HEATERS AND AIR-CONDITIONING

CONTENTS

GENERAL SPECIFICATIONS

Front heater assembly	
Type	Selective recirculating, hot-water type (air-mix type)
Performance	4,884 kW/h (4,200 kcal/h)
Front heater relay	
Exciting coil rated current	0.2 A
Maximum contact current capacity	20 A
Rear heater assembly	
Type	Warm water type
Performance	2,326 kW/h (2,000 kcal/h)
Air conditioner	
Performance	4,070 kW/h (3,500 kcal/h)
Compressor	
Type	6P148
No. of cylinders and displacement	Inclined-plate type; 6,148 cc (9.03 cu.in.)
Maximum speed	6,000 rpm
Electromagnetic clutch	
Type	Dry, single-plate type
Voltage	12 V
Output	40 W
Condenser fan motor	
Air volume	800 m^3/h
Voltage	12 V
Output	96 W
Speed	2,350 rpm
Control	
Idle-up	850 to 950 rpm when cooler is ON
Icing prevention	1.0°C (22°F) when fin thermo is OFF 4.5°C (39°F) when fin thermo is ON
Quantity of refrigerant to be charged	R12 700^{+300}_{-100} g ($1.54^{+0.66}_{-0.22}$ lb.)

SERVICE SPECIFICATIONS

Heater assembly	
Water hose overlap length mm (in.)	25-30 (1.0-1.2)
Air-conditioning	
Drive belt deflection mm (in.)	17-20 (.7-.8)
Pressure plate to rotor clearance mm (in.)	0.4-0.7 (.02-.03)
Shaft rotating torque Nm (ft.lbs.)	5 (4) or less
Shaft starting torque Nm (ft.lbs.)	5 (4) or less

TORQUE SPECIFICATIONS

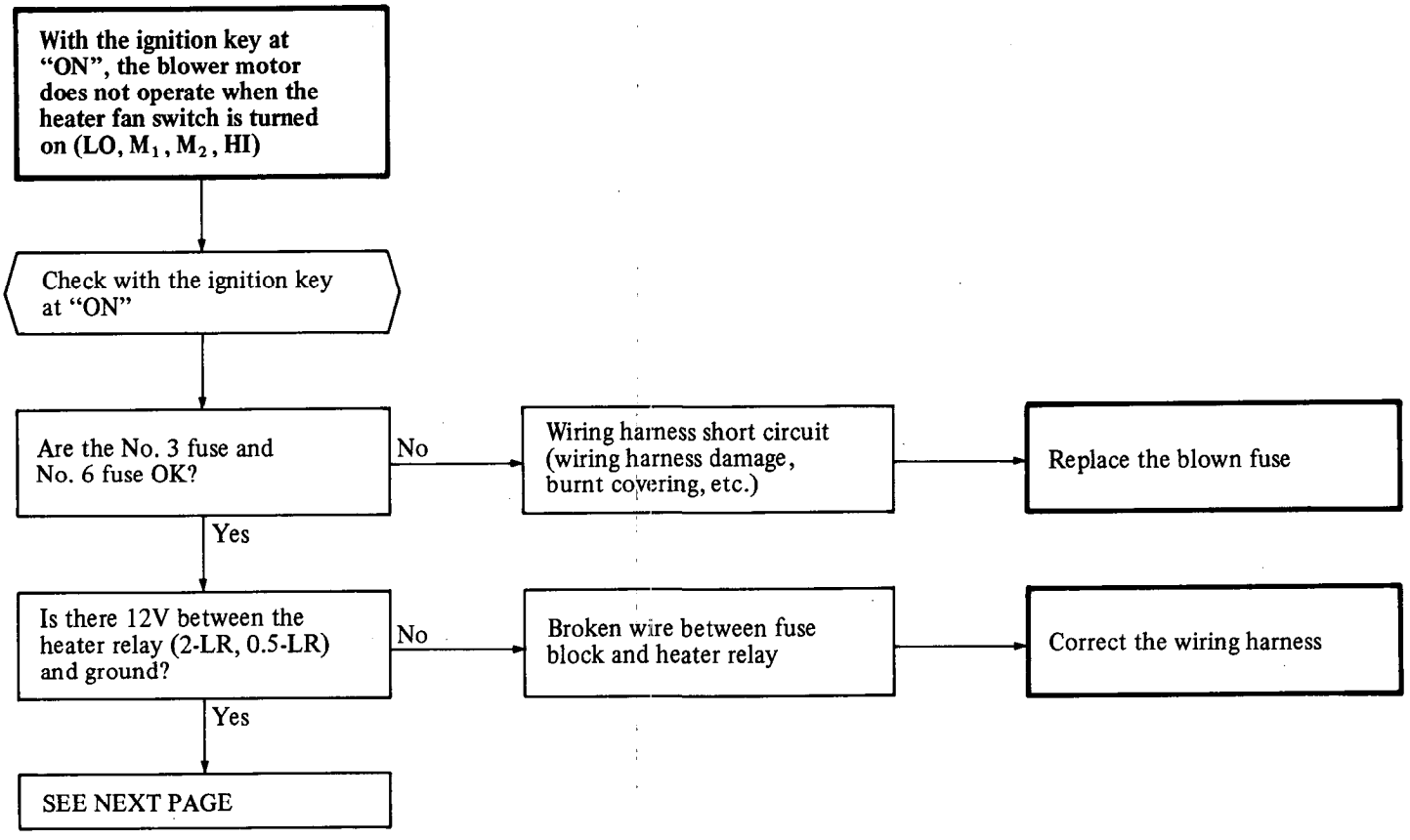
	Nm (ft.lbs.)
Heater assembly	
Water hose clamp bolts	1.3-1.8 (0.9-1.3)
Air conditioner	
Center piece securing nut	15-17 (11-13)
Discharge and suction service valve mounting bolts	25-26 (18-20)
Front housing through bolt	2.5-2.6 (1.8-2.0)

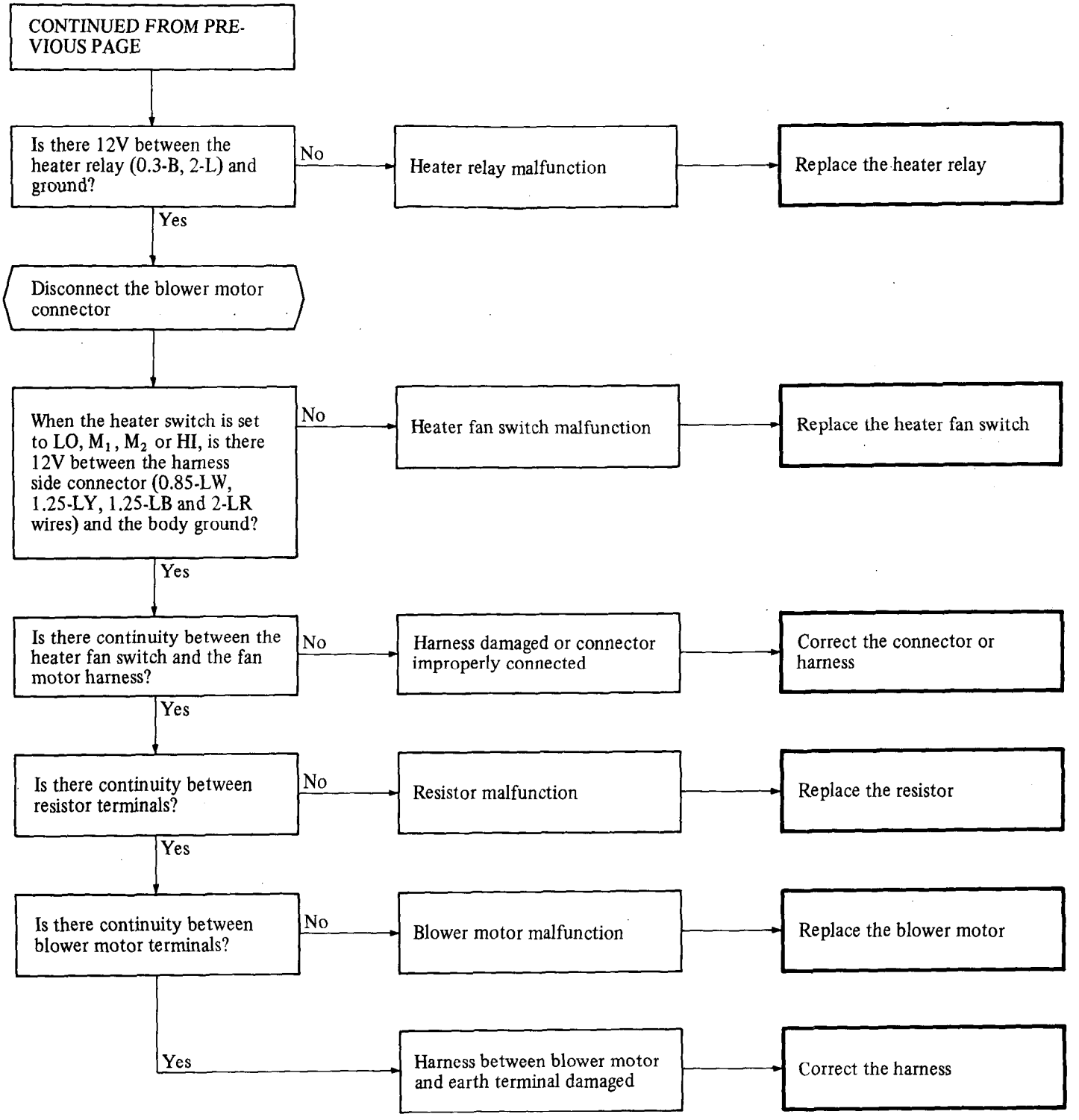
LUBRICANTS

	Specified lubricant	Quantity
Heater assembly		
Heater control lever	Multipurpose grease SAEJ310a, NLGI grade #2	As required
Air conditioner		
Compressor oil	DENSOIL 6 [SUNISO 5GS (VG100)] or equivalent	Total : approx. 170 ± 30 cc (10.37 ± 1.83 cu.in.)

FRONT HEATER

Symptom	Probable cause	Remedy
The temperature cannot be regulated by operating the hot-water flow control lever	Clogged or stuck water valve	Repair or replace the water valve
	Incorrect installation of hot-water flow control cable	Adjust the hot-water flow control cable
	Incorrect adjustment of water valve link	Adjust the water valve link
No ventilation even when air outlet changeover lever is operated	Incorrect adjustment of changeover dampers	Adjust the air outlet changeover cable
	Loose duct connection	Connect the duct securely
Abnormal sound from blower motor	Foreign matter inside blower	Remove foreign matter
	Incorrect balance of blower motor or fan	Replace the blower motor or fan
	Damaged blower	Replace
Dust enters passenger compartment	Ventilator duct connection malfunction	Connect the duct securely or replace the packing
	Incorrect adjustment of recirculation/fresh air changeover damper	Adjust the recirculation/fresh air changeover cable

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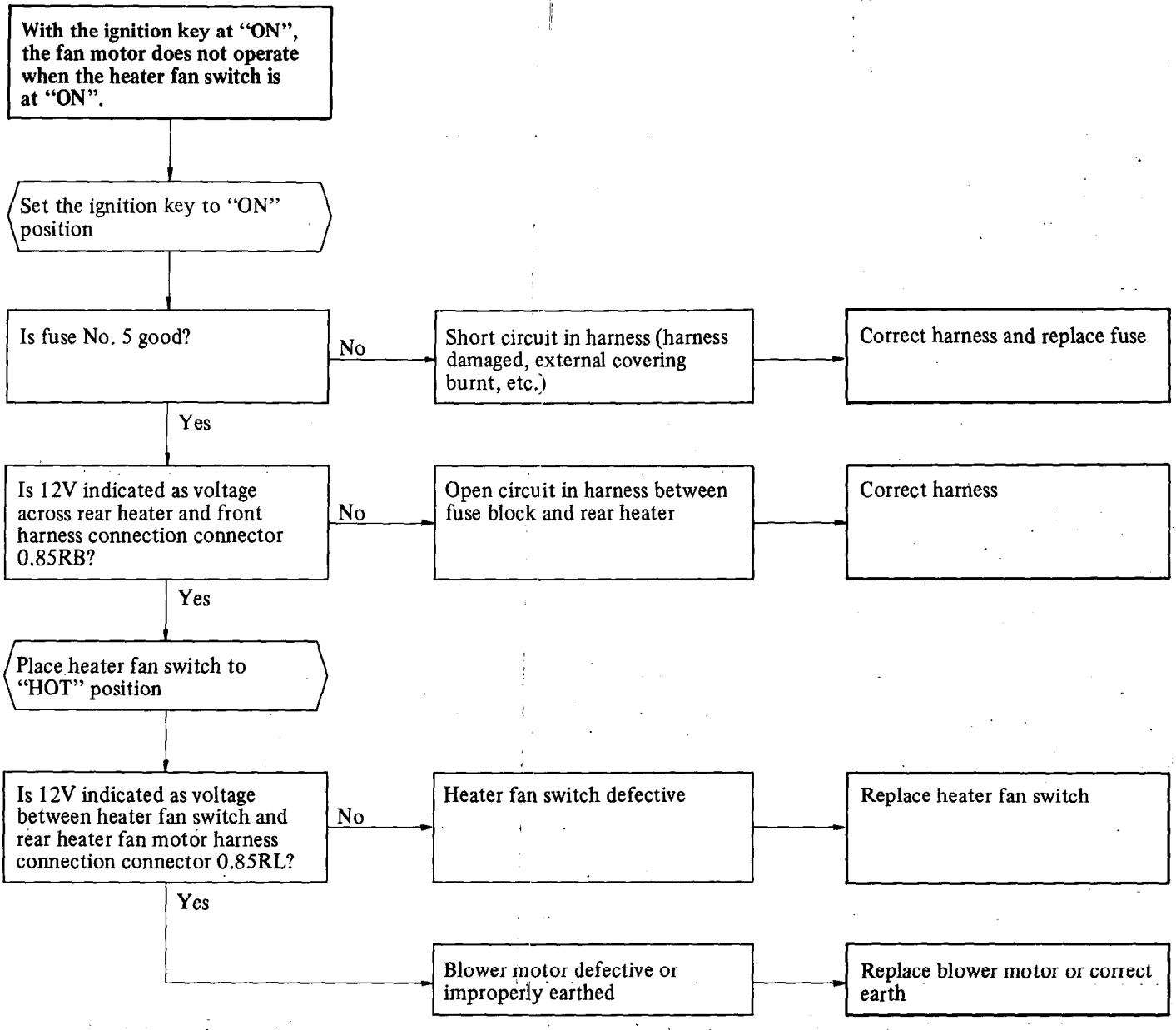
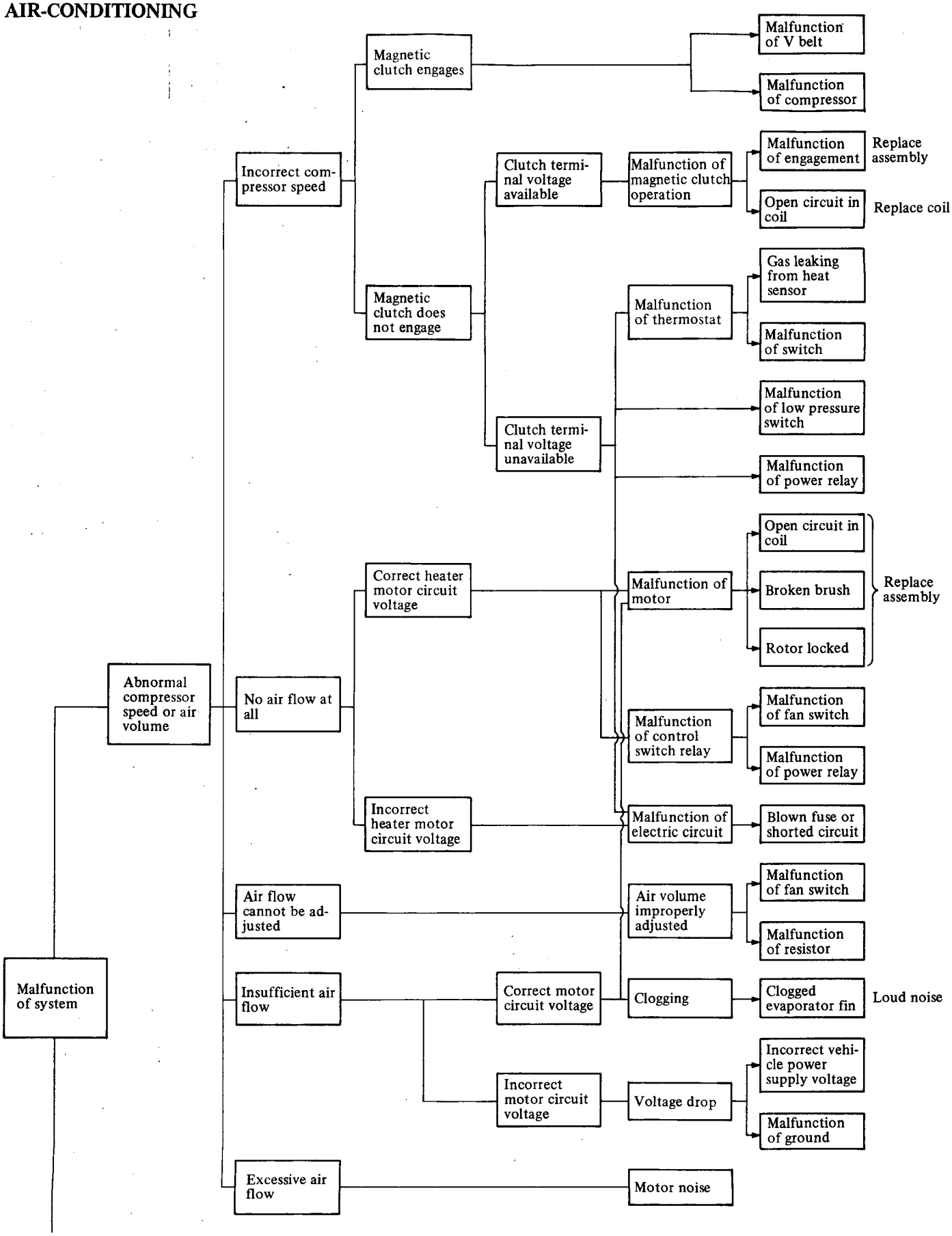
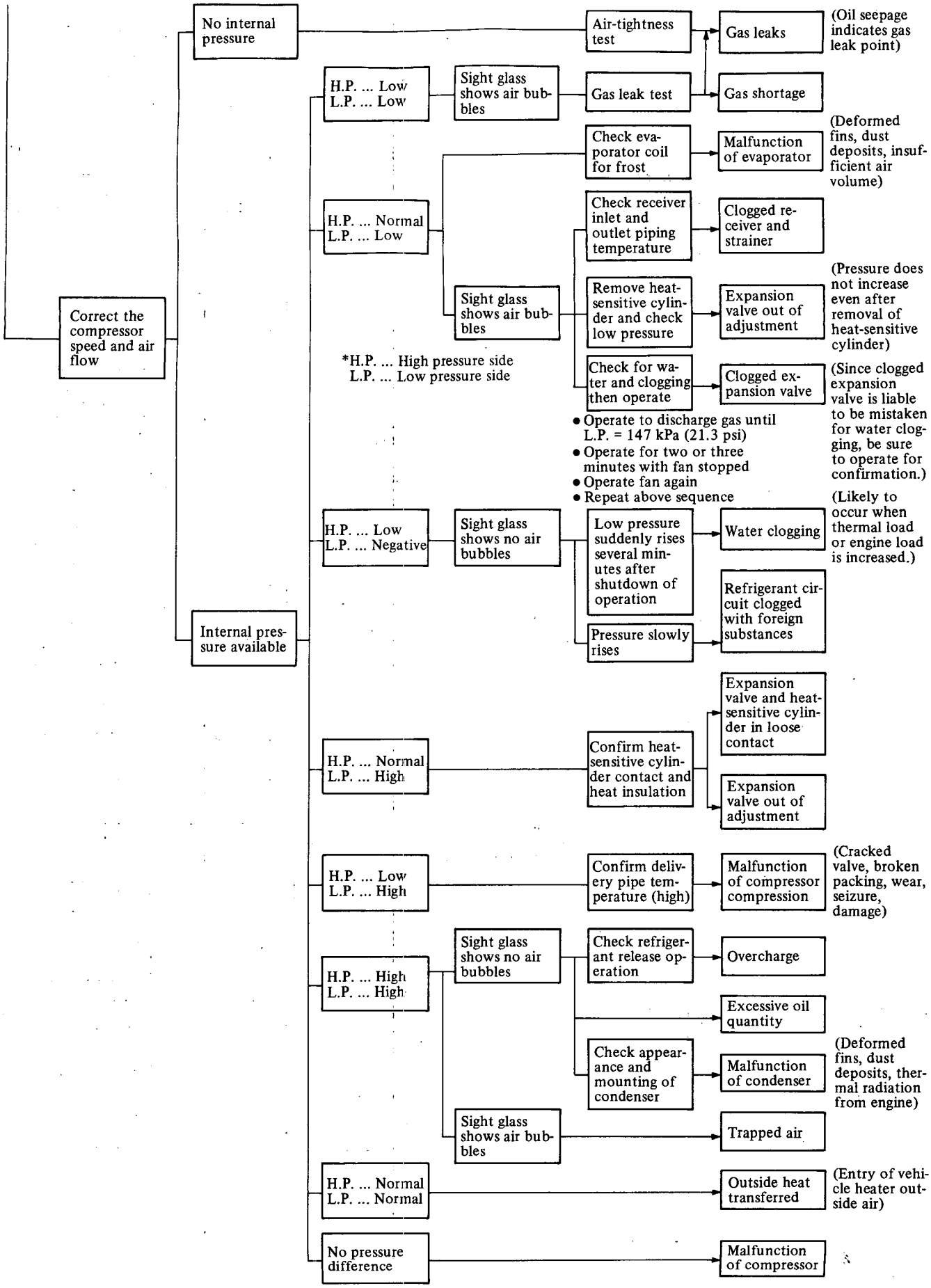
Is there 12V between the heater relay (0.3-B, 2-L) and ground?
No
Heater relay malfunction
Replace the heater relay
Yes
Disconnect the blower motor connector
When the heater switch is set to LO, M_1, M_2 or HI, is there 12V between the harness side connector (0.85-LW, 1.25-LY, 1.25-LB and 2-LR wires) and the body ground?
No
Heater fan switch malfunction
Replace the heater fan switch
Yes
Is there continuity between the heater fan switch and the fan motor harness?
No
Harness damaged or connector improperly connected
Correct the connector or harness
Yes
Is there continuity between resistor terminals?
No
Resistor malfunction
Replace the resistor
Yes
Is there continuity between blower motor terminals?
No
Blower motor malfunction
Replace the blower motor
Yes
Harness between blower motor and earth terminal damaged
Correct the harness

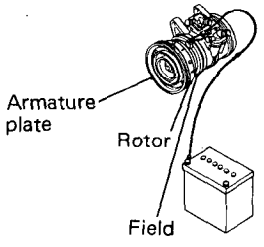
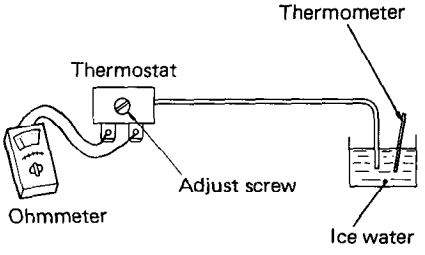
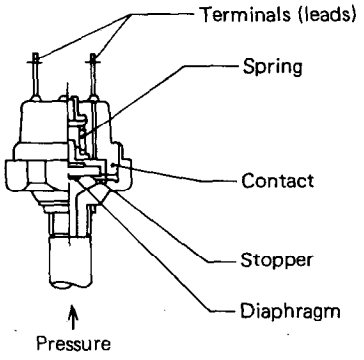
REAR HEATER

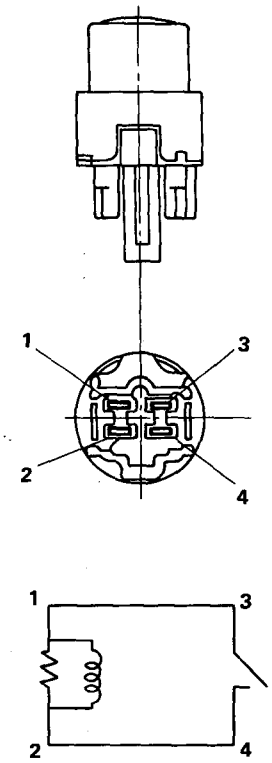
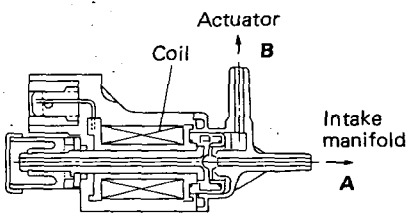

With the ignition key at "ON", the fan motor does not operate when the heater fan switch is at "ON".
Set the ignition key to "ON" position
Is fuse No. 5 good?
No
Short circuit in harness (harness damaged, external covering burnt, etc.)
Correct harness and replace fuse
Yes
Is 12V indicated as voltage across rear heater and front harness connection connector 0.85RB?
No
Open circuit in harness between fuse block and rear heater
Correct harness
Yes
Place heater fan switch to "HOT" position
Is 12V indicated as voltage between heater fan switch and rear heater fan motor harness connection connector 0.85RL?
No
Heater fan switch defective
Replace heater fan switch
Yes
Blower motor defective or improperly earthed
Replace blower motor or correct earth

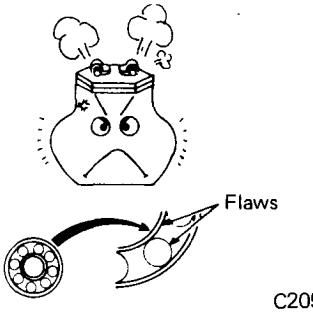
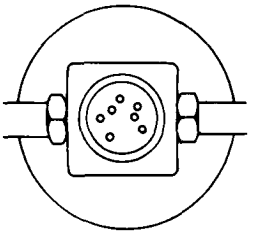
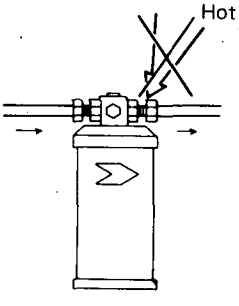
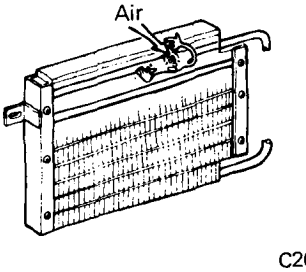
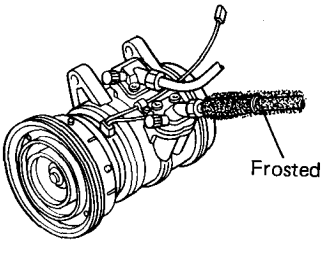
AIR-CONDITIONING

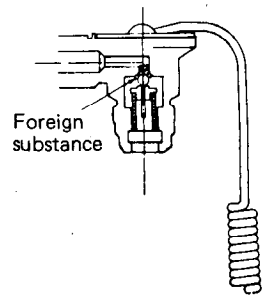
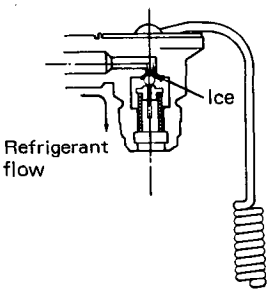
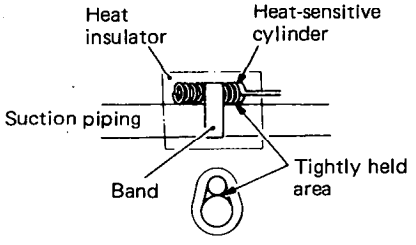
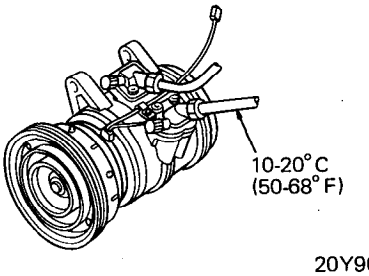
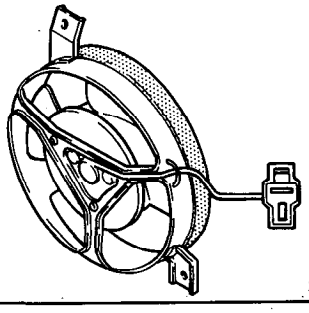



Correct the compressor speed and air flow
No internal pressure
Air-tightness test
Gas leaks
(Oil seepage indicates gas leak point)
H.P. ... Low
L.P. ... Low
Sight glass shows air bubbles
Gas leak test
Gas shortage
H.P. ... Normal
L.P. ... Low
Check evaporator coil for frost
Malfunction of evaporator
(Deformed fins, dust deposits, insufficient air volume)
Check receiver inlet and outlet piping temperature
Clogged receiver and strainer
Sight glass shows air bubbles
Remove heat-sensitive cylinder and check low pressure
Expansion valve out of adjustment
(Pressure does not increase even after removal of heat-sensitive cylinder)
*H.P. ... High pressure side
L.P. ... Low pressure side
Check for water and clogging then operate
Clogged expansion valve
(Since clogged expansion valve is liable to be mistaken for water clogging, be sure to operate for confirmation.)
• Operate to discharge gas until L.P. = 147 kPa (21.3 psi)
• Operate for two or three minutes with fan stopped
• Operate fan again
• Repeat above sequence
Internal pressure available
H.P. ... Low
L.P. ... Negative
Sight glass shows no air bubbles
Low pressure suddenly rises several minutes after shutdown of operation
Water clogging
(Likely to occur when thermal load or engine load is increased.)
Refrigerant circuit clogged with foreign substances
Pressure slowly rises
H.P. ... Normal
L.P. ... High
Confirm heat-sensitive cylinder contact and heat insulation
Expansion valve and heat-sensitive cylinder in loose contact
Expansion valve out of adjustment
H.P. ... Low
L.P. ... High
Confirm delivery pipe temperature (high)
Malfunction of compressor compression
(Cracked valve, broken packing, wear, seizure, damage)
H.P. ... High
L.P. ... High
Sight glass shows no air bubbles
Check refrigerant release operation
Overcharge
Excessive oil quantity
Check appearance and mounting of condenser
Malfunction of condenser
(Deformed fins, dust deposits, thermal radiation from engine)
Sight glass shows air bubbles
Trapped air
H.P. ... Normal
L.P. ... Normal
Outside heat transferred
(Entry of vehicle heater outside air)
No pressure difference
Malfunction of compressor

Probable cause	Diagnosis and correction	Remarks
Malfunction of magnetic clutch	[Diagnostic procedure] 1. Connect the lead to the (+) terminal of the battery to see if the clutch engages with a click. 2. Check for continuity between the lead and ground. (Check for open circuit in the coil.) 3. Check for noise during operation. (Check for malfunction of bearing and for slipping.) [Correction] 1. If there is an open circuit in the coil, replace the clutch. 2. If the bearing makes noise, replace it. 3. If slipping is evident, replace the clutch.	 20Y901
Fin thermostat	[Diagnostic procedure] 1. Immerse the heat-sensitive portion of the thermostat in ice water as shown. Check to ensure that when the temperature is lowered to 1.6°C (35°F), there is no continuity (OFF). If the thermostat is not OFF, it has a problem. 2. Gradually add lukewarm water into the water tank until the thermometer registers 4.6°C (40.28°F), and check to ensure that there is continuity (ON). If the thermostat is not ON, it has a problem. [Correction] 1. If there is anything wrong, slightly turn the adjust screw (clockwise for lower temperature setting and vice versa) and check by performing the above steps 1. and 2. 2. If this does not correct the problem, replace.	 20Y902
Low pressure switch	[Diagnostic procedure] 1. When the air conditioner is stationary, connect the gauge manifold to the service valve of the compressor. If there is a pressure of over 2.1 kg/cm²G (30 lb/in²G) in the system, connect an ohmmeter between terminals (leads) to verify that there is continuity (ON). OFF indicates a problem. 2. If the pressure in the system is lower than 2.1 kg/cm²G (30 lb/in²G), check to ensure that there is no continuity between terminals (leads) (OFF). ON indicates a problem. 3. If there is no continuity (OFF) in the above step (2), add refrigerant through the gauge manifold and check to ensure that when the pressure of the high pressure side rises to 2.35 kg/cm²G (33.5 lb/in²G), the switch becomes ON. If it does not become ON, there is a problem. [Correction] If there is a problem, replace.	 20Y903

Probable cause	Diagnosis and correction	Remarks
Power relay	[Diagnostic procedure] If there is continuity (ON) between the terminals (1) and (2) when a voltage is applied between the terminals (3) and (4), and if there is no continuity (OFF) when no voltage is applied across the terminals (3) and (4), the power relay is good. Otherwise the power relay is defective. [Correction] Replace if defective.	 20W703
Idle-up device solenoid valve	Checking Method 1. Confirm that the vacuum hoses are not damaged, and that they are connected properly. 2. Connect a voltage of 12V to the lead wire of the solenoid valve. (Connect it directly to the battery.) There should be a clear passage between (A) and (B). (Blow through the valve to check it.) Correction If the solenoid valve is malfunctioning, replace it with a new one.	 20K543
Malfunction of cooling performance	If the refrigerant level is low, the compressor oil can also be assumed to be low. Remove the compressor from the vehicle, check the amount of oil output from the compressor, and then replenish the oil so that there is approximately 90 cc. (5.5 cu. in.) If the cooling effectiveness is low even though the refrigerant level is correct, it is probably due to an excessive amount of compressor oil. Remove the compressor from the vehicle, check the amount of oil output from the compressor, and drain out enough oil so that there is approximately 90 cc. (5.5 cu. in.)	Check the refrigerant level visually in the sight glass at least once every three months.

Probable cause	Diagnosis and correction	Remarks
Malfunction of compressor	[Diagnostic procedure] 1. Check to see if the pulley can be turned by hand. (Check for seizure.) 2. Operation causes low pressure to increase and main body temperature to rise. (Broken packing, cracked valve) [Correction] Correct any malfunctions by replacing parts.	 C20524
Refrigerant leaks	[Diagnostic procedure] 1. Check superheated temperature of the compressor suction piping. If the superheated temperature is 10 to 20°C (50° to 68°F), the piping is good. If the temperature is lower, there is a malfunction of the piping. 2. If the sight glass shows air bubbles, the refrigerant is leaking. [Correction] Check to discover leaking points. Correct or recharge.	 C20525
Clogged strainer (receiver)	[Diagnostic procedure] If the temperature difference between the strainer intake and outlet pipes is more than 5°C (9°F), there is a malfunction of the strainer in the receiver. [Correction] Replace.	 C20526
Air in refrigerant circuit	[Diagnostic procedure] High pressure increases more than 98 kPa (14.2 psi) over saturation pressure which corresponds to the temperature of the refrigerant outlet piping of the condenser. [Correction] Evacuate the circuit and recharge refrigerant.	 C20527
Refrigerant overcharged	[Diagnostic procedure] 1. Both high and low pressures are high. 2. Compressor suction piping is frosted. [Correction] Remove refrigerant through the check valve. As a guide, make certain that the suction pipe superheating temperature just prior to appearance of air bubbles in the sight glass is 10 to 20°C (50 to 68°F).	 20Y905

Probable cause	Diagnosis and correction	Remarks
Clogging with foreign substance	[Diagnostic procedure] 1. High pressure increases and low pressure falls, and there is no cooling. 2. Clogging is not automatically corrected during shutdown. 3. Clogging usually occurs in the expansion valve. [Correction] Remove clogged parts and replace them.	 C20529
Clogging with water	[Diagnostic procedure] 1. Symptoms similar to clogging with a foreign substance appear. 2. The trouble is corrected after more than 30 minutes of shutdown, but it occurs again after resumption of operation. [Correction] Replace the receiver drier two or three times. (A new receiver allows operation for at least three hours.) The drier can be dehydrated by letting hot dry air pass through.	 C20530
Expansion valve heat-sensitive cylinder	[Diagnostic procedure] 1. Low pressure is high, although the interior is cool. 2. The suction piping is frosted. [Correction] Check and correct.	 C20531
Expansion valve out of adjustment	[Diagnostic procedure] 1. Check to see that the superheating temperature of the compressor suction piping is 10 to 20°C (50 to 68°F). 2. Removal of the heat-sensitive cylinder does not cause low pressure to increase. [Correction] Replace.	 20Y906
Condenser fan motor	[Diagnostic procedure] 1. Apply 12V battery voltage to the 2-p connector of the fan motor. 2. Confirm the smooth rotation of the motor within the specified current. Standard current: 8.0 ± 0.8 A [Correction] Replace if defective.	 20W728

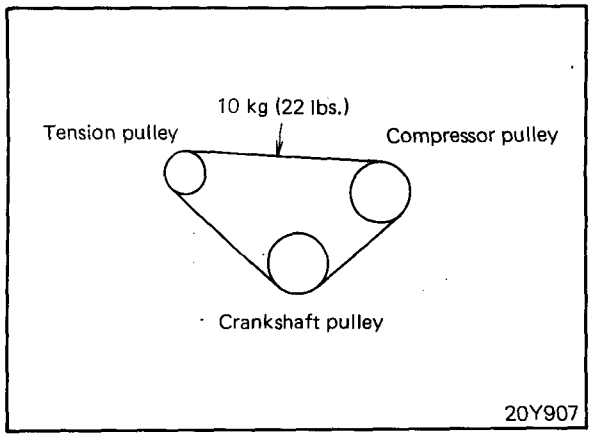
CHECK AND ADJUSTMENT

After installation, check the following points and confirm that everything is in order, and then charge the gas, adjust the idle, make the adjustment, and carry out the performance and operation tests.

1. Check for any abnormal vehicle performance which might have been caused by installation of the A/C equipment.
2. Check operation of the magnetic clutch (without running the compressor).
3. Check for any parts left unmounted or any tools left behind in the vehicle.
4. Check the belt deflection. (20Y907)

Drive belt deflection	17-20 mm (.7-.8 in.) at 10 Nm (22 lbs.) of force

5. Readjust the belt deflection after two or three weeks to eliminate initial stretch of new belt.

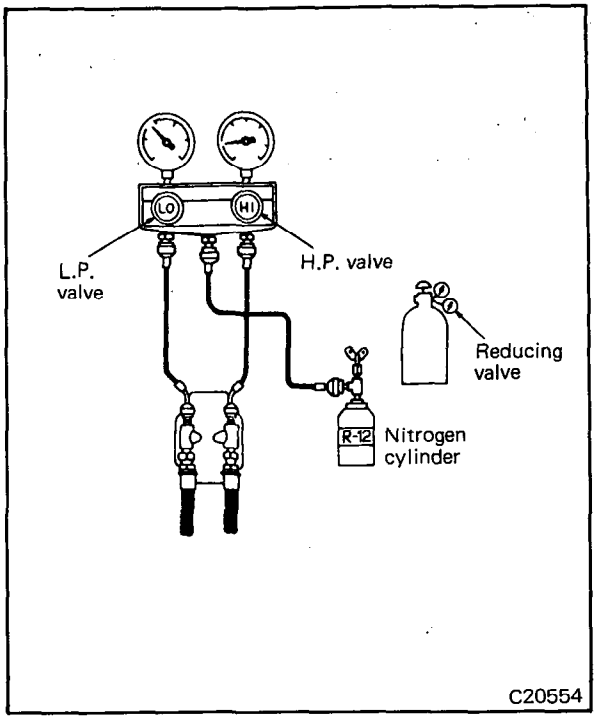


AIR-TIGHTNESS TEST

After all piping work has been completed, conduct an air tightness test by the following procedure to check for leaks through the flare connections, etc., and then evacuate the system. If this air-tightness test is omitted and evacuation is immediately started, there is no way of detecting possible leaks. If there are leaks, the specified vacuum cannot be attained unless the test is made at the beginning. In order to avoid wasting time, therefore, be sure to conduct the air-tightness test before evacuation.

Air-Tightness Test Procedure

- Correct gauge manifold to compressor check valve. (Do not mix up the high-pressure and low-pressure sides.)
- H.P. valve (closed) / L.P. valve (closed)
- Attach service can to charge hose.
- H.P. valve (open) / L.P. valve (open)
- Charge refrigerant [196 kPa (28.4 psi) of gaseous refrigerant from the service can held in vertical position].
- H.P. valve (closed) / L.P. valve (closed)
- Replace service can with nitrogen cylinder.
- Charge nitrogen gas [883 kPa (127.8 psi)].
- H.P. valve (open) / L.P. valve (open)
- Let sit. (Check to be sure that the gauge reading does not change.)
- Air-tightness test*
- Discharge gas inside the system (slowly, from low-pressure side).



- Gauge manifold L.P. valve (open)
- Reducing valve (open)
- Set nitrogen gas to 883 kPa (127.8 psi) with the reducing valve.

*Air-tightness test method

Apply an aqueous solution of nekal to each flared joint to check for leakage. If there is leakage, a small gas bubble will form.

NOTE

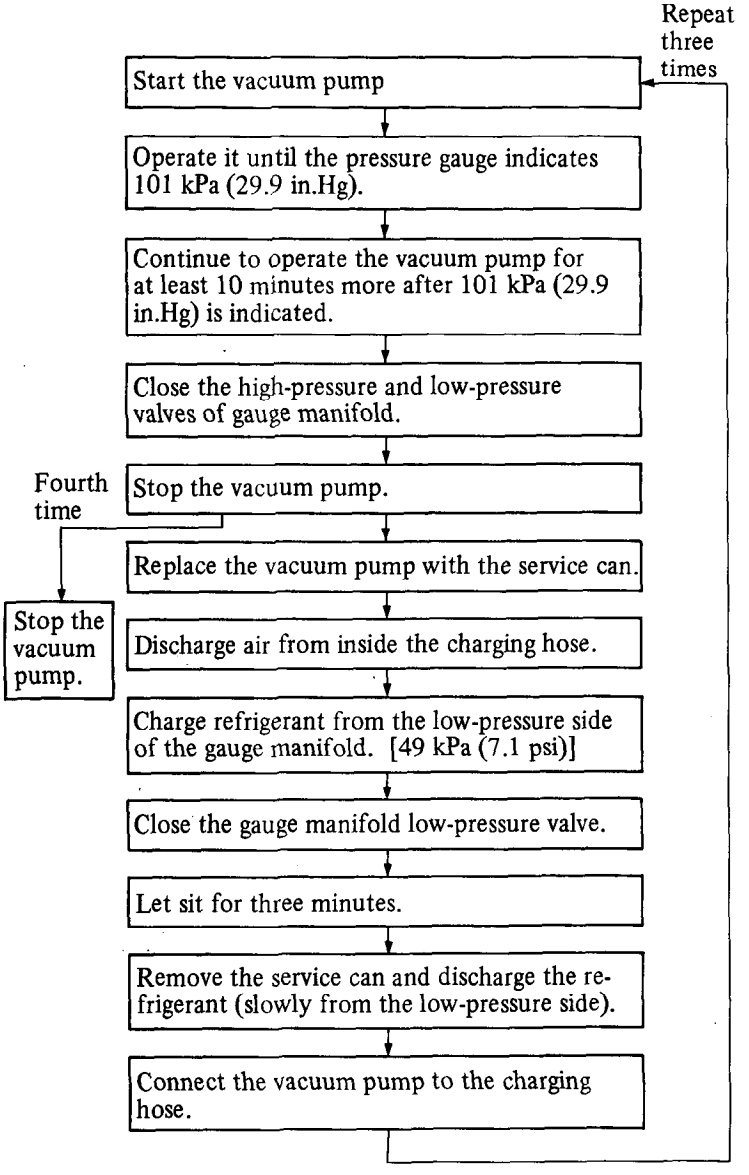
The aqueous solution of nekal is a kind of foaming solution specially designed for detection of gas leakage.

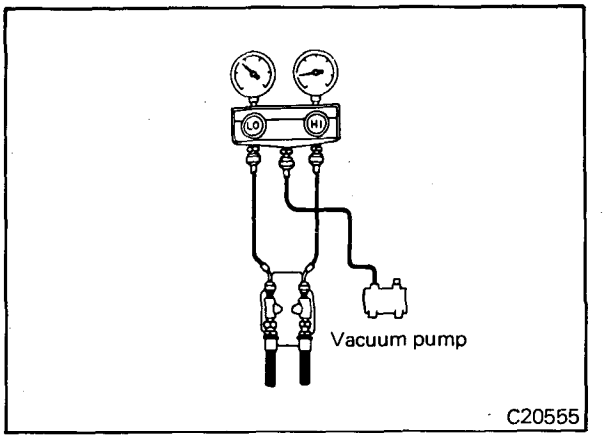
EVACUATION

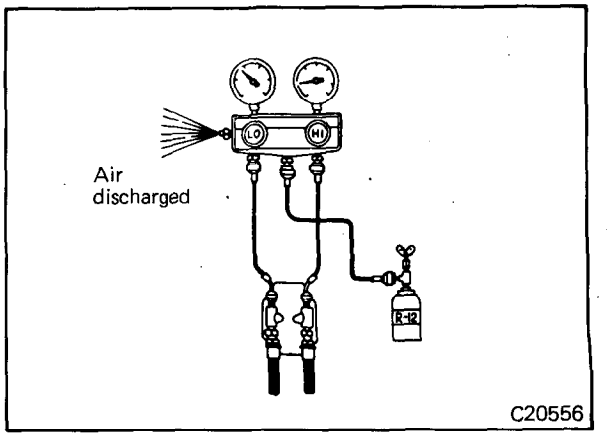
After the air-tightness test, evacuate the system as a preliminary step before charging the refrigerant in the system. With regard to the air-conditioner, the most important point to note is existence of non-condensing gas or water in the system. Since the refrigerant R12 is very insoluble in water, even a small amount of moisture left in the system will freeze, causing what is called "water clogging".

Evacuation Procedure

1. Check to ensure that there is no internal pressure in the system. If there is internal pressure, it should be relieved through the check valve.
2. Connect the charging hoses of the gauge manifold to the intake and outlet check valves of the compressor.
3. Connect a vacuum pump to the charging hose. Carry out the evacuation in the following sequence.







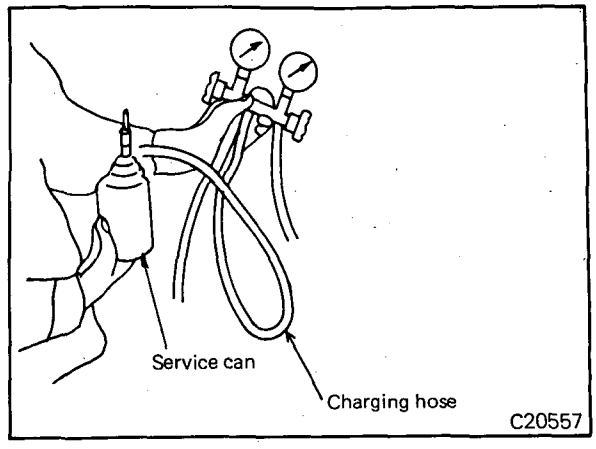
Notes
1. Do not use the refrigerant pressure to expel air.
2. Do not use the compressor for evacuation.
3. Do not operate the compressor in the vacuum condition; shaft seal leaks could occur.

GAS CHARGE

Charge gas immediately after evacuation.

Charging from Service Can

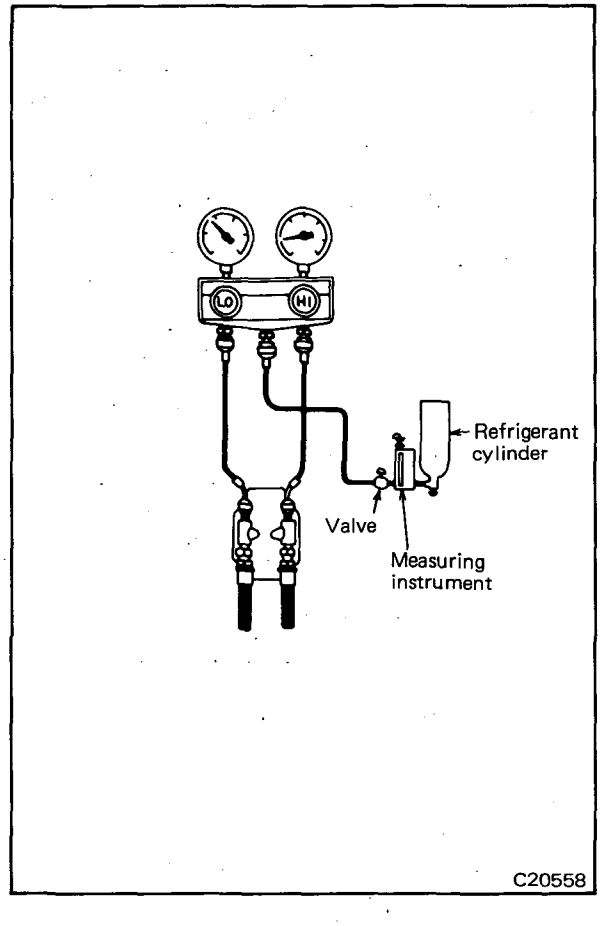
1. Connect the service can to the charging hose. (C20557)
2. Slightly loosen the flare nut at the gauge manifold to remove air (from inside the charging hose) with the refrigerant, and tighten the flare nut immediately after the removing air.
3. Hold the service can upright and loosen the low-pressure valve of the gauge manifold so that the gaseous refrigerant is drawn into the system.
4. When drawing of the gaseous refrigerant stops, start the engine and keep it running at approx. 1,100 rpm in order to charge the refrigerant into the system.
5. Touch the bottom of the service can. If it is no longer cool, it is empty; replace it with a new one.
6. When replacing the service can, close the low-pressure valve of the gauge manifold.
7. After a new service can has been connected, repeat steps 1 through 5 until the specified amount of refrigerant is charged.
8. After the specified amount of refrigerant has been charged, close the low-pressure valve of the gauge manifold and check the condition while observing the pressure gauge.
9. Close the service can valve and remove the gauge manifold.



Caution
The service cans should always be kept below 40°C (104°F).

Charging from Refrigerant Cylinder

1. Connect the refrigerant cylinder and measuring instrument as shown. (C20558)
2. Let the specified amount of refrigerant flow into the measuring instrument, and check the indication.
3. Connect the measuring instrument to the charging hose.
4. Slightly loosen the flare nut at the gauge manifold to remove air (from inside the charging hose) with the gaseous refrigerant, and tighten the flare nut immediately after removing the air. Loosen the valve of the measuring instrument and charge the gaseous refrigerant in accordance with the procedures described in step 3 and subsequent steps of "Charging from Service Can".

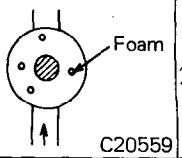
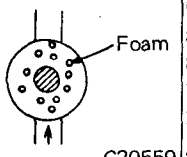
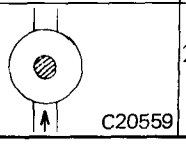


Cautions
1. **If the high-pressure gauge registers more than 1,471 kPa (213 psi), such as on a hot summer day, stop charging for a while and allow the pressure to fall by spraying water on the compressor before charging is resumed.**
2. **Never overcharge the system.**

Checking the Refrigerant Level

When charging the refrigerant, use a measuring instrument for measuring. Use of a sight glass for checking and judging the proper refrigerant level requires considerable experience and proficiency. The charging procedure is as follows:

1. Operate the engine at approx. 1,100 rpm.
2. Adjust the high pressure to 1,177 to 1,373 kPa (170 to 200 psi).
3. Adjust the cooler intake temperature to 25°C (77°F) or higher.
4. Adjust for maximum cooling unit air output (HI).
5. Check the sight glass according to the following table.

Sight glass condition		Remarks
Proper refrigerant level		1. Foam occasionally appears. 2. Foam disappears if speed is slightly increased.
Insufficient refrigerant		Considerable foam appears. If the system is extremely short of refrigerant, the sight glass appears clear.
Excessive refrigerant		1. No foam appears. 2. Slight foam appears if speed is decreased.

Cautions

1. **To check with the sight glass, start and stop the engine a few times.**
2. **When charging refrigerant at a low atmospheric temperature, such as in winter, foam may disappear before the specified level is reached. If so, cover the front of the condenser to increase the pressure to the specified level. The temperature of the passenger compartment should also be increased.**
3. **When charging at a very high atmospheric temperature, place the vehicle in a cool, well-ventilated area, and keep doors of the vehicle open. (Under such circumstances the system tends to be overcharged with refrigerant because of slower foam disappearance.)**

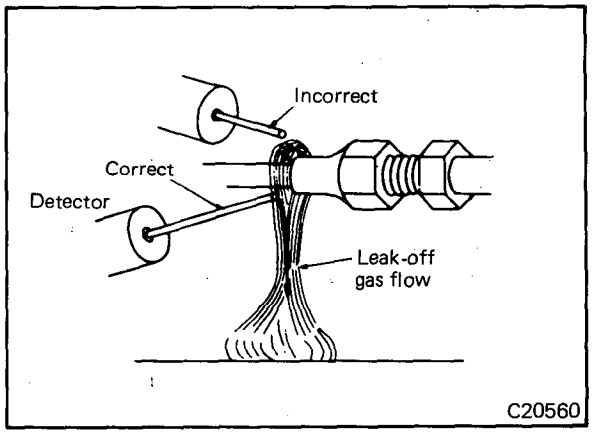
GAS LEAK TEST

Test Points

1. All flare joints of connection piping.
2. Shaft seal and check valve mountings on compressor and shaft.
3. Soldered piping joints of expansion valve and other parts.

Test Procedure

1. For gas leak test, the use of an electronic gas leak detector is recommended.
2. Perform the test in a windless area indoor, or under similar conditions.
3. Refrigerant is heavier than air. Leaks will be concentrated at the bottom of connections. Make certain that the tester tube is applied below the test point.
4. The test should be performed patiently. Make certain that the testing tube is moved slowly [approx. 10 mm/sec. (.4 in./sec.)].
5. The high-pressure side refrigerant circuit should be tested for gas leaks during operation. Those areas which are dangerous or hard to test during operation (including areas around the compressor and condenser) should be tested immediately after shutdown.
6. The low-pressure side refrigerant circuit should be tested during shutdown after the gas pressure has balanced.
7. The test should be performed on the basis of the following standards.



Gas Leak Test Standards

Test point / Instrument	Compressor shaft seal	Other parts
Electric gas leak detector	Pointer should not swing more than 0.1 mA at low sensitivity.	Pointer should not swing more than 0.1 mA at high sensitivity.

Caution
Smoking should be prohibited during gas leak detection.

PERFORMANCE TEST

Preparations

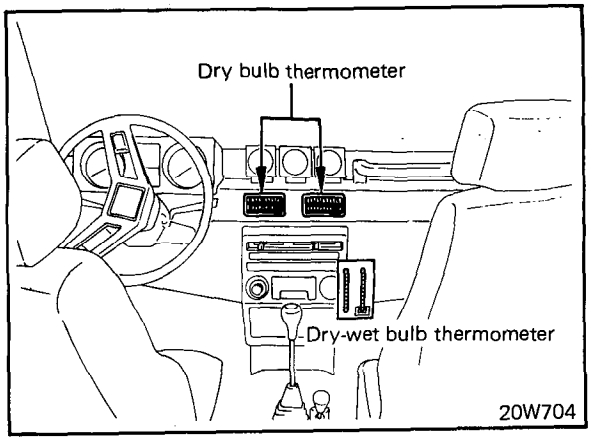
Reinstall all vehicle parts that were removed for installation of the air conditioner to their original positions, and adjust and test the following items.

1. Installation of grommets
   Install the specified grommets and seal off piping holes with sealant.
2. Heat insulation of piping in passenger compartment
   After the gas leak test, heat-insulate the cooling unit low-pressure pipe joint with a tacking sheet to prevent moisture condensed on the piping.
3. Adjustment of engine idle

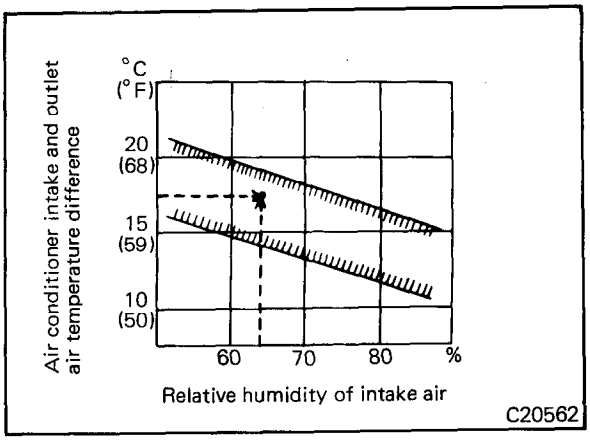
Stationary Performance Test

1. Operating conditions
   (1) Place the vehicle in the shade with all windows and doors open.
   (2) Keep the air conditioner intake air temperature between 25 to 30°C (77 to 86°F). (Adjust by opening and closing the doors.)
   (3) Set the air flow control knob to the maximum (HI) position.
   (4) Turn the knob of the thermo switch to the coldest position (fully clockwise).
   (5) Set the engine speed to approx. 2,000 rpm [top speed at 40 km/h (25 miles/h).]

2. Test procedure
   Operate the air conditioner for more than 10 minutes in the above operating conditions in order to stabilize high and low pressures. Then perform the test by the following procedure:
   (1) Measure the outlet air temperature at the frame of the outlet grille.
   (2) Measure the air conditioner intake air temperature, humidity, etc., and the items shown in the Table of Measuring Items at a position free from the effects of cool outlet air.

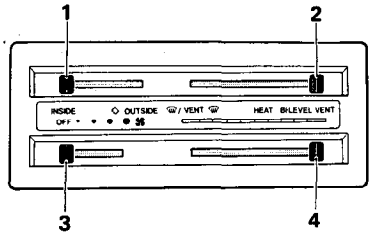


   (3) The point at which the difference between the intake and outlet air temperatures intersects the relative humidity of the intake air should be within the shaded range in the illustration. (C20562)

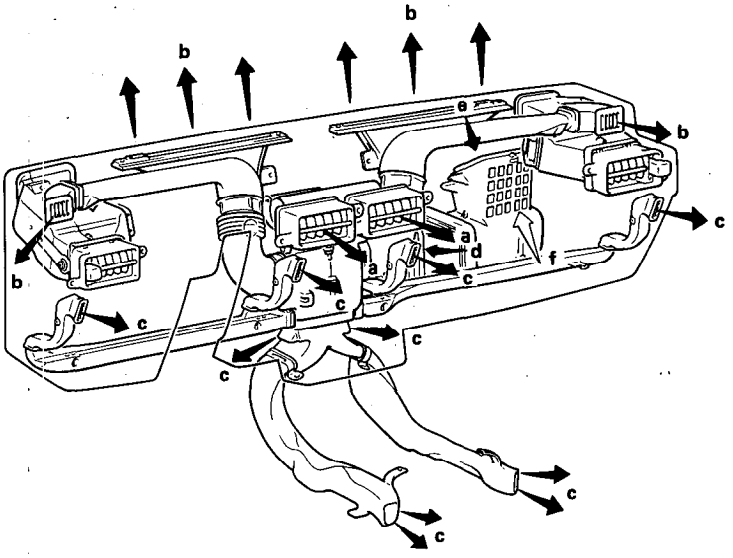


OPERATION

1. Recirculation/fresh air changeover lever
2. Air outlet changeover lever
3. Heater fan switch
4. Hot-water flow control lever



70W520

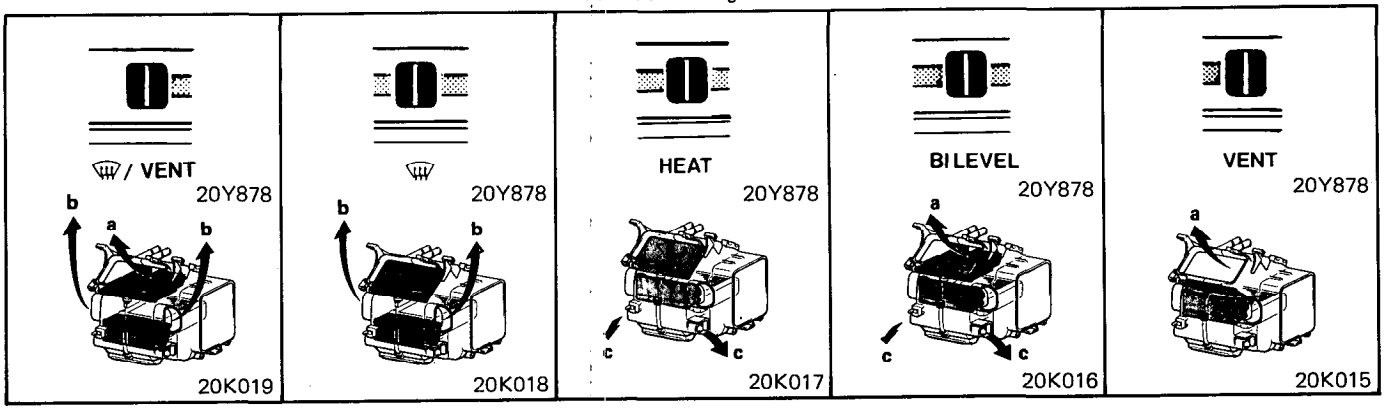


Fresh air

Recirculating air

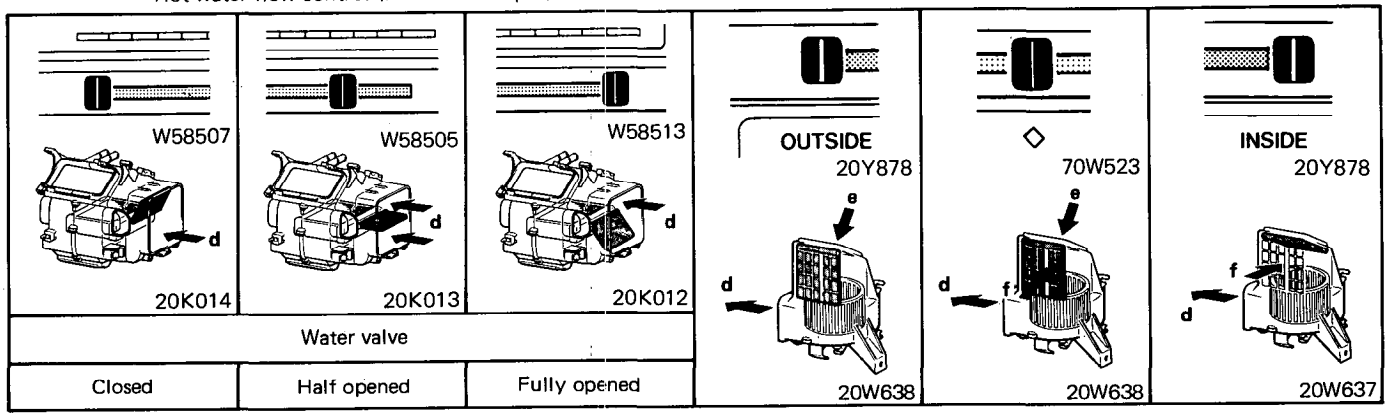
20W640

Air outlet changeover



Hot-water flow control (linked to damper)

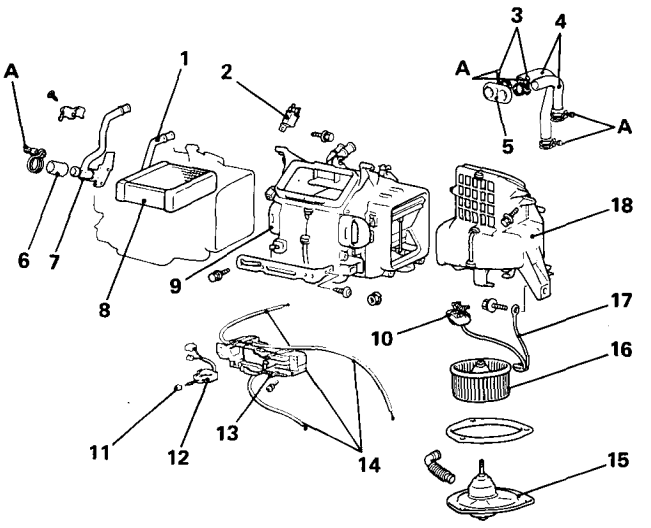
Recirculation/fresh air changeover



Water valve		
Closed	Half opened	Fully opened

COMPONENTS

1. Heater pipe
2. Heater relay
3. Clamp
4. Water hose
5. Grommet
6. Hose
7. Water valve
8. Heater core
9. Heater case
10. Resistor
11. Heater fan switch knob
12. Heater fan switch
13. Heater control lever
14. Heater control cable
15. Blower motor
16. Fan
17. Blower motor harness
18. Blower case

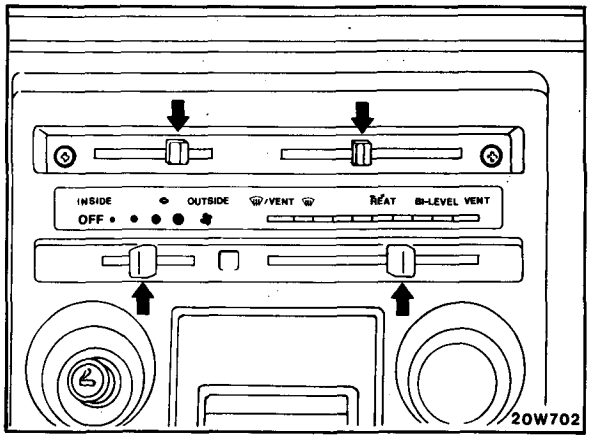


	Nm	ft.lbs.
A	1.3-1.8	.9-1.3

20W672

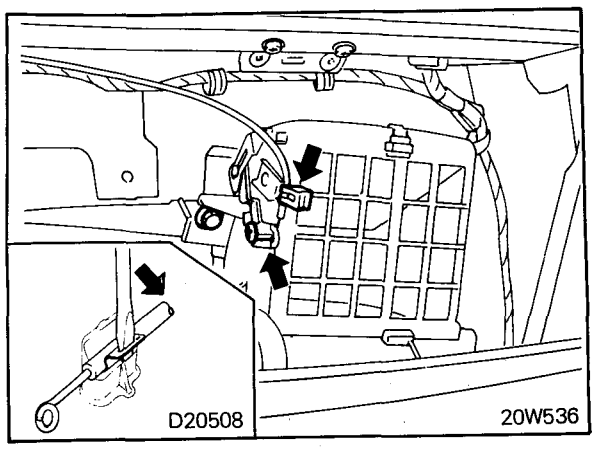
REMOVAL

1. Remove the heater control knob and heater fan switch knob. (20W702)
2. Remove the center console. (Refer to GROUP 23.)
3. Remove the defroster nozzle at the temperature control cable side.
4. Remove lap heater duct B and glove box stopper and push the glove box forward and down. (Refer to GROUP 23.)



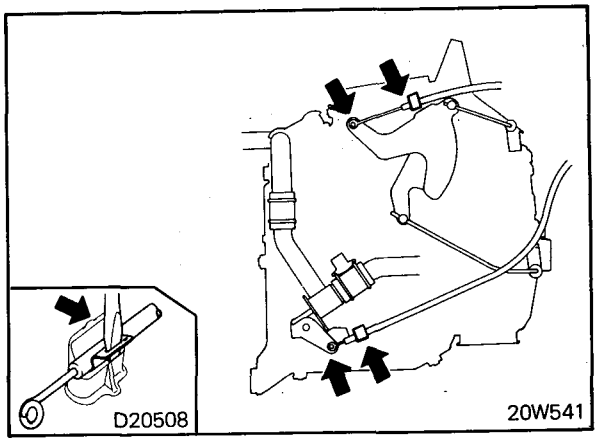
5. Disconnect the RECIRC-FRESH control cable from the blower assembly.

NOTE
Detach the control cables with a screwdriver as shown in the illustration.

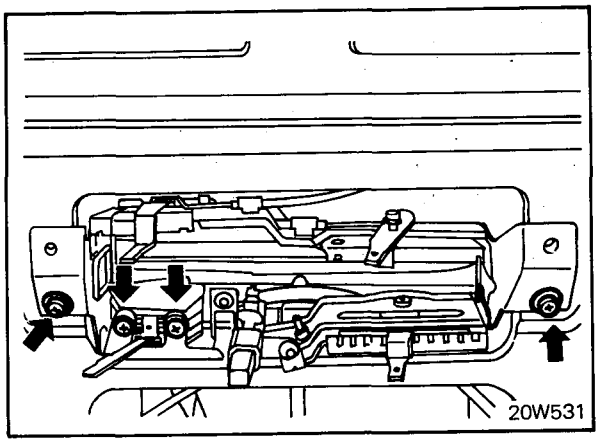


6. Disconnect the VENT-HEAT-DEF control cable and COOL-WARM control cable from the heater unit.

NOTE
Detach the control cables with a screwdriver as shown in the illustration.



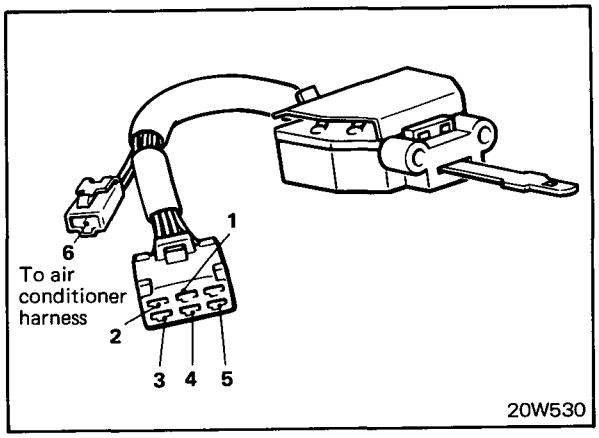
7. Remove the heater control assembly mounting screws and pull out the assembly slightly. (20W531)
8. Disconnect the heater fan switch harness connectors.
9. Remove the heater control assembly.
10. Remove the heater fan switch from the heater control assembly. (20W531)



INSPECTION

Operate the heater fan switch to check for continuity. (20W530)

Terminal / Switch position OFF	1	2	3	4	5	6
OFF						
• (Low)	○	○				○
• (M_1)	○		○			○
• (M_2)	○			○		○
● (High)	○				○	○

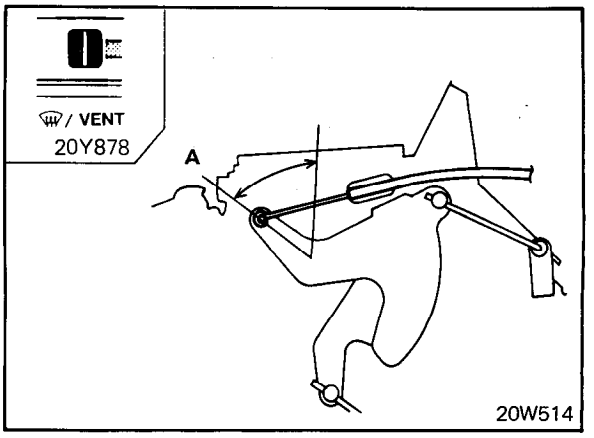


INSTALLATION

Connect each control cable and damper lever by using the following procedures.

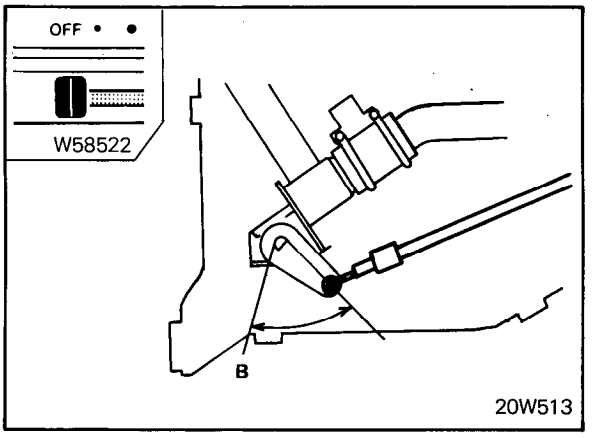
Air Outlet Changeover System

1. Place the air outlet changeover lever at the position as illustrated. (20Y878)
2. With the heater side air outlet changeover damper lever in position A, connect the inner cable to the lever and secure the cable casing with clips. (20W514)



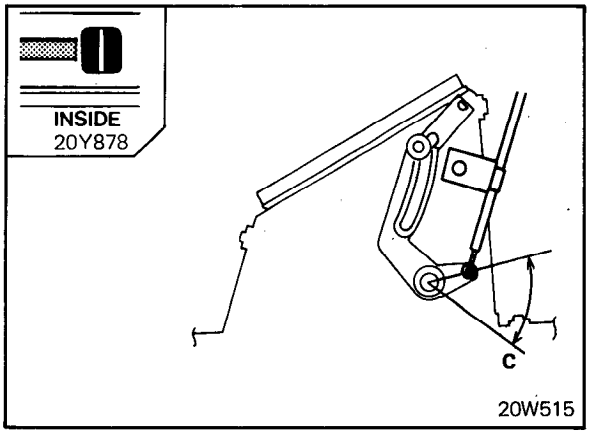
Warm Water Flow Control System

1. Place the warm water flow control lever at the off position. (W58522)
2. With the heater side water valve control lever in position B, connect the inner cable to the lever and secure the cable casing with clips. (20W513)



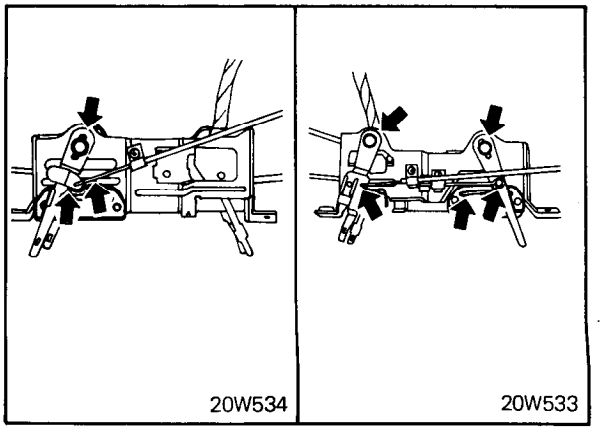
Recirculation/Fresh Air Changeover System

1. Place the recirculation/fresh air changeover lever at the "recirculation" position. (20Y878)
2. With the heater side recirculation/fresh air changeover damper lever in position C, connect the inner cable to the lever and secure the cable casing with clips. (20W515)
3. Set the control lever to each position to check for correct operation. If not correct, adjust by moving the outer wire at the clipped point.



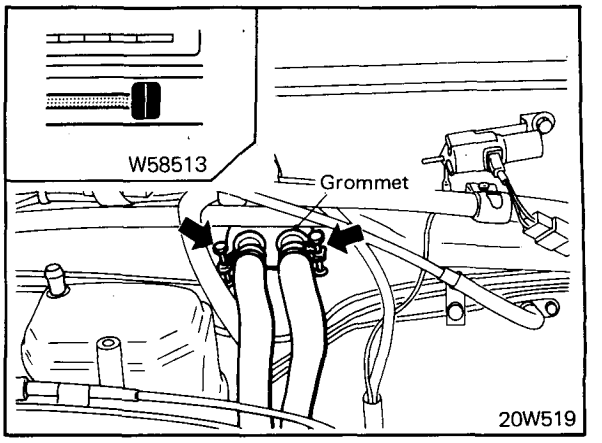
4. Check to make sure that each control lever moves smoothly. If there is any noise or stiff movement, apply the specified multipurpose grease to all moving parts.

NOTE
When mounting the heater control assembly to the instrument panel, tighten the upper bolts to the instrument panel so that they also secure the center panel.

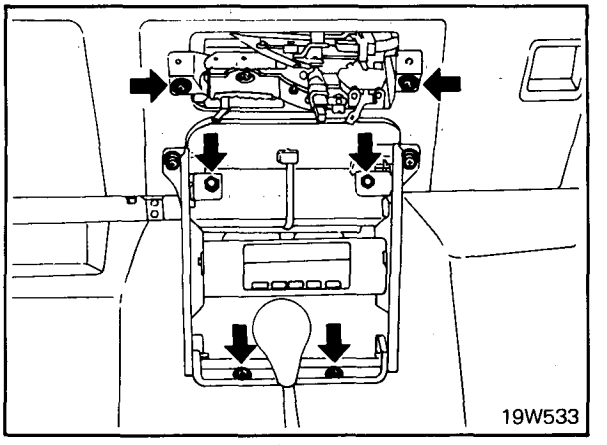


REMOVAL

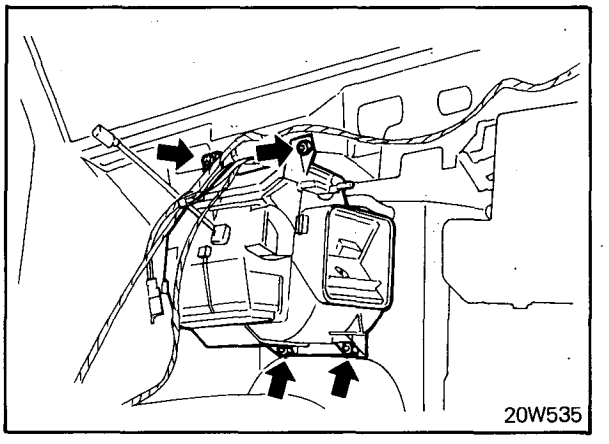
1. Move the hot-water flow control lever to the "hot" position. (W58513)
2. After the radiator cap has been removed, loosen the radiator drain plug and drain the coolant.
3. Disconnect the water hoses from the heater unit. (20W519)



4. Remove the instrument panel. (Refer to GROUP 23.) The center reinforcement, support bracket and radio should be removed together with the instrument panel.



5. Remove the center ventilator duct and defroster duct.
6. Remove the rear heater duct.
7. Remove the heater unit. (20W535)

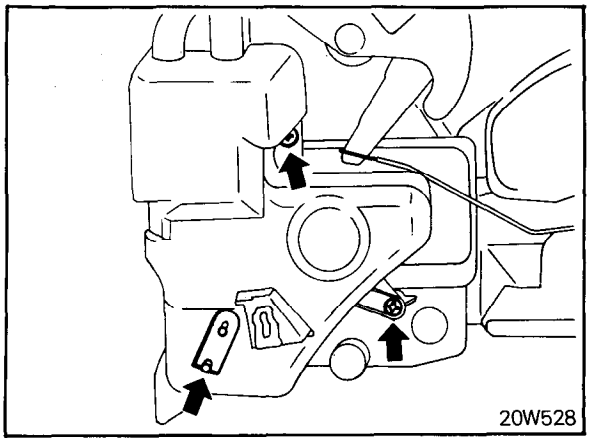


INSPECTION

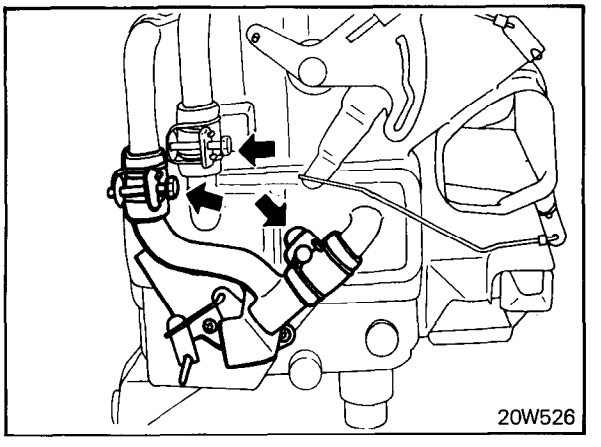
1. Check heater core for leaks, and clogging.
2. Check water valve for operation.
3. Check all hoses for cracks and deterioration.

HEATER CORE REPLACEMENT

1. Remove the heater control lever arm and remove the water valve cover.

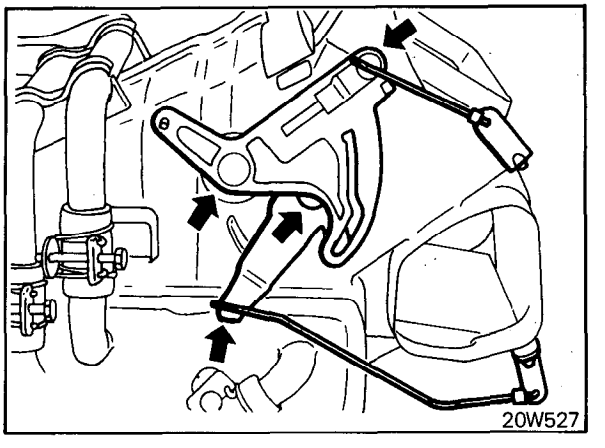


2. Remove the heater pipe and water valve.

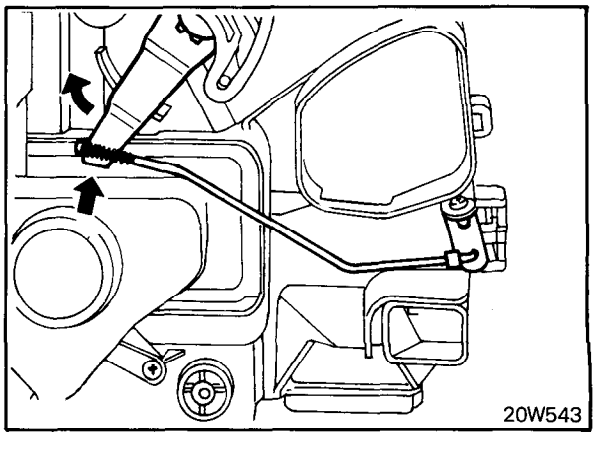


3. Disconnect the control arm linkage. (20W527)
4. Remove the control arm.
5. Remove the heater core by moving it sideways.

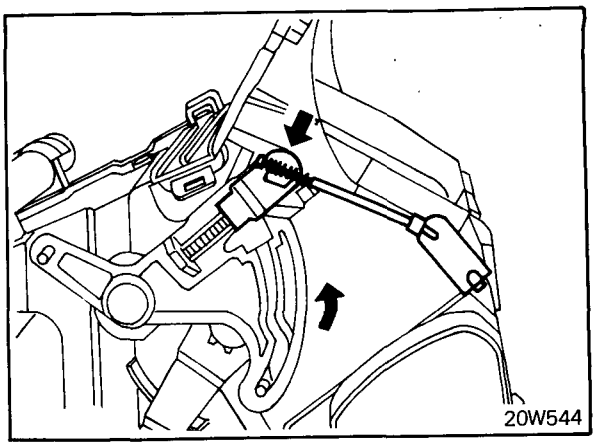
Caution
To prevent some substances invasion between the heater core and case, use care not to remove the heater core felt when removing the heater core.



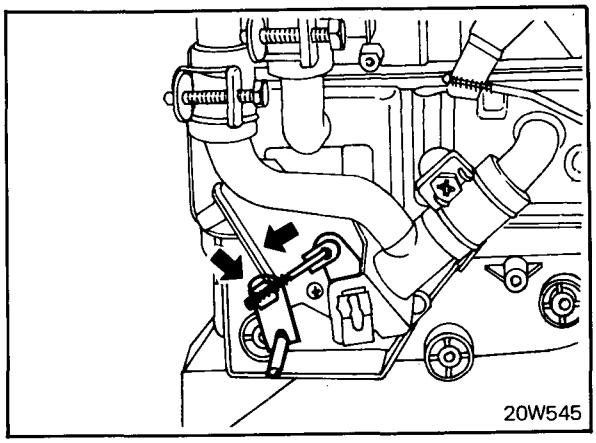
6. After the center ventilator open/close damper has been placed in the fully closed position, turn the arm fully clockwise, and then connect it to the link.



7. With the defroster/heater changeover damper in the fully closed defroster position, turn the arm fully counter-clockwise, and then connect it to the link.



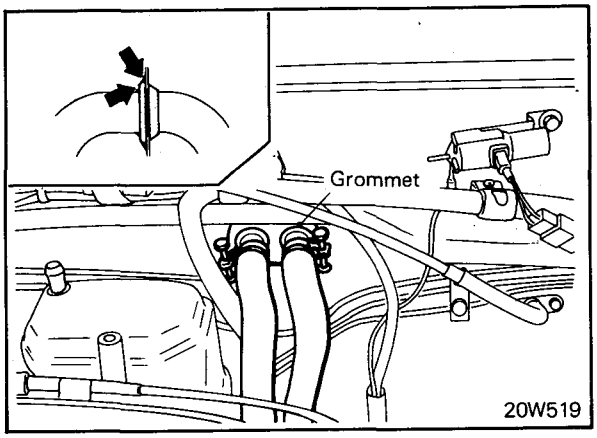
8. With the water valve fully closed and the air intake damper fully closed, connect the arm to the link.



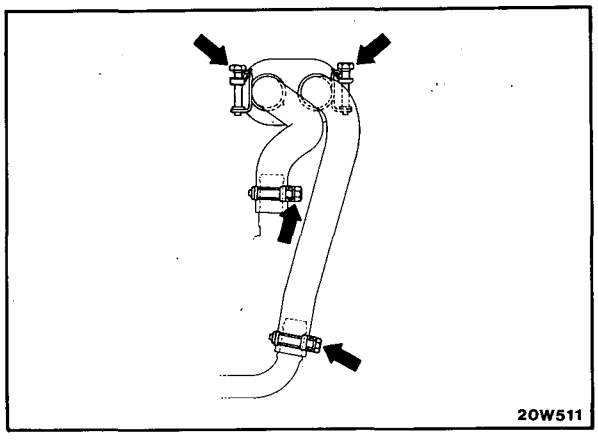
9. Connect each heater hose up to the specified length.

Heater hose overlap length .....
25-30 mm (1.0-1.2 in.)

10. When installing the water hoses, apply a coating of non-drying adhesive to the engine compartment side of the grommet. (20W519)

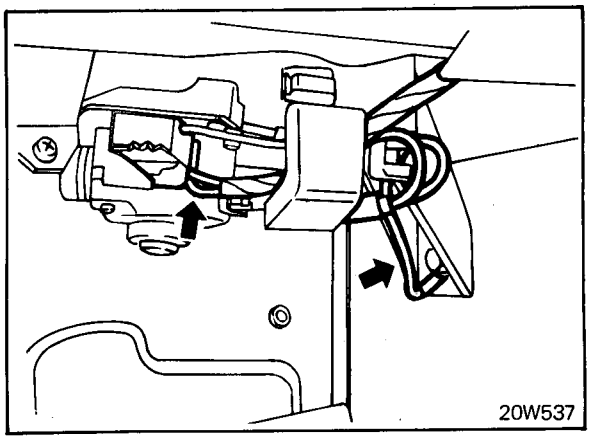


11. Tighten the clamps in the positions shown in the illustration.

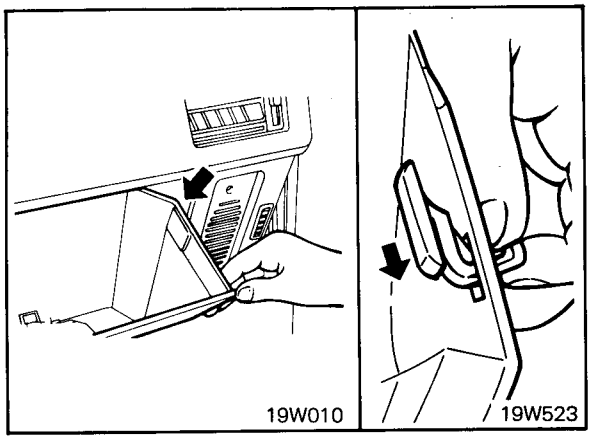


REMOVAL

1. Disconnect the front wiring harness and blower motor coupling connectors. (20W537)
2. Remove the lower mounting bolts of the blower assembly.
3. Remove lap heater duct B and duct.



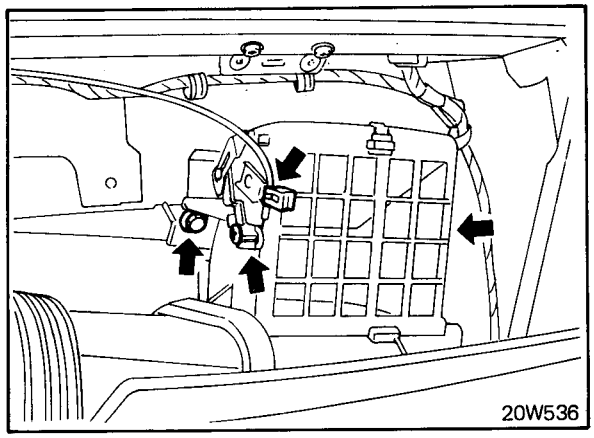
4. Remove the stopper of the glove box and push the glove box down.



5. Remove the RECIRC-FRESH control wire and blower assembly mounting bolts. (20W536)
6. Remove the blower assembly.

INSTALLATION

Tighten the lower mounting bolt of blower assembly which also secures the blower motor ground wire.



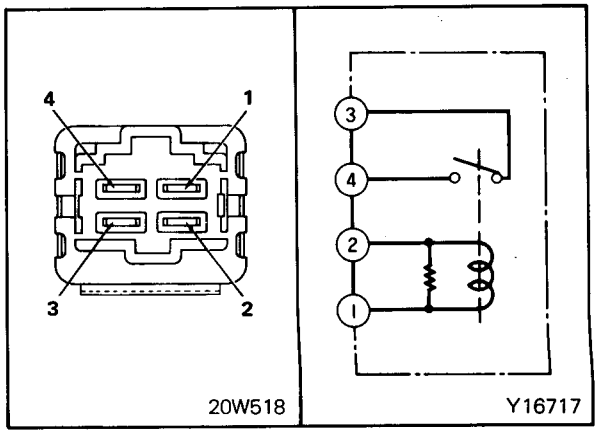
HEATER RELAY

REMOVAL

1. Remove the glove box stopper and remove the glove box by pulling it toward you.
2. Disconnect the heater relay connector and remove the heater relay.

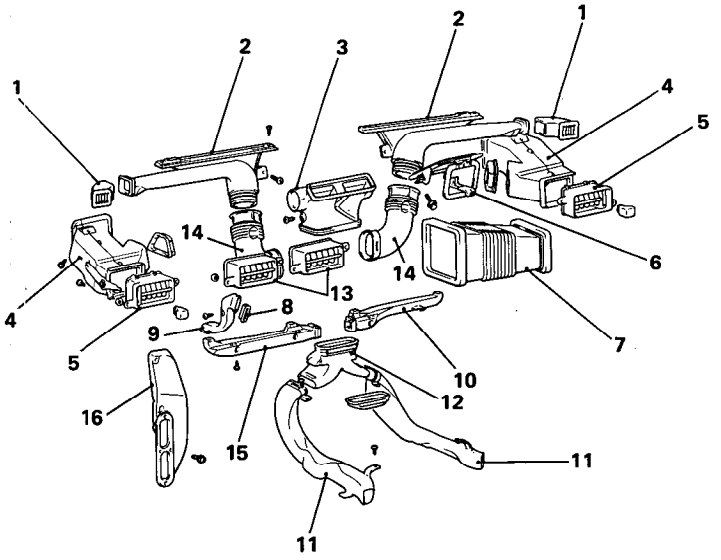
INSPECTION

1. Check continuity between terminals 1 and 2; there should be continuity.
2. Check continuity between terminals 3 and 4; there should not be continuity.
3. Check continuity between terminals 3 and 4 while applying battery voltage to terminals 1 and 2; there should be continuity.



COMPONENTS

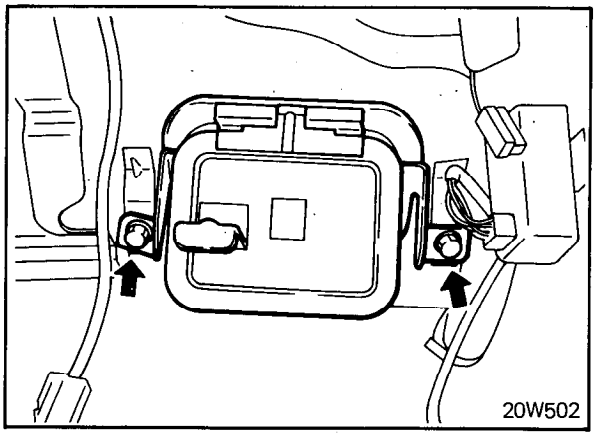
1. Demister grille
2. Defroster nozzle
3. Center ventilator duct
4. Deflector duct
5. Side air outlet
6. Front ventilation
7. Duct
8. Lap heater garnish
9. Lap heater duct (A)
10. Lap heater duct (C)
11. Rear heater duct (B)
12. Rear heater duct (A)
13. Center air outlet
14. Defroster duct
15. Lap heater duct (B)
16. Rear ventilator duct



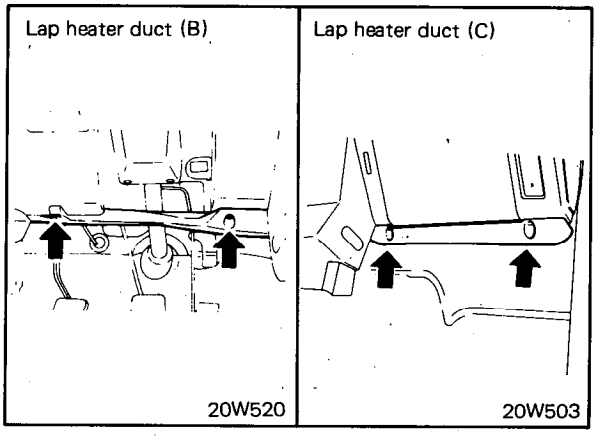
20W542

REMOVAL

1. Remove the mounting bolts and remove the front ventilation by moving it downward.

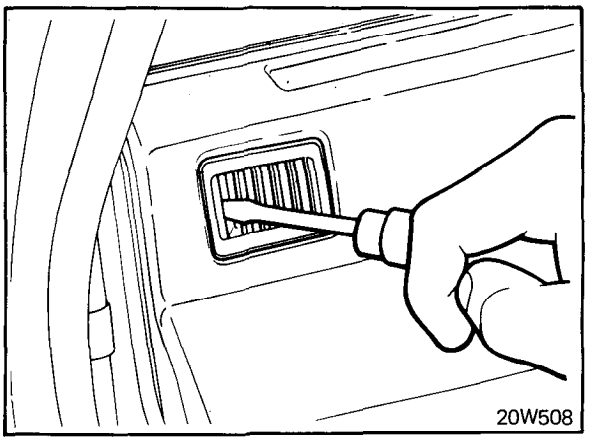


2. Remove the lap heater duct from under the instrument panel.

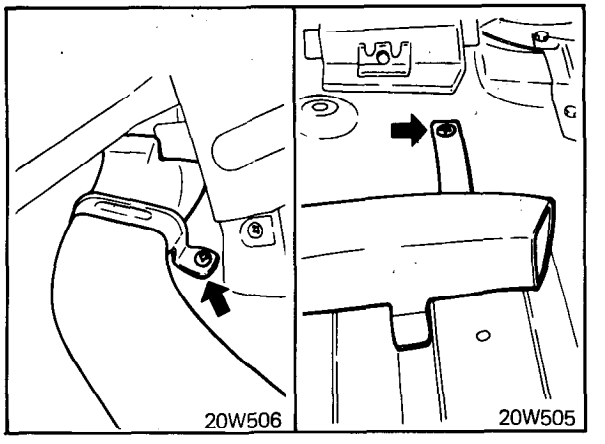


3. Using a screwdriver as shown, remove the demister grille.

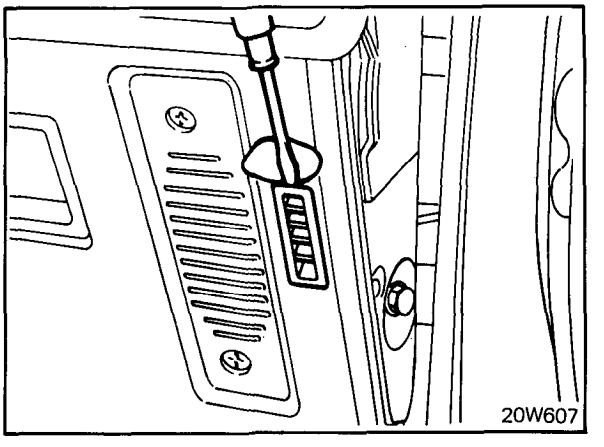
Caution
Use care not to break the projections for attaching the demister grille.



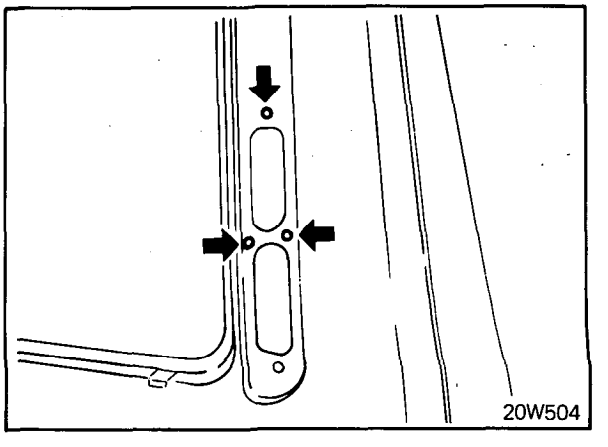
4. Remove the rear heater duct by detaching it from the floor panel.



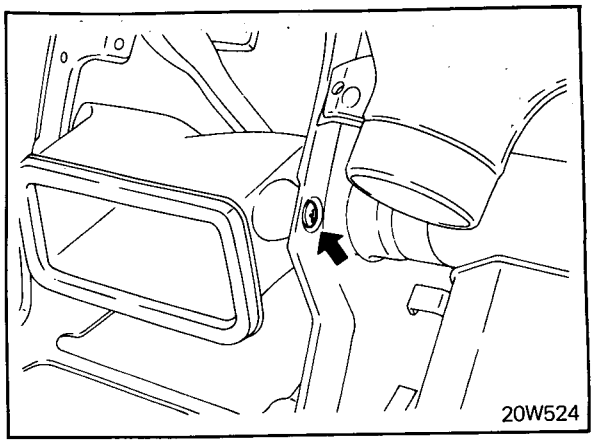
5. Remove the lap heater garnish by prying up the edges with a screwdriver.



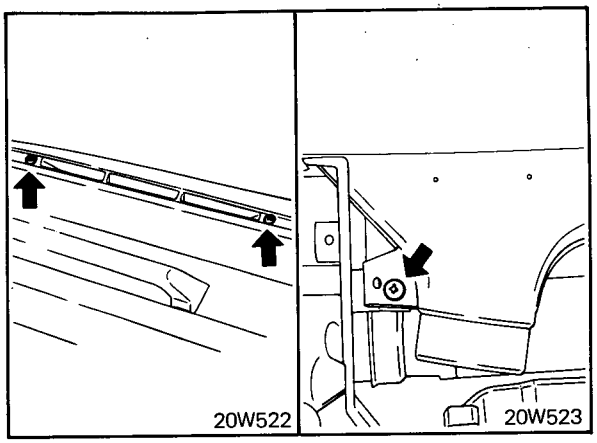
6. Remove the rear ventilator garnish. (Refer to GROUP 23.)
7. Remove the rear ventilator duct by moving it upward from inside the passenger compartment. (20W504)



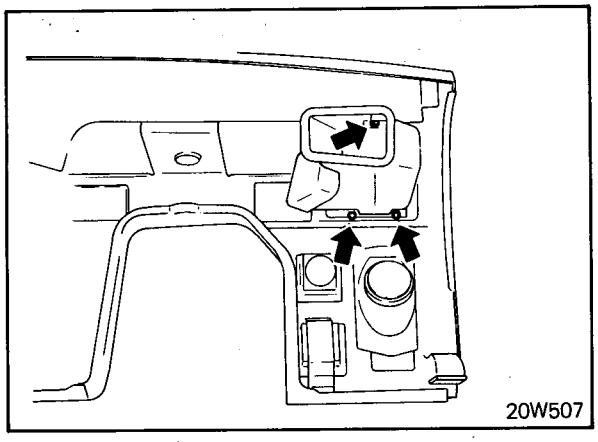
8. Remove the instrument panel. (Refer to GROUP 23.)
9. Remove the center ventilator duct from the reverse side of the instrument panel. (20W524)



10. Disconnect the demister grille and defroster duct and remove the defroster nozzle by moving it downward.

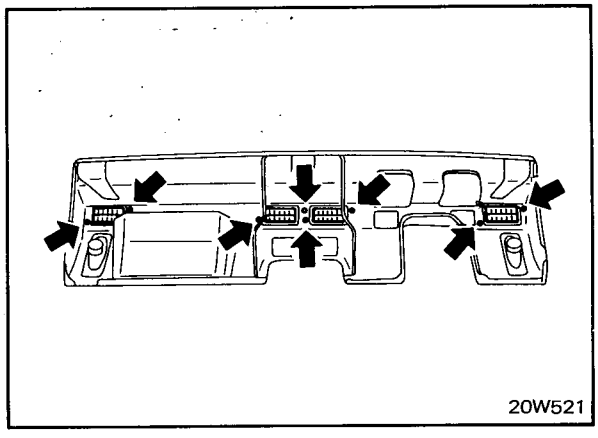


11. Remove the defroster duct from the back of the instrument panel.

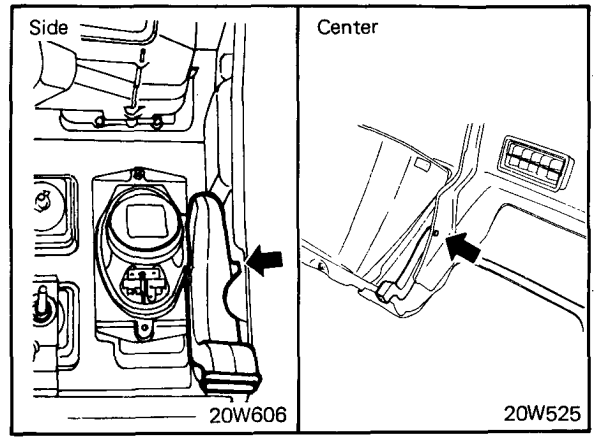


12. Remove the center air outlet and side air outlet from the back of the instrument panel.

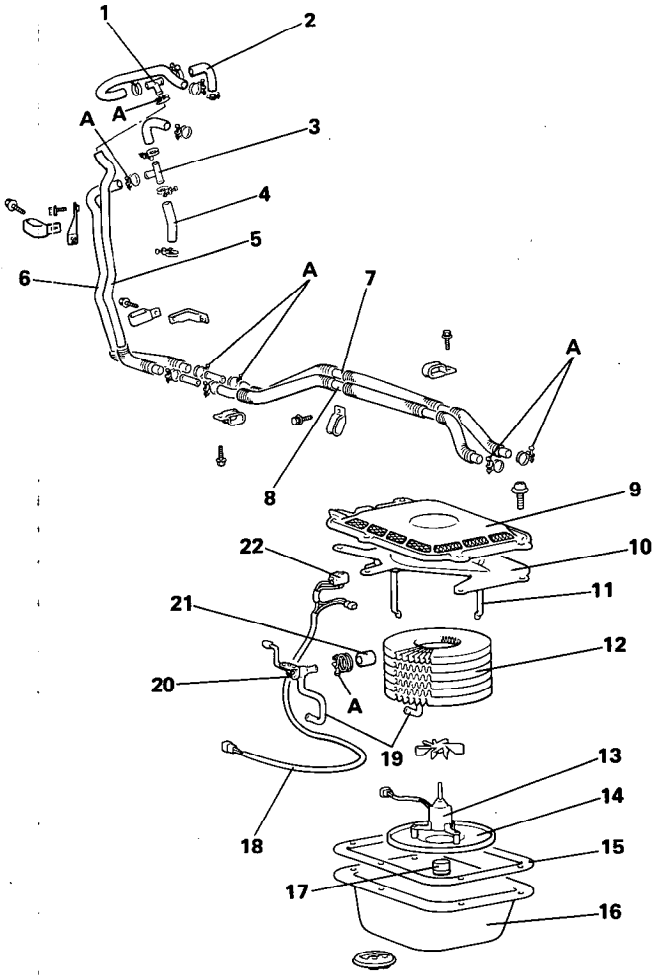
NOTE
The center air outlet and side air outlet are secured together with the instrument pad.



13. Remove the lap heater duct from the back of the instrument panel.



COMPONENTS



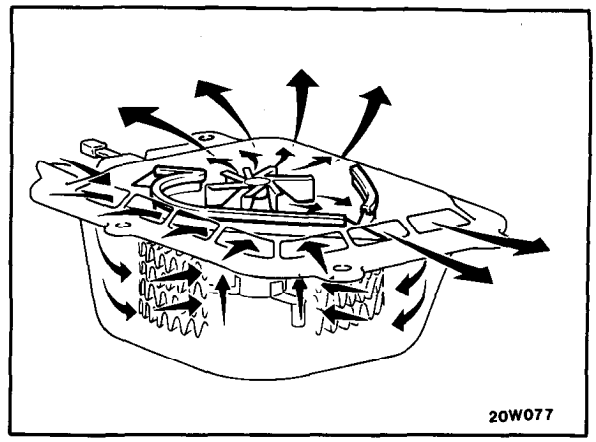
1. Joint (B)
2. Water hose (inlet side)
3. Joint (A)
4. Water hose (outlet side)
5. Water hose (C)
6. Water hose (D)
7. Water hose (B)
8. Water hose (A)
9. Cover
10. Heater nozzle
11. Clip
12. Heater core
13. Fan and motor assembly
14. Core cover
15. Secret box packing
16. Secret box
17. Rubber
18. Rear heater wiring harness
19. Piping
20. Water valve
21. Joint hose
22. Heater fan switch

	Ncm	in.lbs.
A	130-180	11-16

20W726

OPERATION

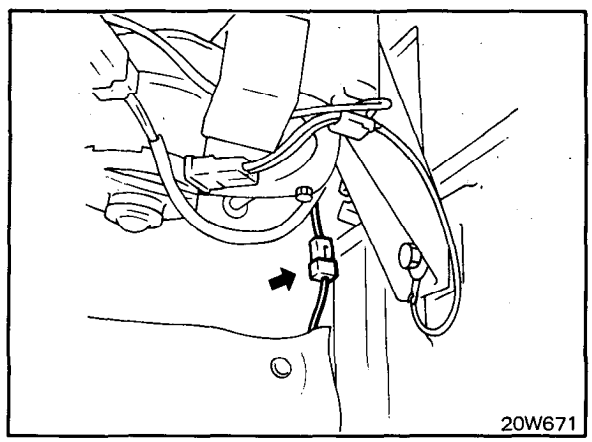
The rear heater blows off warm air in two directions, forward and backward, at properly distributed air flow rates for sufficient convection to provide comfortable heating.
The rear heater switch has a single lever which serves the combined purposes of the heater fan switch and warm water flow control lever.
Operation is only ON-OFF switching.



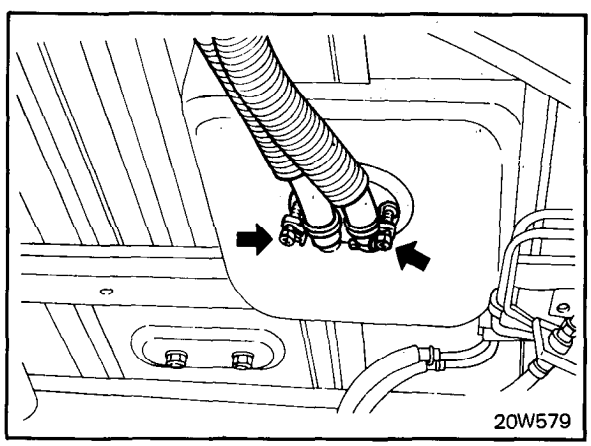
REAR HEATER

REMOVAL

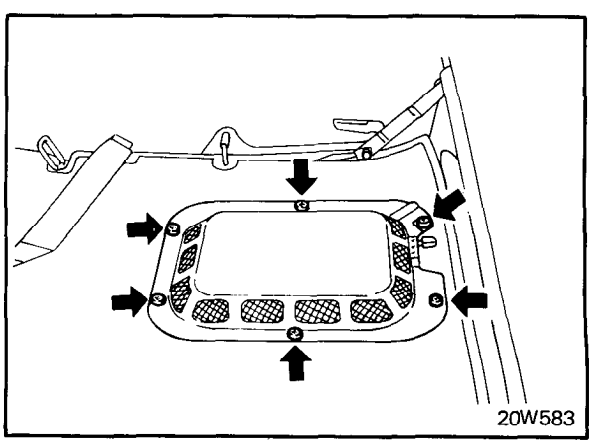
1. Remove coolant.
2. Disconnect the connector of rear heater wiring harness and front wiring harness. (20W671)



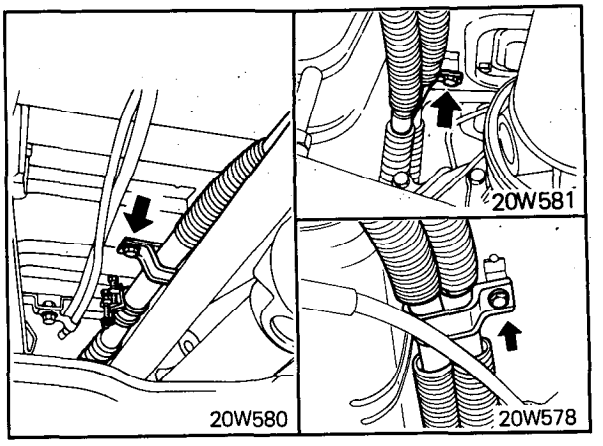
3. Disconnect the water hoses (A) and (B) from the piping. (20W579)
4. Remove the grommet upward.



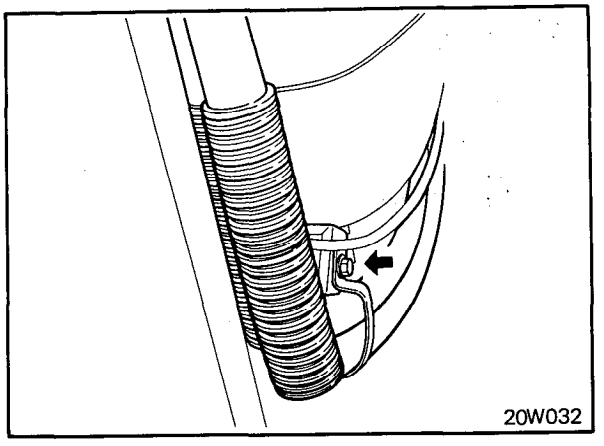
5. Remove the cover. (20W583)
6. Remove the rear heater assembly upward.



7. Remove the water hose (A) and (B) attaching clamps.



8. Remove the water hose (C) and (D) attaching clamps. (20W032)
9. Remove the clips attaching the joints to the water hoses (C) and (D) and remove the water hose assembly.
10. After the water hose assembly has been removed, disconnect the water hoses (A) and (B) from the water hoses (C) and (D).

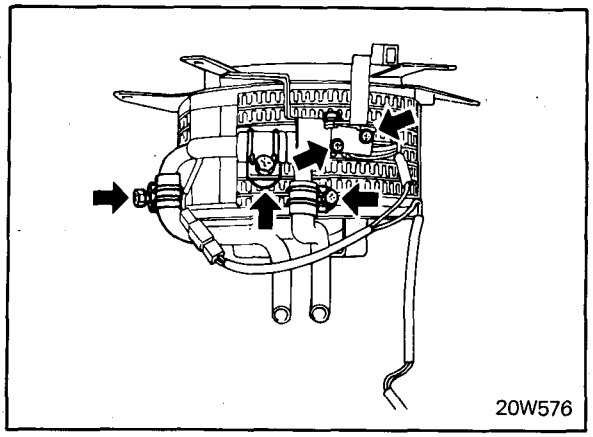


INSPECTION

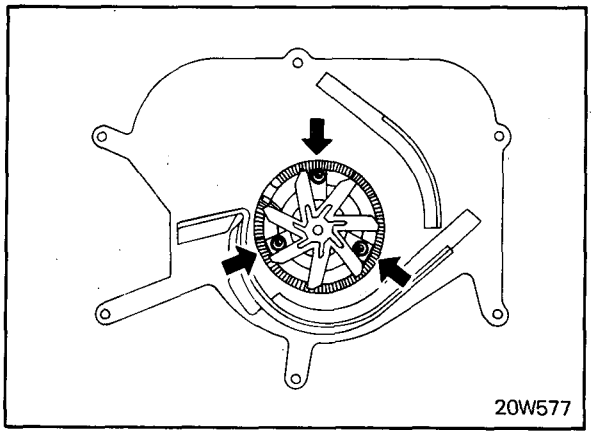
1. Check water hose and joint hose for deterioration, damage and leaks.
2. Check fan motor for noise and unsmooth rotation.
3. Check secret box for foreign substances.
4. Check rubber for deterioration and damage.

DISASSEMBLY

1. Disconnect the joint hoses and remove the water valve and pipings. (20W576)
2. Disconnect the connector of the fan switch harness and motor harness and remove the heater fan switch from the water valve. (20W576)

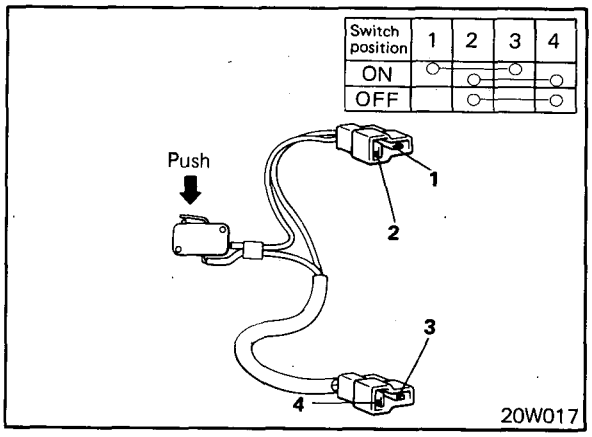


3. Remove the fan and motor assembly from the heater core. (20W577)
   Remove the clips and remove the heater nozzle, heater core and core cover in that order.



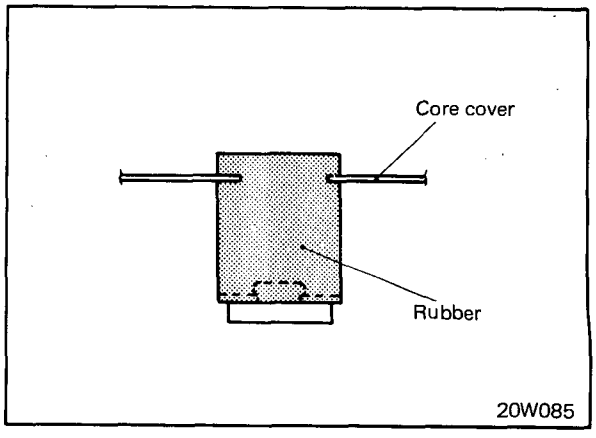
INSPECTION

1. Check water valve for faulty operation, clogging and leaks.
2. Check heater core for clogging, damage and leaks.
3. Check piping for damage.
4. Check heater fan switch for continuity.



REASSEMBLY

Securely install the rubber on the core cover.

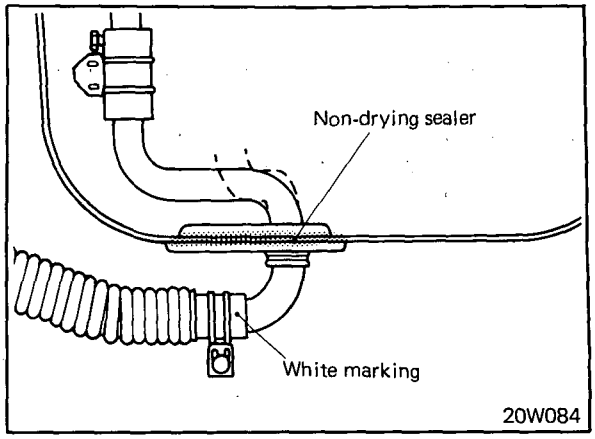


INSTALLATION

1. Apply non-drying sealer between the secret box and the grommet. (20W084)
2. Conncet the inlet side (white marking side) of piping to the inlet side of water hose. (20W084)
3. When the water hose is installed, use care to prevent its contact with other parts and sliding portions, its torsion and twisting.

NOTE
Install the clip over the yellow marking of the hose and clamp.

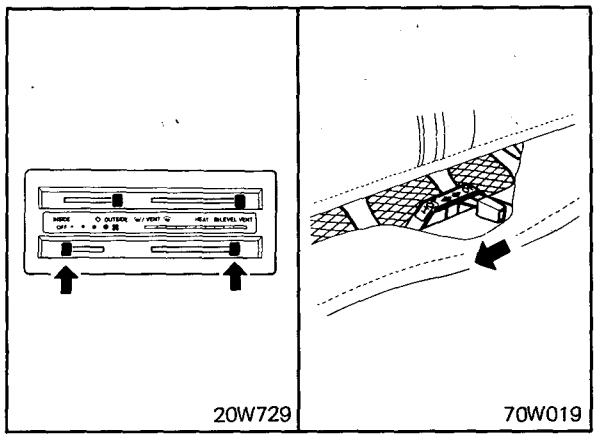
4. Install the rear heater wiring along the front wiring harness using care to prevent the wiring from being caught or gouged by other parts and avoid its contact with other parts.



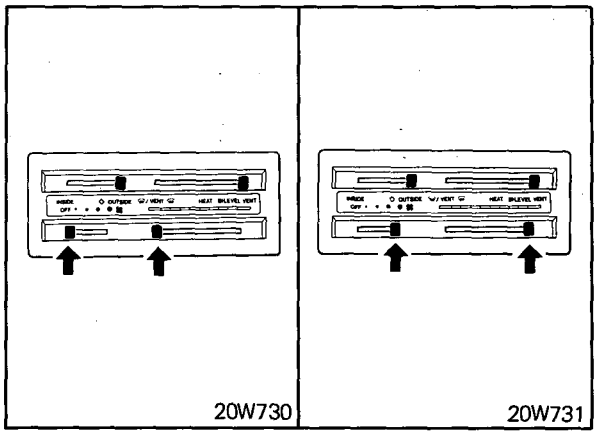
20W084

BLEEDING OF REAR HEATER

1. Place the hot water flow control lever of the front heater to HOT position, and set the heater fan switch to OFF position. (20W729)
2. Set the rear heater fan switch to HOT position. (70W019)
3. Remove the intake manifold heating water hose at the bottom of the carburetor.
4. Slowly fill the radiator with coolant up to the maximum level.
5. Check to ensure that coolant comes out from both the intake manifold and water hose and then install the hoses.
6. Allow the eingine to warm up, until coolant reaches a temperature of 50°C (122°F) or above.
7. After the engine has warmed up place the hot water flow control lever of the front heater to COLD position. (20W730)
8. Run the engine at speeds of 1,500 to 2,000 rpm (occasionally race the engine) until warm air flows out from the rear heater blow-off opening.
9. Place the hot water flow control lever of the front heater to HOT position and check to ensure that warm air flows out. (20W731)


20W729

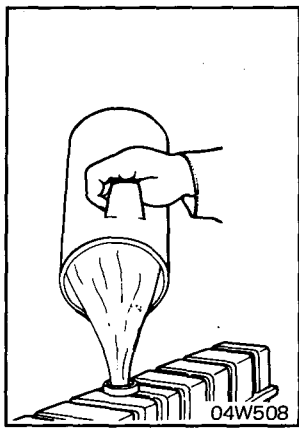
70W019

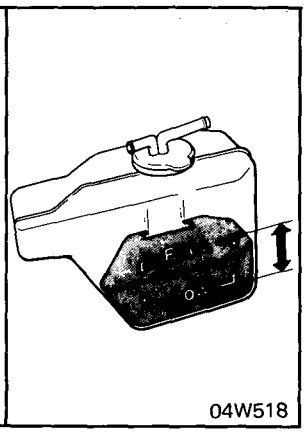

20W730

20W731

NOTE
If there is a large difference in blow-off temperature between the front heater and rear heater, perform bleeding operations again.

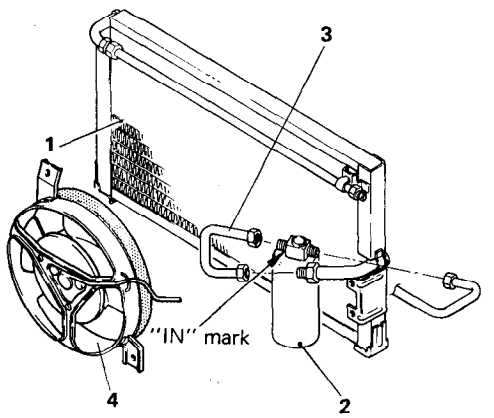
10. Refill the radiator and reservoir tank with coolant up to the specified level. (04W508, 04W518)


04W508

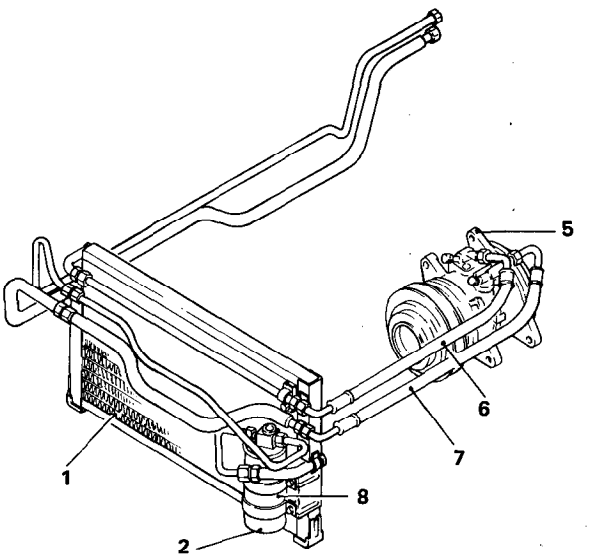

04W518

COMPONENTS

Piping

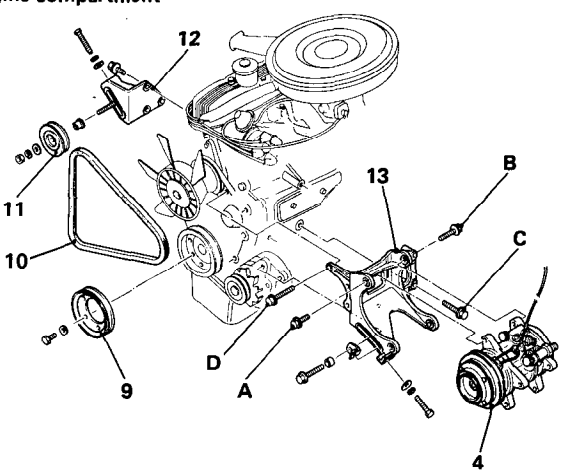


20W706



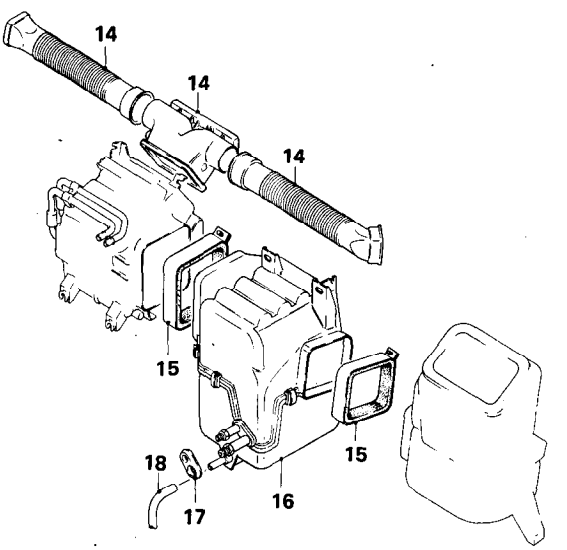
20W705

Engine compartment



20Y911

Passenger compartment



20W707

1. Condenser
2. Receiver
3. Pipe
4. Condenser fan motor
5. Compressor
6. High pressure hose
7. Low pressure hose
8. Receiver bracket
9. Crankshaft pulley
10. V-belt
11. Tension pulley
12. Tension pulley bracket
13. Compressor bracket
14. Air duct
15. Duct joint
16. Air-conditioning unit
17. Grommet
18. Drain hose

	Nm	ft.lbs.	O.D. x length mm (in.)
A	20-29	14-22	10 x 30 (1.2)
B	20-29	14-22	10 x 35 (1.4)
C	40-50	29-36	10 x 50 (2.0)
D	20-29	14-22	8 x 80 (3.1)

OPERATION

Air Selector Lever

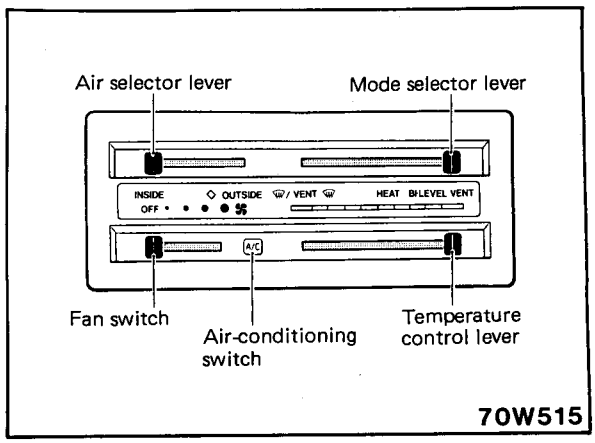
During normal operation, keep the lever at INSIDE. If inside air is contaminated, move the lever to OUTSIDE.

Blower Switch

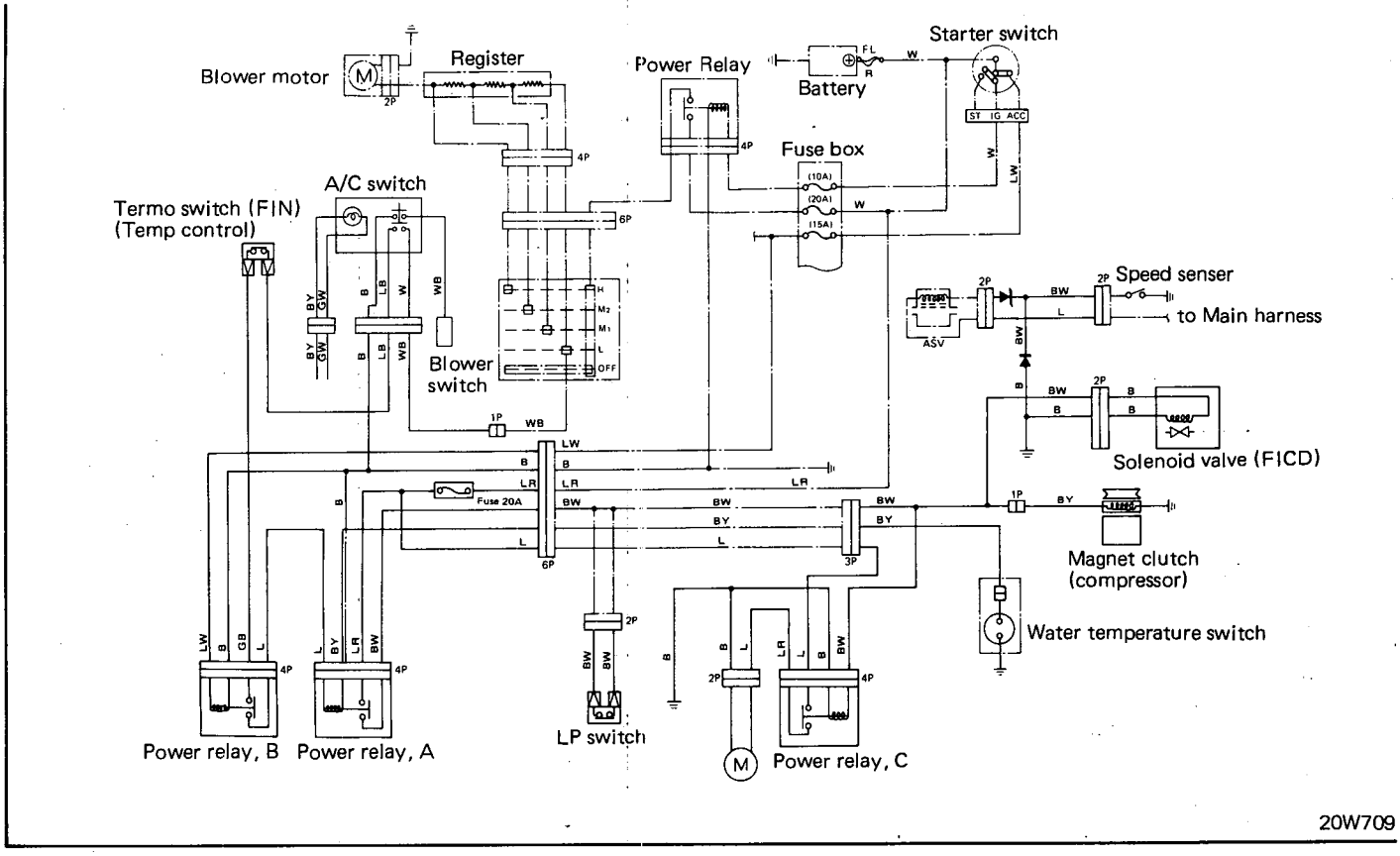
Controls the inside air flow rate in three steps.

Air-Conditioning Switch

Depress the button to operate the air conditioner. (The button is ON when pushed in and OFF when released out.)



ELECTRIC WIRING DIAGRAM



When the A/C switch is set to ON, the magnetic clutch is energized. The following components are used to control A/C compressor operation by deenergizing the magnetic clutch:

The thermostat prevents ice build up on the evaporator fins.

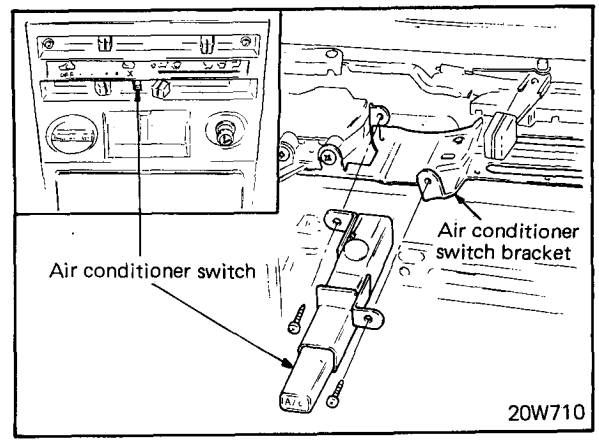
The low pressure switch protects the compressor in an excessive low freon charge condition.

The water temperature switch prevents engine overheating by sensing higher than normal engine operating temperature.

Also, an idle control system is used to maintain engine idle speed when the A/C magnetic clutch is energized.

REMOVAL

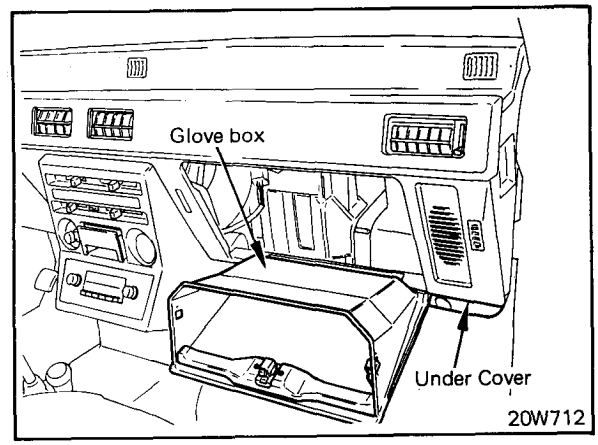
1. Remove the knob of the control lever.
2. Remove the control panel by pushing it from behind.
3. Remove the A/C switch attaching screws.
4. Disconnect the A/C switch harness.
5. Remove the A/C switch.



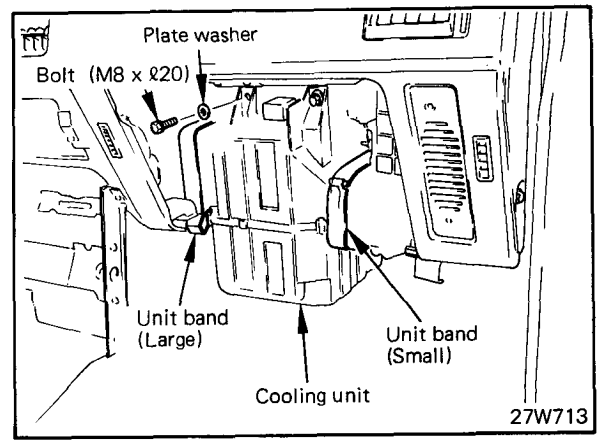
COOLING UNIT

REMOVAL

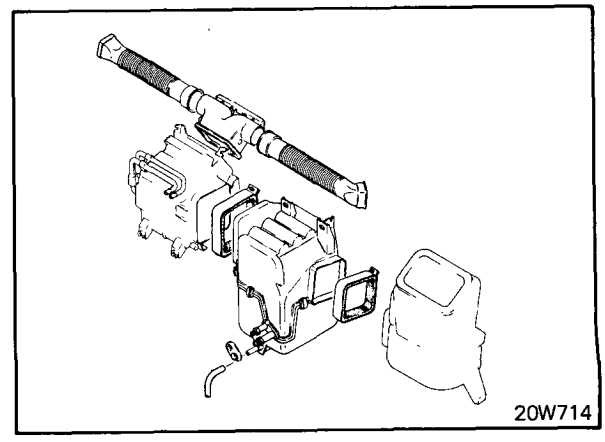
1. Remove the glove box. The glove box should be removed with the lower frame attached. (20W712)
2. Disconnect the glove box switch harness at the round topped terminal.
3. Remove the lap heater duct.
4. Remove the under tray stay.



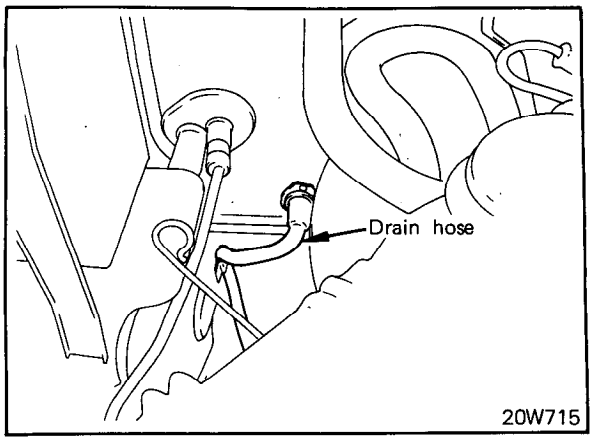
5. Disconnect the duct joint.
   Loosen the duct joint tightening bolt to free the duct joint. (Heater unit side, blower motor side)



6. Disconnect the A/C switch harness and air-conditioner harness.



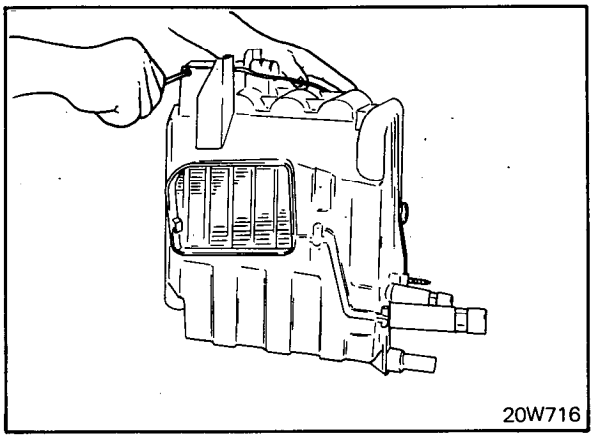
7. Disconnect the drain hose.
8. Disconnect the piping at the piping connection projecting from the firewall in the engine compartment. (20W715)
9. Remove the cooling unit attaching nuts.
10. Remove the cooling unit top attaching bolts in the passenger compartment.
11. Remove the cooling unit.



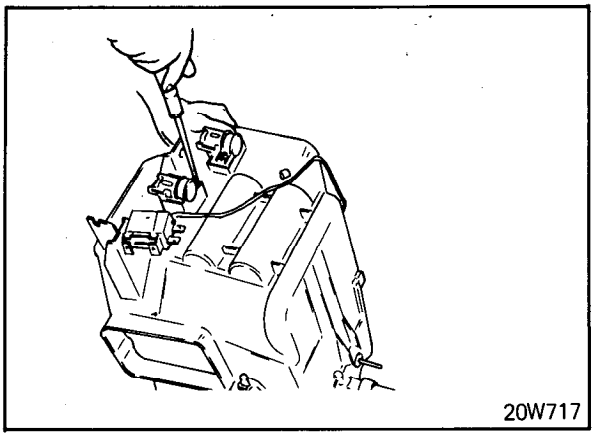
20W715

DISASSEMBLY

1. Disconnect the harness from the cooling case.

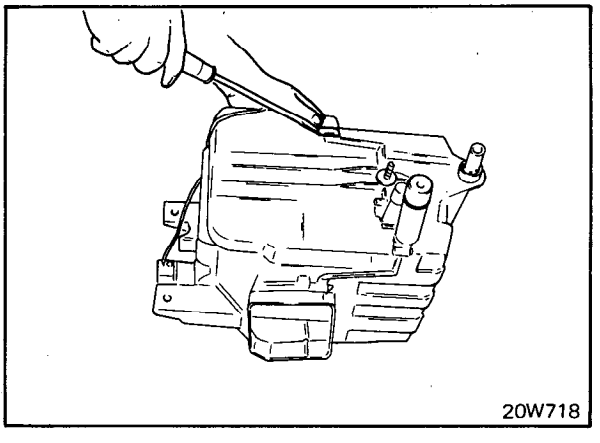

20W716

2. Remove the two power relays. Remove the tapping screws.

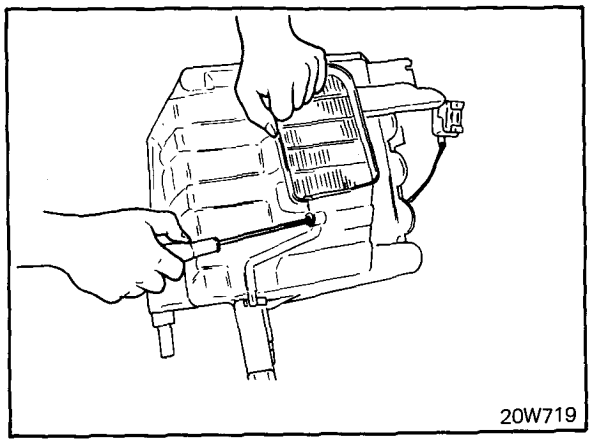

20W717

3. Remove the upper and lower cooling case attaching clips with a screwdriver.

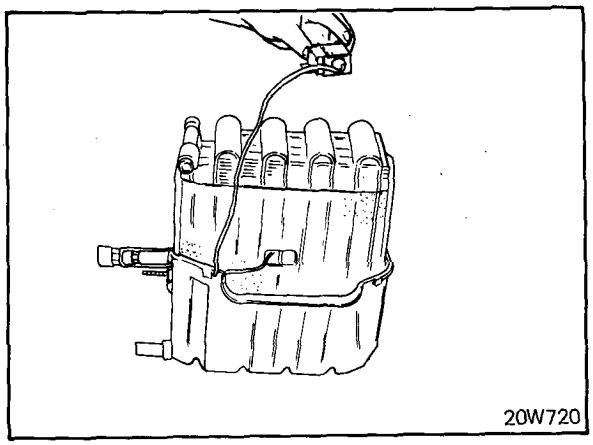
Caution
Use care to prevent the clips from flying off.


20W718

4. Remove the tapping screws.
5. Remove the upper cooling case. (20W719)

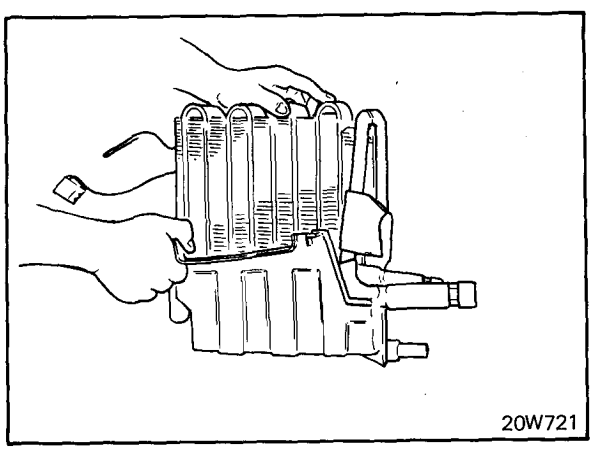

20W719

6. Remove the thermostat. Remove the heat-sensitive cylinder from inside the fins.

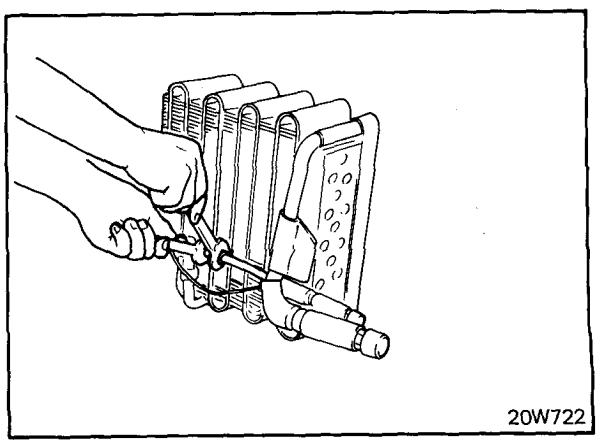

20W720

7. Remove the cooling unit by lifting it from the lower cooling case.

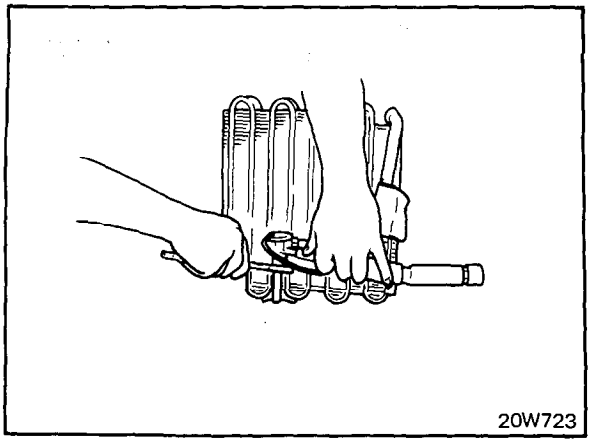
Caution
Hold the lower cooling case tightly when removing the cooling unit.


20W721

8. Remove the pipe assembly.


20W722

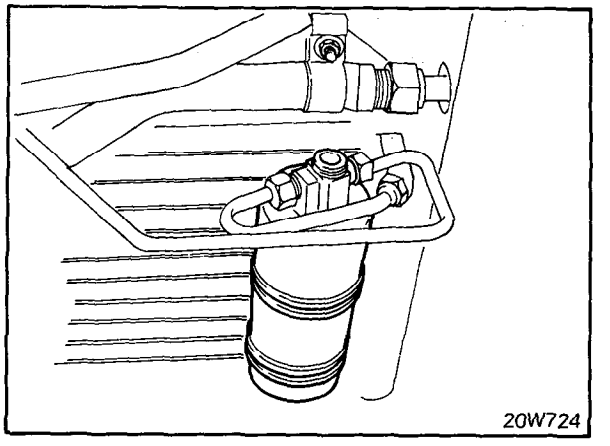
9. Remove the expansion valve.
10. Remove the tacking sheet. (20W723)


20W723

RECEIVER

REMOVAL

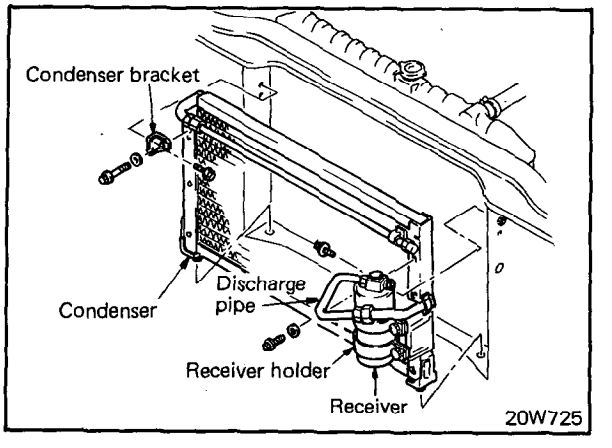
1. Remove the front grille.
2. Disconnect the receiver outlet and intake pipes.
3. Remove the receiver mounting bolts. (20W724)
4. Remove the receiver by lifting it upward.


20W724

CONDENSER

REMOVAL

1. Remove the center support.
2. Disconnect and plug the receiver outlet and intake pipes.
3. Remove the condenser mounting bolts. (20W725)
4. Remove the condenser from the vehicle.



20W725

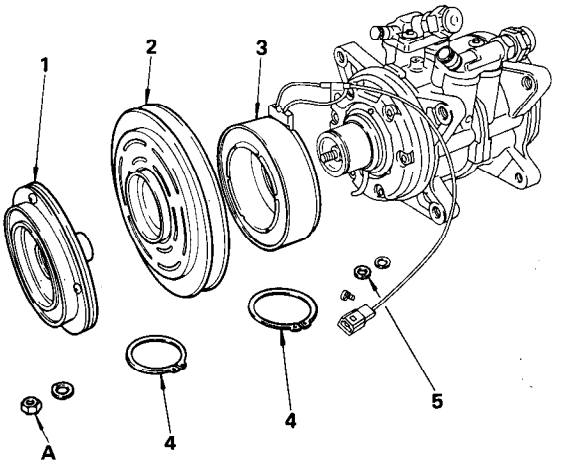
COMPRESSOR

REMOVAL

1. Loosen the idler pulley and remove the V-belt.
2. Disconnect the primary cord of the ignition coil.
3. Disconnect the magnet clutch harness.
4. Disconnect and plug the HP and LP hoses.
5. Remove the front and rear set bolts.
6. Remove the compressor.

COMPONENTS

1. Center piece
2. Clutch rotor assembly
3. Clutch stator
4. Snap ring
5. Shim

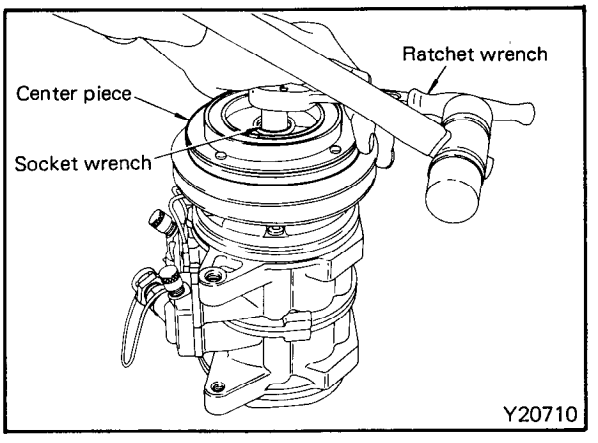


	Nm	ft.lbs.
A	15-17	11-13

Y20709

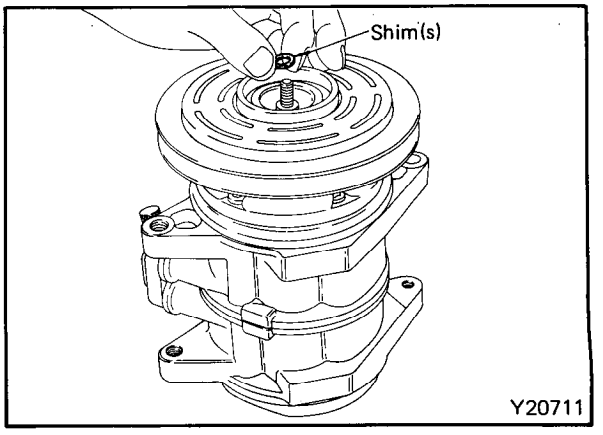
DISASSEMBLY

1. Hold the center piece and loosen the nut. (Y20710)
2. Remove the center piece.



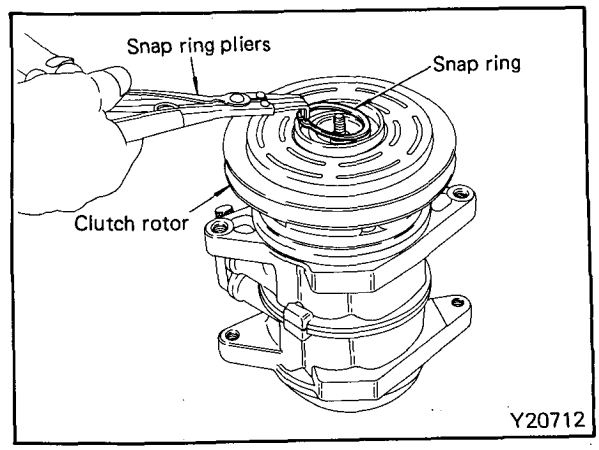
Y20710

3. Remove the clearance adjusting shim(s) located on the end of the compressor shaft.



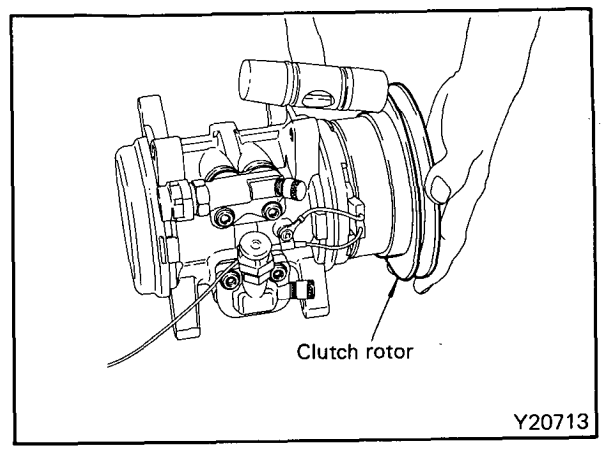
Y20711

4. Remove the snap ring which secures the clutch rotor.



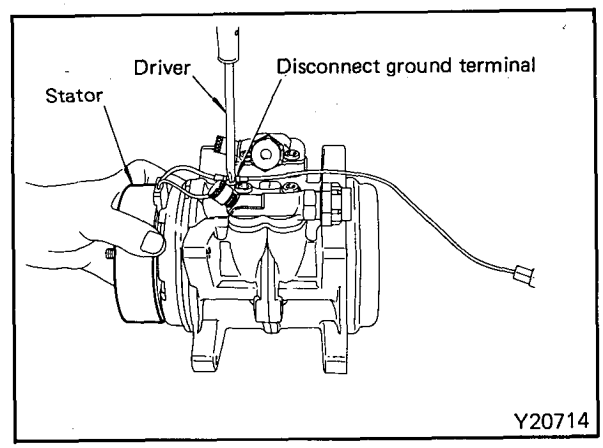
5. Pull the clutch rotor off of the compressor.

NOTE
It may be necessary to lightly tap the rotor with a plastic hammer.

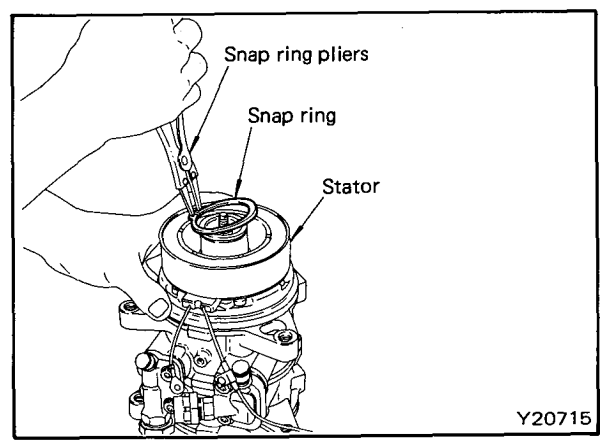


6. Disconnect the ground terminal for the stator coil.

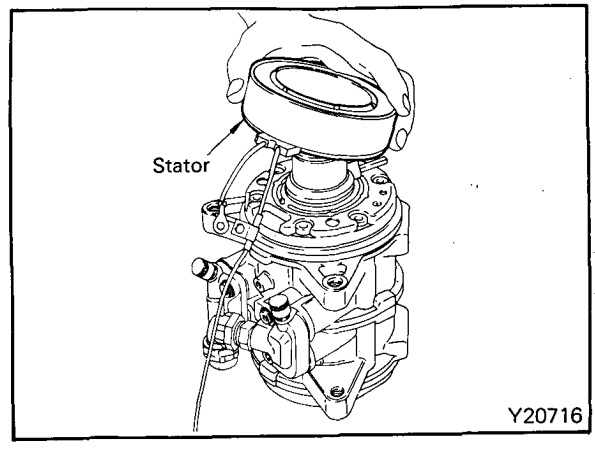
NOTE
Use an impact driver to remove the attaching screw.



7. Remove the snap ring which secures the stator.



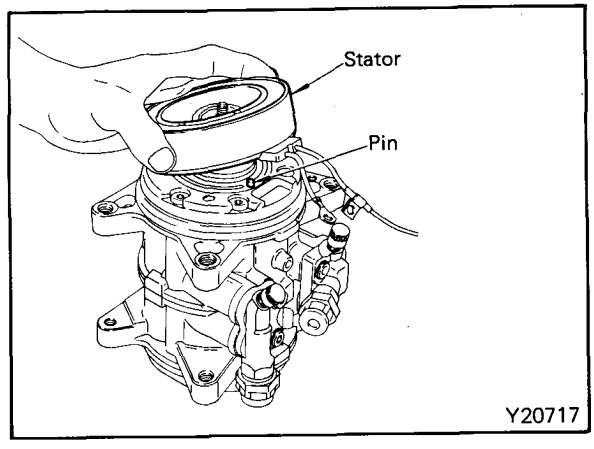
8. Pull the stator off of the compressor housing.



INSPECTION

1. Check the surface of the center piece for scoring or bluing.
2. Check the surface of the rotor for scoring or discoloration.
3. Measure the resistance of the stator coil. Resistance should be equal to the standard value.

Coil resistance [at ambient temperature 20° C (68° F)]	2.9 ± 0.2Ω



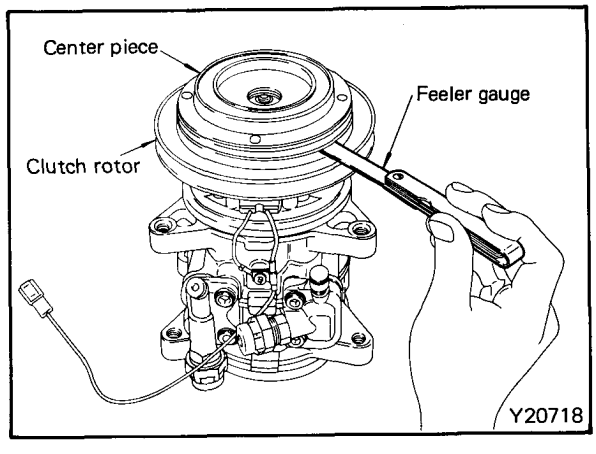
INSTALLATION

The stator must be aligned with the pin in the compression housing and center piece to stator clearance must be checked after installation.

MAGNETIC CLUTCH CLEARANCE INSPECTION

1. Tighten the clutch nut.
2. Check the clutch clearance as illustrated. (Y20718)

Pressure plate to rotor clearance	0.4-0.7 mm (.02-.03 in.)



NOTE
Remove clearance adjusting shims to decrease clutch clearance. Add shims selected from the following table to increase clutch clearance.

Clearance Adjustment Shims

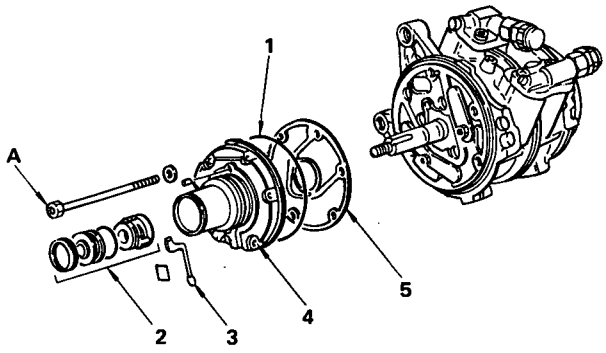
Part No.	Thickness
RS13023A	0.1 mm (.004 in.)
RS13023B	0.2 mm (.008 in.)
RS13024	0.5 mm (.020 in.)

3. Turn the rotor by hand to confirm that it rotates freely.

COMPONENTS

1. O-ring
2. Seals
3. Oil drain guide
4. Front housing
5. Gasket

	Nm	ft.lbs.
A	25-26	18-20

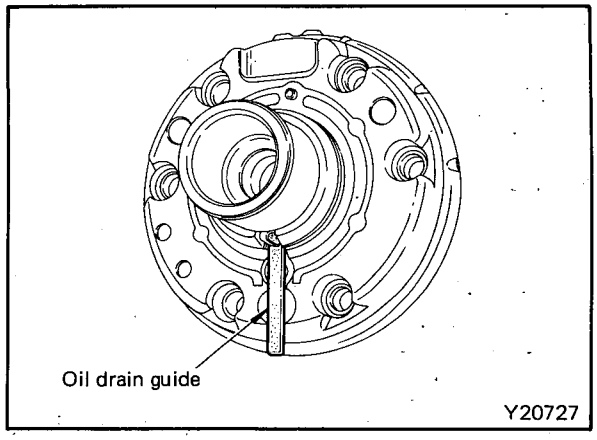


20Y947

REMOVAL

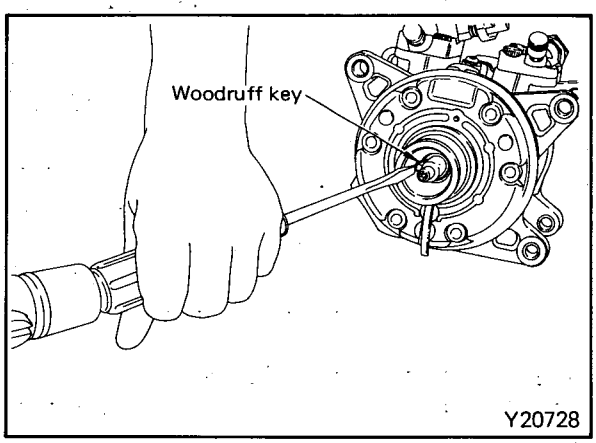
NOTE
The magnetic clutch must be removed. (Refer to p. 24-44.)

1. Remove the oil drain from the front housing.



Y20727

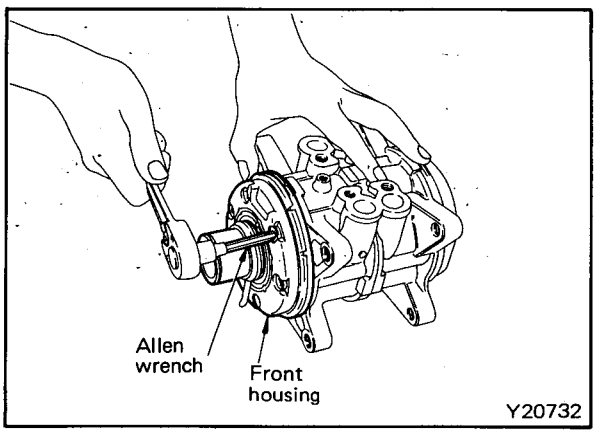
2. Remove the woodruff key.



Y20728

3. Remove the six compressor through bolts as illustrated.

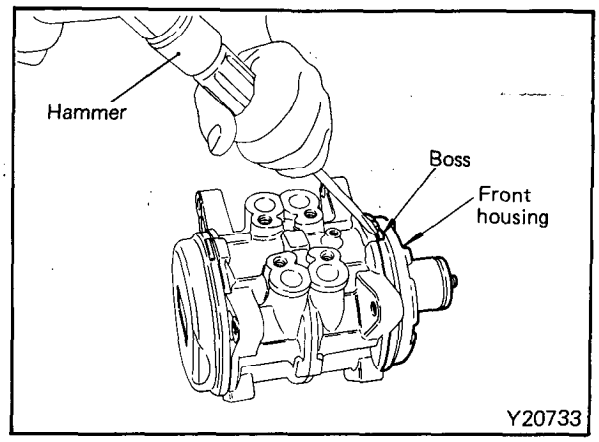
NOTE
Set the compressor on end to prevent any loss of oil during removal of the front housing.



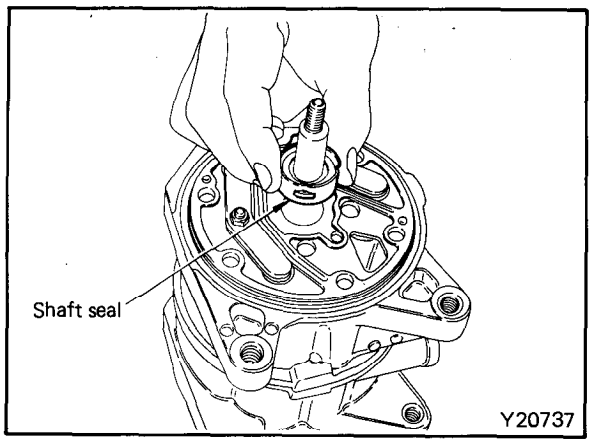
Y20732

4. Using a hammer and punch, remove the front housing by tapping on the boss. Remove the front housing from the compressor.

NOTE
Do not damage the front housing.



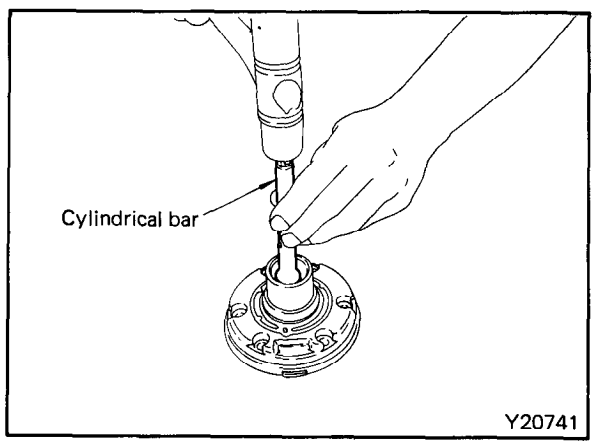
5. Remove the shaft seal.



6. Remove the seal plate from the front housing with a remover. (Y20741)

NOTE
Do not damage the inside surface of the front housing when removing and installing the seal plate.

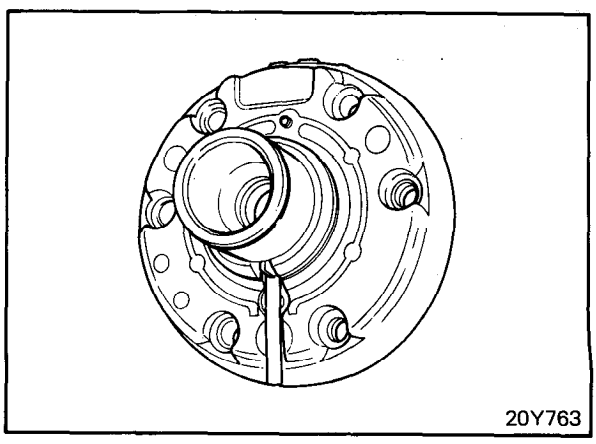
7. Carefully drain the oil from the compressor into a container.



8. Check the sealing surfaces for cracks, scratches or deformation. (20Y763)

INSPECTION

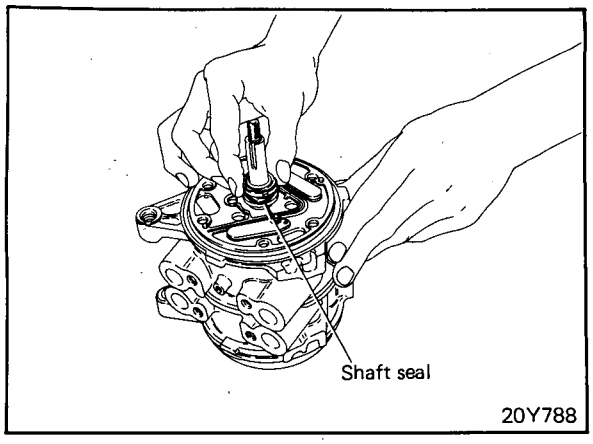
1. Check the front housing for cracks or scoring on the sealing surfaces.
2. Check the compressor shaft for scoring.



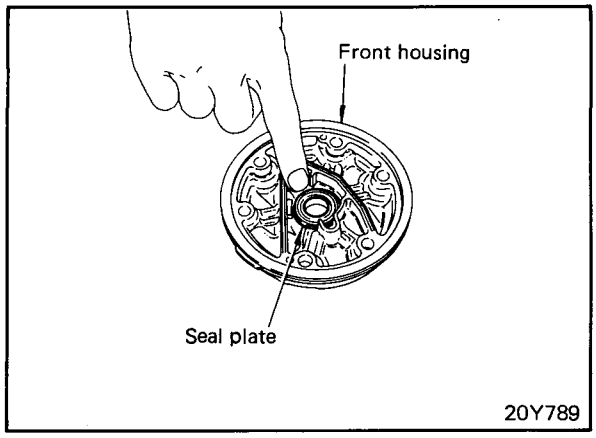
INSTALLATION

1. Lubricate the shaft seal with compressor oil. Install the shaft seal on the shaft.

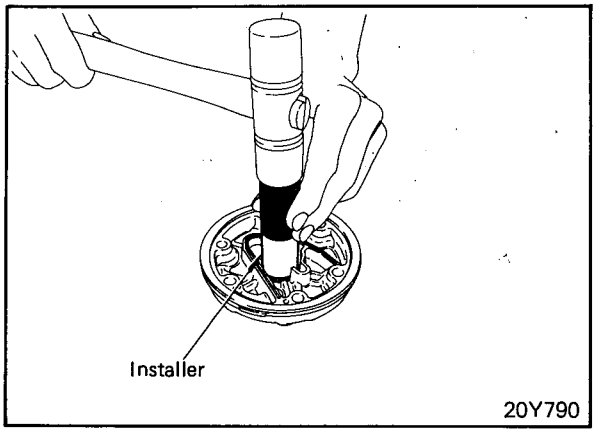
NOTE
Rotate the shaft seal lightly by hand to check that it is fitted into the notch on the compressor shaft.



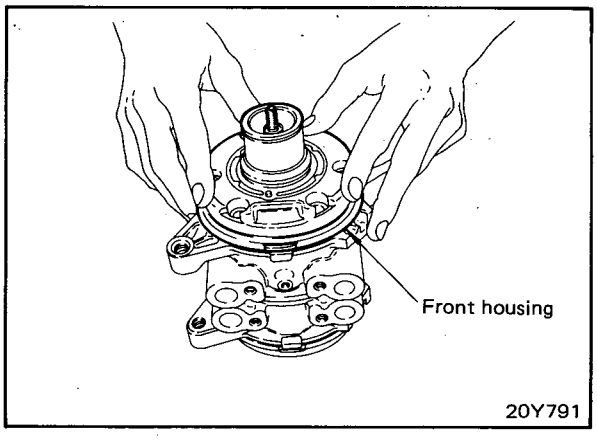
2. Lubricate the seal plate and a new O-ring with compressor oil. Push the seal plate and O-ring into the front housing.



3. Lubricate the new front housing O-ring with compressor oil and install it into the compressor housing.

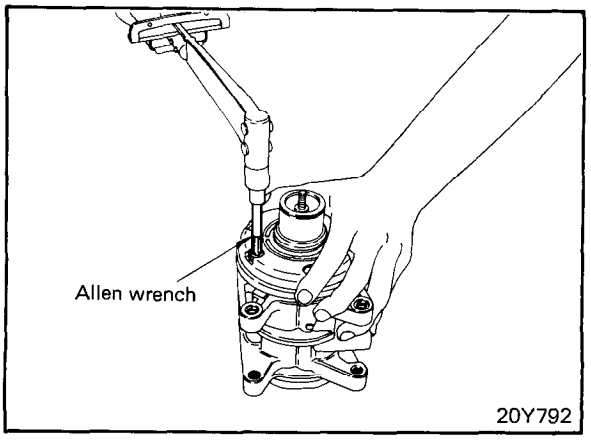


4. Install the front housing in position over the locating pins in the compressor.

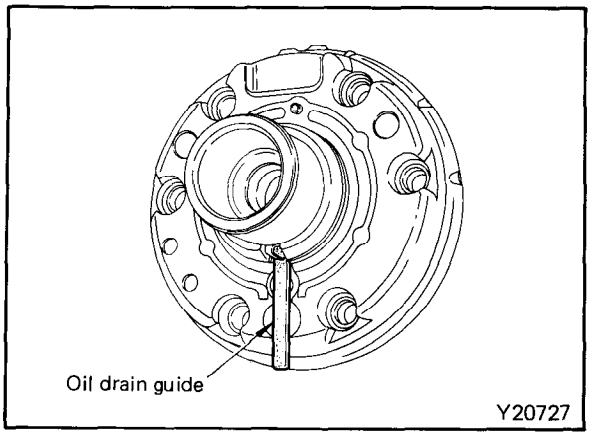


5. Install the six compressor through bolts.

NOTE
New washers should be used on the six through bolts.



6. Install the woodruff key.
7. Insert a new oil drain guide in front of the seal plate on the front housing. (Y20727)



8. Pour the specified quantity of new compressor oil into the service valves.

Compressor oil	90 cc (5.5 cu.in.)