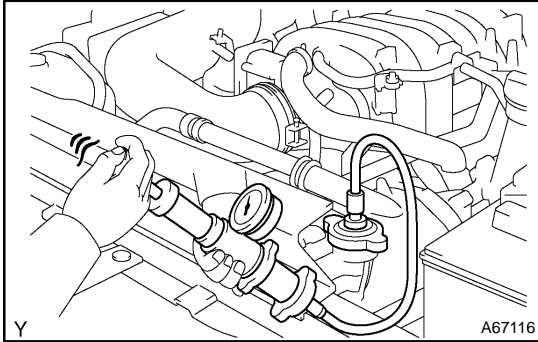


COOLING SYSTEM (2UZ-FE)(From August, 2003)

ON-VEHICLE INSPECTION

160EP-04



1. INSPECT COOLING SYSTEM FOR LEAKS

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.

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

HINT:

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.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

- The engine coolant level should be between the "LOW" and "FULL" line when the engine is cold. If low, check for leaks and add "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology up to the "FULL" line.

3. CHECK ENGINE COOLANT QUALITY

- Remove the radiator cap.

CAUTION:

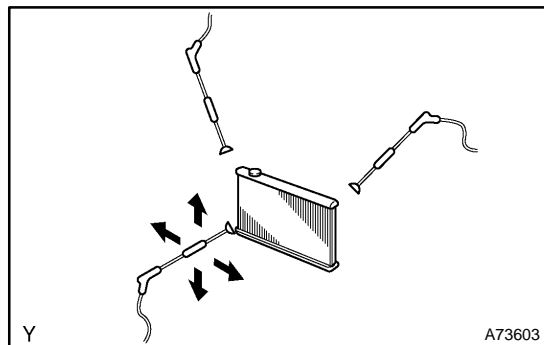
To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot, as fluid and steam can be blown out under pressure.

- Check if there are any excessive deposits of rust or scale around the radiator cap and radiator filler hole; the coolant should be free from oil.

HINT:

If excessively dirty, replace the coolant.

- Reinstall the radiator cap.



4. INSPECT FIN BLOCKAGE

- (a) If the fins are clogged, wash them with water or a steam cleaner, then dry with compressed air.

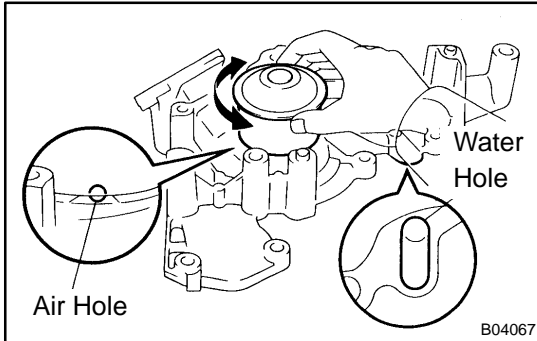
NOTICE:

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

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

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

INSPECTION



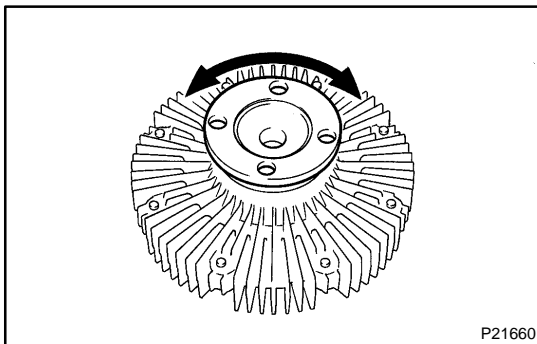
1. INSPECT WATER PUMP ASSY

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

If leakage is found, replace the water pump and timing belt.

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

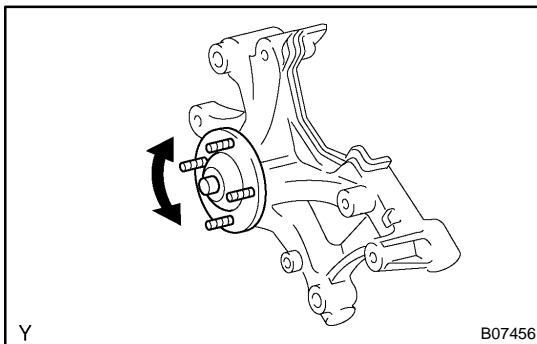
If necessary, replace the water pump.



2. INSPECT FLUID COUPLING ASSY

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

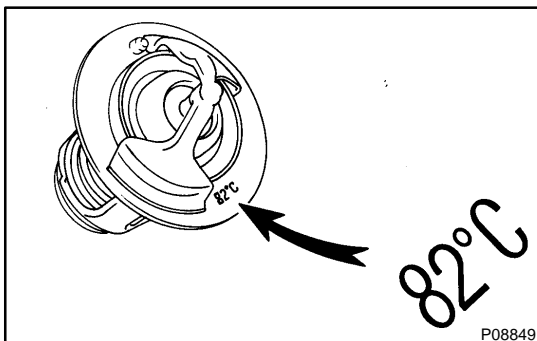
If necessary, replace the fluid coupling.



3. INSPECT FAN BRACKET SUB-ASSY

- (a) Check the turning smoothness of the fan pulley.

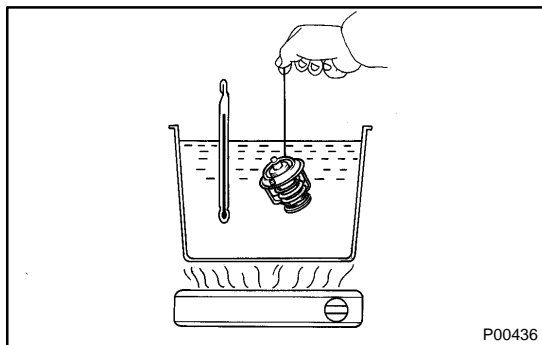
If necessary, replace the pulley bracket.



4. INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.



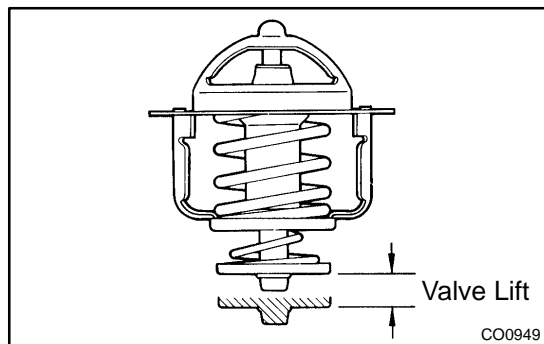
- (a) Immerse the thermostat in water and gradually heat the water.

- (b) Check the valve opening temperature.

Valve opening temperature:

80 – 84 °C (176 – 183 °F)

If the valve opening temperature is not as specified, replace the thermostat.



- (c) Check the valve lift.

Valve lift: 10 mm (0.39 in.) or more at 95 °C (203 °F)

If the valve lift is not as specified, replace the thermostat.

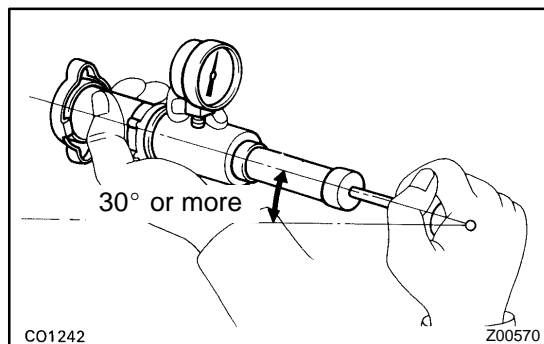
- (d) Check that the valve is fully closed when the thermostat is at low temperatures (below 40 °C (104 °F)).

If not closed, replace the thermostat.

5. INSPECT RADIATOR CAP SUB-ASSY

NOTICE:

- If the reservoir cap has contaminations, always rinse it with water.
- Before using a radiator cap tester, wet the relief valve and pressure 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.

HINT:

- Pump speed: 1 push / (3 seconds or more)
- If air is not coming from the vacuum valve, replace the reservoir cap.

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

Standard opening pressure:

93 – 123 kPa (0.95 – 1.25 kgf/cm², 13.5 – 17.8 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

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.

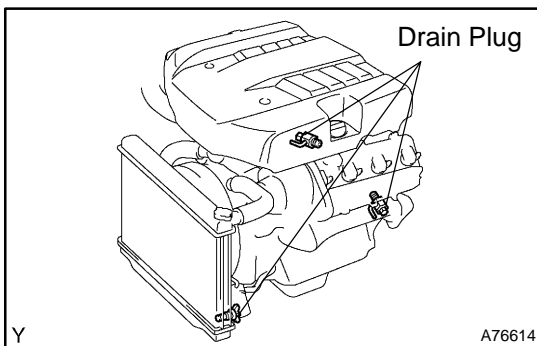
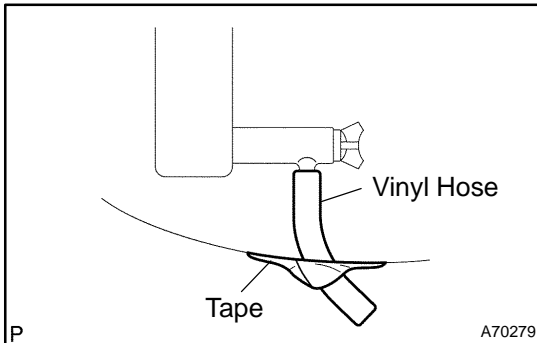
HINT:

- Pump speed: 1 push within 1 second.
- Use the tester's maximum reading as the opening pressure.
- If the opening pressure is less than minimum, replace the reservoir cap.

COOLANT (2UZ-FE)(From August, 2003)

REPLACEMENT

160F0-08



1. DRAIN ENGINE COOLANT

CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. It is a probable result that heated fluid and steam are spewed by pressure inside the radiator.

- Remove the radiator cap.
 - Remove the service hole cover for the engine under cover No. 1.
 - Install a vinyl hose to the drain at the radiator side.
 - Loosen the radiator drain plug and engine drain plug, then drain the coolant from the radiator.
 - Drain the coolant from the reservoir tank.
 - Close the drain plugs.
- Torque: 13 N·m (130 kgf·cm, 9 ft·lbf) for engine**
- Remove the vinyl hose from the radiator.

2. ADD ENGINE COOLANT

- Slowly fill the cooling system with engine coolant.
Capacity: 12.9 liters (13.6 US qts, 11.4 Imp. qts)

HINT:

- Use of improper coolants may damage the engine cooling system.
- Only use "Toyota Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, and non-borate coolant with long-life hybrid organic acid technology.
- New Toyota vehicles are filled with Toyota Super Long Life Coolant (color is pink, premixed ethylene-glycol concentration is approximately 50% and freezing temperature is -35°C (-31°F)). When replacing the coolant, Toyota Super Long Life Coolant is recommended.
- Observe the coolant level inside the radiator by pressing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add the coolant.

NOTICE:

Do not use plain water alone.

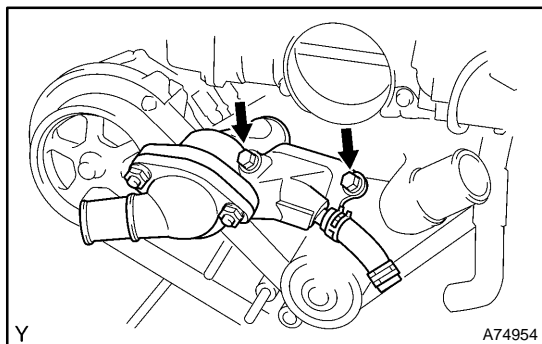
- Install the radiator cap.
 - Operate the cooling system.
 - Start the engine, then open the heater water valve.
 - Maintain the engine speed at 2,000 to 2,500 rpm, then warm up the engine.
 - Stop the engine, then wait until the engine coolant cools down.
 - Refill the reservoir with the coolant up to the "FULL" line.
- ### 3. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

WATER PUMP ASSY (2UZ-FE)

REPLACEMENT

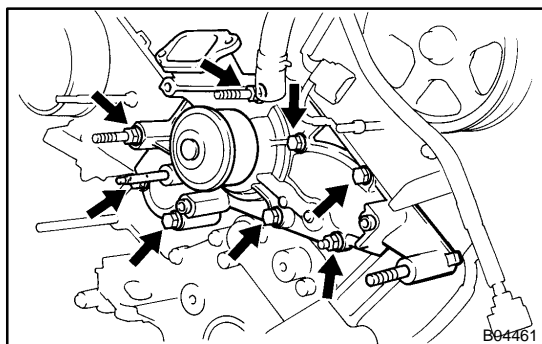
160F2-07

1. REMOVE TIMING BELT (See page 14-115)



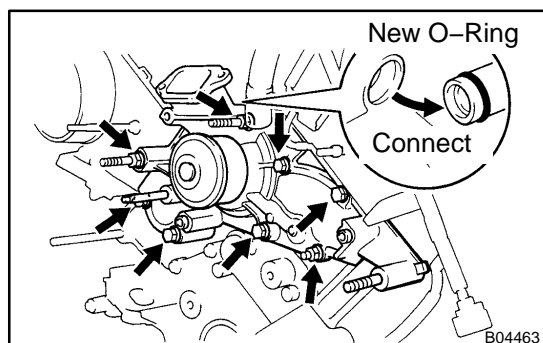
2. REMOVE WATER INLET HOUSING

- Disconnect the water by-pass hose from the water inlet housing.
- Remove the 2 bolts holding the water inlet housing to the water pump.
- Disconnect the water inlet housing from the front water by-pass joint, and remove the water inlet housing w/ water inlet.
- Remove the O-ring from the water inlet housing.



3. REMOVE WATER PUMP ASSY

- Remove the 5 bolts, 2 stud bolts, nut, water pump and gasket.
- Remove the O-ring from the water by-pass pipe.



4. INSTALL WATER PUMP ASSY

- Install a new O-ring to the water by-pass pipe end.
- Apply soapy water to the O-ring.
- Connect the water pump to the water by-pass pipe end.
- Install the water pump and new gasket with the 5 bolts, 2 stud bolts and nut. Uniformly tighten the bolts, stud bolts and nut in several passes.

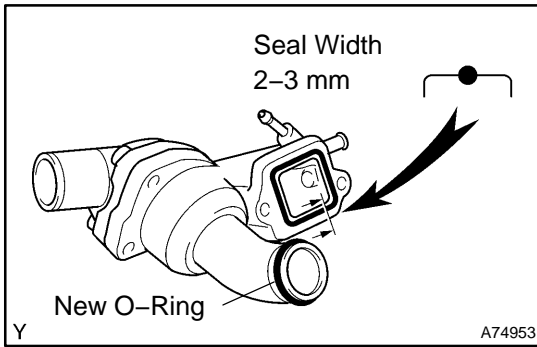
Torque:

Bolt 21 N·m (215 kgf·cm, 16 ft·lbf)

Stud bolt and nut 18 N·m (185 kgf·cm, 13 ft·lbf)

5. INSTALL WATER INLET HOUSING

- Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water inlet housing and water pump.
 - 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 sealing groove of water inlet housing as shown in the illustration.

Seal packing: Part No. 08826-00100 or equivalent

- (1) Install a nozzle that has been cut to a 2 – 3 mm (0.08 – 0.12 in.) opening.
 - (2) Parts must be assembled within 5 minutes of application. Otherwise the material must be removed and reapplied.
 - (3) Immediately remove nozzle from the tube and reinstall cap.
- (c) Install a new O-ring to the water inlet housing.
- (d) Apply soapy water on the O-ring.
- (e) Attach the water inlet housing end to the front water bypass joint hole.
- (f) Install the water inlet and housing assembly with the 2 bolts. Alternately tighten the bolts.

Torque: 18 N·m (185 kgf·cm, 13 ft·lbf)

6. INSTALL TIMING BELT (See page [14-115](#))

THERMOSTAT (2UZ-FE)

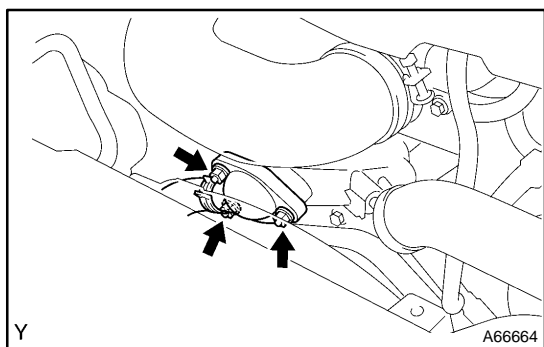
REPLACEMENT

160F1-04

HINT:

Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **REMOVE V-BANK COVER SUB-ASSY**
2. **DRAIN ENGINE COOLANT (See page 16-5)**

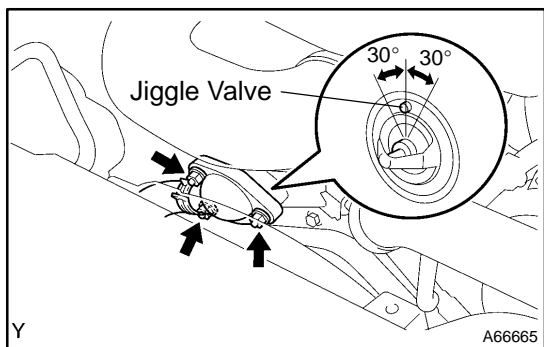


3. SEPARATE WATER INLET

- (a) Remove the 3 nuts, and separate the water inlet from the water inlet housing.

4. REMOVE THERMOSTAT

- (a) Remove the thermostat.
- (b) Remove the gasket from the thermostat.



5. INSTALL THERMOSTAT

- (a) Install a new gasket to the thermostat.
- (b) Insert the thermostat into the water inlet housing with the jiggle valve facing straight upward.

HINT:

The jiggle valve may be set within 30° of either side of the prescribed position.

6. INSTALL WATER INLET

- (a) Install the water inlet with the 3 nuts.

Torque: 19 N·m (195 kgf·cm, 14 ft·lbf)

7. ADD ENGINE COOLANT (See page 16-5)

8. INSTALL V-BANK COVER SUB-ASSY

- (a) Install the V-bank cover sub-assy with 2 cap nuts.

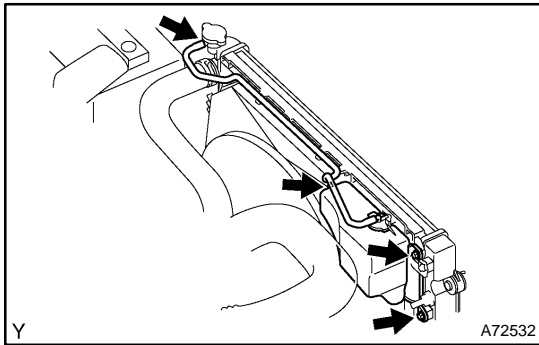
Torque: 7.5 N·m (80 kgf·cm, 66 in·lbf)

RADIATOR ASSY (2UZ-FE)

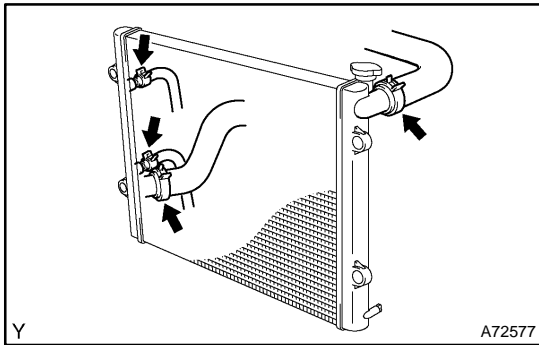
160ER-04

Removal & Installation and Disassembly & Reassembly

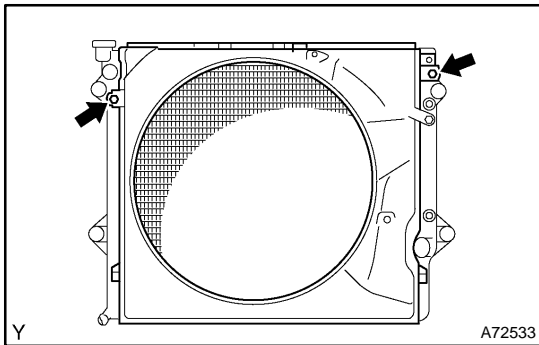
1. **DRAIN ENGINE COOLANT** (See page 16-5)
2. **REMOVE ENGINE UNDER COVER SUB-ASSY NO.1**
 - (a) Remove the 4 bolts and engine under cover.
3. **REMOVE RADIATOR SUPPORT SEAL UPPER**
 - (a) Remove the 11 clips and radiator support upper.



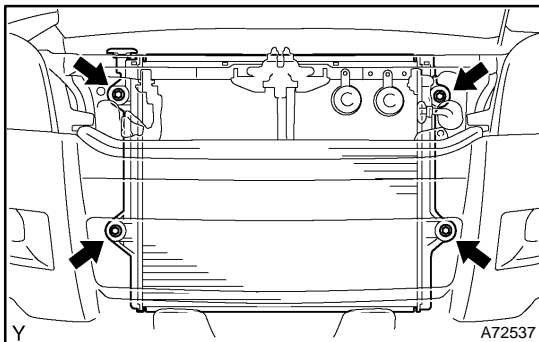
4. **REMOVE RADIATOR RESERVE TANK ASSY**
 - (a) Disconnect the reserve tank hose from the radiator.
 - (b) Remove the 3 bolts and reserve tank.



5. **SEPARATE FAN SHROUD**
 - (a) Disconnect the radiator hose No. 1 from the radiator.
 - (b) Disconnect the oil cooler inlet hose from the radiator. (A/T TRANSMISSION)
 - (c) Disconnect the oil cooler outlet hose from the radiator. (A/T TRANSMISSION)
 - (d) Disconnect the radiator hose No. 2 from the radiator.



- (e) Remove the 2 bolts, and separate the fan shroud.
- HINT:**
Temporarily put the separated fan shroud at an appropriate location in the engine room.



6. **REMOVE RADIATOR ASSY**
 - (a) Remove the 4 bolts and radiator.

7. REMOVE RADIATOR SUPPORT NO.1

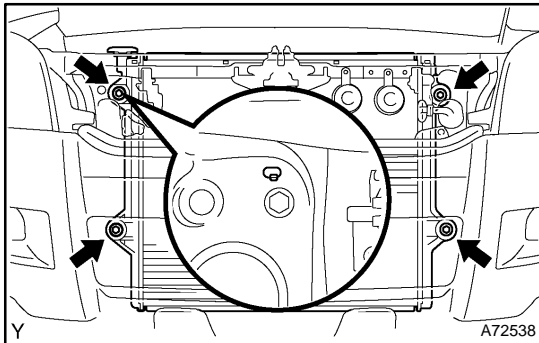
- (a) Remove the 1 radiator support No. 1 from the radiator.

8. REMOVE RADIATOR SUPPORT NO.2

- (a) Remove the 3 radiator support No. 2 from the radiator.

9. REMOVE RADIATOR SUPPORT NO.1 BUSH

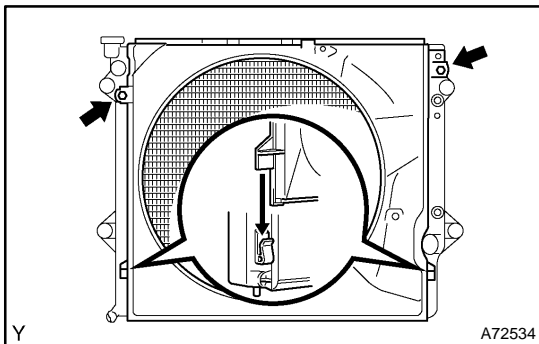
- (a) Remove the 4 radiator support No. 1 bush from the radiator.

**10. INSTALL RADIATOR ASSY**

- (a) Insert the tabs of the radiator support through the radiator service holes.

- (b) Install the radiator assy with the 4 bolts.

Torque: 18 N·m (184 kgf·cm, 13 ft·lbf)

**11. INSTALL FAN SHROUD**

- (a) Insert tabs in the slots described in the illustration, attach the fan shroud with the 2 bolts.

Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

12. INSTALL RADIATOR RESERVE TANK ASSY

- (a) Install the reserve tank with the 3 bolts.

Torque: 5.0 N·m (51 kgf·cm, 44 in·lbf)

- (b) Connect the reserve tank hose to the radiator.

13. ADD ENGINE COOLANT (See page 16-5)**14. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**