

# **A/C COMPRESSOR OIL CHECKING**

1991 Mazda Miata

1991 GENERAL SERVICING  
Compressor Refrigerant Oil Checking

## **ISOLATING COMPRESSOR**

NOTE: Only compressors with stem-type service valves can be isolated.

1) Connect service gauge set to the compressor service valves and open compressor valves slightly (turn in clockwise). Start engine and operate air conditioning. Slowly turn compressor suction valve clockwise toward closed (front-seated) position.

2) When suction pressure is reduced to zero or less, turn off engine and compressor and quickly turn suction valve stem in to full front-seated position. Suction pressure should be slightly above zero. Turn discharge valve into front-seated position.

3) To check oil level, slowly open compressor crankcase plug to relieve any remaining pressure. After oil level is corrected, cap service gauge ports on both valves. Back-seat suction service valve to allow refrigerant to enter compressor. Open discharge valve halfway.

4) Loosen discharge service valve cap, allowing refrigerant pressure to force air out of compressor. Back-seat service valve and tighten cap. Compressor is now ready for operation.

## **REFRIGERANT OIL**

Only new, pure, moisture-free refrigerant oil should be used in the air conditioning system. This oil is highly refined and dehydrated to a point where moisture content is less than 10 parts per million. The oil container must be tightly closed at all times when not in use, or moisture will be absorbed into the refrigerant oil from the air.

## **SERVICING PRECAUTIONS**

NOTE: Recent findings by the EPA indicate that refrigerant is harmful to the earth's protective Ozone layer. When discharging refrigerant, DO NOT allow refrigerant to enter the atmosphere. If available, use refrigerant recovery/recycle systems when discharging system. Always follow manufacturer's instructions.

## **DISCHARGING SYSTEM PRECAUTIONS**

If compressor has stem-type service valves, it can be isolated and removed without discharging entire system. See ISOLATING COMPRESSOR at the beginning of this article. Otherwise, discharge system completely before loosening any fittings.

## **DISCONNECTING LINES & FITTINGS TEST**

After system is discharged, carefully clean area around all fittings to be opened. Always use 2 wrenches when tightening or loosening fittings to avoid twisting or distorting lines. Cap or plug all openings as soon as lines are removed. DO NOT remove caps until immediately before connections are made. This will keep entry of air

and moisture to a minimum.

## **CONNECTING LINES AND FITTINGS**

A new gasket or "O" ring should be used in all instances when connecting lines or fittings. Dip "O" ring in new refrigerant oil and ensure it is not twisted during installation. Always use 2 wrenches to prevent damage to lines and fittings.

## **PLACING SYSTEM IN OPERATION**

After component service or replacement has been completed and all connections have been made, evacuate system thoroughly with a vacuum pump. Charge system with proper amount of refrigerant and perform a leak test. See REFRIGERANT OIL & R-12 SPECIFICATIONS chart in this section for system capacities. Be sure to check all fittings that have been opened. After system has been leak tested, make a system performance check.

NOTE: Air conditioning systems will not normally need addition of refrigerant oil unless definite oil loss has occurred due to ruptured lines, leaking compressor seals, compressor overhaul or component replacement.

## **ATSUGI ROTARY VANE DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes to return oil to compressor.

2) Stop engine, discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at beginning of article. Drain compressor oil from compressor discharge port and measure the amount. Oil is sometimes hard to drain when compressor is cool. Remove oil while compressor is warm.

3) If the amount drained is less than 3 ounces, conduct leak tests at system connections, and if necessary, repair or replace faulty parts. Check purity of oil and adjust oil level as follows.

4) If amount drained was above 3 ounces, oil level is right. Pour in same amount as was drained. If amount drained was below 3 ounces, pour in 3 ounces of new refrigerant oil.

## **BOSCH 6-CYL DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes to return oil to compressor.

2) Stop engine and discharge refrigerant. Remove refrigerant oil level inspection plug on side of compressor. Oil should be at lower lip of threaded hole. Add necessary new refrigerant oil (if low). Replace inspection plug and tighten to 10-12 ft. lbs. (14-16 N.m).

## **CALSONIC V5 5-CYLINDER**

1) Before checking and adjusting oil level, operate compressor at 1000-1500 engine RPM, and set controls at maximum cooling and blowing speed for 20-30 minutes to return oil to

compressor.

2) Stop engine. Discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain compressor oil from compressor discharge port and measure oil amount. Oil may be hard to drain if compressor is cool. Drain oil while compressor is warm.

3) If amount drained is less than 3.2 ounces, conduct leak tests at system connections. Repair or replace faulty parts as necessary. Check purity of oil and oil level as follows.

4) If amount drained is more than 3.2 ounces, oil level is okay; fill with same amount drained using new oil. If amount drained is less than 3.2 ounces, pour in 3.2 ounces of new refrigerant oil.

### **DIESEL KIKI ROTARY VANE DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes to return oil to compressor.

2) Stop engine, discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain compressor oil from compressor discharge port and measure the amount. Oil is sometimes hard to drain when compressor is cool. Remove oil while compressor is warm.

3) If the amount is less than 2.4 ounces, conduct leak tests at system connections, and if necessary, repair or replace faulty parts. Check purity of oil and adjust oil level as follows.

4) If amount drained was above 2.4 ounces, oil level is right. Pour in same amount as was drained. If amount drained was below 2.4 ounces, pour in 2.4 ounces of new refrigerant oil.

### **DIESEL KIKI 6-CYL DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 20 to 30 minutes to return oil to compressor.

2) Stop engine, discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Remove oil drain plug and drain oil. Measure amount of oil drained. Install drain plug with new "O" ring.

3) If amount drained was more than 2 ounces (4.4 ounces for Infinity), refill with same amount of new oil. If amount drained was less than 2 ounces (4.4 ounces for Infinity), refill with 2 ounces (4.4 ounces for Infinity). Install filler plug and recharge system.

### **FORD FX-15 6-CYLINDER DRAIN & REFILL**

NOTE: Replacement FX-15 compressors contain 7 ounces of refrigerant oil. Prior to installing compressor, drain refrigerant oil and determine proper amount of refrigerant oil to be added.

1) Slowly discharge system. Remove A/C compressor. Drain compressor oil from suction and discharge ports. Measure amount drained and discard oil.

2) If amount drained from removed (old) compressor is between 3 and 5 ounces, add drained amount of new SUNINSO 5GS refrigerant oil into the NEW compressor through suction port.

3) If amount drained is less than 3 ounces, add 3 ounces to the NEW compressor. If amount drained is more than 5 ounces, add 5 ounces. Use new "O" rings on refrigerant lines. Install A/C

compressor. Evacuate and recharge system. Perform leak test.

## **HARRISON 4-CYL DRAIN & REFILL**

NOTE: The Harrison compressor DOES NOT have an oil sump. It's crucial that the compressor remains well oiled. It takes very little time to destroy this compressor if it runs dry.

The Harrison 4-cyl compressor is charged (new) with 6 ounces of refrigerant oil. Because compressor does not have an oil sump, it should not have to be removed for oil measurement (it retains very little oil). Note the following situations for checking and adding oil to this compressor.

### **NO OIL LEAK; REPLACING COMPONENTS**

If only the compressor is to be replaced, remove, drain oil, measure and reinstall an equal amount of new oil. If evaporator is being replaced, add 3 ounces of new oil. If condenser is being replaced, add one ounce.

### **LOSS OF REFRIGERANT OVER EXTENDED PERIOD**

When a loss of refrigerant has occurred over an extended period of time and a component is being replaced to correct the leak, add an appropriate amount of refrigerant oil to the component.

### **SIGNS OF EXCESSIVE OIL LEAKAGE**

If system has lost excessive oil, remove accumulator. Drain and measure oil. If more than 3 ounces is measured, replace the same amount of new oil as was drained. If less than 3 ounces is measured, add 3 ounces of new oil. Add and additional 2 ounces of new oil to compensate for that lost by replacing the accumulator (held in desiccant).

NOTE: If the exact oil charge is in doubt, drain and flush system. Add a new 6-ounce charge of refrigerant oil to the system.

## **HARRISON V5 5-CYLINDER DRAIN & REFILL**

1) If system is operable, run for several minutes to stabilize system before performing repairs. Turn off engine. Discharge system and remove compressor. See SERVICING PRECAUTIONS at the beginning of this article. Remove drain plug. Drain and measure oil.

2) If more than one ounce is drained, add same amount. If less than one ounce is drained, add 2 ounces of new refrigerant oil to compressor.

3) If A/C components are replaced, add refrigerant oil to system. Add one ounce if condenser is replaced. Add 3.5 ounces if accumulator is replaced.

4) When replacing a component which has caused a large refrigerant leak, add 3 ounces of new oil plus the required amount for the part being replaced. Add oil directly to part being replaced if possible. If oil can not be easily added to part, add oil to accumulator.

NOTE: If oil drained contains metal chips or other debris, replace receiver-drier. Flush out system before evacuating and recharging.

## **HITACHI 5-CYL DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at 1000-1500 engine RPM, and set controls at maximum cooling and high blowing speed for about 10 minutes to return oil to compressor.

2) Stop engine. Discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain oil from compressor through suction port. Measure amount of oil drained.

3) If amount drained is more than 2.4 ounces, fill with same amount using new oil. If amount drained is less than 2.4 ounces, fill with 2.4 ounces. Install compressor and recharge.

4) If A/C components are replaced, add refrigerant oil to system. Add 1.7 ounces if condenser is replaced. Add 2.4 ounces if evaporator is replaced. oil does not need to be added if receiver-drier is replaced.

## **HITACHI 6-CYL DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idling speed, with controls set for maximum cooling and high blower speed, for 10 minutes to return oil to compressor.

2) Stop engine, discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain oil from compressor suction port. Measure amount of oil drained. If amount drained was more than 2.4 ounces, refill with same amount of new oil. If amount drained was less than 2.4 ounces, refill with 2.4 ounces. Install compressor and recharge.

## **MATSUSHITA ROTARY VANE DRAIN & REFILL**

Discharge system. Remove compressor from vehicle. Drain oil from compressor through inlet and outlet holes. Refill compressor with 3.4-4.7 ounces of oil through suction port. When replacing evaporator, add 2 ounces. When replacing other A/C components, add 1.4 ounces per component replaced.

## **NIPPONDENSO ROTARY VANE DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at engine idle speed, and set controls at maximum cooling and high blowing speed for 20-30 minutes to return oil to compressor.

2) Stop engine. Discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain compressor oil through compressor intake and discharge ports. Measure amount drained. Oil may be hard to drain if compressor cool. Drain compressor while compressor is warm.

3) If amount drained is less than 2.4 ounces, conduct leak tests at system connections. If necessary, repair or replace faulty parts. Check purity of oil level and adjust oil level as follows.

4) If amount drained is more than 2.4 ounces, oil level is okay; fill with same amount drained using new oil. If amount drained is less than 2.4 ounces, pour 2.4 ounces of new refrigerant oil.

5) When replacing condenser, add one ounce. when replacing other A/C components, add .33 ounce per container replaced.

## **NIPPONDENSO 6 & 10-CYL DRAIN & REFILL**

When inspecting system for oil loss, look for signs of leaking (shiny, wet spots on components or underside of hood). If oil leak is noted or component replacement is required, use the following procedure as indicated:

### **NO OIL LEAK**

Discharge system and change components as necessary. See SERVICING PRECAUTIONS at the beginning of this article. Add refrigerant oil to components as necessary.

### **OIL LEAK**

1) Slowly discharge system. Repair or replace faulty components. If equipped with a drain plug, remove plug, drain and discard oil. If not equipped with a drain plug, remove compressor from vehicle and pour oil out suction and discharge ports.

2) Replace drain plug (if equipped). Add 1.5 ounces of new refrigerant oil through suction port. Use new gaskets or "O" rings when replacing suction and discharge lines.

### **COMPRESSOR FAILURE OR SYSTEM CONTAMINATED**

If either situation exists, discharge system and remove compressor, receiver-drier and expansion valve. Clean expansion valve screen. Flush entire system. Install new compressor and receiver-drier. New compressors contain correct amount of oil. If installing overhauled compressor, add 1.5 ounces of new refrigerant oil through suction port.

### **PANASONIC ROTARY VANE DRAIN & REFILL**

1) Before checking and adjusting oil level, operate compressor at 1000-1500 engine RPM, and set controls at maximum cooling and high blowing speed for about 10 minutes to return oil to compressor.

2) Stop engine. Discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Drain oil from compressor through suction and discharge ports. Measure amount of oil drained. If amount drained is more than 2.4 ounces, fill with same amount using new oil. If amount drained is less than 2.4 ounces, fill with 2.4 ounces. Install compressor and recharge.

3) If A/C components are replaced, add refrigerant oil to system. Add 1.4 ounces if condenser is replaced. Add 2 ounces if the evaporator is replaced. Oil does not need to be added if receiver-drier is replaced.

### **SANDEN SCROLL DRAIN & REFILL**

Discharge system. Remove compressor from vehicle. Drain oil from compressor through inlet and outlet holes. Refill compressor with 2.8 ounces of oil through suction port. When replacing condenser, add .5 ounce. When replacing evaporator, add 1.7 ounces. When replacing other A/C components, add .5 ounce per component replaced.

### **SANDEN 5-CYL DRAIN & REFILL**

1) Discharge system. Remove compressor belt and loosen

mounting bolts. Rotate compressor in brackets until filler plug is at top. Clean area around filler plug and remove plug slowly. Rotate front hub plate so notch in lobe is 110 degrees from the bottom. This rotates ball end of top piston to align with oil fill port and allows clearance for dipstick. See Fig. 1.

2) Insert compressor dipstick diagonally from right to left until stop on dipstick contacts filler plug surface. Remove dipstick and note oil fill level. Each increment on dipstick represents one ounce of oil. Add oil if necessary to reach 3-4 ounce level.

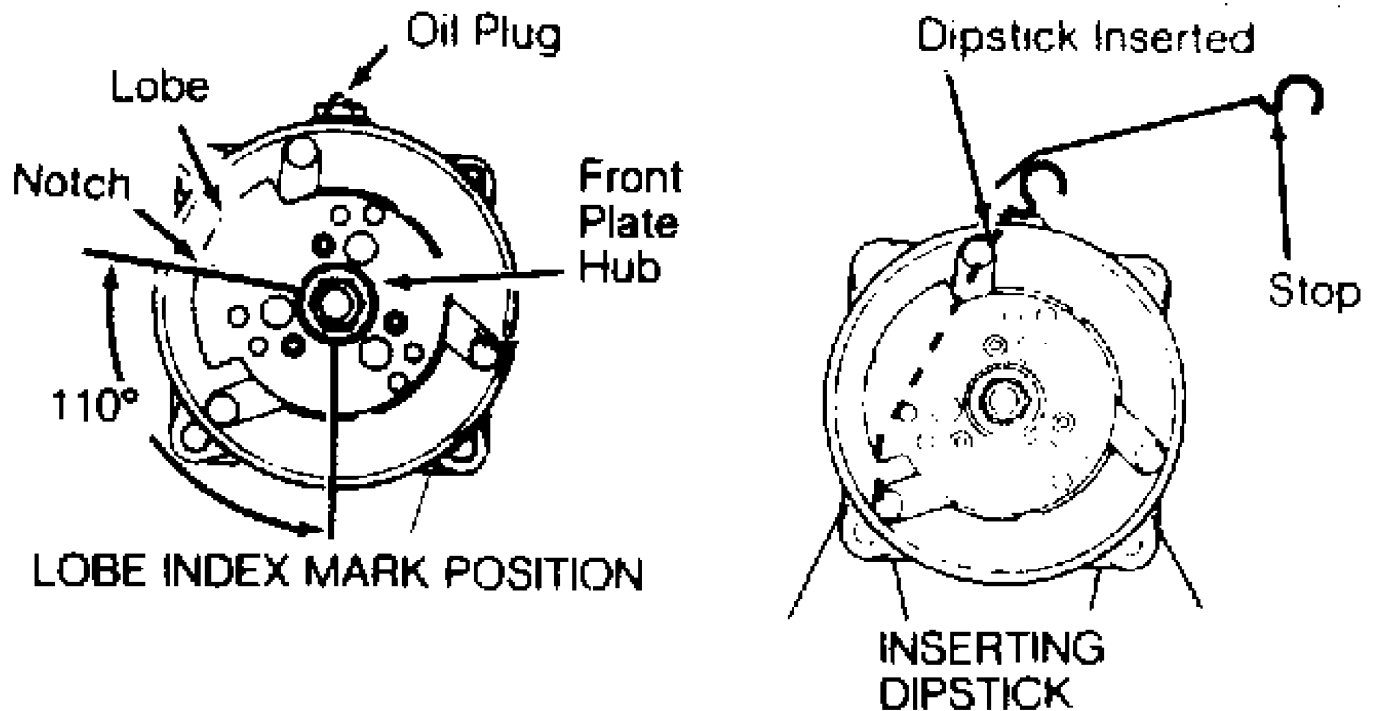


Fig. 1: Sanden 5-Cylinder Oil Level Checking  
Courtesy of Sanden International U.S.A, Inc.

### SANDEN 7-CYL DRAIN & REFILL

1) Before checking and adjusting oil level, operate compressor at engine idle speed, and set controls at maximum cooling and high blowing speed for 20-30 minutes to return oil to compressor.

2) Stop engine. Discharge refrigerant and remove compressor from vehicle. See SERVICING PRECAUTIONS at the beginning of this article. Remove oil drain plug and drain oil. Measure amount of oil drained. Install drain plug with new "O" ring.

3) If amount drained is more than 3 ounces, fill with same amount using new oil. If amount drained is less than 3 ounces, fill with 3 ounces. Install filler plug. Install compressor and recharge system.