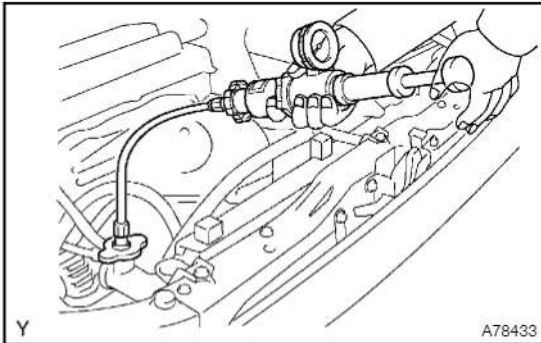


COOLING SYSTEM (2AZ-FSE)

ON-VEHICLE INSPECTION

160MY-02



1. INSPECT COOLING SYSTEM FOR LEAKS

- (a) Remove the radiator cap.

CAUTION:

To avoid the danger of being burned, radiator cap is required while the engine and radiator are still hot. Thermal expansion will cause hot engine coolant and steam to blow out from the radiator.

- (b) Remove the radiator support opening cover
(see page 14-23).
- (c) Remove the engine room cover side
(see page 14-23).
- (d) Fill the radiator with coolant, then attach a radiator cap tester.
- (e) Warm up the engine.
- (f) 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 leaks. If there are no signs or traces of external coolant leaks, check the heater core, cylinder block and head.

- (g) Reinstall the engine room cover side.
- (h) Reinstall the radiator support opening cover.
- (i) Reinstall the radiator cap.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

- (a) Check that the coolant level in the reservoir tank is between "F" and "L" lines 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

- (a) Remove the radiator cap.

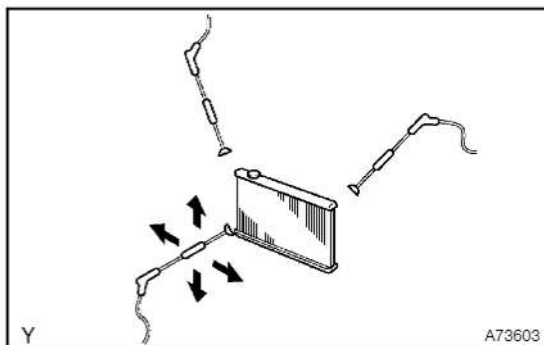
CAUTION:

To avoid the danger of being burned, radiator cap are required 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 if there are any excessive deposits of rust or scale around the water outlet cap and water outlet filler hole; the coolant should be free of oil.

If excessively dirty, replace the coolant.

- (c) Reinstall the radiator cap.



4. INSPECT FIN BLOCKAGE

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

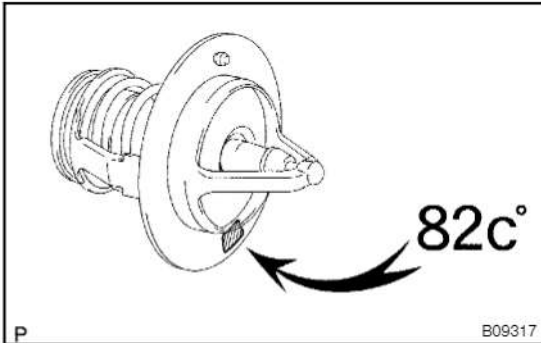
NOTICE:

- If the distance between the steam cleaner and core is too 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.
- Be careful not to expose electronic components to water.

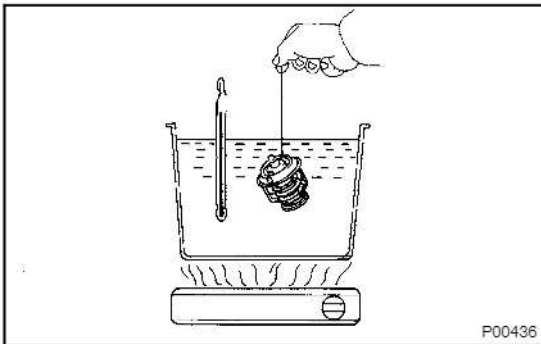
INSPECTION



1. INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.



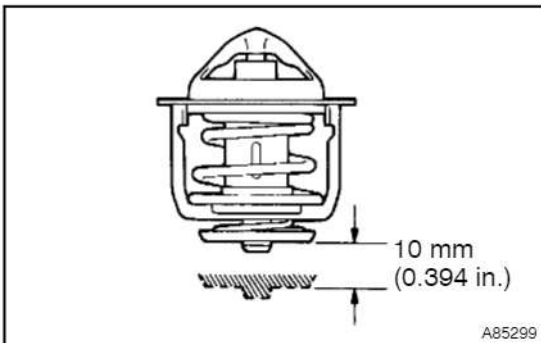
- (a) Immerse the thermostat in water, then gradually heat the water.

- (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) Inspect the valve lift.

Valve lift: 10 mm (0.394 in.) or more at 95 °C (203 °F)

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

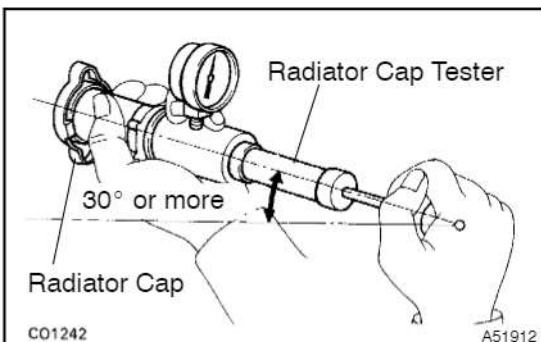
- (d) Camshaft that the valve of the thermostat is closed when the water temperature (b) cools down below 77 °C (170 °F).

If not fully closed, replace the thermostat.

2. INSPECT RADIATOR CAP SUB-ASSY

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 over 30° above horizontal.



- (a) Using a radiator cap tester, slowly pump the tester, then 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, then measure the relief valve opening pressure.

NOTICE:

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

Pump speed: 1 push within 1 second

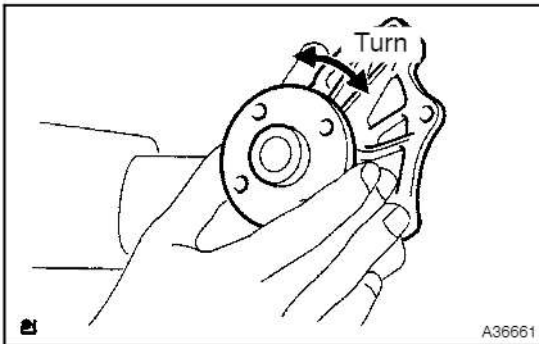
Standard opening pressure:

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

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

HINT:

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

**3. INSPECT WATER PUMP ASSY**

- (a) Visually check the drain hole for coolant leakage. If leakage is found, replace the water pump.
- (b) Turn the pulley, then check that the water pump bearing moves smoothly and does not make noise. If necessary, replace the water pump.

COOLING FAN SYSTEM (2AZ-FSE)

ON-VEHICLE INSPECTION

16092-01

HINT:

It is normal that the cooling fan sometime rotates when the ignition switch is turned from ACC to ON.

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

- Turn the ignition switch ON.
- Check that the cooling fan stops.

If not, check the cooling fan relay and engine coolant temperature sensor, then check for disconnection of connectors or wire break between the cooling fan relay and engine coolant temperature sensor.

- Disconnect the engine coolant temperature sensor connector.
- Check that the cooling fan rotates.

If not, check the fuses, cooling fan relay, ECM and cooling fan, then check for a short circuit between the cooling fan relay and engine coolant temperature sensor.

- Reconnect the engine coolant temperature sensor connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 100°C (212°F))

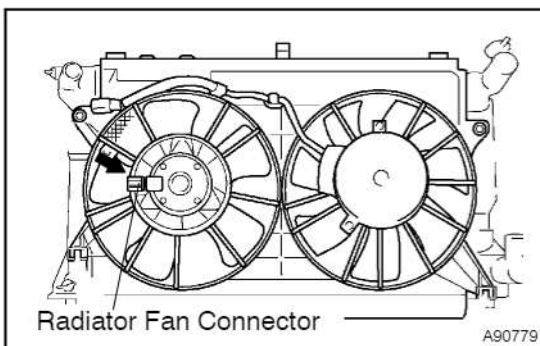
- Start the engine, then raise coolant temperature to above 100°C (212°F).

HINT:

Coolant temperature is the value detected by the engine coolant temperature sensor on the water outlet.

- Check that the cooling fan rotates.

If not, replace the engine coolant temperature sensor.

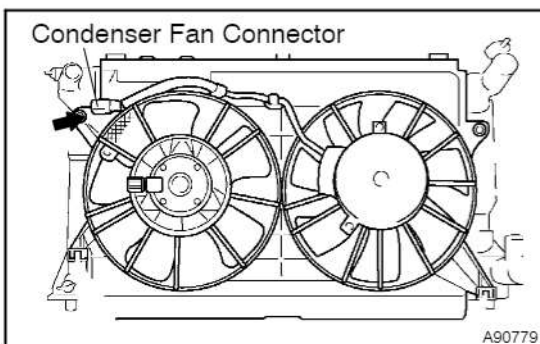


3. INSPECT RADIATOR FAN MOTOR

- Disconnect the radiator fan connector.
- Connect battery and ammeter to the radiator fan connector.
- Check that the radiator fan rotates smoothly, then check the reading on the ammeter.

Standard amperage: 8.5 to 11.5 A at 20°C (68°F)

- Reconnect the cooling fan connector.



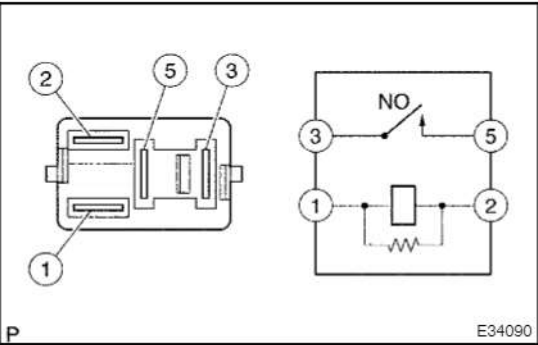
4. INSPECT CONDENSER FAN MOTOR

- Disconnect the condenser fan connector.
- Connect battery and ammeter to the condenser fan connector.
- Check that the condenser fan rotates smoothly, then check the reading on the ammeter.

Standard amperage: 5.2 to 8.2 A at 20°C (68°F)

- Reconnect the condenser fan connector.

INSPECTION



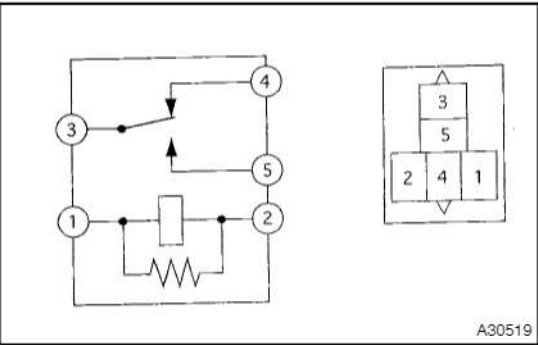
1. INSPECT COOLING FAN RELAY

- (a) Inspect the resistance
 - (1) Using an ohmmeter, measure the resistance between each terminal.

Specified condition:

Tester Connection	Specified Condition
3 – 5	10 kΩ or Higher
3 – 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the specified condition is not as specified, replace the cooling fan relay.



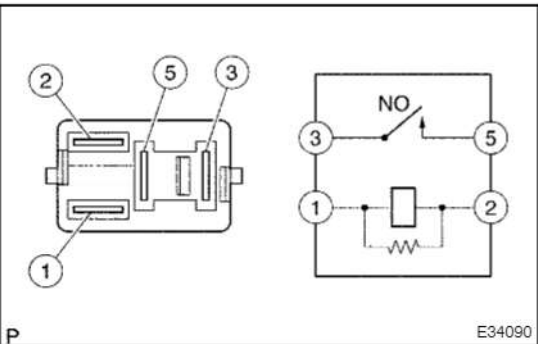
2. INSPECT COOLING FAN RELAY NO.2

- (a) Inspect the resistance
 - (1) Using an ohmmeter, measure the resistance between each terminal.

Specified condition:

Tester Connection	Specified Condition
3 – 4	Below 1 Ω
3 – 4	10 kΩ or Higher (Apply battery voltage to terminals 1 and 2)
3 – 5	10 kΩ or Higher
3 – 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the specified condition is not as specified, replace the cooling fan relay No. 2.



3. INSPECT COOLING FAN RELAY NO.3

- (a) Inspect the resistance
 - (1) Using an ohmmeter, measure the resistance between each terminal.

Specified condition:

Tester Connection	Specified Condition
3 – 5	10 kΩ or Higher
3 – 5	Below 1 Ω (Apply battery voltage to terminals 1 and 2)

If the specified condition is not as specified, replace the cooling fan relay No. 3.

ENGINE COOLANT (2AZ-FSE) REPLACEMENT

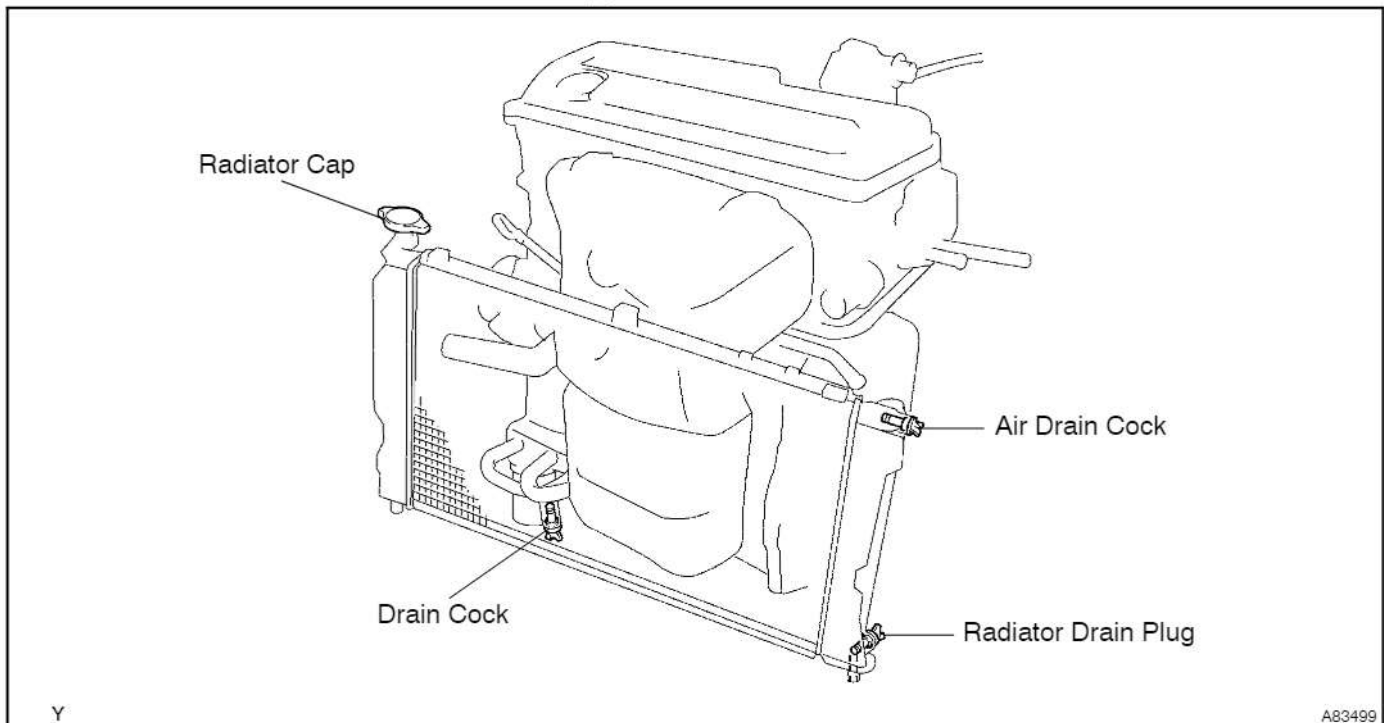
160MU-02

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, as fluid and steam can be blown out under pressure.

- (a) Remove the radiator cap.
- (b) Loosen the radiator drain plug, then drain the engine coolant.
- (c) Remove the engine under cover No. 4 RH (see page 17-6).
- (d) Loosen the drain cock, then drain the engine coolant.
- (e) Loosen the air drain cock.



- (f) Tighten the drain plug and 2 drain cocks.

2. ADD ENGINE COOLANT

- (a) Pour coolant into the radiator until it overflows.

Capacity:

Steering	Coolant Capacity [liters (US gts, Imp. gts)]
LHD	6.3 (6.7, 5.5)
RHD	6.4 (6.8, 5.6)

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. 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.

CAUTION:**Do not use plain water alone.**

- (b) Loosen the drain cock, then fasten the drain cock if the engine coolant overflowed.
- (c) Reinstall the radiator cap.
- (d) Pour engine coolant into the reservoir tank until it reaches full line.
- (e) Warm up the engine until the thermostat valve begins to open.

HINT:

Press the radiator inlet and outlet hose several times with hand during the warming up.

- (f) Stop the engine, then wait until the coolant temperature drops. Gets cold. Then remove the radiator cap to check the coolant level.

HINT:

- If the level gets lower, perform the procedures above again.
- If the level does not gets lower, adjust the reservoir tank coolant level.

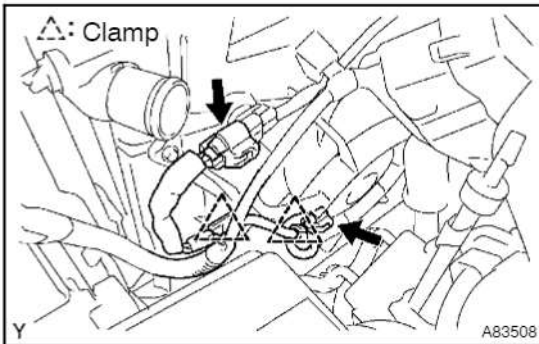
3. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

RADIATOR ASSY (2AZ-FSE)

REPLACEMENT

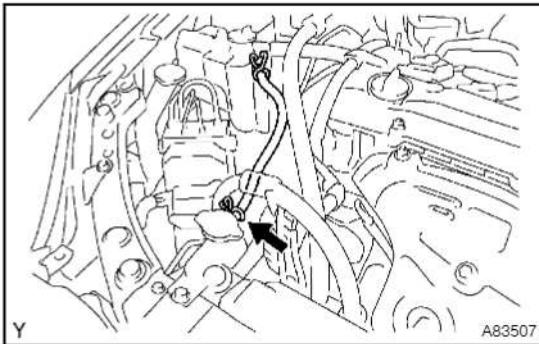
16070-01

1. DRAIN COOLANT (See page 16-7)
2. REMOVE RADIATOR SUPPORT OPENING COVER (See page 14-23)
3. REMOVE ENGINE ROOM COVER SIDE (See page 14-23)
4. REMOVE ENGINE UNDER COVER LH (See page 14-23)
5. REMOVE ENGINE UNDER COVER NO.4 RH (See page 14-23)
6. REMOVE ENGINE UNDER COVER RH (See page 14-23)
7. DISCONNECT RADIATOR HOSE INLET (See page 14-23)
8. DISCONNECT RADIATOR HOSE OUTLET (See page 14-23)
9. SEPARATE RADIATOR RELAY BLOCK (See page 14-23)

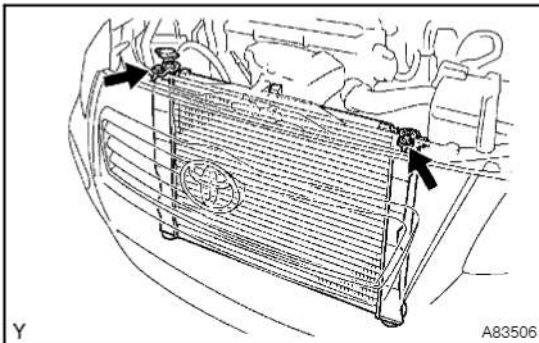


10. REMOVE RADIATOR ASSY

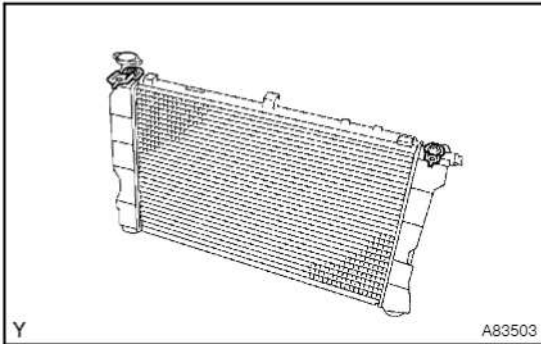
- (a) Disconnect the 2 connectors from the 2 fan motors.
- (b) Separate the 2 clamps from the fan shroud.



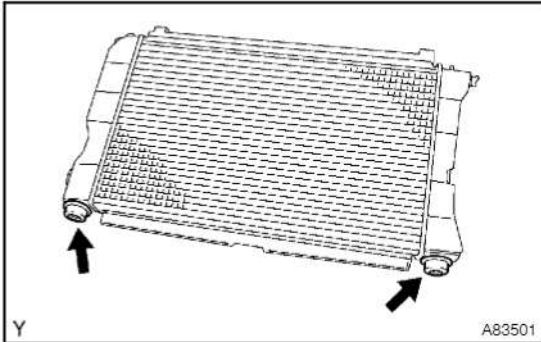
- (c) Disconnect the radiator reservoir tank hose as shown in the illustration.



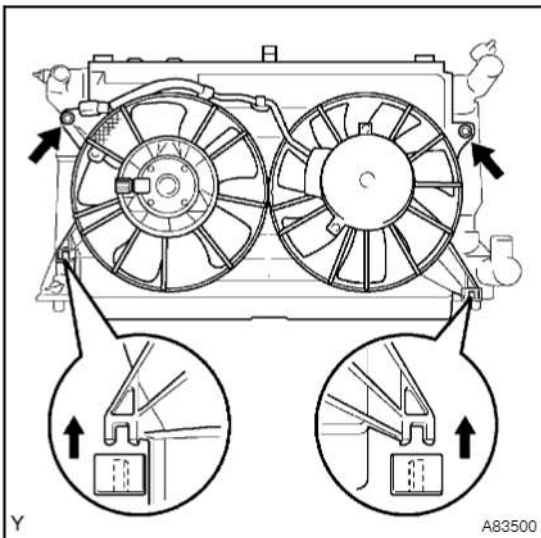
- (d) Remove the 2 bolts, then remove the radiator assembly.

**11. REMOVE RADIATOR SUPPORT NO.1**

- (a) Remove the 2 radiator supports from the radiator assembly.

**12. REMOVE RADIATOR SUPPORT LOWER**

- (a) Remove the 2 radiator support lowers from the radiator assembly.

**13. REMOVE FAN ASSY W/MOTOR**

- (a) Remove the 2 bolts.
(b) Remove the 2 pawl fittings, then remove the fan assembly with motor.

14. INSTALL FAN ASSY W/MOTOR

- (a) Insert tabs in the slot, then attach the fan assembly with motor with the 2 bolts.

Torque: 6.0 N·m (61 kgf·cm, 53 in·lbf)

15. INSTALL RADIATOR SUPPORT LOWER

- (a) Be sure to insert the 2 radiator support lowers to the radiator lower plane.

16. INSTALL RADIATOR SUPPORT NO.1**17. INSTALL RADIATOR ASSY**

Torque: 19 N·m (194 kgf·cm, 14 ft·lbf)

18. INSTALL RADIATOR RELAY BLOCK

Torque: 5.0 N·m (54 kgf·cm, 46 in·lbf)

19. CONNECT RADIATOR HOSE OUTLET**20. CONNECT RADIATOR HOSE INLET****21. ADD COOLANT (See page 16-7)****22. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**

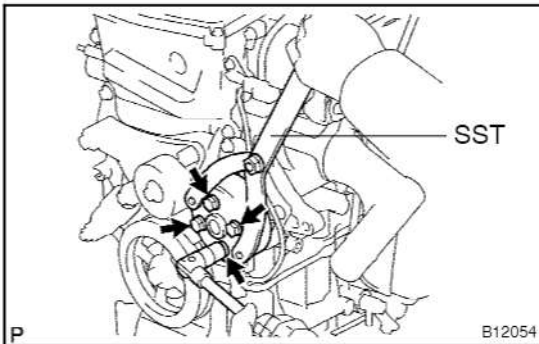
- 23. INSTALL ENGINE UNDER COVER RH
- 24. INSTALL ENGINE UNDER COVER NO.4 RH
- 25. INSTALL ENGINE UNDER COVER LH
- 26. INSTALL ENGINE ROOM COVER SIDE
- 27. INSTALL RADIATOR SUPPORT OPENING COVER

WATER PUMP ASSY (2AZ-FSE)

REPLACEMENT

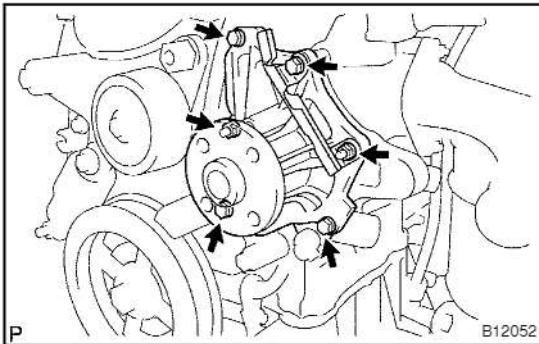
160MR-02

1. DRAIN COOLANT (See page 16-7)
2. REMOVE RADIATOR SUPPORT OPENING COVER (See page 14-23)
3. REMOVE ENGINE ROOM COVER SIDE (See page 14-23)
4. REMOVE ENGINE UNDER COVER LH (See page 14-23)
5. REMOVE ENGINE UNDER COVER NO.4 RH (See page 14-23)
6. REMOVE ENGINE UNDER COVER RH (See page 14-23)
7. REMOVE FAN AND GENERATOR V BELT (See page 14-5)
SST 09249-63010
8. REMOVE GENERATOR ASSY (See page 19-8)



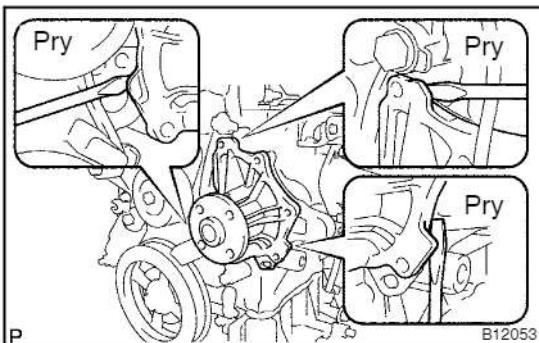
9. REMOVE WATER PUMP PULLEY

- (a) Using SST, remove the 4 bolts and pump pulley.
SST 09960-10010 (09962-01000, 09963-00700)
- (b) Disconnect the crankshaft position sensor wire clamp from the water pump.
- (c) Disconnect the crankshaft position sensor wire from the clamp on the water pump.



10. REMOVE WATER PUMP ASSY

- (a) Remove the 4 bolts, 2 nuts, wire clamp and water pump.



- (b) Using a screwdriver, pry out between the water pump and cylinder block, and remove the water pump.

NOTICE:

Be careful not to damage the contact surface of the water pump and cylinder block.

11. INSTALL WATER PUMP ASSY

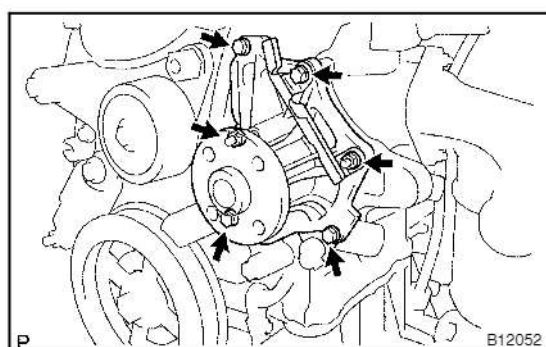
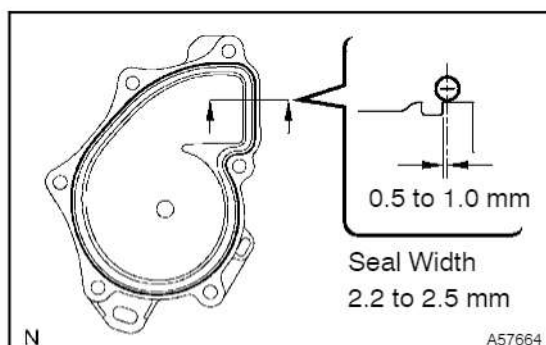
- (a) Remove any old packing (FIPG) material and be careful not to drop any oil on the contact surfaces of the water pump assy.

- (b) Apply a continuous bead of the seal packing (diameter 2.2 to 2.5 mm (0.09 to 0.10 in.)) as shown in the illustration.

Seal packing: Part No. 08826 - 00100 or equivalent

NOTICE:

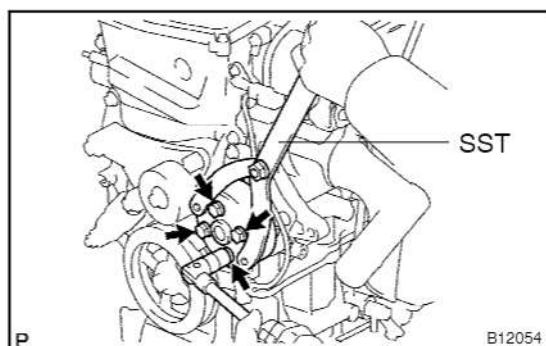
Install the water pump assy within 5 minutes after applying seal packing. Otherwise the material must be removed and reapplied.



- (c) Install the water pump and wire clamp with 4 bolts and 2 nuts.

Torque: 9.0 N·m (90 kgf·cm, 80 in·lbf)

- (d) Install the crankshaft position sensor wire harness clamp to the water pump.
(e) Install the crankshaft position sensor wire to the wire clamp on the water pump.

**12. INSTALL WATER PUMP PULLEY**

- (a) Using SST, install the pump pulley with 4 bolts.
SST 09960-10010 (09962-01000, 09963-00700)
Torque: 26 N·m (265 kgf·cm, 19 ft·lbf)

13. INSTALL GENERATOR ASSY (See page 19-8)**14. INSTALL FAN AND GENERATOR V BELT (See page 14-5)**

SST 09249-63010

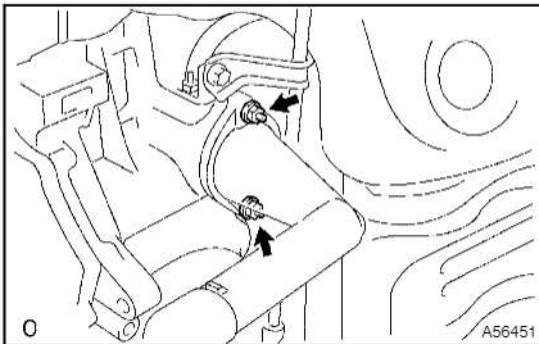
15. ADD COOLANT (See page 16-7)**16. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)**

THERMOSTAT (2AZ-FSE)

REPLACEMENT

160MQ-02

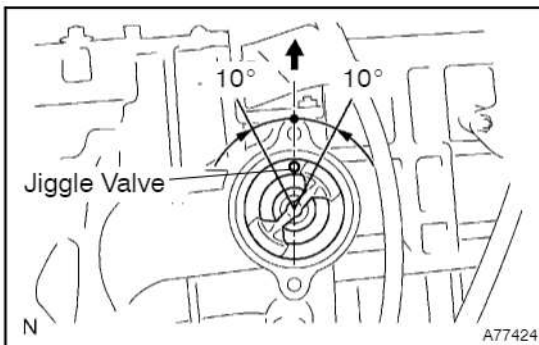
1. DRAIN COOLANT (See page 16-7)
2. REMOVE RADIATOR SUPPORT OPENING COVER (See page 14-23)
3. REMOVE ENGINE ROOM COVER SIDE (See page 14-23)
4. REMOVE ENGINE UNDER COVER LH (See page 14-23)
5. REMOVE ENGINE UNDER COVER NO.4 RH (See page 14-23)
6. REMOVE ENGINE UNDER COVER RH (See page 14-23)
7. REMOVE FAN AND GENERATOR V BELT (See page 14-5)
SST 09249-63010
8. REMOVE GENERATOR ASSY (See page 19-8)



9. REMOVE WATER INLET

- (a) Remove the 2 nuts and water inlet.

10. REMOVE THERMOSTAT



11. INSTALL THERMOSTAT

- (a) Install a new gasket to the thermostat.
- (b) Install the thermostat while aligning the jiggle valve with its right position described in the illustration.

HINT:

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

12. INSTALL WATER INLET

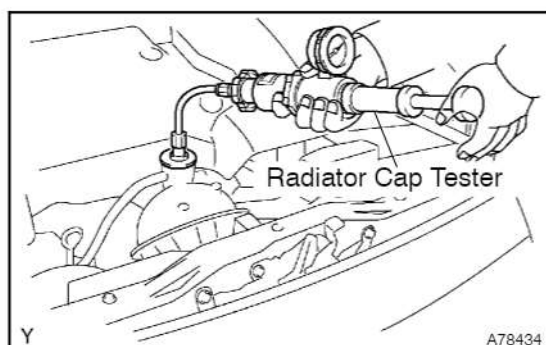
Torque: 9.0 N·m (92 kgf·cm, 7 in.·lbf)

13. INSTALL GENERATOR ASSY (See page 19-8)
14. INSTALL FAN AND GENERATOR V BELT (See page 14-5)
SST 09249-63010
15. ADD COOLANT (See page 16-7)
16. CHECK FOR ENGINE COOLANT LEAKS (See page 16-1)

COOLING SYSTEM (1CD-FTV)(From September, 2003)

ON-VEHICLE INSPECTION

160T1-01



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

- Remove the radiator support opening cover.
- Remove the engine room cover side.
- Fill the radiator with coolant, then attach a radiator cap tester.
- Warm up the engine.
- Pump it to 137 kPa (1.4 kgf/cm², 19.9 psi), then check that the pressure does not drop.

If the pressure drops, check the hoses, radiator and water pump for leaks. If there are no signs or traces of external coolant leaks, check the heater core, cylinder block and head.

- Reinstall the engine room cover side.
- Reinstall the radiator support opening cover.

2. CHECK ENGINE COOLANT LEVEL AT RESERVOIR

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

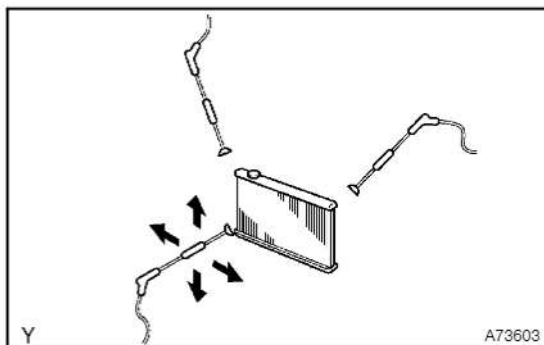
3. CHECK ENGINE COOLANT QUALITY

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

- Check the radiator cap and radiator filler hole for rust or scale; the coolant should be free from oil. 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 and dry them with compressed air.

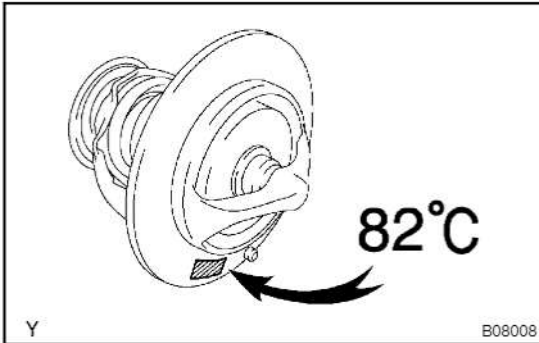
NOTICE:

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

Injection Pressures 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 pour water directly onto the electronic components.

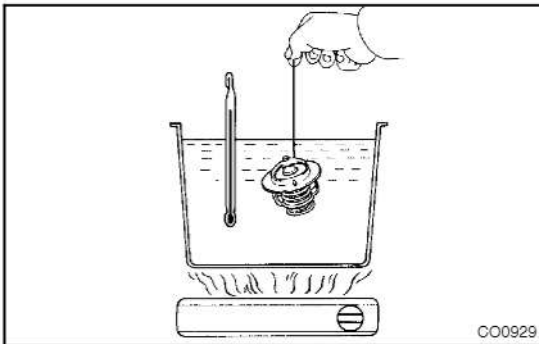
INSPECTION



1. INSPECT THERMOSTAT

HINT:

The thermostat is imprinted with the valve opening temperature.



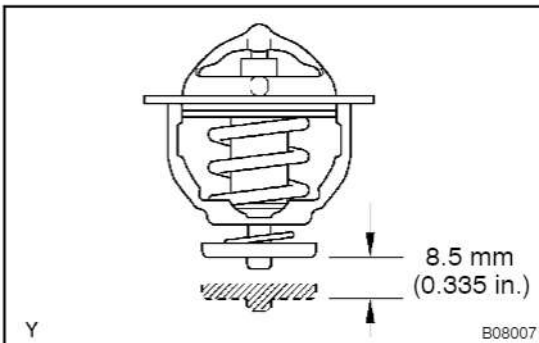
- (a) Immerse the thermostat in the water, then gradually heat the water.

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

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

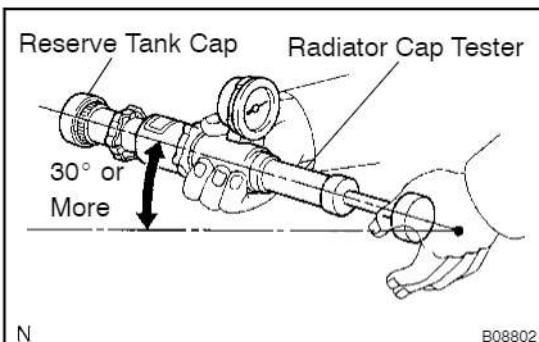
- (d) Check that the valve is fully closed when the thermostat is at low temperatures (below 77°C (171°F)).

If not fully closed, replace the thermostat.

2. INSPECT RESERVE TANK CAP SUB-ASSY

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 following steps (a) and (b), keep the tester at an angle of over 30° above horizontal.



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

Pumping 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 reserve tank cap.

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

NOTICE:

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

Pumping speed: 1 push within 1 second

Standard opening pressure:

93 to 122 kPa (0.95 to 1.25 kgf/cm², 13.4 to 17.6 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.4 psi)

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

HINT:

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

ENGINE COOLANT (1CD-FTV)(From September, 2003) REPLACEMENT

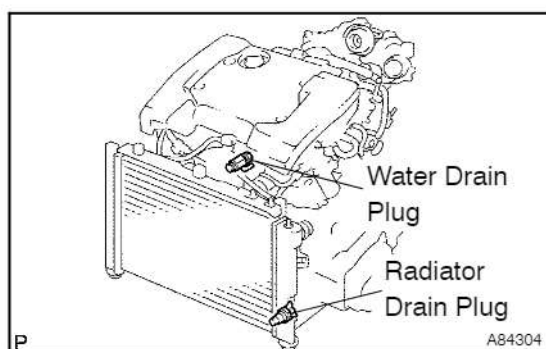
16073-01

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



- (b) Loosen the radiator and engine drain plugs, then drain the coolant.

- (c) Put in the drain plugs.

Torque: 13 N·m (133 kgf·cm, 10 ft·lbf) for engine

2. ADD ENGINE COOLANT

- (a) Loosen air bleed valve A.
(b) Fill the cooling system with coolant up to line B.

Capacity:

7.6 liters (8.0 US qts, 6.7 Imp. qts) : with power heater

7.4 liters (7.8 US qts, 6.5 Imp. qts) : without power heater

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. 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.

- (c) Tighten air bleed valve A securely.
(d) Install the radiator cap securely.
(e) Warm up the engine.

HINT:

Warm up the engine with the engine speed of 2,000 rpm or more. Keep warming it up until the thermostat is open and the radiator reservoir becomes hot.

- (f) Run the engine intermittently at 3,000 rpm for 5 seconds and at idle for 45 seconds.
(g) Do the above operation for 7 minutes or more.

- (h) After the engine gets cold, check that the coolant level is between the "LOW" and "FULL" lines.

3. CHECK FOR ENGINE COOLANT LEAKS

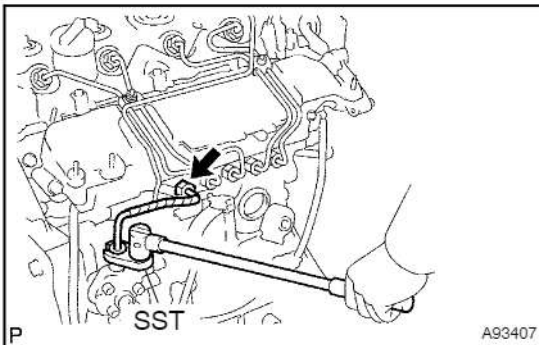
- (a) Fill the radiator with coolant, then attach a radiator cap tester.
- (b) Pump it to 137 kPa (1.4 kgf/cm², 19.9 psi), then check that the pressure does not drop.

WATER PUMP ASSY (1CD-FTV)(From September, 2003)

16074-01

REPLACEMENT

1. REMOVE RADIATOR SUPPORT OPENING COVER
2. REMOVE ENGINE ROOM COVER SIDE
3. DRAIN ENGINE COOLANT (See page 16-19)
4. REMOVE FRONT WHEEL RH
5. REMOVE ENGINE UNDER COVER SUB-ASSY NO.1
6. REMOVE ENGINE UNDER COVER RH
7. REMOVE ENGINE COVER SUB-ASSY NO.1 (See page 14-90)
8. REMOVE INJECTOR DRIVER (See page 14-108)
9. REMOVE V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(See Pub. No. RM1018E on page 14-269)
10. REMOVE GENERATOR V BELT (See Pub. No. RM1018E on page 14-269)
11. SEPARATE POWER STEERING IDLE PULLEY BRACKET (See page 14-138)
12. DISCONNECT ENGINE WIRE (See page 14-138)
13. DISCONNECT VACUUM HOSE (See page 14-108)
14. REMOVE ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-138)
15. REMOVE CRANKSHAFT PULLEY (See page 14-138)
SST 09213-54015 (09213-70020), 09330-00021, 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05031)
16. REMOVE IDLER PULLEY SUB-ASSY (See page 14-138)
17. REMOVE TIMING BELT NO.2 COVER (See page 14-138)
18. REMOVE TIMING BELT NO.1 COVER (See page 14-138)
19. REMOVE TIMING BELT GUIDE
20. REMOVE TRANSVERSE ENGINE ENGINE MOUNTING BRACKET (See page 14-138)
21. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page 14-138)
22. REMOVE TIMING CHAIN COVER PLATE (See page 14-138)
23. REMOVE TIMING BELT (See page 14-138)



24. REMOVE FUEL INLET PIPE SUB-ASSY

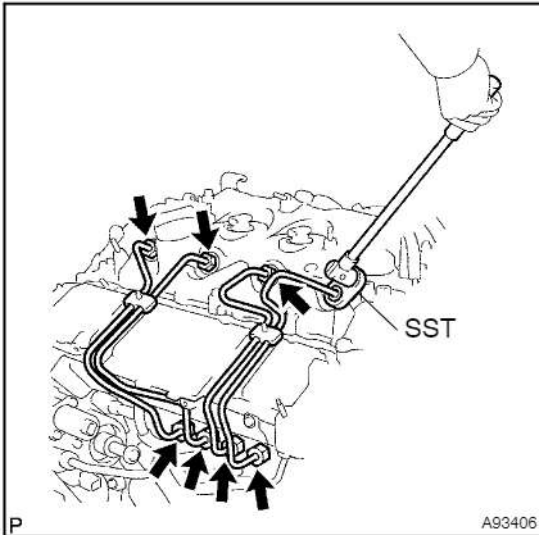
NOTICE:

After removing the fuel inlet pipe, cover the common rail and injection pump with vinyl tape to prevent dust from being introduced.

- (a) Remove the wire bracket, then slide the engine wire.
- (b) Using SST, remove the fuel inlet pipe from the common rail.
SST 09023-12700
- (c) Using SST, remove the fuel inlet pipe from the injection pump.
SST 09023-12700

25. REMOVE FUEL PIPE NO.3 (See page 14-108)

SST 09023-12700

**26. REMOVE INJECTION PIPE SUB-ASSY NO.1**

- (a) Remove the 2 upper injection pipe clamps from the intake manifold.
- (b) Using SST, remove the injection pipe from the common rail side.
SST 09023-12700
- (c) Using SST, remove the injection pipe from the injector side.
SST 09023-12700
- (d) After removing the fuel pipe, in order to prevent dust or foreign objects from being introduced, cover the common rail with vinyl tape and protect the injector inlet with a vinyl or plastic bag.
- (e) Remove the 2 lower injection pipe clamps from the intake manifold.

27. REMOVE INJECTION PIPE SUB-ASSY NO.2

SST 09023-12700

HINT:

Perform the same procedures as the injection pipe No. 1.

28. REMOVE INJECTION PIPE SUB-ASSY NO.3

SST 09023-12700

HINT:

Perform the same procedures as the injection pipe No. 1.

29. REMOVE INJECTION PIPE SUB-ASSY NO.4

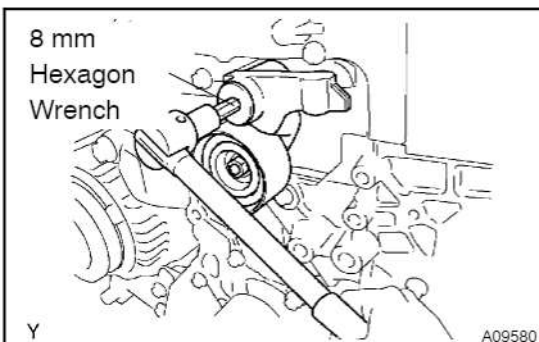
SST 09023-12700

HINT:

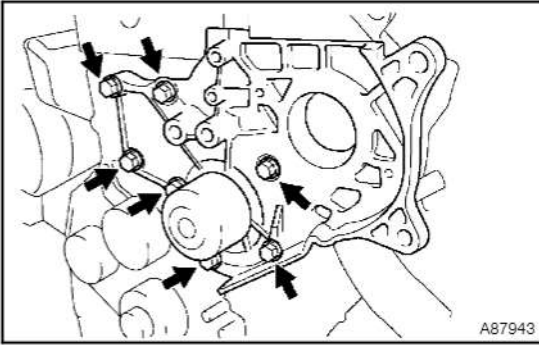
Perform the same procedures as the injection pipe No. 1.

30. REMOVE INTAKE MANIFOLD INSULATOR NO.1 (See page 14-108)**31. REMOVE OIL LEVEL GAGE SUB-ASSY****32. REMOVE OIL LEVEL GAGE GUIDE (See page 17-11)****33. REMOVE WATER INLET (See Pub. No. RM1018E on page 16-50)****34. DISCONNECT INJECTION PUMP TO FUEL PIPE FUEL HOSE (See page 11-58)****35. DISCONNECT INJECTION PUMP TO FUEL FILTER FUEL HOSE OR PIPE (See page 11-58)****36. REMOVE INJECTION PUMP DRIVE PULLEY (See page 11-58)**

SST 09960-10010 (09962-01000, 09963-01000), 09950-50013 (09951-05010, 09952-05010, 09953-05020, 09954-05021)

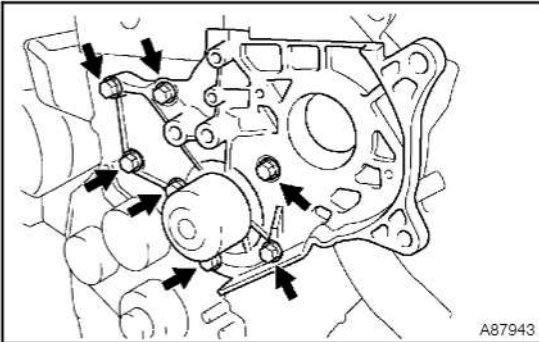
37. REMOVE INJECTION PUMP STAY NO.1 (See page 11-58)**38. REMOVE INJECTION OR SUPPLY PUMP ASSY (See page 11-58)****39. REMOVE TIMING BELT IDLER SUB-ASSY NO.1**

- (a) Using an 8 mm hexagon wrench, remove the idler pulley shaft, idler pulley and plate washer.



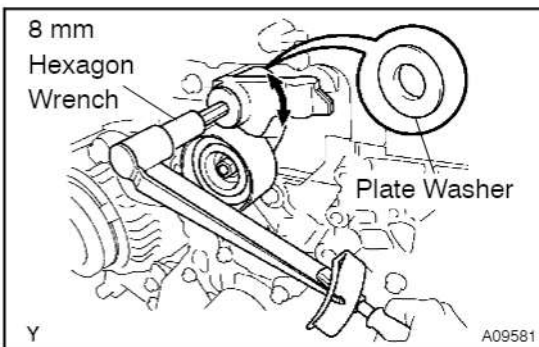
40. REMOVE WATER PUMP ASSY

- (a) Remove the 7 bolts, then remove the water pump and gasket.



41. INSTALL WATER PUMP ASSY

- (a) Install a new gasket and the water pump with the 7 bolts.
Torque: 31 N·m (320 kgf·cm, 23 ft·lbf)



42. INSTALL TIMING BELT IDLER SUB-ASSY NO.1

- (a) Using an 8 mm hexagon wrench, install the plate washer and idler pulley with the idler pulley shaft.
Torque: 35 N·m (357 kgf·cm, 26 ft·lbf)
- (b) Check that the pulley bracket moves smoothly.

43. INSTALL INJECTION OR SUPPLY PUMP ASSY (See page 11-58)

44. INSTALL INJECTION PUMP STAY NO.1 (See page 11-58)

45. INSTALL INJECTION PUMP DRIVE PULLEY (See page 11-58)

SST 09960-10010 (09962-01000, 09963-01000)

46. INSTALL WATER INLET (See Pub. No. RM1018E on page 16-50)

47. INSTALL OIL LEVEL GAGE GUIDE (See page 17-11)

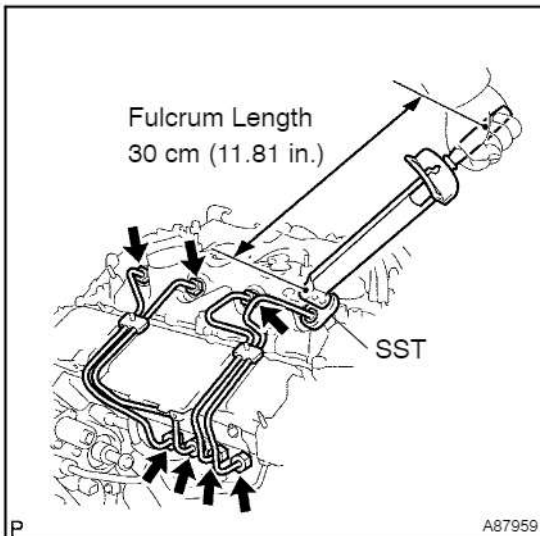
48. INSTALL INTAKE MANIFOLD INSULATOR NO.1 (See page 14-108)

49. INSTALL INJECTION PIPE SUB-ASSY NO.1

NOTICE:

When assembling the pipes, perform the operation with the engine cold at room temperature.

- (a) Remove the vinyl or plastic bag from the injector and the vinyl tape from the common rail.
- (b) Install the 2 lower injection pipe clamps to the intake manifold.
- (c) Temporarily install the injection pipe.



- (d) Using SST, tighten the nut of the injection pipe on the common rail side.

SST 09023-12700

Torque:

31 N·m (316 kgf·cm, 23 ft·lbf) with SST

34 N·m (347 kgf·cm, 25 ft·lbf) without SST

HINT:

- Use a torque wrench with the fulcrum length of 30 cm (11.81 in.).
 - After the injection pipe is reassembled, check that the used pipe has no deflection and is installed properly. If it has deflection or could not be installed properly, replace the used pipe with a new pipe.
- (e) Using SST, tighten the nut of the injection pipe on the injector side.

SST 09023-12700

Torque:

For used pipe:

36 N·m (372 kgf·cm, 27 ft·lbf) with SST

40 N·m (408 kgf·cm, 30 ft·lbf) without SST

For new pipe:

31 N·m (316 kgf·cm, 23 ft·lbf) with SST

34 N·m (347 kgf·cm, 25 ft·lbf) without SST

HINT:

- Use a torque wrench with the fulcrum length of 30 cm (11.81 in.).
- After the injection pipe is reassembled, check that the used pipe has no deflection and is installed properly. If it has deflection or could not be installed properly, replace the used pipe with a new pipe.

- (f) Install the 2 upper injection pipe clamps.

50. INSTALL INJECTION PIPE SUB-ASSY NO.2

SST 09023-12700

HINT:

Perform the same procedures as the injection pipe No. 1.

51. INSTALL INJECTION PIPE SUB-ASSY NO.3

SST 09023-12700

HINT:

Perform the same procedures as the injection pipe No. 1.

52. INSTALL INJECTION PIPE SUB-ASSY NO.4

SST 09023-12700

HINT:

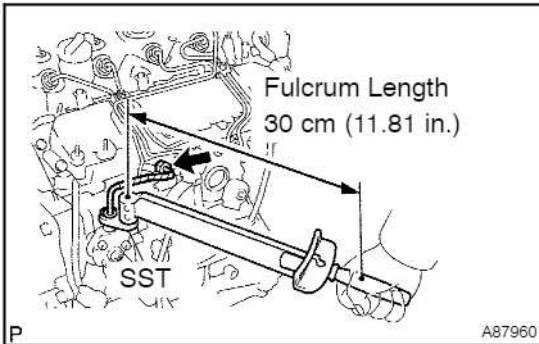
Perform the same procedures as the injection pipe No. 1.

53. INSTALL FUEL PIPE NO.3 (See page 14-108)

SST 09023-12700

54. INSTALL FUEL INLET PIPE SUB-ASSY**NOTICE:**

- In case of replacing the water pump, the fuel inlet pipe must be replaced, too.
 - When assembling the pipe, perform the operation with the engine cold at room temperature.
- (a) Temporarily install a new fuel inlet pipe.



- (b) Using SST, tighten the nut of the fuel inlet pipe on the common rail side.

SST 09023-12700

Torque:**31 N·m (316 kgf·cm, 23 ft·lbf) with SST****34 N·m (347 kgf·cm, 25 ft·lbf) without SST****HINT:**

- Use a torque wrench with the fulcrum length of 30 cm (11.81 in.).
 - After the inlet pipe is reassembled, check that the used pipe has no deflection and is installed properly. If it has deflection or could not be installed properly, replace the used pipe with a new pipe.
- (c) Using SST, tighten the nut of the fuel inlet pipe on the injection pump side.

SST 09023-12700

Torque:**31 N·m (316 kgf·cm, 23 ft·lbf) with SST****34 N·m (347 kgf·cm, 25 ft·lbf) without SST****HINT:**

- Use a torque wrench with the fulcrum length of 30 cm (11.81 in.).
- After the inlet pipe is reassembled, check that the used pipe has no deflection and is installed properly. If it has deflection or could not be installed properly, replace the used pipe with a new pipe.

55. SET NO. 1 CYLINDER TO TDC/COMPRESSION (See page 14-138)

SST 09960-10010 (09962-01000, 09963-01000)

56. INSTALL TIMING BELT (See page 14-138)**57. CHECK VALVE TIMING (See page 14-138)****58. INSTALL TIMING CHAIN COVER PLATE (See page 14-138)****59. INSTALL TRANSVERSE ENGINE ENGINE MOUNTING BRACKET (See page 14-138)****60. INSTALL TIMING BELT GUIDE (See page 14-138)****61. INSTALL TIMING BELT NO.1 COVER (See page 14-138)****62. INSTALL TIMING BELT NO.2 COVER (See page 14-138)****63. INSTALL IDLER PULLEY SUB-ASSY (See page 14-138)****64. INSTALL CRANKSHAFT PULLEY (See page 14-138)**

SST 09213-54015 (09213-70020), 09330-00021

65. INSTALL ENGINE MOUNTING INSULATOR SUB-ASSY RH (See page 14-138)

66. INSTALL POWER STEERING IDLE PULLEY BRACKET ([See page 14-108](#))
67. ADJUST V (COOLER COMPRESSOR TO CRANKSHAFT PULLEY) BELT NO.1
(See Pub. No. RM1018E on page 14-269)
68. INSTALL INJECTOR DRIVER ([See page 14-108](#))
69. INSTALL FRONT WHEEL RH
Torque: 103 N·m (1,050 kgf·cm, 76 ft·lbf)
70. INSTALL ENGINE COVER SUB-ASSY NO.1 ([See page 14-90](#))
71. ADD ENGINE COOLANT ([See page 16-19](#))
72. CHECK FOR ENGINE COOLANT LEAKS ([See page 16-15](#))
73. CHECK FOR FUEL LEAKS ([See page 11-46](#))