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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 refrigerant system is basically the same as conventional systems and R134a refrigerant has been adopted as a response to restrictions on the use of chlorofluorocarbons.
For the air conditioning switch, push-button controls have been adopted for air flow control, air conditioning mode switching and blower speed. When the button is depressed, the air flow direction, air conditioning mode and blower speed are indicated on a graphic display. A rotary control is used for setting cabin temperature. When the knob is rotated, the desired temperature is indicated on the graphic display.
On vehicles with manual air conditioning a belt lock controller is used to compare compressor rpm to engine rpm to determine if the drive belt is slipping or the compressor has seized. If the speed difference between the engine and compressor indicates the belt slipping, the belt lock controller will de-energise the magnetic clutch.

Items		Specifications
Heater unit	Type	Two-way-flow full-air-mix system
Heater control assembly		Push button type
Compressor	Type	Scroll
Dual pressure switch	High pressure switch	OFF: 3,140, ON: 2,550
	Low pressure switch	OFF: 200, ON: 220
Refrigerant and quantity g		R-134a(HFC-134a), Approx. 630–670

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.
Ozone filters out harmful radiation from the sun. To assist in protecting the ozone layer, the use of a R-134a refrigerant recycling device is recommended.
Refrigerant R-134a is transparent and colourless in both the liquid and vapour state. Since it has a boiling point of – 29.8°C, at atmospheric pressure, it will be a vapour at all normal temperatures and pressures. The vapour is heavier than air, non-flammable, and non–explosive. 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 cool water. Call your doctor immediately even if irritation has ceased after treatment.

Caution
Do not heat R-134a above 40°C

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

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

When adding 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. **A leak detector designed 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

Items		Standard value
Idle speed r/min (N or P RANGE)		700±50
Idle up speed r/min		900
Air gap mm (Magnetic clutch) mm		0.4–0.65
Resistance of air mix damper potentiometer kΩ	MAX, HOT	4.82
	MAX COOL	0.18
Resistance of mode selector damper potentiometer kΩ	DEF position	0.18
	FACE position	4.82
Revolution pickup sensor resistance (at 20°C) Ω		405±35

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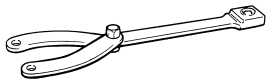
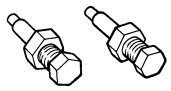
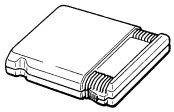
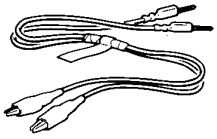
LUBRICANTS

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	170–190

SPECIAL TOOLS

Tool	Tool number and name	Supersession	Application
	MB991367 Special spanner	–	Armature mounting nut of compressor removal and installation
	MB991386 Pin	–	Armature mounting nut of compressor removal and installation
	MB991502 MUT-II	–	Checking the full automatic air conditioning
	ROM pack	–	
	MB991529 Diagnosis code check harness	–	Checking the full automatic air conditioning when using a voltmeter

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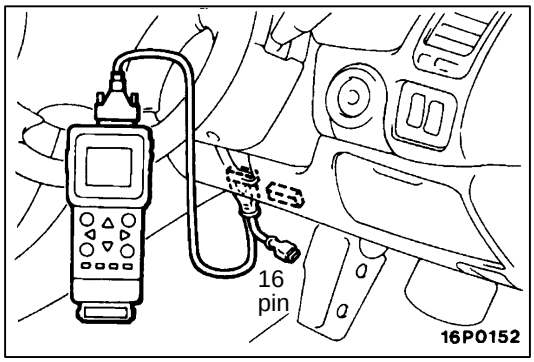


AUTOMATIC AIR CONDITIONING TROUBLESHOOTING

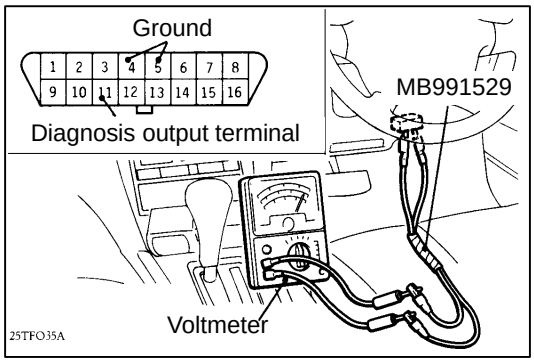
DIAGNOSIS FUNCTION

DIAGNOSIS CODE CHECK

With the MUT-II

Connect the MUT-II to the diagnosis connector then check diagnosis trouble codes.

Caution
Turn the ignition switch off before connecting or disconnecting the MUT-II.



Using a Voltmeter

1. Turn OFF the ignition switch.
2. Connect an analog voltmeter across the diagnosis output terminal 11 and terminal 4 or 5 (ground terminal) of the diagnosis connector.
3. Turn ON the ignition switch.
4. According to the voltmeter pointer deflection, read the diagnosis test mode pattern.
5. Referring to the diagnosis chart, repair the faulty item.
6. Turn OFF the ignition switch.
7. Disconnect the battery cable from the battery terminal and leave it disconnected for 10 seconds or more then reconnect the cable.
8. Turn ON the ignition switch and read the diagnosis code to check that the normal condition code is being output.

ERASING DIAGNOSIS CODES

With the MUT-II

Connect the MUT-II to the diagnosis connector then erase the diagnosis codes.

Without the MUT-II

Remove the battery cable from the negative battery terminal for 10 seconds or more then reconnect the cable.

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INSPECTION CHART FOR DIAGNOSIS CODES

Item No.	Diagnosis Item
11	Passenger compartment temperature sensor (open circuit)
12	Passenger compartment temperature sensor (short circuit)
13	Outside air temperature sensor system (open circuit)
14	Outside air temperature sensor system (short circuit)
15	Heater water temperature sensor system (open circuit)
16	Heater water temperature sensor system (short circuit)
21	Air thermo sensor system (open circuit)
22	Air thermo sensor system (short circuit)
31	Potentiometer system for air mix damper motor
32	Potentiometer system for mode selector damper motor
41	Driving system for air mix damper motor
42	Driving system for mode selector damper motor

INSPECTION PROCEDURE FOR DIAGNOSIS CODES

Code No. 11 Passenger compartment temperature sensor (open circuit)	**Probable cause**
This code is output when there is an open circuit in the power supply wiring or input wiring in the passenger compartment temperature sensor in the A/C-ECU, and there is no input from the passenger compartment temperature sensor to the A/C-ECU.	• A/C-ECU fault

Replace A/C-ECU

Code No. 12 Passenger compartment temperature sensor (short circuit)	**Probable cause**
This code is output when there is a short circuit in the power supply wiring and output wiring in the passenger compartment temperature sensor in the A/C-ECU, and the power supply voltage is input from the passenger compartment temperature sensor to the A/C-ECU.	• A/C-ECU fault

Replace A/C-ECU

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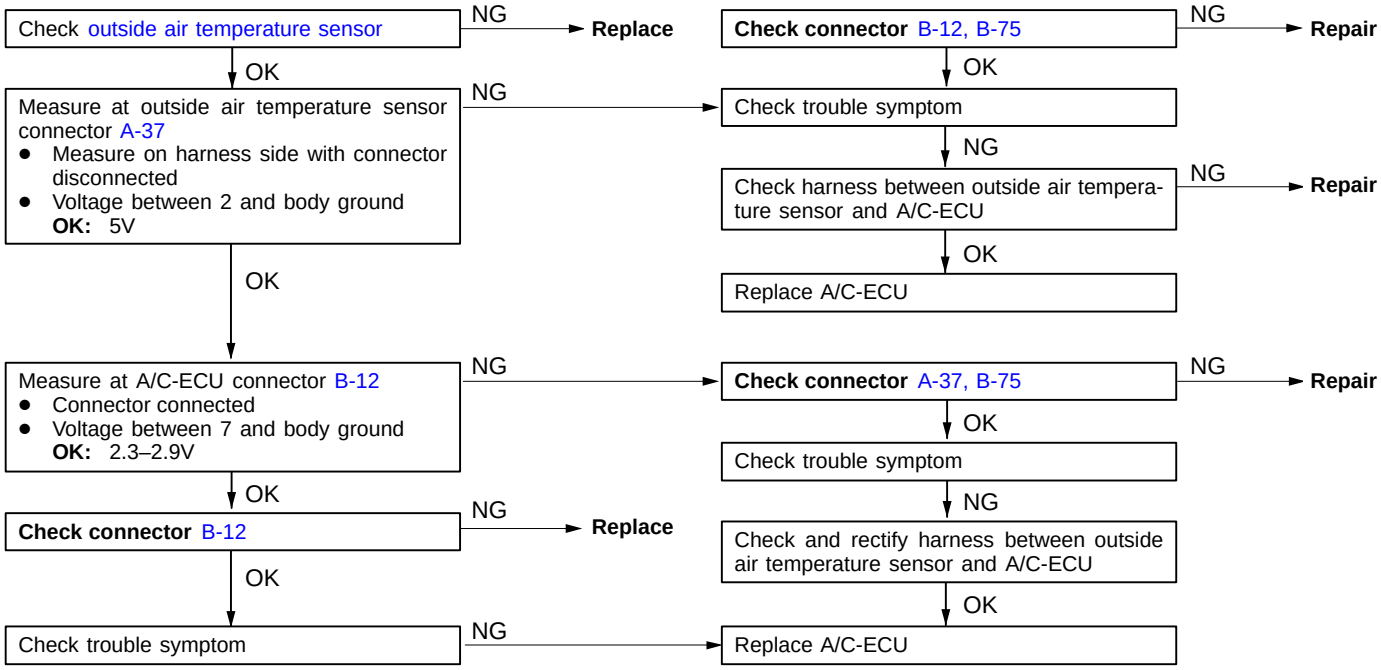
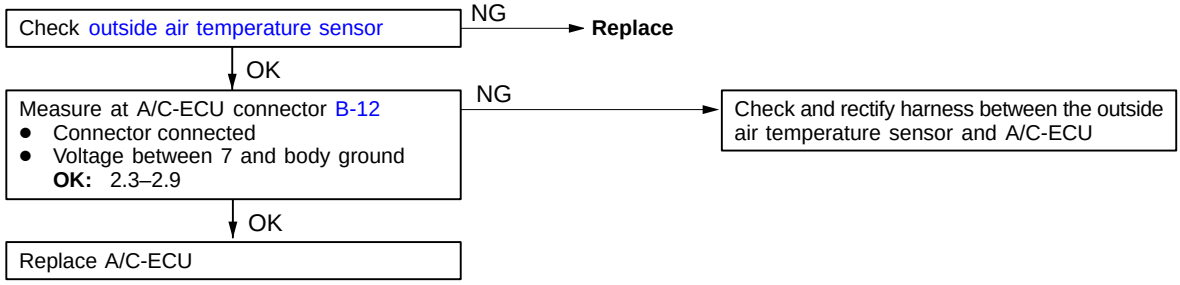
Code No. 13 Outside air temperature sensor system (open circuit)	Probable cause
This code is output when there is an open circuit in the outside air temperature sensor power supply or input wiring, and there is no input from the outside air temperature sensor in the A/C-ECU.	• Outside air temperature sensor fault • Connector or harness fault • A/C-ECU fault



Code No. 14 Outside air temperature sensor system (short circuit)	Probable cause
This code is output when there is a short circuit in the outside air temperature sensor power supply and input wiring, and the outside air temperature sensor power supply voltage is output to the A/C-ECU.	• Outside air temperature sensor fault • Connector or harness fault • A/C-ECU fault



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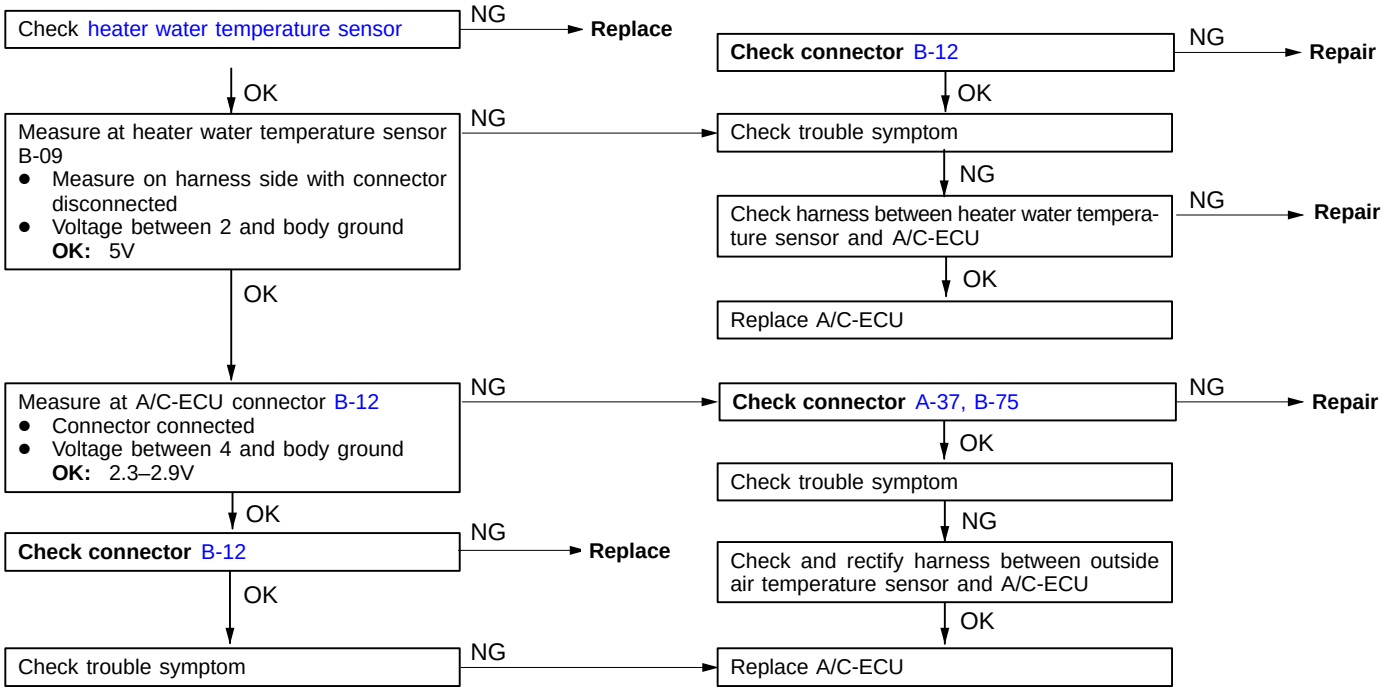
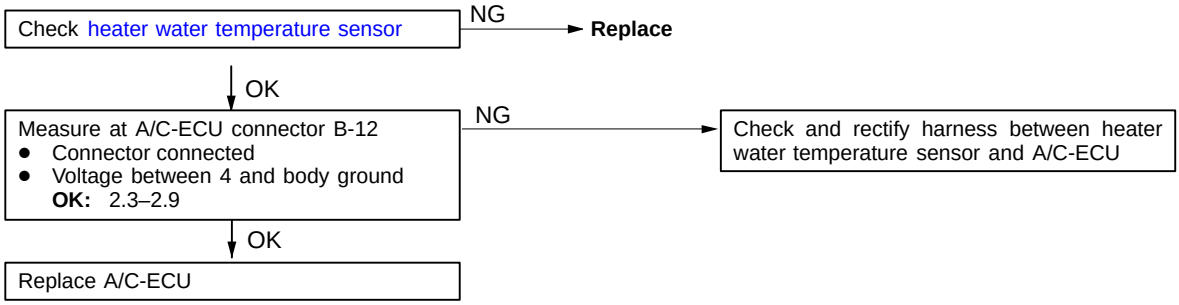
Code No. 15 Heater water temperature sensor system (open circuit)	Probable cause
This code is output when there is an open circuit in the heater water temperature sensor power supply or input wiring, and there is no input from the heater water temperature sensor into the A/C-ECU.	• Heater water temperature sensor fault • Harness or connector fault • A/C-ECU fault



Code No. 16 Heater water temperature sensor system (short circuit)	Probable cause
This code is output when the heater water temperature sensor power supply and output wires are shorted and the heater water temperature sensor power supply voltage has been input into the A/C-ECU.	• Heater water temperature sensor fault • Harness or connector fault • A/C-ECU fault



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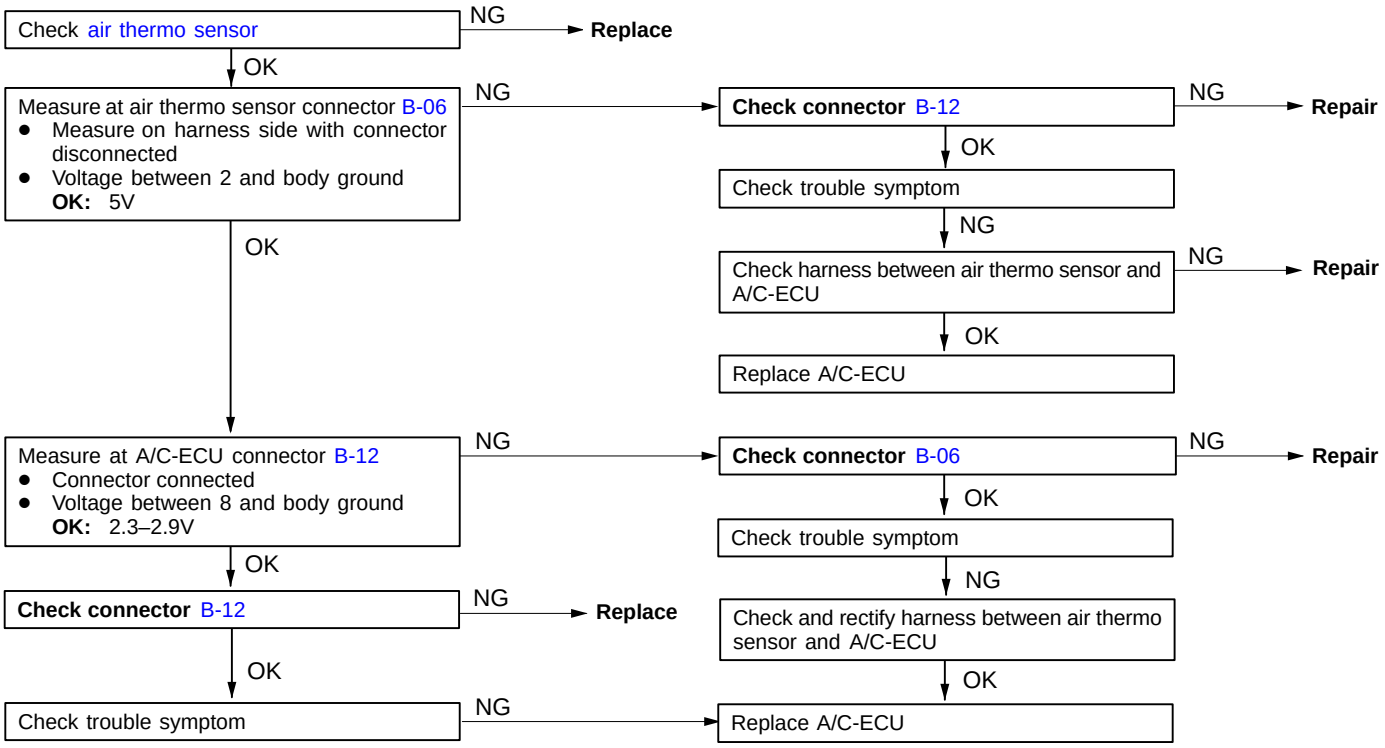
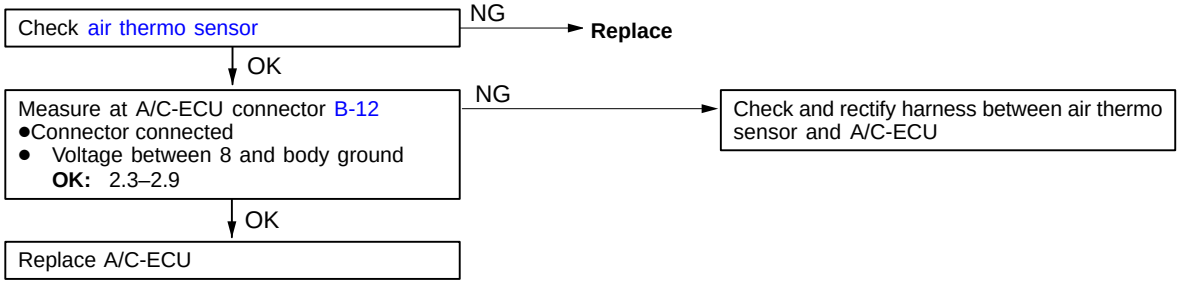
Code No. 21 Air thermo sensor system (open circuit)	Probable cause
This code is output when there is an open circuit in the air thermo sensor power supply or input wiring, and there is no input from the air thermo sensor to the A/C-ECU.	• Air thermo sensor fault • Harness or connector fault • A/C-ECU fault



Code No. 22 Air thermo sensor system (short circuit)	Probable cause
This code is output when the air thermo sensor power supply and output wires are shorted, and the air thermo sensor power supply voltage has been input into the A/C-ECU.	• Air thermo sensor fault • Harness or connector fault • A/C-ECU fault



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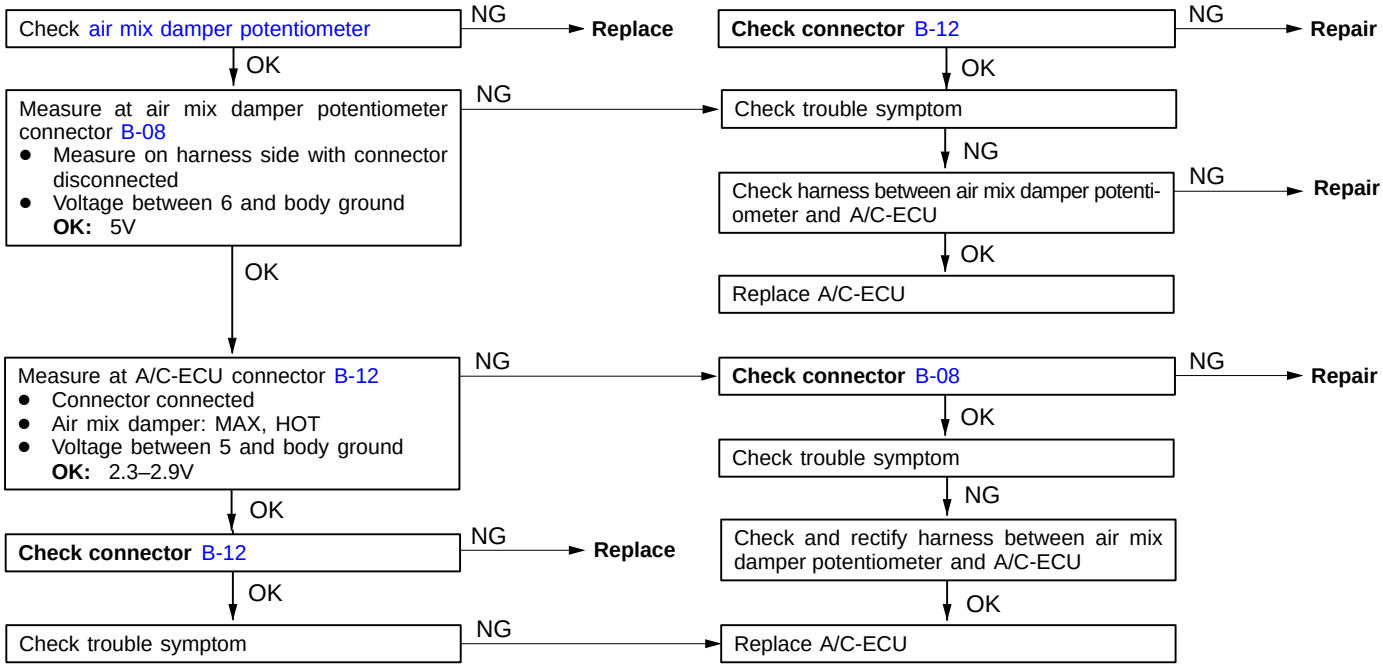
Code No. 31 Potentiometer system for air mix damper	Probable cause
This code is output when there is no input from the air mix damper potentiometer to the A/C-ECU due to an open or short circuit in the harness.	• Air mix damper potentiometer fault • Harness or connector fault • A/C-ECU fault



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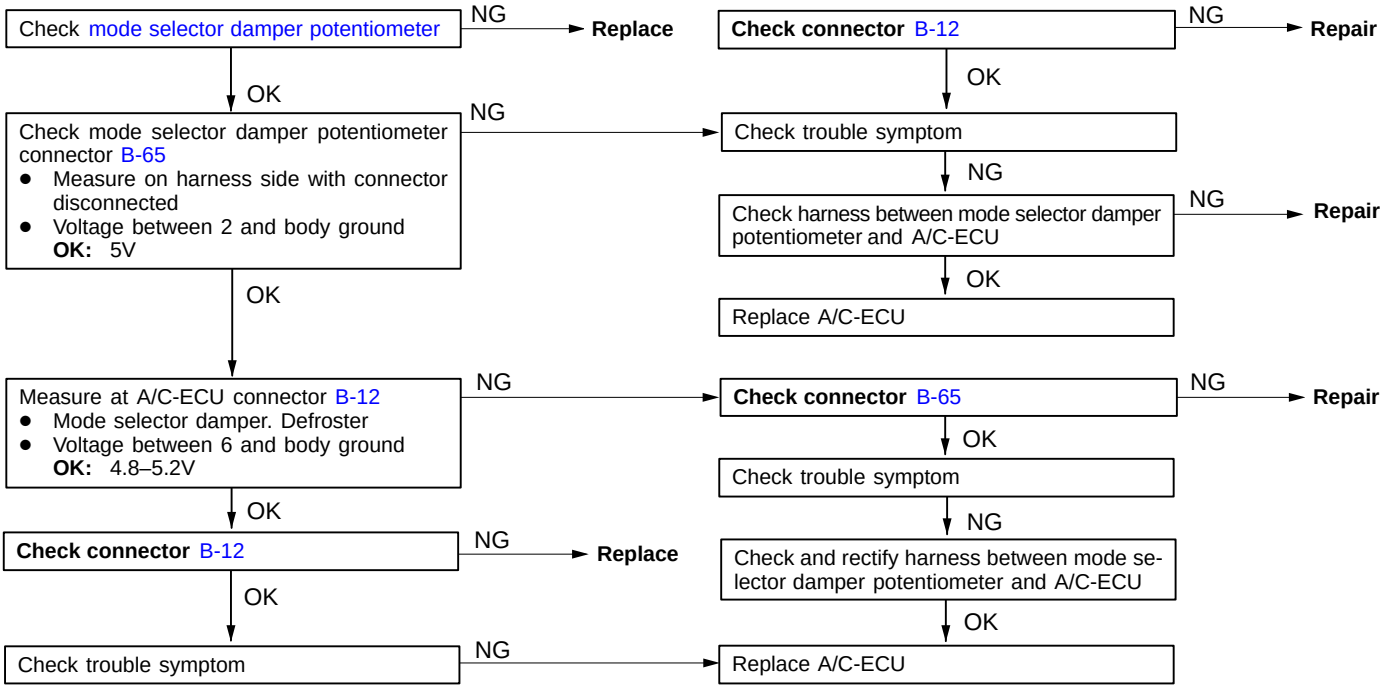
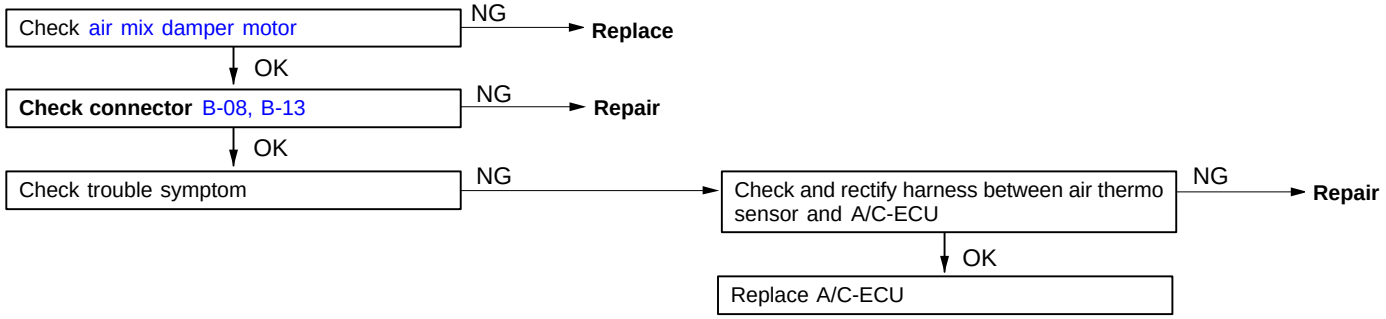
Code No. 32 Potentiometer system for mode selector damper	Probable cause
This code is output when there is no input from the mode selector damper potentiometer to the A/C-ECU due to an open or short circuit in the harness.	• Mode selector damper potentiometer fault • Harness or connector fault • A/C-ECU fault



Code No. 41 Driving system for air mix damper motor	Probable cause
This code is output when the air mix damper cannot be rotated to the set opening angle.	• Air mix damper motor fault • Harness or connector fault • A/C-ECU fault



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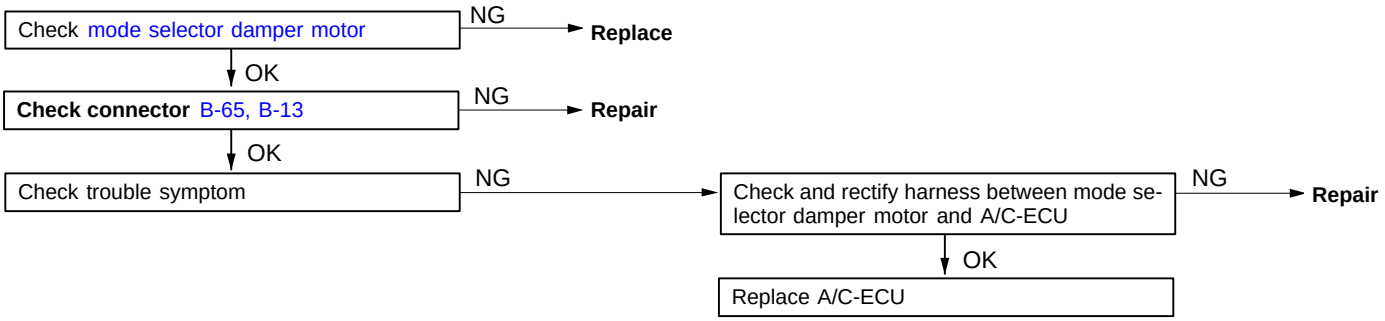
Code No. 42 Driving system for mode selector damper motor	Probable cause
This code is output when the mode selector damper cannot be rotated to the set opening angle.	• Mode selector damper motor fault • Harness or connector fault • A/C-ECU fault



INSPECTION CHART BY TROUBLE SYMPTOM

Trouble symptom	Inspection Procedure No.
Cannot communicate with MUT-II	1
Air conditioning does not operate	2
Graphical air conditioning display in control unit does not display	3
Cannot set the temperature	4
The air conditioning blower air temperature does not rise	5
The air conditioning blower air temperature does not fall	6
The blower does not operate	7
The blower does not operate on HI	8
Cannot change blower air volume	9
Cannot switch mode selector	10
Cannot switch air inlet selector	11
Defroster function does not operate	12
Condenser fan does not operate	13
Rear defogger does not operate	14
Check A/C-ECU power supply circuit	15
Check A/C compressor control circuit	16

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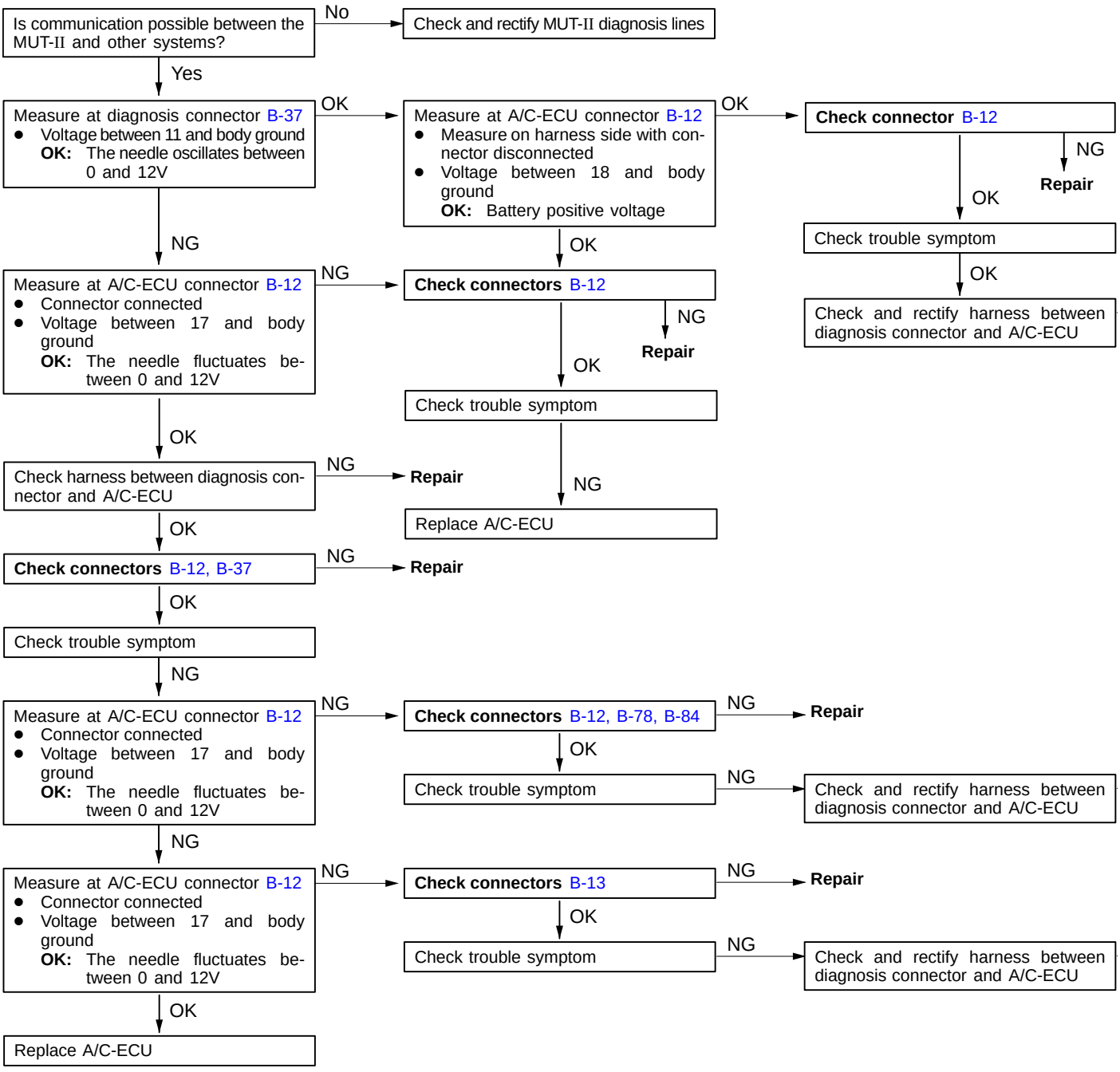
INSPECTION PROCEDURE FOR TROUBLE SYMPTOMS

INSPECTION PROCEDURE 1

Cannot communicate with MUT-II	Probable cause
In the event that communication is impossible with all systems, it is highly likely that there is a diagnosis line fault. If communication is impossible with the air conditioning system only, possible causes include a diagnosis line fault or an A/C-ECU power supply system (ground) fault.	• Harness or connector fault • A/C-ECU fault



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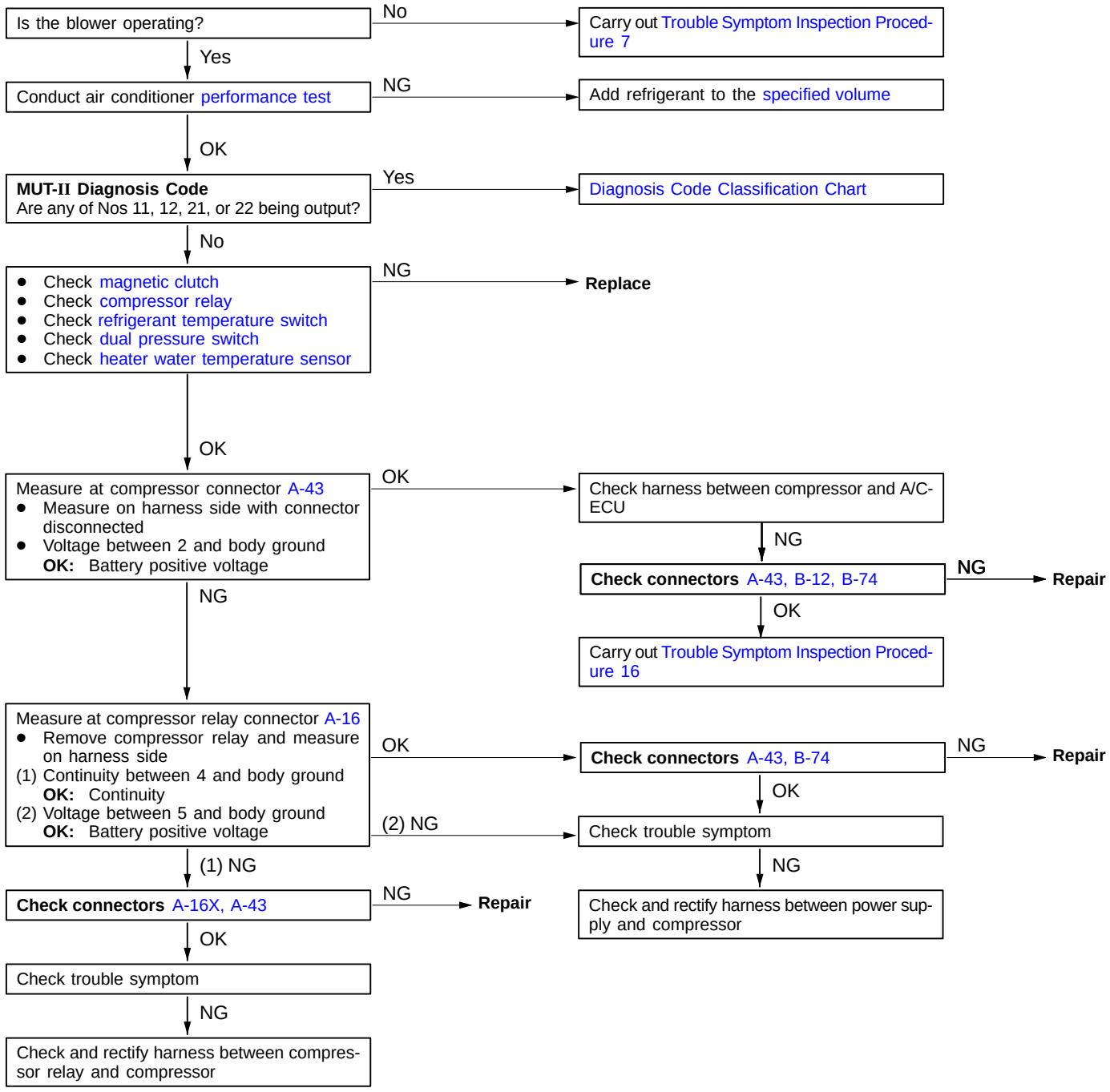
INSPECTION PROCEDURE 2

Air conditioning does not operate	Probable cause
If the air conditioning does not operate even when the temperature setting is turned to 17°C with the A/C switch ON, possible causes include a blower operation fault or a magnetic clutch power supply system fault.	• Blower system fault • Insufficient refrigerant volume • Magnetic clutch fault • Air thermo sensor fault • Compressor relay fault • Refrigerant temperature switch fault • Dual pressure switch fault • Heater water temperature sensor fault • Harness or connector fault • A/C-ECU fault



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INSPECTION PROCEDURE 3

Graphical air conditioning display in control unit does not display	Probable cause
It is possible there is a fault in the A/C-ECU power supply system (including the ground).	• Harness or connector fault • A/C-ECU fault

Is the air conditioning operating?
- No → Trouble Symptom Inspection Procedure 15
- Yes → Replace the A/C-ECU

INSPECTION PROCEDURE 4

Cannot set the temperature	Probable cause
It is possible that there is a fault in the input or output systems for the temperature setting signal.	• Harness or connector fault • A/C-ECU fault

Trouble Symptom Inspection Procedure 15

INSPECTION PROCEDURE 5

The air conditioning blower air temperature does not rise	Probable cause
If the blower air temperature does not rise even though the set temperature has been raised, possible causes include a fault in one of the sensors, or an operating fault in the air mix damper. In such a case, the breakdown causes can be verified for each system using the MUT-II to check the diagnosis trouble codes.	• Air mix damper potentiometer fault • Air mix damper motor fault • Air mix damper fault • Harness or connector fault • Thermostat fault • A/C-ECU fault

MUT-II Diagnosis Code
Are any of Nos 11, 12, 31, 41 being output?
- Yes → Diagnosis Code Classification Chart
- No → Check engine thermostat (See Group 14)
  - NG → **Replace**
  - No → Replace the A/C-ECU

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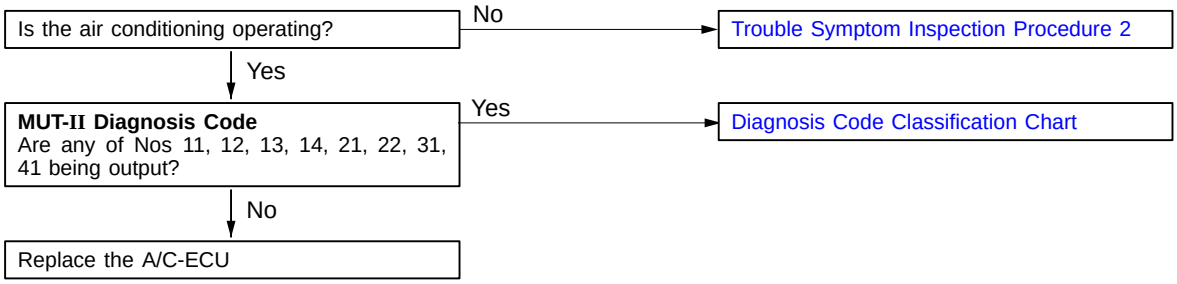
INSPECTION PROCEDURE 6

The air conditioning blower air temperature does not fall	Probable cause
If the room temperature does not fall even though the set temperature has been lowered, possible causes include mis-detections in sensors causing an air conditioning operation fault or an air mix damper operation fault. In such a case, the breakdown causes can be verified for each system using the MUT-II to check the diagnosis codes.	• Outside air temperature sensor fault • Air mix damper potentiometer fault • Air mix damper motor fault • Air thermo sensor fault • Harness or connector fault • Air mix damper fault • A/C-ECU fault



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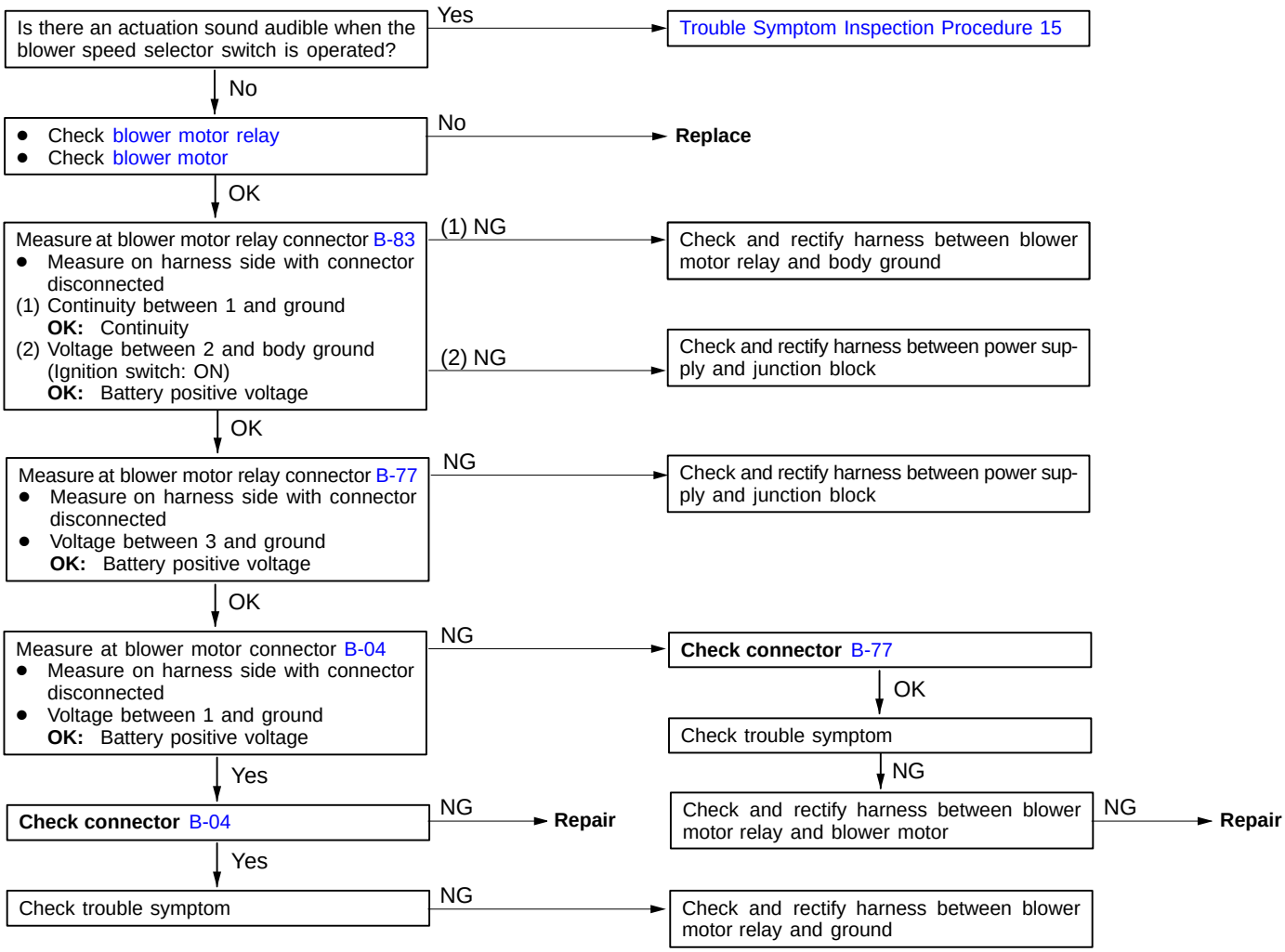
INSPECTION PROCEDURE 7

The blower does not operate	Probable cause
If no air is blown although the blower switch is ON, it is possible that there is a fault in the blower motor relay circuit system.	• Blower motor relay fault • Blower motor fault • Harness or connector fault • A/C-ECU fault



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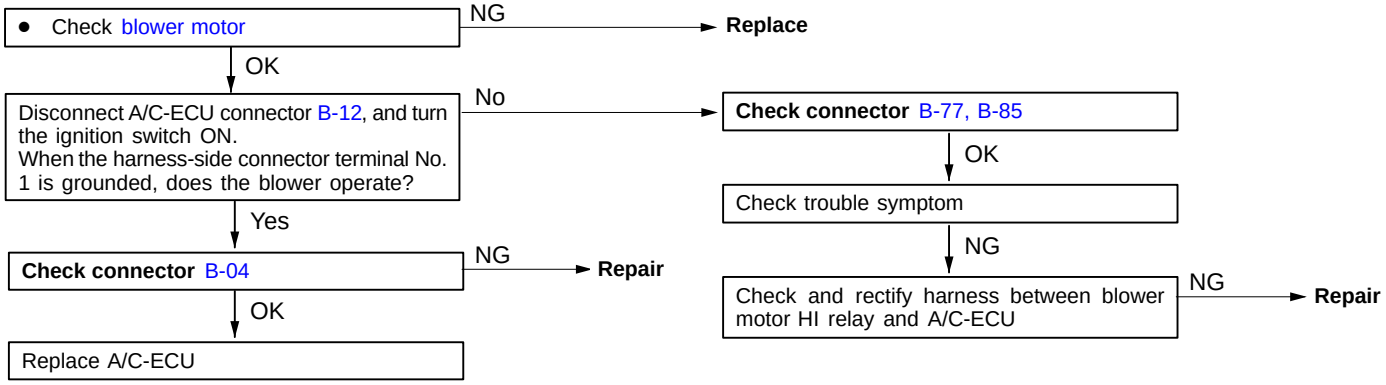
INSPECTION PROCEDURE 8

The blower does not operate on HI	Probable cause
If the blower does not operate on HI when the temperature setting is on 17 or 32, a possible cause is a fault in the blower motor HI circuit.	• Blower motor fault • Harness or connector fault • A/C-ECU fault



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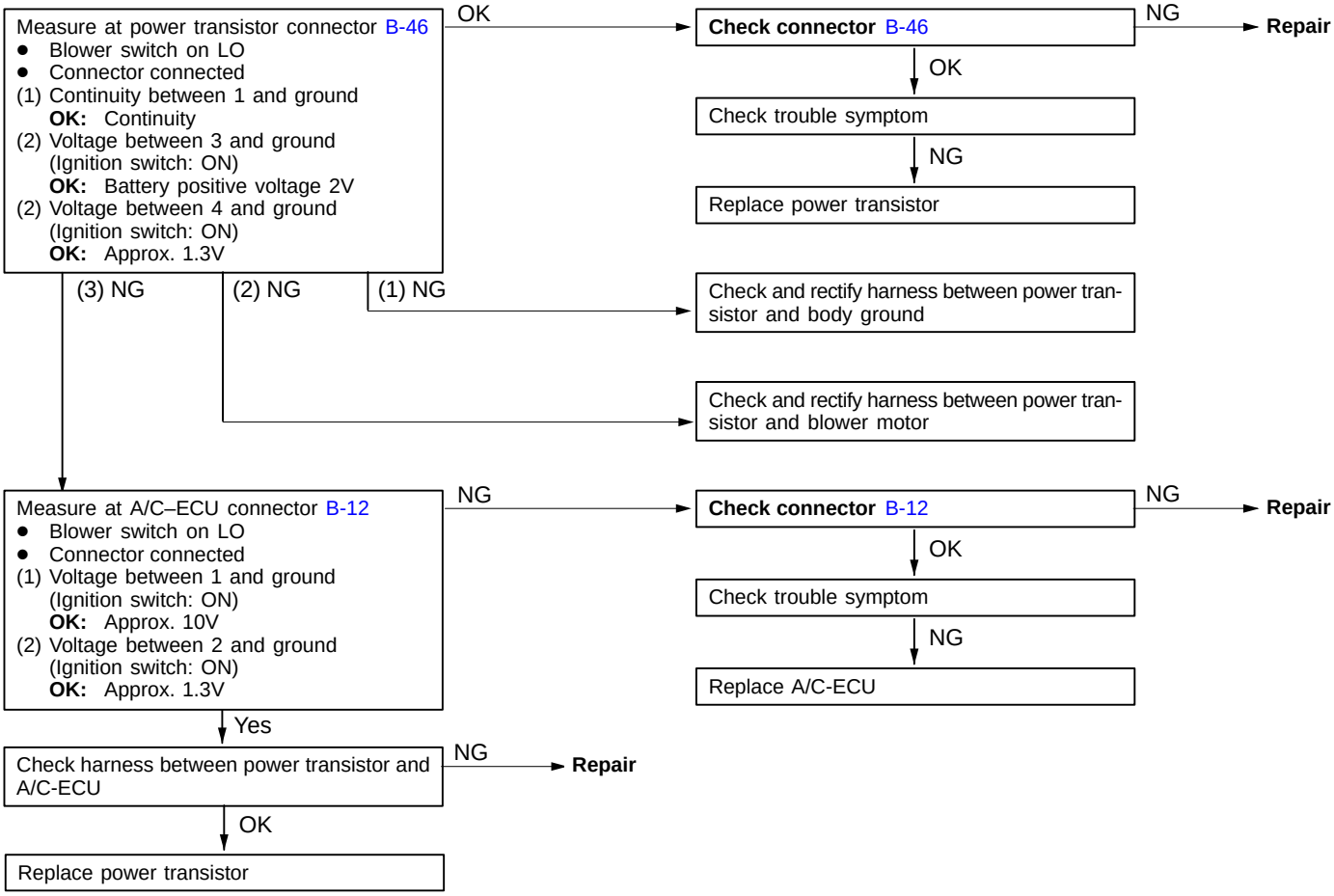
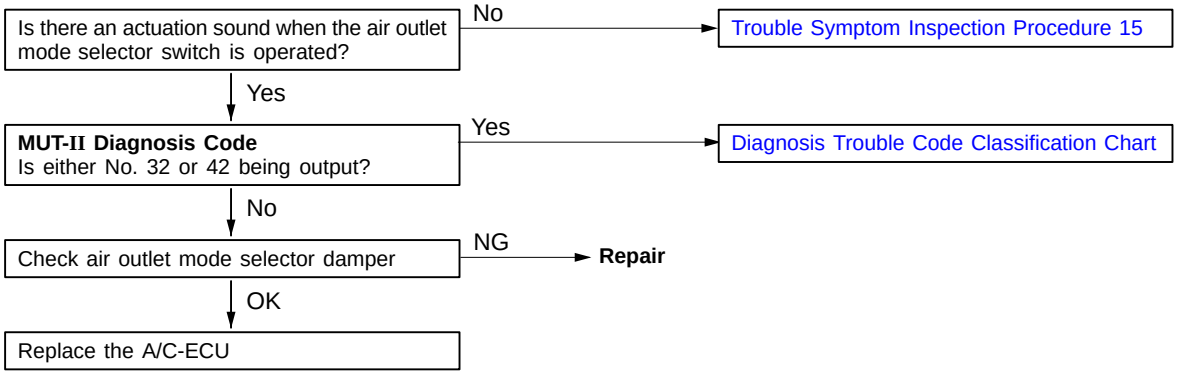
INSPECTION PROCEDURE 9

Cannot change blower air volume	Probable cause
If the blower speed does not vary, there is probably a fault in the power transistor system.	• Power transistor fault • Harness or connector fault • A/C-ECU fault



INSPECTION PROCEDURE 10

Cannot switch air outlet mode selector	Probable cause
It is possible that there is a fault in either the air outlet mode selector signal input or output systems. In such a case, the cause of the breakdown can be confirmed using the MUT-II to check the diagnosis codes.	• Air outlet mode selector damper potentiometer fault • Air outlet mode selector damper motor fault • Air outlet mode selector damper fault • Harness or connector fault • A/C-ECU fault



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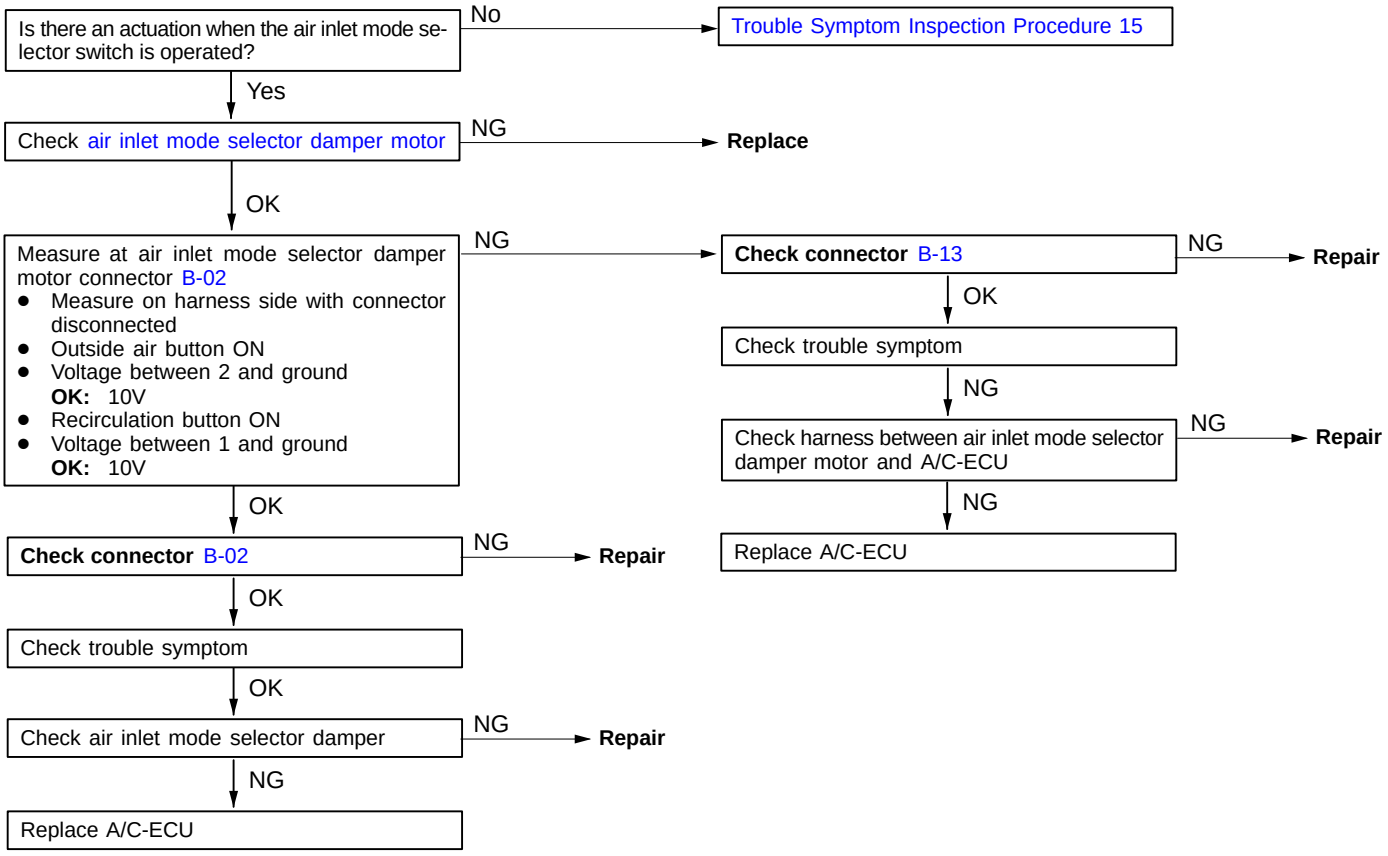
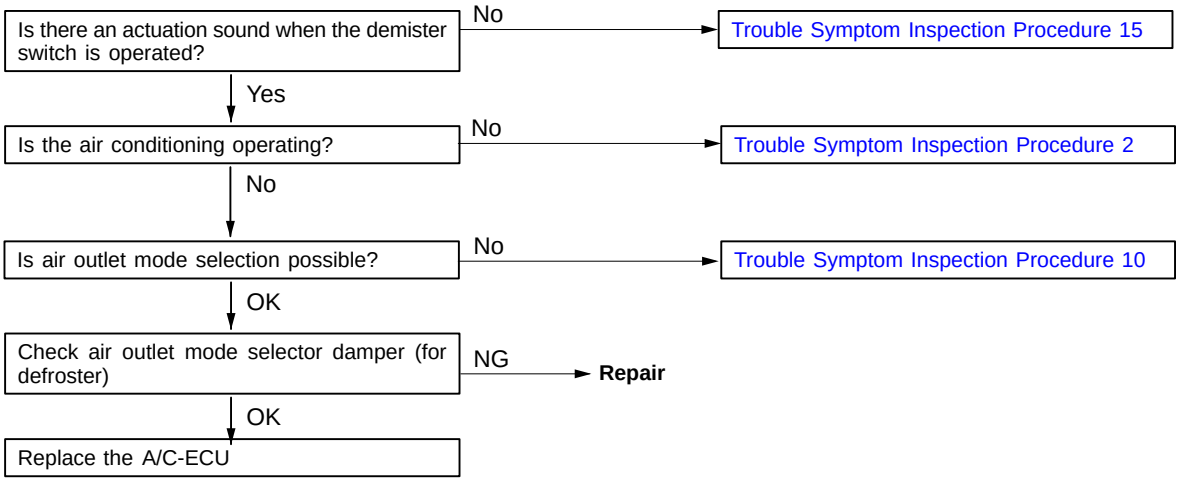
INSPECTION PROCEDURE 11

Cannot switch air inlet mode selector	Probable cause
In the event that the air inlet mode does not switch over even when the air inlet mode selector is switched, there is probably a fault with the air inlet mode selector damper motor.	• Air inlet mode selector damper motor fault • Air inlet mode selector damper fault • Harness or connector fault • A/C-ECU fault



INSPECTION PROCEDURE 12

Demister function does not operate	Probable cause
If the demister function does not operate even though the demister switch is ON, possible causes include an air conditioning operation fault or an air outlet mode selector circuit fault.	• Air conditioning operation system fault • Air outlet mode selector system fault • Harness or connector fault • A/C-ECU fault



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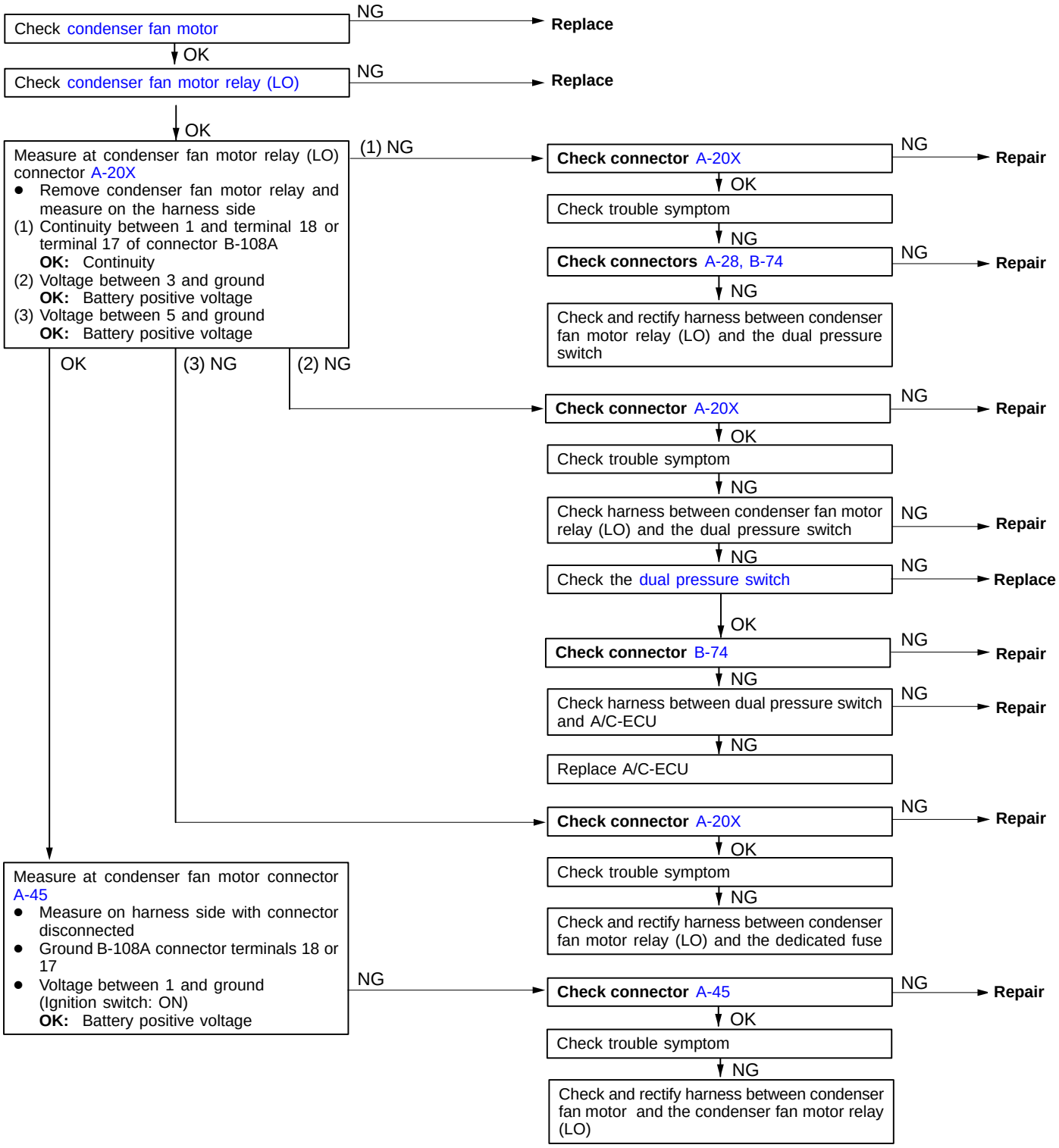
INSPECTION PROCEDURE 13

Condenser fan does not operate	Probable cause
If the condenser fan does not rotate when the air conditioning is operated, it is possible that there is a fault in the condenser fan motor operation circuit. In such a case, this will be a cause of reduced cooling performance when the vehicle is not moving.	• Condenser fan motor fault • Condenser fan motor relay fault • Harness or connector fault



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INSPECTION PROCEDURE 14

Rear defogger does not operate	Probable cause
If the rear defogger does not operate even when the switch is ON (12 min. timer operates), it is possible that there is a fault in the A/C-ECU power supply system (including ground).	• Harness or connector fault • A/C-ECU fault

Is there an actuation sound when the rear demister switch is operated?
- No → Trouble Symptom Inspection Procedure 15
- No → Replace the A/C-ECU

INSPECTION PROCEDURE 15

Check A/C-ECU power supply circuit

Measure at A/C-ECU connector B-12
- Measure on harness side with connector disconnected
- Voltage between 3 and ground
  OK: Battery positive voltage

NG → **Check connector** B-78, B-84
- NG → **Repair**
- OK → Check trouble symptom
  - NG → Check and rectify harness between A/C-ECU and fusible link

OK →

Measure at A/C-ECU connector B-13
- Measure on harness side with connector disconnected
- Voltage between 28 and ground (Ignition switch: ON)
  OK: Battery positive voltage

NG → **Check connector** B-13, B-78
- NG → **Repair**
- OK → Check trouble symptom
  - NG → Check and rectify harness between A/C-ECU and junction block

OK →

Measure at A/C-ECU connector B-13
- Measure on harness side with connector disconnected
- Continuity between 29 and ground
  OK: Continuity
- Continuity between 35 and ground
  OK: Continuity
- Continuity between 27 and ground
  OK: Continuity

NG → **Check connector** B-13
- NG → **Repair**
- OK → Check trouble symptom
  - NG → Check and rectify harness between A/C-ECU and body ground

OK →

Check connector B-13
- NG → **Repair**
- OK → Check trouble symptom
  - NG → Replace A/C-ECU

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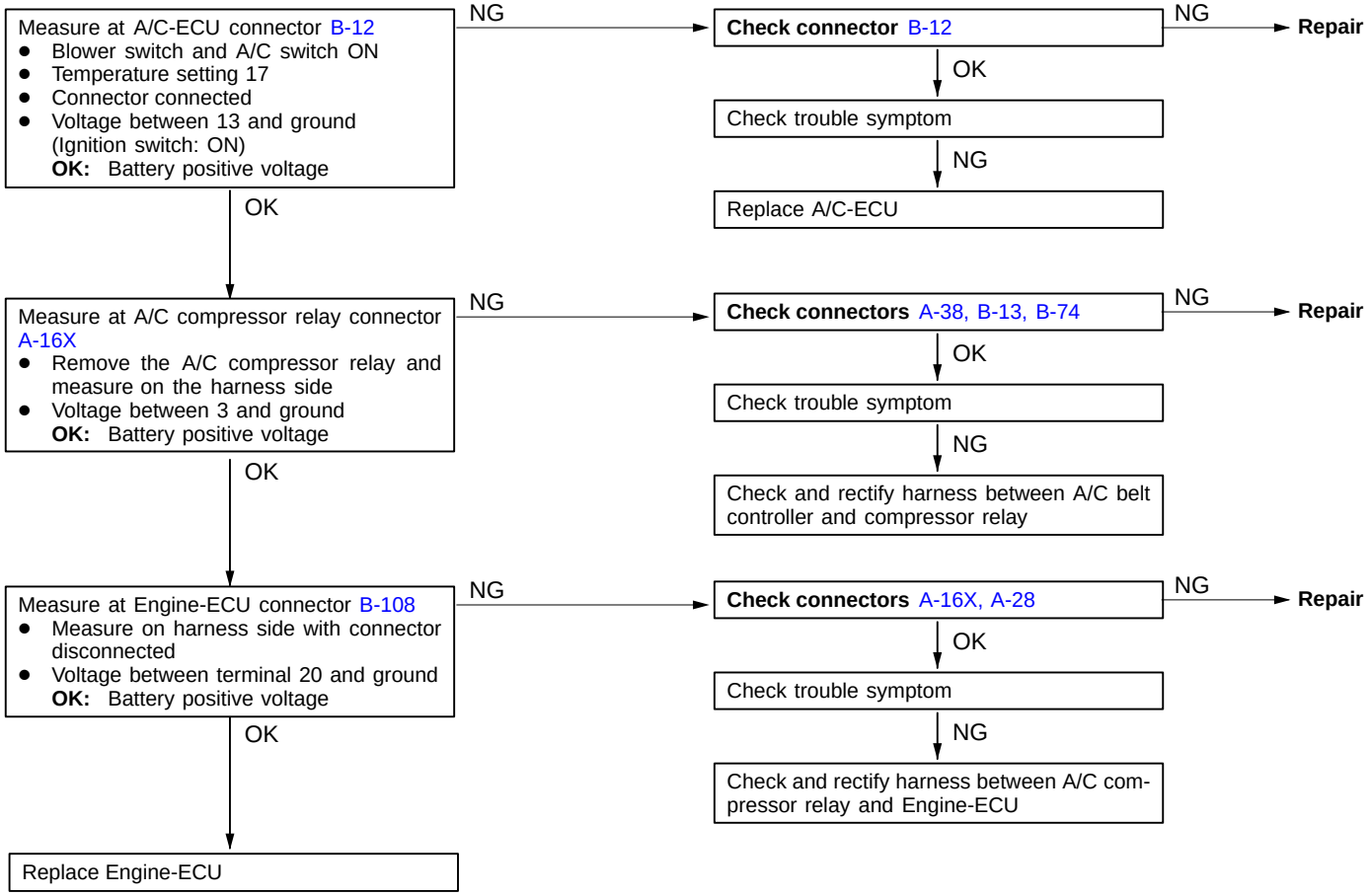
INSPECTION PROCEDURE 16

Check A/C compressor control circuit



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SERVICE DATA REFERENCE TABLE

Item No.	Inspection item	Inspection condition		Normal condition
11	Passenger compartment temperature sensor	Ignition switch ON		Ambient temperature at sensor and MUT-II indicated value agree
13	Outside air temperature sensor	Ignition switch ON		Outside temperature and MUT-II indicated value agree
15	Heater water temperature sensor	Ignition switch ON		Temperature at heater core wall surface and MUT-II indicated value agree
21	Air thermo sensor	Ignition switch ON		Evaporator outlet temperature and MUT-II indicated value agree
25	Photo sensor	Ignition switch ON		Voltage displayed on MUT-II is proportional to sunlight intensity
31	Air mix damper potentiometer	Ignition switch ON	Damper position	Degree of opening (%)
			MAX HOT	Approx. 100
			MAX COOL	Approx. 0
32	Air outlet mode selector damper potentiometer	Ignition switch ON	Damper position	Degree of opening (%)
			FACE	Approx. 0
			FOOT	Approx. 50
			FOOT/DEF	Approx. 75
			DEF	Approx. 100

ACTUATOR TEST REFERENCE TABLE

Item No.	Actuator test item		Item No.	Actuator test item	
01	Blower fan motor	OFF command	08	Air outlet mode	Drive FACE
02		Drive Low	09		Drive FOOT
03		Drive Medium	10		Drive DEF
04		Drive High	11	Magnetic clutch	OFF command
05	Air mix damper	Drive 0%	12		ON command
06		Drive 50%	13	Air inlet mode selection	Drive FRESH
07		Drive 100%	14		Drive RECIRC

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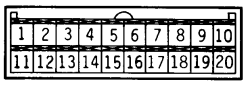
CHECK AT THE A/C-ECU TERMINALS



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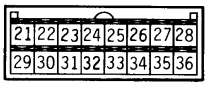

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Figures in brackets ( ) in the Normal condition column are reference values.

Terminal No.	Checking items	Checking conditions	Normal condition
1	Blower HI control circuit	Blower switch OFF	Battery voltage
		Blower switch HI	Small voltage (0V)
2	Front power transistor base output	Blower switch OFF	0V
		Blower switch LO	Approx. 1.3V
		Blower switch HI	Approx. 2.5V
3	Backup power supply	At all times	Battery voltage
4	Heater water temperature sensor input	Sensor temperature 25°C (4kΩ)	2.3–2.9V
5	Air mix damper potentiometer input	Damper moved to MAX. HOT position	4.7–5.0V
6	Air outlet mode selector damper potentiometer input	Damper moved to Defroster position	4.8–5.2V
7	Outside air temperature sensor input	Sensor temperature 25°C (4kΩ)	2.3–2.9V
8	Fin Thermo sensor input	Sensor temperature 25°C (4kΩ)	2.3–2.9V
9	Photo sensor (-)	Illumination 0 lux Illumination 100 000 lux or above	0V –0.1–0.2
10	Sensor power supply	Full-time	4.8–5.2V
13	Compressor operating signal	Compressor operating	Battery voltage
14	Engine speed signal input	Ignition switch: ON	5V (approx)
16	Rear defogger	Rear defogger switch ON	1.5V or greater
		Rear defogger switch OFF	Battery voltage
17	Diagnosis output	Ignition switch: ON	Needle oscillates between 0 and 12V
18	Diagnosis control output	Ignition switch: ON	Battery voltage–2V
19	Photo sensor (+)	At all times	0V
20	Sensor ground	At all times	0V
21	Air outlet mode selector damper motor (FACE)	Damper moved to FACE position	10V
		Damper moved to DEFROSTER position	Small voltage (0.5V)
22	Air mix damper motor (MAX. COOL)	Damper moved to MAX. COOL position	10V
		Damper moved to MAX. HOT position	Small voltage (0.5V)
23	Air inlet mode selector damper motor (RECIRC)	Selector switch on RECIRC	Small voltage (0.5V)
		Selector switch on Outside Air Intake	10V

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Terminal No.	Checking items	Checking conditions	Normal condition
24	Air outlet mode selector damper motor	Damper moved to FACE position (DEFROSTER)	Small voltage (0.5V)
		Damper moved to DEFROSTER position	10V
25	Air mix damper motor (MAX. HOT)	Damper moved to MAX. COOL position	Small voltage (0.5V)
		Damper moved to MAX. HOT	10V
26	Air inlet mode selector damper motor (OUTSIDE AIR)	Selector switch on RECIRC Selector switch on Outside Air Intake	10V Small voltage (0.5V)
27	Ground	Full-time	Continuity exists
28	IG2 power supply	Ignition switch: ON	Battery voltage
29	Illumination circuit ground (rheostat)	Full-time	Continuity exists
30	Illumination power supply	Lighting switch ON	Battery voltage
31*	Revolution pick-up sensor	Compressor: ON	0.2V AC
32*	Revolution pick-up sensor	Compressor: ON	0.2V AC
35	Ground	Full-time	Continuity exists
36	Air conditioning output	Air conditioning: OFF	0V
		Air conditioning: ON	Battery voltage

NOTE: *The voltage shown is the pulse signal voltage

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MANUAL AIR CONDITIONING

TROUBLESHOOTING PROCEDURES

Trouble Symptom	Problem cause	Remedy
When the engine is running the A/C does not operate	Fuse is defective	Replace the fuse
	Harness or connector is defective	Repair the harness or connector
	A/C compressor relay is defective	Replace the A/C compressor relay
	A/C compressor magnetic clutch is defective	Replace the armature plate, rotor or clutch coil
	Refrigerant leak or overfilling of refrigerant	Replenish the refrigerant, repair the leak or take out some of the refrigerant
	Dual pressure switch is defective	Replace the dual pressure switch
	A/C switch is defective	Replace the A/C switch assembly
	Blower switch is defective	Replace the blower switch assembly
	Engine-ECU is defective	Replace the engine-ECU
When the A/C is operating, temperature inside the passenger compartment doesn't decrease (cool air is not emitted)	Refrigerant leak	Replenish the refrigerant and repair the leak
	Dual pressure switch is defective	Replace the dual pressure switch
	Engine-ECU is defective	Replace the engine-ECU
	Thermostat is defective	Replace the thermostat
	Fin thermo sensor is defective	Replace the fin thermo sensor
Blower fan and motor do not turn	Fuse is defective	Replace the fuse
	Harness or connector is defective	Repair the harness or connector
	Blower relay is defective	Replace the blower relay
	Blower fan and motor are defective	Replace the blower fan and motor
	Blower switch is defective	Replace the blower switch assembly
Blower fan and motor do not stop turning	Harness or connector is defective	Repair the harness or connector
	Blower switch is defective	Replace the blower switch assembly
	Blower relay is defective	Replace the blower relay

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Trouble Symptom	Problem cause	Remedy
When the A/C is operating the condenser fan or radiator fan does not turn	Fuse is defective	Replace the fuse
	Harness or connector is defective	Repair the harness or connector
	Condenser fan motor is defective	Replace the condenser fan motor
	Radiator fan motor is defective	Replace the radiator fan motor
	Engine-ECU is defective	Replace the engine-ECU

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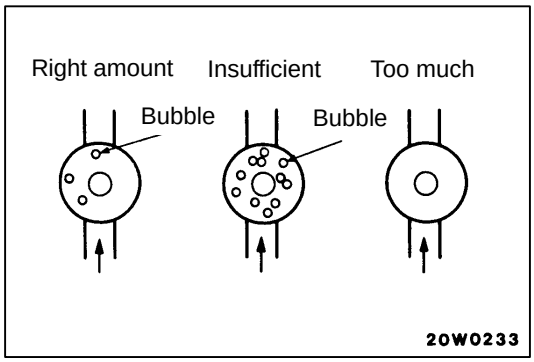
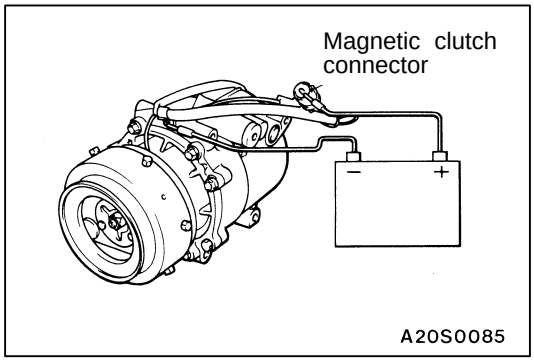


ON-VEHICLE SERVICE

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 and hold engine speed at 1500 rpm. 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 bubbles are visible occasionally in the sight glass and disappear when engine speed is raised, the magnetic clutch is engaged, the compressor discharge line is warm and the compressor inlet line is cool; the system may be overcharged.
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 most of its refrigerant charge.
3. If the sight glass shows foam or bubbles, the system could be low on refrigerant or the receiver drier is restricted. The system has to be tested, leak checked then recharged with refrigerant.

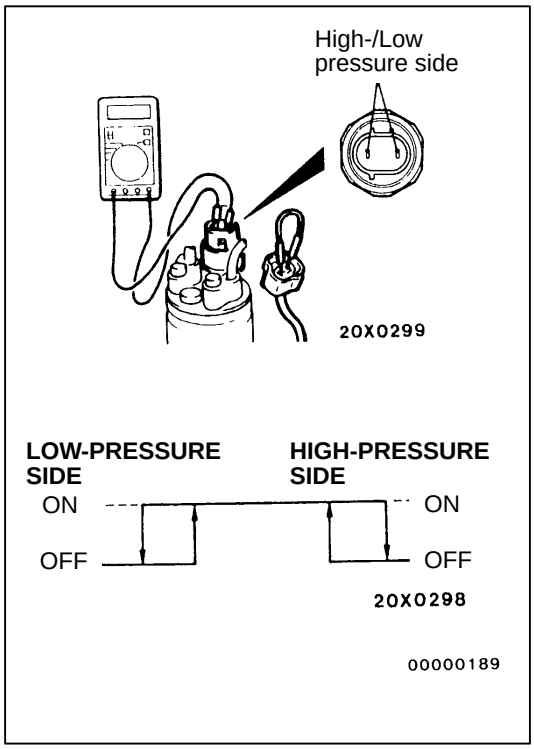


MAGNETIC CLUTCH TEST

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

RECEIVER DRIER TEST

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

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 to ON	ON to OFF
Low-pressure side	220	200
High-pressure side	2,550	3,140

COMPRESSOR DRIVE BELT ADJUSTMENT

Refer Group 11A.

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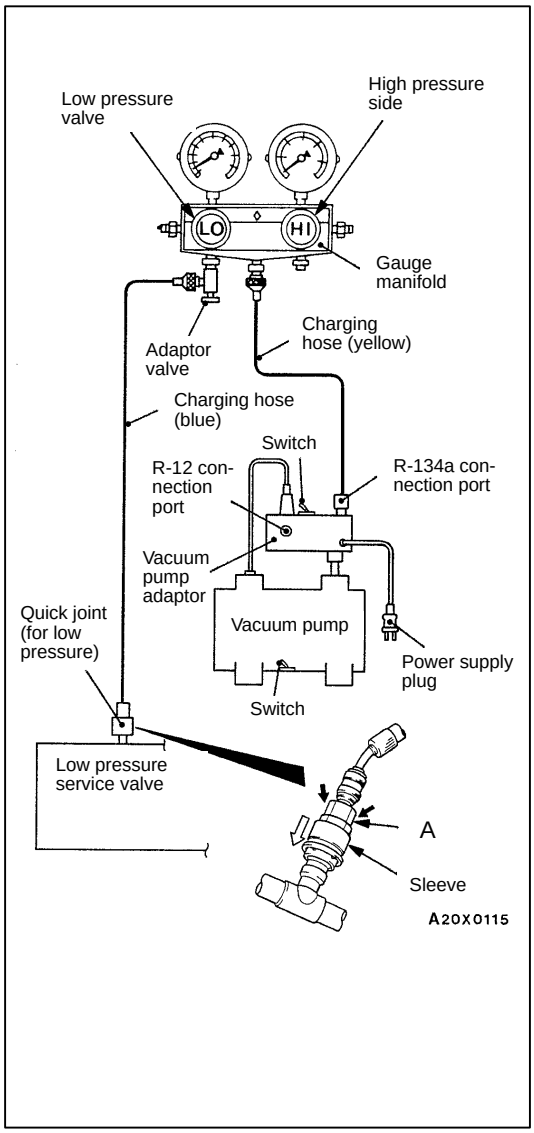

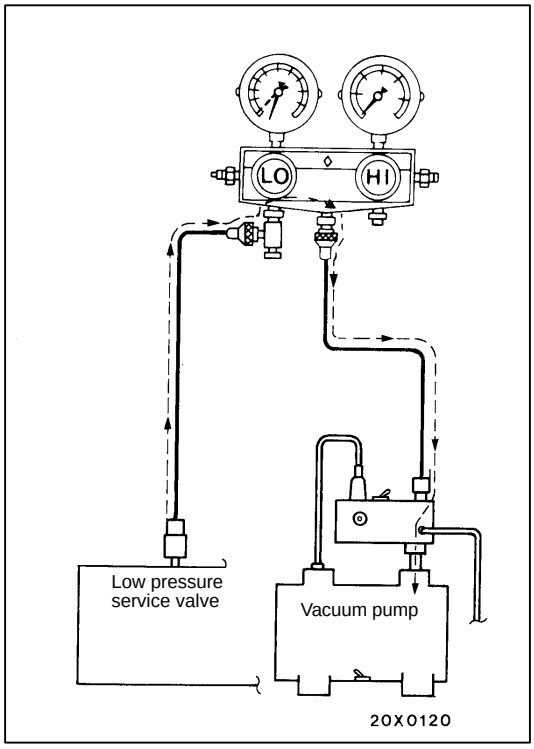

CHARGING

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 low pressure hose.

   Caution
   1. Use tools that are designed for 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 A/C compressor during 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 (vacuum) is lost, check for loose connections. Then, repeat the evacuation procedure from step (12).

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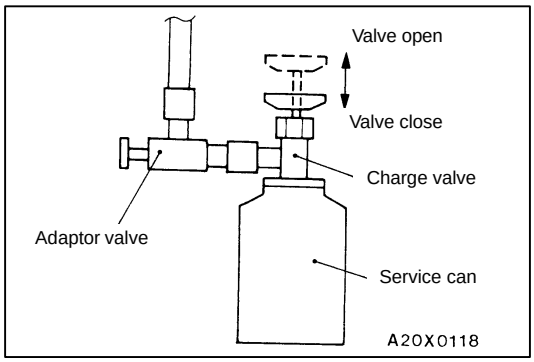
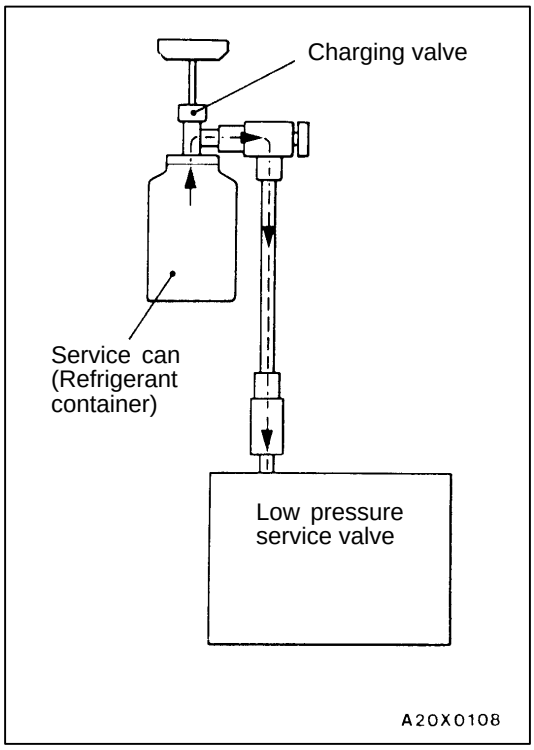


16. With the handle turned out all the way (valve open), install the charging valve to the service can.
17. Turn the handle of the adaptor valve back all the way (valve closed), remove it from the gauge manifold and install the service can.
18. Tighten the handle of the charging valve (valve closed)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



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

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

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

    Caution
    A leak detector designed 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 rpm.
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.

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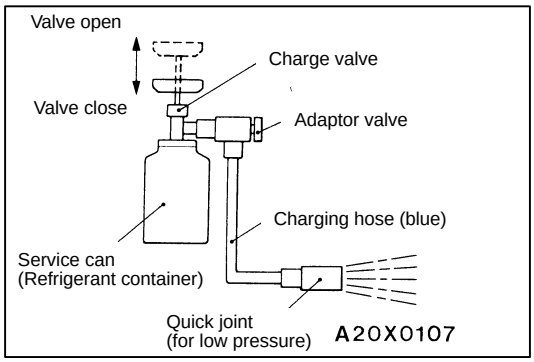
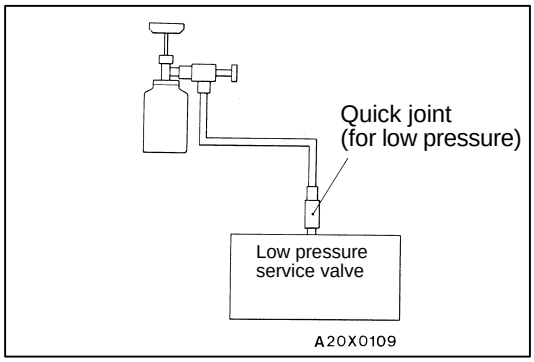


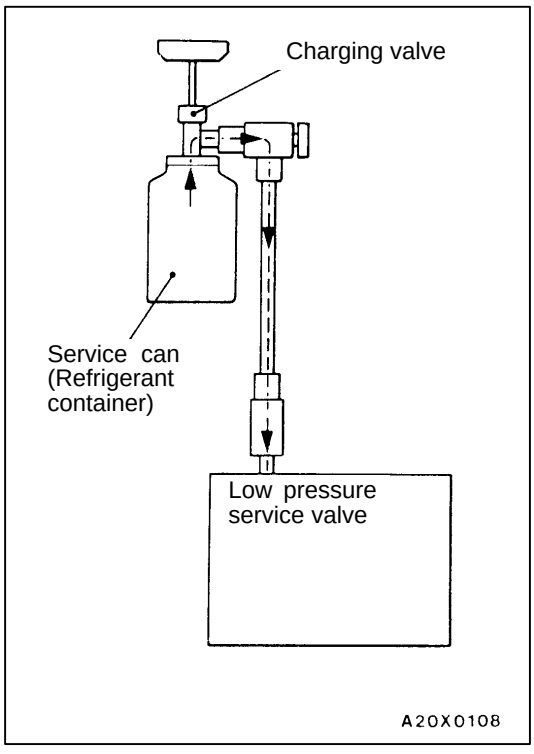
CORRECTING LOW REFRIGERANT LEVEL IN CASE THE SERVICE CAN IS USED

1. Install the charge valve with the handle turned all the way out (valve open) of the service can.
2. Install the adaptor value 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 low-pressure hose.

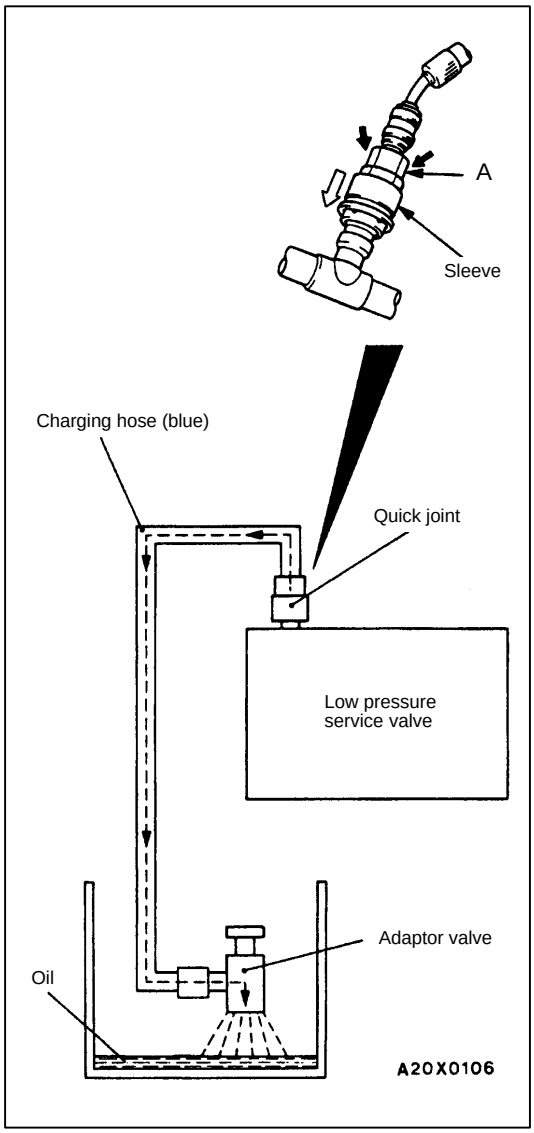


8. Start the engine.
9. Operate the air conditioner and set at the lowest temperature (MAX. COOL).
10. Fix the engine speed at 1,500 rpm.
11. Tighten the handle of the adaptor valve (valve open), and replenish refrigerant checking the quantity through the sight glass.

    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 charged 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
    If any refrigerant is remaining in the service can, close the adaptor valve and save the refrigerant for another vehicle. Do not release into the atmosphere.



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 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.

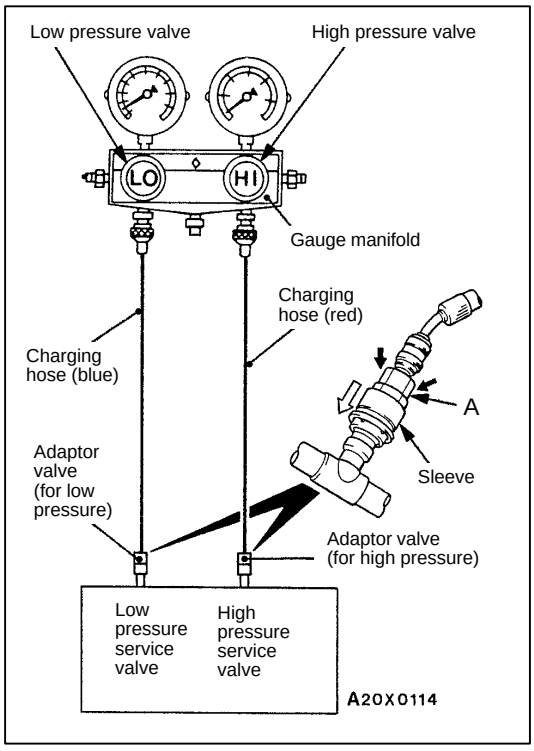
   Caution
   To connect the quick joint, press section "A" firmly against the service valve until a click is heard. When connecting , run your hand along the hose while pressing to ensure that there are no bends in the hose.
6. Place the adaptor valve inside the container and discharge the refrigerant by opening the handle gradually so that the 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 170 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:
Evaporator: 60 ml.
Condenser: 15 ml.
Suction hose: 10 ml.
Receiver: 10 ml.



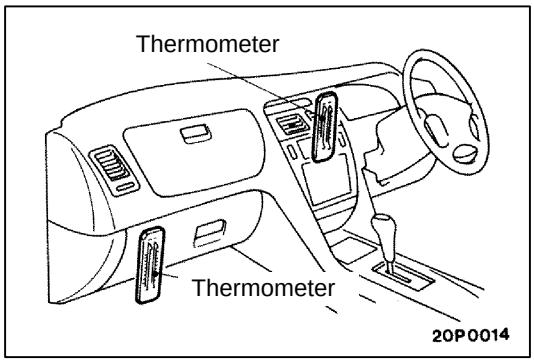
PERFORMANCE TEST

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 high-pressure pipe B, and the low-pressure service valve is on the low-pressure 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 A/C controls 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 1500 rpm with A/C clutch engaged.
9. Engine should be warmed up with doors and windows closed.



10. Insert a thermometer in the left centre 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	21	26.7	32.2	37.8
Discharge air temperature °C	0.0–3.0	0.0–3.0	0.0–4.0	0.0–4.0
Compressor high pressure kPa	650–700	740–790	980–1020	1650–1200
Compressor low pressure kPa	130–140	130–190	130–190	130–190

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REFRIGERANT LEAK REPAIR

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 450 g, 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 absorb water/water vapour water quickly upon exposure to the atmosphere. When installing a drier, have all tools and supplies ready for quick reassembly to avoid keeping the system open any longer than necessary.

7. Evacuate and charge system.

LOW CHARGE

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

COMPRESSOR NOISE CHECK

You must first know the conditions when the noise occurs. These conditions are: weather, vehicle speed, in gear or neutral, engine temperature or any other special conditions.

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

Improper accessory drive belt tension can cause a misleading noise when the compressor is engaged and little or no noise when the compressor is disengaged.

Drive belts are speed-sensitive. That is, at different engine speeds, and depending upon belt tension, belts can develop unusual noises that are often mistaken for mechanical problems within the compressor.

HANDLING TUBING AND FITTINGS

Kinks in the refrigerant tubing or sharp bends in the refrigerant hose lines will greatly reduce the capacity of the entire system. High pressures are produced in the system when it is operating. Extreme care must be exercised to make sure that all connections are pressure tight. Dirt and moisture can enter the system when it is opened for repair or replacement of lines or components. The following precautions must be observed. The system must be completely discharged before opening any fitting 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.

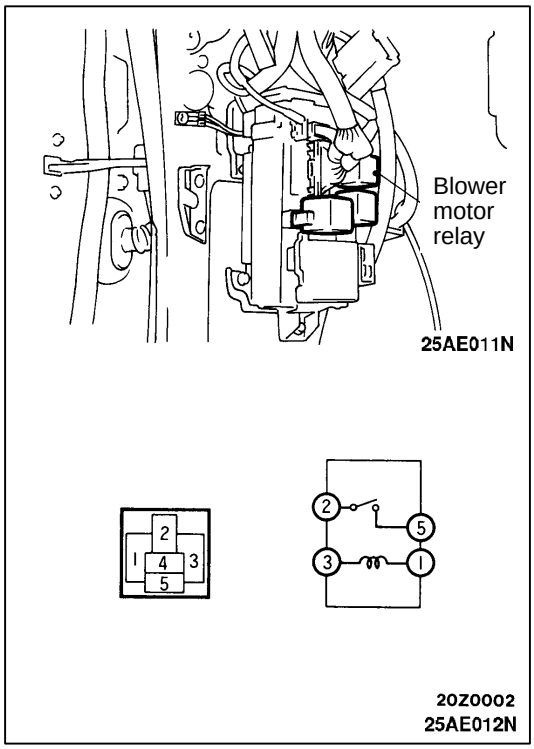
Never attempt to rebend formed lines to fit. Use the correct line for the installation you are servicing. A good rule for the flexible hose lines is keep the radius of all bends at least 10 times the diameter of the hose.

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.

O-rings used on connections are not reusable.

ADJUSTMENT

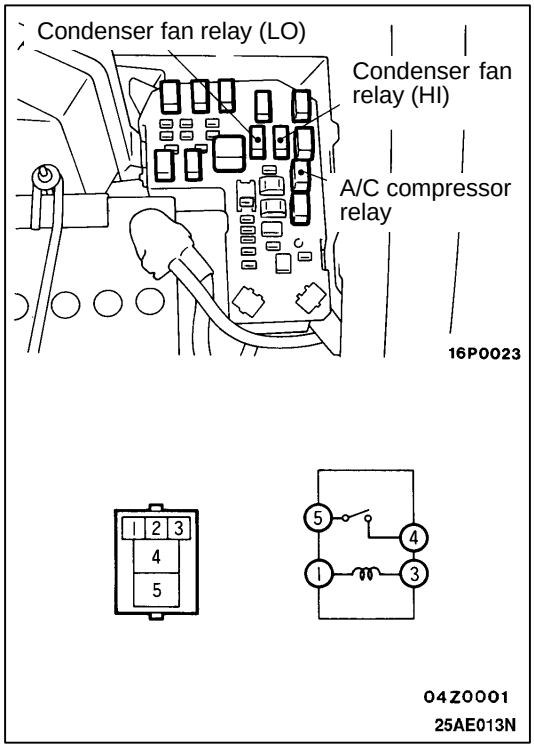
1. Select a quiet area for testing. Duplicate conditions as much as possible. Switch compressor on and off several times to clearly identify compressor noise. To duplicate high ambient conditions (high head pressure), restrict air flow through condenser. Install manifold gauge set to make sure discharge pressure doesn't exceed 2,070 kPa.
2. Tighten all compressor mounting bolts, clutch mounting bolt, and compressor drive belt. Check to assure clutch coil is tight (no rotation or wobble).
3. Check refrigerant hoses for rubbing or interference that can cause unusual noises.
4. Check refrigerant charge.
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 CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	2	3	4
Not supplied	○		○	
Supplied	⊖		⊕	
		○		○



A/C COMPRESSOR CLUTCH RELAY, CONDENSER FAN RELAY (LO) AND (HI) CONTINUITY CHECK

Battery voltage	Terminal No.			
	1	3	4	5
Not supplied	○	○		
Supplied	⊕	⊖	○	○

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IDLE-UP OPERATION CHECK

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: N or P
   - Steering wheel: Straightahead
2. Check whether or not the idling speed is the standard value.

   Standard value: 700 ± 50 rpm
3. When the A/C is running after turning the A/C switch to ON, and the blower switch to the MED or HI position, check to be sure that the idle speed is at the standard value.

   Standard value: 900 ± 50 rpm

   NOTE
   Idle speed is controlled by the ISC system and is not adjustable. If, idle speed is not within specifications, check the ISC system.

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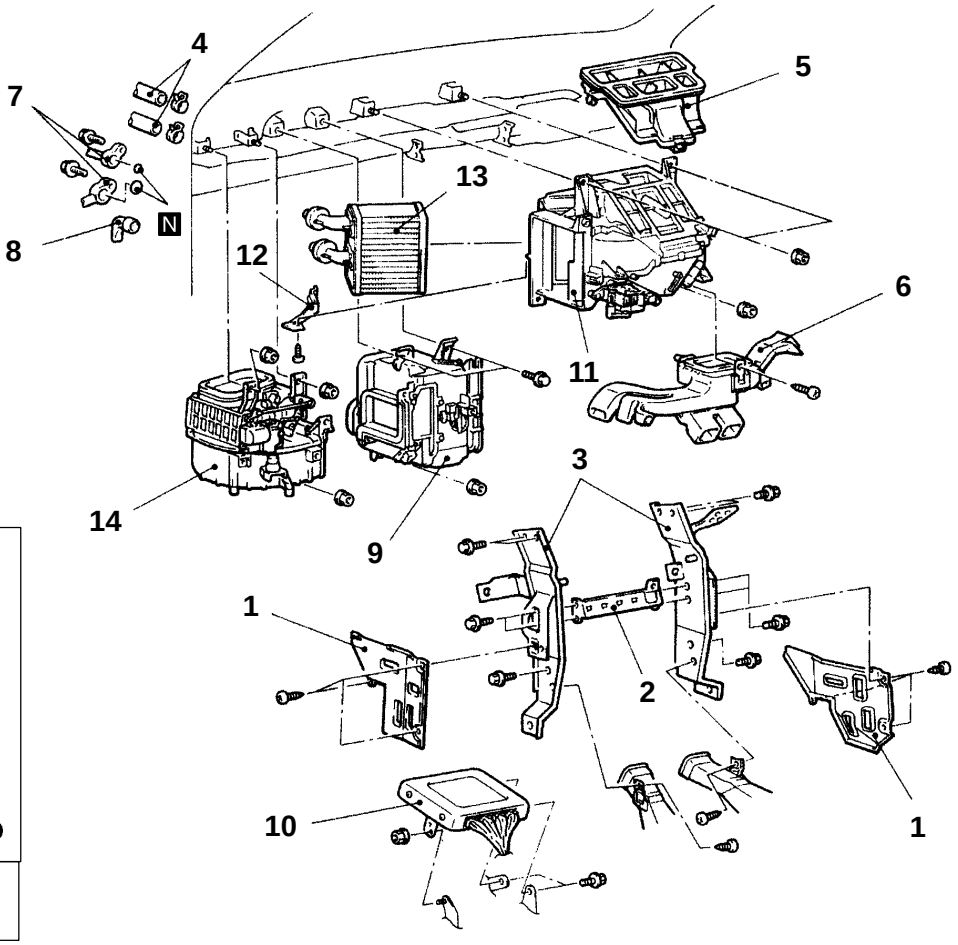
MANUAL AIR CONDITIONING, HEATER UNIT, HEATER CORE, BLOWER ASSEMBLY AND COOLING UNIT

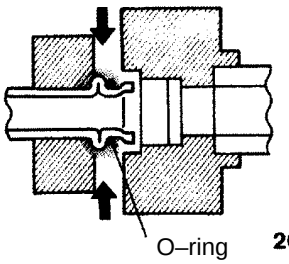
REMOVAL AND INSTALLATION

Pre-removal and Post-installation procedures
- Remove or install instrument panel and floor console box, Refer Group 52A.
- Evacuate or recharge the refrigerant system (only when removing the cooling unit).
- Remove or install the air cleaner cover and hose, refer Group 15.
- Drain or add coolant (only when removing the heater unit) refer Group 14.

CAUTION: SRS
(1) Before removing the passenger seat airbag module, ensure that you refer to Group 52B–Servicing Cautions and the section on the Airbag Module.
(2) When removing or installing the instrument panel or engine control module, do not apply bump to the SRS-ECU.



Piping joints



A/C compressor oil: SUN PAG 56

Heater Unit removal steps
1. Floor carpet front reinforcement
2. ECU bracket
3. Centre stay assembly
4. Heater hose connection
5. Centre duct assembly
6. Foot distribution duct
◀A▶ 7. Suction pipe, liquid pipe B and cooling unit connection
8. Drain hose
9. Cooling unit
10. Engine and A/T ECU
11. Heater unit
12. Heater core support
13. Heater core

Blower assembly removal steps
◀A▶ 7. Suction pipe, liquid pipe B and cooling unit connection
8. Drain hose
9. Cooling unit
14. Blower assembly

Cooling unit removal steps
1. Suction pipe, liquid pipe B and cooling unit connection
3. Centre stay assembly
◀A▶ 7. Suction pipe, liquid pipe B and cooling unit connection
8. Drain hose
9. Cooling unit

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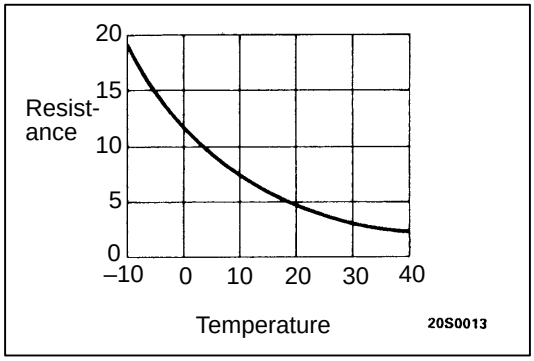
REMOVAL SERVICE POINTS

◀A▶ DISCONNECTING THE SUCTION PIPE, LIQUID PIPE B AND THE COOLING UNIT

1. To prevent the entry of dust and other contaminants, insert plugs in the disconnected pips and the cooling unit nipples.

   Caution
   Because the compressor oil and receiver are strongly hygroscopic, use plugs that do not allow air to pass.



INSPECTION

AIR THERMO SENSOR (IN EVAPORATOR)

- When the resistance between the terminals is measured under two or more sets of temperature conditions, the resistance values should approximately satisfy the illustrated values.

  NOTE
  The temperature conditions when carrying out the check should not exceed the range in the characteristic diagram.

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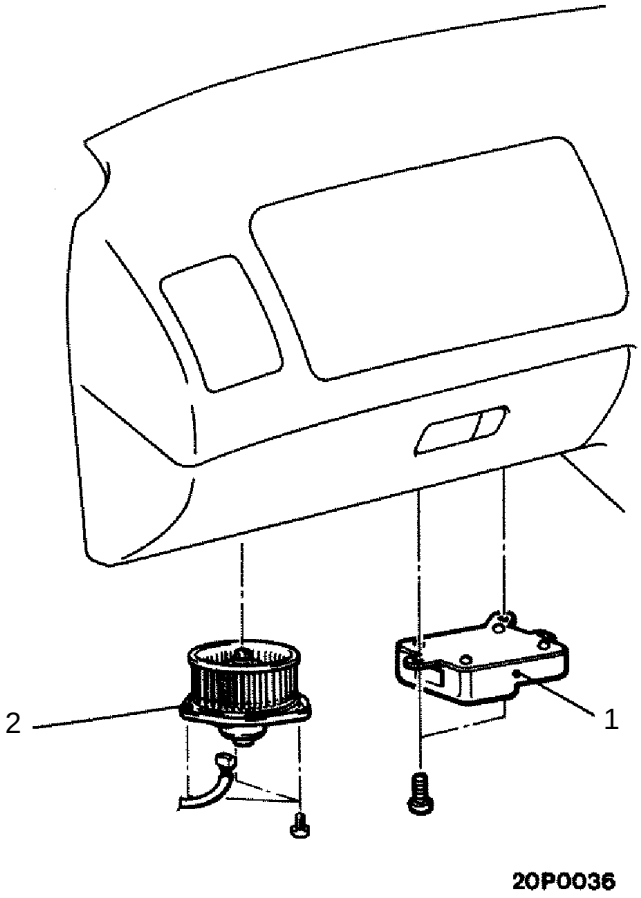
BLOWER MOTOR ASSEMBLY

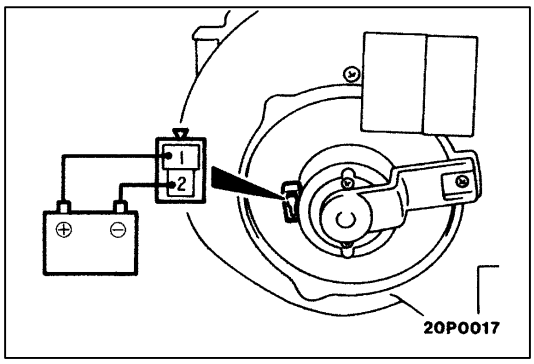
REMOVAL AND INSTALLATION

Pre-removal and Post-installation procedures
- Remove or install the undercover assembly, glove box assembly and glove box outer case, Refer group 52A.



Blower removal steps

1. A/C belt lock controller (Magna only)
2. Blower motor assembly



INSPECTION

BLOWER MOTOR

- Confirm that the motor rotates when the battery voltage is applied to the terminals and that no abnormal noises are emitted from the motor.

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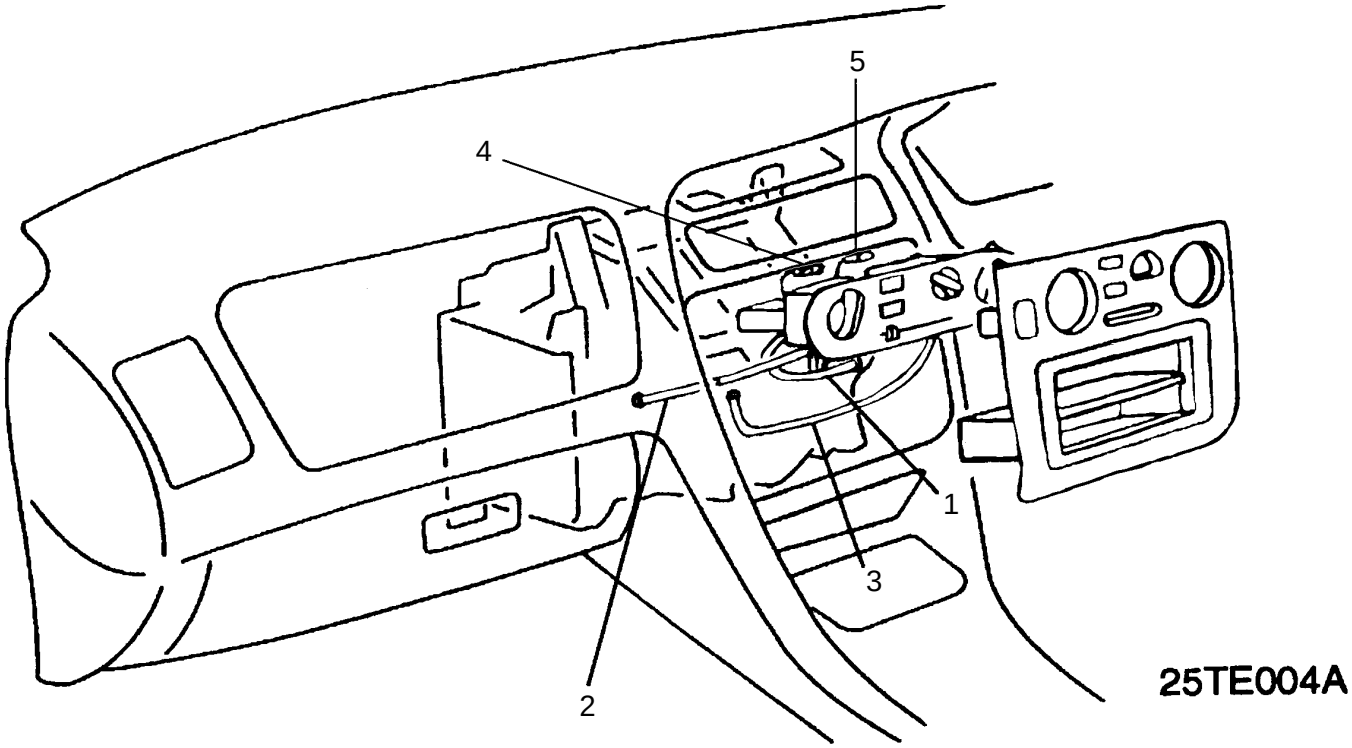
AIR CONDITIONING CONTROLS

REMOVAL AND INSTALLATION

Pre-removal and Post-installation procedures
- Remove or install the floor console panel (refer Group 52A.)
- Remove or install the centre air outlet assembly and ashtray, (refer Group 52A.)



Air conditioning controls removal steps

1. Mode selection switch
2. Air selection control wire
3. Temperature control wire
4. Fan speed switch wiring
5. Wiring from A/C switch

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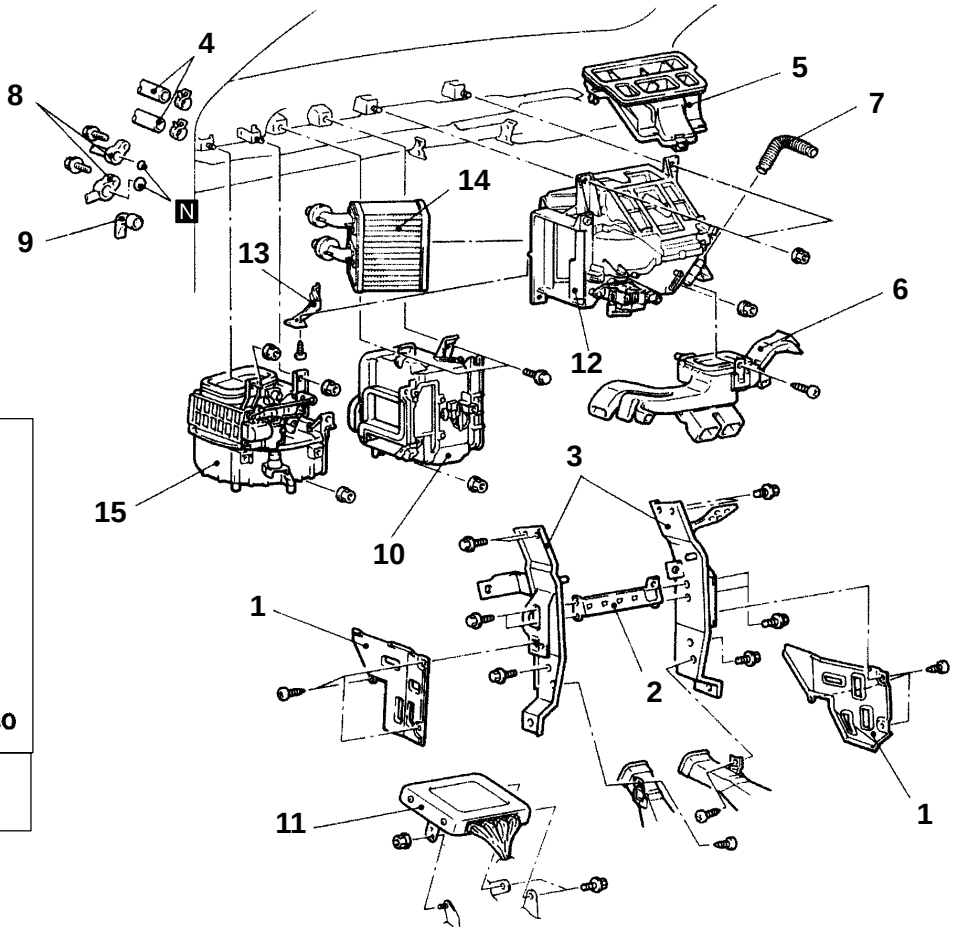
AUTOMATIC AIR CONDITIONING, HEATER UNIT, HEATER CORE, BLOWER ASSEMBLY AND COOLING UNIT

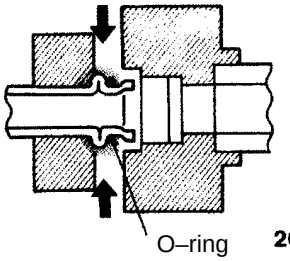
REMOVAL AND INSTALLATION

Pre-removal and Post-installation procedures
- Remove or install instrument panel and floor console box, refer Group 52A.
- Evacuate or recharge the refrigerant system (only when removing the cooling unit).
- Remove or install the air cleaner cover and hose.
- Drain or add coolant (only when removing the heater unit) refer group 14.

CAUTION: SRS
(1) Before removing the passenger seat airbag module, ensure that you refer to Group 52BGroup 52B–Servicing Cautions and the section on the Airbag Module.
(2) When removing or installing the instrument panel or engine control module, do not apply bump to the SRS-ECU.



Piping joints



A/C compressor oil: SUN PAG 56

Heater Unit removal steps
1. Floor carpet front reinforcement
2. ECU bracket
3. Centre stay assembly
4. Heater hose connection
5. Centre duct assembly
6. Foot distribution duct
7. Aspirator hose

◀A▶ 8. Suction pipe, liquid pipe B and cooling unit connection

9. Drain hose
10. Cooling unit
11. Engine and A/T ECU
12. Heater unit
13. Heater core support
14. Heater core

Blower assembly removal steps

◀A▶ 8. Suction pipe, liquid pipe B and cooling unit connection

9. Drain hose
10. Cooling unit
15. Blower assembly

Cooling unit removal steps
1. Floor carpet front reinforcement
2. ECU bracket
3. Centre stay assembly

◀A▶ 8. Suction pipe, liquid pipe B and cooling unit connection

9. Drain hose
10. Cooling unit

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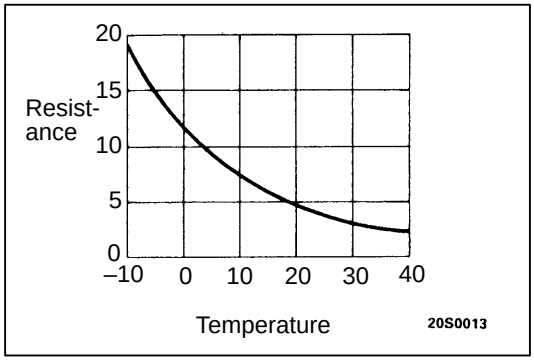
REMOVAL SERVICE POINTS

◀A▶ DISCONNECTING THE SUCTION PIPE, LIQUID PIPE B AND THE COOLING UNIT

1. To prevent the entry of dust and other contaminants, insert plugs in the disconnected pips and the cooling unit nipples.

   Caution
   Because the compressor oil and receiver are strongly hygroscopic, use plugs that do not allow air to pass.



INSPECTION

AIR THERMO SENSOR (IN EVAPORATOR)

- When the resistance between the terminals is measured under two or more sets of temperature conditions, the resistance values should approximately satisfy the illustrated values.

  NOTE
  The temperature conditions when carrying out the check should not exceed the range in the characteristic diagram.

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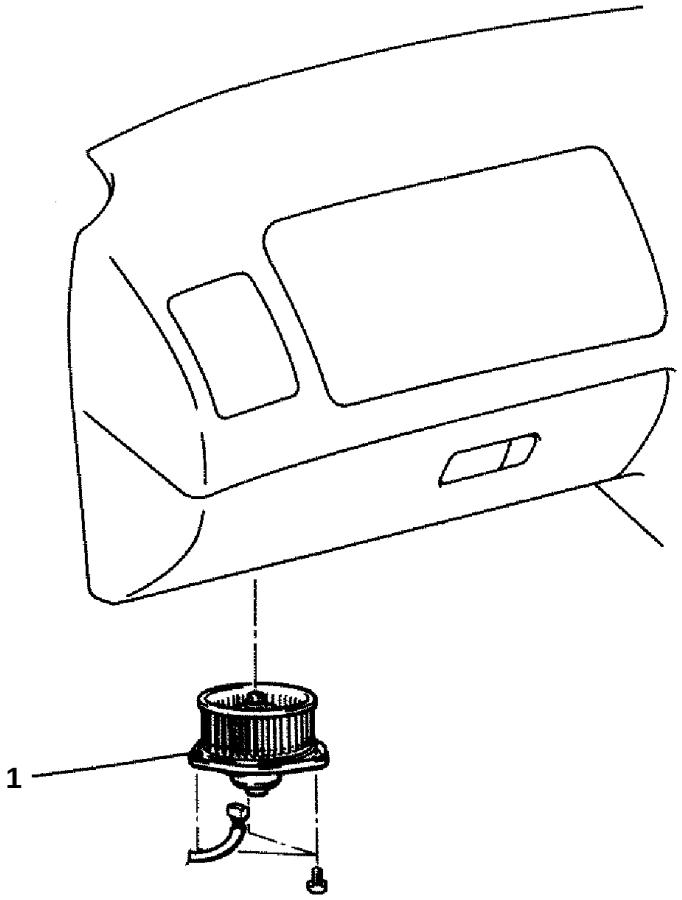
BLOWER MOTOR ASSEMBLY

REMOVAL AND INSTALLATION

Pre-removal and Post-installation procedures
- Undercover Assembly, Glove Box Assembly, Glove Box Assembly, Glove Box Outer Case Removal and Installation (Refer to group 52A.)



25TH037A

Removal steps
1. Blower motor assembly

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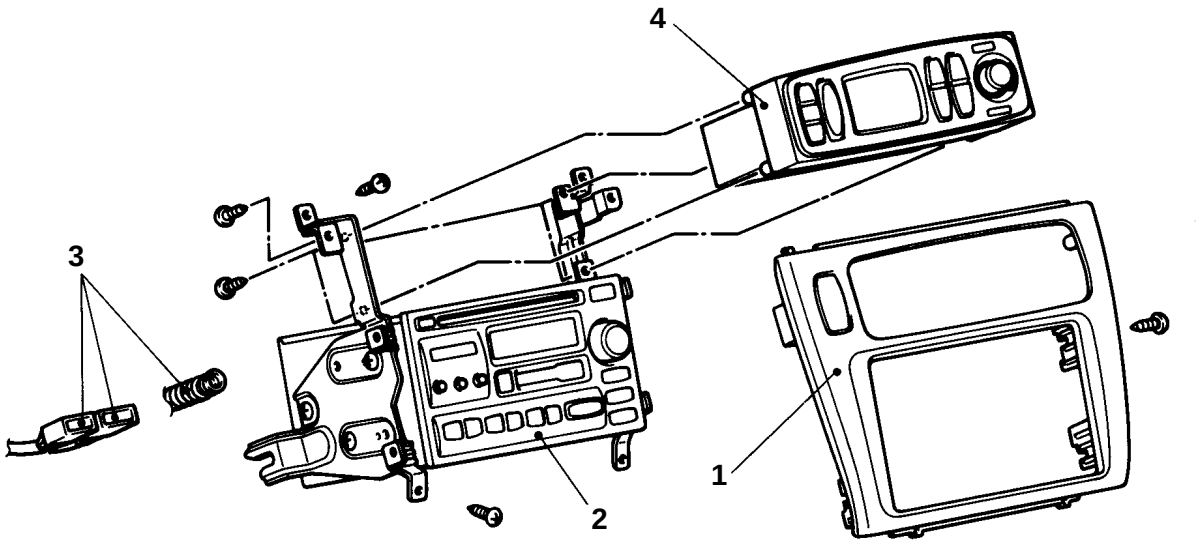
AIR CONDITIONING CONTROL UNIT ASSEMBLY

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operations
- Floor Console Panel Removal and Installation (Refer Group 52A.)
- Centre Air Outlet and Ashtray Removal and Installation (Refer Group 52A)



20P0038

Removal steps
1. Audio panel
2. Air control panel assembly and radio/tape player
3. Harness connector and breather hose
4. A/C control assembly

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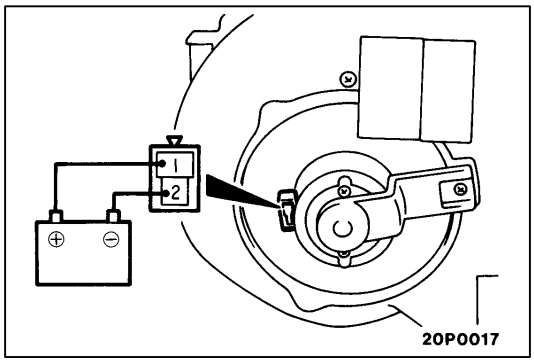

INSPECTION

BLOWER FAN AND MOTOR

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

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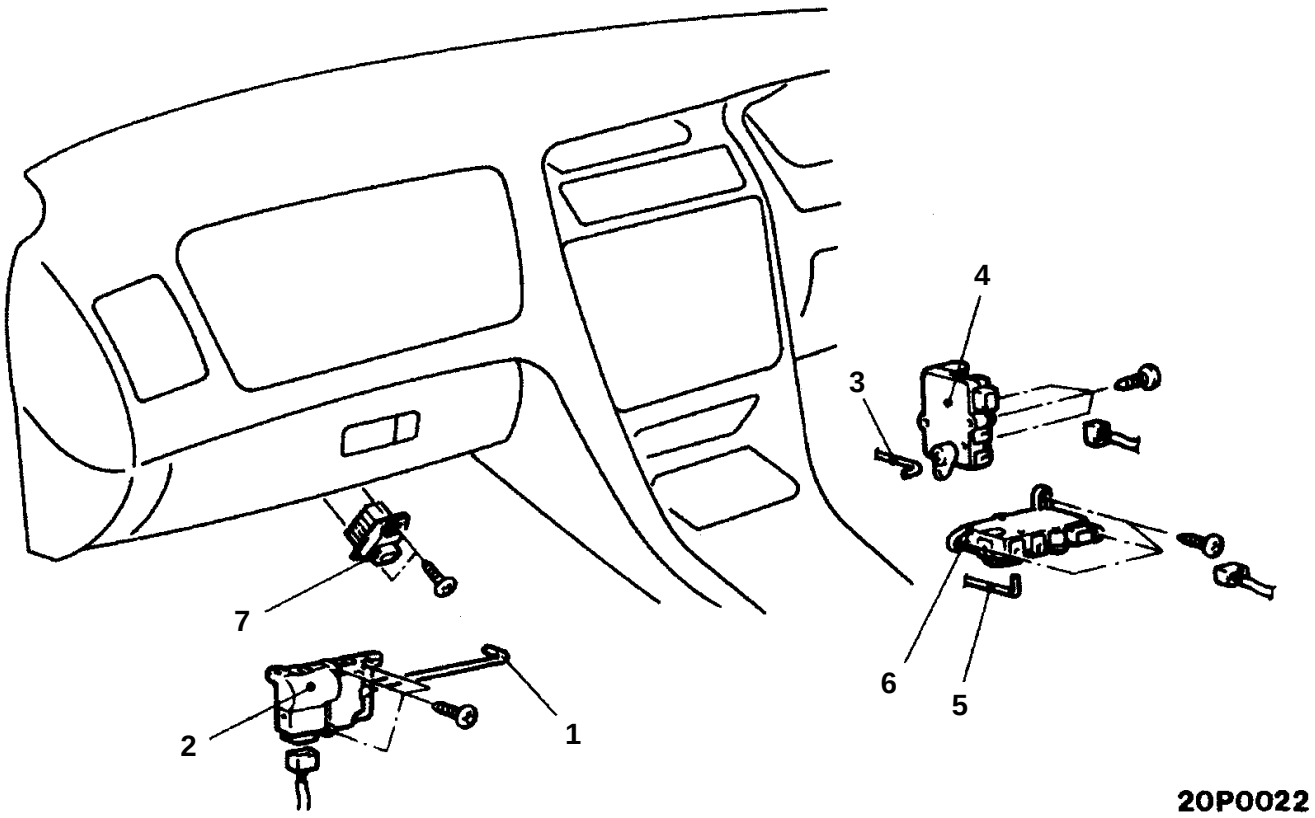
DAMPER CONTROL MOTOR ASSEMBLY AND POWER TRANSISTOR

REMOVAL AND INSTALLATION



Air inlet mode selector damper motor removal steps

- Undercover assembly, glove box assembly, glove box frame (Refer group 52A.)

1. Linkage connection
2. Air inlet mode selector damper motor

Air outlet mode selector damper motor removal steps

- Instrument panel lower cover assembly (Refer group 52A.)

3. Linkage connection
4. Air outlet mode selector damper motor

Air mix damper motor removal steps

- Undercover assembly, glove box assembly, glove box outer case, console side cover assembly (Refer group 52A.)

5. Linkage connection
6. Air mix damper motor

Power transistor removal steps

- Undercover assembly, glove box assembly, glove box frame (Refer Group 52A.)

7. Power transistor

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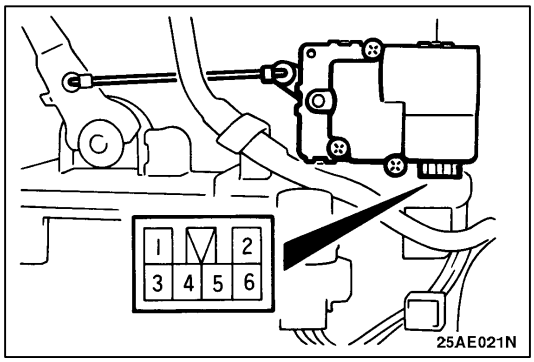


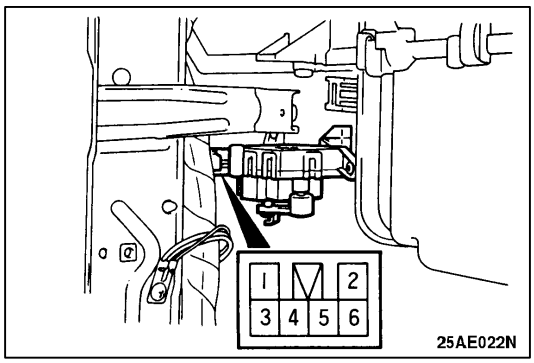
INSPECTION

AIR INLET MODE SELECTOR DAMPER MOTOR OPERATION 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 opposite direction when polarity is reversed.

Caution

1. **Remove the voltage when the damper is at the inside air position or outside air position.**
2. **Remove the voltage if the motor does not turn when battery voltage is applied.**



AIR MIX DAMPER MOTOR OPERATION 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 opposite direction when polarity is reversed.

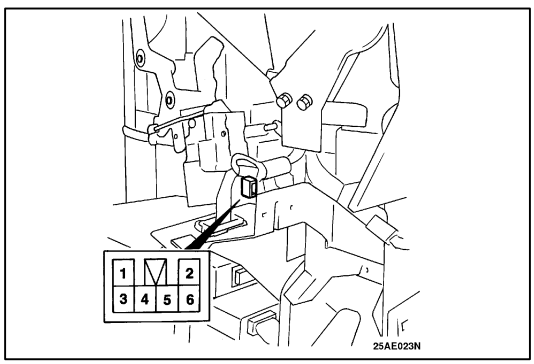
Caution

1. **Remove the voltage when the damper is at the inside air position or outside air position.**
2. **Remove the voltage if the motor does not turn when battery voltage is applied.**

AIR MIX DAMPER MOTOR POTENTIOMETER CHECK

During motor operation check, confirm that the resistance value between motor connector terminals 2 and 5 and 5 and 6 changes gradually in the range of the standard value.

Standard value: 0.18–4.82 kΩ



AIR OUTLET MODE SELECTOR DAMPER MOTOR OPERATION 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 opposite direction when polarity is reversed.

Caution

1. **Remove the voltage when the damper is at the inside air position or outside air position.**
2. **Remove the voltage if the motor does not turn when battery voltage is applied.**

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AIR OUTLET MODE SELECTOR DAMPER MOTOR POTENTIOMETER CHECK

During motor operation check, confirm that the resistance value between motor connector terminals 2 and 5 and 5 and 6 changes gradually in the range of the standard value.

Standard value: 0.18–4.82 kΩ

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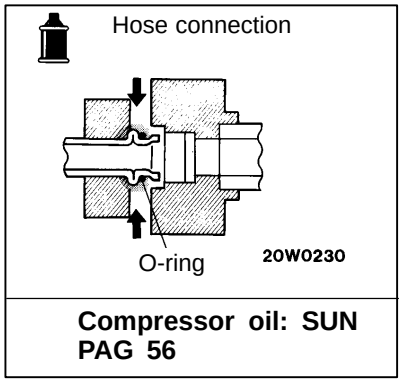
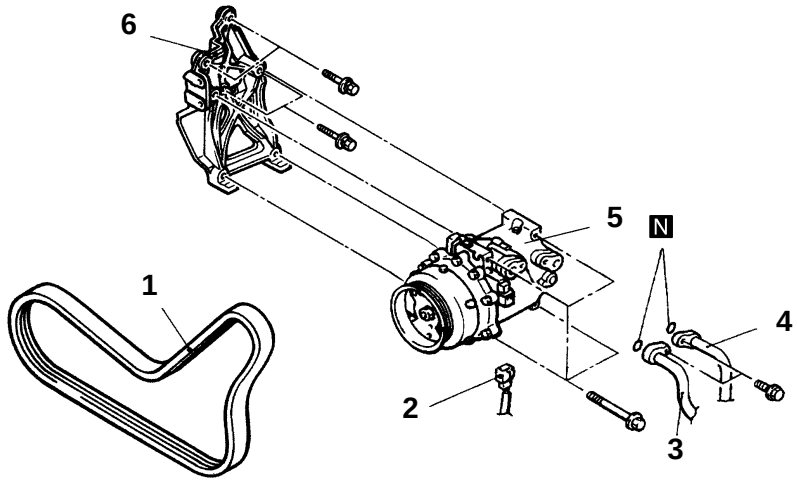
COMPRESSOR AND TENSION PULLEY

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Refrigerant Discharging and Charging.
- Compressor Drive Belt Adjustment



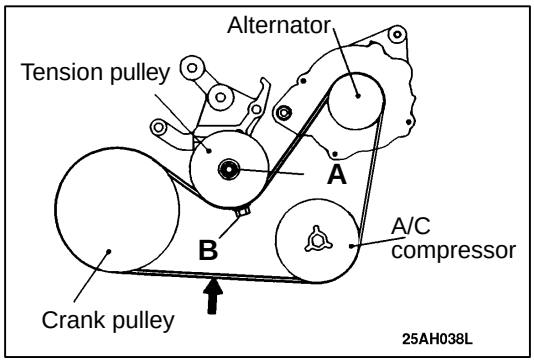
Compressor oil: SUN PAG 56



25TJ043A

Removal steps

◀A▶ 1. Alternator and A/C compressor drive belt
2. Harness connector
◀B▶ ▶A◀ 3. Suction hose connection
4. Discharge hose connection
5. Compressor
6. Compressor bracket



REMOVAL SERVICE POINTS

◀A▶ COMPRESSOR DRIVE BELT REMOVAL

1. Loosen nut “A” for holding the tension pulley.
2. Loosen bolt “B” for adjustment.
3. Remove the alternator and compressor drive belt.

◀B▶ 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 then new compressor.
   New compressor oil amount
   170–190 ml. – X ml. = Y ml.
   NOTE
   (1) Y ml. indicates the amount of oil in the refrigerant line, the condenser, the evaporator etc.
   (2) When replacing A/C system parts with new ones, recharge the compressor oil the equivalent amount that was in the component.

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

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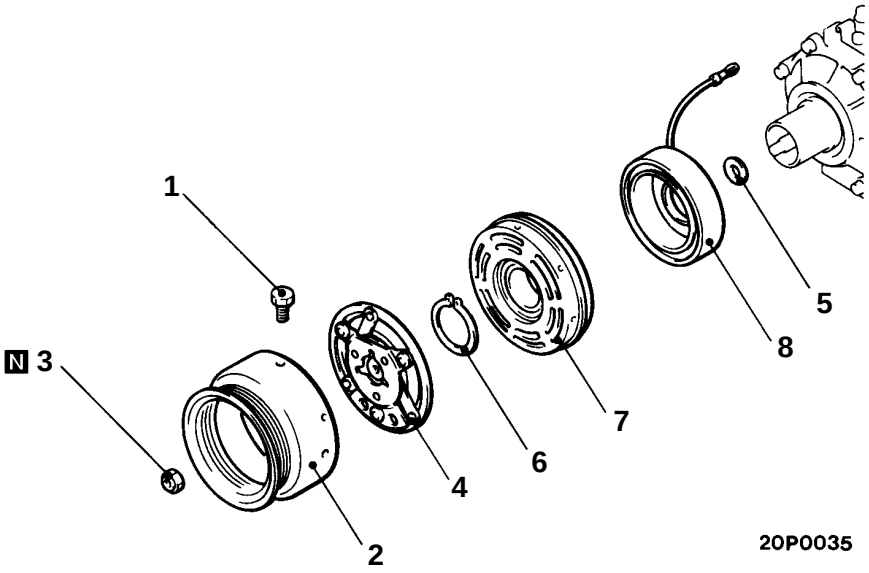
INSPECTION

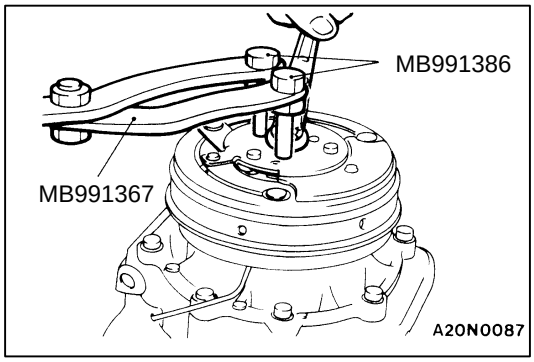
- Checking for heat damage of the tension pulley.
- Check for excessive play or deflection of the tension pulley.
- Check for unusual wear of the tension pulley.
- Check for hardening of the compressor drive belt.
- Check for unusual wear or abrasion of the compressor drive belt.

DISASSEMBLY AND REASSEMBLY



Disassembly steps

1. Bolt
2. Pulley
◀A▶ ▶D◀ ▶C◀ 3. Self-locking nut
4. Armature
5. Shim
▶B◀ 6. Snap ring
7. Rotor
▶A◀ 8. Field core



DISASSEMBLY SERVICE POINTS

◀A▶ NUT REMOVAL

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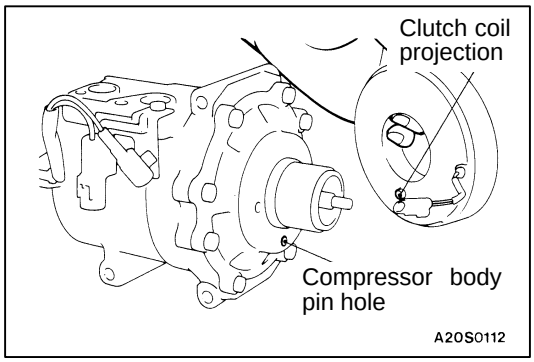
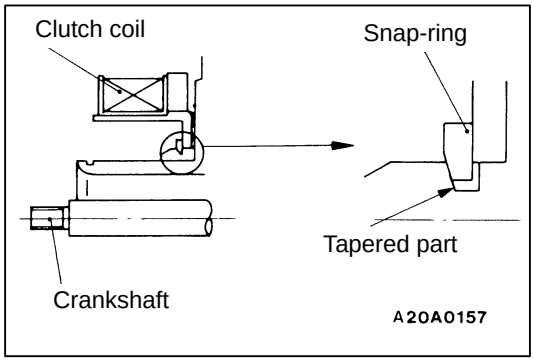


REASSEMBLY SERVICE POINTS

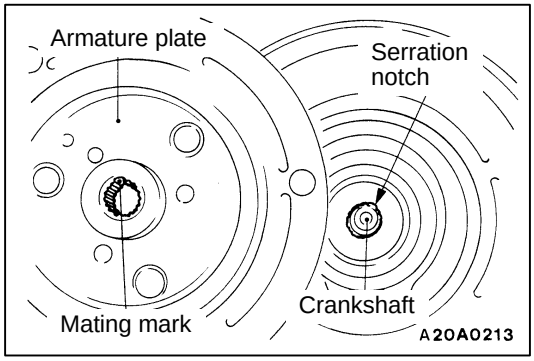
▶A◀ CLUTCH COIL INSTALLATION

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



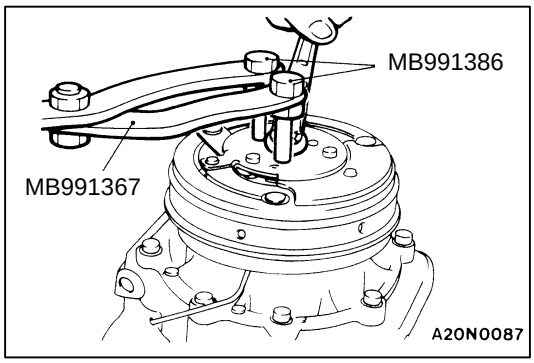
▶B◀ SNAP RING INSTALLATION

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



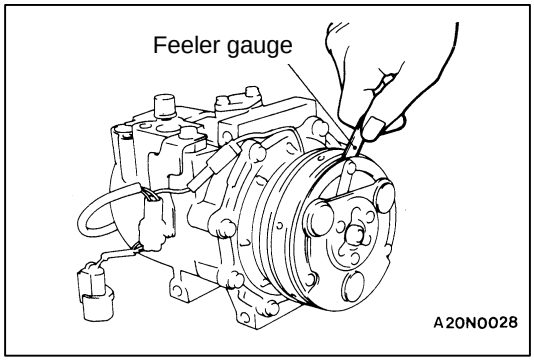
▶C◀ ARMATURE PLATE INSTALLATION

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



▶D◀ NUT INSTALLATION

1. Install the nut.



2. 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.

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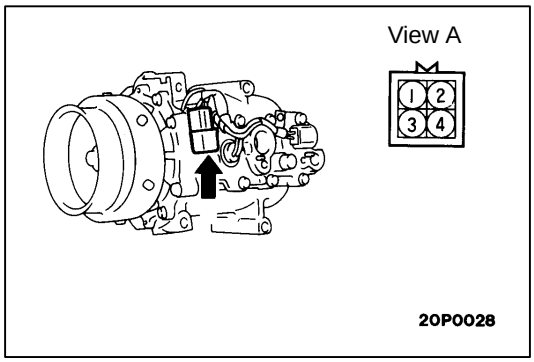

INSPECTION

- Check the surface of the armature for scoring or bluing.
- Check the surface of the rotor for scoring or bluing.
- Check the sealing surfaces for cracks, scratches and deformation.
- Check the front housing for cracks or scoring on the sealing surfaces.
- Check the compressor shaft for scoring.

REFRIGERANT-TEMPERATURE SWITCH

Check that there is continuity between connector terminals 1 and 2.

REVOLUTION PICK UP SENSOR CHECK

Check that the resistance between connector terminals 3 and 4 is in the standard value range.

Standard value: 405±35Ω (at 20°C)

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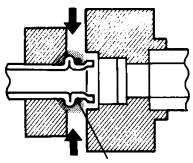
REFRIGERANT LINE

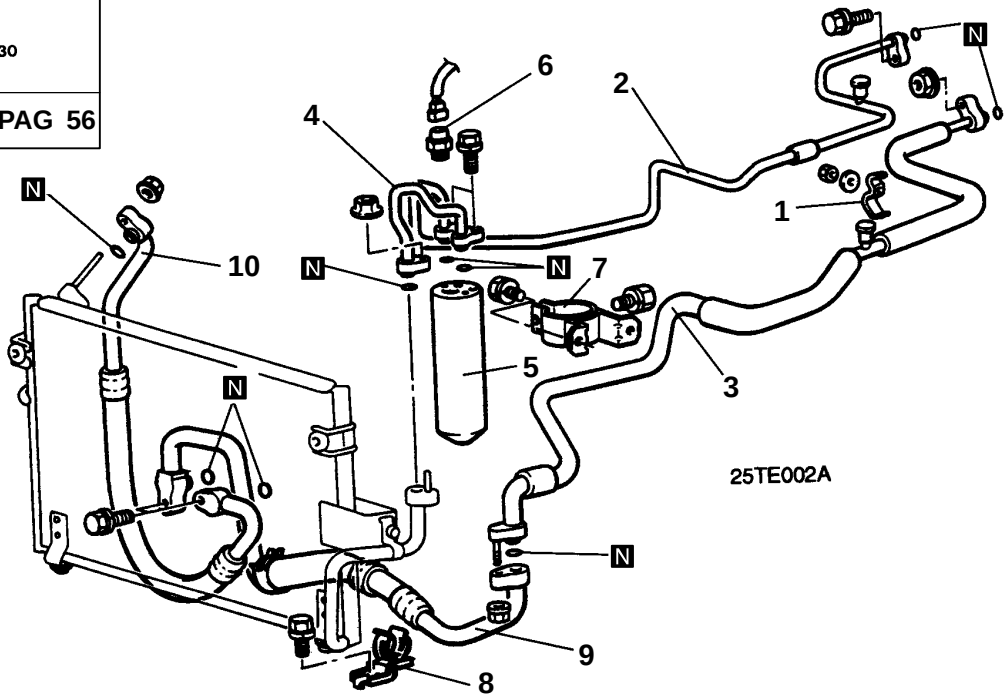
REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Discharge and Charging of Refrigerant
- Battery and Battery Tray Removal and Installation
- Air Cleaner Removal and Installation

Piping or hose connection



Compressor oil: SUN PAG 56



Removal steps
1. Clamp
2. Liquid pipe B
3. Suction pipe
4. Liquid pipe A
▶A◀ 5. Receiver
6. Dual pressure switch
7. Receiver bracket
8. Clamp
▶A◀ 9. Suction hose
10. Discharge hose

INSTALLATION SERVICE POINT

▶A◀ SUCTION HOSE, RECEIVER ASSEMBLY INSTALLATION

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

Compressor oil: SUN PAG 56
Quantity:
Suction hose: 10 ml.
Receiver: 10 ml.

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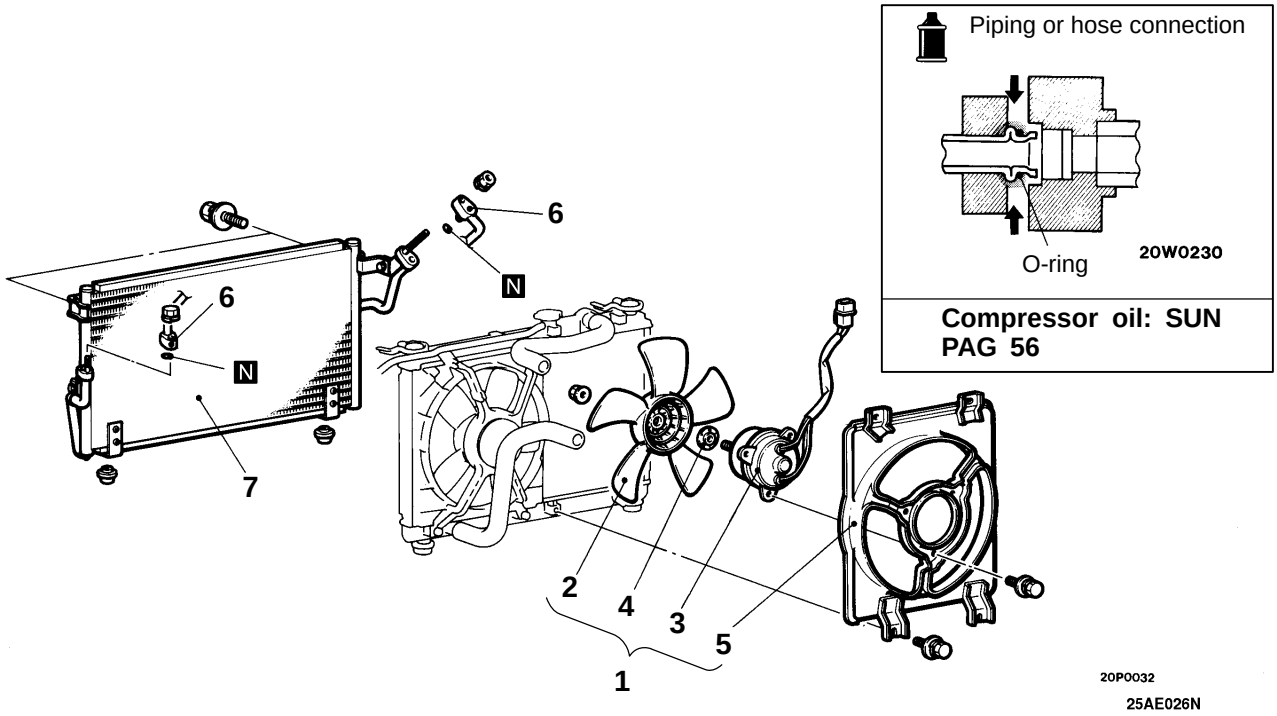
CONDENSER AND CONDENSER FAN MOTOR

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Discharge and Charging of Refrigerant



Condenser fan motor removal steps
1. Condenser fan motor and shroud assembly
2. Condenser fan
3. Condenser fan motor
4. Spacer
5. Shroud

Condenser removal steps

▶A◀ 6. Discharge pipe
▶A◀ 7. Condenser

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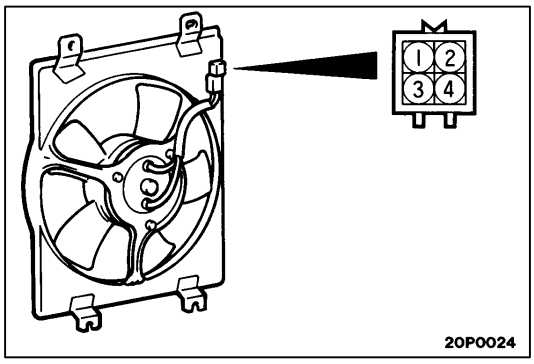
INSTALLATION SERVICE POINT

▶A◀ CONDENSER INSTALLATION

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

Compressor oil: SUN PAG 56
Quantity: 15 ml.



INSPECTION

CONDENSER FAN MOTOR

1. Check to be sure that the condenser fan motor operates when battery voltage (+) is applied to terminal 1 and terminal 2 is grounded (–).
2. In this same condition, apply battery (+) voltage to terminal 3 and ground terminal 4. Check to be sure that the condenser fan motor operates faster at this time.

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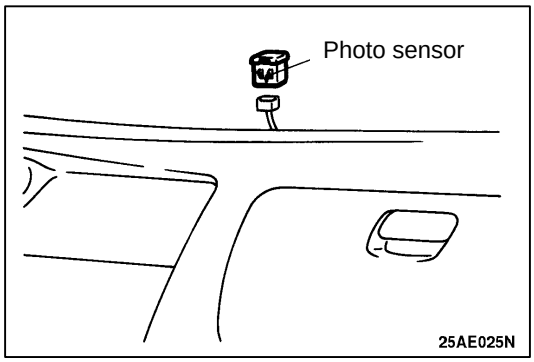

SENSORS

PHOTO SENSORS

REMOVAL AND INSTALLATION

1. Remove the centre air outlet assembly.
2. Remove the centre message display
3. Remove the photo sensor.

INSPECTION

With the fully automatic air conditioning operating (during summer in daylight), cover the light-sensitive part of the photo sensor with the hand – if the blower speed drops, it is normal. If it does not drop, replace the photo sensor.

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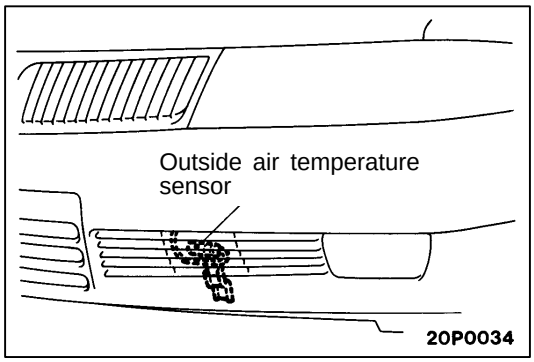
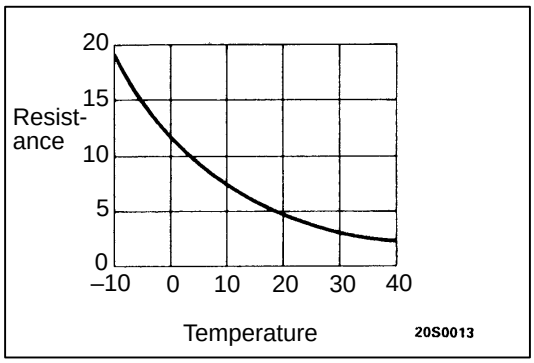


OUTSIDE AIR TEMPERATURE SENSOR

REMOVAL AND INSTALLATION

1. Remove the radiator grille. (Refer Group 51.)
2. Remove the outside air temperature sensor.



INSPECTION

When the resistance between the sensor terminals is measured under two or more temperature conditions, the resistance should approximately satisfy the illustrated values.

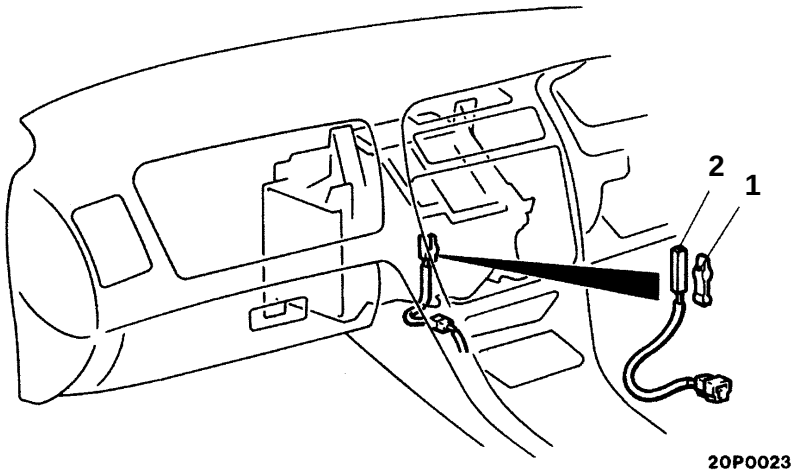
NOTE
The temperature conditions when checking should not exceed the range shown in the diagram.

HEATER WATER TEMPERATURE SENSOR

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Instrument Panel Lower Cover Assembly, Under-cover Assembly, Console Side Cover Assembly, and Floor Carpet Front Reinforcement, Removal and Installation.
- Engine-ECU, Transmission ECU and A/T Control Relay Removal and Installation

Caution: SRS
(1) Before removing the passenger seat airbag module, ensure that you refer to Group 52B –Servicing Cautions and the section on the Airbag Module.
(2) When removing or fitting the engine control module, do not let it knock against the SRS-ECU.



Removal steps

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

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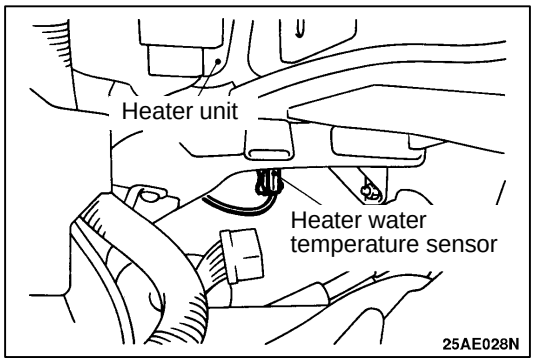

REMOVAL SERVICE POINTS

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

Pull out the heater water temperature sensor clip from the base of the heater unit, and remove the heater water temperature sensor from the heater unit.

INSTALLATION SERVICE POINT

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

Insert the heater water temperature sensor into the mounting hole at the base of the heater unit, and secure by plugging in the heater water temperature sensor clip.

INSPECTION

Check using the same procedure as in checking the outside air temperature sensor.

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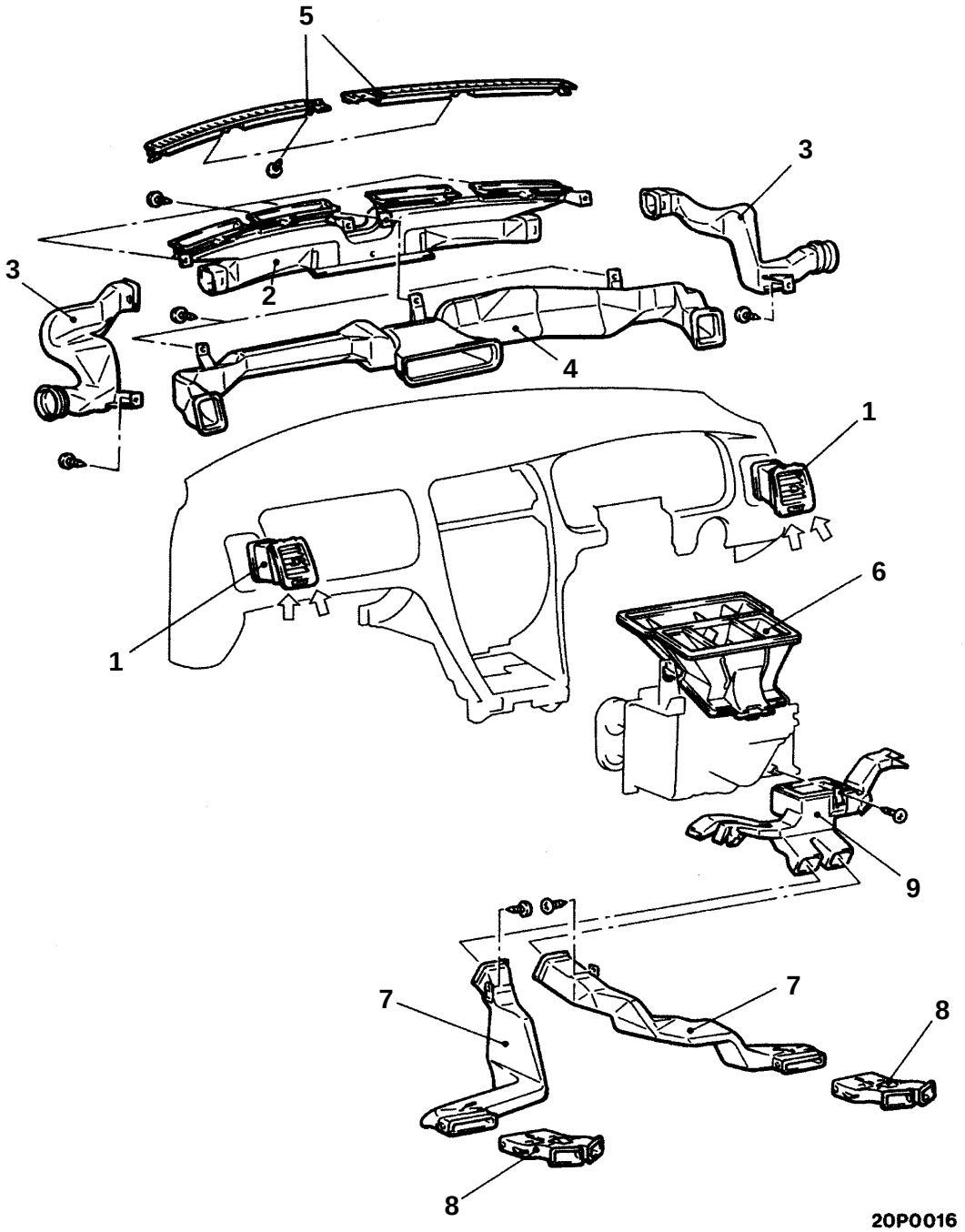
VENTILATORS

REMOVAL AND INSTALLATION



Defroster nozzle and distribution duct removal steps

1. Side air outlet assembly
   - Instrument panel (Refer Group 52A.)
2. Defroster nozzle
3. Side defroster hose
4. Distribution duct
5. Defroster garnish
6. Centre duct

Rear heater duct removal steps

- Front seat (Refer Group 52A.)
- Instrument Panel, centre stay assembly (Refer Group 52A.)

7. Rear heater duct
8. Rear heater nozzle
9. Distribution duct

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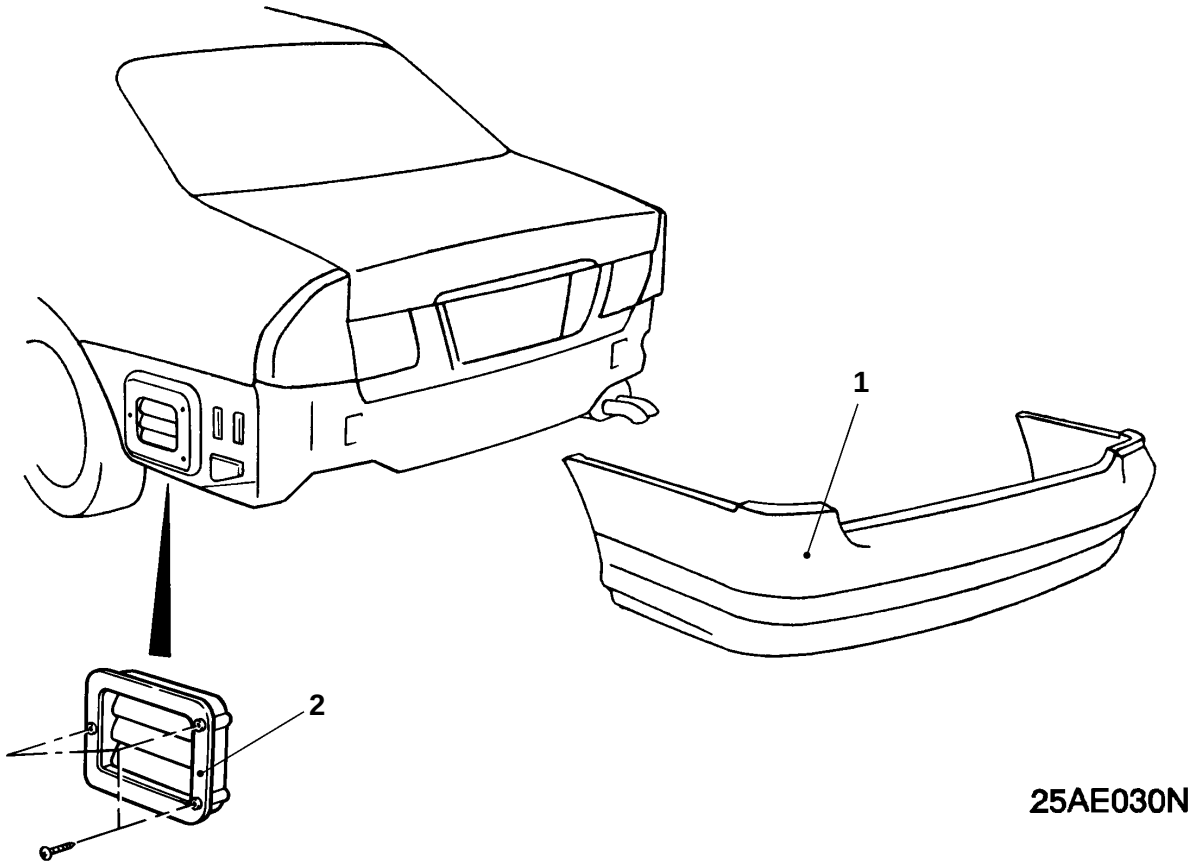
VENTILATORS (AIR OUTLET)

REMOVAL AND INSTALLATION



Removal steps

1. Rear bumper (Refer Group 51)
2. Rear ventilation duct