

AIR CONDITIONING SYSTEM

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PRECAUTIONS

1. When handling refrigerant (R-12), the following precautions should be observed:
 - (a) Always wear eye protection.
 - (b) Keep the refrigerant container (service drum) below 40°C (104°F).
 - (c) Do not handle refrigerant in an enclosed area where there is any open flame.
 - (d) Discharge refrigerant slowly when purging the system.
 - (e) Be careful that the liquid refrigerant does not get on your skin.
2. If liquid refrigerant gets in the eyes or on the skin:
 - (a) Do not rub.
 - (b) Wash the area with a lot of cool water.
 - (c) Apply clean petroleum jelly to the skin.
 - (d) Rush to a physician or hospital for immediate professional treatment.
 - (e) Do not attempt to treat yourself.
3. When tubing:
 - (a) Apply a few drops of compressor oil to the seats of the O-ring fittings.
 - (b) Tighten the nut using two wrenches to avoid twisting the tube.
 - (c) Tighten the O-ring fitting to the specified torque.

Tightening torque for O-ring fittings

Fitting size	Torque
3/8 in. Tube	135 kg-cm (10 ft-lb, 13 N·m)
1/2 in. Tube	225 kg-cm (16 ft-lb, 22 N·m)
5/8 in. Tube	325 kg-cm (24 ft-lb, 32 N·m)

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
No cooling or warm air	Magnetic clutch does not engage		
	(a) A/C fuse blown	Replace fuse and check for short	AC-7
	(b) Magnetic clutch faulty	Check magnetic clutch	AC-15
	(c) Temperature control resistor faulty	Check resistor	AC-25
	(d) Thermistor faulty	Check thermistor	AC-26
	(e) Wiring or ground faulty	Repair as necessary	AC-4, 5
	(f) Refrigerant empty	Check refrigerant pressure	AC-8
	(g) Relay faulty	Check relay	AC-28
	(h) Pressure switch faulty	Check pressure switch	AC-27
	Compressor does not rotate properly		
	(a) Drive belt loose or broken	Adjust or replace drive belt	AC-17
	(b) Compressor faulty	Check compressor	AC-15
	Expansion valve faulty	Check expansion valve	AC-23
	Leak in system	Leak in system	AC-10
	Fusible plug on receiver blown or clogged screen	Check receiver	AC-20

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TROUBLESHOOTING

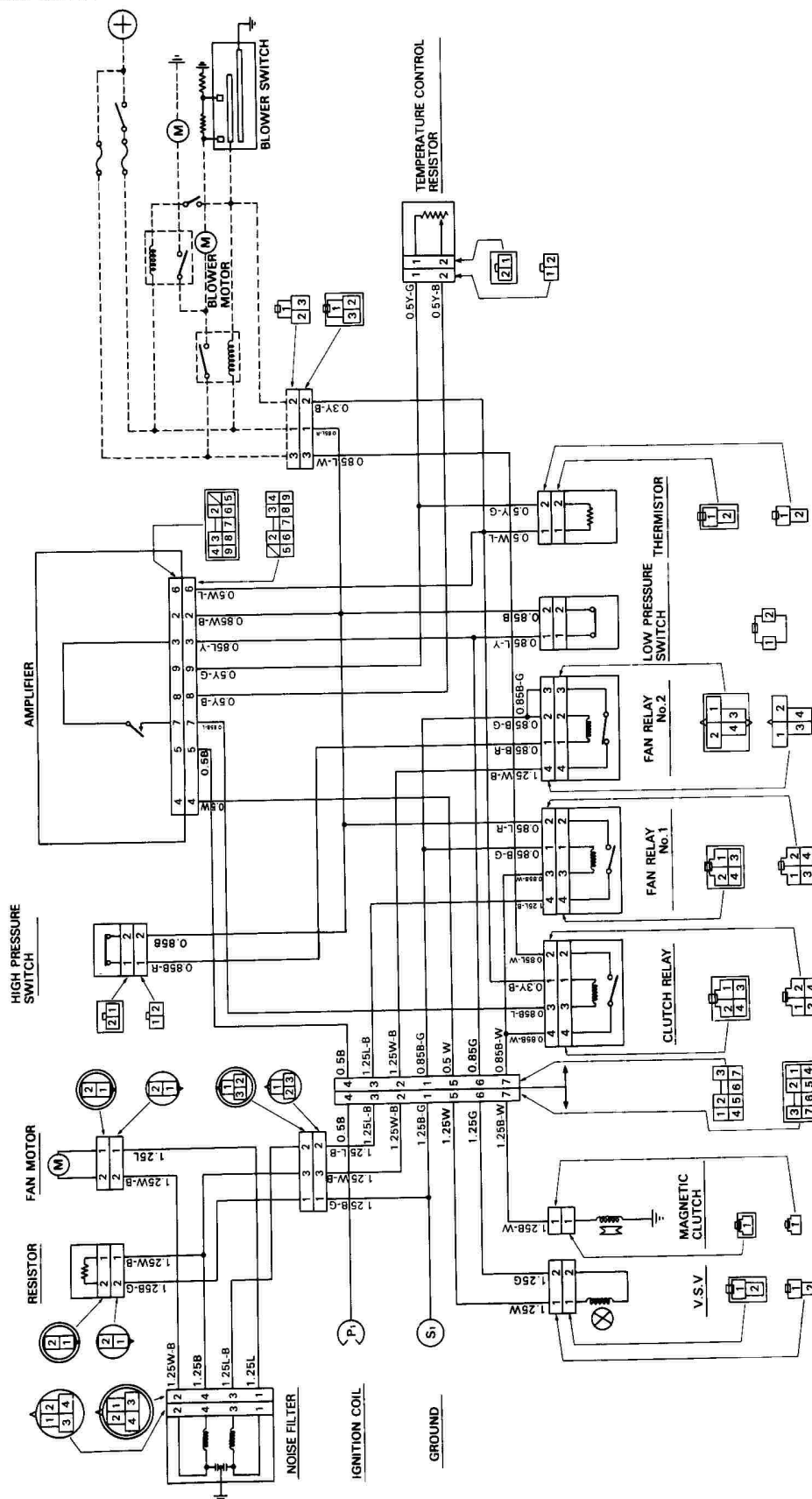
Problem	Possible cause	Remedy	Page
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	(a) A/C fuse blown		
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	(f) Refrigerant empty	Check refrigerant pressure	AC-8
	(g) Relay faulty	Check relay	AC-28
	(h) Pressure switch faulty	Check low pressure switch	AC-27
	Compressor does not rotate properly		
	(a) Drive belt loose or broken	Adjust or replace drive belt	AC-17
	(b) Compressor faulty	Check compressor	AC-15
	Expansion valve faulty	Check expansion valve	AC-23
	Leak in system	Leak test system	AC-10
	Fusible plug on receiver blown or clogged screen	Check receiver	AC-20

TROUBLESHOOTING (Cont'd)

Problem	Possible cause	Remedy	Page
No cooling or warm air (Cont'd)	Blower does not operate (a) Heater fuse blown (b) Temperature control resistor faulty (c) Clutch relay faulty (d) Blower motor faulty (e) Wiring faulty	Replace fuse and check for short Check resistor Check clutch relay Check blower motor Repair as necessary	AC-4, 5 AC-25 AC-29 AC-4, 5
Cool air comes out intermittently	Magnetic clutch slipping Expansion valve faulty Wiring connection faulty Excessive moisture in the system	Check magnetic clutch Check expansion valve Repair as necessary Evacuate and charge system	AC-15 AC-23 AC-4, 5 AC-9
Limited amount of cool air at high speed	Thermistor faulty	Check thermistor	AC-26
Cool air comes out only at high speed	Condenser clogged Drive belt slipping Compressor faulty Insufficient or too much refrigerant Air in system	Check condenser Check or replace drive belt Check compressor Check refrigerant charge Evacuate and charge system	AC-19 AC-17 AV-15 AC-8 AC-9
Insufficient cooling	Condenser clogged Drive belt slipping Magnetic clutch faulty Compressor faulty Expansion valve faulty Thermistor faulty Insufficient or too much refrigerant Air or excessive compressor oil in system Receiver clogged Temperature control resistor faulty	Check condenser Check or replace drive belt Check magnetic clutch Check compressor Check expansion valve Check thermistor Check refrigerant charge Evacuate and charge system Check receiver Check resistor	AC-19 AC-17 AC-15 AC-15 AC-23 AC-26 AC-8 AC-9 AC-20 AC-25
Insufficient velocity of cool air	Evaporator clogged or frosted Air leakage from cooling unit or air duct Air inlet blocked Blower motor faulty	Clean evaporator fins or filters Repair as necessary Repair as necessary Replace blower motor	AC-23 AC-21

AIR CONDITIONING SYSTEM CIRCUIT

YU, RU series



WIRE COLOR

Wire colors are indicated by an alphabetical code. The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

LG = Light Green
R = Red
Y = Yellow

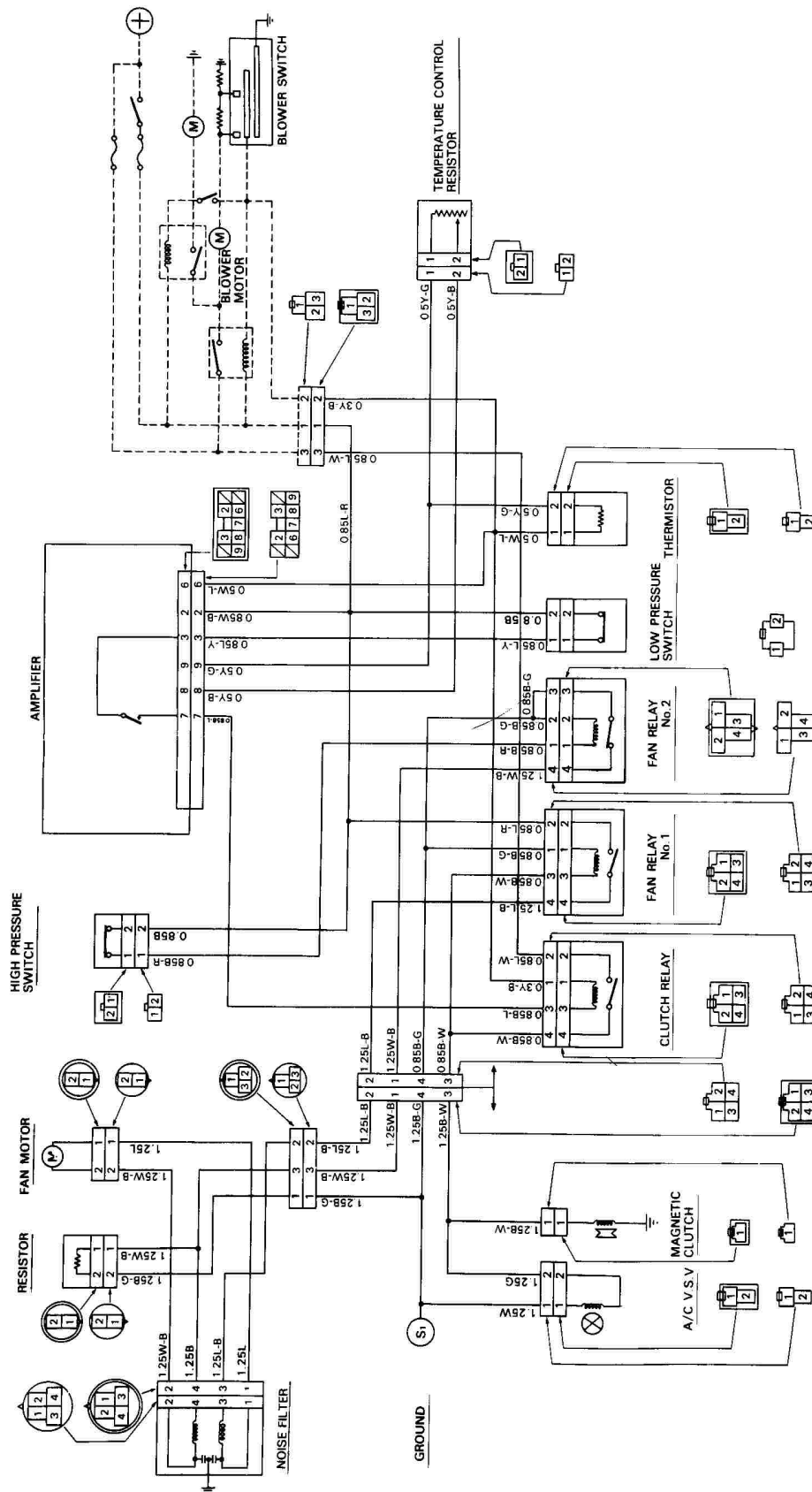
P = Pink
W = White
G = Green

V = Violet
BR = Brown
L = Light Blue

B = Black
GR = Grey
O = Orange

Example: R-G indicates a Red wire with a Green stripe.

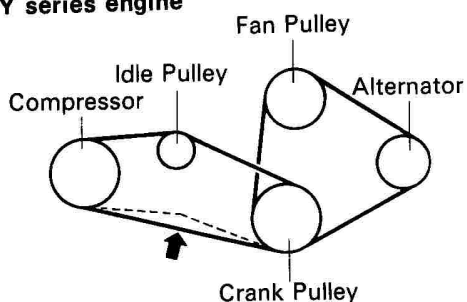
BU, WU series



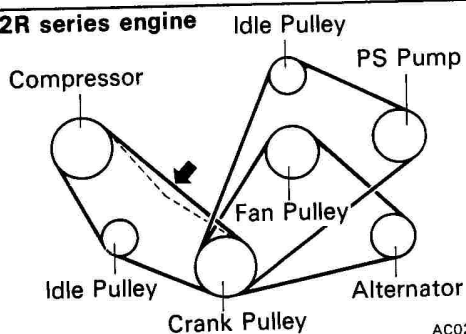
Wire colors are indicated by an alphabetical code. The first letter indicates the basic wire color and the second letter indicates the color of the stripe.

B = Black
GR = Grey
O = Orange

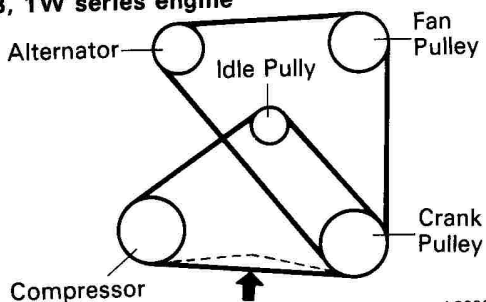
Example: R-G indicates a Red wire with a Green stripe.

3Y series engine

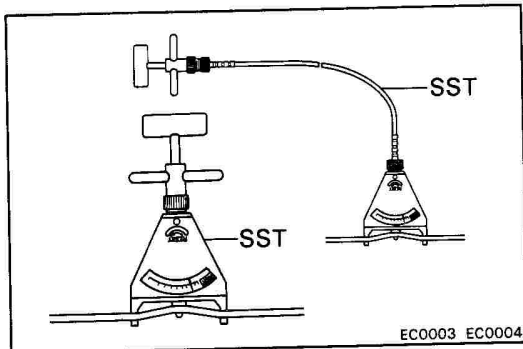
AC0219

22R series engine

AC0220

B, 1W series engine

AC0221



EC0003 EC0004

ON-VEHICLE INSPECTION**1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE**

If the fins are clogged, clean them with pressurized water.

CAUTION: Be careful not to damage the fins.

2. CHECK DRIVE BELT TENSION

Drive belt tension at 10 kg (22.0 lb, 98 N):

mm (in.)

Engine	New belt	Used belt
3Y	7 - 9 (0.28 - 0.35)	9 - 13 (0.35 - 0.51)
22R	13 - 17 (0.51 - 0.67)	17 - 23 (0.67 - 0.91)
B, 11B, 13B	9 - 12 (0.35 - 0.47)	12 - 16 (0.47 - 0.63)
1W	8 - 10 (0.31 - 0.39)	10 - 14 (0.39 - 0.55)

NOTE:

- "New belt" refers to a brand new belt which has never before been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

(Reference)

Using SST, check the drive belt tension.

SST 09216-00020 and 09216-00030

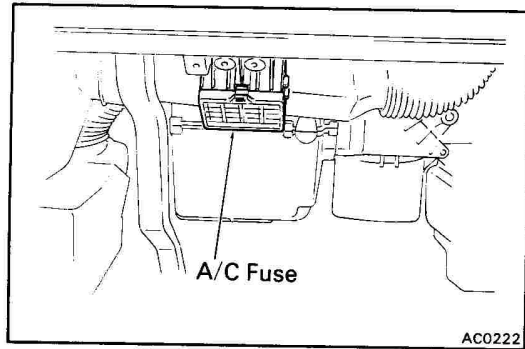
Drive belt tension:

New belt 50 ± 5 kg

Used belt 30 ± 5 kg

NOTE:

- "New belt" refers to a brand new belt which has never before been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

**3. START ENGINE****4. POSITION THE TEMPERATURE CONTROL RESISTOR ON "MAX COOL"**

Check that the A/C operates at each position of the blower switch.

If A/C does not operate, check A/C fuse.

5. CHECK MAGNETIC CLUTCH OPERATION**6. CHECK THAT IDLE INCREASES**

When the magnetic clutch engages, engine revolution should increase.

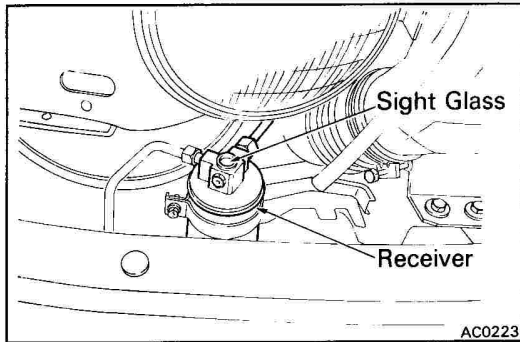
Standard idle up rpm: 900 – 1,000 rpm

7. CHECK AMOUNT OF REFRIGERANT

If you can see bubbles in the sight glass, additional refrigerant is needed. (See page AC-8)

8. IF NO OR INSUFFICIENT COOLING, INSPECT FOR LEAKAGE

Using a gas leak tester, inspect each component of the refrigeration system. (See page AC-9)



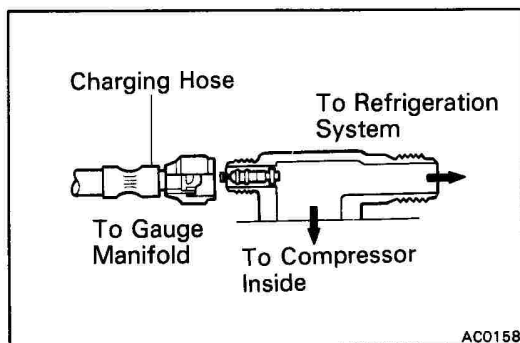
REFRIGERATION SYSTEM

Checking of Refrigerant Charge

1. RUN ENGINE AT FAST IDLE
2. OPERATE AIR CONDITIONER AT MAXIMUM COOLING FOR A FEW MINUTES
3. CHECK AMOUNT OF REFRIGERANT

Observe the sight glass on the receiver.

Item	Symptom	Amount of refrigerant	Remedy
1	Bubbles present in sight glass	Insufficient	Check for leak with gas leak tester
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	Evacuate and charge system. Then check for leak with gas leak tester
4	Temperature between compressor inlet and outlet is noticeably different	Proper or too much	Refer to items 5 and 6
5	Immediately after the air conditioner is turned off, refrigerant in sight glass stays clear	Too much	Discharge the excess refrigerant to specified amount
6	When the air conditioner is turned off, refrigerant foams and then stays clear	Proper	—



Installation of Manifold Gauge Set

NOTE: Fittings for attaching the manifold gauge set are located on the compressor service valves.

1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
2. INSTALL CHARGING HOSES OF GAUGE SET TO SERVICE VALVES

Connect the low pressure hose to the suction service valve and the high pressure hose to the discharge service valve. Tighten the hose nuts by hand.

NOTE: Do not apply compressor oil to the seat of the connection.

Discharging of Refrigeration System

1. CONNECT MANIFOLD GAUGE SET TO COMPRESSOR
2. PLACE FREE END OF CENTER HOSE IN A SHOP TOWEL
3. DISCHARGE SYSTEM

- (a) Slowly open the high pressure hand valve to adjust the refrigerant flow. Do not open the valve very much.

CAUTION: If refrigerant is allowed to escape too fast, compressor oil will be drawn out of the system.

- (b) Check the shop towel to make sure no oil is being discharged.

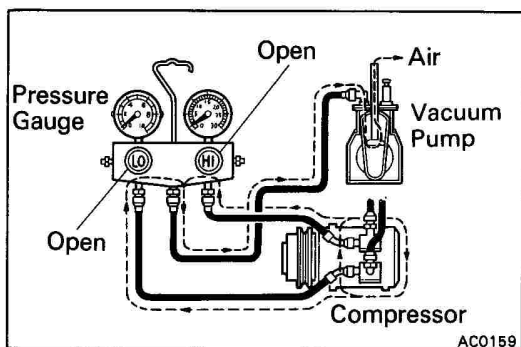
If oil is present, partially close the hand valve.

- (c) After the manifold gauge reading drops below 3.5 kg/cm² (50 psi, 343 kPa), slowly open the low pressure valve.
- (d) As the system pressure drops, gradually open both high and low valves until both gauges read 0 kg/cm² (0 psi, 0 kPa).

Evacuating and Charging of Refrigeration System

NOTE:

- Whenever the air conditioning system has been exposed to the atmosphere, it must be evacuated.
- After installation of a component, the system should be evacuated for approximately 15 minutes. A component in service that has been opened for repair should be evacuated for 30 minutes.



1. EVACUATE SYSTEM

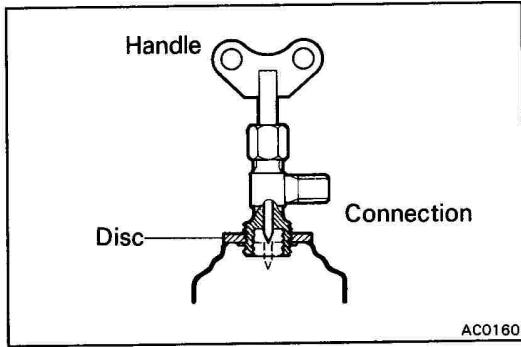
- (a) Connect the manifold gauge set. (See page AC-8)
- (b) Install the center hose of the gauge set to the vacuum pump inlet.
- (c) Run the vacuum pump, and then open both hand valves.
- (d) After about ten minutes, check that the low pressure gauge reads more than 600 mmHg (23.62 in. Hg, 80.0 kPa) of vacuum.

If the reading is not more than 600 mmHg (23.62 in. Hg, 80.0 kPa), close both valves and stop the vacuum pump. Check the system for leaks and repair as necessary.

If no leaks are found, continue evacuating the system.

- (e) After the low pressure gauge indicates more than 700 mmHg (27.56 in. Hg, 93.3 kPa) of vacuum, continue evacuating for 15 minutes.
- (f) Close both hand valves, and stop the vacuum pump. Disconnect the hose from the vacuum pump.

The system is now ready for charging.



2. INSTALL REFRIGERANT CONTAINER TAP VALVE

CAUTION: Observe the precautions listed in the front of this section.

- (a) Before installing the valve on the refrigerant container, turn the handle counterclockwise until the valve needle is fully retracted.
- (b) Turn the disc counterclockwise until it reaches its highest position.
Screw down the valve on the refrigerant container.
- (c) Connect the center hose to the valve fitting. Turn the disc fully clockwise by hand.
- (d) Turn the handle clockwise to make a hole in the sealed tap.
- (e) Turn the handle fully counterclockwise to fill the center hose with gas. Do not open the high and low pressure valves.
- (f) Loosen the center hose nut connected to the center fitting of the manifold gauge until a hiss can be heard.
Allow air to escape for a few seconds, and then tighten the nut.

3. TEST SYSTEM FOR LEAKS

NOTE: After finishing the evacuation of the system, check the system for leaks.

- (a) Install the refrigerant can tap valve as described in step 2.
- (b) Open the high pressure valve to charge the system with refrigerant vapor.
- (c) When the low pressure gauge reads 1 kg/cm² (14 psi, 98 kPa) close the high pressure valve.
- (d) Using a halide gas leak detector, propane torch, or electric leak detector, check the system for leaks.

If a leak is found, repair the faulty component or connection.

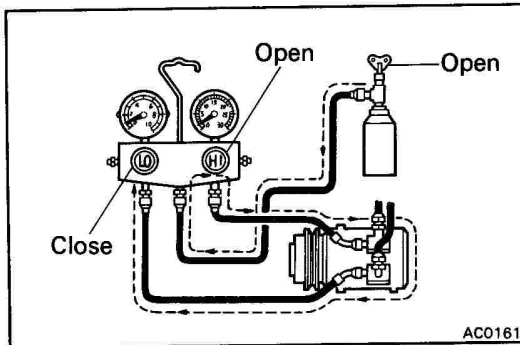
- (e) After checking and repairing the system, perform the following:
 - Turn the container tap handle fully clockwise.
 - Disconnect the center hose from the can valve fitting.
 - Evacuate the system for at least 15 minutes.
(See step 1 on page AC-9)

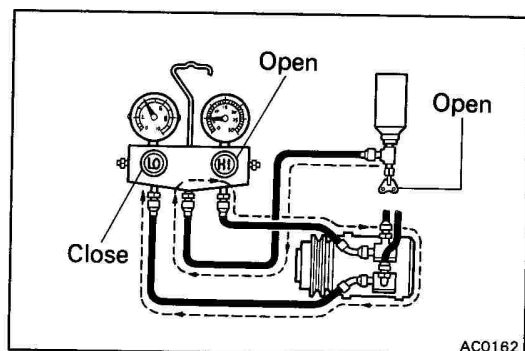
4. CHARGE EMPTY SYSTEM (LIQUID)

NOTE: This step is to charge and empty system through the high pressure side with refrigerant in a liquid state. When the refrigerant container is held upside down, refrigerant will enter the system as a liquid.

CAUTION:

- Never run the engine when charging the system through the high pressure side.
- Do not open the low pressure valve when the system is being charged with liquid refrigerant.





- Close both high and low pressure valves completely after the system is evacuated.
- Install the refrigerant can tap valve as described in step 2.
- Open the high pressure valve fully, and keep the container upside down.
- Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the high pressure valve.

Specified amount: 650 – 750 g (1.4 – 1.7 lb)

NOTE:

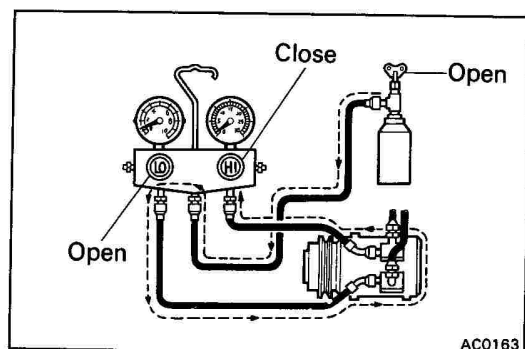
- A fully charged system is indicated by the receiver sight glass being free of any bubbles.
- If the low pressure gauge does not show a reading, the system is clogged and must be repaired.

5. (VAPOR)

CHARGE EMPTY OR PARTIALLY CHARGED SYSTEM

NOTE:

- This step is to charge the system through the low pressure side with refrigerant in a vapor state. When the refrigerant container is placed rightside up, refrigerant will enter the system as a vapor.
- Put the refrigerant container in a pan of warm water (maximum temperature 40°C (104°F) to keep vapor pressure in the container slightly higher than vapor pressure in the system.



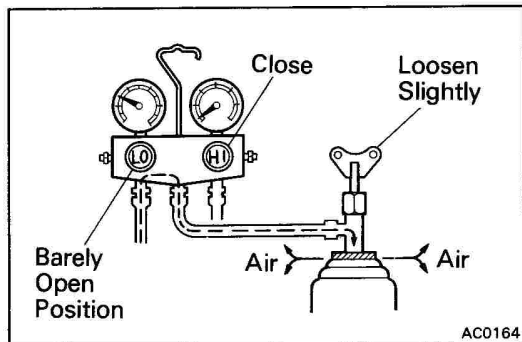
- Install the refrigerant can tap valve as described in step 2.
- Open the low pressure valve. Adjust the valve so that the low pressure gauge does not read over 4.2 kg/cm² (60 psi, 412 kPa).
- Run the engine at fast idle, and operate the air conditioner.

CAUTION: Be sure to keep the container upright to prevent liquid refrigerant being charged into the system through the suction side, resulting in possible damage to the compressor.

- Charge the system with more than one container (400 g, 0.9 lb) to the specified amount. Then, close the low pressure valve.

Specified amount: 650 – 750 g (1.4 – 1.7 lb)

NOTE: A fully charged system is indicated by the receiver sightglass being free of any bubbles.



6. IF NECESSARY, CHARGE SYSTEM WITH ANOTHER CONTAINER

- When the refrigerant container is empty, close the pressure valves.
- Remove the can tap valve from the container.
- Attach the can tap valve to a new refrigerant container.
- Purge the air from the center hose by barely opening the low pressure valve and loosening the valve disc.
- Make a hole in the sealed tap of the new container and charge the system.

CAUTION: Be careful not to overcharge the refrigerant as it could cause failure of the bearings and belt.

7. WHEN SYSTEM IS FULLY CHARGED, DISCONNECT MANIFOLD GAUGE SET

- Close both low and high pressure valves.
- Close valve of the refrigerant container. If using one-pound containers of R-12, allow remaining refrigerant to escape by slowly removing the charge line.
- Turn off the engine.
- Using a shop rag, quickly remove both hoses from the compressor service valves.

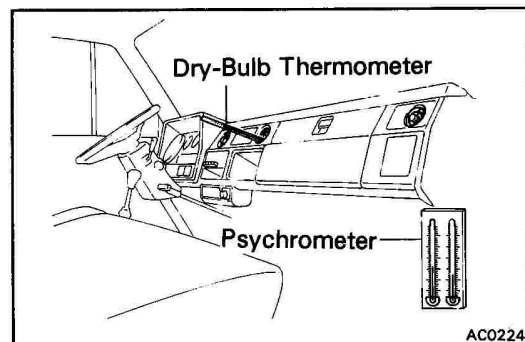
WARNING: Care must be taken to protect eyes and skin when removing the high pressure hoses.

- Put the cap nuts on the service valve fittings.

Performance Test

1. INSTALL MANIFOLD GAUGE SET

- Close the high pressure and low pressure hand valves.
- Connect the high pressure hose to the discharge service valve of the compressor.
- Connect the low pressure hose to the suction service valve of the compressor.



2. RUN ENGINE AND OPERATE AIR CONDITIONER

- Run the engine at 2,000 rpm.
- Set the blower switch at HI, A/C switch ON temperature control at COOL, and air flow control at VENT.
- Keep all windows and doors open.

3. POSITION THERMOMETERS

- Place a dry-bulb thermometer in the cool air outlet.
- Place a psychrometer close to the inlet of the cooling unit.

4. WAIT UNTIL AIR CONDITIONING SYSTEM STABILIZES

- (a) Check that the reading on the high pressure gauge is 14.0 – 15.5 kg/cm² (199 – 220 psi, 1,373 – 1,520 kPa).

If the reading is too high, pour water on the condenser. If the reading is too low, cover the front of the condenser.

- (b) Check that the reading on the dry-bulb thermometer at the air inlet is 25 – 35 °C (77 – 95 °F).

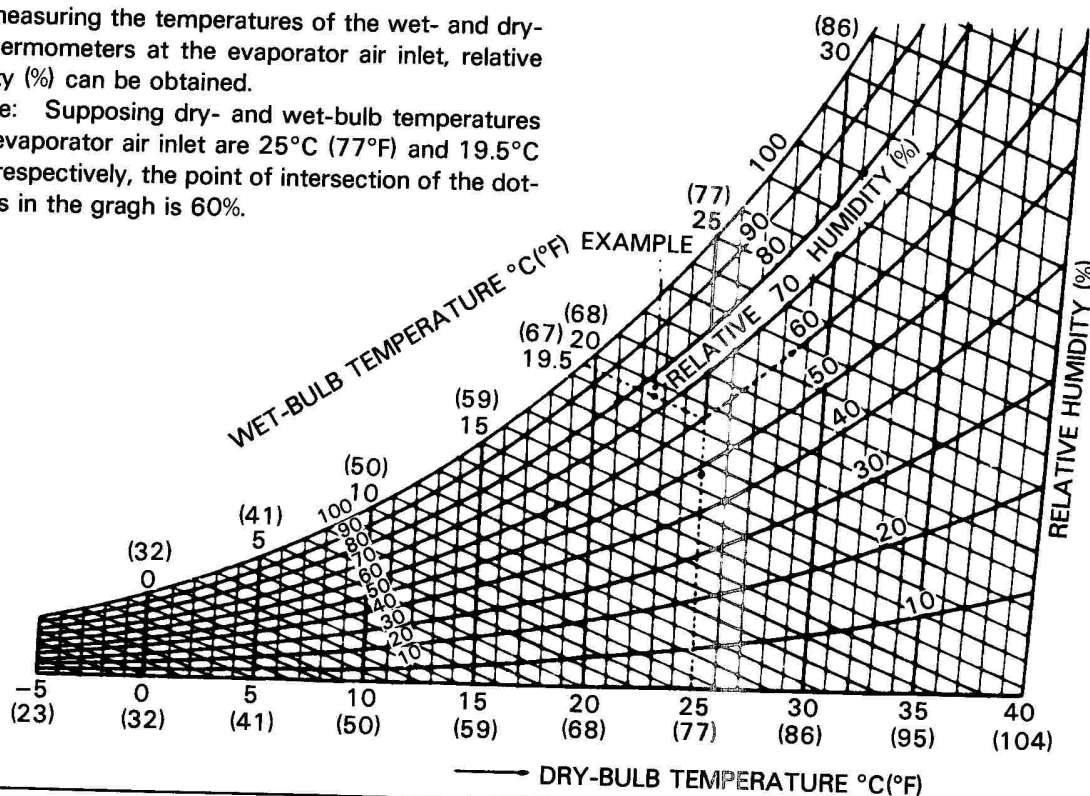
5. CHECK PERFORMANCE OF AIR CONDITIONING SYSTEM

- (a) Calculate the relative humidity from the psychrometric graph by comparing the wet- and dry-bulb readings of the psychrometer at the air inlet.

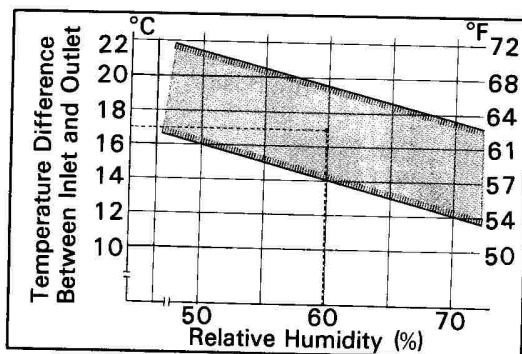
HOW TO READ THE GRAPH:

After measuring the temperatures of the wet- and dry-bulb thermometers at the evaporator air inlet, relative humidity (%) can be obtained.

Example: Supposing dry- and wet-bulb temperatures at the evaporator air inlet are 25°C (77°F) and 19.5°C (67°F) respectively, the point of intersection of the dotted lines in the graph is 60%.



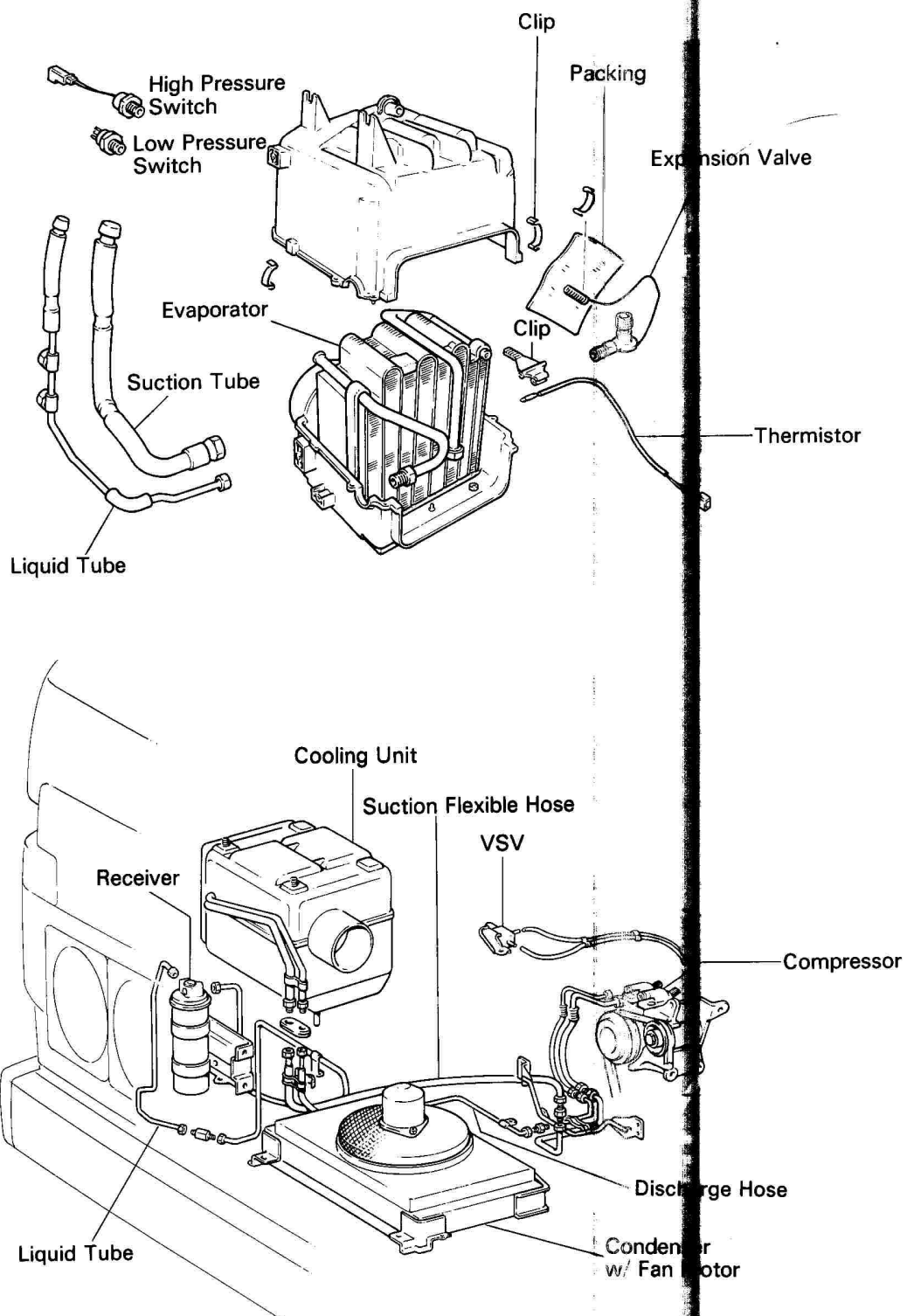
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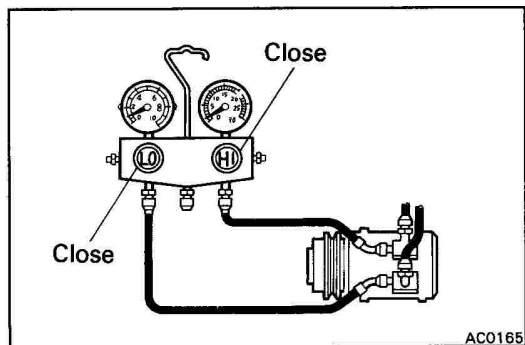


- (b) Measure the dry-bulb temperature at the cool air outlet, and calculate the difference between the inlet dry-bulb and outlet dry-bulb temperatures.
- (c) Check that the intersection of the relative humidity and temperature difference is between the two hatched lines.

If the intersection is within the two lines, cooling performance is satisfactory.

SYSTEM COMPONENTS





COMPRESSOR

ON-VEHICLE INSPECTION

1. INSTALL MANIFOLD GAUGE SET

- Close the high pressure and low pressure valves.
- Connect the high pressure hose to the discharge service valve of the compressor.
- Connect the low pressure hose to the suction service valve of the compressor.

2. RUN ENGINE AT FAST IDLE

3. CHECK COMPRESSOR FOR FOLLOWING:

- High pressure gauge reading is not low and low pressure gauge reading is not higher than normal.
- Metallic sound
- Leakage from shaft seal

If defects are found, repair the compressor.

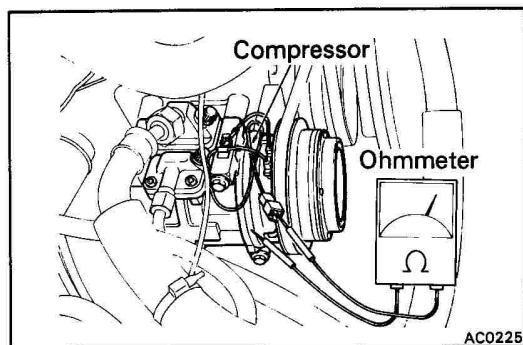
4. CHECK MAGNETIC CLUTCH

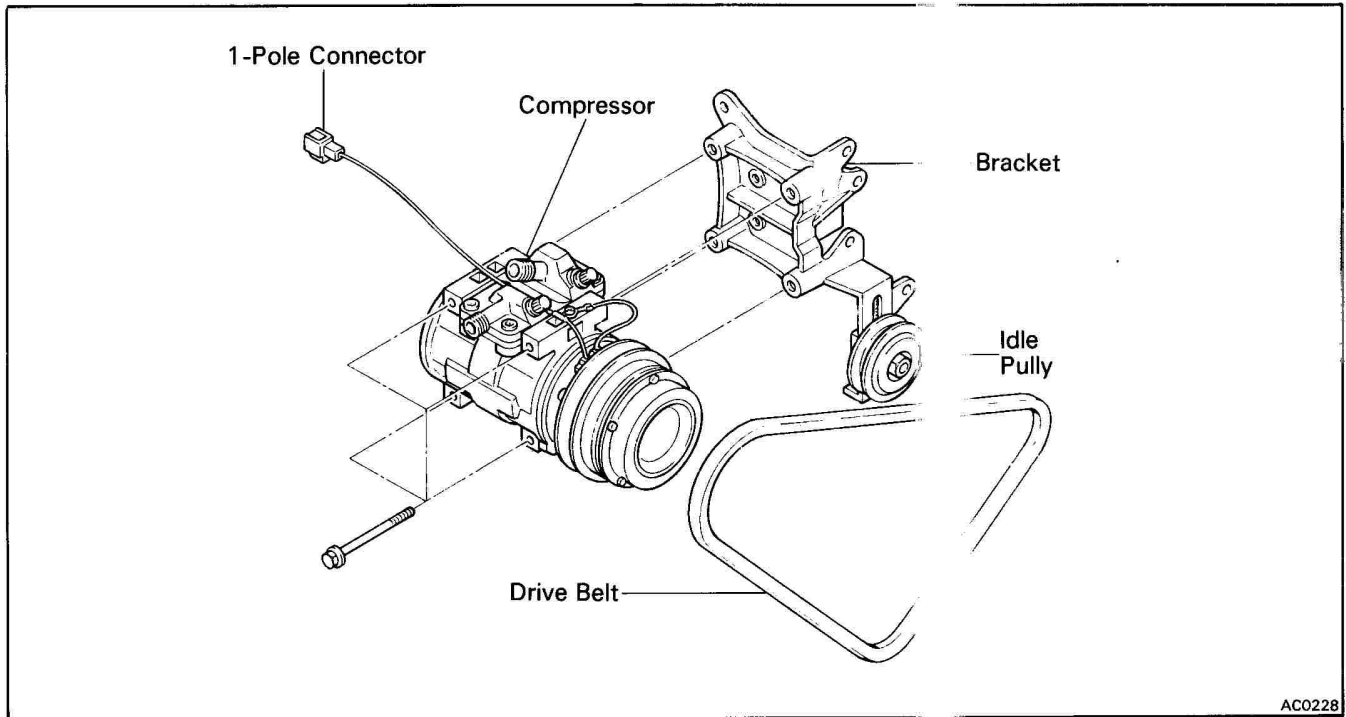
- Inspect the pressure plate and the rotor for signs of oil.
- Check the clutch bearings for noise and grease leakage.

- Using an ohmmeter, measure the resistance of the stator coil between the clutch lead wire and ground.

If the resistance is not within tolerance, replace the coil.

Standard resistance: at 20°C (68°F)
 $3.6 \pm 0.2 \Omega$

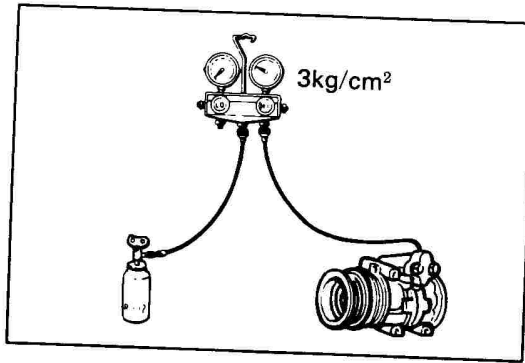




AC0228

REMOVAL OF COMPRESSOR

1. RUN ENGINE AT IDLE FOR 10 MINUTES WITH AIR CONDITIONING ON
2. DISCONNECT NEGATIVE CABLE FROM BATTERY
3. DISCONNECT CLUTCH LEAD WIRE FROM WIRING HARNESS
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM (See page AC-8)
5. DISCONNECT TWO FLEXIBLE HOSES FROM COMPRESSOR SERVICE VALVES
Cap the open fitting immediately to keep moisture out of the system.
6. REMOVE COMPRESSOR
 - (a) Loosen the drive belt
 - (b) Remove the compressor mounting bolts and the compressor.



INSTALLATION OF COMPRESSOR

(See page AC-16)

1. PERFORM GAS LEAKAGE TEST

- Put caps on both service valves.
- Charge the compressor with refrigerant through the charge valve until the pressure is 3 kg/cm² (43 psi, 294 kPa).
- Using a gas leak detector, check the compressor for leaks.

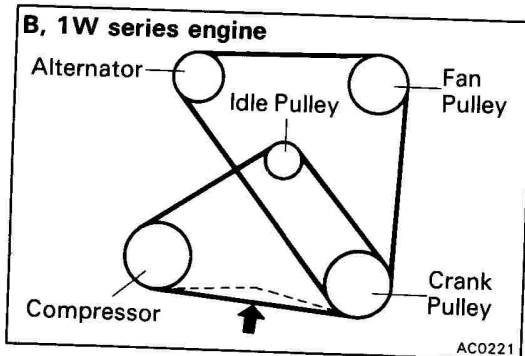
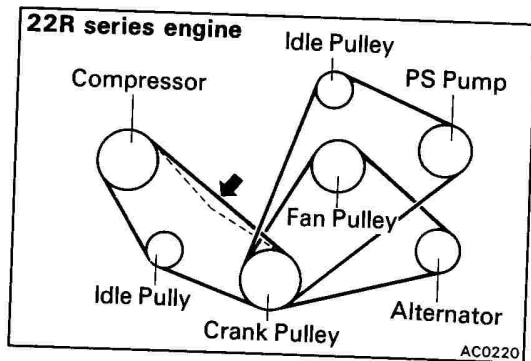
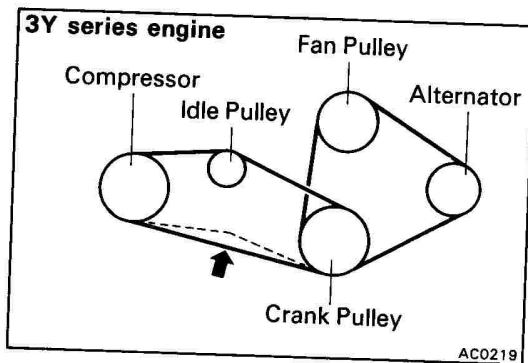
If leaks are found, check and replace the gasket, O-ring, or shaft seal.

2. FILL COMPRESSOR WITH CLEAN COMPRESSOR OIL

Remove the service valve and drain the compressor oil. Fill with new oil.

Compressor oil: **DENSO OIL 6, SUNISO No. 5GS** or equivalent

Compressor oil capacity: 60 – 100 cc (2.0 – 3.4 oz)



3. INSTALL COMPRESSOR WITH FOUR MOUNTING BOLTS

4. INSTALL DRIVE BELT

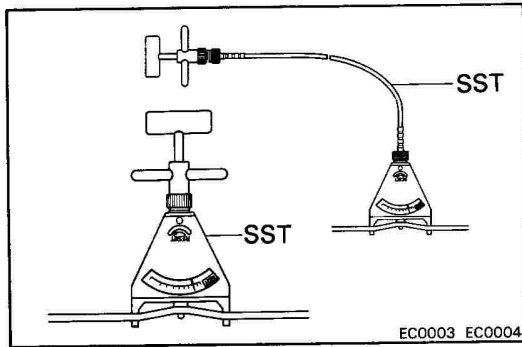
- Install the drive belt to the pulley.
- Tighten the belt with the adjusting bolts.

Drive belt tension: at 10 kg (22.0 lb, 98N):

		mm (in.)	
Engine		New belt	Used belt
3Y	7	7 - 9 (0.28 - 0.35)	9 - 13 (0.35 - 0.51)
22R	13	13 - 17 (0.51 - 0.67)	17 - 23 (0.67 - 0.91)
B, 11B, 13B	9	9 - 12 (0.35 - 0.47)	12 - 16 (0.47 - 0.63)
1W	8	8 - 10 (0.31 - 0.39)	10 - 14 (0.39 - 0.55)

NOTE:

- "New belt" refers to a brand new belt which has never before been used.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.



(Reference)

Using SST, check the belt tension.
SST 09216-00020 and 09216-00030

Drive belt tension:

New belt 50 ± 5 N

Used belt 30 ± 5 N

NOTE:

- "New belt" refers to brand new belt which has never before been used.
- "Used belt" refers to belt which has been used on a running engine for 10 minutes or more.

5. CONNECT TWO FLEXIBLE HOSES TO COMPRESSOR SERVICE VALVES

Torque:

Discharge line 15 kg-cm (16 ft-lb, 22 N·m)

Suction line 15 kg-cm (24 ft-lb, 32 N·m)

6. CONNECT CLUTCH WIRE TO WIRING HARNESS

7. CONNECT NEGATIVE CABLE TO BATTERY

8. EVACUATE AND CHARGE REFRIGERATION SYSTEM (See page AC-9)

CONDENSER

ON-VEHICLE INSPECTION

1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

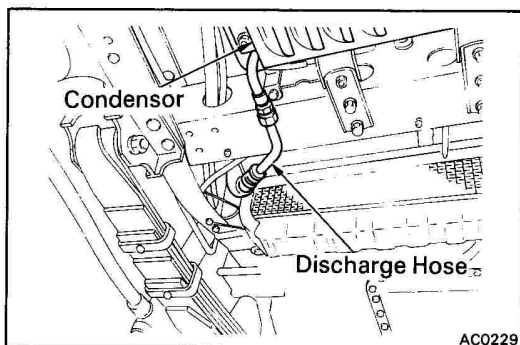
If the fins are clogged, wash them with water and dry with compressed air.

CAUTION: Be careful not to damage the fins.

If the fins are bent, straighten them with a screwdriver or pliers.

2. CHECK CONDENSER FITTINGS FOR LEAKAGE

Repair as necessary.



REMOVAL OF CONDENSER

(See page AC-14)

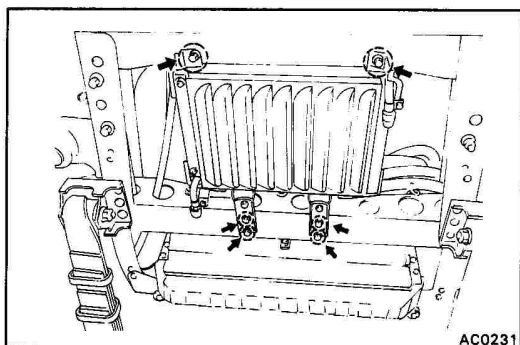
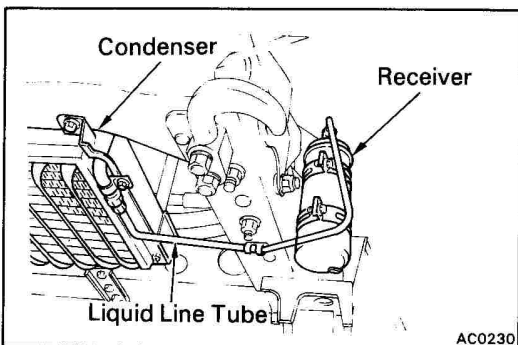
1. DISCHARGE REFRIGERATION SYSTEM (See page AC-9)
2. DISCONNECT DISCHARGE HOSE FROM CONDENSER INLET FITTING

3. DISCONNECT LIQUID LINE TUBE FROM CONDENSER OUTLET FITTING

NOTE: Cap the open fittings immediately to keep moisture out of the system.

4. REMOVE CONDENSER

Remove the six bolts.



INSTALLATION OF CONDENSER

(See page AC-14)

1. INSTALL CONDENSER
2. CONNECT LIQUID LINE TUBE AND DISCHARGE HOSE TO CONDENSER

Torque:

Liquid line tube	135 kg-cm (10 ft-lb, 13 N·m)
Discharge hose	225 kg-cm (16 ft-lb, 22 N·m)

3. IF CONDENSER IS PLACED, ADD COMPRESSOR OIL TO COMPRESSOR

Add 25 – 30 cc (1 – 1.0 oz)

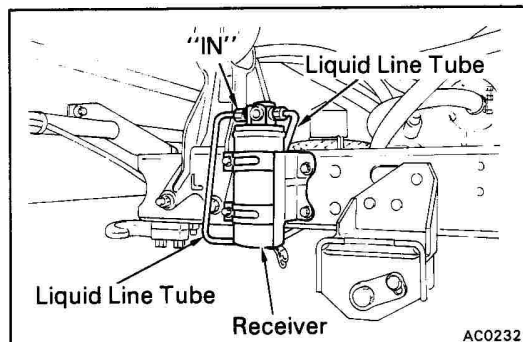
4. EVACUATE, CHARGE, AND TEST REFRIGERATION SYSTEM (See page AC-9)

RECEIVER

ON-VEHICLE INSPECTION

CHECK SIGHT GLASS, FUSEABLE PLUG AND FITTINGS FOR LEAKAGE

Use a gas leak tester. Repair as necessary.



REMOVAL OF RECEIVER

(See page AC-14)

1. **DISCHARGE REFRIGERATION SYSTEM**
(See page AC-9)
2. **DISCONNECT TWO LIQUID LINE TUBES FROM RECEIVER**
NOTE: Cap the open fittings immediately to keep moisture out of the system.
3. **REMOVE RECEIVER FROM RECEIVER HOLDER**

INSTALLATION OF RECEIVER

(See page AC-14)

1. **INSTALL RECEIVER IN RECEIVER HOLDER**
NOTE: Do not remove the blind plugs until ready for connection.
2. **CONNECT TWO LIQUID LINE TUBES TO RECEIVER**
Torque: 135 kg-cm (10 ft-lb, 13 N·m)
3. **IF RECEIVER WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR**
Add 20 cc (0.7 oz)
4. **EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM** (See page AC-9)

COOLING UNIT

ON-VEHICLE INSPECTION OF EXPANSION VALVE

1. CONNECT MANIFOLD GAUGE TO COMPRESSOR
2. CHECK EXPANSION VALVE OPERATION
 - (a) Run the engine at fast idle with the air conditioning on.
 - (b) Check that the low pressure reading is between 0.5 – 5.0 kg/cm² – 71 psi, 49 – 490 kPa.

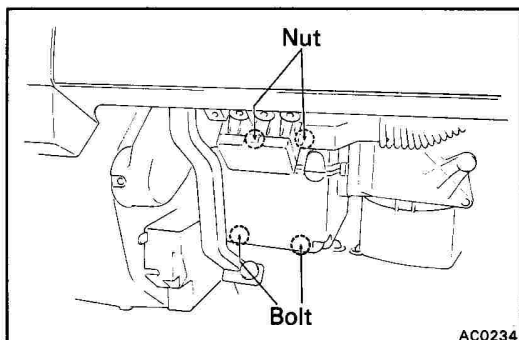
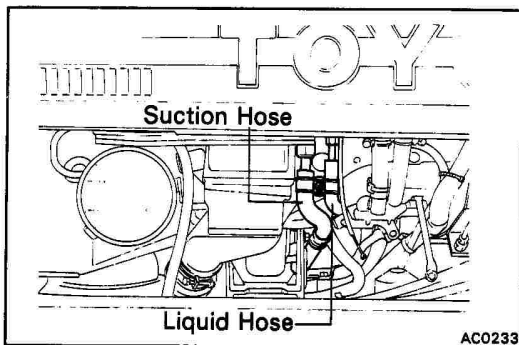
If the reading is too high, check and replace the expansion valve and/or receiver.

If the reading is too low, tighten the remote bulb holders and/or replace the expansion valve.

REMOVAL OF COOLING UNIT

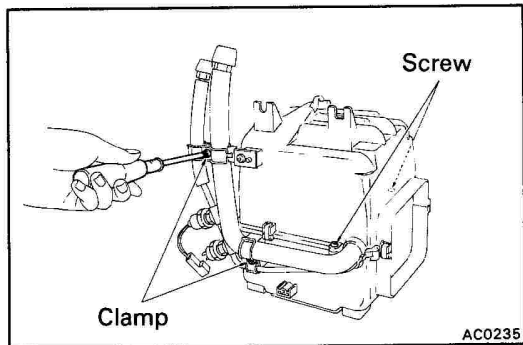
1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. DISCHARGE REFRIGERATION SYSTEM
(See page AC-9)
3. DISCONNECT SUCTION HOSE FROM COOLING UNIT
OUTLET FITTING
4. DISCONNECT LIQUID LINE HOSE FROM COOLING
UNIT INLET FITTING

NOTE: Cap the open fittings immediately to keep moisture out of the system.
5. REMOVE GROMMETS FROM INLET AND OUTLET
FITTINGS
6. REMOVE FOLLOWING COMPONENTS:
 - (a) Under tray
 - (b) Glove box
7. DISCONNECT FOLLOWING CONNECTORS:
 - (a) Connectors for pressure switch
 - (b) Connector for evaporator
 - (c) Connector for temperature control resistor
 - (d) Connectors for blays and amplifire
 - (e) Connector connected to vehicle wire harness



8. REMOVE COOLING UNIT

Remove the two nuts and two bolts.
9. REMOVE A/C WIRE HARNESS AND RELAYS FROM
COOLING UNIT



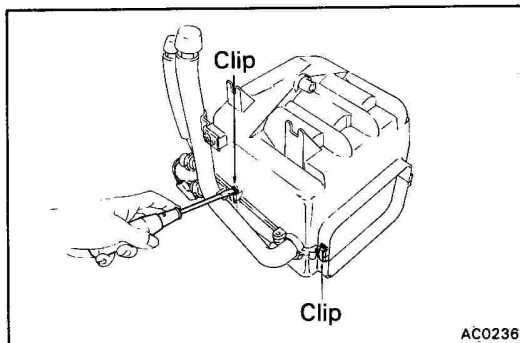
DISASSEMBLY OF COOLING UNIT

(See page AC-14)

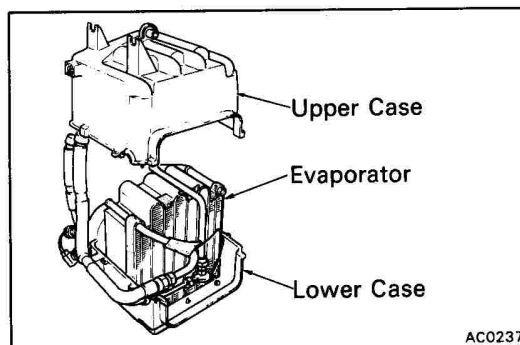
1. REMOVE UPPER AND LOWER CASES FROM EVAPORATOR

(a) Remove the clamp and two screws.

(b) Remove six clips

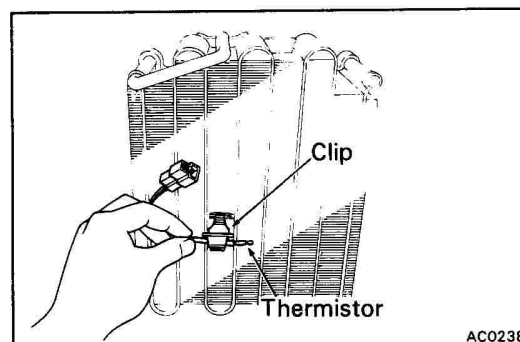


(c) Remove upper and lower cases from the evaporator.



2. REMOVE THERMISTOR

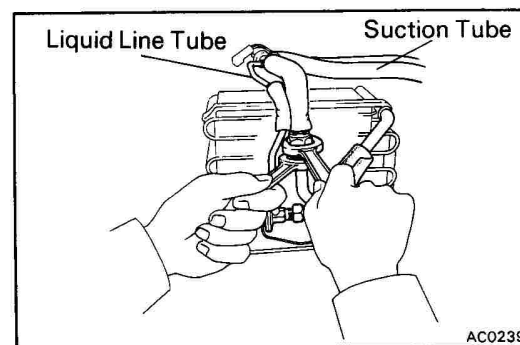
Pull out the clip with thermistor from the evaporator.

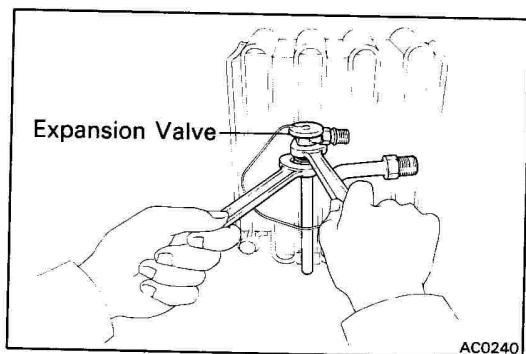


3. REMOVE COMPONENTS FROM EVAPORATOR

(a) Disconnect the suction tube from the evaporator.

(b) Disconnect the liquid line tube from the inlet fitting of the expansion valve.





- (c) Disconnect the expansion valve from the inlet fitting of the evaporator.
- (d) Remove the pressure switch, if necessary.

Evaporator

INSPECTION OF THE EVAPORATOR

1. CHECK EVAPORATOR FINS FOR BLOCKAGE

If the fins are clogged, clean them with compressed air.

CAUTION: Never use water to clean the evaporator.

2. CHECK FITTINGS FOR CRACKS OR SCRATCHES

Repair as necessary.

Expansion Valve

INSPECTION OF THE EXPANSION VALVE

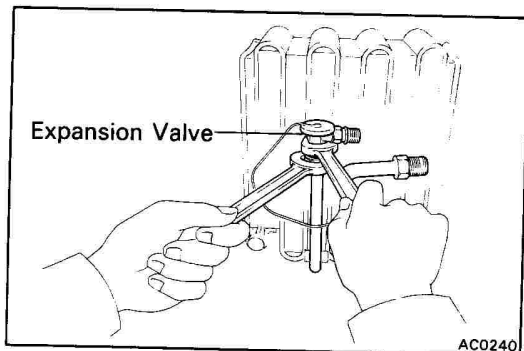
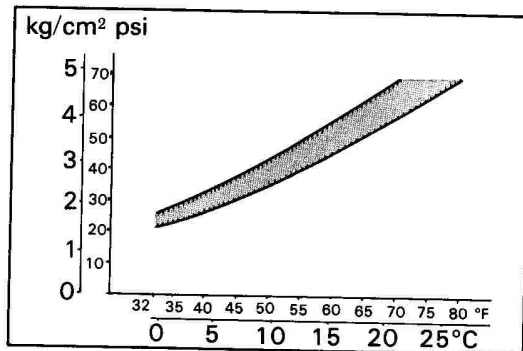
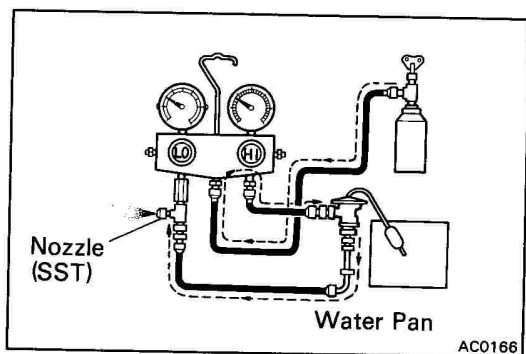
1. CONNECT MANIFOLD GAUGE

Connect the manifold gauge set to the expansion valve, testing nozzle (SST) and refrigerant container as shown. SST 07115-7101C

2. CHECK EXPANSION VALVE

- (a) Close both manifold gauge hand valves.
- (b) Pierce the refrigerant container to release the pressure.
- (c) Open the high pressure hand valve and adjust the high side pressure to approximately 5 kg/cm² (71 psi, 490 kPa).
- (d) Dip the heat sensing tube of the expansion valve in a pan of water. While varying the temperature of the water, read the pressure gauge and, at the same time, measure the temperature of the water with a thermometer.
- (e) Compare the two readings on the chart.

If the intersection is not between the two lines, replace the expansion valve.



ASSEMBLY OF COOLING UNIT

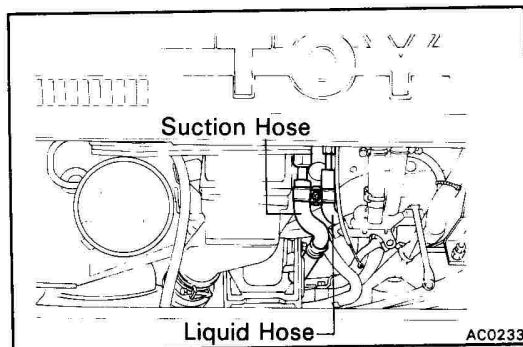
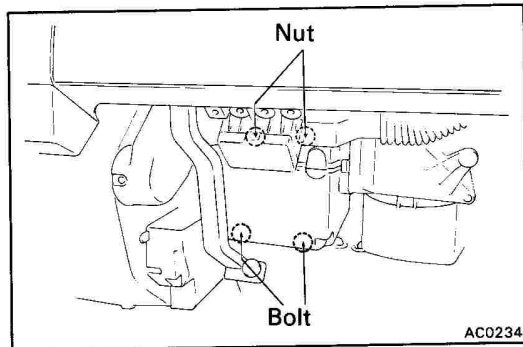
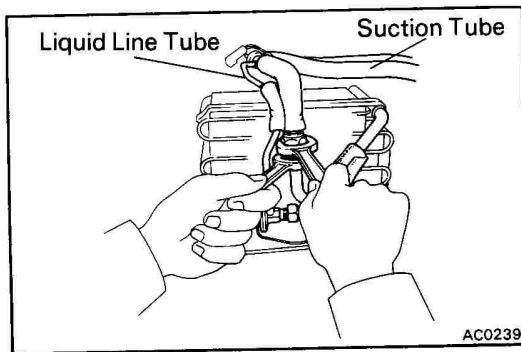
(See page AC-14)

1. INSTALL COMPONENTS ON EVAPORATOR

- (a) Connect the expansion valve to the inlet fitting of the evaporator. Torque the nut.

Torque: 235 kg-cm (17 ft-lb, 23 N·m)

NOTE: Be sure that the O-ring is positioned on the tube fitting.



(b) Connect the liquid tube to the inlet fitting of the expansion valve. Tighten the nut.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

(c) Connect the suction tube to the inlet fitting of the evaporator. Tighten the nut.

Torque: 235 kg-cm (17 ft-lb, 23 N·m)

(d) Install the pressure switch, if removed.

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

(e) Using the clip, install the heat sensing tube.

(f) Install the packing.

2. INSTALL THERMISTOR ON EVAPORATOR

3. INSTALL UPPER AND LOWER CASES ON EVAPORATOR

INSTALLATION OF COOLING UNIT

1. INSTALL A/C WIRE HARNESS AND RELAYS TO COOLING UNIT

2. INSTALL COOLING UNIT

Install the cooling unit with the two nuts and the two bolts.

CAUTION: Be careful not to pinch the wire harness while installing the cooling unit.

3. CONNECT FOLLOWING CONNECTORS:

- Connectors for pressure switch
- Connector for the compressor
- Connector for temperature control resistor
- Connectors for relay and amplifier
- Connector connected to vehicle wire harness

4. INSTALL FOLLOWING COMPONENTS:

- Glove box
- Under tray

5. INSTALL GROMMETS IN INLET AND OUTLET FITTINGS

6. CONNECT LIQUID LINE TUBE TO COOLING UNIT INLET FITTINGS

Torque: 135 kg-cm (10 ft-lb, 13 N·m)

7. CONNECT SUCTION HOSE TO COOLING UNIT OUTLET FITTING

Torque: 325 kg-cm (24 ft-lb, 32 N·m)

8. IF EVAPORATOR WAS REPLACED, ADD COMPRESSOR OIL TO COMPRESSOR

Add 40 – 50 cc (1.4 – 1.7 oz)

9. CONNECT NEGATIVE CABLE TO BATTERY

10. EVACUATE, CHARGE AND TEST REFRIGERATION SYSTEM (See page 19)

REFRIGERANT LINES

ON-VEHICLE INSPECTION

1. **INSPECT HOSES AND TUBES FOR LEAKAGE**
Use a gas leak tester. Replace, if necessary.
2. **CHECK THAT HOSE AND TUBE CLAMPS ARE NOT LOOSE**
Tighten or replace, as necessary.

REPLACEMENT OF REFRIGERANT LINES

(See page AC-14)

1. **DISCHARGE REFRIGERATION SYSTEM**
(See page AC-9)

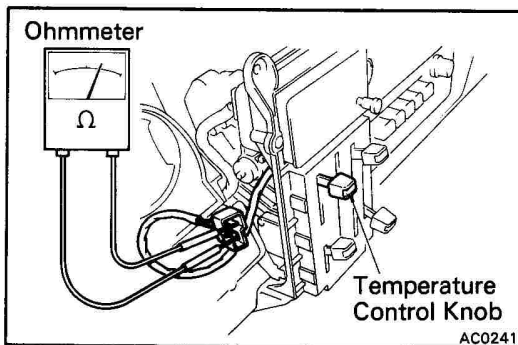
2. **REPLACE FAULTY TUBE OR HOSE**

NOTE: Cap the open fittings immediately to keep moisture out of the system.

Tightening torques for O-ring fittings

Fitting size	Torque
3/8 in. tube for liquid line	135 kg-cm (10 ft-lb, 13 N·m)
1/2 in. tube for discharge line	225 kg-cm (16 ft-lb, 22 N·m)
5/8 in. tube for suction line	325 kg-cm (24 ft-lb, 32 N·m)

3. **EVACUATE CHARGE AND TEST REFRIGERATION SYSTEM** (See page AC-9)



TEMPERATURE CONTROL RESISTOR

ON-VEHICLE INSPECTION

1. **DISCONNECT NEGATIVE CABLE FROM BATTERY**
2. **REMOVE METER CLUSTER**
3. **DISCONNECT TEMPERATURE CONTROL RESISTOR CONNECTOR**

4. **CHECK TEMPERATURE CONTROL RESISTOR**

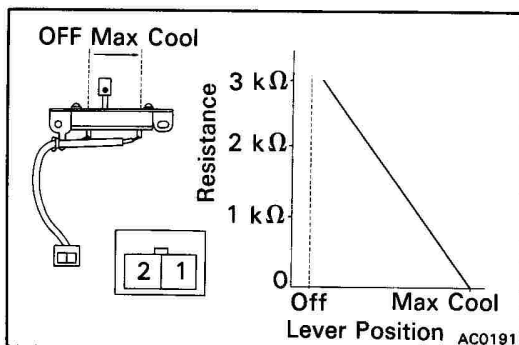
Using an ohmmeter, measure the resistance between the terminal 1 and 2.

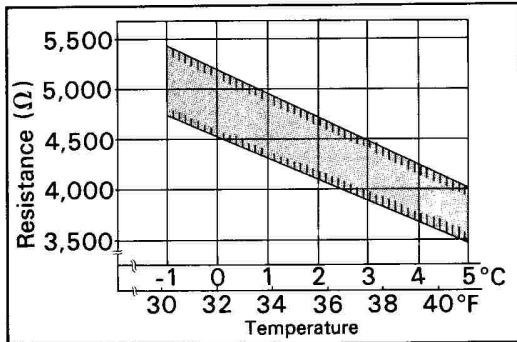
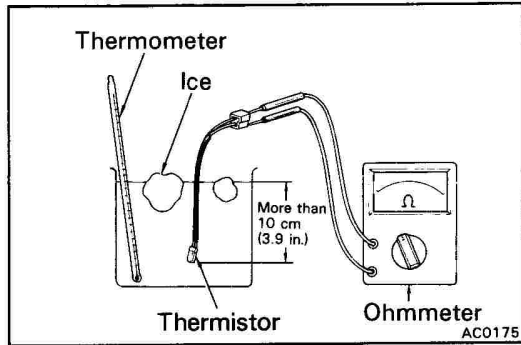
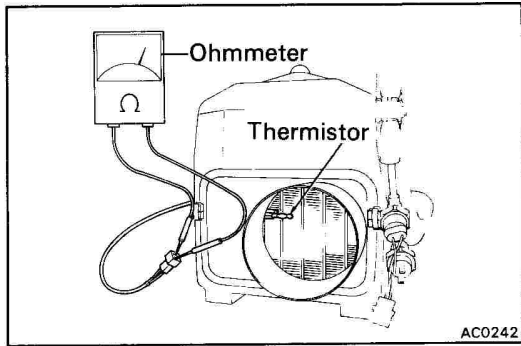
If defective, replace the temperature control resistor.

5. **CONNECT TEMPERATURE CONTROL RESISTOR CONNECTOR**

6. **INSTALL METER CLUSTER**

7. **CONNECT NEGATIVE CABLE TO BATTERY**





THERMISTOR

(See page AC-14)

REMOVAL AND INSPECTION OF THERMISTOR

1. DISCONNECT NEGATIVE CABLE FROM BATTERY

2. REMOVE UNDER TRAY

3. CHECK THERMISTOR STALLED OPERATION

Using an ohmmeter, measure the resistance at the connector.

Resistance: 1,500 Ω ± 25°C (77°F)

4. REMOVE THERMISTOR

- (a) Disconnect the connector.
- (b) Remove the clip and thermistor from the evaporator.

5. CHECK THERMISTOR OPERATION

- (a) Place the thermistor in cold water. While varying the temperature of the water, measure the resistance at the connector and at the same time, measure the temperature of the water with a thermometer.

- (b) Compare the two readings on the chart.

If the intersection is not between the two lines, replace the thermistor.

INSTALLATION OF THERMISTOR

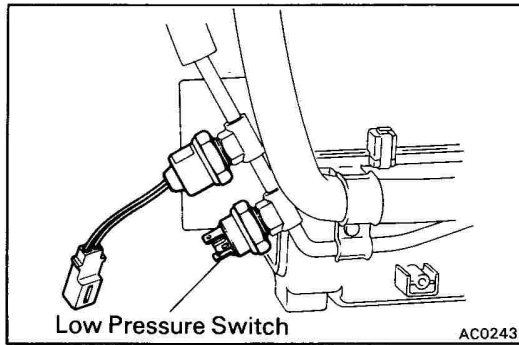
1. INSTALL THERMISTOR

- (a) Install thermistor with the clip.
- (b) Connect the connector.

2. INSTALL COOLING UNIT

3. INSTALL UNDER TRAY

4. CONNECT NEGATIVE CABLE TO BATTERY



LOW PRESSURE SWITCH

(See page AC-14)

INSPECTION OF LOW PRESSURE SWITCH

1. CHECK REFRIGERANT PRESSURE

- Connect the hoses of the manifold gauge set to the compressor service valves and observe the gauge reading.
- The gauge reading must be more than 2.7 kg/cm² (38 psi, 265 kPa) when the ambient temperature is higher than 5°C (41°F).

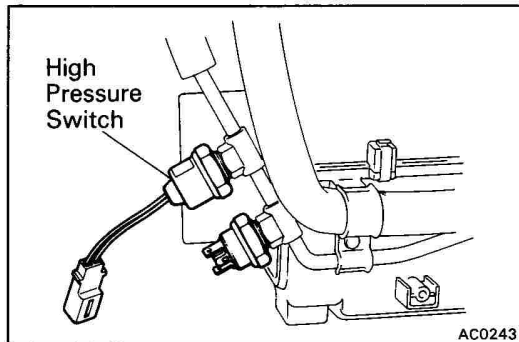
If the pressure is less than 2.7 kg/cm² (38 psi, 265 kPa), charge the refrigerant. (See page AC-9)

2. CHECK LOW PRESSURE SWITCH

- Remove the under tray.
- Disconnect the lead wire of the A/C wire harness.
- Using an ohmmeter, check the continuity between the two terminals of the low pressure switch. The ohmmeter must indicate zero ohm.

If there is no continuity, replace the low pressure switch.

3. REINSTALL REMOVED PARTS IN REVERSE ORDER



HIGH PRESSURE SWITCH

(See page AC-14)

INSPECTION OF HIGH PRESSURE SWITCH

1. CHECK REFRIGERANT PRESSURE

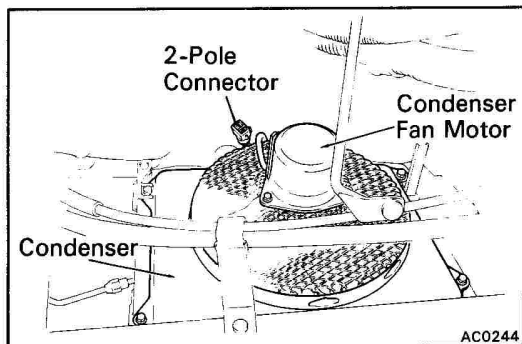
- Connect the hoses of the manifold gauge set to the compressor service valves and observe the gauge reading.
- The gauge reading must be less than 15.5 kg/cm² (220 psi, 1,550 kPa) when the ambient temperature is higher than 5°C (41°F).

2. CHECK HIGH PRESSURE SWITCH

- Remove the under tray.
- Disconnect the lead wire of the A/C wire harness.
- Using an ohmmeter, check the continuity between the two terminals of the high pressure switch. The ohmmeter must indicate zero ohm.

If there is no continuity, replace the high pressure switch.

3. REINSTALL REMOVED PARTS IN REVERSE ORDER



CONDENSER FAN MOTOR

(See page AC-14)

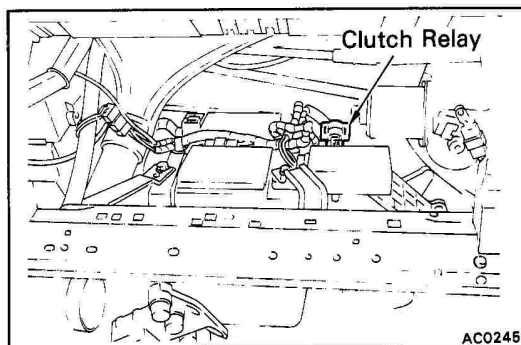
INSPECTION OF CONDENSER FAN MOTOR

1. DISCONNECT NEGATIVE CABLE FROM BATTERY
2. DISCONNECT CONNECTOR OF FAN MOTOR
3. CHECK FAN MOTOR
 - (a) Using the wire harness, apply battery voltage to the connector.
 - (b) Confirm smooth rotation of the motor within the specified current flow.

Standard current: $8 \pm 0.8A$

If defective, replace the motor

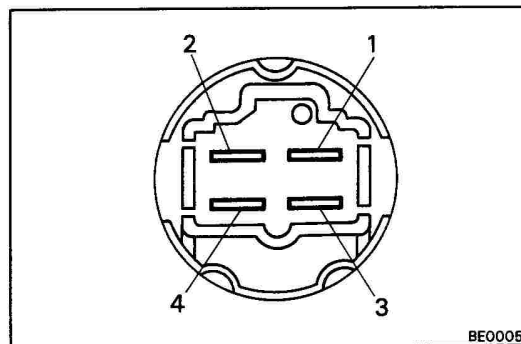
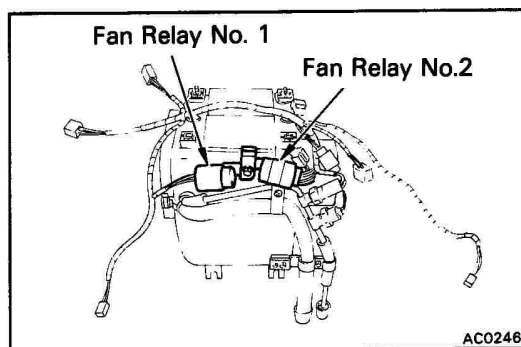
4. CONNECT CONNECTOR OF FAN MOTOR
5. CONNECT NEGATIVE CABLE TO BATTERY



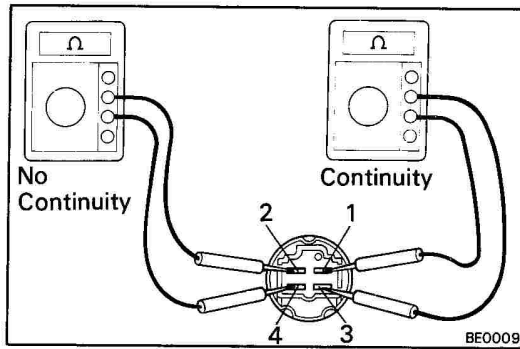
RELAYS

INSPECTION OF A/C RELAYS

1. REMOVE GLOVE BOX
2. REMOVE BOLTS
3. REMOVE RELAYS

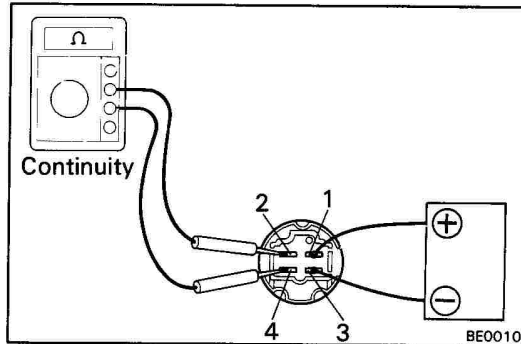


4. INSPECT CLUTCH RELAY GROUND CONNECTION
Check the ground connection between terminal 3 of the wiring connector and body ground.

**5. INSPECT CLUTCH RELAY CONTINUITY**

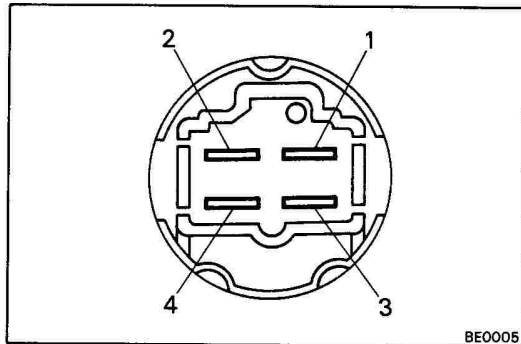
- Check that there is continuity between terminals 1 and 3.
- Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.

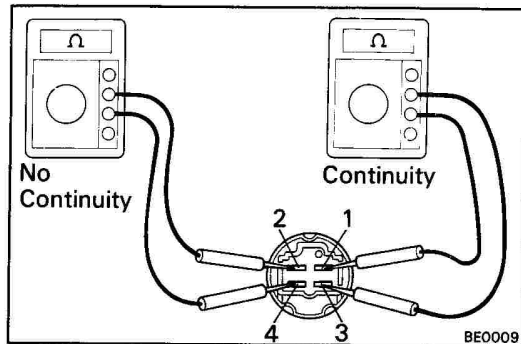
**6. INSPECT CLUTCH RELAY OPERATION**

- Apply battery voltage across terminals 1 and 3.
- Check that there is continuity between terminals 2 and 4.

If there is no continuity, replace the relay.

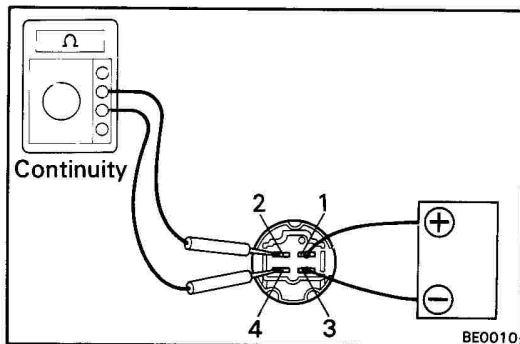
**7. INSPECT FAN FUSE RELAY NO. 1 GROUND CONNECTION**

Check the ground connection between terminal 3 of the wiring connector and body ground.

**8. INSPECT FAN FUSE RELAY NO. 1 CONTINUITY**

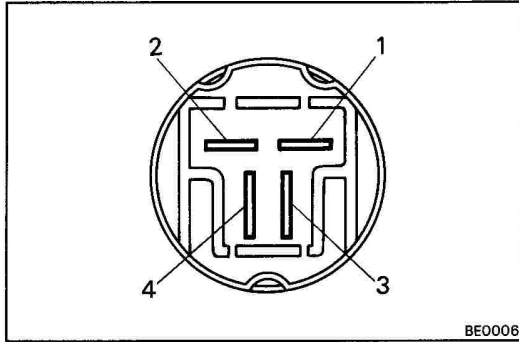
- Check that there is continuity between terminals 1 and 3.
- Check that there is no continuity between terminals 2 and 4.

If continuity is not as specified, replace the relay.

**9. INSPECT FAN FUSE RELAY NO. 1 OPERATION**

- Apply battery voltage across terminals 1 and 3.
- Check that there is continuity between terminals 2 and 4.

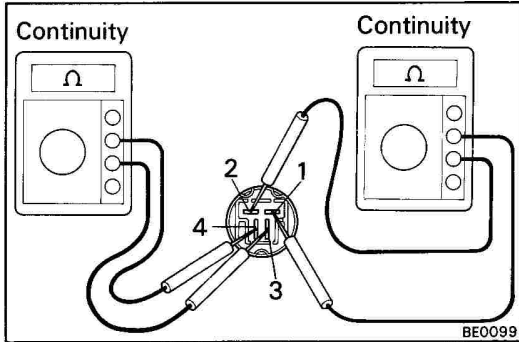
If there is no continuity, replace the relay.

**10. INSPECT FAN RELAY**

Check the ground connection between terminal 1 of the wiring connector and body ground, and between terminal 3 and body ground.

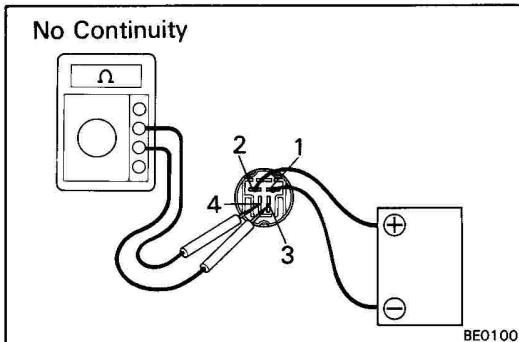
1. 2 GROUND CONNECTION

Check the ground connection between terminal 1 of the wiring connector and body ground, and between terminal 3 and body ground.

**11. INSPECT FAN RELAY****2. 2 CONTINUITY**

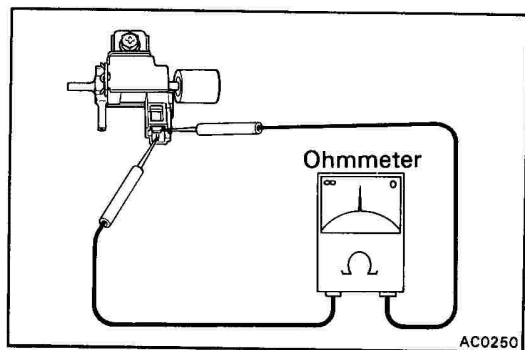
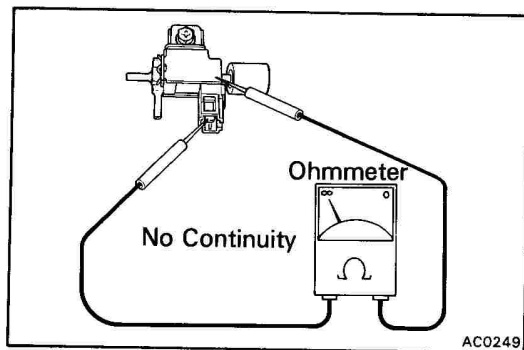
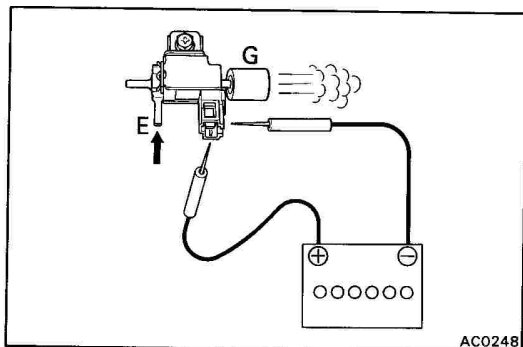
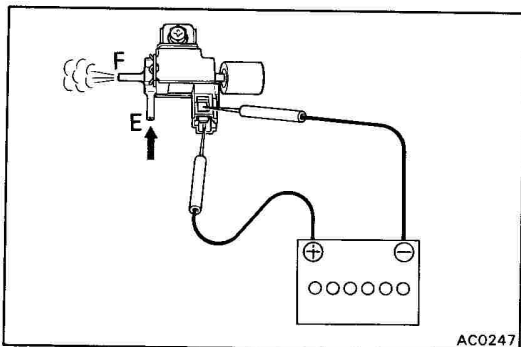
- Check that there is continuity between terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

**12. INSPECT FAN RELAY****2. 2 OPERATION**

- Apply battery voltage across terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.

If there is continuity, replace the relay.



VACUUM SWITCHING VALVE (VSV)

(See page AC-14)

INSPECTION OF VSV

1. **CHECK VACUUM CIRCUIT CONTINUITY IN VSV BY BLOWING AIR IN PIPES**
 - (a) Connect the test leads to the battery terminals as illustrated.
 - (b) Blow into pipe "E" and check that air comes out of pipe "F".
 - (c) Disconnect the battery.
 - (d) Blow into pipe "E" and check that air comes out of filter "G".

If a problem is found, replace the VSV.

2. **CHECK FOR SHORT CIRCUIT**

Using an ohmmeter, check that there is no continuity between each terminal and the VSV body.

If there is continuity, replace the VSV.

3. **CHECK FOR OPEN CIRCUIT**

Using an ohmmeter, measure the resistance between the two terminals.

Resistance: at 20°C (68°F)
38 — 100 Ω

If resistance is not within specification, replace the VSV.