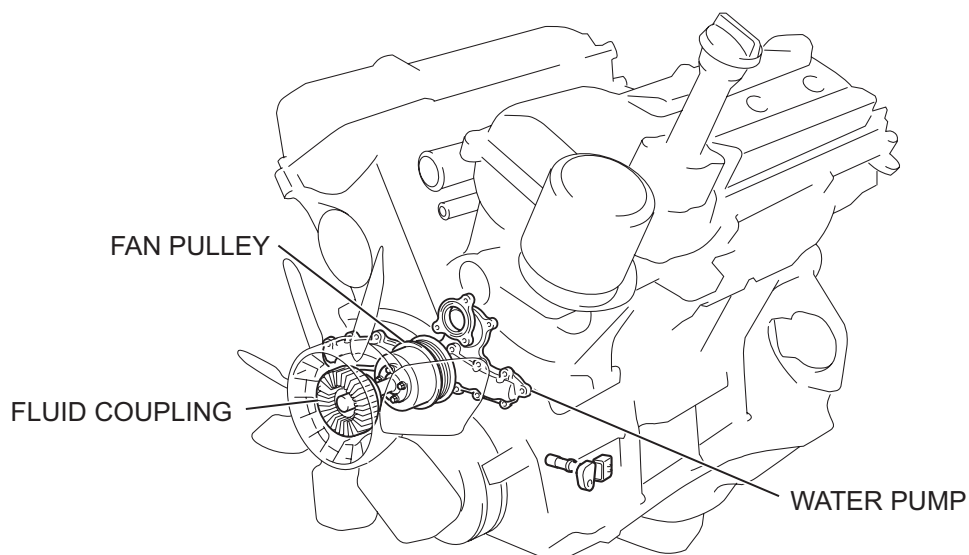
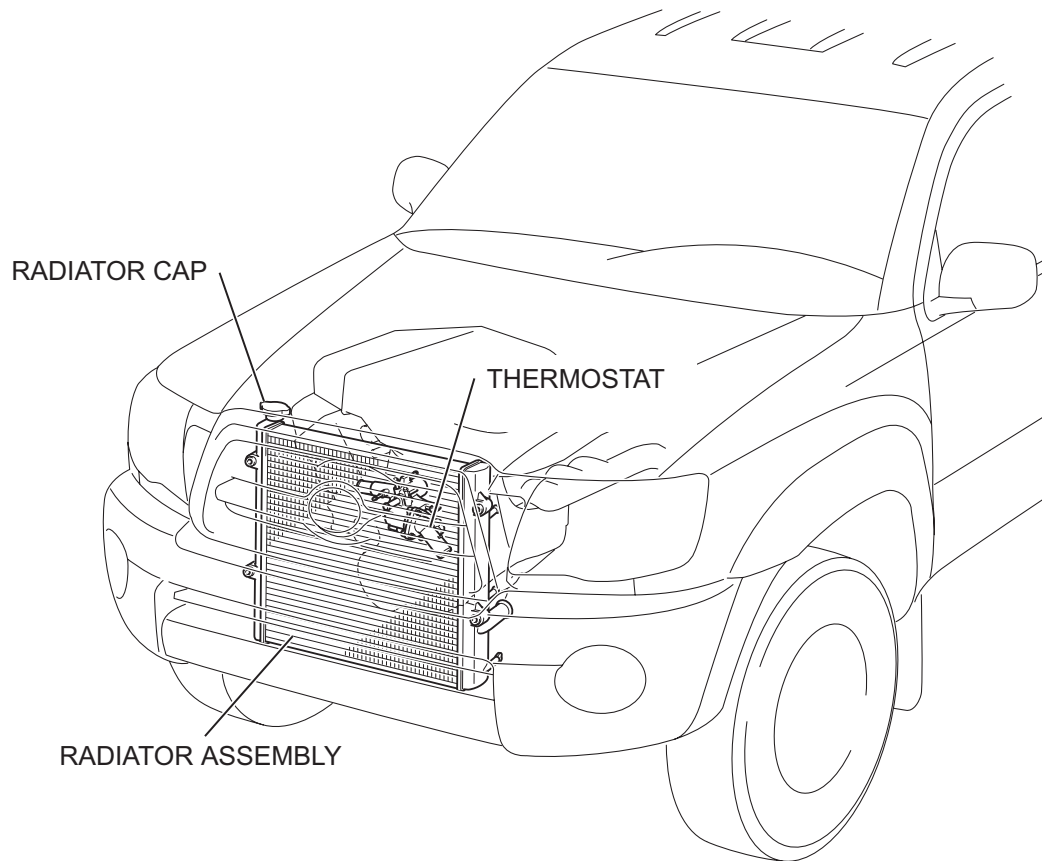


COOLING SYSTEM

PARTS LOCATION



CO

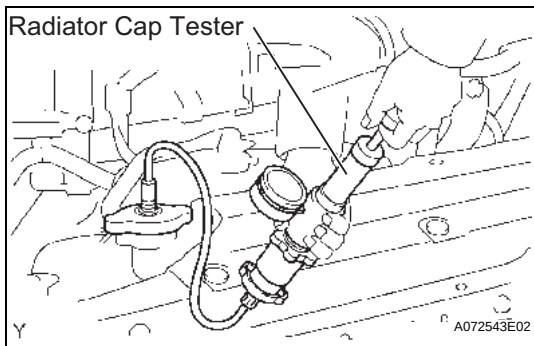
ON-VEHICLE INSPECTION

1. CHECK COOLING SYSTEM FOR LEAKAGE

- (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. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.



- (b) Fill the radiator with coolant and attach a radiator cap tester.
- (c) Warm up the engine.
- (d) Pump it to 118 kPa (1.2 kgf/cm², 17.1 psi), then check that the pressure does not drop. If the pressure drops, check the hoses, radiator and water pump for leakage. If there are no signs of external coolant leakage, check the heater core, cylinder block and head.
- (e) Reinstall the radiator cap.

2. CHECK COOLANT LEVEL OF RESERVOIR

- (a) The engine coolant should be between the LOW and FULL lines when the engine is cold. If low, check for leakage 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.

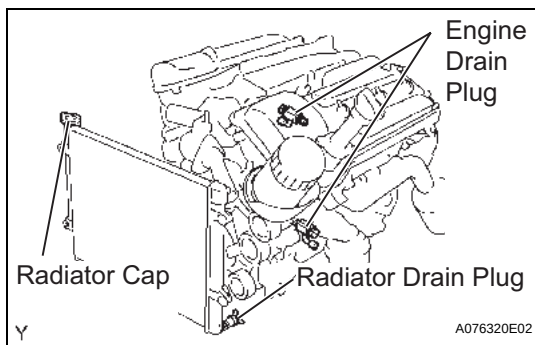
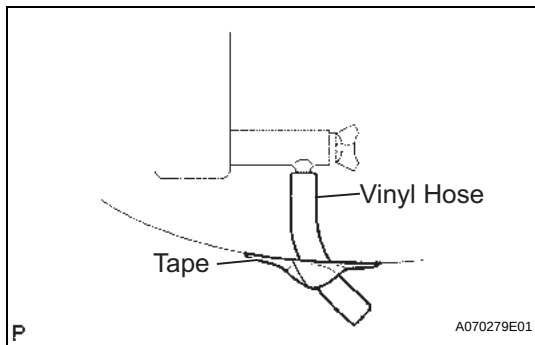
3. CHECK ENGINE COOLANT QUALITY

- (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. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

- (b) Check for any excessive deposits of rust or scale around the radiator cap and radiator filler hole; the coolant should be free of oil. If excessively dirty, replace the coolant.
- (c) Reinstall the radiator cap.



COOLANT

REPLACEMENT

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. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

- Remove the service hole cover from the engine under cover.
- Install a vinyl hose onto the drain on the radiator side.
- Fix the vinyl hose with tape.
- Loosen the 3 drain plugs on the engine and radiator, and drain the coolant.
- Remove the radiator cap.
- Drain the coolant from the reservoir tank.
- Tighten the 3 drain plugs.

Torque: 13 N*m (130 kgf*cm, 9 ft.*lbf) for the engine

- Remove the vinyl hose from the radiator.

2. ADD ENGINE COOLANT

- Pour coolant into the radiator until it overflows.

Capacity

Transmission	Capacity
Manual Transmission	9.7 liters (10.3 Us qts, 8.5 Imp. qts)
Automatic Transmission	9.8 liters (10.4 Us qts, 8.6 Imp. qts)

HINT:

- Use of improper coolants may damage the engine cooling system.
- Use only 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 (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids).
- 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.

NOTICE:

Do not substitute plain water for engine coolant.

- Check the coolant level inside the radiator by squeezing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add coolant.
- Install the radiator cap securely.

- (d) Slowly pour coolant into the radiator reservoir until it reaches the FULL line.
- (e) Warm up the engine until the cooling fan operates.
 - (1) Set the air conditioning as follows while warming up the engine.

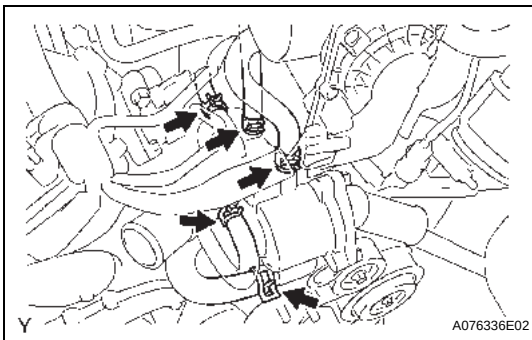
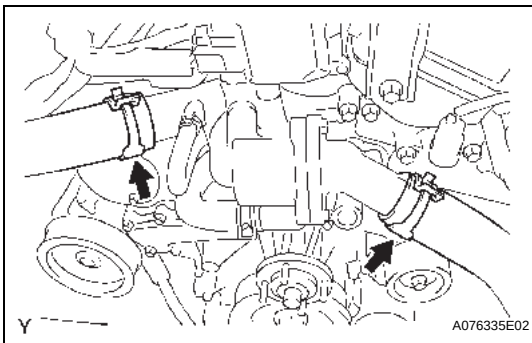
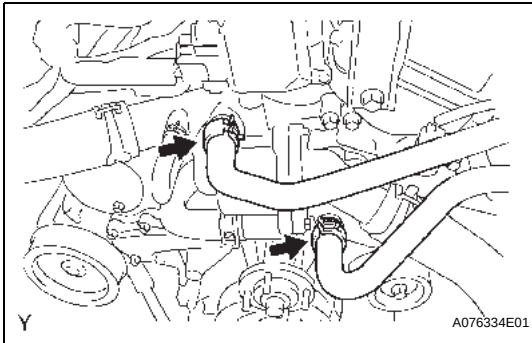
Item	Condition
Fan Speed	Any setting except OFF
Temperature	Toward WARM
Air Conditioning Switch	OFF

- (2) Maintain the engine speed at 2,000 to 2,500 rpm and warm up the engine until the cooling fan operates.
 - (f) Squeeze the inlet and outlet radiator hoses several times by hand while warming up the engine.
 - (g) Stop the engine and wait until the coolant cools down.
 - (h) Remove the radiator cap and check the coolant level inside the radiator.
 - (i) If the coolant level is below the full level, perform the steps from (a) through (h) and repeat the operation until the coolant level remains at the full level.
 - (j) Check the coolant level inside the radiator reservoir tank again. If it is below the full level, add coolant.
- 3. CHECK FOR ENGINE COOLANT LEAKAGE**
- (a) Fill the radiator with coolant and attach a radiator cap tester.
 - (b) Pump it to 118 kPa (1.2 kgf/cm² 17.1 psi), then check for leakage.

WATER PUMP

REMOVAL

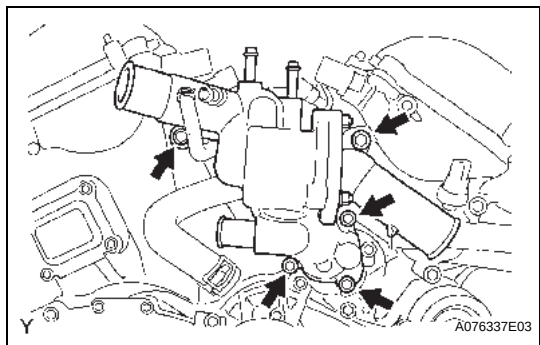
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY (for Pre Runner and 4WD Type)**
 - (a) Remove the 4 bolts, then remove the engine under cover.
3. **DRAIN ENGINE COOLANT (See page [CO-3](#))**
4. **REMOVE RADIATOR SUPPORT TO FRAME SEAL LH (See page [CO-15](#))**
5. **REMOVE V-BANK COVER (See page [ES-414](#))**
6. **REMOVE FAN SHROUD (See page [CO-15](#))**
7. **REMOVE AIR CLEANER ASSEMBLY (See page [ES-415](#))**
8. **REMOVE WATER INLET**
 - (a) Disconnect the 2 oil cooler hoses (with oil cooler).



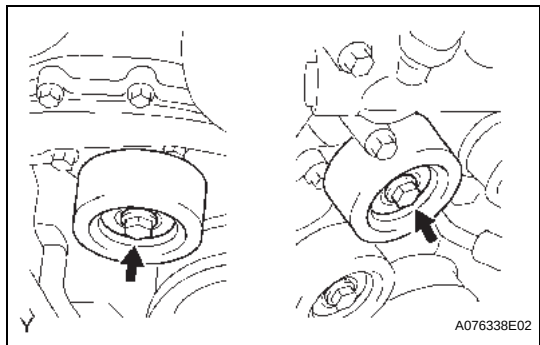
- (b) Disconnect the 2 radiator hoses.

CO

- (c) Disconnect the 5 water by-pass hoses.

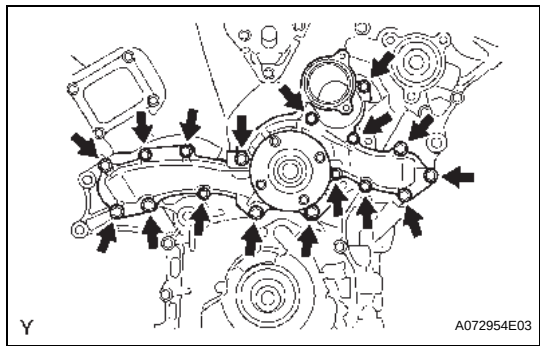


- (d) Remove the 5 bolts and water inlet.
- (e) Remove the O-ring from the water outlet pipe.
- (f) Remove the gasket from the water pump.

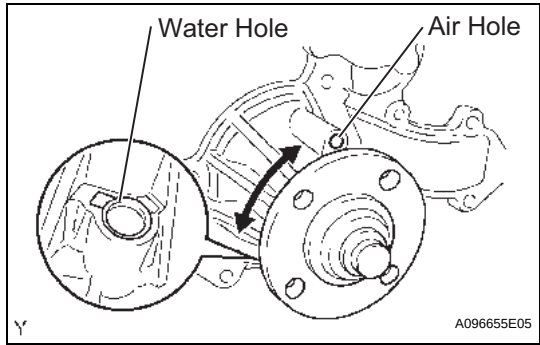


- 9. REMOVE NO. 2 IDLER PULLEY SUB-ASSEMBLY
 - (a) Remove the 2 bolts, then remove the 2 idler pulleys.
 - 10. REMOVE GENERATOR ASSEMBLY (See page [CH-7](#))
 - 11. SEPARATE COOLER COMPRESSOR ASSEMBLY (See page [ES-409](#))
 - 12. REMOVE V-RIBBED BELT TENSIONER ASSEMBLY
- HINT:

Drive Type	See Page
2WD	EM-23
Pre Runner and 4WD	EM-44

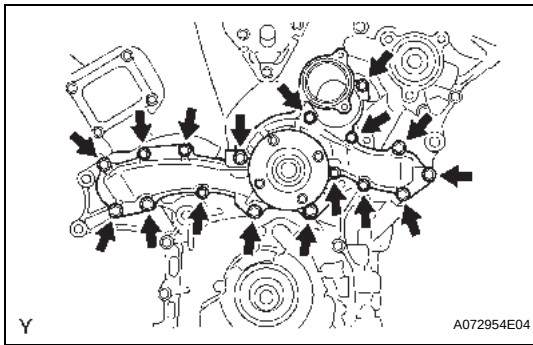


- 13. REMOVE WATER PUMP ASSEMBLY
 - (a) Remove the 17 bolts, then remove the water pump and gasket.



INSPECTION

- 1. INSPECT WATER PUMP ASSEMBLY
 - (a) Visually check the water hole for coolant leakage. If leakage is found, replace the water pump assembly.
 - (b) Turn the pulley and check that the water pump bearing moves smoothly and quietly. If necessary, replace the water pump assembly.



INSTALLATION

1. INSTALL WATER PUMP ASSEMBLY

- (a) Install a new gasket and the water pump with the 17 bolts.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf) for bolt A
23 N*m (235 kgf*cm, 17 ft.*lbf) for bolt B

2. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY

HINT:

Drive Type	See Page
2WD	EM-26
Pre Runner and 4WD	EM-48

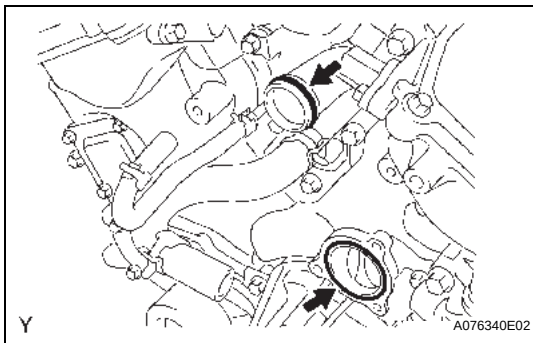
3. INSTALL COOLER COMPRESSOR ASSEMBLY (See page [ES-410](#))

4. INSTALL GENERATOR ASSEMBLY (See page [CH-13](#))

5. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY

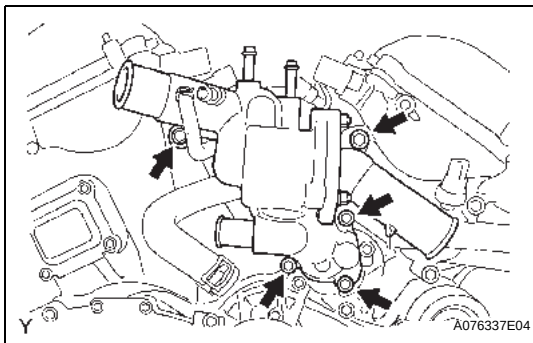
- (a) Install the 2 idler pulleys with the 2 bolts.

Torque: 39 N*m (398 kgf*cm, 29 ft.*lbf)



6. INSTALL WATER INLET

- (a) Install a new O-ring onto the water outlet pipe.
 (b) Install a new gasket onto the water pump.
 (c) Apply soapy water to the O-ring.



- (d) Install the water inlet with the 5 bolts.

Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

- (e) Connect the 5 water by-pass hoses.

- (f) Connect the 2 radiator hoses.

- (g) Connect the 2 oil cooler hoses (with oil cooler).

7. INSTALL AIR CLEANER ASSEMBLY (See page [ES-416](#))

8. INSTALL FAN SHROUD (See page [CO-20](#))

9. INSTALL RADIATOR SUPPORT TO FRAME SEAL LH

10. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

11. ADD ENGINE COOLANT (See page [CO-3](#))

12. CHECK FOR ENGINE COOLANT LEAKAGE (See page [CO-4](#))

13. INSTALL V-BANK COVER

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

Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)

14. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY (for Pre Runner and 4WD Type)

- (a) Install the engine under cover with the 4 bolts.
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

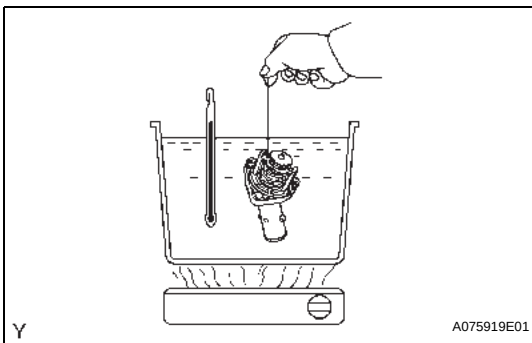
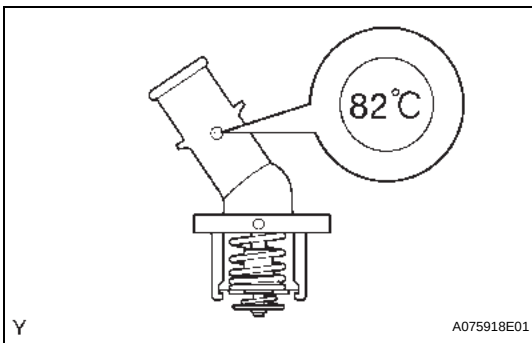
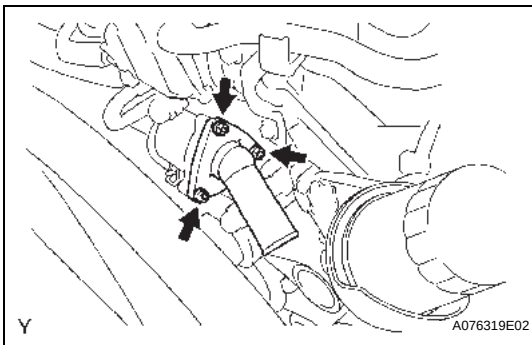
THERMOSTAT

REMOVAL

HINT:

If the thermostat is not installed, cooling efficiency will be reduced. Do not remove the thermostat, to prevent the engine overheating.

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **DRAIN ENGINE COOLANT** (See page [CO-3](#))
3. **REMOVE V-BANK COVER** (See page [ES-414](#))
4. **REMOVE NO.2 RADIATOR HOSE**
5. **REMOVE WATERY INLET WITH THERMOSTAT**
 - (a) Remove the 3 nuts, then remove the water inlet with thermostat and gasket.



INSPECTION

1. **INSPECT WATER INLET WITH THERMOSTAT**

HINT:

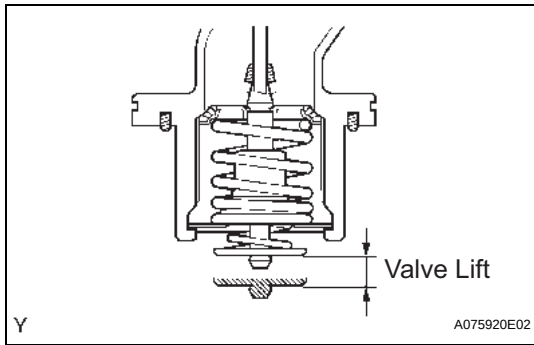
The valve opening temperature is inscribed on the thermostat.

- (a) Immerse the thermostat in water, then gradually heat the water.
- (b) Check the valve opening temperature of the thermostat.

Valve opening temperature:

80 to 84°C (176 to 183°F)

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



- (c) Check the valve lift.

Valve lift:

8.0 mm (0.31 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 77°C (171°F)).

If not fully closed, replace the thermostat.

INSTALLATION

1. INSTALL WATER INLET

- (a) Install a new gasket onto the water inlet with thermostat.
- (b) Install the water inlet with thermostat with the 3 nuts.
Torque: 9.0 N*m (92 kgf*cm, 80 in.*lbf)

2. CONNECT NO.2 RADIATOR HOSE

3. CONNECT BATTERY NEGATIVE TERMINAL

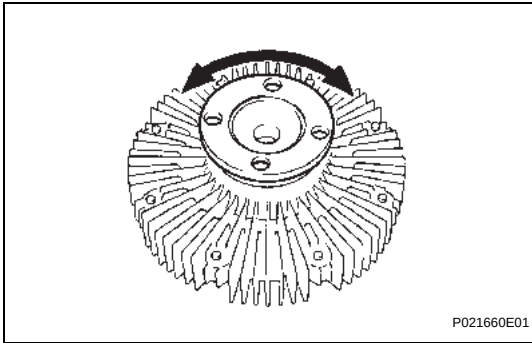
Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

4. ADD ENGINE COOLANT (See page [CO-3](#))

5. CHECK FOR ENGINE COOLANT LEAKAGE (See page [CO-4](#))

6. INSTALL V-BANK COVER

- (a) Install the V-bank cover with the 2 nuts.
Torque: 7.5 N*m (76 kgf*cm, 66 in.*lbf)



FAN

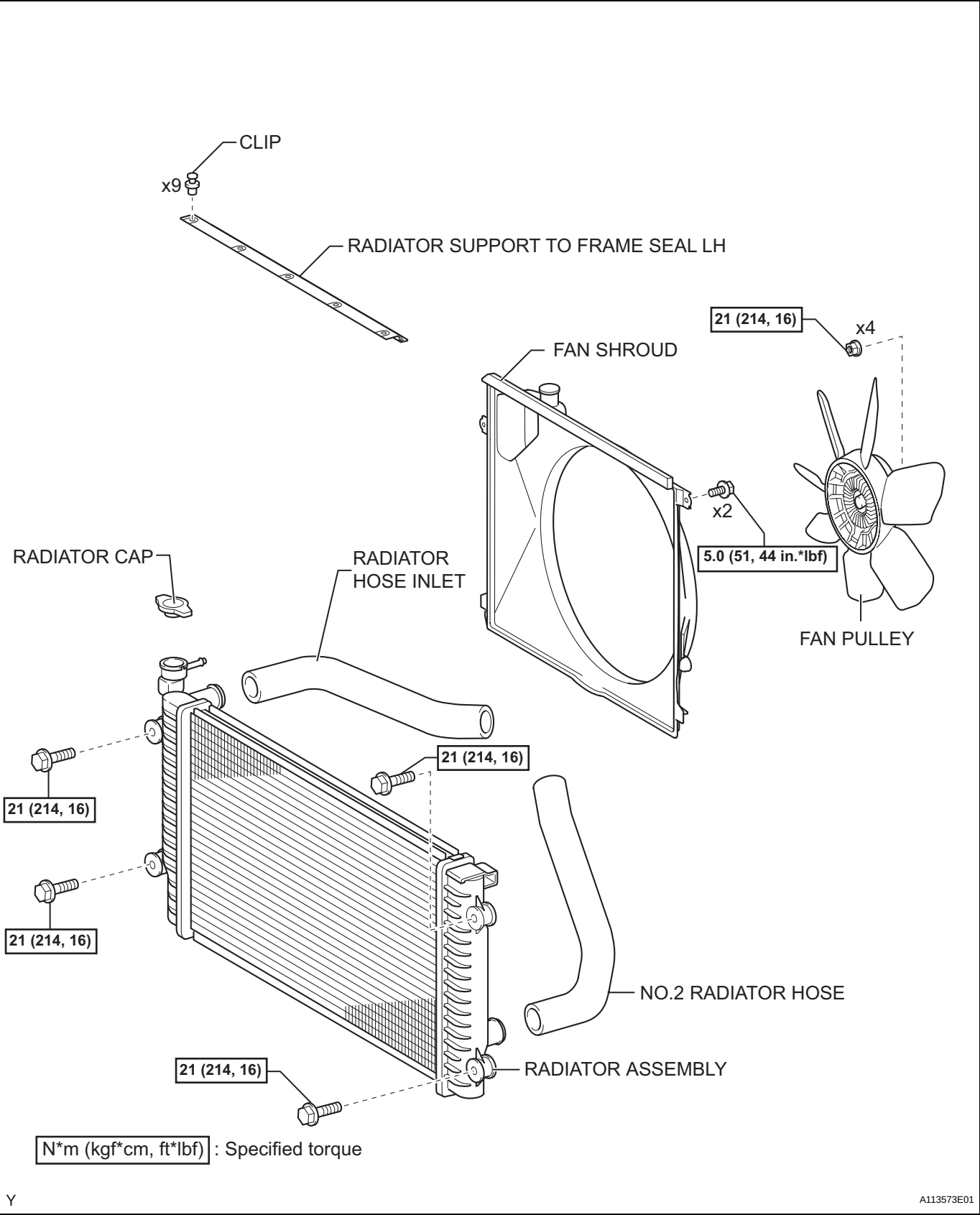
INSPECTION

1. INSPECT FLUID COUPLING ASSEMBLY

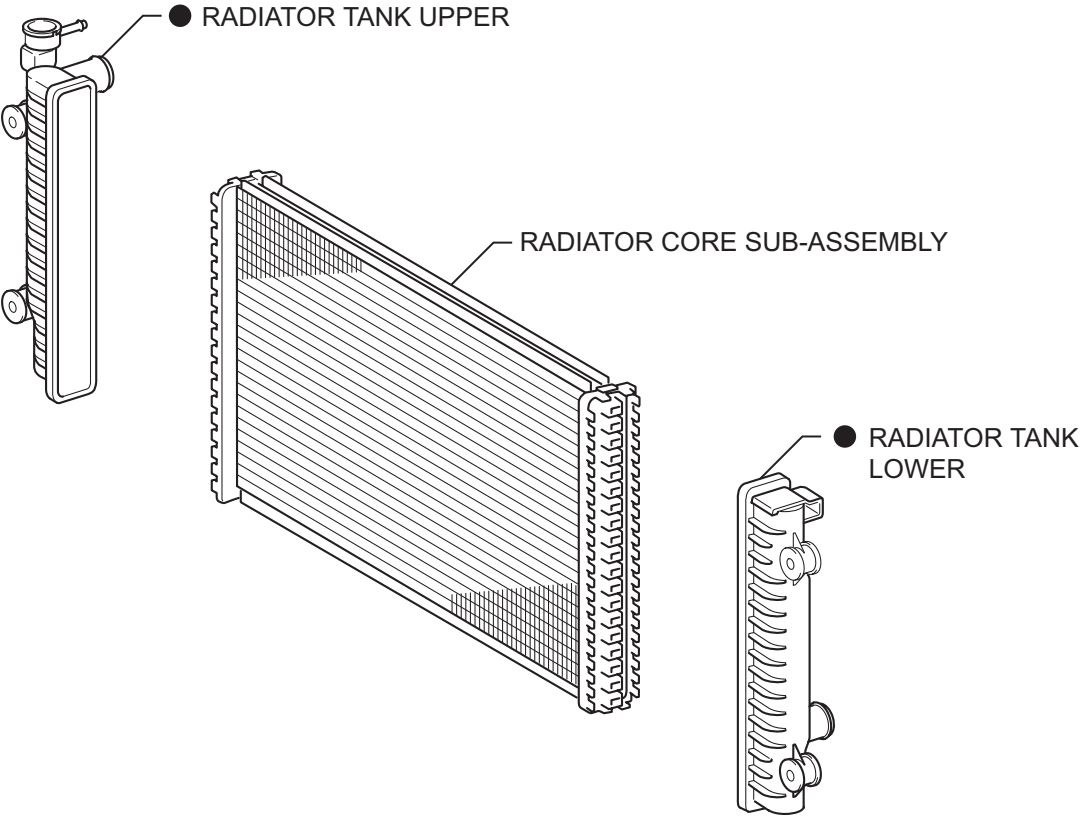
- (a) Check the fluid coupling for damage and silicon oil leakage.
If necessary, replace the fluid coupling.

RADIATOR

COMPONENTS



CO



● Non-reusable part

Y

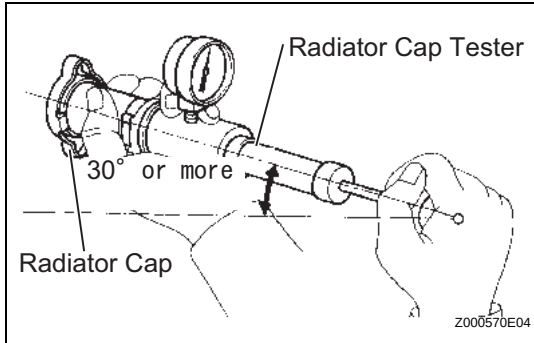
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ON-VEHICLE INSPECTION

1. INSPECT RADIATOR CAP SUB-ASSEMBLY

NOTICE:

- If the radiator cap is contaminated, rinse it with water.
- Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.
- When performing the following steps (a) and (b), keep the tester at an angle of 30° or more above the horizontal.



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

Pumping speed:

1 push every 3 seconds or more

NOTICE:

Push the pump at a constant speed.

If air does not come from the vacuum valve, replace the radiator cap.

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

Pumping speed:

1 push every second

NOTICE:

The above pumping speed is for the first pumping only (in order to close the vacuum valve). After the first pumping, the pumping speed can be reduced.

HINT:

Use the tester's maximum reading as the opening pressure.

Standard opening pressure:

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

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

If the opening pressure is less than the minimum, replace the radiator cap.

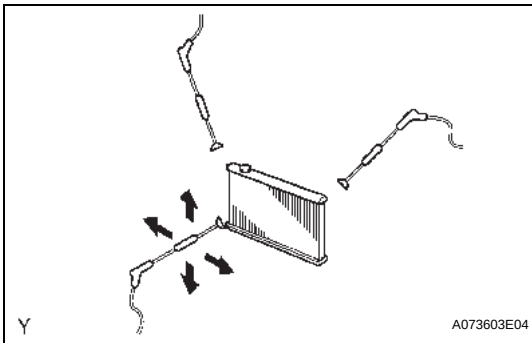
ON-VEHICLE CLEANING

1. CHECK FINS FOR BLOCKAGE

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

NOTICE:

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



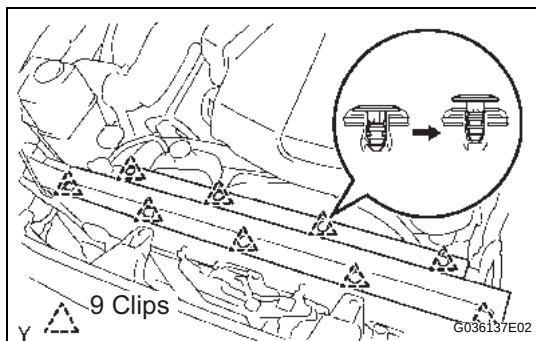
Injection Pressure kPa (kg/cm ² , psi)	Injection Distance mm (in.)
2,942 to 4,903 (30 to 50, 427 to 711)	300 (11.811)
4,903 to 7,845 (50 to 80, 711 to 1,138)	500 (19.685)

-
- If the fins are bent, straighten them with a screwdriver or pliers.
 - Be careful not to expose electronic components to water.

REMOVAL

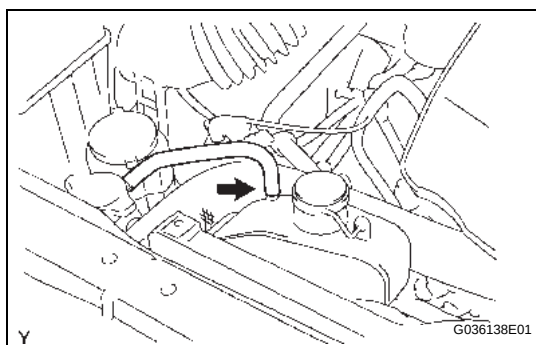
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **DRAIN ENGINE COOLANT** (See page [CO-3](#))
3. **REMOVE RADIATOR SUPPORT TO FRAME SEAL LH**

- (a) Disengage the 9 clips, then remove the radiator support to frame seal.

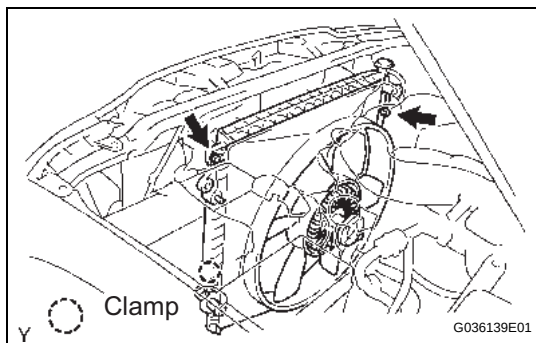


4. **REMOVE FAN SHROUD**

- (a) Disconnect the hose from the radiator reserve tank.

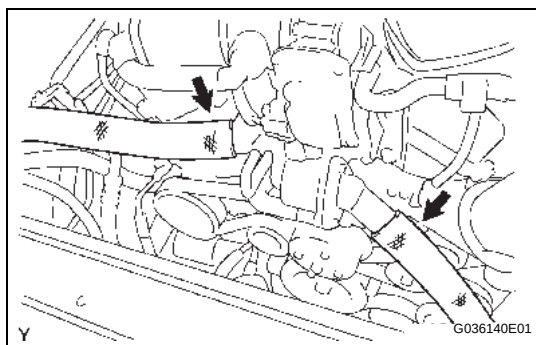


- (b) Remove the 2 cooler hoses from the clamp (with automatic transmission).
- (c) Remove the 4 nuts from the fan pulley.
- (d) Remove the fan and generator V belt (see page [EM-5](#)).
- (e) Remove the 2 bolts from the fan shroud.
- (f) Remove the fan pulley and fan shroud.

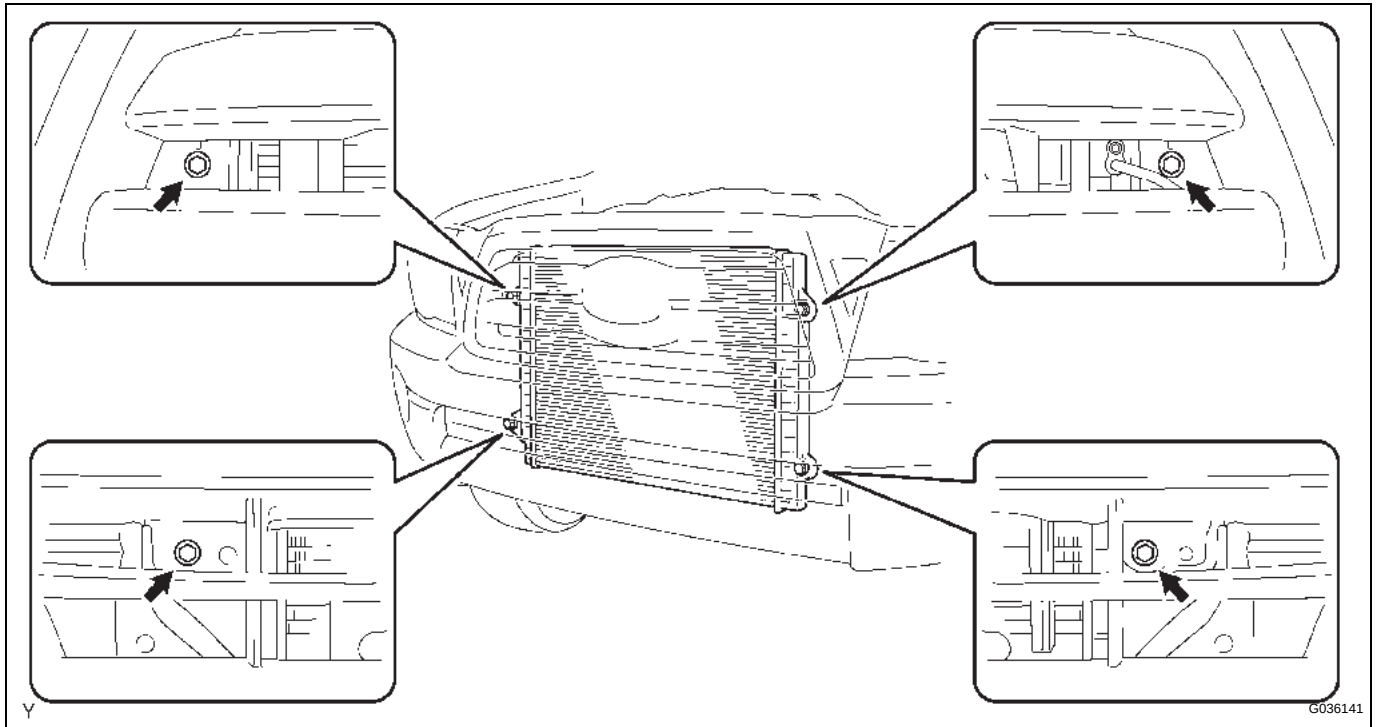


5. **REMOVE RADIATOR ASSEMBLY**

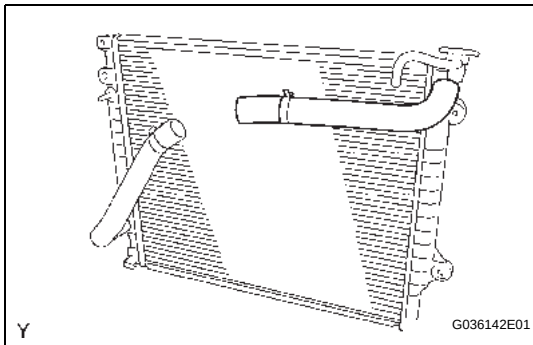
- (a) Disconnect the 2 radiator hoses.
- (b) Remove the 4 bolts, then remove the radiator.



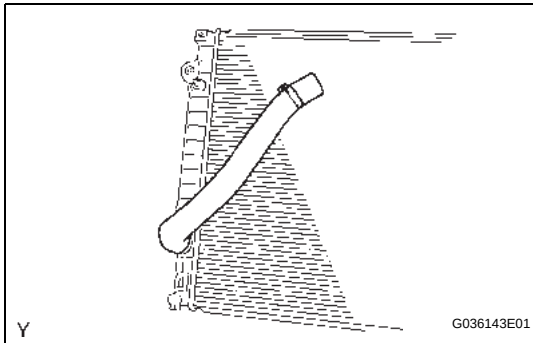
- (c) Disconnect the 2 oil cooler hoses (with automatic transmission).



6. REMOVE RADIATOR HOSE INLET



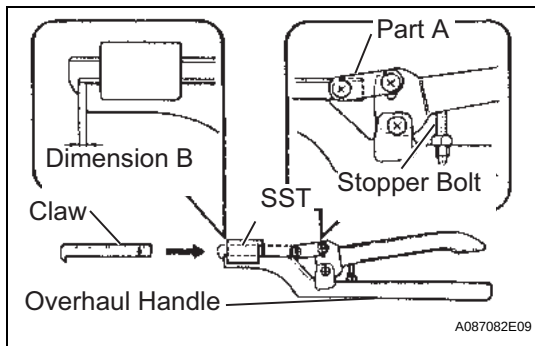
7. REMOVE NO.2 RADIATOR HOSE



DISASSEMBLY

1. REMOVE RADIATOR DRAIN COCK

- Remove the drain cock plug.
- Remove the O-ring from the drain cock plug.



2. ASSEMBLE SST

SST 09230-01010 (09231-01010, 09231-01030)

- Engage the claw with the overhaul handle by inserting it into the hole in part A as shown in the illustration.
- While gripping the handle, adjust dimension B to between 0.2 and 0.3 mm, using the stopper bolt.

Dimension B:

0.2 to 0.3 mm (0.008 to 0.012 in)

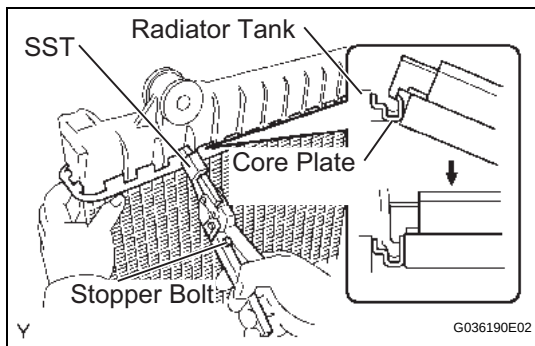
NOTICE:

If the stopper bolt can not be adjusted, the claw may be damaged.

3. UNCAULK CORE PLATE

- Straighten the core plate by gripping it with SST until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01030)



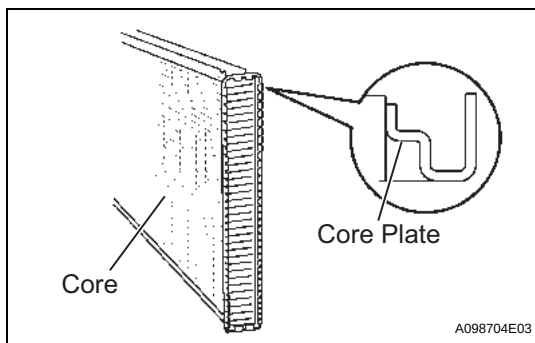
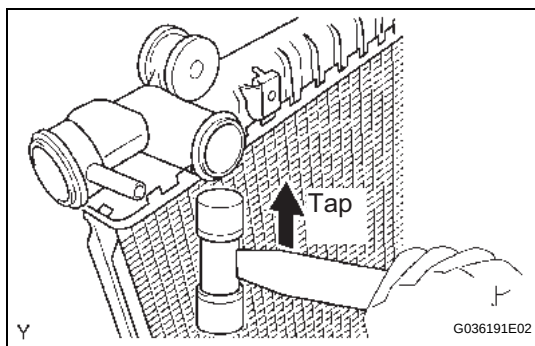
4. REMOVE RADIATOR TANK UPPER

- Lightly tap the radiator tank bracket (or radiator tank pipe) with a soft-faced hammer to remove the radiator tank.

5. REMOVE RADIATOR TANK LOWER

HINT:

Perform the same procedures as for the radiator tank upper.



INSPECTION

1. INSPECT RADIATOR CORE SUB-ASSEMBLY

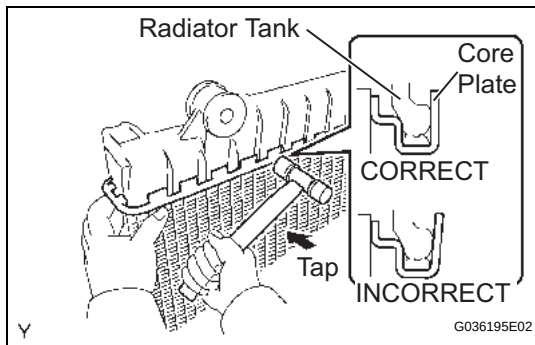
Check the core plate for damage.

HINT:

- If the sides of the core plate groove are deformed, it is impossible to reassemble the radiator tank. Therefore, first correct any deformation using pliers or a similar tool.
- Water leakage will occur if the bottom of the core plate groove is damaged or dented. Repair or replace the core plate if necessary.

NOTICE:

The radiator can only be recaulked twice. After being recaulked twice, the radiator assembly must be replaced.



REASSEMBLY

1. INSTALL RADIATOR TANK UPPER

- Install the new radiator tank.
- Tap the core plate with a soft-faced hammer until there is no gap between the core plate and radiator tank.

2. INSTALL RADIATOR TANK LOWER

HINT:

Perform the same procedures as for the radiator tank upper.

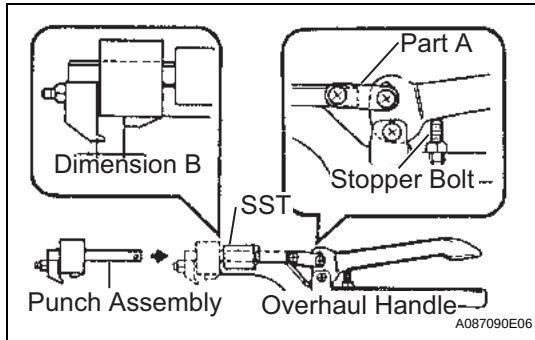
3. ASSEMBLE SST

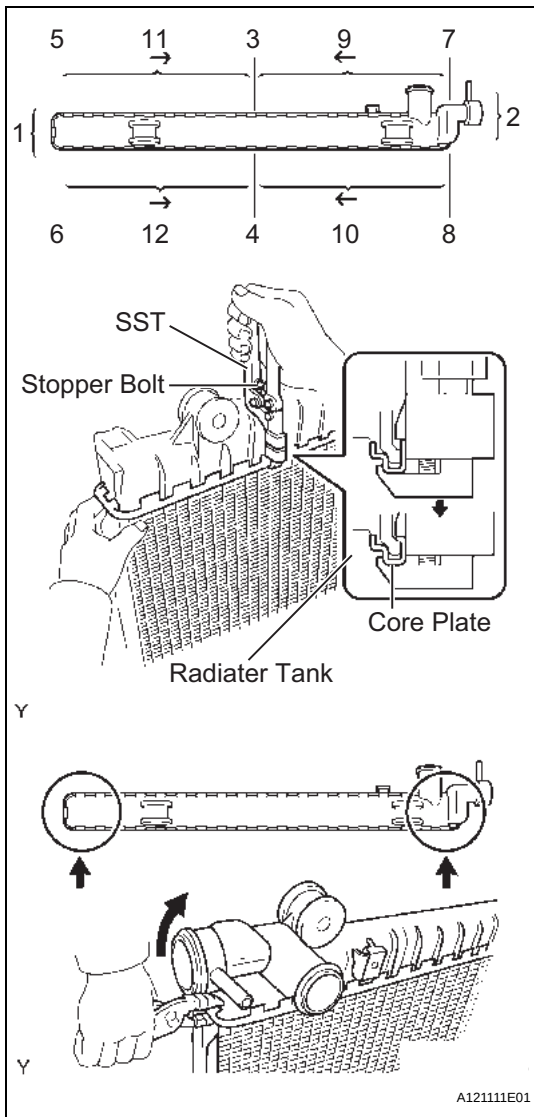
SST 09230-01010 (09231-01010, 09231-01020)

- Install the punch assembly into the overhaul handle by inserting it into the hole in part A as shown in the illustration.
- While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B:

8.4 mm (0.331 in.)





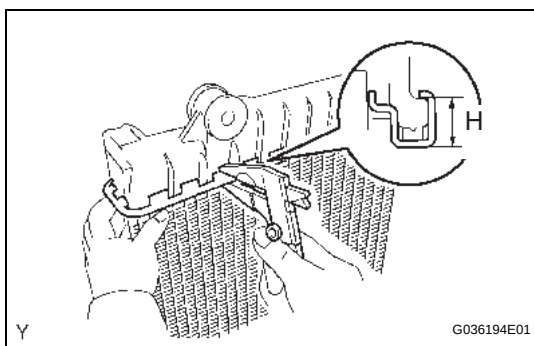
4. CAULK CORE PLATE

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

SST 09230-01010 (09231-01010, 09231-01020)

HINT:

Do not tap the portions indicated in the illustration or the oil collar using SST. Use pliers or a similar tool. Be careful not to damage the core plate.



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

Plate height (H):

8.7 to 9.1 mm (0.343 to 0.358 in.)

If the height is not as specified, readjust the stopper bolt of the handle, then caulk it again.

5. INSTALL RADIATOR DRAIN COCK

- (a) Install a new O-ring onto the drain cock plug.
(b) Install the drain cock plug.

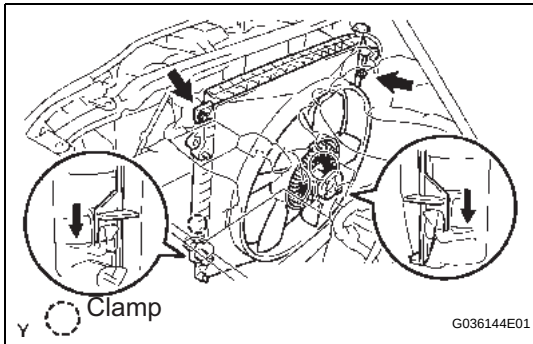
INSTALLATION

1. INSTALL NO.2 RADIATOR HOSE

2. INSTALL RADIATOR HOSE INLET

3. INSTALL RADIATOR ASSEMBLY

- (a) Install the radiator with the 4 bolts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)
- (b) Connect the 2 oil cooler hoses (with automatic transmission).



4. INSTALL FAN SHROUD

- (a) Provisionally install the fan shroud together with the fan pulley.
- (b) Install the fan and generator V belt (see page [EM-5](#)).
- (c) Install the fan pulley with the 4 nuts.
Torque: 21 N*m (214 kgf*cm, 16 ft.*lbf)
- (d) Install the fan shroud with the 2 bolts.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)
- (e) Install the 2 cooler hoses into the clamp (with automatic transmission).
- (f) Connect the hose to the radiator reserve tank.

5. INSTALL RADIATOR SUPPORT TO FRAME SEAL LH

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

7. ADD ENGINE COOLANT (See page [CO-3](#))

8. CHECK FOR ENGINE COOLANT LEAKAGE (See page [CO-4](#))

COOLING SYSTEM

PARTS LOCATION

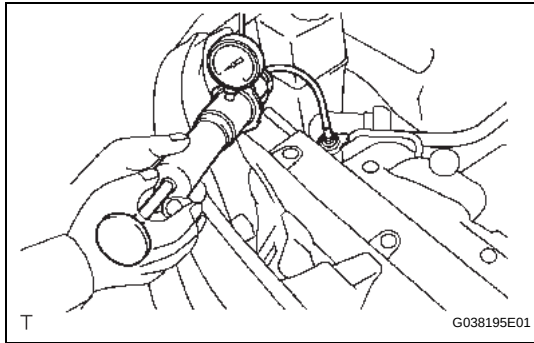
RADIATOR CAP
SUB-ASSEMBLY

FLUID COUPLING ASSEMBLY

WATER PUMP ASSEMBLY

THERMOSTAT

CO



ON-VEHICLE INSPECTION

1. INSPECT COOLING SYSTEM FOR LEAKAGE

CAUTION:

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

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

HINT:

If the pressure drops, check the hose, radiator and water pump for leakage. If no external leakage is found, check the heater core, cylinder block and cylinder head.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

- (a) Check that the coolant level in the reservoir tank is between the FULL and LOW lines when the engine is cold.

If low, check for leakage 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

- (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. Fluid and steam could be blown out under pressure.

- (b) Check that there are no excessive deposits of rust or scale around the radiator cap or radiator filler hole.
If excessively dirty, replace the coolant.
- (c) Attach the radiator cap.

COOLANT

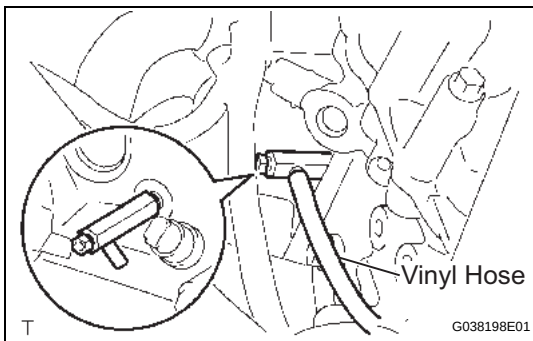
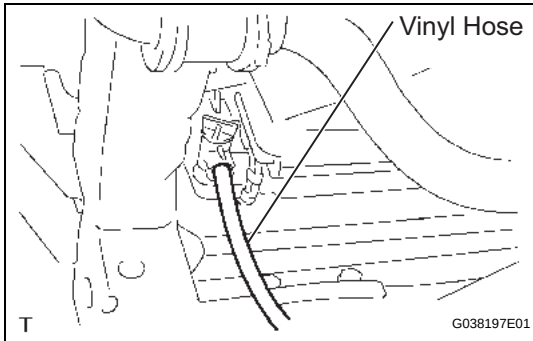
REPLACEMENT

1. DRAIN ENGINE COOLANT

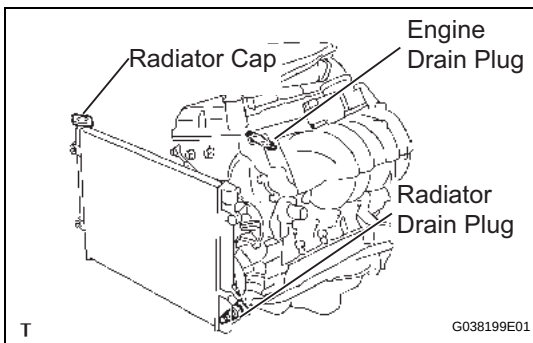
CAUTION:

To avoid the danger of being burned, do not remove the radiator cap while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

- (a) Remove the 4 bolts, then remove the engine under cover No. 1. (PRE RUNNER AND 4WD TYPE)
- (b) Install a vinyl hose onto the radiator side.



- (c) Install a vinyl hose onto the engine side.



- (d) Loosen the engine drain plug.
- (e) Loosen the radiator drain plug.
- (f) Remove the radiator cap and drain coolant.
- (g) Drain the coolant from the reservoir tank.

2. ADD ENGINE COOLANT

- (a) Tighten the engine drain plug.
Torque: 13 N*m (130 kgf*cm, 9 ft.*lbf)
- (b) Tighten the radiator drain plug.
- (c) Disconnect the 2 vinyl hoses.
- (d) Slowly fill the system with engine coolant.

Capacity:

M/T: 8.7 liters (9.2 US qts, 7.7 Imp. qts)

A/T: 8.6 liters (9.1 US qts, 7.6 Imp. qts)

HINT:

- Use of improper coolants may damage the engine cooling system.

- Use only 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 (coolant with long-life hybrid organic acid technology consists of a combination of low phosphates and organic acids.)
- New Toyota vehicles are filled with Toyota Super Long Life Coolant. When replacing the coolant, Toyota Super Long Life Coolant (color is pink, premixed ethylene glycol concentration is approximately 50 % and freezing temperature is -35°C (-31°F)) is recommended.

NOTICE:

Do not substitute plain water for engine coolant.

- (e) Check the coolant level inside the radiator by squeezing the inlet and outlet radiator hoses several times by hand. If the coolant level goes down, add coolant.
- (f) Install the radiator cap securely.
- (g) Slowly pour coolant into the radiator reservoir until it reaches the FULL line.
- (h) Warm up the engine until the cooling fan operates.
 - Set the air conditioning as follows while warming up the engine.

Item	Condition
Fan speed	Any setting except OFF
Temperature	Toward warm
Air condition switch	OFF

- (i) Squeeze the inlet and outlet radiator hoses several times by hand while warming up the engine.
- (j) Stop the engine and wait until the coolant cools down.
- (k) Remove the radiator cap and check the coolant level inside the radiator.
- (l) If the coolant level is below the full level, perform the steps from (d) through (k) and repeat the operation until the coolant level remains at the full level.
- (m) Check the coolant level inside the radiator reservoir tank again. If it is below the full level, add coolant.
- (n) Install the engine under cover No. 1 with the 4 bolts. (PRE RUNNER AND 4WD TYPE)

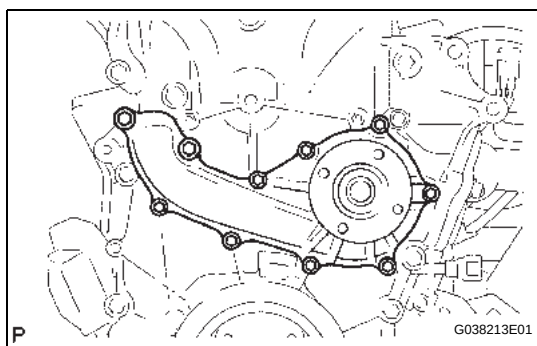
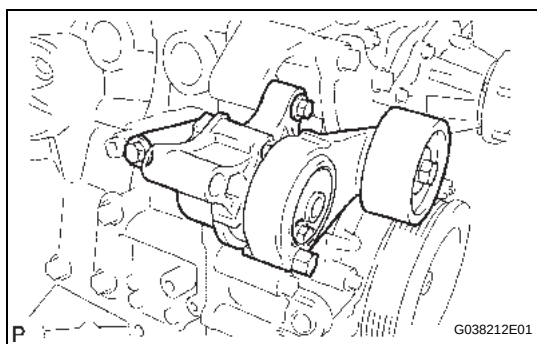
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

3. CHECK FOR ENGINE COOLANT LEAKAGE

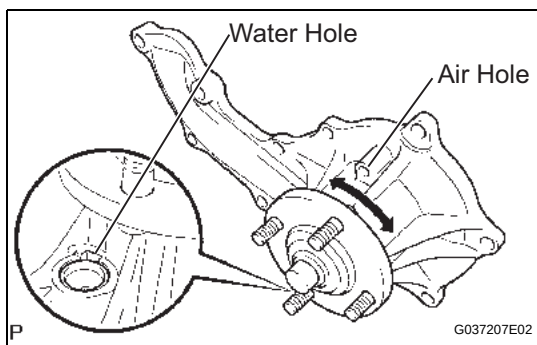
WATER PUMP

REMOVAL

1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY (for Pre Runner and 4WD Type)**
 - (a) Remove the 4 bolts, then remove the engine under cover No. 1.
3. **DRAIN ENGINE COOLANT (See page CO-3)**
4. **REMOVE RADIATOR SUPPORT TO FRAME SEAL LH (See page CO-12)**
5. **REMOVE FAN SHROUD (See page CO-13)**
6. **REMOVE GENERATOR ASSEMBLY (See page CH-7)**
7. **REMOVE V-RIBBED BELT TENSIONER ASSEMBLY**
 - (a) Remove the 3 bolts, then remove the V-ribbed belt tensioner.

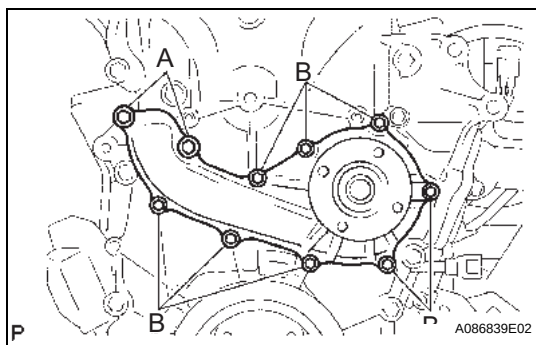


8. **REMOVE WATER PUMP ASSEMBLY**
 - (a) Remove the 10 bolts, then remove the water pump and gasket.



INSPECTION

1. **INSPECT WATER PUMP ASSEMBLY**
 - (a) Visually check the air hole and water hole for coolant leakage. If any leakage is found, replace the water pump.
 - (b) Turn the pulley seat and check that the water pump bearing moves smoothly and does not make a noise. If necessary, replace the water pump.

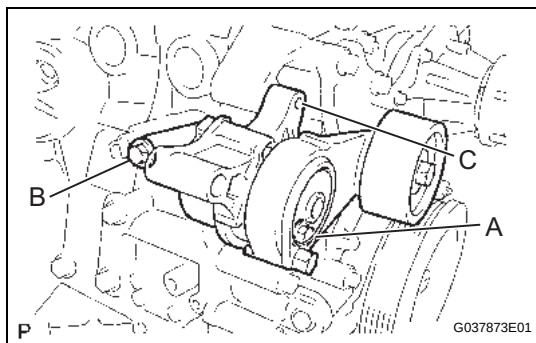


INSTALLATION

1. INSTALL WATER PUMP ASSEMBLY

- (a) Install a new gasket, then install the water pump with the 10 bolts.

Torque: 21 N*m (214 kgf*cm, 15 ft.*lbf) for bolt A
9 N*m (92 kgf*cm, 80 in.*lbf) for bolt B



2. INSTALL V-RIBBED BELT TENSIONER ASSEMBLY

- (a) Provisionally install the V-ribbed belt tensioner with bolts A and B.

- (b) Tighten bolt B.

Torque: 40 N*m (408 kgf*cm, 30 ft.*lbf)

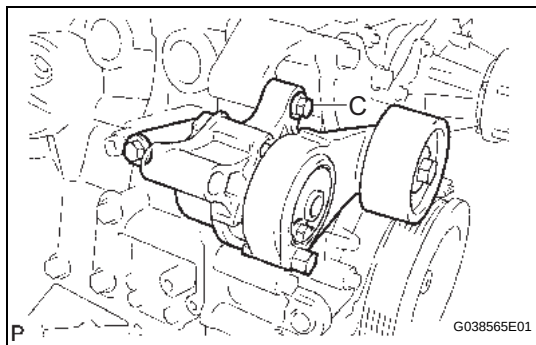
- (c) Tighten bolt A.

Torque: 21 N*m (214 kgf*cm, 16 ft.*lbf)

- (d) Check that the bolt holes of the V-ribbed belt tensioner and timing chain cover are aligned, and install bolt C.

- (e) Tighten bolt C.

Torque: 43 N*m (434 kgf*cm, 32 ft.*lbf)



3. INSTALL GENERATOR ASSEMBLY

(See page [CH-13](#))

4. INSTALL FAN SHROUD (See page [CO-18](#))

5. INSTALL RADIATOR SUPPORT TO FRAME SEAL LH (See page [CO-19](#))

6. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)

7. ADD ENGINE COOLANT (See page [CO-3](#))

8. CHECK FOR ENGINE COOLANT LEAKAGE (See page [CO-2](#))

9. INSTALL NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY (for Pre Runner and 4WD Type)

- (a) Install the engine under cover No. 1 with the 4 bolts.

Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)

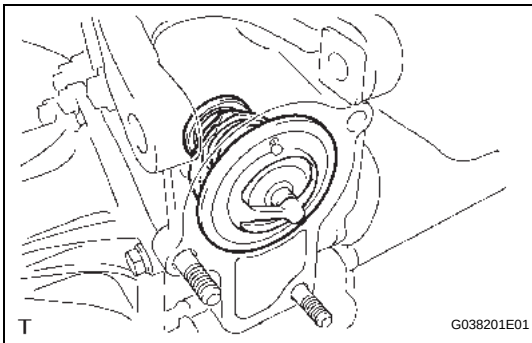
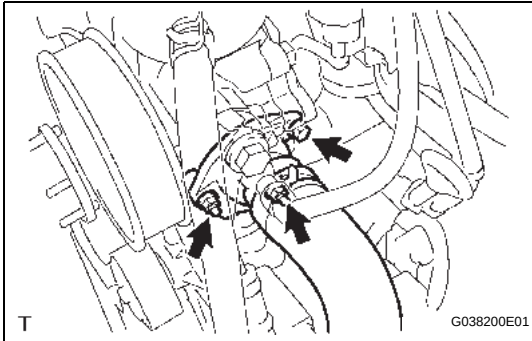
THERMOSTAT

REMOVAL

1. DRAIN ENGINE COOLANT (See page [CO-3](#))

2. REMOVE WATER INLET

- Remove the bolt and 2 nuts, then remove the water inlet.
- Remove the gasket from the timing chain cover.



3. REMOVE THERMOSTAT

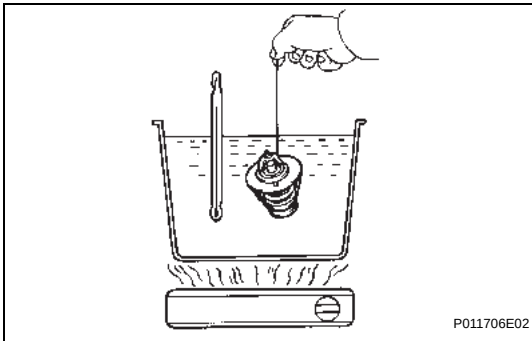
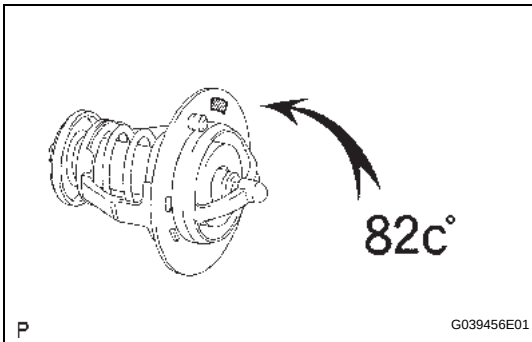
- Remove the thermostat from the timing chain cover.

INSPECTION

1. INSPECT THERMOSTAT

HINT:

The valve opening temperature is inscribed on the thermostat.

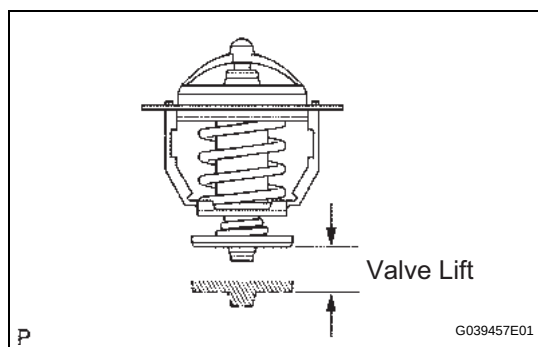


- Immerse the thermostat in water, then gradually heat the water.
- Check the valve opening temperature of the thermostat.

Valve opening temperature:

80 to 84°C (176 to 183°F)

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



- (c) Check the valve lift.

Valve lift:

8.5 mm (0.355 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 77°C (171°F)).

If not fully closed, replace the thermostat.

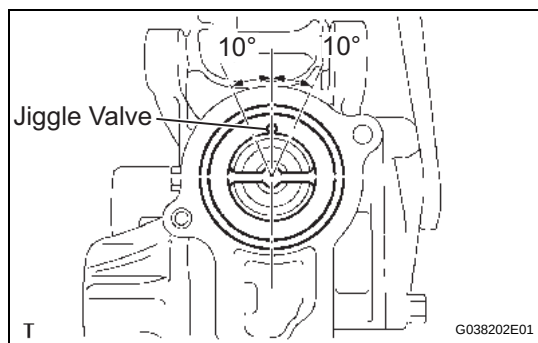
INSTALLATION

1. INSTALL THERMOSTAT

- (a) Install a new gasket onto the thermostat.
(b) Install the thermostat with the jiggle valve upward.

HINT:

The jiggle valve may be set within 10° to either side of the prescribed position.



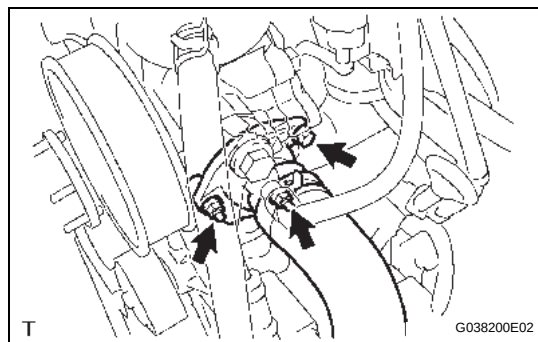
2. INSTALL WATER INLET

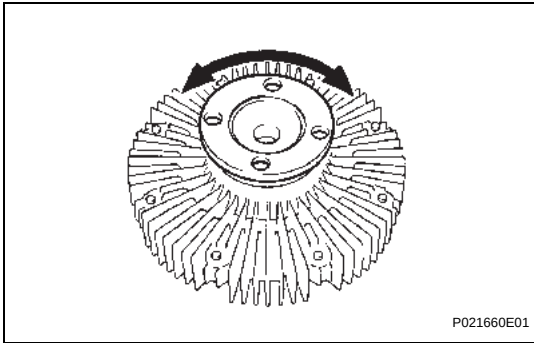
- (a) Install a new gasket and the water inlet with the bolt and 2 nuts.

Torque: 20 N*m (204 kgf*cm, 15 ft.*lbf)

3. ADD ENGINE COOLANT (See page [CO-3](#))

4. CHECK FOR ENGINE COOLANT LEAKAGE (See page [CO-2](#))





FAN

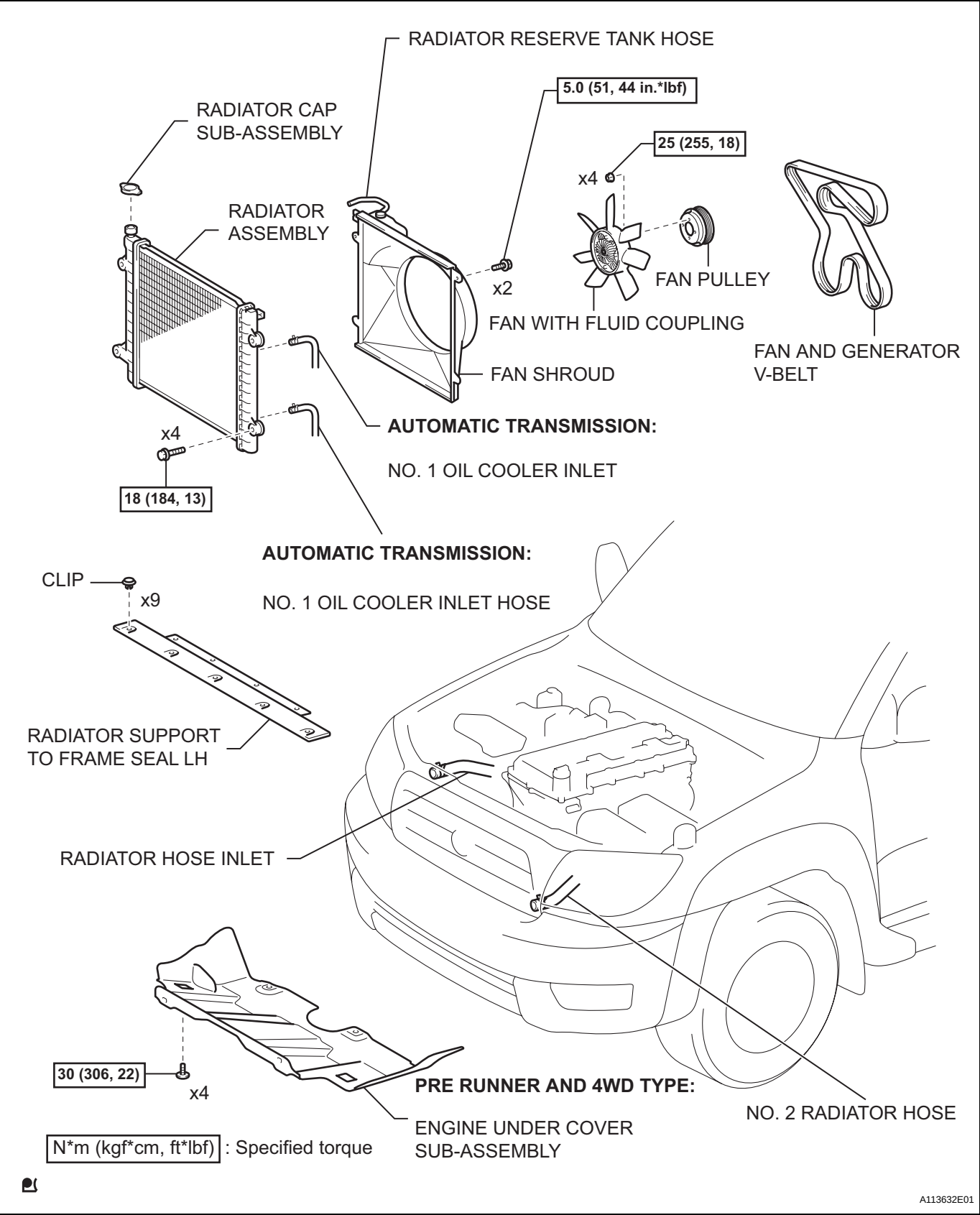
INSPECTION

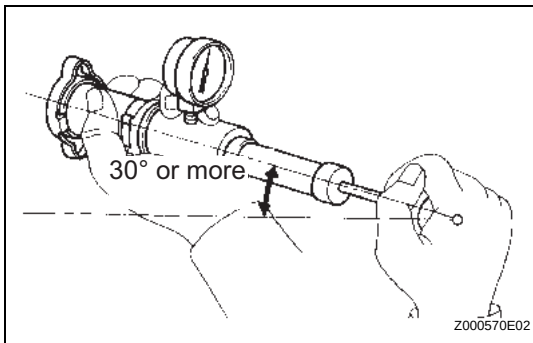
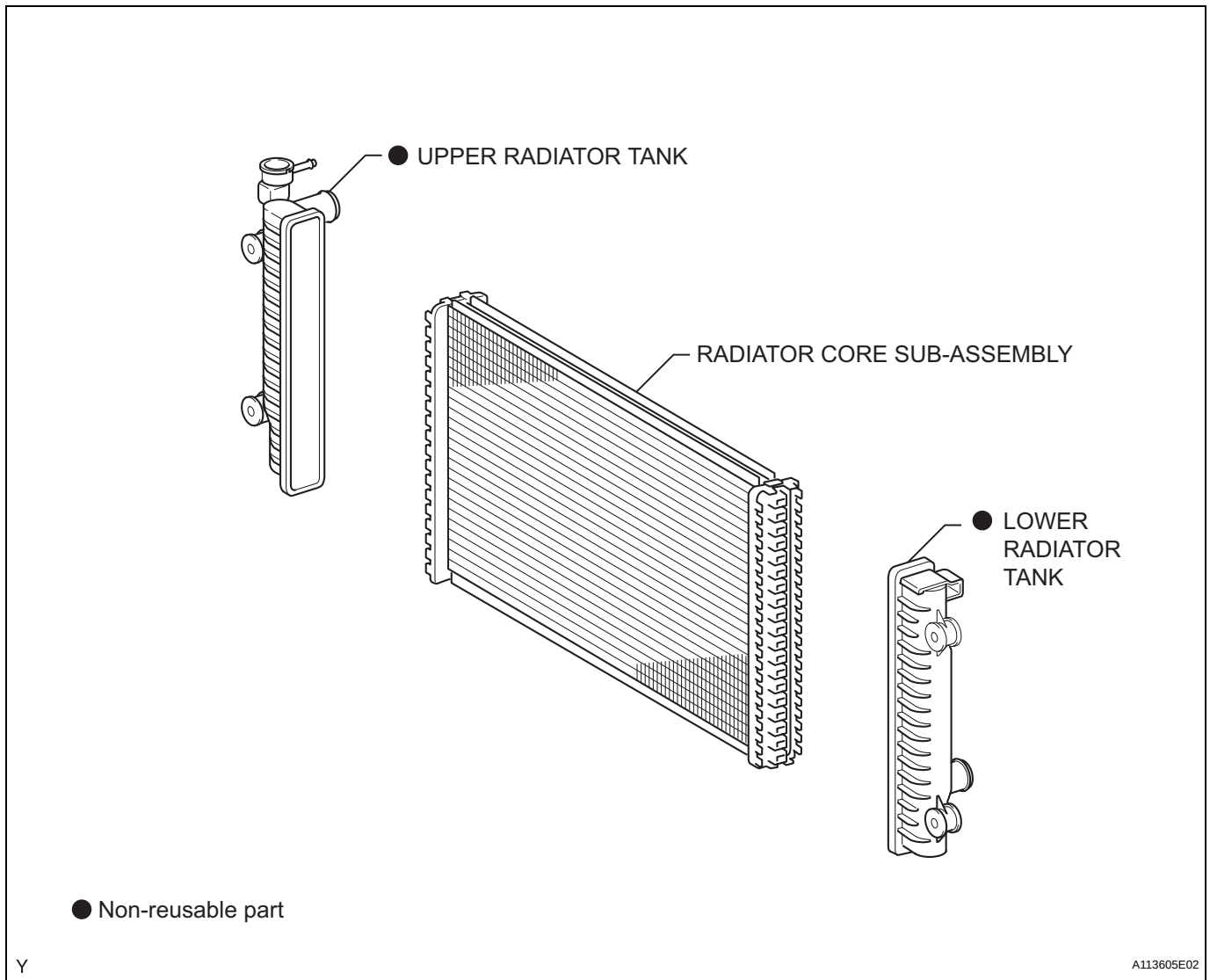
1. INSPECT FLUID COUPLING ASSY

- (a) Check the fluid coupling for damage and silicon oil leakage.
If necessary, replace the fluid coupling.

RADIATOR

COMPONENTS





ON-VEHICLE INSPECTION

1. CHECK RADIATOR CAP SUB-ASSEMBLY

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

Pumping speed:

1 push every 3 seconds or more

NOTICE:

Push the pump at a constant speed.

If air does not come from the vacuum valve, replace the radiator cap.

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

Standard opening pressure:

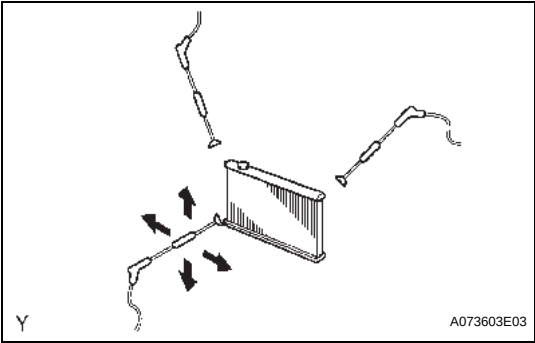
93 to 123 kPa (0.95 to 1.25 kgf/cm², 13.5 to 17.8 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

NOTICE:
The above pumping speed is for the first pumping only (in order to close the vacuum valve). After the first pumping, the pumping speed can be reduced.

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



ON-VEHICLE CLEANING

- 1. CHECK FINS FOR BLOCKAGE**
- (a) If the fins are clogged, wash them with water or a steam cleaner and then dry them with compressed air.

NOTICE:

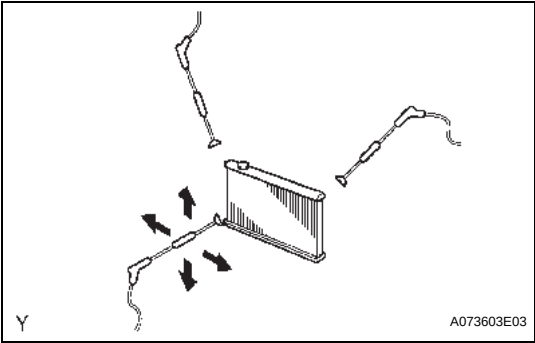
- If the distance between the steam cleaner and core is too small, the fins may be damaged. So, keep to the following injection distances.

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.
- Be careful not to expose electronic components to water.

NOTICE:
The above pumping speed is for the first pumping only (in order to close the vacuum valve). After the first pumping, the pumping speed can be reduced.

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



ON-VEHICLE CLEANING

- 1. CHECK FINS FOR BLOCKAGE**
(a) If the fins are clogged, wash them with water or a steam cleaner and then dry them with compressed air.

NOTICE:

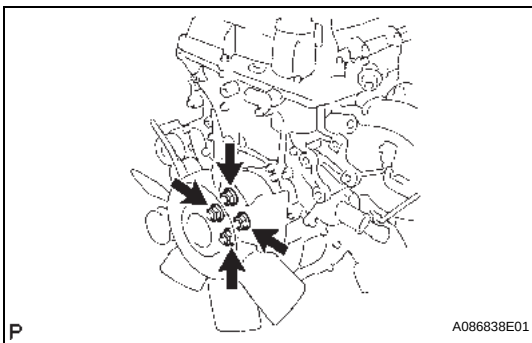
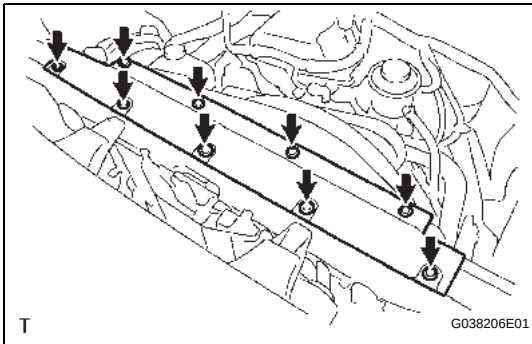
- If the distance between the steam cleaner and core is too small, the fins may be damaged. So, keep to the following injection distances.

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)

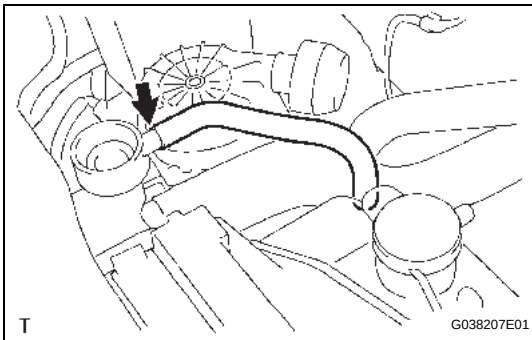
- If the fins are bent, straighten them with a screwdriver or pliers.
- Be careful not to expose electronic components to water.

REMOVAL

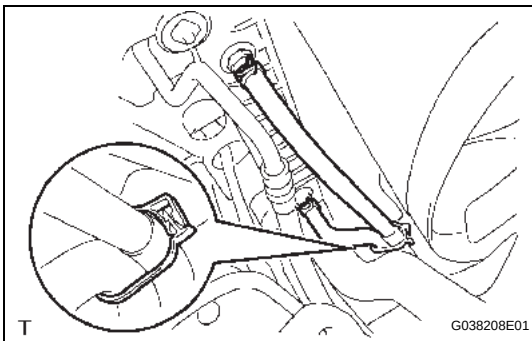
1. **DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL**
2. **REMOVE NO. 1 ENGINE UNDER COVER SUB-ASSEMBLY (for Pre Runner and 4WD Type)**
 - (a) Remove the 4 bolts, then remove the engine under cover No. 1.
3. **DRAIN ENGINE COOLANT (See page CO-3)**
4. **REMOVE RADIATOR SUPPORT TO FRAME SEAL LH**
 - (a) Disengage the 9 clips, then remove the radiator support to frame seal LH.



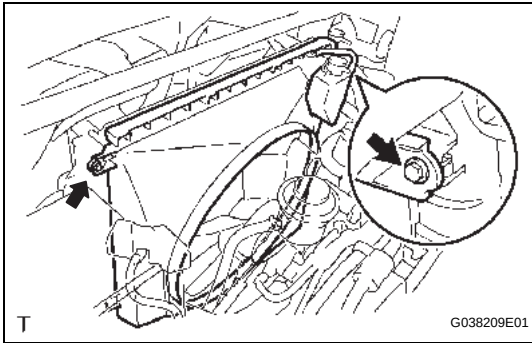
5. **REMOVE FAN SHROUD**
 - (a) Loosen the 4 nuts shown in the illustration.
 - (b) Remove the fan and generator V belt.



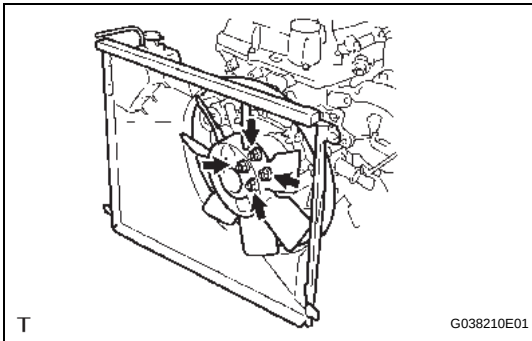
- (c) Disconnect the radiator reserve tank hose from the radiator.



- (d) Disconnect the oil cooler inlet and outlet hoses from the fan shroud. (for Automatic Transmission)



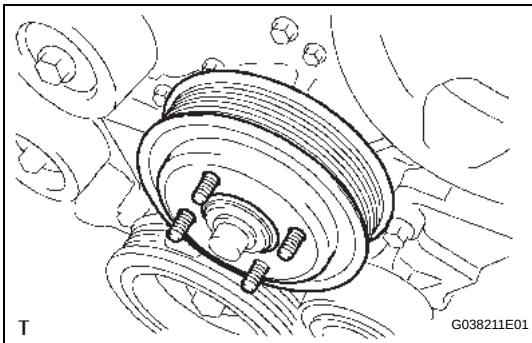
(e) Remove the 2 bolts shown in the illustration.



(f) Remove the 4 nuts, then remove the fan shroud and fan with fluid coupling together.

NOTICE:

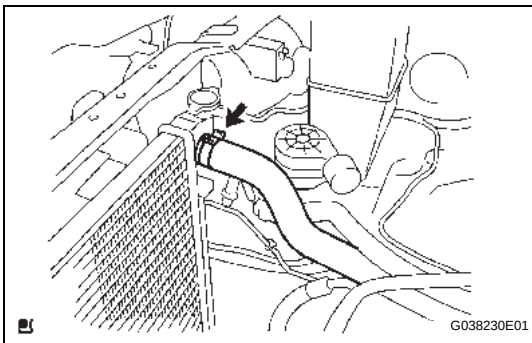
Make sure that the fan shroud and fan with fluid coupling do not make any contact with the radiator when they are removed.



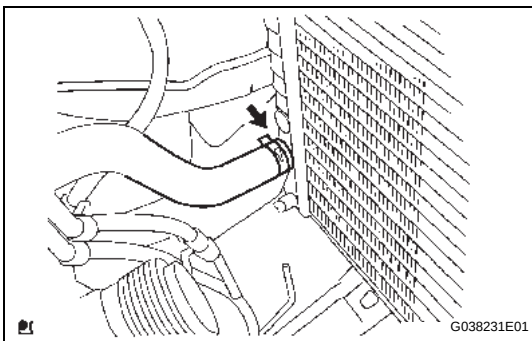
(g) Remove the fan pulley.

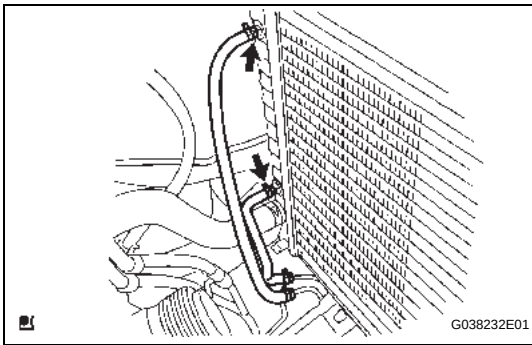
6. REMOVE RADIATOR ASSEMBLY

(a) Disconnect the radiator hose inlet.

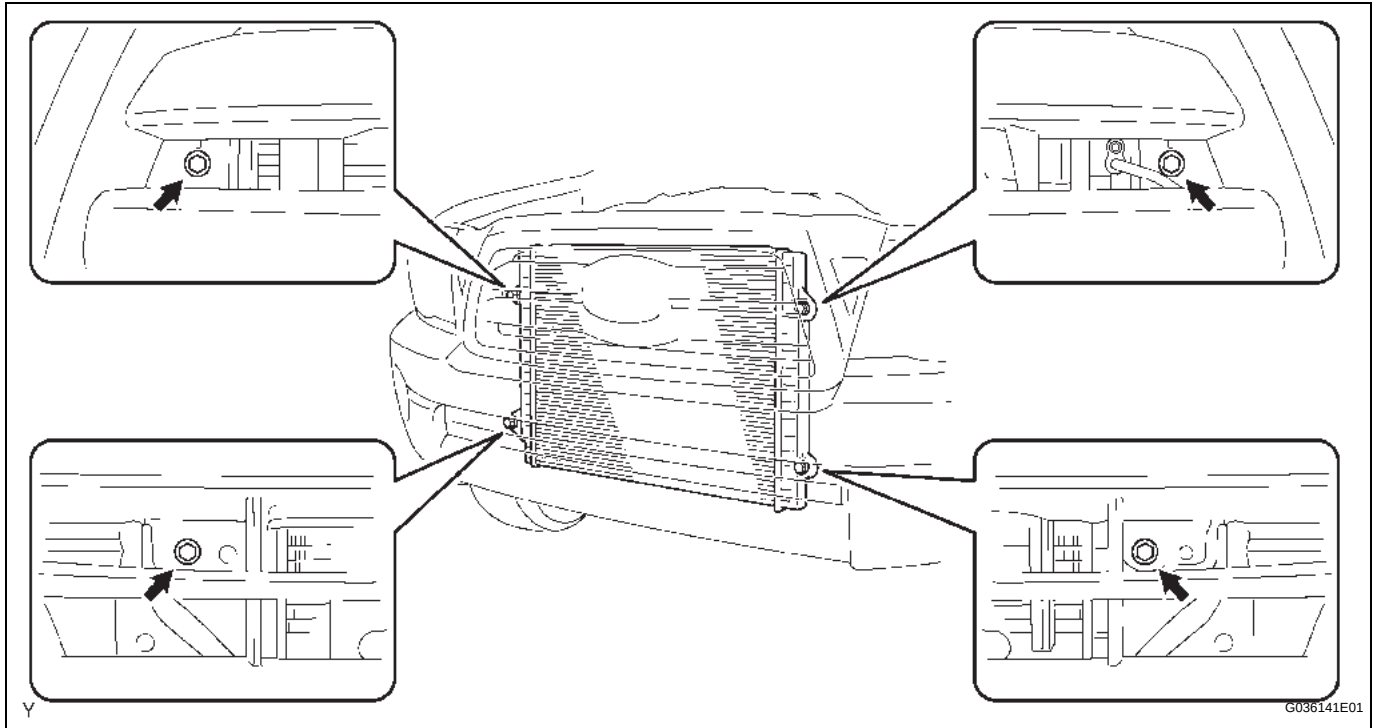


(b) Disconnect the radiator hose No. 2.





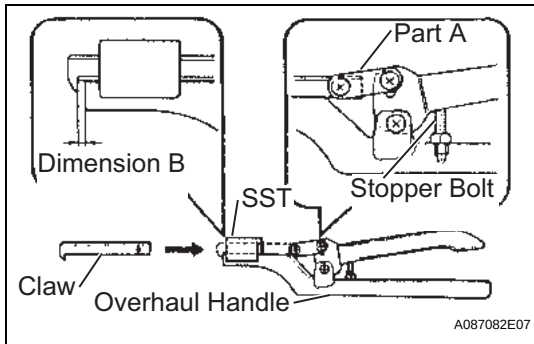
- (c) Disconnect the oil cooler inlet and outlet hoses. (for Automatic Transmission)
- (d) Remove the 4 bolts, then remove the radiator.



DISASSEMBLY

1. REMOVE RADIATOR DRAIN COCK

- Remove the drain cock plug.
- Remove the O-ring from the drain cock plug.



2. ASSEMBLE SST

SST 09230-01010 (09231-01010, 09231-01030)

- Engage the claw with the overhaul handle by inserting it into the hole in part A as shown in the illustration.
- While gripping the handle, adjust dimension B to between 0.2 and 0.3 mm, using the stopper bolt.

Dimension B:

0.2 to 0.3 mm (0.008 to 0.012 in)

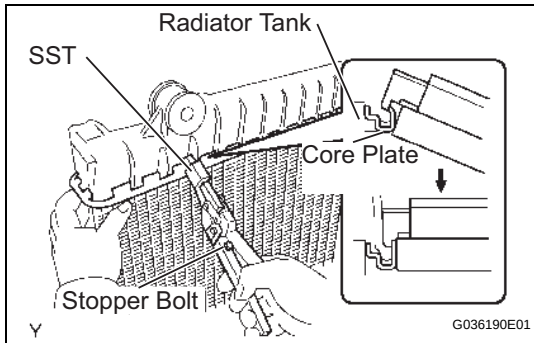
NOTICE:

If the stopper bolt can not be adjusted, the claw may be damaged.

3. UNCAULK CORE PLATE

- Straighten the core plate by gripping it with SST until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01030)



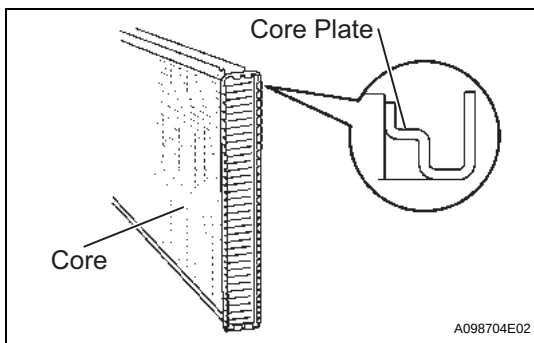
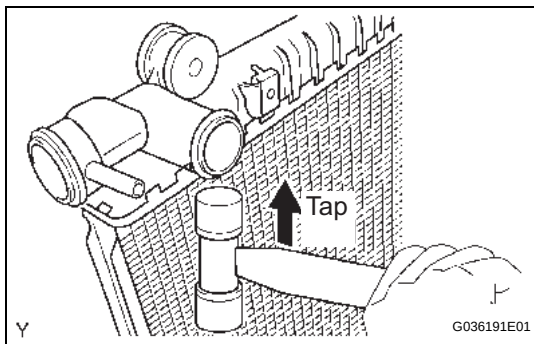
4. REMOVE RADIATOR TANK UPPER

- Lightly tap the radiator tank bracket (or radiator tank pipe) with a soft-faced hammer to remove the radiator tank.

5. REMOVE RADIATOR TANK LOWER

HINT:

Perform the same procedures as for the radiator tank upper.



INSPECTION

1. INSPECT RADIATOR CORE SUB-ASSEMBLY

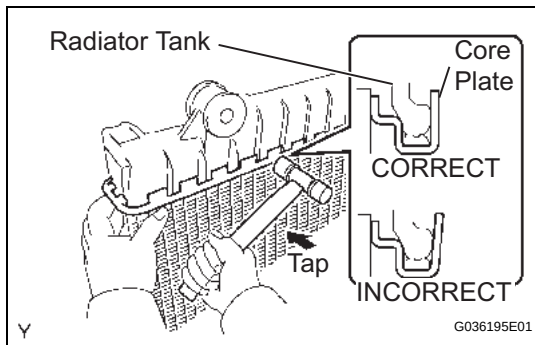
Check the core plate for damage.

HINT:

- If the sides of the core plate groove are deformed, it is impossible to reassemble the radiator tank. Therefore, first correct any deformation using pliers or a similar tool.
- Water leakage will occur if the bottom of the core plate groove is damaged or dented. Repair or replace the core plate if necessary.

NOTICE:

The radiator can only be caulked twice. After being caulked twice, the radiator assembly must be replaced.



REASSEMBLY

1. INSTALL RADIATOR TANK UPPER

- Install the new radiator tank.
- Tap the core plate with a soft-faced hammer until there is no gap between the core plate and radiator tank.

2. INSTALL RADIATOR TANK LOWER

HINT:

Perform the same procedures as for the radiator tank upper.

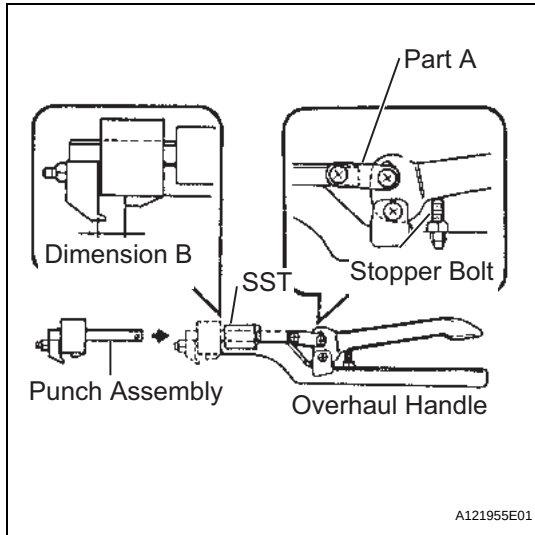
3. ASSEMBLE SST

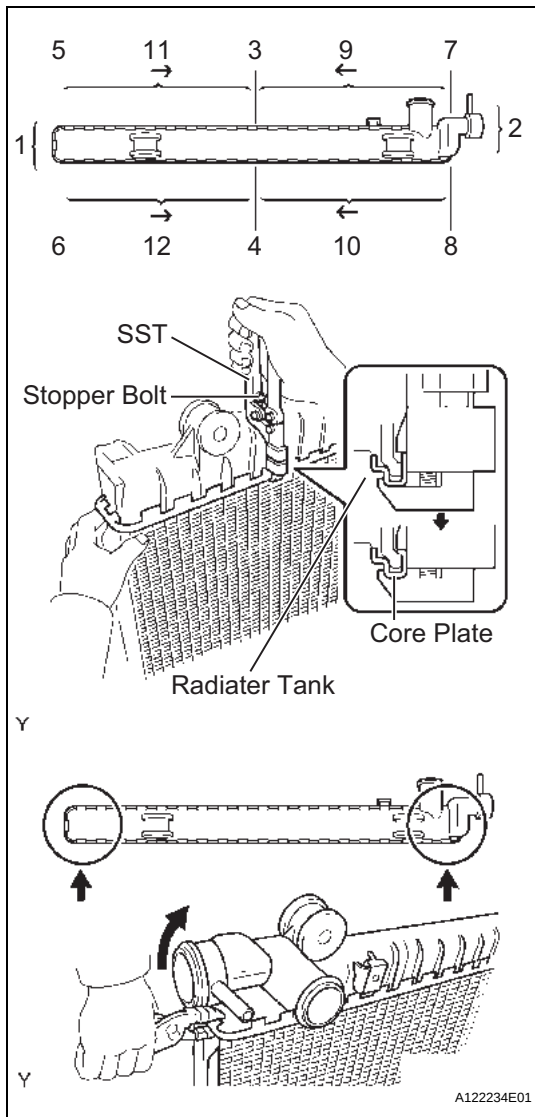
SST 09230-01010 (09231-01010, 09231-01020)

- Install the punch assembly into the overhaul handle by inserting it into the hole in part A as shown in the illustration.
- While gripping the handle, adjust the stopper bolt so that dimension B is as shown in the illustration.

Dimension B:

8.4 mm (0.331 in.)





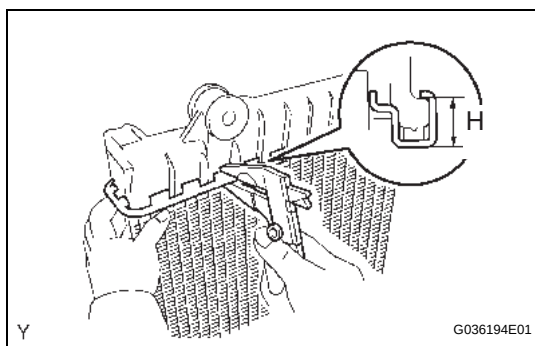
4. CAULK CORE PLATE

- (a) Gently press SST against the core plate in the order shown in the illustration. After repeating this a few times, fully caulk the core plate by gripping the handle until stopped by the stopper bolt.

SST 09230-01010 (09231-01010, 09231-01020)

HINT:

Do not tap the portions indicated in the illustration or the oil cooler using SST. Use pliers or a similar tool. Be careful not to damage the core plate.



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

Plate height (H):

8.7 to 9.1 mm (0.343 to 0.358 in.)

If the height is not as specified, readjust the stopper bolt of the handle, then caulk it again.

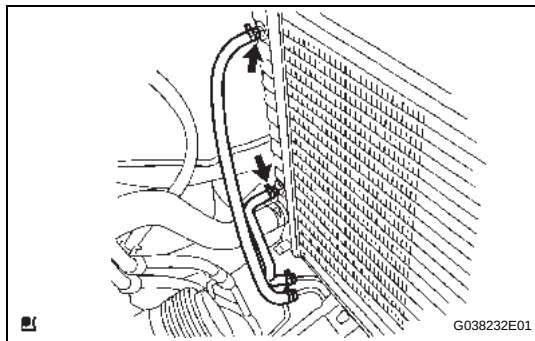
5. INSTALL RADIATOR DRAIN COCK

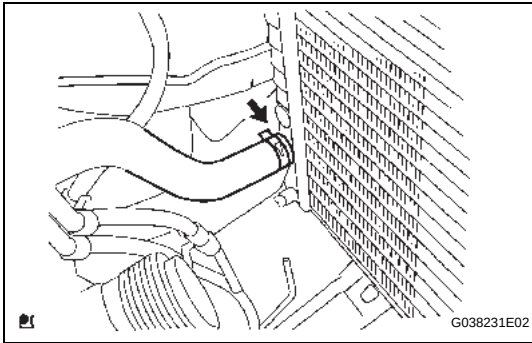
- (a) Install a new O-ring onto the drain cock plug.
(b) Install the drain cock plug.

INSTALLATION

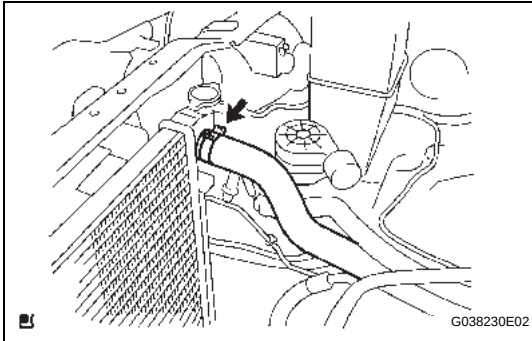
1. INSTALL RADIATOR ASSEMBLY

- (a) Install the radiator with the 4 bolts.
Torque: 18 N*m (184 kgf*cm, 13 ft.*lbf)
(b) Connect the oil cooler inlet and outlet hoses. (for Automatic Transmission)

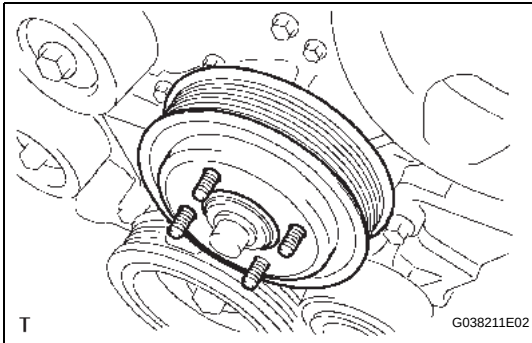




(c) Connect the radiator hose NO. 2.

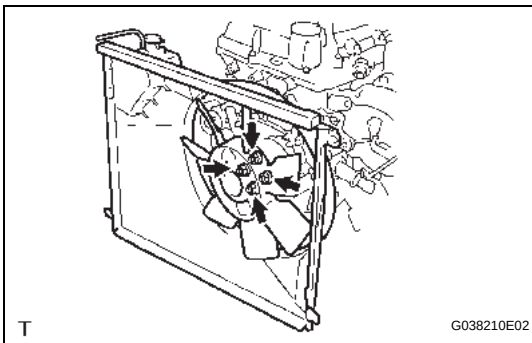


(d) Connect the radiator hose inlet.



2. INSTALL FAN SHROUD

(a) Install the fan pulley.

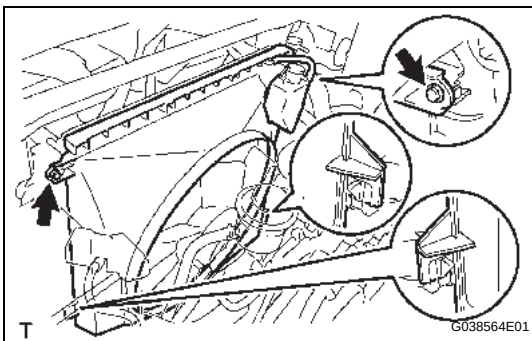


(b) Install the fan shroud and fan with fluid coupling together.

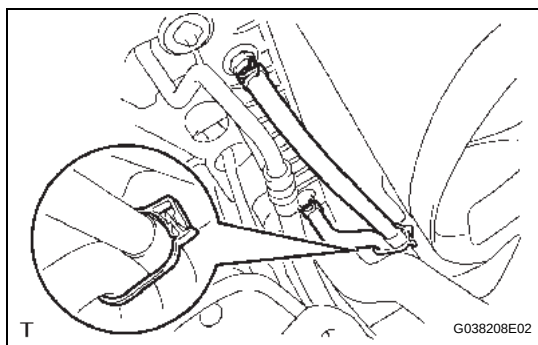
NOTICE:

Make sure that the fan shroud and fan with fluid coupling do not make any contact with the radiator when they are installed.

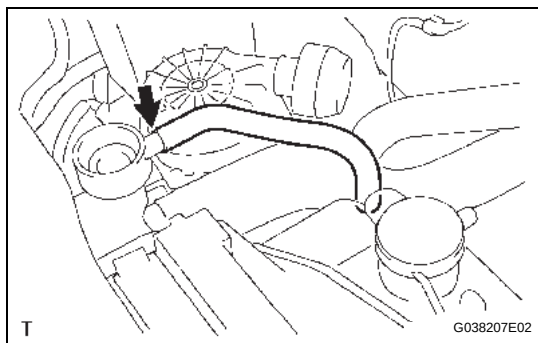
(c) Provisionally install the fan with fluid coupling with the 4 nuts.



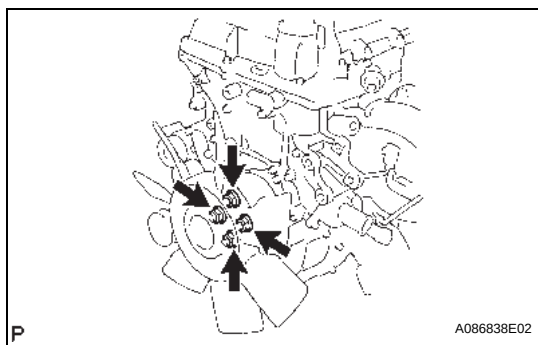
(d) Install the 2 bolts shown in the illustration.
Torque: 5.0 N*m (51 kgf*cm, 44 in.*lbf)



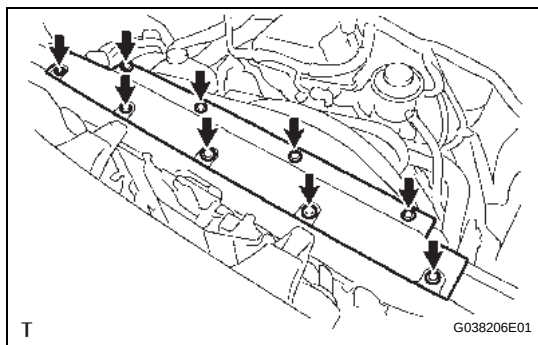
- (e) Connect the oil cooler inlet and outlet hoses to the fan shroud. (for Automatic Transmission)



- (f) Connect the radiator reserve tank hose to the radiator.
(g) Install the fan generator V belt.



- (h) Tighten the 4 nuts shown in the illustration.
Torque: 25 N*m (255 kgf*cm, 18 ft.*lbf)



- 3. INSTALL RADIATOR SUPPORT TO FRAME SEAL LH**
 - (a) Install the radiator support frame seal LH with the 9 clips.
- 4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL**
Torque: 3.9 N*m (40 kgf*cm, 35 in.*lbf)
- 5. ADD ENGINE COOLANT** (See page [CO-3](#))
- 6. CHECK FOR ENGINE COOLANT LEAKAGE** (See page [CO-2](#))
- 7. INSTALL ENGINE UNDER COVER SUB-ASSEMBLY NO.1** (for Pre Runner and 4WD Type)
Torque: 30 N*m (306 kgf*cm, 22 ft.*lbf)