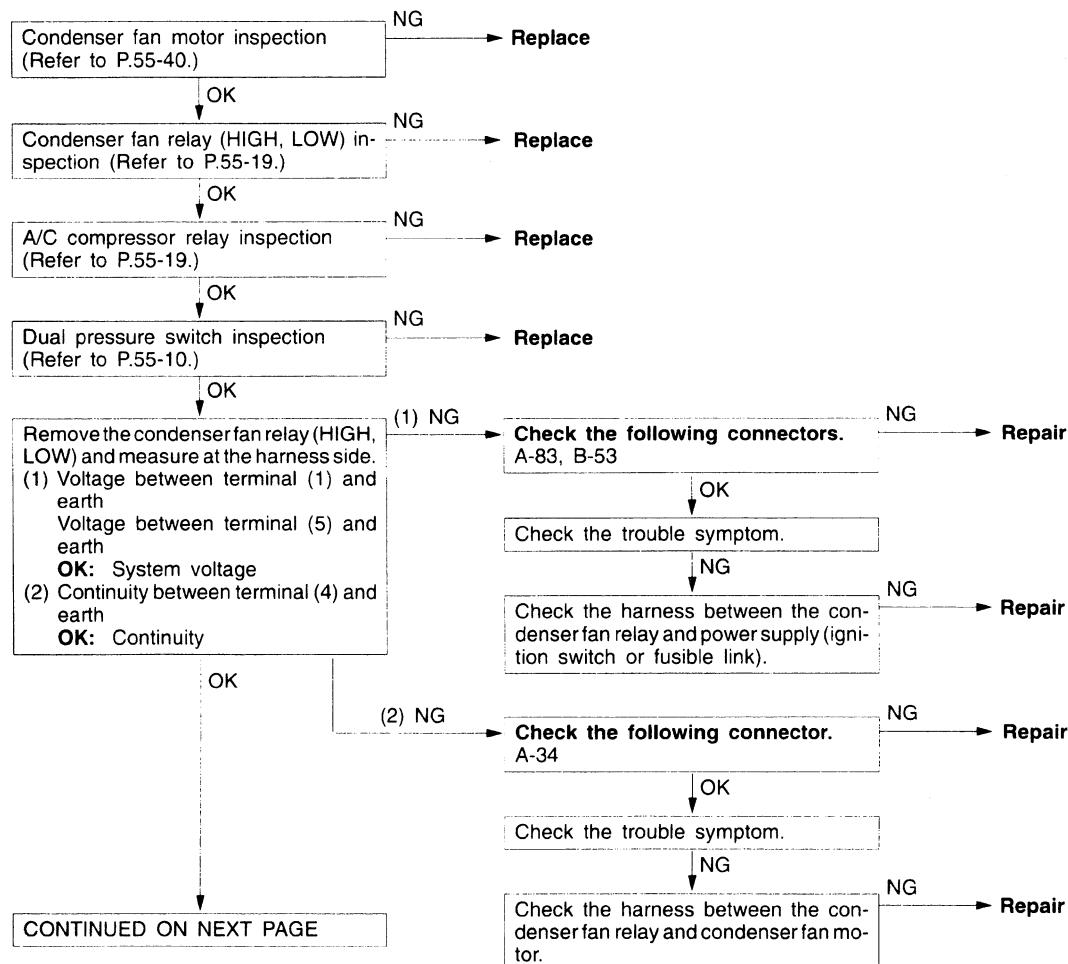
### Inspection procedure 12

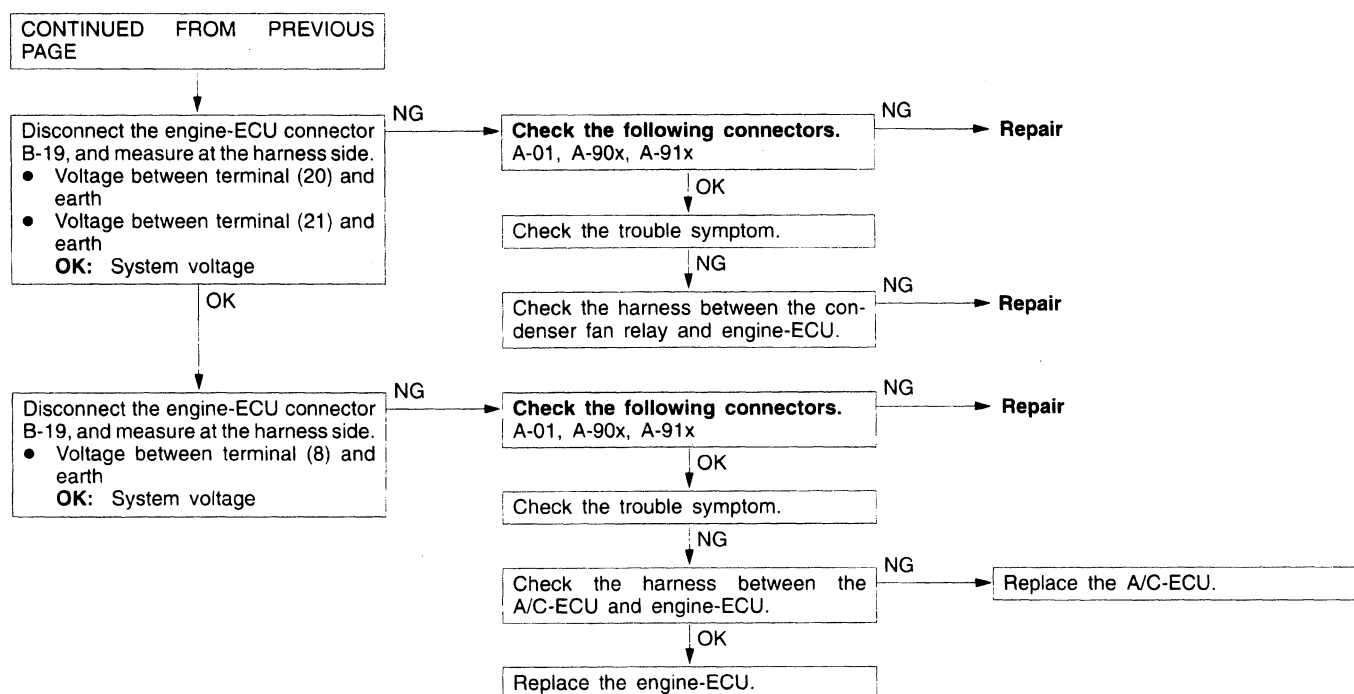
Outside air temperature display does not change from 20°C.	Probable cause
The cause is probably a defective outside air temperature sensor system or a defective A/C-ECU. Furthermore in cases where the outside air temperature sensor system is defective, the MUT-II can be used to check the trouble symptoms in each system by inspecting the diagnosis codes.	<ul style="list-style-type: none"> <li>● Malfunction of outside air temperature sensor</li> <li>● Malfunction of connector</li> <li>● Malfunction of harness</li> <li>● Malfunction of A/C-ECU</li> </ul>



### Inspection procedure 13

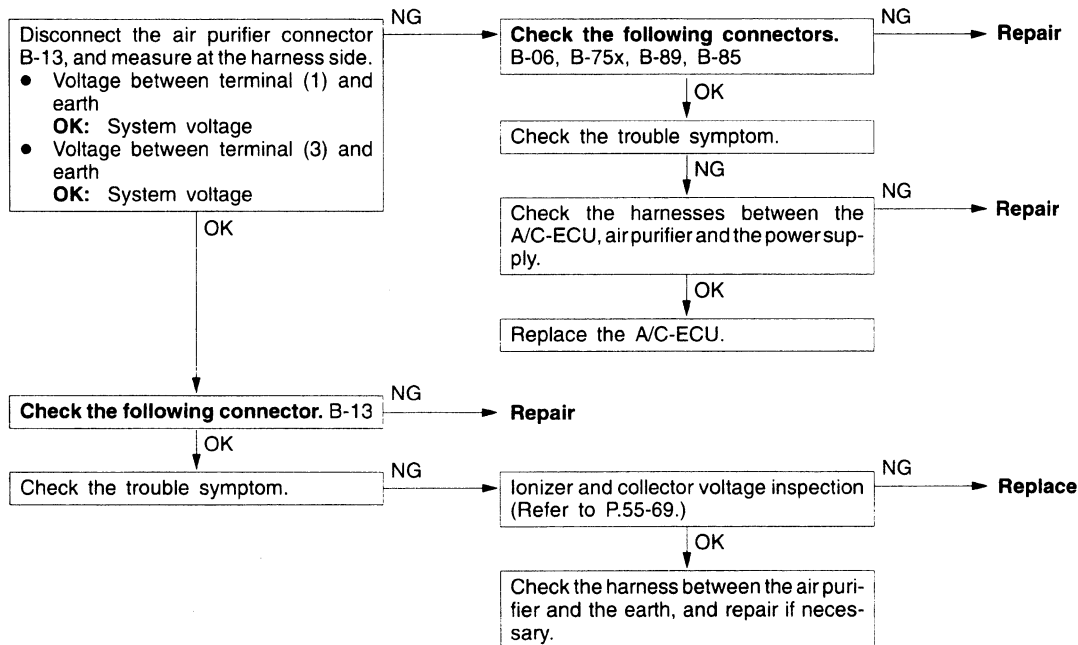
Condenser fan does not operate	Probable cause
If the condenser fan does not operate even when the air conditioner is turned on, the cause is probably a malfunction of the condenser fan operation circuit. This will cause a drop in the cooling performance while the vehicle is not moving.	<ul style="list-style-type: none"> <li>● Malfunction of condenser fan motor</li> <li>● Malfunction of condenser fan relay</li> <li>● Malfunction of harness or connector</li> <li>● Malfunction of dual pressure switch</li> <li>● Malfunction A/C compressor relay</li> <li>● Malfunction of A/C-ECU</li> <li>● Malfunction of Engine-ECU</li> </ul>





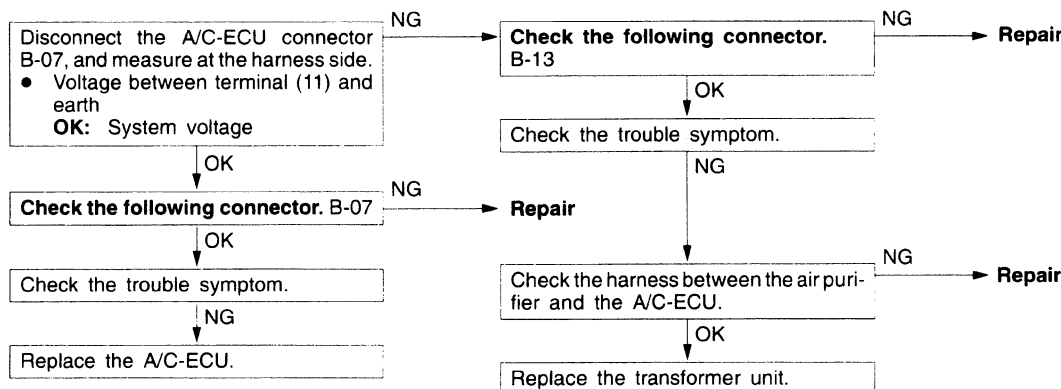
### Inspection procedure 14

Air purifier does not operate.	Probable Cause
<p>The air purifier operates when the ignition switch is at the ON position and the blower switch is turned to ON. Accordingly, if only the blower fan operates, the cause is probably a defective air purifier power supply circuit.</p>	<ul style="list-style-type: none"> <li>• Malfunction of ionizer</li> <li>• Malfunction of collector</li> <li>• Malfunction of transformer unit</li> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of A/C-ECU</li> </ul>



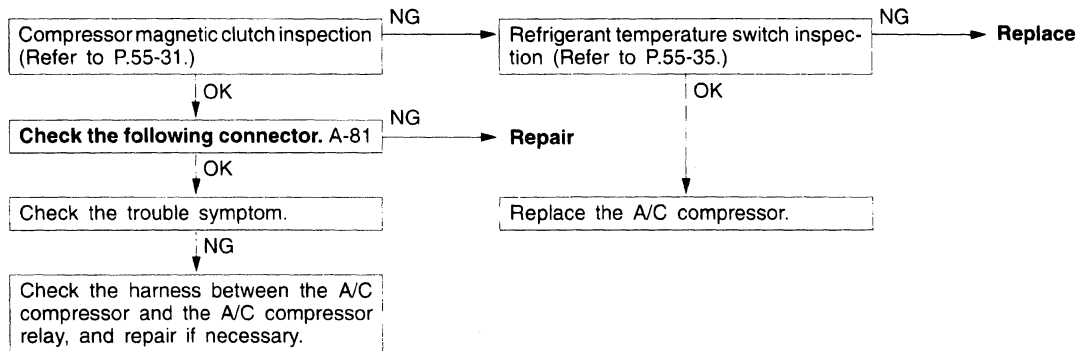
### Inspection procedure 15

Air purifier indicator lamp (A/P) does not illuminate (however, air purifier is operating).	Probable cause
<p>The cause is probably an open circuit in the harness between the air purifier and the A/C-ECU, or a defective air purifier or A/C-ECU.</p>	<ul style="list-style-type: none"> <li>• Malfunction of connector</li> <li>• Malfunction of harness</li> <li>• Malfunction of transformer unit</li> <li>• Malfunction of A/C-ECU</li> </ul>



Inspection procedure 16

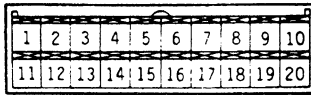
**A/C compressor (magnetic clutch) circuit inspection**



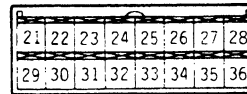
**SERVICE DATA REFERENCE TABLE**

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 switch	Ignition switch: ON		ON when heater core wall temperature is 30°C or higher
21	Air thermo sensor	Ignition switch: ON		Temperature of blow air from evaporator 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	Potentiometer of air mix damper motor	Ignition switch: ON	Damper position	Opening degree (%)
			MAX. HOT	Approx. 100
			MAX. COOL	Approx. 0
32	Potentiometer of air outlet changeover damper motor	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



20X0191



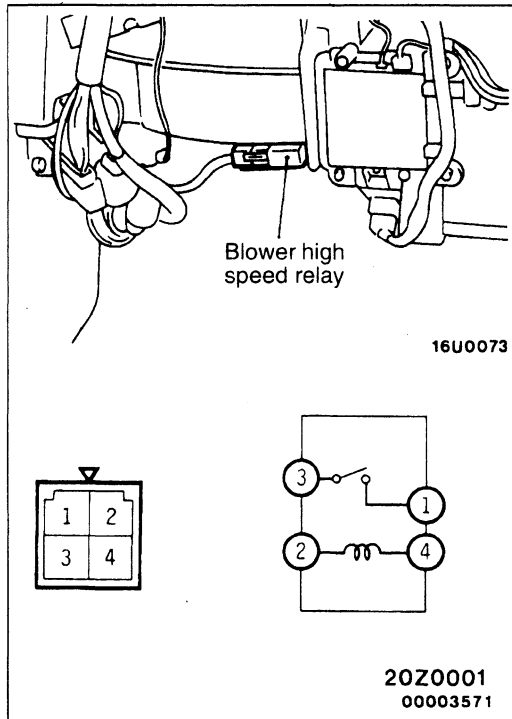
20X0192

00003123

Terminal No.	Check Item	Check Condition	Normal Condition
1	Power transistor collector	When blower switch is at OFF	System voltage
		When blower switch is at LO	Approx. 7 V
		When blower switch is at HI	0 V
2	Power transistor base	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 air mix damper is at MAX. COOL position	0.1–0.3 V
		When air mix damper is at MAX. HOT position	4.7–5.0 V
6	Air outlet changeover damper motor potentiometer input	When air outlet changeover damper is at FACE position	0.1–0.3 V
		When air outlet changeover damper is at 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 A/C is OFF and 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
11	A/P indicator input	When blower switch is at ON	System voltage
12	Blower relay (HI)	When blower switch is at HI	1.5 V or less
		When blower switch is at ME, LO or OFF	System voltage
13	Earth	At all times	Continuity

Terminal No.	Check Item	Check Condition	Normal Condition
16	Earth	At all times	Continuity
17	Diagnosis data output	0 ↔ System voltage	–
18	Diagnosis control input	When ignition switch is ON	4–5 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
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	Air purifier	When blower switch is at ON	System voltage

Terminal No.	Check Item	Check Condition	Normal Condition
34	A/C compressor relay output	When A/C compressor magnetic clutch is ON	System voltage
35	Earth	At all times	Continuity



## ON-VEHICLE SERVICE

55400420029

### POWER RELAY CHECK

#### BLOWER HIGH SPEED RELAY

Battery voltage	Terminal No.			
	1	2	3	4
Not supplied		○	—	○
Supplied	○	+	—	—

### IDLE-UP OPERATION CHECK

55400430022

- Before inspection, set the vehicle to the pre-inspection condition.
- Check whether or not the idling speed is the standard value.

**Standard value: 800±50 r/min**

- 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 that the idle speed is at the standard value.

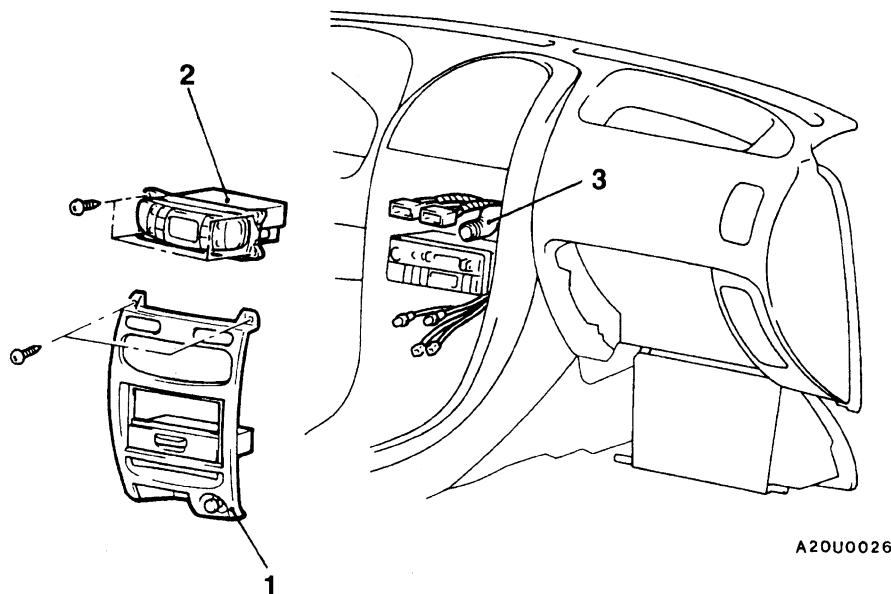
**Standard value: 850 r/min**

#### 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 CONDITIONER CONTROL PANEL AND ECU ASSEMBLY REMOVAL AND INSTALLATION

55400100022



A20U0026

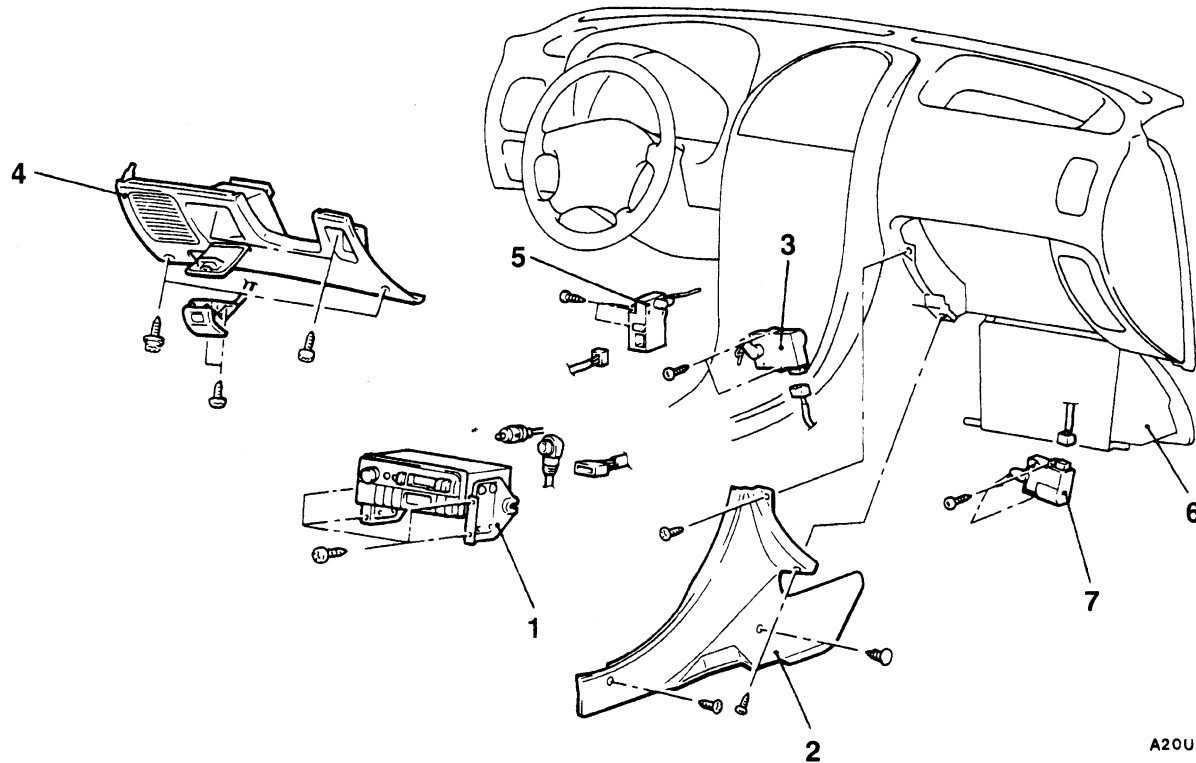
### Removal steps

1. Center console panel (Refer to GROUP 52A – Floor Console.)
2. Air conditioner control panel and ECU assembly
3. Aspirator



## DAMPER MOTOR ASSEMBLY REMOVAL AND INSTALLATION

55400160020



A20U0027

### Removal steps

1. Radio and tape player (Refer to GROUP 52A – Floor Console.)
2. Side cover (Both side) (Refer to GROUP 52A – Floor Console.)
3. Air mix damper motor assembly
4. Instrument under cover (Refer to GROUP 52A – Instrument Panel.)
5. Outlet air changeover damper motor assembly
6. Glove box (Refer to GROUP 52A – Instrument Panel.)
7. Inside/outside air changeover damper motor assembly

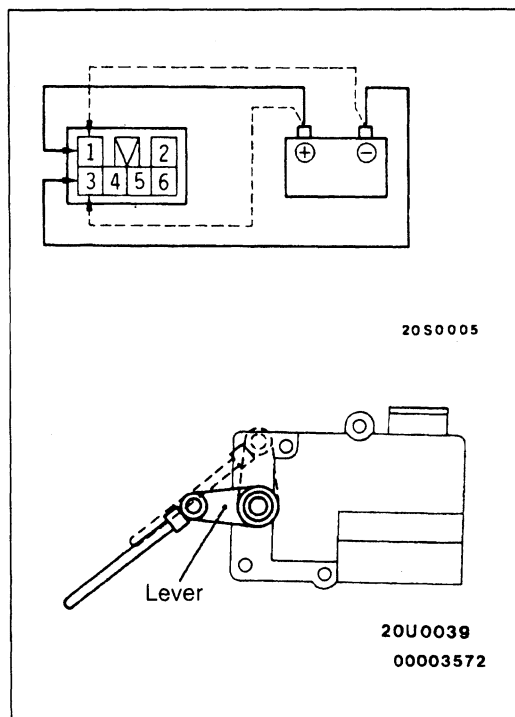
## INSPECTION

### INSIDE/OUTSIDE AIR CHANGEOVER DAMPER MOTOR ASSEMBLY CHECK

Check that the lever moves when battery voltage is applied across terminals 1 and 3 of motor assembly side 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 inside air position or outside air position.
2. Cut off the voltage if the motor does not turn when battery voltage is applied.



### AIR MIX DAMPER MOTOR ASSEMBLY CHECK

#### Motor

Check that the lever moves when battery voltage is applied across terminals 1 and 3 of motor assembly side 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 and MAX. COOL position.
2. Cut off the voltage if the motor does not turn when battery voltage is applied.

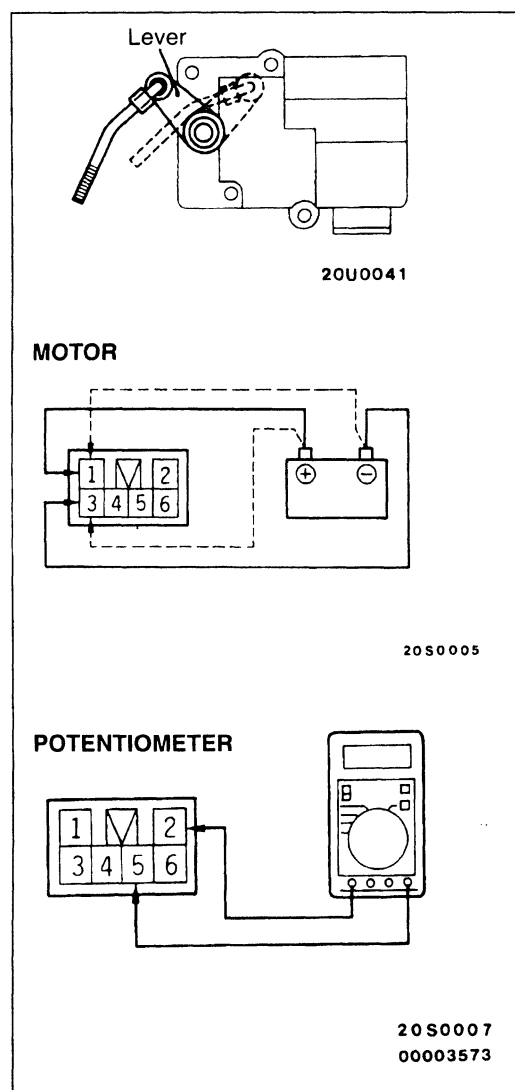
#### Potentiometer

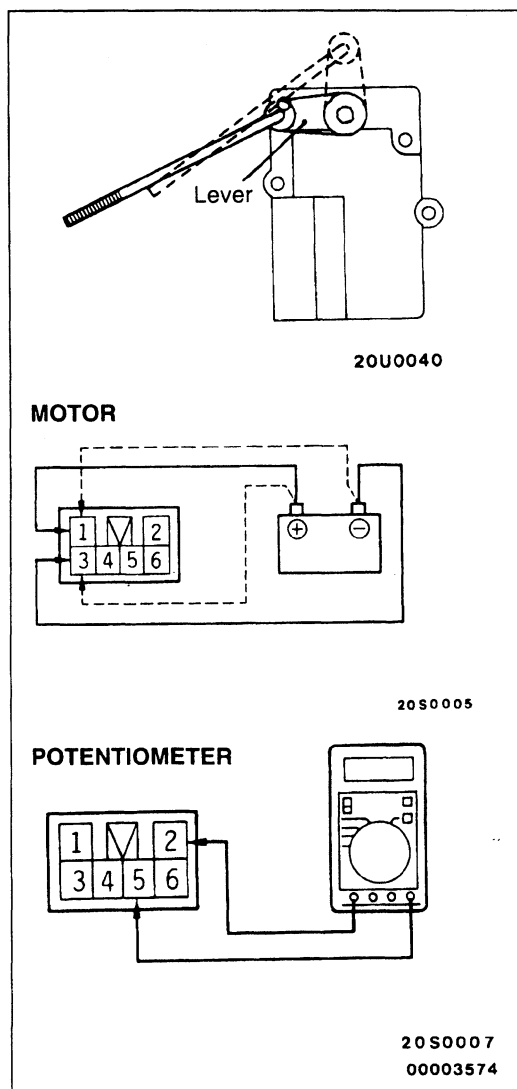
Connect a circuit tester across terminals 2 and 5 of the motor assembly connector and check that resistance gradually changes as the damper is moved from MAX. HOT to MAX. COOL position.

#### Standard value:

MAX. HOT position: Approx. 4.82 k $\Omega$

MAX. COOL position: Approx. 0.18 k $\Omega$





## 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

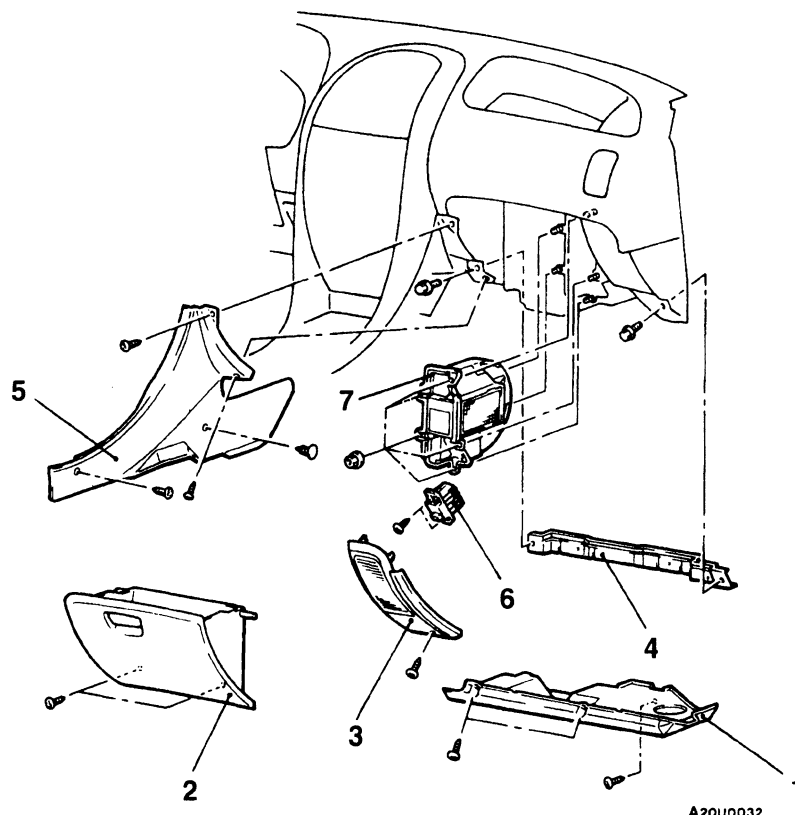
Connect a circuit tester across terminals 2 and 5 of the motor assembly connector and check that resistance gradually changes as the damper is moved from DEF. to FACE position.

### Standard value:

DEF. position: Approx. 4.82 k $\Omega$   
FACE position: Approx. 0.18 k $\Omega$

## AIR PURIFIER ASSEMBLY REMOVAL AND INSTALLATION

55500100025



### Removal steps

1. Under cover (Refer to GROUP 52A - Instrument Panel.)
2. Glove box (Refer to GROUP 52A - Instrument Panel.)
3. Corner panel (Refer to GROUP 52A - Instrument Panel.)
4. Glove box flame (Refer to GROUP 52A - Instrument Panel.)
5. Side cover (passenger side) (Refer to GROUP 52A - Instrument Panel.)
6. Power transistor
7. Air purifier assembly



### REMOVAL SERVICE POINT

#### ◀▶ AIR PURIFIER ASSEMBLY REMOVAL

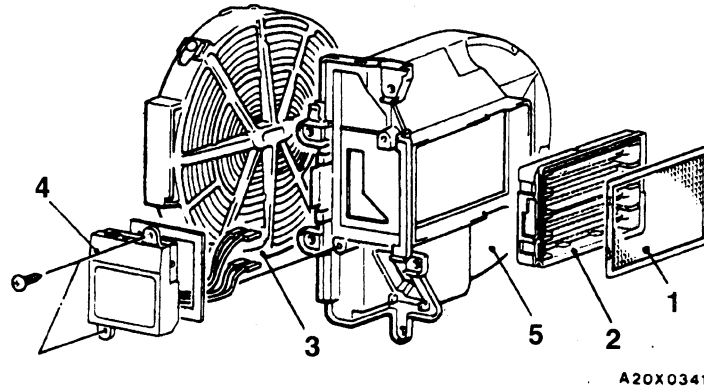
#### Caution

After the power supply is turned OFF (blower switch is in OFF position or ignition switch is in ACC or LOCK position), the air purifier will still be at high pressure for approximately 5 seconds.

Accordingly, wait for 5 seconds after turning off the power supply before removing the air purifier.

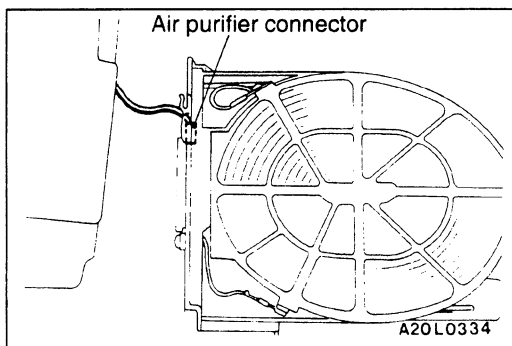
## DISASSEMBLY AND REASSEMBLY

55500120021



### Disassembly steps

1. Prefilter
2. Ionizer
3. Collector
4. Transformer unit
5. Case



## INSPECTION

55500130017

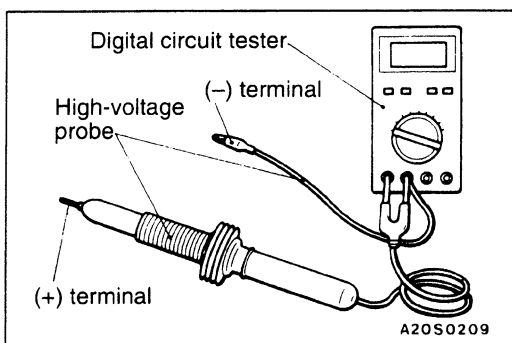
### APPROPRIATE VOLTAGE FOR COLLECTOR AND IONIZER CHECK

Measure the voltages at the collector and ionizer by the following procedure.

- (1) Turn the air purifier in the opposite direction and reconnect the connector so that the unit can operate.

#### Caution

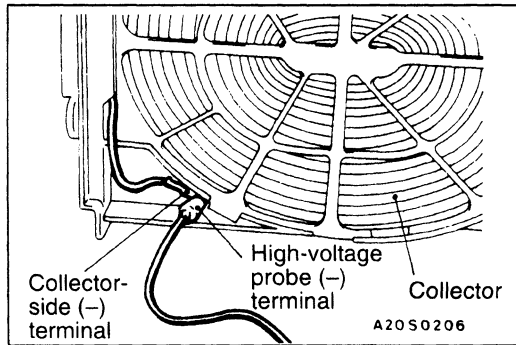
The power transistor should not be connected.



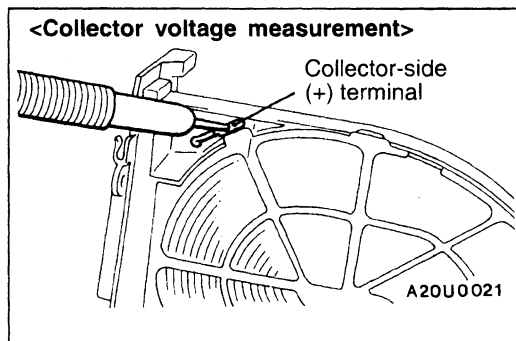
- (2) Connect a high-voltage probe (one that can measure up to 10,000 V DC) to a digital circuit tester.

#### Caution

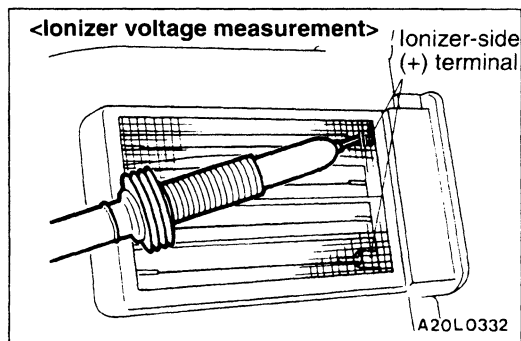
1. When measuring, take sufficient care not to short the terminals.
2. A probe which is made by the same manufacturer as the digital circuit tester should be used.



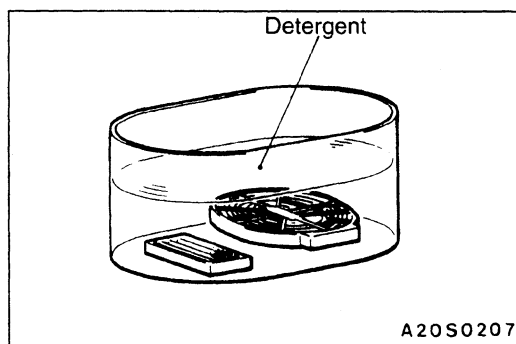
- (3) Start the engine and set the blower switch to HI. Connect the (-) terminal of the high-voltage probe to the (-) terminal on the collector side.



- (4) If the voltage measured when the (+) terminal of the high-voltage probe is touched against the collector-side (+) terminal is 2,000 V or higher, then the collector is normal.



- (5) If the voltage measured when the (+) terminal of the high-voltage probe is touched against the ionizer-side (+) terminal is 4,000 V or higher, then the ionizer is normal.



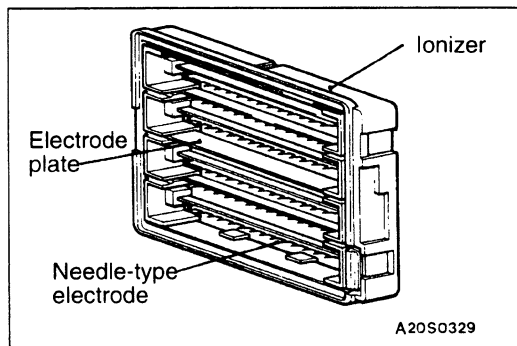
### COLLECTOR AND IONIZER CLEANING

- (1) Mix a weak alkali or alkali detergent into warm water (60°C or less) in a container, and dip the collector and ionizer into the solution and leave them in for approximately 10 minutes.

#### NOTE

The cleaning liquid should be mixed to about 1 part detergent to 20 parts water (by weight).

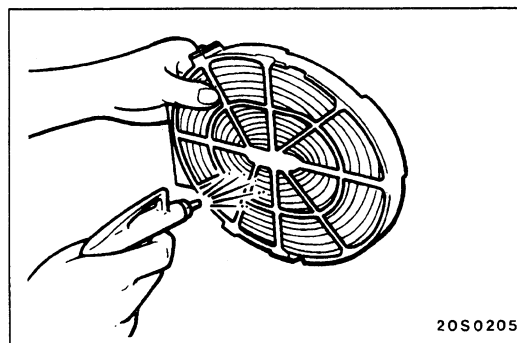
- (2) After this, shake the collector and ionizer around in the detergent for 2-3 minutes to remove all dirt.



#### NOTE

If the electrode plate of the ionizer is extremely dirty, scrub off all dirt using a soft brush, while being careful not to break the tungsten wires.

- (3) Throw away the detergent in the container, refill with clean water and then immerse the collector and ionizer in the water for approximately 2 minutes to rinse them.



- (4) After rinsing, dry off all of the water using an air blower.

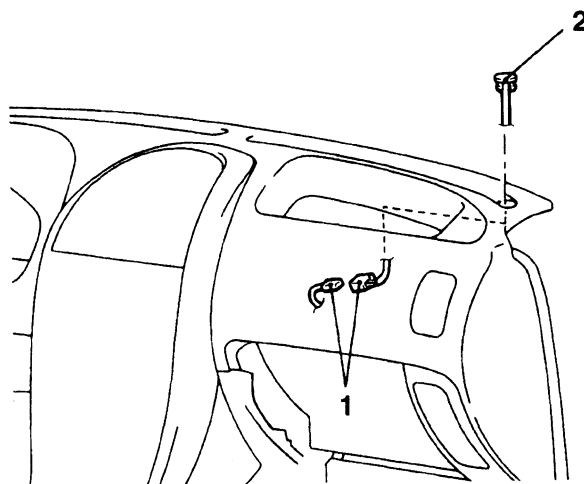
#### Caution

If the parts are dried by heating with a drier or similar, there is the danger that plastic components may become deformed, so such a drying method should not be used.

## PHOTO SENSOR

55400310029

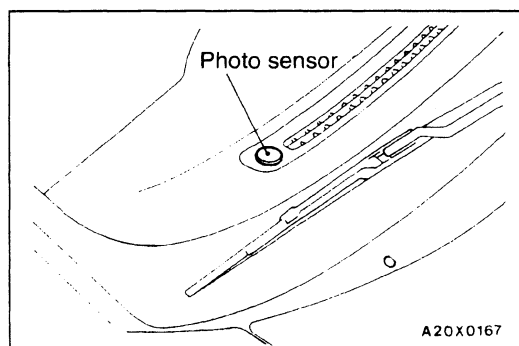
### REMOVAL AND INSTALLATION



A20U0028

#### Removal steps

1. Photo sensor connector
2. Photo sensor



A20X0167

#### INSPECTION

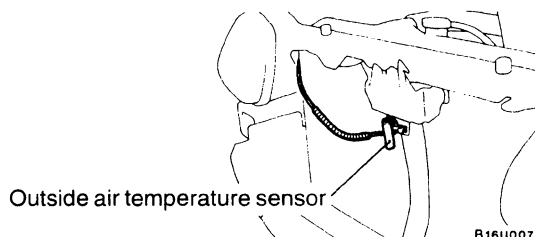
55400320022

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

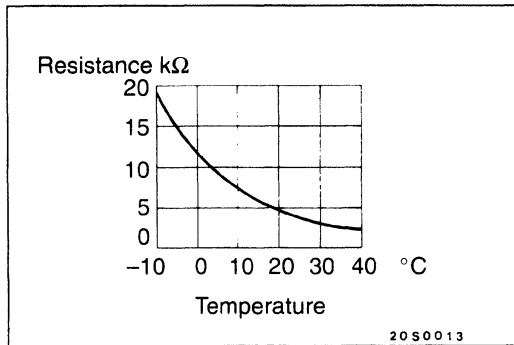
55400340028

### REMOVAL AND INSTALLATION



B16U0078





## 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.

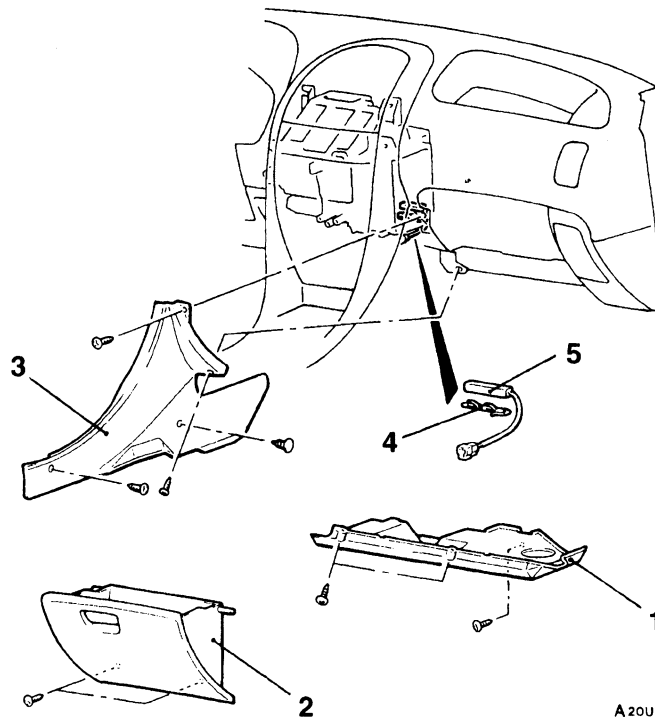
### NOTE

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

## HEATER WATER TEMPERATURE SENSOR

55400450035

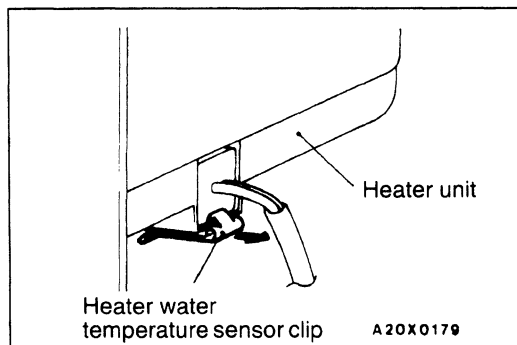
### REMOVAL AND INSTALLATION



### Removal steps

1. Under cover (Refer to GROUP 52A – Instrument Panel.)
2. Glove box (Refer to GROUP 52A – Instrument Panel.)
3. Side cover (passenger side) (Refer to GROUP 52A – Instrument Panel.)

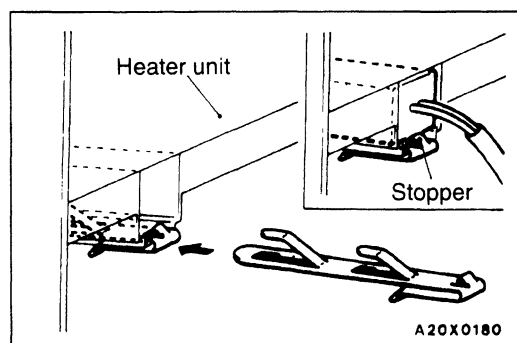
- ◀A▶ ▶A▶ 4. Heater water temperature sensor clip
- ▶A▶ 5. Heater water temperature sensor



## REMOVAL SERVICE POINT

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

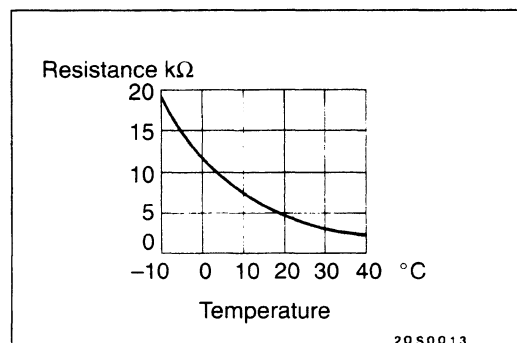
Take the heater water temperature sensor clip from the base of the heater unit out to the front of the vehicle.



## INSTALLATION SERVICE POINT

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

- (1) Insert the heater water temperature sensor clip into the heater unit.
- (2) Push in the heater water temperature sensor until the end touches against the stopper of the heater water temperature sensor clip.



## 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

55400400023

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

Items		Reference page
GENERAL INFORMATION	Safety Precautions	55-3
ON-VEHICLE SERVICE	Sight Glass Refrigerant Level Test	55-9
	Magnetic Clutch Test	55-9
	Receiver Drier Test	55-9
	Dual Pressure Switch Check	55-10
	Compressor Drive Belt Adjustment	55-10
	Charging	55-11
	Performance Test	55-16
	Refrigerant Leak Repair	55-17
	Compressor Noise	55-18
	Power Relay Check	55-19
HEATER UNIT AND HEATER CORE		55-23
BLOWER ASSEMBLY		55-24
EVAPORATORS		55-26
COMPRESSOR		55-29
CONDENSER		55-39
VENTILATORS		55-41

**NOTES**