INSTALLATION MANUAL

TOYOTA

LAND CRUISER

HZJ80R

AIR CONDITIONING

HFC-134a(R134a)

MAC-1067

FOREWORD

This manual has been published to explain how to install the air conditioning into the TOYOTA LANDCRUISER HZJ80R (1HZ E/G) for AUSTRALIAN SPEC.

When installing the air conditioning, installation should be performed as described in this manual.

Improper installation will reduce both the air conditioning and vehicle performance.

TABLE OF CONTENTS

GENERAL INFORMATION

1. INSTALLATION PREPARATIONS

(1) Prior to installing the air conditioning, check the following for damage or malfunctions.

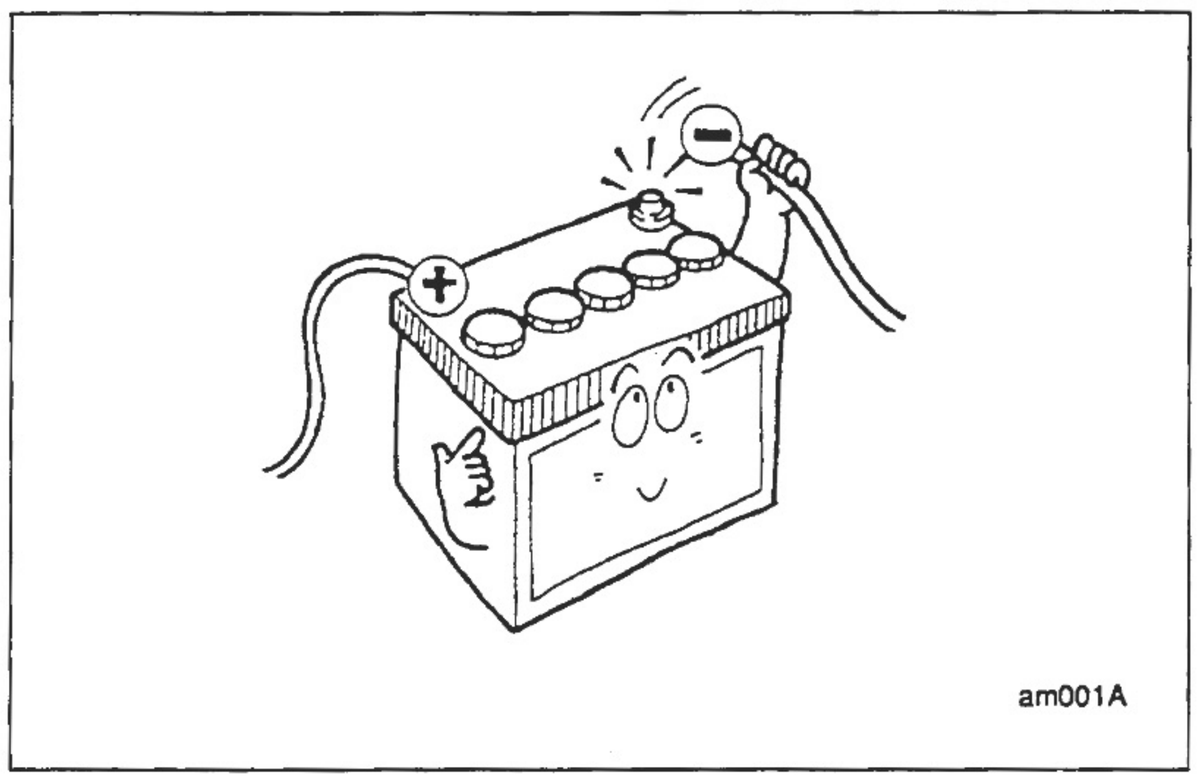
(a) Internal and external trim and bodywork.
(b) Engine idle speed.
(c) Engine cooling system.
(d) All vehicle functions.
(Headlights, indicators, horn, etc.)

(2) Air Conditioning Parts Preparation

(a) Check that the correct kit has been selected for the installation.
(b) When unpacking the kit, lay all parts out in order of installation and check for missing or damaged parts.
(c) When installing the air conditioning, use fender covers and seat covers for protection.

(3) Installation Tools

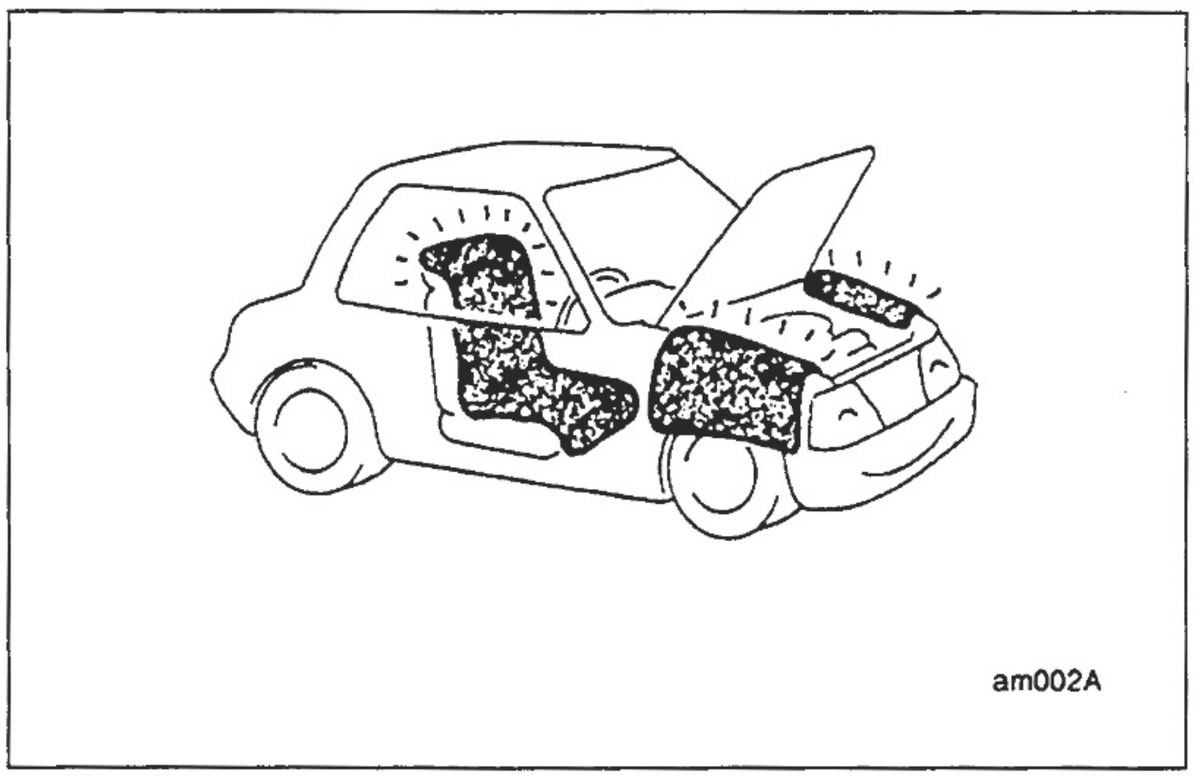
(a) Vacuum Pump
(b) Air Conditioning Service Tools
(c) Hand service Tools
(d) Fender covers and seat covers



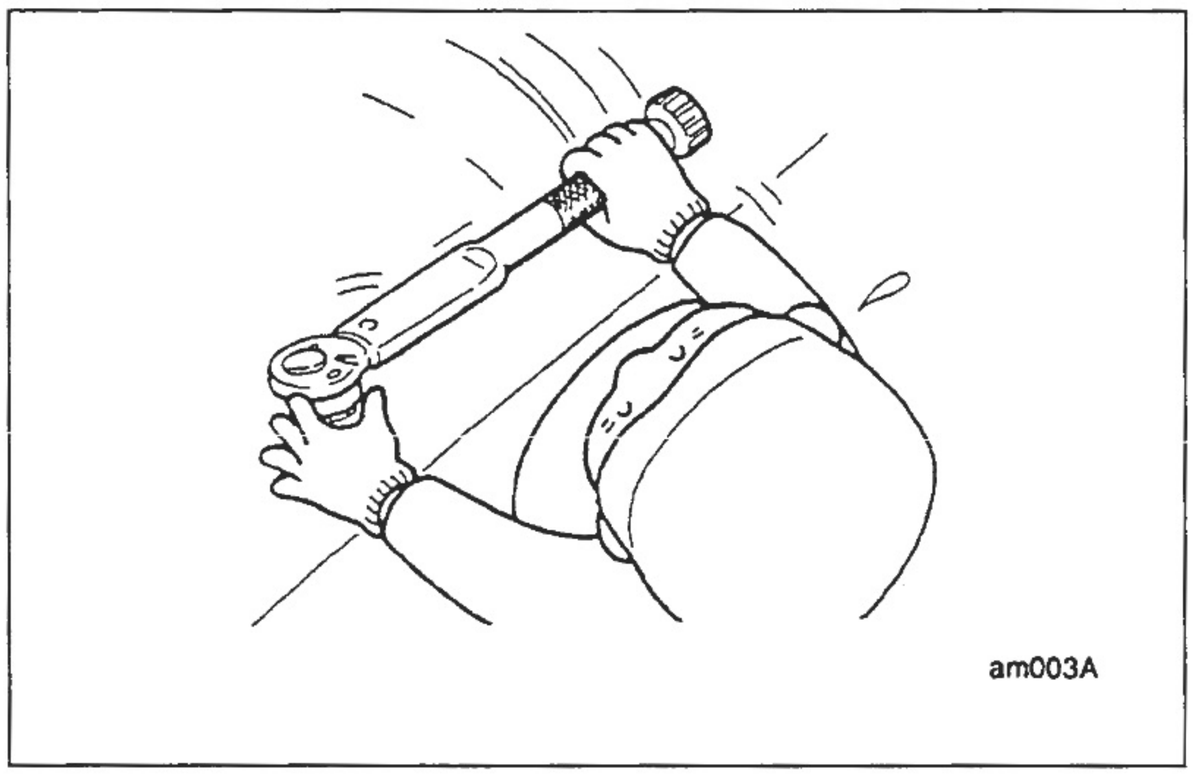
am001A

2. SERVICE PRECAUTIONS

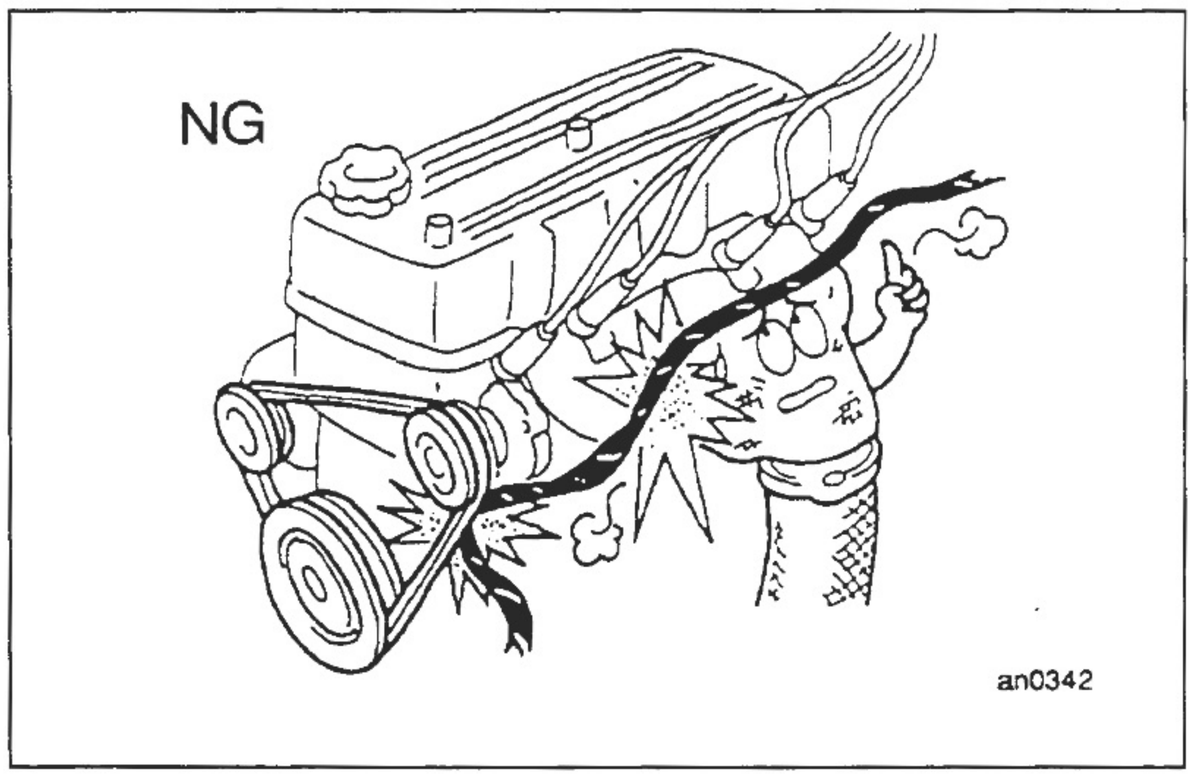
(1) Disconnect the battery negative cable from the terminal.



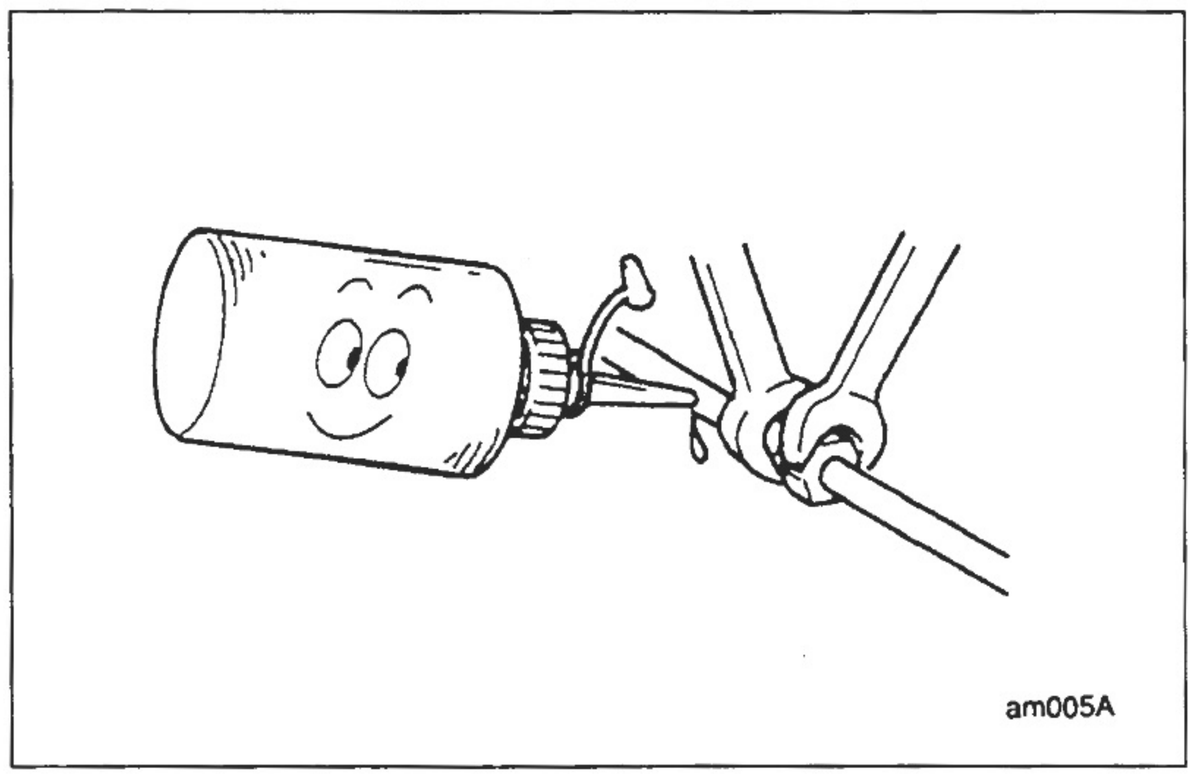
(2) Use the protective covers to avoid damage to the vehicle and the air conditioning parts.



(3) The bolt where specified must be torqued to specification.



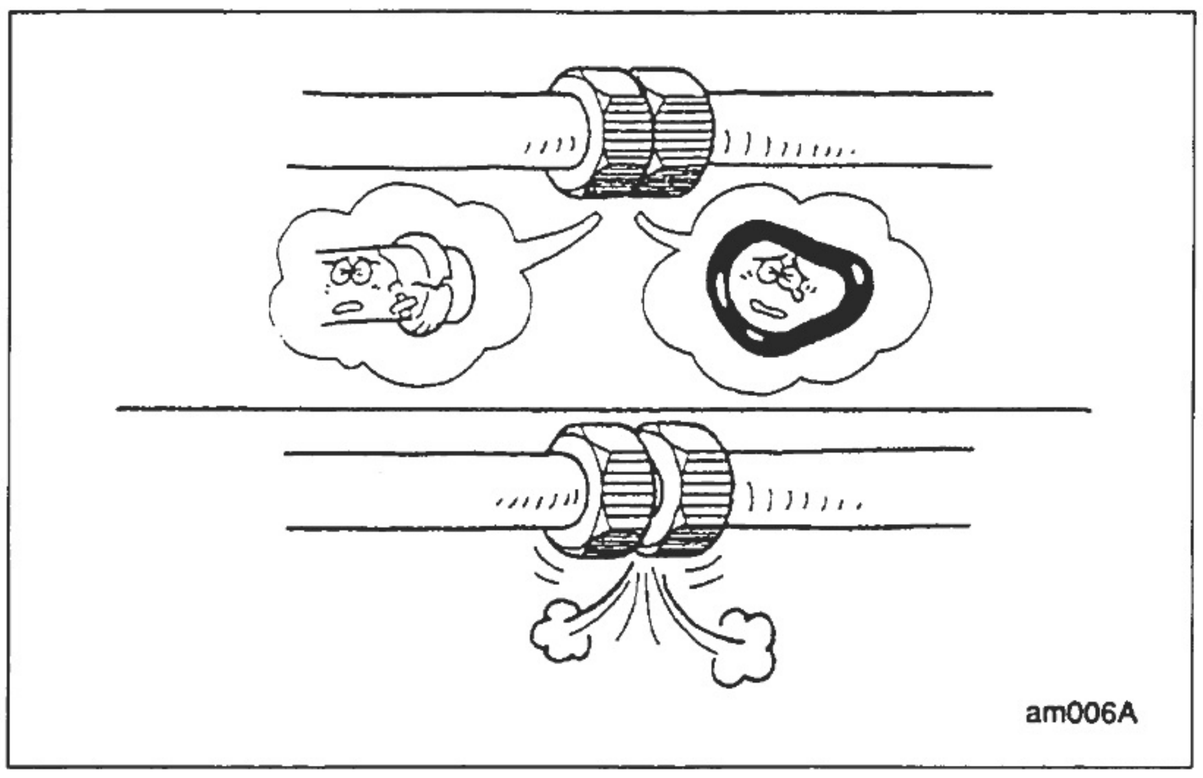
(4) When installing air conditioning piping and A/C harnesses, route properly to avoid interference with surrounding parts.



(5) Before making any hose and tube connections, apply a few drops of compressor oil to the seat of O-ring to avoid refrigerant leakage.

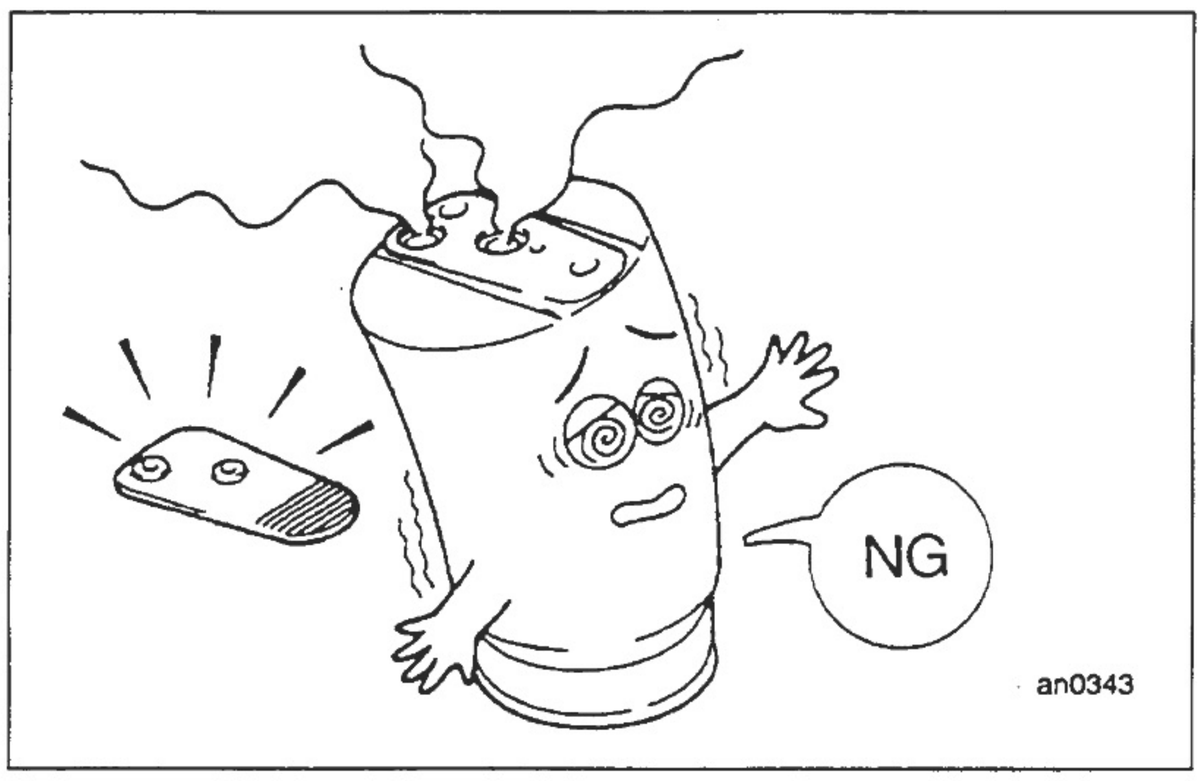
CAUTION

Do not re-use the O-ring. Use new O-ring in making any hose or tube connection.



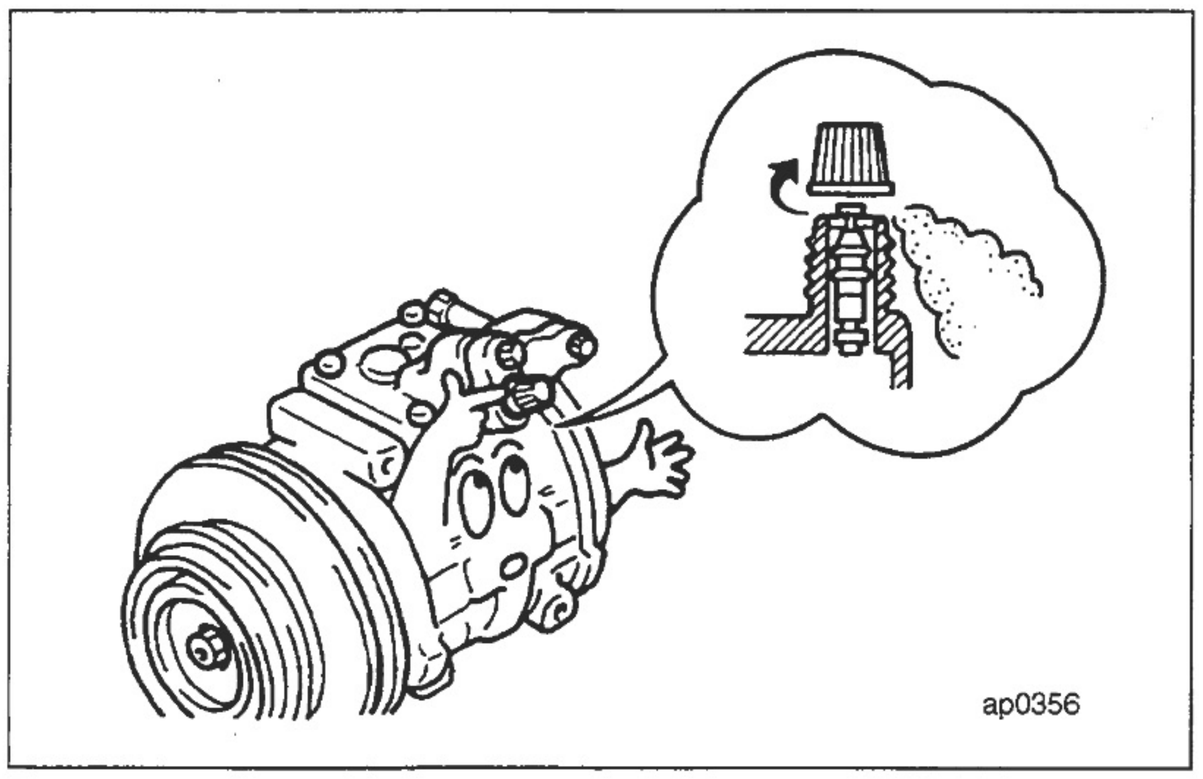
am006A

(6) When tightening or loosening fittings, use two wrenches to prevent the tubes from twisting. After loosening fittings, tighten it with specified torque.



an0343

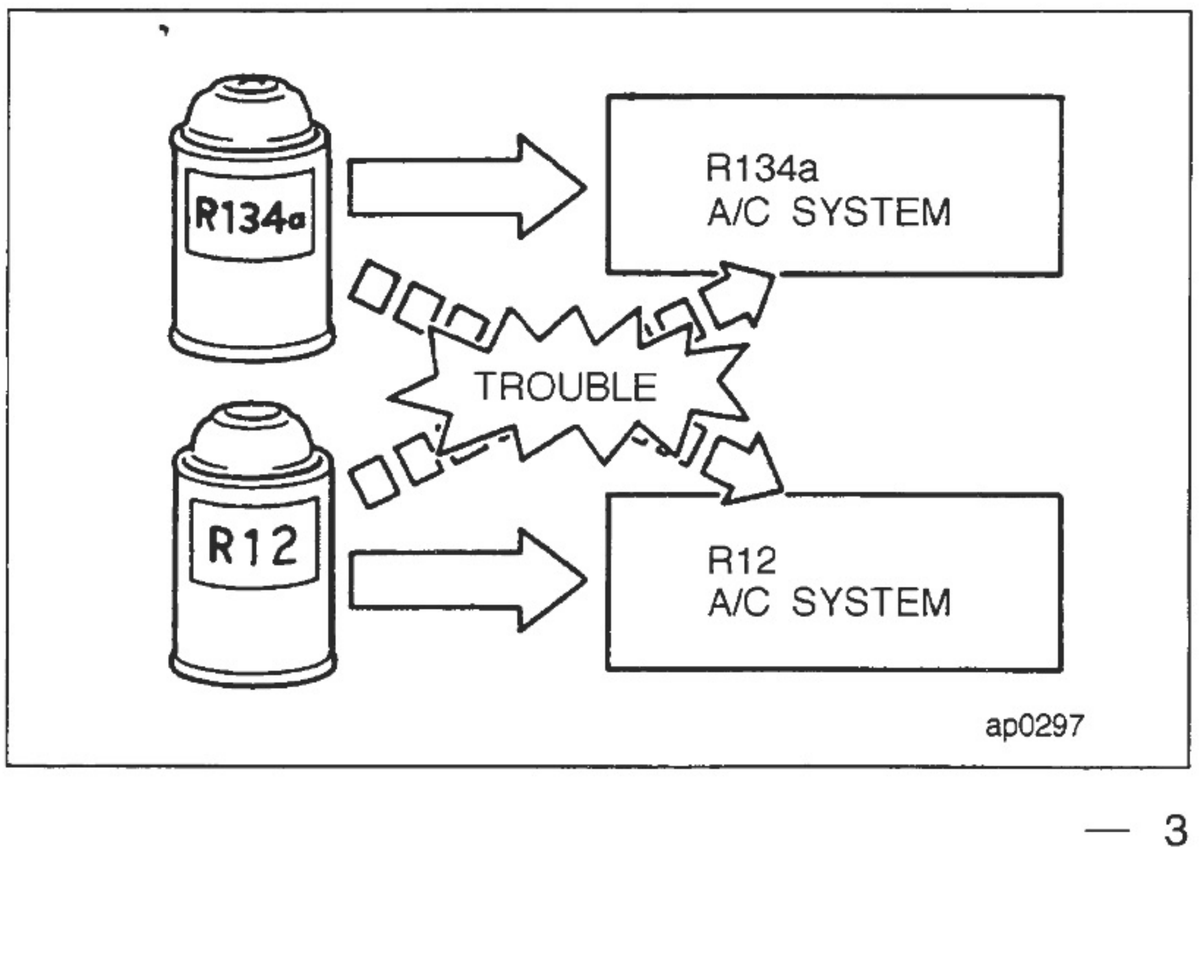
(7) Do not remove the caps from fittings until each component is ready for connection.



ap0356

CAUTION

The compressor is shipped from the factory with a slight charge of nitrogen gas to prevent any corrosion of seals.
Before uncapping the compressor, push the schrader valve slowly and allow nitrogen gas to escape.

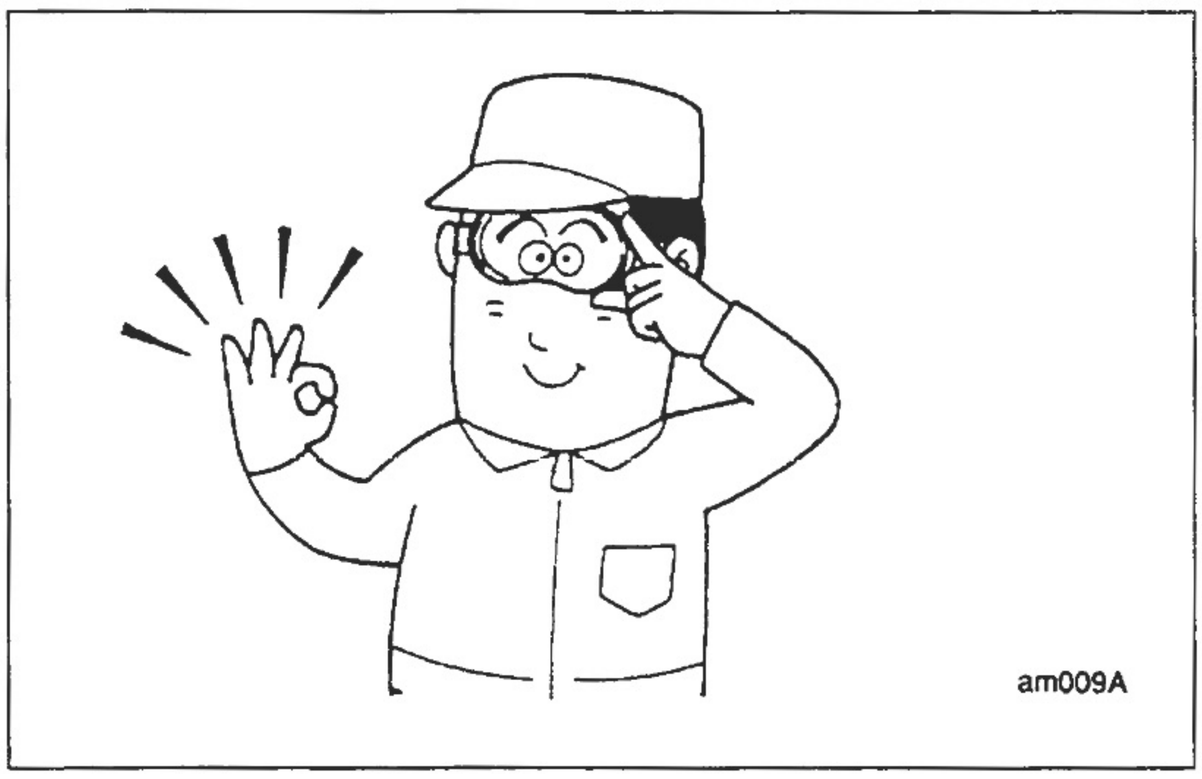


ap0297

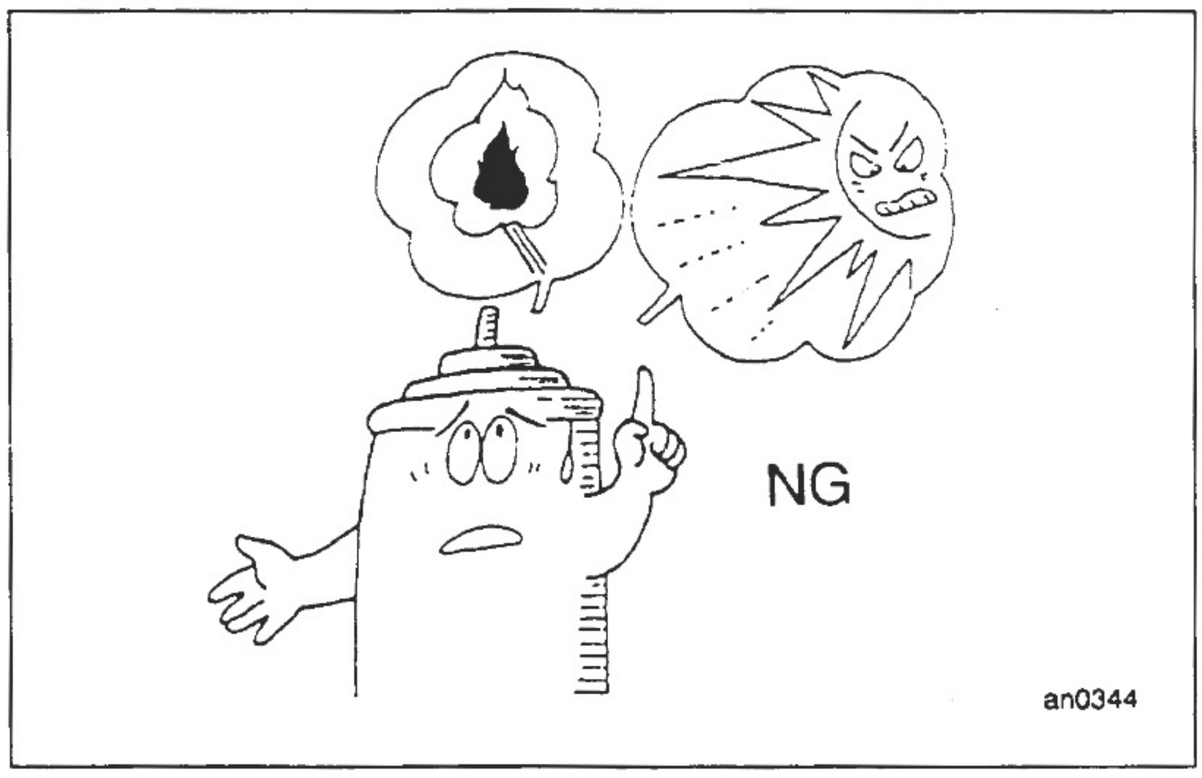
(8) Use of new refrigerant HFC-134a (R134a).

CAUTION

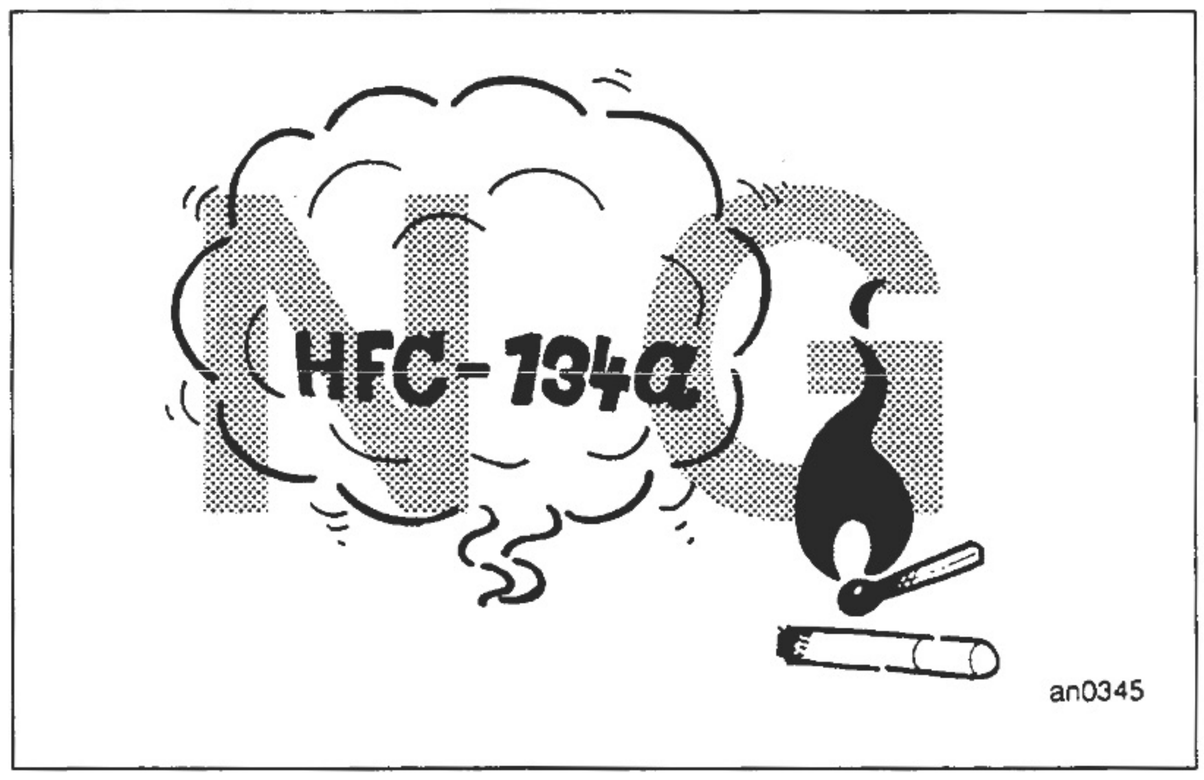
The very different characteristics of refrigerants HFC-134a (R134a) and CFC-12 (R12) have determined the design of their respective air conditioning systems. Under no circumstances allow CFC-12 (R12) to enter an HFC-134a (R134a) system, or vice versa, because serious damage could occur.



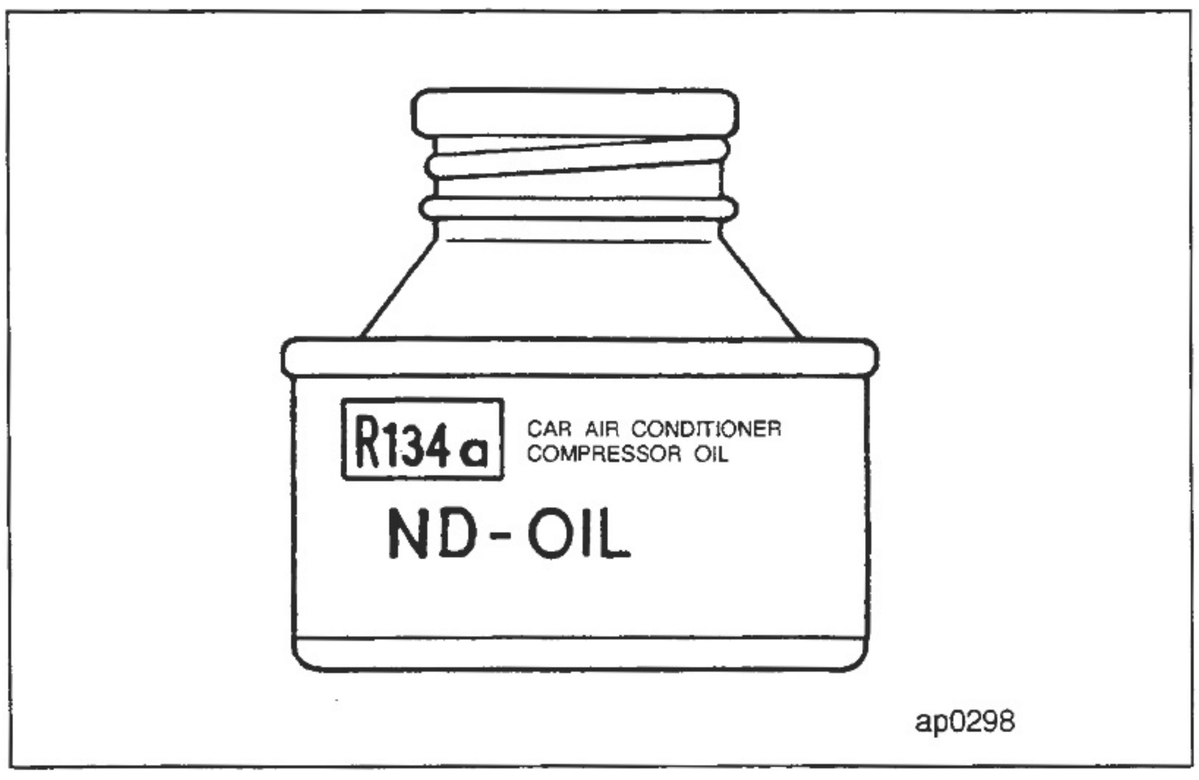
(9) When handling the refrigerant, it is important to wear eye protection and to take care that liquid refrigerant does not come in contact with skin.



(10) Always keep the refrigerant container (service drum) below 40 ℃ (100 ℉).



(11) Do not expose refrigerant to an open flame.



(12) Use of proper compressor oil.

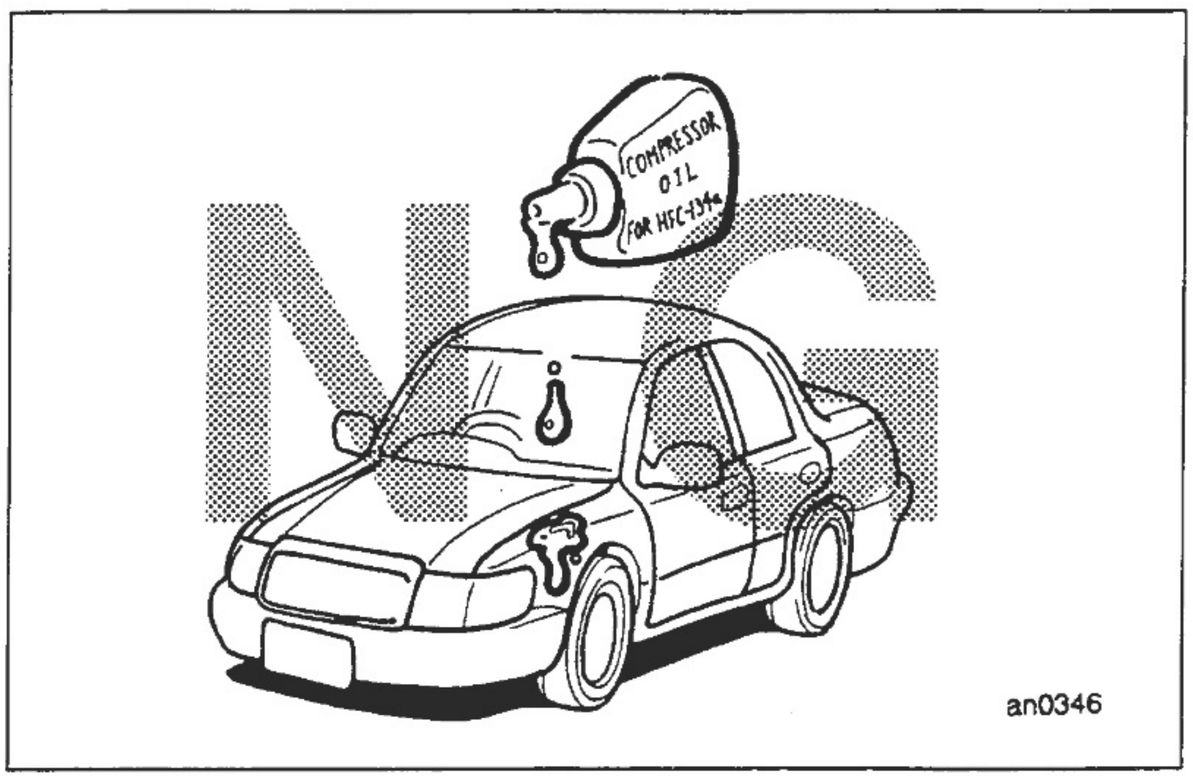
CAUTION

Compressor oil used in conventional CFC-12 (R12) air conditioning systems cannot be used in HFC-134a (R134a) air conditioning systems.

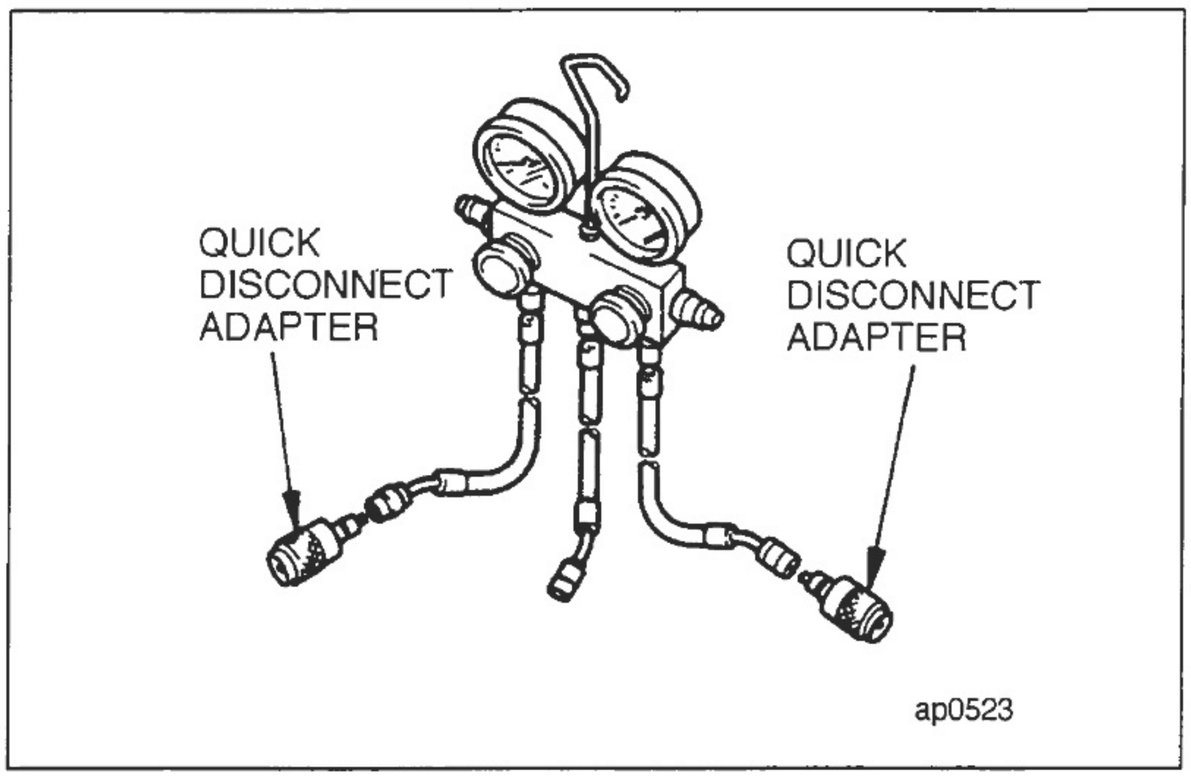
<Compressor oil>

For a piston type compressor : ND-OIL8

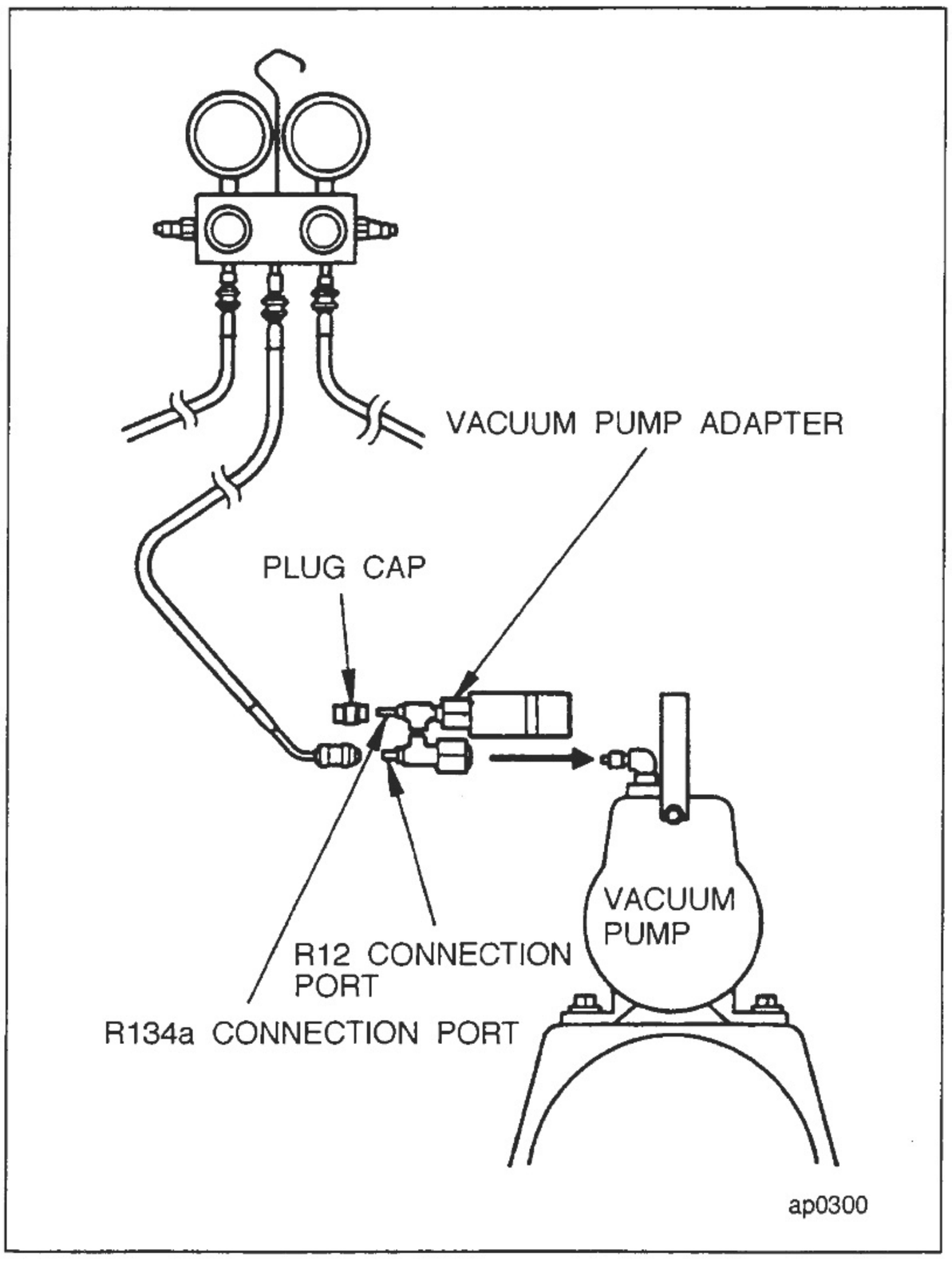
For a vane type compressor : ND-OIL9



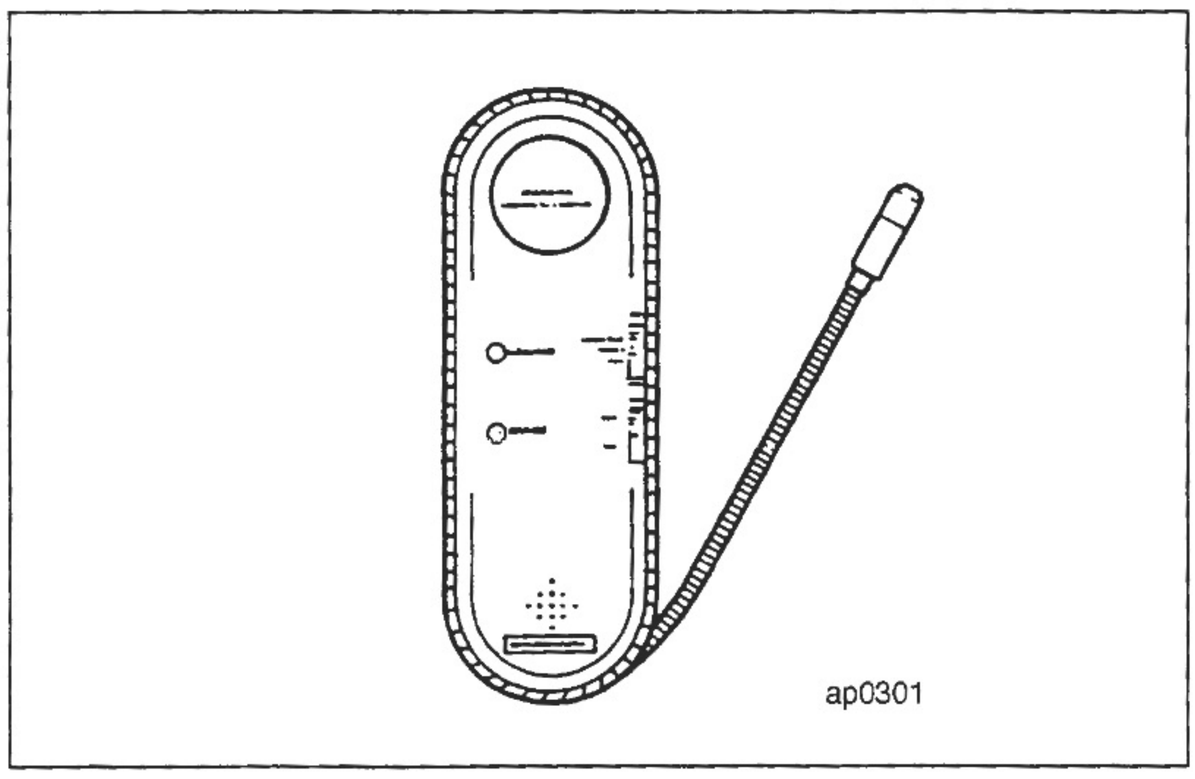
(13) Do not drop compressor oil (ND-OIL 8,9) onto the car it causes the discoloration of the car body surface, or deterioration of the components made from acrylic or ABS plastic.



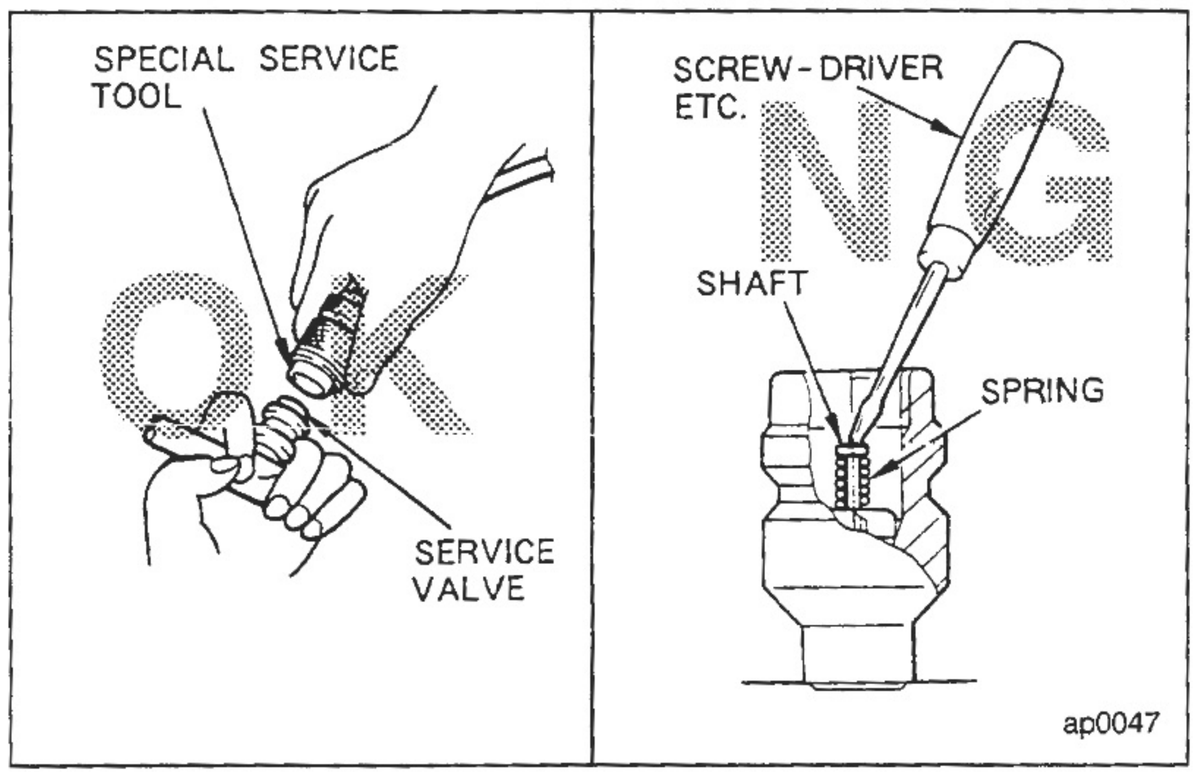
(14) Use manifold gauges for HFC-134a (R134a).



(15) Use vacuum pump adapter.
By connecting a vacuum pump adapter, the vacuum pump can be used for both HFC-134a (R134a) and CFC-12 (R12) air conditioning systems.



(16) Use HFC-134a (R134a) gas leak detector.



(17) When recovering refrigerant, use necessary special service tools. To use a general tool like a screw-driver may cause refrigerant leak by damaging the service valves.

CAUTION

Support the service valve by hand to prevent the tube from bending when connecting the special service tool.

(18) Make sure that the caps of high and low pressure charging valves are surely installed in order to prevent refrigerant from leaking.

3. WHEN INSTALLING

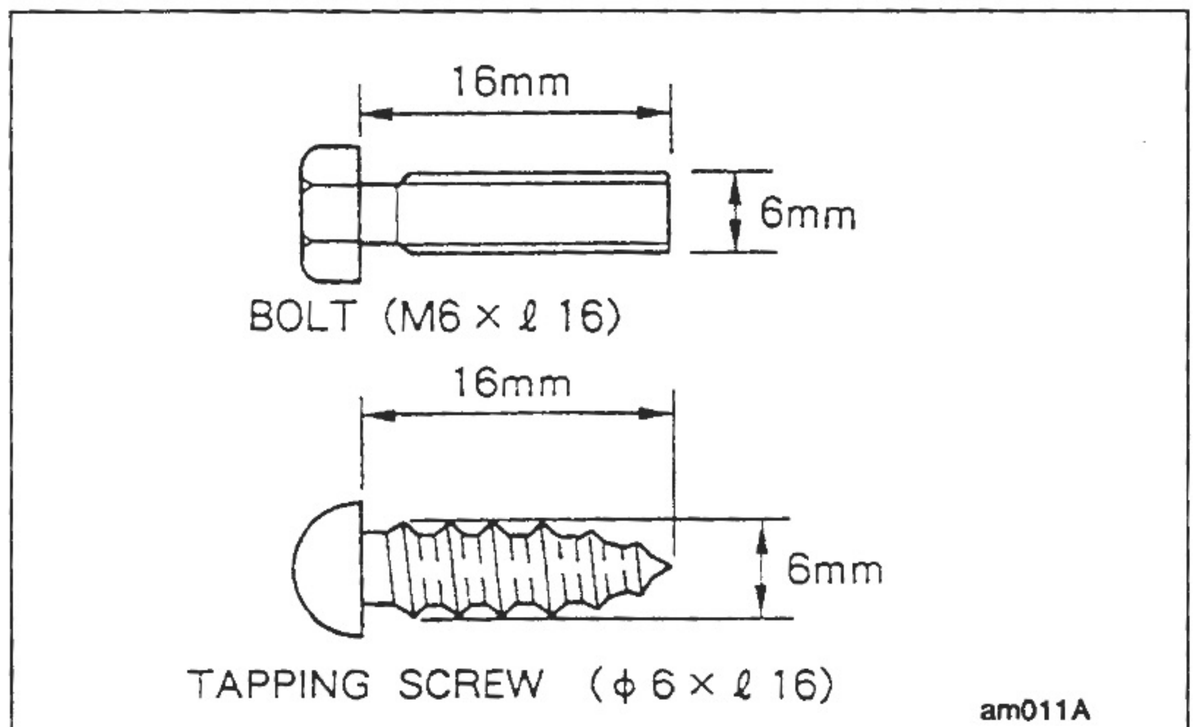
(1) All instructions are given from the driver's point of view.

(2) Figures in parenthesis indicate the diameter and length of the bolt stem.

Example:

(a) BOLT (M6 X ℓ 16) means a hex. head bolt which has 6mm thread diameter and 16mm stem.

(b) SCREW or TAPPING SCREW (ϕ6 X ℓ 16) means a round head screw which has 6mm thread diameter and 16mm stem.



(3) Standard tightening torque

Dia × Pitch	Bolt Intensity	Tightening Torque N·m <kgf·cm> (ft·lbf)
M6 × 1.0	4T	5.4 < 55> (4.0)
M8 × 1.25		12.7 <130> (9.4)
M10 × 1.25		25.5 <260> (18.8)
M12 × 1.25		47.1 <480> (34.7)
M6 × 1.0	6T	7.8 < 80> (5.8)
M8 × 1.25		19.1 <195> (14.1)
M10 × 1.25		39.2 <400> (29.0)
M12 × 1.25		71.6 <730> (52.8)
M6 × 1.0	8T	———
M8 × 1.25		29.4 <300> (21.7)
M10 × 1.25		60.8 <620> (44.8)
M12 × 1.25		107.9 <1100> (79.6)

(4) Tighten coupling nut type fittings or bolted type fittings according to the specified torque rating.

Standard Torque for O-ring Fittings

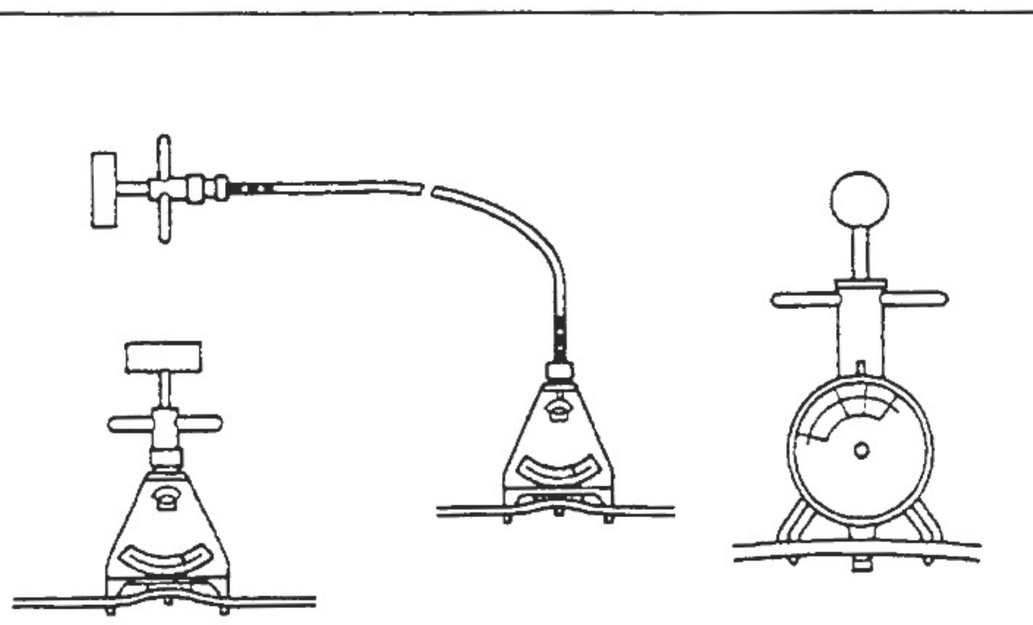
<Coupling nut type fitting>

Size of Tube (inch)	Fitting Torque N·m (kgf·cm, ft·lbf)
0.31	13.7 (140, 10.1)
0.50	22.5 (230, 16.6)
0.62	32.3 (330, 23.9)

<Block type fittings>

Block Type fittings	Bolt or Nut Size	Fitting Torque N·m (kgf·cm, ft·lbf)
Compressor Side	M8	24.5 (250, 18.1)
	M6	9.8 (100, 7.2)
Condenser Side	M8	12.7 (130, 9.4)
	M6	9.8 (100, 7.2)
		5.4 (55, 4.0) *
Receiver Side	M6	5.4 (55, 4.0)
Others	M8	12.7 (130, 9.4)
	M6	9.8 (100, 7.2)

* For Multi Flow type condenser



am012A

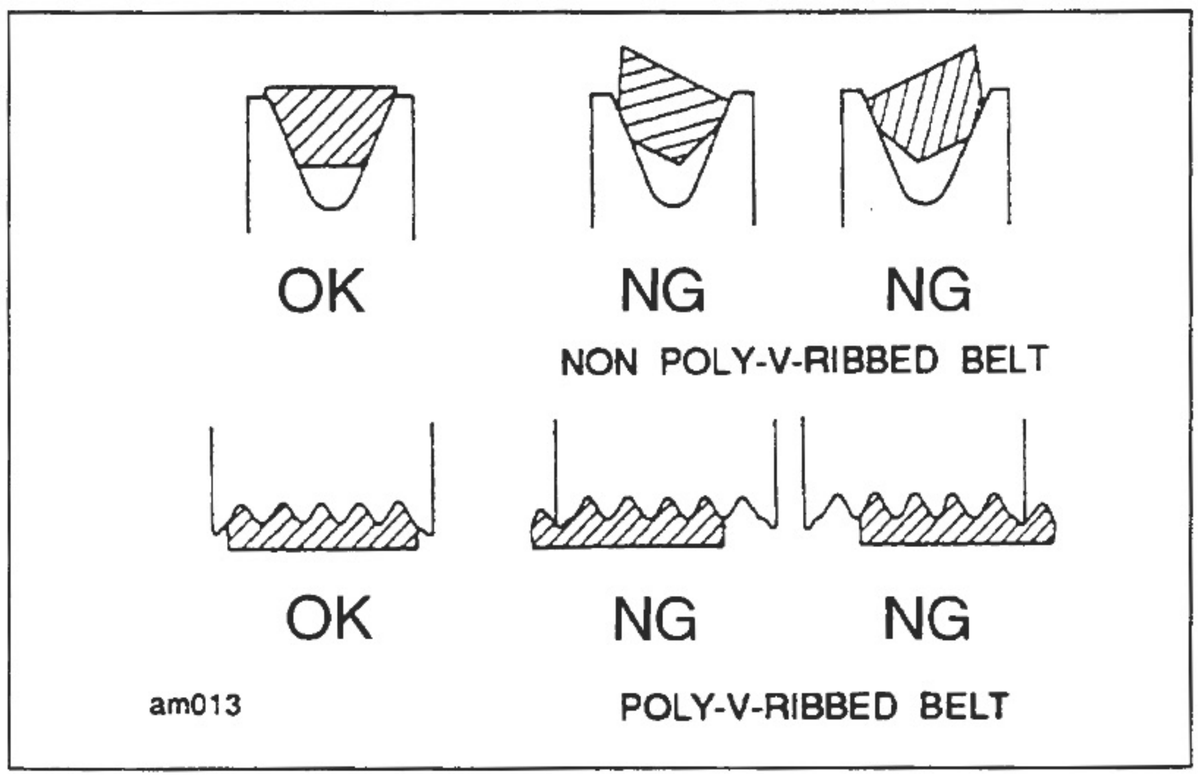
(5) After installing the drive belt, check the belt tension using belt tension gauge NIPPONDENSO BTG-20 or BURROUGHS BT-33-73F.

NOTE

1. *The belt tension may be measured between any two pulleys by using a belt tension gauge.*
2. *A "New belt" refers to a belt which has been used for less than 5 minutes on an air conditioning operation.*
   A "Used belt" refers to a belt which has been used for more than 5 minutes on an air conditioning operation.

CAUTION

1. *The drive belt requires accurate tension adjustment ; a slack belt is likely to cause belt whine, while excessive tension may result in damage to accessory bearing or to idle pulley bracket.*
2. *After installing the drive belt, check that it is properly seated in the grooves.*

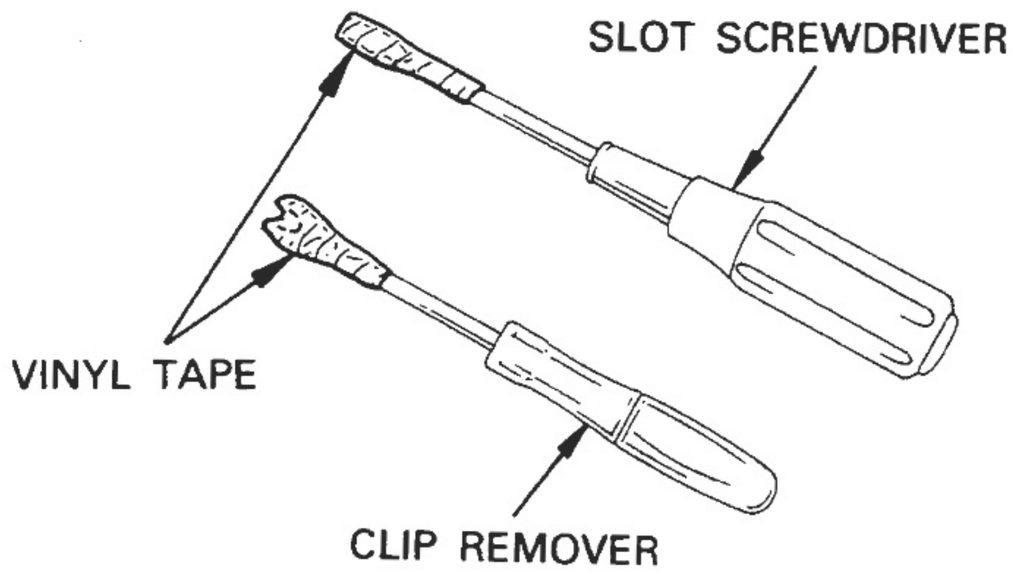


am013

CAUTION

This air conditioning is of the "HFC-134a (R134a)" type. Be sure that you use the correct oil (ND-OIL8), gas and tool.

1. INSTALLATION

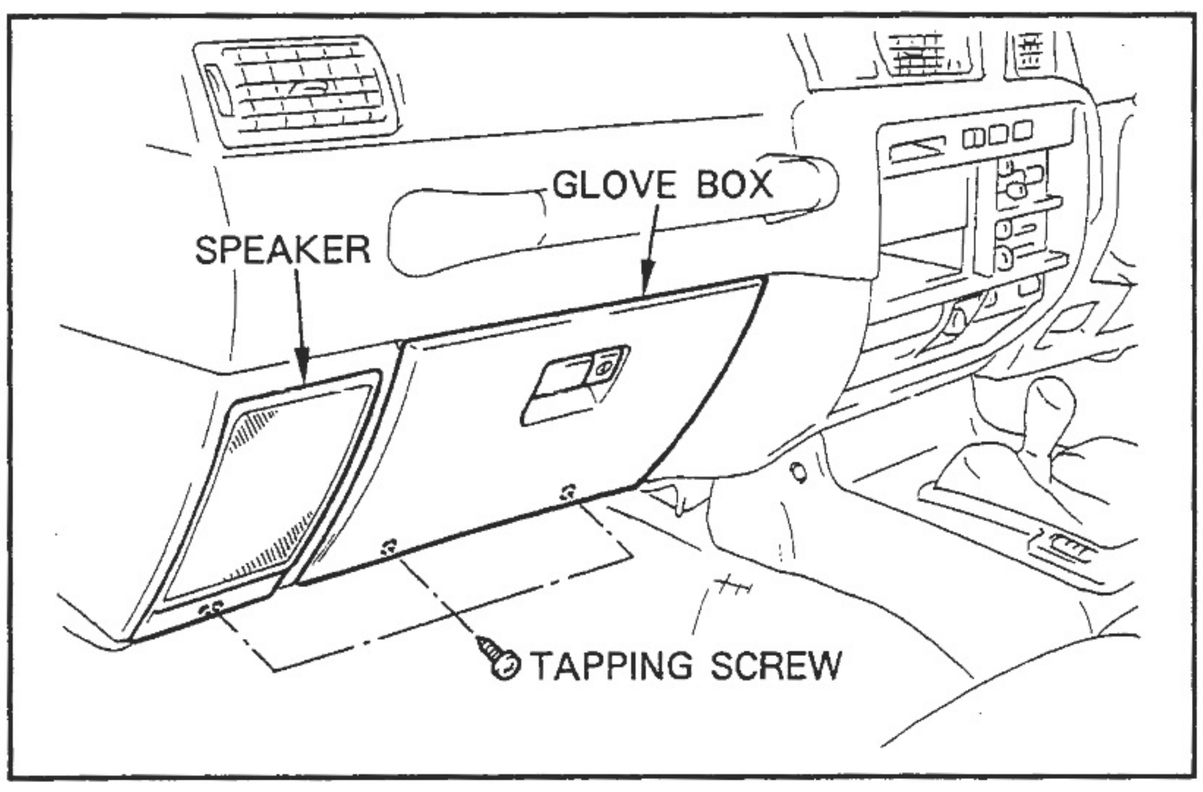


CAUTION

1. *Before starting installation, remove the (–) terminal of the battery.*
2. *Take care not to scratch any parts of the vehicle.*
3. *Sort removed bolts and tapping screws into groups so that they can be reassembled correctly.*
4. *Ensure seat/floor protectors are in position.*

In connection with caution 2 above, bind the tips of tools (clip remover, slot screwdriver etc.) with a piece of vinyl tape to prevent damage to parts of the car.

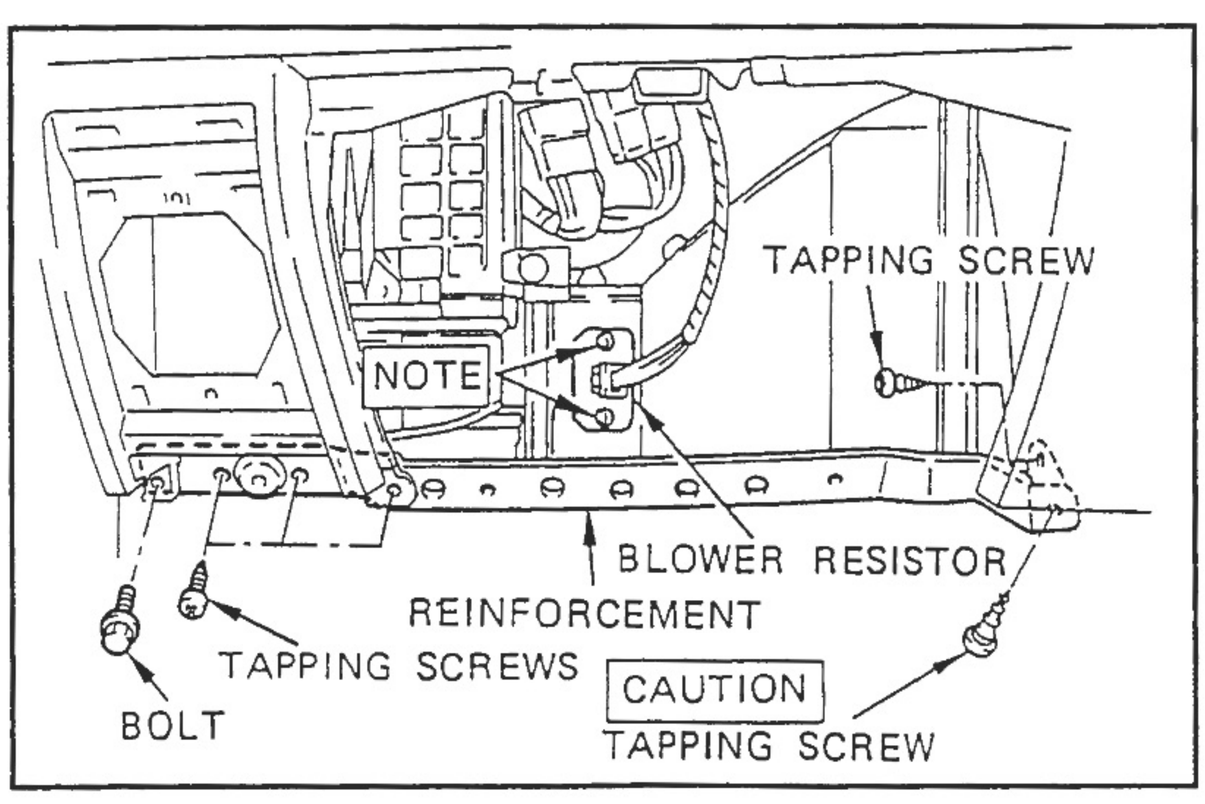
1.1 INSTALLATION INSIDE PASSENGER COMPARTMENT



(1) REMOVAL OF PARTS

(a) Glove box

(b) Speaker



(c) Reinforcement

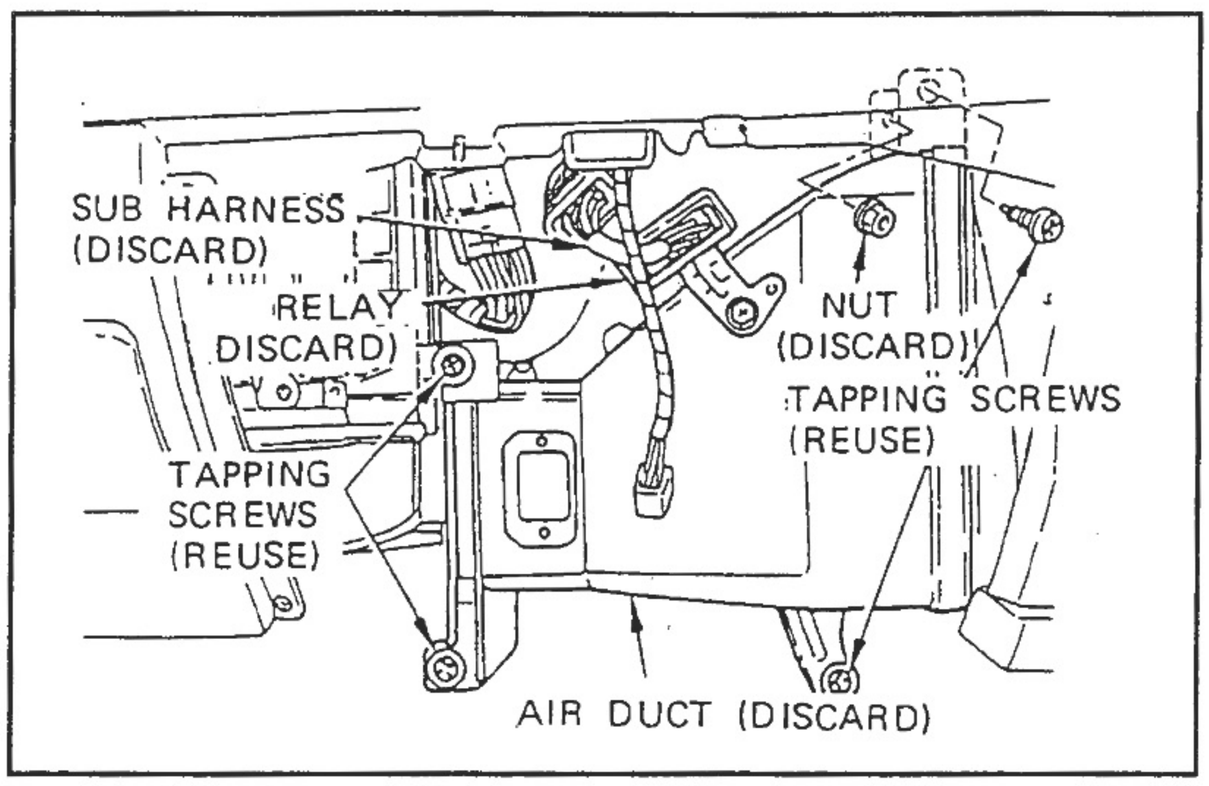
CAUTION

Ensure that the tapping screw on the far left hand side is removed.

(d) Blower resistor

NOTE

Do not discard the two tapping screws for the blower resistor.

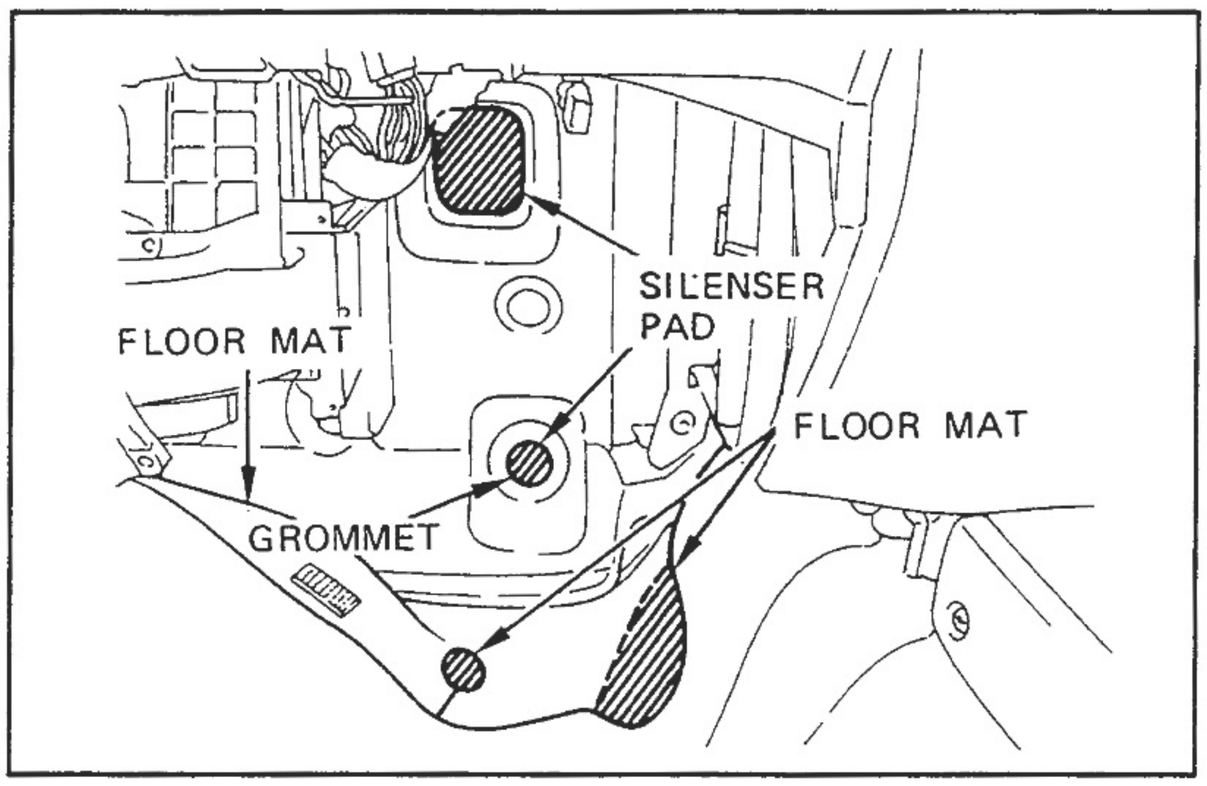


(e) Relay (Equipped model only) . . . . . Discard
(f) Sub harness (Equipped model only) Discard
(g) Air duct . . . . . Discard

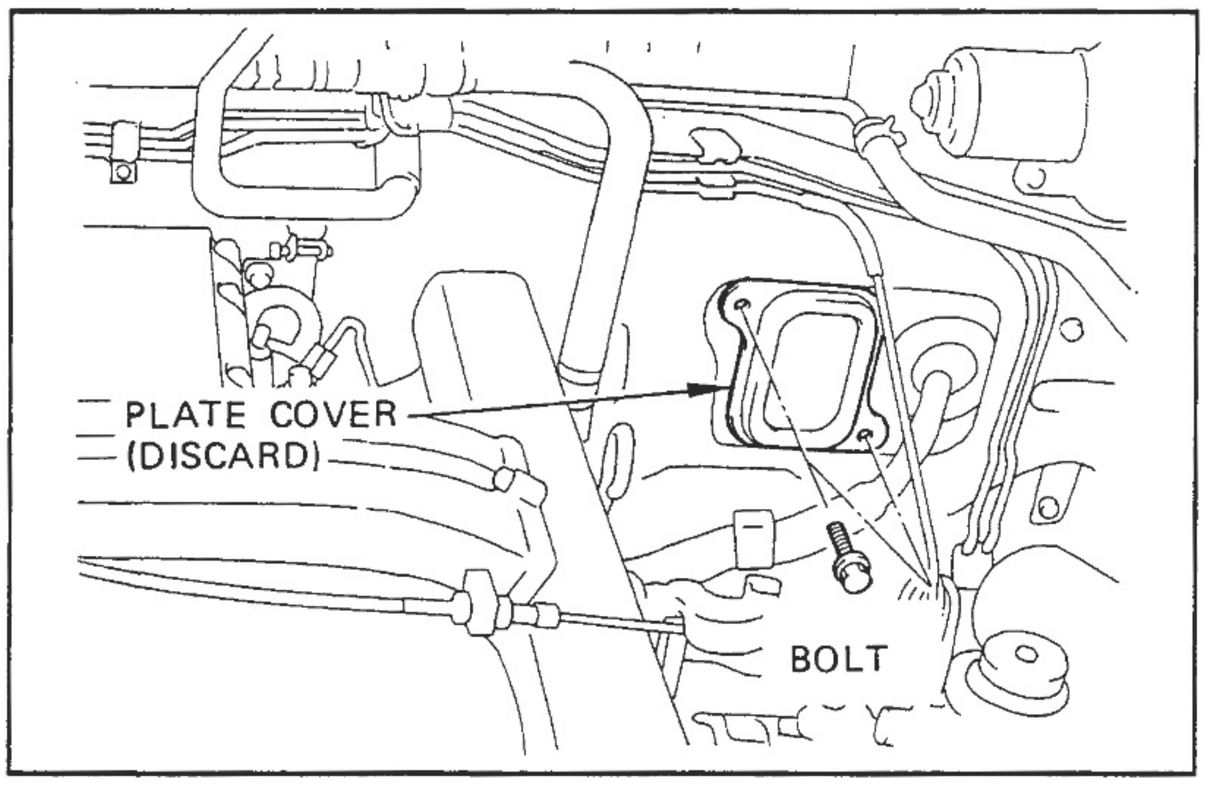
NOTE

Do not discard four original tapping screws.

(h) Nut . . . . . Discard



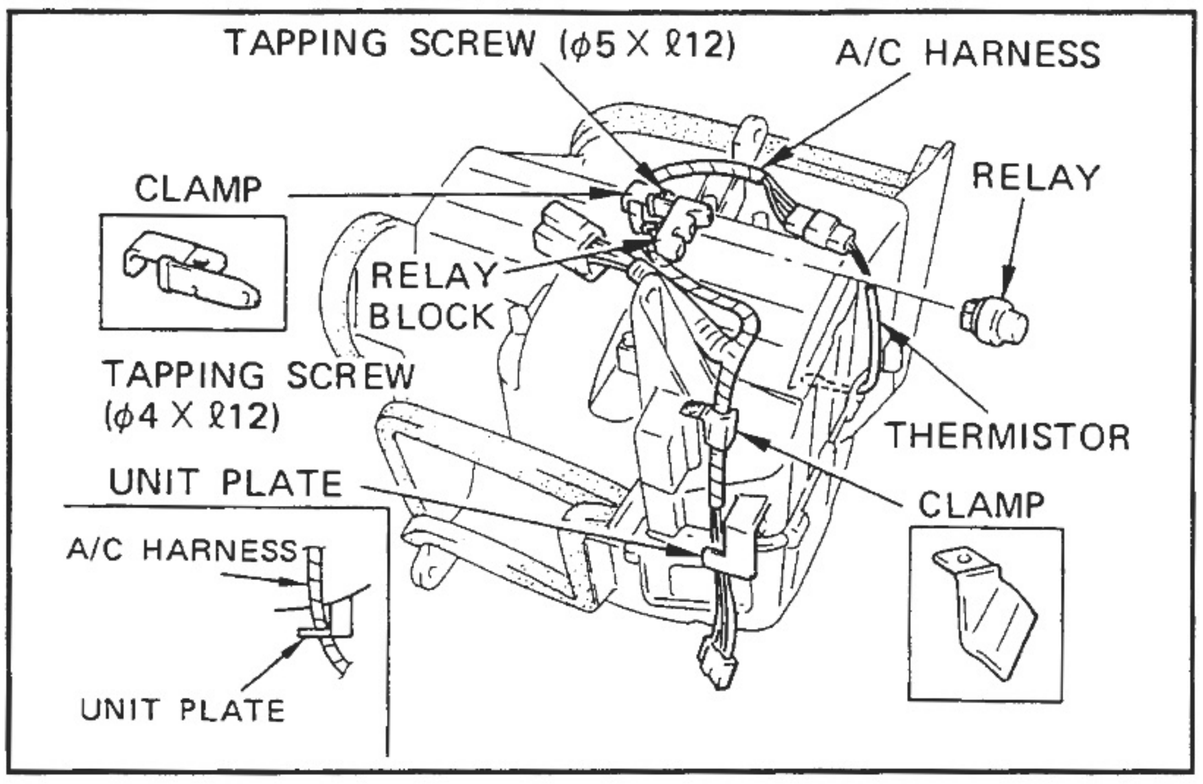
(i) Temporarily pull the floor mat down and cut out 2 shaded areas from floor mat.
(j) Cut out 2 shaded areas from silencer pad.
(k) Remove and discard the grommet from the fire wall.

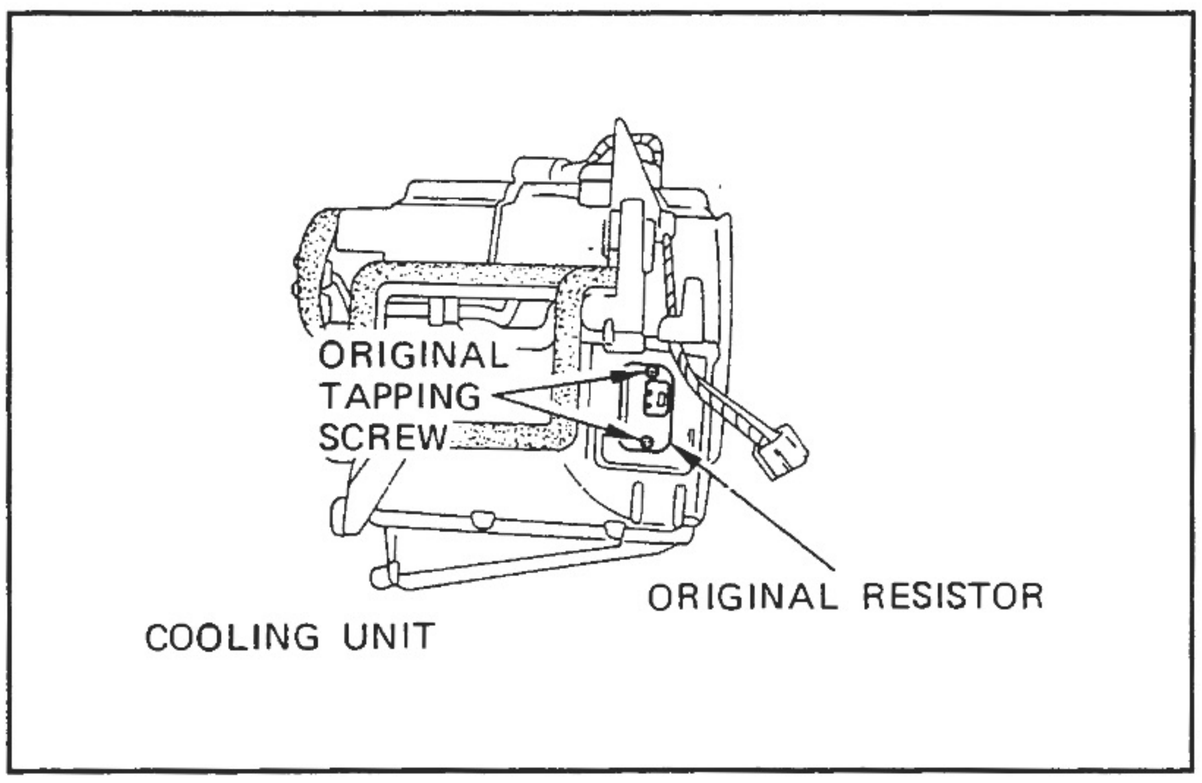


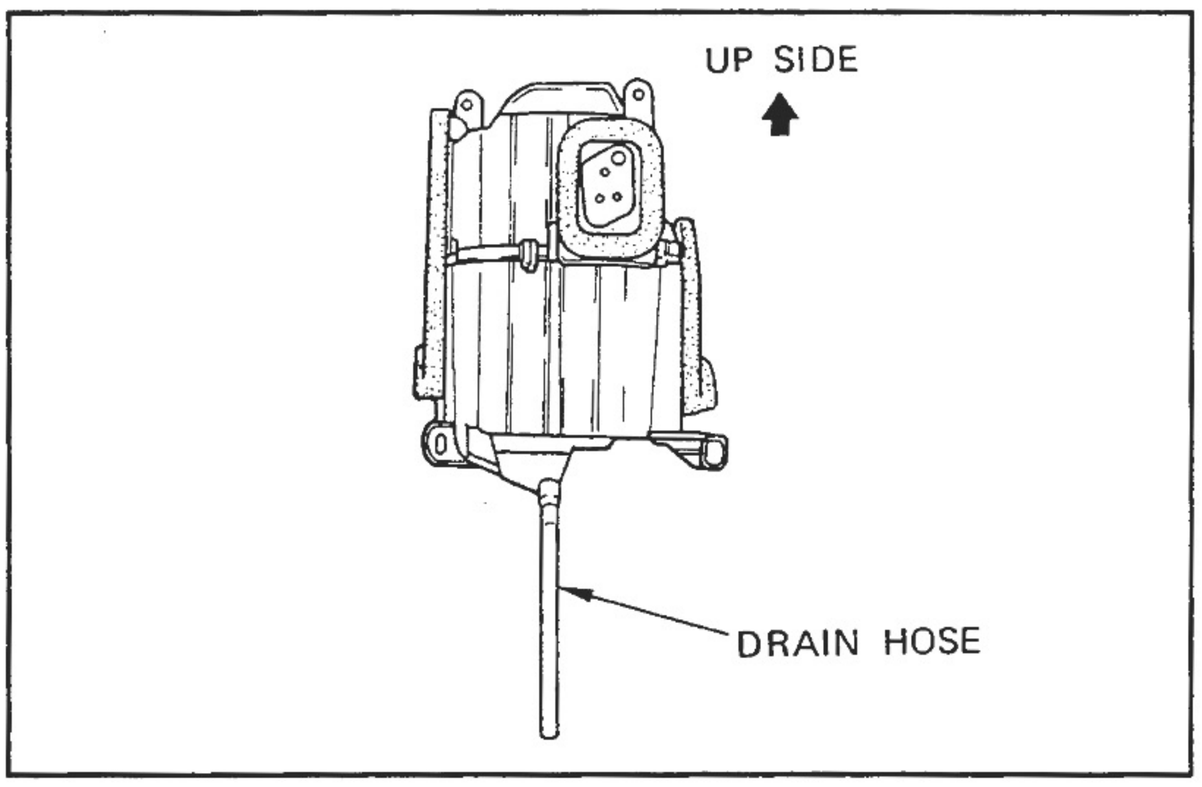
(l) Plate cover . . . . . Discard

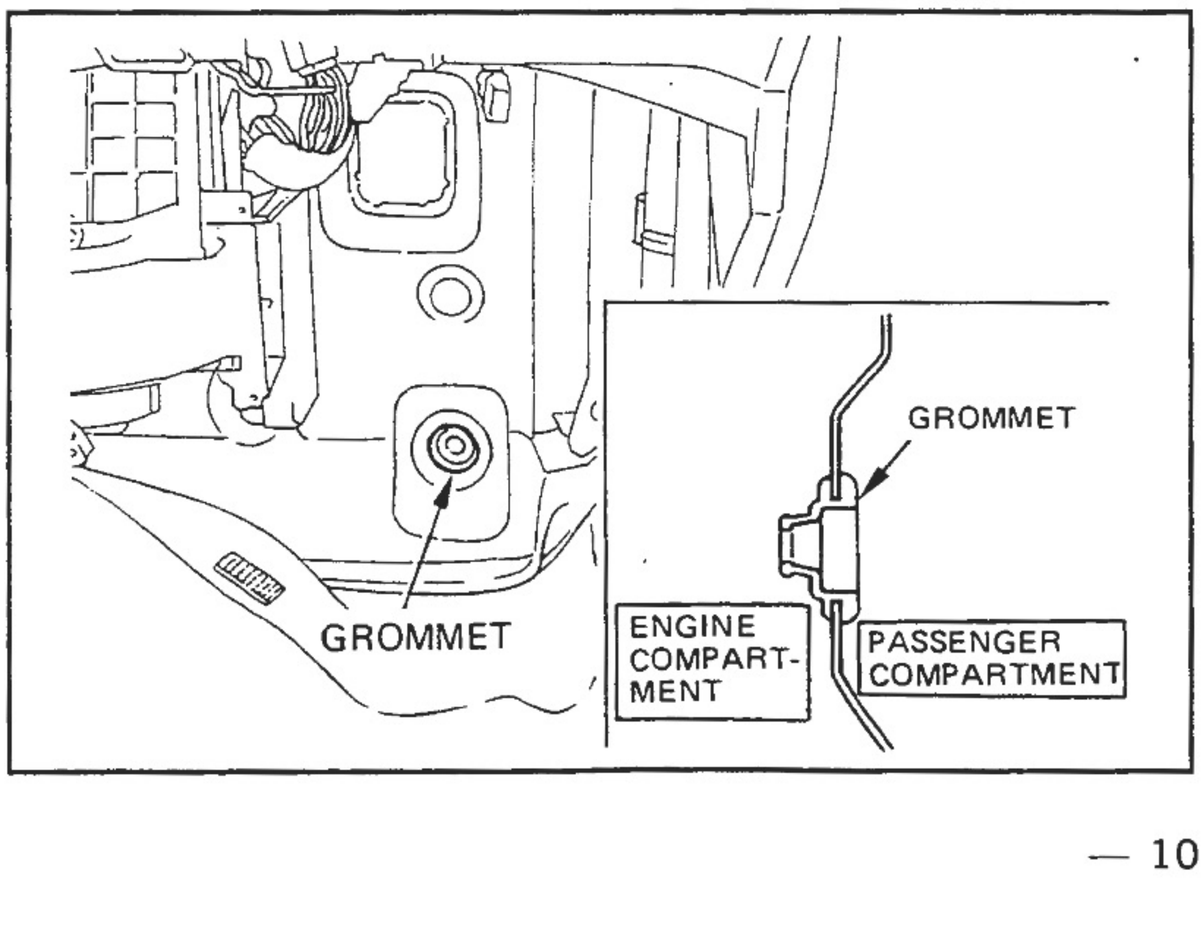
NOTE

Do not discard two original bolts.









(2) COOLING UNIT

(a) Install and secure the A/C harness to the cooling unit using two clamps and two tapping screws.

NOTE

Secure the A/C harness using the unit plate as shown.

(b) Connect the 2-P connector of the A/C harness to the thermistor.

(c) Fasten the relay block to the clamp and install the 4-P relay.

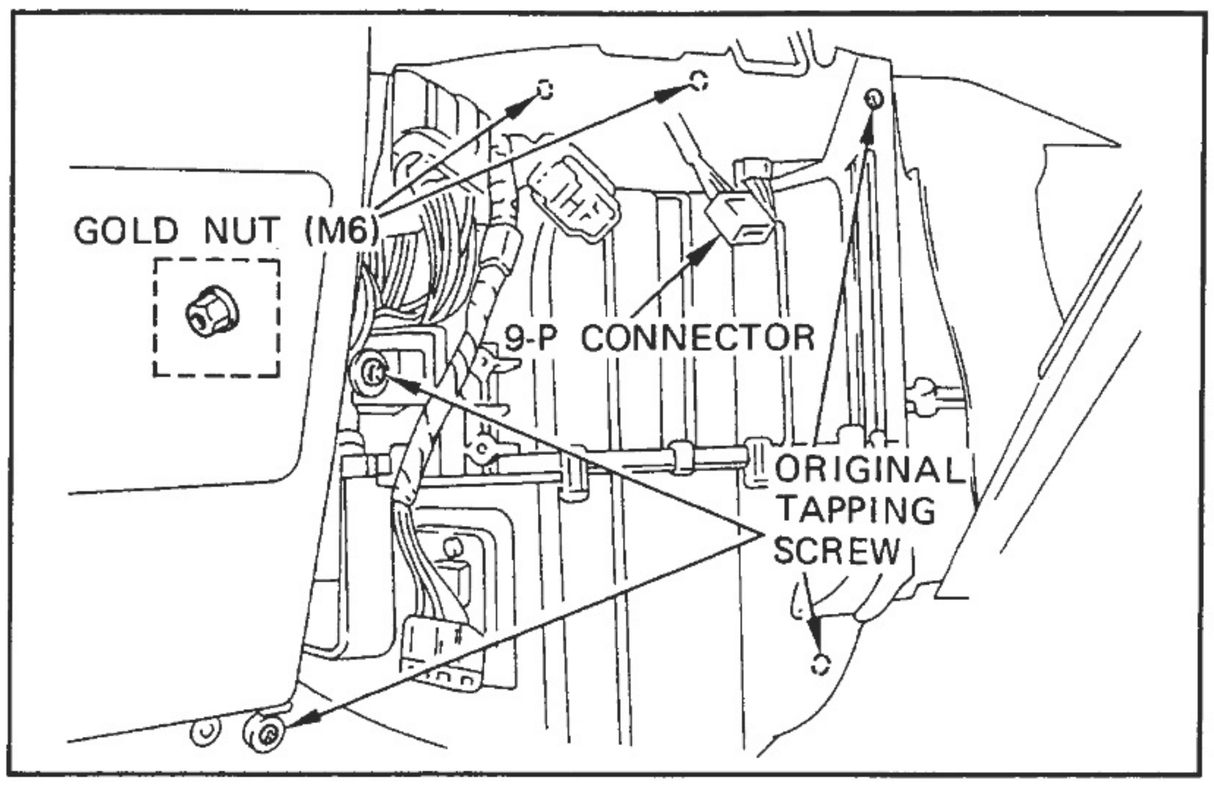
(d) Install the original blower resistor to the cooling unit using two original tapping screws.

(e) Install the drain hose to the cooling unit.

(f) Install the grommet for the drain hose from passenger compartment.

NOTE

Lift the silencer pad to install the drain hose grommet.

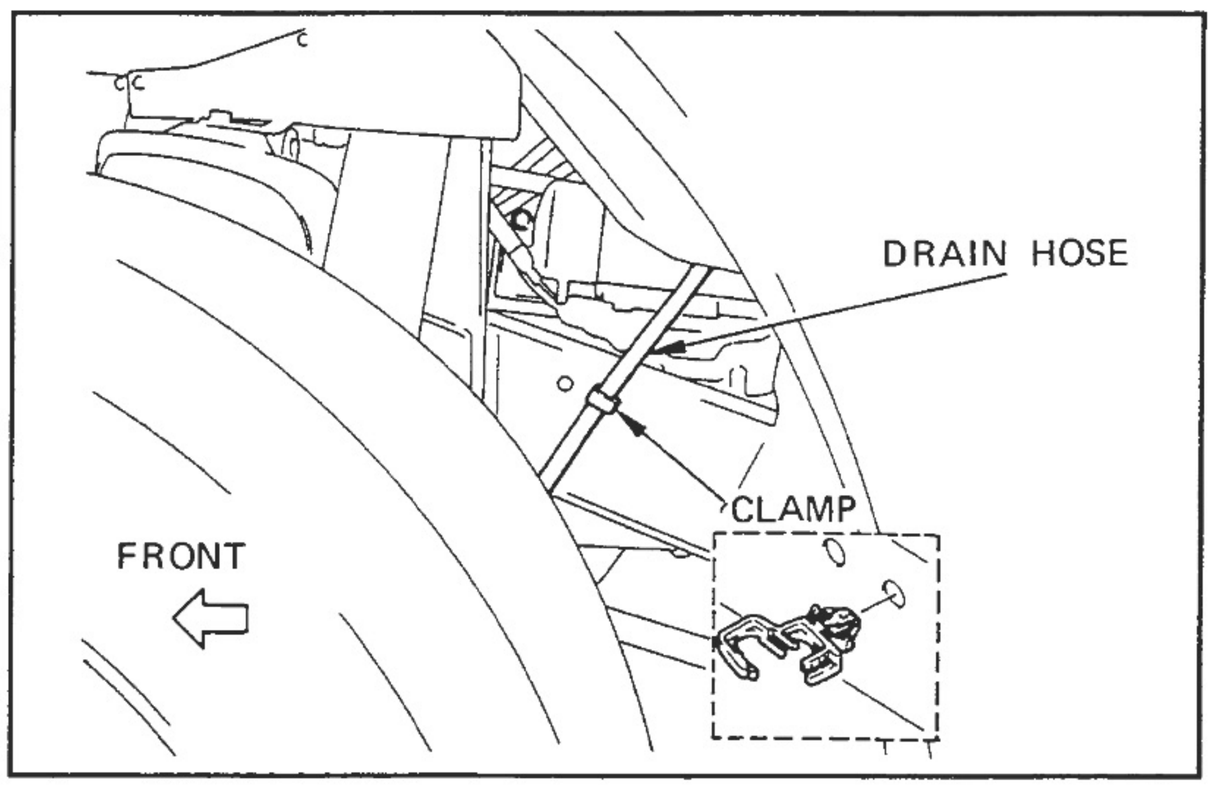


(g) Untape the 9-P connector from the vehicle harness, prior to installing the cooling unit.

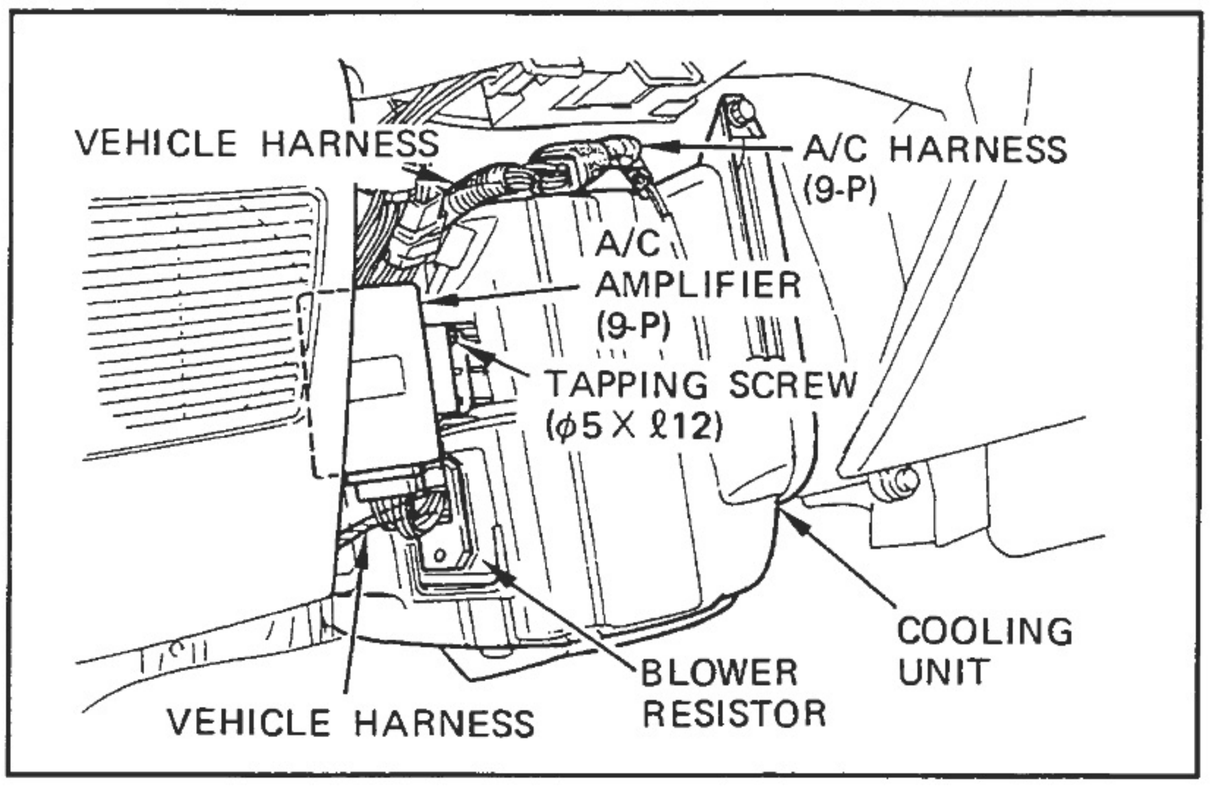
NOTE

The 9-P connector is located between the demister duct and the reinforcement tube.

(h) Install the cooling unit using two nuts and four original tapping screws.



(i) Fasten the drain hose on the frame using a clamp.

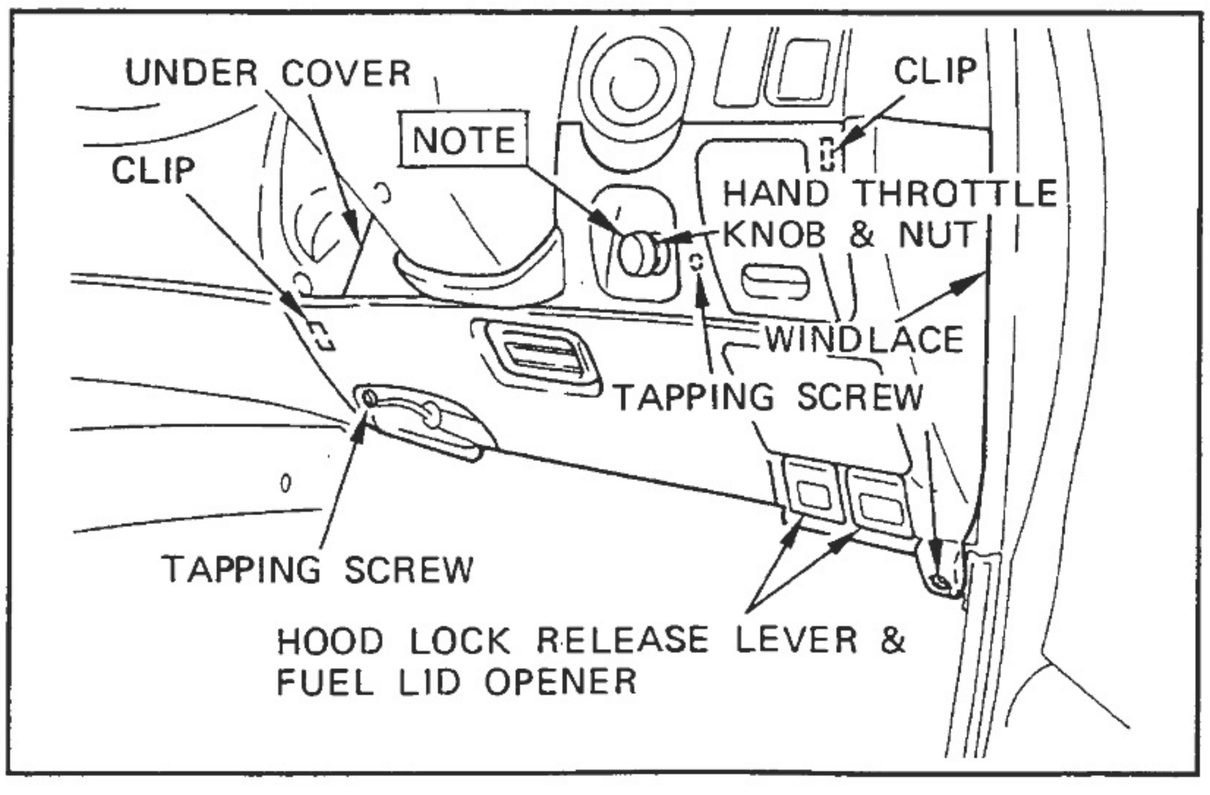


(j) Install the A/C amplifier to the cooling unit using a tapping screw.

(k) Reconnect the vehicle harness to the blower resistor.

(l) Connect the 9-P connector of the A/C harness to vehicle harness.

(m) Connect the A/C harness to the A/C amplifier (9-P).



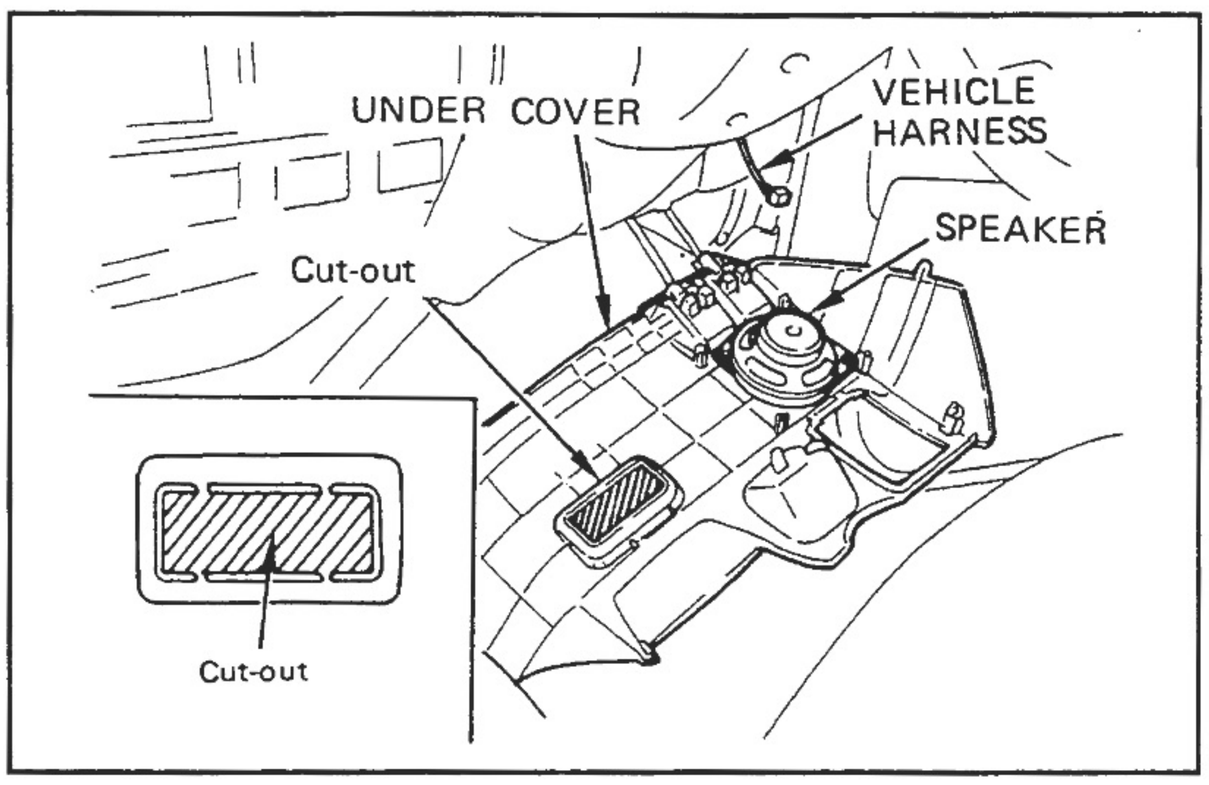
(3) SIDE AIR DUCT

(a) Temporarily remove the hand throttle knob and nut.

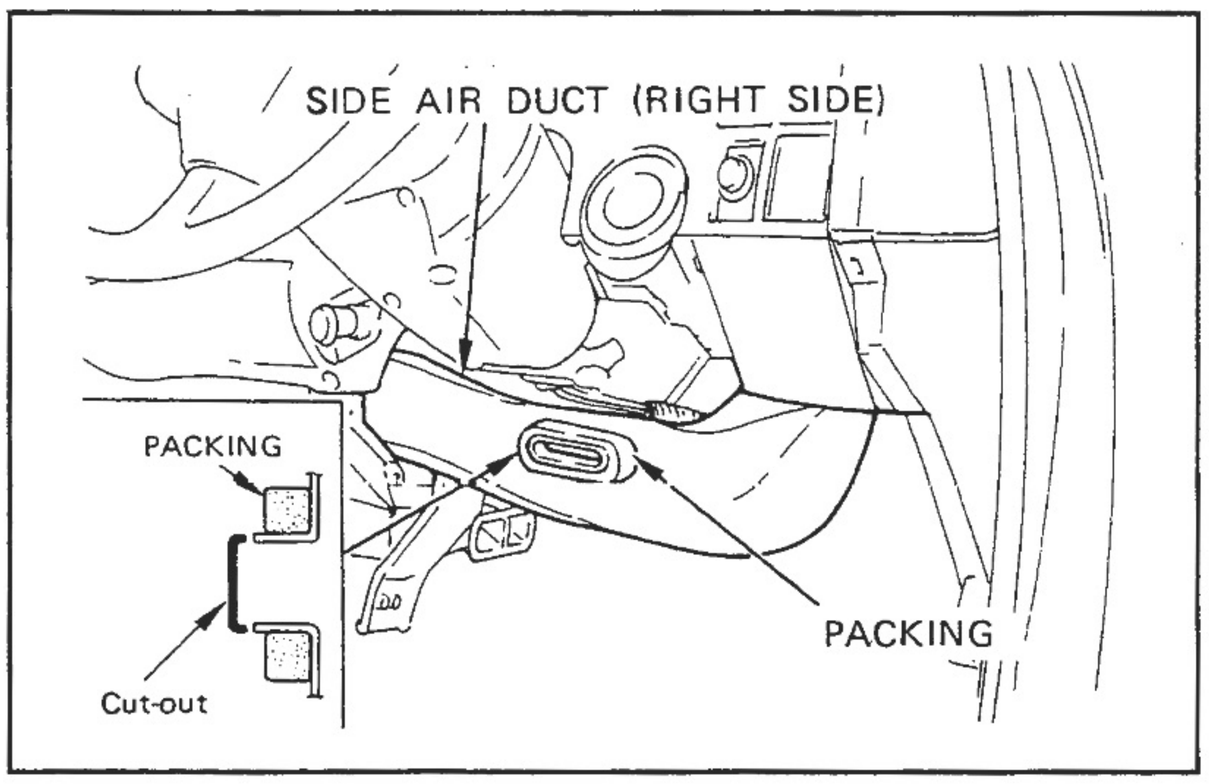
NOTE

To remove the hand throttle knob, depress the lock pin in the knob and pull.

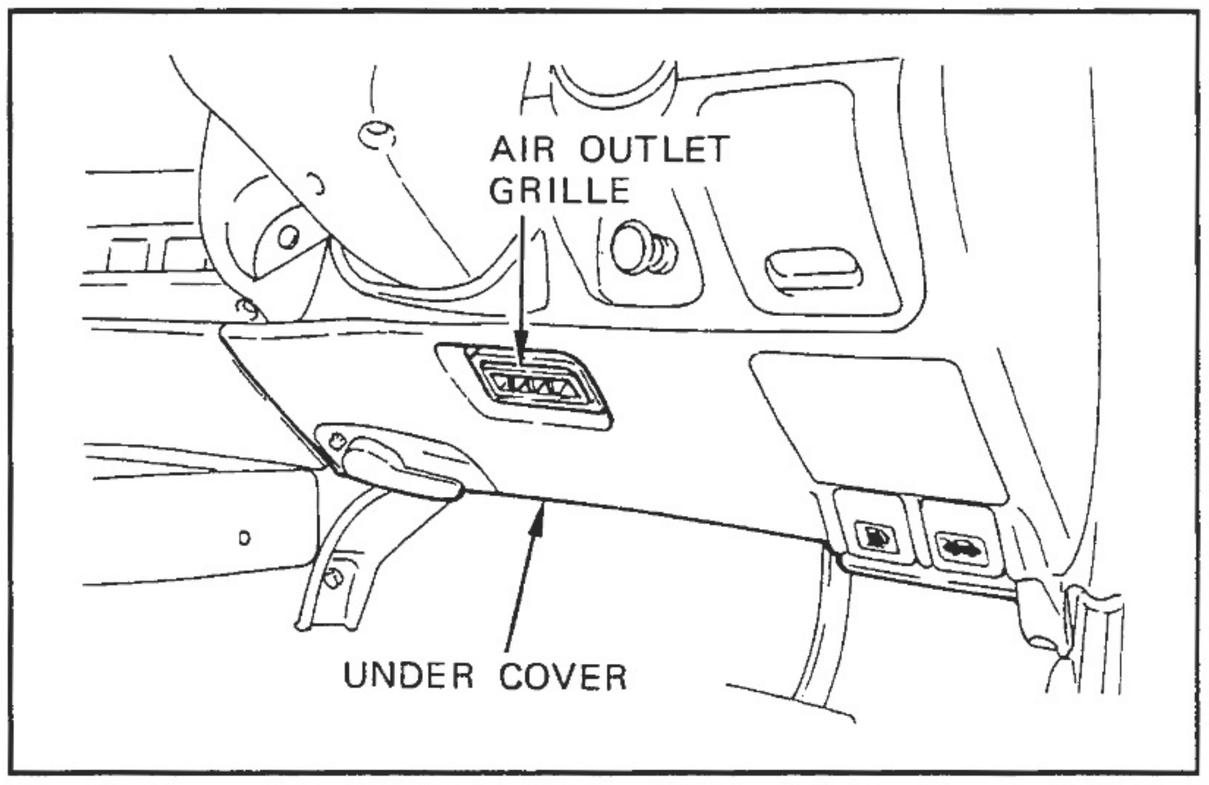
(b) Temporarily remove the windlace and the under cover with the hood lock release lever & fuel lid opener.



(c) Disconnect the vehicle harness from the speaker.
(d) Cut out the shaded area from the under cover.



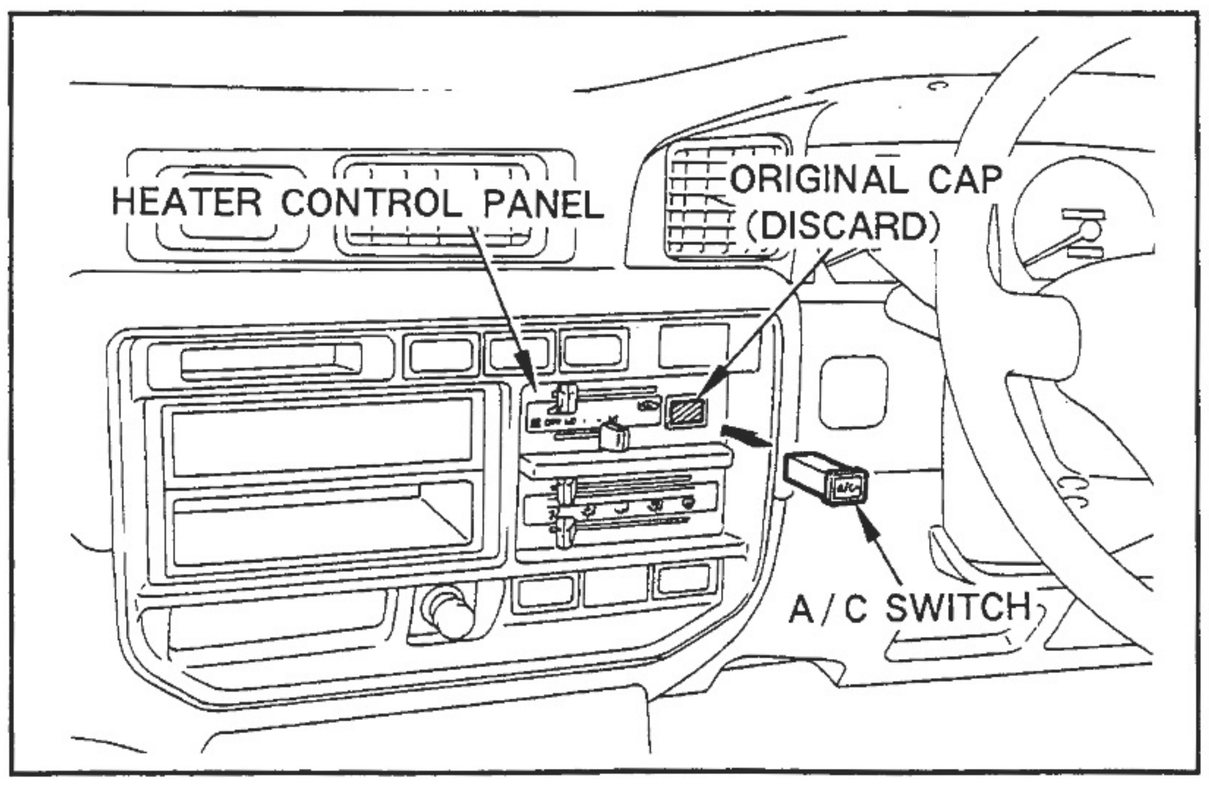
(e) Cut out the indicated part in figure from side air duct.
(f) Attach the packing around the air outlet port of side air duct as shown.



(g) Reconnect the vehicle harness to speaker.
(h) Reinstall the under cover.
(i) Install the air outlet grille into the under cover.

NOTE

Shot down the air outlet grille.



(4) A/C SWITCH

(a) Cut out the original cap from heater control panel.
(b) Install the A/C switch.

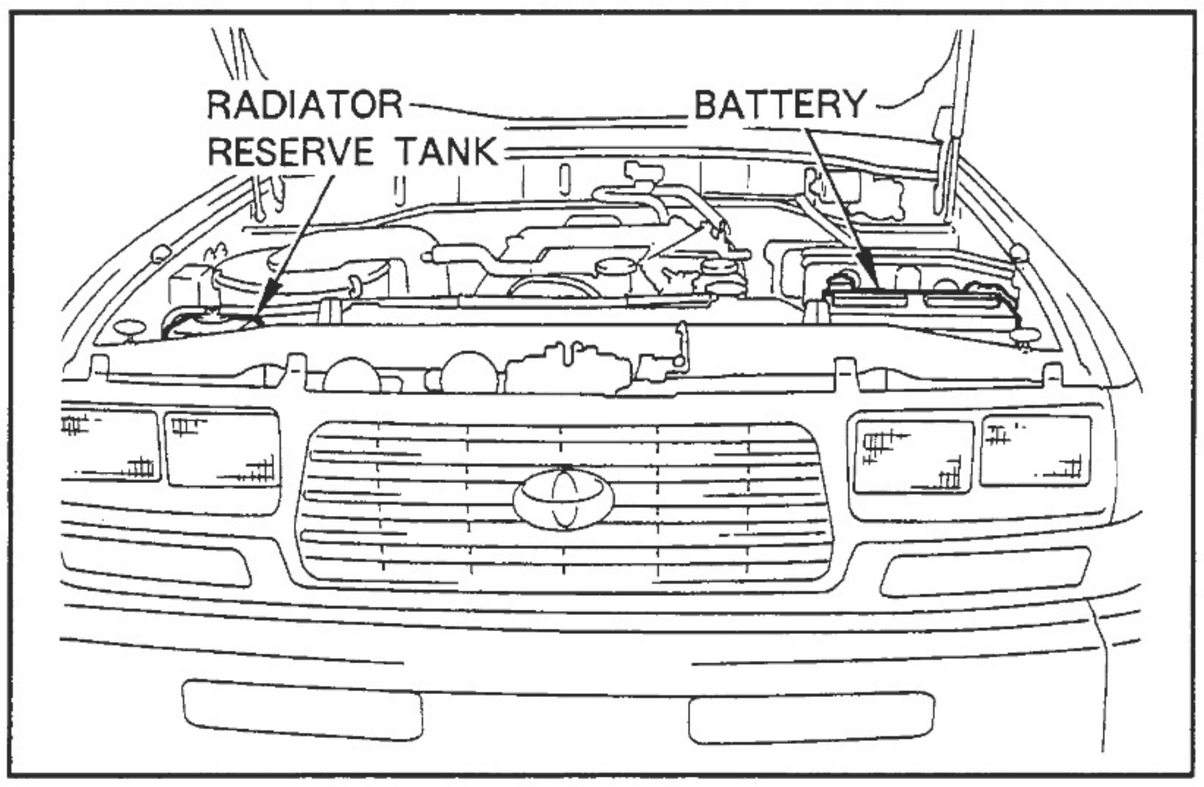
(5) REINSTALLATION

(a) Reinstall the temporarily removed parts.

1.2 INSTALLATION INSIDE ENGINE COMPARTMENT

CAUTION

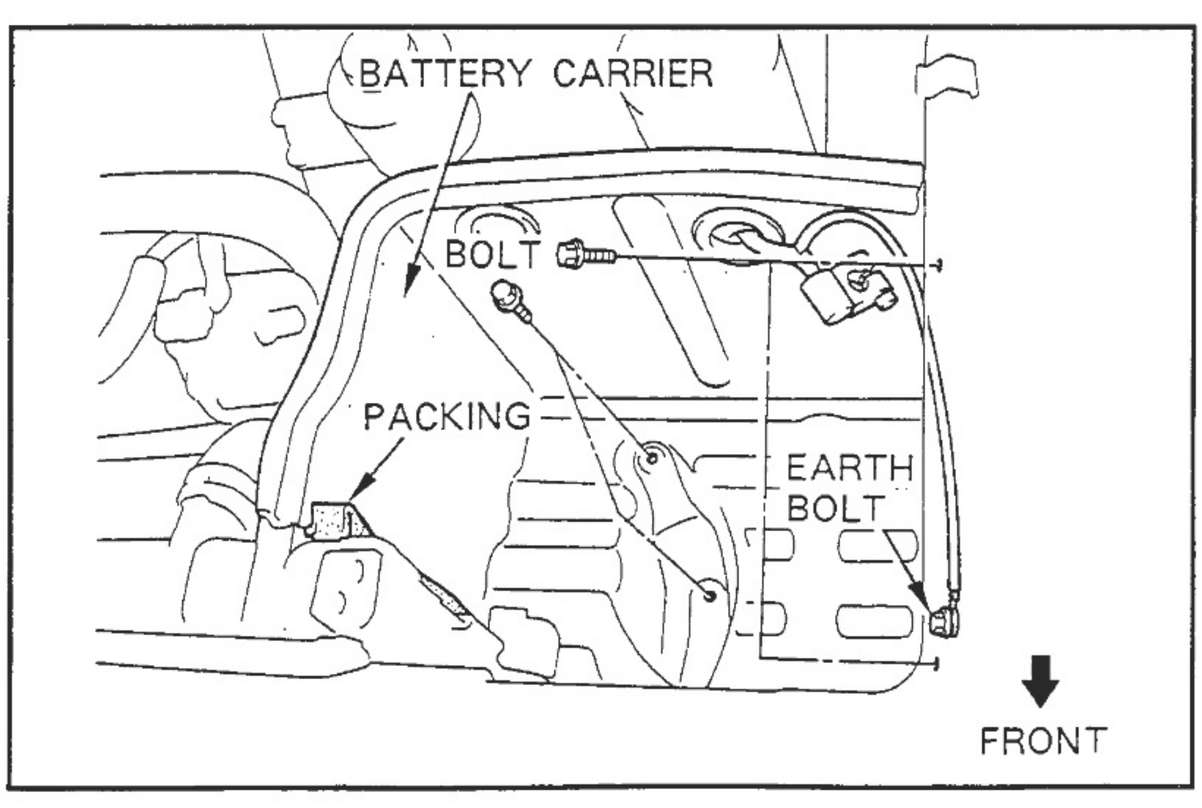
1. *Before starting installation, remove the (–) terminal of the battery.*
2. *Before making any hoses and tubes connections, apply a few drops of compressor oil to the seat of O-ring and coupling nuts.*
3. *When tightening and loosening fittings, use two wrenches for support.*
4. *Ensure fender covers are in position.*



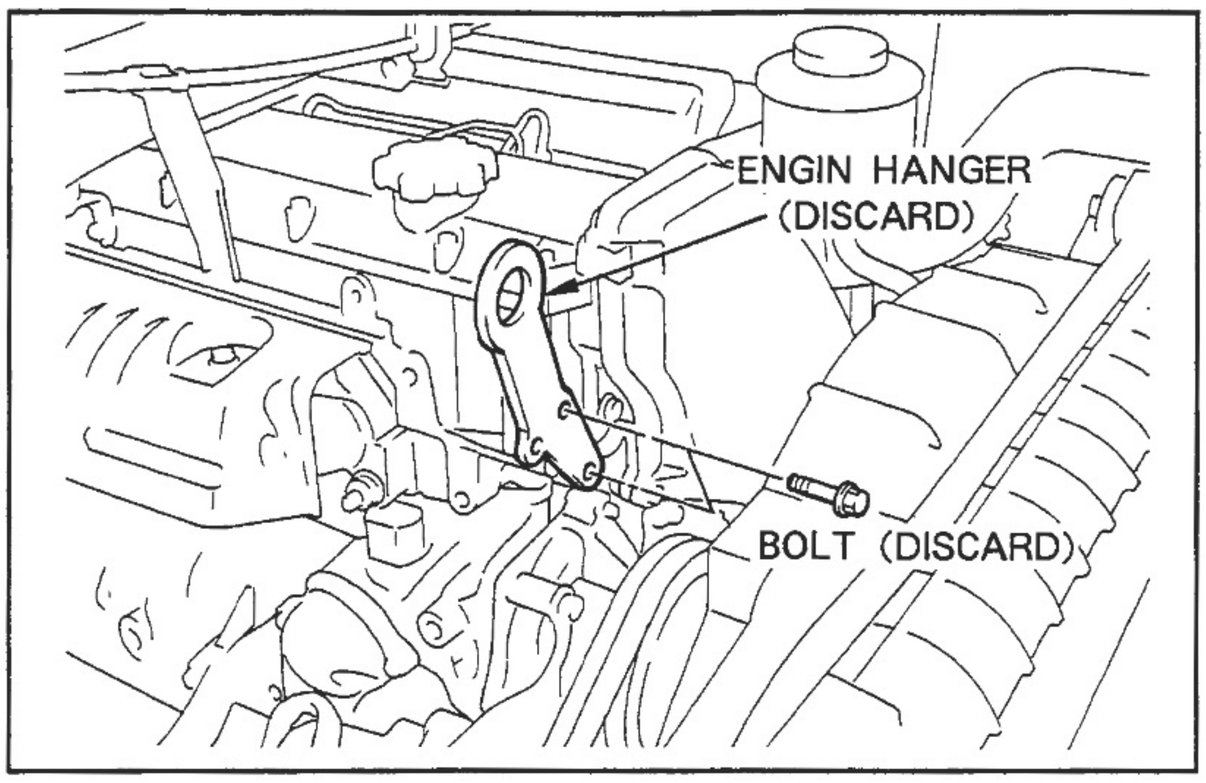
(1) REMOVAL OF PARTS

Remove the following parts

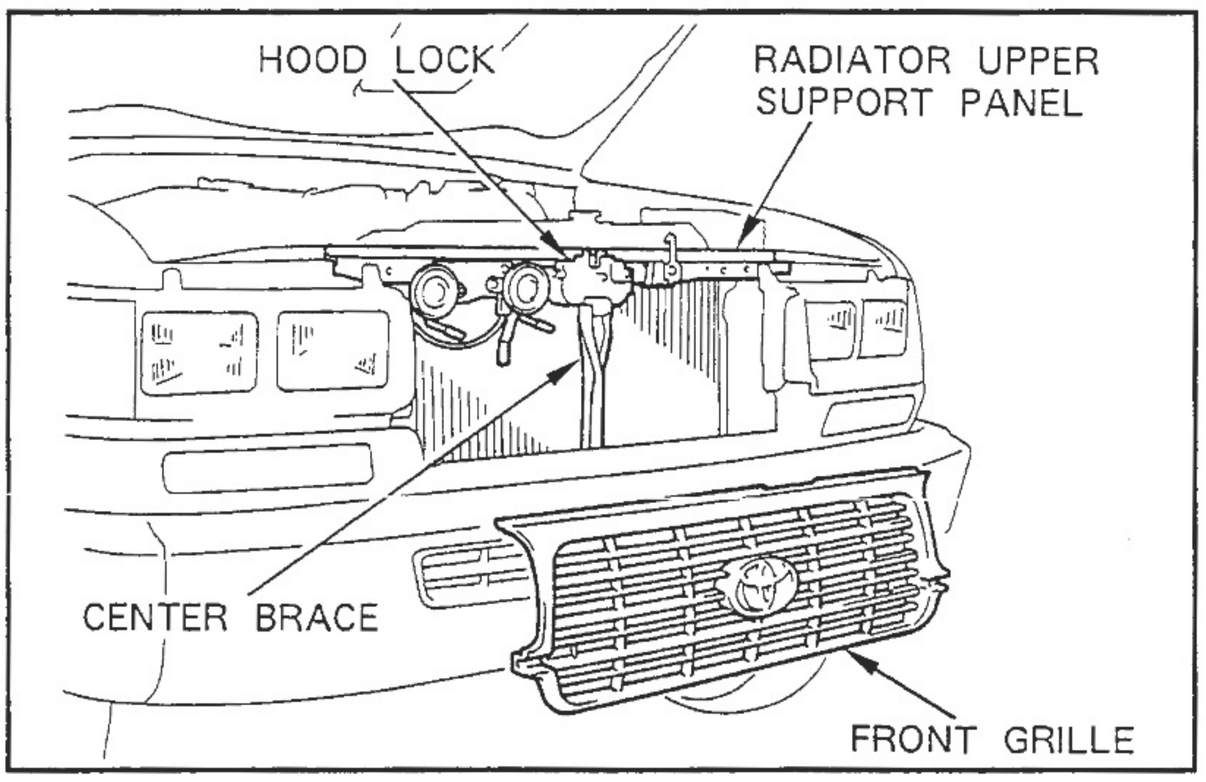
(a) Radiator reserve tank
(b) Battery



(c) Earth bolt, Battery carrier and packing.



(d) Engine hanger & bolt . . . . . Discard



(e) Radiator grill

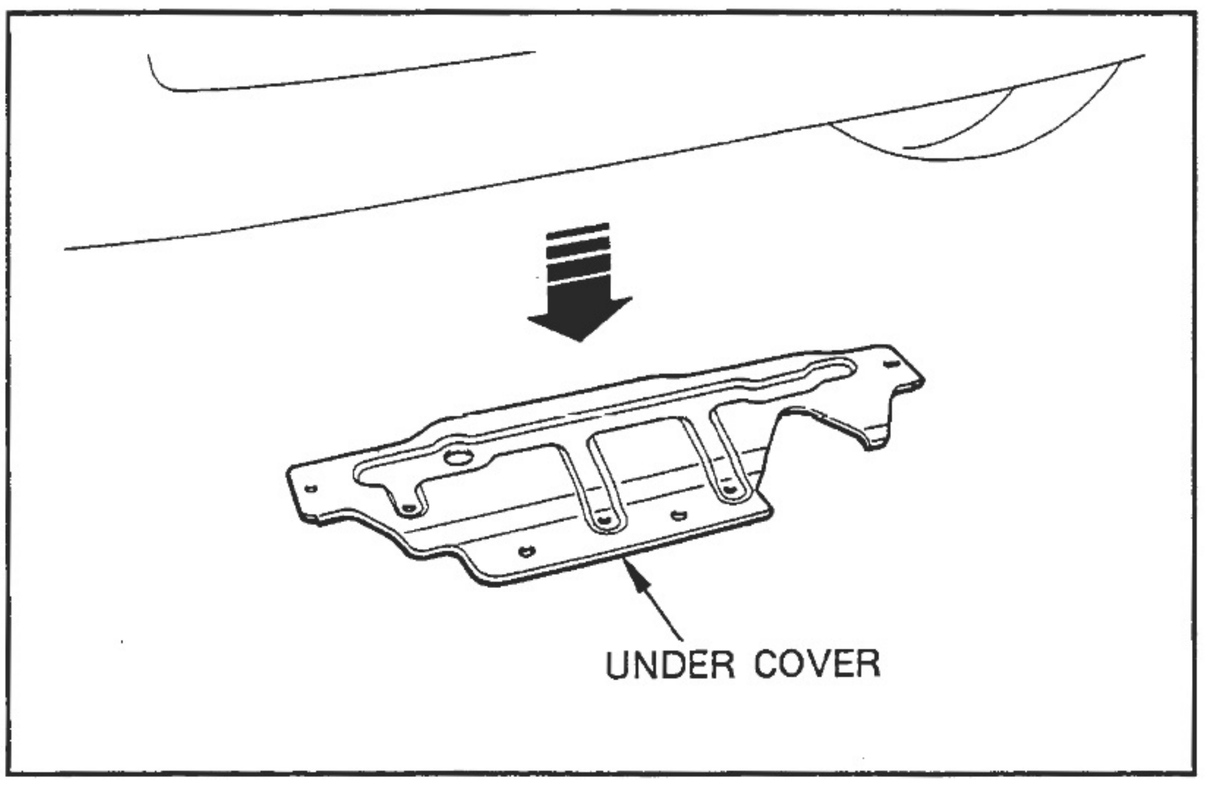
(f) Hood lock and center brace.

(g) Radiator upper support panel.

NOTE

1) Disconnect the horn harness.

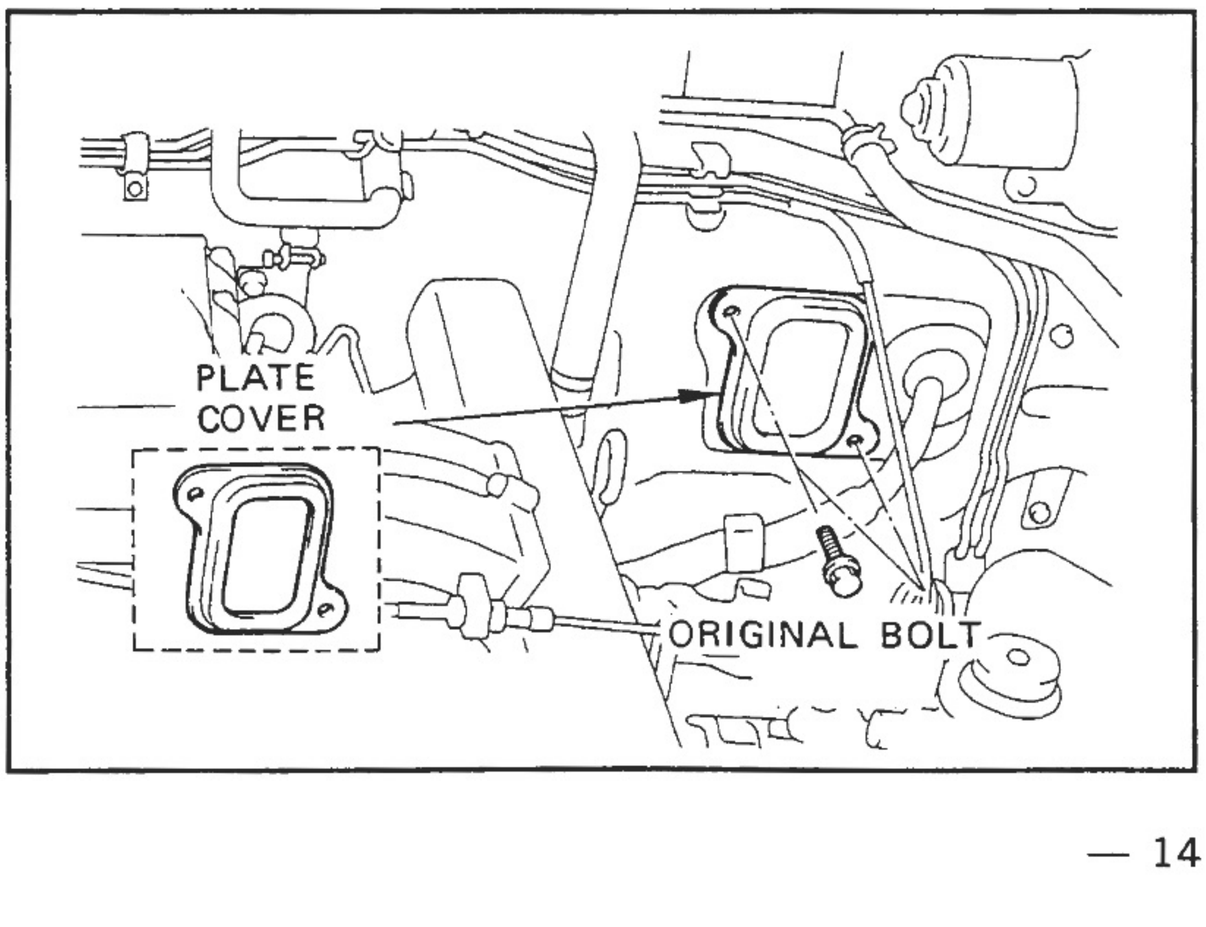
2) Unclip the vehicle harness from the radiator upper support panel.



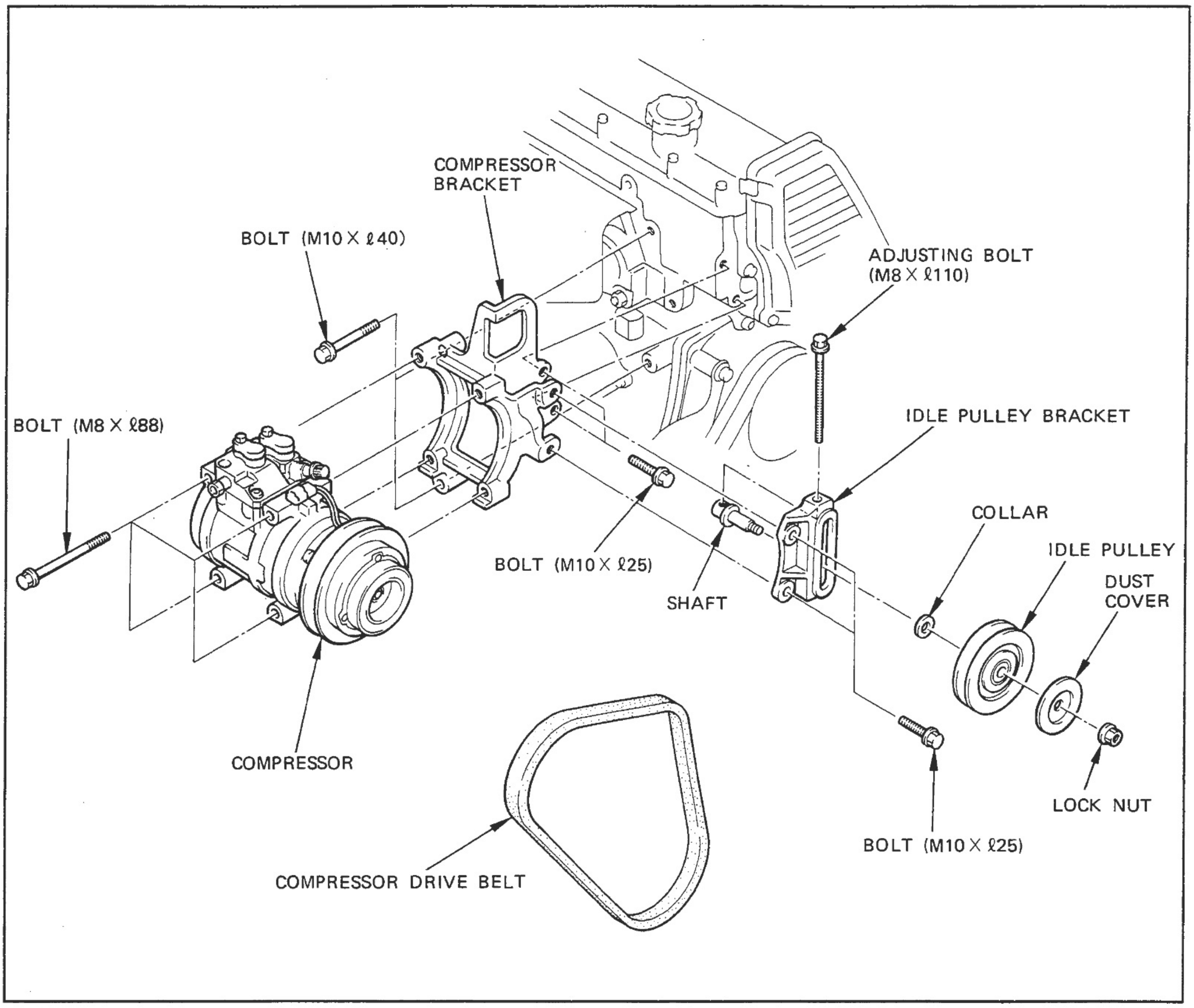
(h) Under cover

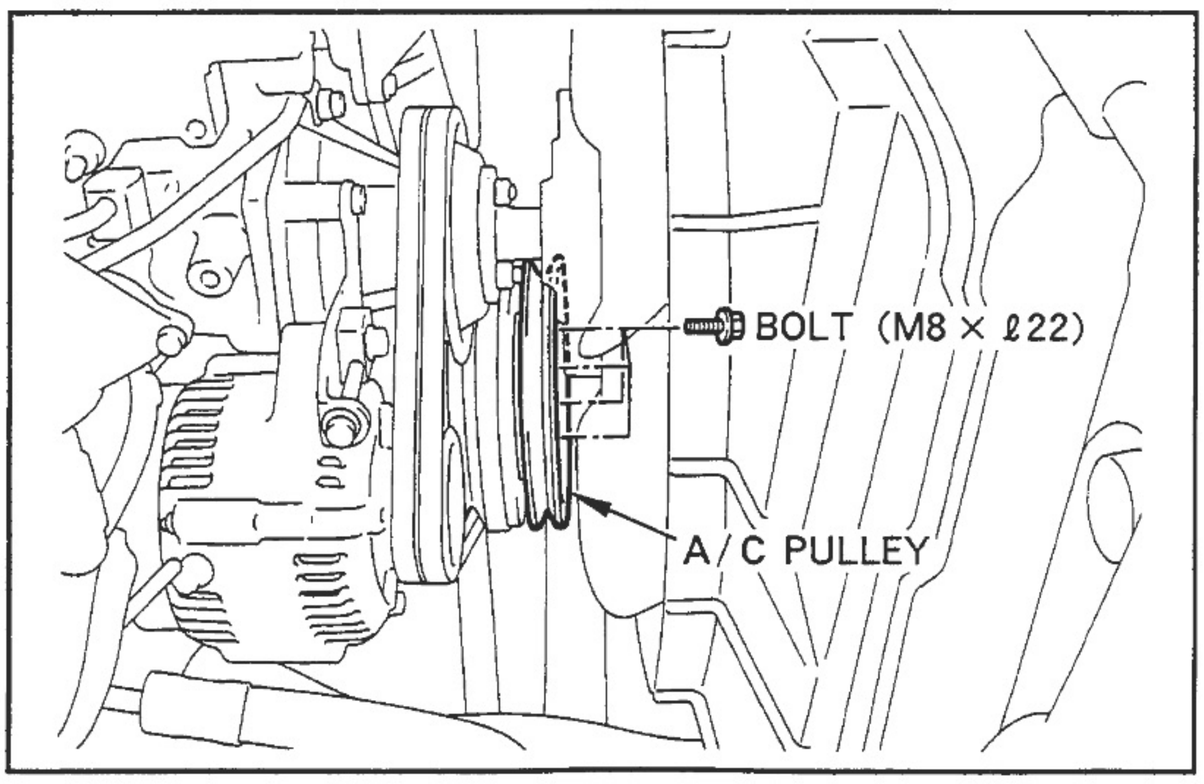
(2) PLATE COVER

(a) Install the plate cover supplied in the kit on the bulkhead using two original bolts.



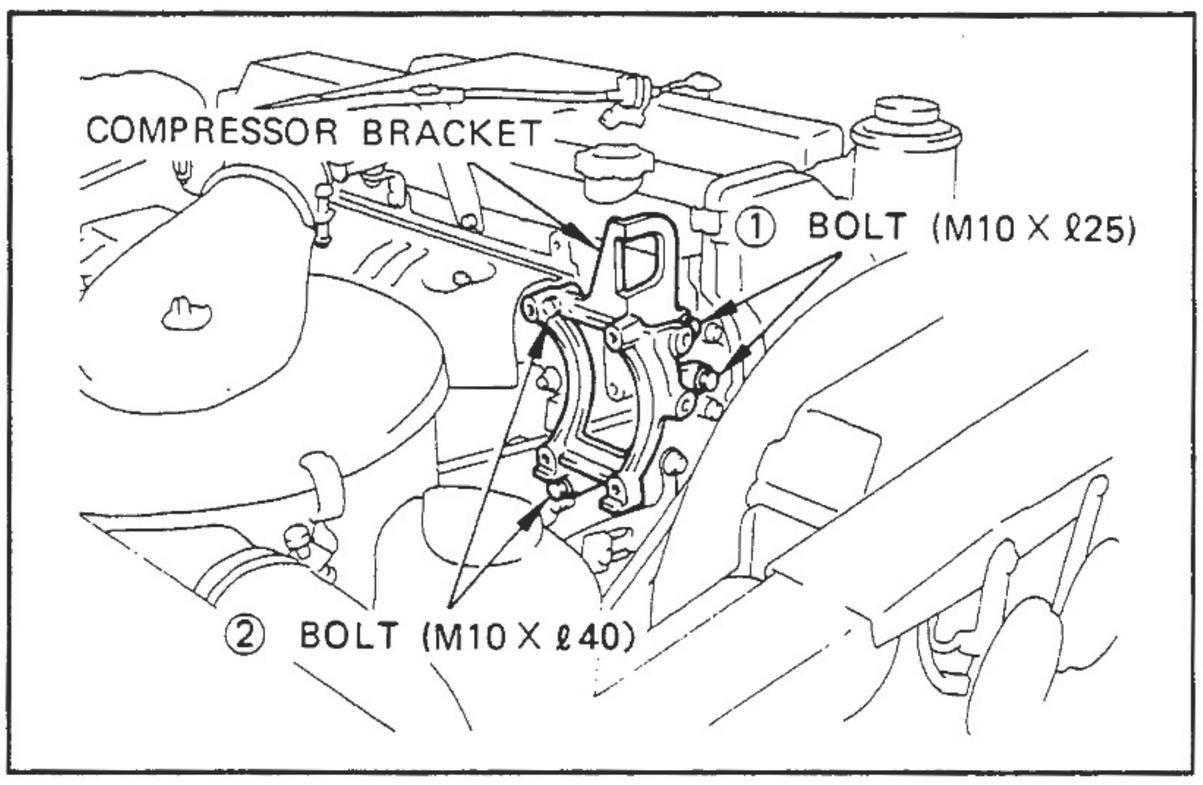
(3) COMPRESSOR





(a) Install the A/C pulley to the crankshaft pulley using four bolts.

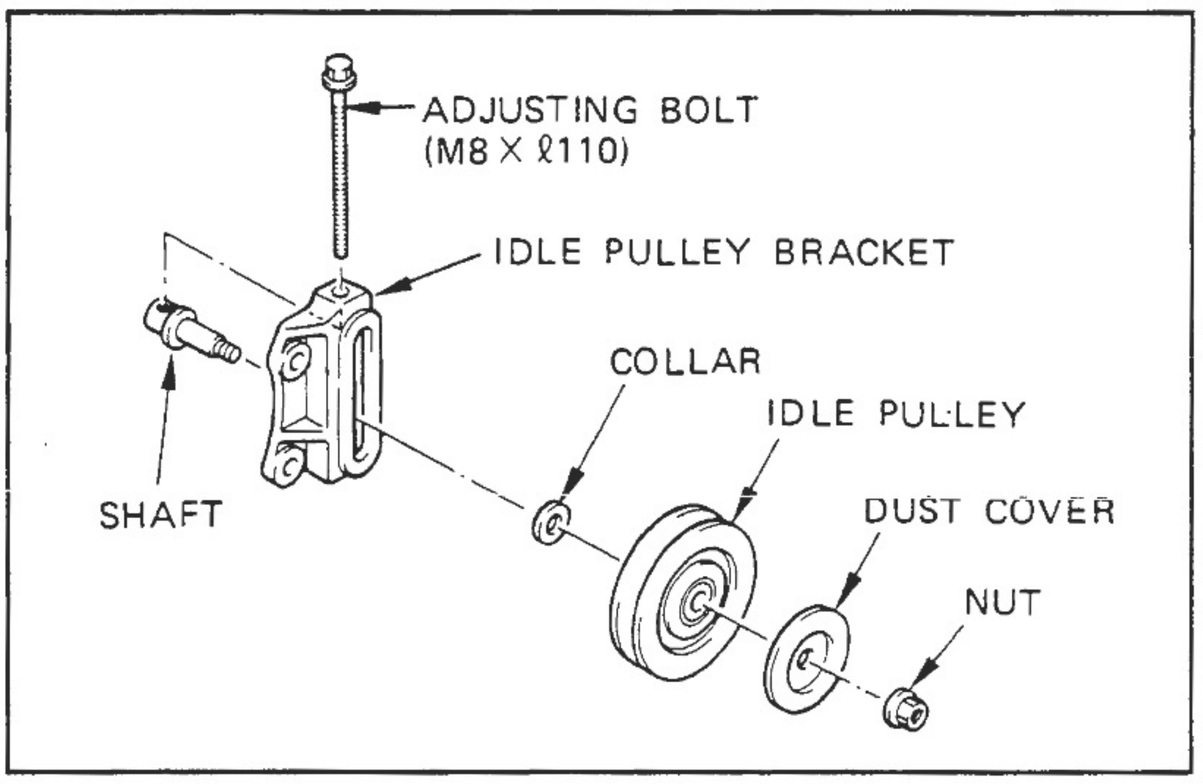
Tightening Torque :
18.1 N · m (185 kgf · cm, 13.3 ft · lbf)



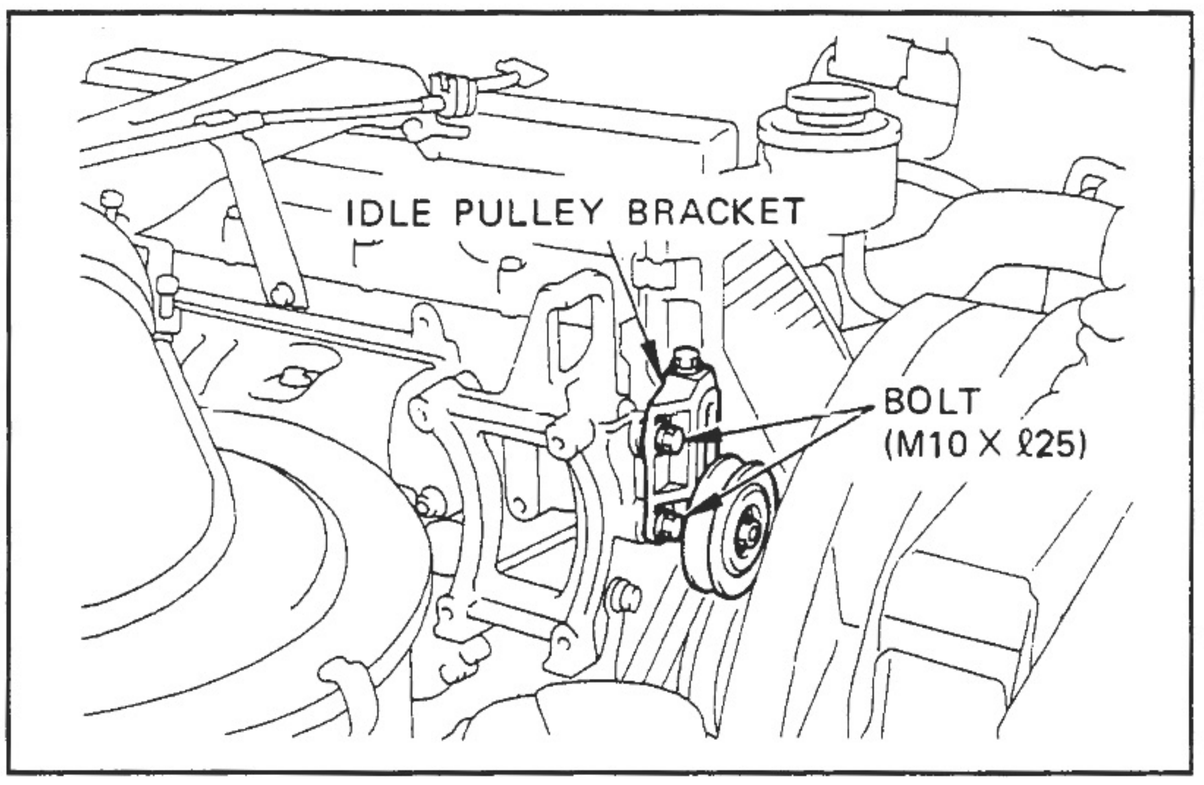
(b) Install the compressor bracket to the engine block using four bolts.

Tightening Order : ①→②

Tightening Torque :
40.2 N · m (410 kgf · cm, 29.5 ft · lbf)

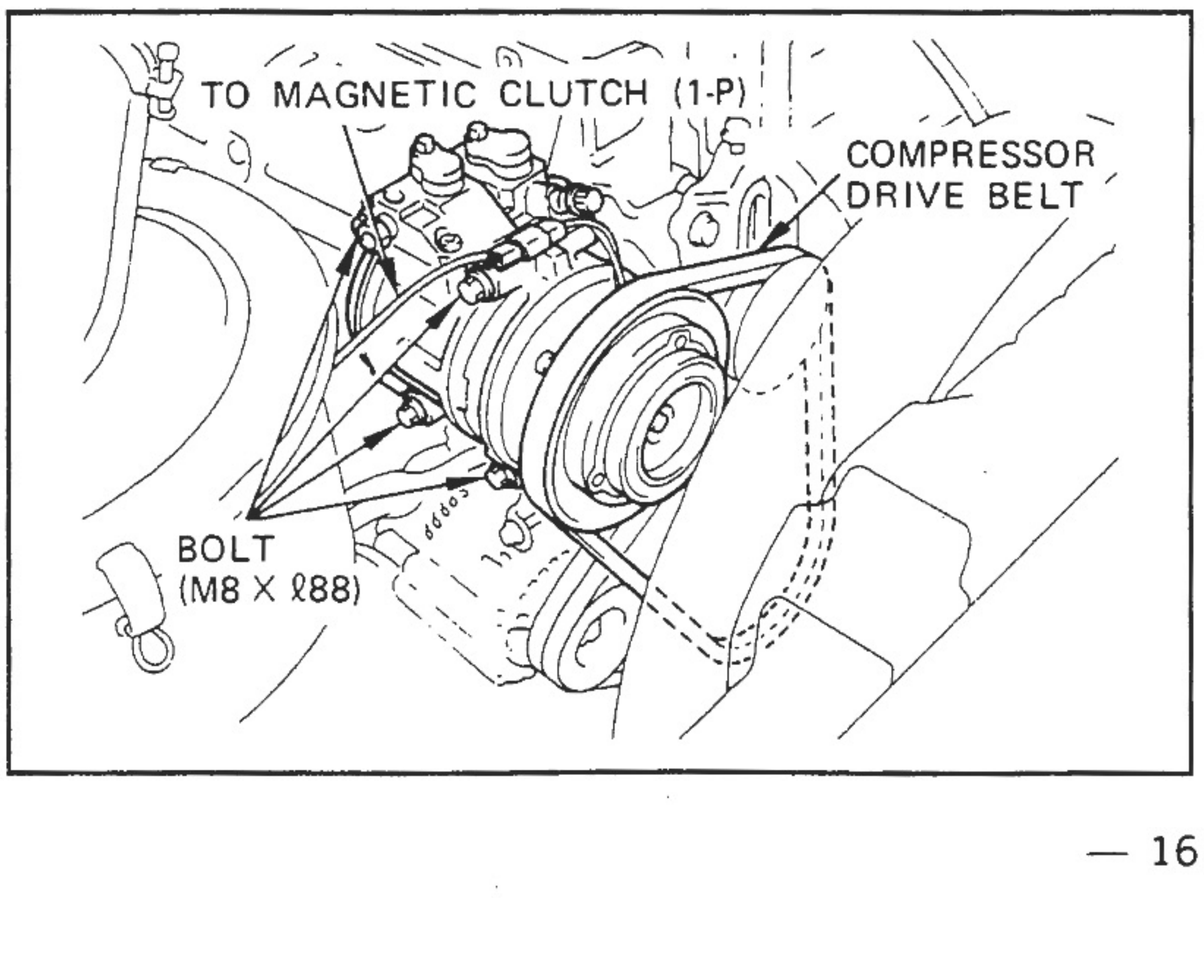


(c) Assemble the idle pulley and adjusting bolt to the idle pulley bracket.



(d) Install the idle pulley bracket with idle pulley to the compressor bracket using two bolts.

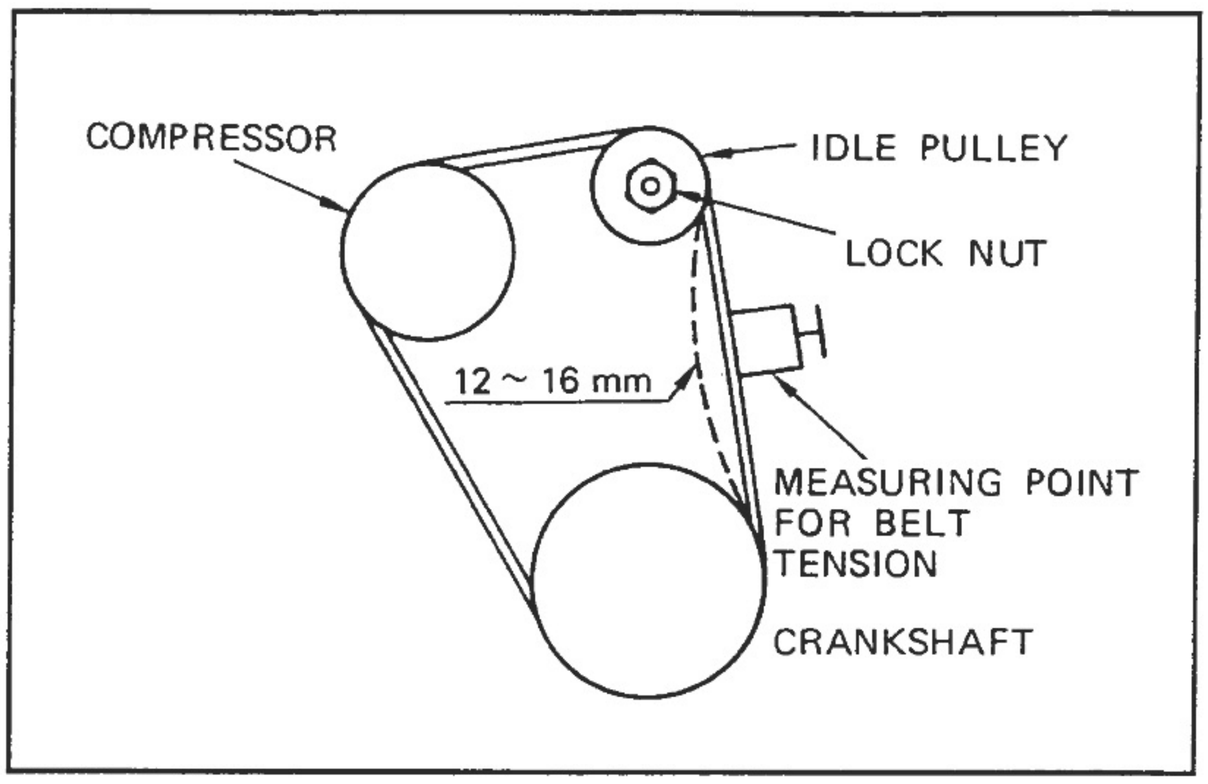
Tightening Torque :
40.2 N · m (410 kgf · cm, 29.5 ft · lbf)



(e) Install the compressor to the compressor bracket using four bolts.

Tightening Torque :
24 N · m (250 kgf · cm, 18 ft · lbf)

(f) Connect the vehicle harness to the magnetic clutch lead wire.



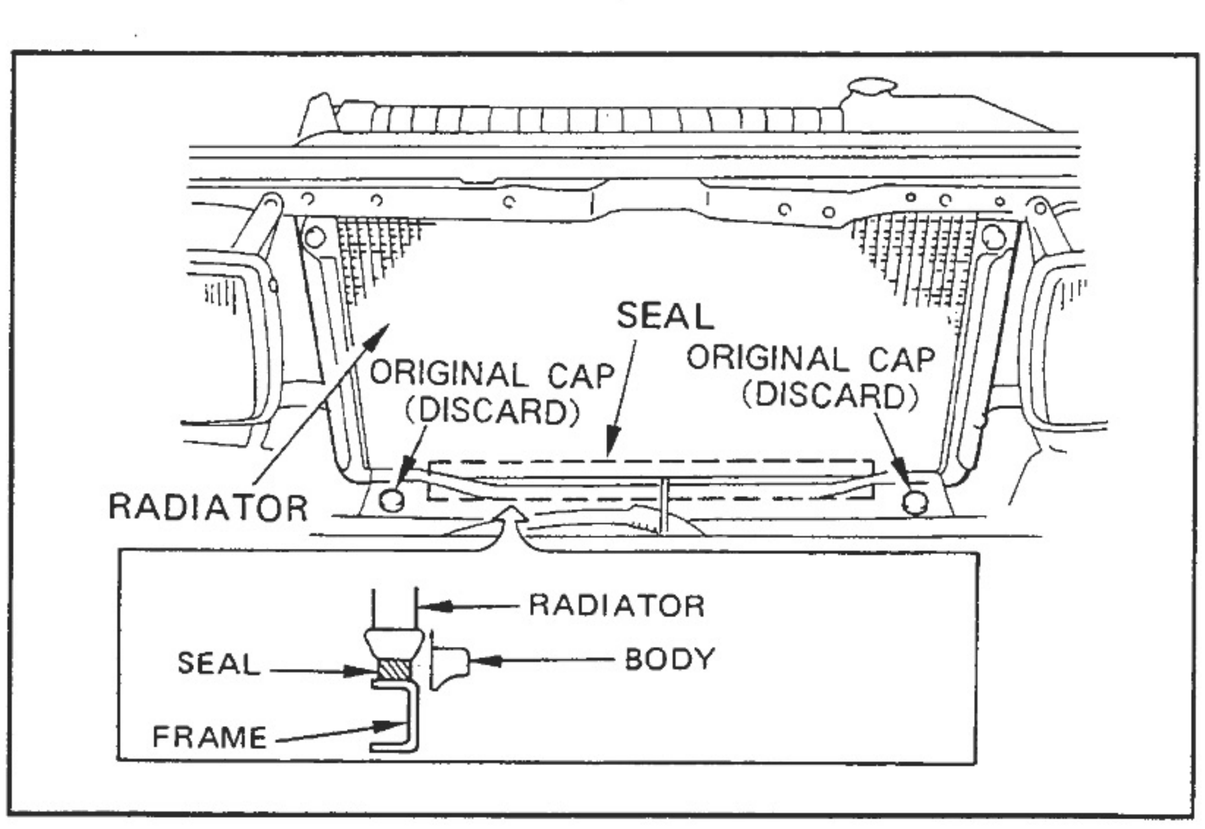
(g) Install the compressor drive belt, and adjust the belt tension by turning the adjusting bolt.

(h) Check the belt tension using Burroughs Drive Belt Tension Gauge (No. BT-33-73F) or a NIPPONDENSO BTG-20.

	Belt deflection at 10kg (22lbs) force	Belt tension using the belt tension gauge
NEW BELT	12-16 mm (0.47-0.62 inch)	50 ± 10 kgf (110 ± 22 lbf)
USED BELT	16-22 mm (0.62-0.86 inch)	30 ± 10 kgf (66 ± 22 lbf)

(i) Tighten the lock nut.

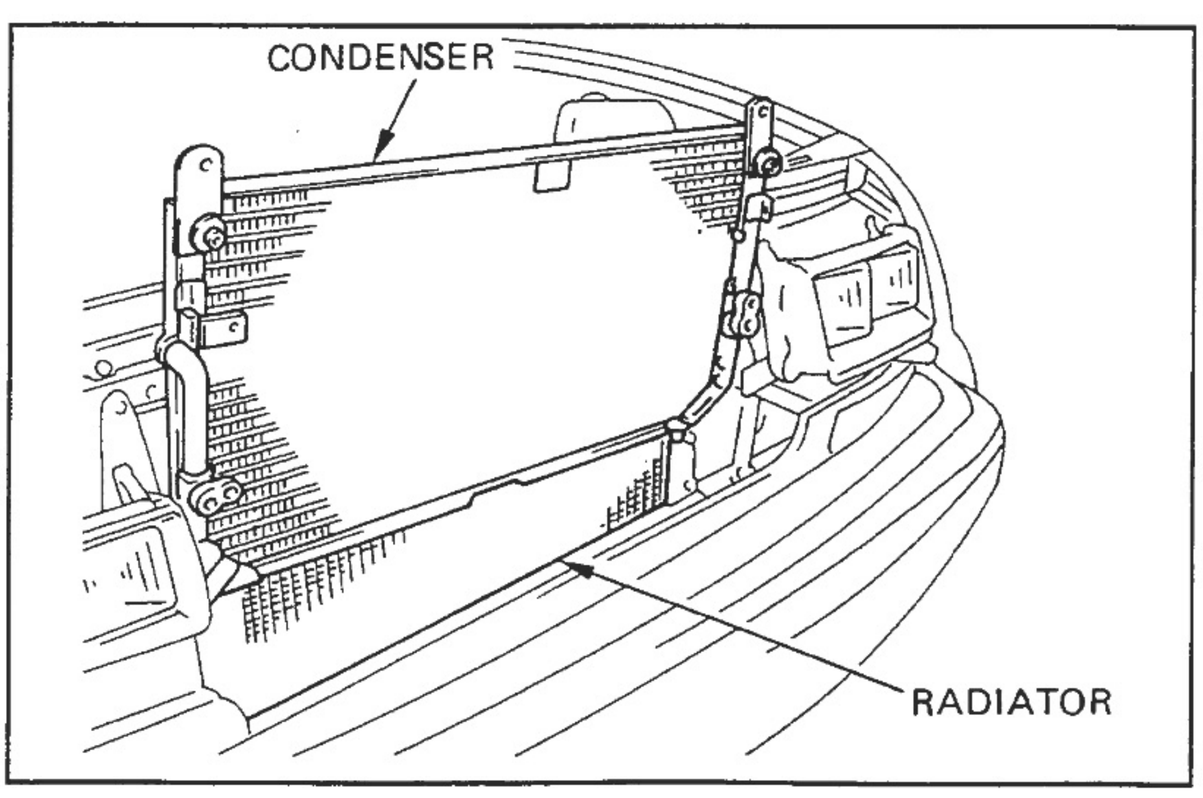
Tightening Torque :
39 N · m (400 kgf · cm, 29 ft · lbf)



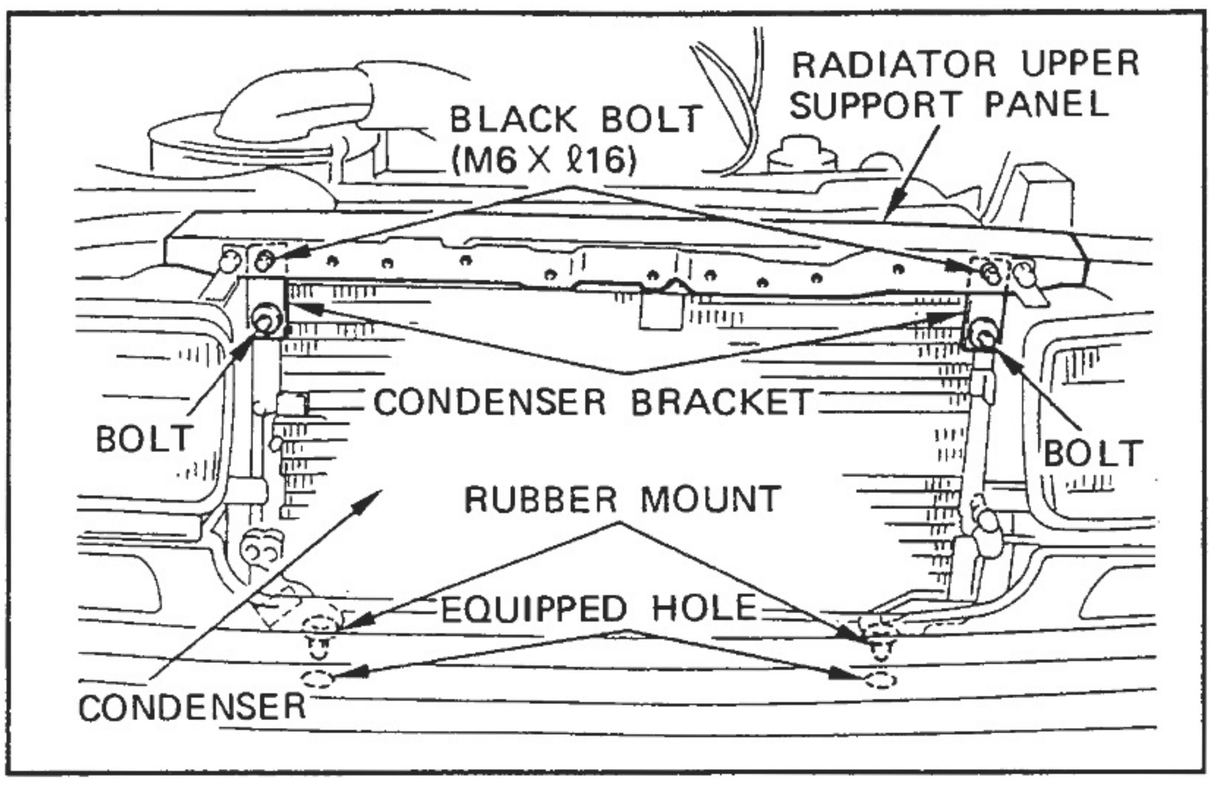
(4) CONDENSER

(a) Attach the seal to the bottom of radiator as shown.

(b) Remove and discard the original caps from the frame.



(c) Slide in the condenser and gently maneuver it into its position where the lower mounts slot into the chassis rail.

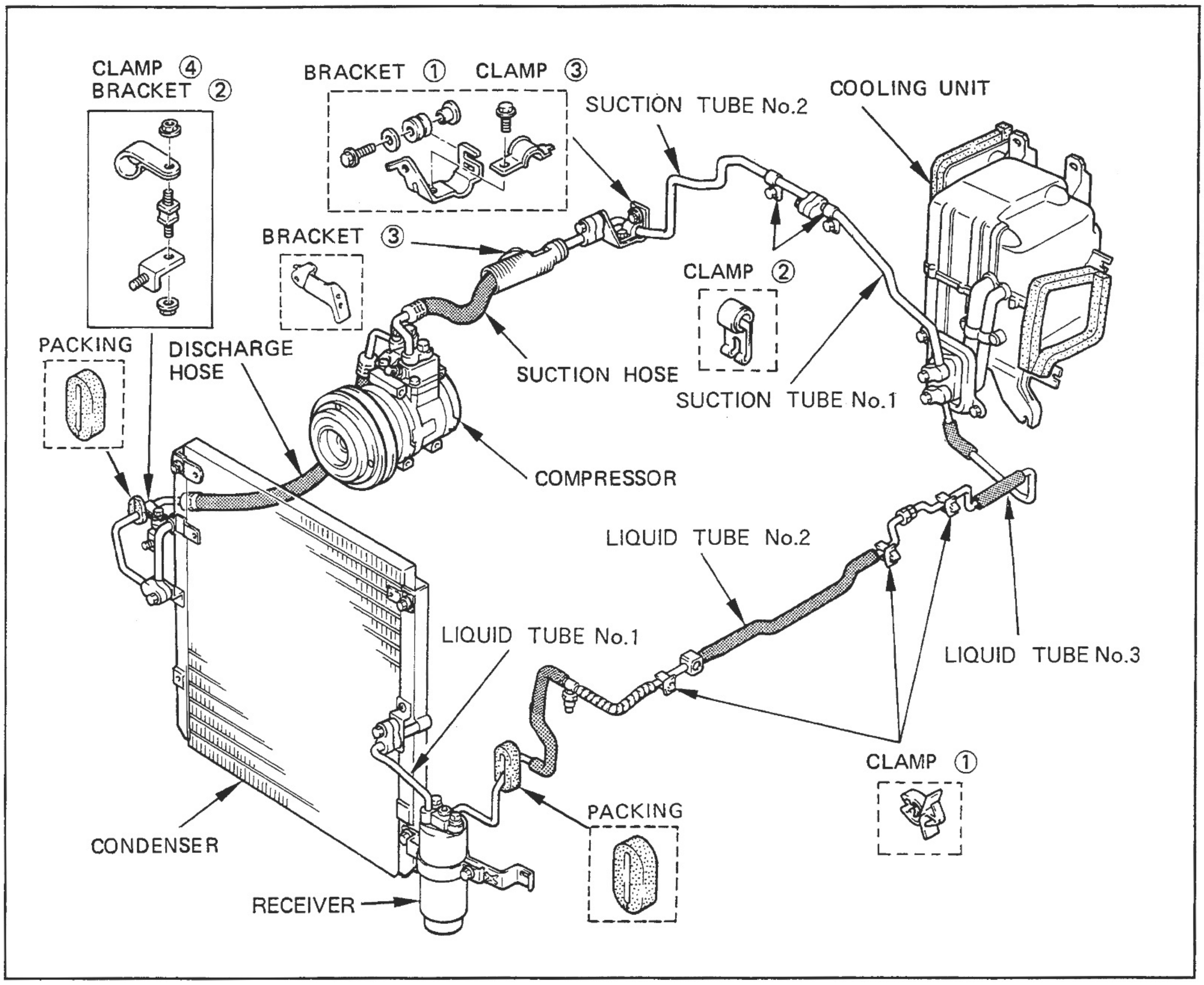


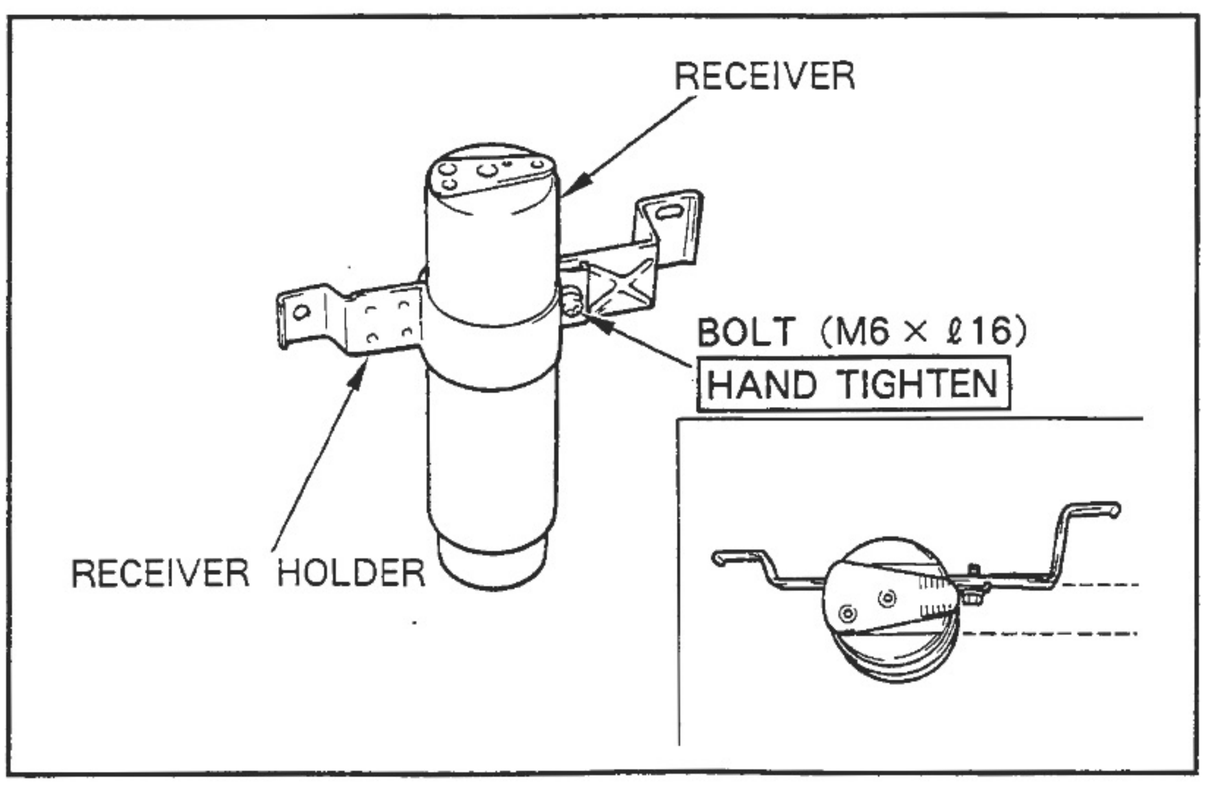
(d) Reinstall the radiator upper support panel and connect the horn harness to the horns, and clip in the vehicle harness to the radiator upper support panel.

(e) Fasten the two condenser brackets to the radiator upper support panel using two bolts.

(f) Fasten the two condenser brackets to the condenser.

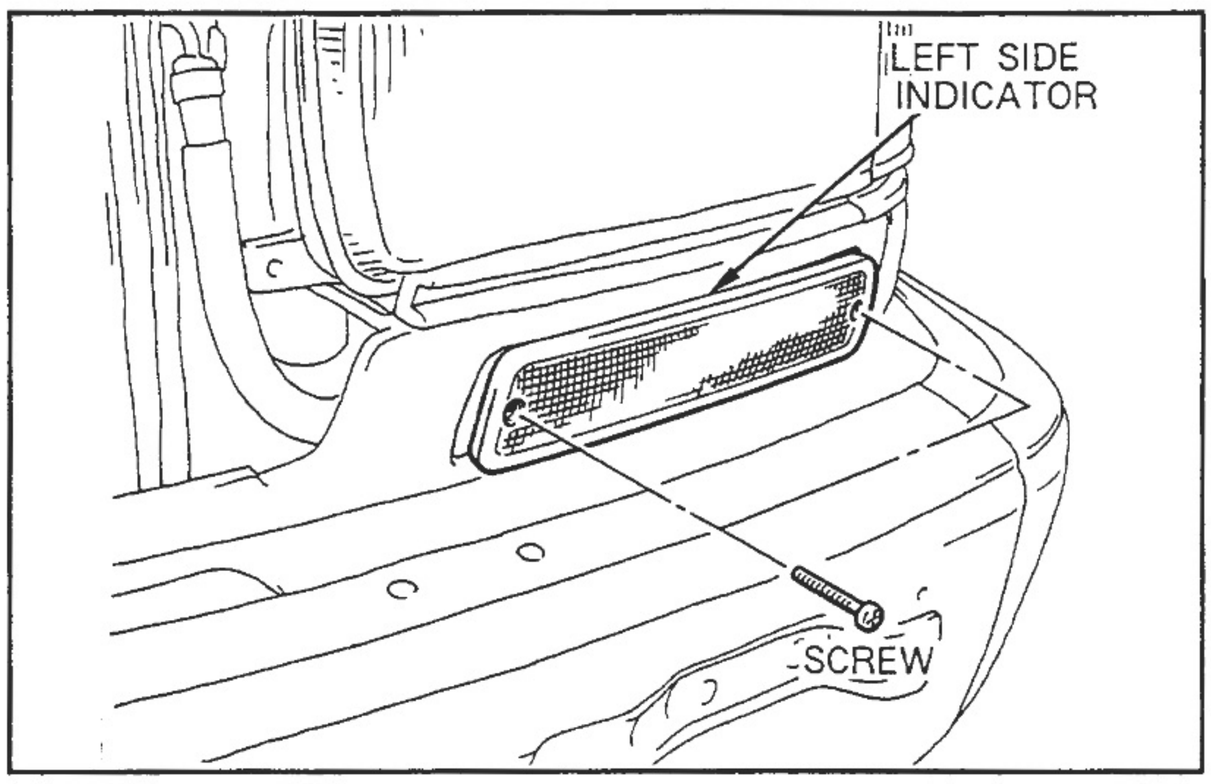
■ PIPING LAYOUT



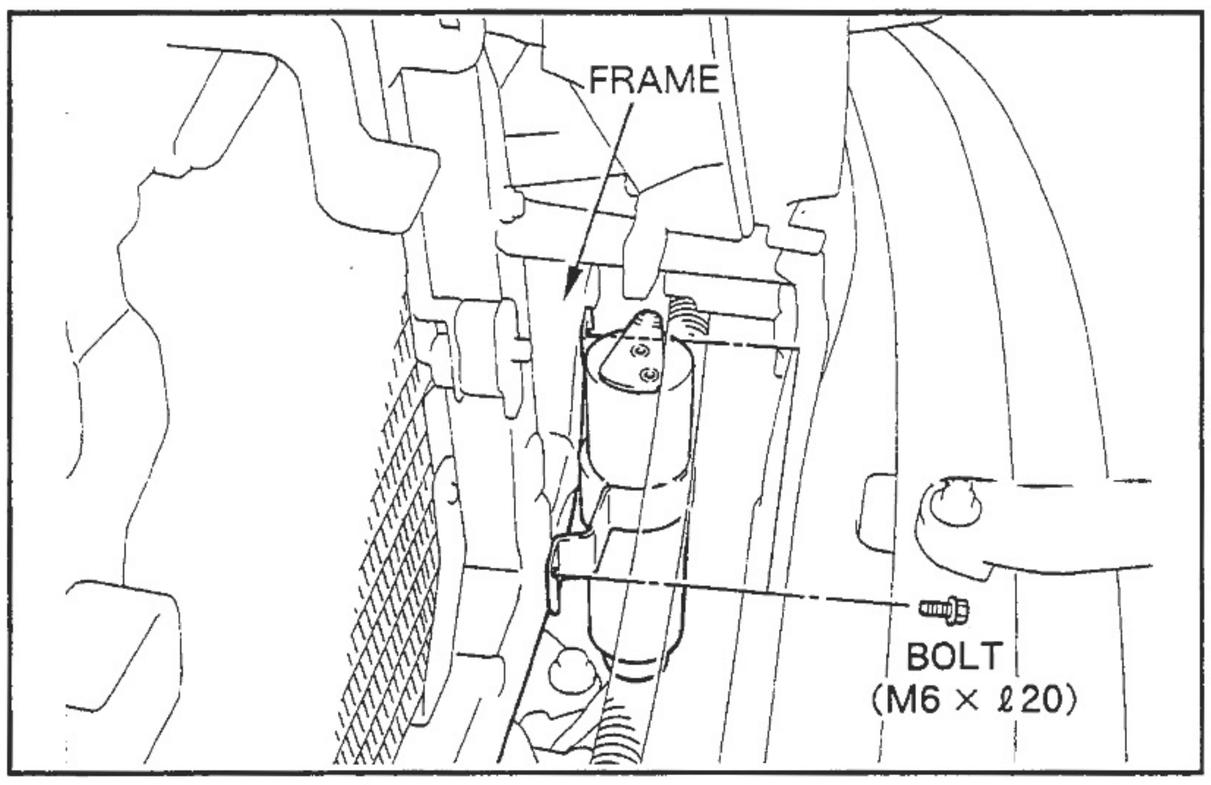


(5) RECEIVER

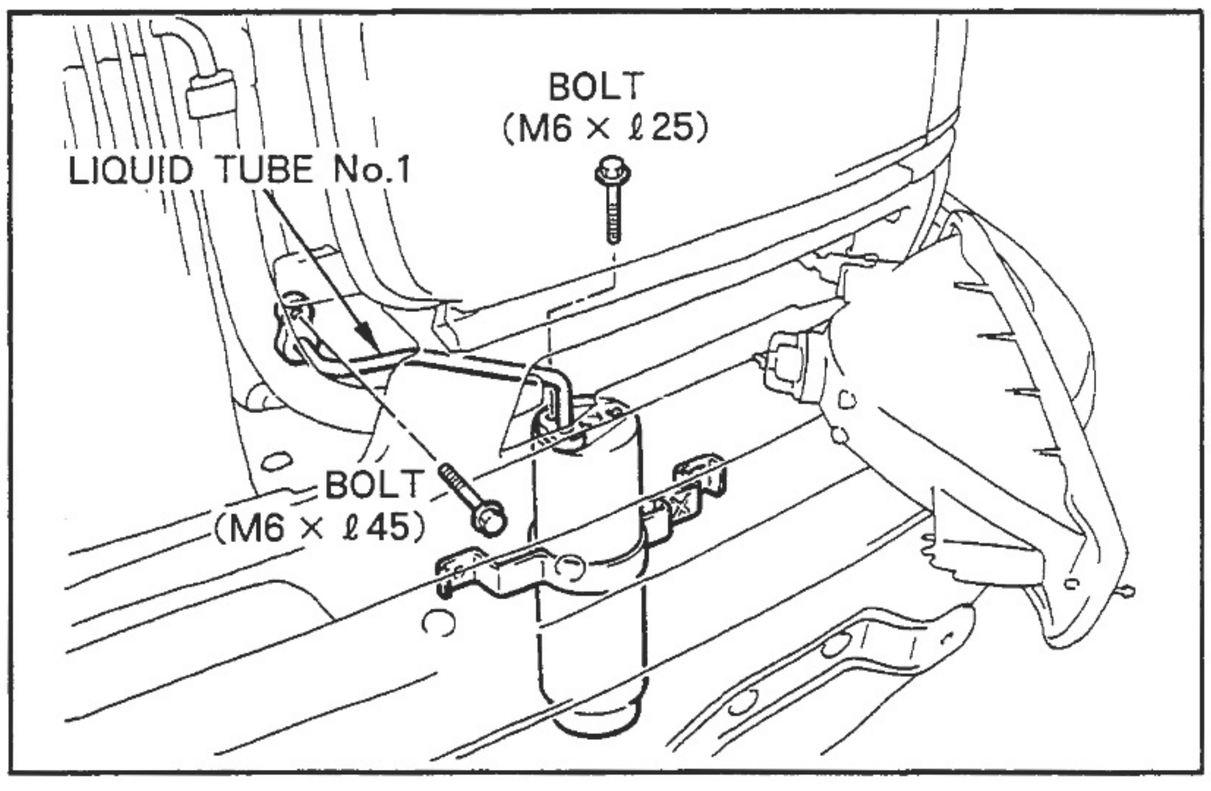
(a) Assemble the receiver to the receiver holder using a bolt.



(b) Temporarily remove the left side indicator.



(c) Install the receiver holder to the front frame using two bolts.

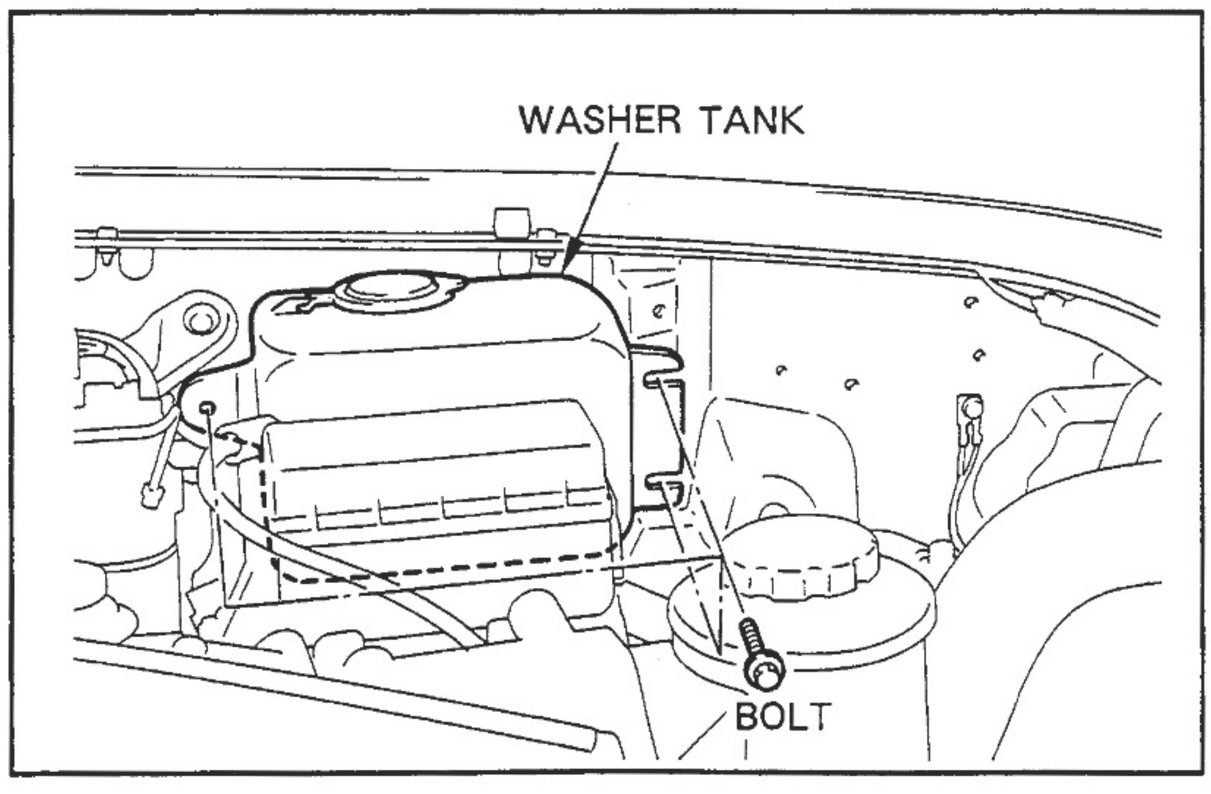


(6) LIQUID TUBE

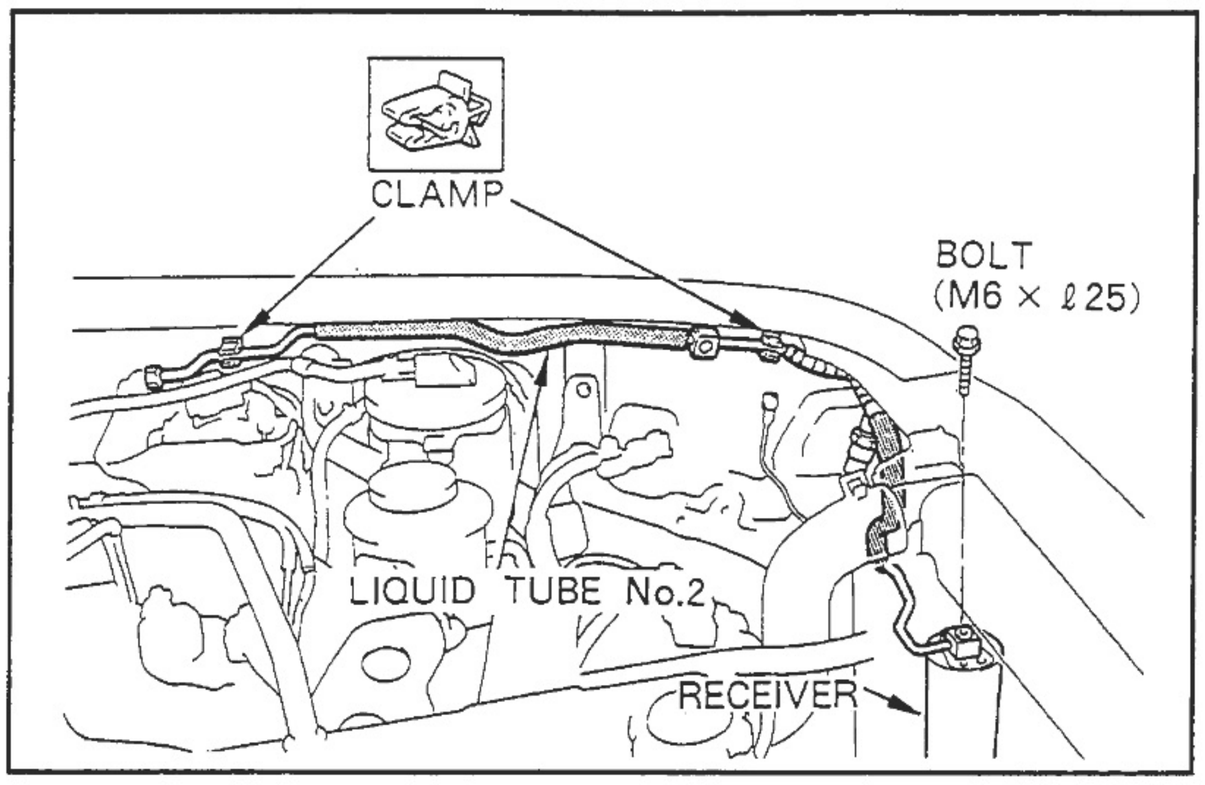
(a) Connect the liquid tube No.1 from receiver to condenser.

Tightening Torque : Receiver side
5.4 N · m (55 kgf · cm, 4.0 ft · lbf)

Tightening Torque : Receiver side
9.8 N · m (100 kgf · cm, 7.2 ft · lbf)



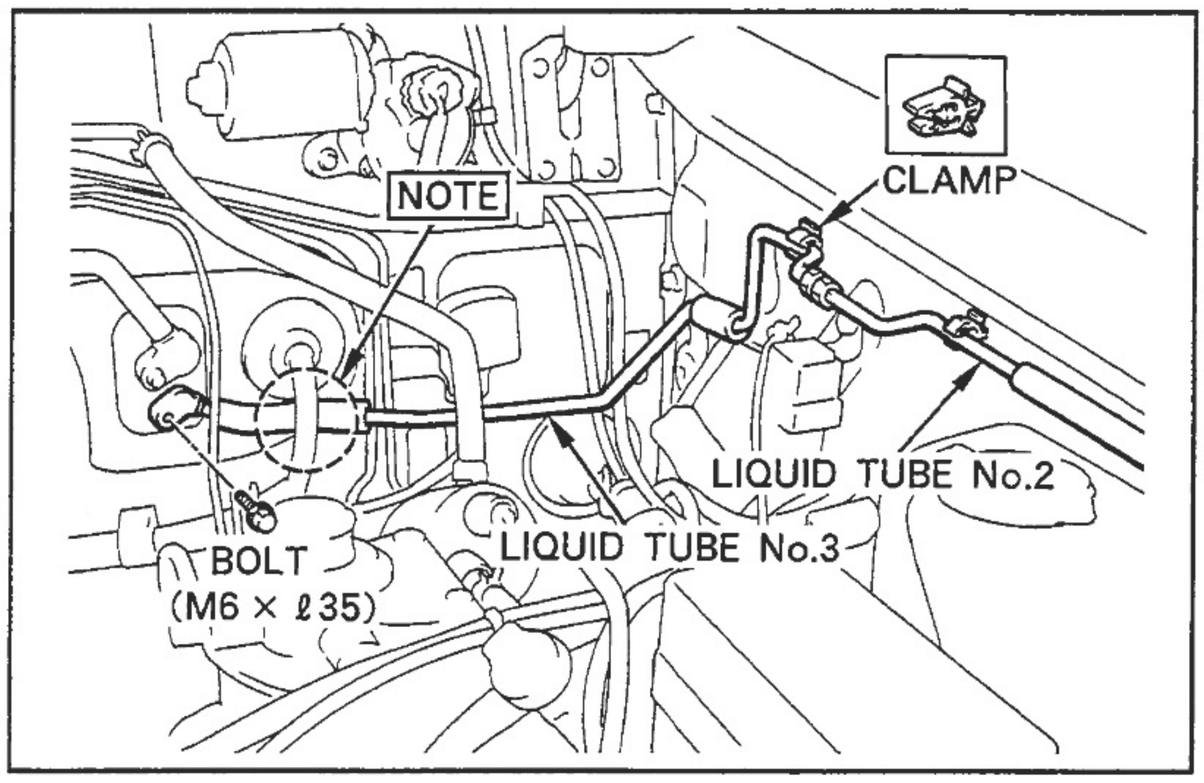
(b) Temporarily remove the washer tank.



(c) Install two clamp to the left side inner guard.
(d) Connect the liquid tube No.2 to receiver.

Tightening Torque : Receiver side
5.4 N · m (55 kgf · cm, 4.0 ft · lbf)

(e) Fasten the liquid tube No.2 to the clamp.



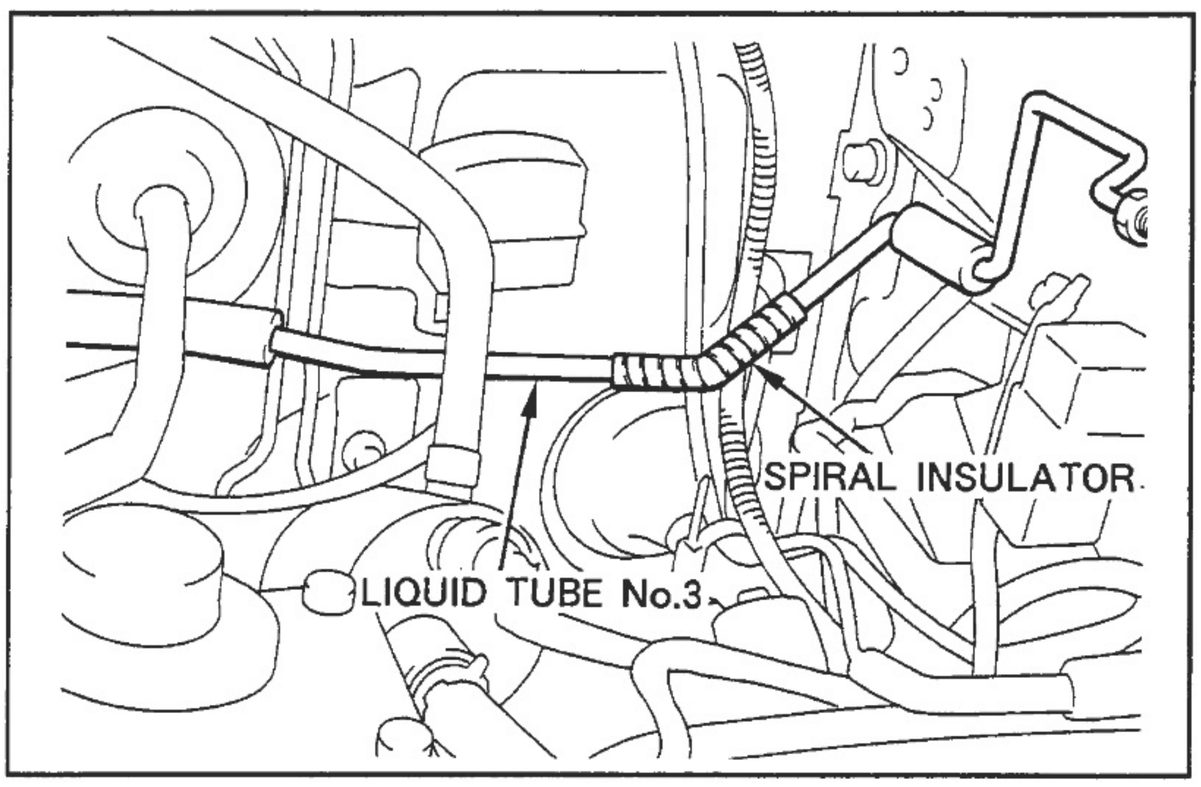
(f) Install a clamp to the left side inner guard.
(g) Connect the liquid tube No.3 from cooling unit to liquid tube No.2.

Tightening Torque : Receiver side
5.4 N · m (55 kgf · cm, 4.0 ft · lbf)

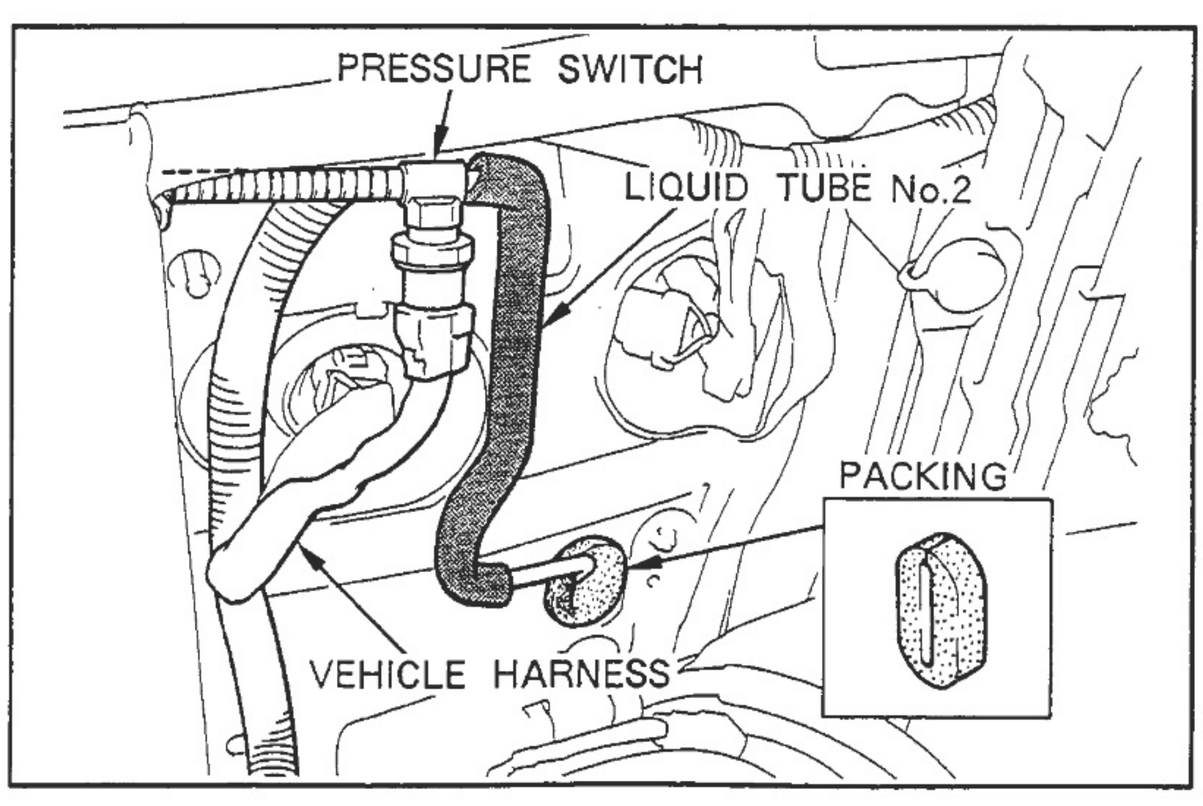
NOTE

Route the liquid tube No.3 beneath the vehicle harness.

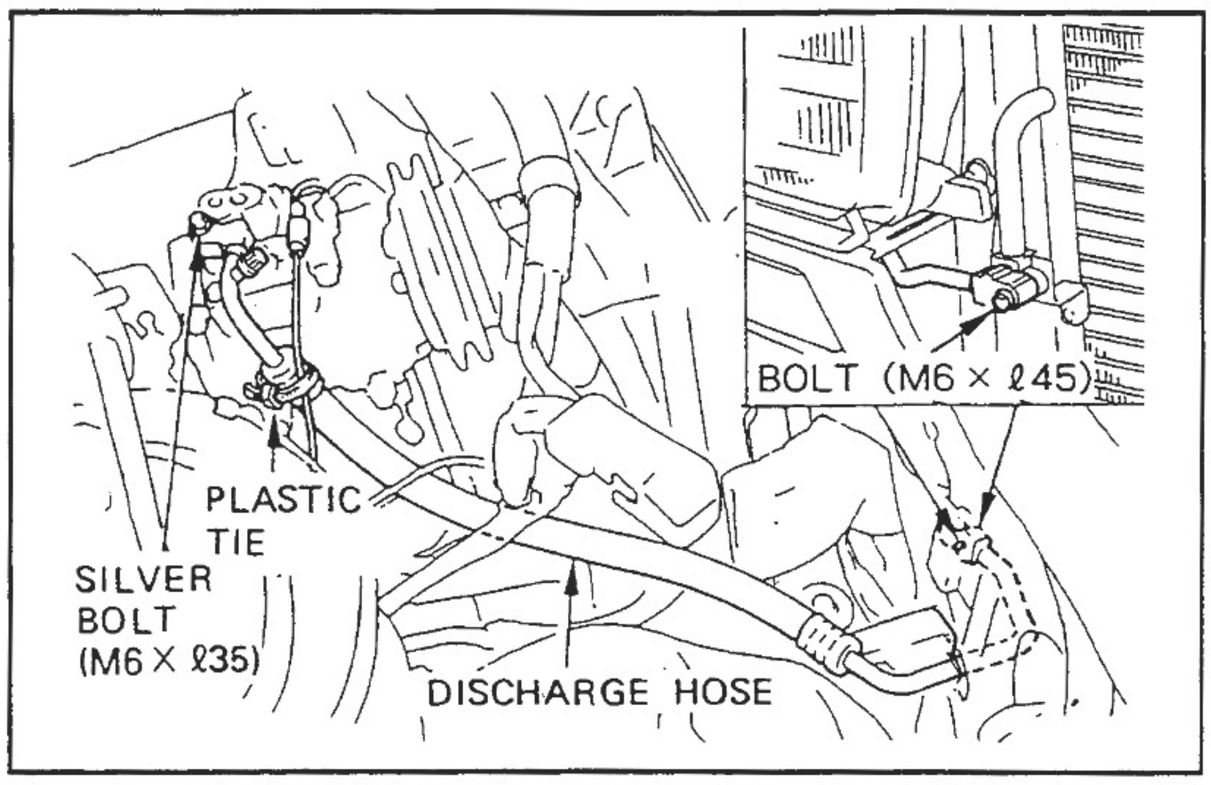
(h) Fasten the liquid tube No.3 to the clamp.



(i) Wrap the insulator around the liquid tube No.3 as shown.



(j) Stuff the packing into the hole of radiator support panel.
(k) Connect the vehicle harness to the pressure switch.

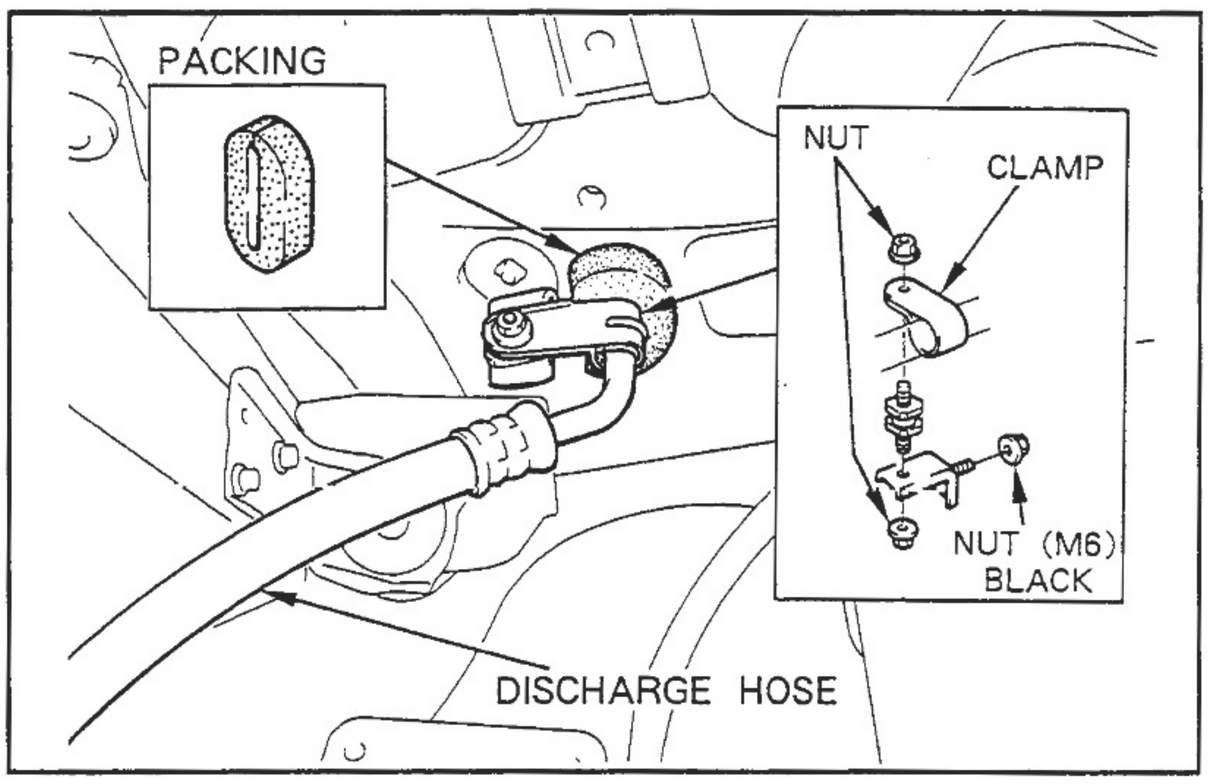


(7) DISCHARGE HOSE

(a) Connect the discharge hose between compressor and condenser.

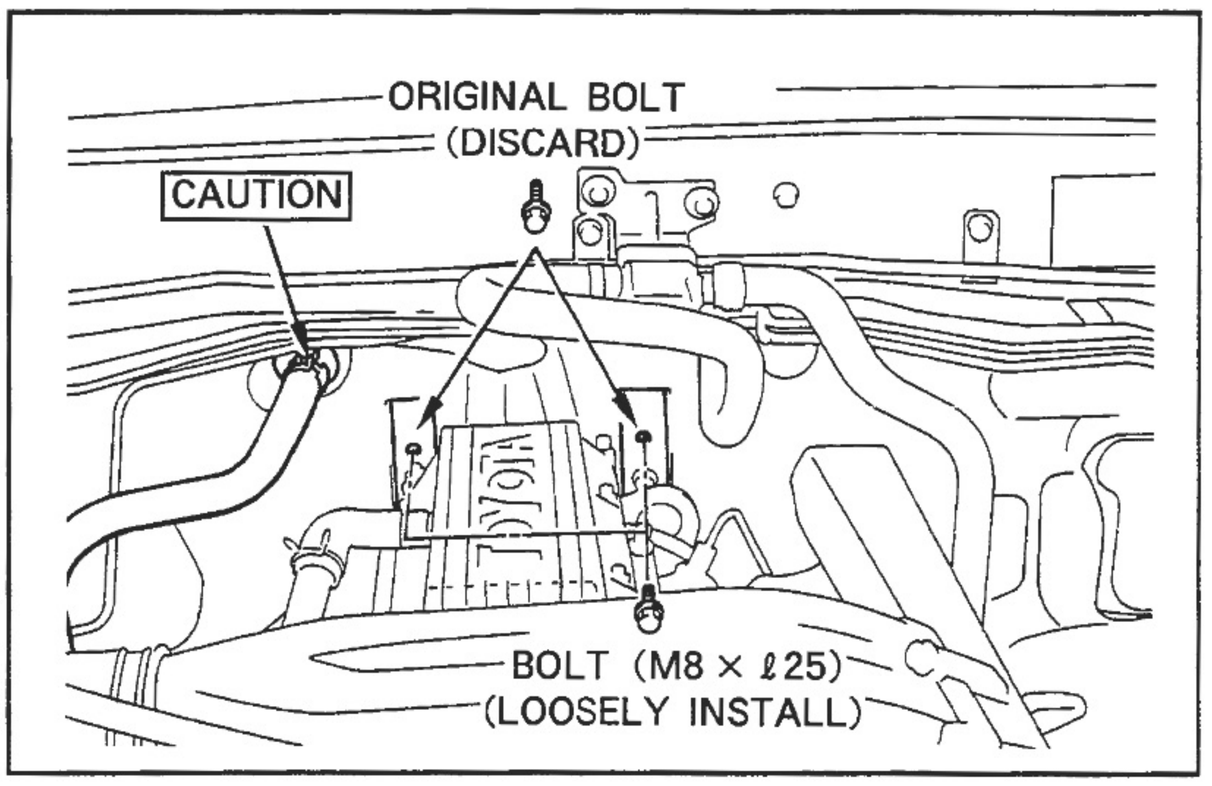
Tightening Torque :
9.8 N · m (100 kgf · cm, 7.2 ft · lbf)

(b) Connect the vehicle harness to the magnetic clutch lead wire and secure it to the discharge hose using a plastic tie.



(c) Assemble the clamp, rubber mount, and bracket to the discharge hose.
(d) Fasten the clamp to the radiator support panel using a nut.
(e) Stuff the packing into the hole of radiator support panel.

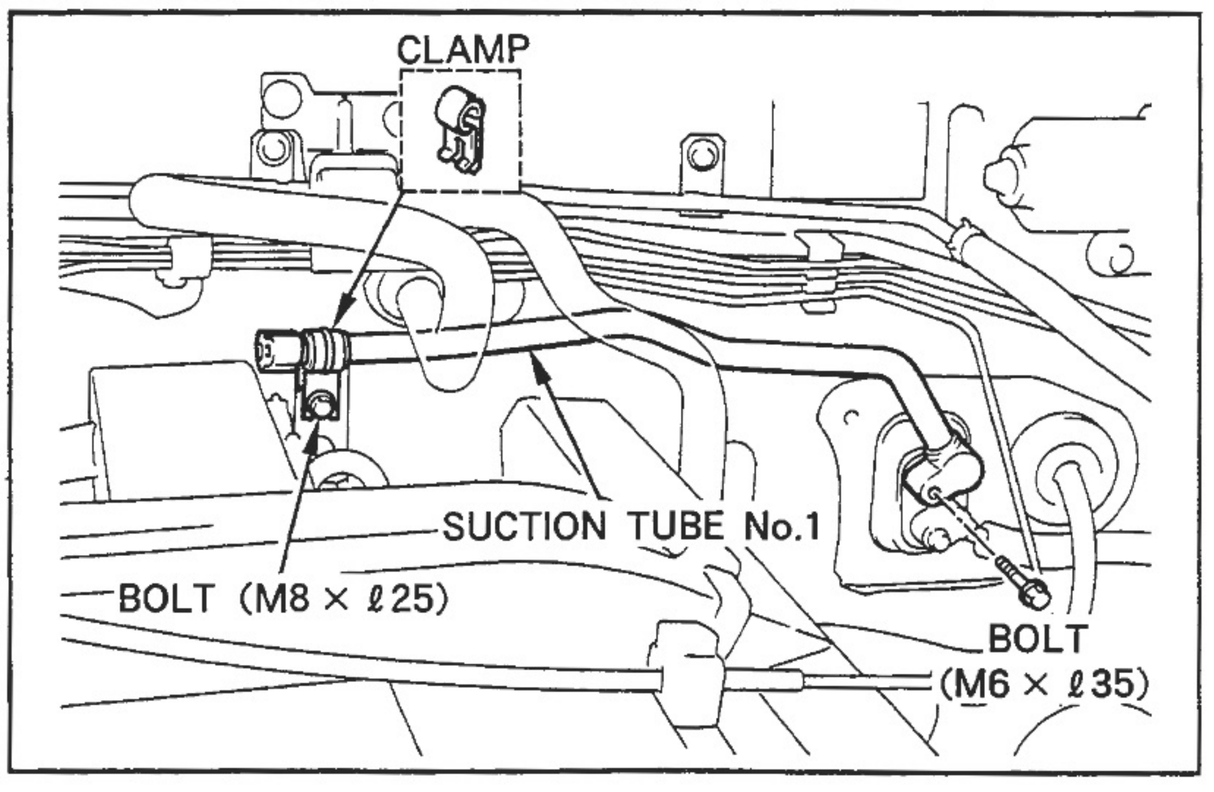
(8) SUCTION TUBE



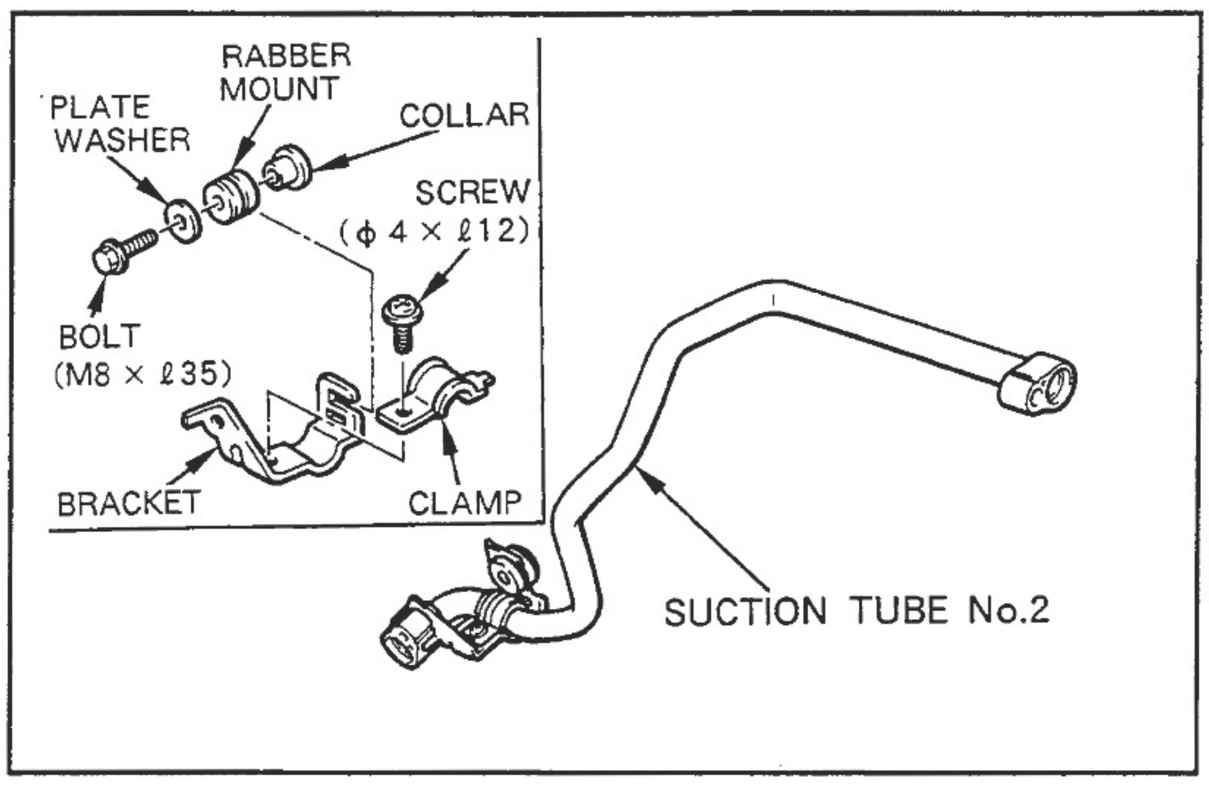
(a) Remove and discard the original bolts from bulkhead.
(b) Loosely install the bolts to the bulkhead.

CAUTION

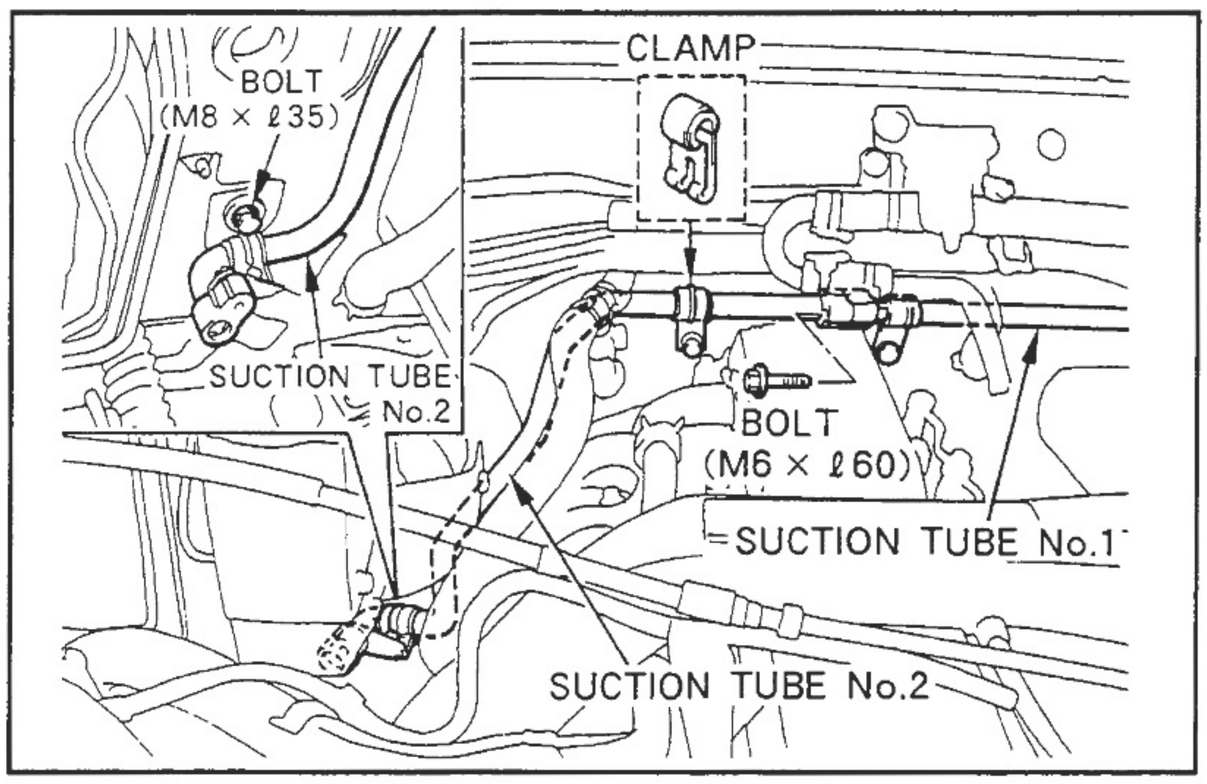
Re-position the radiator hose band upward.



(c) Route the suction tube No.1 between the front heater hose and rear heater hose.
(d) Connect the suction tube No.1 to the cooling unit using a bolt.
(e) Fasten the suction tube No. 1 using the clamp and a bolt.

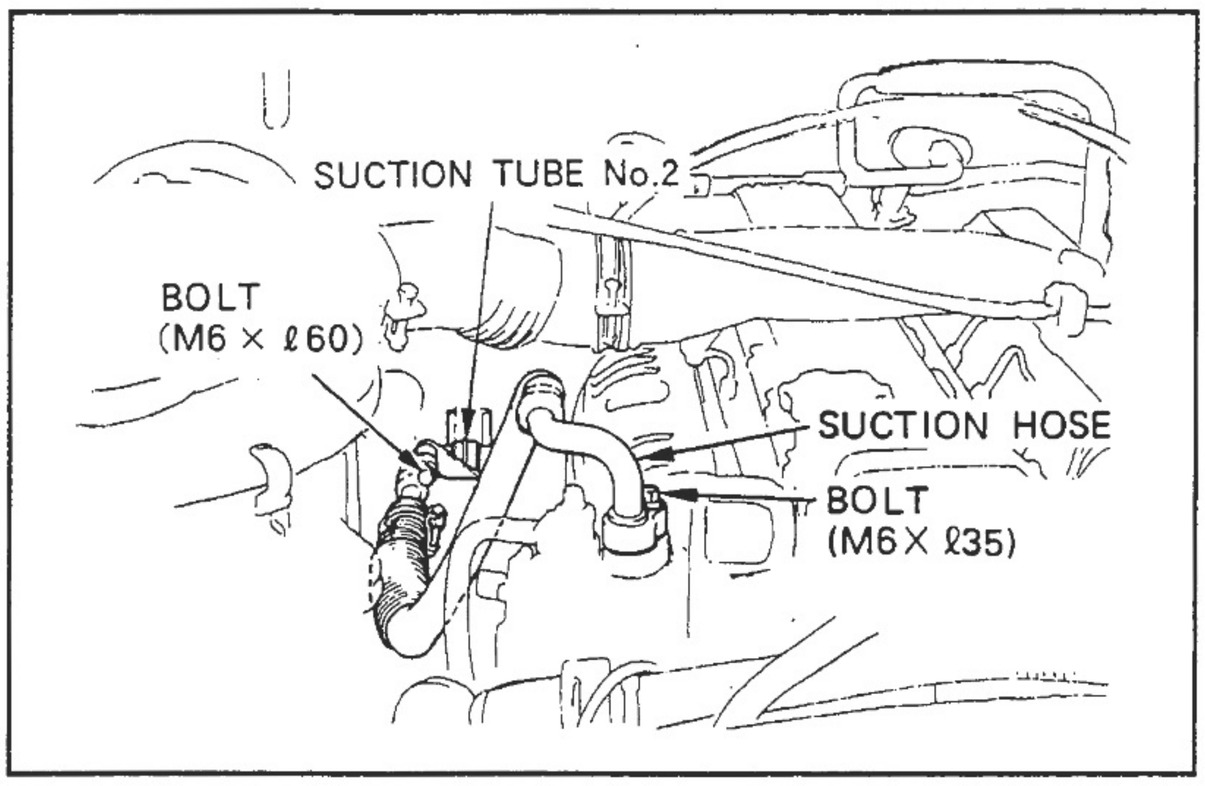


(f) Assemble the rubber mount, collar and clamp to the bracket.



(g) Connect the suction tube No.2 in place to the bulkhead using the clamp and a bolt.

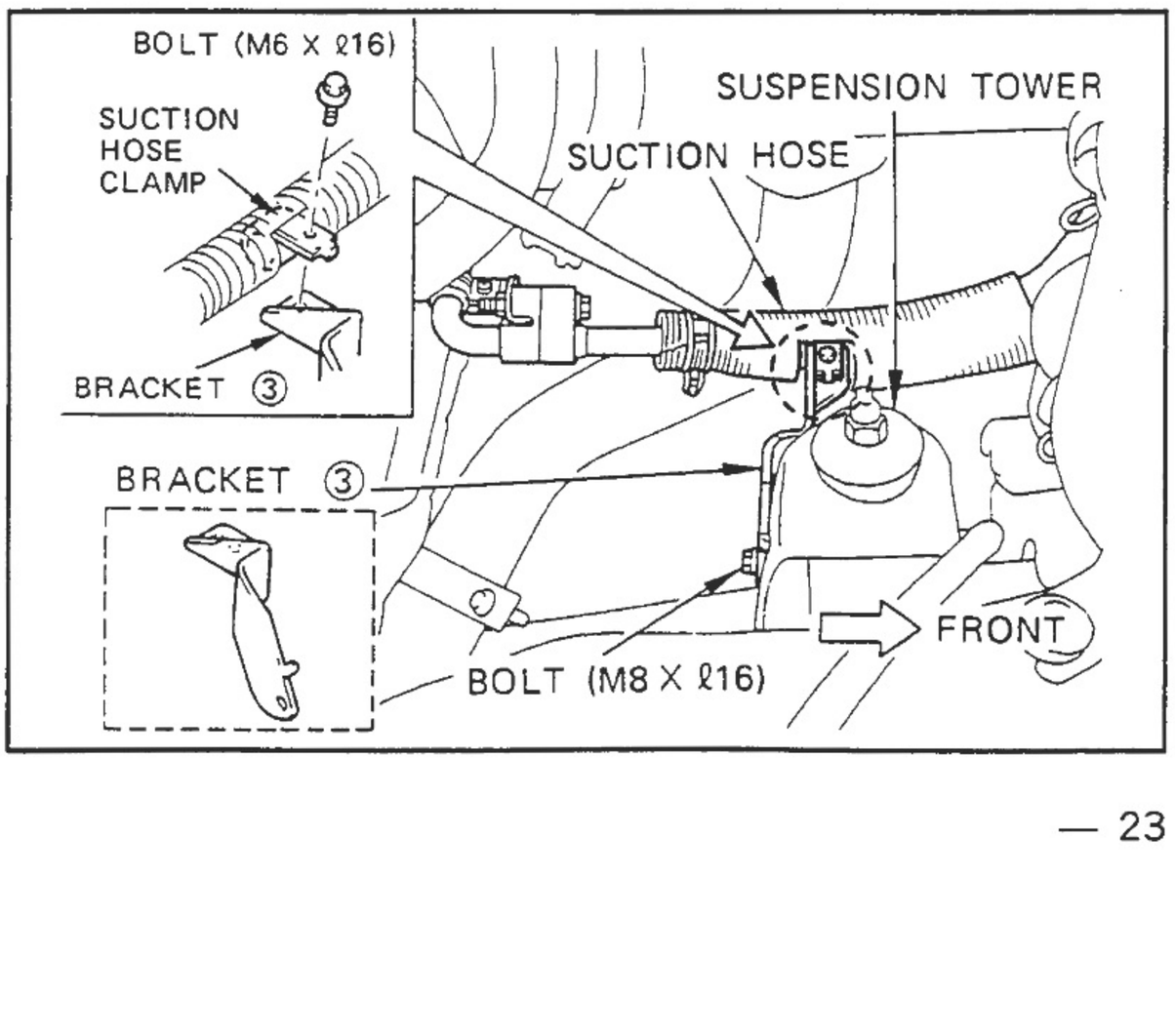
(h) Connect the suction tube No.2 to the suction tube No.1 using a bolt.



(9) SUCTION HOSE

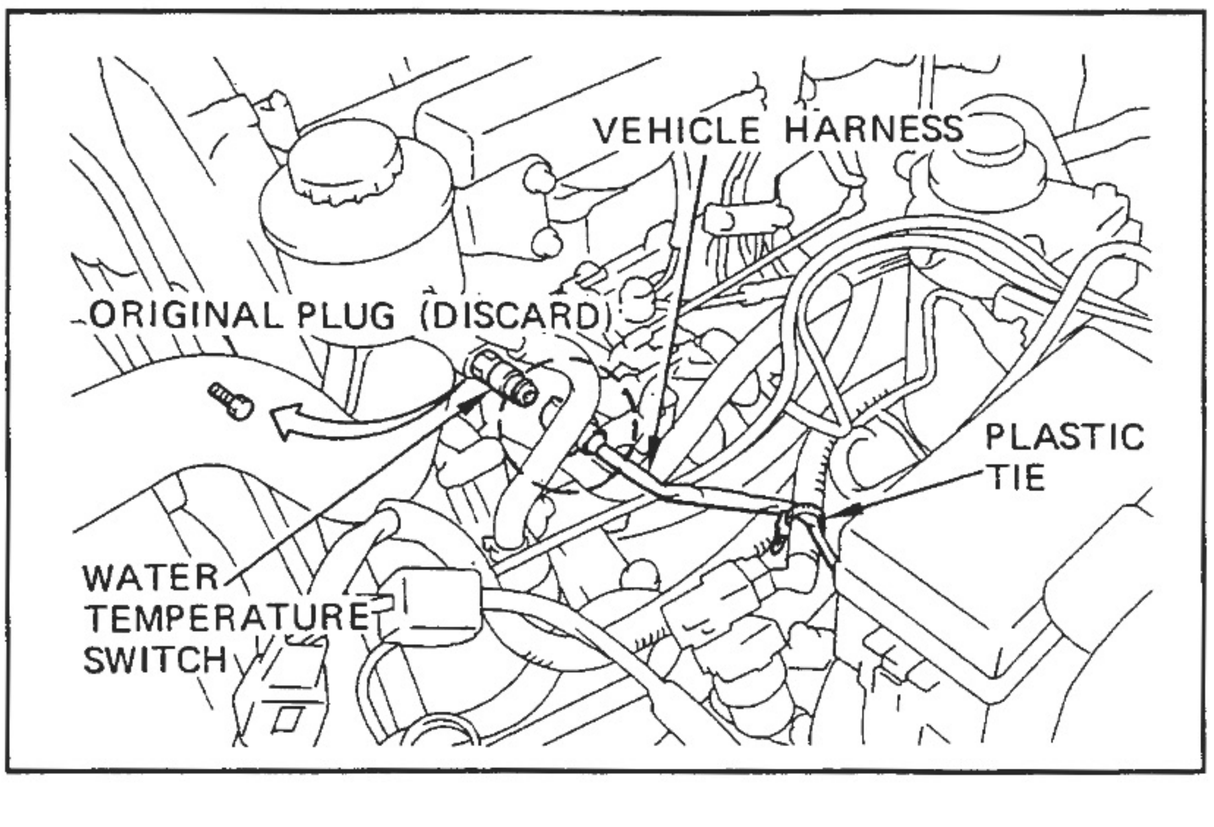
(a) Connect the suction hose between the compressor and the suction tube No.2 using a bolt.

Tightening Torque : Compressor side
9.8 N · m (100 kgf · cm, 7.2 ft · lbf)



(b) Install the bracket to the suction hose clamp using a bolt.

(c) Install the bracket to the suspension tower using a bolt.



(10) WATER TEMPERATURE SWITCH

(a) Loosen the water filler cap to release the pressure.

CAUTION

Never open the water filler cap when hot.

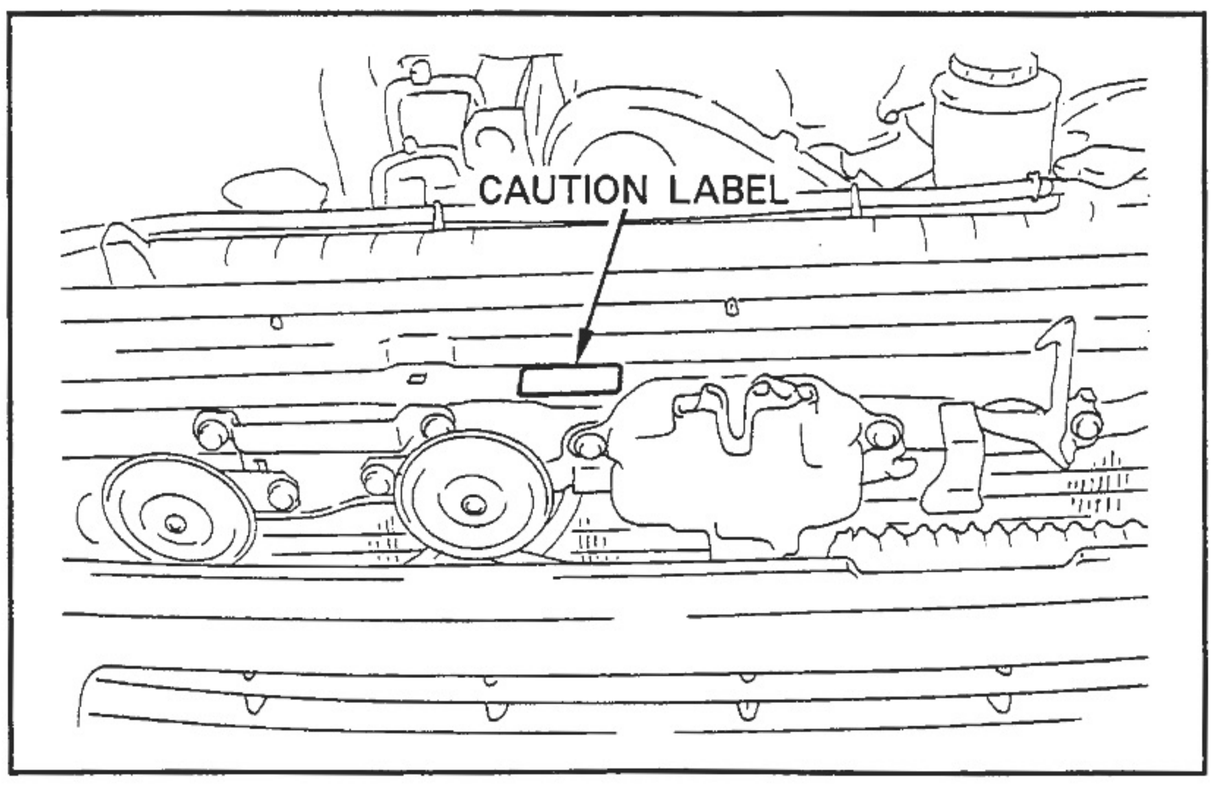
(b) Close the water filler cap.
(c) Remove and discard the original plug.
(d) Install the water temperature switch supplied in the kit.

Tightening Torque :
34.3 N · m (350 kgf · cm, 25.2 ft · lbf)

(e) Connect the vehicle harness to the water temperature switch.
(f) Secure the vehicle harness to the battery cable using a plastic tie as shown.

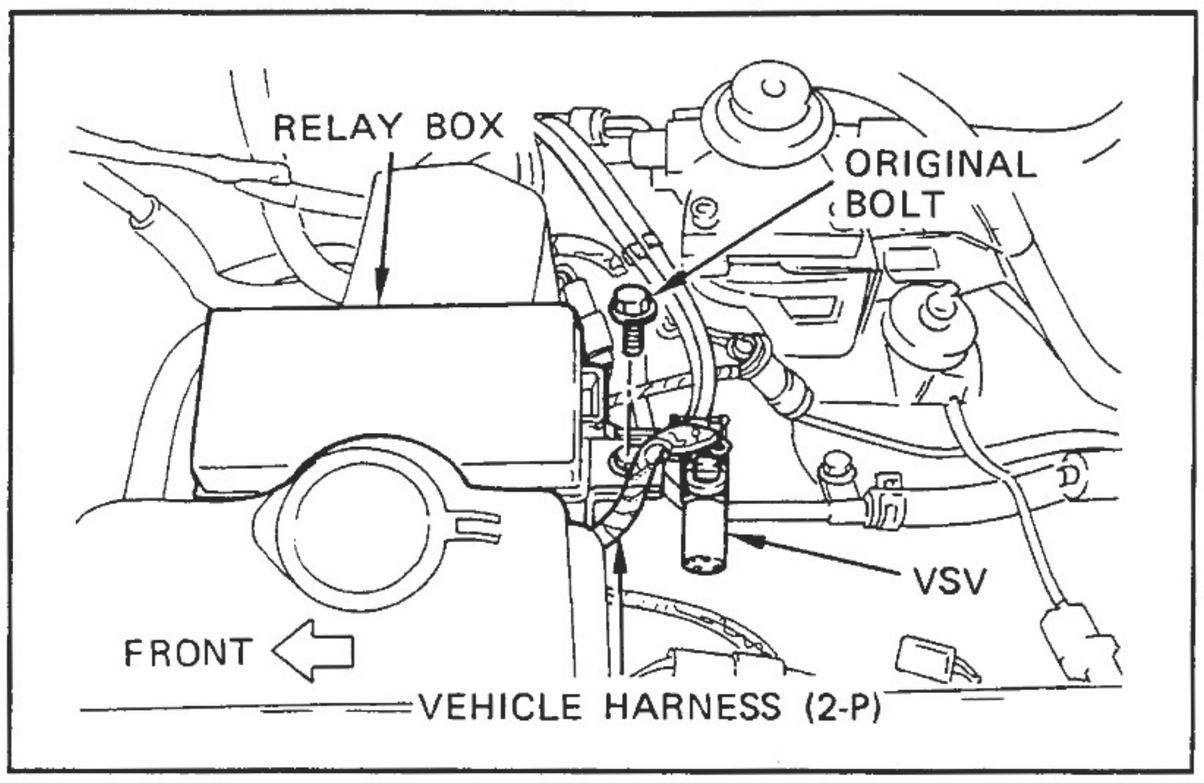
CAUTION

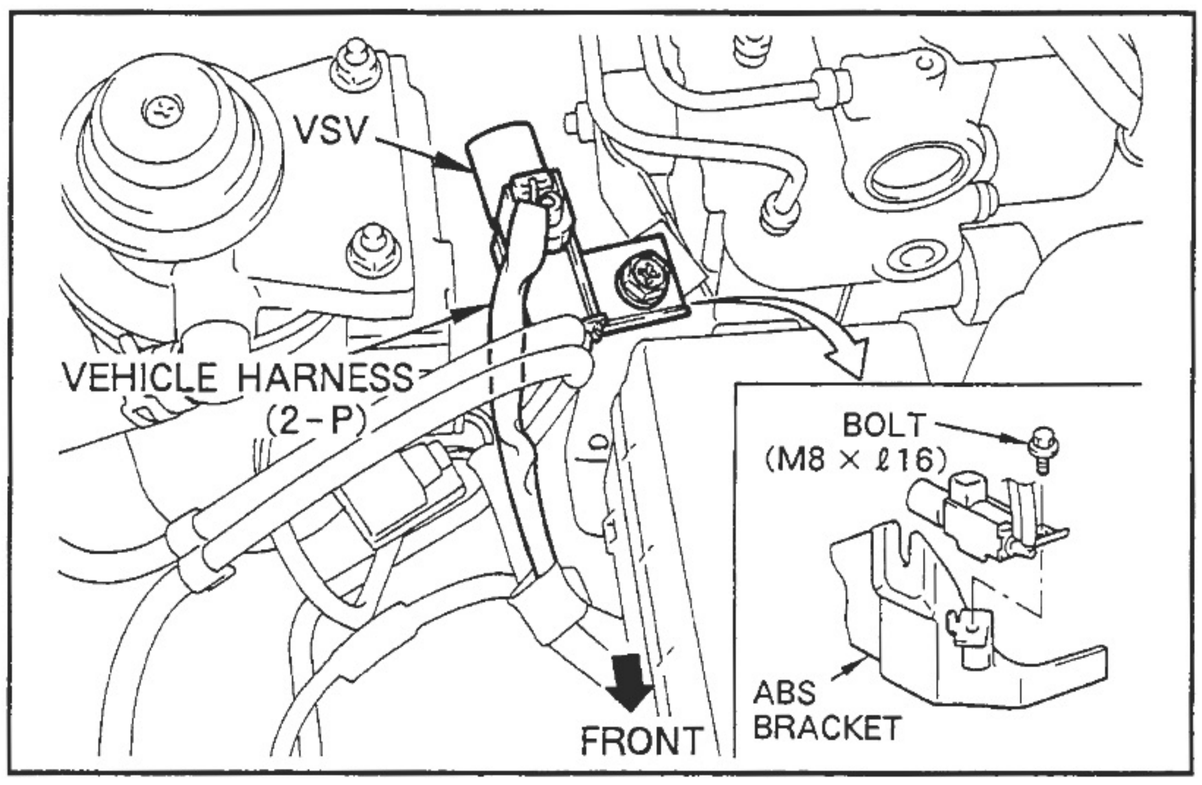
Keep the clearance 10mm or more between hose and connector.

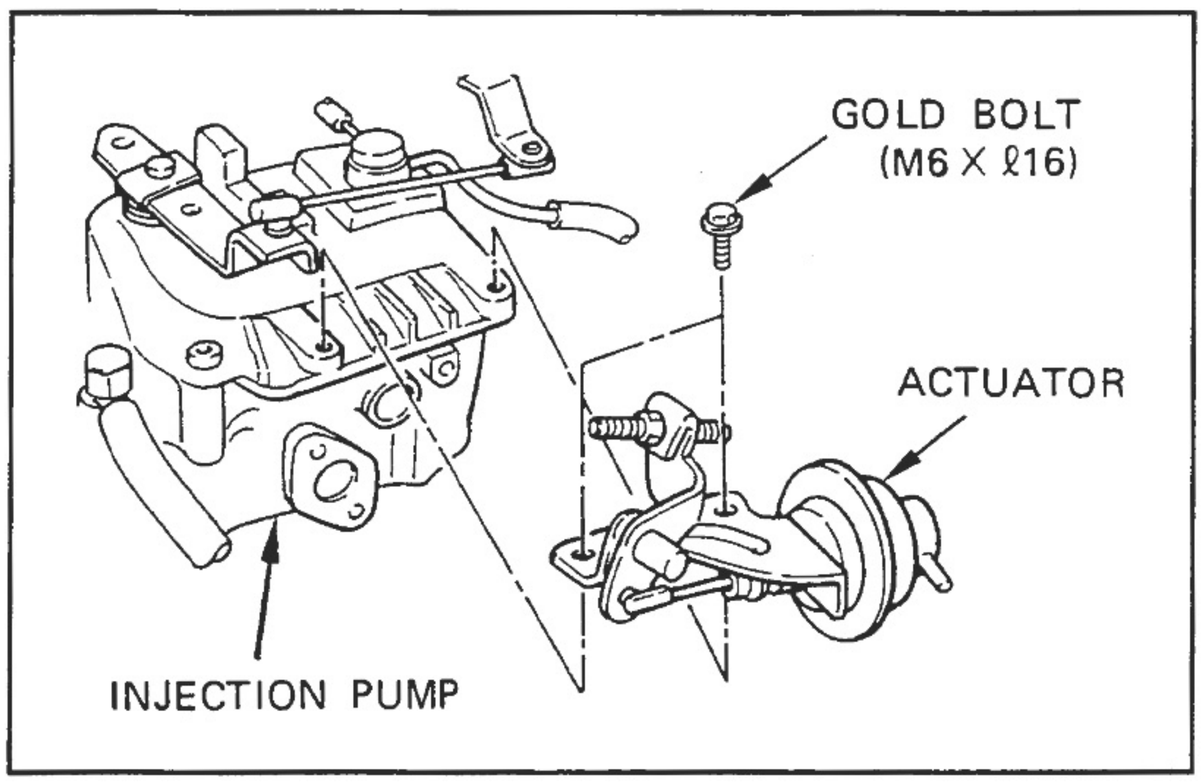


(11) CAUTION LABEL

(a) Attach the caution label to the radiator upper support panel.







1.3 ENGINE IDLE UP DEVICE

(1) VSV

■ WITHOUT ABS MODEL

(a) Tighten the VSV together with the relay box using a original bolt.
(b) Connect the vehicle harness to the VSV.

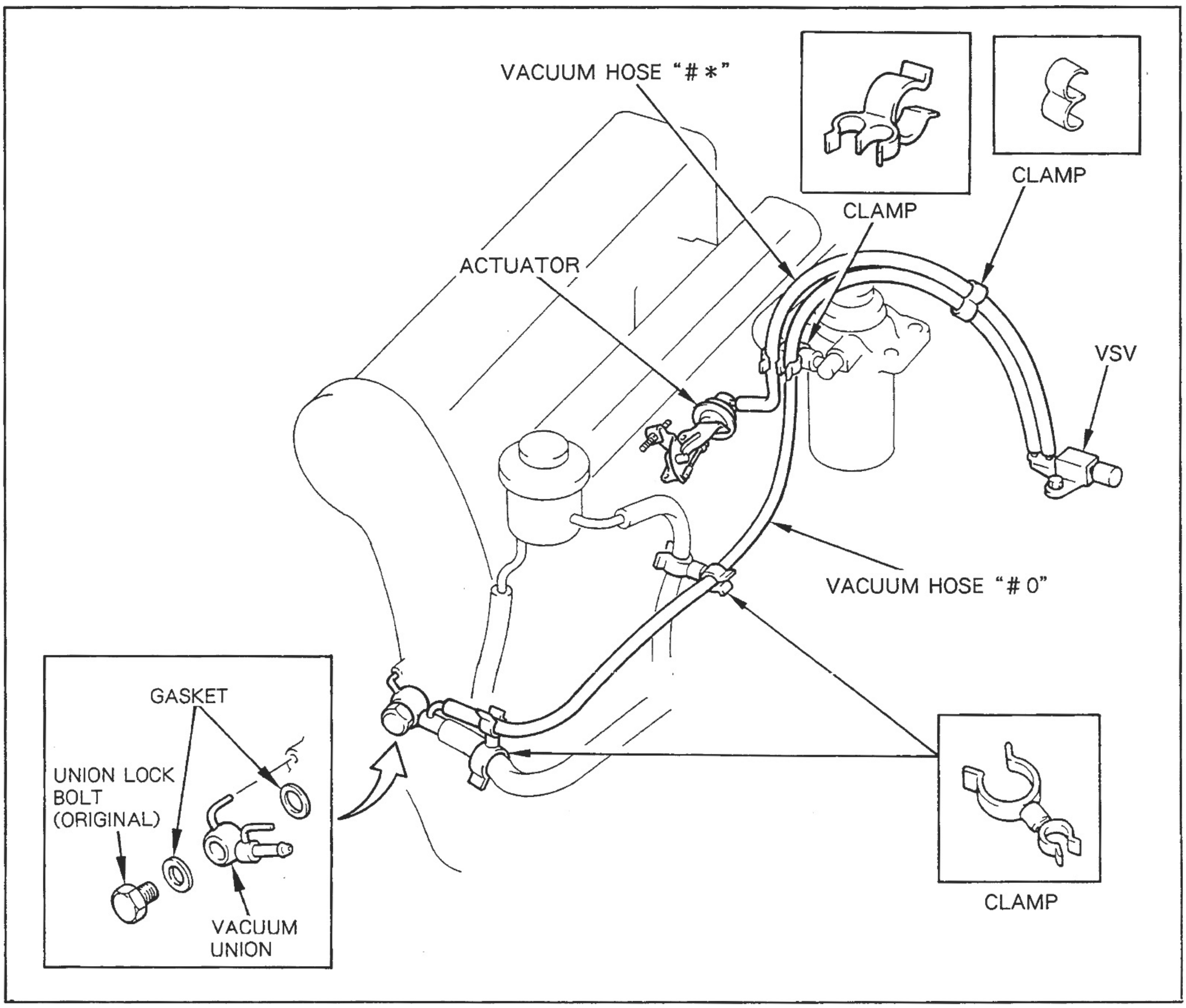
■ WITH ABS MODEL

(c) Install the VSV to the ABS bracket using a bolt.
(d) Connect the vehicle harness to the VSV.

(2) ACTUATOR

(a) Install the actuator to injection pump using two bolts.

Tightening Torque : Lock nut
8 N · m (80 kgf · cm, 6 ft · lbf)



(b) Exchange the vacuum union and two gaskets to the new one supplied in the kit.

(c) Connect the vacuum hose "# ✳" to the actuator and vacuum hose "#0" to the vacuum union.

(d) Secure the vacuum hoses using three clamps as shown.

2. FINISH

(1) GENERAL

After air conditioning installation is completed, reinstall the all temporarily removed parts.

(2) REFRIGERANT CHARGE

Make a thorough inspection for gas leakage and various details, and then charge the air conditioning system with refrigerant (Freon HFC-134a) as specified below.

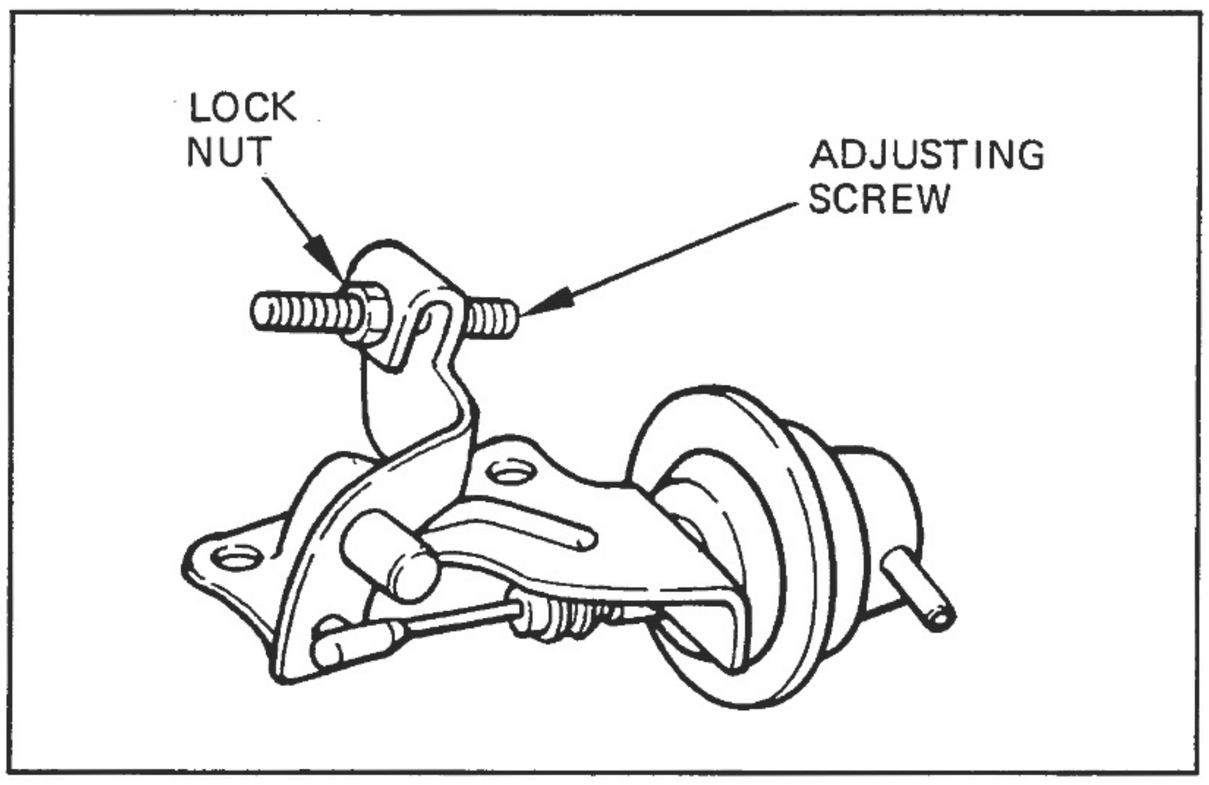
Standard amount of refrigerant :
850 ± 50 g (1.87 ± 0.11 lbs)

CAUTION

Never rotate the compressor before charging air conditioning system with refrigerant.

(3) ADJUSTMENT OF ENGINE REVOLUTION

The engine idling speed should be adjusted by operation the air conditioning as described below.



(a) Start engine and allow it to reach operating temperature before adjusting the idling speed.
(b) Check the initial ignition timing and initial idling speed.
Adjust as necessary.
(c) Place the vehicles in the following conditions.

Mode control	VENT
Temperature control	MAX COOL
Blower Speed	HIGH
Shift lever	"N" RANGE
Steering	STRAIGHT

(d) Turn the air conditioning on and adjust the engine idling speed.

Idling speed specification :
825^{+25}_{-50} rpm

(4) DRIVE BELT

CAUTION

1) *The new compressor drive belt is given extra tension when installed because it will loosen after several minutes running. Recheck that its tension is within the standard specification after operation and performance test. (Five minutes or more operation)*
2) *The belt tension may be measured between any two pulleys in using NIPPONDENSO belt tension gauge. Tension must be adjusted to the middle of standard value.*

(5) FINAL INSPECTION

Check if :

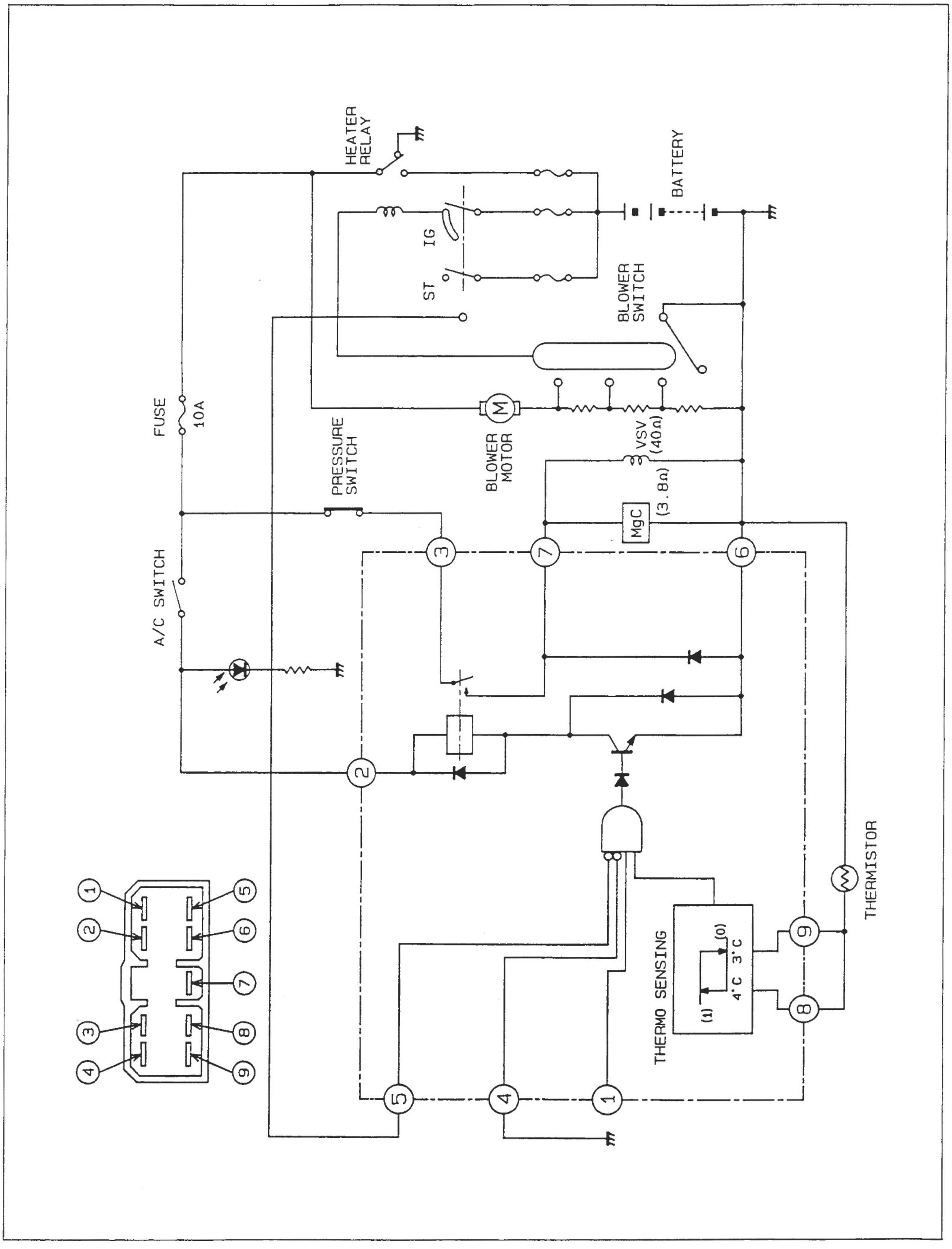
(a) All heater and air conditioning controls operate correctly.

(b) All vehicle functions operate correctly.

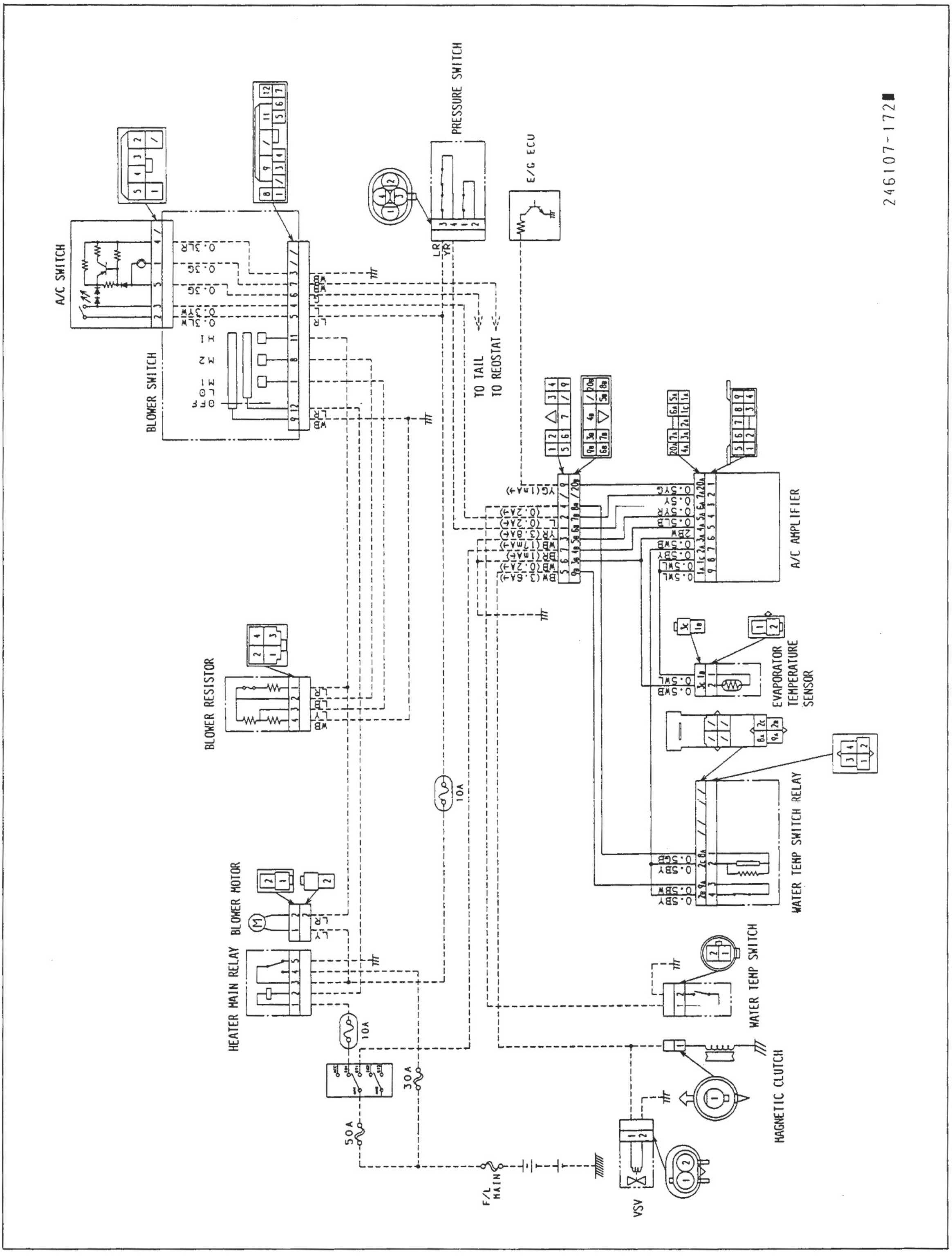
(c) Any abnormal noises are heard when the air conditioning operating.

NOW THE AIR CONDITIONING IS READY FOR USE.
BE SURE TO EXPLAIN ITS OPERATION AND MAINTENANCE SCHEDULE TO THE OWNER.

3. A/C AMPLIFIER



4. WIRING DIAGRAM



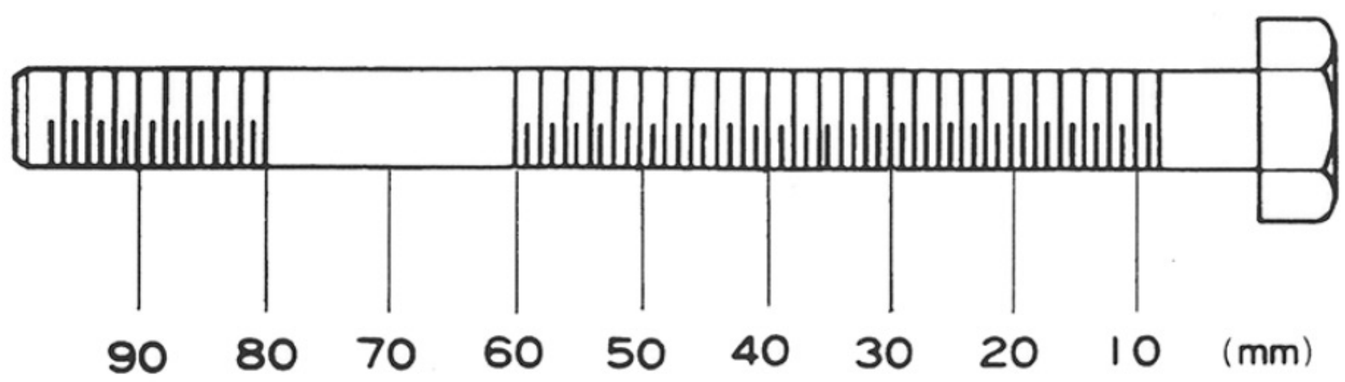
NIPPONDENSO (AUSTRALIA) PTY LTD

A.C.N. 004 938 621
255 Melrose Drive
TULLAMARINE VIC 3043

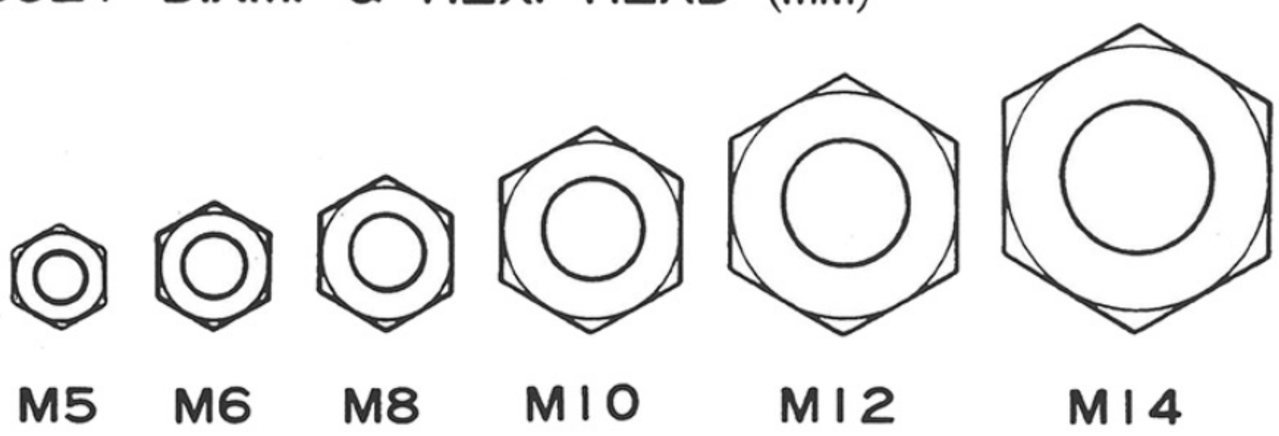
First Issue: April, 1995
Publication N°: MAC-1067

TOYOTA MOTOR CORPORATION
NIPPONDENSO (AUSTRALIA) PTY. LTD.

BOLT LENGTH RULER (mm)



BOLT DIAM. & HEX. HEAD (mm)



MAC-1067