

---

# **HEATER, AIR CONDITIONER AND VENTILATION <MANUAL A/C>**

Click on the applicable bookmark to selected the required model year.

---

# HEATER, AIR CONDITIONER AND VENTILATION <MANUAL A/C>

## CONTENTS

<b>SERVICE SPECIFICATIONS</b> .....	<b>3</b>	Air Conditioner Control Panel Assembly and A/C Switch .....	<b>23</b>
<b>LUBRICANTS</b> .....	<b>3</b>	Heater Unit and Blower Assembly .....	<b>26</b>
<b>TROUBLESHOOTING &lt;FRONT HEATER, FRONT A/C&gt;</b> .....	<b>4</b>	Blower Motor and Resistor .....	<b>29</b>
<b>TROUBLESHOOTING &lt;REAR HEATER, REAR COOLER&gt;</b> .....	<b>7</b>	Inside/Outside Air Changeover Damper Motor ...	<b>30</b>
<b>ON-VEHICLE SERVICE</b> .....	<b>9</b>	Automatic Compressor-ECU and Air Thermo Sensor Assembly .....	<b>31</b>
Refrigerant Level Test through Performance Test .	9	<b>REAR HEATER AND REAR COOLER</b> .....	<b>32</b>
Magnetic Clutch Test .....	10	Rear A/C Switch, Front Rear Fan Switch .....	32
Receiver Drier Test .....	10	Rear A/C Control Unit .....	34
Compressor Drive Belt Adjustment .....	10	Rear Heater Unit .....	34
Dual Pressure Switch Check .....	10	Rear Heater Unit and Rear Blower Assembly ...	37
Charging .....	11	<b>HEAT SWITCH</b> .....	<b>40</b>
Performance Test .....	15	<b>COMPRESSOR</b> .....	<b>41</b>
Front Blower Relay and Rear Blower Relay Continuity Check .....	18	<b>CONDENSER ASSEMBLY AND CONDENSER FAN</b> .....	<b>45</b>
Continuity Check of A/C Compressor Relay and Condenser Fan Relay .....	18	<b>REFRIGERANT LINE</b> .....	<b>47</b>
PTC Heater Relay Continuity Check .....	19	<b>ENGINE COOLANT TEMPERATURE SWITCH</b> .....	<b>51</b>
Idle-up Operation Check <Diesel> .....	19	<b>IDLE-UP SYSTEM</b> .....	<b>53</b>
Vacuum Actuator Check <Diesel-powered vehicles> .....	20	<b>DUCTS</b> .....	<b>54</b>
Idle-up Solenoid Valve Check .....	21	<b>VENTILATION</b> .....	<b>56</b>
Clean Air Filter Replacement Procedure .....	22		
<b>FRONT A/C</b> .....	<b>23</b>		

## SERVICE SPECIFICATIONS

Item				Standard value
Idle speed r/min (N or P range)	Diesel	4D56		750 ± 100
		4M41		750 ± 50
Idle-up speed r/min (N or P range)	4D56			925 ± 25
	4M41	A/C	When the A/C is under low or medium load	800 ± 50
			When the A/C is under high load	1,000 ± 50
Water temperature switch °C	A/C cut-off		ON	108
			OFF	115
	Condenser fan		OFF	97
			ON	102
Resistor resistance (Front A/C) Ω	Between terminals 2 and 4			0.39 ± 7 %
	Between terminals 1 and 2			1.49 ± 7 %
	Between terminals 2 and 3			2.79 ± 7 %
Resistance of the rear air conditioner switch (temperature control switch) kΩ <except rear heater (floor console)>				0 - 3
Potentiometer for air mix damper kΩ <Rear heater>				1.2 - 4.8
Resistor resistance [Rear heater (front console)] Ω	Between terminals 1 and 6			4.9 ± 7 %
	Between terminals 1 and 3			1.25 ± 7 %
Resistor resistance [Rear heater (quarter trim), rear heater] Ω	Between terminals 1 and 6			4.9 ± 7 %
	Between terminals 1 and 3			1.25 ± 7 %
Idle-up solenoid valve resistance Ω				40
Air compressor air gap mm				0.35-0.65

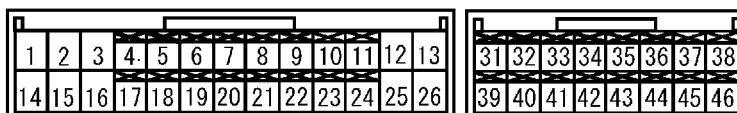
## LUBRICANTS

Item		Specified lubricants	Quantity
Compressor oil mL	Except for vehicles with rear cooler	DENSO OIL 8	120 ± 20
	Vehicles with rear cooler	DENSO OIL 8	140 ± 20
Pipe connections		DENSO OIL 8	As required
Refrigerant g	Except for vehicles with rear cooler	R134a (HFC-134a)	500 ± 20
	Vehicles with rear cooler	R134a (HFC-134a)	780 ± 20

**TROUBLESHOOTING <Front heater, Front A/C>**

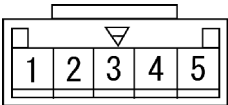
Trouble symptom	Probable cause	Remedy	Reference page
The air conditioner does not work.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	Refrigerant leak or overfilling of refrigerant	Replenish the refrigerant, repair the leak or take out some of the refrigerant.	—
	A/C compressor relay is defective.	Replace the A/C compressor relay.	55A-18
	The A/C compressor magnetic clutch is defective.	Replace the A/C compressor.	55A-10
	The dual pressure switch is defective.	Replace the dual-pressure switch.	55A-10
	The A/C switch is defective.	Replace the heater control assembly.	55A-24
	The blower switch is defective.	Replace the heater control assembly.	55A-24
	The air thermo sensor is defective.	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-31
	The automatic compressor-ECU is defective.	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-6
	The 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.	—
	The dual pressure switch is defective.	Replace the dual-pressure switch.	55A-10
	The condenser fan relay is defective.	Replace the condenser fan relay.	55A-18
	A/C compressor relay is defective.	Replace the A/C compressor relay.	55A-18
	The A/C compressor magnetic clutch is defective.	Replace the A/C compressor.	55A-10
When the A/C is operating, temperature inside the passenger compartment doesn't increase (warm air is not emitted).	Malfunction of the air thermo sensor	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-31
The blower motor does not run.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	The blower relay is defective.	Replace the blower relay.	55A-18
	The blower motor is defective.	Replace the blower motor.	55A-29
	The blower switch is defective.	Replace the heater control assembly.	55A-24
	Malfunction of the resistor	Replace the resistor.	55A-29
	The automatic compressor-ECU is defective.	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-6

Trouble symptom	Probable cause	Remedy	Reference page
The blower motor does not stop running.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	The blower switch is defective.	Replace the blower switch assembly.	55A-24
	Malfunction of the resistor	Replace the resistor.	55A-29
	The automatic compressor-ECU is defective.	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-6
The inside/outside air changeover is impossible.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	Malfunction of the inside/outside air changeover damper motor	Check the inside/outside air changeover damper motor.	55A-30
	The automatic compressor-ECU is defective.	Replace the automatic compressor-ECU and the air thermo sensor assembly.	55A-6

**CHECK AT ENGINE-ECU TERMINALS <4M41>**

Terminal No.	Check item	Check conditions	Normal condition
7	Input from the condenser fan relay (HI)	When the condenser fan stopped	0 V
		When the condenser fan is operating	System voltage
21	Input from the A/C compressor relay	When the A/C is off.	0 V
		When the A/C is in operation (When the compressor is operating)	System voltage
32	Input from dual pressure switch	Dual-pressure switch: OFF	0 V
		Dual-pressure switch: ON	System voltage
33	Automatic compressor-ECU	—	—

CHECK AT THE AUTOMATIC COMPRESSOR-ECU TERMINALS AND THE AIR THERMO SENSOR ASSEMBLY TERMINALS

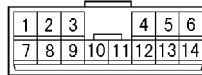


Termi- nal No.	Check item	Check conditions		Normal condition
2	Automatic compressor-ECU <4M41>	—		—
3	Earth	At all times		Continuity
4	Output to the dual-pressure switch	Dual-pressure switch: OFF		0 V
		Dual-pressure switch: ON		System voltage
5	Input from the A/C switch	Blower switch: LO	A/C switch: OFF	0 V
			A/C switch: ON	System voltage

**TROUBLESHOOTING <Rear Heater, Rear Cooler>**

Trouble symptom	Probable causes	Remedy	Reference page
The rear cooler does not operate.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	Refrigerant leak or overfilling of refrigerant	Replenish the refrigerant, repair the leak or take out some of the refrigerant.	—
	Malfunction of the rear A/C switch	Replace the rear A/C switch.	55A-32
	Malfunction of the front rear fan switch	Replace the front rear fan switch.	55A-33
	Malfunction of the air thermo sensor	Replace the air thermo sensor.	55A-39
	Malfunction of the rear blower relay	Replace the rear blower relay.	55A-18
	The rear blower motor is defective.	Replace the rear blower motor.	55A-40
	The rear cooler control unit is defective.	Replace the rear cooler control unit.	55A-34
When the rear cooler is operating, temperature inside the passenger compartment does not decrease(cool air is not emitted).	Refrigerant leak	Replenish the refrigerant and repair the leak.	—
When the rear heater is operating, temperature inside the passenger compartment does not increase(warm air is not emitted).	Malfunction of the air thermo sensor	Replace the air thermo sensor.	55A-39
The blower motor does not run.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	Malfunction of the rear blower relay	Replace the blower relay.	55A-18
	The rear blower motor is defective.	Replace the blower motor.	55A-40
	Malfunction of the rear A/C switch	Replace the rear A/C switch.	55A-32
	Malfunction of the front rear fan switch	Replace the front rear fan switch.	55A-33
	Malfunction of the resistor	Replace the resistor.	55A-35
	The rear cooler control unit is defective.	Replace the rear cooler control unit.	55A-34
The blower motor does not stop running.	Malfunction of fuse	Replace the fuse.	—
	Malfunction of harness or connector	Repair the harness or connector.	—
	Malfunction of the rear A/C switch	Replace the rear A/C switch.	55A-32
	Malfunction of the front rear fan switch	Replace the front rear fan switch.	55A-33
	Malfunction of the resistor	Replace the resistor.	55A-35
	The rear cooler control unit is defective.	Replace the rear cooler control unit.	55A-34

## CHECK AT THE REAR A/C CONTROL UNIT TERMINALS



X1136CA

Terminal No.	Check item	Check conditions	Normal condition
1	Magnet valve	Magnet valve: OFF	System voltage
		Magnet valve: ON	Faint voltage (0.5 V)
2	Earth	At all times	Continuity
3	Input from temperature adjusting switch	Temperature adjusting switch: MAX. HOT	1 V
		Temperature adjusting switch: MAX. COOL	4 V
4	Power supply to potentiometer	At all times	5 V
5	Power supply to ignition switch (IG2)	Ignition switch: ON	System voltage
6	Electric motor for the air mix damper (MAX. COOL)	When the damper flap is moving to the MAX. COOL position.	10 V
		When the damper flap is moving to the MAX. HOT position.	Faint voltage (0.5 V)
7	Input from potentiometer for air mix damper	Air mix damper: MAX. HOT	1 V
		Air mix damper: MAX. COOL	4 V
8	Earth to sensor and potentiometer	At all times	0 V
9	Signal from air outlet changeover damper motor	Ignition switch: ON	0 – 12 V
10	Signal from air outlet changeover damper motor	Ignition switch: ON	0 – 12 V
11	Signal from air outlet changeover damper motor	Ignition switch: ON	0 – 12 V
12	Input from air thermo sensor	Sensor temperature: 25°C (1.5 k Ω)	2.2 V
13	Input from rear fan switch and front rear fan switch	Rear fan switch or front rear fan switch: ON	0 V
14	Electric motor for the air mix damper (MAX. HOT)	When the damper flap is moving to the MAX. COOL position.	Faint voltage (0.5 V)
		When the damper flap is moving to the MAX. HOT position.	10 V



## ON-VEHICLE SERVICE

### REFRIGERANT LEVEL TEST THROUGH PERFORMANCE TEST

1. Park the vehicle to be tested in a place that is not in direct sunlight.
2. Set conditions for outside air temperature as follows:  
Dry-bulb temperature: 22°C or more  
Relative humidity: 60 to 100%
3. Close all of the doors with the windows fully closed.
4. Close the valves of the gauge manifold.
5. Connect the charging hose (red) to the gauge manifold (high-pressure side) and the quick joint (for high-pressure) to the end of the hose.
6. Connect the charging hose (blue) to the gauge manifold (low-pressure side) and the quick joint (for low-pressure) to the end of the hose.
7. Connect the quick joints to the appropriate service valves of the vehicle.

#### 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 the section "A" to ensure that there are no bends in the hose.

8. Start the engine.
9. Turn the blower switch to HI position.
10. Turn on the A/C switch, and set the A/C control to MAX. COOL.
11. Set the air outlet changeover to FACE mode and the inside air/outside air changeover to the inside air recirculation mode.
12. Adjust the engine speed to 1,500 r/min.

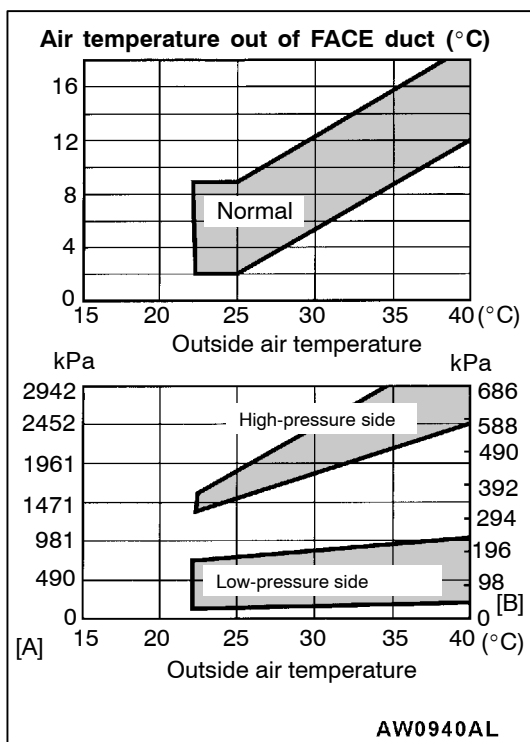
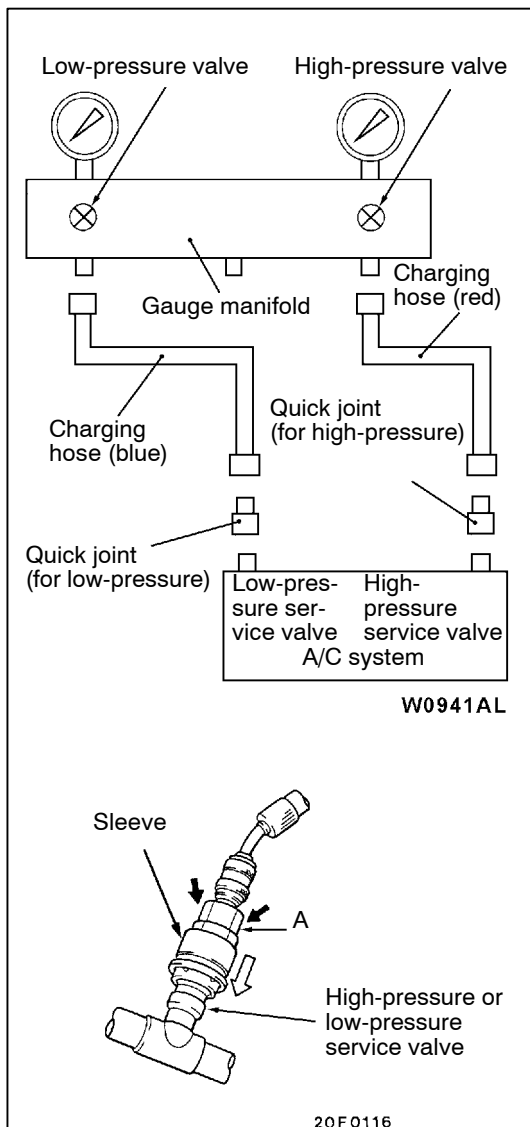
13. Check if the outside air temperature and air temperature blown out of FACE duct, and the outside air temperature and refrigerant pressure (high-pressure and low-pressure sides) are within the normal value range shown in the graphs.
14. If the temperature and pressure are below the given range, replenish the refrigerant. If above, drain the refrigerant. (For charging, refer to P.55A-11.)

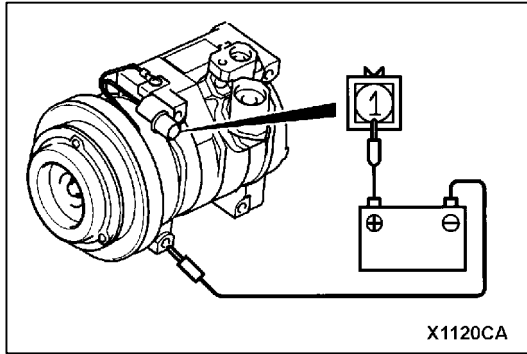
#### NOTE

In the graph below, see the following:

[A]: Refrigerant pressure (high-pressure side)

[B]: Refrigerant pressure (low-pressure side)





### MAGNETIC CLUTCH TEST

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

### RECEIVER DRIER TEST

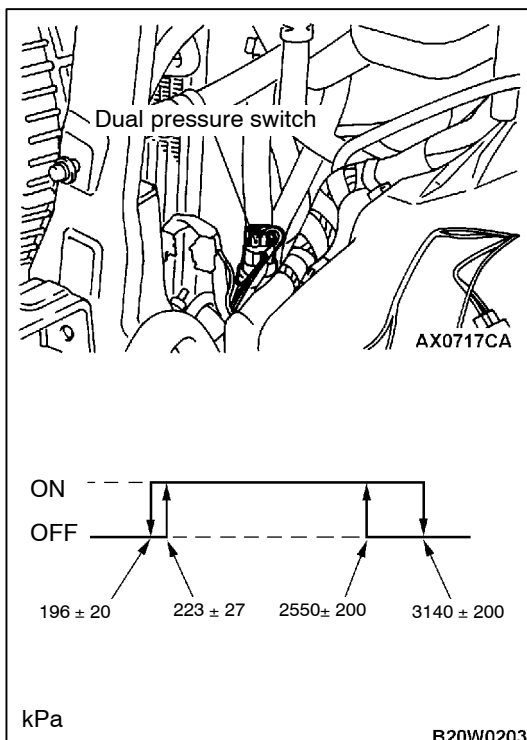
Operate the unit and check the piping temperature by touching the receiver drier outlet and inlet.

If there is a difference in the temperatures, the receiver drier is restricted.

Replace the receiver drier.

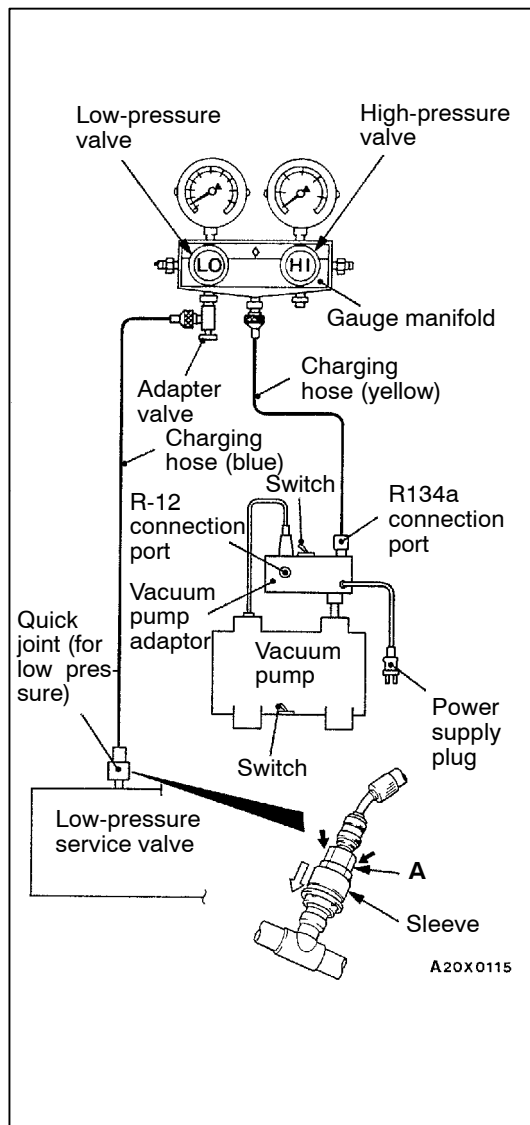
### COMPRESSOR DRIVE BELT ADJUSTMENT

Refer to GROUP 11 - On-vehicle Service.



### 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.



## 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

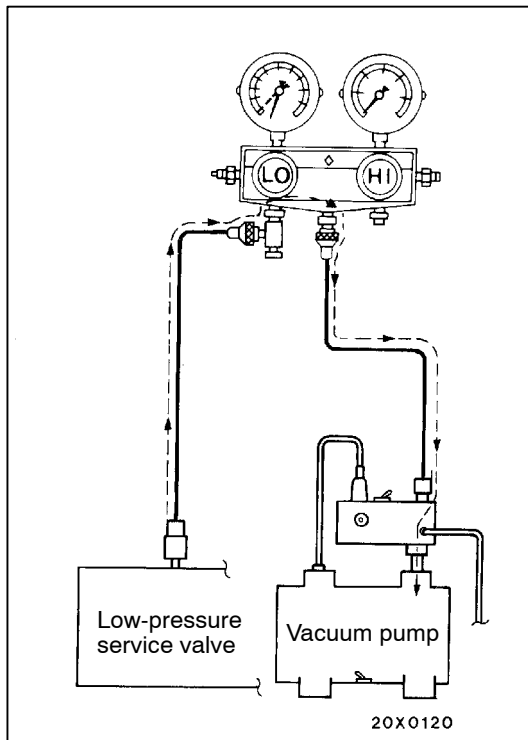
The low-pressure service valve should be connected to the suction hose.

### Caution

- (1) Use tools that are suited to R134a.
  - (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 R134a 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 R134a side to start the vacuum pump.

**Caution**

**Do not operate the compressor for evacuation.**

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

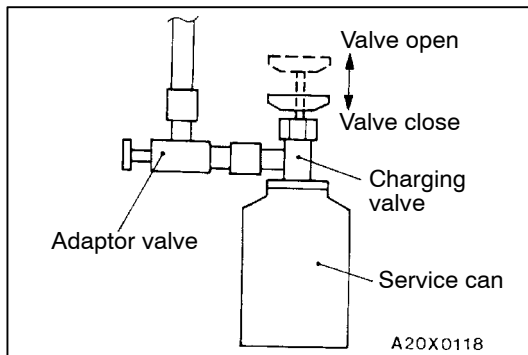
**Caution**

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

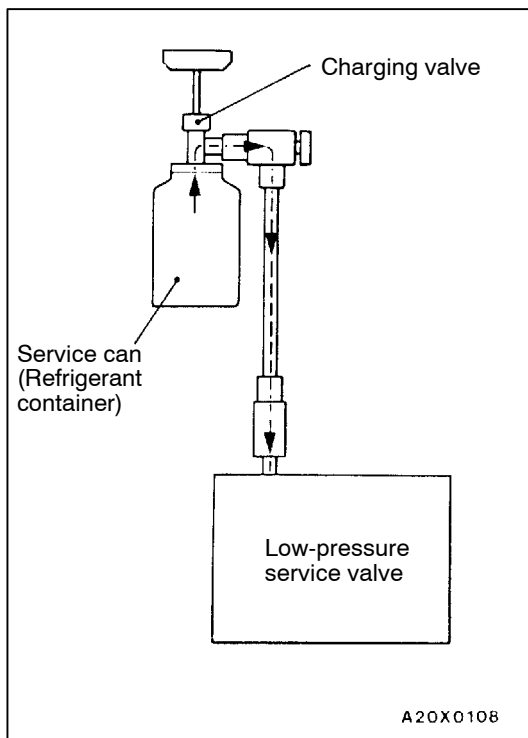
15. Carry out a leak test. (Good if the negative pressure does not drop.)

**Caution**

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



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



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

**Caution**

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

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

**Caution**

**The leak detector for R134a 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.

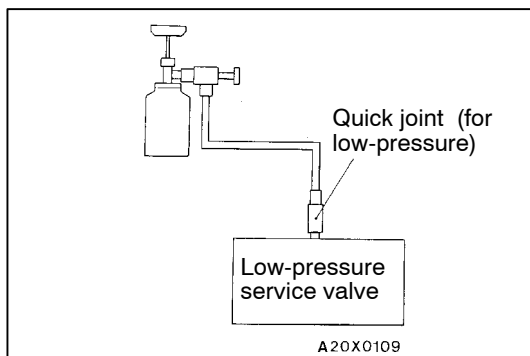
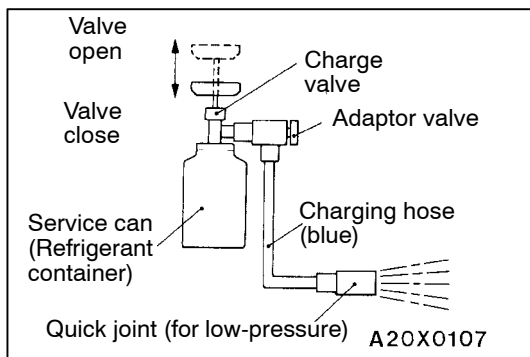
**Caution**

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**

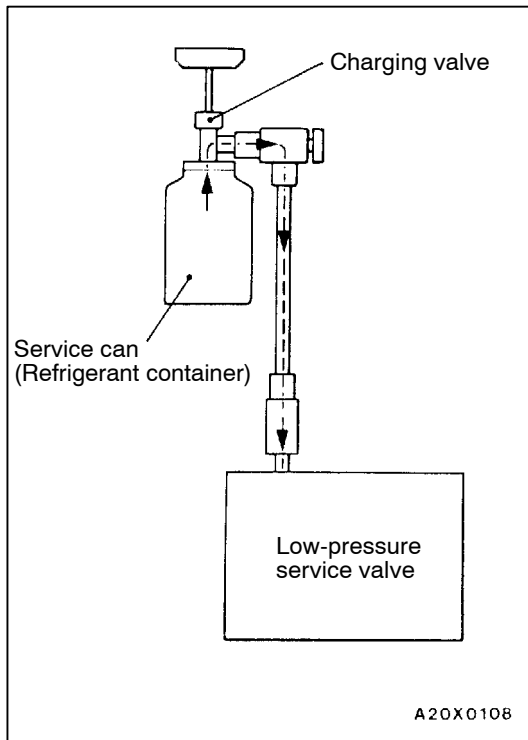
If the service can is not emptied completely, keep the handles of the charging valve and adaptor valve closed for the next charging.

**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.

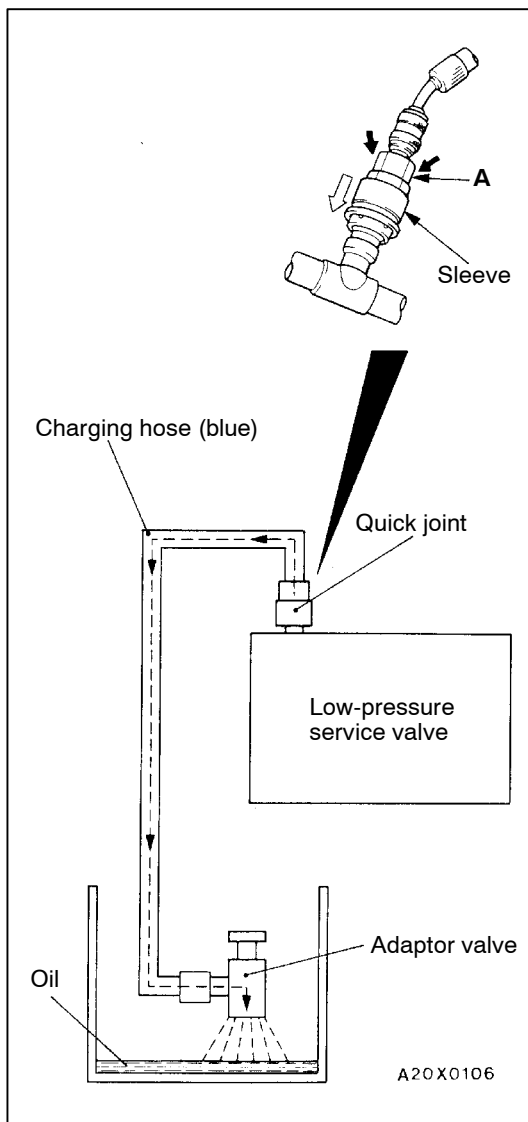
#### Caution

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

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

#### NOTE

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



#### DISCHARGING SYSTEM

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

#### NOTE

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

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

#### NOTE

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

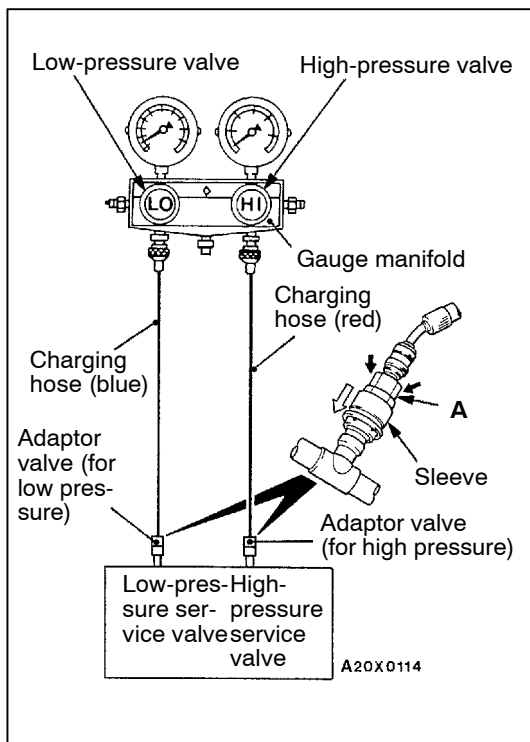
**Compressor oil: DENSO OIL 8**

**Quantity**

**Condenser: 10 mL**

**Evaporator: 40 mL**

**Suction hose: 6.5 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.

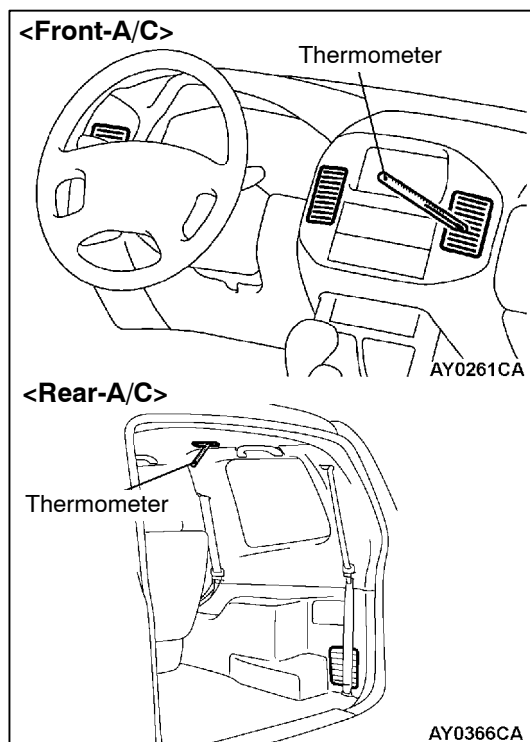
**NOTE**

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

**Caution**

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

6. Start the engine.



7. Set the controls to the A/C as follows:

<Testing the front-A/C>

- 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

<Testing the rear-A/C>

- The front A/C should be set as above.
- A/C switch: A/C - ON position
- Temperature control: Max. cooling 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 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

#### <Front-A/C test>

Garage ambient temperature °C	20	25	35	40
Discharge air temperature °C	3.5 - 5.5	3.5 - 5.5	4.5 - 6.5	5.5 - 7.5
Compressor high-pressure kPa	1,050 - 1,250	1,050 - 1,250	1,400 - 1,600	1,650 - 1,850
Compressor low-pressure kPa	120 - 140	120 - 140	130 - 150	160 - 180

### Performance Temperature Chart

#### <Rear-A/C test>

Garage ambient temperature °C	20	25	35	40
Discharge air temperature °C	5.5 - 7.5	5.5 - 7.5	6.5 - 8.5	7.5 - 9.5
Compressor high-pressure kPa	1,150 - 1,350	1,150 - 1,350	1,500 - 1,700	1,750 - 1,950
Compressor low-pressure kPa	130 - 150	130 - 150	140 - 160	180 - 200



## 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 one pound of refrigerant.
3. Check for leaks.
4. Discharge the system.
5. Repair leaks.
6. Replace receiver drier.

#### Caution

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

7. Evacuate and charge system.

### LOW CHARGE

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

## COMPRESSOR NOISE

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

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

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

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

## HANDLING TUBING AND FITTINGS

Kinks in the refrigerant tubing or sharp bends in the refrigerant hose lines will greatly reduce the capacity of the entire system. High pressures are produced in the system when it is operating. Extreme care must be exercised to make sure that all connections are pressure tight. Dirt and moisture can enter the system when it is opened for repair or replacement of lines or components. The following precautions must be observed. The system must be completely discharged before opening any fitting of connection in the refrigeration system. Open fittings with caution even after the system has been discharged. If any pressure is noticed as a fitting is loosened, allow trapped pressure to bleed off very slowly.

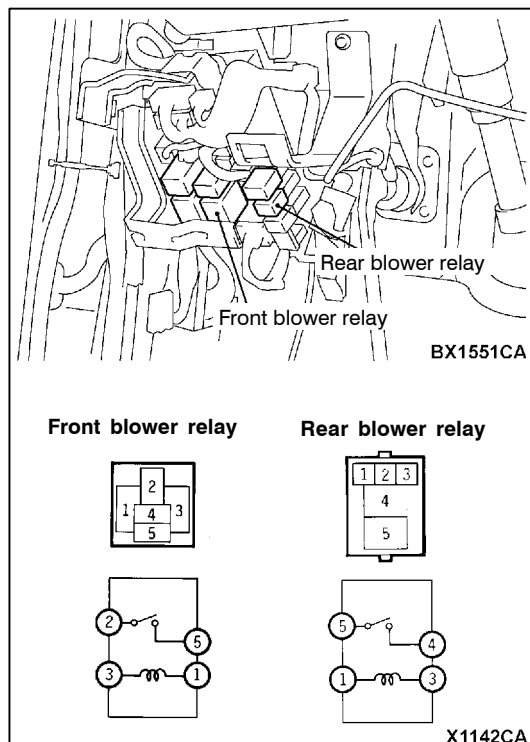
Never attempt to rebend formed lines to fit. Use the correct line for the installation you are servicing. A good rule for the flexible hose lines is keep the radius of all bends at least 10 times the diameter of the hose.

Sharper bends will reduce the flow of refrigerant. The flexible hose lines should be routed so that they are at least 80 mm from the exhaust manifold. It is good practice to inspect all flexible hose lines at least once a year to make sure they are in good condition and properly routed.

Unified plumbing connections with O-rings, these O-rings are not reusable.

## ADJUSTMENT

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



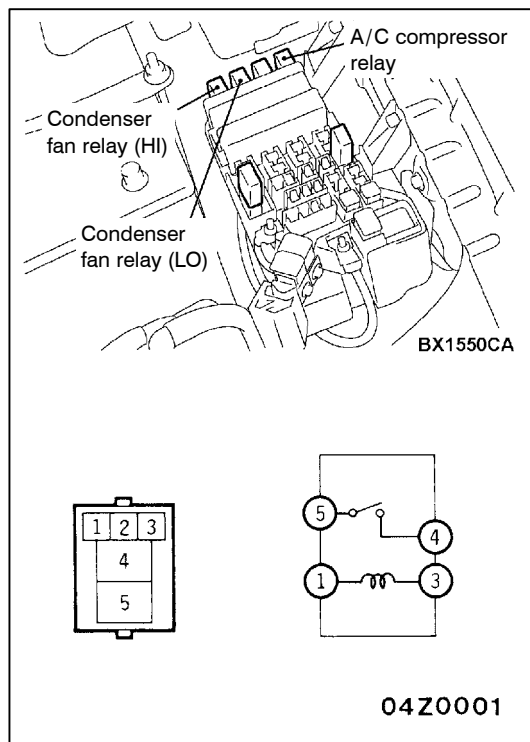
## FRONT BLOWER RELAY AND REAR BLOWER RELAY CONTINUITY CHECK <Vehicles with rear cooler>

### FRONT BLOWER RELAY

System voltage	Terminal No.			
	1	3	2	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○

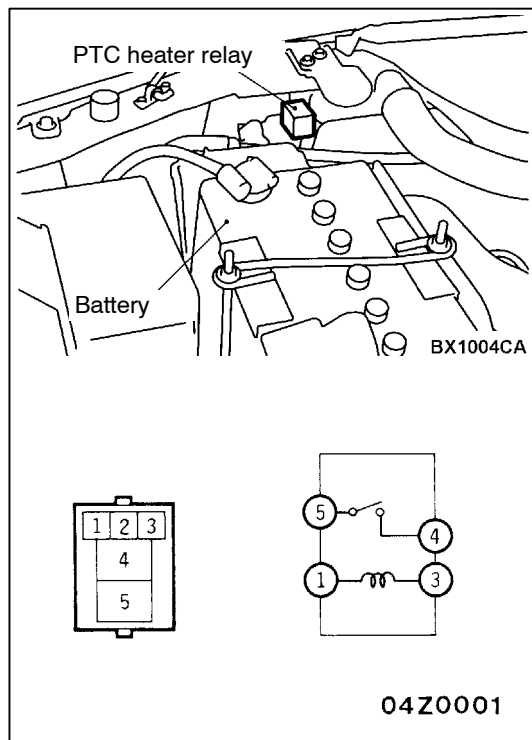
### REAR BLOWER RELAY

System voltage	Terminal No.			
	1	3	4	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○



## CONTINUITY CHECK OF A/C COMPRESSOR RELAY AND CONDENSER FAN RELAY

System voltage	Terminal No.			
	1	3	4	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○



### PTC HEATER RELAY CONTINUITY CHECK <4M41>

System voltage	Terminal No.			
	1	3	2	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○

#### NOTE

The PTC heater is located at the heater core.

### IDLE-UP OPERATION CHECK <Diesel>

1. Set the vehicle in the pre-inspection condition:
2. Check that the idle speed is within the standard value.

#### Standard value:

<4D56>  $750 \pm 100$  r/min

<4M41>  $750 \pm 50$  r/min

#### NOTE

The idle speed is controlled by the engine-ECU and should not be adjusted.

3. The idle speed should be within the standard value when the A/C switch is turned on and the A/C is operating.

#### Standard value:

<4D56>  $925 \pm 25$  r/min

<4M41: When the A/C is under low medium load>

$800 \pm 50$  r/min

<4M41: When the A/C is under high load>

$1,000 \pm 50$  r/min

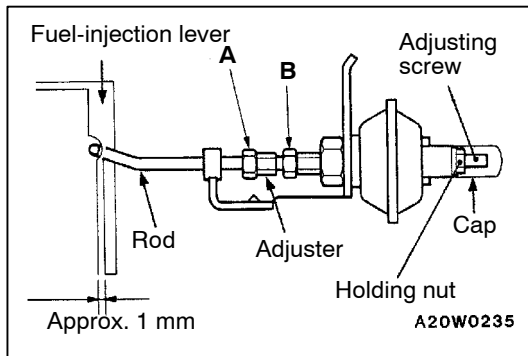
4. When the front A/C is set as follows, the idle speed should be within the standard value.

Blower switch: ON

Air outlet temperature: FOOT, FOOT/DEF, DEF

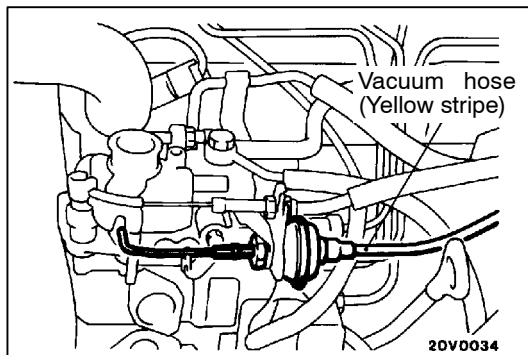
Set temperature: MAX. HOT (32°C)

Heat switch: ON



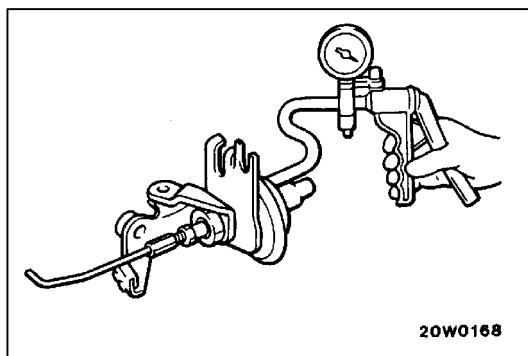
5. If there is a deviation of the idling speed from the standard value, adjust the idling speed by the following the procedures.<4D56>

- (1) Loosen nuts (A) and (B).
- (2) Adjust, by using the adjuster, so that the end of the vacuum actuator's rod is at the position indicated in the illustration.
- (3) Securely tighten nuts (A) and (B).
- (4) After activating the vacuum actuator, check to be sure that the rod and the lever do not contact when the activation is cancelled.
- (5) Remove the cap and loosen the nut for holding.
- (6) Adjust to the specified r/min by turning the adjusting screw.
- (7) Securely tighten the holding nut, and then attach the cap.



### VACUUM ACTUATOR CHECK <Diesel-powered Vehicles>

1. Pull off the vacuum hose (yellow stripe) connected to the vacuum actuator.



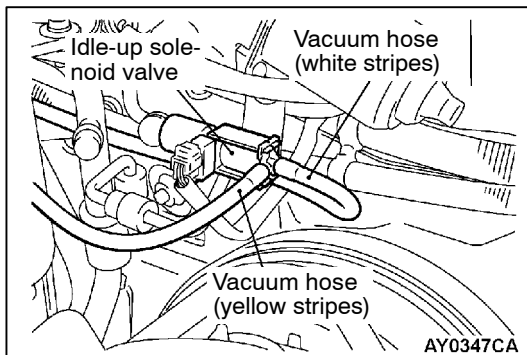
2. Connect a manual vacuum pump to the nipple of the vacuum actuator.
3. Check to be sure that the vacuum actuator rod starts to contact when 8 kPa of negative pressure is applied, and that the rod contracts to its full stroke when 12 kPa of negative pressure is applied.
4. Disconnect the manual vacuum pump from the vacuum actuator, and connect the vacuum hose (yellow stripe) to the vacuum actuator.

5. Start the engine and let it run at idle. Then cover the end of the vacuum hose (yellow stripe) with a finger and check the negative pressure when the A/C switch is turned on and off.

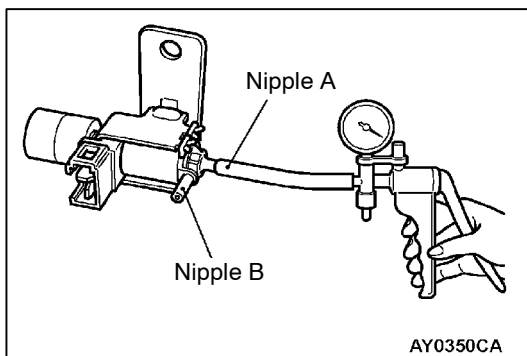
A/C switch	Negative pressure at hose end
OFF	NO
ON	YES

**Caution**

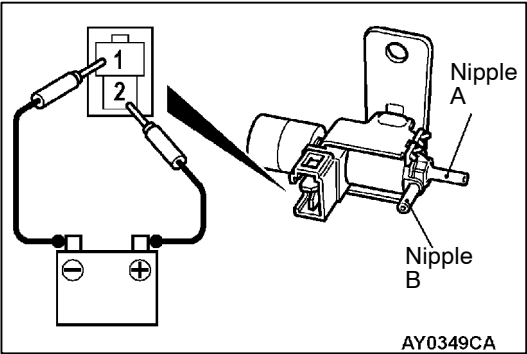
Be careful, when connecting the vacuum hose not to damage it.

**IDLE-UP SOLENOID VALVE CHECK  
<Diesel-powered vehicles>**

1. Disconnect the vacuum hoses (white stripes, yellow stripes) from the solenoid valve.
2. Disconnect the harness connector.



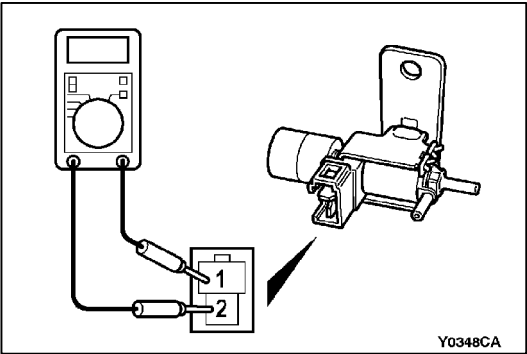
3. Connect a manual vacuum pump to the nipple A.



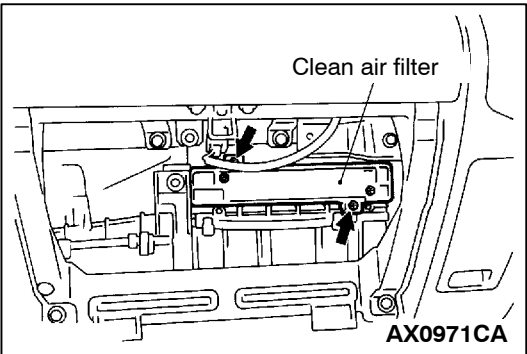
4. Check air-tightness by applying a vacuum with voltage applied directly from the battery to the solenoid valve terminal and without applying voltage.

Battery voltage	Nipple B	Vacuum condition
Applied	Open	Vacuum leaks from nipple B
	Blocked with finger *1	Vacuum is maintained
Not applied	Open	Vacuum is maintained
	Blocked with finger *2	

NOTE  
In case of mark \*1, a vacuum can be felt but in case of mark \*2, a vacuum can not be felt.



5. Measure the resistance of the solenoid valve.  
**Standard value: Approx. 40 Ω**
6. When disconnecting the vacuum hose, always make a mark so that the hose can be reconnected at original position.

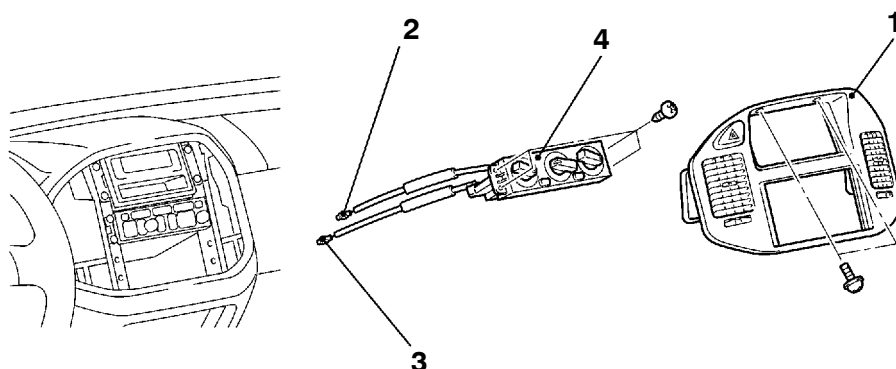


**CLEAN AIR FILTER REPLACEMENT PROCEDURE**

1. Remove the glove box. (Refer to GROUP 52A - Instrument Panel.)
2. Remove the two screws as shown, and replace the clean air filter.
3. Remove the clean air filter.
4. Install the glove box.

## FRONT A/C

### AIR CONDITIONER CONTROL PANEL ASSEMBLY AND A/C SWITCH REMOVAL AND INSTALLATION



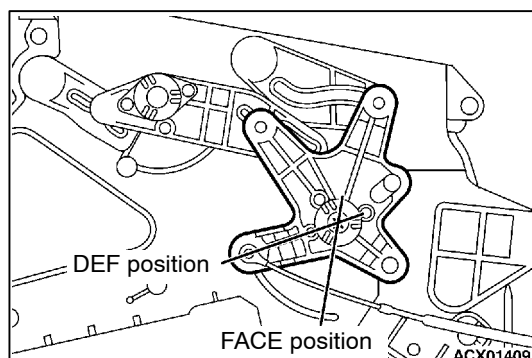
ACX01411

#### Removal steps

- Front floor console  
(Refer to GROUP 52A.)
- Lower panel (Refer to GROUP 52A  
- Instrument Panel.)
- Foot duct C
- Foot duct D



1. Center panel (Refer to GROUP 52A -  
Instrument Panel.)
2. Air mix damper cable connection
3. Air outlet changeover damper cable  
connection
4. Heater control assembly

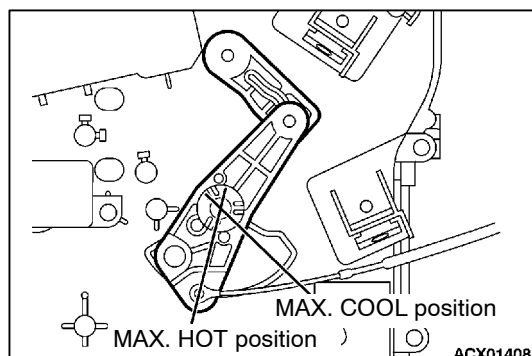


ACX01409

#### INSTALLATION SERVICE POINTS

##### ►A◄ AIR OUTLET CHANGEOVER DAMPER CABLE CONNECTION

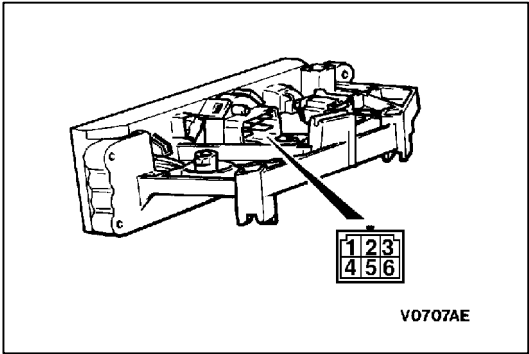
1. Set the air outlet changeover knob of the heater control assembly to the DEF position.
2. Move the air outlet changeover damper lever to the DEF position (rotate the damper lever counterclockwise fully), and then connect the cable.



ACX01408

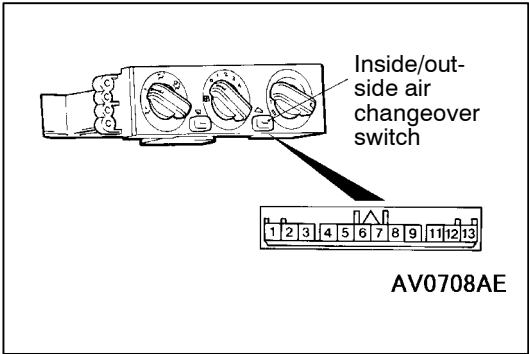
##### ►B◄ AIR MIX DAMPER DOOR CABLE CONNECTION

1. Turn the temperature adjusting knob of the heater control assembly to the HOT side fully.
2. Move the air mix door lever of the heater unit to the MAX. HOT position (rotate the damper lever clockwise fully), and then install the cable.



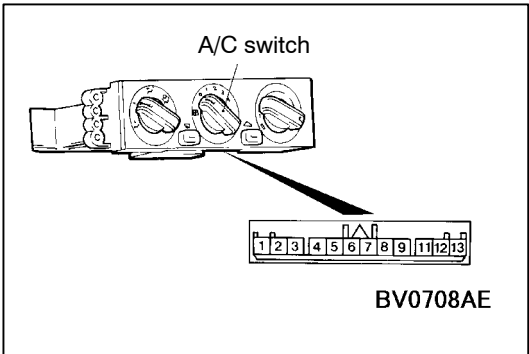
INSPECTION  
BLOWER SWITCH CONTINUITY CHECK

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



INSIDE/OUTSIDE AIR CHANGEOVER SWITCH  
CONTINUITY CHECK

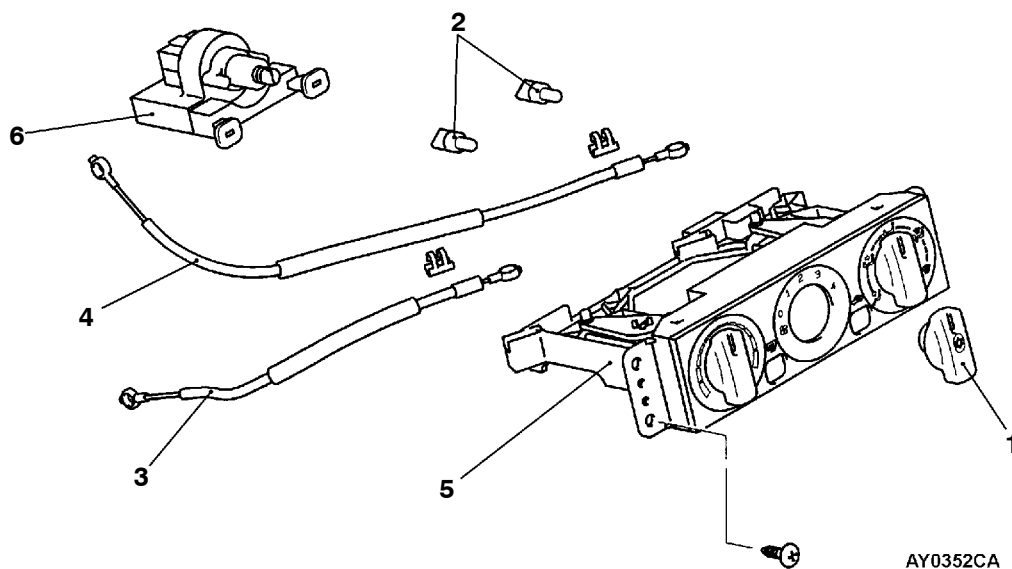
Switch position	Terminal No.						
	1	IND	3	4	5	8	9
When the switch is not pressed		○	○				ILL
When the switch is pressed				○	○		



A/C SWITCH CONTINUITY CHECK

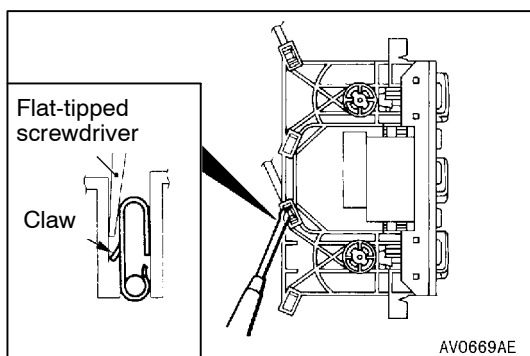
Switch position	Terminal No.						
	1	IND	7	5	6	8	9
OFF position		○	○				ILL
ON position				○	○		



**DISASSEMBLY AND REASSEMBLY****Disassembly steps**

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

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

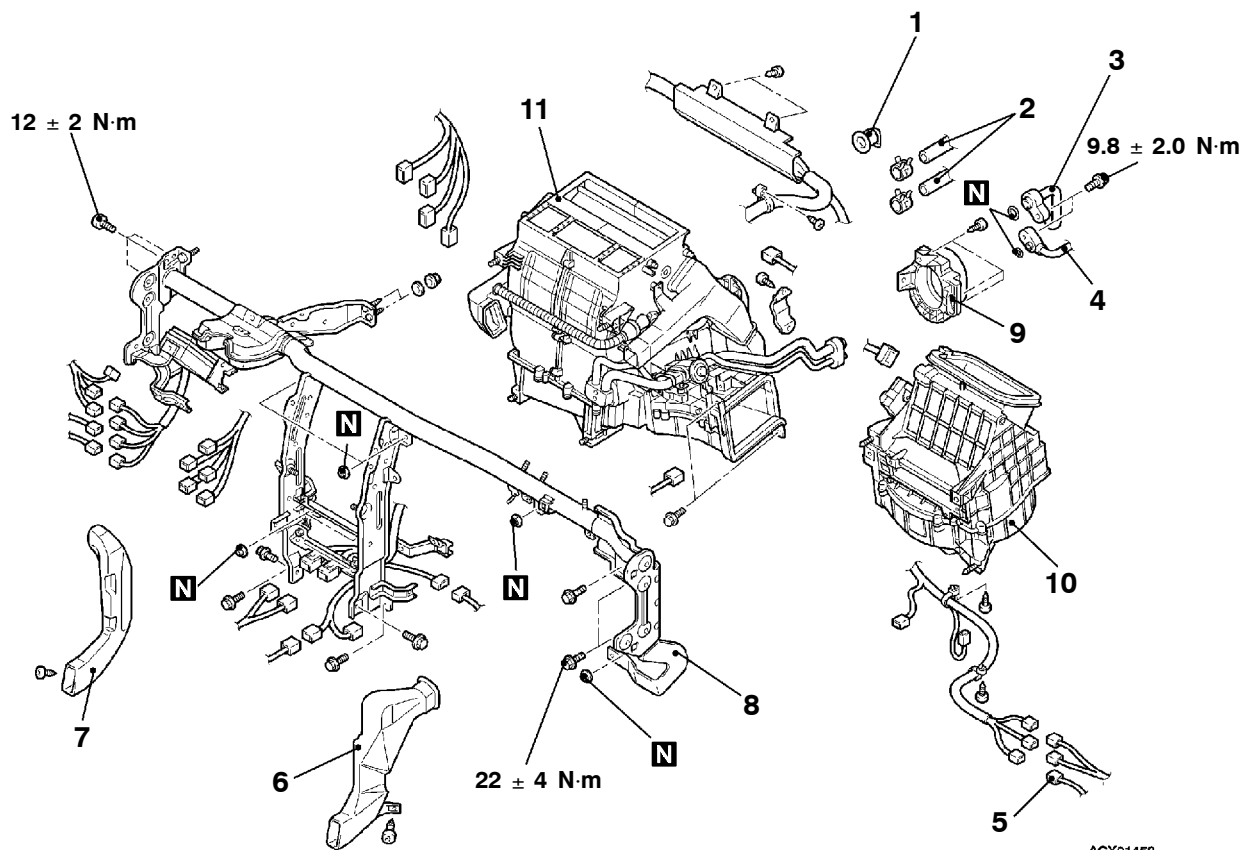
**DISASSEMBLY SERVICE POINT****◀A▶ AIR OUTLET CHANGEOVER DAMPER CABLE /AIR MIX DAMPER CABLE DISCONNECTION**

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

## HEATER UNIT AND BLOWER ASSEMBLY REMOVAL AND INSTALLATION

### Pre-removal and Post-installation Operations

- Refrigerant Discharge and Refilling (Refer to P.55A-9.)
- Engine Coolant Draining and Refilling (Refer to GROUP 14 - On-vehicle Service.)
- Instrument Panel Removal and Installation (Refer to GROUP 52A.)
- Bolt Securing Steering Column Shaft to Front Deck Crossmember (Refer to GROUP 37A - Steering Wheel and Shaft.)



ACX01458

### Removal steps

- |                                     |                               |
|-------------------------------------|-------------------------------|
| 1. Drain hose                       | 7. Foot duct                  |
| 2. Heater hose connection           | 8. Front crossmember assembly |
| 3. Suction flexible hose connection | 9. Flange bracket             |
| 4. Liquid pipe A connection         | 10. Blower assembly           |
| 5. Connectors                       | 11. Heater unit               |
| 6. Foot duct B                      |                               |



### REMOVAL SERVICE POINT

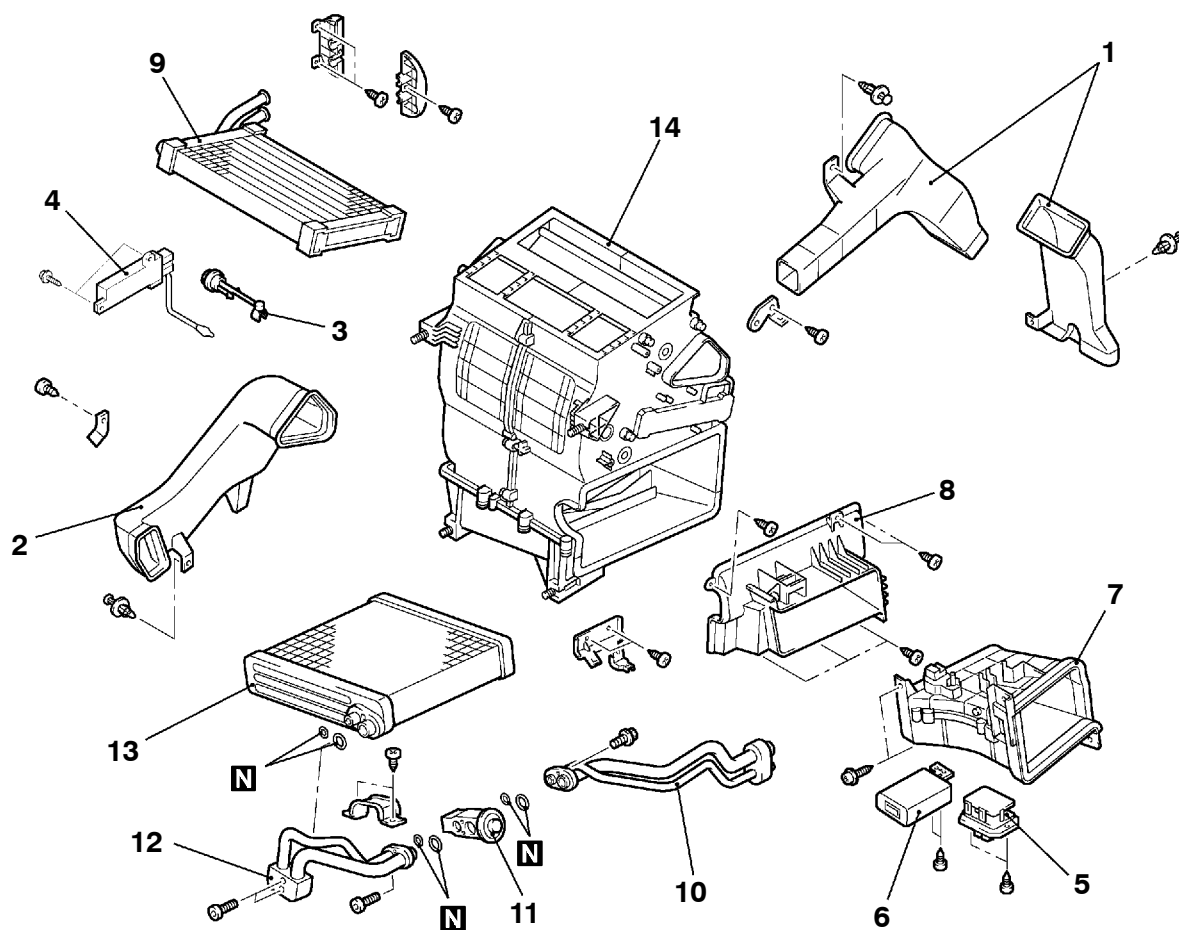
#### ◀▶ SUCTION FLEXIBLE HOSE/LIQUID PIPE A DISCONNECTION

Plug the disconnected hose nipple to prevent dust or foreign material from entering them.

#### Caution

Use a plug, which air does not penetrate through. Compressor oil and receiver absorb moisture easily.

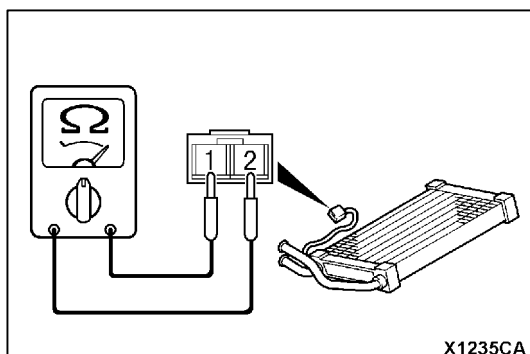
## HEATER UNIT DISASSEMBLY AND REASSEMBLY



ACX01450

**Disassembly steps**

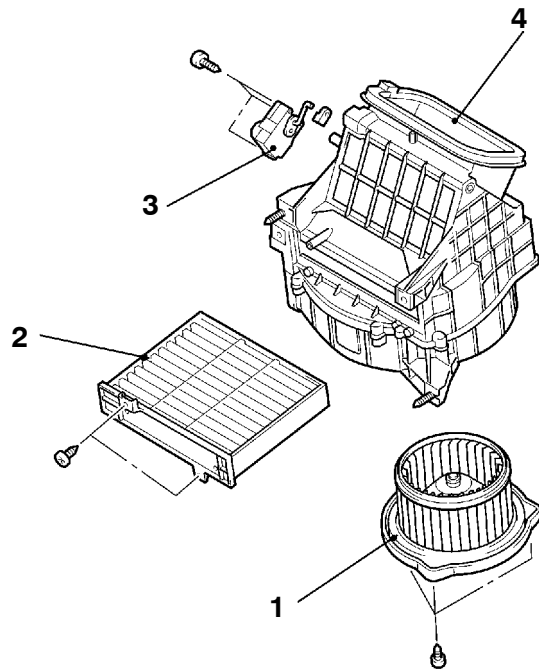
- |  |                          |
|--|--------------------------|
| 1. Foot duct A   | 8. Joint duct            |
| 2. Foot duct C   | 9. Air duct sub-assembly |
| 3. Air thermo sensor clip                                  | 10. Heater core          |
| 4. Automatic compressor-ECU and air thermo sensor assembly | 11. Front pipe assembly  |
| 5. Aspirator hose  | 12. Expansion valve      |
| 6. Blower linear controller                                | 13. Pipe                 |
| 7. Rear A/C control unit<br><Vehicles with dual A/C>       | 14. Evaporator           |
|  | 15. Case                 |



X1235CA

**INSPECTION****PTC HEATER CHECK <4M41>**

Continuity should be present between the terminals.

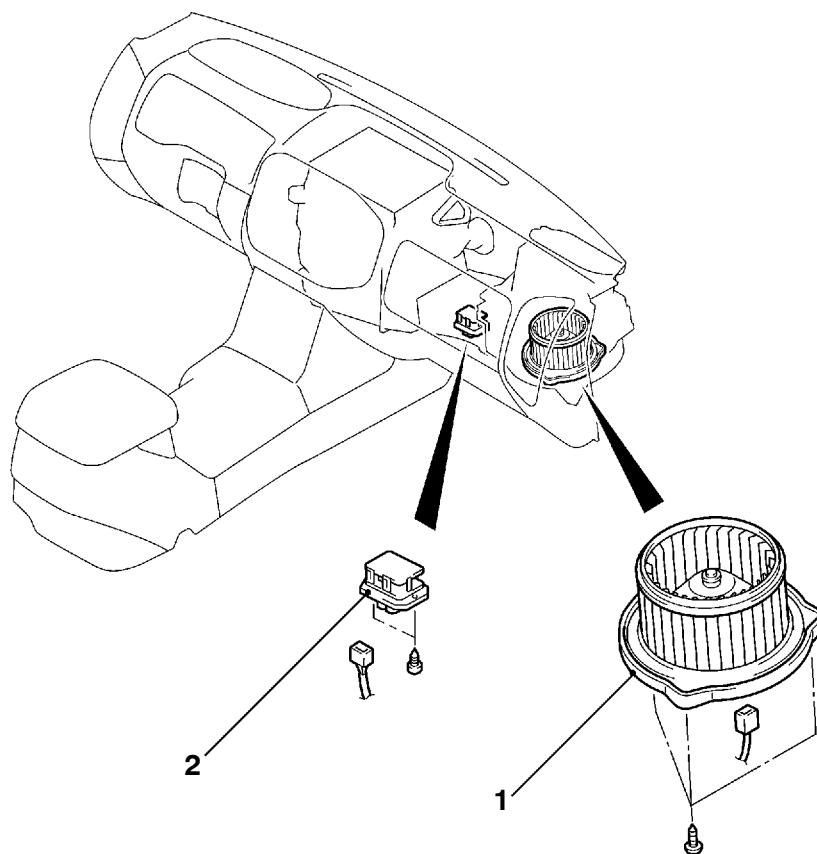
**BLOWER ASSEMBLY DISASSEMBLY AND REASSEMBLY**

ACX01407

**Disassembly steps**

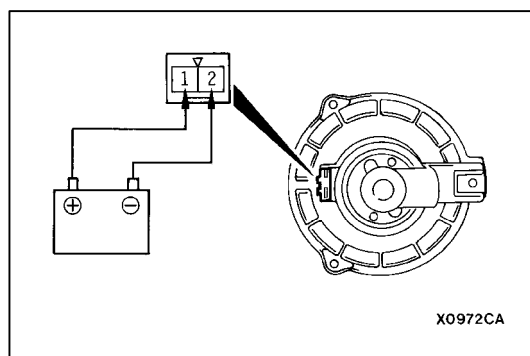
1. Blower motor
2. Clean air filter <Vehicles with clean air filter>
3. Inside/outside air changeover damper motor
4. Case

## BLOWER MOTOR AND RESISTOR REMOVAL AND INSTALLATION



ACX01452

1. Blower motor
2. Resistor

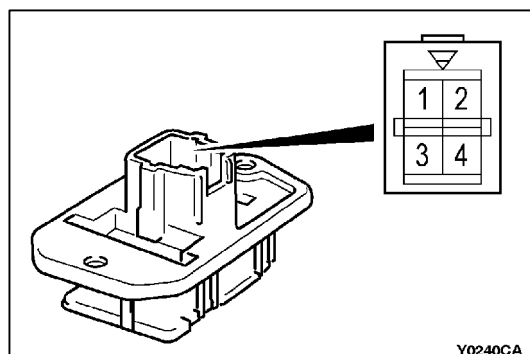


X0972CA

### INSPECTION

#### BLOWER MOTOR INSPECTION

The motor should run when battery voltage is applied between the terminals. In addition, any abnormal sound should not be heard from the motor.



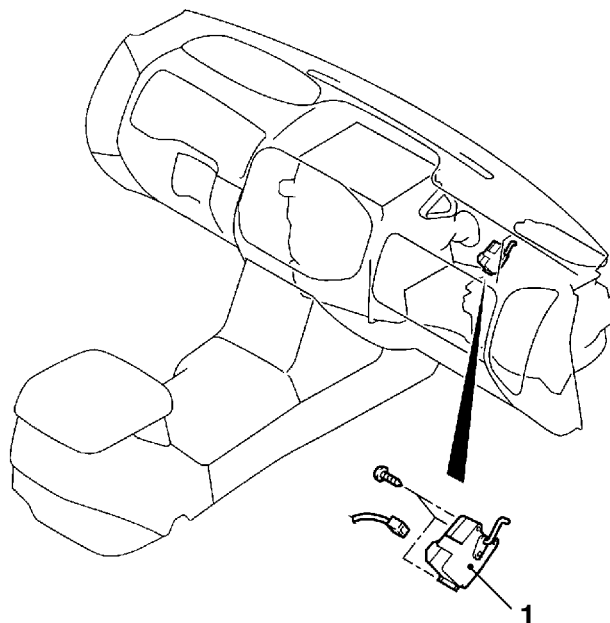
Y0240CA

### RESISTOR CHECK

Standard value:

Terminal to be measured	Standard value $\Omega$
Between terminals No.3 and 2	$2.79 \pm 7 \%$
Between terminals No.1 and 2	$1.49 \pm 7 \%$
Between terminals No.2 and 4	$0.39 \pm 7 \%$

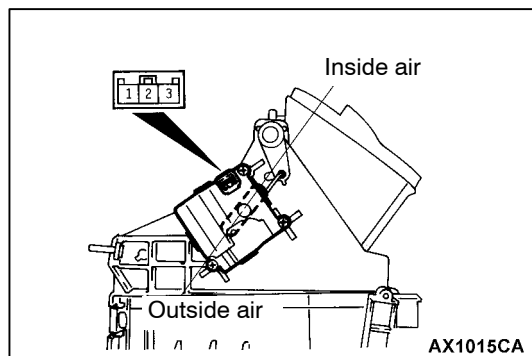
## INSIDE/OUTSIDE AIR CHANGEOVER DAMPER MOTOR REMOVAL AND INSTALLATION



ACX01448

### Removal steps

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



### INSPECTION

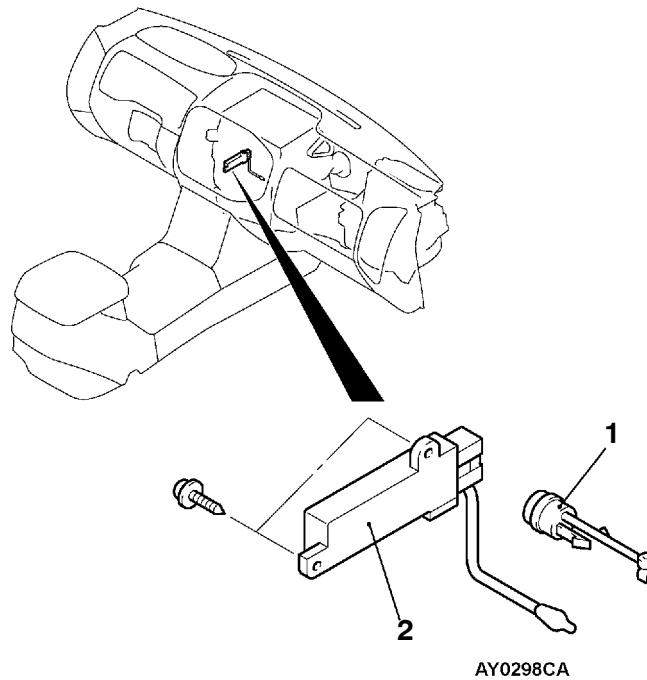
#### INSIDE/OUTSIDE AIR CHANGEOVER DAMPER MOTOR CHECK

Battery terminal voltage			Lever operation
1	2	3	
⊕		⊖	Rotate to the inside air recirculation position.
⊕	⊖		Rotate to the outside air induction position.

### Caution

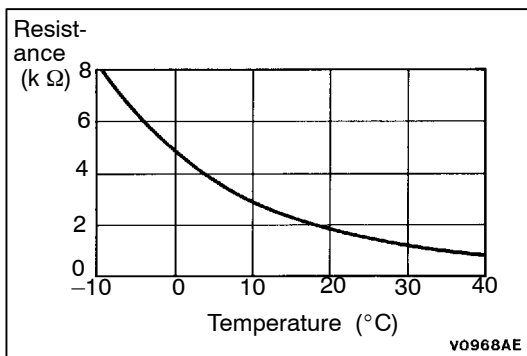
If the lever reaches the stop position, disconnect the battery voltage.

## AUTOMATIC COMPRESSOR-ECU AND AIR THERMO SENSOR ASSEMBLY REMOVAL AND INSTALLATION



### Removal steps

- Under cover (Refer to GROUP 52A – Instrument Panel.)
- 1. Air thermo sensor clip
- 2. Automatic compressor-ECU and air thermo sensor assembly



### INSPECTION

#### AIR THERMO SENSOR CHECK

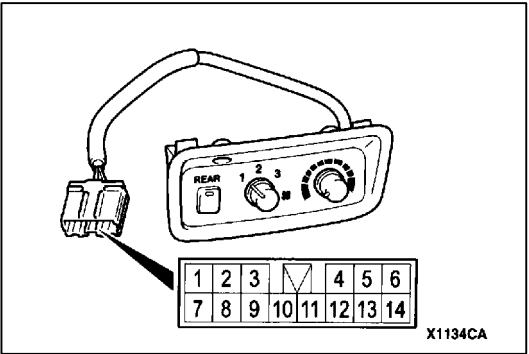
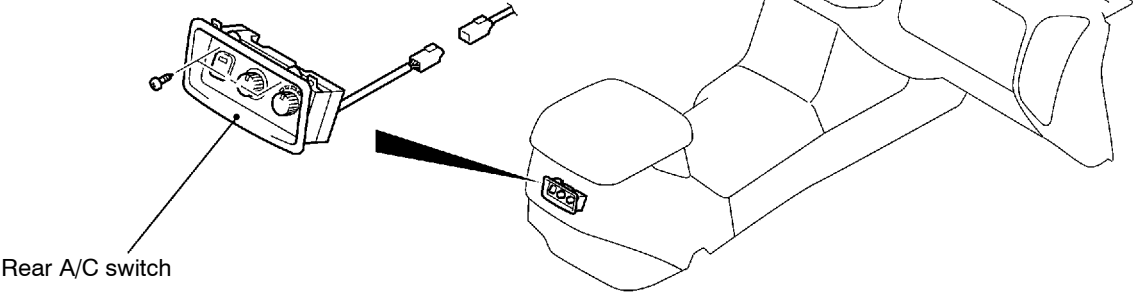
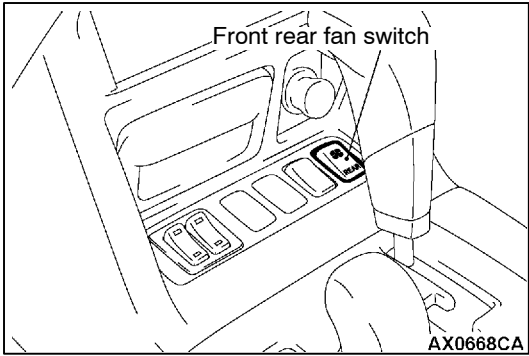
Measure the resistance between the sensor terminals under at least two temperatures. The resistance values should meet the left graph.

#### NOTE

The temperature should be within the shown range.

REAR HEATER AND REAR COOLER

REAR A/C SWITCH, FRONT REAR FAN SWITCH  
REMOVAL AND INSTALLATION



INSPECTION  
CONTINUITY CHECK OF THE REAR A/C SWITCH  
Air Volume Adjusting Switch Check

Switch position	Terminal No.			
	1	4	6	7
1				
2				
3				



Rear Fan Switch Check

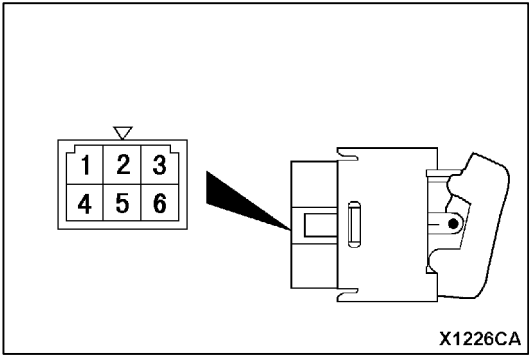
The rear fan switch toggles on and off.

Switch position	Terminal No.							
	2	8	9	IND	12	10	ILL	11
OFF position								
ON position								

Temperature Adjusting Switch Check

Connect an ohmmeter between connector terminals No.3 and 5 as well as 5 and 13. The resistance values should change within the standard value range gradually when the temperature adjusting switch is operated.

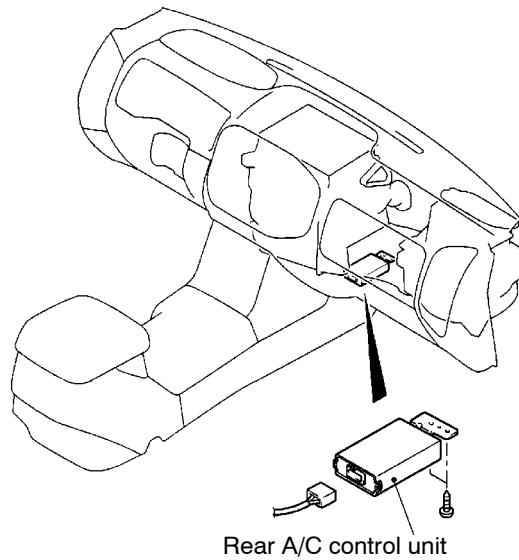
Standard value: 0 - 3 kΩ



Front Rear Fan Switch Continuity Check

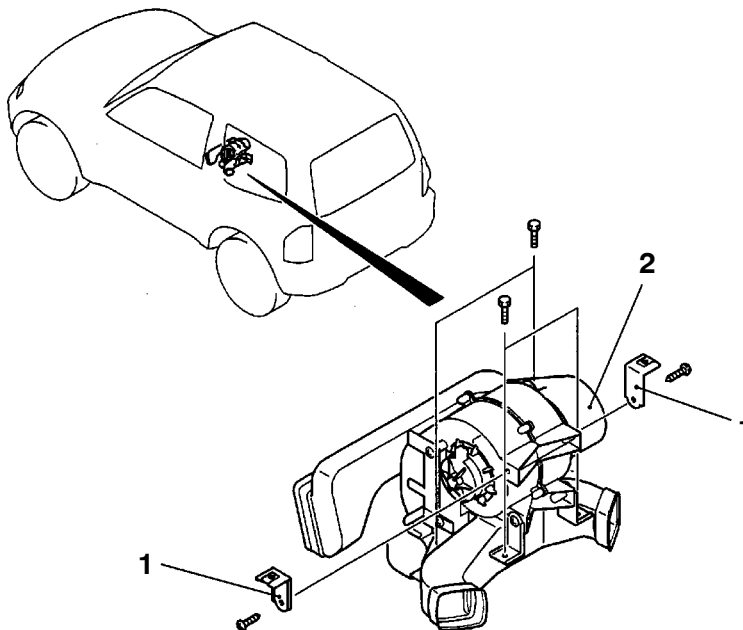
Switch position	Terminal No.							
	1	2	IND	5	6	3	ILL	4
OFF position								
ON position								

## REAR A/C CONTROL UNIT REMOVAL AND INSTALLATION



**BX0970CA**

## REAR HEATER UNIT <Floor console> REMOVAL AND INSTALLATION

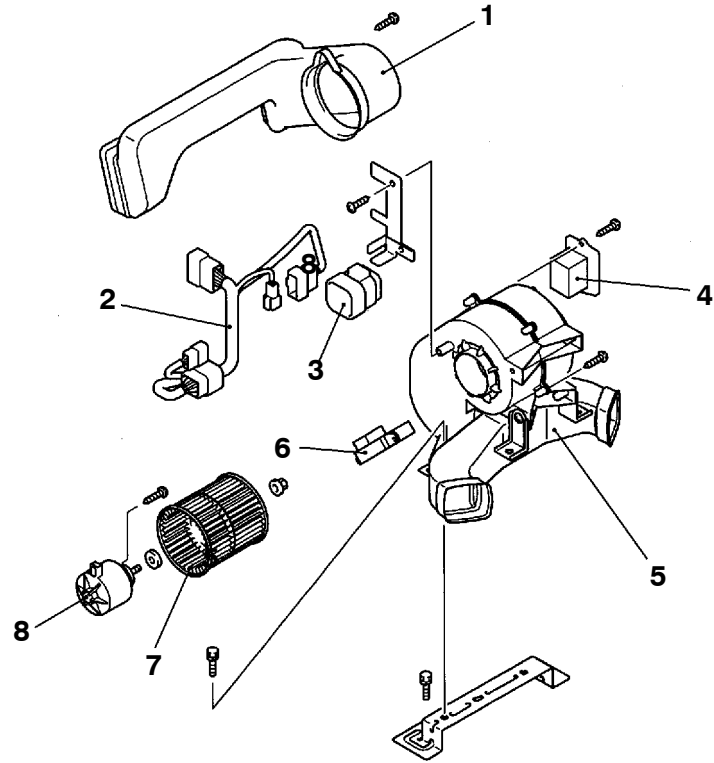


**AY0259CA**

### Removal steps

- Front floor console  
(Refer to GROUP 52A.)
  1. Upper bracket
  2. Rear heater unit

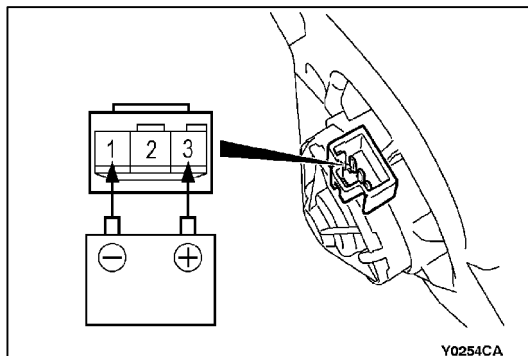
## REAR HEATER UNIT <FLOOR CONSOLE> DISASSEMBLY AND REASSEMBLY



AY0258CA

### Disassembly steps

- |                     |                 |
|---------------------|-----------------|
| 1. Rear inlet duct  | 5. Heater case  |
| 2. Harness assembly | 6. Heater core  |
| 3. Relay            | 7. Blower fan   |
| 4. Resistor         | 8. Blower motor |

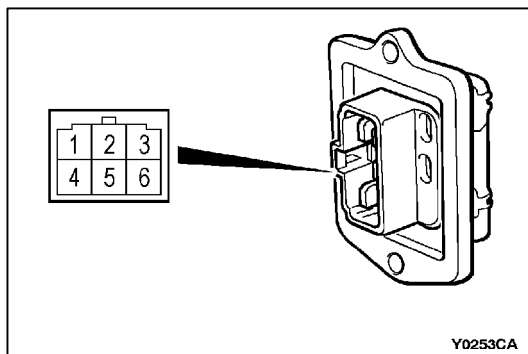


Y0254CA

## INSPECTION

### BLOWER MOTOR INSPECTION

The motor should run when battery voltage is applied between the terminals. In addition, any abnormal sound should not be heard from the motor.

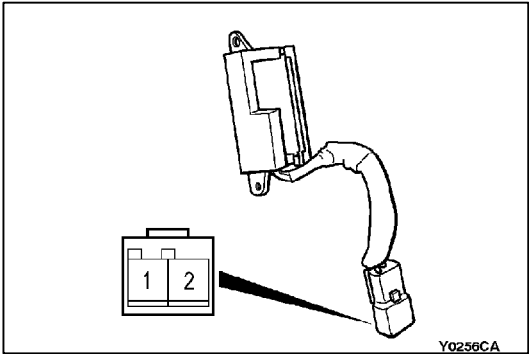


Y0253CA

### RESISTOR CHECK

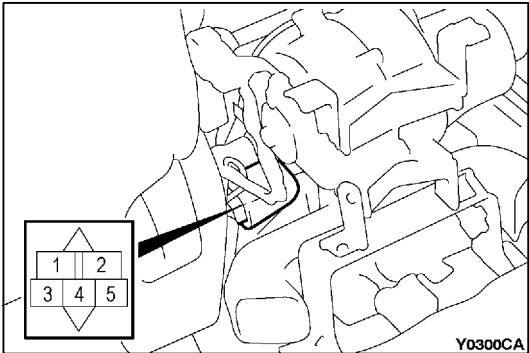
Standard value:

Terminal to be measured	Standard value $\Omega$
Between terminals No.1 and 6	$4.9 \pm 7\%$
Between terminals No.1 and 3	$1.25 \pm 7\%$



PTC HEATER CHECK

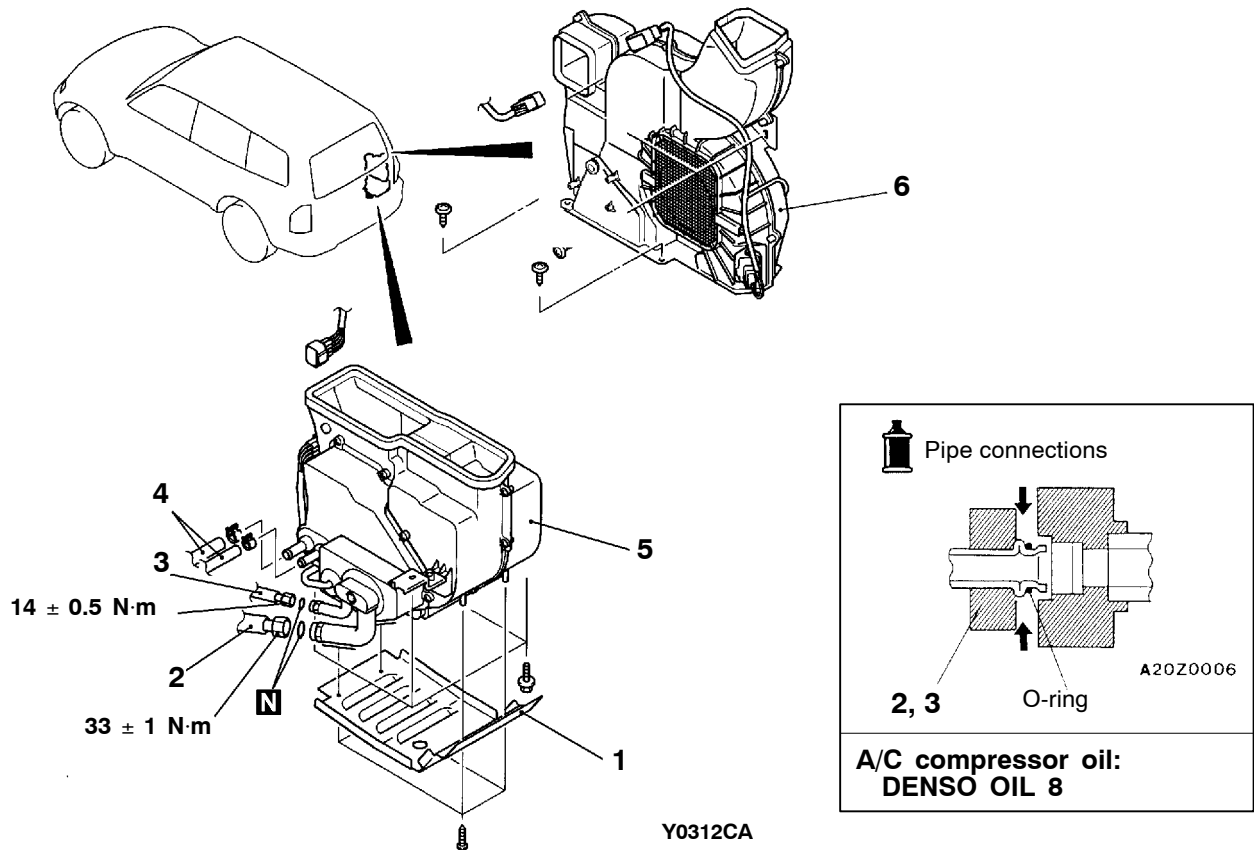
Continuity should be present between the terminals.



RELAY CONTINUITY CHECK

System volt- age	Terminal No.			
	1	3	2	5
When current is not supplied	○	○		
When current is supplied	⊕	⊖	○	○

## REAR HEATER UNIT AND REAR BLOWER ASSEMBLY <QUARTER TRIM> REMOVAL AND INSTALLATION



### Rear heater unit removal steps

- Refrigerant discharge and refilling (Refer to P.55A-9.)
- Engine coolant draining and refilling (Refer to GROUP 14 - On-vehicle Service.)
- Rear mud guard (Refer to GROUP 51.)
- 1. Heater cover
- 2. Suction pipe C connection
- 3. Liquid pipe D connection
- 4. Heater hose connection
- 5. Rear heater unit

### Rear blower assembly removal steps

- Upper quarter trim (RH), lower quarter trim (RH) (Refer to GROUP 52A - Trim.)
- Rear quarter duct, rear floor duct A mounting bolt, pillar duct mounting bolt (Refer to P.55A-55.)
- 6. Rear blower assembly

## REMOVAL SERVICE POINTS

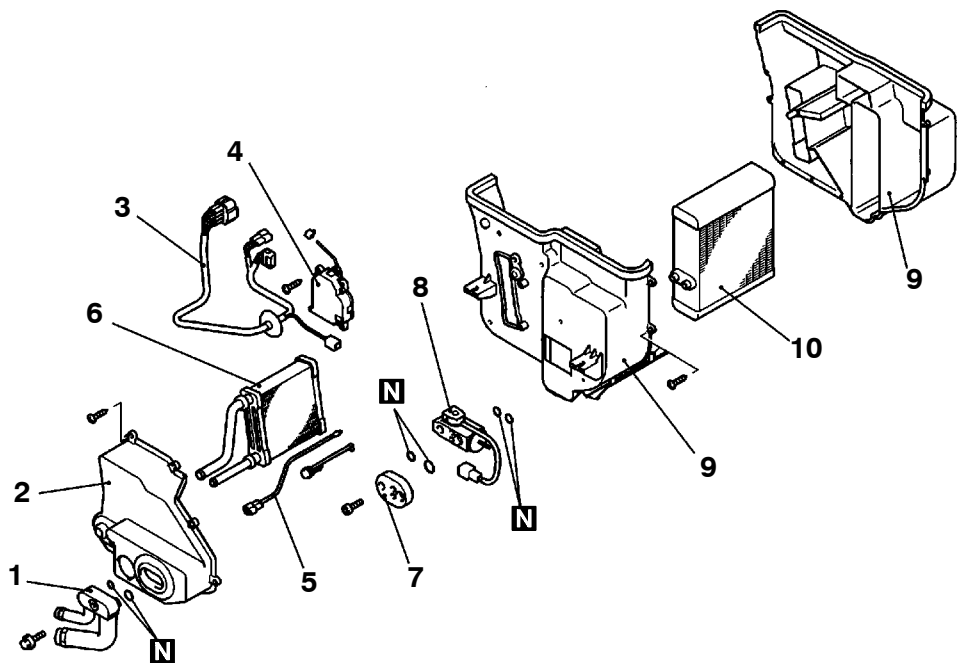
### ◀A▶ SUCTION PIPE C/LIQUID PIPE D DISCONNECTION

Plug the disconnected pipe and the rear heater unit nipples to prevent dust or foreign material from entering them.

#### Caution

Use a plug, which air does not penetrate through. Compressor oil and receiver absorb moisture easily.

REAR HEATER UNIT DISASSEMBLY AND REASSEMBLY



AX0924CA

Disassembly steps

1. Tube accessory assembly

2. Heater cover

3. Harness assembly

4. Electric motor for the air mix damper  
<Vehicles with rear heater>

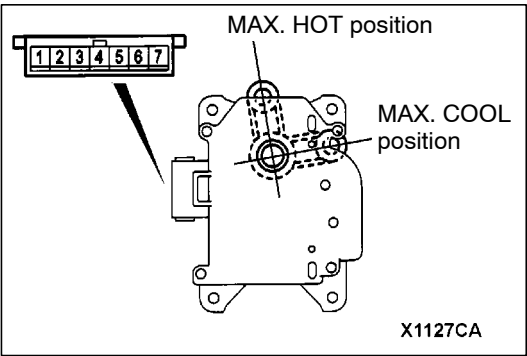
5. Air thermo sensor  
<Vehicles with rear cooler>

6. Heater core  
<Vehicles with rear heater>
7. Connector tube  
<Vehicles with rear cooler>

8. Expansion valve  
<Vehicles with rear cooler>

9. Heater case

10. Evaporator  
<Vehicles with rear cooler>



X1127CA

INSPECTION

AIR MIX DAMPER MOTOR CHECK

Motor Check

Battery connection terminal		Lever operation
1	2	
⊕	⊖	Rotate to the COOL position.
⊖	⊕	Rotate to the HOT position.

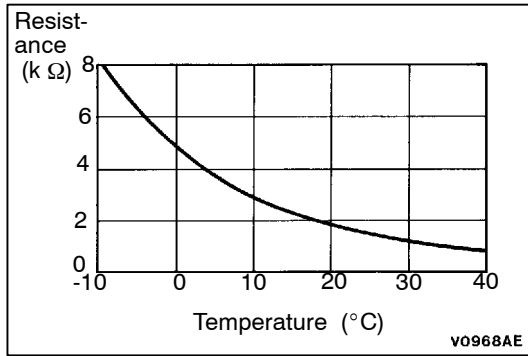
Caution

If the lever reaches the stop position, disconnect the battery voltage.

Potentiometer Check

When the resistances between terminals 3 and 5 as well as terminals 3 and 7 are measured at the previous check, the resistance value should change gradually within the standard value.

Standard value: 1.2 - 4.8 kΩ

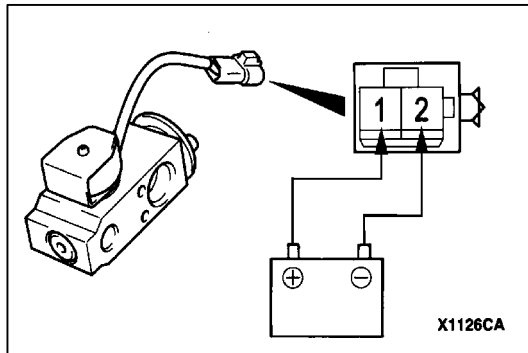


### Air Thermo Sensor Check

Measure the resistance between the sensor terminals under at least two temperatures. The resistance values should meet the left graph.

#### NOTE

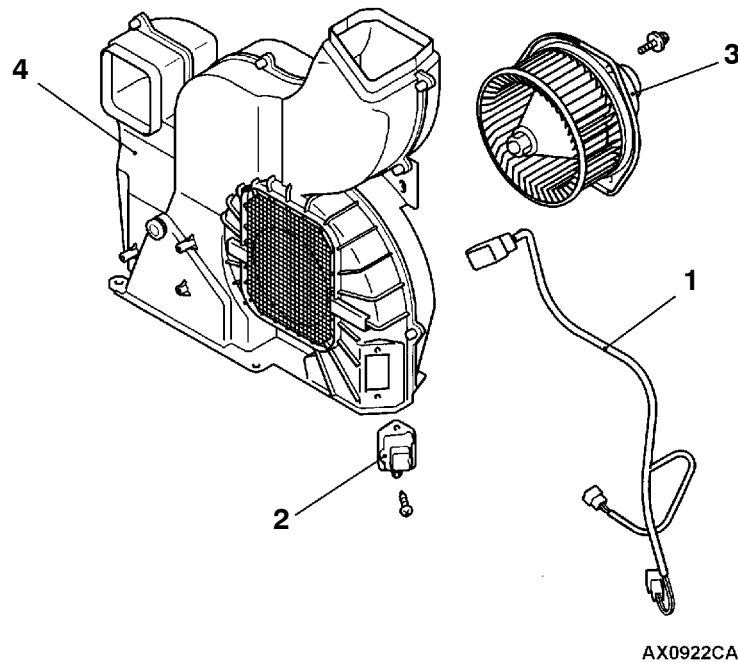
The temperature should be within the shown range.



### Expansion Valve (Magnet Valve) Check

When battery voltage is applied to the magnetic valve terminal No.1 and No.2 terminal is earthed, operating sound should be heard from the magnetic valve.

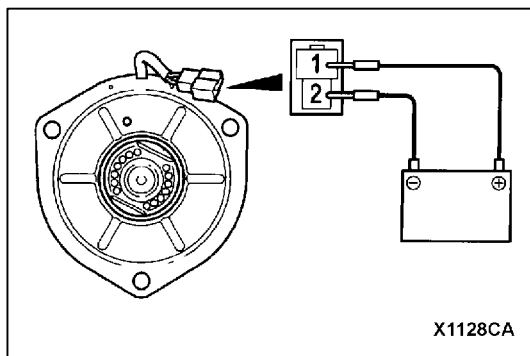
## REAR BLOWER ASSEMBLY DISASSEMBLY AND REASSEMBLY



### Disassembly steps

1. Harness assembly
2. Resistor

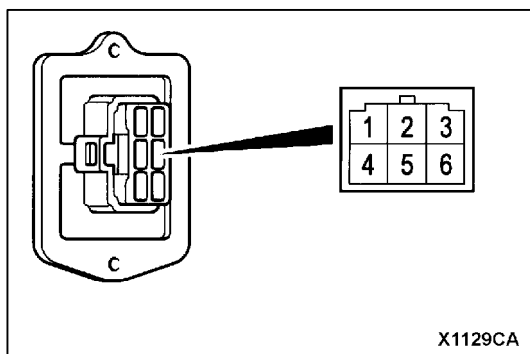
3. Blower motor assembly
4. Case



## INSPECTION

### BLOWER MOTOR CHECK

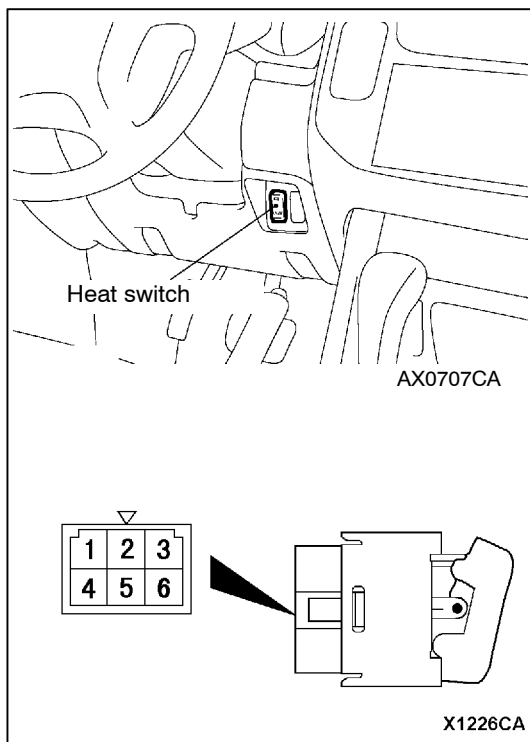
The motor should run when battery voltage is applied between the terminals. In addition, any abnormal sound should not be heard from the motor.



## RESISTOR CHECK

### Standard value:

Terminal to be measured	Standard value $\Omega$
Between terminals No.1 and 6	$4.9 \pm 7\%$
Between terminals No.1 and 3	$1.25 \pm 7\%$



## HEAT SWITCH <4M41>

## INSPECTION

### HEAT SWITCH CHECK

Switch position	Terminal No.						
	1	2	IND	6	3	ILL	4
OFF position	○	○	○	○	○	○	○
ON position	○	○	○	○	○	○	○



# COMPRESSOR

## REMOVAL AND INSTALLATION

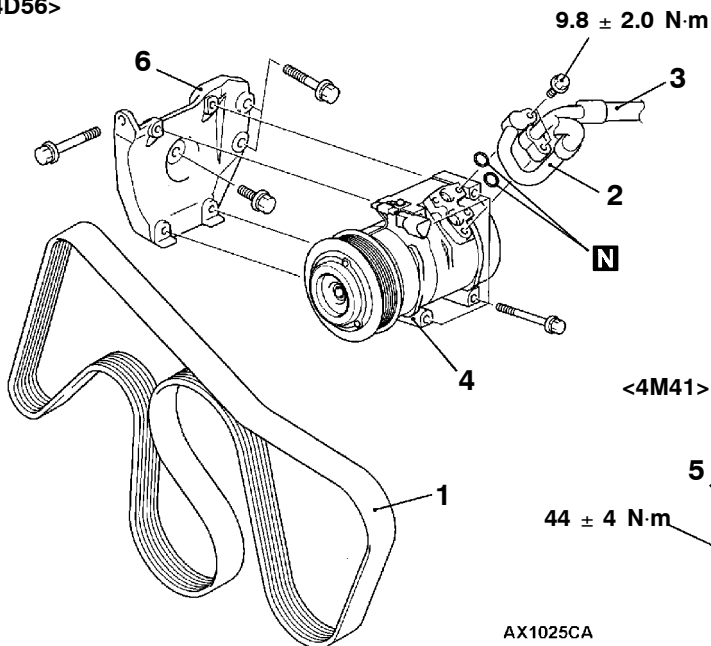
### Pre-removal Operations

- Refrigerant Discharge (Refer to P.55A-9.)
- Air Duct A Removal (Refer to GROUP 15 – Air Cleaner.)
- Condense Tank Removal (Refer to GROUP 14 – Radiator.)

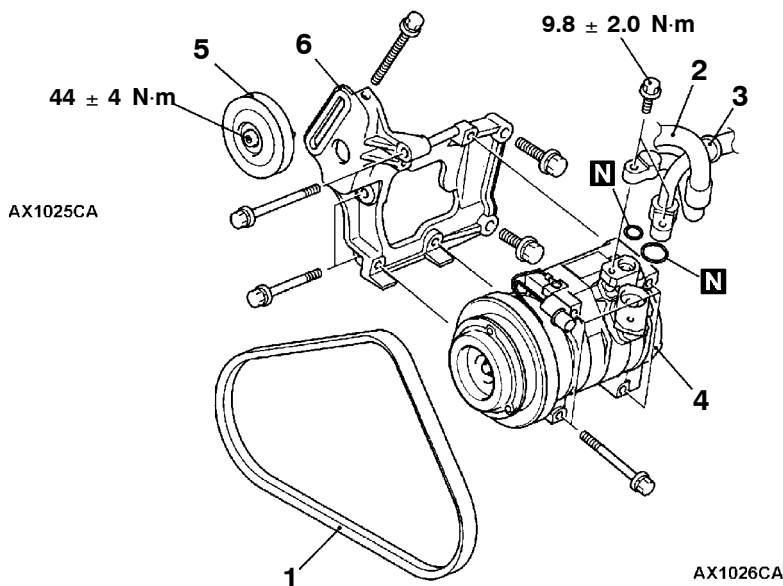
### Post-installation Operations

- Refrigerant Charge (Refer to P.55A-9.)
- Condense Tank Installation (Refer to GROUP 14 – Radiator.)
- Air Duct A Installation (Refer to GROUP 15 – Air Cleaner.)
- Drive Belt Tension Check (Refer to GROUP 11A, B - On-vehicle Service.)

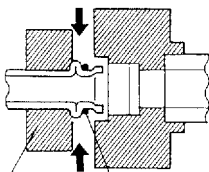
&lt;4D56&gt;



&lt;4M41&gt;



Pipe connections



2, 3

O-ring

A20Z0006

A/C compressor oil:  
DENSO OIL 8

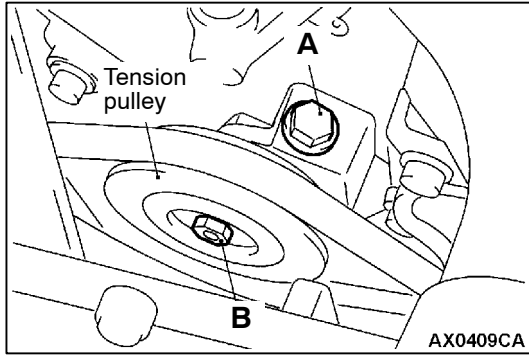
### Removal steps



1. Drive belt
2. Discharge flexible hose connection
3. Suction flexible hose connection



4. Compressor
5. Tension pulley assembly
6. Compressor bracket



## REMOVAL SERVICE POINTS

### ◀A▶ DRIVE BELT REMOVAL

Loosen tension pulley mounting bolt A and adjusting bolt B in that order, and then remove the drive belt.

#### Caution

If the drive belt is reused, mark an arrow indicating rotation direction (clockwise direction) on the belt surface with a chalk.

### ◀B▶ DISCHARGE FLEXIBLE HOSE/SUCTION FLEXIBLE HOSE DISCONNECTION

Plug the disconnect hoses and the compressor nipples to prevent dust or foreign material from entering them.

#### Caution

Use a plug, which air does not penetrate through. Compressor oil and receiver absorb moisture easily.

### ◀C▶ COMPRESSOR REMOVAL

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

**Except vehicles with rear cooler:**

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

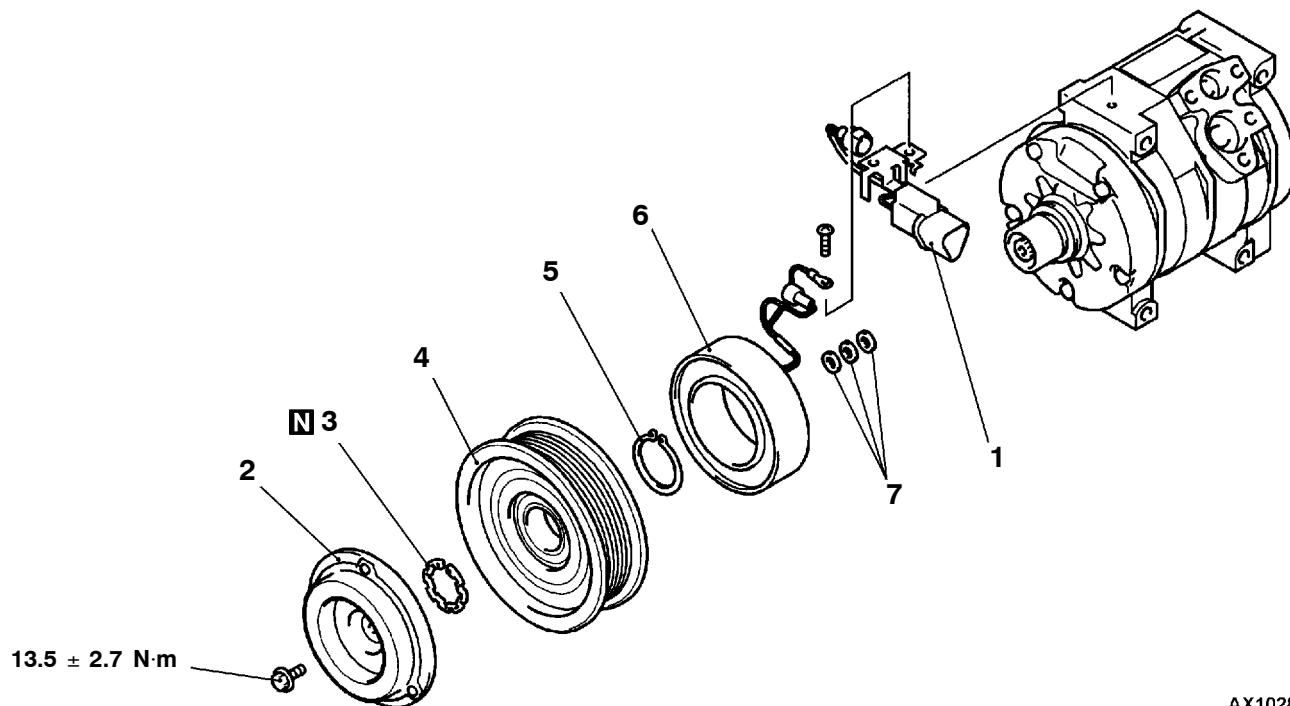
**Vehicles with rear cooler, dual A/C:**

$$140 \text{ mL} - X \text{ mL} = Y \text{ mL}$$

#### NOTE

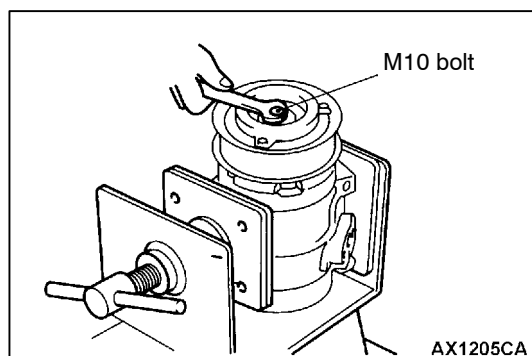
- (1) The above amounts (120 mL and 140 mL) indicate the factory-charged amount inside a new compressor.
- (2) Y mL indicates the amount of oil in the refrigerant line, the condenser, the evaporator, etc.

## DISASSEMBLY AND REASSEMBLY

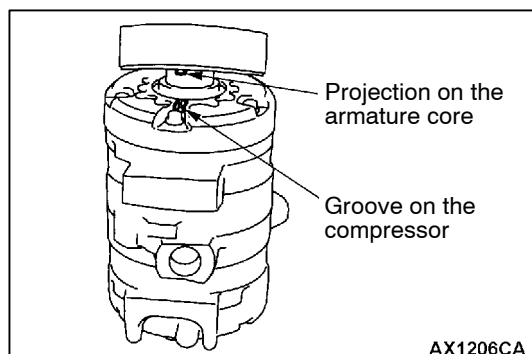
**Disassembly steps**

- C◄ ● Air gap adjustment
- A◄ 1. Connector
- B◄ 2. Armature
3. Snap ring

- A◄ 4. Rotor
5. Snap ring
6. Field core
7. Washer

**DISASSEMBLY SERVICE POINT****►A► ARMATURE REMOVAL**

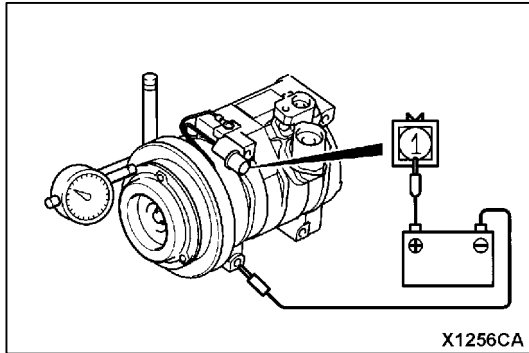
1. Remove the armature mounting bolt.
2. Tighten the M10 bolt in the armature bolt hole to disengage the shaft from the armature serration.

**ASSEMBLY SERVICE POINT****►A◄ FIELD CORE INSTALLATION**

Align the compressor groove with the field core projection to install the field core.

**►B◄ SNAP RING INSTALLATION**

Be careful not to expand the snap ring excessively. If the inside diameter of the snap ring exceeds 30.5 mm due to excessive expansion, replace it.

**►C◄ AIR GAP ADJUSTMENT**

Apply battery voltage to the magnetic clutch, and check that the clutch air gap is within the standard value.

If not within the standard value, use a washer to adjust the air gap.

**Standard value: 0.35 - 0.65 mm**

**NOTE**

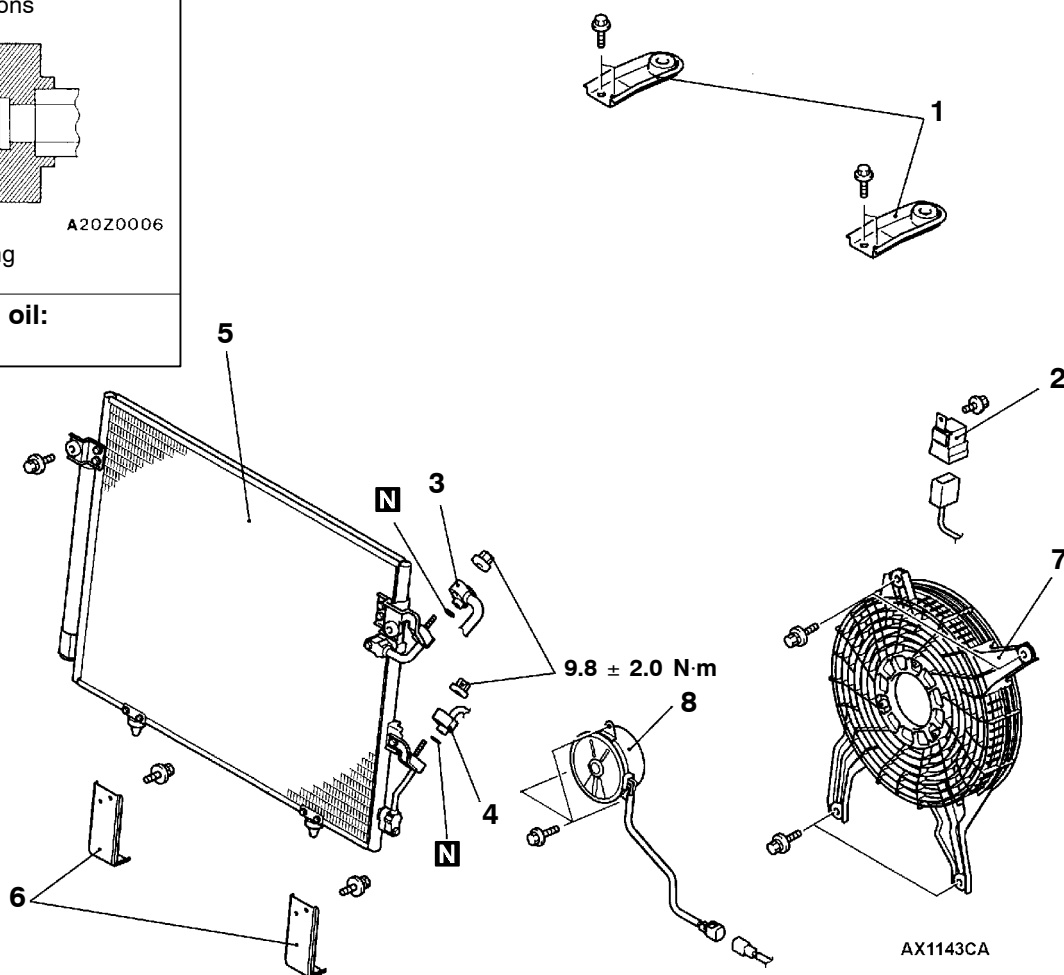
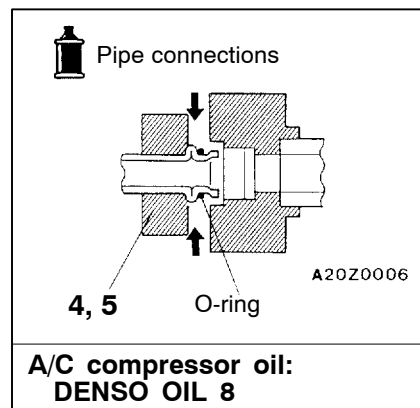
The washers are available in three thicknesses (0.1 mm, 0.3 mm, 0.5 mm).

# CONDENSER ASSEMBLY AND CONDENSER FAN

## REMOVAL AND INSTALLATION

### Pre-removal and Post-installation Operations

- Refrigerant Discharge and Refilling (Refer to P.55-9.)
- Radiator Grille and Skid Plate Removal and Installation (Refer to GROUP 51 – Front Bumper.)
- Air Duct A Removal and Installation (Refer to GROUP 15 – Air Cleaner.)
- Condenser Tank Removal and Installation (Refer to GROUP 14 - Radiator.)
- Oil Reservoir Mounting Bolt Removal and Installation (Refer to GROUP 37 – Oil Line.)



### Condenser assembly removal steps

1. Radiator bracket
2. PTC heater relay <4M41>
3. Discharge flexible hose connection
4. Liquid pipe A connection

5. Condenser

6. Condenser bracket

### Condenser fan removal steps

7. Condenser fan assembly
8. Motor assembly

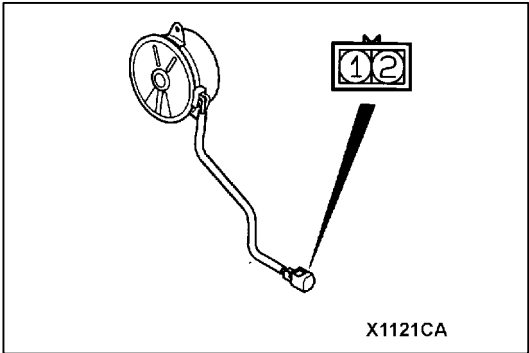


REMOVAL SERVICE POINT

◀A▶ DISCHARGE FLEXIBLE HOSE/LIQUID PIPE A  
DISCONNECTION

Plug the disconnected hoses, pipes and the condenser nipples to prevent system contamination.

**Caution**  
Use a plug, which air does not penetrate through.  
Compressor oil and receiver absorb moisture easily.



INSPECTION

MOTOR ASSEMBLY CHECK

Battery connection terminal		Motor operation
1	2	
⊕	⊖	Turns

# REFRIGERANT LINE

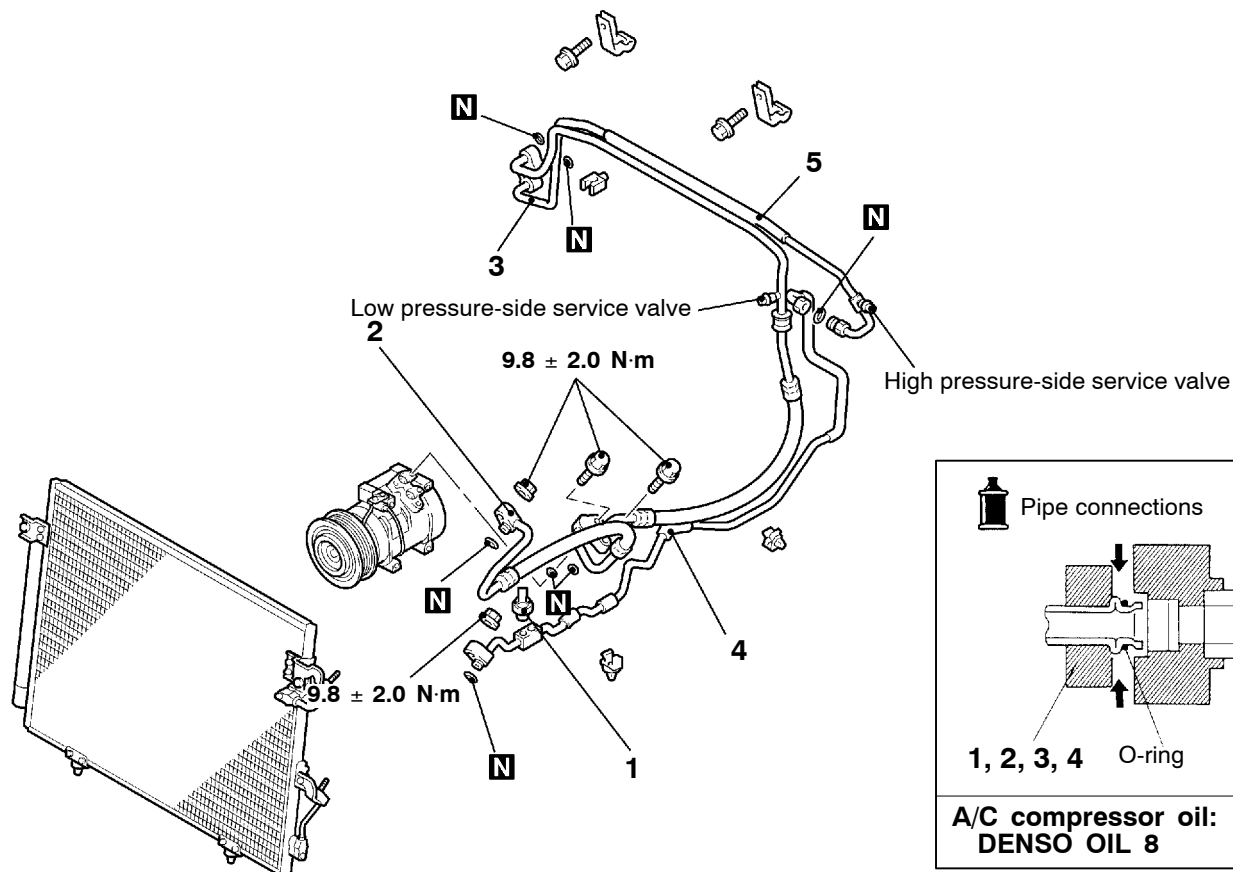
## REMOVAL AND INSTALLATION

### <L.H. drive vehicles>

#### Pre-removal and Post-installation Operations

- Refrigerant Discharge and Refilling (Refer to P.55-9.)
- Condense Tank Removal and Installation (Refer to GROUP 14 – Radiator.)
- Engine Cover Removal
- Battery, Battery Tray Removal and Installation

### <Single A/C>



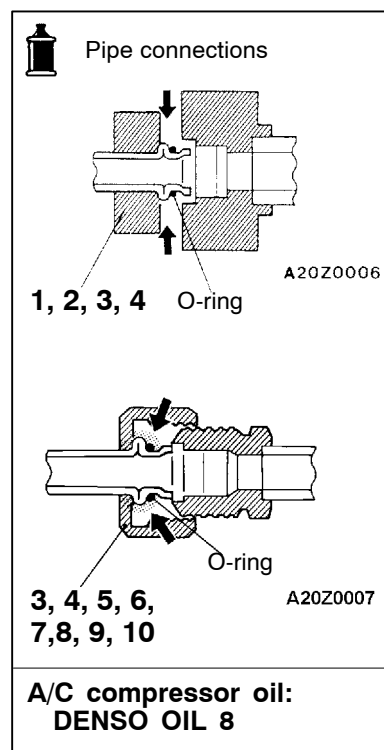
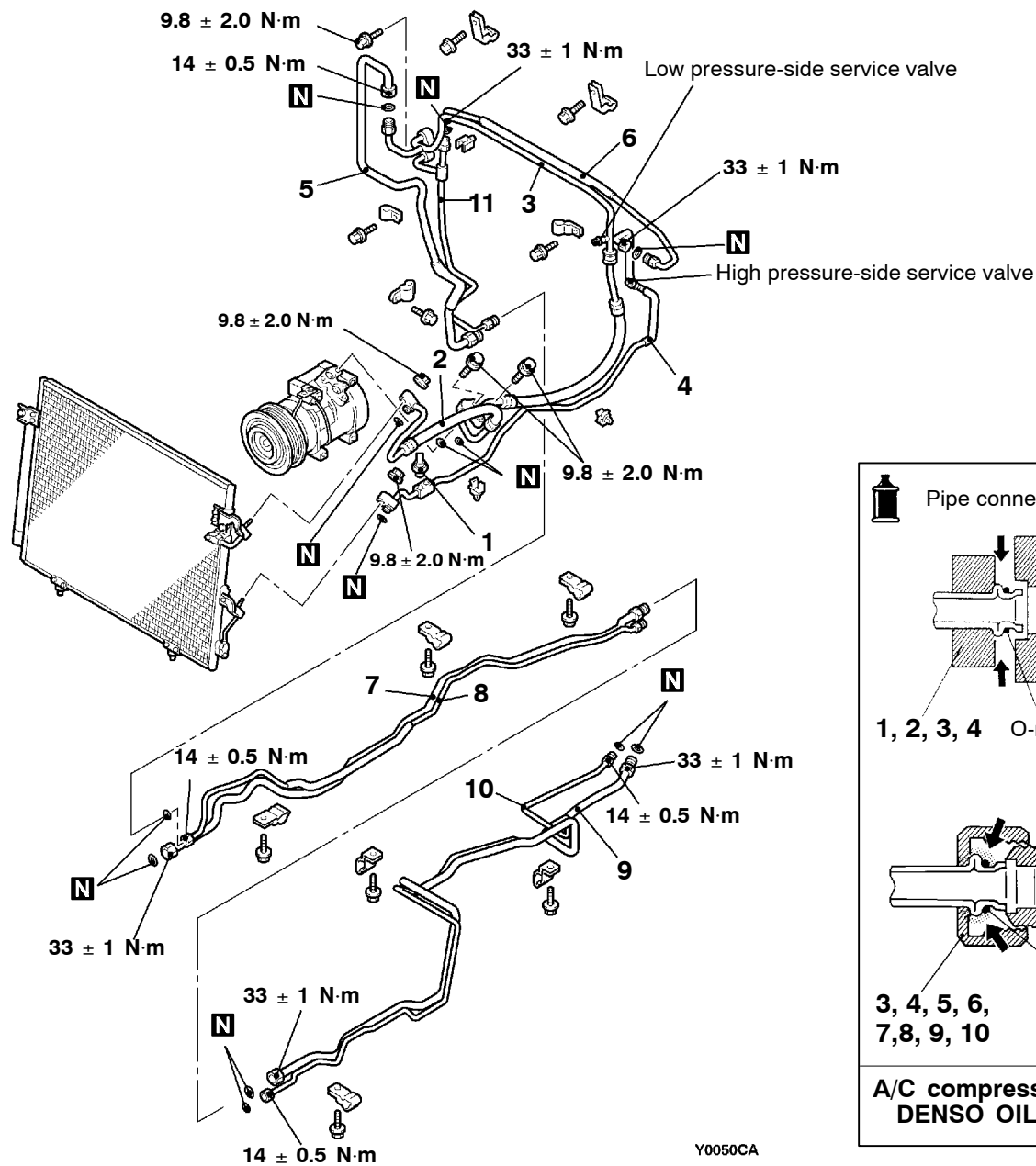
Y0052CA

#### Removal steps

1. Dual pressure switch
2. Discharge flexible hose
3. Suction flexible hose

4. Liquid pipe A
5. Liquid pipe B

&lt;Dual A/C&gt;

**Removal steps**

1. Dual pressure switch
2. Discharge flexible hose
3. Suction flexible hose
4. Liquid pie A
5. Suction pipe A
6. Liquid pipe B



7. Suction pipe B
8. Liquid pipe C
9. Suction pipe C
10. Liquid pipe D
11. Liquid pipe E

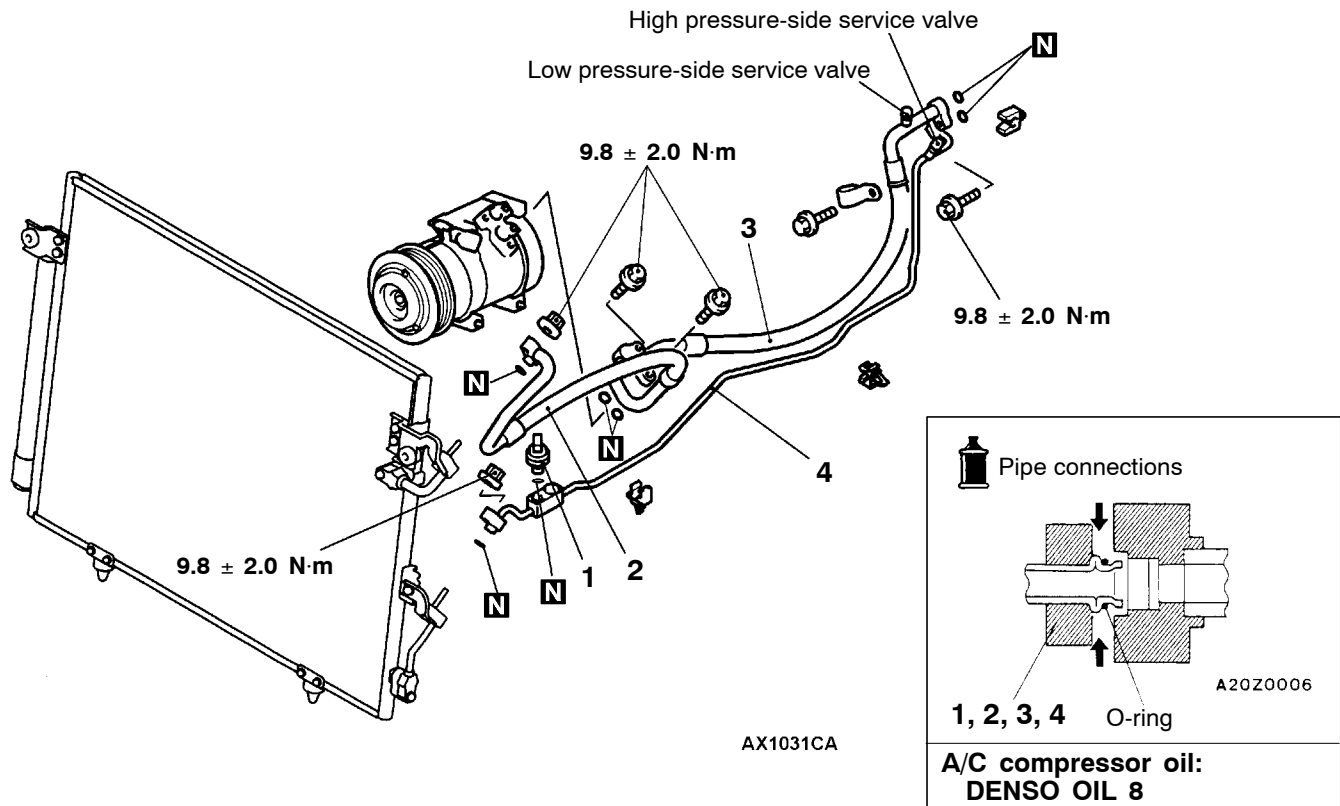


## &lt;R.H. drive vehicles&gt;

**Pre-removal and Post-installation Operations**

- Refrigerant Discharge and Refilling (Refer to P.55-9.)
- Condense Tank Removal and Installation (Refer to GROUP 14 – Radiator.)
- Engine Cover Removal
- Battery, Battery Tray Removal and Installation

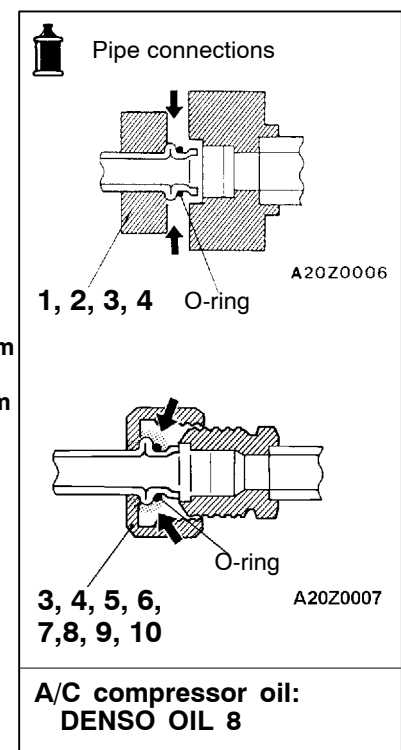
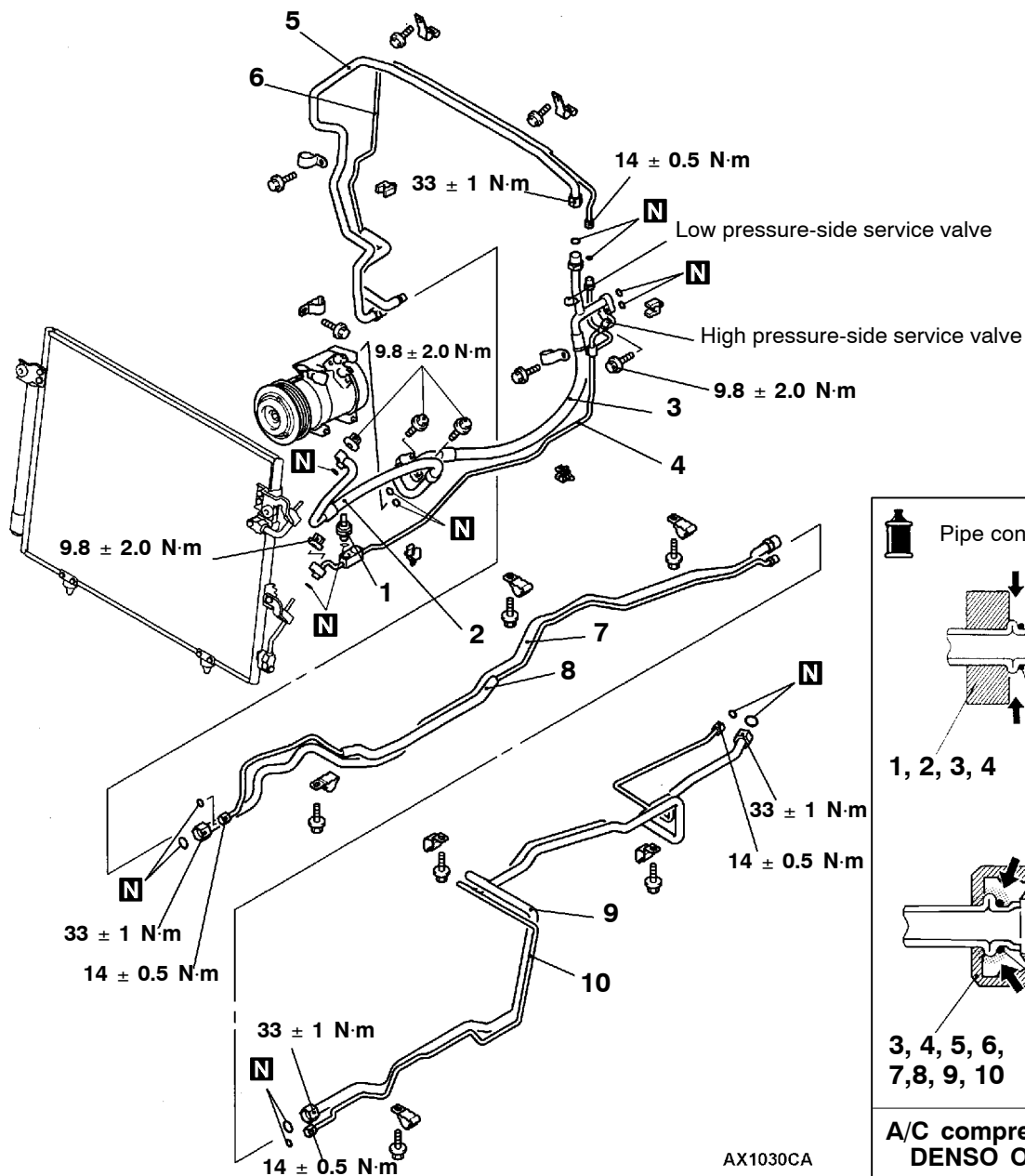
## &lt;Single A/C&gt;

**Removal steps**

1. Dual pressure switch
2. Discharge flexible hose

3. Suction flexible hose
4. Liquid pipe A

&lt;Dual A/C&gt;

**Removal steps**

1. Dual pressure switch
2. Discharge flexible hose
3. Suction flexible hose
4. Liquid pie A
5. Suction pipe A



6. Liquid pipe B
7. Suction pipe B
8. Liquid pipe C
9. Suction pipe C
10. Liquid pipe D

**REMOVAL SERVICE POINT****◀A▶ HOSE/PIPE DISCONNECTION**

Plug the condenser, the compressor and the heater unit nipples to prevent system contamination.

**Caution**

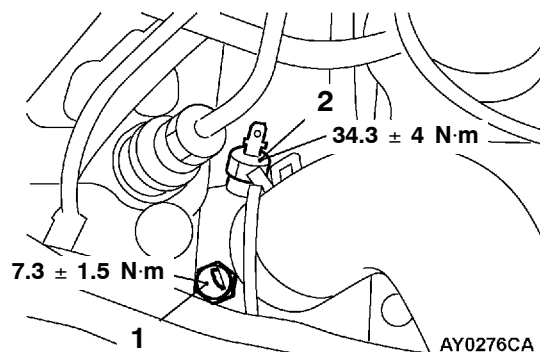
Use a plug, which air does not penetrate through. Compressor oil and receiver absorb moisture easily.

## ENGINE COOLANT TEMPERATURE SWITCH<4D56>

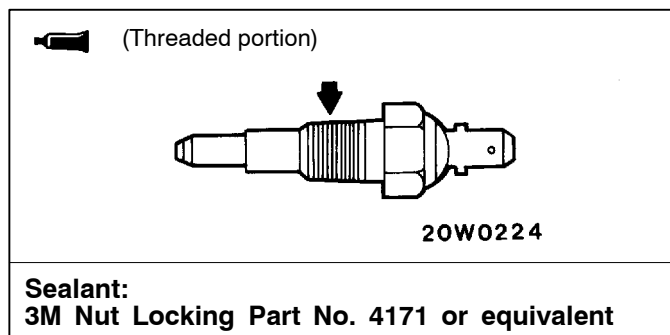
### REMOVAL AND INSTALLATION

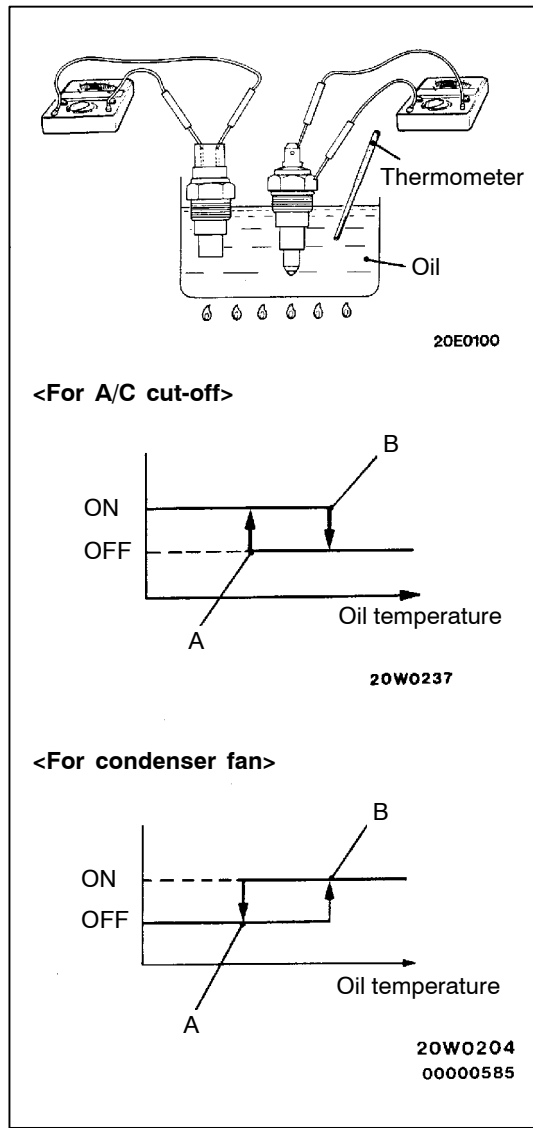
**Pre-removal and Post-installation Operation**

- Coolant Refilling (Refer to GROUP 14 - On-vehicle Service.)
- Intercooler Removal and Installation <Vehicles with intercooler> (Refer to GROUP 15.)



1. Engine coolant temperature switch (for A/C cut-off)
2. Engine coolant temperature switch (for condenser fan)





## INSPECTION

### ENGINE COOLANT TEMPERATURE SWITCH CONTINUITY CHECK

- Dip the engine coolant temperature switch in oil and heat the oil with a gas burner or similar item.

#### Caution

**Do not heat any more than is necessary.**

- Check the continuity with a circuit tester as the temperature of the oil changes, and the condition is normal if the continuity is within the following ranges.

#### Standard value:

Engine coolant temperature switch	Temperature	Continuity
For A/C cut-off	Less than 108 °C (Temperature at point A)	ON (Continuity)
	More than 115 °C (Temperature at point B)	OFF (No continuity)
For condenser fan	Less than 97 °C (Temperature at point A)	OFF (No continuity)
	More than 102 °C (Temperature at point B)	ON (Continuity)

# IDLE-UP SYSTEM <Diesel-powered Vehicles>

## REMOVAL AND INSTALLATION

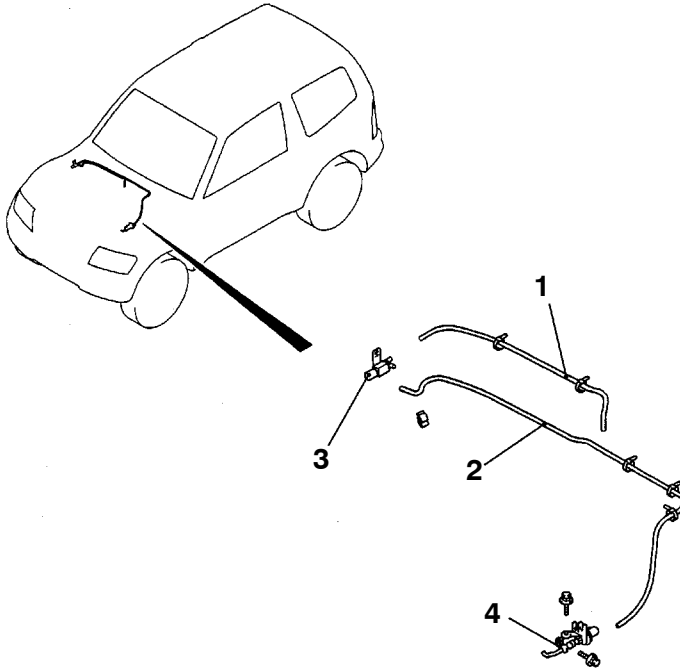
### Pre-removal Operation

Intercooler Removal <Vehicle with intercooler> (Refer to GROUP 15.)

### Post-installation Operation

- Accelerator Cable Adjustment (Refer to GROUP 17 - On-vehicle Service.)
- Throttle Cable Adjustment <A/T> (Refer to GROUP 23 - On-vehicle Service.)
- Intercooler Installation <Vehicles with intercooler> (Refer to GROUP 15.)
- Idle-up Operation Check (Refer to P. 55-16.)

### <R.H. drive vehicles>

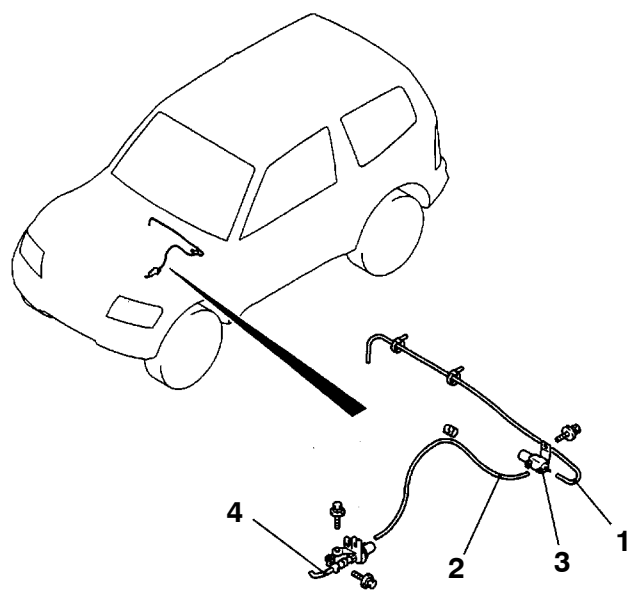


AY0277CA

### Idle-up solenoid valve removal steps

1. Vacuum hose (white stripe) connection
2. Vacuum hose (yellow stripe) connection
3. Idle-up solenoid valve
4. Solenoid valve bracket B
5. Solenoid valve bracket A

### <L.H. drive vehicles>



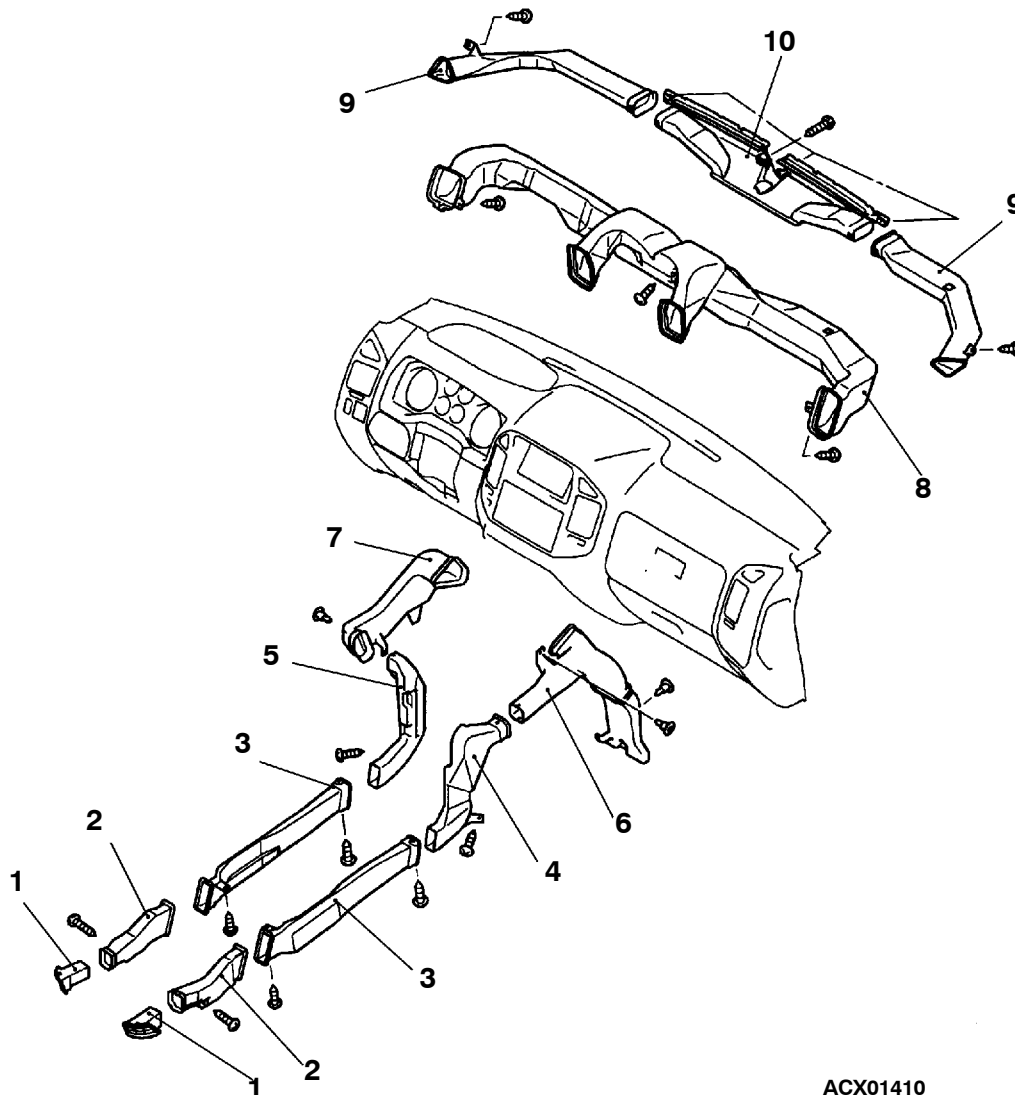
AY0275CA

### Vacuum actuator assembly removal steps

2. Vacuum hose (yellow stripe) connection
6. Accelerator cable connection
7. Split pin <A/T>
8. Throttle cable connection <A/T>
9. Vacuum hose (blue stripe) <Vehicles with ABS>
10. Vacuum actuator assembly

## DUCTS

### FRONT A/C DUCT REMOVAL AND INSTALLATION



ACX01410

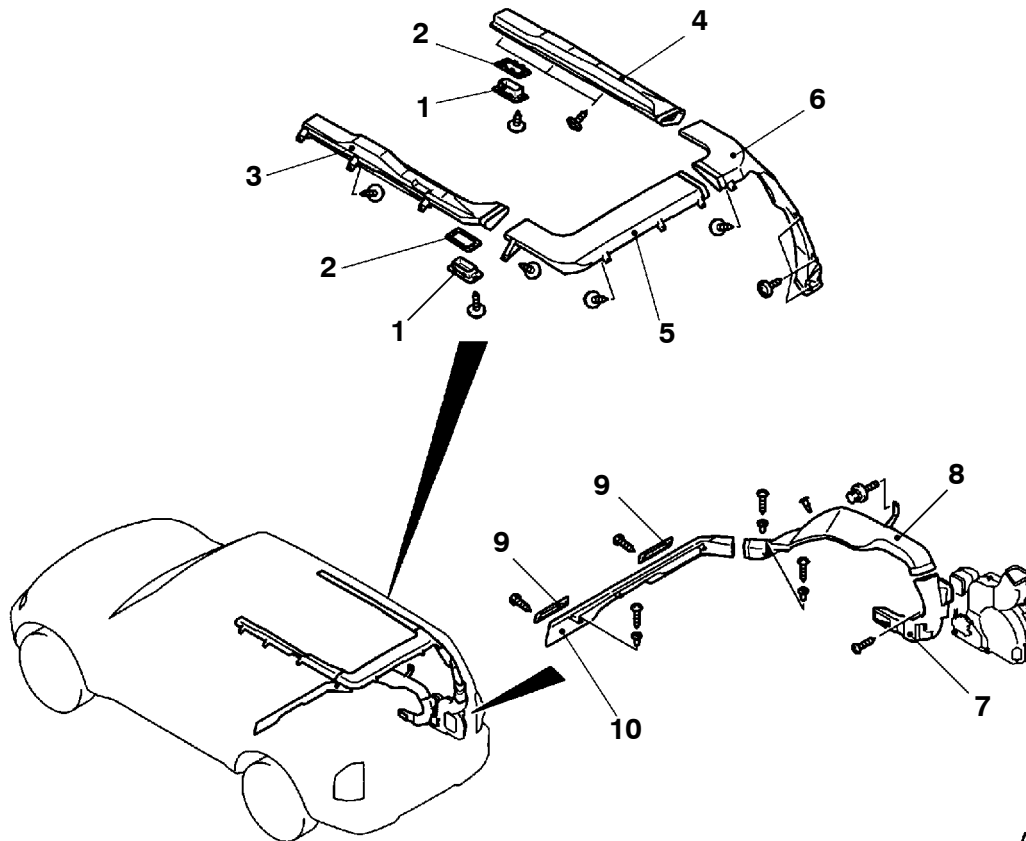
#### Rear heater duct removal steps

- Front floor console and rear floor console (Refer to GROUP 52A.)
- 1. Foot grille
- 2. Rear heater duct B
- 3. Rear heater duct A

#### Defroster nozzle, distribution duct and foot duct removal steps

- Instrument panel (Refer to GROUP 52A.)
- 4. Foot duct B
- 5. Foot duct D
- 6. Foot duct A
- 7. Foot duct C
- 8. Distribution duct
- 9. Side defroster duct
- 10. Defroster nozzle assembly

## REAR A/C DUCT REMOVAL AND INSTALLATION



AX1063CA

### Rear roof duct removal steps

- Upper quarter trim (R.H.)  
(Refer to GROUP 52-Trims.)
- 1. Air outlet assembly
- 2. Retainer
- Head lining
- 3. Roof duct (L.H.)
- 4. Roof duct (R.H.)
- 5. Rear roof duct
- 6. Pillar duct

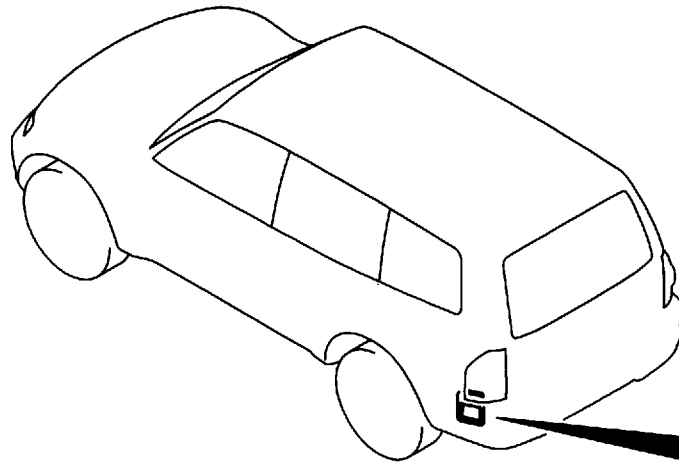
### Rear floor duct removal steps

- Upper quarter trim (R.H.), lower  
quarter trim (R.H.)  
(Refer to GROUP 52 - Trims.)
- 7. Rear quarter duct
- 8. Rear floor duct A
- 9. Rear heater grille
- Floor carpet
- 10. Rear floor duct B

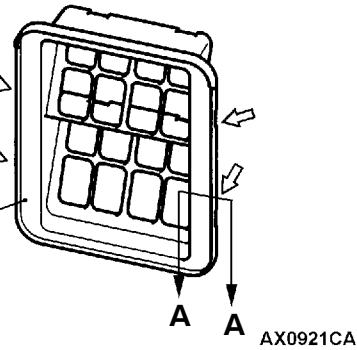
## VENTILATION

### REMOVAL AND INSTALLATION

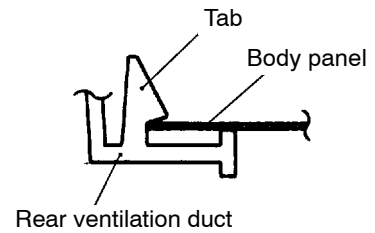
**Pre-removal and Post-installation Operations**  
Rear Bumper Removal and Installation (Refer to GROUP 51.)



Rear ventilation duct



#### Section A – A



AV0545AA

#### NOTE

↔ : indicates the tab positions.



---

# Service Bulletins


Click on the applicable bookmark to select the Service Bulletin.

---



# SERVICE BULLETIN

TECHNICAL SERVICE PLANNING  
INTERNATIONAL CAR ADMINISTRATION OFFICE. MITSUBISHI MOTORS CORPORATION

<b>SERVICE BULLETIN</b>		NO. : MSB-01E55-502	
		DATE : 2001-1-20	<MODEL>      <M/Y> (EC)PAJERO PI-      00-10 NIN(H60,H70)      01-10 (EC)PAJ-      99-10 ERO(V60,70)      93-10 (EC)SPACE RUN-      97-10 NER/SPACE WAG-      95-10 ON(N60,80,90)      95-10 (EC)COLT/LANC-      99-10 ER(CK01,CJ0A) (EC)L200(K00T,K30T )      97-10 (EC)L300(P00) (EC)L400(PA0-PD0) (EC)PAJERO SPORT(K80W,K90W ) (EC)SPACE STAR (EC)CARISMA (EC)GALANT(EA0A)
SUBJECT : AIR CONDITIONING REFRIGERANT PROCEDURE			
GROUP : HEATER, A/C & VENTILATION		DRAFTNO. : 00AL112911	
CORRECTION	INTERNATIONAL CAR ADMINISTRATION OFFICE	 T. MASAKI - MANAGER TECHNICAL SERVICE PLANNING	

## 1. Description:

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

## 2. Applicable Manuals:

Manual	Pub. No.	Page
'00 PAJERO PININ/MONTERO io Workshop Manual	CKRE00E1 (English) CKRS00E1 (Spanish) CKRF00E1 (French) CKRG00E1 (German) CKRD00E1 (Dutch)	55-13
'99 SPACE RUNNER/SPACE WAGON Workshop Manual	PWDE9803 (English) PWDS9804 (Spanish) PWDF9805 (French) PWDG9806 (German) PWDD9807 (Dutch) PWDW9808 (Swedish)	55-13
'96 COLT/LANCER Workshop Manual	PWME9511 (English) PWMS9512 (Spanish) PWMF9513 (French) PWMG9514 (German) PWMD9515 (Dutch) PMMW9516 (Swedish)	55-13

Manual	Pub. No.	Page
'01 PAJERO/MONTERO Workshop Manual VOL.2	PWJE0001 (English) PWJS0002 (Spanish)	55A-14
'95 L300 Workshop Manual	PWWE9409 (English)	55-67-4

#### CD-ROM

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

### 3. Details:

<Correct>

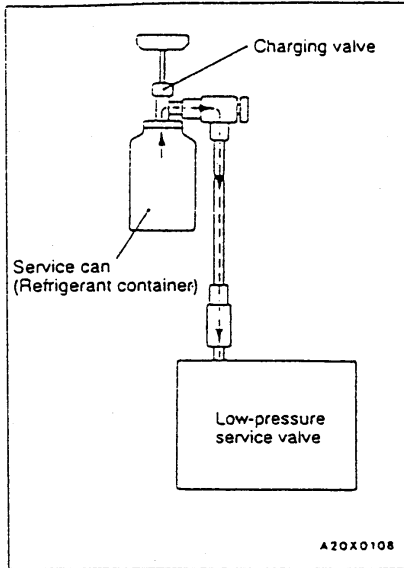
#### DISCHARGING SYSTEM

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

#### NOTE

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

### HEATER, AIR CONDITIONER AND VENTILATION – On-vehicle Service



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

#### Caution

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

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

#### NOTE

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

<Incorrect>

#### DISCHARGING SYSTEM

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

#### NOTE

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

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

#### NOTE

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

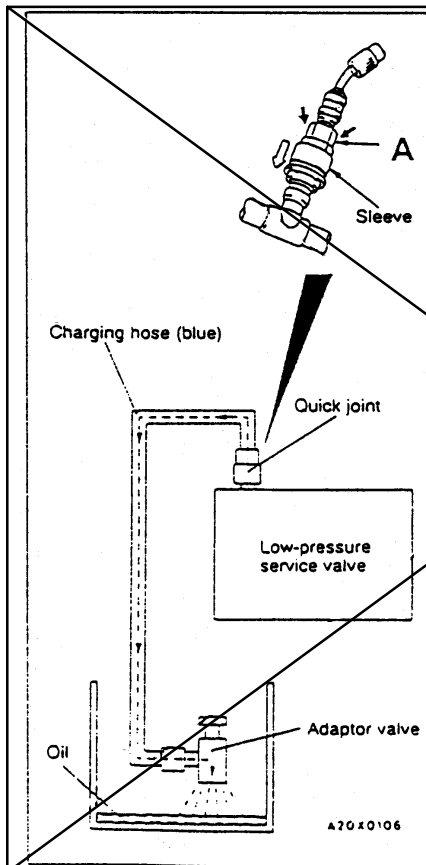
#### Caution

To connect the quick joint, press section "A" firmly against the service valve until a click is heard. When connecting, run your hand along the 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

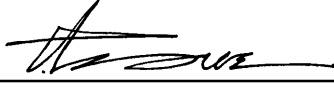
Any oil remaining in the container should be returned to the A/C system.





# SERVICE BULLETIN

SERVICE PUBLICATION & TRAINING  
INTERNATIONAL AFTER-SALES DEPARTMENT. MITSUBISHI MOTORS CORPORATION

SERVICE BULLETIN		NO. : MSB-02E55-001	
		DATE : 2002-03-20	<MODEL> (EC)PAJERO/ MONTERO (V60,V70)
SUBJECT : CHANGE TO AIR CONDITIONER REFRIGERANT QUANTITY		<M/Y> 02-02	
GROUP : HEATER, A/C & VENTILATION		DRAFTNO. : 02SY003	
INFORMATION	INTERNATIONAL AFTER-SALES DEPARTMENT	 T. Inoue - Manager SERVICE PUBLICATION & TRAINING	

## 1. Description:

This Service Bulletin informs you that the air conditioner refrigerant quantity described in the PAJERO/MONTERO SERVICE MANUAL has been changed.

## 2. Applicable Manuals:

Manual	Pub. No.	Page
2001 PAJERO/MONTERO WORKSHOP MANUAL chassis VOL2	PWJE0001 (2/2) (English)	55A-3, 55B-2
	PWJS0002 (2/2) (Spanish)	
2001-2002 PAJERO/MONTERO WORKSHOP MANUAL CD-ROM	PWJT0008R-B (English, Spanish, German, French)	-
1991-2002 PAJERO/MONTERO WORKSHOP MANUAL CD-ROM	PWJT0101R (English, Spanish, German, French)	-

### 3. Details:

## SERVICE SPECIFICATIONS

Item				Standard value
Idle speed r/min (N or P range)	Diesel	4D56		750 ± 100
		4M41		750 ± 50
Idle-up speed r/min (N or P range)	4D56			925 ± 25
	4M41	A/C	When the A/C is under low or medium load	800 ± 50
			When the A/C is under high load	1,000 ± 50
Water temperature switch °C	A/C cut-off		ON	108
			OFF	115
	Condenser fan		OFF	97
			ON	102
Resistor resistance (Front A/C) Ω	Between terminals 2 and 4			0.39 ± 7 %
	Between terminals 1 and 2			1.49 ± 7 %
	Between terminals 2 and 3			2.79 ± 7 %
Resistance of the rear air conditioner switch (temperature control switch) kΩ <except rear heater (floor console)>				0 – 3
Potentiometer for air mix damper kΩ <Rear heater>				1.2 – 4.8
Resistor resistance [Rear heater (front console)] Ω	Between terminals 1 and 6			4.9 ± 7 %
	Between terminals 1 and 3			1.25 ± 7 %
Resistor resistance [Rear heater (quarter trim), rear heater] Ω	Between terminals 1 and 6			4.9 ± 7 %
	Between terminals 1 and 3			1.25 ± 7 %
Idle-up solenoid valve resistance Ω				40
Air compressor air gap mm				0.35–0.65

## LUBRICANTS

Item		Specified lubricants	Quantity
Compressor oil mL	Except for vehicles with rear cooler	DENSO OIL 8	120 ± 20
	Vehicles with rear cooler	DENSO OIL 8	140 ± 20
Pipe connections		DENSO OIL 8	As required
Refrigerant g	Except for vehicles with rear cooler	R134a (HFC-134a)	550 ± 20 <Old>
	Vehicles with rear cooler	R134a (HFC-134a)	750 ± 20 <Old>

550 750  
<New> <New>