

COOLING SYSTEM

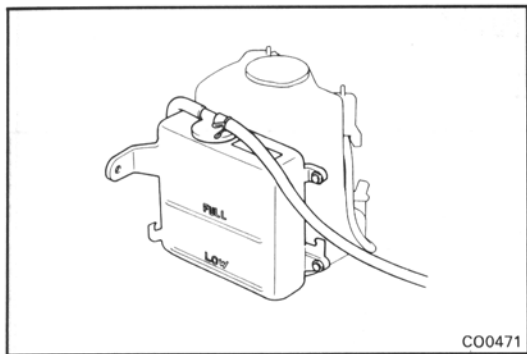
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CO

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Engine overheats	Check coolant	Replenish coolant	CO-3
	Alternator drive belt loose or missing	Adjust or replace belt	EM-35, 36
	Radiator plugged or cap faulty	Check radiator or cap	CO-7
	Radiator hose plugged or rotted	Replace hose	
	Dirt leaves, or insects on radiator	Clean radiator	CO-7
	Hoses, water pump, water outlet housing, radiator, heater, core plugs or head gasket leakage	Repair as necessary	CO-7
	Thermostat faulty	Check thermostat	CO-6
	Water pump faulty	Replace water pump	CO-4
	Electric cooling system faulty	Inspect electric cooling system	CO-13
	Injection timing retarded	Reset timing	EM-18
	Cylinder head or block, cracked or plugged	Repair as necessary	

NOTE: The thermostat on the 1N engine is equipped with a by-pass valve. Therefore, if the engine tends to overheat, removal of the thermostat would have an adverse effect, by causing a lower cooling efficiency.

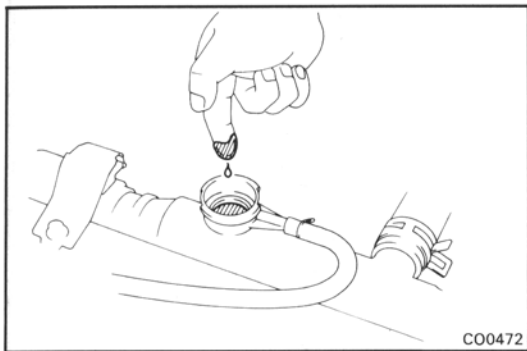


CHECK AND REPLACEMENT OF ENGINE COOLANT

1. CHECK ENGINE COOLANT LEVEL AT RESERVE TANK

The coolant level should be between the "LOW" and "FULL" lines.

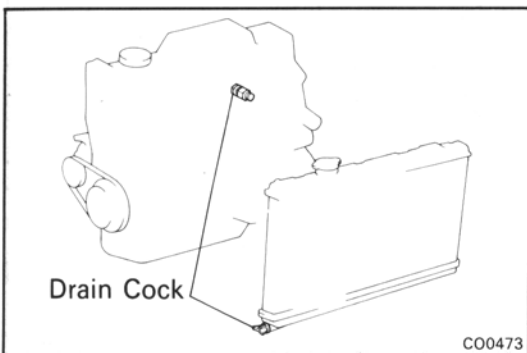
If low, check for leaks and add coolant up to the "FULL" line.



2. CHECK ENGINE COOLANT QUALITY

There should be no excessive deposits of rust or scales around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.



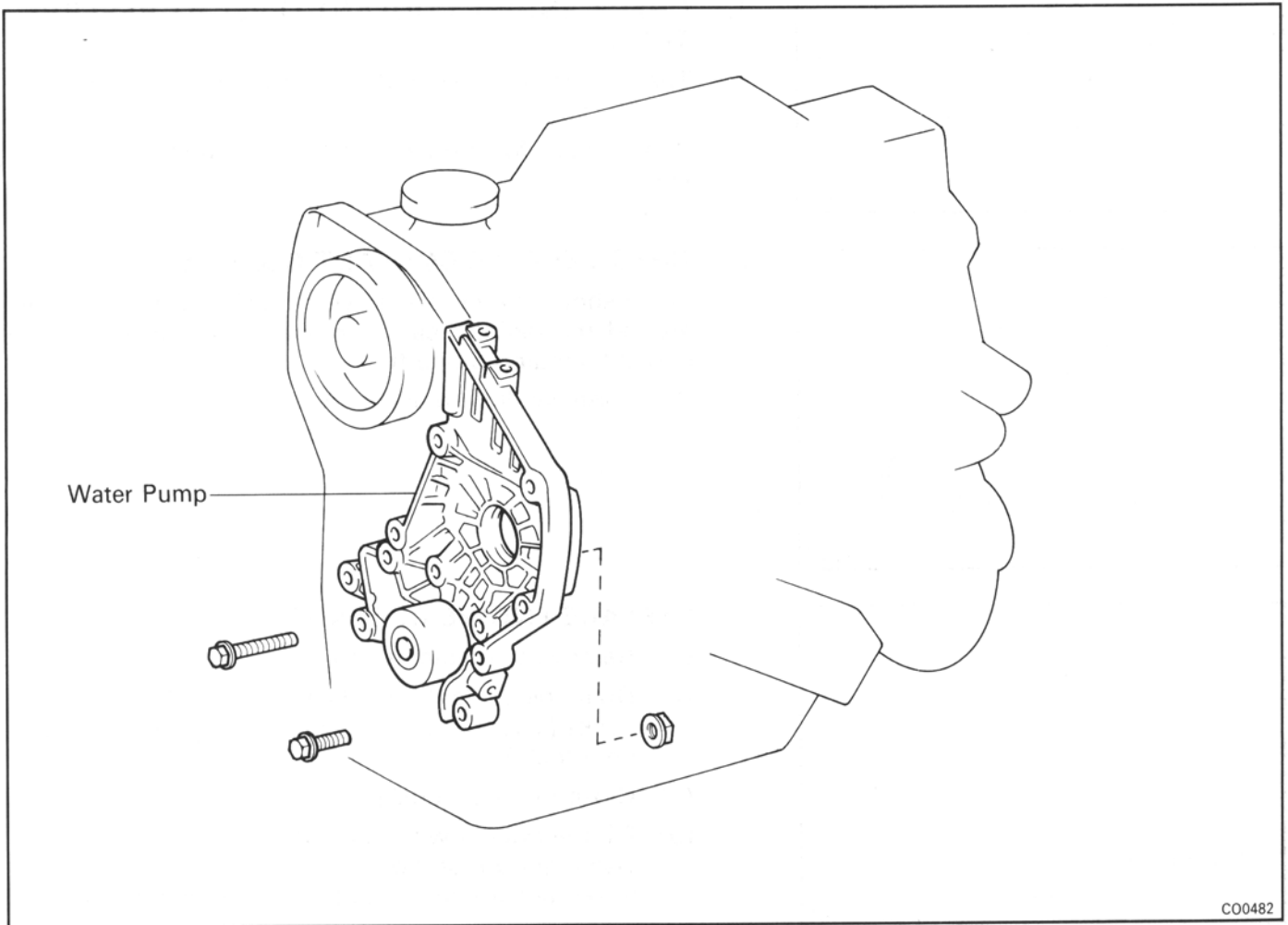
3. REPLACE ENGINE COOLANT

- (a) Remove the radiator cap.
- (b) Drain the coolant from the radiator and engine drain cocks. (The engine drain cock is at right rear of cylinder block.)
- (c) Close the drain cocks.
- (d) Fill the system with coolant.
Use a good brand of ethylene-glycol base coolant, mixed according to the manufacturer's directions.

Coolant capacity (w/ Heater):
5.7 liters (6.0 US qts, 5.0 Imp.qts)

- (e) Install the radiator cap.
- (f) Start the engine and check for leaks.
- (g) Recheck the coolant level and refill as necessary.

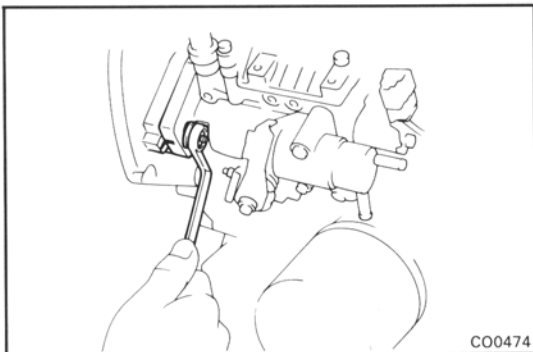
WATER PUMP COMPONENTS

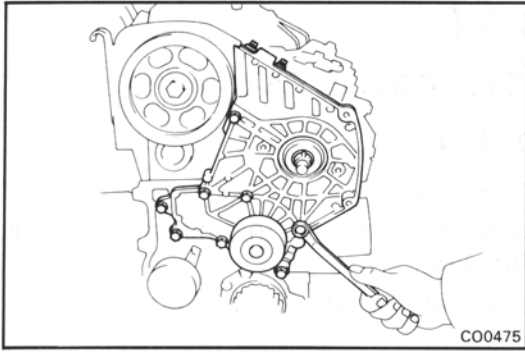


REMOVAL OF WATER PUMP

1. REMOVE TIMING BELT
(See steps 1 to 8 on pages EM-25 to 27)
2. REMOVE INJECTION PUMP PULLEY
(See step 10 on page EM-27)

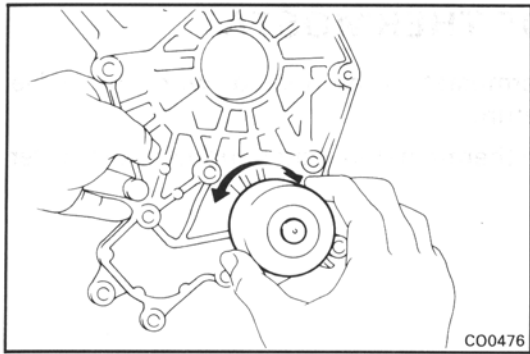
3. REMOVE INJECTION PUMP SET NUTS





4. REMOVE WATER PUMP

- (a) Remove the eight bolts.
- (b) Using a plastic-faced hammer, lightly tap the water pump and remove the water pump.

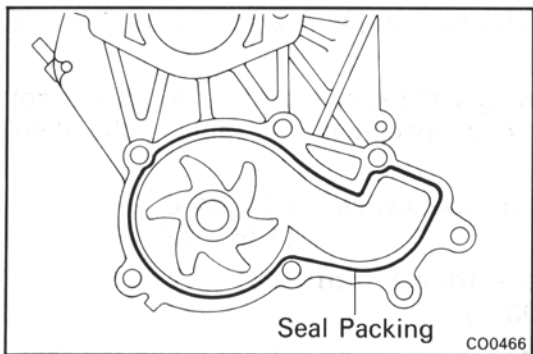


INSPECTION OF WATER PUMP

INSPECT WATER PUMP BEARING

Check that the water pump bearing operation is not rough or noisy.

If necessary, replace the water pump



INSTALLATION OF WATER PUMP

(See page CO-4)

1. INSTALL WATER PUMP

- (a) Apply seal packing to the water pump.

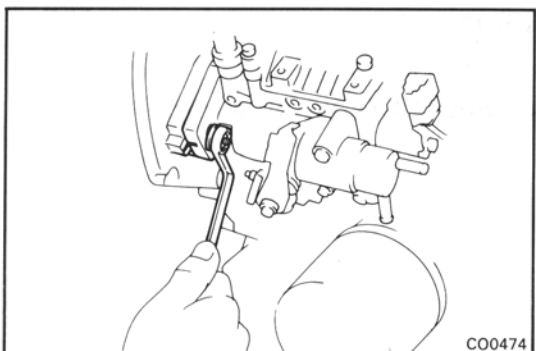
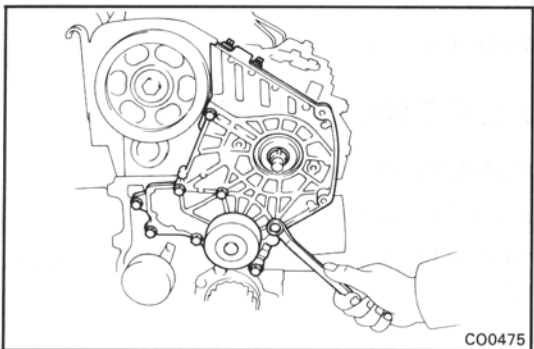
Seal packing: Part No.08826-00100 or equivalent

NOTE: Cleaning and application of seal packing to the installation surface. However, use a nozzle cut to 2 mm (0.08 in.).

(See page LU-10)

- (b) Install the water pump with the eight bolts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)



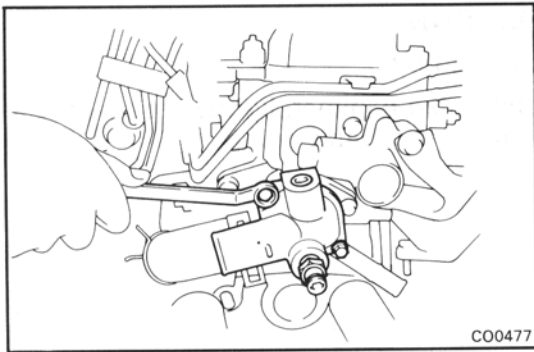
2. INSTALL INJECTION PUMP SET NUTS

3. INSTALL INJECTION PUMP PULLEY

(See step 3 on page EM-31)

4. INSTALL TIMING BELT

(See steps 5 to 14 on pages EM-32 to 36)



THERMOSTAT

REMOVAL OF THERMOSTAT

REMOVE THERMOSTAT

- (a) Remove the two nuts.
- (b) Remove the water inlet and thermostat from the water inlet housing.
- (c) Remove the gasket from the thermostat.

INSPECTION OF THERMOSTAT

NOTE: The thermostat is numbered with the valve opening temperature.

- (a) Immerse the thermostat in water and heat the water gradually.

- (b) Check the valve opening temperature and the valve lift.

If the valve opening temperature and valve lift are not within the following specifications, replace the thermostat.

Valve opening temperature: 80 – 84°C
(176 – 183°F)

Valve lift: More than 8 mm (0.31 in.) at 95°C
(203°F)

- (c) Check that the valve spring is tight when the thermostat is fully closed.

If not closed, replace the thermostat.

INSTALLATION OF THERMOSTAT

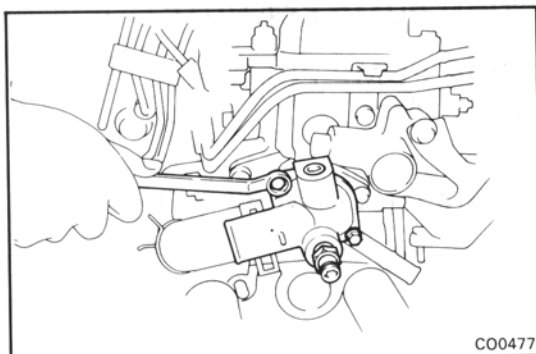
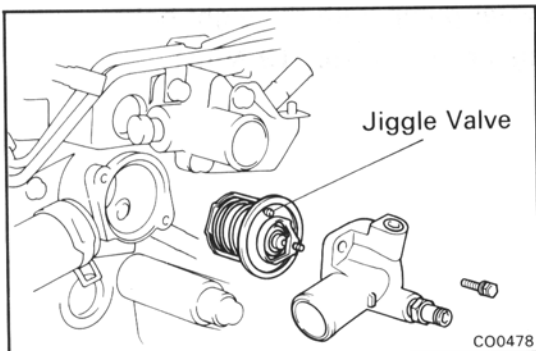
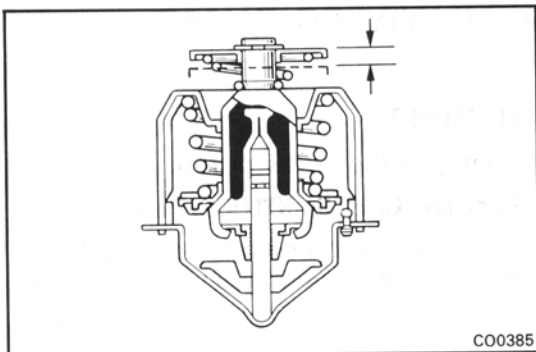
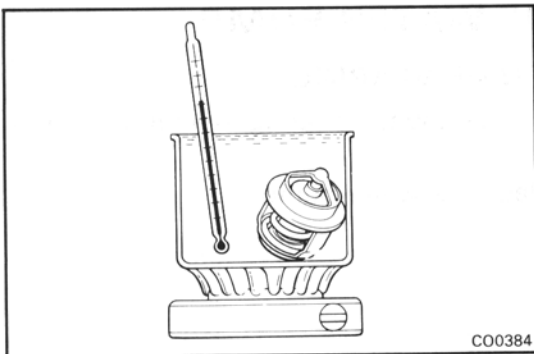
1. PLACE THERMOSTAT IN WATER INLET

- (a) Install a new gasket to the thermostat.
- (b) Install the thermostat and water inlet with the jiggle valve upward.

2. INSTALL WATER INLET

Install and torque the two nuts.

Torque: 195 kg-cm (14 ft-lb, 19 N·m)

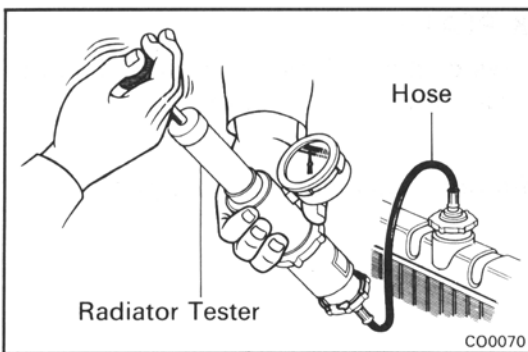
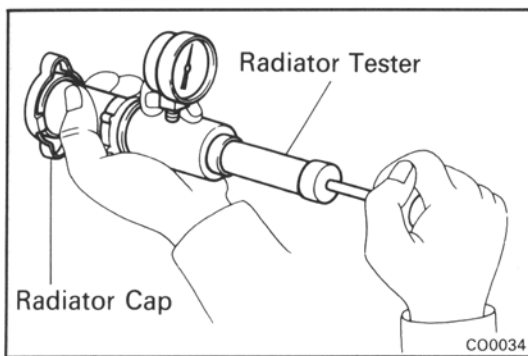


RADIATOR

CLEANING OF RADIATOR

Using water or steam cleaner, remove any mud or dirt from the radiator core.

CAUTION: If using high pressure type cleaner, be careful not to deform the fins of the radiator core. For example, keep a distance of more than 40 – 50 cm (15.75 – 19.69 in.) between the radiator core and cleaner nozzle when the cleaner nozzle pressure is 30 – 35 kg/cm² (427 – 498 psi, 2,942 – 3,432 kPa).



INSPECTION OF RADIATOR

1. CHECK RADIATOR CAP

Using a radiator tester, pump the tester until the relief valve opens.

Check that the valve opens between 0.75 kg/cm² (10.7 psi, 74 kPa) and 1.05 kg/cm² (14.9 psi, 103 kPa).

Check that the pressure does not drop rapidly when the pressure on the cap is below 0.6 kg/cm² (8.5 psi, 59 kPa).

If either check is not within limits, replace the cap.

2. CHECK COOLING SYSTEM FOR LEAKS

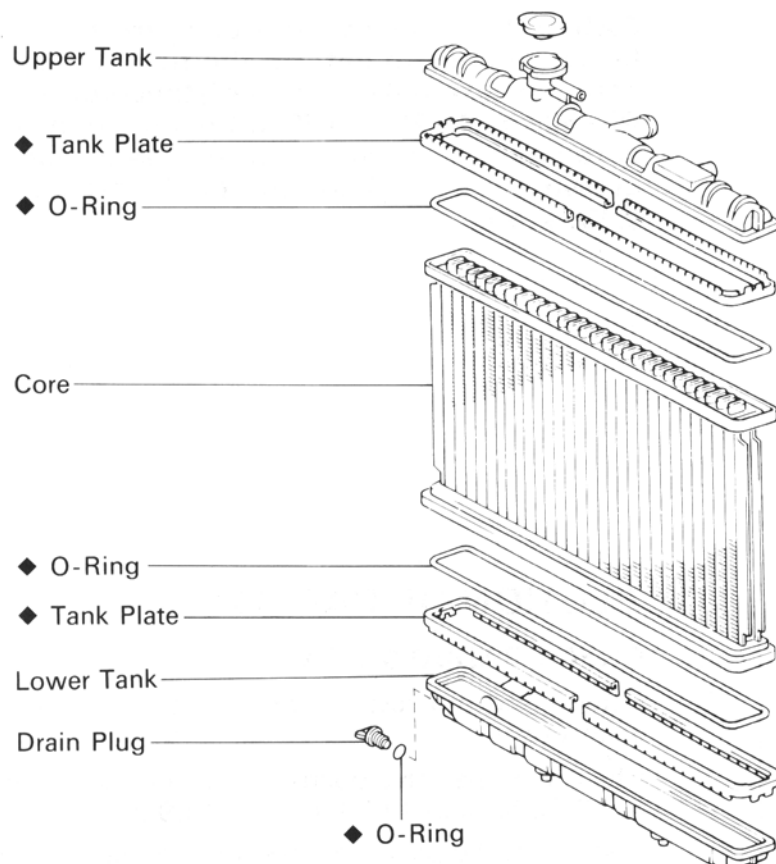
(a) Fill the radiator with coolant and attach a pressure tester.

(b) Warm up the engine.

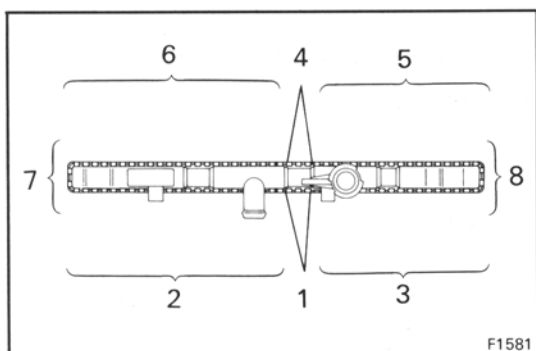
(c) Pump it 1.2 kg/cm² (17.1 psi, 118 kPa), check that pressure does not drop.

If the pressure drops, check for leaks from the hoses, radiator or water pump. If no external leaks are found, check the heater core, block and head.

DISASSEMBLY OF RADIATOR COMPONENTS



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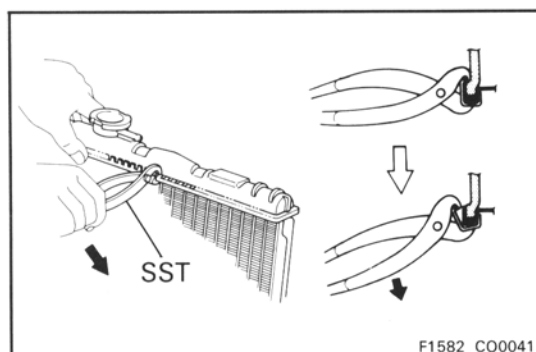


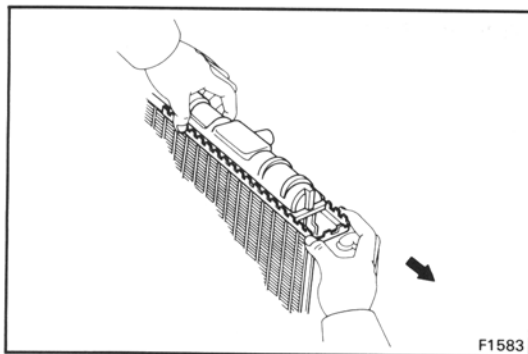
1. REMOVE TANK PLATE

- (a) Raise the claws of the tank plates with SST in the numerical order shown in the figure.

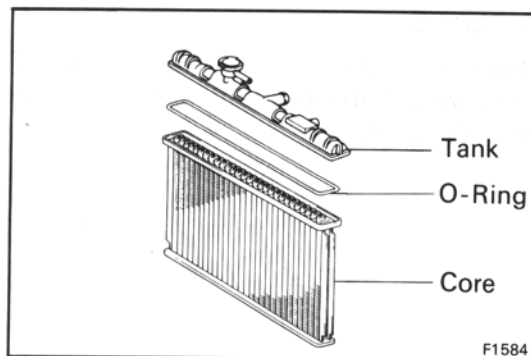
SST 09230-00010

NOTE: Be careful not to damage the core plate.





(b) Pull the tank plates outward.



2. REMOVE TANK AND O-RING

- (a) Pull the tank upward.
- (b) Remove the O-ring.

ASSEMBLY OF RADIATOR

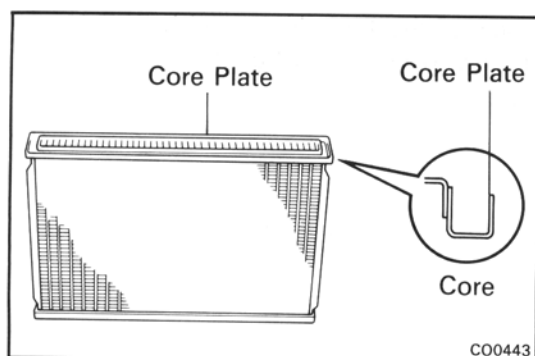
(See page CO-8)

1. INSPECT CORE PLATE

Inspect the core plate for damage.

NOTE:

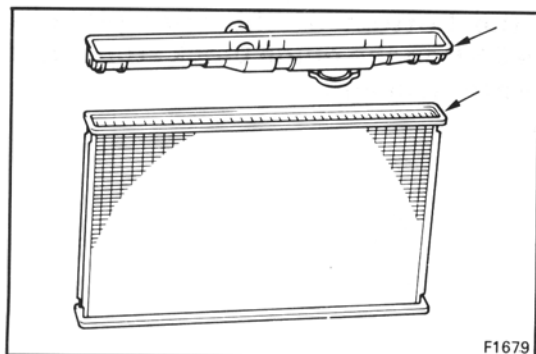
- If the sides of the core plate groove are deformed, reassembly of the tank will be impossible. Therefore, first correct any deformation with pliers or like object.
- Water leakage will result if the bottom of the core plate groove is damaged or dented. Therefore, repair or replace if necessary.

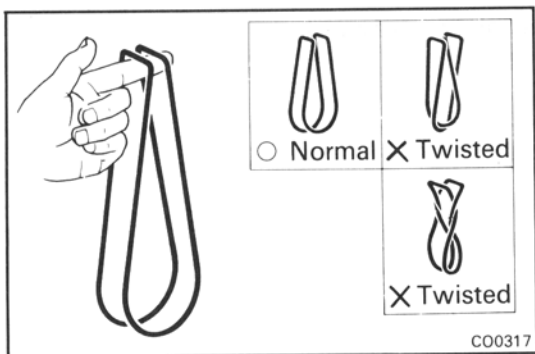


2. INSTALL NEW O-RING AND TANK

NOTE:

- Clean the tank and core plate.

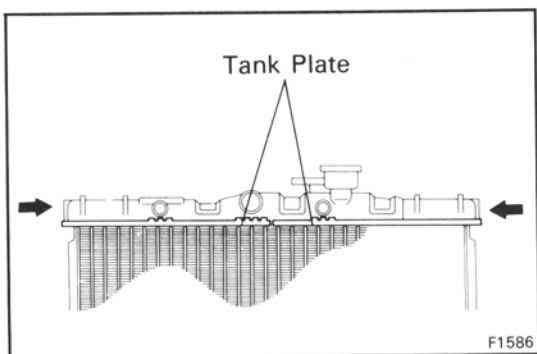




- Inspect the O-ring for twists.

3. INSTALL TANK PLATE

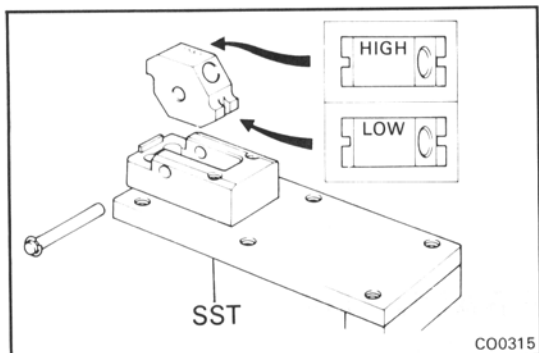
Install the tank plates from both ends in the direction of the arrows. Insert to where the portions shown by the arrows contact with the tank.



4. STAKE CLAW OF TANK PLATE

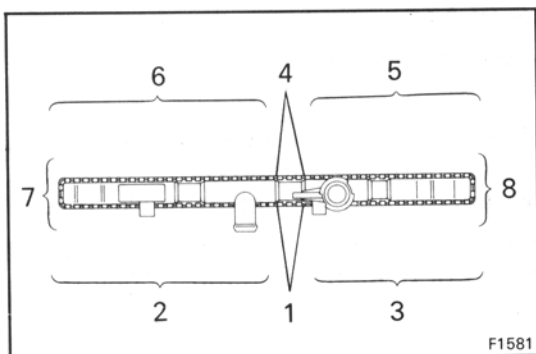
(a) Set the punch of SST to "LOW".

SST 09230-00010



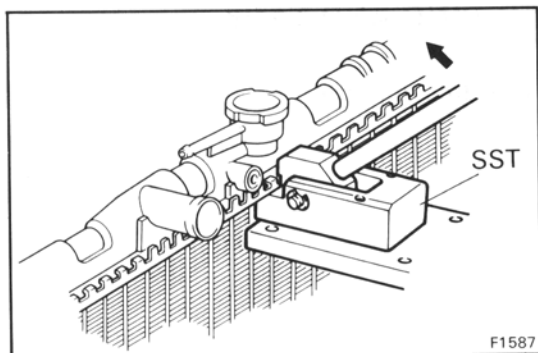
(b) Stake the claws of the tank plates with SST in the numerical order shown in the figure.

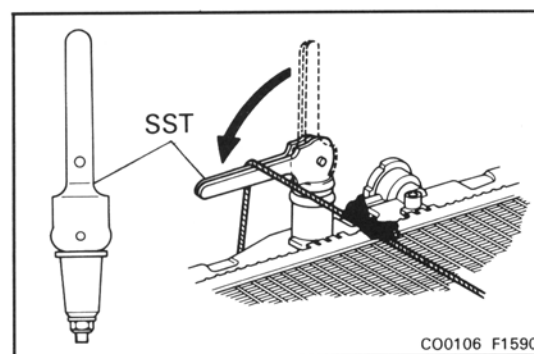
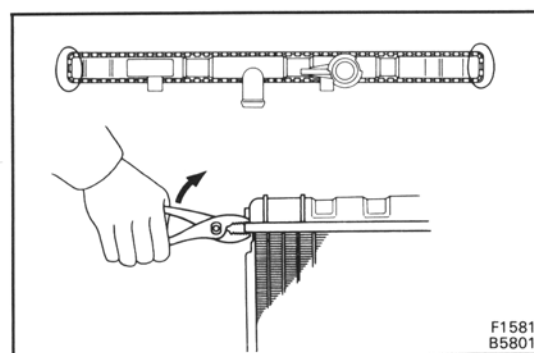
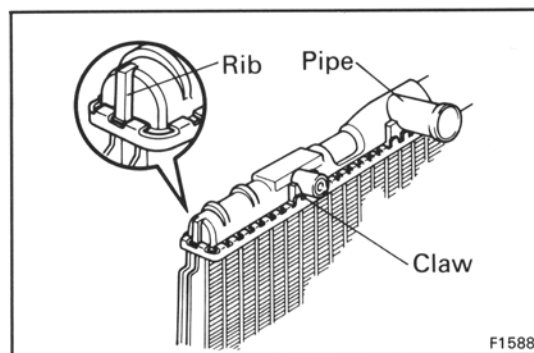
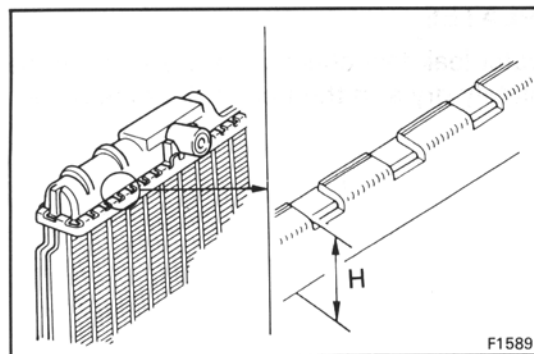
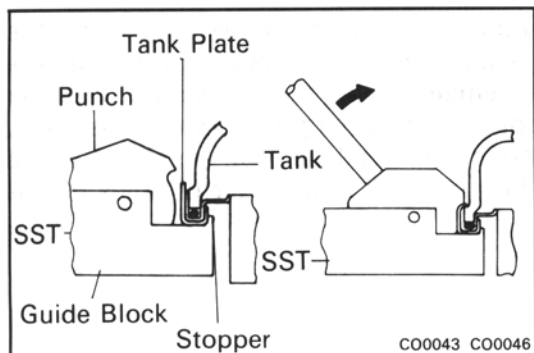
SST 09230-00010



CAUTION: If the bottom of the core plate is staked with the SST on the guide block stopper, it may result in water leakage.

SST 09230-00010



**NOTE:**

- Stake with just enough pressure to leave a mark on the claw. The staked plate height (H) should be as follows:

Plate height: 9.18 – 9.53 mm (0.3614 – 0.3752 in.)

- Do not stake the areas protruding around the pipes, brackets or tank ribs.

- The points shown in the illustration cannot be staked with the SST. Use a pliers or like object and be careful not to damage the core plates.

5. INSPECT FOR WATER LEAKS

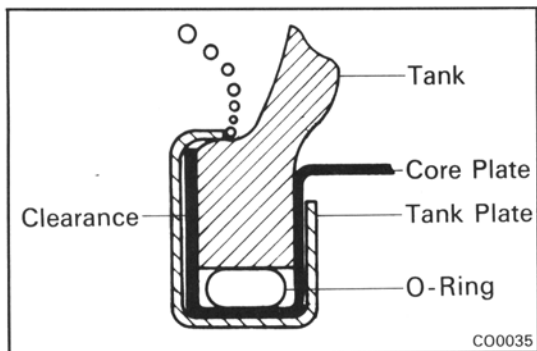
- Tighten the drain plug.
- Plug the inlet and outlet pipes of the radiator with SST.

SST 09230-00010

- Using a radiator tester, apply pressure to the radiator.

Test pressure: 1.8 kg/cm² (26 psi, 177 kPa)

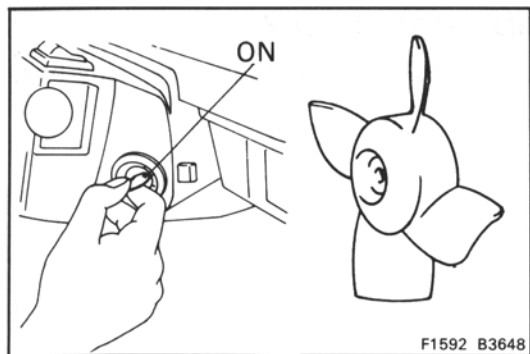
- Inspect for water leaks.



NOTE: On radiator with resin tanks, there is a clearance between the core plate and tank plate where a minute amount of air will remain, giving the appearance of an air leak when the radiator is submerged in water. Therefore, before performing the water leak test, first switch the radiator around in the water until all air bubbles disappear.

6. PAINT TANK PLATES

NOTE: If the water leak test checks out okay, allow the radiator to completely dry and then paint the tank plates.



ELECTRIC COOLING FAN

ON-VEHICLE INSPECTION

Low Coolant Temperature (below 83°C (181°F))

1. TURN IGNITION SWITCH ON

Check that the fan is stopped.

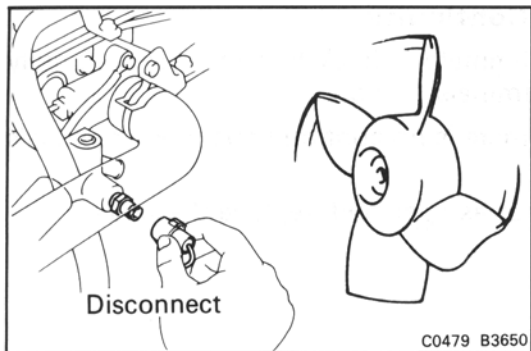
If it does not, check the fan relay and temp. switch, and check for a separated connector or severed wire between the relay and temp. switch.

2. DISCONNECT TEMP. SWITCH CONNECTOR

Check that the fan rotates.

If it doesn't, check the fan relay, fan motor, engine main relay and fuse, and check for a short circuit between the fan relay and temp. switch.

3. CONNECT TEMP. SWITCH CONNECTOR



High Coolant Temperature (above 93°C (199°F))

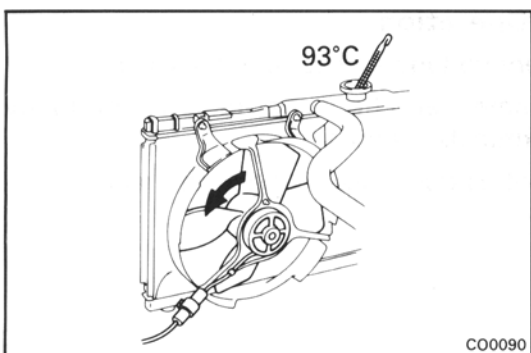
4. START ENGINE

(a) Raise engine coolant temperature to above 93°C (199°F).

(b) Check that the fan rotates.

(c) Check that the fan stops when coolant temperature is below 83°C (181°F).

If it doesn't replace the temp. switch.



INSPECTION

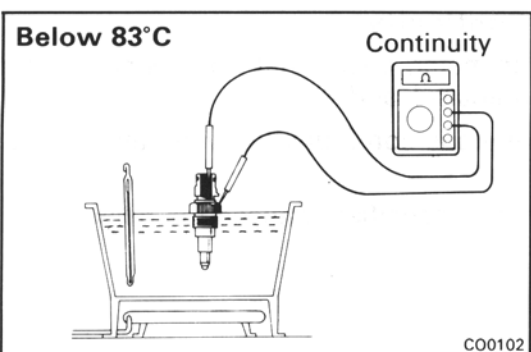
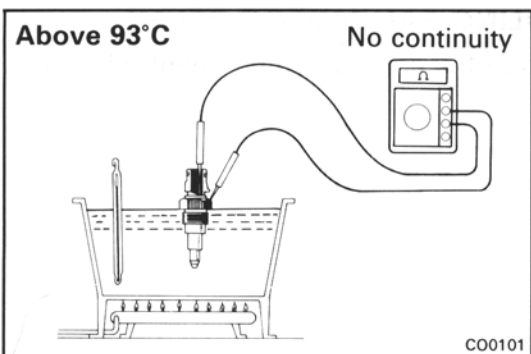
1. INSPECT TEMP. SWITCH

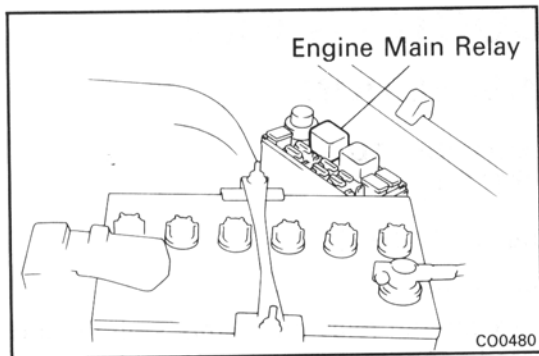
NOTE: Located on the water inlet housing.

(a) Using an ohmmeter, check that there is no continuity when the coolant temperature is above 93°C (199°F).

(b) Check that there is continuity when the coolant temperature is below 83°C (181°F).

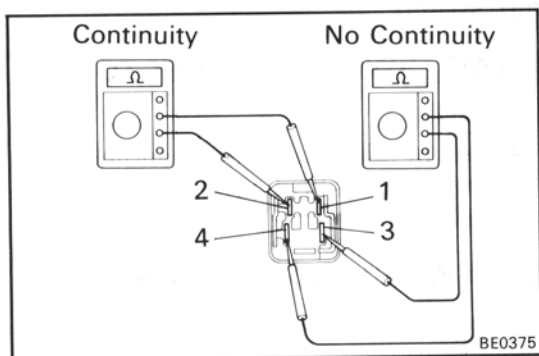
If continuity is not as specified, replace the temp. switch.





2. INSPECT ENGINE MAIN RELAY

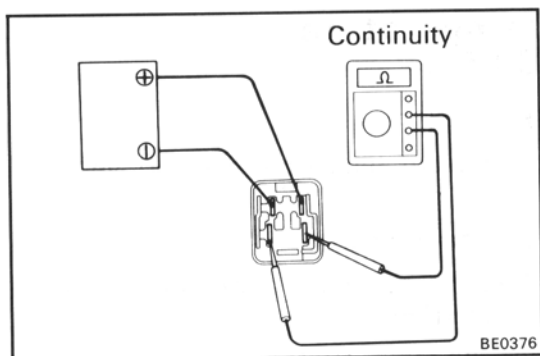
NOTE: Located in the engine compartment relay box.



Inspect Relay Continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is no continuity between terminals 3 and 4.

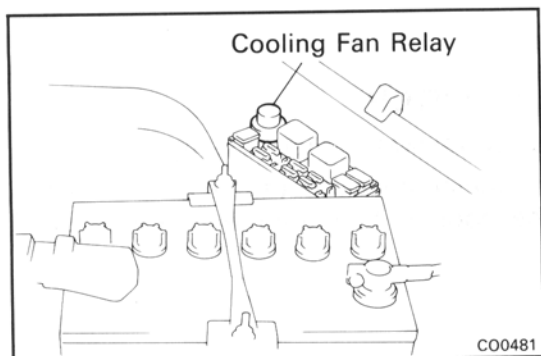
If continuity is not as specified, replace the relay.



Inspect Relay Operation

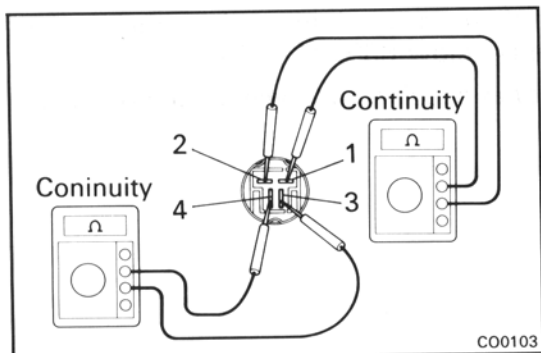
- Apply battery voltage across terminals 1 and 2.
- Using an ohmmeter, check that there is continuity between terminals 3 and 4.

If operation is not as described, replace the relay.



3. INSPECT COOLING FAN MOTOR RELAY

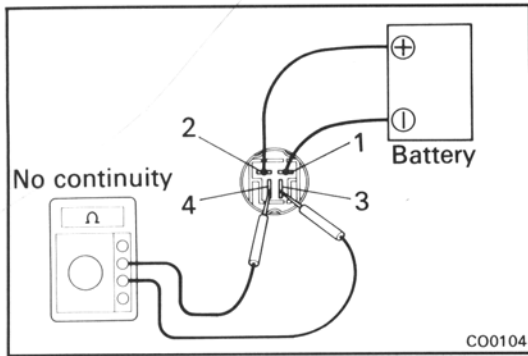
NOTE: Located in the engine compartment relay box.



Inspect Relay Continuity

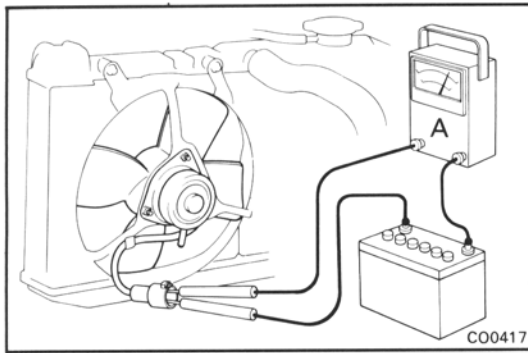
- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.

**Inspect Relay Operation**

- (a) Apply battery voltage across terminals 1 and 2.
- (b) Check that there is no continuity between terminals 3 and 4.

If operation is not as described, replace the relay.

**4. INSPECT FAN MOTOR**

- (a) Connect battery voltage to the fan motor connector.
- (b) Check to see that the motor rotates smoothly and current is as follows:

Current: 6.8 – 7.4 A