AIR CONDITIONING SYSTEM
GENERAL DESCRIPTION
NEW AIR CONDITIONING SYSTEM WITH R134a

Refrigerant R12 (CFC12), previously used in automobiles air conditioning systems is believed to contribute towards the depletion the earth’s ozone layer. The ozone layer help to protect us against the harmful ultraviolet rays of the sun.

A newly developed refrigerant, R134a (HFC 134a), does not the destroy the ozone layer.

PRECAUTIONS FOR SERVICING R134a AIR CONDITIONERS
1. USE OF NEW REFRIGERANT R134a
   The very different characteristics of refrigerants R134a and R12 have determined the design of their respective air conditioning systems. Under no circumstances allow R12 to enter an R134a system, or vice versa, because serious damage could occur.

2. USE OF PROPER COMPRESSOR OIL
   Compressor oil used in conventional R12 air conditioning systems cannot be used in R 134a air conditioning systems. Always use genuine Toyota R1 34a air conditioning oil ND – OIL 8, made expressly for use with R 1 34a.

   If even a small amount of the wrong oil is changed, it will result in clouding of the refrigerant. A large amount will cause the compressor to seize up.
3. **USE OF PROPER O–RINGS AND SEALS**

O–rings and seals used for conventional R12 air conditioning systems cannot be used for R134a air conditioning systems.

Always use genuine Toyota R 134a system 0–rings and seals for R 134a air conditioning systems.

If O–rings and/or seals for R1 2 air conditioning systems are used by mistake in the connections of an R 134a air conditioning system, the O–ring and seals will foam and swell resulting in leakage of refrigerant.

4. **TIGHTEN CONNECTING PARTS SECURELY**

Securely tighten the connecting parts to prevent leaking of refrigerant gas.

Apply a few drops of compressor oil to O–ring fittings for easy tightening and to prevent leaking of refrigerant gas.

**CAUTION:** Apply only ND–OIL 8 compressor oil

Tighten the nuts using 2 wrenches to avoid twisting the tube.

Tighten the O–ring fittings or the bolted type fittings to the specified torque.

5. **INSERT PLUG IMMEDIATELY IN DISCONNECTED PARTS**

Insert a plug immediately in the disconnected parts to prevent the ingress of moisture and dust.

6. **DO NOT REMOVE PLUG FROM NEW PARTS UNTIL IMMEDIATELY BEFORE INSTALLATION**

7. **DISCHARGE GAS IN NEW COMPRESSOR FROM CHARGING VALVE BEFORE INSTALLING IT**

If the gas in the new compressor is not discharged first, compressor oil will spray out with gas when the plug is removed.
SERVICE TOOLS FOR R134a AIR CONDITIONER

When servicing R134a air conditioning systems always use the R134a dedicated manifold gauges, gas leak detector and vacuum pump adaptor.

1. USE MANIFOLD GAUGES FOR R134a AIR CONDITIONER
Always use R134a dedicated manifold gauges to prevent R12 and R12 compressor oil contaminating the R 134a system.

2. USE R134a GAS LEAK DETECTOR
Similarly, always use an R 134a dedicated leak detector. The R12 leak detector is not sufficiently sensitive.

3. USE VACUUM PUMP ADAPTER
By connecting a vacuum pump adapter, the vacuum pump can be used for both R 134a and R 12 air conditioning systems. The vacuum pump adaptor has an internal magnetic valve. When evacuation is completed and the vacuum pump switch is turned off, the magnetic valve opens allowing the introduction atmospheric air into the manifold gauges to prevent the back flow of oil from the vacuum pump into the gauge hose.

**CAUTION:**
Be sure to turn off the manifold gauge valve immediately after evacuating the system. Then you may switch off the vacuum pump. If this order is reversed, the line will be temporarily open to atmosphere.
HANDLING PRECAUTIONS FOR REFRIGERANT

1. DO NOT HANDLE REFRIGERANT IN AN ENCLOSED AREA OR NEAR AN OPEN FLAME
2. ALWAYS WEAR EYE PROTECTION

3. BE CAREFUL THAT LIQUID REFRIGERANT DOES NOT GET IN YOUR EYES OR ON YOUR SKIN
   If liquid refrigerant gets in your eyes or on your skin:
   (a) Wash the area with lots of cool water. 
      CAUTION: Do not rub your eyes or skin.
   (b) Apply clean petroleum jelly to the skin.
   (c) GO immediately to a physician or hospital for professional treatment.

HANDLING PRECAUTIONS FOR REFRIGERANT CONTAINER

1. NEVER HEAT CONTAINER OR EXPOSE IT TO NAked FLAME
2. BE CAREFUL NOT TO DROP CONTAINER AND NOT TO APPLY PHYSICAL SHOCKS TO IT

CHARGING AND LEAK–CHECK METHODS

Evacuate the refrigeration system according to the following procedures.
CAUTION:
• Be sure to connect both the high and low pressure quick-connectors onto the A/C system when evacuating. If only one side is connected, the system would be open to atmosphere through the other connector, making it impossible to maintain vacuum.

• Be sure to turn off the manifold gauge valve immediately after evacuating the system. Then you may switch off the vacuum pump.

PRECAUTIONS WHEN CHARGING REFRIGERANT
1. DO NOT OPERATE COMPRESSOR WITHOUT ENOUGH REFRIGERANT IN REFRIGERANT SYSTEM
   If there is not enough refrigerant in the refrigerant system oil lubrication will be insufficient and compressor burnout may occur, so take care to avoid this.

2. DO NOT OPEN HIGH PRESSURE MANIFOLD VALVE WHILST COMPRESSOR IS OPERATING
   If the high pressure valve is opened, refrigerant flows in the reverse direction and could cause the charging cylinder to rupture, so open and close the low pressure valve only.

3. BE CAREFUL NOT TO OVERCHARGE WITH REFRIGERANT IN SYSTEM
   If refrigerant is overcharged, it causes problems such as insufficient cooling, poor fuel economy, engine overheating etc.

ELECTRICAL PARTS
   Before removing and inspecting the electrical parts, set the ignition switch to the LOCK position and disconnect the negative (–) terminal cable from battery.

   CAUTION: Work must be started after 90 seconds from the time the Ignition switch is turned to the “LOCK” position and the negative (–) terminal cable is disconnected from the battery.
SUPPLEMENTAL RESTRAINT SYSTEM (SRS)

Failure to carry out service operations in the correct sequence could cause the supplemental restraint system to deploy, possibly leading to a serious accident.

During removal or installation of the parts and the yellow wire harness and connector for the airbag is necessary, refer to the precautionary notices in the RS section before performing the operation.

CAUTION: Work must be started after 90 seconds from the time the ignition switch is turned to the “LOCK” position and the negative (−) terminal cable is disconnected from the battery.
DESCRIPTION

PARTS LOCATION

[Diagram of an air conditioning system with labels for Evaporator, Expansion Valve, Compressor, Receiver, and Condenser]
(Push Button Type On 5S–FE Engine Model)
(Lever Type On 1 MZ–FE Engine Model)
(Push Button Type On 1 MZ–FE Engine Model)
DAMPERS POSITION

![Diagram of air conditioning system with damper positions]

<table>
<thead>
<tr>
<th>Air Outlet Mode</th>
<th>Mode Control Damper Position</th>
<th>Vent</th>
<th>Foot</th>
<th>Defroster</th>
</tr>
</thead>
<tbody>
<tr>
<td>Face</td>
<td>① ③ ⑥ ⑧</td>
<td>○</td>
<td>○</td>
<td></td>
</tr>
<tr>
<td>Bi-level</td>
<td>① ③ ⑤ ⑧</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Foot</td>
<td>② ④ ⑤ ⑧</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Foot/Defroster</td>
<td>② ④ ⑤ ⑦</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Defroster</td>
<td>② ④ ⑥ ⑦</td>
<td>○</td>
<td>○</td>
<td>○</td>
</tr>
</tbody>
</table>

The size of the circle ○ indicates the proportion of air flow volume.
## PREPARATION

### SST (SPECIAL SERVICE TOOLS)

<table>
<thead>
<tr>
<th>Item Number</th>
<th>Description</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>07110–58060</td>
<td>Air Conditioner Service Tool Set</td>
<td></td>
</tr>
<tr>
<td>(07117–58060)</td>
<td>Refrigerant Drain Service Valve</td>
<td></td>
</tr>
<tr>
<td>(07117–58070)</td>
<td>T–Joint</td>
<td>Discharge (diam. 16 mm)</td>
</tr>
<tr>
<td>(07117–58080)</td>
<td>Quick Coupler</td>
<td>Suction (diam. 13 mm)</td>
</tr>
<tr>
<td>(07117–58090)</td>
<td>Quick Coupler</td>
<td></td>
</tr>
<tr>
<td>(07117–78050)</td>
<td>Refrigerant Charging Gauge</td>
<td></td>
</tr>
<tr>
<td>(07117–88060)</td>
<td>Refrigerant Charging Hose</td>
<td>Discharge (Red)</td>
</tr>
<tr>
<td>(07117–88070)</td>
<td>Refrigerant Charging Hose</td>
<td>Suction (Blue)</td>
</tr>
<tr>
<td>(07117–88080)</td>
<td>Refrigerant Charging Nose</td>
<td>Utility (Green)</td>
</tr>
<tr>
<td>07112–66040</td>
<td>Magnetic Clutch Remover</td>
<td></td>
</tr>
<tr>
<td>07112–76060</td>
<td>Magnetic Clutch Stopper</td>
<td></td>
</tr>
<tr>
<td>07114–84020</td>
<td>Snap Ring Pliers</td>
<td></td>
</tr>
<tr>
<td>07116–38360</td>
<td>Gas Leak Detector Assembly</td>
<td></td>
</tr>
</tbody>
</table>
RECOMMENDED TOOL

09082–00050 TOYOTA Electrical Tester Set

LUBRICANT

<table>
<thead>
<tr>
<th>Item</th>
<th>Capacity</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compressor oil</td>
<td>–</td>
<td>ND-OIL 8 or equivalent</td>
</tr>
<tr>
<td>When replacing receiver</td>
<td>10 cc (0.34 fl.oz.)</td>
<td></td>
</tr>
<tr>
<td>When replacing condenser</td>
<td>40 cc (1.4 fl.oz.)</td>
<td></td>
</tr>
<tr>
<td>When replacing evaporator</td>
<td>40 cc (1.4 fl.oz.)</td>
<td></td>
</tr>
<tr>
<td>When replacing compressor</td>
<td>140 cc (4.9 fl.oz.)</td>
<td></td>
</tr>
</tbody>
</table>
USE OF MANIFOLD GAUGE SET

MANIFOLD GAUGE SET INSTALLATION
1. CONNECT CHARGING HOSES TO MANIFOLD GAUGE SET
   Tighten the nuts by hand.
   **CAUTION:** Do not connect the wrong hoses.
2. CONNECT QUICK CONNECTORS TO CHARGING HOSES
   Tighten the nuts by hand.
3. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
4. REMOVE CAPS FROM SERVICE VALVES ON REFRIGERANT LINE

5. CONNECT QUICK CONNECTORS TO SERVICE VALVES
   **HINT:** Push the quick connector onto the service valve, then slide the sleeve of the quick connector downward to lock it.

MANIFOLD GAUGE SET REMOVAL
1. CLOSE BOTH HAND VALVES OF MANIFOLD GAUGE SET
2. DISCONNECT QUICK CONNECTORS FROM SERVICE VALVES ON REFRIGERANT LINE
   **HINT:** Slide the sleeve of the quick connector upward to unlock the connector and remove it from the service valve.
3. INSTALL CAPS TO SERVICE VALVES ON REFRIGERANT LINE
TROUBLESHOOTING

Use the table below to help you find the cause of problem. The numbers indicate the priority of the likely cause of the problem. Check each rt in order. If necessary, replace these parts.

<table>
<thead>
<tr>
<th>Trouble</th>
<th>Parts Name</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inspect Volume of Refrigerant</td>
<td>AC–29</td>
</tr>
<tr>
<td></td>
<td>Inspect Refrigeration System with Manifold Gauge Set</td>
<td>AC–24</td>
</tr>
<tr>
<td></td>
<td>Inspect Drive Belt Tension</td>
<td>AC–30</td>
</tr>
<tr>
<td></td>
<td>Fusible Link</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Fuse (A/C)</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Pressure Switch</td>
<td>AC–60</td>
</tr>
<tr>
<td></td>
<td>Evaporator Temp. Sensor</td>
<td>AC–62</td>
</tr>
<tr>
<td></td>
<td>Revolution Detecting Sensor</td>
<td>AC–63</td>
</tr>
<tr>
<td></td>
<td>Magnet Clutch Relay</td>
<td>AC–63</td>
</tr>
<tr>
<td></td>
<td>A/C Fan Relays</td>
<td>AC–64</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Trouble</th>
<th>See page</th>
</tr>
</thead>
<tbody>
<tr>
<td>No blow operation</td>
<td>AC–22</td>
</tr>
<tr>
<td>No blow control</td>
<td>AC–24</td>
</tr>
<tr>
<td>No air flow mode control</td>
<td>AC–30</td>
</tr>
<tr>
<td>No air inlet control</td>
<td>–</td>
</tr>
<tr>
<td>Insufficient flow of cool air</td>
<td>AC–22</td>
</tr>
<tr>
<td>Insufficient flow of warm air</td>
<td>AC–22</td>
</tr>
<tr>
<td>No cool air comes out</td>
<td>3</td>
</tr>
<tr>
<td>Cool air comes out intermittently</td>
<td>1</td>
</tr>
<tr>
<td>Cool air comes out only at high engine speed</td>
<td>2</td>
</tr>
<tr>
<td>Insufficient cooling</td>
<td>1</td>
</tr>
<tr>
<td>No warm air comes out</td>
<td>1</td>
</tr>
<tr>
<td>Air temp. control not functioning</td>
<td>AC–22</td>
</tr>
<tr>
<td>No engine idle up when A/C switch on</td>
<td>AC–22</td>
</tr>
<tr>
<td>Blower Resistor</td>
<td>Air Inlet Servomotor</td>
</tr>
<tr>
<td>----------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td></td>
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<tr>
<td>2</td>
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<td>1</td>
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<td>1</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>
REFRIGERANT SYSTEM INSPECTION WITH MANIFOLD GAUGE SET

This is a method in which the trouble is located by using a manifold gauge set. (See "USE OF MANIFOLD GAUGE SET" on page AC–21)

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 1,500 rpm
(c) Blower speed control switch set at high
(d) Temperature control set at max. cool

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

1. NORMALLY FUNCTIONING REFRIGERATION SYSTEM
   Gauge reading:
   Low pressure side:
   0.15 – 0.25 MPa (1.5 – 2.5 kgf/cm²)
   High pressure side:
   1.37 – 1.57 MPa (14 – 16 kgf/mt)

![Manifold Gauge Set Diagram]
2. MOISTURE PRESENT IN REFRIGERATION SYSTEM

Condition: Periodically cools and then fails to cool

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• During operation, pressure on low pressure side sometimes becomes a vacuum and sometimes normal</td>
<td>• Moisture entered in refrigeration system freezes at expansion valve orifice and temporarily stops cycle, but normal state is restored after a time when the ice melts</td>
<td>• Drier in oversaturated state</td>
<td>(1) Replace receiver/drier</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Moisture in refrigeration system freezes at expansion valve orifice and blocks circulation of refrigerant</td>
<td>(2) Remove moisture in cycle through repeatedly evacuating air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3) Charge new refrigerant to proper amount</td>
</tr>
</tbody>
</table>

3. INSUFFICIENT REFRIGERANT

Condition: Insufficient cooling

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pressure low on both low and high pressure sides</td>
<td>• Gas leakage at some place in refrigeration system</td>
<td>• Insufficient refrigerant in system 1</td>
<td>(1) Check for gas leakage with leak detector and repair if necessary</td>
</tr>
<tr>
<td>• Bubbles seen in sight glass continuously</td>
<td></td>
<td>• Refrigerant leaking</td>
<td>(2) Charge refrigerant to proper amount</td>
</tr>
<tr>
<td>• Insufficient cooling performance</td>
<td></td>
<td></td>
<td>(3) If pressure indicated value is near 0 when connected to gauge, create the vacuum after inspecting and repairing the location of the leak</td>
</tr>
</tbody>
</table>
## 4. POOR CIRCULATION OF REFRIGERANT

### Condition: Insufficient cooling

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pressure low on both low and high pressure sides</td>
<td>Refrigerant flow obstructed by dirt in receiver</td>
<td>Receiver clogged</td>
<td>Replace receiver</td>
</tr>
<tr>
<td>• Frost on tubes from receiver to unit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## 5. REFRIGERANT DOES NOT CIRCULATE

### Condition: Does not cool (Cools from time to time in some cases)

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Vacuum indicated on low pressure side, very low pressure indicated on high pressure side</td>
<td>Refrigerant flow obstructed by moisture or dirt in refrigeration system</td>
<td>Refrigerant does not circulate</td>
<td>(1) Check heat sensing tube, expansion valve and EPR</td>
</tr>
<tr>
<td>• Frost or dew seen on piping before and after receiver/drier or expansion valve</td>
<td>Refrigerant flow obstructed by gas leakage from expansion valve heat sensing tube</td>
<td></td>
<td>(2) Clean out dirt in expansion valve by blowing with air</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>If not able to remove dirt, replace expansion valve</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(3) Replace receiver</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(4) Evacuate air and charge new refrigerant to proper amount.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>For gas leakage from heat sensing tube, replace expansion valve.</td>
</tr>
</tbody>
</table>
6. REFRIGERANT OVERCHARGE OR INSUFFICIENT COOLING OF CONDENCER

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure too high on both low and high pressure sides</td>
<td>Unable to develop sufficient performance due to excessive refrigerant in system</td>
<td>Excessive refrigerant in cycle – refrigerant overcharged; Condenser cooling insufficient – condenser fins clogged or fan motor faulty</td>
<td>(1) Clean condenser (2) Check fan motor operation (3) If (1) and (2) are in normal state, check amount of refrigerant Charge proper amount of refrigerant</td>
</tr>
<tr>
<td>No air bubbles seen through the sight glass even when the engine rpm is lowered.</td>
<td>Insufficient cooling of condenser</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

7. AIR PRESENT IN REFRIGERATION SYSTEM

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pressure too high on both low and high pressure sides</td>
<td>Air entered in refrigeration system</td>
<td>Air present in refrigeration system</td>
<td>(1) Check compressor oil to see if dirty or insufficient (2) Evacuate air and charge new refrigerant</td>
</tr>
<tr>
<td>The low pressure piping is hot to the touch</td>
<td></td>
<td>Insufficient vacuum purging</td>
<td></td>
</tr>
<tr>
<td>Bubbles seen in sight glass</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Condition: Does not cool sufficiently
8. EXPANSION VALVE IMPROPERLY MOUNTED/HEAT SENSING TUBE DEFECTIVE (OPENS TOO WIDE)

Condition: Insufficient cooling

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pressure too high on both low and high pressure sides</td>
<td>• Trouble in expansion valve or heat sensing tube not installed correctly</td>
<td>• Excessive refrigerant in low pressure piping</td>
<td>(1) Check heat sensing tube installed condition (2) If (1) is normal, check expansion valve Replace if defective</td>
</tr>
<tr>
<td>• Frost or large amount of dew on piping on low pressure side</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

9. DEFECTIVE COMPRESSION COMPRESSOR

Condition: Does not cool

<table>
<thead>
<tr>
<th>Symptom seen in refrigeration system</th>
<th>Probable cause</th>
<th>Diagnosis</th>
<th>Remedy</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Pressure too high on low pressure side</td>
<td>• Internal leak in compressor</td>
<td>• Compression defective</td>
<td>• Repair or replace compressor</td>
</tr>
<tr>
<td>• Pressure too low on high pressure side</td>
<td></td>
<td>• Valve leaking or broken, sliding parts</td>
<td></td>
</tr>
</tbody>
</table>


**REFRIGERANT VOLUME**

**REFRIGERANT VOLUME INSPECTION**

1. RUN ENGINE AT IDLE SPEED
2. OPERATE A/C AT MAXIMUM COOLING FOR A FEW MINUTES
3. INSPECT AMOUNT OF REFRIGERANT
   OBSERVE THE SIGHT GLASS ON THE LIQUID TUBE.

<table>
<thead>
<tr>
<th>Item</th>
<th>Symptom</th>
<th>Amount of refrigerant</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| 1    | Bubbles present in sight glass       | Insufficient               | (1) Check for gas leakage with gas leak tester and repair if necessary  
                                             |                          | (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    | Empty or nearly empty       | (1) Check for gas leakage with gas leak tester and repair if necessary  
   compressor inlet and outlet            |                          | (2) Add refrigerant until bubbles disappear |
| 4    | Temperature between compressor inlet | Proper or too much          | Refer to items 5 and 6                          |
|      | and outlet is noticeably different   |                            |                                                 |
| 5    | Immediately after air conditioning   | Too much                    | (1) Discharge refrigerant  
                                             | is turned off, refrigerant in sight glass stays clear |            | (2) Evacuate air and charge proper amount of purified refrigerant |
| 6    | When air conditioning is turned off, | Proper                      |                                                 |
|      | refrigerant foams and then stay clear|                            |                                                 |

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

**REFRIGERANT CHARGE VOLUME**

**Specified amount:**

\[ 850 \pm 50 \text{ g} \ (29.98 \pm 1.76 \text{ oz}) \]
DRIVE BELT TENSION

DRIVE BELT TENSION INSPECTION

1. INSPECT DRIVE BELT’S INSTALLATION CONDITION
   Check that the drive belt fits properly in the ribbed grooves.

2. INSPECT 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:
   5S–FE:
   New belt 165 ± 26 lbf
   Used belt 110 ± 11 lbf
   1 MZ–FE:
   New belt 165 ± 26 lbf
   Used belt 88 ± 22 lbf
   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.
   • After installing the drive belt, check that it fits properly in the ribbed grooves.

IDLE–UP SPEED

IDLE UP SPEED INSPECTION

1. WARM UP ENGINE
2. INSPECT IDLE SPEED

5S–FE:

<table>
<thead>
<tr>
<th>Magnet clutch condition</th>
<th>Standard idle speed (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No engaged</td>
<td>Approx. 750</td>
</tr>
<tr>
<td>Engaged</td>
<td>Approx. 850</td>
</tr>
</tbody>
</table>

1 MZ – FE:

<table>
<thead>
<tr>
<th>Magnet clutch condition</th>
<th>Standard idle speed (rpm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No engaged</td>
<td>Approx. 700</td>
</tr>
<tr>
<td>Engaged</td>
<td>Approx. 700</td>
</tr>
</tbody>
</table>
ON–VEHICLE INSPECTION

1. INSPECTION HOSE AND TUBE CONNECTIONS FOR LOoseness
2. INSPECT HOSES AND TUBES FOR LEAKAGE
   Using a gas leak tester, check for leakage of refrigerant.
REFRIGERANT LINES REPLACEMENT

1. DISCHARGE REFRIGERANT IN REFRIGERATION SYSTEM
   (See page AC–21)

2. REPLACE FAULTY TUBE OR HOSE
   HINT: Cap the open fittings immediately to keep moisture or dirt out of the system.

3. TORQUE CONNECTIONS TO SPECIFIED TORQUE
   NOTICE: Connections should not be torque tighter than the specified torque.

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT
   Specified amount:
   \[ 850 \pm 50 \text{g} \ (29.98 \pm 1.76 \text{ oz}) \]

5. INSPECT FOR LEAKAGE OF REFRIGERANT
   Using a gas leak tester, check for leakage of refrigerant.

6. INSPECT AIR CONDITIONING OPERATION
AIR CONDITIONING UNIT

A/C UNIT REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
   (See page AC–21)

2. DRAIN ENGINE COOLANT FROM RADIATOR
   HINT: It is not necessary to drain out all the coolant.

3. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE

4. DISCONNECT WATER HOSES FROM HEATER RADIATOR PIPES

5. REMOVE INSTRUMENT PANEL AND REINFORCEMENT
   (See page BO–108)

6. REMOVE BLOWER UNIT
   (See page AC–35)

7. DISCONNECT LIQUID AND SUCTION TUBE FROM BLOCK JOINT
   Remove 2 bolts and both tubes.

8. REMOVE REAR AIR DUCTS
   Remove the clip and the air duct.

9. REMOVE HEATER PROTECTOR
   Remove the 2 clips and the heater protector.
A/C UNIT INSTALLATION

1. INSTALL A/C UNIT
   (a) Install the A/C unit with the 3 nuts.
   (b) Connect connectors.
2. INSTALL HEATER PROTECTOR
3. INSTALL REAR AIR DUSTS
4. CONNECT LIQUID AND SUCTION TUBE TO BLOCK JOINT
5. INSTALL BLOWER UNIT
6. INSTALL INSTRUMENT PANEL AND REINFORCEMENT
7. CONNECT WATER HOSES TO HEATER RADIATOR PIPES
8. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE
   (See step 3 on page AC–33)
9. REFILL WITH ENGINE COOLANT
10. EVACUATE AIR FROM REFRIGERATION SYSTEM
11. CHARGE SYSTEM WITH REFRIGERANT AND INPECT FOR LEAKAGE OF REFRIGERANT

Specified amount:
   850 ±50 g (29.98 ±1.76 oz)

10. REMOVE A/C UNIT
   (a) Disconnect connectors from the unit.
   (b) Remove the 3 nuts and the A/C unit.
BLOWER UNIT INSTALLATION

BLOWER UNIT REMOVAL

1. REMOVE GLOVE COMPARTMENT
   (See page BO–108)
2. REMOVE ECU AND ECU BRACKET

3. REMOVE CONNECTOR BRACKET
   (a) Disconnect the connector from the connector bracket.
   (b) Remove the 2 screws and the bracket.

4. REMOVE BLOWER UNIT
   (a) Disconnect the connector from the blower unit.
   (b) Disconnect the air inlet damper control cable.
   (c) Remove the 3 screws, nut and the blower unit.

BLOWER UNIT INSTALLATION

1. INSTALL BLOWER UNIT
   (a) Install the blower unit with the 3 screws and the nut.
   (b) Connect the air inlet damper control cable to the blower unit.
   (c) Connect the connector.
2. INSTALL CONNECTOR BRACKET
3. INSTALL ECU BRACKET AND ECU
4. INSTALL GLOVE COMPARTMENT
COMPRESSOR

ON-VEHICLE INSPECTION

Magnet Clutch:

1. **MAKE THE FOLLOWING VISUAL CHECKS:**
   - Leakage of grease from the clutch bearing.
   - Signs of oil on the pressure plate or rotor.
   - Repair or replace, as necessary.

2. **INSPECT MAGNET CLUTCH BEARING FOR NOISE**
   (a) Start engine.
   (b) Check for abnormal noise from near the compressor when the A/C switch is OFF.
   If abnormal noise is being emitted, replace the magnetic clutch.

3. **INSPECT MAGNET CLUTCH**
   (a) Disconnect the connector from the magnet clutch.
   (b) Connect the positive (+) lead from the battery to the terminal on the magnetic clutch connector and the negative (−) lead to the body ground.
   (c) Check that the magnet clutch is energized.
   If operation is not as specified, replace the magnet clutch.

Compressor:

1. **INSTALL MANIFOLD GAUGE SET**
   (See page AC–21)

2. **START ENGINE**

3. **INSPECT COMPRESSOR FOR METALLIC SOUND**
   Check that there is a metallic sound from the compressor when the A/C switch is turn on.
   If metallic sound is heard, replace the compressor assembly.

4. **INSPECT PRESSURE OF REFRIGERATION SYSTEM**

5. **STOP ENGINE**

6. **INSPECT VISUALLY FOR LEAKAGE OF REFRIGERANT FROM SAFETY SEAL**
   If there is any leakage, replace the compressor assembly.
1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE (–) CABLE FROM BATTERY
   CAUTION: Work must be started after 90 seconds from the time the ignition switch is turned to the “LOCK” position and the negative (–) terminal cable is disconnected from the battery.
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
   (See page AC–21)
5. DISCONNECT DISCHARGE HOSE AND SUCTION HOSE FROM COMPRESSOR
6. DISCONNECT CONNECTOR FROM MAGNET CLUTCH
7. REMOVE COMPRESSOR
   (a) Loosen the drive belt.
   (b) Remove 3 bolts and compressor.
1. RUN ENGINE AT IDLE SPEED WITH A/C ON FOR APPROX 10 MINUTES
2. STOP ENGINE
3. DISCONNECT NEGATIVE (–) CABLE FROM BATTERY

CAUTION: Work must be started after 90 seconds from the time the ignition switch is turned to the "LOCK" position and the negative (–) terminal cable is disconnected from the battery.
4. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM  
   (See page AC–21)

5. DISCONNECT DISCHARGE HOSE AND SUCTION HOSE FROM COMPRESSOR

6. DISCONNECT CONNECTOR FROM MAGNET CLUTCH

7. REMOVE DRIVE BELT  
   Loosen the pivot bolt and adjusting lock bolt and remove the drive belt.

8. REMOVE COMPRESSOR  
   (a) Remove 2 nuts and 2 bolts.  
   (b) Remove the compressor.
1. REMOVE PRESSURE PLATE
   (a) Using SST and socket wrench, remove the shaft bolt.
       SST 07112 – 76060
   (b) Install a SST on the pressure plate.
       SST 07112–66040
2. REMOVE ROTOR

(a) Using SST, remove the snap ring.
   SST 07114–84020
   CAUTION: Do not spread the point of SST widely.
   Max width:
   23.1 mm

(b) Using a plastic hammer, tap the rotor off the shaft.
   NOTICE: Be careful not to damage the pulley when tapping on the rotor.

(c) Using SST and socket wrench, remove the pressure plate.
   SST 07112–76060

(d) Remove the shims from the pressure plate.

3. REMOVE STARTER

(a) Disconnect the stator lead wire from the compressor housing.
MAGNET CLUTCH ASSEMBLY

1. INSTALL STATOR

(a) Install the stator on the compressor.

(b) Using a SST, install the new snap ring.
   SST 07114–84020

(c) Remove the stator.

NOTICE: The snap ring should be installed so that its beveled side faces up.
2. INSTALL ROTOR
(a) Install the rotor on the compressor shaft.
(b) Using SST, install the new snap ring.
   SST 07114–84020
   CAUTION: Do not spread the point of SST widely.
   Max width:
   23.1 mm
(c) Using SST and torque wrench, fasten the magnet clutch lead wire to the cylinder block.
   Torque: 3.4 N–m (35 kgf.cm, 30 in.–lbf)
   SST 07110–61050

3. INSTALL PRESSURE PLATE
(a) Put the shims on the pressure plate.
(b) Using SST and torque wrench, install the shaft bolt.
   SST 07112–76060
   Torque: 13 N–m (135 kgf–cm, 10 ft–lbf)
4. **CHECK CLEARANCE OF MAGNET CLUTCH**  
   (a) Set the dial – gauge to the pressure plate of the magnet clutch.  
   (b) Connect the magnet clutch lead wire to the positive (+) terminal of the battery.  
   (c) Check the clearance between the pressure plate and rotor, when connect the negative (–) terminal of the battery.  
   **Standard clearance:**  
   \[ 0.5 \pm 0.15 \text{ mm (0.020} \pm 0.059 \text{ in.)} \]  
   If the clearance is not within standard clearance, adjust the clearance using shims to obtain the standard clearance.

---

**COMPRESSOR INSTALLATION**  
1. **INSTALL COMPRESSOR**  
   (a) Install compressor with 4 bolts.  
   **Torque:** \(25 \text{ N–m (250 kgf–cm, 18 ft–lbf)}\)  
   (b) Install drive belt.  
   (c) Inspect drive belt tension.  
2. **CONNECT CONNECTOR TO MAGNET CLUTCH**  
3. **CONNECT DISCHARGE HOSE AND SUCTION HOSE TO COMPRESSOR**  
   **NOTICE:** Hoses should be connected immediately after the caps have been removed.  
   **Torque:** \(25 \text{ N–m (250 kgf–cm, 18 ft–lbf)}\)  
4. **EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT**  
   **Specified amount:**  
   \[ 850 \pm 50 \text{ g (29.98} \pm 1.76 \text{ oz)} \]  
5. **INSPECT FOR LEAKAGE OF REFRIGERANT**  
   Using a gas leak tester, check for leakage of refrigerant.  
   If there is leakage, check the tightening torque at the joints.  
6. **CONNECT NEGATIVE (–) CABLE TO BATTERY**  
7. **INSPECT A/C OPERATION**
RECEIVER

ON–VEHICLE INSPECTION

INSPECT FITTINGS FOR LEAKAGE

Using a gas leak tester, check for leakage. If there is leakage, check the tightening torque at the joints.

RECEIVER REMOVAL

1. DICHLARGER REFRIGERANT FROM REFRIGERATION SYSTEM
   (See page AC–21)

2. REMOVE 2 LIQUID TUBES FROM RECEIVER
   Remove the 2 bolts and the both tubes from the receiver.

3. REMOVE RECEIVER FROM RECEIVER HOLDER
   Remove the bolt, then remove the receiver from receiver holder.
   NOTICE: Cap the open fittings immediately to keep moisture out of the system.
RECEIVER INSTALLATION

1. INSTALL RECEIVER INTO RECEIVER HOLDER
   Install the receiver into the receiver holder with the bolt.

2. INSTALL 2 LIQUID TUBES TO RECEIVER
   Install 2 liquid tubes to the receiver with 2 bolts.
   Torque: 5.5 N·m (55 kgf·cm, 48 in.–lbf)
   NOTICE: Do not remove the caps until the tubes are connected.

3. REPLENISH COMPRESSOR OIL IF RECEIVER HAS BEEN REPLACED
   Add 15 cc (0.5 fl.oz.)
   Compressor oil: ND OIL 8 or equivalent

4. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT
   Specified amount: 850 ±50 g (29.98 ±1.76 oz)

5. INSPECT FOR LEAKAGE OF REFRIGERANT

6. INSPECT A/C OPERATION
CONDENSER

ON–VEHICLE INSPECTION
1. INSPECT CONDENSER FINS FOR BLOCKAGE OR DAMAGE
   If the fins are clogged, wash them with water and dry with compressed air.
   NOTICE: Be careful not to damage the fins.
   If the fins are bent, straighten them with a screwdriver or pliers.

2. INSPECT CONDENSER AND FITTINGS FOR LEAK–AGE
   Using a gas leak tester, check for leakage.
   If there is leakage, check the tightening torque at the joints.

CONDENSER REMOVAL
1. DISCHAGE REFRIGERANT FROM REFRIGERATION SYSTEM
   (See page AC–21)
2. REMOVE UPPER COVER

3. REMOVE COOLING FAN
   (See page EG–351)

4. REMOVE UPPER SUPPORT
   Remove the 2 bolts and 2 upper supports.

5. REMOVE LIQUID TUBES
   Remove the 2 bolts and 2 tubes.
   NOTICE: Cap the open fittings immediately to keep moisture out of the system.

6. REMOVE HEADLIGHTS ON THE BOTH SIDES
CONDENSER INSTALLATION

1. INSTALL CONDENSER
   Install the condenser with the 2 bolt.

2. INSTALL LIQUID TUBES
   Install both tubes with the 2 bolts.
   Specified torque: 9.8 N–m (100 kgf–cm, 7 ft–lbf)
   NOTICE: Do not remove caps until the tube is installed.

3. INSTALL COOLING FAN

4. REPLENISH COMPRESSOR OIL IF CONDENSER HAS BEEN REPLACED
   Add 40 cc (1.4 fl.oz.)
   Compressor Oil:
       ND OIL 8 or equivalent

5. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT
   Specified amount:
       850 ±50g (33.51 ±1.76 oz)

6. INSPECT FOR LEAKAGE OF REFRIGERANT
   Using a gas leak tester, check for leakage of refrigerant.

7. INSTALL REMOVAL PARTS
   Install the removal parts in reverse order of removal procedure.

7. REMOVE CONDENSER
   Remove the 2 bolts and lean the radiator backward, then remove the condenser.
EVAPORATOR

EVAPORATOR REMOVAL

1. DISCHARGE REFRIGERANT FROM REFRIGERATION SYSTEM
   (See page AC–21)

2. REMOVE BLOWER UNIT
   (See page AC–35)

3. REMOVE EVAPORATOR COVER
   (a) Remove 2 bolts for the liquid and suction tube.
   (b) Remove 8 screws and evaporator cover.

4. REMOVE EVAPORATOR
   (a) Pull and remove the evaporator.
   (b) Remove 2 bolts using a hexagon wrench and separate the evaporator and expansion valve.

EVAPORATOR INSPECTION

1. INSPECT FINS FOR BLOCKAGE
   If the fins are clogged, clean them with compressed air.
   NOTICE: Never use water to clean the evaporator.

2. INSPECT FITTINGS FOR CRACKS OR SCRATCHES
   Repair as necessary.
EVAPORATOR INSTALLATION

1. INSTALL REMOVAL PARTS
   Install the removal parts in reverse order of removal procedure.
   HINT:
   The tightening torque for the bolt used to install the expansion valve on the evaporator is shown below.
   Torque: 5.4 N–m (55 kgf–cm, 48 in.–lbf)
   The tightening torque for the bolts used to install the liquid and suction tube is shown below.
   Torque: 9.8 N–m (100 kgf–cm, 7 ft–lbf)

2. REPLENISH COMPRESSOR OIL IF EVAPORATOR HAS BEEN REPLACED
   Add 40 cc (1.4 fl.oz)
   Compressor oil:
   ND OIL 8 or equivalent

3. EVACUATE AIR IN REFRIGERATION SYSTEM AND CHARGE WITH REFRIGERANT
   Specified amount:
   850 ± 50g (29.98 ±1.76 oz)

4. INSPECT FOR LEAKAGE OF REFRIGERANT
   Using a gas leak tester, check for leakage of refrigerant.
HEATER RADIATOR

HEATER RADIATOR INSTALLATION
1. INSTALL HEATER RADIATOR TO A/C UNIT
   (a) Put the radiator in the A/C unit.
   (b) Connect the heater pipes.
   (c) Install the 3 clamps with 3 screws.

HEATER RADIATOR REMOVAL
1. REMOVE HEATER PROTECTOR
   Remove the 2 clips and the heater protector.

2. REMOVE HEATER RADIATOR
   (a) Remove the 3 screws and the 3 clamps.
   (b) Disconnect the heater pipes.
   (c) Pull the heater radiator out.

HEATER RADIATOR INSPECTION
   If the fin are clogged, clean them with compressed air.

HEATER RADIATOR INSTALLATION
1. INSTALL HEATER RADIATOR TO A/C UNIT
   (a) Put the radiator in the A/C unit.
   (b) Connect the heater pipes.
   (c) Install the 3 clamps with 3 screws.

2. INSTALL HEATER PROTECTOR
WATER VALVE

WATER VALVE REMOVAL
1. DRAIN ENGINE COOLANT FROM RADIATOR
   HINT: It is not necessary to drain out all the coolant.
2. DISCONNECT WATER VALVE CONTROL CABLE FROM WATER VALVE
3. DISCONNECT WATER HOSE FROM WATER VALVE

4. REMOVE WATER VALVE
   (a) Disconnect the water hose from the heater radiator pipe.
   (b) Remove the bolt and the water valve

WATER VALVE INSTALLATION
1. INSTALL WATER VALVE
   (a) Push the water hose onto the heater radiator pipe as far as fits on the pipe and install the hose clip.
   (b) Install water valve with the bolt.
2. CONNECT HEATER HOSE TO WATER VALVE

3. CONNECT WATER VALVE CONTROL CABLE TO WATER VALVE
   (a) Set the temperature control switch to "COOL".
   (b) Set the water valve lever to "COOL", install the control cable and lock the clamp.
   HINT: Lock the clamp while lightly pushing the outer cable in the direction shown by the arrow.
EXPANSION VALVE

ON–VEHICLE INSPECTION

1. CHECK QUANTITY OF GAS DURING REFRIGERATION CYCLE
2. INSTALL MANIFOLD GAUGE SET
3. RUN ENGINE
   Run the engine at 1,500 rpm for at least 5 minutes. Then check that the high pressure reading is 1.37 – 1.53 MPa (14 – 16 kgf/cm², 199 – 228 psi).
4. CHECK EXPANSION VALVE
   If the expansion valve is faulty, the low pressure reading will drop to 0 kPa (0 kgf/cm², 0 psi).
   HINT: When the low pressure drops to 0 kPa (0 kgf/cm², 0 psi), feel the receiver’s IN and OUT sides for no temperature difference.

EXPANSION VALVE REMOVAL

1. REMOVE EVAPORATOR
   (See page AC–50)
2. REMOVE EXPANSION VALVE
   (See page AC–51)

EXPANSION VALVE INSTALLATION

1. INSTALL EXPANSION VALVE
   (See page AC–51)
2. INSTALL EVAPORATOR
   (See page AC–51)
AIR SWITCHING VALVE (ASV)
VACUUM HOSE CIRCUIT (5S–FE ENGINE MODEL)

ASV INSPECTION (5S–FE ENGINE MODEL)

1. CHECK VACUUM CIRCUIT CONTINUITY IN ASV BY BLOWING AIR INTO PIPES
   (a) Connect the ASV terminals to the battery terminals as illustrated.
   (b) Blow into pipe "A" and check that air comes out of pipe "B".
   (c) Disconnect the battery.
   (b) Blow into pipe "A" and check that air does not come out of pipe "B".
   If a problem is found, replace the ASV.

2. CHECK FOR SHORT CIRCUIT
   Using an ohmmeter, check that there is no continuity between each terminal and the ASV.
   If there is continuity, replace the ASV.

3. CHECK FOR OPEN CIRCUIT
   Using an ohmmeter, measure the resistance between the 2 terminals.
   Resistance:
   \[ 30 \text{ } - \text{ } 34 \text{ } 0 \text{ } \text{at } 20^\circ \text{C (68}^\circ \text{F)} \]
   If resistance value is not as specified, replace the ASV.
BLOWER MOTOR

BLOWER MOTOR REMOVAL
1. REMOVE INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2
   (See page BO–108)
2. REMOVE CONNECTOR BRACKET
   Remove the 2 screws and the bracket

3. REMOVE MOTOR
   (a) Disconnect the connector.
   (b) Remove the 3 screws and the motor.

BLOWER MOTOR INSPECTION
INSPECT BLOWER MOTOR OPERATION
Connect the positive (+) lead from the battery to terminal 2 and the negative (−) lead to terminal 1, then check that the motor operation is smooth.

BLOWER MOTOR INSTALLATION
1. INSTALL MOTOR
   (a) Install the motor with the 3 screws.
   (b) Connect the connector.
2. INSTALL CONNECTORBracket
3. INSTALL INSTRUMENT LOWER PANEL AND UNDER COVER NO. 2
CONDENSER FAN MOTOR

CONDENSER FAN MOTOR Inspection

5S–FE ENGINE MODEL:

1. DISCONNECT CONNECTOR
2. INSPECT CONDENSER FAN MOTOR

Connect positive (+) lead from battery and negative (–) lead to terminals, then check that the condenser fan motor operates smoothly.

**Standard current:**

6.7±1 (A)

If current value is not as specified, replace the condenser fan motor.
AIR INLET SERVOMOTOR

AIR INLET SERVOMOTOR INSPECTION

INSPECT SERVOMOTOR OPERATION

(a) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 2, check that the arm rotates to the "FRESH" side smoothly.

(b) Connect the positive (+) lead from the battery to terminal 1 and the negative (–) lead to terminal 3, check that the arm rotates to the "RECI RC" side smoothly.

If operation is not as specified, replace the servomotor.

AIR INLET SERVOMOTOR INSTALLATION

1. INSTALL SERVOMOTOR
   (a) Install the servomotor with the 2 screws.
   (b) Connect the connector.

2. INSTALL ECU AND ECU BRACKET

3. INSTALL GLOVE COMPARTMENT
AIR OUTLET SERVOMOTOR

AIR OUTLET SERVOMOTOR REMOVAL
1. REMOVE INSTRUMENT LOWER FINISH PANEL AND AIR DUCT
   (See page BO–108)
2. REMOVE AIR DUCT NO. 2
3. REMOVE SERVOMOTOR
   (a) Disconnect the connector.
   (b) Remove the 2 screws and the servomotor.

AIR OUTLET SERVOMOTOR INSTALLATION
1. INSTALL SERVOMOTOR
   (a) Install the servomotor with 2 screws.
   (b) Connect the connector
2. INSTALL HEATER DUCT
3. INSTALL LOWER FINISH PANEL

AIR OUTLET SERVOMOTOR INSPECTION
INSPECT SERVOMOTOR OPERATION
(a) Connect the positive (+) lead from the battery to terminal 6 and the negative (–) lead to terminal 7.
(b) Connect the negative (–) lead from the battery to each terminal and check that the arm rotates to each position as shown below.

<table>
<thead>
<tr>
<th>Connected terminal</th>
<th>Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DEF</td>
</tr>
<tr>
<td>2</td>
<td>FOOT/DEF</td>
</tr>
<tr>
<td>3</td>
<td>FOOT</td>
</tr>
<tr>
<td>4</td>
<td>B/L</td>
</tr>
<tr>
<td>5</td>
<td>FACE</td>
</tr>
</tbody>
</table>

If operation is not as specified, replace the servomotor.

AC–58
AIR CONDITIONING SYSTEM – AIR OUTLET SERVOMOTOR
BLOWER RESISTOR

BLOWER RESISTOR REMOVAL
1. REMOVE INSTRUMENT LOWER FINISH PANEL
   (See page BO–108)
2. REMOVE BLOWER RESISTOR
   (a) Disconnect the connector from the resistor.
   (b) Remove the 2 screws and the resistor.

BLOWER RESISTOR INSTALLATION
1. INSTALL BLOWER RESISTOR
   (a) Install the resistor with the 2 screws.
   (b) Connect the connector to the resistor.
2. INSTALL INSTRUMENT LOWER FINISH PANEL

If continuity is not as specified, replace the blower resistor.

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tester connectoin to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1–2–3–6</td>
<td>Continuity</td>
</tr>
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<tbody>
<tr>
<td>Constant</td>
<td>t–2–3–5–6</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the blower resistor.

BLOWER RESISTOR INSPECTION

INSPECT BLOWER RESISTOR CONTINUITY
Continuity

---

If continuity is not as specified, replace the blower resistor.
PRESSURE SWITCH

ON-VEHICLE INSPECTION
1. INSTALL MANIFOLD GAUGE SET
   (See page AC–21)
2. DISCONNECT CONNECTOR FROM PRESSURE SWITCH
3. RUN ENGINE AT APPROX. 2000 RPM
4. INSPECT PRESSURE SWITCH OPERATION

Magnet Clutch Control:
(a) Connect the positive (+) lead from the ohmmeter to terminal 4 and negative (−) lead to terminal 1.
(b) Check continuity between terminals when refrigerant pressure is changed, as shown.
   If operation is not as specified, replace the pressure switch.

Cooling Fan Control:
(a) Connect the positive (+) lead from the ohmmeter to terminal 2 and negative (−) lead to terminal 3.
(b) Check continuity between terminals when refrigerant pressure is changed, as shown.
   If operation is not as specified, replace the pressure switch.
5. STOP ENGINE AND REMOVE MANIFOLD GAUGE SET
6. CONNECT CONNECTOR TO PRESSURE SWITCH
PRESSURE SWITCH REMOVAL

1. Discharge refrigerant in refrigeration system
2. Remove pressure switch
   (a) Disconnect the connector.
   (b) Remove the pressure switch from the liquid tube.
      HINT: Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and remove the switch.

PRESSURE SWITCH INSTALLATION

1. Install pressure switch
   (a) Install the pressure switch to the liquid tube.
      Torque: 9.8 N-m (100 kgf-cm, 7 ft-lbf)
      HINT: Lock the switch mount on the tube with an open end wrench, being careful not to deform the tube, and install the switch.
   (b) Connect the connector.
2. Evacuate air in refrigeration system and charge with refrigerant
   Specified amount:
   850 ±50 g (29.98 ±1.76 oz)
3. Inspect for leakage of refrigerant
   Using a gas leak tester, check for leakage of refrigerant from the pressure switch mount.
4. Inspect A/C operation
EVAPORATOR TEMPERATURE SENSOR

EVAPORATOR TEMPERATURE SENSOR REMOVAL

REMOVE EVAPORATOR TEMPERATURE SENSOR
Remove the screw and the evaporator temperature sensor (thermistor).

EVAPORATOR TEMPERATURE SENSOR INSPECTION

Check resistance between terminals of evaporator temperature sensor (thermistor) connector at each temperature.

Resistance:
- at 0°C (32°F): 4.6 – 5.1 kΩ
- at 15°C (59°F): 2.1 – 2.6 kΩ

In addition as temperature increases, the resistance decreases gradually.

EVAPORATOR TEMPERATURE SENSOR INSTALLATION

INSTALL EVAPORATOR TEMPERATURE SENSOR
Install evaporator temperature sensor in reverse order of removal procedure.
3. INSPECT REVOLUTION DETECTING SENSOR
Check the resistance between terminals 1 and 2 of the sensor.
Specified resistance:
   5S–FE:
   165 – 205Ω at 20 °C (68 °F)
   1 MZ–FE:
   65 – 125Ω at 20 °C (68 °F)
If the resistance value is not as specified, replace the revolution detecting sensor.

REVOLUTION DETECTING SENSOR
INSTALLATION
1. INSTALL REVOLUTION DETECTING SENSOR
   Using a torque wrench, tighten the bolts.
   Torque: 6 N⋅m (60 kgf⋅cm, 4 ft–lb)
2. INSTALL COMPRESSOR
   (See page AC–46)
RELAY

RELAYS REMOVAL

1. DISCONNECT NEGATIVE (–) CABLE FROM BATTERY

CAUTION: Work must be started after 90 seconds from the time the ignition switch is turned to the 'LOCK' position and the negative (–) terminal cable is disconnected from the battery.

2. REMOVE RELAYS

RELAYS INSPECTION

1. INSPECT MAGNET CLUTCH RELAY CONTINUITY

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1 – 4</td>
<td>Continuity</td>
</tr>
<tr>
<td>Apply B + between terminals 1 and 4.</td>
<td>2 – 3</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the relay.

2. INSPECT A/C FAN RELAY NO. 2 CONTINUITY

5S–FE Engine Model:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1 – 4</td>
<td>Continuity</td>
</tr>
<tr>
<td>3 – 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Apply B + between terminals 1 and 4.</td>
<td>2 – 3</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the relay.

3. INSPECT A/C FAN RELAY NO. 3 CONTINUITY

5S–FE Engine Model:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1 – 4</td>
<td>Continuity</td>
</tr>
<tr>
<td>Apply B + between terminals 1 and 4.</td>
<td>2 – 3</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the relay.
4. INSPECT HEATER MAIN RELAY CONTINUITY

<table>
<thead>
<tr>
<th>Condition</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>1–3 2–4</td>
<td>Continuity</td>
</tr>
<tr>
<td>Apply B + between terminals 1 and 3.</td>
<td>4–5</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the relay.

RELAYS INSTALLATION

1. INSTALL RELAYS
2. CONNECT NEGATIVE (−) CABLE TO BATTERY
AIR CONDITIONING AMPLIFIER

A/C AMPLIFIER INSPECTION

INSPECT AMPLIFIER CIRCUIT

Disconnect the amplifier and inspect the connector on the wire harness side, as shown in the chart below.

Test conditions
- Ignition switch: ON
- Temperature control dial: MAX COOL
- Blower dial: HI

<table>
<thead>
<tr>
<th>Tester connection</th>
<th>Condition</th>
<th>Specified condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 – Ground</td>
<td>Constant</td>
<td>Continuity</td>
</tr>
<tr>
<td>9–13</td>
<td>Constant</td>
<td>1.5 kΩ at 20 °C (68 °F)</td>
</tr>
<tr>
<td>14–13</td>
<td>Constant</td>
<td>Approx. 115Ω at 20 °C (68 °F)</td>
</tr>
<tr>
<td>12 – Ground</td>
<td>Turn A/C switch ON</td>
<td>Battery voltage</td>
</tr>
<tr>
<td>12 – Ground</td>
<td>Turn A/C switch OFF</td>
<td>No voltage</td>
</tr>
<tr>
<td>2 – Ground</td>
<td>Refrigerant pressure: 196 – 3140 kPa</td>
<td>Battery voltage</td>
</tr>
<tr>
<td>2 – Ground</td>
<td>Refrigerant pressure: less than 196 kPa or more than 3140 kPa</td>
<td>No voltage</td>
</tr>
<tr>
<td>10 – Ground</td>
<td>Turn A/C switch ON</td>
<td>Battery voltage</td>
</tr>
<tr>
<td>10 – Ground</td>
<td>Turn A/C switch OFF</td>
<td>No voltage</td>
</tr>
<tr>
<td>8 – Ground</td>
<td>Turn A/C switch ON</td>
<td>Battery voltage</td>
</tr>
<tr>
<td>8 – Ground</td>
<td>Turn A/C switch OFF</td>
<td>No voltage</td>
</tr>
</tbody>
</table>

If circuit is not as specified, replace the amplifier.
AIR CONDITIONING CONTROL ASSEMBLY

A/C CONTROL ASSEMBLY REMOVAL
(See page BO–108)

A/C CONTROL ASSEMBLY INSPECTION
(ROTARY SWITCH AND PUSH BUTTON TYPE)

1. INSPECT A/C INDICATOR
   (a) Connect the positive (+) lead from the battery to terminal A–12 and the negative (–) lead to terminal A–4.
   (b) Push the A/C button in and check that the indicator light up.
       If operation is not as specified, replace the A/C control assembly.

2. INSPECT MODE INDICATOR
   (a) Connect the positive (+) lead from the battery to terminal A–12 and the negative (–) lead to terminal A–1.
   (b) Push each of the mode buttons in and check that their indicators light up.
       If operation is not as specified, replace the A/C control assembly.
3. **INSPECT AIR INLET INDICATOR**
   (a) Connect the positive (+) lead from the battery to terminal A–12 and the negative (–) lead to terminal A–1.
   (b) Check that the FRESH and RECIRC indicators light up alternately each time the air inlet control switch button is pressed.
   If operation is not as specified, replace the A/C control assembly.

4. **INSPECT INDICATOR DIMMING OPERATION**
   (a) Connect the positive (+) lead from the battery to terminal A–12 and the negative (–) lead to terminal A–1.
   (b) Connect the positive (+) lead from the battery to terminal A–14 and check that the mode indicator dims.
   If operation is not as specified, replace the A/C control assembly.

5. **INSPECT A/C SWITCH CONTINUITY**
<table>
<thead>
<tr>
<th>Switch position</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>–</td>
<td>No continuity</td>
</tr>
<tr>
<td>ON</td>
<td>A7 – A8</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

   If continuity is not as specified, replace the A/C control assembly.
6. INSPECT MODE CONTROL SWITCH CONTINUITY

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACE</td>
<td>A11 – A1</td>
<td>Continuity</td>
</tr>
<tr>
<td>B/L</td>
<td>A3 – A1</td>
<td>Continuity</td>
</tr>
<tr>
<td>FOOT</td>
<td>A10 – A1</td>
<td>Continuity</td>
</tr>
<tr>
<td>FOOT/ oeF</td>
<td>A2 – A1</td>
<td>Continuity</td>
</tr>
<tr>
<td>DEF</td>
<td>A9 – A1</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the A/C control assembly.

---

7. INSPECT AIR INLET CONTROL SWITCH CONTINUITY

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RECIRC</td>
<td>A5 – A1</td>
<td>Continuity</td>
</tr>
<tr>
<td>FRESH</td>
<td>A6–A1</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the A/C control assembly.
8. **INSPECT BLOWER SPEED CONTROL SWITCH CONTINUITY**

If continuity is not as specified, replace the switch.
ROTARY SWITCH AND LEVER TYPE:

1. **INSPECT A/C SWITCH CONTINUITY**

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF.</td>
<td>–</td>
<td>No continuity</td>
</tr>
<tr>
<td>ON</td>
<td>2 – 5</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the switch.

2. **INSPECT MODE CONTROL SWITCH CONTINUITY**

<table>
<thead>
<tr>
<th>Switch position</th>
<th>Tester connection to terminal number</th>
<th>Specified value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FACE</td>
<td>1 – 8</td>
<td>Continuity</td>
</tr>
<tr>
<td>B/ L</td>
<td>1 – 7</td>
<td>Continuity</td>
</tr>
<tr>
<td>FOOT</td>
<td>1 – 6</td>
<td>Continuity</td>
</tr>
<tr>
<td>FOOT/ DEF</td>
<td>1 – 5</td>
<td>Continuity</td>
</tr>
<tr>
<td>DEF</td>
<td>1 – 4</td>
<td>Continuity</td>
</tr>
</tbody>
</table>

If continuity is not as specified, replace the switch.

3. **INSPECT BLOWER SPEED CONTROL SWITCH CONTINUITY**
If continuity is not as specified, replace the switch.

### A/C CONTROL CABLES ADJUSTMENT

1. **ADJUST AIR INLET DAMPER CONTROL CABLE**
   Set the air inlet damper and the control lever to "FRESH" position, install the control cable and lock the clamp.

2. **ADJUST AIR MIX DAMPER CONTROL CABLE**
   Set the air mix damper and control switch to "COOL" position, install the control cable and lock the clamp while lightly pushing the outer cable in the direction shown by the arrow.

### A/C CONTROL ASSEMBLY INSTALLATION

(See page BO–108)
## SERVICE SPECIFICATIONS

### SERVICE DATA

<table>
<thead>
<tr>
<th>Part tightened</th>
<th>N·m</th>
<th>kgf-cm</th>
<th>ft-lbf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Refrigerant charge volume</td>
<td>850 ± 50 g (29.98 ± 1.76 oz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Drive belt tension</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5S–FE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New belt</td>
<td>165 ± 28 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used belt</td>
<td>110 ± 11 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MZ– FE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>New belt</td>
<td>165 ± 28 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Used belt</td>
<td>88 ± 22 lb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Idle speed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5S–FE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic clutch no engaged</td>
<td>Approx. 750 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic clutch engaged</td>
<td>Approx. 850 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1 MZ– FE:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic clutch noT engaged</td>
<td>Approx. 700 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic clutch engaged</td>
<td>Approx. 700 rpm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Magnetic clutch clearance</td>
<td>0.5 ± 0.15 mm (0.020 ± 0.006 in.)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TORQUE SPECIFICATIONS

<table>
<thead>
<tr>
<th>Part tightened</th>
<th>N·m</th>
<th>kgf-cm</th>
<th>ft-lbf</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suction hose x Compressor</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Discharge hose x Compressor</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Compressor x Engine</td>
<td>25</td>
<td>250</td>
<td>18</td>
</tr>
<tr>
<td>Liquid x Receiver</td>
<td>5.4</td>
<td>55</td>
<td>48 in.-lbf</td>
</tr>
<tr>
<td>Liquid x Condensor</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Expansion valve x Evaporator</td>
<td>5.4</td>
<td>55</td>
<td>48 in.-lbf</td>
</tr>
<tr>
<td>Suction tube x A/C unit</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Liquid tube x A/C unit</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
<tr>
<td>Pressure switch x Liquired tube</td>
<td>9.8</td>
<td>100</td>
<td>7</td>
</tr>
</tbody>
</table>