HEATER, AIR CONDITIONER AND VENTILATION

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E55AA--

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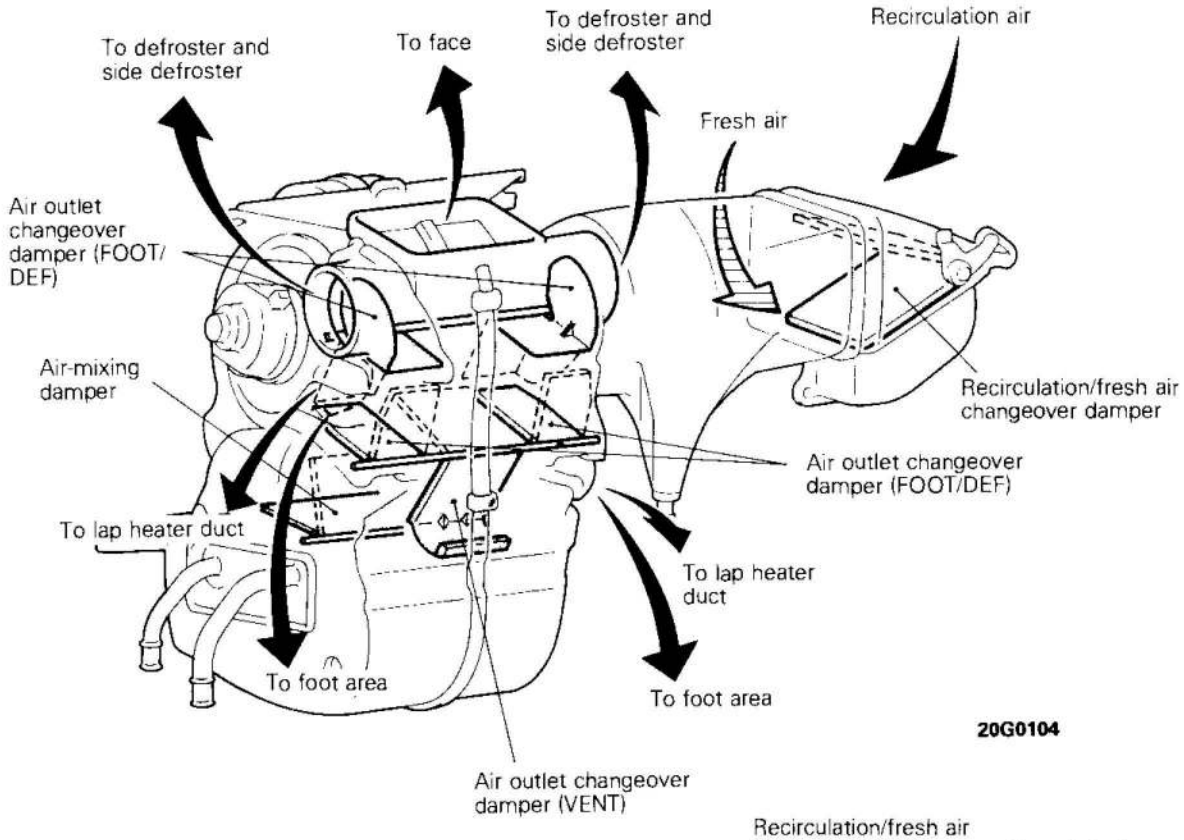
HEATER AND VENTILATION

GENERAL INFORMATION

E55BAAE

FRONT HEATER

For the front heater, the heater unit and the blower motor are the integrated type.
For temperature control of the heater, the air-mix system is used for excellent response and easy temperature adjustment.
Because the damper in the air-mix system controls the warm air, which passes through the heater core, and fresh (cool) air, which does not pass through the core, minor adjustments of the temperature are therefore possible, and the temperature can be set to the optimum level.



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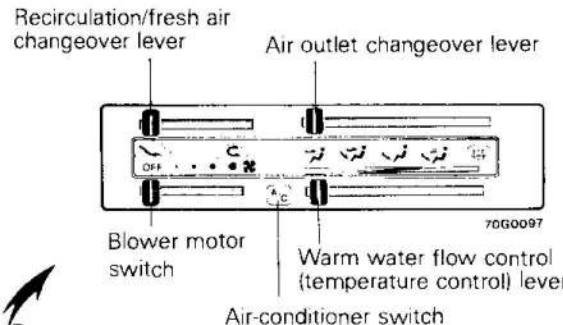

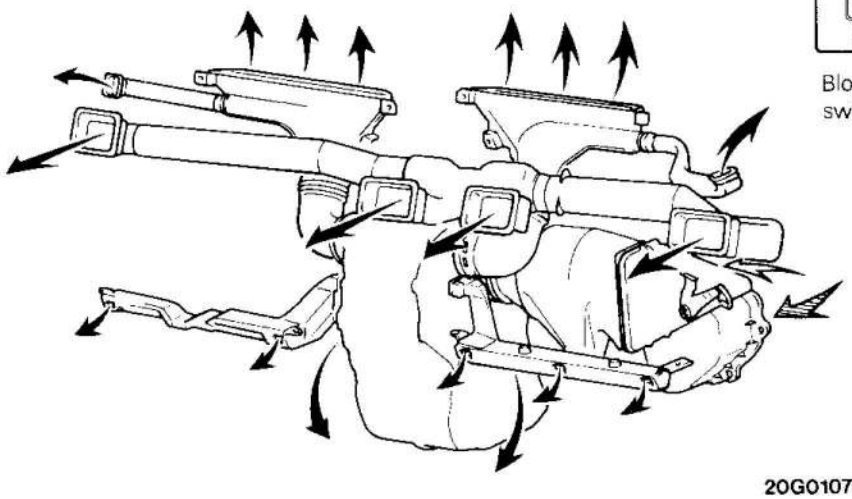

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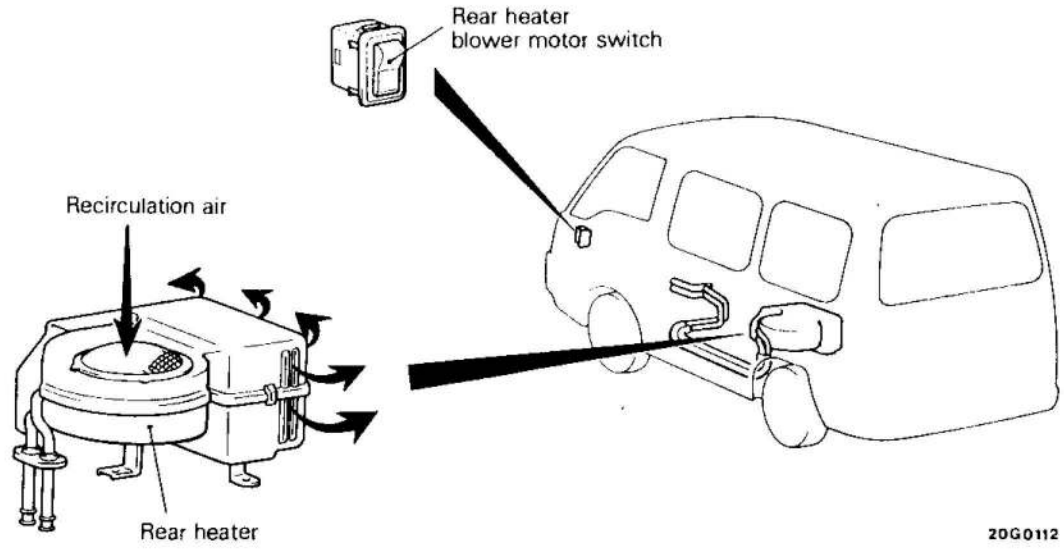
Fresh air
Recirculation air

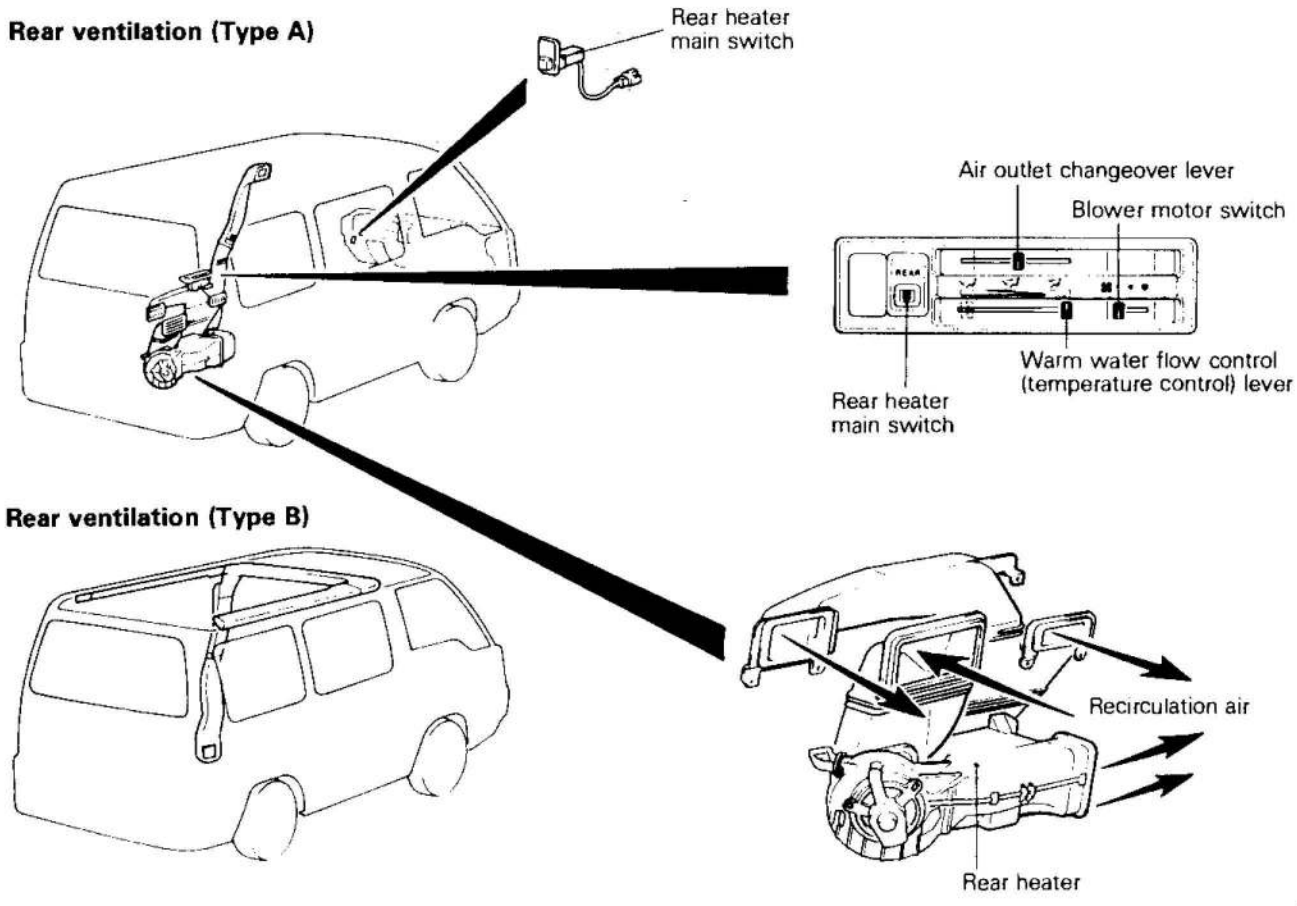
REAR HEATER (Under Seat Type)

In 5-door mini-bus, the rear heater unit is installed under the second seat. This heater unit is a recirculation type with a large heat radiating heater core.



REAR HEATER (Built-in Type)

In 4-door mini-bus, a recirculation air-mix type rear heater unit is installed under the left (or right) rear floor. Rear heater fan switches are located at the driver's seat and the rear seat, and can be controlled by either. Rear ventilation has two types; "A" type with pre-installed duct for easy rear cooler installation, and "B" type with roof-duct as standard equipment.



SPECIFICATIONS

GENERAL SPECIFICATIONS

E55CA--

Items	Specifications
Front heater assembly	
Type	Selective recirculating, warm water type (air-mix type)
Performance kJ/h (kcal/h,B.T.U./h)	
Standard equipment	13,200 (3,150, 12,500)
Options for cold climate areas	14,000 (3,350, 13,300)
Rear heater assembly (Under seat type)	
Type	Recirculation, Warm water type
Performance kJ/h (kcal/h,B.T.U./h)	12,600 (3,000, 11,900)
Rear heater assembly (Built-in type)	
Type	Recirculation, Warm water type (air-mix type)
Performance kJ/h (kcal/h,B.T.U./h)	17,000 (4,100, 16,300)

SERVICE SPECIFICATIONS

E55CB--

Items	Specifications
Standard value	
Air-conditioner compressor V-belt deflection	
Petrol-powered vehicles mm (in.)	7–10 (0.28–0.40)
Diesel-powered vehicles mm (in.)	6–9 (0.24–0.35)
Air-conditioner idle-up engine speed r/min.	950–1,050

TORQUE SPECIFICATIONS

E55CC--

Items	Nm	kgcm	in.lbs.
Front heater fan	2–3.5	20–35	17–30
Rear heater fan (Under seat type)	3	30	26
Rear heater fan (Built-in type)	2–3.5	20–35	17–30

SPECIAL TOOLS

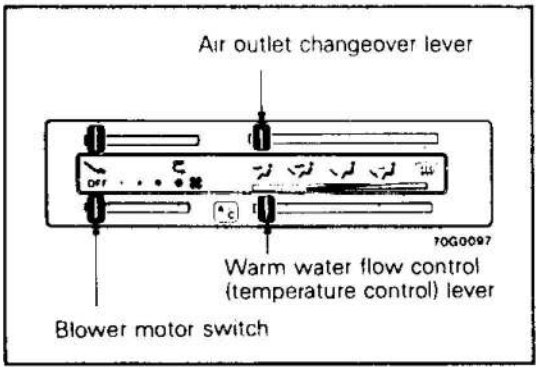
E55DA--

Tool (Number and Name)	Use
MB990784 Ornament remover 	Removal of grill trim etc. Removal of rear heater switch

TROUBLESHOOTING

E55EAAE

Symptom	Probable cause	Remedy	Reference page
Cannot control temperature by operating temperature control lever (insufficient warm air)	Thermostat malfunction	Replace	GROUP 14
	Clogged or damaged water hose	Correct or replace	–
	Clogged or damaged heater core	Correct or replace	55–15, 21, 27
	Air-mix damper malfunction	Correct or replace	55–15
	Wrong temperature control cable connection	Correct	55–6, 7
Air outlet changeover lever operated but no air flow	Air outlet changeover damper malfunction	Correct or replace	–
	Wrongly connected air outlet changeover control cable	Correct	55–6,8
	Wrongly connected duct	Correct	–
Blower motor emits abnormal noise	Foreign substance inside blower	Clean	–
	Unbalanced blower motor or fan	Replace	–
	Damaged fan	Replace	
Blower motor will not function	Fuse blown	Replace	–
	Bad earth	Correct	–
	Blower motor switch malfunction	Replace	55–11, 17, 22
	Blower motor malfunction	Replace	55–15, 20, 26
	Rear heater main switch malfunction	Replace	55–17, 22
	Rear heater relay malfunction	Replace	55–17, 22
Blower will not change speed	Blower motor resistor malfunction	Replace	55–15, 20, 26
	Blower motor switch malfunction	Replace	55–11, 22
No recirculation/fresh air changeover (front heater)	Recirculation/fresh air changeover damper malfunction	Correct	55–13
	Wrong recirculation/fresh air changeover control cable connection	Correct	55–7



SERVICE ADJUSTMENT PROCEDURES E55FAAG

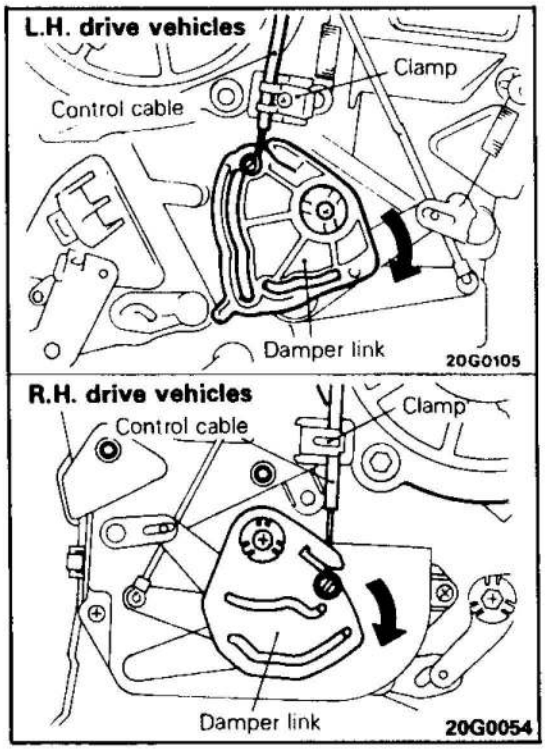
INSPECTION AND ADJUSTMENT OF FRONT HEATER CONTROL

CONFIRMING AIR OUTLET CHANGEOVER LEVER OPERATION

1. Move blower motor switch to the far right and operate air outlet changeover lever. Confirm that lever operation is smooth and air flow at each lever position is correct.
2. When faulty, adjust air outlet changeover control cable.

ADJUSTMENT OF AIR OUTLET CHANGEOVER CONTROL CABLE

1. Move air outlet changeover lever to the far right.
2. Disconnect air outlet changeover control cable from clamp on front heater unit side.
3. Move damper link on front heater unit side all the way down and adjust outer cable tension so that inner cable has no slack. Secure control cable with clamp.
4. Reconfirm smooth operation of air outlet changeover lever.

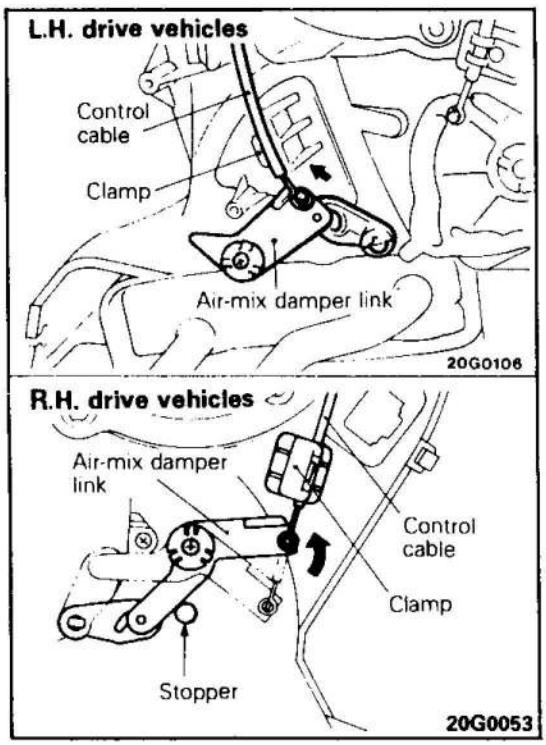


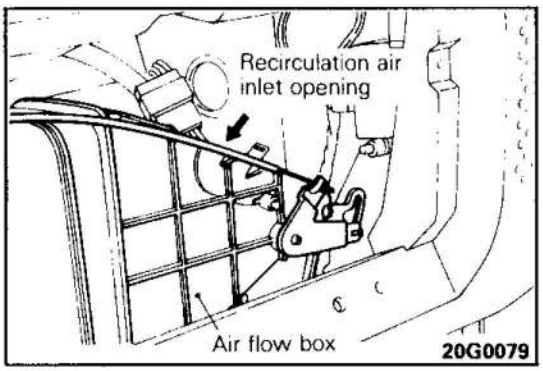
CONFIRMING TEMPERATURE CONTROL LEVER OPERATION

1. Confirm that temperature control lever on the instrument panel moves smoothly from far left to far right. Confirm that front heater unit air-mix damper link touches stopper when temperature control lever is at the far left.
2. When faulty, adjust temperature control cable.

ADJUSTMENT OF TEMPERATURE CONTROL CABLE

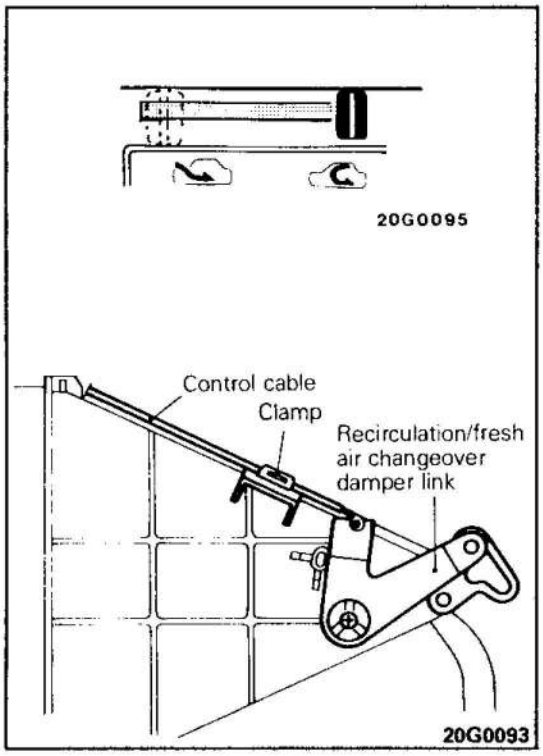
1. Move temperature control lever on the instrument panel to the far left.
2. Disconnect temperature control cable from clamp on front heater unit side.
3. Lift front heater unit air-mix damper link so that it touches stopper and adjust outer cable tension so that inner control cable has no slack. Secure control cable with clamp.
4. Reconfirm smooth temperature control lever operation.





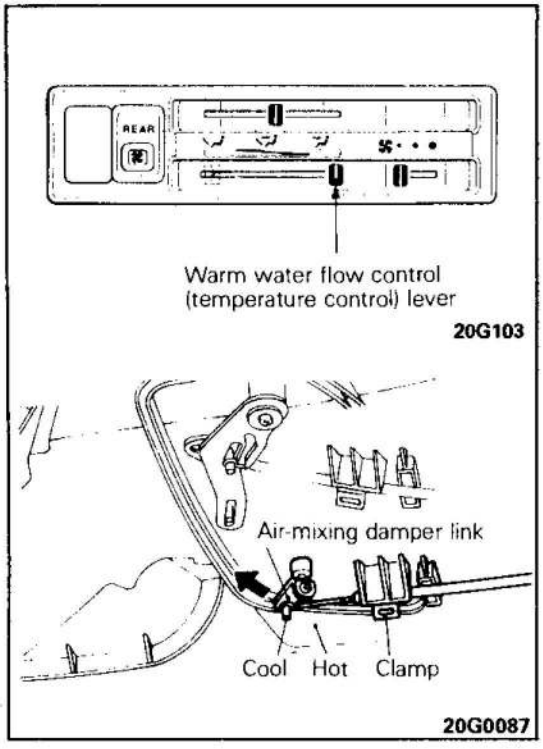
CONFIRMING RECIRCULATION/FRESH AIR CHANGEOVER LEVER OPERATION

1. Remove glove box from instrument panel.
2. Confirm smooth recirculation/fresh air changeover lever operation. Confirm that recirculation air inlet at the top of air flow box is completely sealed with recirculation/fresh air changeover damper when changeover lever is at the far left.
3. When faulty, adjust recirculation/fresh air changeover control cable.



ADJUSTMENT OF RECIRCULATION/FRESH AIR CHANGEOVER CONTROL CABLE

1. Move recirculation/fresh air changeover lever to the far right.
2. Disconnect recirculation/fresh air changeover control cable from clamp on air flow box side.
3. Move air flow box side recirculation/fresh air changeover damper link to the far right and adjust outer cable tension so that inner control cable has no slack. Secure control cable with clamp.
4. Reconfirm smooth recirculation/fresh air changeover lever operation.



INSPECTION AND ADJUSTMENT OF REAR HEATER CONTROL (Built-in Type)

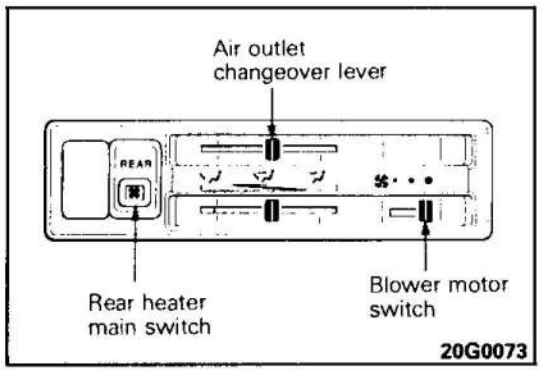
CONFIRMING TEMPERATURE CONTROL LEVER OPERATION

E55FBAA

1. Remove link cover at the bottom of rear heater unit.
2. Confirm that temperature control lever moves smoothly from left to right and back. Confirm when temperature control lever is at the far right, air-mix damper link at the bottom of the rear heater unit is at about the position shown in the diagram.
3. When faulty, adjust temperature control cable.

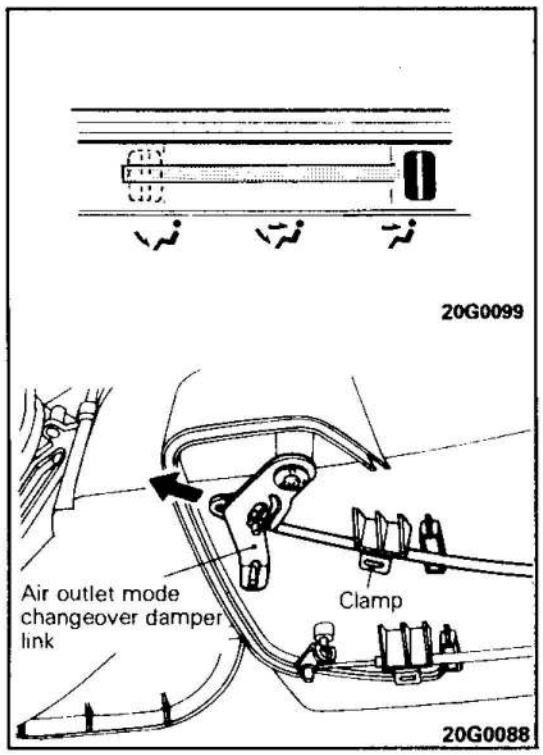
ADJUSTMENT OF TEMPERATURE CONTROL CABLE

1. Move temperature control lever to the far right.
2. Disconnect temperature control cable (insulator color: white) from clamp at bottom of rear heater unit side.
3. Press rear heater unit air-mix damper link so that it touches COOL position and adjust outer cable tension so that inner control cable has no slack. Secure control cable with clamp.
4. Reconfirm smooth temperature control lever operation.



CONFIRMING AIR OUTLET CHANGEOVER LEVER OPERATION

1. Turn rear heater main switch ON and move blower motor switch to the far right. Move air outlet changeover lever and confirm smooth operation. Confirm that air blows from foot grille when changeover lever is to the left, and from the roof grille when to the right and from both when in the center position.
2. When faulty, adjust air outlet changeover control cable.

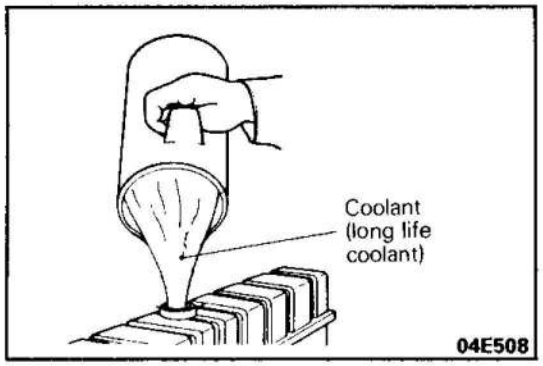


ADJUSTMENT OF AIR OUTLET CHANGEOVER CONTROL CABLE

1. Remove link cover at bottom of rear heater unit.
2. Move rear side trim air outlet changeover lever to the far right.
3. Disconnect air outlet changeover control cable (insulator color: black) from clamp at bottom of rear heater unit.
4. Push air outlet changeover damper link at bottom of rear heater unit in the direction indicated in the diagram and adjust outer cable tension so that inner control cable has no slack. Secure control cable with clamp.
5. Reconfirm smooth operation of air outlet changeover lever.

AIR EVACUATION FROM REAR HEATR WARM WATER (UNDER SEAT TYPE) E55FEAA

When air is mixed with coolant it affects heater performance. When changing coolant or installing/removing heater (front or rear), evacuate air by the following procedures.



1. Top up the radiator with coolant (Long Life Coolant).

2. Run engine till water temperature is above about 50°C (122°F). Stop engine and confirm coolant amount.

   NOTE
   Running engine at about 3000 r/min for 5 minutes will raise water temperature above 50°C (122°F).

3. Start engine and run at 2500 r/min for about 20 sec. Stop engine for about 20 sec.
4. Confirm coolant amount. Add if required.
5. Repeat Step 3 six times.
6. Restart engine and run at about 1000 r/min for about 2 min.
7. Add coolant to radiator and condense tank to specified level.

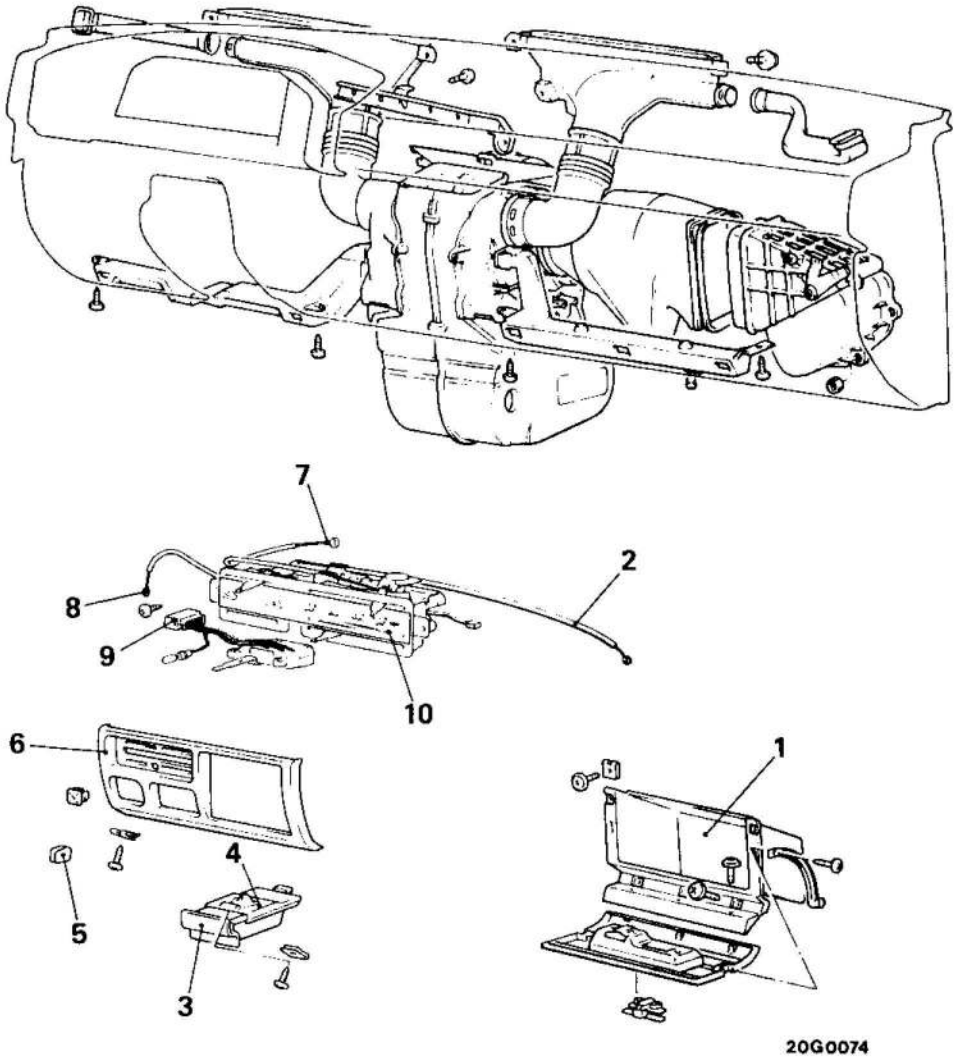
   NOTE
   With above procedures, air can be evacuated without the thermostat opening.

FRONT HEATER CONTROL

E55GA--

REMOVAL AND INSTALLATION

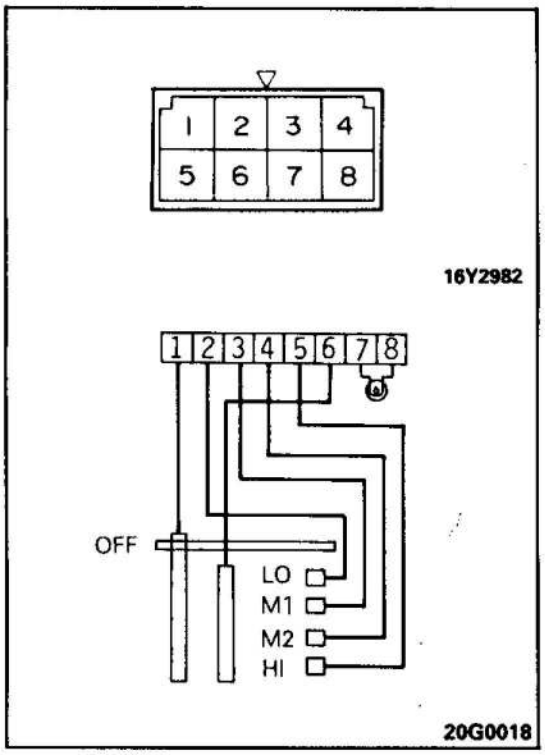
Post-installation Operation
- Adjustment of air outlet changeover control cable (Refer to P.55–6.)
- Adjustment of temperature control cable (Refer to P.55–6.)
- Adjustment of recirculation/fresh air changeover control cable (Refer to P.55–7.)



Removal steps

1. Glove box assembly
2. Recirculation/fresh air changeover control cable connection
3. Ashtray
4. Ashtray cover
5. Heater control lever knob
6. Center panel
7. Air outlet changeover control cable connection
8. Temperature control cable connection
9. Blower motor switch connector connection
- ◆◆ 10. Heater control assembly

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".



INSPECTION

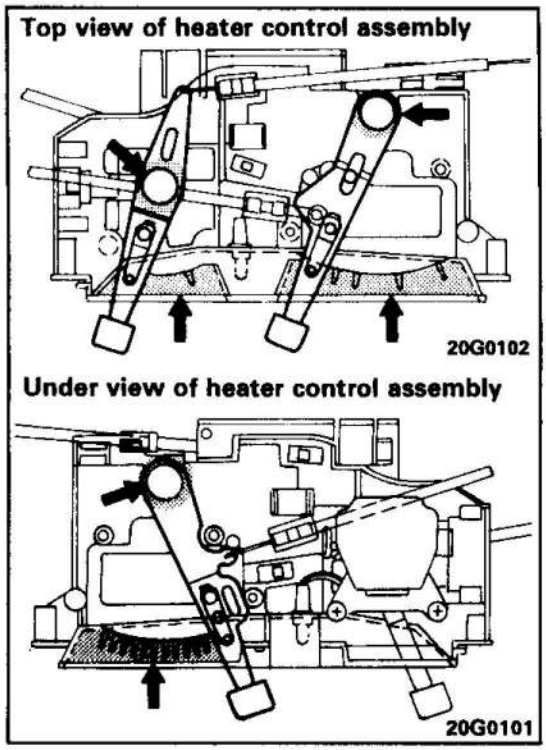
E55GCAD

INSPECTION OF BLOWER MOTOR SWITCH

Operate heater control blower control lever and check continuity between motor switch terminals at each changeover point with circuit tester.

Terminal No. / Switch Position	1	2	3	4	5	6	7	8
OFF	○						○	○
· (LO)	○	○				○	○	○
• (M1)	○		○			○	○	○
● (M2)	○			○		○	○	○
● (HI)	○				○	○	○	○

NOTE
○–○: indicates that there is continuity between the terminals.



SERVICE POINTS OF INSTALLATION

E55GDAF

10. APPLICATION OF GREASE TO HEATER CONTROL ASSEMBLY

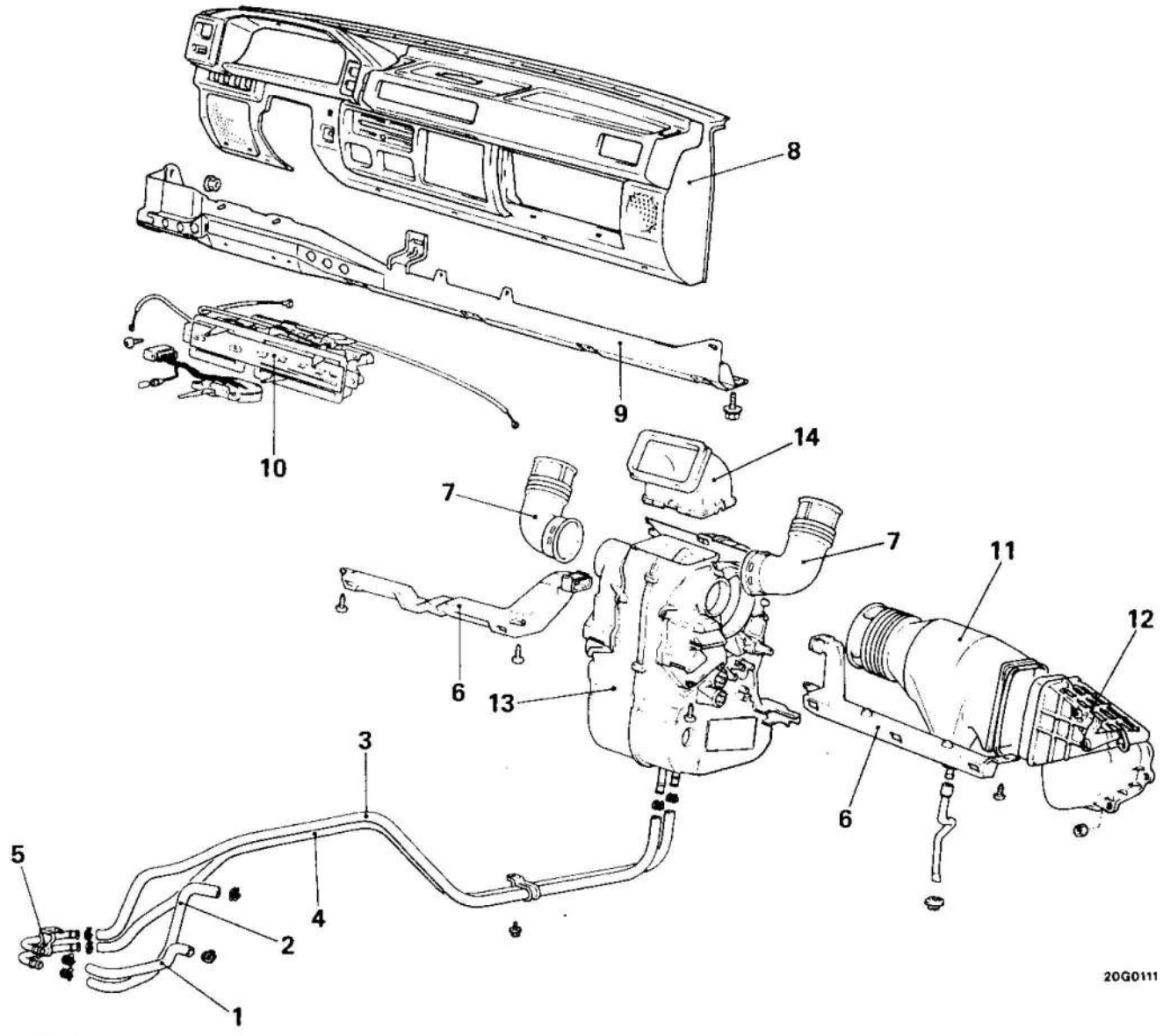
Grease lever's revolving and sliding parts of heater control assembly.

Specified grease: Multipurpose grease SAE J310, NLGI No.2

FRONT HEATER UNIT

E55IA--

REMOVAL AND INSTALLATION



Removal steps

- ◆◆ 1. Water hose (A)
- ◆◆ 2. Water hose (B)
- ◆◆ 3. Water hose (C)
- ◆◆ 4. Water hose (D)
- 5. Water pipe assembly
- 6. Lap heater duct
- 7. Defroster duct
- ◆◆ 8. Instrument panel
- 9. Frame assembly
- 10. Heater control assembly
- 11. Air duct
- 12. Air flow box
- ◆◆ ◆◆ 13. Front heater unit
- 14. Joint duct

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".

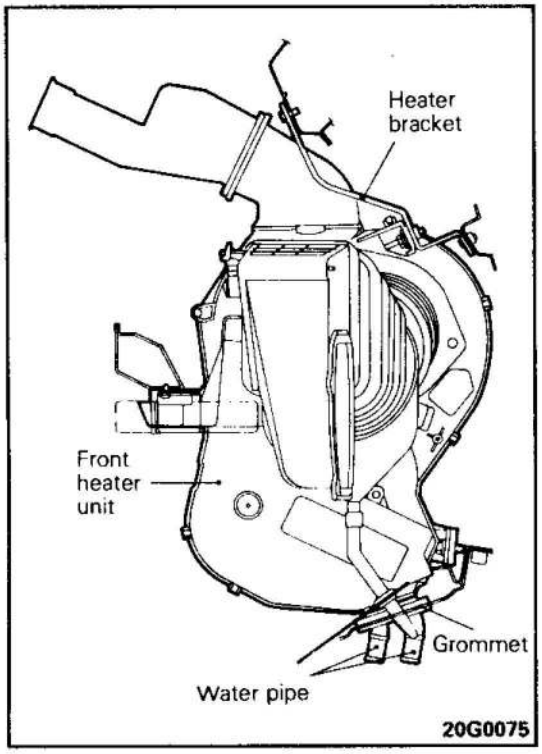
Pre-removal Operation
- Drainage of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)

Post-installation Operation
- Adjustment of air outlet changeover control cable (Refer to P.55–6.)
- Adjustment of temperature control cable (Refer to P.55–6.)
- Adjustment of recirculation/fresh air changeover control cable (Refer to P.55–7.)
- Filling of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)
- Air evacuation from heater warm water (Refer to P.55–8.)

SERVICE POINTS OF REMOVAL E55IBAE

8. REMOVAL OF INSTRUMENT PANEL

For removal of instrument panel, refer to GROUP 52 INTERIOR–Instrument Panel.



13. REMOVAL OF FRONT HEATER UNIT

(1) Remove heater unit installing bolt. Remove blower register. Disconnect blower motor connector.
(2) Tilt heater unit toward you so that upper installation does not strike heater bracket. Lift heater unit obliquely and remove water pipe from front floor pan hole. Remove heater unit.

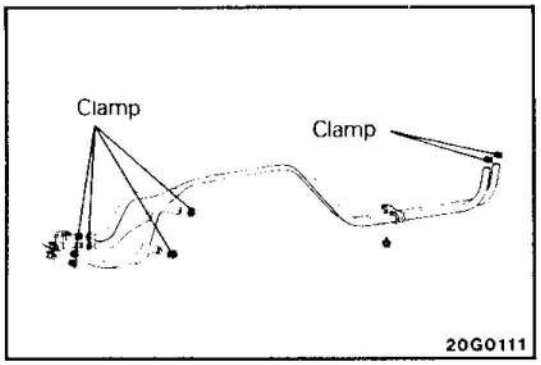
INSPECTION E55ICAB

- Check for damper and damper links operation.
- Check water hose and pipe for damage.

SERVICE POINTS OF INSTALLATION E55IEAD

13. INSTALLATION OF FRONT HEATER UNIT

Install front heater unit so that the packing completely seals front floor pan hole.

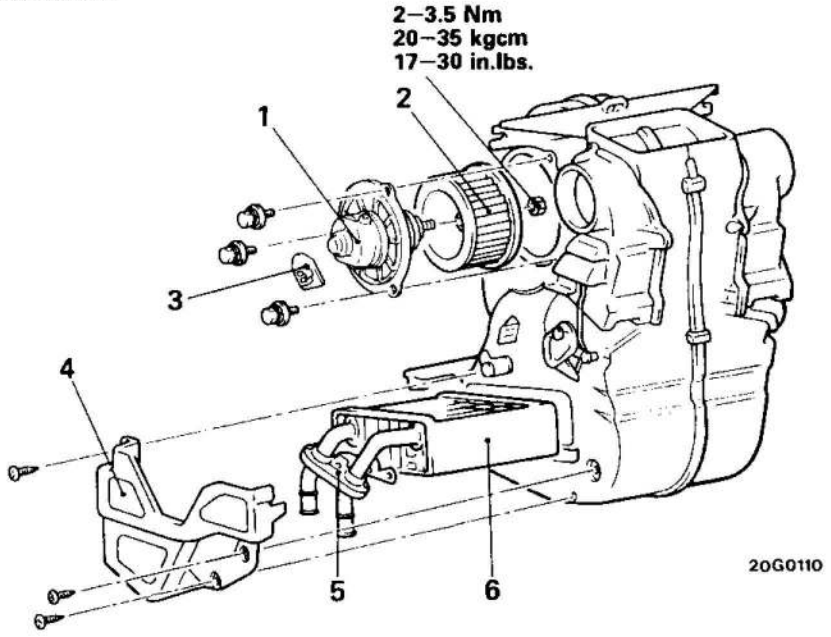


4. INSTALLATION OF WATER HOSE (D) /3. WATER HOSE (C) /2. WATER HOSE (B) /1. WATER HOSE (A)

Install water hose so that it does not touch other parts and is not twisted. Fix clamp securely so that it does not touch other parts.

DISASSEMBLY AND REASSEMBLY

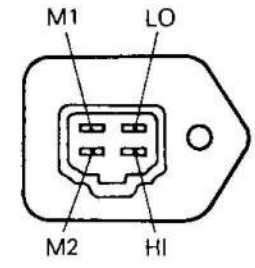
E55IH--



Disassembly steps

1. Blower motor
2. Fan
3. Blower resistor
4. Heater cover
5. Water pipe clamp
6. Heater core

NOTE
Reverse the disassembly procedures to reassemble.



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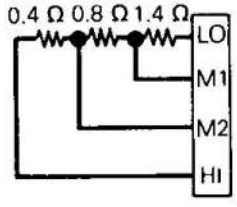

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INSPECTION

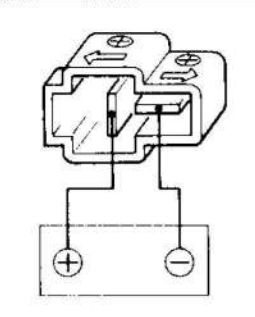
E55IIAA

- Check for damper and damper links operation.
- Check heater core for clogging and leaking.
- Check fan for deformation.

INSPECTION OF BLOWER RESISTOR

Measure blower resistor resistance value between terminals with circuit tester.

	Resistance value between terminals Ω
Between terminals HI–M2	Approx. 0.4
Between terminals HI–M1	Approx. 1.2
Between terminals HI–L0	Approx. 2.6



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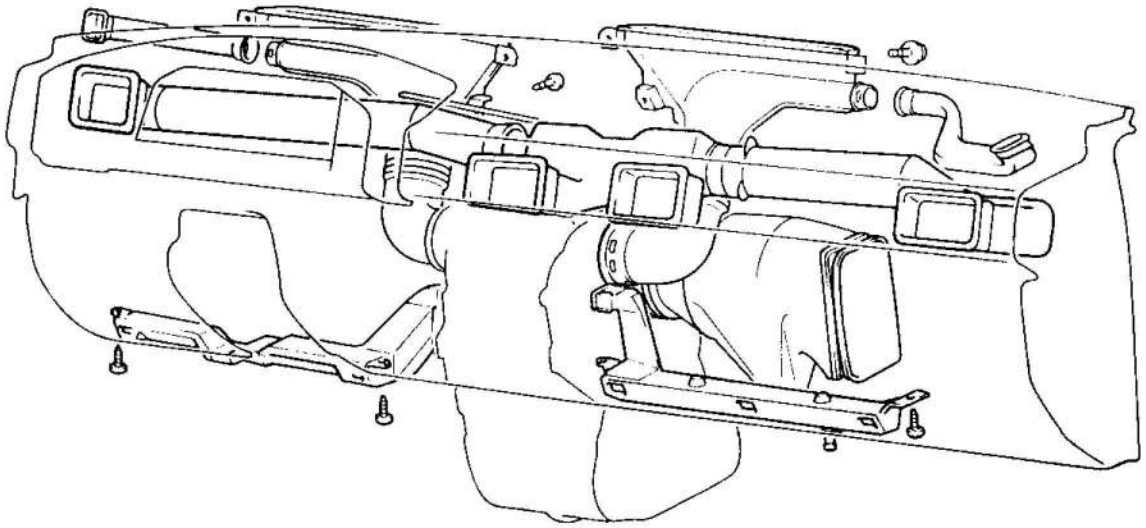
INSPECTION OF BLOWER MOTOR

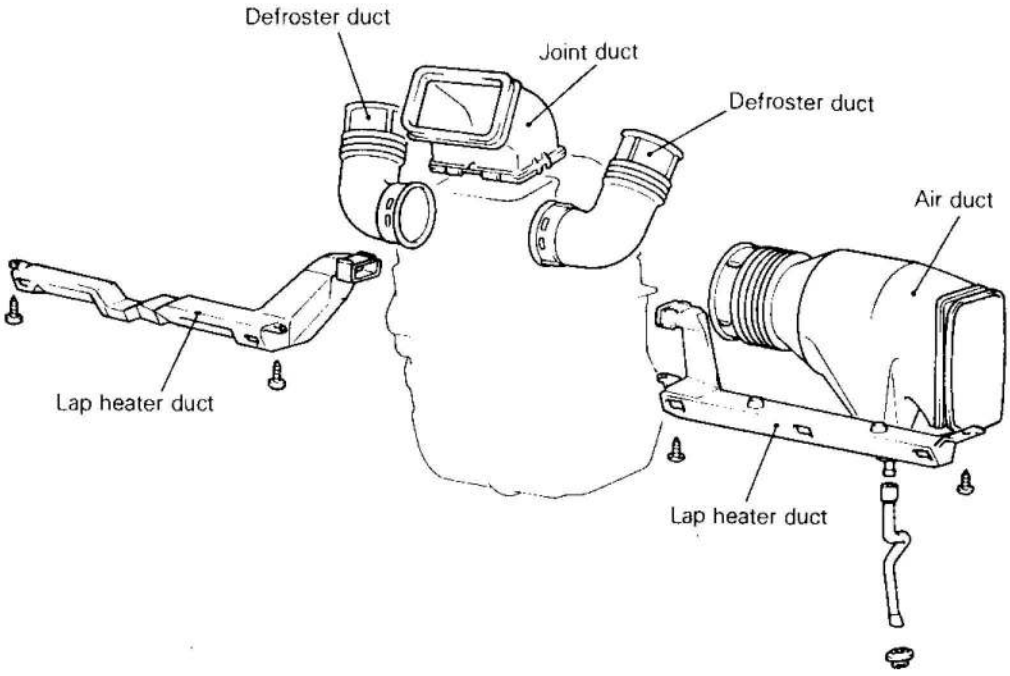
Connect battery to blower motor terminal. Confirm no abnormal noise. Confirm smooth revolution.

FRONT VENTILATORS

E55MA--

REMOVAL AND INSTALLATION





20G0085

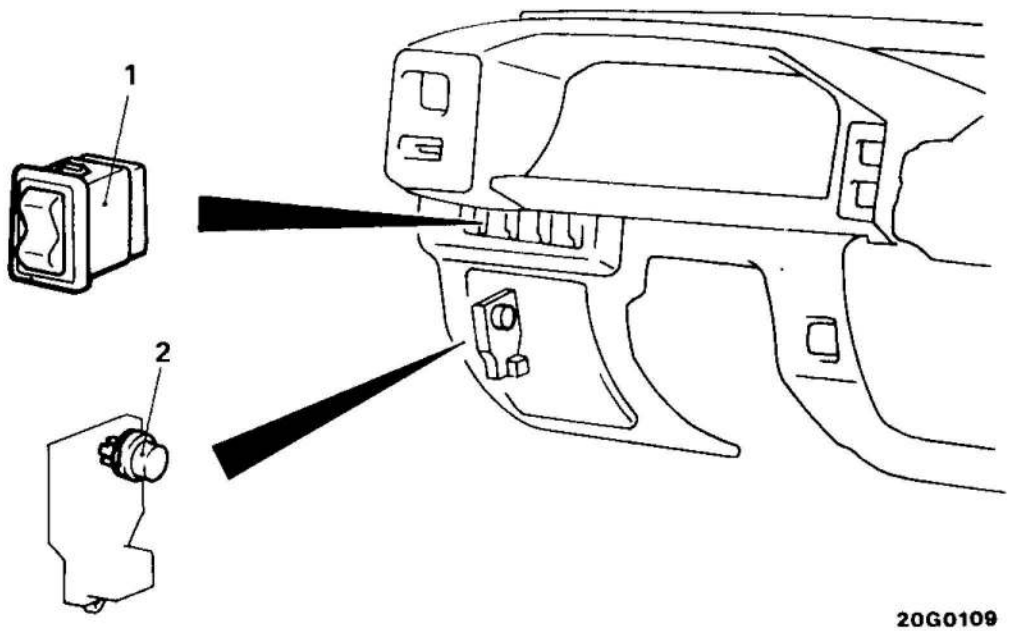
NOTE
Refer to GROUP 52–Instrument Panel for removal and installation of duct, nozzle, grille etc., on instrument panel side.

REAR HEATER (UNDER SEAT TYPE)

REAR HEATER CONTROL

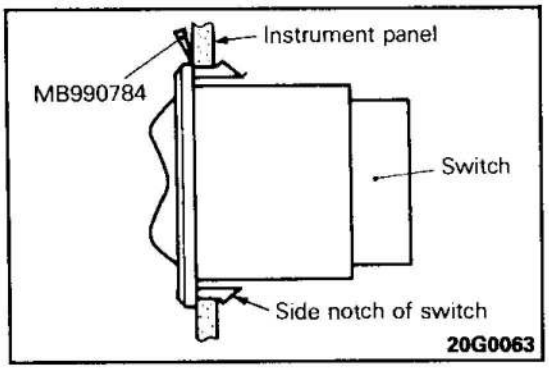
E55TA--

REMOVAL AND INSTALLATION



◆◆ 1. Rear heater blower motor switch
2. Rear heater relay

NOTE
◆◆: Refer to "Service Points of Removal".

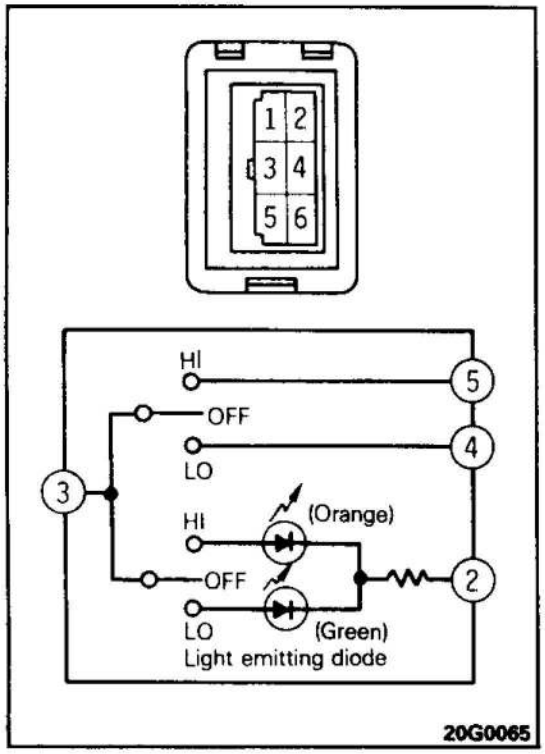


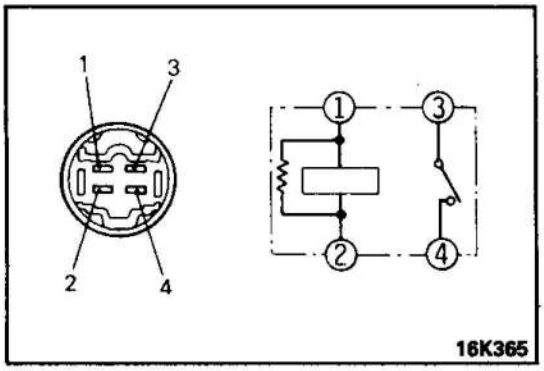
SERVICE POINTS OF REMOVAL

E56TBAA

1. REMOVAL OF REAR HEATER BLOWER MOTOR SWITCH

(1) Disconnect side notch of swtich from instrument panel switch installing hole with special tool.
(2) Disconnect switch connector. Remove rear heater blower motor switch from instrument panel.





INSPECTION

E55TCAA

INSPECTION OF REAR HEATER BLOWER MOTOR SWITCH

Check continuity between terminals at HI, OFF, and LO positions with circuit tester.

Terminal No. / Switch position	3	4	5	Light emitting diode	2
HI	○		○	○	○
OFF					
LO	○	○		○	○

NOTE
○–○: indicates that there is continuity between the terminals.

INSPECTION OF REAR HEATER RELAY

1. Remove rear heater relay from relay box.
2. Check continuity between rear heater relay terminals when power is ON/OFF with circuit tester.

Terminal No. / Battery voltage	1	2	3	4
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

NOTE
(1) ○–○: indicates that there is continuity between the terminals.
(2) ⊕---⊖ indicates charged state of battery voltage.

REAR HEATER UNIT

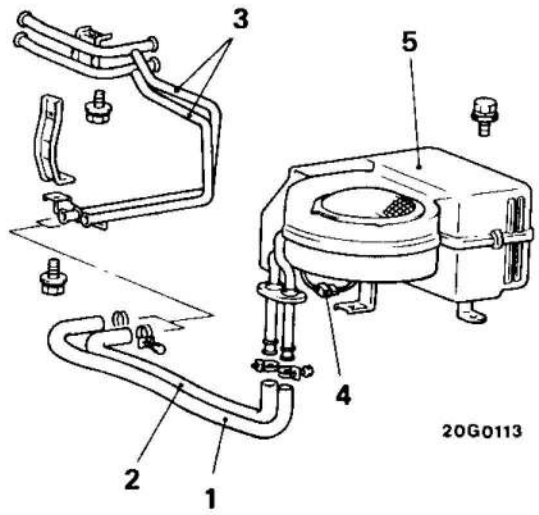
E55UA--

REMOVAL AND INSTALLATION

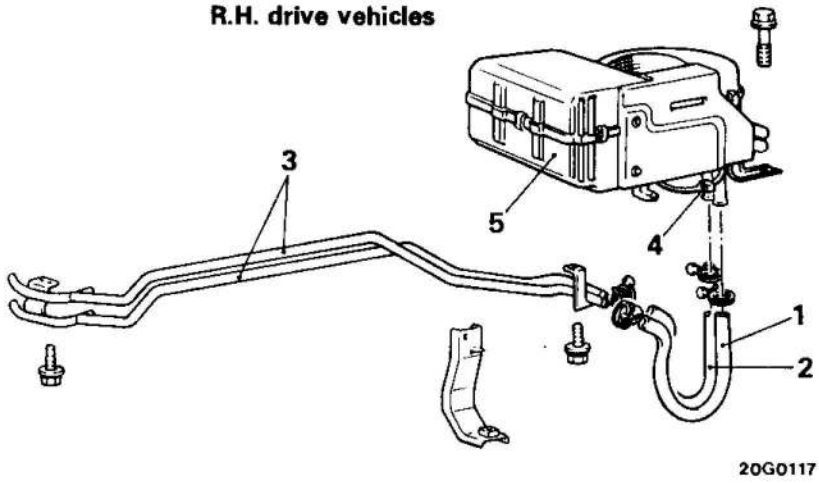
Pre-removal Operation
- Drainage of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)
- Removal of second seat (Refer to GROUP 52 INTERIOR– Second Seat.)

Post-installation Operation
- Filling of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)
- Air evacuation from heater warm water (Refer to P.55–8.)
- Installation of second seat (Refer to GROUP 52 INTERIOR– Second Seat.)

L.H. drive vehicles

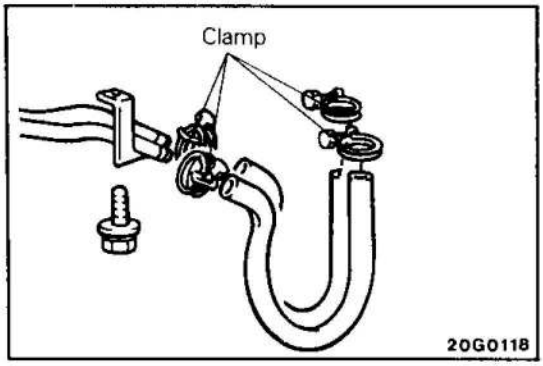


R.H. drive vehicles



Removal steps
- ◆◆1. Water hose (A)
- ◆◆2. Water hose (B)
- 3. Water pipe assembly
- 4. Blower resistor connection connector
- 5. Rear heater unit

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".



SERVICE POINTS OF INSTALLATION

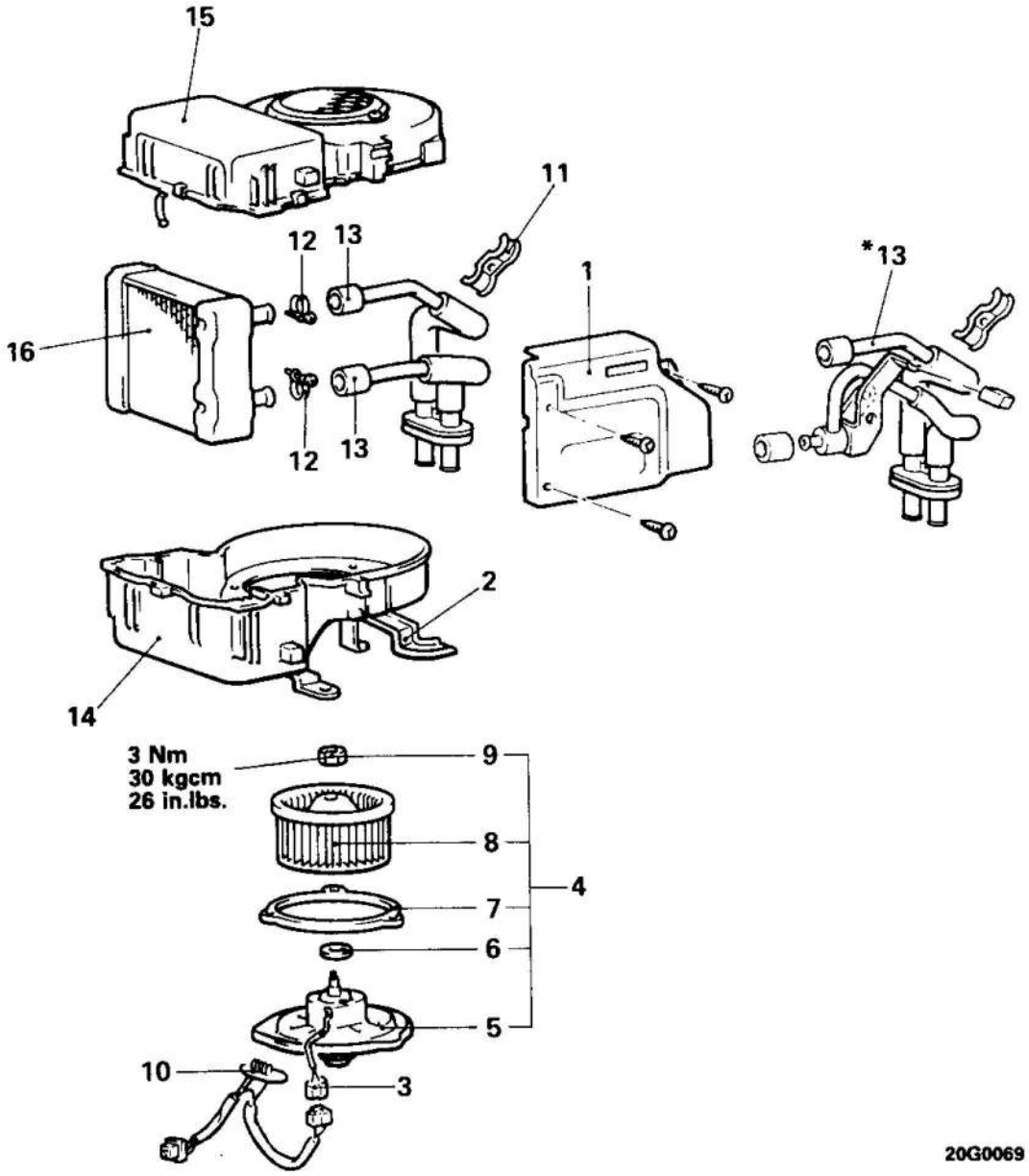
E55UCAA

2. INSTALLATION OF WATER HOSE (B) /1. WATER HOSE (A)

Fix clamp securely so that it does not touch other parts.

DISASSEMBLY AND REASSEMBLY

E55UD--



Disassembly steps

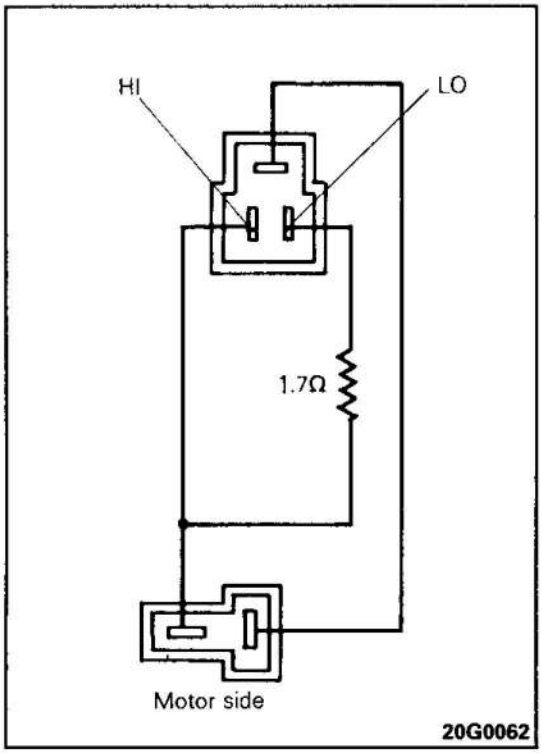
1. Heater cover
2. Case bracket sub assembly
3. Blower motor connection connector
4. Blower motor and fan assembly
5. Blower motor assembly
6. Washer
7. Packing
8. Blower fan
9. Nut
10. Blower resistor
11. Clamp (to secure pipe)
12. Hose clamp
13. Hose connection
14. Heater case (lower)
15. Heater case (upper)
16. Heater core

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) * : Applies to vehicles produced after December, 1987.

INSPECTION

E55UEAA

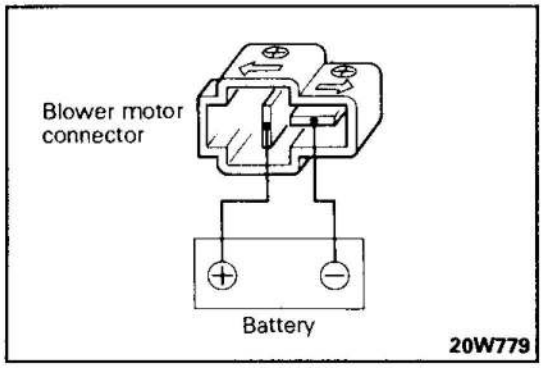
- Check heater core for clogging and leaking.
- Check fan for deformation.



INSPECTION OF BLOWER RESISTOR

Measure blower resistor resistance value between terminals with circuit tester.

	Resistance value between terminal Ω
Between terminals HI–LO	Approx. 1.7



INSPECTION OF BLOWER MOTOR

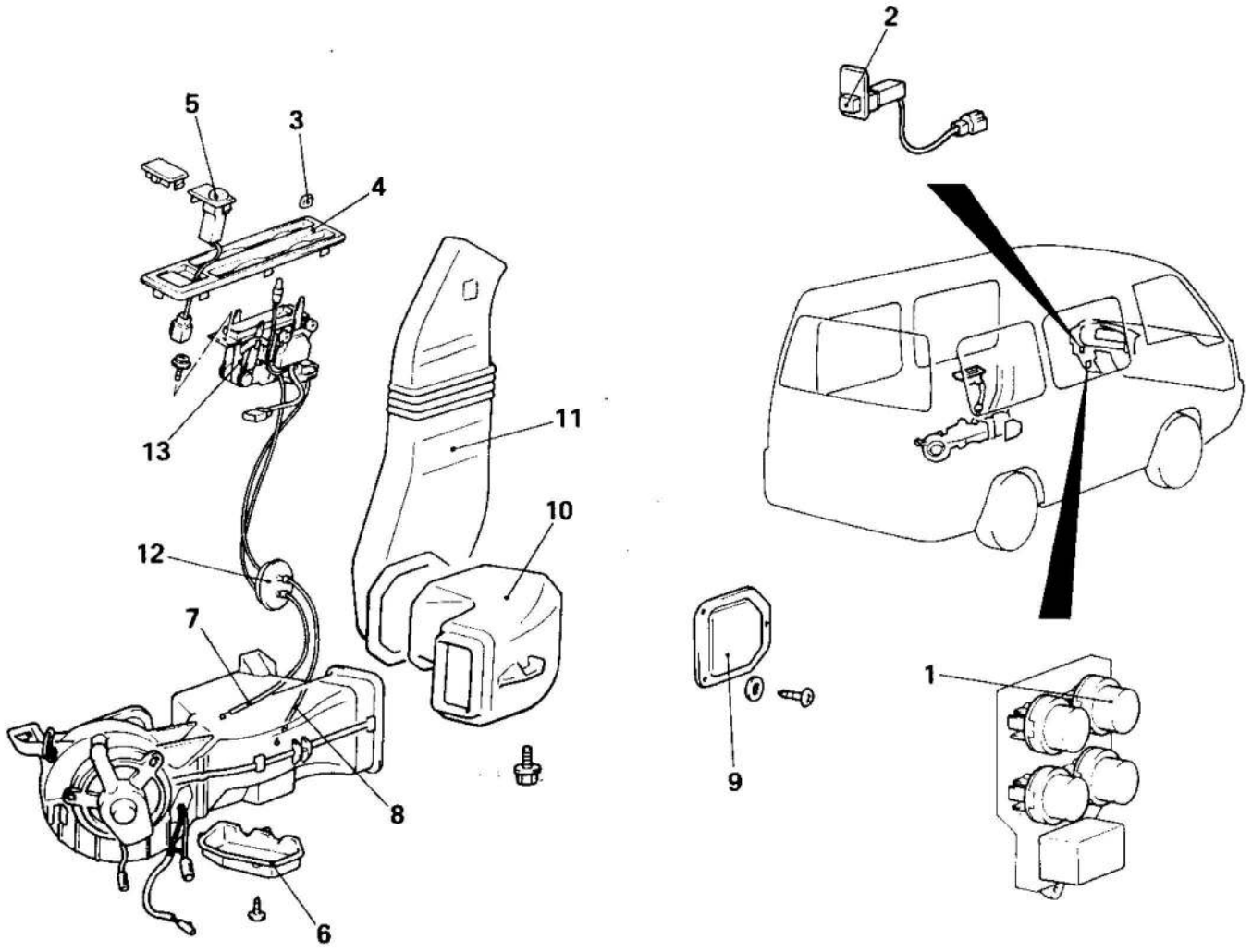
Connect battery to blower motor terminal. Confirm no abnormal noise. Confirm smooth revolution.

REAR HEATER (BUILT-IN TYPE)

E55TA--

REAR HEATER CONTROL

REMOVAL AND INSTALLATION



20G0081

Removal steps

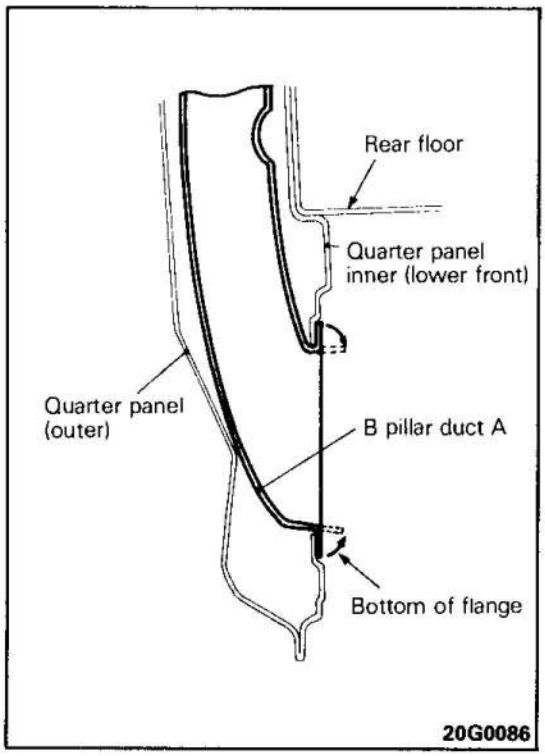
1. Rear heater relay
2. Rear heater main switch (instrument panel side)
3. Heater control lever knob
4. Rear heater control panel
5. Rear heater main swtich (rear side trim side)
6. Link cover
7. Temperature control cable connection
8. Air outlet changeover control cable connection (vehicles with type B rear ventilation)
9. Cover assembly (vehicles with type A rear ventilation)
10. Air duct assembly (vehicles with type B rear ventilation)
- ◆◆ ◆◆ 11. B pillar duct (A)
- ◆◆ 12. Grommet
- ◆◆ 13. Rear heater control

Post-installation Operation

- Adjustment of temperature control cable (Refer to P.55-7.)
- Adjustment of air outlet changeover control cable (Vehicles with type B rear ventilation) (Refer to P.55-8.)

NOTE

(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".

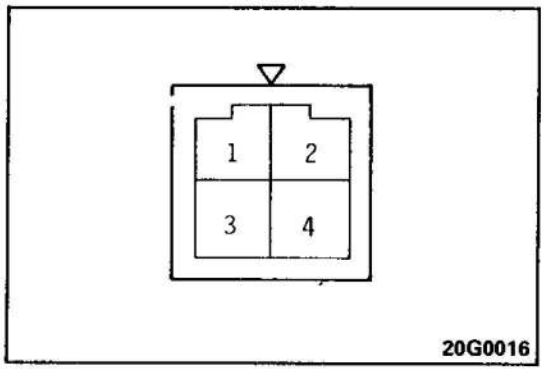


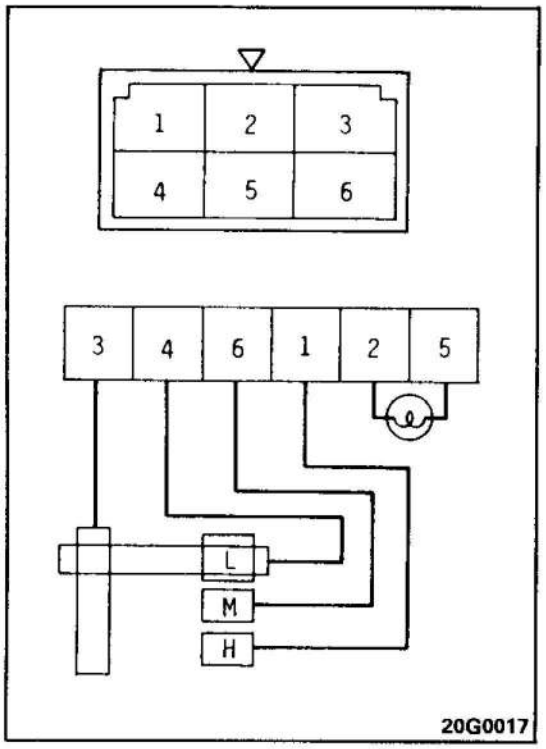
SERVICE POINTS OF REMOVAL E55TBBA

11. REMOVAL OF B PILLAR DUCT (A)

Raise flange on bottom of B pillar duct (A) and insert flange into quarter panel inner (lower front) duct hole.

NOTE
When connecting control cable, it is necessary to put hands through the duct hole. Therefore, first remove flange of B pillar duct (A).





INSPECTION E55TCBA

INSPECTION OF REAR HEATER MAIN SWITCH

Operate main switch and check continuity between switch terminals at ON and OFF positions with circuit tester.

Switch position \ Terminal No.	2	3	4	1
OFF	○	○		
ON	○		○	○

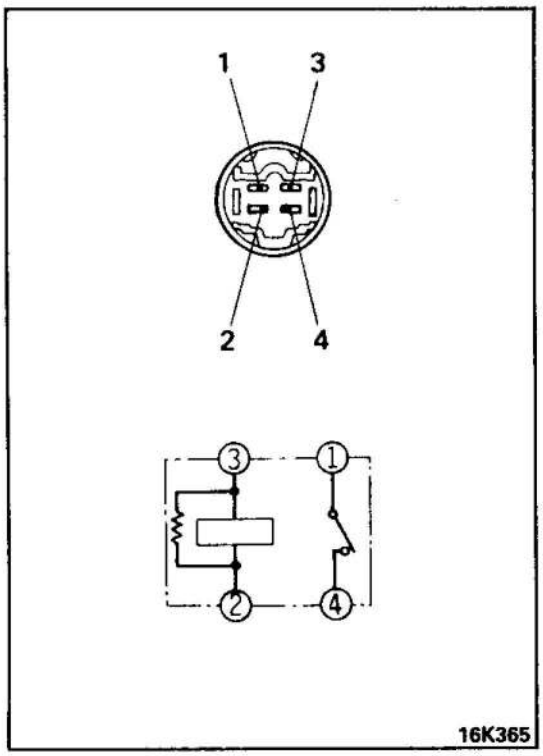
NOTE
○–○: indicates that there is continuity between the terminals.

INSPECTION OF BLOWER MOTOR SWITCH

Operate heater control blower control lever and check continuity between motor switch terminals at each changeover point with circuit tester.

Switch position \ Terminal No.	3	4	6	1	2	5
· (L)	○	○			○	○
● (M)	○		○		○	○
● (H)	○			○	○	○

NOTE
○–○: indicates that there is continuity between the terminals.

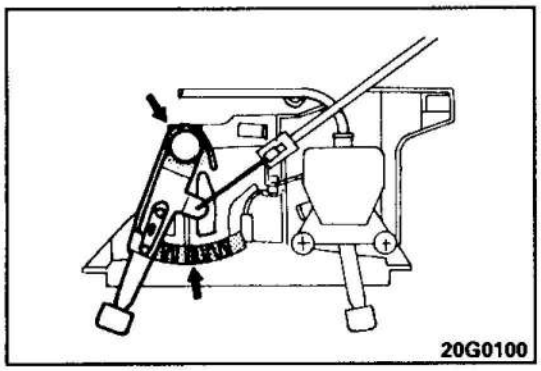


INSPECTION OF REAR HEATER RELAY

Check continuity between rear heater relay terminals when power is ON/OFF with circuit tester.

Terminal No. / Battery voltage	1	2	3	4
Power is not supplied	○	○		
Power is supplied	⊕	⊖	○	○

NOTE
1. ○–○: indicates that there is continuity between the terminals.
2. ⊕·⊖: indicates charged state of battery voltage.

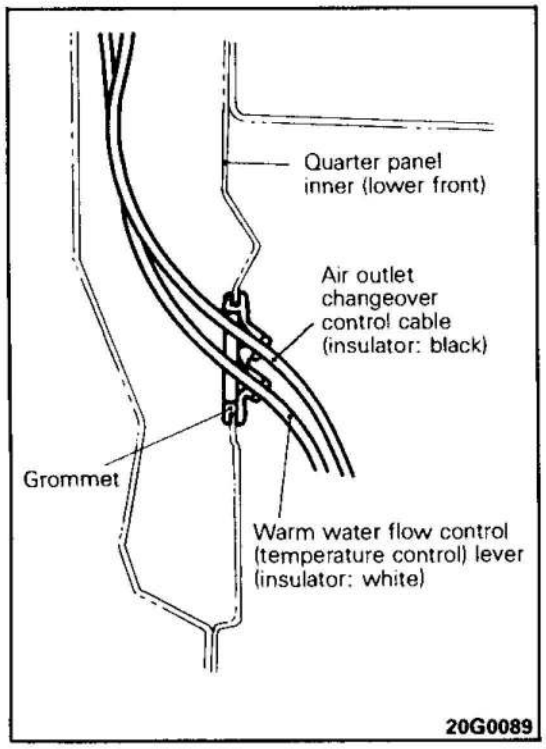


SERVICE POINTS OF INSTALLATION E55TDAA

13. APPLICATION OF GREASE TO REAR HEATER CONTROL

Grease lever's revolving and sliding parts of rear heater control.

Specified grease: Multipurpose grease, SAE J310, NLGI No.2



12. INSTALLATION OF GROMMET

(1) Put hands through B pillar duct (A) hole. Thread control cable through quarter panel inner (lower front) grommet hole.
(2) Thread control cable through grommet as shown in diagram. Set grommet in grommet hole.

11. INSTALLATION OF B PILLAR DUCT (A)

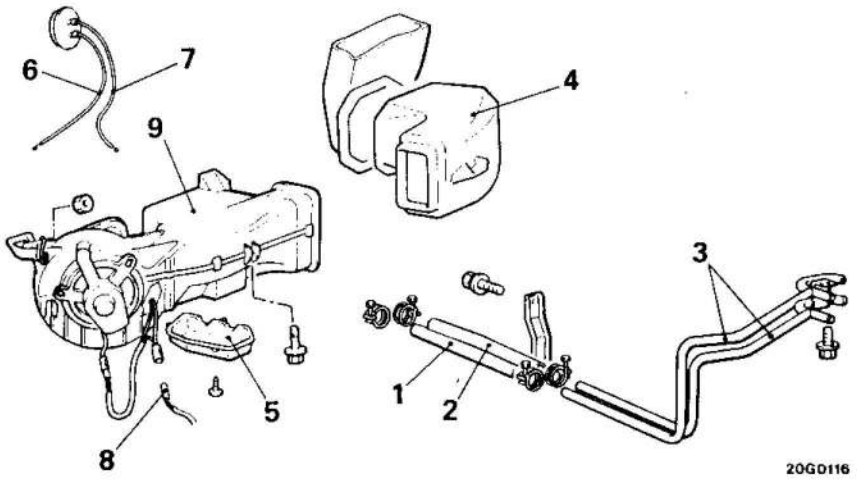
Pull out flange of B pillar duct (A) from duct hole. Fold entire flange smoothly.

REAR HEATER UNIT

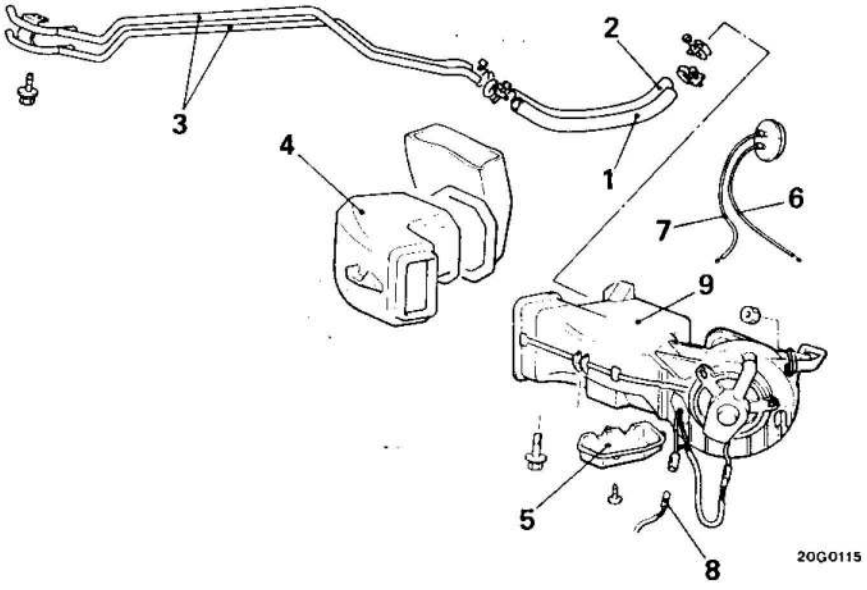
E55UA--

REMOVAL AND INSTALLATION

L.H. drive vehicles



R.H. drive vehicles



Removal steps

- ◆◆ 1. Water hose (A)
- ◆◆ 2. Water hose (B)
- 3. Water pipe assembly
- 4. Air duct assembly (vehicles with type B rear ventilation)
- 5. Link cover
- 6. Temperature control cable connection
- 7. Air outlet changeover control cable connection (vehicles with type B rear ventilation)
- 8. Blower resistor connector connection
- 9. Rear heater unit

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

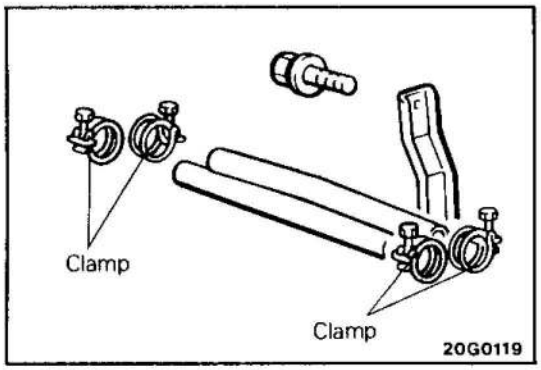
Pre-removal Operation
- Drainage of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures)

Post-installation Operation
- Adjustment of temperature control cable (Refer to P.55–7.)
- Adjustment of air outlet changeover control cable (Vehicles with type B rear ventilation) (Refer to P.55–8.)
- Filling of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)
- Air evacuation from heater warm water (Refer to P.55–8.)

INSPECTION

E55UBAA

- Check the dampers and link mechanism for operation.
- Check water hose and pipe for damage.



SERVICE POINTS OF INSTALLATION

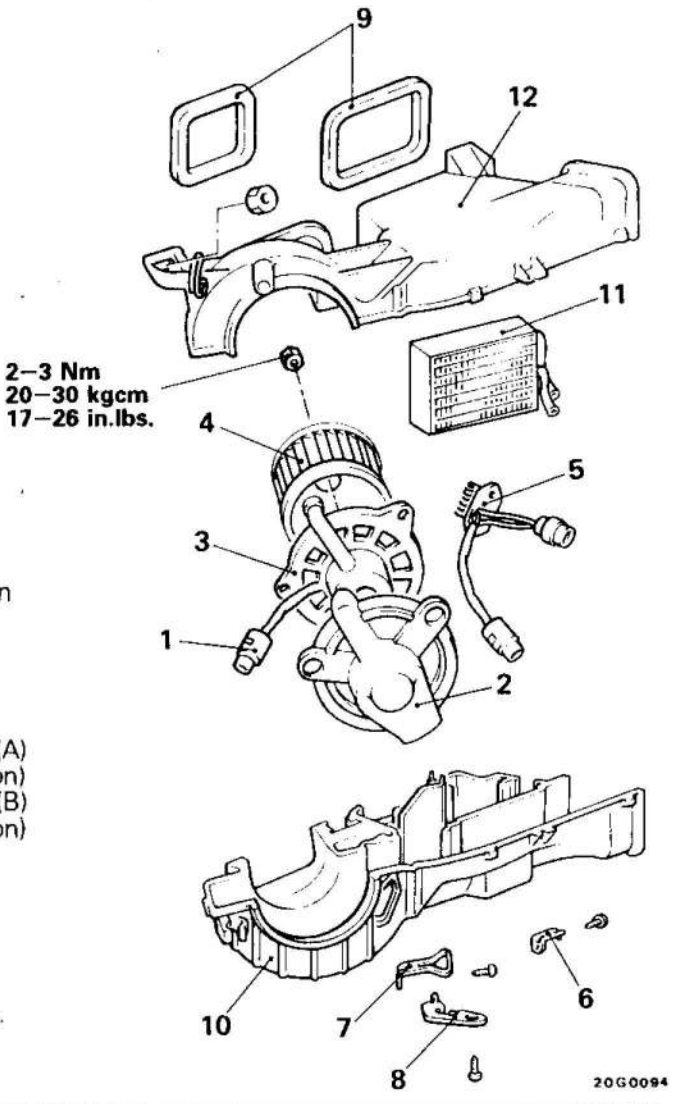
E55UCAA1

2. INSTALLATION OF WATER HOSE (B) /1. WATER HOSE (A)

Fix clamp securely so that it does not touch other parts.

DISASSEMBLY AND REASSEMBLY

E55UD--



Disassembly steps

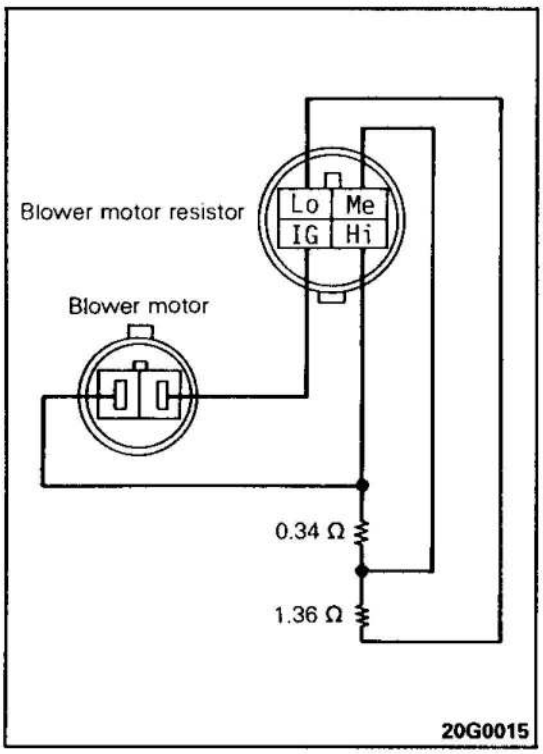
1. Blower motor connector connection
2. Blower motor cover
3. Blower motor
4. Fan
5. Resistor
6. Temperature control damper link
7. Air outlet changeover damper link (A) (vehicles with type B rear ventilation)
8. Air outlet changeover damper link (B) (vehicles with type B rear ventilation)
9. Packing
10. Heater case (lower)
11. Heater core
12. Heater case (upper)

NOTE
Reverse the disassembly procedures to reassemble.

INSPECTION

E55UEBA

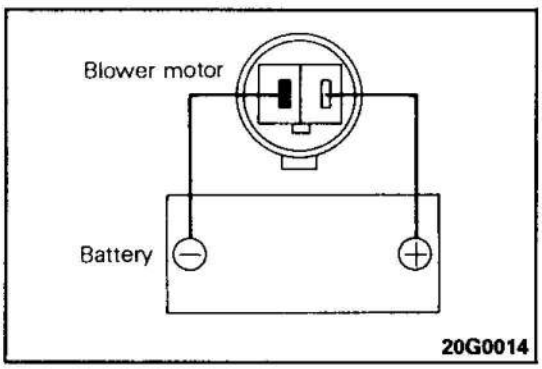
- Check heater core for clogging and leaking.
- Check fan for deformation.



INSPECTION OF BLOWER RESISTOR

Measure blower resistor resistance value between terminals with circuit tester.

	Resistance value between terminals Ω
Between terminals Hi–Me	Approx. 0.34
Between terminals Hi–Lo	Approx. 1.7



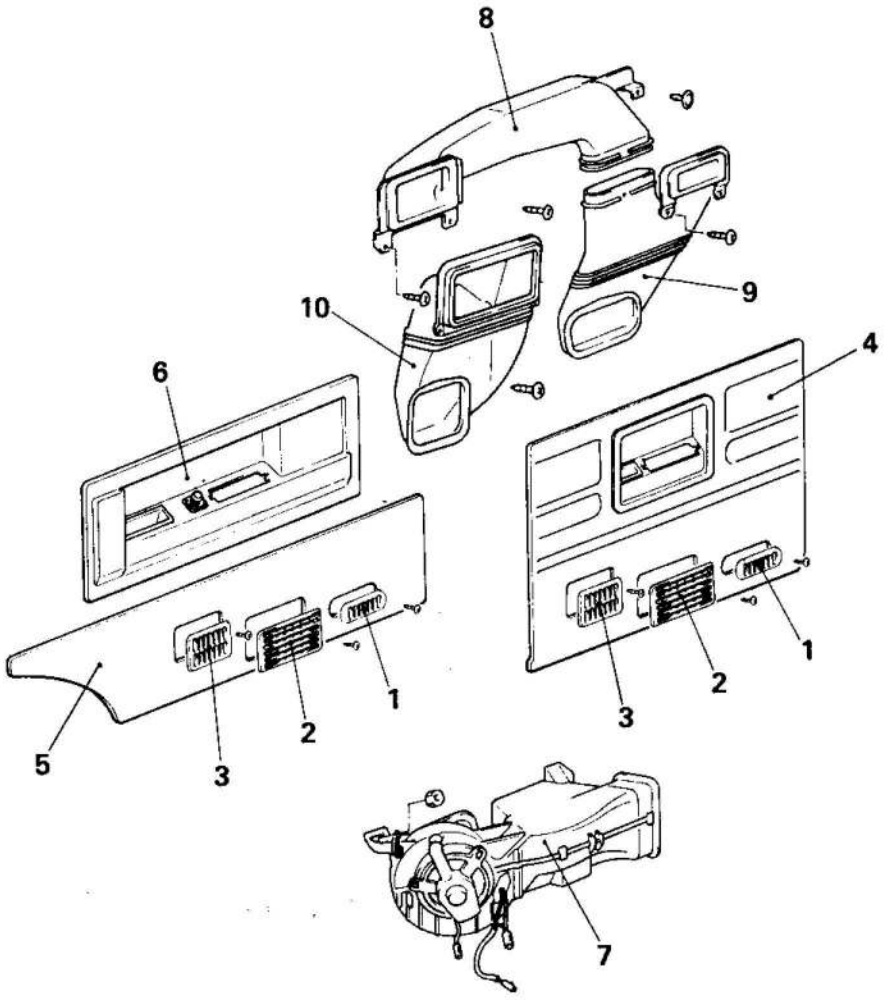
INSPECTION OF BLOWER MOTOR

Connect battery to blower motor terminal. Confirm no abnormal noise. Confirm smooth revolution.

REAR HEATER DUCT (BUILT-IN TYPE)

E55UA--

REMOVAL AND INSTALLATION



20G0083

Removal steps

1. Foot grille (second seat side)
◆◆ 2. Inlet grille
◆◆ 3. Foot grille (third seat side)
◆◆ 4. Rear side trim (vehicles with type A rear ventilation)
◆◆ 5. Rear side trim (lower) (vehicles with type B rear ventilation)
◆◆ 6. Rear side trim (upper) (vehicles with type B rear ventilation)
7. Rear heater unit
◆◆ 8. Rear heater duct (B)
◆◆ ◆◆ 9. Rear heater duct (A)
◆◆ ◆◆ 10. Inlet duct

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".

Pre-removal Operation
- Drainage of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures)
- Removal of beltline trim, quarter trim (lower and rear), and quarter trim (upper) (Refer to GROUP 52 INTERIOR–Trim.)

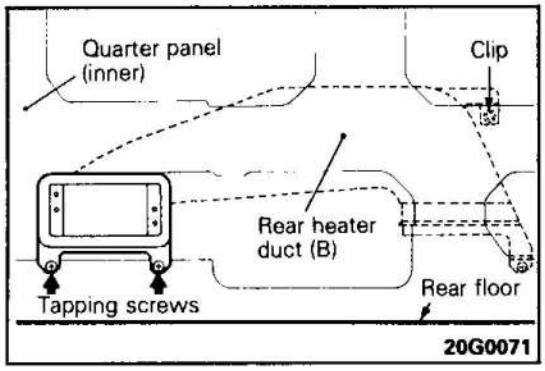
Post-installation Operation
- Adjustment of temperature control cable (Refer to P.55–7.)
- Adjustment of air outlet changeover control cable (Vehicles with type B rear ventilation) (Refer to P.55–8.)
- Installation of beltline trim, quarter trim (lower and rear), and quarter trim (upper) (Refer to GROUP 52 INTERIOR–Trim.)
- Filling of engine coolant (Refer to GROUP 14 COOLING– Service Adjustment Procedures.)

SERVICE POINTS OF REMOVAL E55UBAA

4. REMOVAL OF REAR SIDE TRIM/5. REAR SIDE TRIM (LOWER) /6. REAR SIDE TRIM (UPPER)

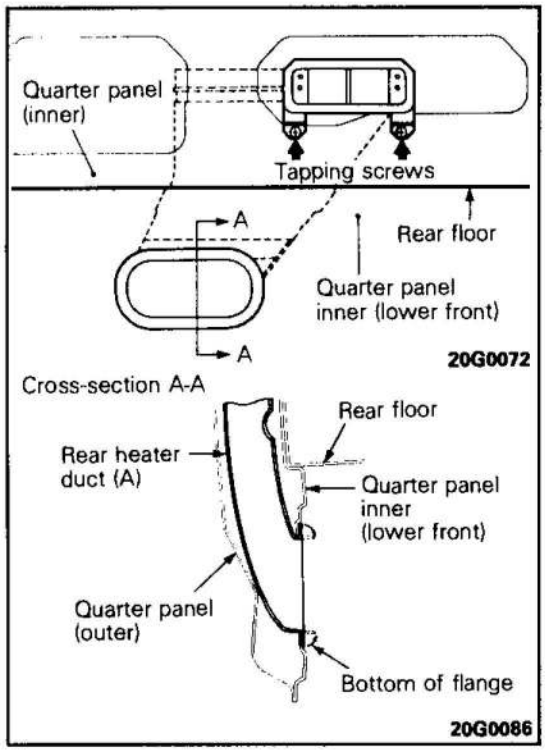
For removal of rear side trim, refer to GROUP 52 INTERIOR–Trims.

NOTE
When removing rear side trim, leave rear heater control assembly connected to body.



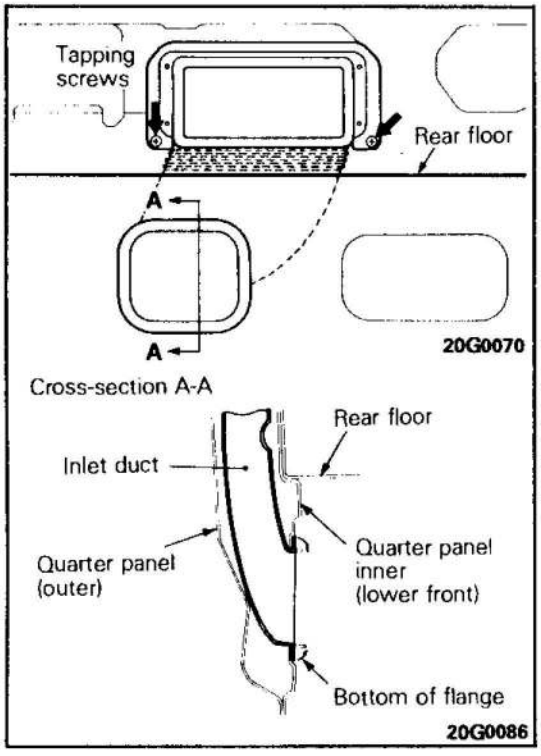
8. REMOVAL OF REAR HEATER DUCT (B)

Remove duct installing clip and screw. Remove rear heater duct (B) through quarter panel (inner) hole.



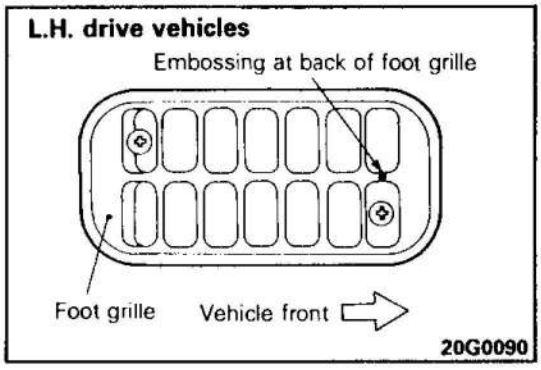
9. REMOVAL OF REAR HEATER DUCT (A)

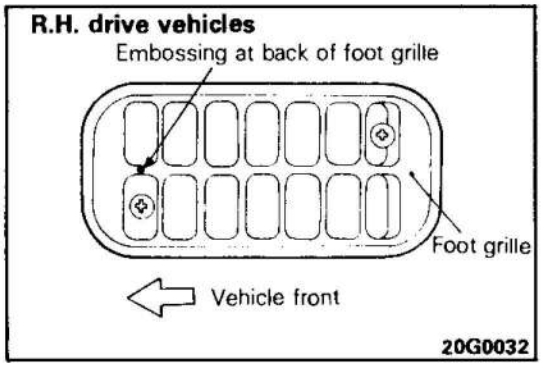
(1) Raise flange on bottom of rear heater duct (A) and insert flange into quarter panel inner (lower front) duct hole.
(2) Remove duct installing screw. Remove rear heater duct (A) through quarter panel (inner) hole.



10. REMOVAL OF INLET DUCT

(1) Raise flange on bottom of inlet duct and insert flange into quarter panel inner (lower front) duct hole.
(2) Remove duct installing screw. Remove inlet duct through quarter panel (inner) hole.





SERVICE POINTS OF INSTALLATION E55UCAA

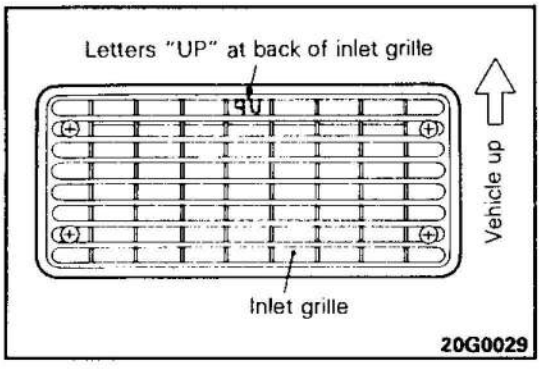
10. INSTALLATION OF INLET DUCT/9. REAR HEATER DUCT (A)

Pull out flange of duct from duct hole. Fold entire flange smoothly.

3. INSTALLATION OF FOOT GRILLE (THIRD SEAT SIDE)

Install foot grille with projection on the back pointing to the vehicle front.

NOTE
Installing in reverse will cause warm air to blow forward and not to the third passenger seat side.



2. INSTALLATION OF INLET GRILLE

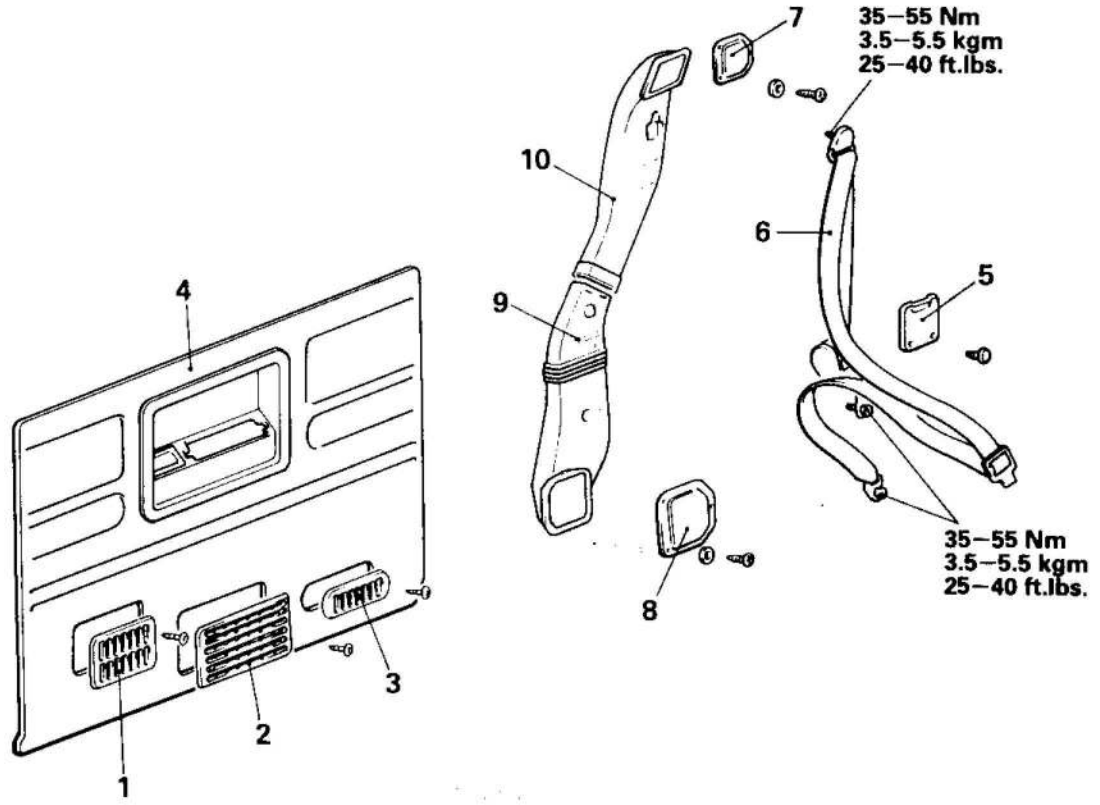
Install inlet grille so that letters UP on the back faces upwards.

Caution
Installing in reverse will cause inlet grille and inlet duct to interfere and cause it to rise or break.

REAR VENTILATORS (TYPE A)

E55VA--

REMOVAL AND INSTALLATION



20G0084

Removal steps

- ◆◆ 1. Foot grille (third seat side)
- ◆◆ 2. Inlet grille
- 3. Foot grille (second seat side)
- ◆◆ 4. Rear side trim
- 5. Retractor cover (L.H.)
- 6. Seat belt (LH.)
- 7. B pillar cover
- 8. Cover assembly
- ◆◆ 9. B pillar duct (A)
- ◆◆ 10. B pillar duct (B)

Post-installation Operation

- Adjustment of temperature control cable (Refer to P.55–7.)

NOTE

(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".
(4) B pillar duct (A), (B) are pre-installed for easier installation of rear cooler by the auto dealers and therefore is not usually used. Do not remove unless for emergency.

SERVICE POINTS OF REMOVAL

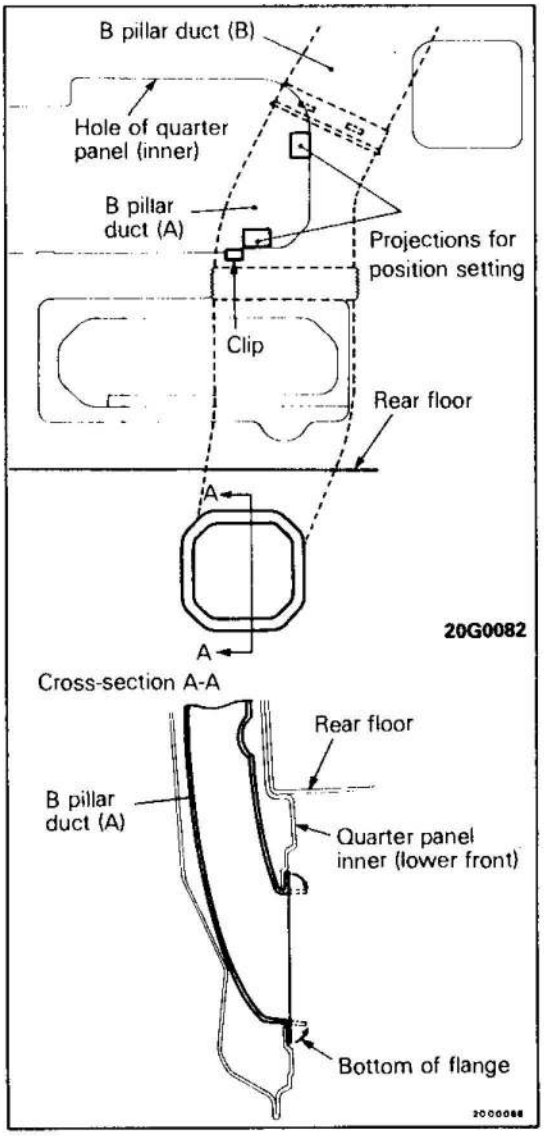
E55V8AA

4. REMOVAL OF REAR SIDE TRIM

Refer to GROUP 52 INTERIOR–Trims.

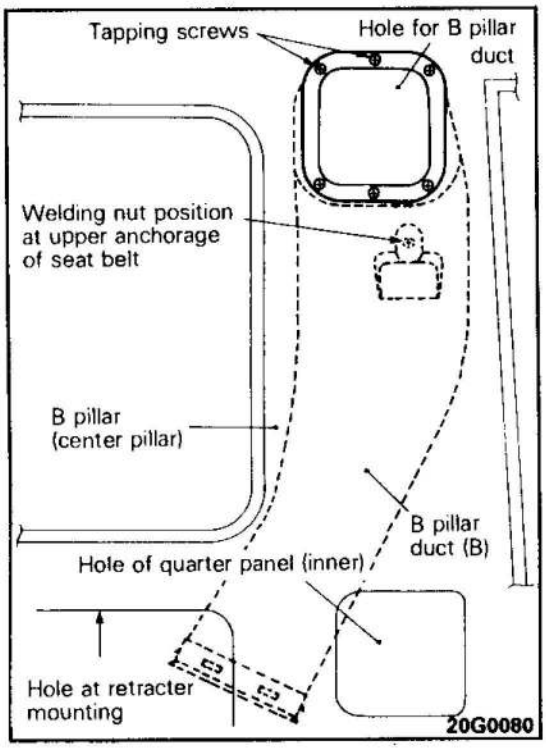
NOTE

When removing rear side trim, leave rear heater control assembly connected to body.



9. REMOVAL OF B PILLAR DUCT (A)

(1) Raise flange on bottom of B pillar duct (A) and insert flange into quarter panel inner (lower front) duct hole.
(2) Disconnect B pillar duct (A) and (B).
(3) Lift B pillar duct (A) slightly and remove clip. Pull B pillar duct (A) up through quarter panel (inner) hole to interior of vehicle.



10. REMOVAL OF B PILLAR DUCT (B)

(1) Remove upper duct installing screw of B pillar duct (B).
(2) Pull B pillar duct (B) down through quarter panel (inner) hole to interior of vehicle.

NOTE
When removing B pillar duct (B), place hands through B pillar duct hole, and ensure that duct is not caught by welding nut at upper driver's seat belt anchorage.

SERVICE POINTS OF INSTALLATION E55VCAA

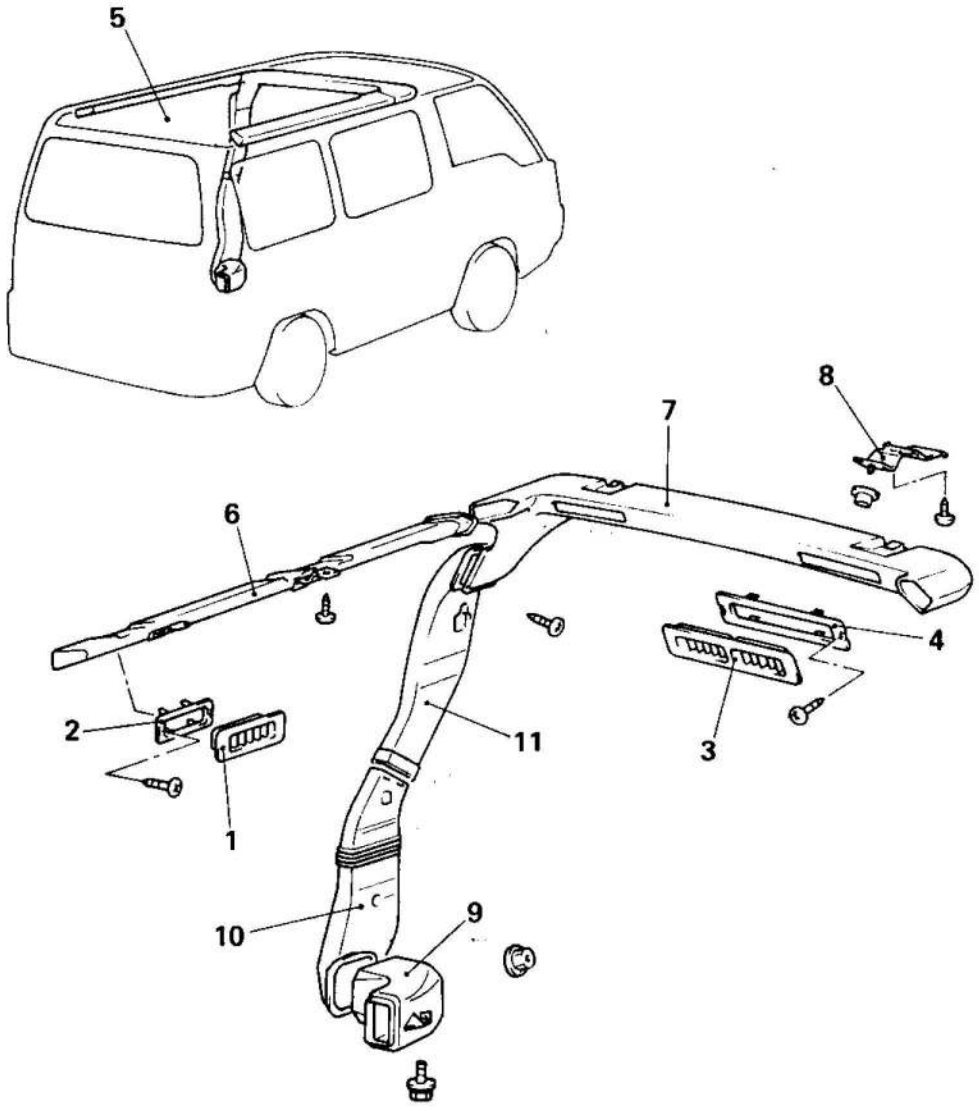
2. INSTALLATION OF INLET GRILLE/1. FOOT GRILLE (THIRD SEAT SIDE)

For installation of inlet grille and foot grille (third seat side) refer to rear heater duct (built-in type) installation procedures. (Refer to P.55–28.)

REAR VENTILATORS (TYPE B)

E55VA--

REMOVAL AND INSTALLATION



20G0078

Removal steps

- ◆◆ 1. Air outlet grille (side roof duct)
- 2. Retainer B
- 3. Air outlet grille (center roof duct)
- 4. Retainer A
- ◆◆ 5. Headlining assembly
- 6. Side roof duct assembly
- ◆◆ 7. Center roof duct assembly
- 8. Plate
- 9. Air duct assembly
- ◆◆ 10. B pillar duct (A)
- ◆◆ 11. B pillar duct (B)

Pre-removal Operation

- Removal of trims
  (Refer to GROUP 52 INTERIOR–Trims.)

Post-installation Operation

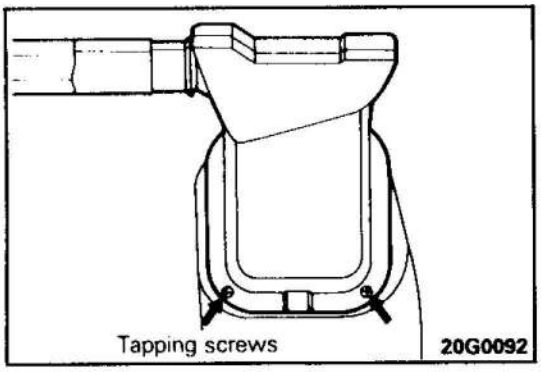
- Installation of trims
  (Referto GROUP 52 INTERIOR–Trims.)
- Adjustment of temperature control cable
  (Refer to P.55–7.)
- Adjustment of air outlet changeover control cable
  (Refer to P.55–8.)

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".
(3) ◆◆ : Refer to "Service Points of Installation".

SERVICE POINTS OF REMOVAL E55VBBA

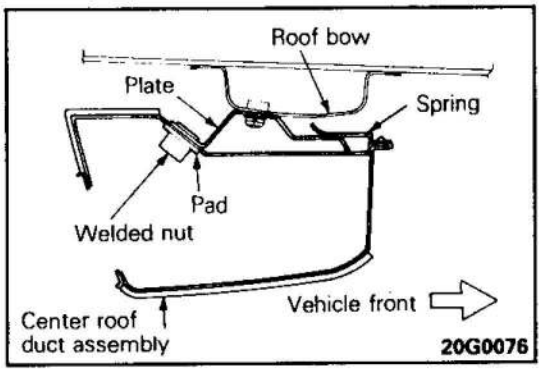
5. REMOVAL OF HEADLINING ASSEMBLY

Refer to GROUP 52 INTERIOR–Headlining.



7. REMOVAL OF CENTER ROOF DUCT ASSEMBLY

(1) Remove right side duct installing screw of center roof duct assembly.



(2) Unscrew dash pad clip from bolt by putting hands through air outlet grille hole.
(3) Pull off duct from plate side bolt by slightly sliding down center roof duct near you.
(4) Remove duct retaining spring from plate by slightly sliding center roof duct forward. Remove center roof duct assembly from plate.

10. REMOVAL OF B PILLAR DUCT (A)/11. B PILLAR DUCT (B)

Refer to rear ventilaters (type A) removal procedures. (Refer to P.55–32.)

SERVICE POINTS OF INSTALLATION E55VCBA

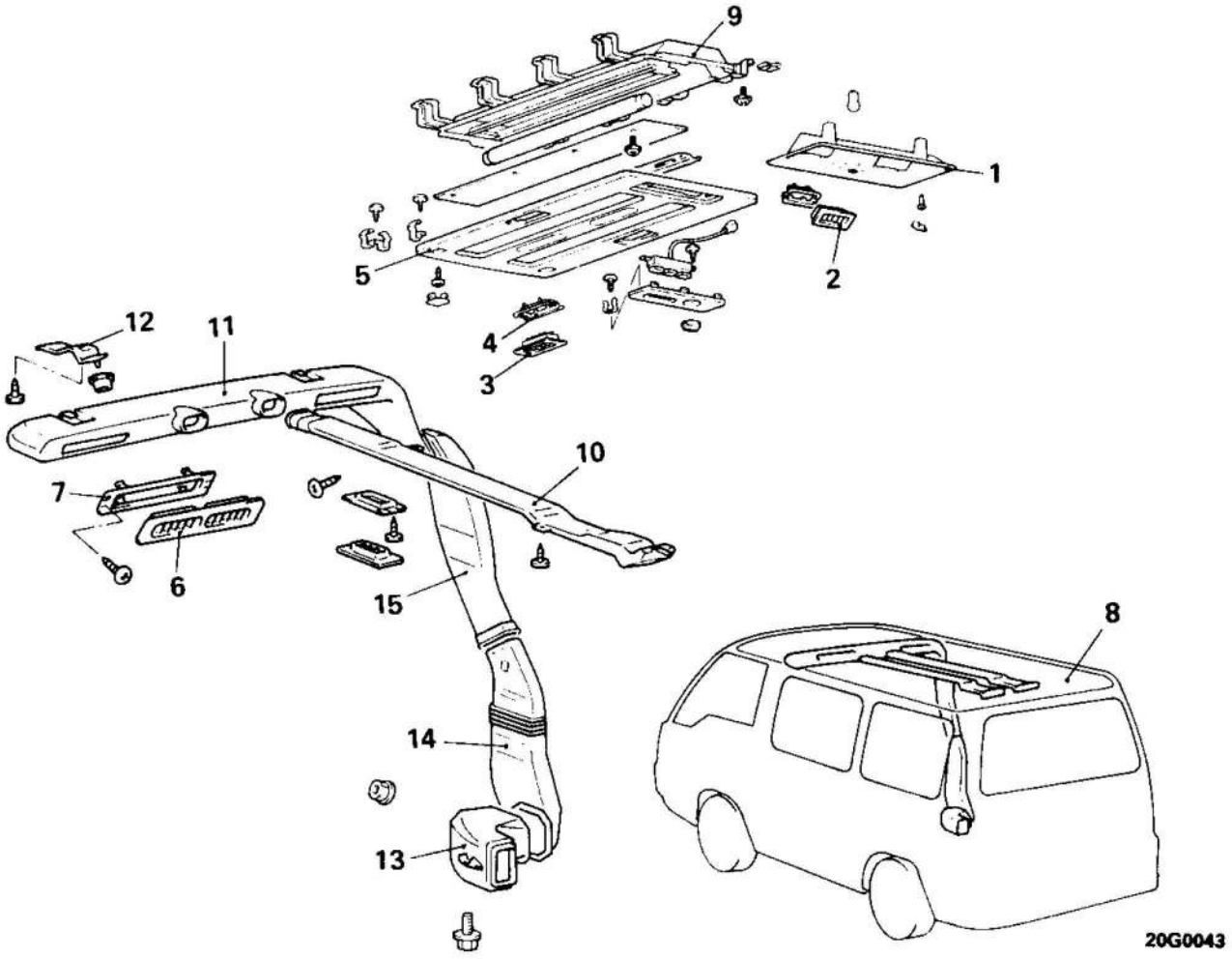
1. INSTALLATION OF AIR OUTLET GRILLE (SIDE ROOF DUCT)

Install air outlet grilles so that letter F on the back points to the vehicle front.

REAR VENTILATORS (TYPE C)

E55VA-C

REMOVAL AND INSTALLATION



Pre-removal Operation
- Removal of trims
  (Refer to GROUP 52 INTERIOR–Trims.)

Post-installation Operation
- Installation of trims
  (Referto GROUP 52 INTERIOR–Trims.)
- Adjustment of temperature control cable
  (Refer to P. 55–7.)
- Adjustment of air outlet changeover control cable
  (Refer to P. 55–8.)

Removal steps

1. Spot lamp
2. ◆◆ Air outlet grille (spot lamp)
3. ◆◆ Air outlet grille (overhead console lamp cover)
4. Retainer B
5. Overhead console lamp cover
6. Air outlet grille (center roof duct)
7. Retainer A
8. ◆◆ Headlining
9. Overhead console lamp
10. Side roof duct
11. ◆◆ Center roof duct
12. Plate
13. Air duct
14. ◆◆ B pillar duct (A)
15. ◆◆ B pillar duct (B)

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".

SERVICE POINTS OF REMOVAL E55VB88

8. REMOVAL OF HEADLINING

Refer to GROUP 52 INTERIOR–Headlining.

11. REMOVAL OF CENTER ROOF DUCT

Follow the same procedure as for the rear ventilators. (Type B-except for the models equipped with the Crystal Light Roof)

14. REMOVAL OF B PILLAR DUCT (A)/15. B PILLAR DUCT (B)

Follow the same procedure as for the rear ventilators (Type A). (Refer to P. 55–31.)

SERVICE POINTS OF INSTALLATION E55VC88

3. INSTALLATION OF AIR OUTLET GRILLE (OVERHEAD CONSOLE LAMP COVER)

Install the air outlet grille so that the letter F on the back of the grille is toward the front of the vehicle.

2. INSTALLATION OF AIR OUTLET GRILLE (SPOT LAMP)

Install the air outlet grille so that the letters IN on the back of the grille are toward the center of the vehicle.

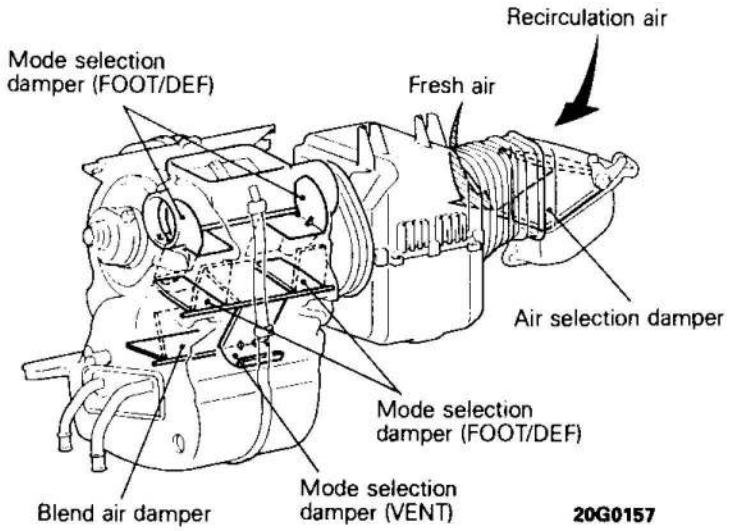
AIR CONDITIONER

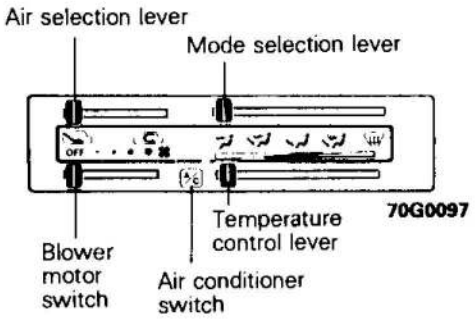
GENERAL INFORMATION

E55BCAA

SINGLE AIR CONDITIONER

The air condition blows out cooled air by driving the compressor when the air conditioner switch installed on the heater control panel is pressed ON and the position of the blower switch is out of OFF position. The temperature in the cabin is adjusted by the position of the temperature control lever which determines the opening of the blend air damper and adjusts the mixing ratio of the cooled air and warm air.
The blowout mode is and the cooled air is blown out from four directions and the blowout can be adjusted by the blower switch changes the blowout in four stages by the cabin condition.
The air selector is set on during cooling, and can be changed to according to the offensive smell and pollution.



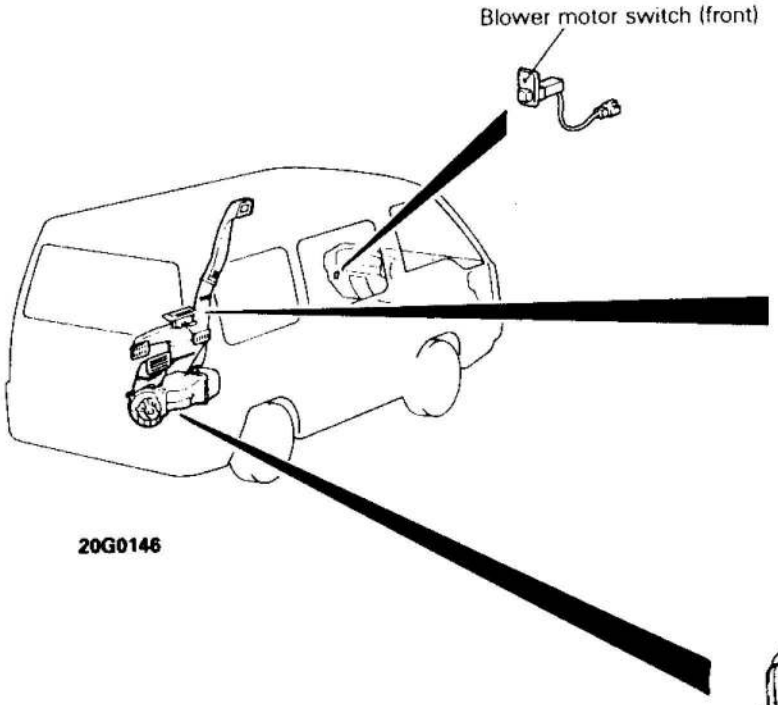


DUAL AIR CONDITIONER

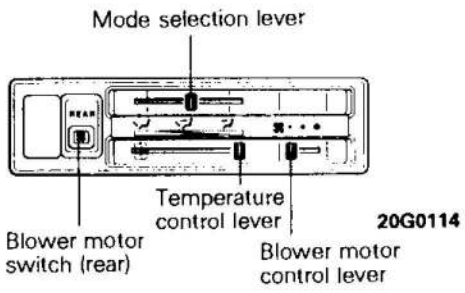
E55BDAA

The rear air conditioner unit is installed below the rear floor, and the main switch is provided at both the driver's seat and the rear seat so that operation can be from either position.
The overhead dual air conditioner is constructed so that it mounts on the ceiling and blows cool air from the ceiling to the passenger seats.
Air flow of the front air conditioner is adjustable to 3 levels by an independent switch and temperature is controlled by a thermostat.
The cool box is installed between the console box and the heater. It is capable of making ice cubes and cooling canned juice, etc. to a temperature of 10°C (50°F) or of warming hot drinks such as canned coffee to about 50°C (122°F). Ice making, cooling or heating are switch selectable. Ice making and cooling can be done while the air conditioner is operating and heating can be done while the front heater is operating.

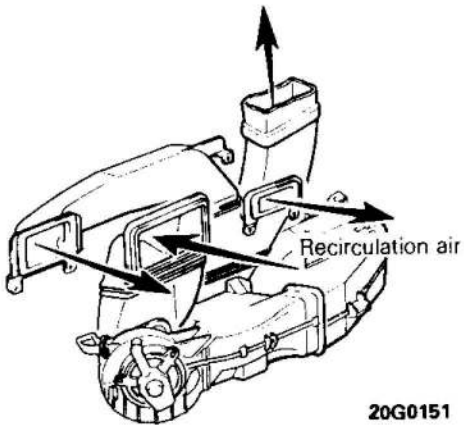
DUAL AIR CONDITIONER



20G0146

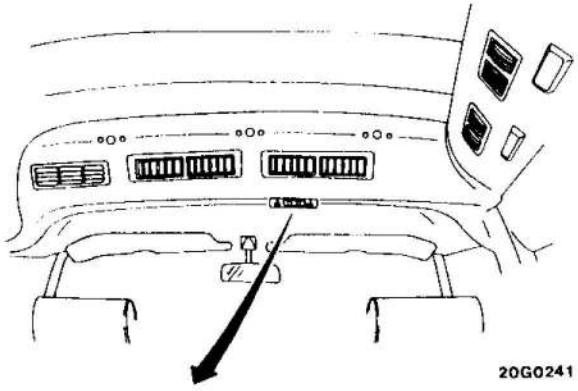


20G0114

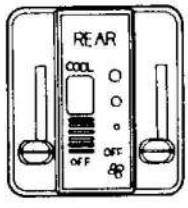


20G0151

OVERHEAD AIR CONDITIONER

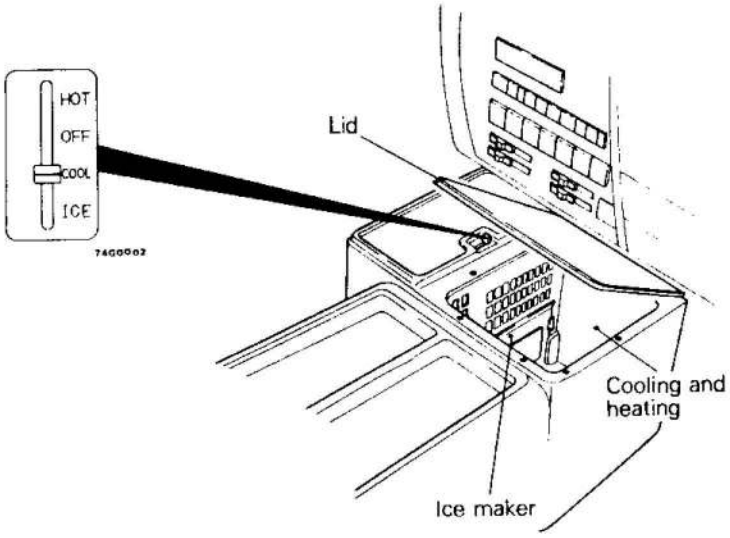


20G0241

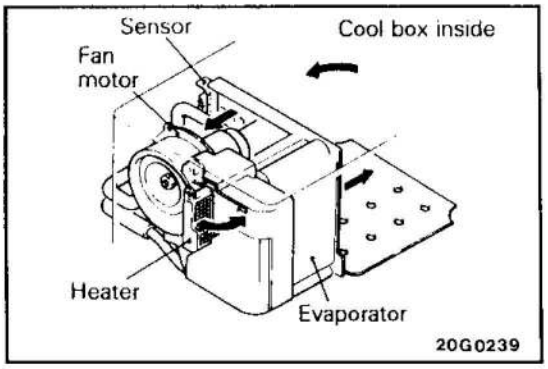


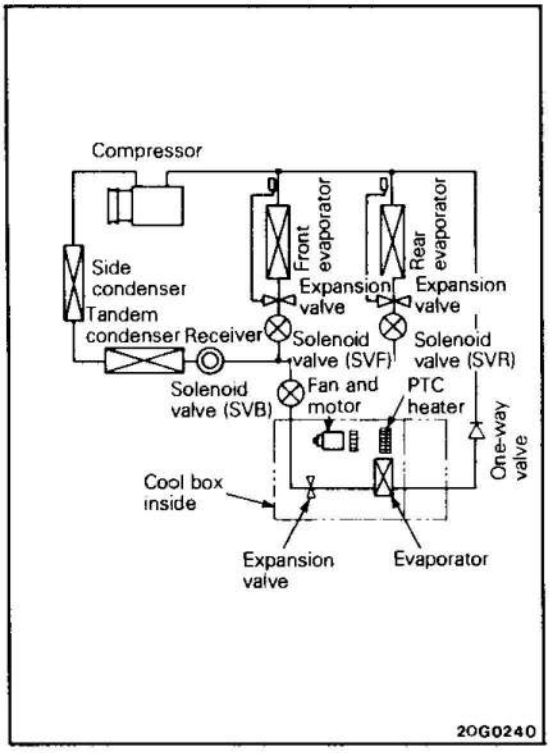
20G0273

COOL BOX



20G0242





OUTLINE OF COOL BOX OPERATION E55BEAA

SYSTEM OUTLINE

Cooler and Ice Maker

The box interior is cooled by an exclusive evaporator with a fan circulating the cool air.

Heater

The box interior is heated by an exclusive PTC heater with a fan circulating the warm air.

Fan Control

The fan is turned ON and OFF automatically during cooling (COOL) and ice making (ICE) to prevent the interior from becoming too cold.
[Thermistor Temperature ON: 3°C (37.4°F) or higher, OFF: 2°C (35.6°F) or lower]

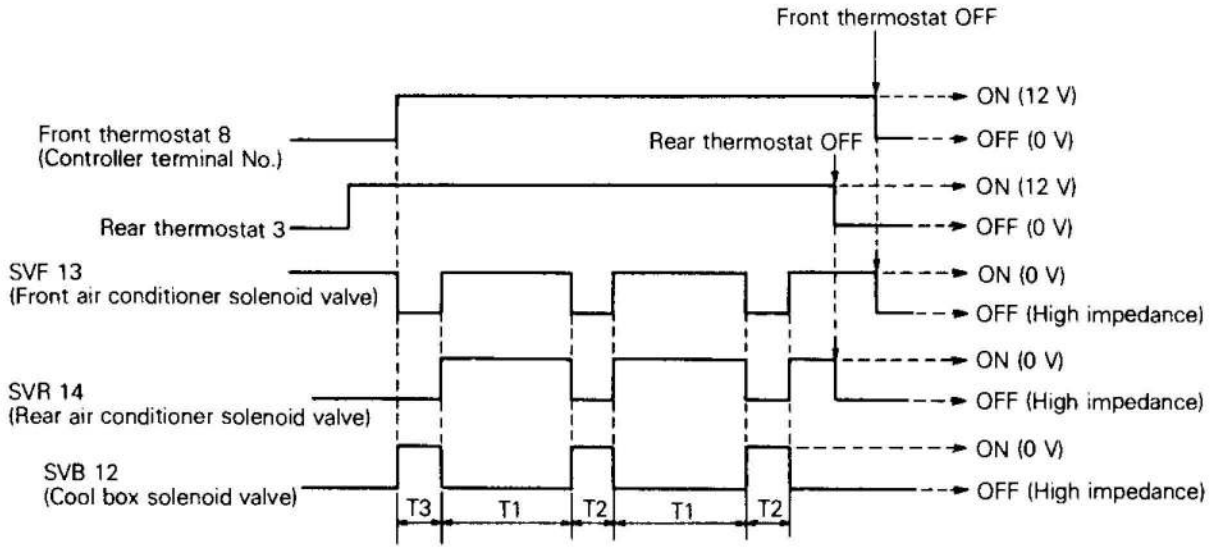
SYSTEM DIAGRAM

Operation of the air conditioners (front air conditioner, rear air conditioner) and cool box (ice making, cooling) is accomplished by the opening and closing of solenoid valves.
Opening and closing of the solenoid valves is specified by the timer controller with alternating operation of the air conditioners and the cool box.

SYSTEM CHART

Cool box select switch	Air conditioner switch	Front air conditioner solenoid valve (SVF)	Rear air conditioner solenoid valve (SVR)	Cool box solenoid valve (SVB)	Timer (sec)			Compressor (THF)	Power relay (R5) (RH)	Power relay (R6) (RF)
					T1	T2	T3			
OFF	ON	ON↔OFF	ON↔OFF	OFF	–	–	–	ON	OFF	OFF
	OFF	OFF	OFF	OFF	–	–	–	OFF	OFF	OFF
COOL	ON	ON↔OFF	ON↔OFF	ON↔OFF	150	13.5	10	ON	OFF	ON OFF
	OFF	OFF	OFF	OFF	–	–	–	OFF	OFF	OFF
ICE	ON	ON↔OFF	ON↔OFF	ON↔OFF	100	15	10	ON	OFF	ON OFF
	OFF	OFF	OFF	OFF	–	–	–	OFF	OFF	OFF
HOT	ON	ON↔OFF	ON↔OFF	OFF	–	–	–	ON	OFF	OFF
	OFF	OFF	OFF	OFF	–	–	–	OFF	ON	ON
NOTE		ON–OFF timing is set according to the front thermostat and rear thermostat timer states and is changed by the time chart procedure.								At THB OFF: 2°C (35.6°F) ON: 3°C (37.4°F)

TIME CHART



20G0234

Reading the Chart

The cool box operates when the front thermostat (rear thermostat) is ON, but the air conditioner and cool box operate alternately and not simultaneously.

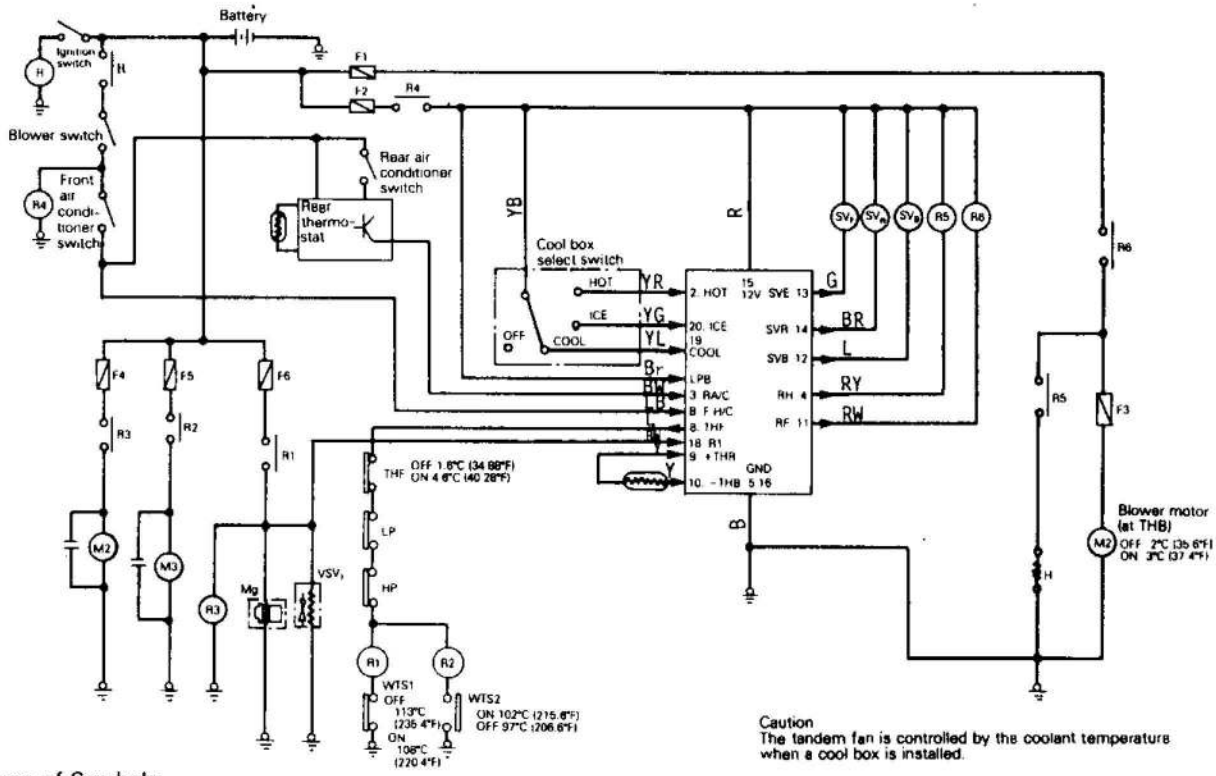
COOL BOX SELECT SWITCH IN THE OFF POSITION
The air conditioner thermostats (front thermostat, rear thermostat) turn only the air conditioners ON and OFF repeatedly.

COOL BOX SELECT SWITCH IN THE COOL POSITION
When the air conditioner thermostats (front thermostat, rear thermostat) turn the air conditioners ON, first the cool box operates for the initial 10 sec. (T3), then the air conditioner operates for 150 sec. (T1). Next the cool box operates for 13.5 sec. (T2) and from then on, the air conditioners and cool box operate alternately for T1 and T2 respectively.

COOL BOX SELECT SWITCH IN THE ICE POSITION
When the air conditioner thermostats (front thermostat, rear thermostat) turn the air conditioners ON, first the cool box operates for the initial 10 sec. (T3), then the air conditioner operates for 100 sec. (T1). Next the cool box operates for 15 sec. (T2) and from then on, the air conditioners and cool box operate alternately for T1 and T2 respectively.

COOL BOX SELECT SWITCH IN THE HOT POSITION
When the air conditioners are turned ON, the cool box will not operate on HOT. It will operate on Hot only when the air conditioner is OFF and the front heater fan switch is operated.

ELECTRICAL WIRING DIAGRAM

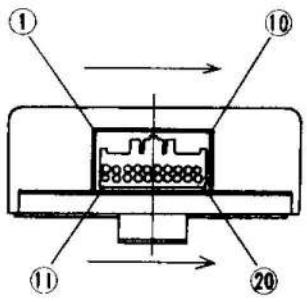


20G0236

Meanings of Symbols

Symbol	Name	Symbol	Name	Symbol	Name
BATT	Battery	F1~6	Fuse	SVB	Cool box solenoid valve
R	Power relay	VSV	Vacuum solenoid valve	WTS1, 2	Ice/Heat Switch
R1~6	Power relay	THF	Fin thermostat	H	PTC heater
M1	Side condenser fan motor	SVF	Front air conditioner solenoid valve	LP	Low pressure switch
M2	Cool box fan motor	SVR	Rear air conditioner solenoid valve	HP	High pressure switch
M3	Tandem fan motor			Mg	Magnet clutch

List of Timer Controller Terminal Voltages

Terminal No.	Symbol	Insulation Color	Name	Condition 1	Condition 2	Terminal Position
15	DC12V	R	Power supply	12V at IG ON	0V at IG OFF	
5.16	GND	B	Earth	0V	0V	
2	HOT	YR	Cool box select switch	12V in HOT position	High impedance when other than HOT	
20	ICE	YG	Cool box select switch	12V in ICE position	High impedance when other than ICE	
19	COOL	YL	Cool box select switch	12V in COOL position	High impedance when other than COOL	
3	R A/C	BW	Rear air conditioner output signal	ON 12V	High impedance when OFF	
6	F A/C	LB	Front air conditioner output signal	ON 12V	High impedance when OFF	
1B	RI	BW	Compressor output signal	12V at compressor ON	0V at Compressor OFF	
9	+THB	Y	Cool box thermistor	–	–	
10	–THB	Y	Cool box thermistor	–	–	
B	THF	L	Clutch relay output	ON 12V	0V or high impedance when OFF	
13	SVF	G	Front air conditioner solenoid valve	ON 0V	High impedance when OFF	
14	SVR	RR	Rear air conditioner solenoid valve	ON 0V	High impedance when OFF	
12	SVB	L	Cool box solenoid valve	ON 0V	High impedance when OFF	
1	RH	RY	PTC heater relay	ON 0V	High impedance when OFF	
11	RF	RW	Cool box fan relay	ON 0V	High impedance when OFF	

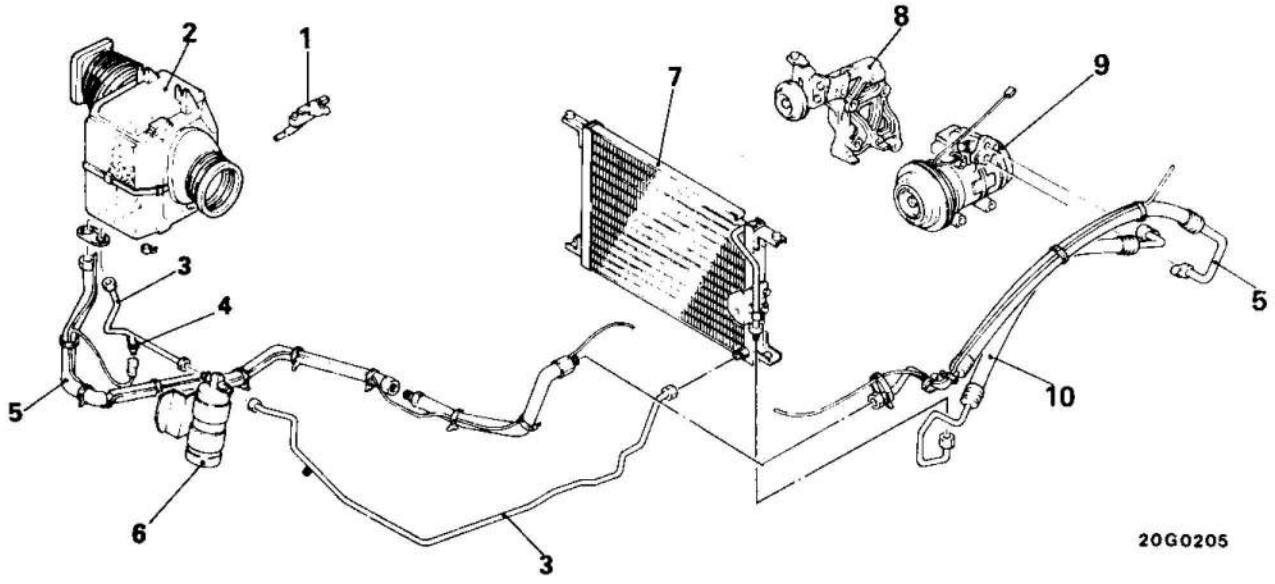
20G0235

AIR CONDITIONING SYSTEM COMPONENTS

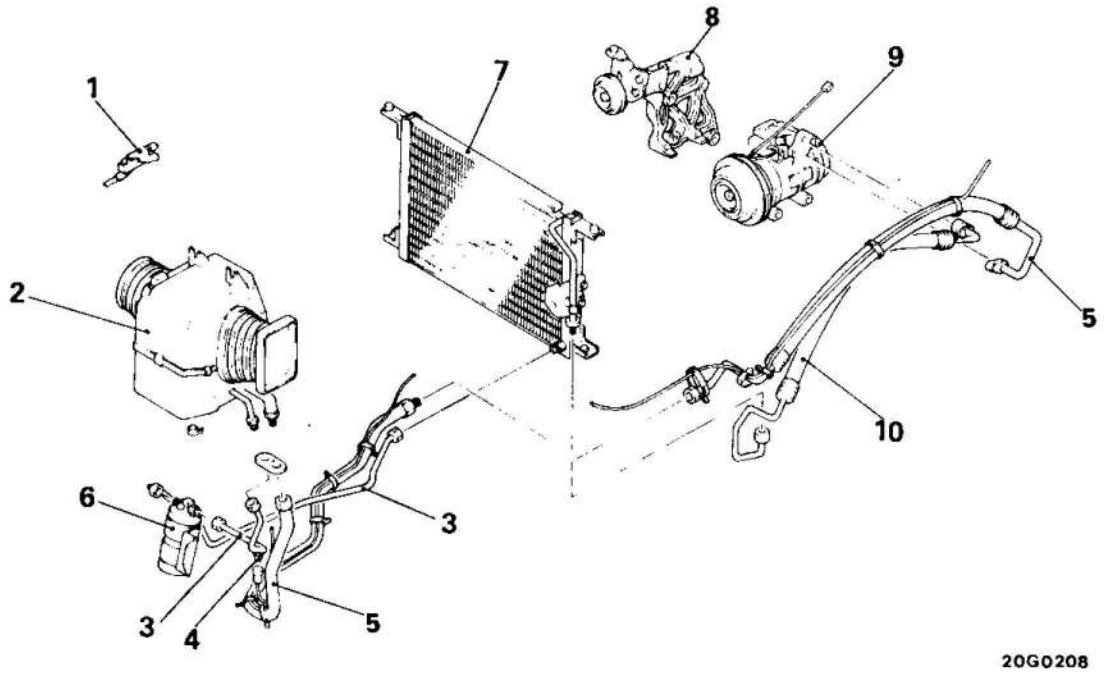
E558FAA

SINGLE AIR CONDITIONER

4G32, 4G33 Engine (L.H. drive vehicles)

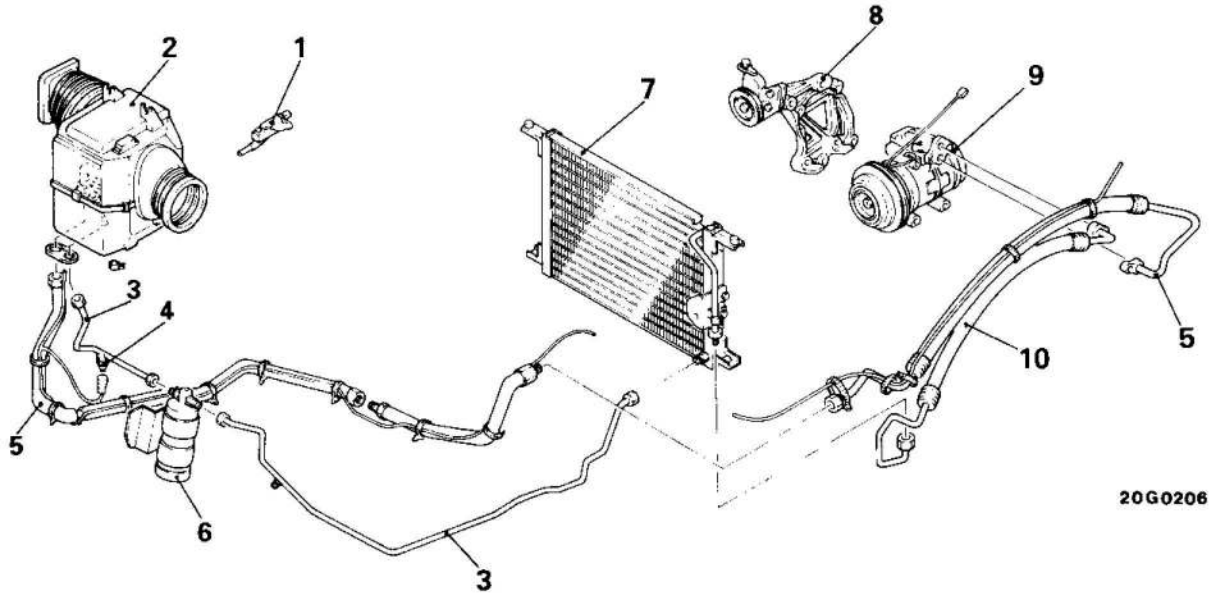


4G32, 4G33 Engine (R.H. drive vehicles)

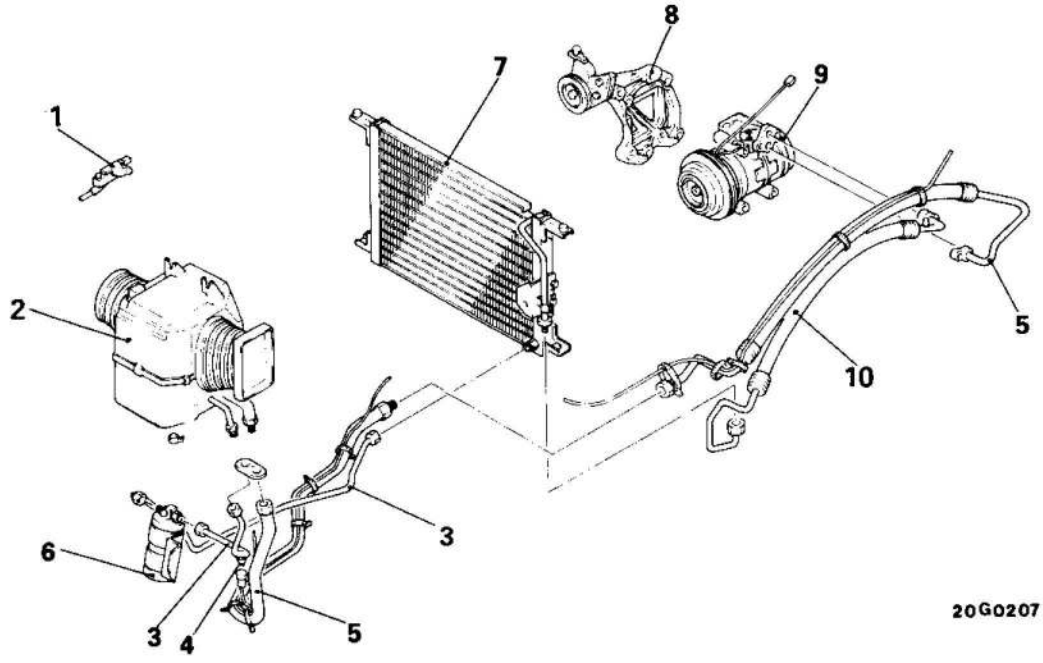


1. Air conditioner switch
2. Evaporator
3. Liquid pipe
4. Dual pressure switch
5. Suction hose
6. Receiver drier
7. Condenser
8. Compressor bracket
9. Compressor
10. Discharge hose

4G63, 4G64 Engine (L.H. drive vehicles)

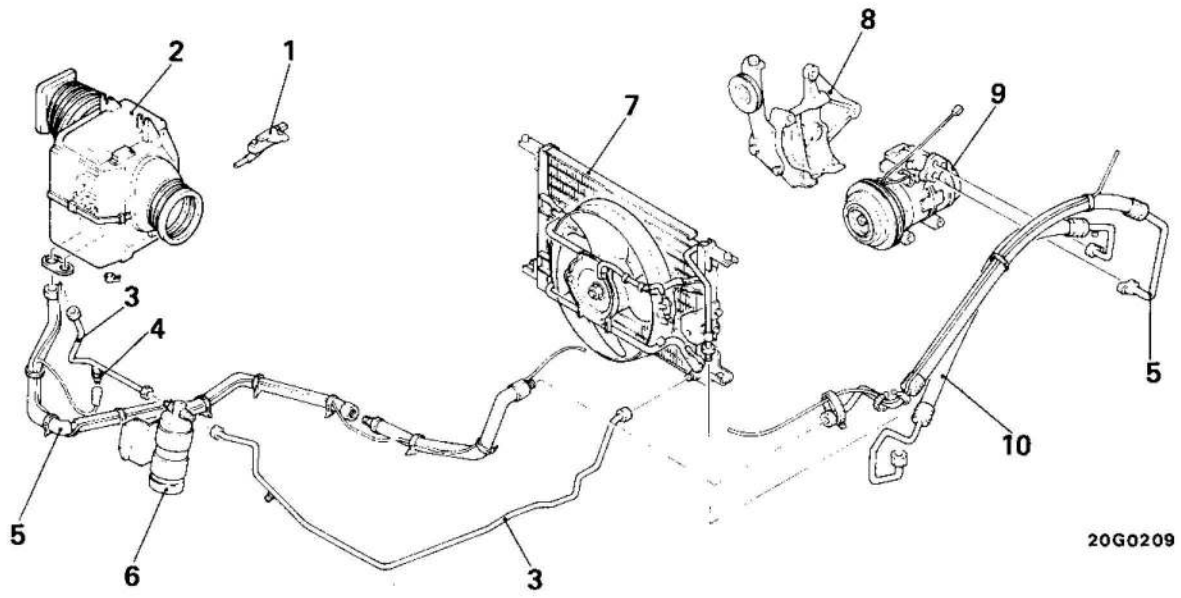


4G63 Engine (R.H. drive vehicles)

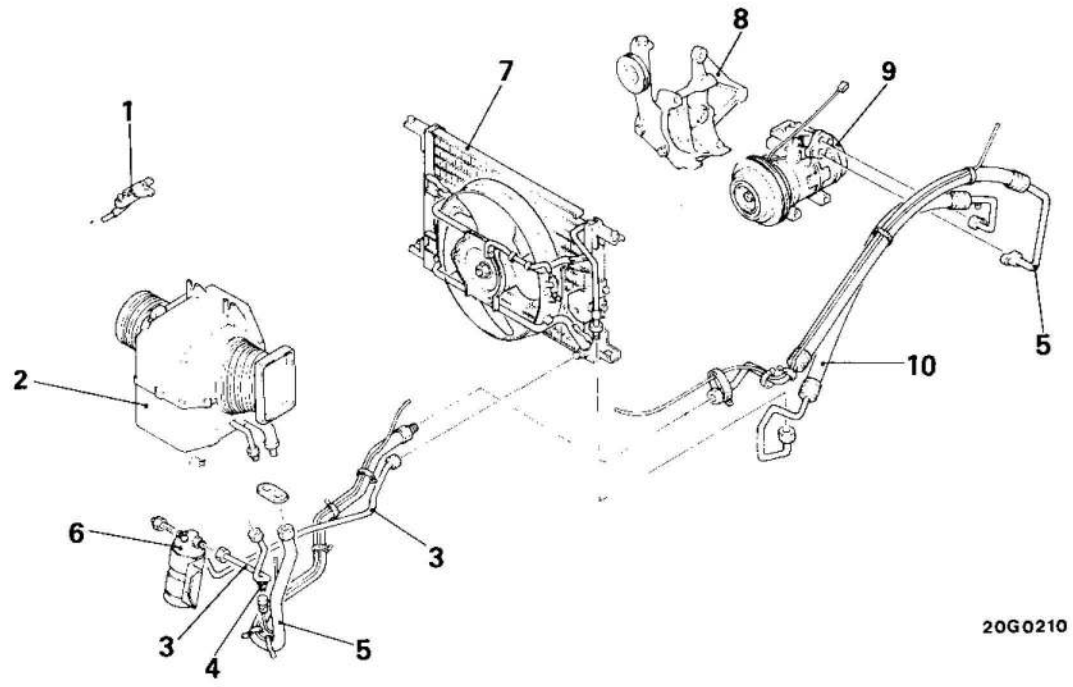


1. Air conditioner switch
2. Evaporator
3. Liquid pipe
4. Dual pressure switch
5. Suction hose
6. Receiver drier
7. Condenser
8. Compressor bracket
9. Compressor
10. Discharge hose

4D56 Engine (L.H. drive vehicles)



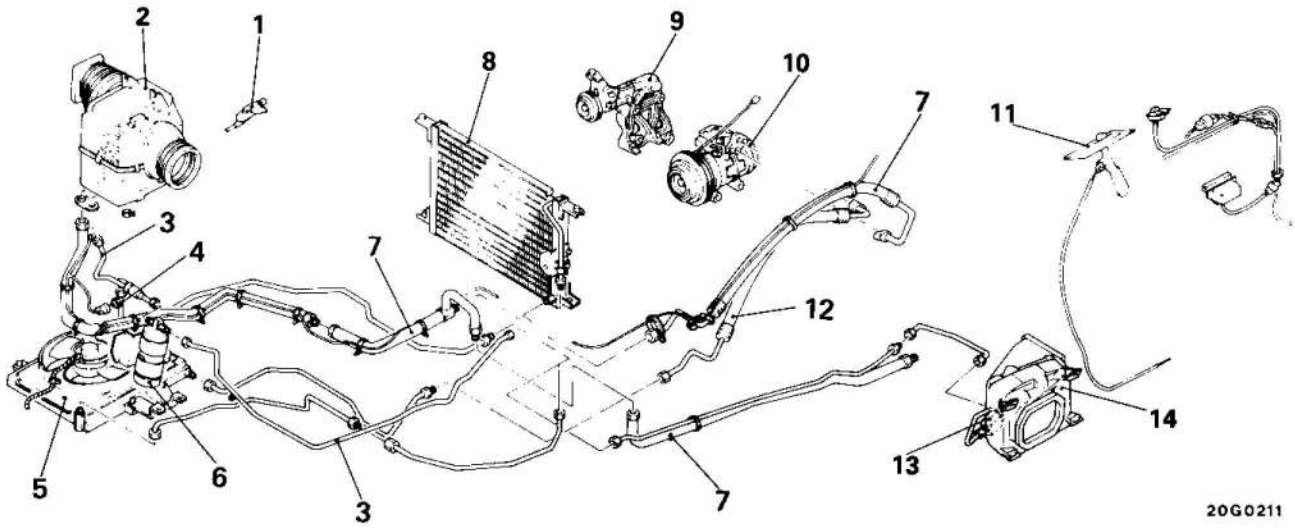
4D56 Engine (R.H. drive vehicles)



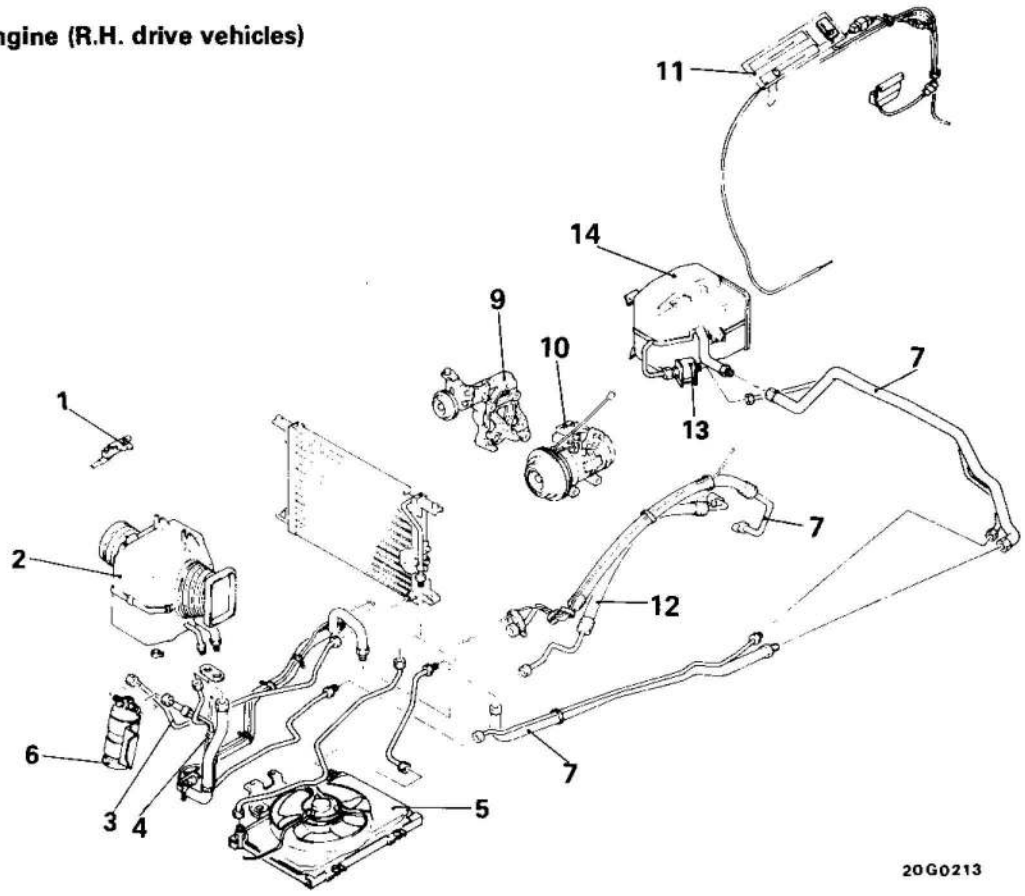
1. Air conditioner switch
2. Evaporator
3. Liquid pipe
4. Dual pressure switch
5. Suction hose
6. Receiver drier
7. Condenser
8. Compressor bracket
9. Compressor
10. Discharge hose

DUAL AIR CONDITIONER

4G32, 4G33 Engine (L.H. drive vehicles)

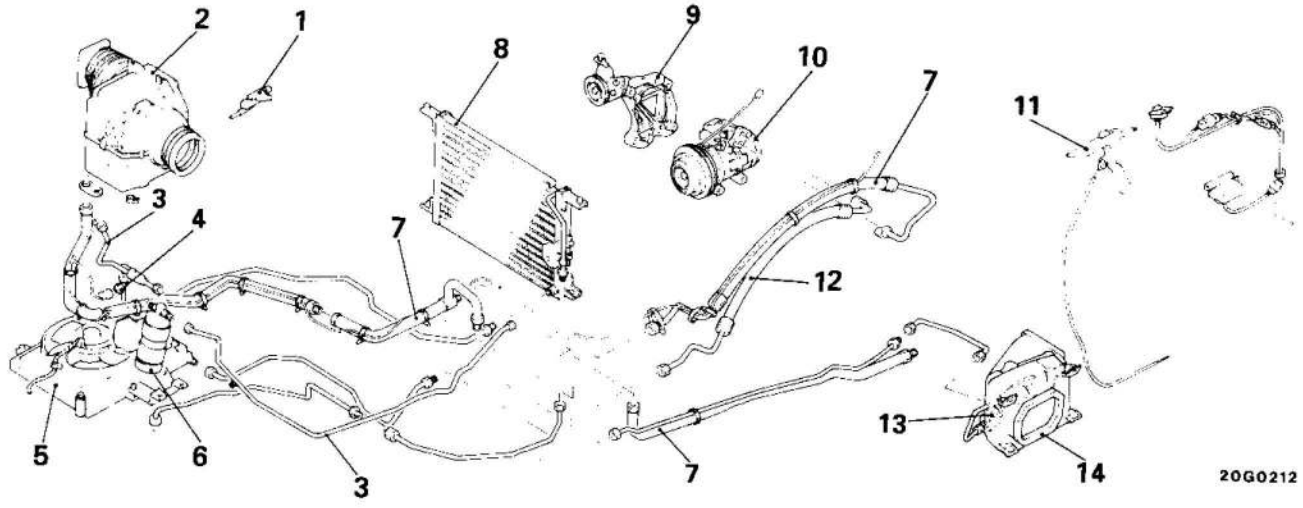


4G32, 4G33 Engine (R.H. drive vehicles)

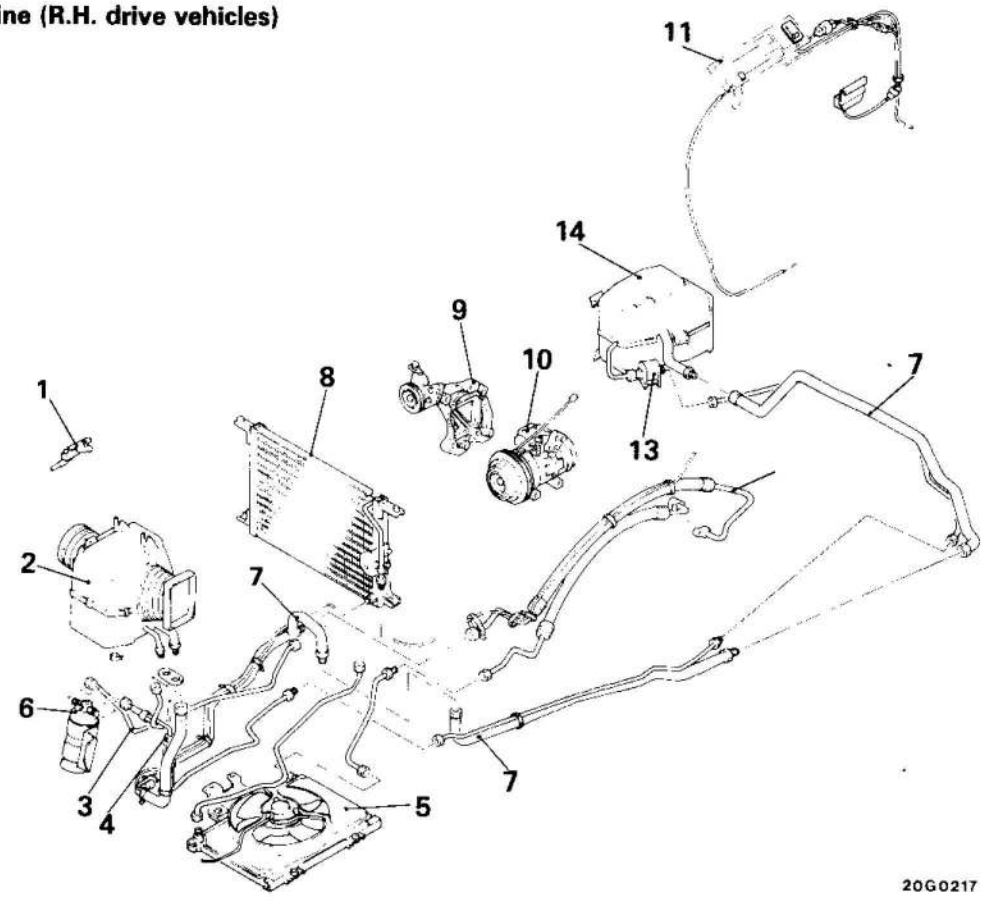


1. Air conditioner switch
2. Front evaporator
3. Liquid pipe
4. Dual pressure switch
5. Side condenser
6. Receiver drier
7. Suction hose
8. Condenser
9. Compressor bracket
10. Compressor
11. Rear control panel
12. Discharge hose
13. Solenoid valve
14. Rear evaporator

4G63, 4G64 Engine (L.H. drive vehicles)



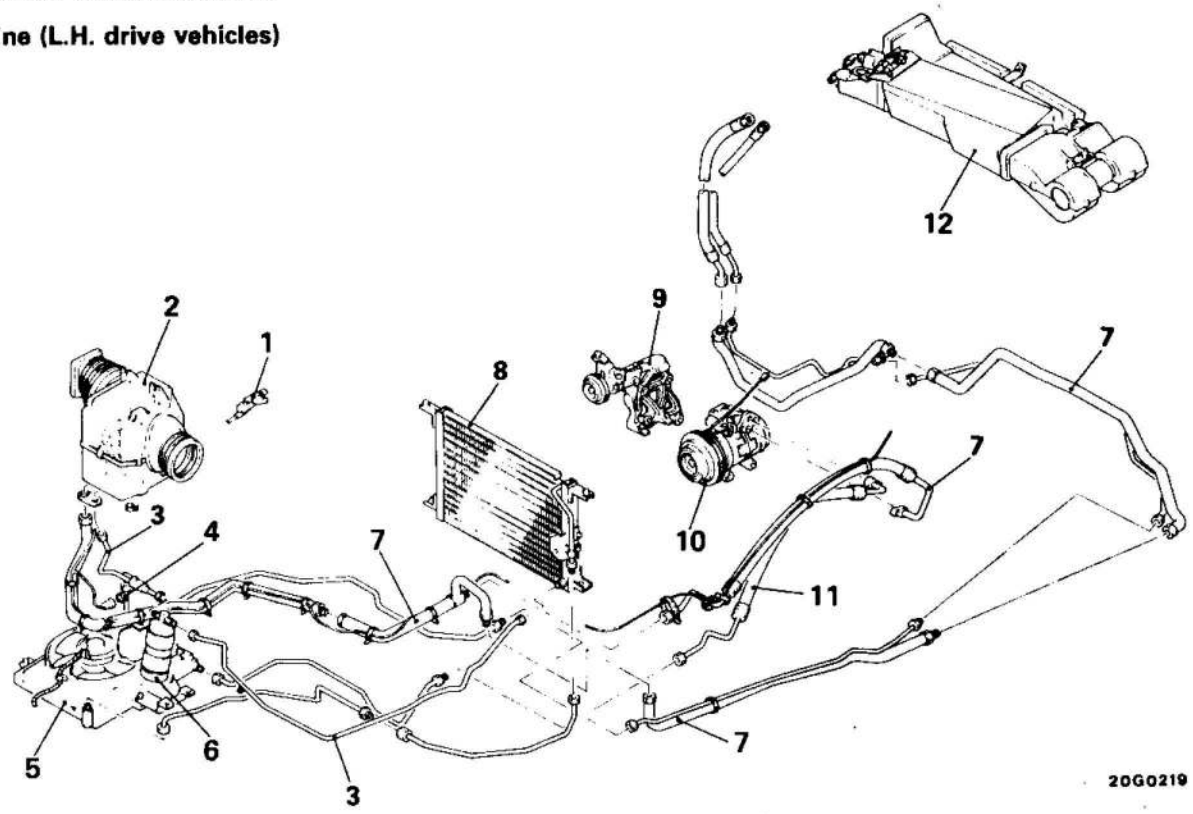
4G63 Engine (R.H. drive vehicles)



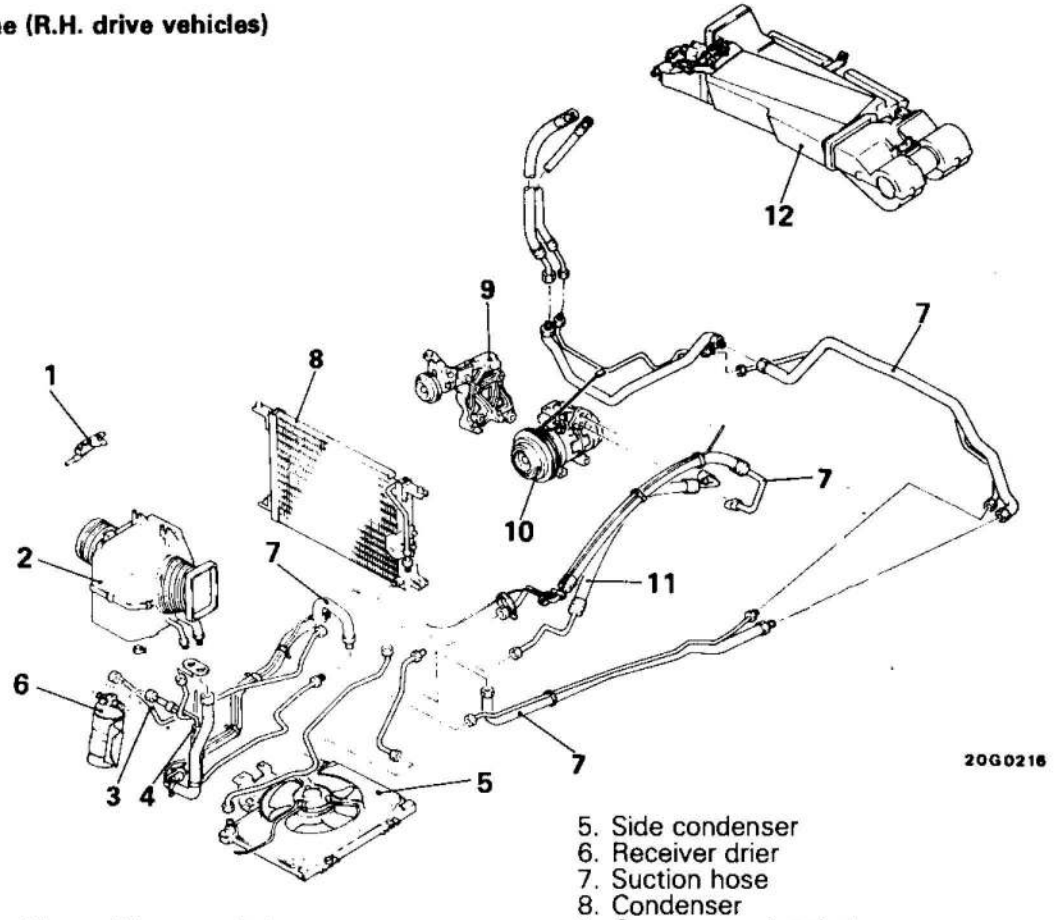
1. Air conditioner switch
2. Front evaporator
3. Liquid pipe
4. Dual pressure switch
5. Side condenser
6. Receiver drier
7. Suction hose
8. Condenser
9. Compressor bracket
10. Compressor
11. Rear control panel
12. Discharge hose
13. Solenoid valve
14. Rear evaporator

OVERHEAD AIR CONDITIONER

4G32 Engine (L.H. drive vehicles)

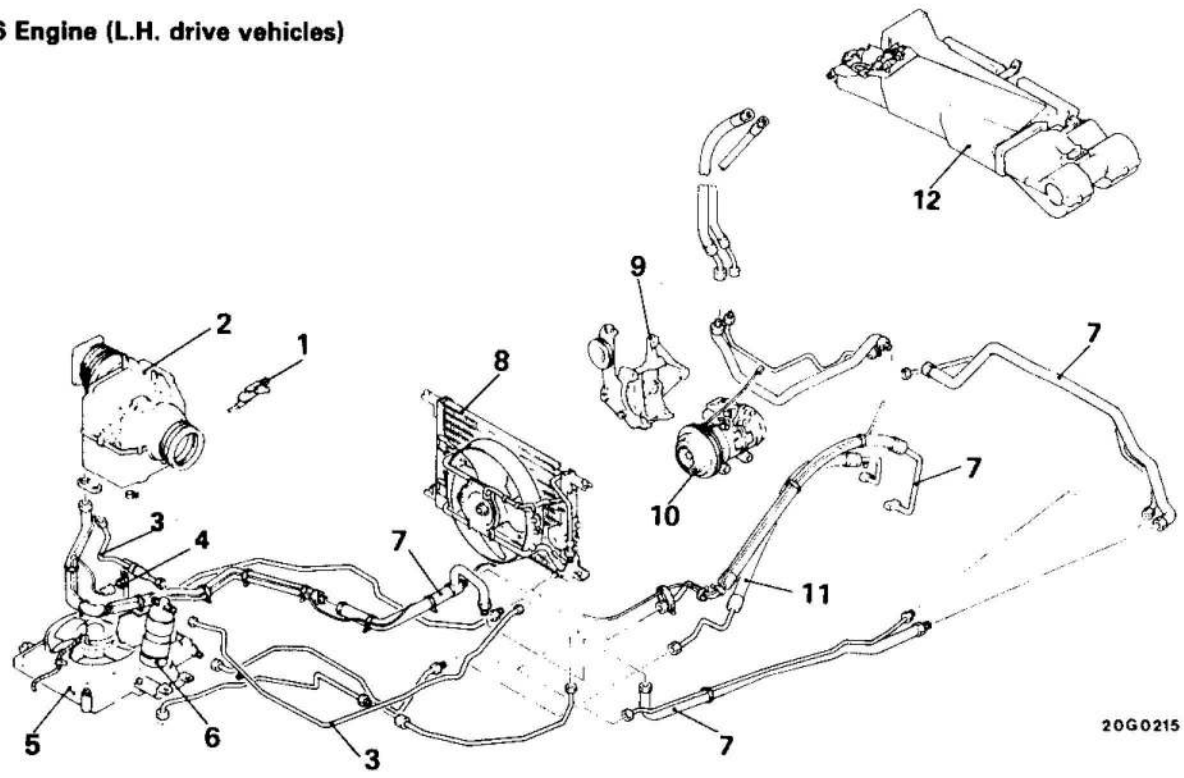


4G32 Engine (R.H. drive vehicles)

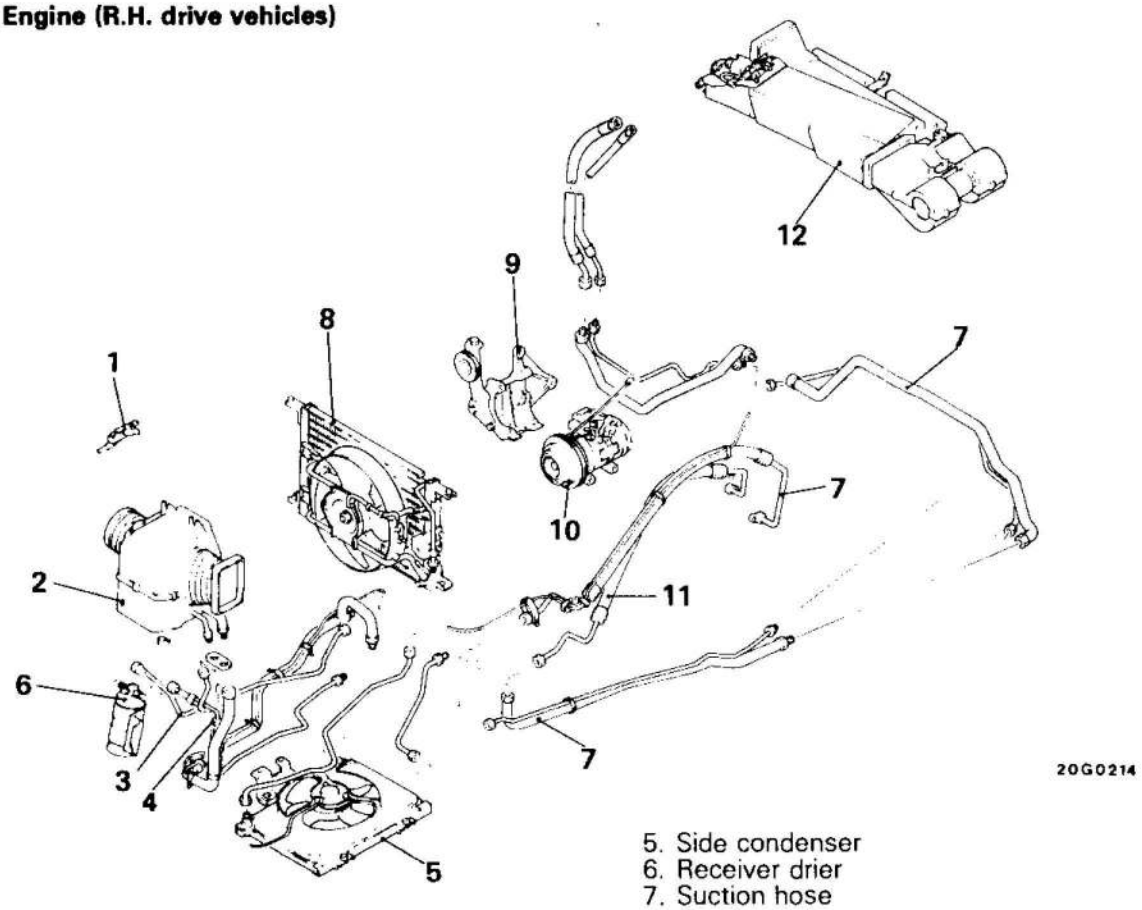


1. Air conditioner switch
2. Front evaporator
3. Liquid pipe
4. Dual pressure switch
5. Side condenser
6. Receiver drier
7. Suction hose
8. Condenser
9. Compressor bracket
10. Compressor
11. Discharge hose
12. Overhead air conditioner

4D56 Engine (L.H. drive vehicles)

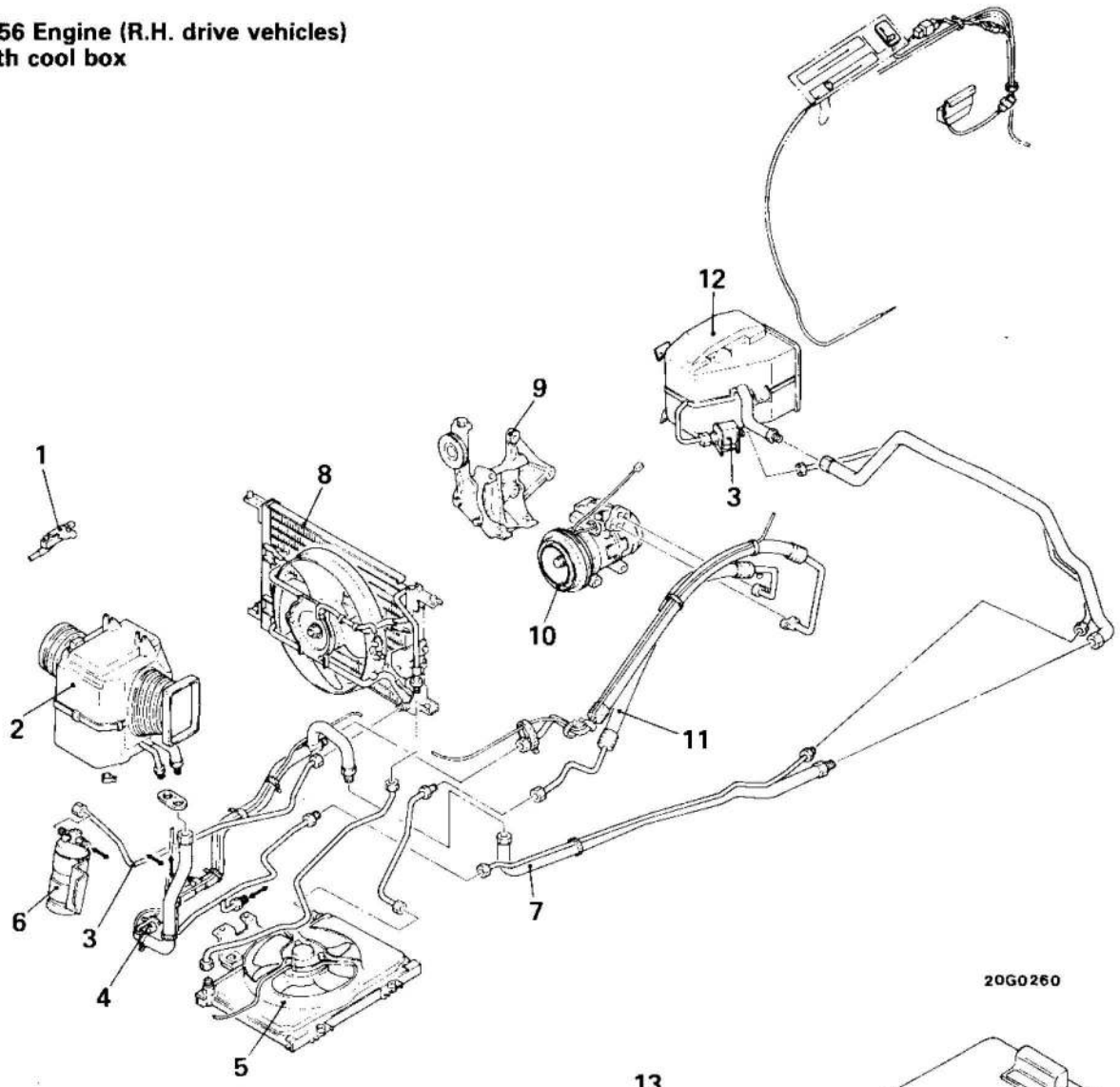


4D56 Engine (R.H. drive vehicles)

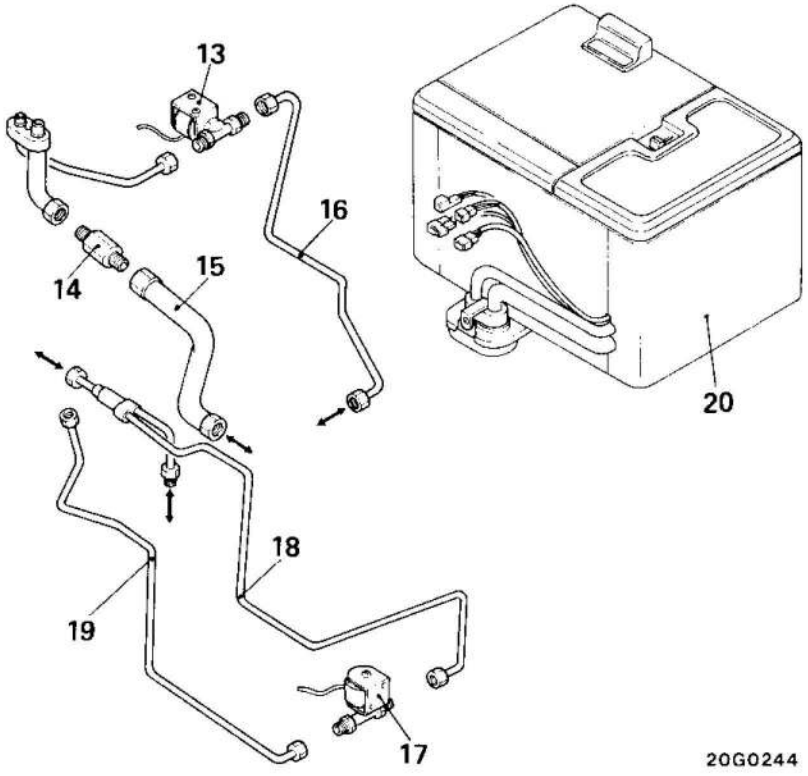


1. Air conditioner switch
2. Front evaporator
3. Liquid pipe
4. Dual pressure switch
5. Side condenser
6. Receiver drier
7. Suction hose
8. Condenser
9. Compressor bracket
10. Compressor
11. Discharge hose
12. Overhead air conditioner

4D56 Engine (R.H. drive vehicles) with cool box



1. Air conditioner switch
2. Front evaporator
3. Liquid pipe
4. Dual pressure switch
5. Side condenser
6. Receiver drier
7. Suction hose
8. Condenser
9. Compressor bracket
10. Compressor
11. Discharge hose
12. Rear evaporator
13. Solenoid valve
14. Check valve
15. Suction hose
16. Liquid pipe
17. Solenoid valve
18. Liquid pipe
19. Liquid pipe
20. Cool box



SPECIFICATIONS

GENERAL SPECIFICATIONS

E55CA-B

<Vehicles using R-12 refrigerant>

Items		Single air conditioner	Dual air conditioner, Overhead air conditioner
Compressor			
Model		10P13 (SWASH PLATE TYPE)	10P15 (SWASH PLATE TYPE)
No. of cylinders and displacement	cc (cu.in.)	10 cylinders 134 (8.2)	10 cylinders 152.8 (9.3)
Refrigeration unit lubricant	cc (cu.in.)	DENSO oil 6 80 (4.9)	DENSO oil 6 150 (9.2)
Compressor drive belt size	mm (in.)	927 (36.5)	927 (36.5)
Protective equipment			
Dual pressure switch			
High pressure switch	kPa (kg/cm², psi)	OFF: 2,700 ± 200 (27 ± 2, 384 ± 28) ON: 2,100 ± 200 (21 ± 2, 300 ± 28)	OFF: 2,700 ± 200 (27 ± 2, 384 ± 28) ON: 2,100 ± 200 (21 ± 2, 300 ± 28)
Low pressure switch	kPa (kg/cm², psi)	OFF: 210 ± 20 (2.1 ± 0.2, 30 ± 3) ON: 235 (2.35, 33)	OFF: 210 ± 20 (2.1 ± 0.2, 30 ± 3) ON: 235 (2.35, 33)
Water temperature switch	°C (°F)	OFF: 113 (1.13, 235) ON: 108 (1.08, 222)	OFF: 113 (1.13, 235) ON: 108 (1.08, 222)
Freeze up prevention	°C (°F)	Fin thermostat OFF: 1.6 (35) ON: 5 (41)	Fin thermostat OFF: 1.6 (35) ON: 5 (41)
Fusible plug	°C (°F)	Burn out temperature 105 (221)	Burn out temperature 105 (221)
Refrigerant and quantity	g (oz.)	R-12 750 (26.46)	R12 1,450 (51.15)*1 1,300 (45.86)*2 1,350 (47.62)*3
Cool box			
Ice maker		—	1 Ice Cube Tray (15 ice cubes)
Capacity		—	9 cans of juice [cooling to approx. 10°C (50°F)]

NOTE
(1) *1 indicates vehicles built up to 1990 model.
(2) *2 indicates vehicles with dual air conditioner built from 1991 model.
(3) *3 indicates vehicles with overhead air conditioner built from 1991 model.

<Vehicles using R-134a refrigerant>

Items		Single air conditioner	Dual air conditioner
Compressor			
Model		10P13 (SWASH PLATE TYPE)	10P13 (SWASH PLATE TYPE)
No. of cylinders and displacement	cc (cu.in.)	10 cylinders 133.6 (8.2)	10 cylinders 152.8 (9.3)
Refrigeration unit lubricant	cc (cu.in.)	ND – oil 8 100 (6.1)	ND – oil 8 180 (11.0)
Compressor drive belt size	mm (in.)	927 (36.5)	927 (36.5)
Protective equipment			
Dual pressure switch			
High pressure switch	kPa (kg/cm², psi)	OFF: 3,200 ± 200 (32 ± 2, 455 ± 28)	OFF: 3,200 ± 200 (32 ± 2, 455 ± 28)
		ON: 2,600 ± 200 (26 ± 2, 370 ± 28)	ON: 2,600 ± 200 (26 ± 2, 370 ± 28)
Low pressure switch	kPa (kg/cm², psi)	OFF: 200 ± 20 (2.0 ± 0.2, 28 ± 3)	OFF: 200 ± 20 (2.0 ± 0.2, 28 ± 3)
		ON: 225 (2.25, 32)	ON: 225 (2.25, 32)
Water temperature switch	°C (°F)	OFF: 113 (1.13, 235) ON: 108 (1.08, 222)	OFF: 113 (1.13, 235) ON: 108 (1.08, 222)
Freeze up prevention	°C (°F)	Fin thermostat OFF: 1.6 (35) ON: 5 (41)	Fin thermostat OFF: 1.6 (35) ON: 5 (41)
Refrigerant and quantity	g (oz.)	R-134a 700–750 (24.70–26.45)	R-134a 1,200–1,250 (42.33–44.10)

SERVICE SPECIFICATIONS

E55CB–B

Items		Specifications
Standard value		
Amount of deflection of drive belt	mm (in.)	7–10 (0.28–0.39)
Clutch clearance	mm (in.)	0.4–0.7 (0.016–0.028)
Compressor shaft rotating torque	Nm (kgcm, in. lbs.)	5 (50, 43.4)

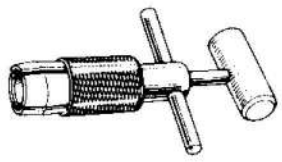
TORQUE SPECIFICATIONS

E55CC–B

Items	Nm	kgm	ft.lbs.
Suction hose to evaporator	30–35	3.0–3.5	22–25
Liquid pipe to evaporator	12–15	1.2–1.5	9–11
Liquid pipe to receiver drier	12–15	1.2–1.5	9–11
Liquid pipe to side condenser	12–15	1.2–1.5	9–11
Liquid pipe to liquid pipe	12–15	1.2–1.5	9–11
Suction hose to suction hose	30–35	3.0–3.5	22–25
Discharge hose to condenser	20–25	2.0–2.5	14–18
Discharge hose to compressor	20–25	2.0–2.5	14–18
Suction hose to compressor	20–25	2.0–2.5	14–18
Water temperature switch	9–13	0.9–1.3	7–10
Dual pressure switch	9.4	0.94	7.2
Shaft nut	15–18	1.5–1.8	11–13
Compressor bracket tightening bolt (M8)	15–22	1.5–2.2	11–16
Compressor bracket tightening bolt (M10)	30–41	3.0–4.1	22–30
Compressor tightening bolt (M10)	20–30	2.0–3.0	14–22
Compressor clutch hub	15–25	1.5–2.5	11–18
Compressor flange fitting	25–26	2.5–2.6	18–20
Compressor through bolt	25–26	2.5–2.6	18–20

SPECIAL TOOLS

E55DA–B

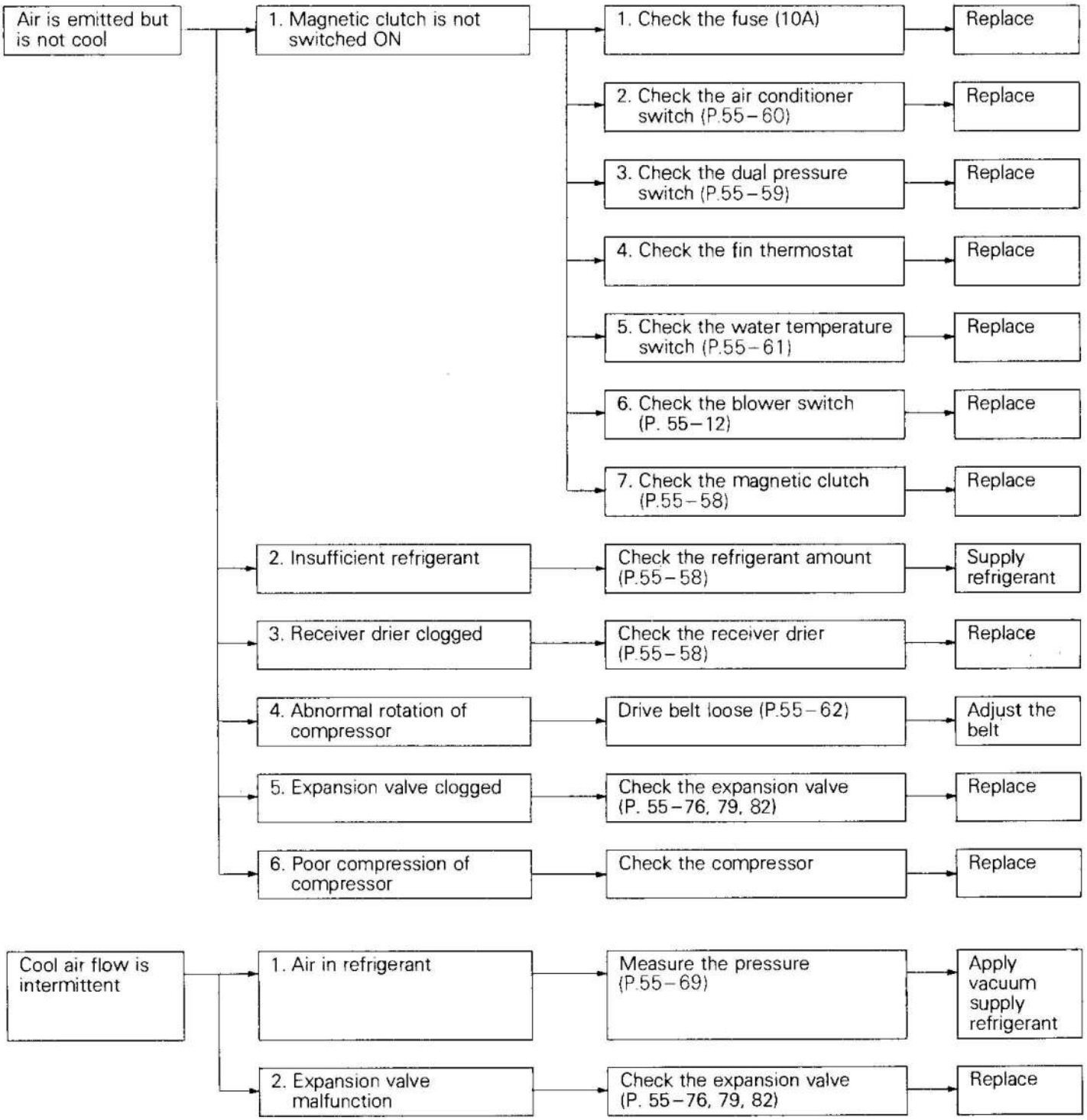
Tool (Number and name)	Use	Tool (Number and name)	Use
MB991142 Seal plate extractor 	Removal of the shaft plate	MB990968 Torque wrench 	Measurement of the rotating torque of compressor shaft
MB991143 Shaft seal remover and installer 	Removal of and installation of shaft seal	MB990326 Preload socket 	

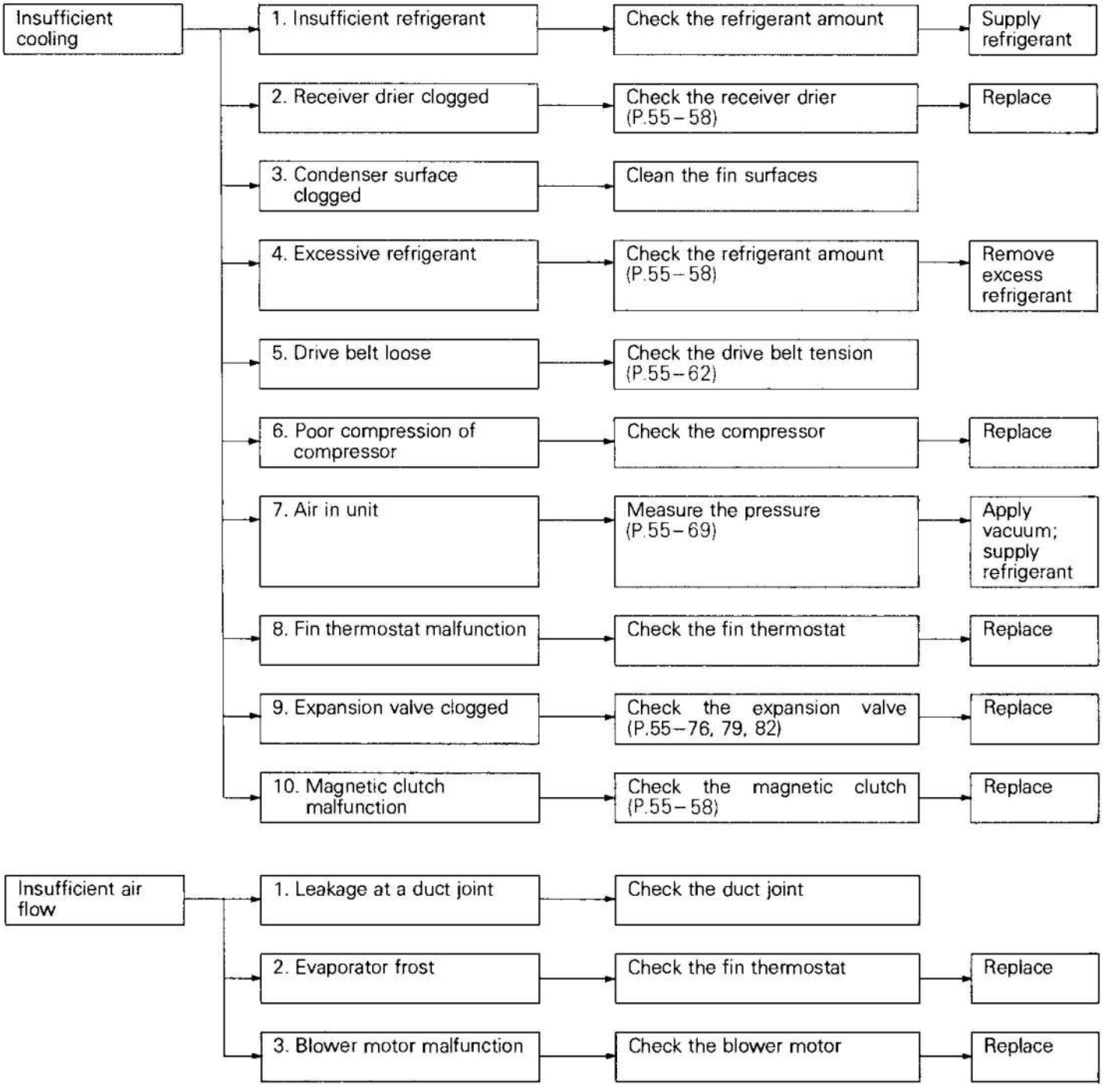
TROUBLESHOOTING

E55EBAA

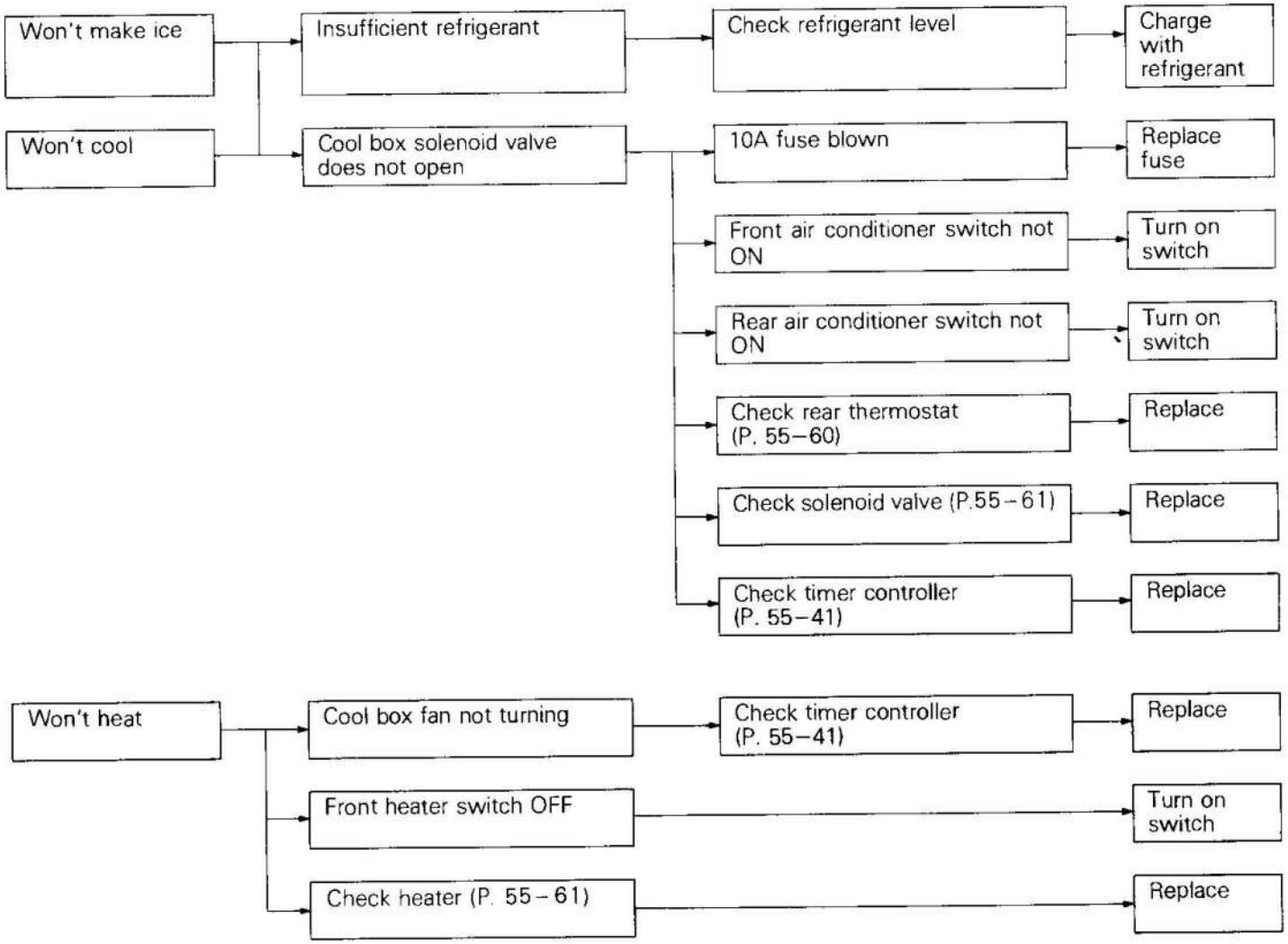
Before replacing or repairing air conditioning components, first determine if the malfunction is; due to refrigerant charge, air flow, or compressor related.
The following diagnostic charts have been developed as a "quick reference" aid in determining the cause of malfunction. If these charts do not satisfactorily describe the problem, refer to appropriate section for detailed explanation.
After correcting the malfunction, check out the complete system to assure satisfactory performance.

MALFUNCTION CAUSES AND REMEDIES (Numbers indicate checking/inspection order.)




Insufficient cooling
1. Insufficient refrigerant
Check the refrigerant amount
Supply refrigerant
2. Receiver drier clogged
Check the receiver drier (P.55–58)
Replace
3. Condenser surface clogged
Clean the fin surfaces
4. Excessive refrigerant
Check the refrigerant amount (P.55–58)
Remove excess refrigerant
5. Drive belt loose
Check the drive belt tension (P.55–62)
6. Poor compression of compressor
Check the compressor
Replace
7. Air in unit
Measure the pressure (P.55–69)
Apply vacuum; supply refrigerant
8. Fin thermostat malfunction
Check the fin thermostat
Replace
9. Expansion valve clogged
Check the expansion valve (P.55–76, 79, 82)
Replace
10. Magnetic clutch malfunction
Check the magnetic clutch (P.55–58)
Replace
Insufficient air flow
1. Leakage at a duct joint
Check the duct joint
2. Evaporator frost
Check the fin thermostat
Replace
3. Blower motor malfunction
Check the blower motor
Replace

COOL BOX



SAFETY PRECAUTIONS

E55XAAC

<Vehicles using R-12 refrigerant>

R-12 refrigerant is a chlorofluoro-carbon (CFC) that can contribute to the depletion of the ozone layer in the upper atmosphere.
Ozone filters out harmful radiation from the sun. To assist in protecting the ozone layer, Mitsubishi Motors Corporation recommends that a R-12 refrigerant recycling device that meets. SAE standard J1991 be used.
Contact an automotive service equipment supplier for refrigerant recycling equipment that is available in your area.
The refrigerant used in all air conditioner is R-12. It is transparent and colorless in both the liquid and vapor state. Since it has a boiling point of −29.8°C (−21.7°F), at atmospheric pressure, it will be a vapor at all normal temperatures and pressures. The vapor is heavier than air, non-flammable, and nonexplosive. It is nonpoisonous except when it is in direct contact with open flame. It is noncorrosive except when combined with water. The following precautions must be observed when handling R-12.

Caution
Wear safety goggles when servicing the refrigeration system

R-12 evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts. For this reason, extreme care must be taken to prevent any liquid refrigerant from contacting the skin and especially the eyes. Always wear safety goggles when servicing the refrigeration part of the air conditioning system. Keep a bottle of sterile mineral oil handy when working on the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out. R-12 is rapidly absorbed by the oil. Next splash the eyes with plenty of cold water. Call your doctor immediately even though irritation has ceased after treatment.

Caution
Do not heat R-12 above 52°C (125.6°F).

In most instances, moderate heat is required to bring the pressure of the refrigerant in its container above the pressure of the system when charging or adding refrigerant. A bucket or large pan of hot water not over 52°C (125.6°F) is all the heat required for this purpose. Do not heat the refrigerant container with a blow torch or any other means that would raise temperature and pressure above this temperature. Do not weld or steam clean on or near the system components or refrigerant lines.

Caution
Keep R-12 containers upright when charging the system.

When metering R-12 into the refrigeration system, keep the supply tank or cans in an upright position. If the refrigerant container is on its side or upside down, liquid refrigerant will enter the system and damage the compressor.

Caution
Always work in a well-ventilated room.

Good ventilation is vital in the working area.
Although R-12 vapor is normally nonpoisonous, contact with an open flame can cause the vapor to become very poisonous. A poisonous gas is produced when using the flame-type leak detector. Avoid inhaling the fumes from the leak detector.

Caution
Do not allow liquid refrigerant to touch bright metal.

Refrigerant will tarnish bright metal and chrome surfaces, and in combination with moisture can severely corrode all metal surfaces.

Note
R12 Refrigerant Recycling

R-12 refrigerant is a chloro-fluoro-carbon (CFC) that can contribute to the depletion of the ozone layer in the upper atmosphere.
Ozone layer filters out harmful radiation from the sun.
To assist in protecting the ozone layer, Mitsubishi Motors Corporation recommends that a R-12 refrigerant recycling device that meets SAE standard J1991 be used.
Contact an automotive service equipment supplier for refrigerant recycling equipment.
Refer to the operating instructions provided with the recycling equipment for proper operation.

<Vehicles using R-134a refrigerant>

Because R-134a refrigerant is a hydrofluorocarbon (HFC) which contains hydrogen atoms in place of chlorine atoms, it will not cause damage to the ozone layer.
Ozone filters out harmful radiation from the sun.
To assist in protecting the ozone layer, Mitsubishi Motors Corporation recommends an R-134a refrigerant recycling device.
Refrigerant R-134a is transparent and colorless in both the liquid and vapor state. Since it has a boiling point of -29.8°C (-21.7°F), at atmospheric pressure, it will be a vapor at all normal temperatures and pressures. The vapor is heavier than air, non-flammable, and nonexplosive. The following precautions must be observed when handling R-134a.

Caution
Wear safety goggles when servicing the refrigeration system.

R-134a evaporates so rapidly at normal atmospheric pressures and temperatures that it tends to freeze anything it contacts. For this reason, extreme care must be taken to prevent any liquid refrigerant from contacting the skin and especially the eyes. Always wear safety goggles when servicing the refrigeration part of the A/C system. Keep a bottle of sterile mineral oil handy when working on the refrigeration system. Should any liquid refrigerant get into the eyes, use a few drops of mineral oil to wash them out. R-134a is rapidly absorbed by the oil. Next splash the eyes with plenty of cool water. Call your doctor immediately even though irritation has ceased after treatment.

Caution
Do not heat R-134a above 40°C (104°F).

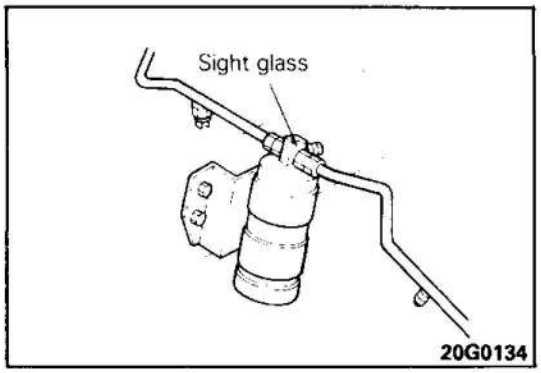
In most instances, moderate heat is required to bring the pressure of the refrigerant in its container above the pressure of the system when charging or adding refrigerant.
A bucket or large pan of hot water not over 40°C (104°F) is all the heat required for this purpose. Do not heat the refrigerant container with a blow torch or any other means that would raise temperature and pressure above this temperature. Do not weld or steam clean on or near the system components or refrigerant lines.

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

When metering R-134a into the refrigeration system keep the supply tank or cans in an upright position. If the refrigerant container is on its side or upside down, liquid refrigerant will enter the system and damage the compressor.

Caution
1. **The leak detector for designed R-134a should be used to check for refrigerant gas leaks.**
2. **Do not allow liquid refrigerant to touch bright metal.**

Refrigerant will tarnish bright metal and chrome surfaces, and in combination with moisture can severely corrode all metal surfaces.



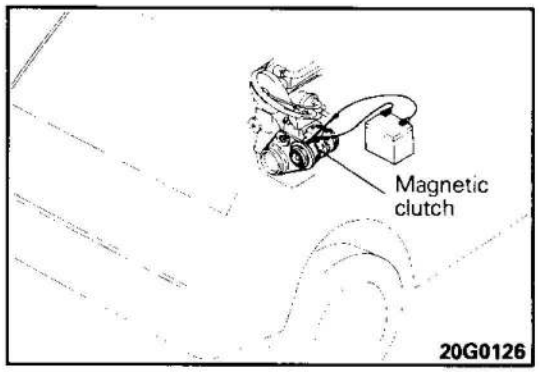
SERVICE ADJUSTMENT PROCEDURES

TEST PROCEDURES E55FABB

SIGHT GLASS REFRIGERANT LEVEL TEST

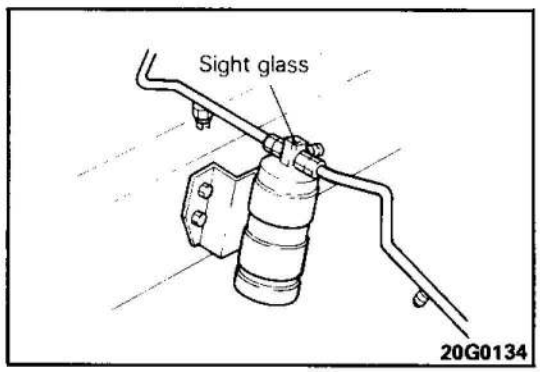
The sight glass is a refrigerant level indicator. To check the refrigerant level, clean the sight glass and start the vehicle engine. Push the air conditioner button to operate the compressor, place the blower switch to high and move the temperature control lever to max cool. After operating for a few minutes in this manner, check the sight glass.

(1) If the sight glass is clear, the magnetic clutch is engaged, the compressor discharge line is warm and the compressor inlet line is cool; the system has a full charge.
(2) If the sight glass is clear, the magnetic clutch is engaged and there is no significant temperature difference between compressor inlet and discharge lines; the system has lost some refrigerant.
(3) If the sight glass shows foam or bubbles, the system could be low on charge. The system has to be charged with some refrigerant.



MAGNETIC CLUTCH

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

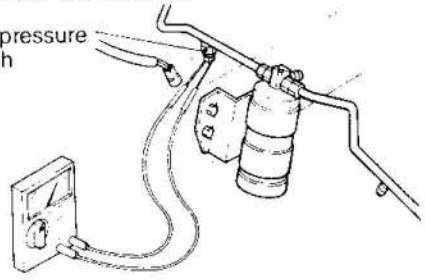


RECEIVER DRIER E55FRAB

To Test the Receiver Drier

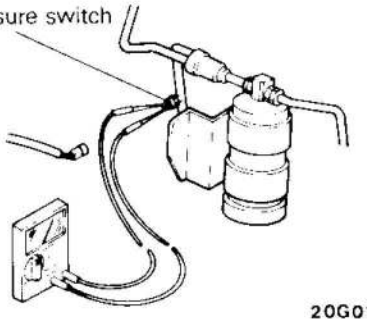
(1) Operate the unit and check the piping temperature by touching the receiver drier outlet and inlet.
(2) If there is a difference in the temperatures, the receiver drier is restricted.
Replace the receiver drier.

Single air conditioner



20G0189

Dual air conditioner
Overhead air conditioner



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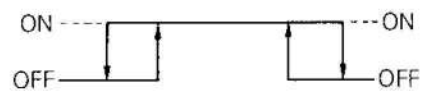


20X0142

DUAL PRESSURE SWITCH

The dual Pressure Switch, located on the liquid line, is wired in series with the magnetic clutch. It cuts off the electrical power supply to the clutch when refrigerant pressure drops below the control point of the switch, or when the refrigerant pressure increases to the set value or higher. Whenever the system is inactivated by the low pressure switch due to refrigerant loss, the refrigerant oil may have been lost. Therefore, to prevent damage to the compressor due to operation without sufficient lubrication, the leak must be repaired and the compressor oil level checked before final charge of the system. The switch is a sealed, factory calibrated unit. No attempt should be made to adjust or otherwise repair it.
If it is found to be faulty it must be replaced.

To Test the Dual Pressure Switch

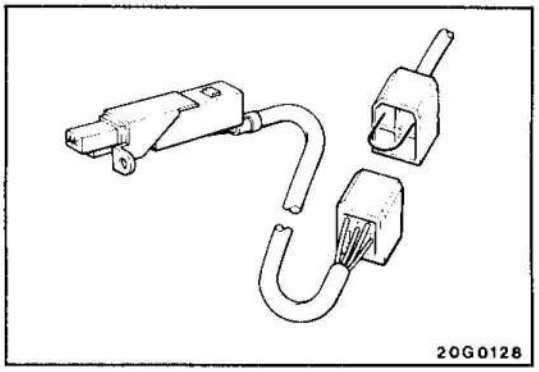
(1) Remove the triple pressure switch connector and connect the high/low pressure side terminals located on the harness side as shown in the illustration.
(2) Install a gage manifold to the high pressure side service valve of the refrigerant line. (Refer to Performance Test.)
(3) When the high/low pressure sides of the triple pressure switch are at operating pressure (ON) and there is continuity between the respective terminals, then the condition is normal. If there is no continuity, replace the switch.

<Vehicles using R-12 refrigerant> kPa (kg/cm², psi)

Items \ Switch position	OFF → ON	ON → OFF
Low-pressure side	235 (2.35, 33)	210 ± 20 (2.1 ± 0.2, 30 ± 3)
High-pressure side	2,100 ± 200 (21 ± 2, 300 ± 28)	2,700 ± 200 (27 ± 2, 384 ± 28)

<Vehicles using R-134a refrigerant> kPa (kg/cm², psi)

Items \ Switch position	OFF → ON	ON → OFF
Low-pressure side	225 (2.25, 32)	200 ± 20 (2.0 ± 0.2, 28 ± 3)
High-pressure side	2,600 ± 200 (26 ± 2, 370 ± 28)	3,200 ± 200 (32 ± 2, 455 ± 28)


20G0128

AIR CONDITIONER SWITCH

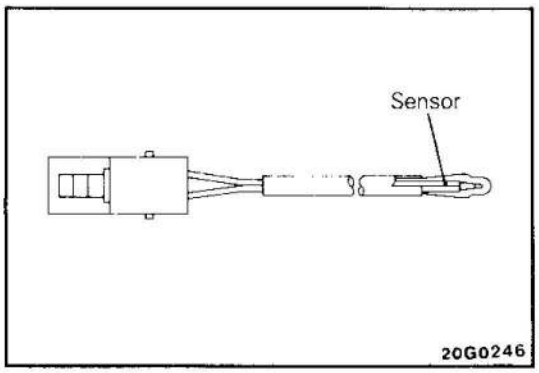
To Test the Air Conditioner Switch

(1) Disconnect the harness connector for the air conditioner switch.
(2) Jump the lead wire as shown.
(3) Turn the blower switch ON.
(4) Momentarily turn the ignition switch on (do not crank the engine), listen for the clutch engaging.
(5) If the clutch does not engage, fin thermostat, dual pressure switch, wiring or fuse may be faulty.
(6) If clutch engages replace the switch.

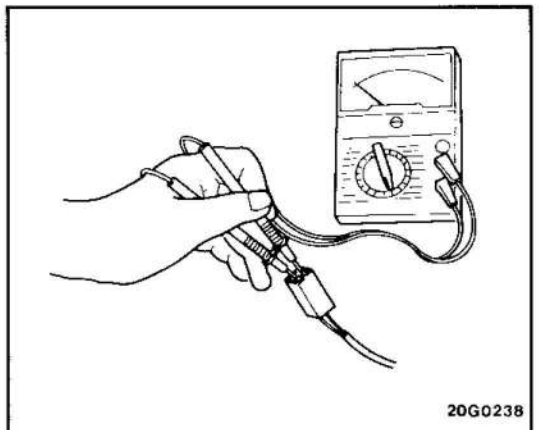
THERMISTOR

This thermistor is mounted on a plate inside the cool box. It stops the fan when the air temperature is 2°C (35.6°F) or lower.

ON: 3°C (37.4°F)



20G0246

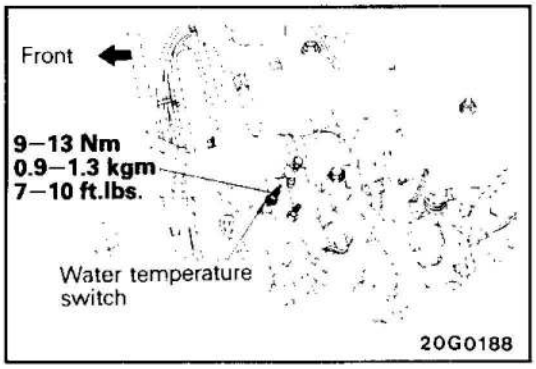

20G0238

Checking the Thermistor

Measure the resistance of the thermistor at the thermistor leads in the connector.
Replace the thermistor if the resistance deviates drastically from the values in the table at left.

Characteristic values

Temperature °C (°F)	Resistance value kΩ
−10 (14)	18.2
0 (32)	11.4
10 (50)	7.3
20 (68)	4.9
30 (86)	3.3
40 (104)	2.3

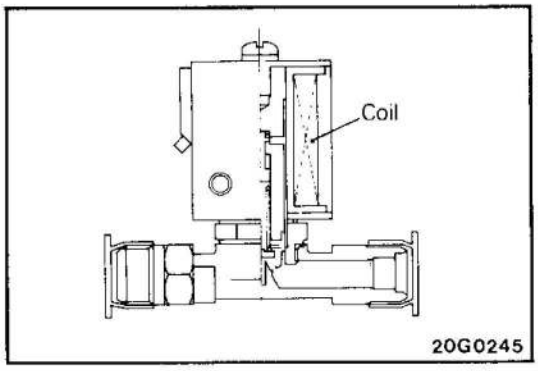


WATER TEMPERATURE SWITCH

The water temperature switch is located on the thermostat housing, is connected to the clutch in series. When the coolant temperature in the radiator reaches above 113 °C (235 °F) <Vehicles built up to July 1991>, 116 °C (241 °F) <Vehicles built from July 1991>, it turns the compressor OFF. This is to prevent engine overheating.
When the water temperature switch is activated and the clutch is OFF, check the surface of the condenser and radiator, the belt tension, and the coolant volume in the radiator, and return to the normal condition.

To Test the Water Temperature Switch

(1) Remove wire from water temperature switch and jump lead wires.
(2) Press the air conditioner switch and blower switch on.
(3) Momentarily turn the ignition switch on (do not crank the engine), listen for the clutch engaging.
(4) If the clutch does not engage, the fin thermostat, dual pressure switch, wiring or fuse may be faulty.
(5) If clutch engages, replace the switch.

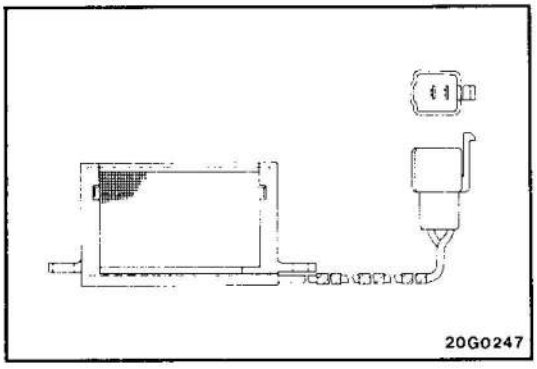


SOLENOID VALVE

This solenoid valve is mounted in the liquid pipe for the cool box and is turned ON and OFF by signals from the timer controller.

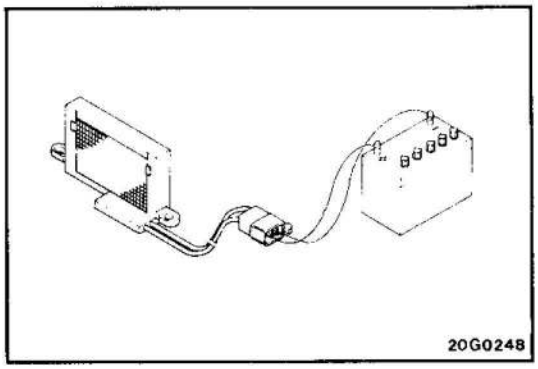
Checking the Solenoid Valve

Feel the inlet and outlet for a temperature difference while voltage is being applied to the solenoid valve.
Replace the solenoid valve if there is a temperature difference.



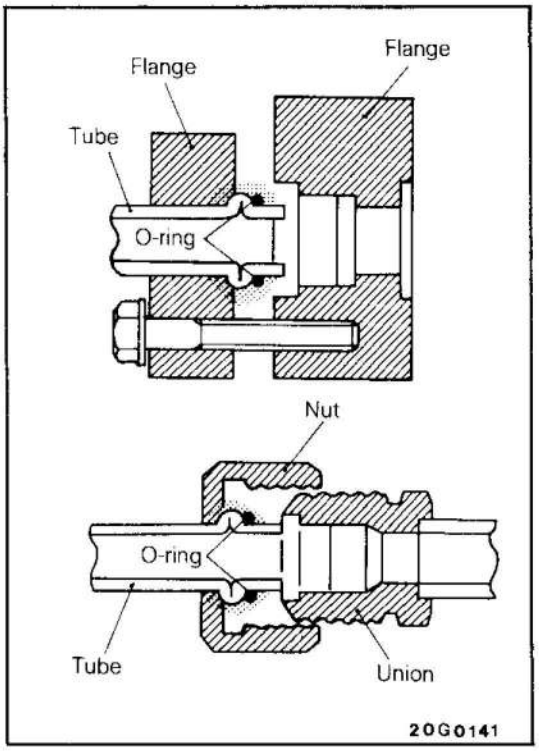
HEATER

This heater is used for heating canned coffee and other hot drinks and is mounted inside the cool box. The heater consists of a PTC heater which possesses the required characteristics, changing the current to the heater, and thus changing the heating level, automatically when the temperature changes.



Checking the Heater

(1) Take the heater out of the cool box and apply 12V DC directly to the terminals in the connector.
(2) After approximately 10 minutes, measure the temperature at the front of the heater. It is normal if the temperature is 80°C (176°F) or higher.
Replace the heater if there is no rise in temperature.

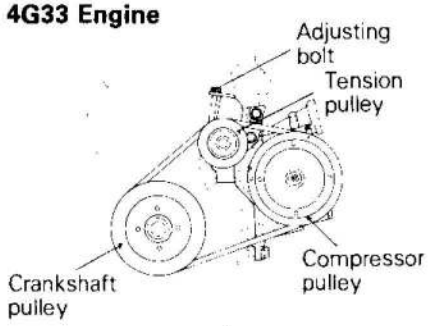


O-RING INSTALLATION

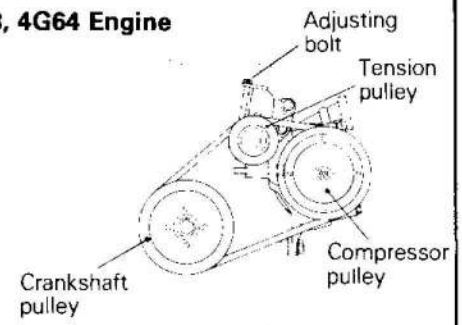
(1) Clean sealing surface.
(2) Make sure O-ring does not have any scratches.
(3) Connect fitting, install fastener, and torque to amount shown in illustration.

The internal part of the refrigeration system will remain in a state of chemical stability as long as pure-moisture-free refrigerant and refrigerant oil is used. Abnormal amounts of dirt, moisture or air can upset the chemical stability and cause operational troubles or even serious damage if present in more than minute quantities. When it is necessary to open to refrigeration system, have everything you will need to service the system ready to the system will not be left open any longer than necessary. Cap or plug all lines and fittings as soon as they are opened to prevent the entrance of dirt and moisture. All lines and components in parts stock should be capped or sealed until they are ready to be used. All tools, including the refrigerant dispensing manifold, the gauge set manifold and test hoses should be kept clean and dry.

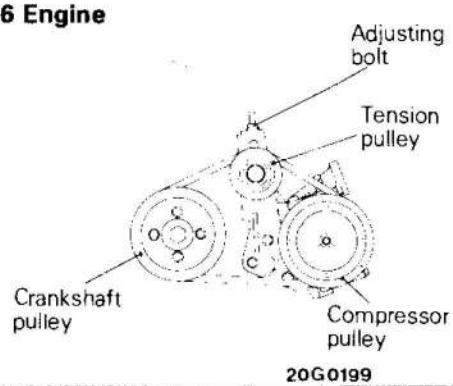
4G32, 4G33 Engine



4G63, 4G64 Engine



4D56 Engine



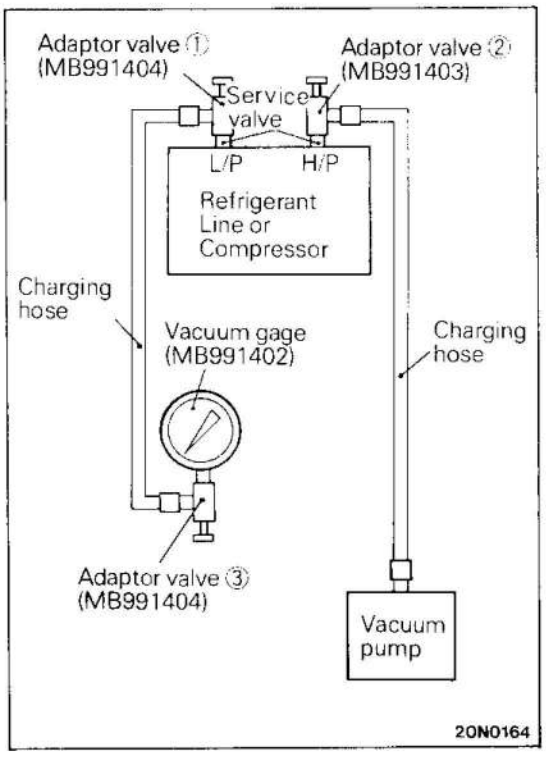
COMPRESSOR DRIVE BELT ADJUSTMENT E55FWAB

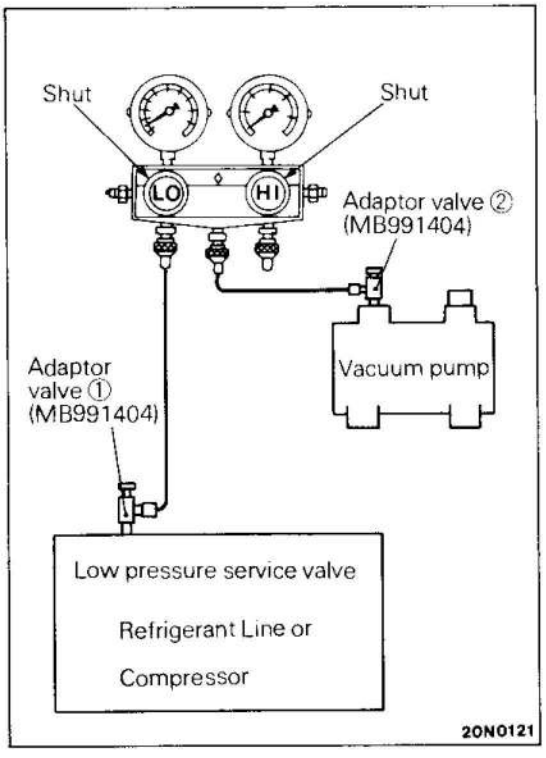
Satisfactory performance of the air conditioning system is dependent upon drive belt condition and tension. If the proper tensions are not maintained belt slippage will greatly reduce air conditioning performance and drive belt life. To avoid such adverse effects, the following service procedure should be followed:

(1) Any belt that has operated for a minimum of one half-hour is considered to be a "used" belt. Adjust air conditioning drive belt at the time of new-car preparation.
(2) Check drive belt tension at regular service intervals and adjust as needed.

Standard value: 7–10 mm (0.28–0.39 in.)

(3) When measured with tension gauge 700 N (70 kg, 154 lbs.)





CHARGING PROCEDURES (Vehicles using R-12 refrigerant) E55FUBA

INSTALLATION OF CHARGE EQUIPMENT

<In case the vacuum gage is used>

(1) With the handle of the adaptor valves ① and ② turned back all the way (valve close), install the adaptor valves ① and ② to each high and low pressure service valve.
(2) Tighten the handle of the adaptor valves ① and ② (valve open).
(3) Connect the charging hose to the adaptor valves ① and ②.
(4) With the handle of the adaptor valve ③ tightened (valve open), install the adaptor valve ③ to the low pressure charging hose.
(5) Install the vacuum gage to the adaptor ③.
(6) Install the vacuum lamp to the high pressure charging hose.

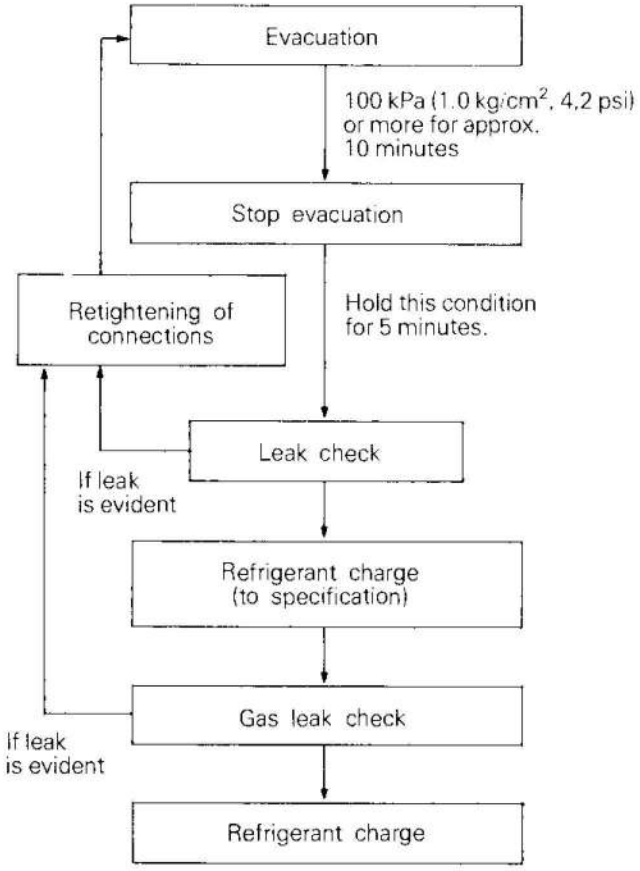
Note
(1) Do not connect the high and low pressure sides adversely. (Connect high pressure side to the condenser and low pressure side to the evaporator.)
(2) The indications "DIS" and "SUC" on the compressor indicate high and low pressure sides respectively.
(3) Use the adaptor valves ① and ③ for low pressure, and the adaptor valve ② for high pressure.

<In case the gage manifold is used>

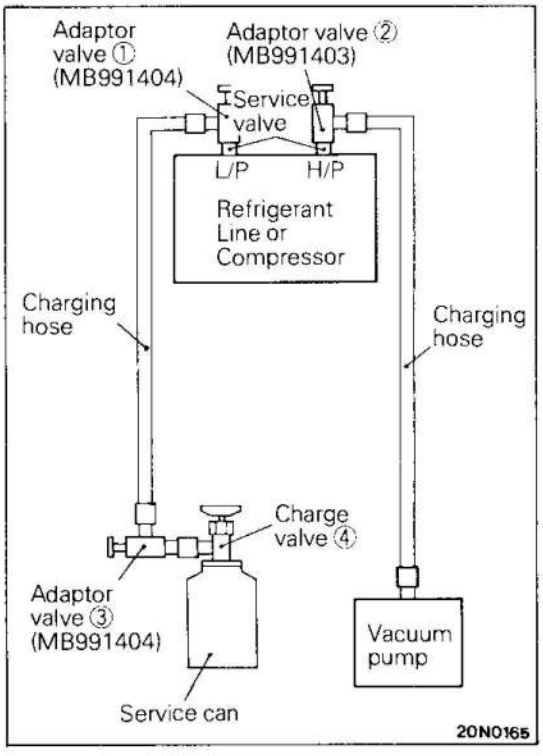
(1) Turn back the handle of the adaptor valves ① and ② (valve close) to install adaptor valve ① and ② to the low pressure service valve and vacuum pump.
(2) Close the high and low pressure valves of the gage manifold.
(3) Connect the charging hose to adaptor valve ① and ② as illustrated.
(4) Tighten the handle of the adaptor valve ① and ② (valve open).

NOTE
① Do not connect the high and low pressure sides adversely. (Connect high pressure side to the condenser and low pressure side to the evaporator.)
② The indications "DIS" and "SUC" on the compressor indicate high and low pressure sides respectively.

CHARGING SYSTEM



The refrigerant system must have been evacuated using the previous procedure before charging. Charge using only R-12 refrigerant. R-12 is available in bulk tanks or small cans. Follow the safety precautions for handling R-12 as listed in this group.



CHARGING THE REFRIGERANT (Vehicles using R-12 refrigerant)

E55FUCA

CHARGING WITH SMALL CANS

<In case the vacuum gage is used>

When using disposable cans of this type, follow carefully the can manufacturers instructions:

(1) Start up the vacuum pump.

Caution
1. Do not use the compressor for evacuation.
2. Do not operate the compressor in the vacuum condition; damage may occur.

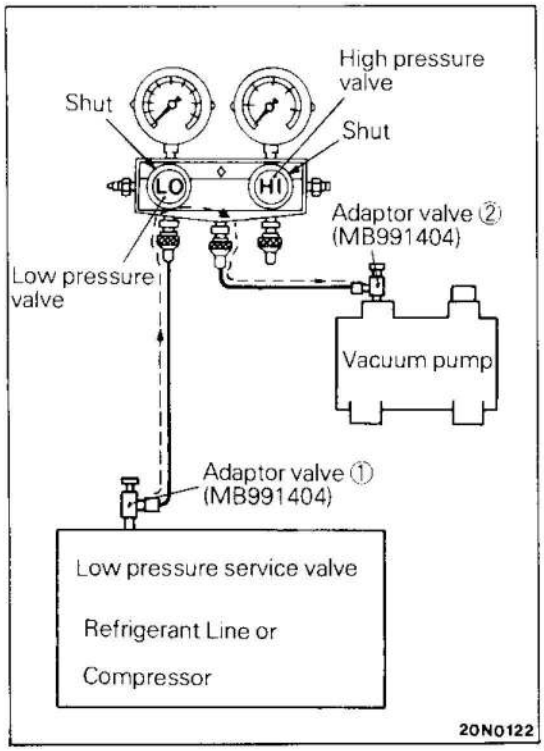
(2) Evacuate to a vacuum reading of -100 kPa (1.0 kg/cm², 14.2 psi) or higher (approx. 10 minutes).

Caution
Read the vacuum gauge as it is stood upright because otherwise it shows wrong indication.

(3) Turn back the handle of the adaptor valve ② on the high pressure side (valve close) all the way.
(4) Stop the vacuum pump and allow to stand for 5 minutes.
(5) Check for leaks. (Good if the vacuum is held.)
(6) With the handle of the charge valve ④ turned back all the way (valve open), install the charge valve ④ to the service can.
(7) With the handle of the service valve ③ turned back all the way (valve close), remove the vacuum gage and install the service can.
(8) Tighten the handle of the charge valve ④ (valve open) to puncture the service can.
(9) Turn back the handle of the charge valve ④ (valve open) and tighten the handle of the adaptor valve ③ (valve open) to charge refrigerant.
(10) When refrigerant is no longer drawn in, turn back the handle of the adaptor valve ① all the way (valve close).
(11) Check for gas leaks using a leak detector.
(12) Start the engine.
(13) Operate the air conditioner and set at the lowest temperature (MAX. COOL).
(14) Fix the engine speed at 1500 r/min.
(15) Tighten the handle of the adaptor valve ① (valve open) to charge refrigerant to a specified amount.

Caution
If liquid refrigerant is drawn into the compressor, the compressor may be damaged due to compression of the liquid, keep the service can upright to ensure that refrigerant is charged in gas state.

(16) After finishing charging refrigerant, turn back the handle of the adaptor valve ① all the way (valve close).



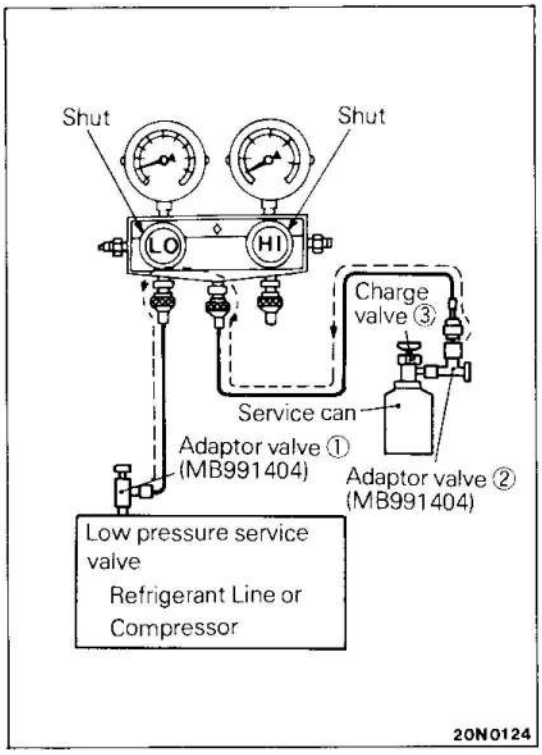
<In case gage manifold is used>

When using disposable cans of this type, follow carefully the can manufacturers instructions:

(1) Start up the vacuum pump.

Caution
1. Do not use the compressor for evacuation.
2. Do not operate the compressor in the vacuum condition; damage may occur.

(2) Evacuate to a vacuum reading of 100 kPa (1.0 kg/cm^2, 14.2 psi) or higher (approx. 10 minutes).
(3) Turn back the handle of the adaptor valve ② (valve close).
(4) Stop the vacuum pump and allow to stand for 5 minutes.
(5) Check for leaks. (Good if the vacuum is held.)



(6) Tighten the handle of the charge valve ③ to puncture the service can.
(7) Turn back the handle of the charge valve ③, tighten the handle of the adaptor valve ② (valve open).

(8) Open the low pressure valve of the gauge manifold to charge 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.

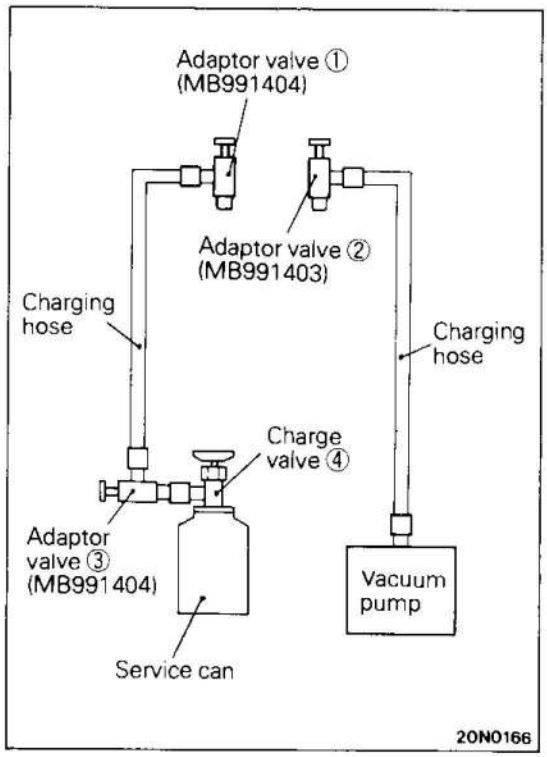
(9) When refrigerant is no longer drawn in, turn back the handle of the adaptor valve ① (valve close).
(10) Check for leakage of gas with a gas leakage detector.
(11) Start engine.
(12) Operate the air conditioner to set up the temperature to the lowest (MAX. COOL).
(13) Fix the engine revolutions to 1500 rpm.
(14) Tighten the handle of the adaptor valve ① (valve open) and charge refrigerant to the specified amount.

Caution:
If the service can is turned upside down, liquid refrigerant is drawn in and the compressor of the air conditioner may be damaged due to compression of the liquid. So keep the service can upright to charge refrigerant in the condition of gas.

(15) After finishing charging refrigerant, turn back the handle of the adaptor valve ① (valve close).

CHARGING WITH REFRIGERANT RECOVERY AND RECYCLING UNIT

When using refrigerant recovery and recycling unit, follow carefully the instruction manual for the unit.

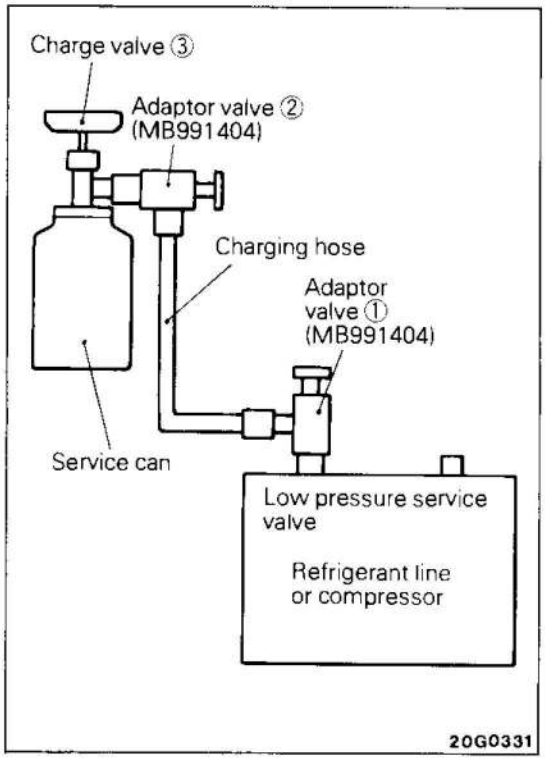


REMOVAL OF CHARGE EQUIPMENT

(1) Tighten the handle of the charge valve ④ (valve close).
(2) Remove the adaptor valves ① and ② from the high and low pressure service valves.
(3) Remove the service can.

Caution
If there is any refrigerant left over, reserve it for next use while keeping the charge valve ④, the adaptor valves ① and ③, and the service can installed.

(4) Remove the charge valve ④.
(5) Remove the adaptor valve ③.
(6) Remove the adaptor valve ①.
(7) Remove the adaptor valve ②.
(8) Remove the vacuum pump.



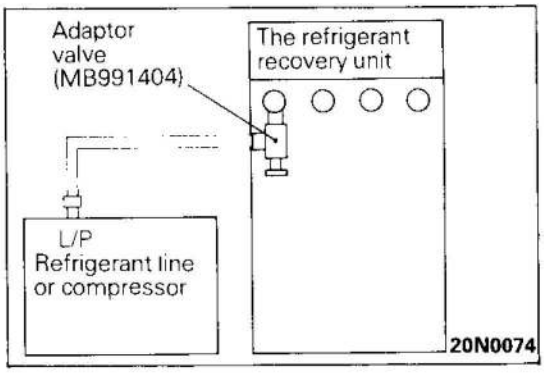
CORRECTING LOW REFRIGERANT LEVEL

(1) Install the charge valve ③ to the service can with its handle turned back all the way.
(2) Install to the charge valve ③ with the adaptor valve ① tightened.
(3) Install the charging hose to the adaptor valve ①.
(4) Turn back the handle of the adaptor valve ② all the way to install the charging hose.
(5) Tighten the handle of charge valve ③ to puncture the service can.
(6) Turn back the handle of the charge valve all the way to open the valve.
(7) Operate the handle of the adaptor valve ② to vacuum the air.
(8) Install the adaptor valve ② to the low pressure side service valve.

Caution
Never use the high pressure side as this may cause refrigerant to flow back, using rupture of the service can.

(9) Start the engine.
(10) Operate the air conditioner and set at the lowest temperature (MAX. COOL.)
(11) Fix the engine speed at 1,500 rpm.
(12) Tighten the handle of the adaptor valve ② (valve open) and charge refrigerant checking level with the sight glass.
(13) Upon completion of charging, turn back the handle of the adaptor valve ② (valve close).
(14) Remove the adaptor valve ② from the service valve.

NOTE
If the service can is not emptied completely, keep the charge valve and adaptor valve ① and ② in closed condition for next charging.



DISCHARGING SYSTEM

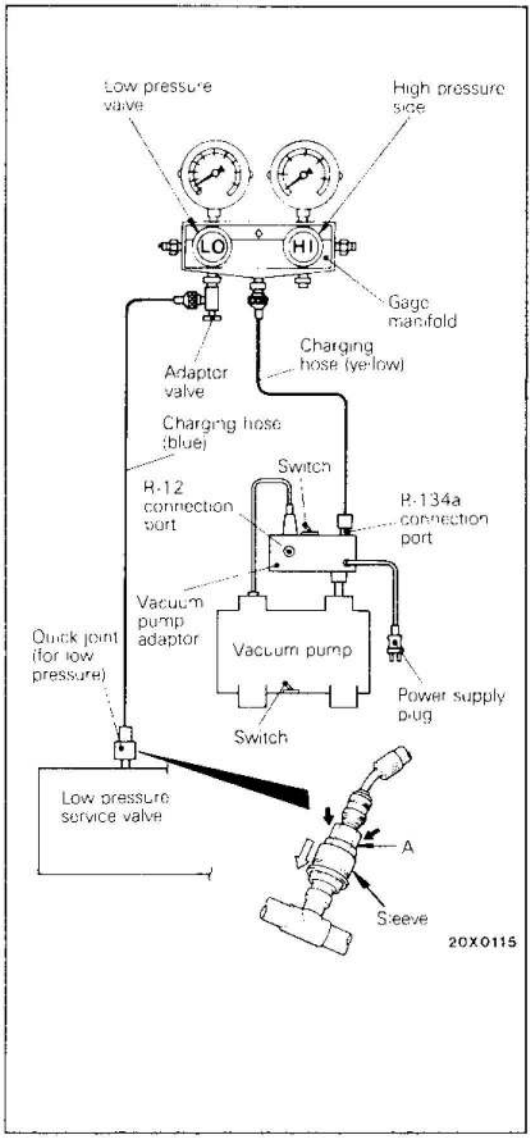
Use the refrigerant recovery unit to discharge refrigerant gas from the system.

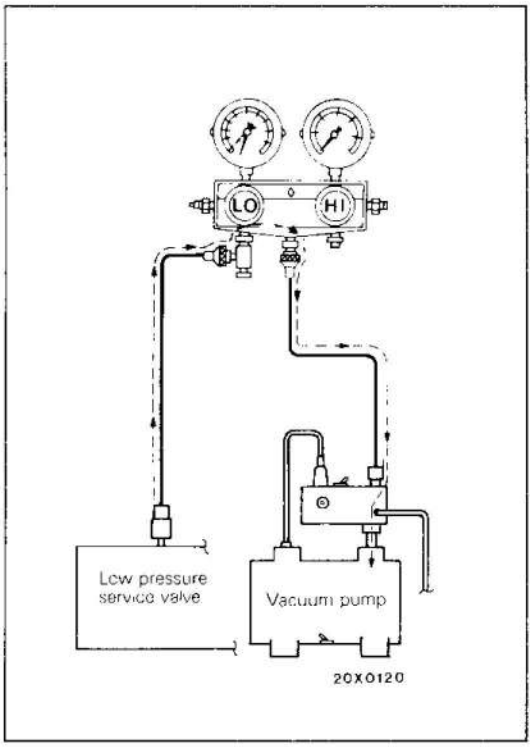
NOTE
Refer to that Refrigerant Recovery and Recycling Unit Instruction Manual for operation of the unit.

REFILLING OF OIL IN THE AIR-CONDITIONER SYSTEM

Too little oil will provide inadequate compressor lubrication and cause a compressor failure. Too much oil will increase discharge air temperature.
The 10P13 compressor is charged with 80 cc (4.9 cu.in.), the 10P15 compressor is charged with 150 cc (9.2 cu.in.) and the cool box (in models equipped with the cool box) is charged with 60 cc (3.7 cu.in.) of refrigerant before shipment from the factory. While the air conditioning 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 6
Quantity:
<10P13>
Evaporator – 60 cc (3.7 cu.in.)
Condenser – 30 cc (1.8 cu.in.)
Low-pressure hose – 10 cc (0.6 cu.in.)
Receiver – 10 cc (0.6 cu.in.)
<10P15>
Evaporator – 63 cc (3.8 cu.in.)
Condenser – 37 cc (2.3 cu.in.)
Low-pressure hose – 15 cc (0.9 cu.in.)
Receiver – 10 cc (0.6 cu.in.)
Cool box – 75 cc (4.6 cu.in.)





CHARGING (Vehicles using R-134a refrigerant)

1. With the handles turned back all the way (valve closed), install the adaptor valve to the low-pressure side of the gage 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 compressor.

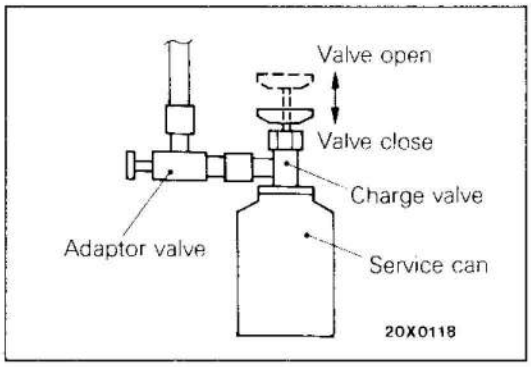
   Caution
   1. Use tools that are suited to R-134a.
   2. To install the quick joint, press section A firmly against the service valve until a click is heard. When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.
5. Close the high and low pressure valves of the gage manifold.
6. Install the vacuum pump adaptor to the vacuum pump.
7. Connect the vacuum pump plug to the vacuum pump adaptor.
8. Connect the charging hose (yellow) to the R-134a connection port of the vacuum pump adaptor.
9. Tighten the adaptor valve handle (valve open).
10. Open the low pressure valve of the gage manifold.
11. Turn the power switch of the vacuum pump to the ON position.

    NOTE
    Even if the vacuum pump power switch is turned ON, the vacuum pump will not operate because of the power supply connection in step (7).
12. Turn the vacuum pump adaptor switch to the R-134a side to start the vacuum pump.

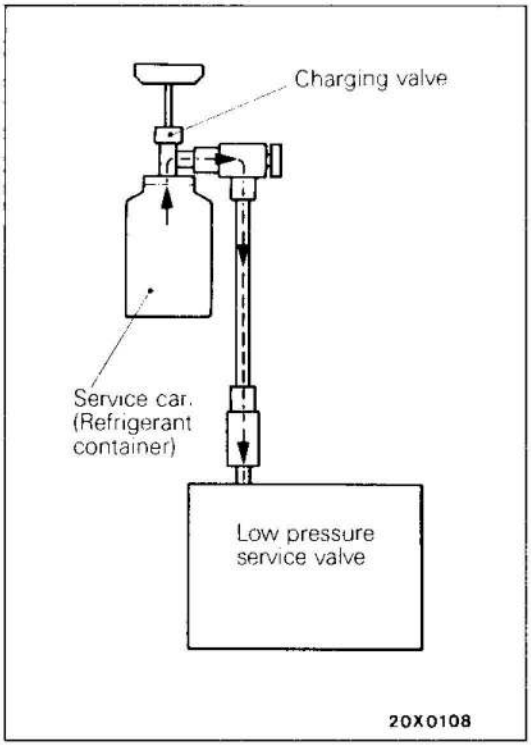
    Caution
    Do not operate the compressor for evacuation.
13. Evacuate to a vacuum reading of -100 kPa (1.0 kg/cm², 14.2 psi) or higher (takes approx. 10 minutes).
14. Turn the vacuum pump adaptor switch OFF and allow to stand it for 5 minutes.

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



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

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

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

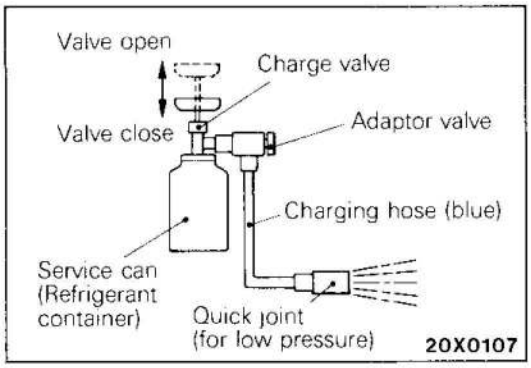
Caution
A leak detector designed for R-134a should be used.

22. Start the engine.
23. Operate the A/C and set to the lowest temperature (MAX. COOL).
24. Fix the engine speed at 1,500 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.

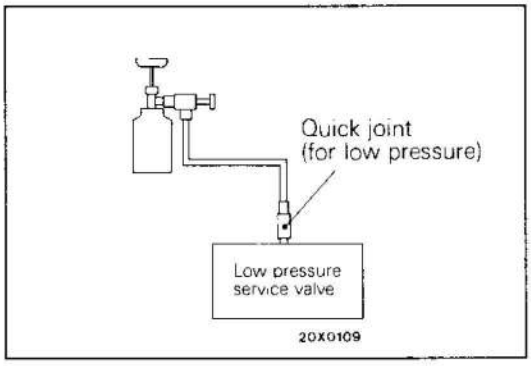
26. After charging with refrigerant, turn the handle of the adaptor valve back all the way (valve closed).
27. Tighten the charging valve handle (valve closed).
Remove the quick joint (for low pressure) from the low-pressure service valve.

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



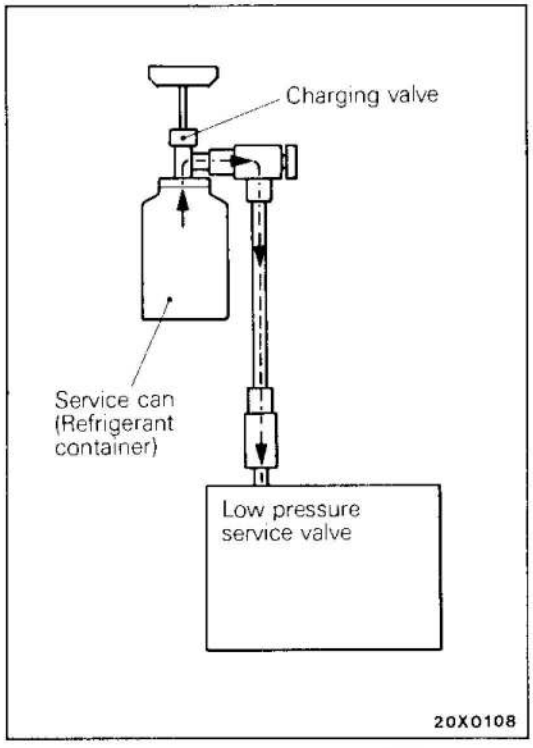
CORRECTING LOW REFRIGERANT LEVEL IN CASE THE SERVICE CAN IS USED E55AF05BA

1. Install the charge valve with the handle turned all the way out (valve open) of 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 compressor.

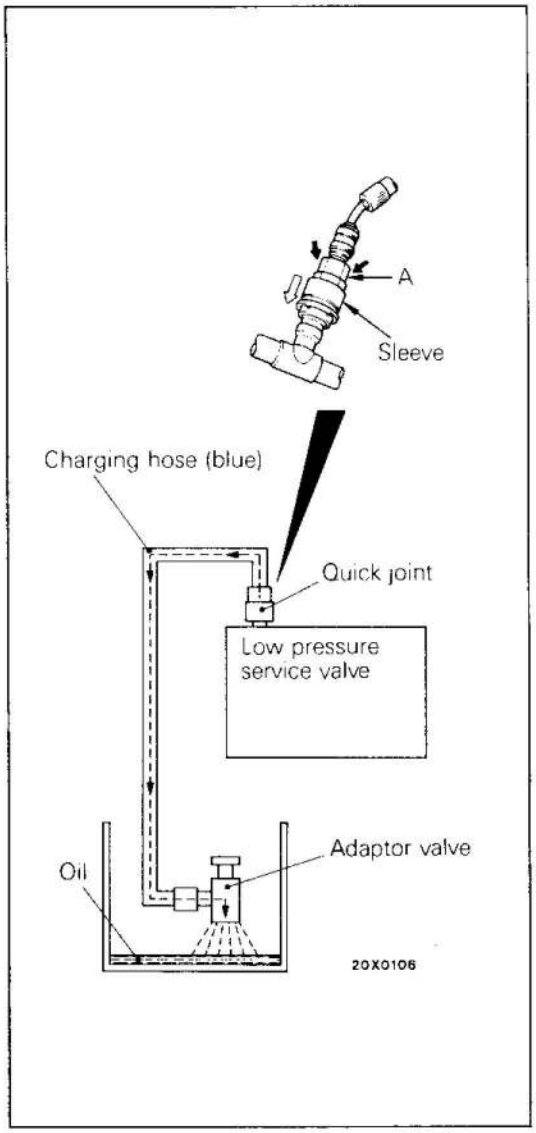


8. Start the engine.
9. Operate the air conditioner and set at the lowest temperature (MAX. COOL).
10. Fix the engine speed at 1,500 r/min.
11. Tighten the handle of the adaptor valve (valve open), and replenish refrigerant checking the quantity through the sight glass.

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

12. After replenishing is completed, turn the handle of the adaptor valve all the lway 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

E55AF05CA

1. Run the engine at an engine speed of 1200 – 1500 r/min for approximately 5 minutes with the A/C operating to return the oil.

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

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

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

   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.

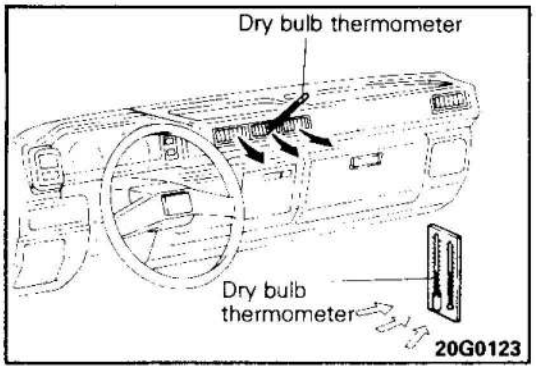
6. Place the adaptor valve inside the container and discharge the refrigerant by opening the handle gradually so that oil does not gush out.

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

REFILLING OF OIL IN THE AIR-CONDITIONER SYSTEM

Too little oil will provide inadequate compressor lubrication and cause a compressor failure. Too much oil will increase discharge air temperature.
The 10P13 compressor is charged with 100 cc (6.1 cu.in.), the 10P15 compressor is charged with 180 cc (11.0 cu.in.) of refrigerant before shipment from the factory. While the air conditioning 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: ND – oil 8
Quantity:
<10P13>
Evaporator – 40 cc (2.4 cu.in.)
Condenser – 40 cc (2.4 cu.in.)
Low-pressure hose – 10 cc (0.6 cu.in.)
Receiver – 10 cc (0.6 cu.in.)
<10P15>
Evaporator – 63 cc (3.8 cu.in.)
Condenser – 37 cc (2.3 cu.in.)
Low-pressure hose – 15 cc (0.9 cu.in.)
Receiver – 10 cc (0.6 cu.in.)



PERFORMANCE TEST

E55FTAH

<Vehicles using R-12 refrigerant>

(1) The vehicle to be tested should be in a place that is not in direct sunlight.
(2) Connect a tachometer.
(3) Turn back the handle of the adaptor valve (valve close) and install the adaptor valves to the high pressure and low pressure service valves.
(4) Connect the gage manifold to the adaptor valves.
(5) Tighten the handle of the adaptor valve (valve open).
(6) Start the engine.
(7) Set the controls to the air conditioner as follows:
Air conditioning switch: Air conditioner – ON position
Mode selection: Face position
Temperature control: Max. cooling position
Air selection: Recirculation position
Blower switch: HI (Fast) position
(8) Adjust engine speed to 1,000 r/min with air conditioner clutch engaged.
(9) Engine should be warmed up with doors, windows close.
(10) <Vehicles equipped with single air conditioning system>
Insert a thermometer in the left center air conditioner outlet and operate the engine for 20 minutes.

<Vehicles equipped with dual air conditioning system>
Insert a thermometer at the air conditioner outlet at the left center of the instrument panel and the one at the ceiling front left side, and then let the engine run for 20 minutes.
(11) Note the discharge air temperature.

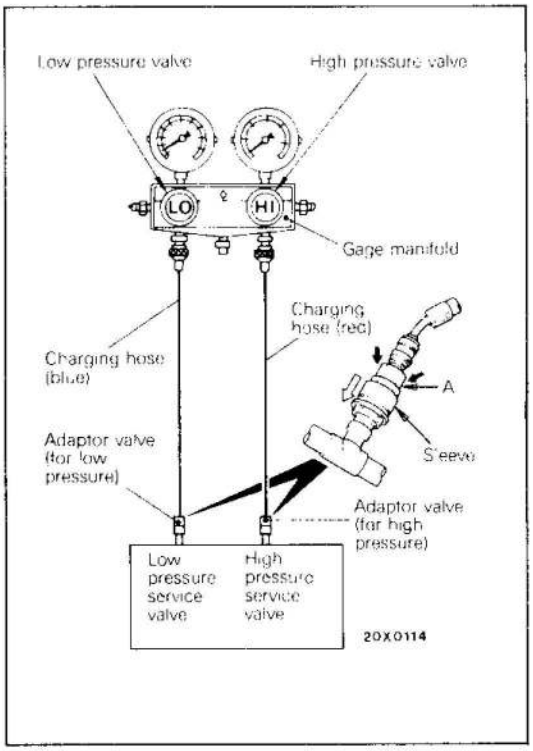
NOTE
If the clutch cycles, take the reading before the clutch disengages.

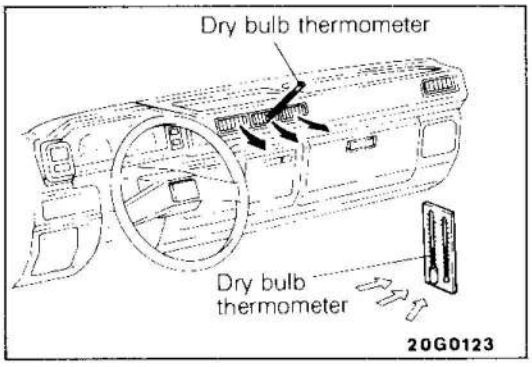
Performance Temperature Chart
<Vehicles equipped with single air conditioning system>

Garage ambient temperature °C (°F)	21 (70)	26.7 (80)	32.2 (90)	37.8 (100)	43.3 (110)
Discharge air temperature °C (°F)	4–10 (39.2 50)				
Compressor discharge pressure kPa (psi)	745 1,138 (106–162)	961–1,353 (137 192)	1,177 1,569 (167–223)	1,392–1,786 (198 254)	1,618–2,011 (230 286)
Compressor suction pressure kPa (psi)	117–186 (17 26)	128 196 (18–28)	142–211 (20–30)	152–221 (22–31)	167 237 (24–34)

<Vehicles equipped with dual air conditioning system>

Garage ambient temperature °C (°F)		21 (70)	26.7 (80)	32.2 (90)	37.8 (100)	43.3 (110)
Discharge air temperature °C (°F)	Front	2–8 (35.6–46.4)	6 12 (42.8–53.6)	9 15 (48.2–59.0)	12.5–18.5 (54.5 65.3)	16 22 (60.8–71.6)
	Rear	2.5–7.5 (36.5 45.5)	5–11 (41.0–51.8)	8–14 (46.4–57.2)	11–17 (51.8 62.6)	14.5–20.5 (58.1–68.9)
Compressor discharge pressure kPa (psi)		785–1,177 (112–167)	1,000–1,393 (142–198)	1,216 1,606 (173–228)	1,412–1,804 (201 257)	1,618–2,011 (230–286)
Compressor suction pressure kPa (psi)		177–245 (25–35)	216 284 (31–40)	245–314 (35–45)	284–353 (40 50)	323–392 (46–56)





<Vehicles using R-134a refrigerant> E55AF06AA

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 gage 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 gage manifold.
4. Install the quick joint (for low pressure) to the charging hose (blue), and connect the quick joint (for high pressure) to the charging hose (red).
5. Connect the quick joint (for low pressure) to the low-pressure service valve and connect the quick joint (for high pressure) to the high-pressure service valve.

   NOTE
   The high-pressure service valve is on high-pressure pipe B, and the low-pressure service valve is on the low-pressure hose.

   Caution
   To connect the quick joint, press section A firmly against the service valve until a click is heard.
   When connecting, run your hand along the hose while pressing to ensure that there are no bends in the hose.
6. Start the engine.
7. Set the A/C controls as follows:
   A/C switch: A/C – ON position
   Mode selection: Face position
   Temperature control: Max. cooling position
   Air selection: Recirculation position
   Blower switch: HI (Fast) position
8. Adjust engine speed to 1,000 r/min with A/C clutch engaged.
9. Engine should be warmed up with doors and windows closed.
10. <Vehicles equipped with single air conditioning system>
    Insert a thermometer in the left center air conditioner outlet and operate the engine for 20 minutes.

    <Vehicles equipped with dual air conditioning system>
    Insert a thermometer at the air conditioner outlet at the left center of the instrument panel and the one at the ceiling front left side, and then let the engine run for 20 minutes.
11. Note the discharge air temperature.

    NOTE
    If the clutch cycles, take the reading before the clutch disengages.

Performance Temperature Chart
<Vehicles equipped with single air conditioning system>

Garage ambient temperature °C (°F)	21 (70)	26.7 (80)	32.2 (90)	37.8 (100)	43.3 (110)
Discharge air temperature °C (°F)	4 – 10 (39.2 – 50)				
Compressor discharge pressure kPa (psi)	768 – 1,233 (111 – 179)	993 – 1,459 (144 – 212)	1,212 – 1,699 (176 – 246)	1,438 – 1,931 (209 – 280)	1,670 – 2,178 (242 – 316)
Compressor suction pressure kPa (psi)	99 – 186 (14 – 27)	105 – 196 (15 – 28)	113 – 211 (16 – 31)	127 – 221 (18 – 32)	134 – 237 (19 – 34)

<Vehicles equipped with dual air conditioning system>

Garage ambient temperature °C (°F)		21 (70)	26.7 (80)	32.2 (90)	37.8 (100)	43.3 (110)
Discharge air temperature °C (°F)	Front	2.0 – 8.0 (36 – 46)	6.0 – 12.0 (43 – 54)	9.0 – 15.0 (48 – 59)	12.5 – 18.5 (55 – 65)	16.0 – 22.0 (61 – 72)
	Rear	2.5 – 7.5 (37 – 46)	5.0 – 11.0 (41 – 52)	8.0 – 14.0 (46 – 57)	11.0 – 17.0 (52 – 63)	14.5 – 20.5 (58 – 69)
Compressor discharge pressure kPa (psi)		811 – 1,269 (118 – 184)	1,029 – 1,508 (149 – 219)	1,255 – 1,733 (182 – 251)	1,459 – 1,959 (212 – 284)	1,670 – 2,178 (242 – 316)
Compressor suction pressure kPa (psi)		141 – 245 (20 – 36)	176 – 284 (26 – 41)	197 – 314 (29 – 46)	226 – 353 (33 – 51)	261 – 392 (38 – 57)

REFRIGERANT LEAK REPAIR PROCEDURE E55FUAG

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 the 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 of refrigerant. If it is possible to repair the leak without discharging the refrigerant system, use the procedure for correcting low refrigerant level.

HANDLING TUBING AND FITTINGS

E55FVAV

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.

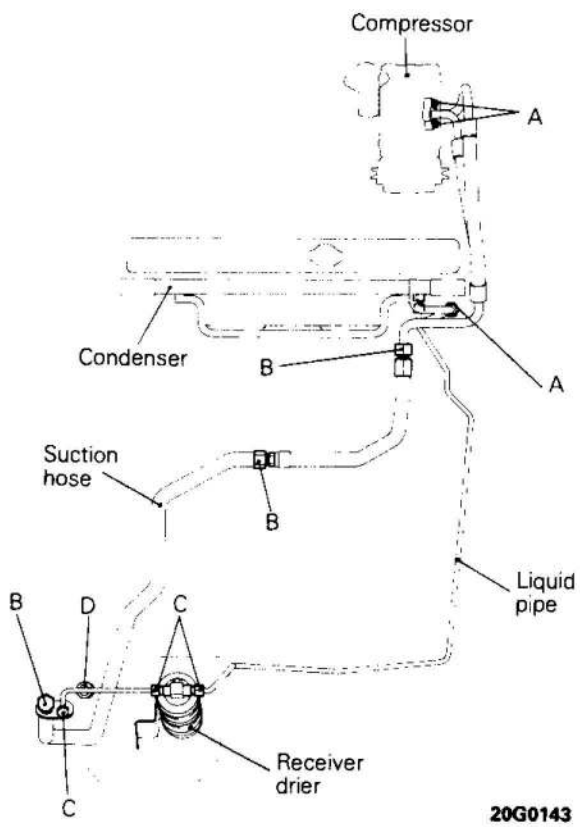
The system must be completely discharge before opening any fitting or connection in the refrigeration system. Open fittings with caution even after the system has been discharged. If any pressure is noticed as a fitting is loosened, allow trapped pressure to bleed off very slowly. **Never attempt to rebend formed lines to fit. Use the correct line for the installation you are servicing.**

A good rule for the flexible hose lines is keep the radius of all bends at least 10 times the diameter of the hose. Sharper bends will reduce the flow of refrigerant. The flexible hose lines should be routed so that they are at least 80 mm (3 in.) 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.

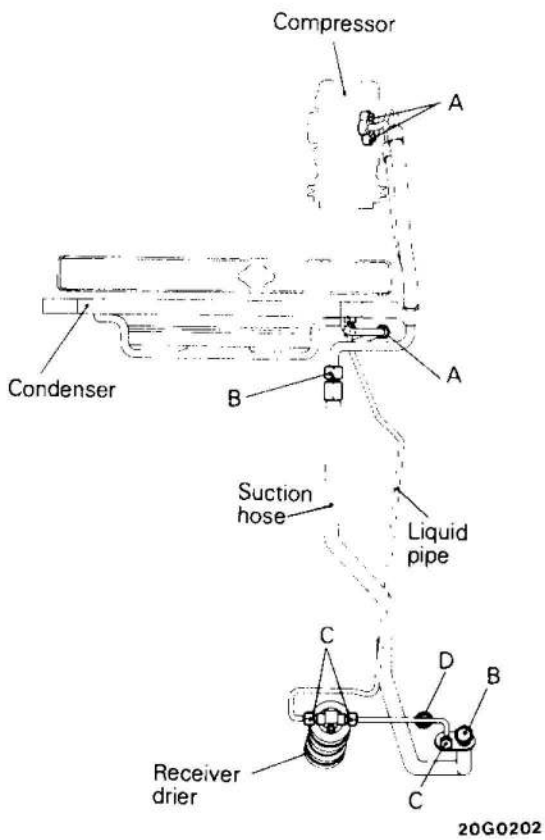
Single air conditioner

L.H.drive vehicles



20G0143

R.H.drive vehicles

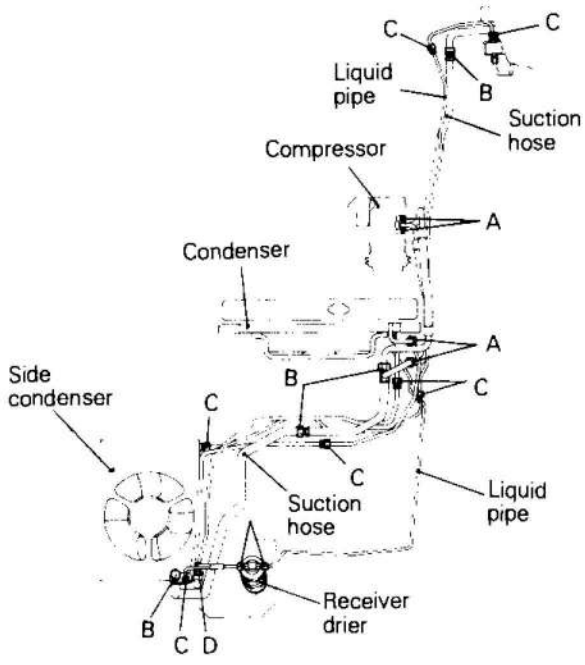


20G0202

Symbol	Nm	kgm	ft.lbs.
A	20–25	2.0–2.5	14–18
B	30–35	3.0–3.5	22–25
C	12–15	1.2–1.5	9–11
D	9.4	0.94	7.2

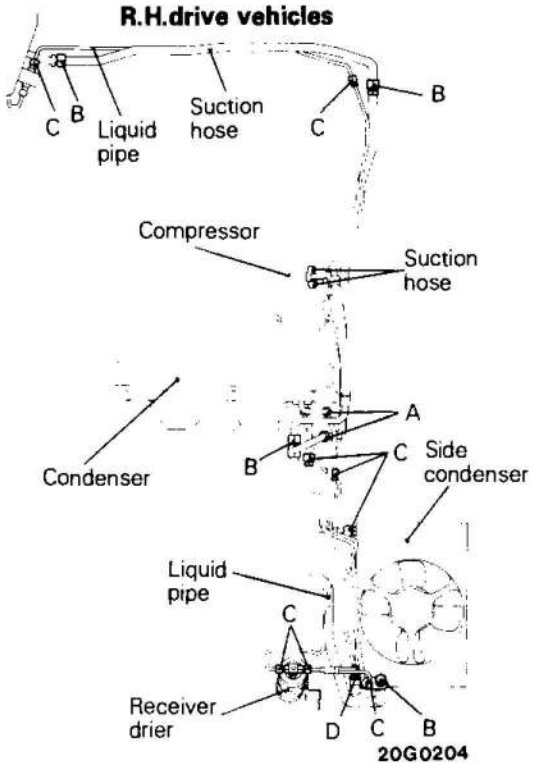
Dual air conditioner

L.H.drive vehicles



20G0142

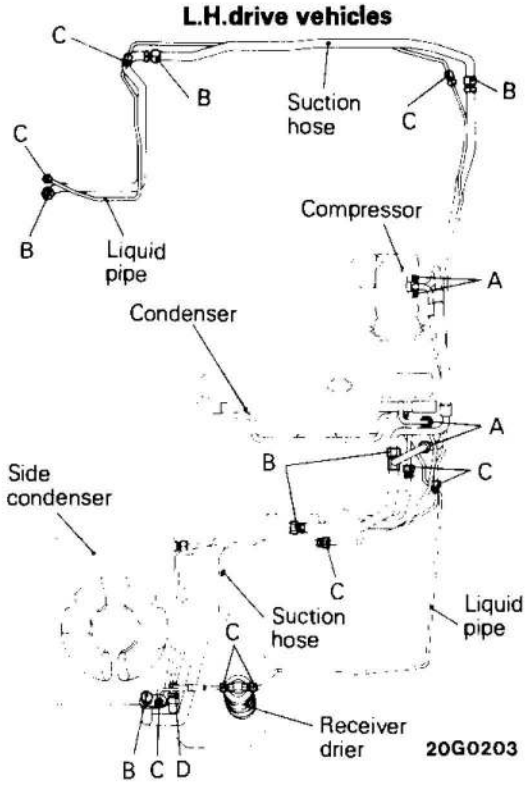
R.H.drive vehicles



20G0204

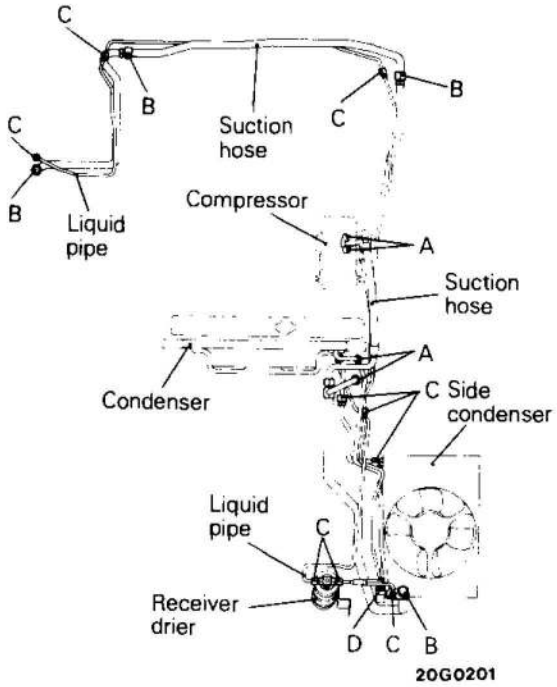
Overhead air conditioner

L.H.drive vehicles



20G0203

R.H.drive vehicles



20G0201

Symbol	Nm	kgm	ft.lbs.
A	20–25	2.0–2.5	14–18
B	30–35	3.0–3.5	22–25
C	12–15	1.2–1.5	9–11
D	9.4	0.94	7.2

COMPRESSOR NOISE

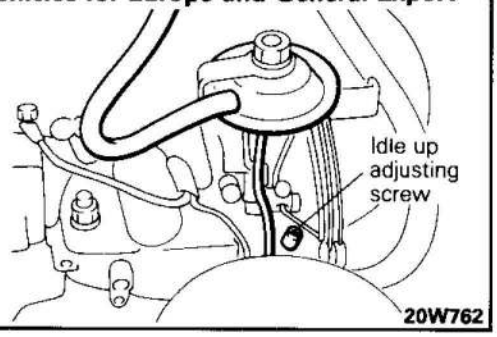
When investigating an air conditioning related noise, you must first know the conditions when the noise occurs. These conditions are: weather, vehicle speed, in gear or neutra, engine temperature or any other special conditions. Noise that develop during air conditioning operation can often be misleading. 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, alternator or air pump). Improper accessory drive belt tension can cause a misleading noise when the compressor is engaged and little or no noise when the compressor is disengaged.

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

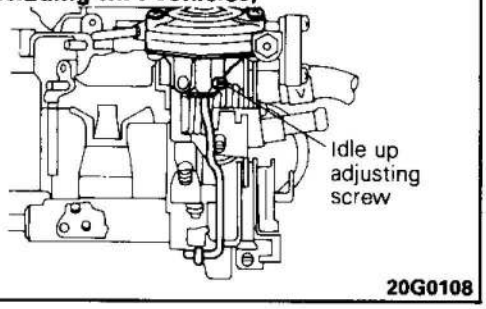
Adjustment Procedures

(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 does not exceed 2,070 kPa (20.70 kg/cm², 300 psi.).
(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 the 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.

Vehicles for Europe and General Export



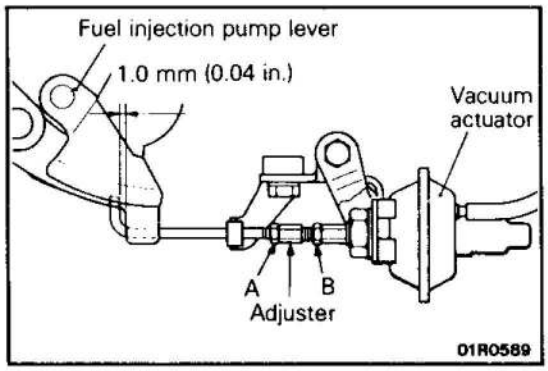
Vehicles for Australia (excluding MPI vehicles)

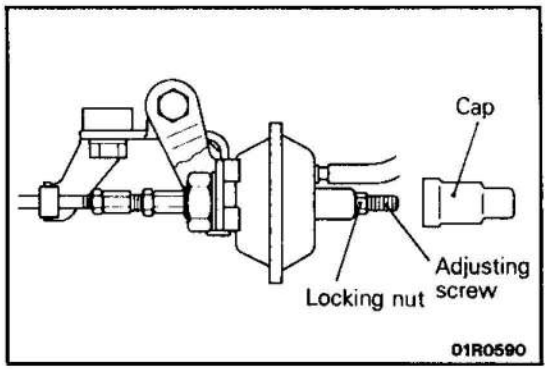


AIR CONDITIONER IDLE UP (PETROL-POWERED VEHICLES) INSPECTION AND ADJUSTMENT E55FOAE

1. Run engine till coolant temperature is 80–90°C (176–194°F).
2. Turn off all lamps and accessories.
3. Confirm engine idling rpm is at the standard value.
(Refer to GROUP 13 FUEL–Service Adjustment Procedures.)
4. Position blower motor switch to the far right (HI) and turn air conditioner switch ON.
5. Confirm air conditioner idle up rpm is within the standard value. If not, adjust with idle up adjusting screw.
Standard value: 950–1,050 r/min.
6. Turn air conditioner switch ON and OFF several times. Confirm throttle opener is operating correctly.

NOTE
Idle rpm of MPI vehicles is automatically controlled by ISC system, so no adjustment is necessary. If not at the standard value, inspect ISC system.
(Refer to GROUP 13 FUEL–Service Adjustment Procedures.)





AIR CONDITIONER IDLE UP (DIESEL-POWERED VEHICLES) INSPECTION AND ADJUSTMENT E55F088a

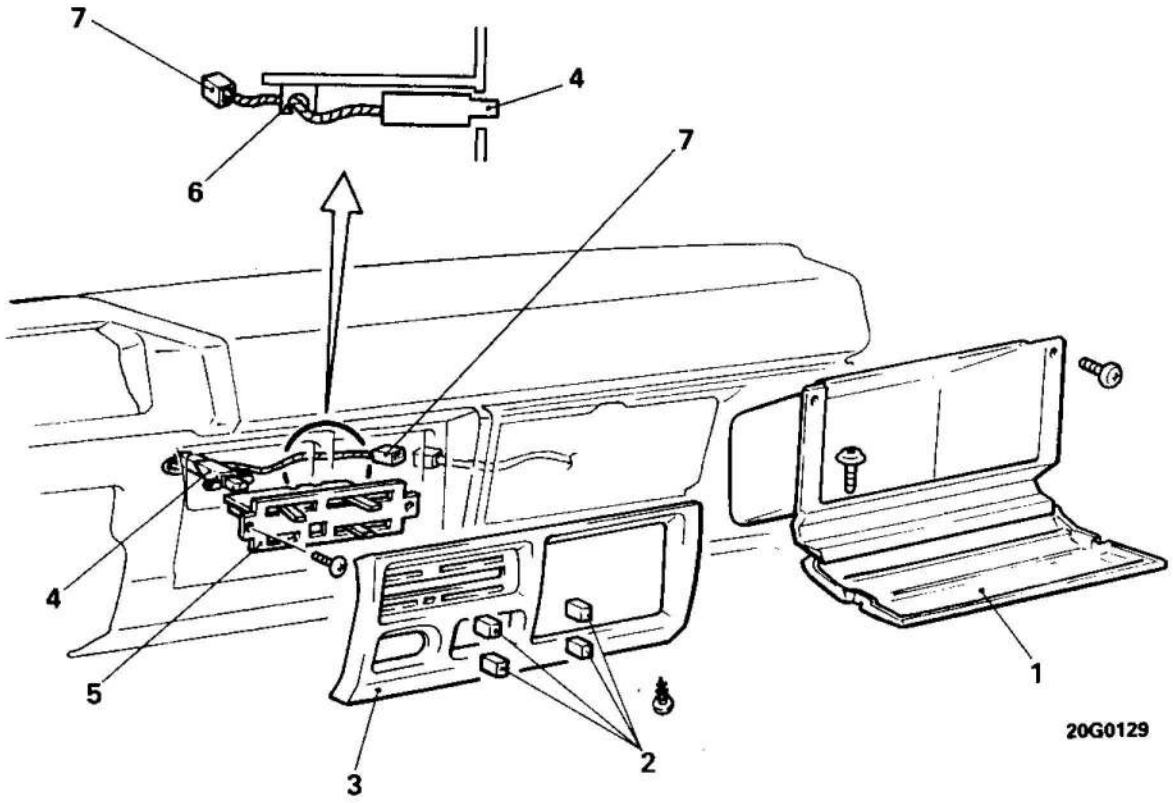
1. Run engine till coolant temperaute is 80–90°C (176–194°F).
2. Turn off all lamps and accessories.
3. Confirm engine idling rpm is at the standard value. (Refer to GROUP 13 FUEL–Service Adjustment Procedures.)
4. Loosen nuts A and B.
5. Adjust rod length with adjuster so that gap between fuel injection pump lever and rod is as the measurement shown in the diagram.
6. Tighten nuts A and B.
7. Position blower motor switch to the far right (HI) and turn air conditioner switch ON.
8. Confirm air conditioner idle up rpm is within the standard value. If not, remove cover, loosen locking nut and adjust with idle up adjuster screw.

   Standard value: 950–1,050 r/min.
9. Turn air conditioner switch ON and OFF several times. Confirm throttle opener is operating correctly.
10. Confirm fuel injection pump lever does not touch rod when air conditioner switch is OFF.

AIR CONDITIONER SWITCH

E55OA--

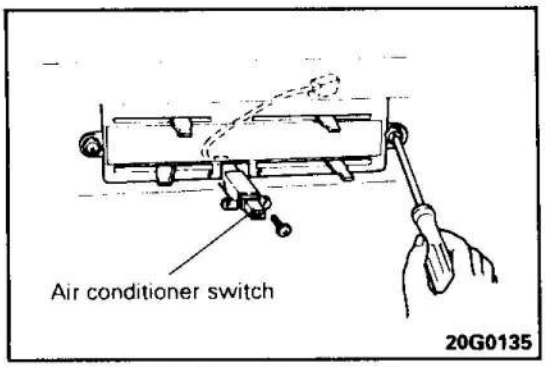
REMOVAL AND INSTALLATION



Removal steps

1. Glove box
2. Knobs
3. Center panel
◆◆ 4. Air condition switch
5. Heater control panel
6. Clip
7. Connector

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆ : Refer to "Service Points of Removal".



SERVICE POINTS OF REMOVAL

E55OBAA

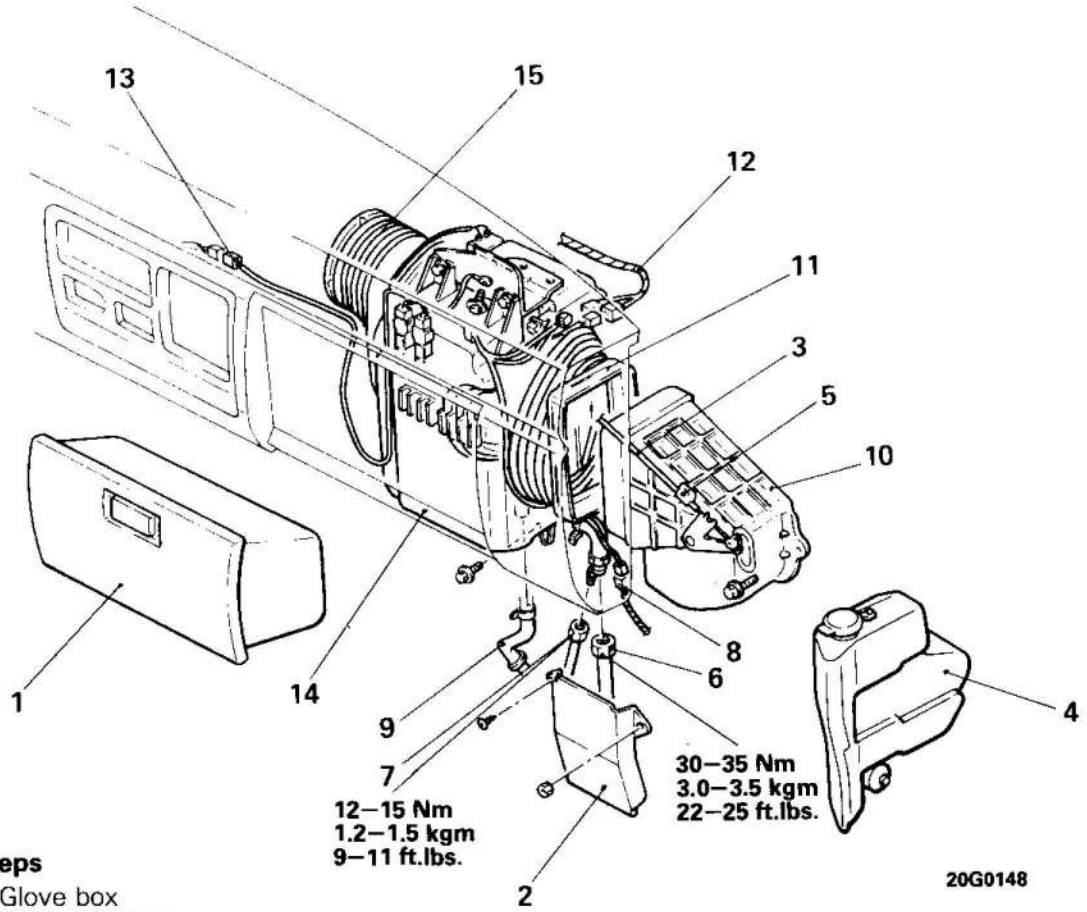
4. REMOVAL OF AIR CONDITIONER SWITCH

Raise the panel and draw out the air conditioner switch forward.

EVAPORATOR (FRONT)

E55JA–A

REMOVAL AND INSTALLATION



Removal steps

1. Glove box
2. Foot protecter
3. ◆◆ Recirculation/fresh air control wire
4. Washer tank
5. Clamp
6. ◆◆ Suction hose connection
7. ◆◆ Liquid pipe connection
8. Engine compartment harness connector connection
9. Drain hose connection
10. Air flow box
11. ◆◆ Duct
12. Main harness connector connection
13. Air conditioner switch harness
14. ◆◆ Evaporator
15. ◆◆ Duct

Pre-removal and Post-installation Operation

- Discharge and Charge of Refrigerant
  <Vehicles using R-12 refrigerant>
  (Refer to P.55-64-1.)
  <Vehicles using R-134a refrigerant>
  (Refer to P.55-67-1.)

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

SERVICE POINTS OF INSTALLATION

E55JGAB

15. INSTALLATION OF DUCT/11. DUCT

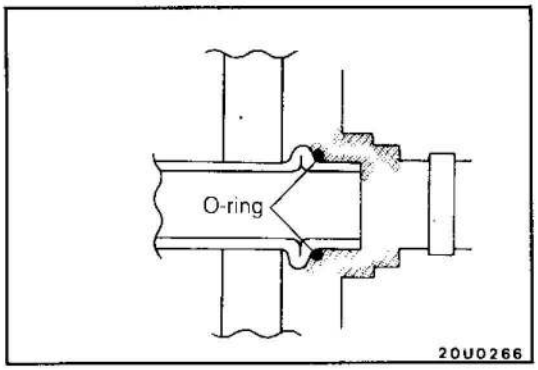
Install the duct securely so that no air leakage occurs.

14. INSTALLATION OF EVAPORATOR

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

<Vehicles using R-12 refrigerant>
Compressor oil: DENSO oil 6
Quantity: 10P13 compressor – 60 cc (3.7 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)

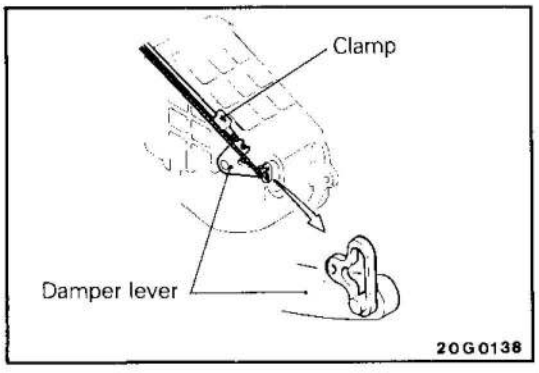
<Vehicles using R-134a refrigerant>
Compressor oil: ND – oil 8
Quantity: 10P13 compressor – 40 cc (2.4 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)



7. APPLICATION OF COMPRESSOR OIL TO LIQUID PIPE/6. SUCTION HOSE

Apply specified compressor oil to portions indicated before installing the liquid pipe and suction flexible hose.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

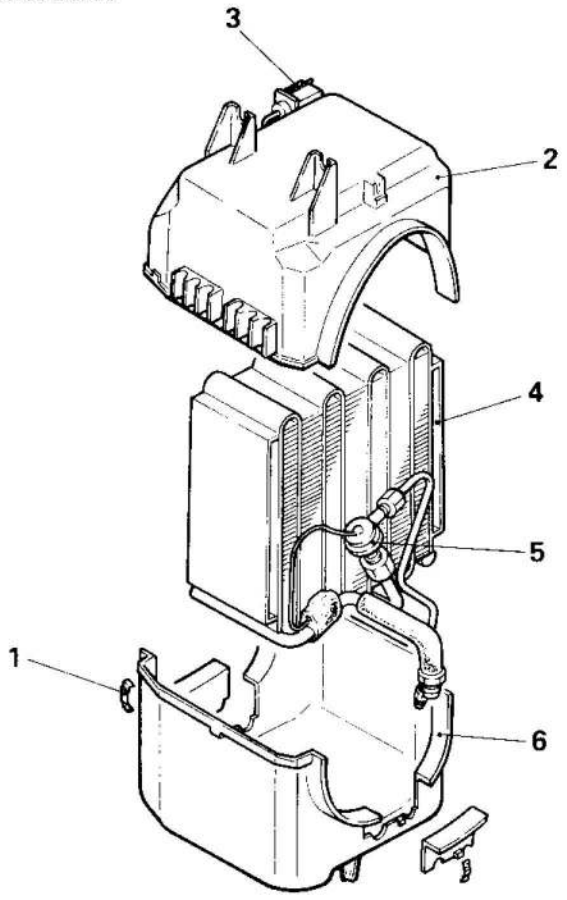


3. INSTALLATION OF RECIRCULATION/FRESH AIR CONTROL WIRE

Adjust the clamp so that the damper lever is at the position shown in the illustration by setting the air-selection lever to the recirculation air side.

DISASSEMBLY AND REASSEMBLY

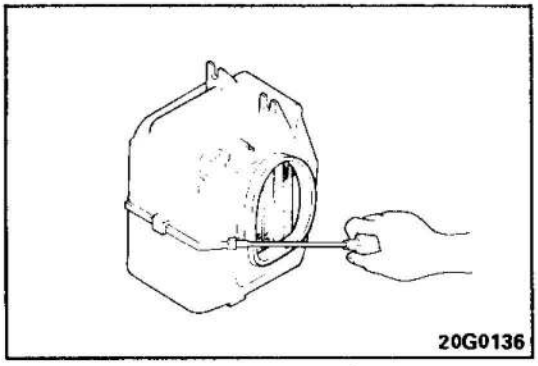
E55JC–A

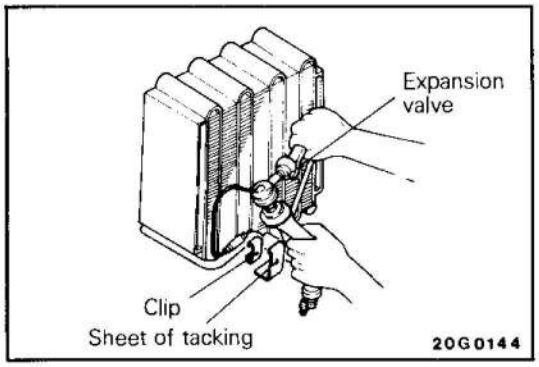


Disassembly steps

◆◆ 1. Clip
2. Evaporator case (Upper)
◆◆ 3. Thermostat
4. Evaporator assembly
◆◆ ◆◆ 5. Expansion valve
6. Evaporator case (Lower)

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".





SERVICE POINTS OF DISASSEMBLY

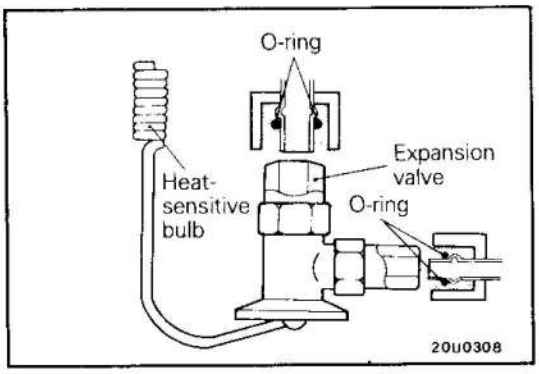
E55JDAB

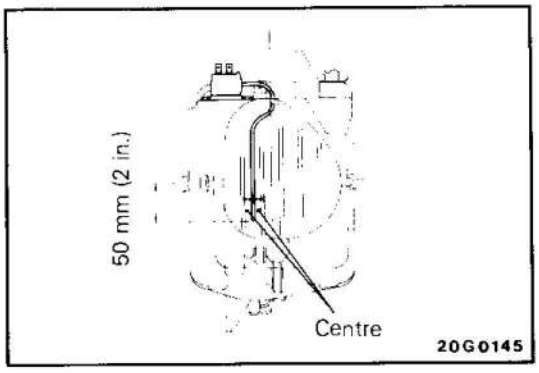
1. REMOVAL OF CLIP

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

5. REMOVAL OF EXPANSION VALVE

Use two wrenches to loosen the flare nut on the pipe connection (for both the inlet and outlet).





SERVICE POINTS OF REASSEMBLY E44JEAB

5. APPLICATION OF COMPRESSOR OIL TO EXPANSION VALVE

Apply specified compressor oil to the O-rings and install the expansion valve to the evaporator assembly.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

3. INSTALLATION OF THERMOSTAT

For the thermostat, insert the heat-sensing part at the position shown in the illustration.

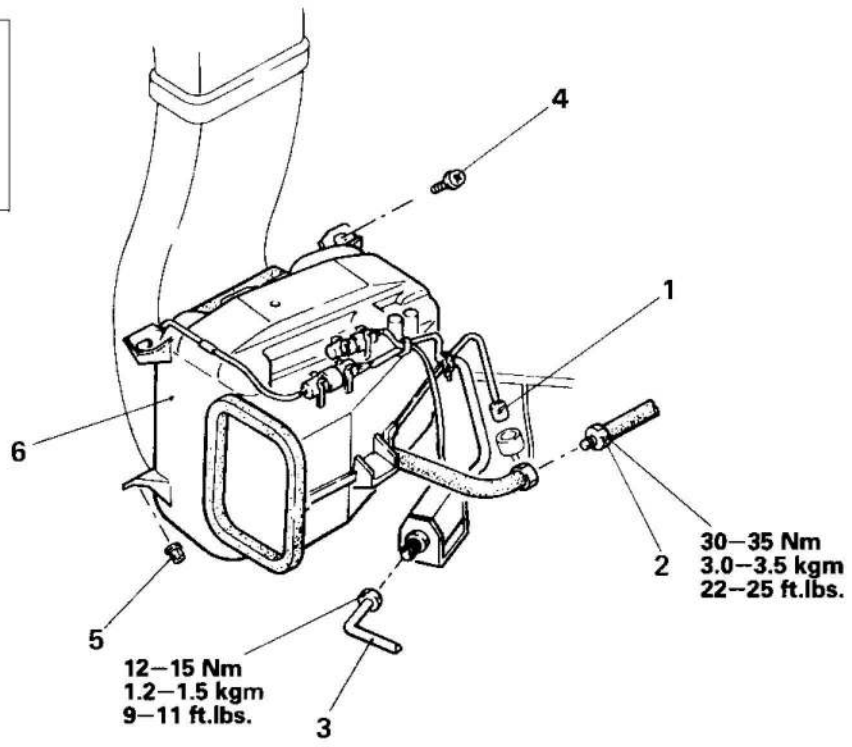
NOTES

EVAPORATOR (REAR)

E55JA-B

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Discharge and Charge of Refrigerant <Vehicles using R-12 refrigerant> (Refer to P.55-64-1.) <Vehicles using R-134a refrigerant> (Refer to P.55-67-1.)



Removal steps
1. Harness connector connection
◆◆ 2. Suction hose connection
◆◆ 3. Liquid pipe connection
4. Bolt
5. Nut
◆◆ 6. Evaporator

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".

SERVICE POINTS OF INSTALLATION

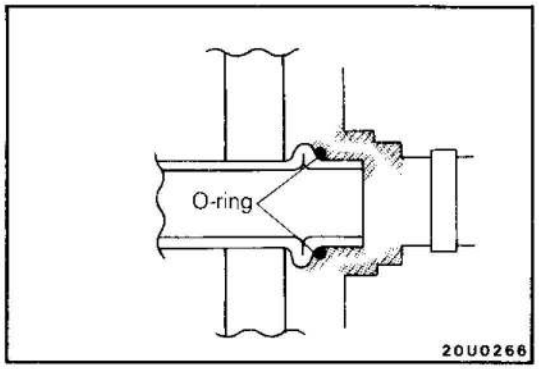
E55JGAC

6. INSTALLATION OF EVAPORATOR

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

<Vehicles using R-12 refrigerant>
Compressor oil: DENSO oil 6
Quantity: 10P13 compressor – 60 cc (3.7 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)

<Vehicles using R-134a refrigerant>
Compressor oil: ND – oil 8
Quantity: 10P13 compressor – 40 cc (2.4 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)



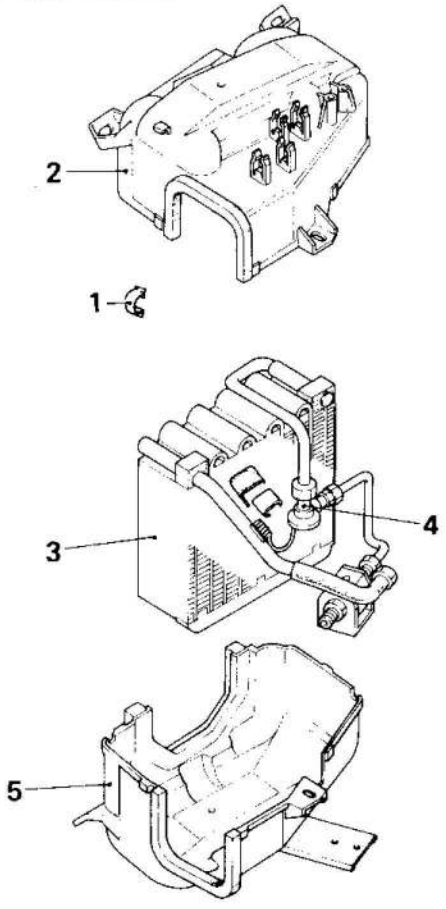
3. APPLICATION OF COMPRESSOR OIL TO LIQUID PIPE/2. SUCTION HOSE

Apply specified compressor oil to portions indicated before installing the liquid pipe and suction flexible hose.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

DISASSEMBLY AND REASSEMBLY

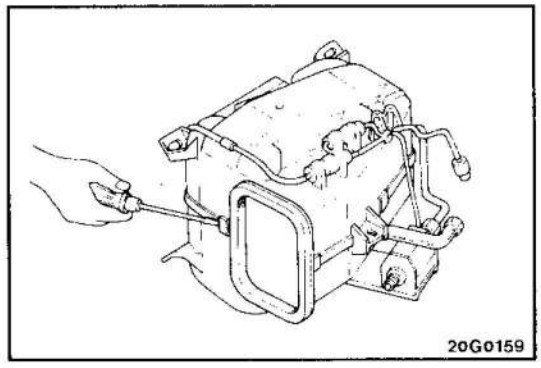
E55JC–B



Disassembly steps

◆◆ 1. Clip
2. Evaporator case (upper)
3. Evaporator assembly
◆◆ ◆◆ 4. Expansion valve
5. Evaporator case (lower)

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".

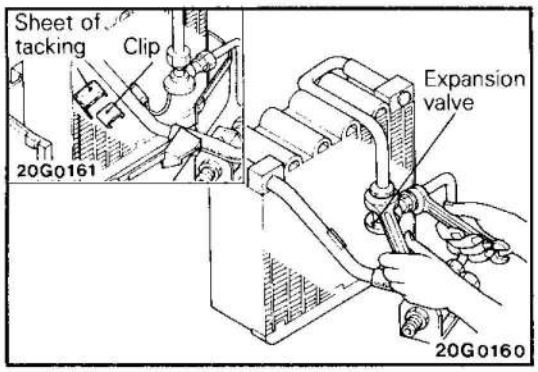


SERVICE POINTS OF DISASSEMBLY

E55JDAC

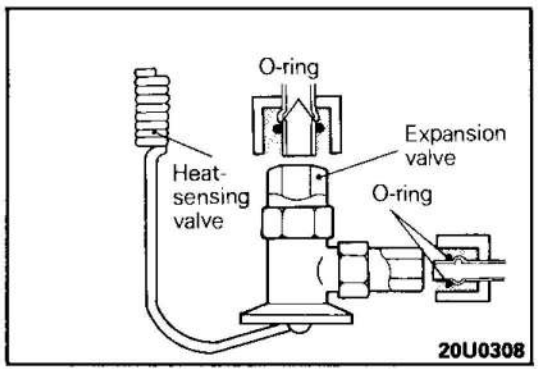
1. REMOVAL OF CLIP

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



4. REMOVAL OF EXPANSION VALVE

Use two wrenches to loosen the flare nut on the pipe connection (for both the inlet and outlet).



SERVICE POINTS OF REASSEMBLY E55JEAC

4. APPLICATION OF COMPRESSOR OIL TO EXPANSION VALVE

Apply specified compressor oil to the O-rings and install the expansion valve to the evaporator assembly.

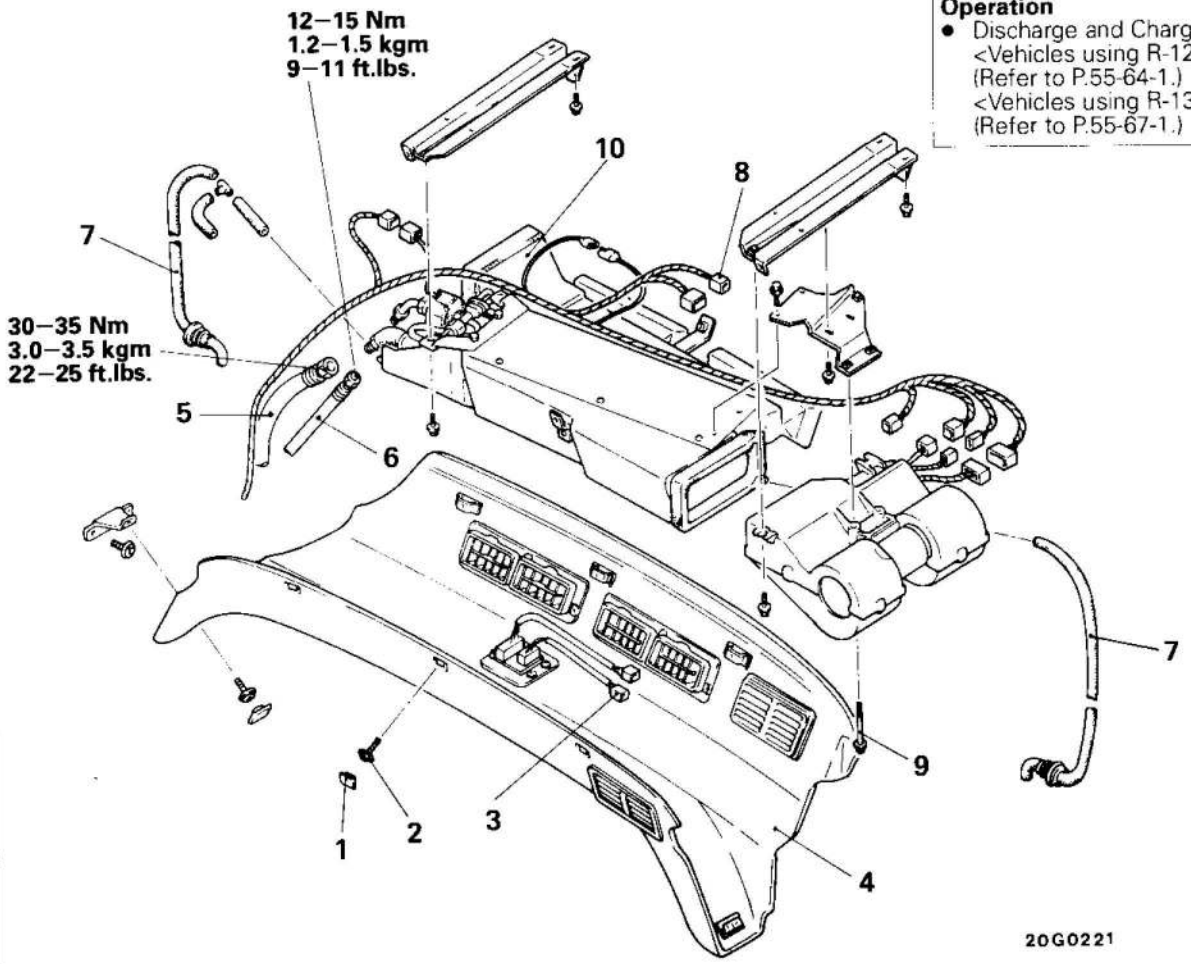
Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

EVAPORATOR (OVERHEAD)

E55JA–C

REMOVAL AND INSTALLATION

Pre-removal and Post-installation Operation
- Discharge and Charge of Refrigerant
  <Vehicles using R-12 refrigerant>
  (Refer to P.55-64-1.)
  <Vehicles using R-134a refrigerant>
  (Refer to P.55-67-1.)



Removal steps

1. Grommet
2. Screw
3. Rear wiring harness connector connection
4. Cover
◆◆ 5. Suction hose connection
◆◆ 6. Liquid pipe connection
7. Drain hose connection
8. Rear wiring harness connector connection
9. Bolt
◆◆◆◆ 10. Evaporator and fan

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Removal".
(3) ◆◆: Refer to "Service Points of Installation".

SERVICE POINTS OF REMOVAL

E55JBAD

10. REMOVAL OF EVAPORATOR AND FAN

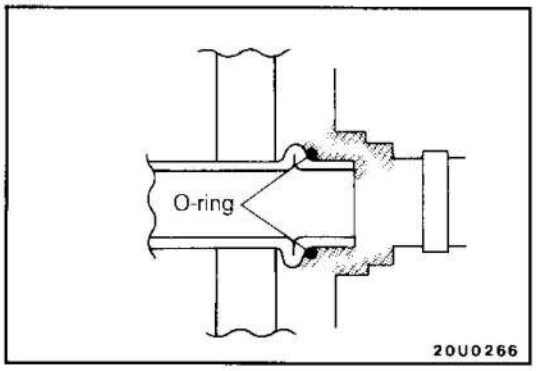
Caution
The evaporator and fan unit is heavy so be careful not to drop it during removal.

SERVICE POINTS OF INSTALLATION E55JGAD

10. INSTALLATION OF EVAPORATOR AND FAN

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

<Vehicles using R-12 refrigerant>
Compressor oil: DENSO oil 6
Quantity: 10P13 compressor – 60 cc (3.7 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)
<Vehicles using R-134a refrigerant>
Compressor oil: ND – oil 8
Quantity: 10P13 compressor – 40 cc (2.4 cu.in.)
10P15 compressor – 63 cc (3.8 cu.in.)

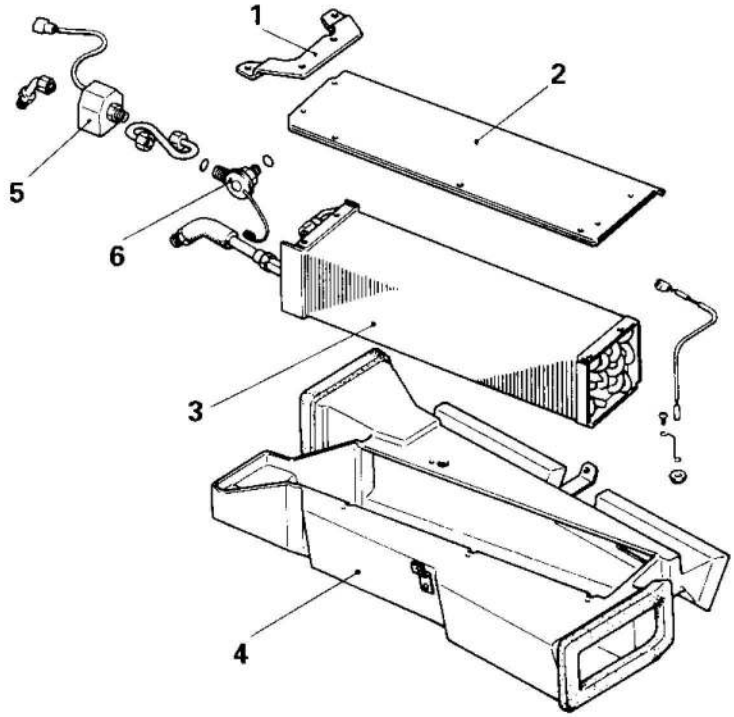


6. APPLICATION OF COMPRESSOR OIL TO LIQUID PIPE/5. SUCTION HOSE

Apply specified compressor oil to portions indicated before installing the liquid pipe and suction flexible hose.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

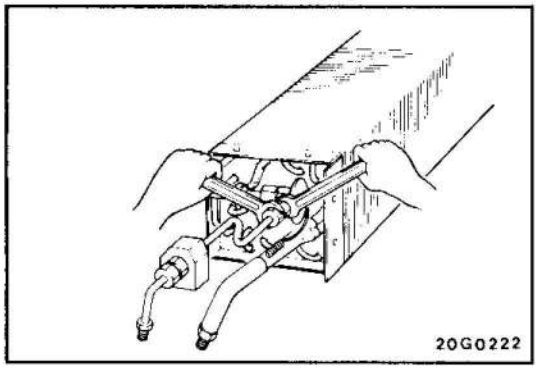
DISASSEMBLY AND REASSEMBLY E55JC–C



Disassembly steps

1. Bracket
2. Cover
3. Evaporator assembly
4. Evaporator case (Lower)
5. Solenoid valve
◆◆▶◆ 6. Expansion valve

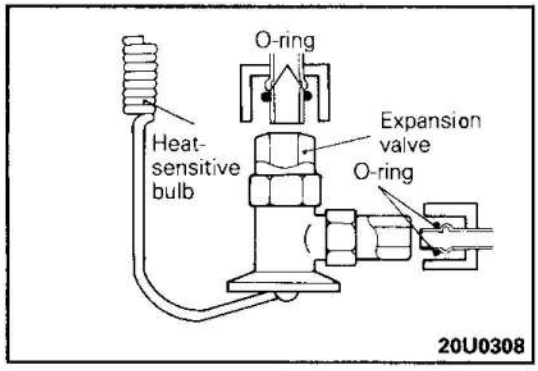
NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ▶◆: Refer to "Service Points of Reassembly".



SERVICE POINTS OF DISASSEMBLY E55JDAD

6. REMOVAL OF EXPANSION VALVE

Use two wrenches to loosen the flare nut on the pipe connection (for both the inlet and outlet).



SERVICE POINTS OF REASSEMBLY E55JEAD

6. APPLICATION OF COMPRESSOR OIL TO EXPANSION VALVE

Apply specified compressor oil to the O-rings and install the expansion valve to the evaporator assembly.

Specified compressor oil:

<Vehicles using R-12 refrigerant>	**DENSO oil 6**
<Vehicles using R-134a refrigerant>	**ND – oil 8**

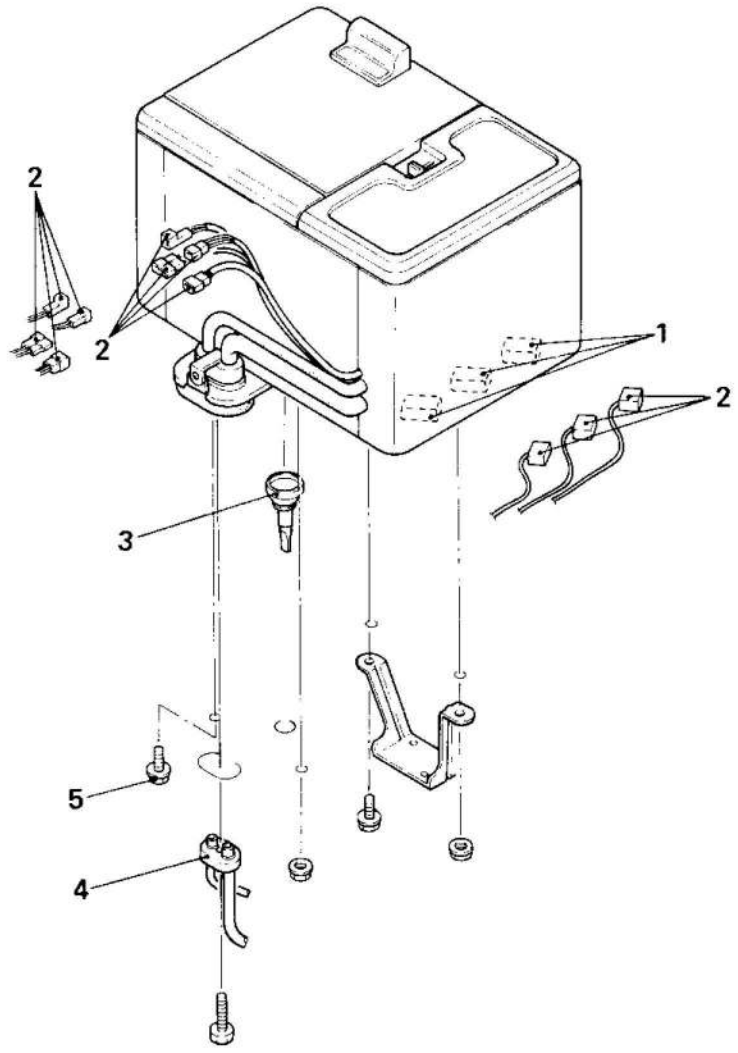
COOL BOX

E55PA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Discharge the Refrigerant. (Refer to P. 55–66.)

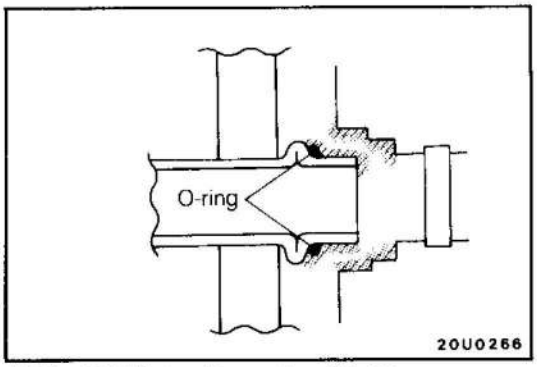
Post-installation Operation
- Charge the Refrigerant. (Refer to P. 55–67.)



20G0237

Removal steps
1. Relay
2. Connector
3. Drain hose
◆◆ 4. Flange
5. Bolt

NOTE
(1) Reverse the removal procedures to reinstall.
(2) ◆◆: Refer to "Service Points of Installation".



20U0266

SERVICE POINTS OF INSTALLATION

E55PBAA

4. APPLICATION OF COMPRESSOR OIL TO FLANGE

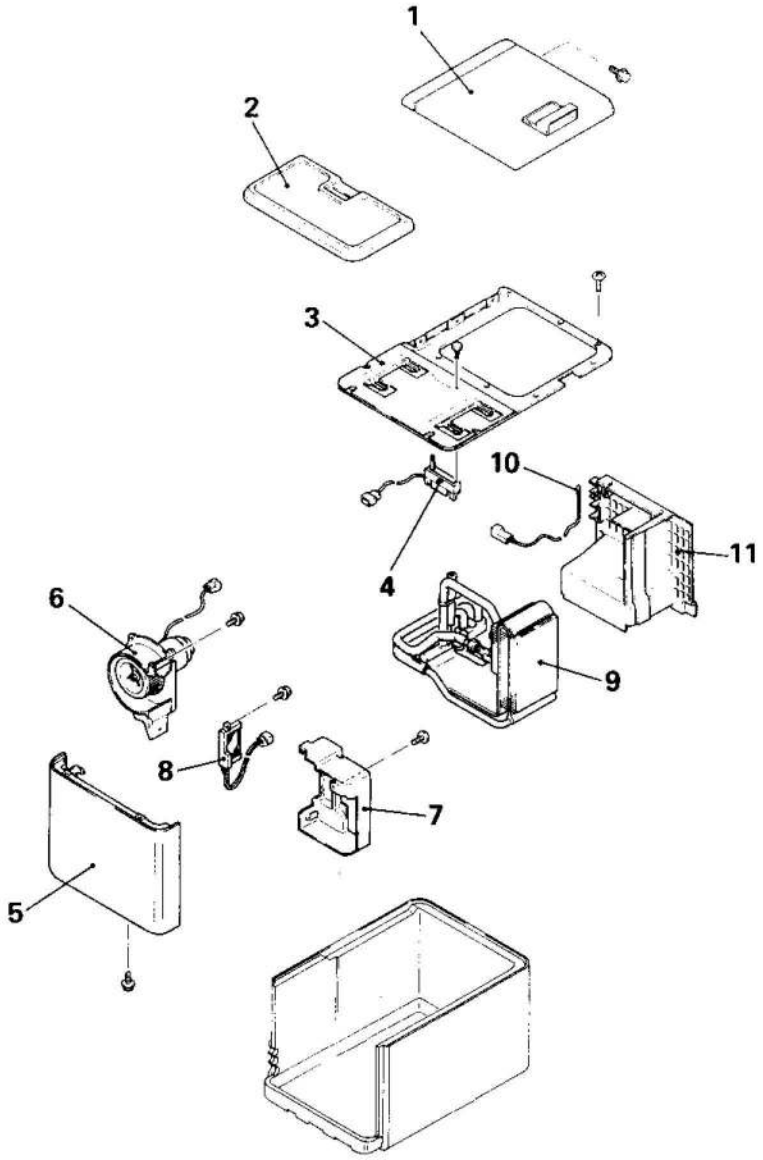
Apply specified compressor oil to portions indicated before installing the flange.

Specified compressor oil: DENSO oil 6

ADDED

DISASSEMBLY AND REASSEMBLY

E55PE---

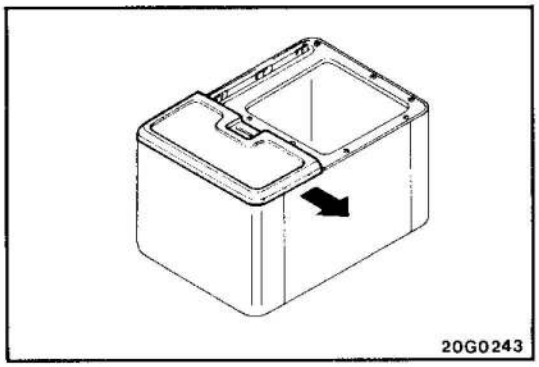


Disassembly steps

1. Cover
◆◆ 2. Cover
3. Plate
4. Switch
5. Side cover
6. Fan assembly
7. Plate
8. Heater
9. Evaporator
10. Sensor
11. Plate

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".

20G0258



SERVICE POINTS OF DISASSEMBLY

E55PFAA

2. REMOVAL OF COVER

Push strongly in the arrow direction to remove.

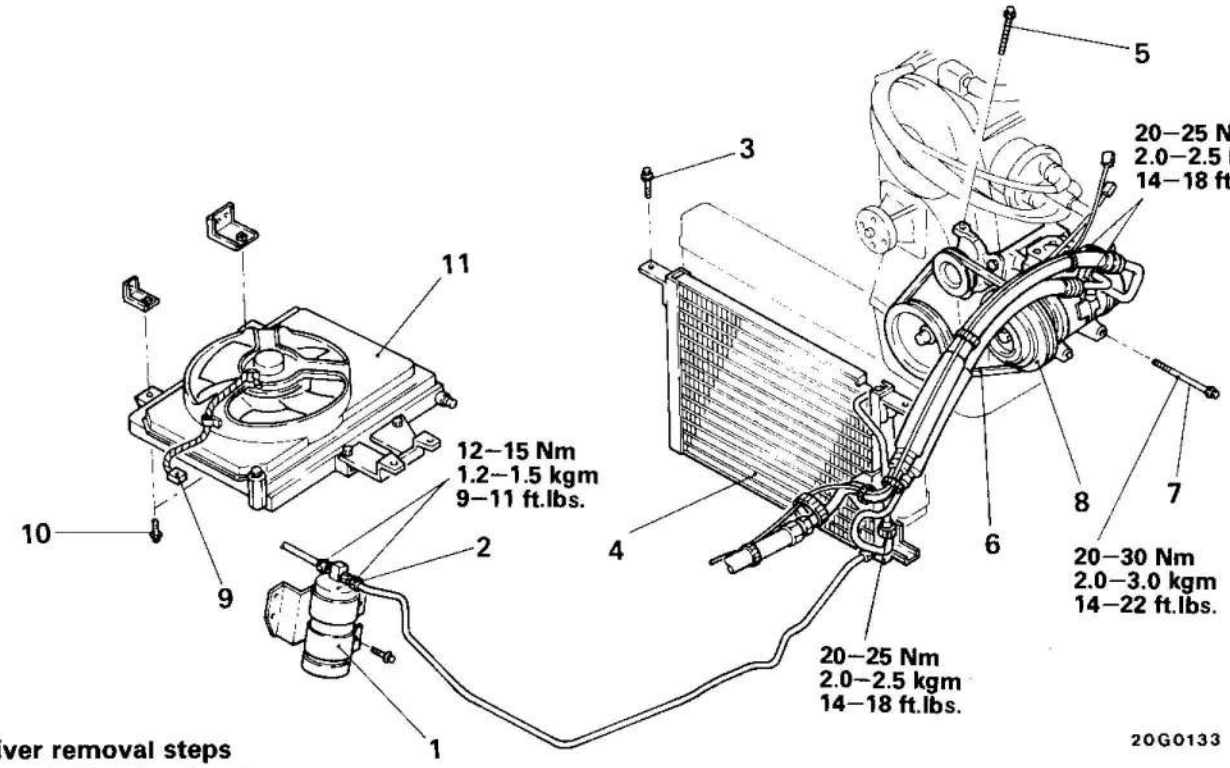
RECEIVER, CONDENSER, COMPRESSOR

E55QA--

REMOVAL AND INSTALLATION

Pre-removal Operation
- Discharge the Refrigerant
  <Vehicles using R-12 refrigerant>
  (Refer to P.55-64-1.)
  <Vehicles using R-134a refrigerant>
  (Refer to P.55-67-1.)
- Remove the Seat Underframe.
- Remove the Snow Guard Plate.

Post-installation Operation
- Charge the Refrigerant.
  <Vehicles using R-12 refrigerant>
  (Refer to P.55-64-1.)
  <Vehicles using R-134a refrigerant>
  (Refer to P.55-67-1.)
- Adjustment of the Tension of the Air Conditioner Drive Belt.
  (Refer to P.55-62.)



Receiver removal steps
1. Receiver bracket
2. Receiver

Condenser removal steps
3. Condenser mounting bolt
4. Condenser

Compressor clutch assembly removal steps
5. Tension adjusting bolt
6. Drive belt
7. Compressor mounting bolt
8. ◆◆ Compressor

Side condenser removal steps
9. Harness connector connection
10. Bolts
11. Side condenser

NOTE
Reverse the removal procedures to reinstall.

SERVICE POINTS OF REMOVAL

E55QBAA

Caution
If the hoses or pipes are disconnected cap the hoses or pipes with a blank plug to prevent entry of dust, dirt, and water.

8. INSTALLATION OF COMPRESSOR

If a new compressor is installed, first adjust the amount of oil according to the procedures described below, and then install the compressor.

(1) Measure the amount {X cc (x cu.in.)} of oil within the removed compressor.

(2) Wipe away (from the new compressor) the amount of oil calculated according to the following formula, and then install then new compressor.

New compressor oil amount
<Vehicles using R-12 refrigerant>

- 10P13 compressor
  80 cc (4.9 cu.in.)
  (amount of oil in new compressor)
  -X cc (x cu.in.) = Y cc (y cu.in.)
- 10P15 compressor
  150 cc (9.2 cu.in.)
  (amount of oil in new compressor)
  -X cc (x cu.in.) = Y cc (y cu.in.)

<Vehicles using R-134a refrigerant>

- 10P13 compressor
  100 cc (6.1 cu.in.)
  (amount of oil in new compressor)
  -X cc (x cu.in.) = Y cc (y cu.in.)
- 10P15 compressor
  180 cc (11.0 cu.in.)
  (amount of oil in new compressor)
  -X cc (x cu.in.) = Y cc (y cu.in.)

NOTE
(1) Y cc (y cu.in.) indicates the amount of oil in the refrigerant line, the condenser, the evaporator etc.
(2) When replacing the entire A/C system parts with new ones, discharge the compressor oil including A/C system parts oil from the new compressor.

<Vehicles using R-12 refrigerant>
Compressor oil: DENSO oil 6
Quantity:

- **10P13 compressor**
  Evaporator – 60 cc (3.7 cu.in.)
  Condenser – 30 cc (1.8 cu.in.)
  Low-pressure hose – 10 cc (0.6 cu.in.)
  Receiver – 10 cc (0.6 cu.in.)
- **10P15 compressor**
  Evaporator – 63 cc (3.8 cu.in.)
  Condenser – 37 cc (2.3 cu.in.)
  Low-pressure hose – 15 cc (0.9 cu.in.)
  Receiver – 10 cc (0.6 cu.in.)
  Cool box – 75 cc (4.6 cu.in.)

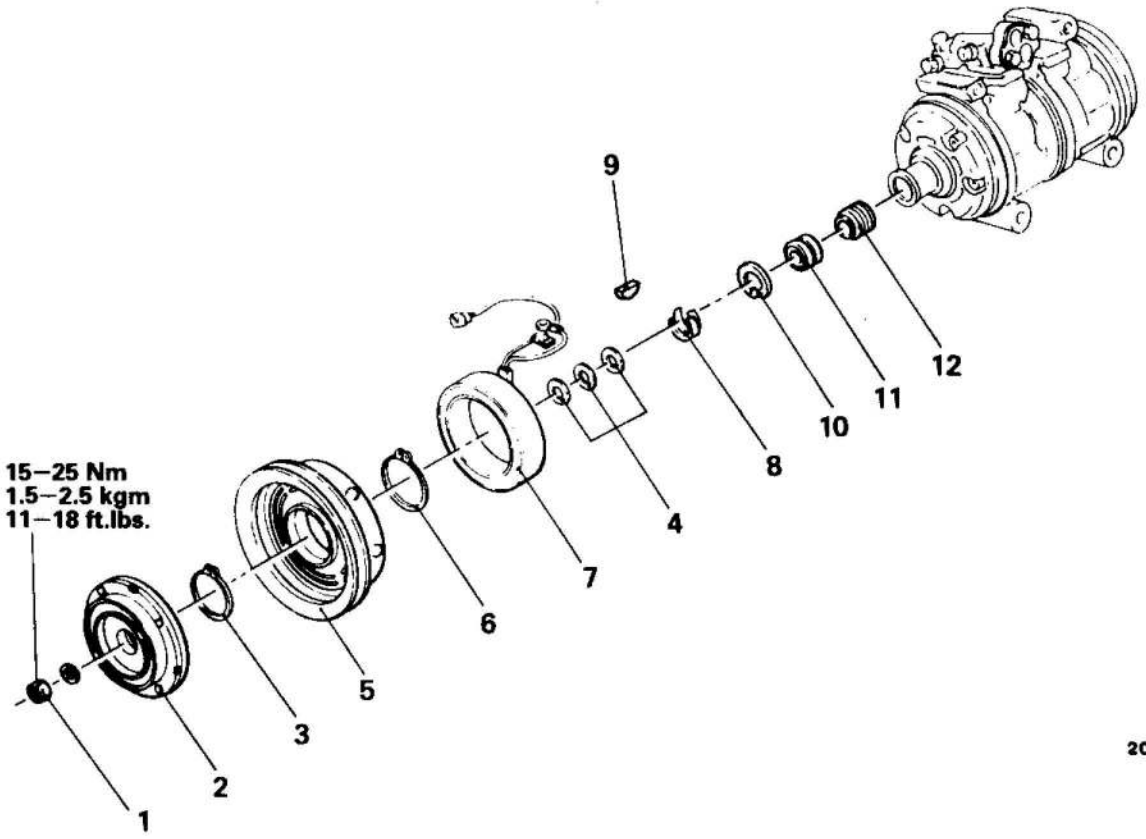
<Vehicles using R-134a refrigerant>
Compressor oil: ND – oil 8
Quantity:

- 10P13 compressor
  Evaporator – 40 cc (2.4 cu.in.)
  Condenser – 40 cc (2.4 cu.in.)
  Low-pressure hose – 10 cc (0.6 cu.in.)
  Receiver – 10 cc (0.6 cu.in.)
- 10P15 compressor
  Evaporator – 63 cc (3.8 cu.in.)
  Condenser – 37 cc (2.3 cu.in.)
  Low-pressure hose – 15 cc (0.9 cu.in.)
  Receiver – 10 cc (0.6 cu.in.)

COMPRESSOR (MAGNETIC CLUTCH, SHAFT SEAL)

E55LB-A

DISASSEMBLY AND REASSEMBLY



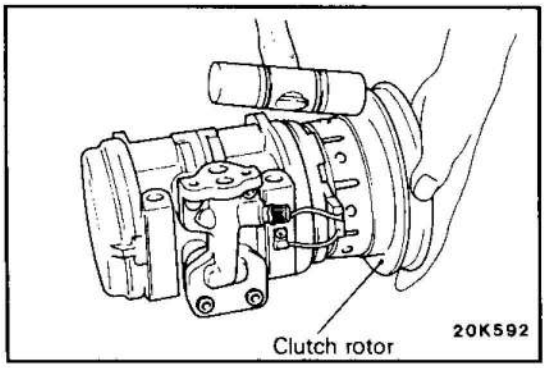
Magnetic clutch disassembly steps

1. Nut
◆◆ Adjusting of clutch clearance
2. Clutch hub
3. Snap ring
4. Shims
◆◆ 5. Rotor assembly
6. Snap ring
◆◆ 7. Clutch coil

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ◆◆: Refer to "Service Points of Reassembly".

Shaft seal disassembly steps

1. Nut
◆◆ Adjustment of clutch clearance
2. Clutch hub
3. Snap ring
4. Shims
◆◆ 5. Rotor assembly
6. Snap ring
◆◆ 7. Clutch coil
◆◆ 8. Dust seal
◆◆ 9. Woodruff key
◆◆ 10. Snap ring
◆◆◆◆ 11. Shaft plate
◆◆◆◆ 12. Shaft seal

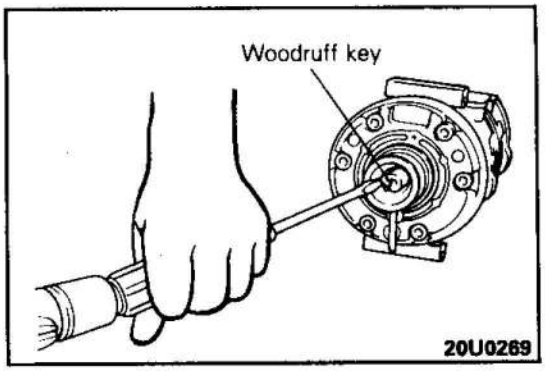


SERVICE POINTS OF DISASSEMBLY

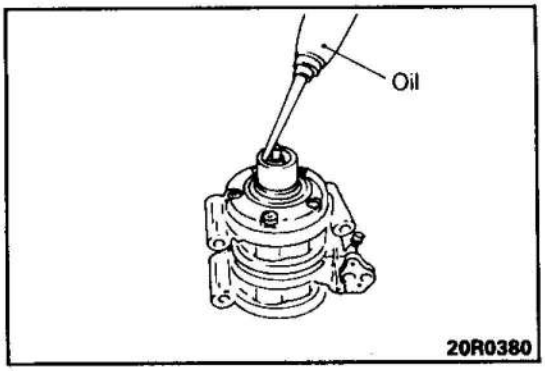
E55LCAB

5. REMOVAL OF ROTOR ASSEMBLY

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

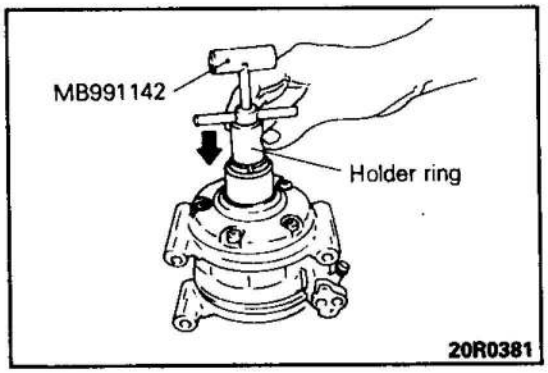


9. REMOVAL OF WOODRUFF KEY

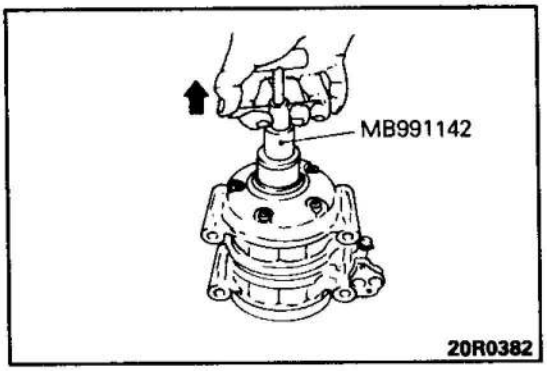


11. REMOVAL OF SHAFT PLATE

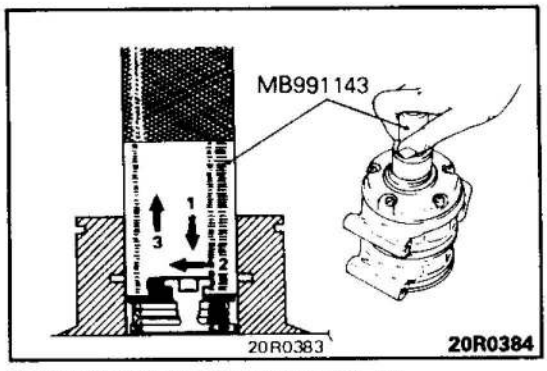
(1) Apply compressor oil to inner bore.



(2) Insert the special tool on to the compressor shaft.
(3) Push the holder ring downward.



(4) Pull up on the cross bar, then pull up on the special tool to remove the shaft seal plate.

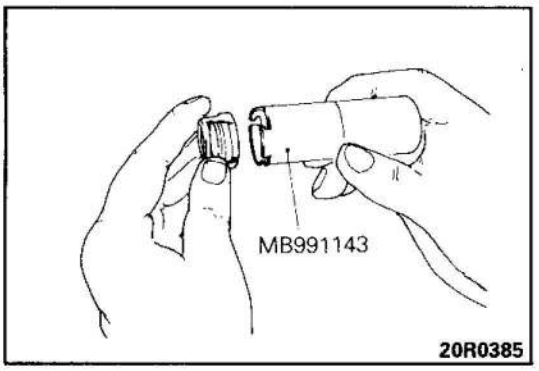


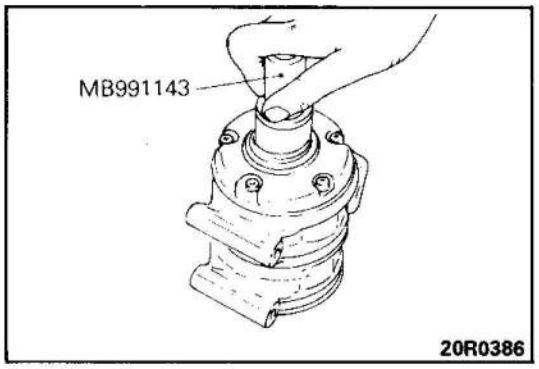
12. REMOVAL OF SHAFT SEAL

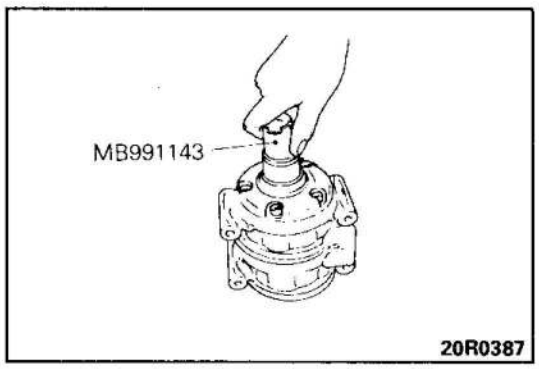
(1) Insert the special tool against the shaft seal and turn it to the right while pressing down on special tool.
(2) Pull the special tool up to remove the shaft seal.

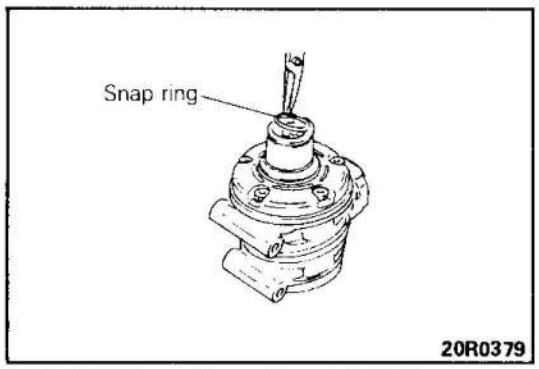
INSPECTION E55LDAB

- Check the surface of the clutch hub for scoring or bluing.
- Check the surface of the rotor for scoring or bluing.









SERVICE POINTS OF REASSEMBLY E55LEAB

12. INSTALLATION OF SHAFT SEAL

NOTE

1. Do not touch the sealing surfaces of shaft seal carbon ring and shaft plate.
2. If the shaft seal is being replaced, replace the shaft seal and shaft plate as a set.

(1) Lubricate the shaft seal with specified compressor oil and install it on to special tool.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

(2) Apply the specified compressor oil on the inner bore of the compressor. Insert the special tool, and turn it to the left while pressing lightly downward on the tool. Remove the special tool.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

11. INSTALLATION OF SHAFT PLATE

(1) Apply the specified compressor oil to the shaft seal plate.

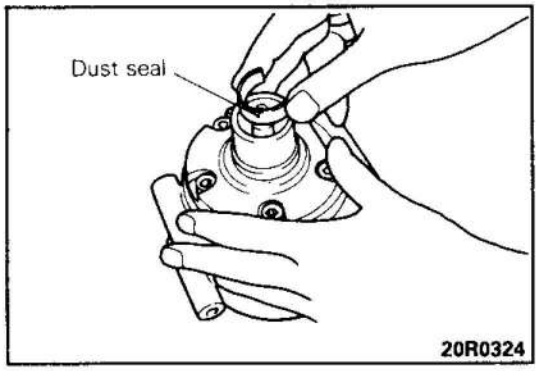
Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

(2) With the seat (lapped) surface facing toward the seal, insert the shaft seal plate onto the compressor shaft by hand.

(3) Using the other end of the special tool, press the shaft plate down until it comes in contact with the shaft seal (until the snap ring groove is exposed).

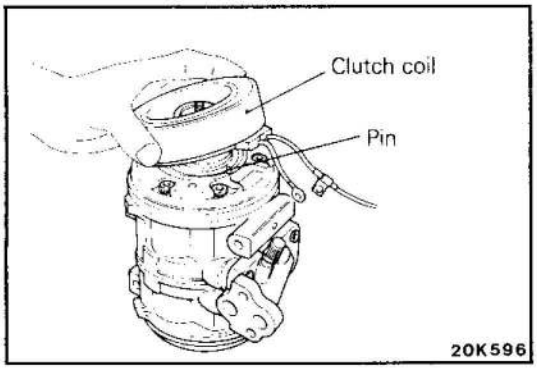
10. INSTALLATION OF SNAP RING

Tapered surface snap ring faces upward.



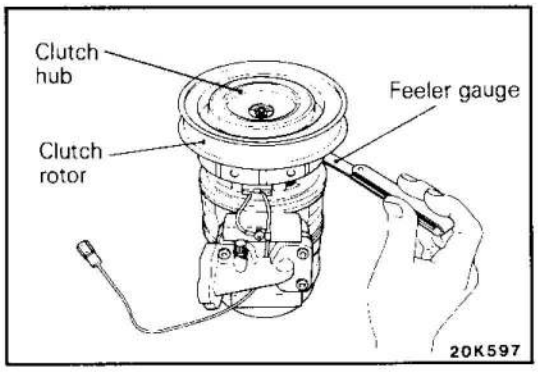
8. INSTALLATION OF DUST SEAL

The dust seal gap should face the top of the compressor as it is installed on the engine.



7. INSTALLATION OF CLUTCH COIL

The coil must be aligned with the pin in the compressor housing.



• ADJUSTMENT OF CLUTCH CLEARANCE

(1) Check the pressure plate to rotor clearance as illustrated.

Standard value; 0.4–0.7 mm (0.016–0.028 in.)

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

Clearance Adjustment Shims

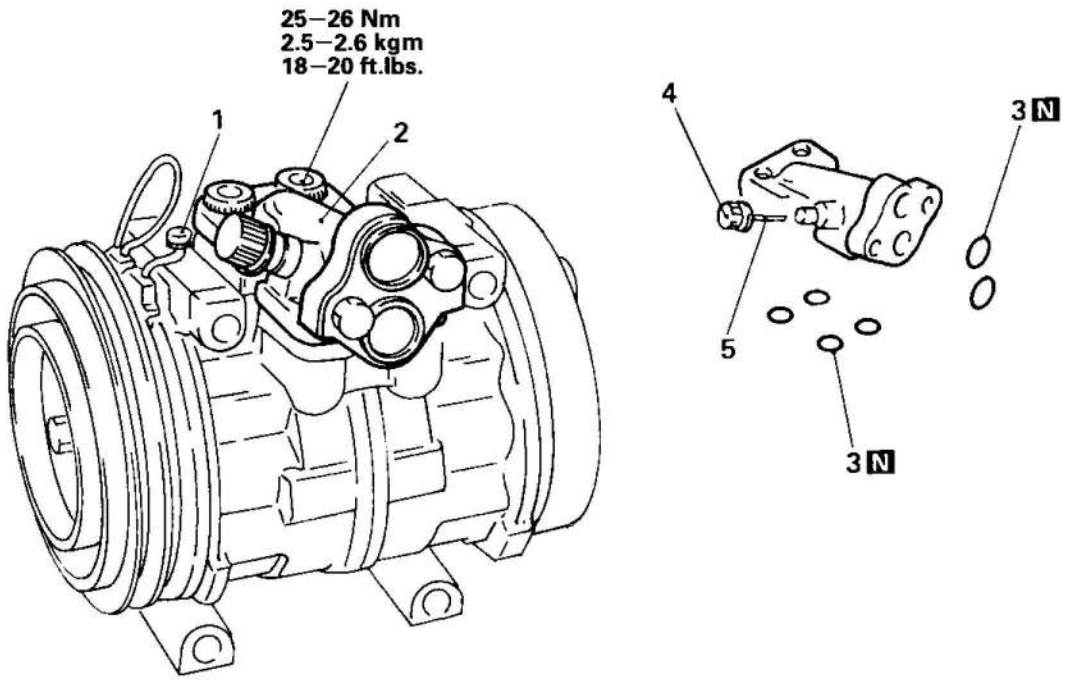
Part No.	Thickness
CSA935F100	0.1 mm (0.004 in.)
CSA935F100A	0.2 mm (0.008 in.)
CSA935F100B	0.5 mm (0.020 in.)

(2) Turn the rotor by hand to confirm that it rotates freely.

COMPRESSOR (FLANGE FITTING ASSEMBLY)

E55LB-8

DISASSEMBLY AND REASSEMBLY



20G0233

Disassembly steps

1. Earth terminal
2. Flange fitting assembly
3. ◆◆ O-ring
4. Cap
5. Service valve

NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆ : Refer to "Service Points of Reassembly".
(3) N : Non-reusable parts

SERVICE POINTS OF REASSEMBLY

E55LCAC

3. APPLICATION OF COMPRESSOR OIL TO O-RING

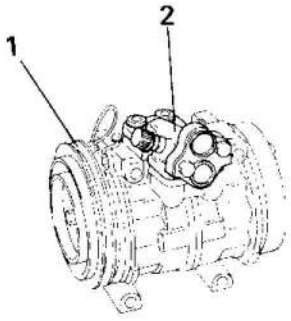
Apply the specified compressor oil to the O-ring.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8

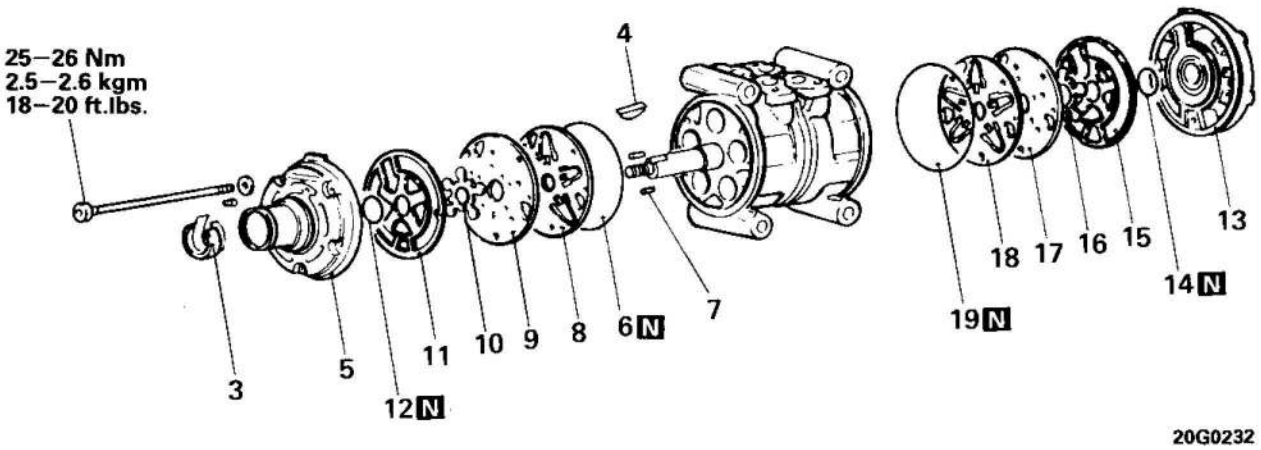
COMPRESSOR (CYLINDER HEAD AND REAR HOUSING)

E55LB-C

DISASSEMBLY AND REASSEMBLY



20G0233



20G0232

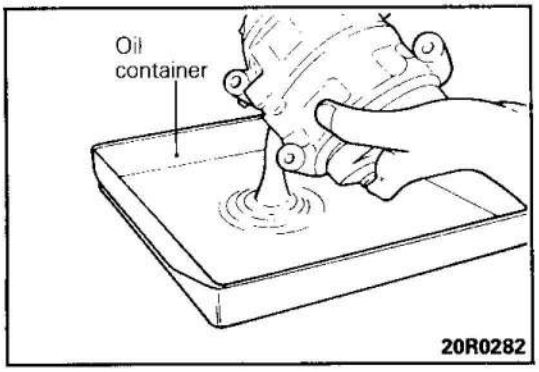
Cylinder head disassembly steps

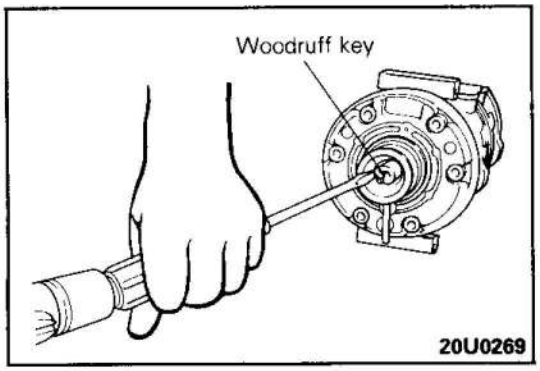
◆◆ ▶◀ 1. Magnetic clutch
◆◆ ▶◀ 2. Flange fitting assembly
▶◀ 3. Dust seal
▶◀ Checking shaft rotating torque
◆◆ 4. Woodruff key
◆◆ ▶◀ 5. Cylinder head
▶◀ 6. O-ring
7. Pin
▶◀ 8. Suction valve
◆◆ ▶◀ 9. Valve plate
▶◀ 10. Discharge valve
▶◀ 11. Gasket
▶◀ 12. O-ring

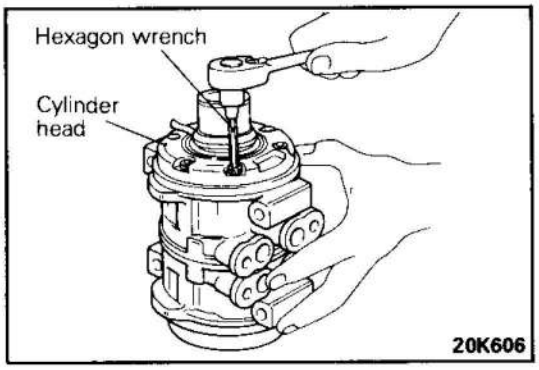
Rear housing disassembly steps

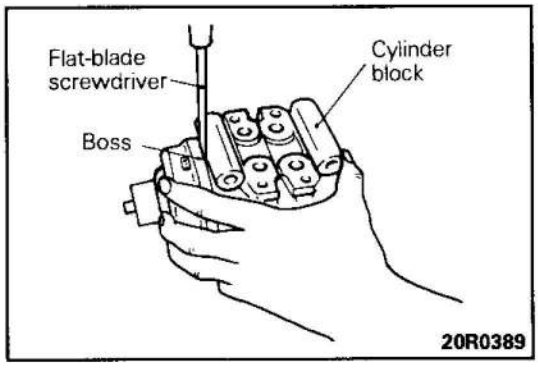
◆◆ ▶◀ 1. Clutch coil and rotor assembly
◆◆ ▶◀ 2. Flange fitting assembly
◆◆ ▶◀ 13. Rear housing
▶◀ 14. O-ring
▶◀ 15. Gasket
▶◀ 16. Discharge valve
◆◆ ▶◀ 17. Valve plate
▶◀ 18. Suction valve
▶◀ 19. O-ring

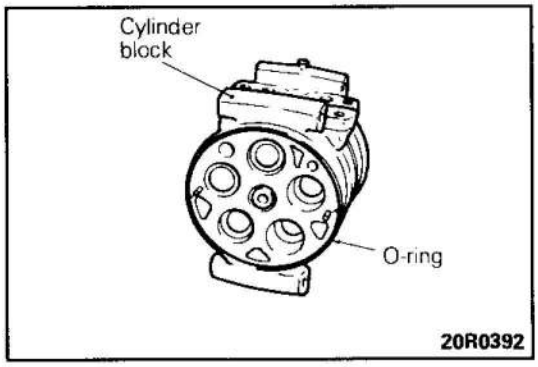
NOTE
(1) Reverse the disassembly procedures to reassemble.
(2) ◆◆: Refer to "Service Points of Disassembly".
(3) ▶◀: Refer to "Service Points of Reassembly".
(4) N: Non-reusable parts











SERVICE POINTS OF DISASSEMBLY E55LCAD

1. REMOVAL OF MAGNETIC CLUTCH

Refer to P. 55–86.

2. REMOVAL OF FLANGE FITTING ASSEMBLY

Refer to P. 55–91.
Drain out the compressor oil after removal.

4. REMOVAL OF WOODRUFF KEY

5. REMOVAL OF CYLINDER HEAD/13. REAR HOUSING

(1) Remove the five compressor through bolts as illustrated.

NOTE
Set compressor to prevent oil loss during cylinder head or rear housing removal.

(2) Remove the cylinder head or rear housing from the cylinder block.

NOTE
It may be necessary to lightly tap the cylinder head or rear housing at the boss as illustrated. Do not damage the cylinder head or rear housing.

9./ 17. REMOVAL OF VALVE PLATE

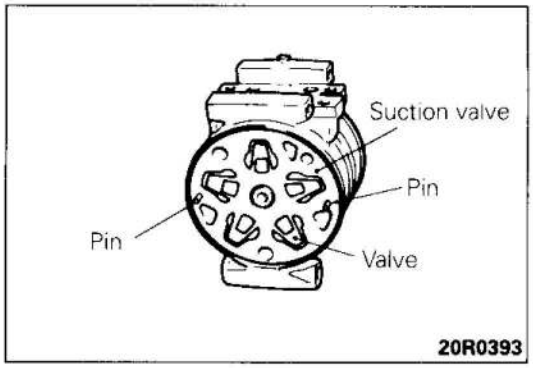
Caution
Do not damage or deform the valve plate which is made of aluminum.

SERVICE POINTS OF REASSEMBLY E55LEAC

19. APPLICATION OF COMPRESSOR OIL TO O-RING

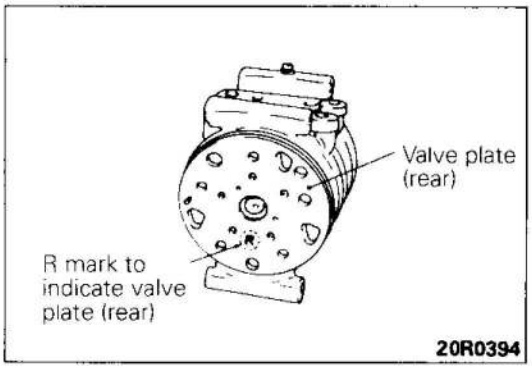
Apply the specified compressor oil to O-ring and install it into the O-ring groove provided in the cylinder block.

Specified compressor oil:
<Vehicles using R-12 refrigerant> DENSO oil 6
<Vehicles using R-134a refrigerant> ND – oil 8



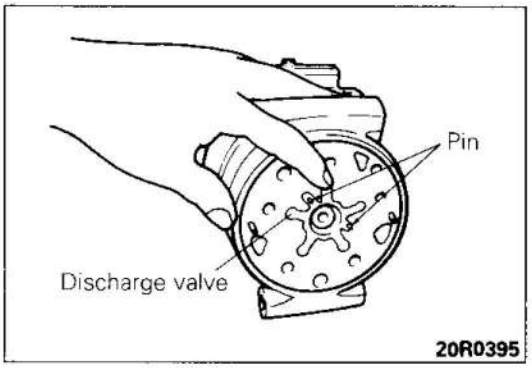
18. INSTALLATION OF SUCTION VALVE

Install the suction valve with the through bolt holes aligned. Locate each valve right above the piston.



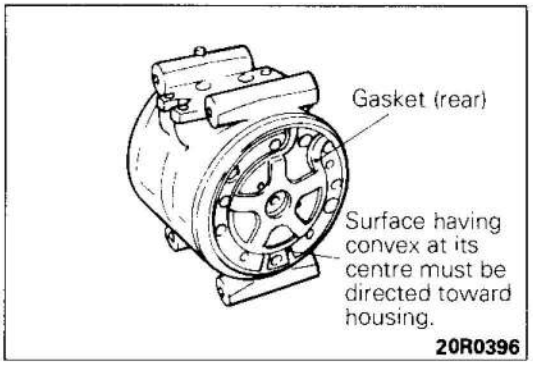
17. INSTALLATION OF VALVE PLATE

Install the valve plate on the suction valve.
Locate the stamped R mark as shown in the illustration.



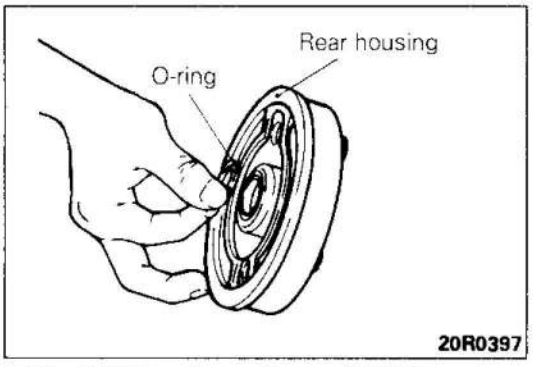
16. INSTALLATION OF DISCHARGE VALVE

Install the discharge valve with reference to the positions of pins in the valve plate.



15. INSTALLATION OF GASKET

Install the gasket to the valve plate. The gasket surface having a convex at its centre must be directed toward the rear housing.

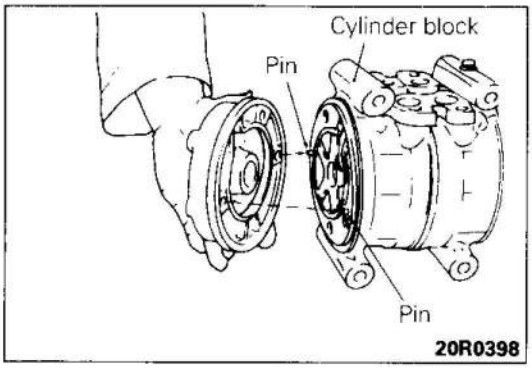


14. APPLICATION OF COMPRESSOR OIL TO O-RING

Apply the specified compressor oil to O-ring and install it into the O-ring groove provided in the rear housing.

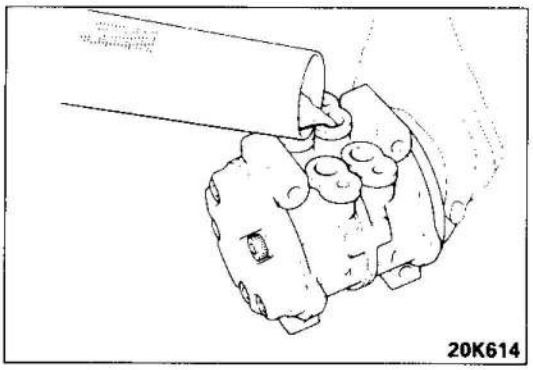
Specified compressor oil:

<Vehicles using R-12 refrigerant>	**DENSO oil 6**
<Vehicles using R-134a refrigerant>	**ND – oil 8**



13. INSTALLATION OF REAR HOUSING

(1) Install the rear housing to the cylinder block with reference to the pins.



(2) Pour new compressor oil into compressor.

Specified compressor oil:

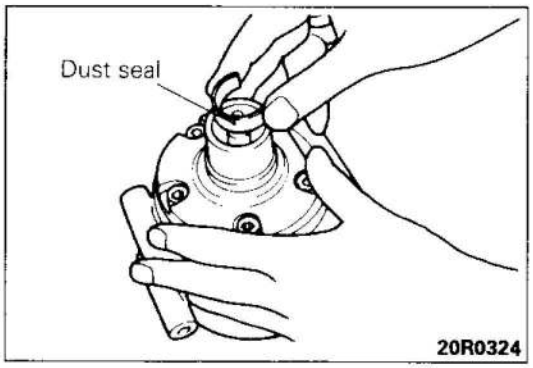
<Vehicles using R-12 refrigerant> DENSO oil 6

<Vehicles using R-134a refrigerant> ND – oil 8

40 cc (2.4 cu.in.)

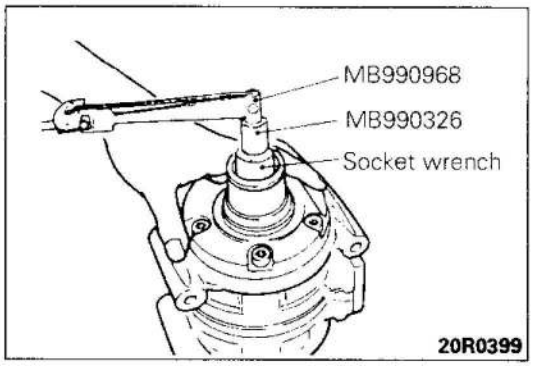
12. INSTALLATION OF O-RING/11. GASKET/10. DISCHARGE VALVE/9. VALVE PLATE/8. SUCTION VALVE/6. O-RING/5. CYLINDER HEAD

Assemble by the same procedure as for the rear housing.



3. INSTALLATION OF DUST SEAL

The dust seal gap should face the top of the compressor as it is installed on the engine.



• CHECKING SHAFT ROTATING TORQUE

Install the nut to the shaft, and use a socket wrench and special tools to check shaft rotating torque.

Standard value: 5 Nm (50 kgcm, 43.4 in. lbs.) or less

2. INSTALLATION OF FLANGE FITTING ASSEMBLY

Refer to P. 55-91.

1. INSTALLATION OF MAGNETIC CLUTCH

Refer to P. 55-87.

NOTES