

COOLANT

INSPECTION

CO05R-01

1. CHECK ENGINE COOLANT LEVEL AT RESERVOIR TANK

The engine coolant level should be between the "LOW" and "FULL" lines, when the engine is cold. If low, check for leaks and add "TOYOTA Long Life Coolant" or equivalent up to the "FULL" line.

2. CHECK ENGINE COOLANT QUALITY

- (a) Remove the radiator cap from the water outlet.

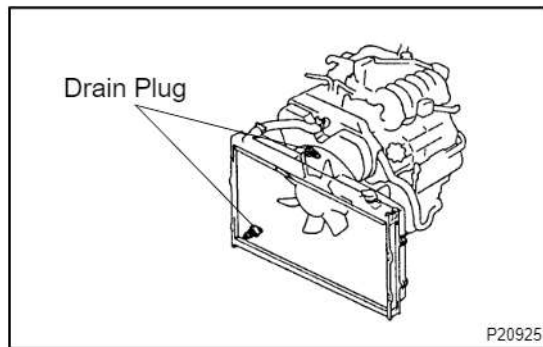
CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

- (b) There should not be any excessive deposits of rust or scale around the radiator cap or radiator filler hole, and the coolant should be free from oil.

If they are excessively dirty, clean the coolant passages and replace the coolant.

- (c) Reinstall the radiator cap.



REPLACEMENT

1. DRAIN ENGINE COOLANT

- (a) Remove the radiator cap.

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

- (b) Loosen the drain plugs, and drain the engine coolant.
(c) Close the drain plugs.

2. FILL ENGINE COOLANT

- (a) Slowly fill the system with engine coolant.
- Use of improper coolants may damage engine cooling system.
 - Use "TOYOTA Long Life Coolant" or equivalent and mix it with plain water according to the manufacturer's directions.
 - Use of the coolant which includes more than 50% (freezing protection down to -35°C (-31°F)) or 60% (freezing protection down to -50°C (-58°F)) of ethylene-glycol is recommended, but not more than 70%

NOTICE:

- Do not use an alcohol type engine coolant.
- The engine coolant should be mixed with demineralized water or distilled water.

Capacity:

w/ Rear heater: 9.0 liters (9.5 US qts, 7.9 Imp. qts)

w/o Rear heater: 8.0 liters (8.5 US qts, 7.0 Imp. qts)

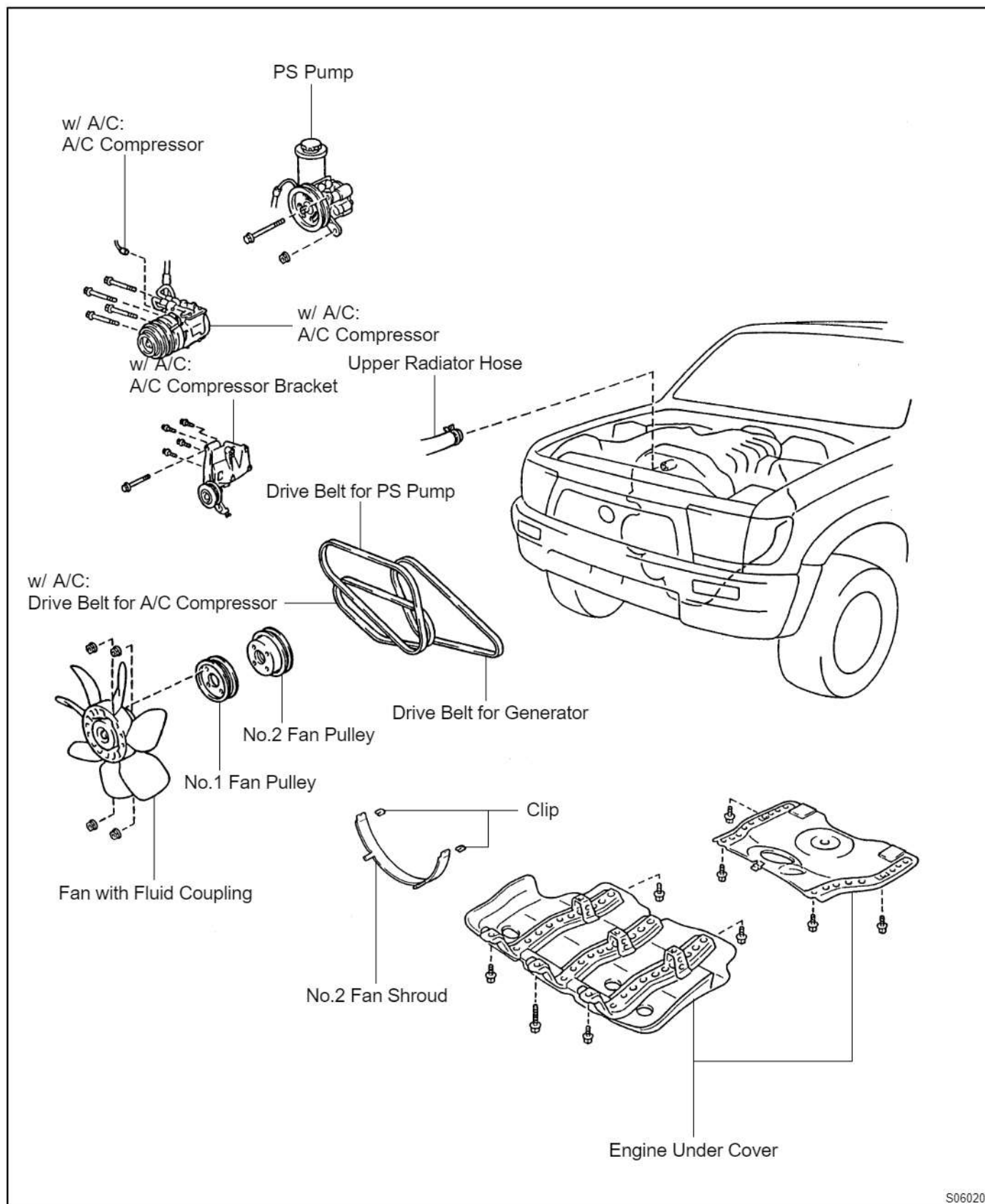
- (b) Reinstall the radiator cap.
(c) Start the engine, and bleed the cooling system.
(d) If necessary, refill engine coolant into the reservoir tank until it is "FULL" line.

3. CHECK ENGINE COOLANT FOR LEAKS

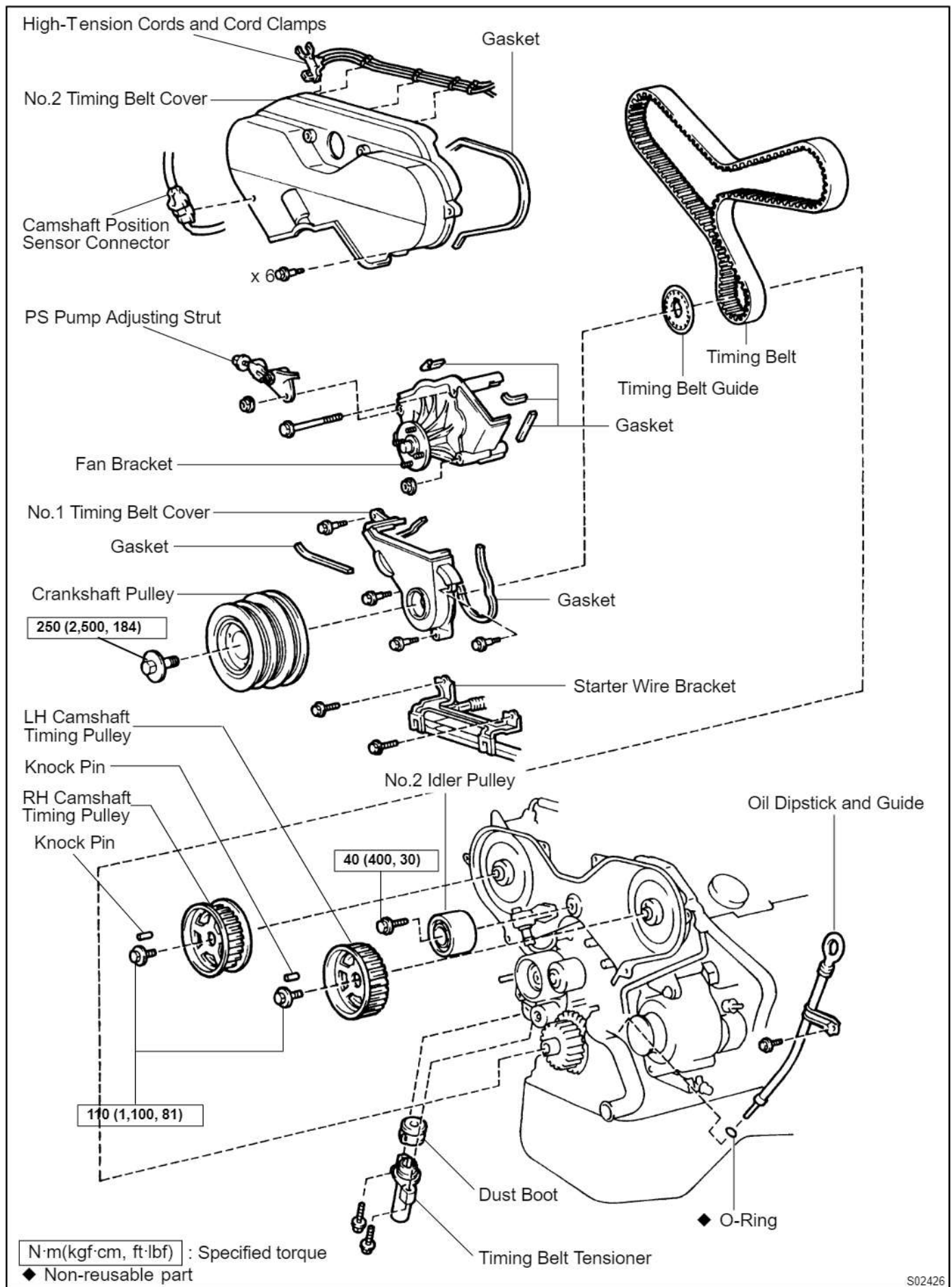
4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

WATER PUMP COMPONENTS

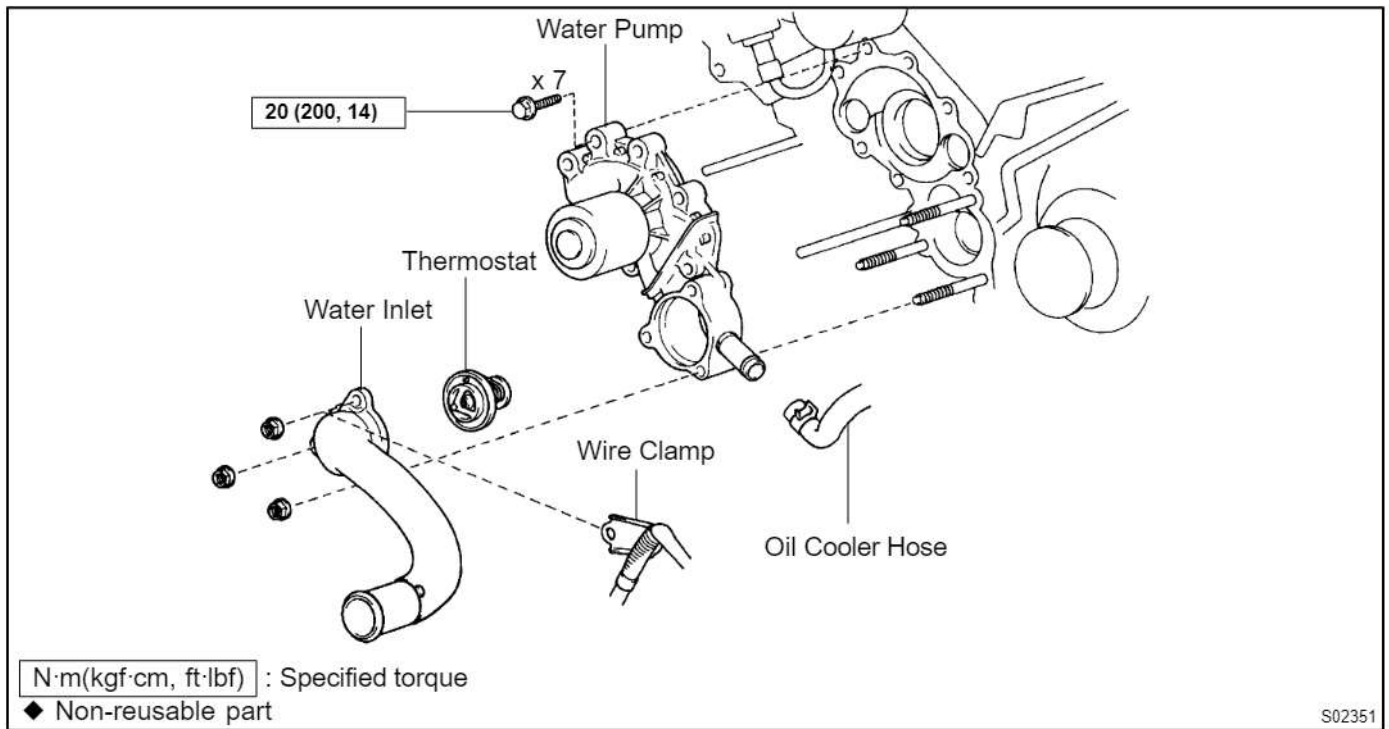
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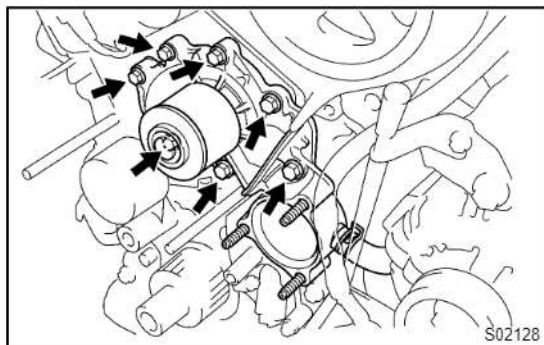


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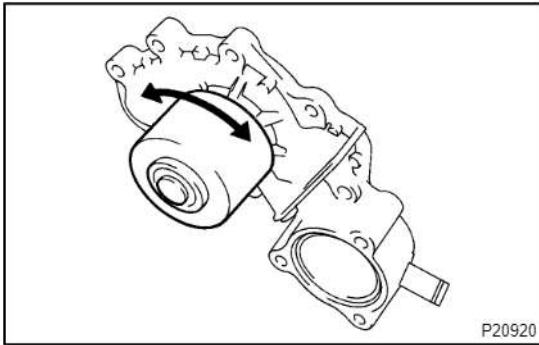
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REMOVAL

1. REMOVE TIMING BELT (See page [EM-13](#))
2. REMOVE WATER INLET AND THERMOSTAT
3. DISCONNECT NO.2 OIL COOLER HOSE FROM WATER PUMP
4. REMOVE WATER PUMP



INSPECTION

1. INSPECT WATER PUMP

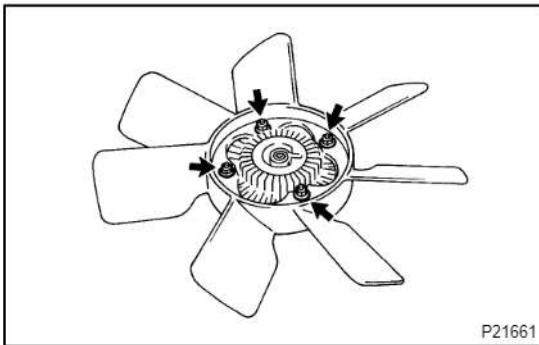
- (a) Visually check the water hole and air hole for coolant leakage.

If leakage is found, replace the water pump.

If engine coolant has leaked onto the timing belt, replace the timing belt.

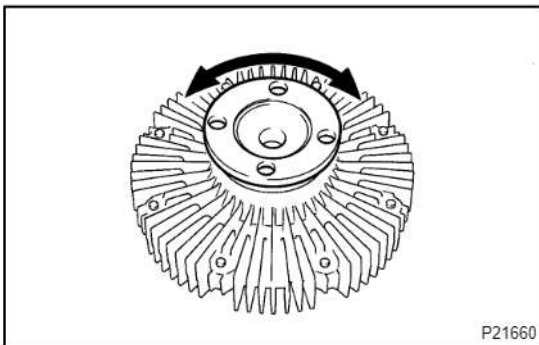
- (b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.



2. INSPECT FLUID COUPLING

- (a) Remove the 4 nuts and fan from the fluid coupling.

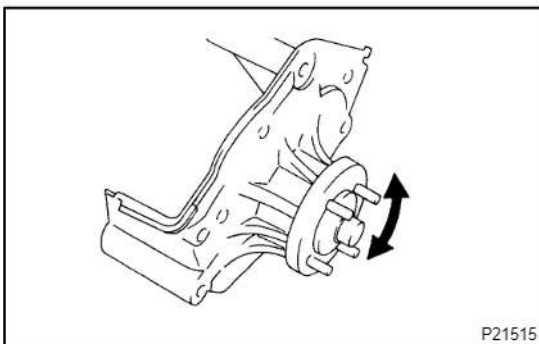


- (b) Check that the fluid coupling is not damaged and that no silicon oil leaks.

If necessary, replace the fluid coupling.

- (c) Reinstall the fan to the fluid coupling with the 4 nuts.

Torque: 7.4 N·m (75 kgf·cm, 65 in·lbf)



3. INSPECT FAN PULLEY BRACKET

Check the turning smoothness of the fan pulley.

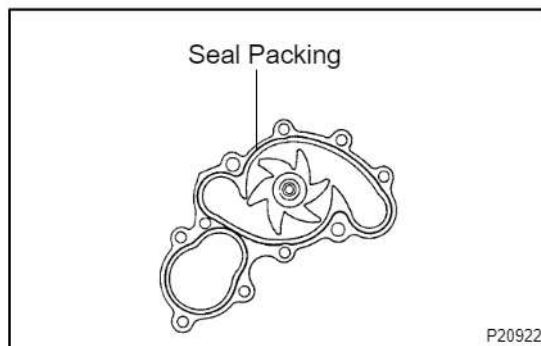
If necessary, replace the fan pulley bracket.

4. INSPECT TIMING BELT (See page [EM-17](#))

INSTALLATION

1. INSTALL WATER PUMP

- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water pump and cylinder block.
- Using a razor blade and gasket scraper, remove all the old packing (FIPG) material from the gasket surfaces and sealing groove.
 - Thoroughly clean all components to remove all the loose material.
 - Using a non-residue solvent, clean both sealing surfaces.



- (b) Apply seal packing to the water pump groove as shown in the illustration.

Seal packing: Part No. 08826-00100 or equivalent

- Install a nozzle that has been cut to a 2 - 3 mm (0.08 - 0.12 in.) opening.
- Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
- Immediately remove nozzle from the tube and reinstall cap.

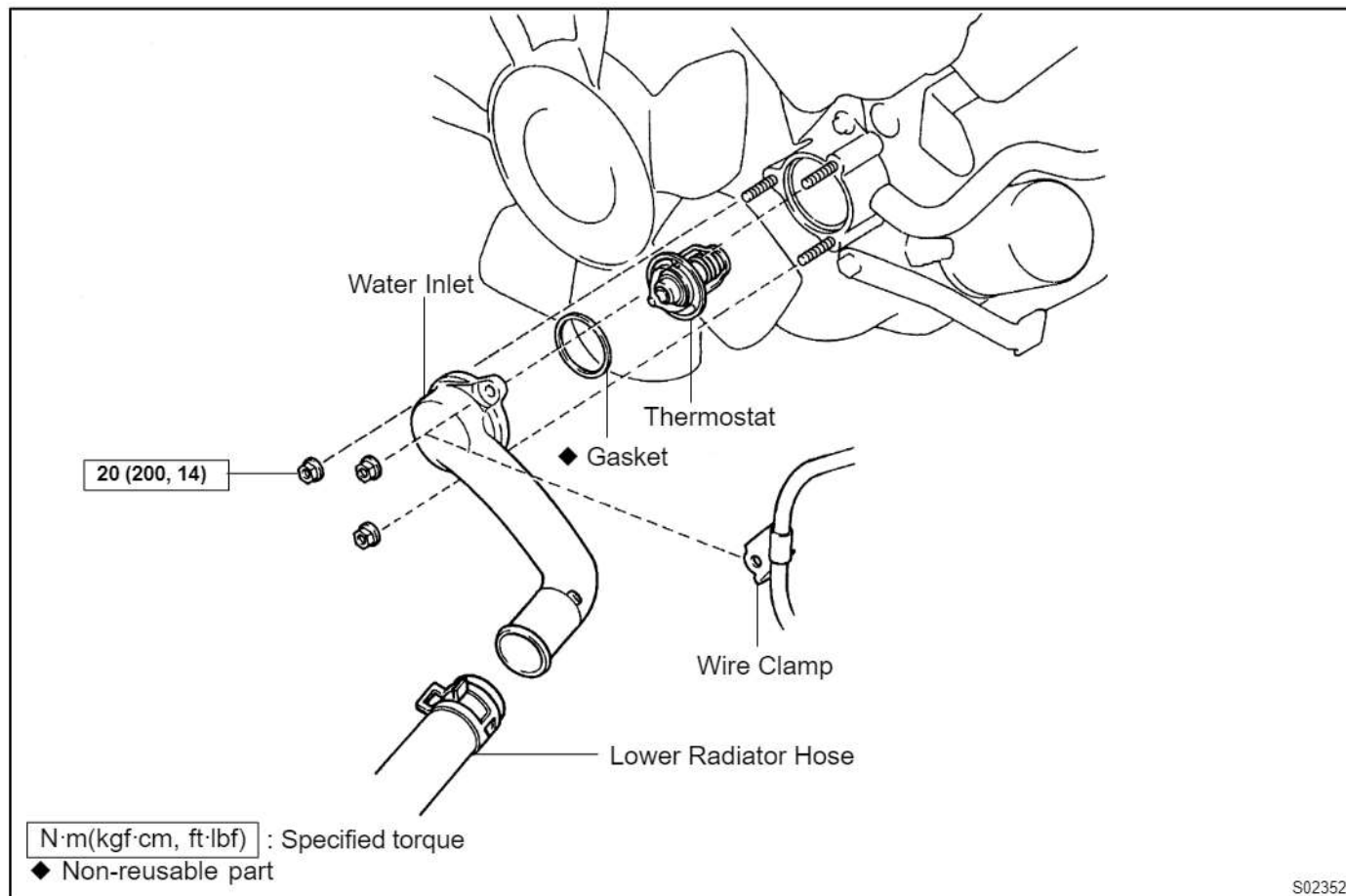
- (c) Install the water pump with the 7 bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

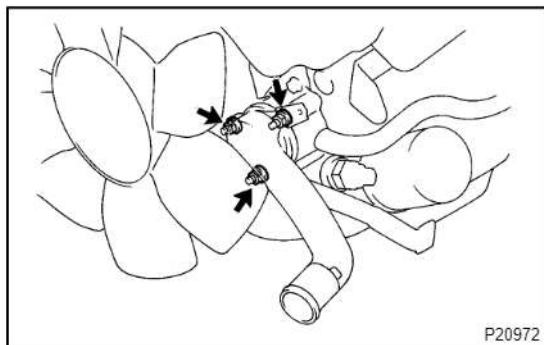
2. **CONNECT NO.2 OIL COOLER HOSE**
3. **INSTALL THERMOSTAT AND WATER INLET**
(See page [CO-12](#))
4. **INSTALL TIMING BELT** (See page [EM-19](#))

THERMOSTAT COMPONENTS

CO00U-03

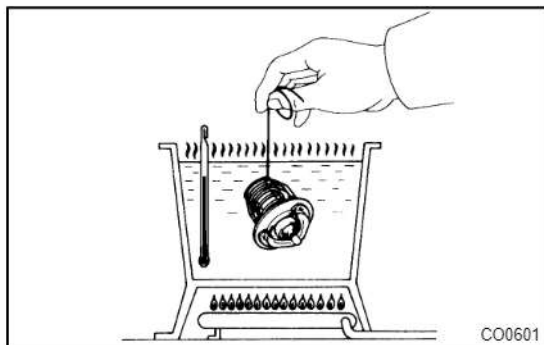


S02352



REMOVAL

1. **DRAIN ENGINE COOLANT**
2. **DISCONNECT LOWER RADIATOR HOSE**
3. **REMOVE THERMOSTAT**
 - (a) Remove the 3 nuts, wire clamp, water inlet and thermostat with gasket from the water pump.
 - (b) Remove the gasket from the thermostat.



INSPECTION

INSPECT THERMOSTAT

HINT:

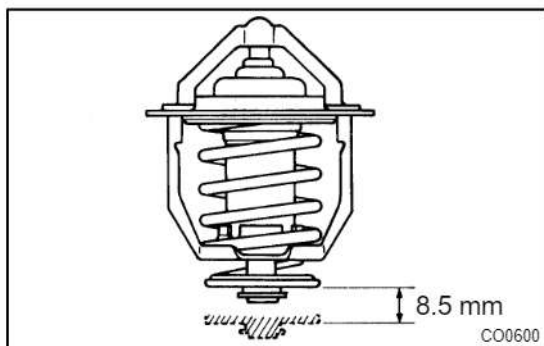
Thermostat is numbered according to the valve opening temperature.

- (a) Immerse the thermostat in water and heat the water gradually.
- (b) Check the valve opening temperature and valve lift.

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

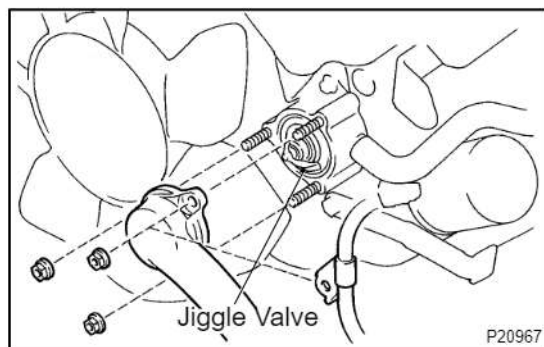
Valve lift: 8.5 mm (0.335 in.) or more at 95°C (203°F)

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



- (c) Check that the valve is fully closed when the thermostat is at low temperatures (below 40°C (104°F)).

If it is not tight, replace the thermostat.



INSTALLATION

1. INSTALL THERMOSTAT

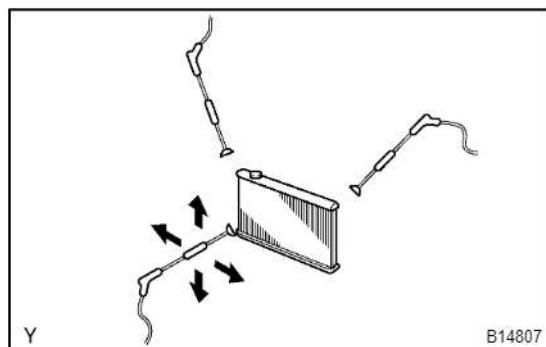
- (a) Place a new gasket to the thermostat.
- (b) Install the thermostat with the jiggle valve downward.
- (c) Install the water inlet with the 3 bolts.

Torque: 20 N·m (200 kgf·cm, 14 ft·lbf)

2. CONNECT LOWER RADIATOR HOSE

3. FILL WITH ENGINE COOLANT

4. START ENGINE AND CHECK FOR LEAKS



RADIATOR

ON-VEHICLE CLEANING

INSPECT FINS FOR BLOCKAGE

CO1B0-01

If fins are clogged, wash them with water or a steam cleaner and dry with compressed air.

NOTICE:

- If the distance between the steam cleaner and the core is too close, there is a possibility of damaging the fin, so keep the following injection distance.

Injection Pressure	Injection Distance
2,942 - 4,903 kpa (30 - 50 kg/cm ² , 427 - 711 psi)	300 mm (11.811 in)
4,903 - 7,845 kpa (50 - 80 kg/cm ² , 711 - 1,138 psi)	500 mm (19.685 in)

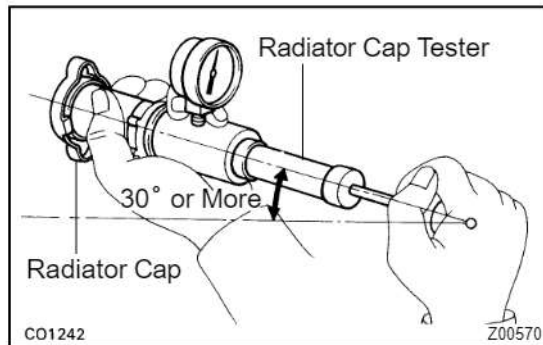
- If the fins are bent, straighten them with a screwdriver or pliers.
- Never apply water directly onto the electronic components.

ON-VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.



2. INSPECT RADIATOR CAP

NOTICE:

- If the radiator cap has contaminations, always rinse it with water.
- When performing steps (a) and (b) below, keep the radiator cap tester at an angle of over 30° above the horizontal.
- Before using a radiator cap tester, wet the relief valve with engine coolant or water.

- (a) Using a radiator cap tester, slowly pump the tester and check that air is coming from the vacuum valve.

Pump speed: 1 push/(3 seconds or more)

NOTICE:

Push the pump at a constant speed.

If air is not coming from the vacuum valve, replace the radiator cap.

- (b) Pump the tester and measure the relief valve opening pressure.

Pump speed: within 1 second/1 push

NOTICE:

This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:

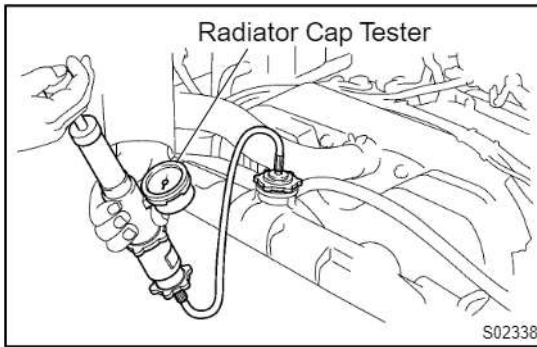
74-103 kPa (0.75-1.05 kgf/cm², 10.7 - 14.9 psi)

Minimum opening pressure:

59 kPa (0.6 kgf/cm², 8.5 psi)

HINT:

Use the tester's maximum reading as the opening pressure. If the opening pressure is less than minimum, replace the radiator cap.

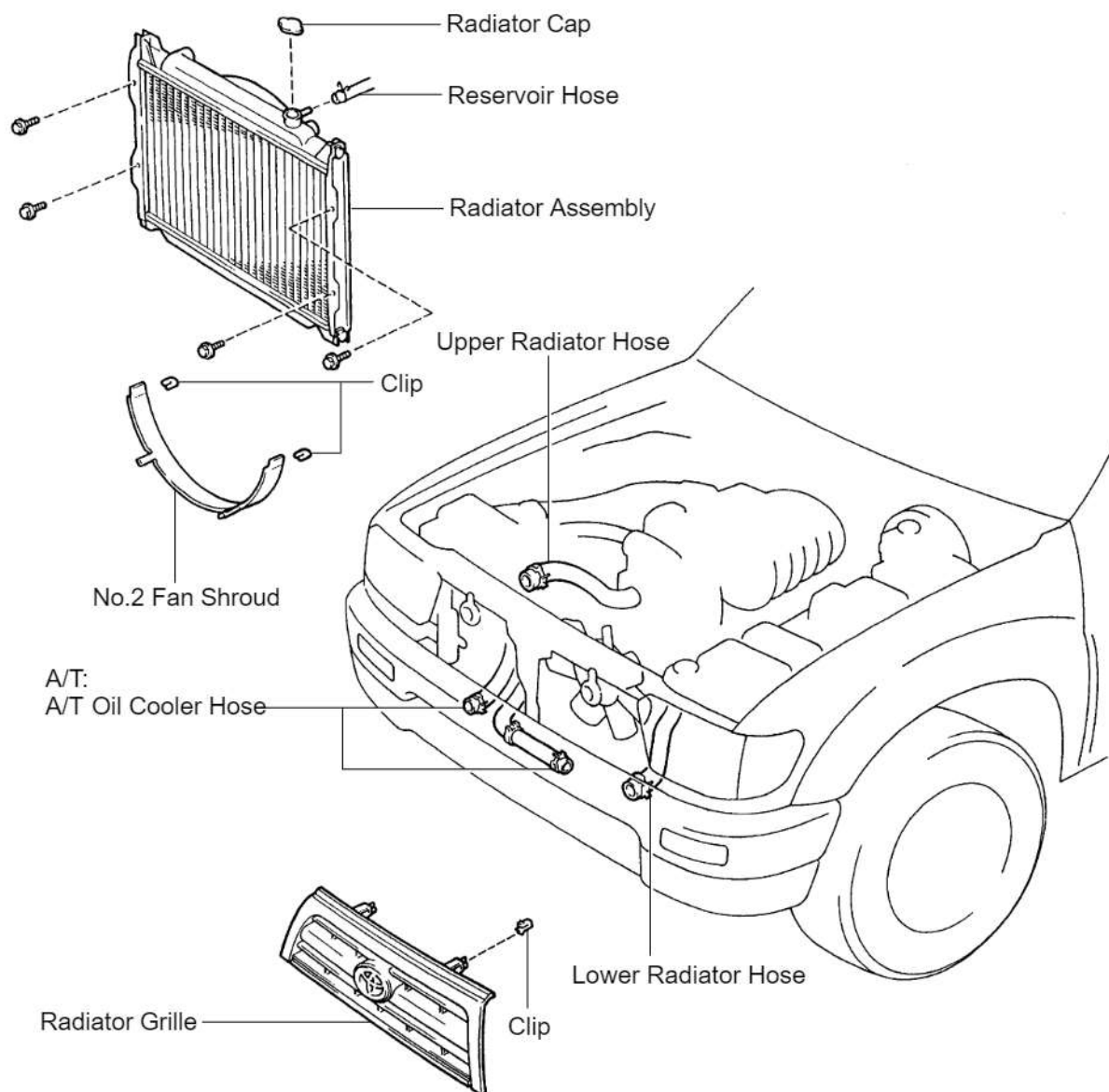
**3. INSPECT COOLING SYSTEM FOR LEAKS**

- (a) Fill the radiator with coolant and attach a radiator cap tester.
- (b) Warm up the engine.
- (c) Pump it to 118 kPa (1.2 kgf/cm², 17.1 psi), and check that the pressure does not drop.

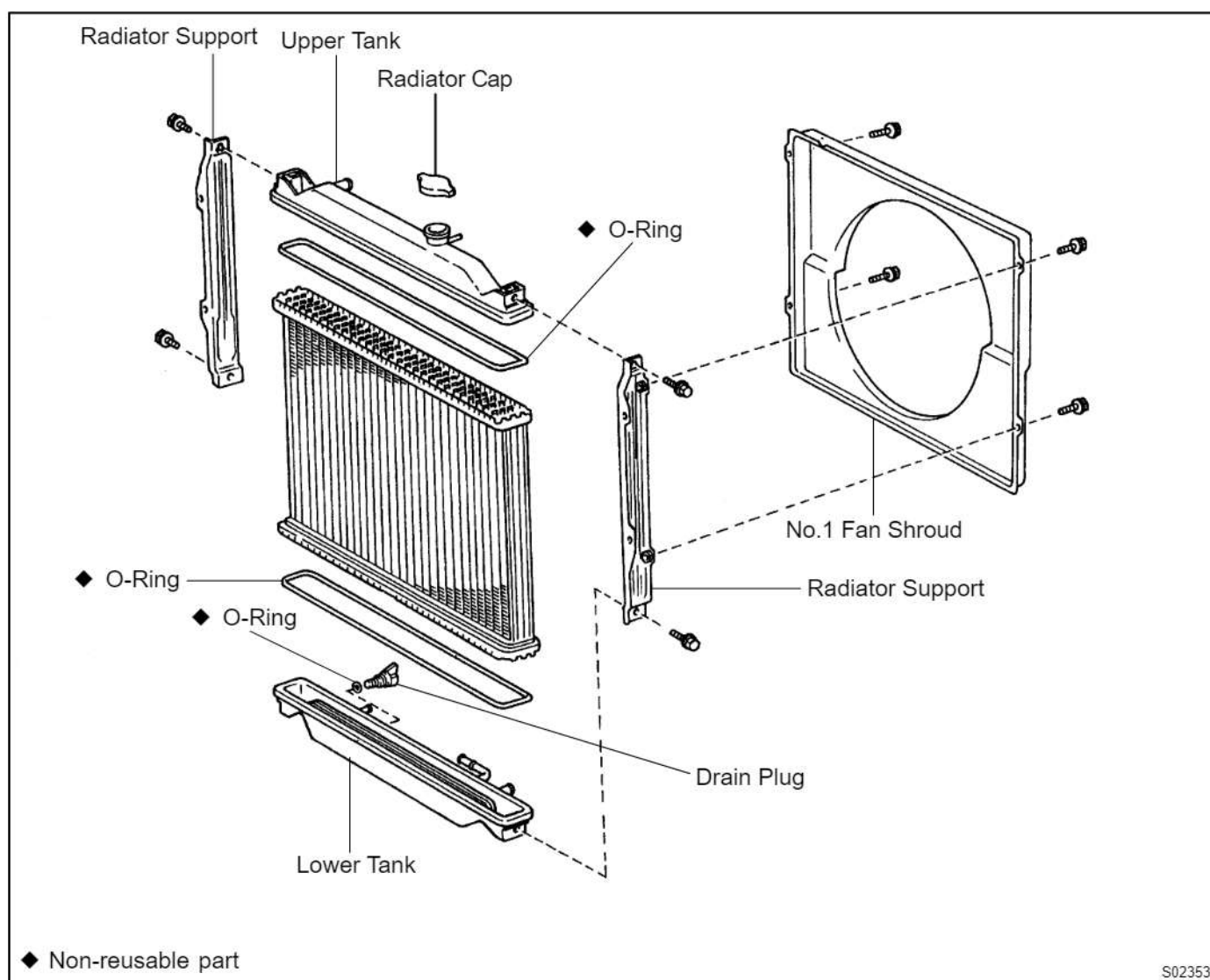
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

4. REINSTALL RADIATOR CAP

COMPONENTS

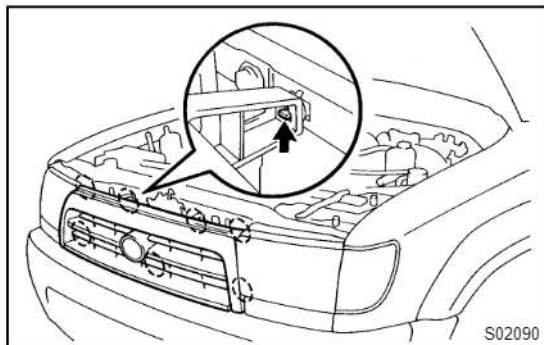


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REMOVAL

1. DRAIN ENGINE COOLANT



2. REMOVE RADIATOR GRILLE

Remove the 7 clips and radiator grille.

3. DISCONNECT UPPER RADIATOR HOSE

4. DISCONNECT RADIATOR RESERVOIR HOSE

5. DISCONNECT LOWER RADIATOR HOSE

6. REMOVE RADIATOR NO.2 FAN SHROUD

7. A/T:

DISCONNECT OIL COOLER HOSES

8. REMOVE RADIATOR

Remove the 4 bolts and the radiator.

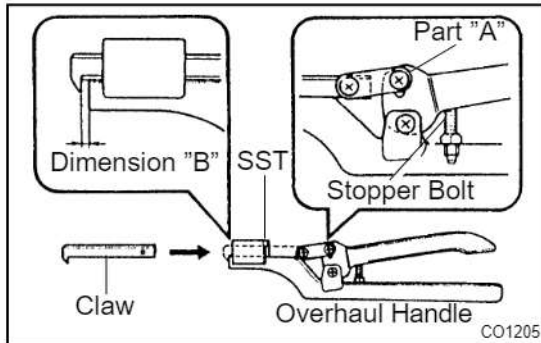
DISASSEMBLY

1. REMOVE NO.1 FAN SHROUD

Remove the 4 bolts and No.1 fan shroud.

2. REMOVE RADIATOR SUPPORTS

3. REMOVE DRAIN PLUG



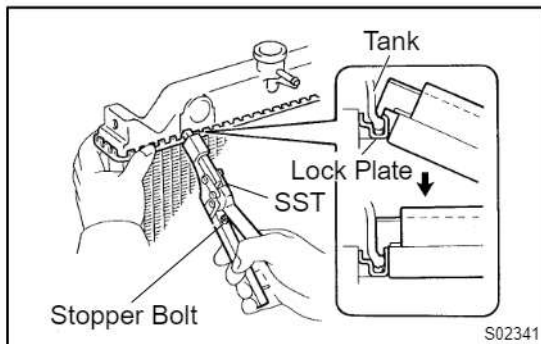
4. ASSEMBLE SST

SST 09230-01010

- Install the claw to the overhaul handle, inserting it in the hole in part "A" as shown in the diagram.
- While gripping the handle, adjust the stopper bolt so that dimension "B" shown in the diagram is 0.2 - 0.3 mm (0.008 - 0.012 in.).

NOTICE:

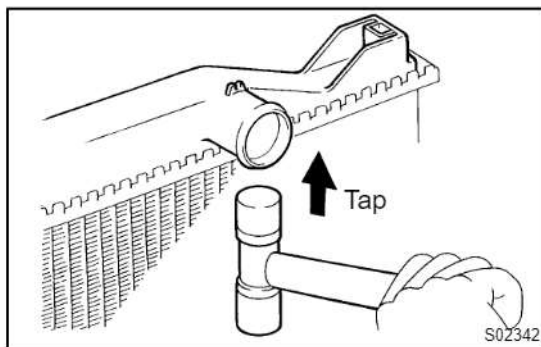
If this adjustment is not done, the claw may be damaged.



5. UNCAULK LOCK PLATES

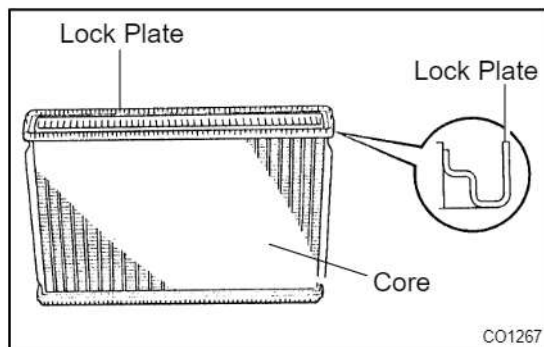
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230-01010



6. REMOVE TANKS AND O-RINGS

- Lightly tap the radiator port (inlet or outlet) with a soft-faced hammer, and remove the tank.
- Remove the O-ring.



REASSEMBLY

1. INSPECT LOCK PLATE

Inspect the lock plate for damage.

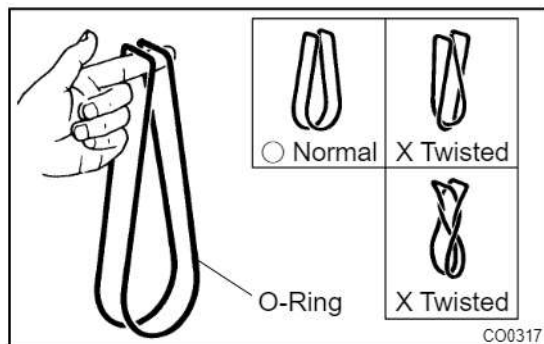
HINT:

If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.

NOTICE:

The radiator can only be recaulked 2 times.

After the 2nd time, the radiator core must be replaced.

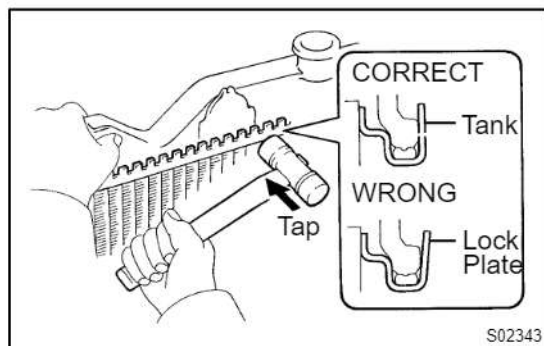


2. INSTALL NEW O-RINGS AND TANKS

- (a) After checking that there are no foreign objects in the lock plate groove, install the new O-ring without twisting it.

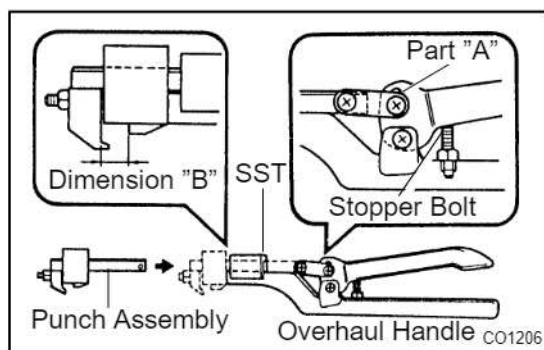
HINT:

When cleaning the lock plate groove, lightly rub it with sand paper without scratching it.



- (b) Install the tank without damaging the O-ring.

- (c) Tap the lock plate with a soft-faced hammer so that there is no gap between it and the tank.

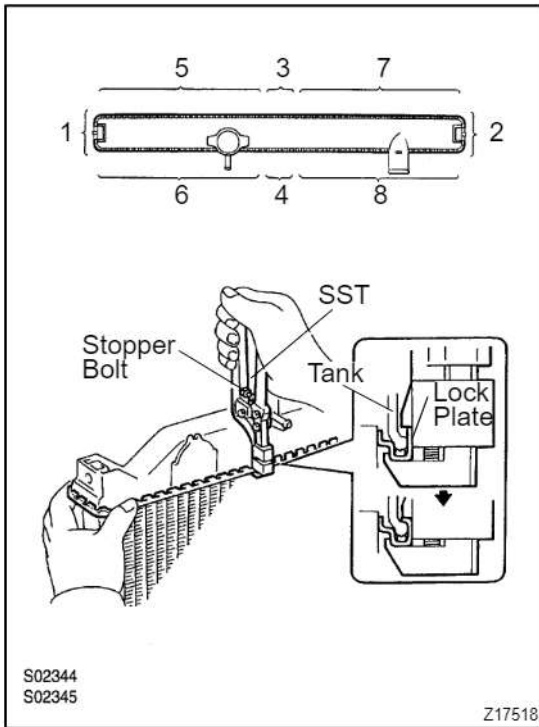


3. ASSEMBLE SST

SST 09230-01010

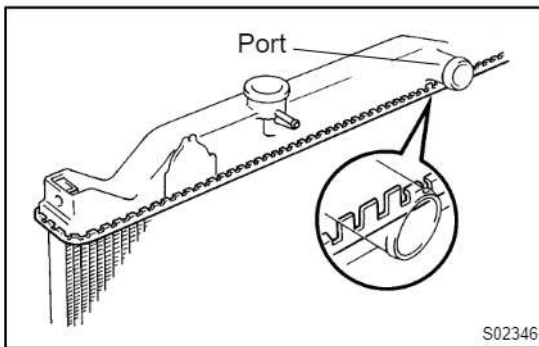
- (a) Install the punch assembly to the overhaul handle, inserting it in the hole in part "A" as shown in the illustration.
- (b) While gripping the handle, adjust the stopper bolt so that dimension "B" shown in the diagram.

Dimension "B": 8.4 mm (0.34 in.)



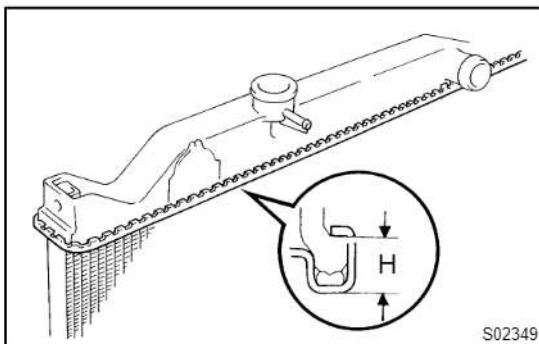
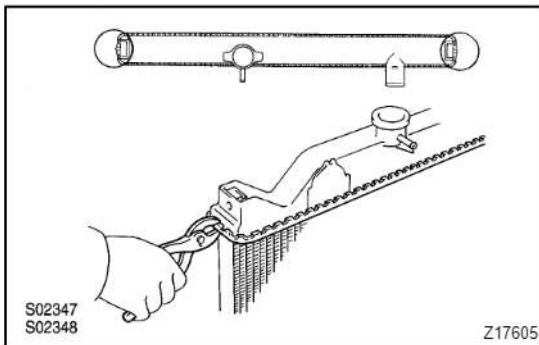
4. CAULK LOCK PLATE

- (a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper bolt.
SST 09230-01010



HINT:

- Do not stake the areas protruding around the ports.
- The points shown in the rib sides near here cannot be staked with SST. Use pliers or similar object and be careful not to damage the core plates.



- (b) Check the lock plate height (H) after completing the caulking.

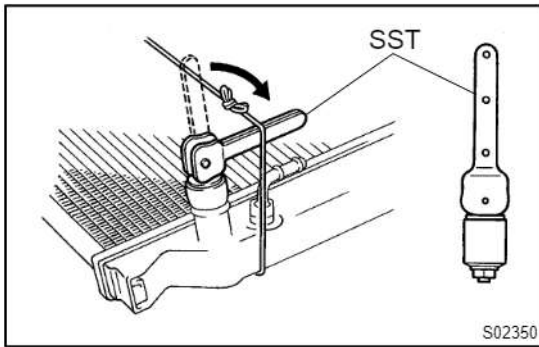
Plate height (H): 7.4 - 7.8 mm (0.2959 - 0.3119 in.)

If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

5. PAINT LOCK PLATES

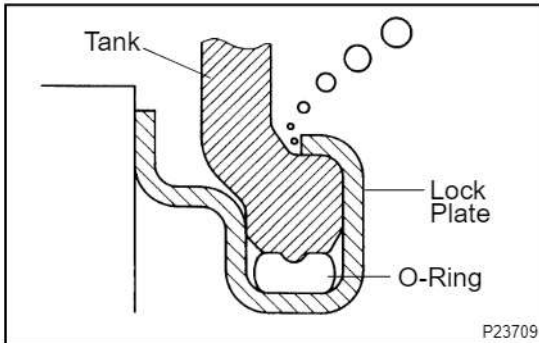
6. INSTALL DRAIN PLUG TO RADIATOR

- (a) Install a new O-ring to the drain plug.
(b) Apply soapy water to the O-ring.
(c) Install the drain plug.



7. CHECK FOR WATER LEAKS

- (a) Using SST, plug the inlet and outlet pipes of the radiator.
SST 09230-01010
- (b) Using a radiator cap tester, apply pressure to the radiator.
Test pressure: 177 kPa (1.8 kgf/cm², 26 psi)



- (c) Check for water leaks.

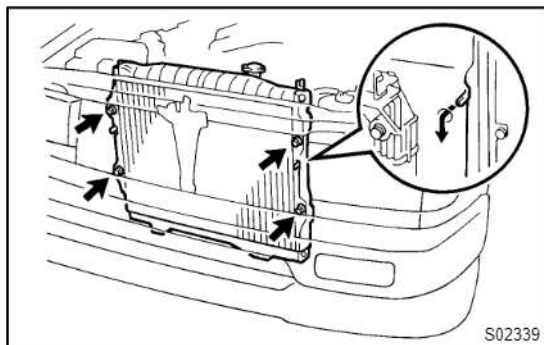
HINT:

On radiators with resin tanks, there is a clearance between the core plate and tank 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 swirl the radiator around in the water until all air bubbles disappear.

8. INSTALL SUPPORTS

Torque: 12.7 N·m (130 kgf·cm, 9 ft·lbf)

9. INSTALL NO.1 FAN SHROUD



INSTALLATION

1. INSTALL RADIATOR

Install the radiator with 4 bolts.

Torque: 12 N·m (120 kgf·cm, 8.7 ft·lbf)

HINT:

Insert the tabs of the radiator support through the radiator service holes.

2. A/T:

CONNECT OIL COOLER HOSES

3. INSTALL RADIATOR NO.2 FAN SHROUD

4. CONNECT LOWER RADIATOR HOSE

5. CONNECT RADIATOR RESERVOIR HOSE

6. CONNECT UPPER RADIATOR HOSE

7. INSTALL RADIATOR GRILLE

Install the radiator grille with 7 clips.

8. FILL WITH ENGINE COOLANT

9. START ENGINE AND CHECK FOR COOLANT LEAKS