

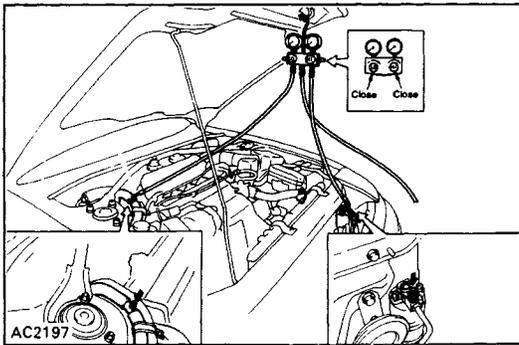
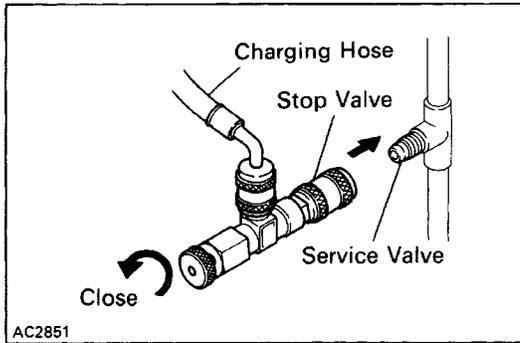
## REFRIGERATION SYSTEM

### INSPECTION OF REFRIGERANT VOLUME

1. RUN ENGINE AT APPROX. 2000 RPM
2. OPERATE AIR CONDITIONING 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                 | (1) Check for gas leakage with gas leak tester and repair if necessary<br>(2) Add refrigerant until bubbles disappear |
| 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        | (1) Check for gas leakage with gas leak tester and repair if necessary<br>(2) Add refrigerant until bubbles disappear |
| 4    | Temperature between compressor inlet and outlet is noticeably different                  | Proper or too much           | Refer to items 5 and 6  |
| 5    | Immediately after air conditioning is turned off, refrigerant in sight glass stays clear | Too much                     | (1) Recover refrigerant<br>(2) Evacuate air and charge proper amount of purified refrigerant                          |
| 6    | When air conditioning is turned off, refrigerant foams and then stay clear               | Proper                       | —   |

\*:Bubbles in the sight glass with ambient temperatures higher can be considered normal if cooling is sufficient



## INSTALLATION OF MANIFOLD GAUGE SET

HINT: To prevent releasing refrigerant, use charging hoses with a stop valve when installing the manifold gauge set to service valves on the refrigerant line.

### 1. CONNECT CHARGING HOSES WITH A STOP VALVE TO MANIFOLD GAUGE SET

Tighten the nuts by hand.

#### CAUTION:

- Do not connect the wrong hoses to the high pressure and the low pressure sides.
- To prevent loosening the nuts, do not apply compressor oil to seat of the connection.

### 2. CLOSE HAND VALVES OF BOTH STOP VALVES

### 3. CLOSE BOTH HAND VALVES OF GAUGE SET

### 4. REMOVE PLUGS FROM SERVICE VALVES ON REFRIGERANT LINE

### 5. CONNECT STOP VALVES TO SERVICE VALVES

Tighten the nuts by hand.

#### CAUTION:

- Do not connect the wrong valves to the high pressure and the low pressure sides.
- To prevent loosening the nuts, do not apply compressor oil to seat of the connection.

### 6. OPEN HAND VALVES OF BOTH STOP VALVES

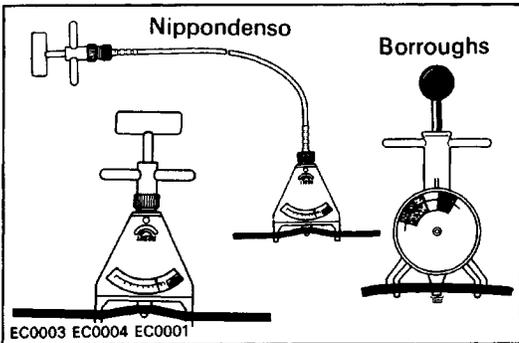
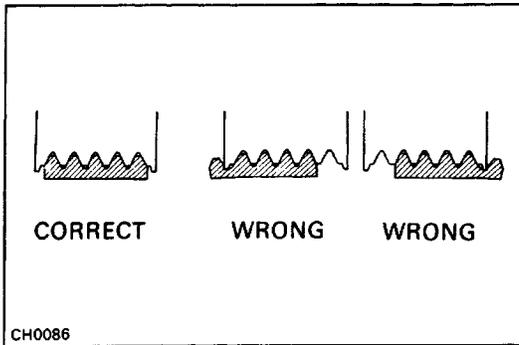
## REMOVAL OF MANIFOLD GAUGE SET

### 1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET

### 2. CLOSE HAND VALVES OF BOTH STOP VALVES

### 3. DISCONNECT STOP VALVES FROM SERVICE VALVES ON REFRIGERANT LINE

### 4. INSTALL PLUGS TO SERVICE VALVES



## ON-VEHICLE INSPECTION

### 1. CHECK CONDENSER FINS FOR BLOCKAGE OR DAMAGE

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

**NOTICE:** Be careful not to damage the fins.

### 2. MAKE SURE THAT DRIVE BELT IS INSTALLED CORRECTLY

After installing the drive belt, check that it fits properly in the ribbed grooves.

### 3. CHECK DRIVE BELT TENSION

Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or

Borroughs No.BT-33-73F

Drive belt tension:

| Engine | New belt (lbf) | Used belt (lbf) |
|--------|----------------|-----------------|
| 4A-FE  | 160 ± 25       | 100 ± 20        |
| 5S-FE  | 165 ± 10       | 110 ± 10        |
| 3S-GTE | 165 ± 10       | 84 ± 15         |

HINT:

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.

### 4. START ENGINE

### 5. TURN ON A/C SWITCH

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

### 6. CHECK MAGNETIC CLUTCH OPERATION

If magnetic clutch does not engage, check the A/C fuse.

### 7. CHECK THAT IDLE INCREASES

When the magnetic clutch engages, engine revolution should increase.

Standard idle-up rpm: 900 –1,000 rpm

### 8. CHECK CONDENSER FAN MOTOR ROTATES

### 9. CHECK AMOUNT OF REFRIGERANT

If you can see bubbles in the sight glass, additional refrigerant is needed. (See page AC-15)

### 10. IF NO COOLING OR IT IS INSUFFICIENT, INSPECT FOR LEAKAGE

Using a gas leak tester, inspect each component of the refrigeration system.

## INSPECTION OF REFRIGERATION SYSTEM WITH MANIFOLD GAUGE SET

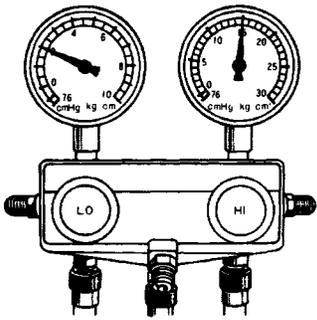
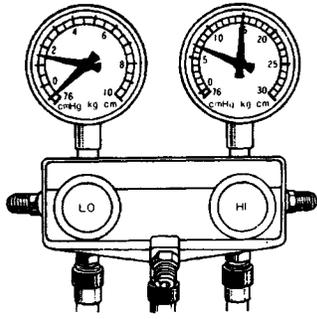
This is a method in which the trouble is located by using a manifold gauge set. (See “Installation of Manifold Gauge Set” on page AC-16) Read the manifold gauge pressure when the following conditions are established:

- (a) Temperature at the air inlet with the switch set at RECIRC is 30 – 35°C (86 – 95°F)
- (b) Engine running at 2,000 rpm
- (c) Blower fan speed control switch set at high speed
- (d) Temperature control switch set at max, cool side

HINT: It should be noted that the gauge indications may vary slightly due to ambient temperature conditions.

### NOTICE:

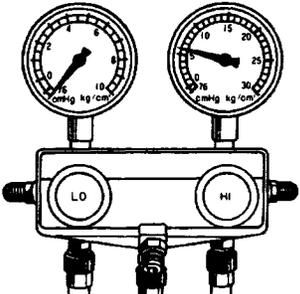
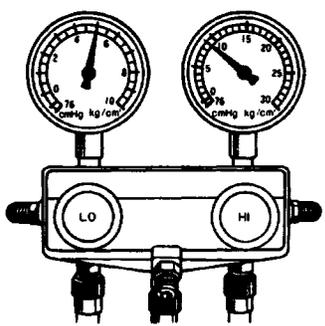
- Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.
- Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant line.

| No | Gauge reading kPa (kgf/cm <sup>2</sup> , psi)  | Condition                                 | Probable cause                           | Remedy  |
|----|--|---|--|---|
| 1  | LO: 147 – 196 (1.5 – 2.0, 21 – 28)<br>HI: 1,422 – 1,471<br>(14.5 – 15.0, 206 – 213)<br><br><br><br>AC0067              | Normal cooling                            | Normally functioning system              |   |
| 2  | During operation, pressure at low pressure side sometimes becomes a vacuum and sometimes normal<br><br><br><br>AC0068 | Periodically cools and then fails to cool | Moisture present in refrigeration system | (1) Replace receiver<br>(2) Remove moisture in system through repeatedly evacuating air |



**NOTICE:**

- Always recover refrigerant before removing the parts in the refrigerant line and evacuating air.
- Evacuate air and charge proper amount of purified refrigerant after installing the parts in the refrigerant, line.

| No | Gauge reading kPa (kgf/cm <sup>2</sup> , psi)   | Condition   | Probable cause                 | Remedy   |
|----|---|---|--------------------------------|--|
| 2  | Vacuum indicated at low pressure side, verylow pressure indicated at high pressure<br><br>AC0156 | <ul style="list-style-type: none"> <li>• Does not cool (Cools from time to time in some cases)</li> <li>• Frost or dew seen on piping before and after receiver or expansion valve</li> </ul> | Refrigerant does not circulate | (1) Check heat sensing tube for gas leakage and replace expansion valve if defective<br>If (1) is normal<br>(2) Clean out dirt in expansion valve by blowing with air<br>If not able to remove dirt, replace expansion valve<br>(3) Replace receiver |
| 9  | Pressure too high at low pressure side, pressure too low at high pressure side<br><br>AC0157   | Does not cool   | Insufficient compression       | Repair or replace compressor   |

**SPECIAL TOOLS AND EQUIPMENT**

| Tool  | SST No.   | Use  |
|---|---|--|
| Ohmmeter<br>Voltage meter<br>Ammeter<br>Air conditioner service tool set<br>Charging hose kit with stop valve<br>Magnetic clutch remover<br>Magnetic clutch stopper<br>Snap ring pliers (External type) | 07110-58011<br>07110-58040<br>07112-66040<br>07112-76060<br>07114-84020 | To perform electrical diagnosis<br>To perform electrical diagnosis<br>To perform electrical diagnosis<br>To evacuate and charge system<br>If you require a stop valve, please order this kit<br>To remove pressure plate<br>To remove and install pressure plate<br>To remove and install rotor and stator |

**SSM (SPECIAL SERVICE MATERIALS)**

| Part Name                               | Part No.    | Use etc.   |
|---|-------------|------------|
| ND OIL6,<br>SUNISO No.5GS or equivalent | 07117-68040 | Compressor |