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who, well, didn't do much this time, since Paul Lee provided the thing already scanned and compiled into a PDF! (Thanks!). Go visit his website: <http://www.iluvmyrx7.com/index.htm> Lots of RX-7 goodness there.

There are several ways to get around in the document. I have provided Bookmarks to all the sections, and thumbnails are also provided in the Thumbnails side bar.

I have also included a label for the spine of a binder, for those who wish to print out all the pages and keep a dead-tree edition handy.☺

The original document is © 1979 Toyo Kogyo Co., Ltd., and remains so. This version is provided as a service for owners of first generation Mazda RX-7s who are having a devil of a time locating the factory service manual for a reasonable price.

If you really want to send me money, email me and I'll tell you where to send it, but it's not necessary. Consider this payback for all the good advice and information gleaned from the various RX-7 email lists!

Subscribe to the Early Mazda Rotaries email list:

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See <http://www.dfw-rx7.com> for information on the DFW-RX7 email list.

09/16/03

COOLING SYSTEM

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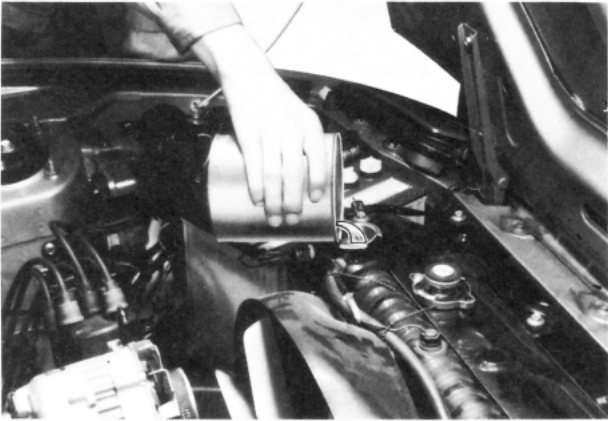


Fig. 3-1

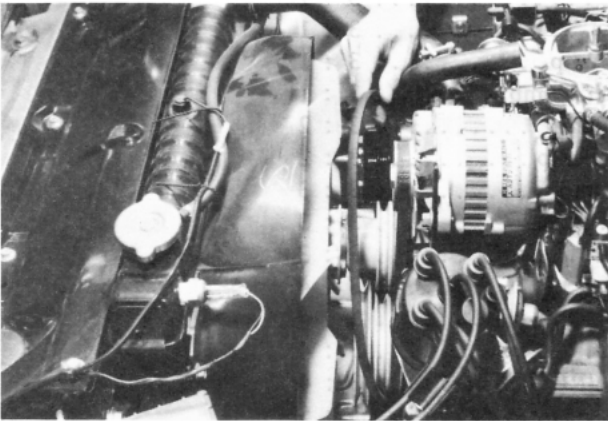


Fig. 3-2

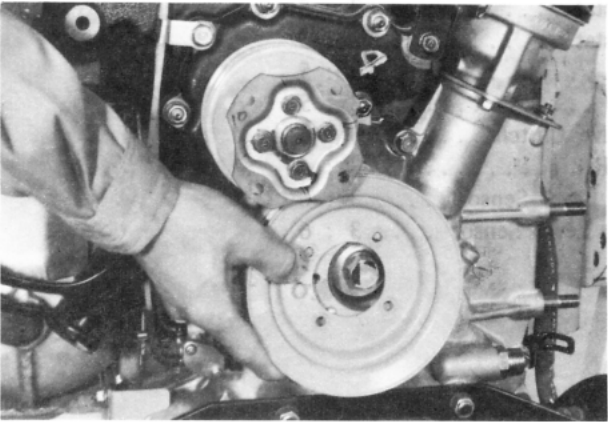


Fig. 3-3

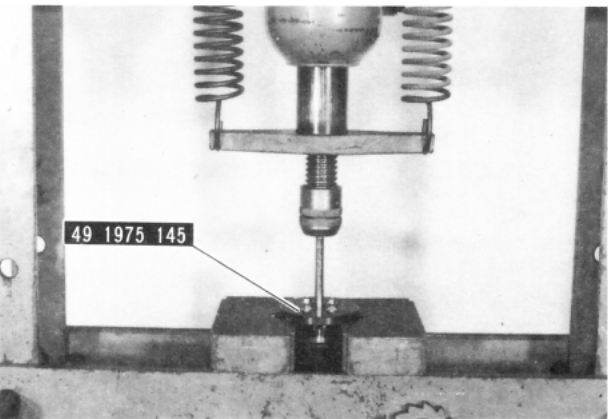


Fig. 3-4

3-A. ANTI-FREEZE SOLUTION

Use recommended mixture of 50% ethylene glycol anti-freeze solution for aluminum engine and 50% clean soft water (demineralized water).

For proper system protection in regions where the temperature goes below -29°C (-20°F), add the necessary amount of ethylene glycol base coolant recommended by the coolant manufacturer.

3-B. WATER PUMP

3-B-1. Removing Water Pump

1. Remove the air cleaner.
2. Disconnect the coupler from the water temperature switch.
3. Disengage the drive belt for air conditioning compressor (if equipped).
4. Remove the air pump and disengage the drive belt.
5. Remove the alternator and disengage the drive belt.
6. Remove the cooling fan and fan drive assembly.

7. Remove the pulley for air conditioning compressor.
8. Disconnect the radiator lower hose (drain the cooling system).
9. Disconnect the radiator upper hose.
10. Remove the water pump.

3-B-2. Disassembling Water Pump

1. Attach the adapter (49 1975 145) on to the pulley boss and tighten the four bolts firmly.
2. Support the water pump pulley adapter on the press. Press the water pump shaft slowly and remove the pulley boss.



Fig. 3-5

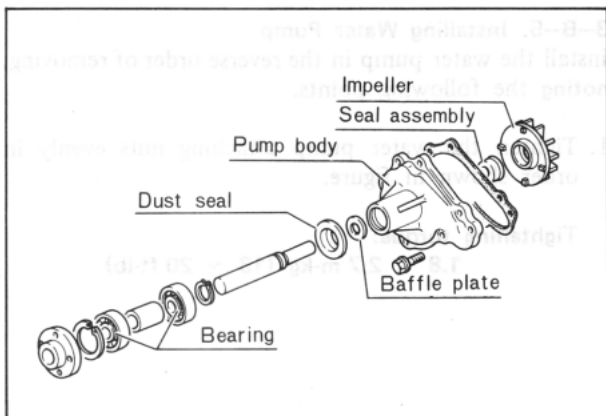


Fig. 3-6

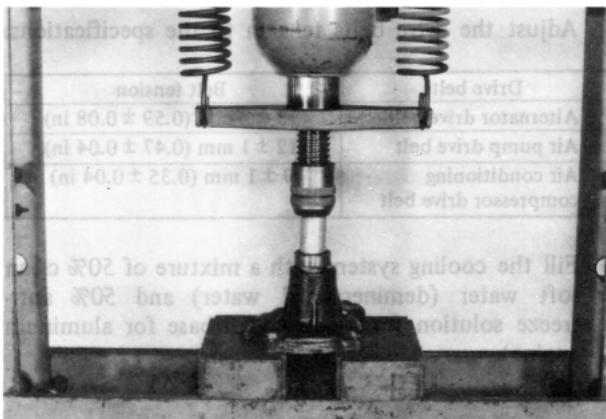


Fig. 3-7

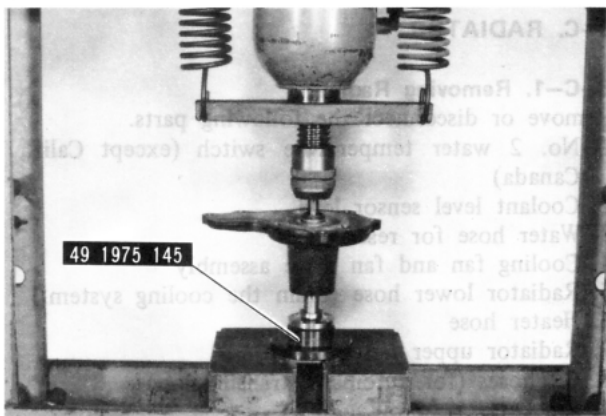


Fig. 3-8

3. Remove the snap ring.
4. Support the pump body and apply pressure to the rear end of the shaft to press the shaft, spacer and bearing assembly out through the front of the pump body.
5. Remove the impeller.
6. Remove the seal assembly from the pump body.
7. Remove the bearings and spacer from the shaft with a suitable puller.

3-B-3. Inspecting Water Pump

1. Inspect the bearing for roughness or excessive end play. Remove any rust or scale from the bearing shaft with an emery cloth.
2. Inspect the seat for seal on the impeller for pit marks or scoring. If the seat for the seal is scored or pitted, the impeller should be replaced.
3. Inspect the water pump body and the impeller for cracks and wear. Replace if defective.

3-B-4. Assembling Water Pump

1. Install the stop ring into the groove on the shaft.
2. Place the dust seal plate on the shaft.
3. Drive the baffle plate onto the taper of the shaft.
4. Press in the rear bearing, with the sealed side rearward, to the shaft until it contacts with stop ring.
5. Press in the shaft and bearing assembly to the pump body.
6. Place the spacer on the shaft and fill grease (lithium base NLGI No. 2).
7. Install the front bearing with sealed side forward until the snap ring can be installed.
8. Install the snap ring.
9. Press the water pump pulley adaptor (49 1975 145) and pulley boss onto the shaft until the water pump shaft contacts with the adaptor.

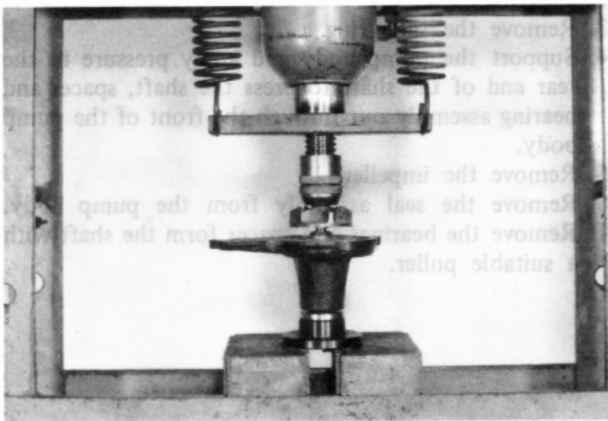


Fig. 3-9

10. Install the seal assembly into the body.
11. Press the impeller onto the shaft until it is flush with the end of the shaft.
Rotate the shaft by hand to see whether it rotates smoothly.

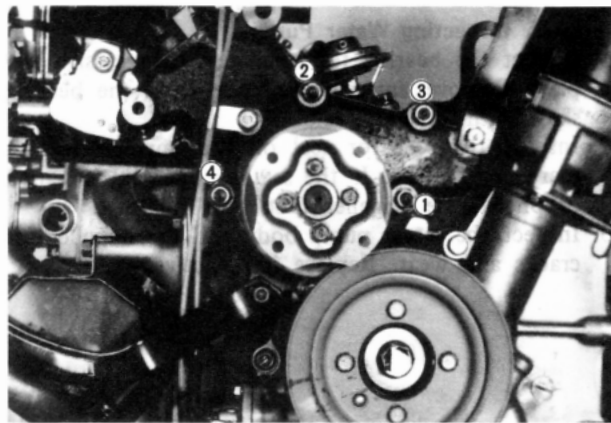


Fig. 3-10

3-B-5. Installing Water Pump

Install the water pump in the reverse order of removing, noting the following points.

1. Tighten the water pump attaching nuts evenly in order shown in figure.

Tightening torque:

1.8 ~ 2.7 m·kg (13 ~ 20 ft·lb)

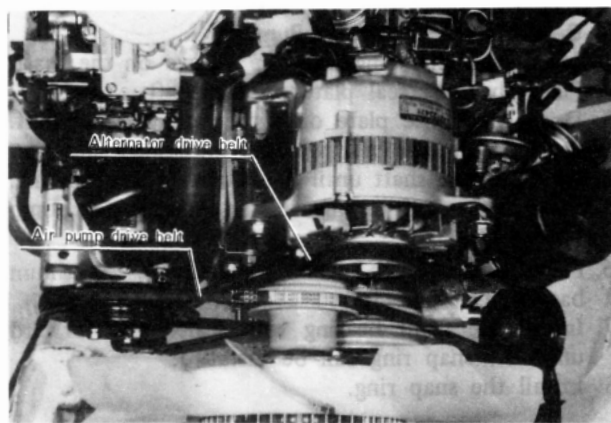


Fig. 3-11

2. Adjust the drive belts tension to the specifications.

Drive belts	Belt tension
Alternator drive belt	15 ± 2 mm (0.59 ± 0.08 in)
Air pump drive belt	12 ± 1 mm (0.47 ± 0.04 in)
Air conditioning compressor drive belt	9 ± 1 mm (0.35 ± 0.04 in)

3. Fill the cooling system with a mixture of 50% clean soft water (demineralized water) and 50% anti-freeze solution (ethylene glycol base for aluminum engine).

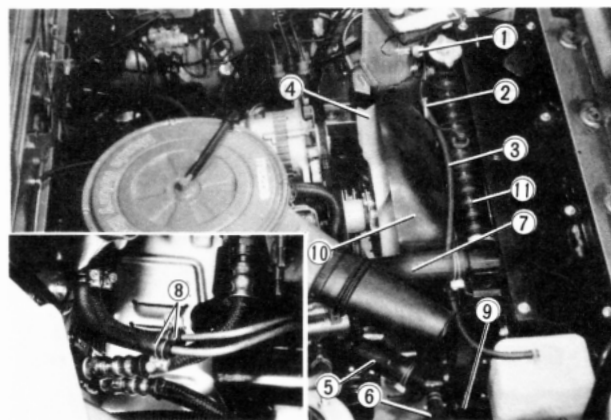


Fig. 3-12

3-C. RADIATOR

3-C-1. Removing Radiator

Remove or disconnect the following parts.

1. No. 2 water temperature switch (except Calif., Canada)
2. Coolant level sensor lead
3. Water hose for reservoir
4. Cooling fan and fan drive assembly
5. Radiator lower hose (drain the cooling system.)
6. Heater hose
7. Radiator upper hose
8. Oil hoses (for automatic transmission)
9. Brackets
10. Radiator shroud
11. Radiator

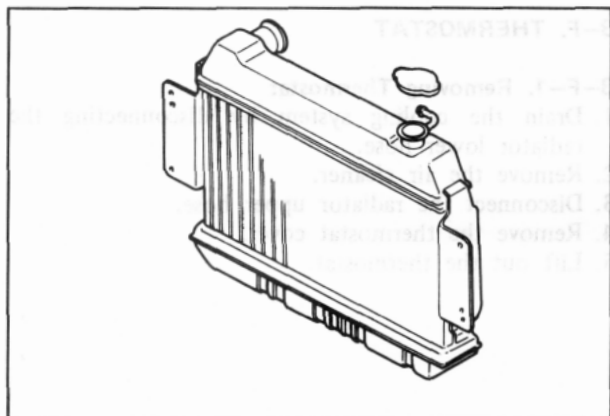


Fig. 3-13

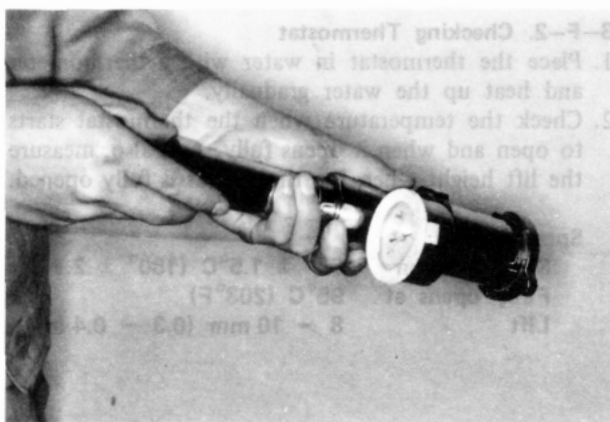


Fig. 3-14



Fig. 3-15

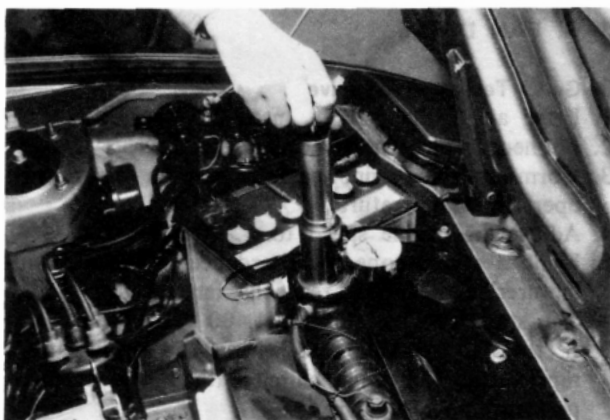


Fig. 3-16

3-C-2. Checking Radiator

1. Examine the radiator carefully for leaks. If any leakage should be discovered, however small it may be, repair completely by soldering, or replace.
2. Clean the exterior of the radiator core by blowing out with compressed air.
3. Check the pressure cap rubber gasket. Replace the pressure cap if the rubber gasket is damaged.

4. Check the pressure cap function. To check, first wet the cap rubber gasket to insure an air tight seal and then attach a tester to the cap. The pressure valve should open **within $0.9 \pm 0.15 \text{ kg/cm}^2$ ($13 \pm 2 \text{ lb/in}^2$)**.

3-C-3. Installing Radiator

Follow the removal procedures in the reverse order. Fill the cooling system with a mixture of 50% clean soft water (demineralized water) and 50% anti-freeze solution (ethylene glycol base for aluminum engine).

3-D. COOLANT RESERVOIR

Check the coolant reservoir for crack, damage and leakage.

To replace, proceed as follows:

1. Disconnect the water hose.
2. Remove the reservoir.
3. Install the reservoir in the reverse order of removing.

3-E. COOLING SYSTEM PRESSURE TEST

1. Remove the radiator cap. Refill the coolant full in the radiator if necessary.
2. Install the radiator cap tester to radiator.
3. Warm up the engine to the normal operating temperature.
4. Stop the engine. Pump up the system to **1.0 kg/cm^2 (14 lb/in^2)** and observe the gauge about one minute. If the pressure drops, visually inspect all hoses and fittings for an external leak.

Note:

To remove the radiator pressure cap when the coolant temperature is high or boiling, place a cloth on the pressure cap and turn counter-clockwise one step. Keep it in this position until all pressure is released. Then, turn the cap further until it can be removed.

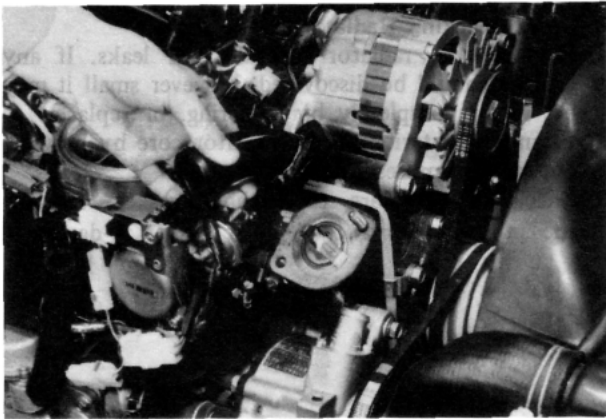


Fig. 3-17

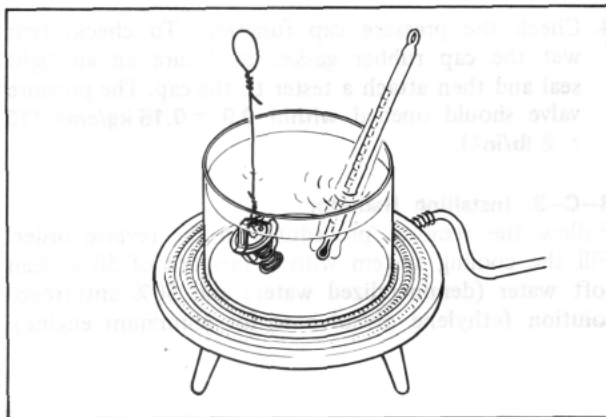


Fig. 3-18

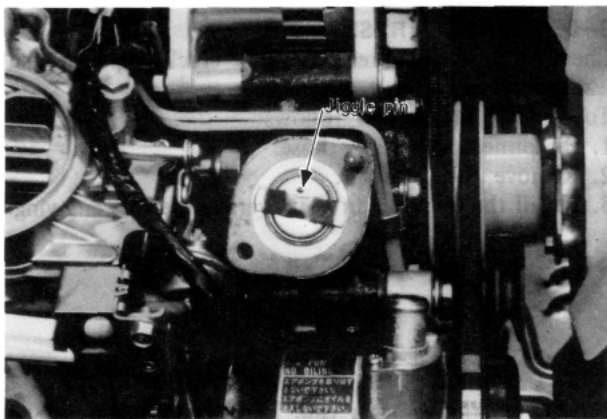


Fig. 3-19

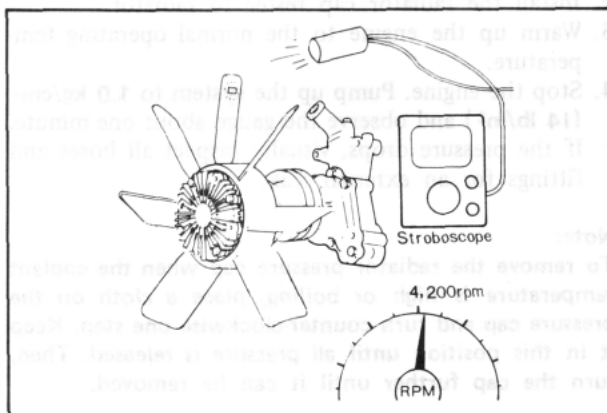


Fig. 3-20

3-F. THERMOSTAT

3-F-1. Removing Thermostat

1. Drain the cooling system by disconnecting the radiator lower hose.
2. Remove the air cleaner.
3. Disconnect the radiator upper hose.
4. Remove the thermostat cover.
5. Lift out the thermostat.

3-F-2. Checking Thermostat

1. Place the thermostat in water with a thermometer and heat up the water gradually.
2. Check the temperature when the thermostat starts to open and when it opens fully. And also, measure the lift height when the thermostat is fully opened.

Specifications:

Start to open	$82^{\circ} \pm 1.5^{\circ}\text{C}$ ($180^{\circ} \pm 2.7^{\circ}\text{F}$)
Fully opens at	95°C (203°F)
Lift	8 ~ 10 mm (0.3 ~ 0.4 in)

3-F-3. Installing Thermostat

Follow the removal procedures in the reverse order. Fill the cooling system with a mixture of 50% clean soft water (demineralized water) and 50% anti-freeze solution (ethylene glycol base for aluminum engine).

Note:

Install the thermostat in the case with the jiggle pin up.

3-G. FAN DRIVE

3-G-1. Testing Fan Drive

1. Using a suitable marker, mark the cooling fan.
2. Connect a tachometer to the engine.
3. Warm up the engine until it reaches the normal operating temperature.
4. Adjust the engine speed to **4,200 rpm**.
5. Using a stroboscope in accordance with the manufacturer's instruction, read the fan speed. The standard revolution is $1,400 \pm 200$ rpm. If the fan speed is not within the specification, replace the fan drive clutch with a new one and perform the test again.

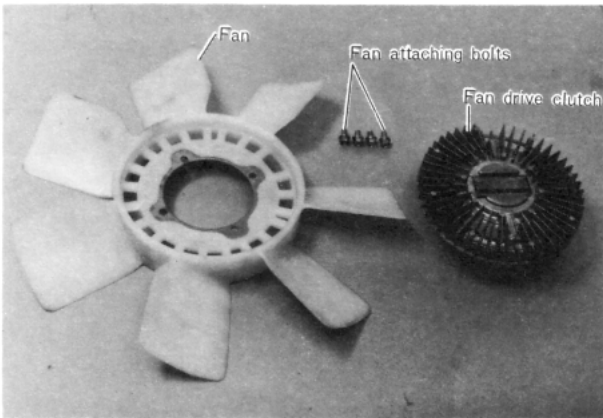


Fig. 3-21

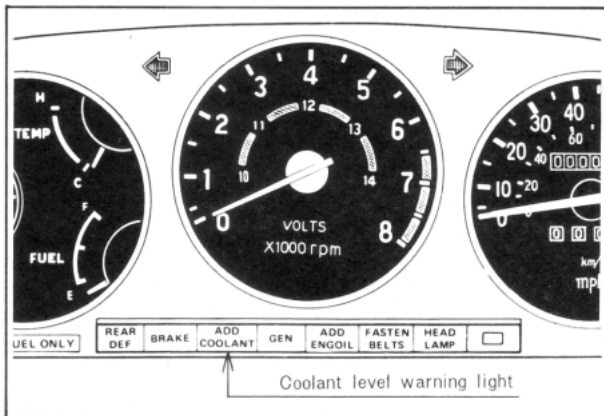


Fig. 3-22

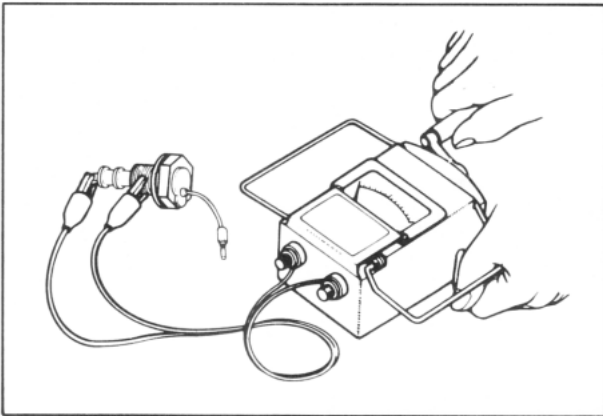


Fig. 3-23



Fig. 3-24

3-G-2. Replacing Fan Drive Clutch

1. Remove the fan and fan drive assembly.
2. Remove the fan attaching bolts and separate the fan from the fan drive.
3. Assemble the fan and fan drive, and install them in the reverse order of removing.

3-H. COOLANT LEVEL SENSOR

3-H-1. Checking Coolant Level Sensor

1. Turn the ignition switch on.
The coolant level warning light comes on.
2. Start the engine and the warning light should go off.
3. Disconnect the coupler from the level sensor and make sure the warning light comes on at idle.

4. Remove the radiator cap to relieve the pressure in the radiator and remove the coolant level sensor from the radiator.
5. Carefully check the sensor on cracks and any damage.
6. Check the sensor for open circuit with an ohmmeter.
7. Check the insulator resistance of the sensor. The insulation resistance is **more than 1MΩ at 500 MV**.

3-H-2. Replacing Coolant Level Sensor

1. Disconnect the coupler from the sensor.
2. Remove the radiator cap, and then the sensor.
3. Install the sensor in the reverse order of removing.

Tightening torque:

15 ~ 30 cm-kg (13 ~ 26 in-lb)

4. Warm up the engine to the normal operating temperature and check to see the coolant is not leaking from the joining face of the sensor.