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# A/C SYSTEM GENERAL DIAGNOSTIC PROCEDURES
## Article Text
1983 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 26, 2001 04:42PM

**ARTICLE BEGINNING**

1983-90 AIR CONDITIONING & HEAT
General Servicing Diagnostic Procedures

All Import Makes & Models

Diagnosis is an important first step in A/C system servicing. To save time and effort, systems should be carefully checked to identify the causes of poor performance. By using the following diagnostic charts, defective components or system damage can be quickly located. To identify problems that are specific to one system, refer to the repair section of this manual. The charts in this section apply to all systems.

### ALTITUDE PRESSURE VARIATIONS

ALTITUDE PRESSURE VARIATIONS TABLE

| Altitude (Ft. Above Sea Level) | Absolute Pressure of Atmosphere (psi) | Gauge Altitude Correction (1) (psi) |
|---|---|---|
| 0 | 14.7 | 0 |
| 1000 | 14.2 | -0.5 |
| 2000 | 13.7 | -1.0 |
| 3000 | 13.2 | -1.5 |
| 4000 | 12.7 | -2.0 |
| 5000 | 12.2 | -2.5 |
| 6000 | 11.7 | -3.0 |
| 7000 | 11.3 | -3.4 |
| 8000 | 10.9 | -3.8 |
| 9000 | 10.5 | -4.2 |
| 10,000 | 10.1 | -4.6 |

(1) - Subtract correction shown from gauge readings.

### ALTITUDE VACUUM VARIATIONS

ALTITUDE VACUUM VARIATIONS TABLE

| Altitude (Ft. Above Sea Level) | Absolute Pressure of Atmosphere (psi) | Gauge Altitude Correction (1) (psi) |
|---|---|---|
| 0 | 29.92 | 0 |
| 1000 | 28.92 | +1.0 |
| 2000 | 27.82 | +2.1 |
| 3000 | 26.82 | +3.1 |
| 4000 | 25.82 | +4.1 |

| | | | |
|---|---|---|---|
| 5000 | 24.92 | | +5.0 |
| 6000 | 23.92 | | +6.0 |
| 7000 | 23.02 | | +6.9 |
| 8000 | 22.22 | | +7.7 |
| 9000 | 21.32 | | +8.6 |
| 10,000 | 20.52 | | +9.4 |

(1) - Add correction shown to gauge readings.

**PREPARATION FOR TESTING**

1) Attach Low and High pressure gauges.
2) Start engine and allow to warm up.
3) Set system to "COOL" and blower to "HIGH".
4) Open car doors and hood.
5) Run engine at fast idle for 2-3 minutes.

AIR CONDITIONING SYSTEM PERFORMANCE CHECK TABLE

| PERFORM TESTS: | SHOULD BE: | IF: |
|---|---|---|
| Temperature Check | | Temperature Check Is |
| * Switch to "LOW" blower.<br>* Close doors.<br>* Check outlet temperature. | 35-45ø F | Too warm - Check control lever operation, heater water valve, cooling system and gauge readings. |
| Visual Check | | Visual Check Shows: |
| * Compressor | Quiet, No Leaks | Noisy - Check belts, oil level, seals, gaskets, reed valves. |
| * Condenser | Free of Obstructions | Blocked - Clean off. Plugged - Flush or replace. |
| * Receiver-Drier | Dry & warm to touch | Frosty - Check for restriction, replace desiccant. |
| * Sight Glass | Clear or few bubbles | Bubbly, foamy or streaks - Check gauge readings. |
| * High Side Lines | Dry & warm to touch | Frosty or very hot - Check for restriction or overcharge. |
| * Low Side Lines | Dry & cool to touch | Frosty or warm - Check for restriction, low charge or bad valve. |
| * Expansion Valve | Dry | Frosty - Check for |

| | | | |
|---|---|---|---|
| | | | moisture or restriction. Check sensing bulb. |
| * | STV | Dry & cool to touch | Frosty or warm - Check gauge readings for valve malfunction. |
| * | Evaporator | Dry & cold to touch | Freezing or warm - Check expansion valve, STV or thermo switch. |
| Gauge Readings | | | Gauge Readings are: |
| * | High Side Gauge | See Pressure Chart | Above or below normal - See A/C Diagnosis. |
| * | Low Side Gauge | See Pressure Chart | Above or below normal - See A/C Diagnosis. |

**AMBIENT TEMPERATURE/PRESSURE**

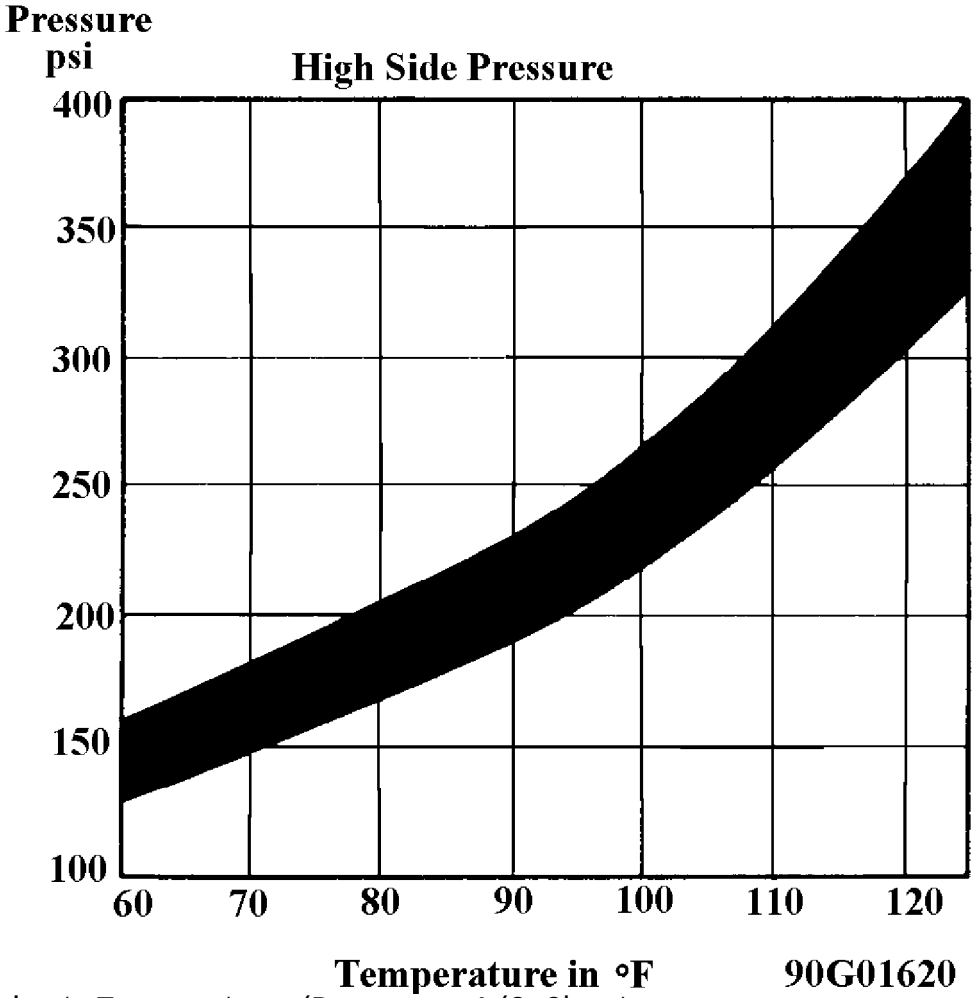


Fig. 1: Ambient Temperature/Pressure A/C Chart

## EVAPORATOR TEMPERATURE/PRESSURE

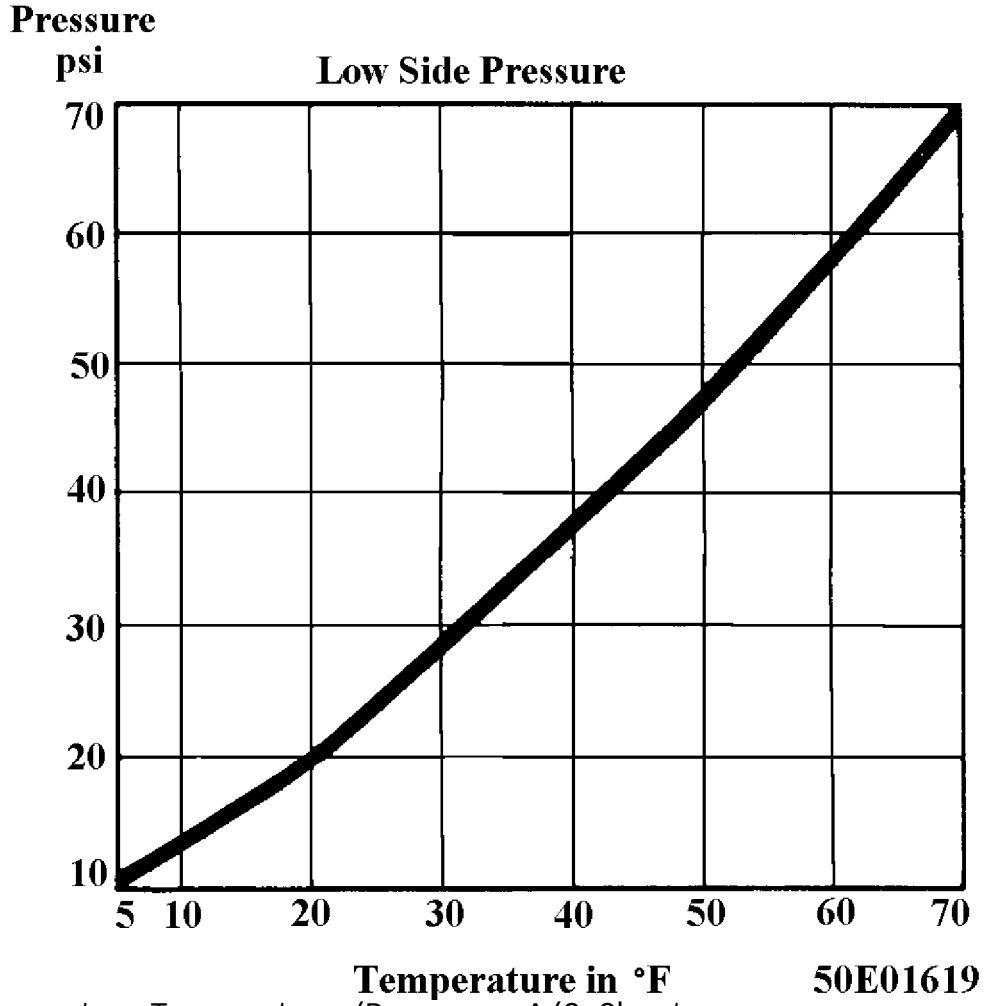


Fig. 2: Evaporator Temperature/Pressure A/C Chart

AIR CONDITIONING DIAGNOSIS WITH GAUGES FOR SYSTEMS WITH INSUFFICIENT OR NO COOLING TABLE

| Low Side Gauge | High Side Gauge | Other Symptoms (1) | Diagnosis |
|---|---|---|---|
| NORMAL | NORMAL | No or few bubbles in sight glass. High side gauge may go high. Low side gauge does not fluctuate with compressor on/off cycle. | Some Air and Moisture in System |
| NORMAL | NORMAL | Cools okay in morning but not during hot part of day. Bubbles in sight glass. Discharge air warm when low side gauge drops into vacuum. | Excessive Moisture in System |
| NORMAL | NORMAL | Thermostatic switch system only - compressor cycles off | Defective Thermostatic |

| | | | |
|---|---|---|---|
| | | and on too rapidly. | Switch |
| NORMAL to HIGH | NORMAL | Cycling clutch systems only - compressor doesn't turn on soon enough. Discharge air becomes warm as low side pressure rises. | Misadjusted Thermostatic Switch or Defective Pressure Sensing Switch |
| LOW | LOW | Bubbles in sight glass. Outlet air slightly cool. | Low R-12 Charge |
| LOW | LOW | Sight glass clear. Outlet air very warm. | Excessively Low R-12 Charge |
| LOW | LOW | Outlet air slightly cool. Sweating or frost at expansion valve. | Expansion Valve Stuck Closed Screen Plugged or Sensing Bulb Malfunction |
| LOW | LOW | Outlet air slightly cool. High side line cool to touch. Sweating or frost on high side. | Restriction on High Side |
| LOW | HIGH | Evaporator outlet pipe cold. Low side goes into vacuum when blower is disconnected. | STV Stuck Open |
| HIGH | LOW | Evaporator outlet pipe warm. Outlet air warm. | STV Stuck Closed |
| HIGH | LOW | Noise from compressor. | Compressor Malfunction |
| HIGH | HIGH | Outlet air warm. Liquid line very hot. Bubbles in sight glass. | Compressor Malfunction or R-12 Overcharge |
| HIGH | HIGH | Outlet air slightly cool. Bubbles in sight glass. | Large Amount of Air and Moisture in System |
| HIGH | HIGH | Outlet air warm. Evaporator outlet sweating and frost. | Expansion Valve Stuck Open |

(1) - If equipped with a low refrigerant charge protection system, compressor operation may have stopped.

**END OF ARTICLE**

# A/C SYSTEM PRECAUTIONS
## Article Text
1983 Mazda RX7
For www.iluvmyrx7.com

Sunday, August 26, 2001 04:42PM

**ARTICLE BEGINNING**

AIR CONDITIONING & HEAT
A/C System Precautions

*** PLEASE READ THIS FIRST ***

CAUTION: When discharging air conditioning system, use only approved refrigerant recovery/recycling equipment. Make every attempt to avoid discharging refrigerant into the atmosphere.

**BEFORE OPENING THE SYSTEM**

Before disconnecting any lines or fittings, the system must be completely discharged using approved refrigerant recovery/recycling equipment.

**DISCHARGING A/C SYSTEM**

NOTE: Recent findings by the EPA indicate that R-11, R-12 and R-113 are harmful to the Earths' protective Ozone layer. Make every attempt possible, to avoid discharging R-11, R-12 or R-113 into the atmosphere.

1) Remove service valve caps and install gauges. For high side gauge hose, Adapter (D81L-19703-A) must be used to connect to high side service valve.
2) Place open end of center hose in garage exhaust outlet or in a well ventilated area. Slightly open low side gauge valve and let refrigerant escape slowly without loosing refrigerant oil.
3) When system is nearly discharged, using approved refrigerant recovery/recycling equipment, open high side gauge valve to release any pressure trapped in compressor. Close valves immediately after discharging to prevent entry of moisture.

**DISCONNECTING LINES & FITTINGS**

1) After system is discharged, using approved refrigerant recovery/recycling equipment, carefully clean entire area around coupling nut to prevent dirt entering system. Always use two wrenches to avoid twisting or distorting lines and fittings (hold fitting with one wrench while loosening coupling nut with second wrench).
2) Cap or plug all LINES and FITTINGS immediately to prevent entry of air and moisture into system. Do not remove these caps until connections are being made.

**COMPONENT REPLACEMENT**

When components are replaced, system oil level must be adjusted. Add refrigeration oil to replacement component. See

Compressor oil Check article, as well as, Component Oil Replacement Quantities" chart under "A/C SYSTEM SPECS" article in this section.

### USING R-12 REFRIGERANT - SAFETY PRECAUTIONS

1) Always work in a well-ventilated, clean area. Refrigerant (R-12) is heavier than oxygen, and will displace oxygen in a confined area. Always wear eye protection when working around air conditioning systems and R-12. The system's high pressure can cause severe injury to eyes and skin if a hose were to burst. R-12 evaporates quickly when exposed to atmosphere, freezing anything it contacts.

2) Use care when handling refrigerant containers. DO NOT drop or strike containers or expose refrigerant containers to excessive heat. Containers must never be heated more than 125øF (52øC). Never expose R-12 directly to open flame.

CAUTION: When R-12 is exposed to an open flame, drawn into a running engine, or detected with a Halide (propane) leak tester, poisonous phosgene gas is formed. Keep work areas ventilated and avoid running engines near work area.

### USING INDIVIDUAL R-12 CANS

Disposable refrigerant cans (referred to as one pound cans) have a flat type seal or a screw type seal, and proper can tap must be used for each type. Be sure sealing gasket on can tap is in good condition. A proper safety can tap will prevent refrigerant from flowing back into open can, as tap has a one-way flow control.

NOTE: Recent findings by the EPA indicate that refrigerant is harmful to the Earth's protective Ozone layer. When discharging refrigerant avoid allowing refrigerant to enter the atmosphere. Refrigerant recovery system should be used when discharging the system.

### MULTI-CAN DISPENSING VALVES

A multi-can dispensing valve allows attachment of several cans of refrigerant, and is a good substitute when a bulk container is not available. Cans are installed onto each leg of multi-can dispensing valve in the same manner as the individual cans, and each leg has its own can tap.

### CAN TAP INSTALLATION FLAT TYPE SEAL CANS

On cam-lock or one-piece can taps, first turn the handle outward to the fully open position. Securely engage locking lugs over the can flange, and lock them in place by turning cam lock or locking nut. Screw tap assembly into adapter so sealing gasket is fully seated against the can top. Turn tap inward to pierce the can and close the tap. DO NOT open tap until ready to purge the service hose or dispense

refrigerant into the system.

On 2-piece can taps, be certain tap handle is turned fully inward to the closed position. Check that locking base is turned to its outer limit. Securely engage locking lugs over the can flange. Turn entire tap assembly (without disturbing the closed setting) downward into the locking base to pierce the can. DO NOT open tap until ready to dispense into system.

### SCREW TYPE SEAL CANS

Ensure can tap is fully closed. Screw refrigerant can into can tap fitting until tight. This will pierce the can. Connect tap to center hose on manifold gauge set. DO NOT open tap until ready to dispense R-12 into system.

WARNING: DO NOT open high side hand valve while air conditioning system is in operation. This high pressure could rupture can or fitting at safety can valve, resulting in damage and personal injury.

### CONNECTING LINES & FITTINGS

A new "O" ring should be used in all instances when connecting lines and fittings (dip "O" ring in clean refrigeration oil and make certain it is not twisted during installation). Always use two wrenches to avoid twisting or distorting lines and fittings, tighten coupling nuts securely.

### PLACING SYSTEM IN OPERATION

After component replacement and/or system servicing has been completed and all connections have been made, proceed as follows:

1) Evacuate the system using a vacuum pump.
2) Charge the system with new R-12 (refrigerant) according to each individual vehicle as outlined in the GENERAL COOLING SYSTEM SERVICING article. Also see Refrigerant Capacity in this Section.
3) Leak test the system, with particular attention to all new connections and components.
4) Make a performance test of the system. Never assume that a recharging has automatically corrected a problem.

### COMPRESSOR REMOVAL INFORMATION - ISOLATION METHOD

On systems which have compressors equipped with stem-type service valves (Tecumseh), it is possible to isolate the compressor for removal.

Isolating
Turn both high and low pressure manual valves to extreme

clockwise (front seat) position. Loosen cap on high pressure manual valve connection to compressor and allow gas to escape until compressor is relieved of pressure.

**COMPRESSOR REMOVAL INFORMATION - DISCHARGE METHOD**

This procedure is to be used on vehicles which have compressor equipped with Schrader service valves. In these cases, the compressor cannot be isolated and the system must be discharged, using approved refrigerant recovery/recycling equipment, prior to compressor removal.

**END OF ARTICLE**