
COOLING

COOLANT	CO-1
WATER PUMP	CO-3
THERMOSTAT	CO-10
RADIATOR	CO-14
ELECTRIC COOLING FAN	CO-25
WATER TEMPERATURE SWITCH	CO-33
COOLING FAN RELAY	CO-34



COOLANT INSPECTION

C007U-02

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

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

2. CHECK ENGINE COOLANT QUALITY

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

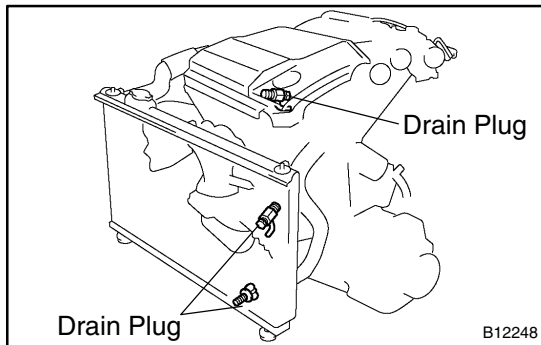
CAUTION:

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

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

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

- (c) Reinstall the radiator cap.



REPLACEMENT

1. REMOVE ENGINE UNDER COVER

2. DRAIN ENGINE COOLANT

- (a) Remove the radiator cap.

CAUTION:

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

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

- (c) Close the drain plugs.

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

3. FILL ENGINE COOLANT

- (a) Slowly fill the system with coolant.

- Use a good brand of ethylene–glycol base engine coolant and mix it according to the manufacturer's directions.
- Using coolant which includes more than 50 % ethylene–glycol (but not more than 70 %) is recommended.

NOTICE:

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

Capacity:

9.0 liters (9.5 US qts, 7.9 Imp. qts)

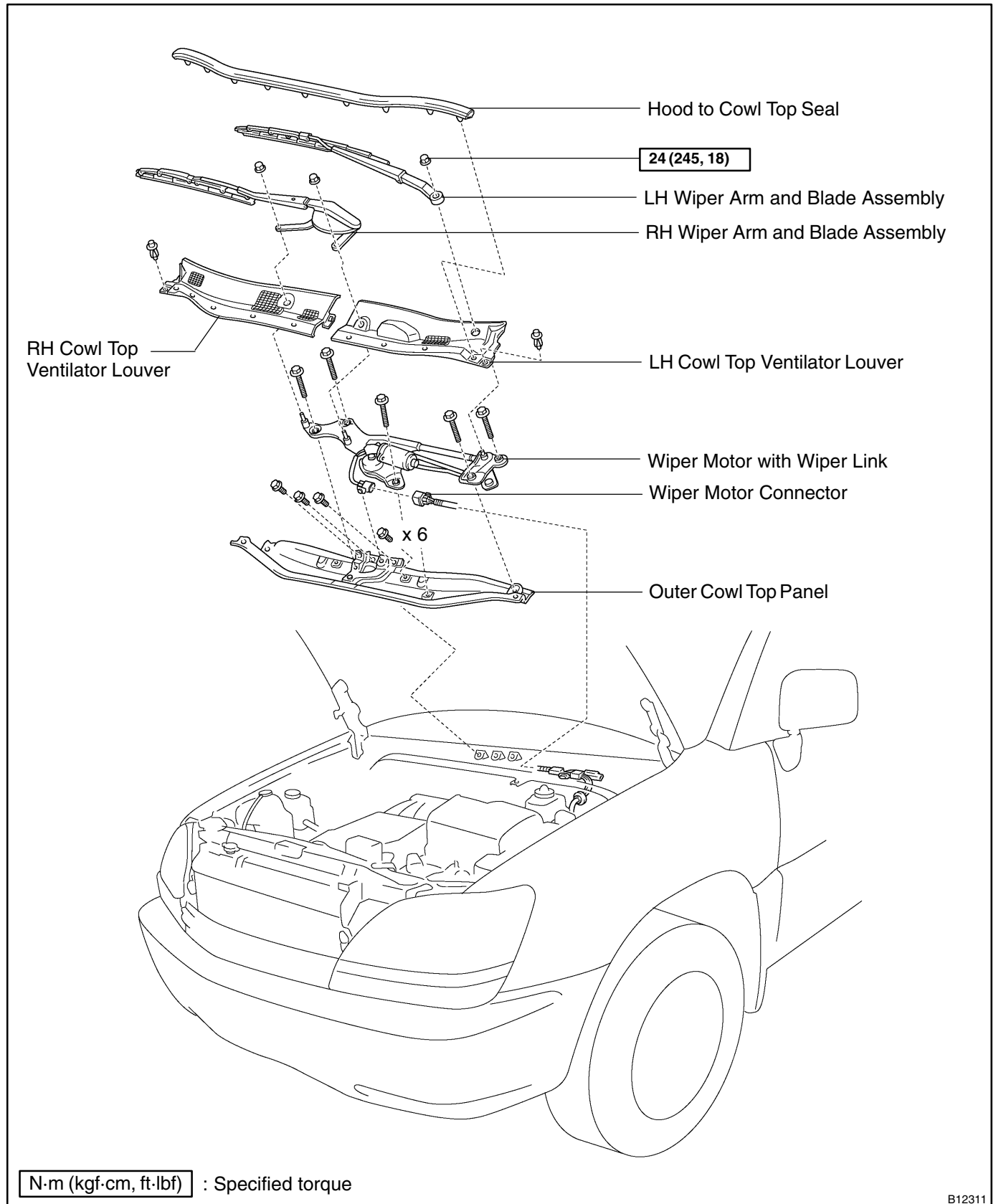
- (b) Install the radiator cap.
- (c) Start the engine, and bleed the cooling system.
- (d) If necessary, refill coolant into the reservoir up to the "FULL" line.

4. CHECK ENGINE COOLANT FOR LEAKS

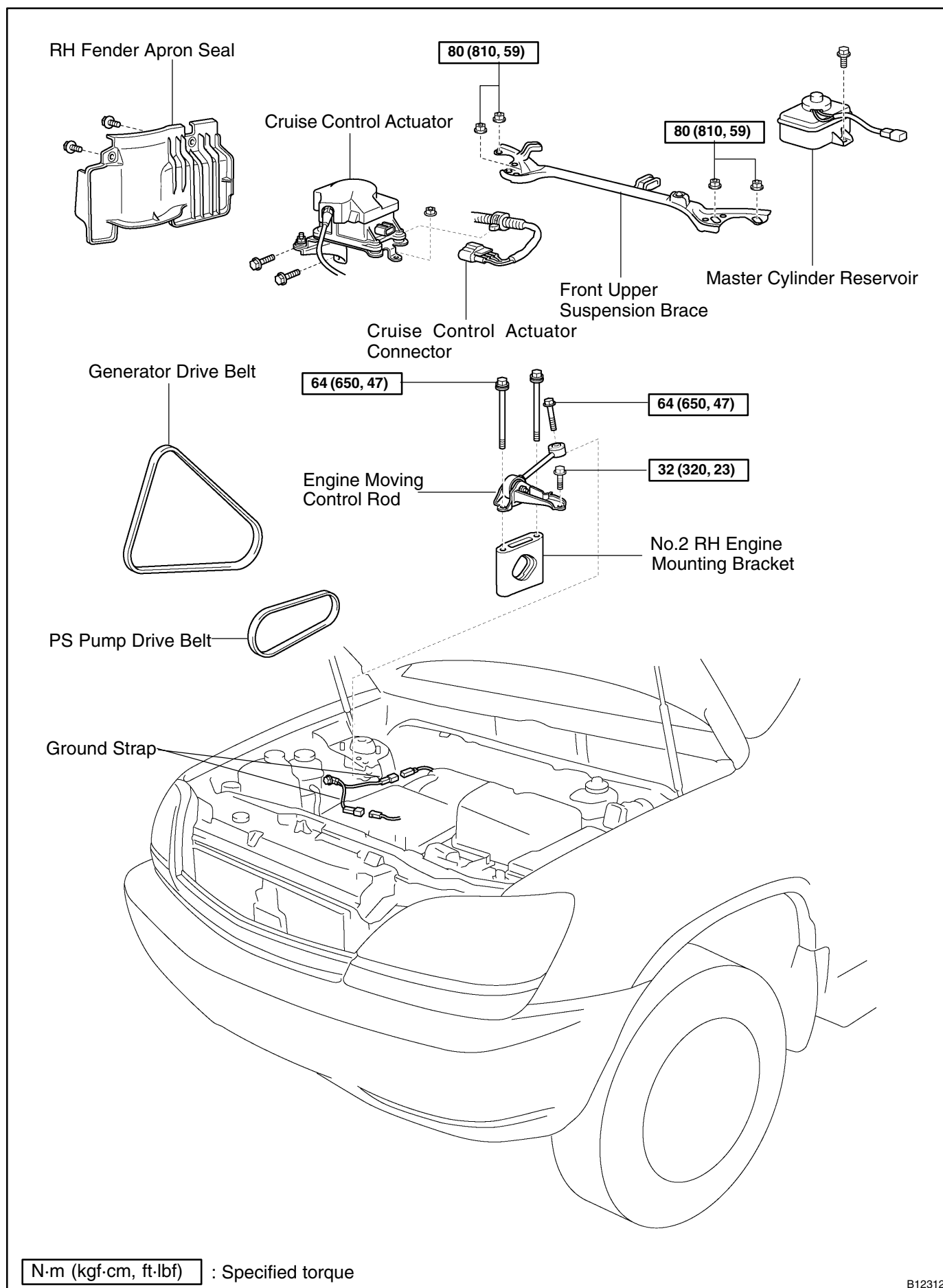
5. REINSTALL ENGINE UNDER COVER

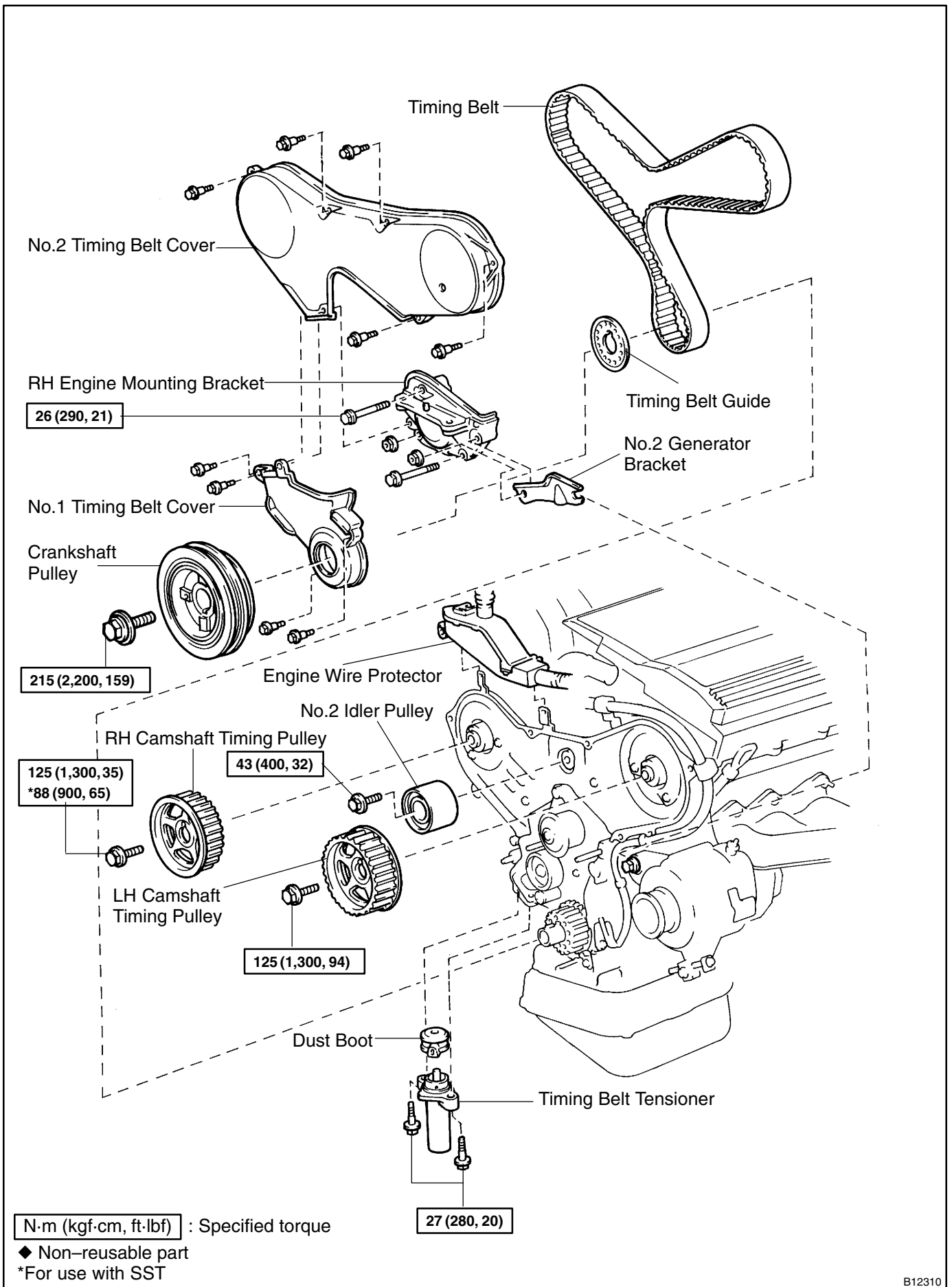
WATER PUMP COMPONENTS

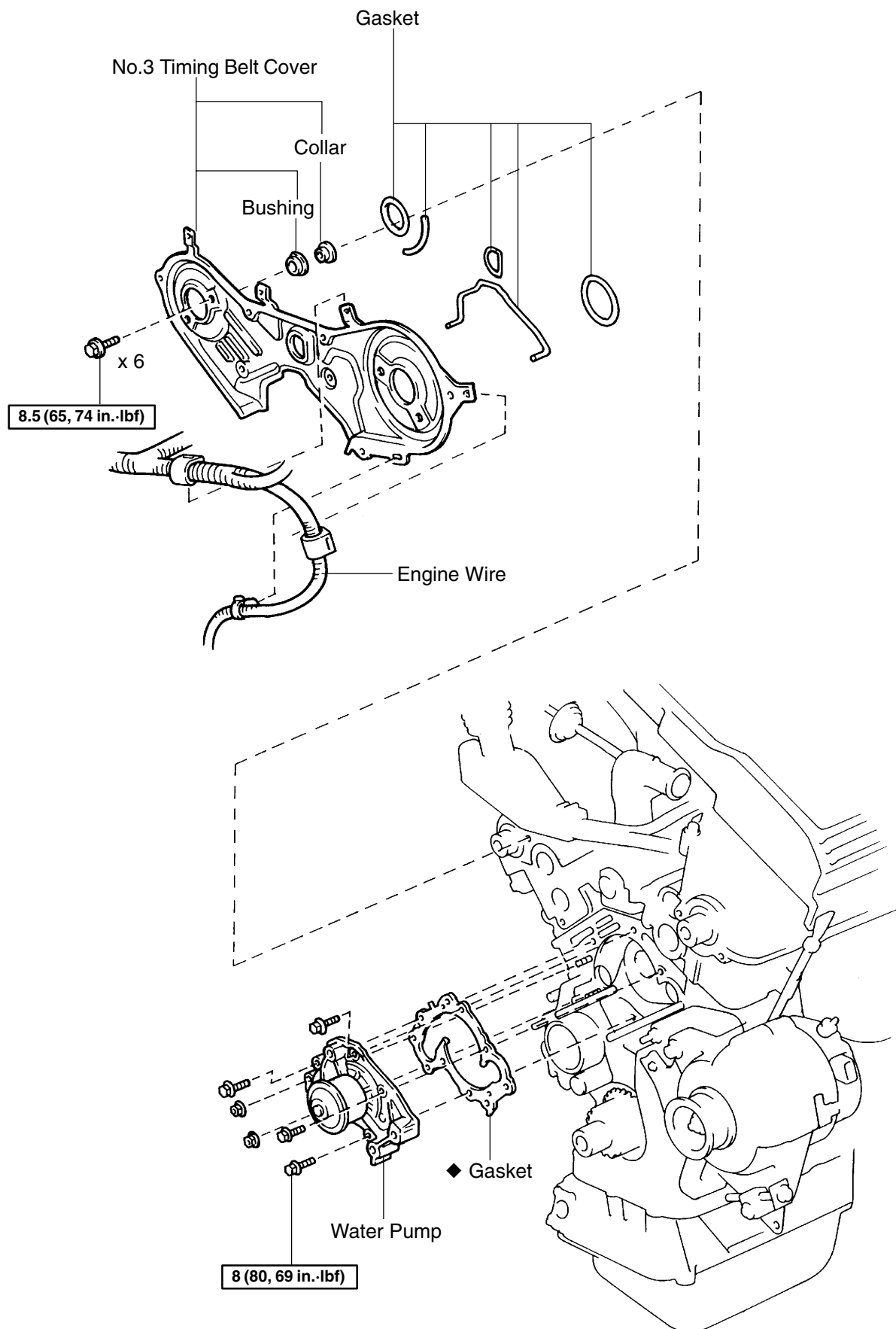
C007W-03



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N·m (kgf·cm, ft·lbf) : Specified torque

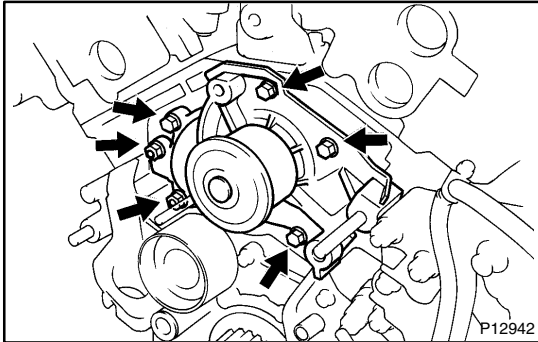
◆ Non-reusable part

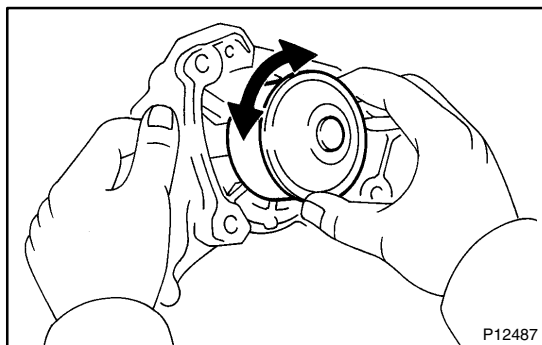
B04242

REMOVAL

1. DRAIN ENGINE COOLANT
2. REMOVE OUTER COWL TOP PANEL
(See page EM-75)
3. REMOVE FRONT UPPER SUSPENSION BRACE
(See page EM-75)
4. REMOVE TIMING BELT
(See page EM-16)
5. REMOVE CAMSHAFT TIMING PULLEYS
(See page EM-16)
6. REMOVE NO.2 IDLER PULLEY
(See page EM-16)
7. REMOVE NO.3 TIMING BELT COVER
(See page EM-33)
8. REMOVE WATER PUMP

Remove the 4 bolts, 2 nuts, water pump and gasket.





INSPECTION

1. INSPECT WATER PUMP

(a) Visually check the drain hole for coolant leakage.

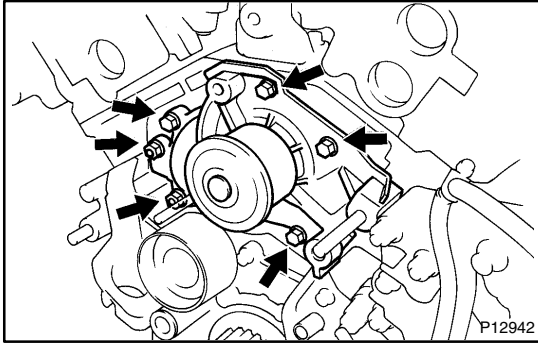
If leakage is found, replace the water pump.

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

If necessary, replace the water pump.

2. INSPECT TIMING BELT COMPONENTS

(See page EM-20)



INSTALLATION

1. INSTALL WATER PUMP

Install a new gasket and the water pump with the 4 bolts and 2 nuts.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

NOTICE:

Do not get oil on the gasket.

2. INSTALL NO.3 TIMING BELT COVER

(See page EM-60)

3. INSTALL NO.2 IDLER PULLEY

(See page EM-22)

4. INSTALL CAMSHAFT TIMING PULLEYS

(See page EM-22)

5. INSTALL TIMING BELT

(See page EM-22)

6. INSTALL FRONT UPPER SUSPENSION BRACE

(See page EM-82)

7. INSTALL OUTER COWL TOP PANEL

(See page EM-82)

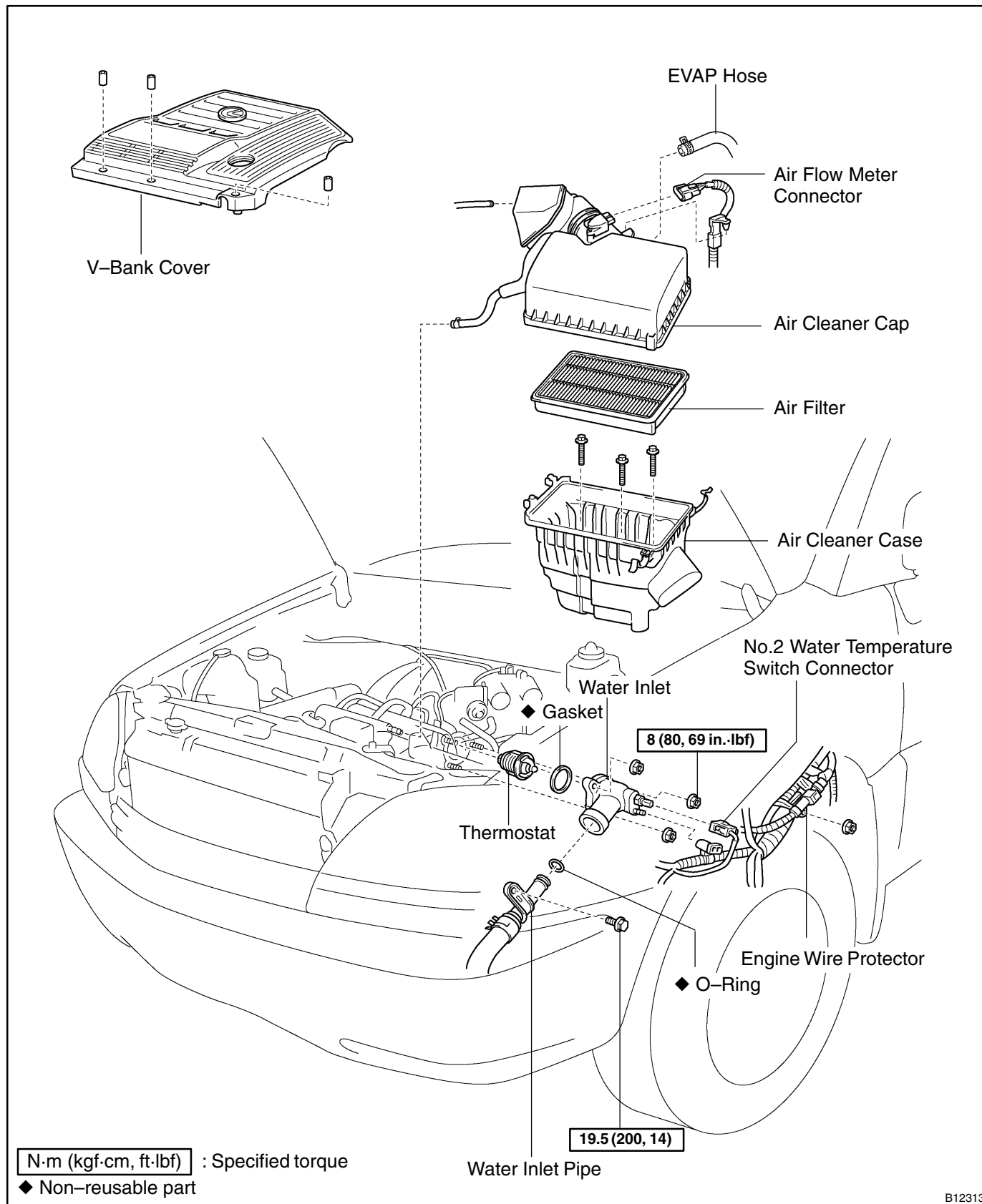
8. FILL WITH ENGINE COOLANT

9. START ENGINE AND CHECK FOR LEAKS

10. RECHECK ENGINE COOLANT LEVEL

THERMOSTAT COMPONENTS

CO080-03



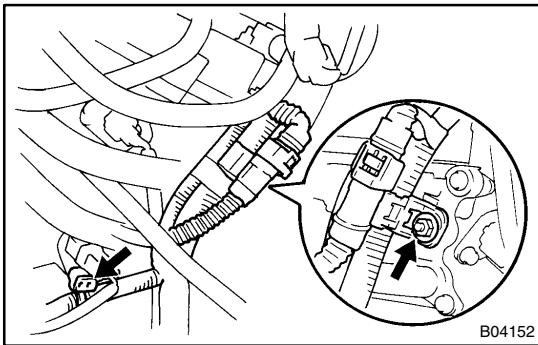
B12313

REMOVAL

HINT:

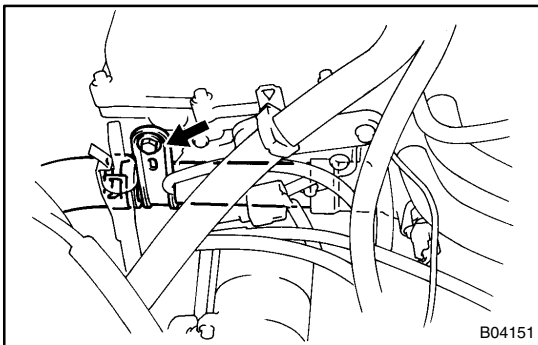
Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **DRAIN ENGINE COOLANT**
2. **REMOVE AIR CLEANER CAP AND AIR CLEANER CASE**
3. **DISCONNECT NO.2 WATER TEMPERATURE SWITCH CONNECTOR**



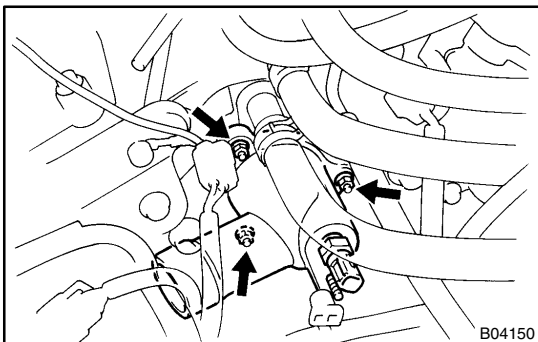
4. **DISCONNECT ENGINE WIRE PROTECTOR FROM WATER INLET AND RH CYLINDER HEAD**

Remove the nut and disconnect the clamp, and disconnect the engine wire protector from the water inlet and cylinder head.



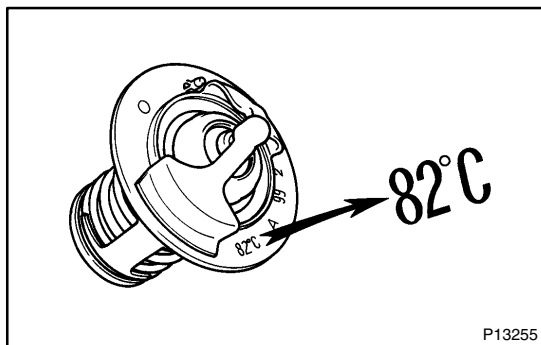
5. **DISCONNECT WATER INLET PIPE FROM WATER INLET AND LH CYLINDER HEAD**

- (a) Remove the bolt, and disconnect the inlet pipe from the water inlet.
- (b) Remove the O-ring from the inlet pipe.



6. **REMOVE WATER INLET AND THERMOSTAT**

- (a) Remove the 3 nuts, water inlet and thermostat.
- (b) Remove the gasket from the thermostat.

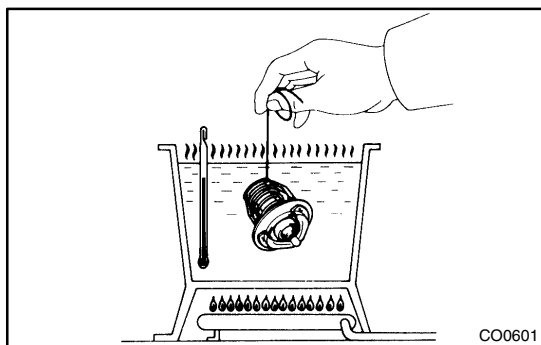


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.



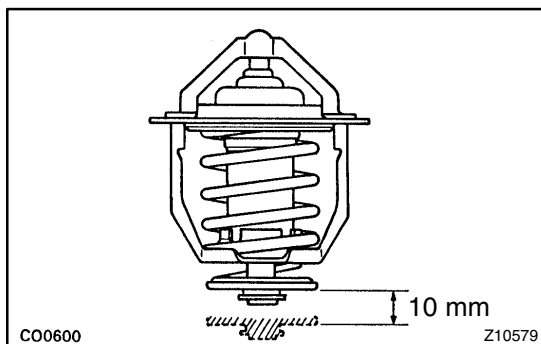
(a) Immerse the thermostat in water and gradually heat the water.

(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.



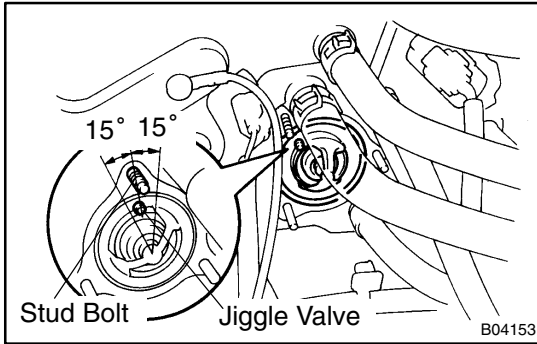
(c) Check the valve lift.

Valve lift: 10.0 mm (0.394 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.



INSTALLATION

1. PLACE THERMOSTAT IN WATER PUMP

- (a) Install a new gasket on to the thermostat.
- (b) Align the thermostat jiggle valve with the upper stud bolt, and insert the thermostat in the water inlet housing.

HINT:

The jiggle valve may be set within 15° of either side of the prescribed position.

2. INSTALL WATER INLET

Install the water inlet with the 3 nuts.

Torque: 8 N·m (80 kgf·cm, 69 in.·lbf)

3. INSTALL WATER INLET PIPE

- (a) Install a new O-ring to the water inlet pipe.
- (b) Apply soapy water to the O-ring.
- (c) Connect the water inlet pipe to the water inlet.
- (d) Install the bolt holding the water inlet pipe to the cylinder head.

Torque: 19.5 N·m (200 kgf·cm, 14 ft·lbf)

4. INSTALL ENGINE WIRE PROTECTOR

5. CONNECT WATER TEMPERATURE SWITCH CONNECTOR

6. REINSTALL AIR CLEANER CAP AND AIR CLEANER CASE

7. FILL WITH ENGINE COOLANT

8. START ENGINE AND CHECK FOR LEAKS

9. RECHECK ENGINE COOLANT LEVEL

RADIATOR

ON-VEHICLE CLEANING

C006G-01

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

NOTICE:

If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. (i.e. Maintain a distance between the cleaner nozzle and radiator core.)

ON-VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

CAUTION:

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

2. INSPECT RADIATOR CAP

NOTICE:

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

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

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

Pump speed: 1 push within 1 second

NOTICE:

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

Standard opening pressure:

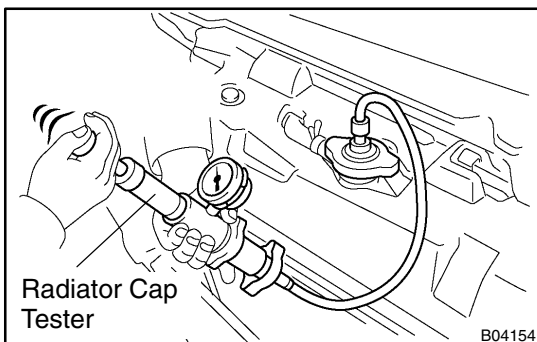
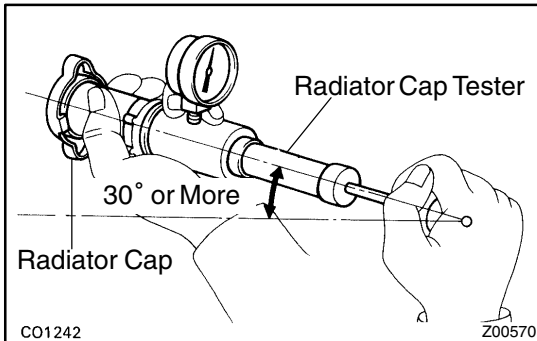
93 – 122 kPa (0.95 – 1.25 kgf/cm², 13.4 – 17.6 psi)

Minimum opening pressure:

78 kPa (0.8 kgf/cm², 11.2 psi)

HINT:

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



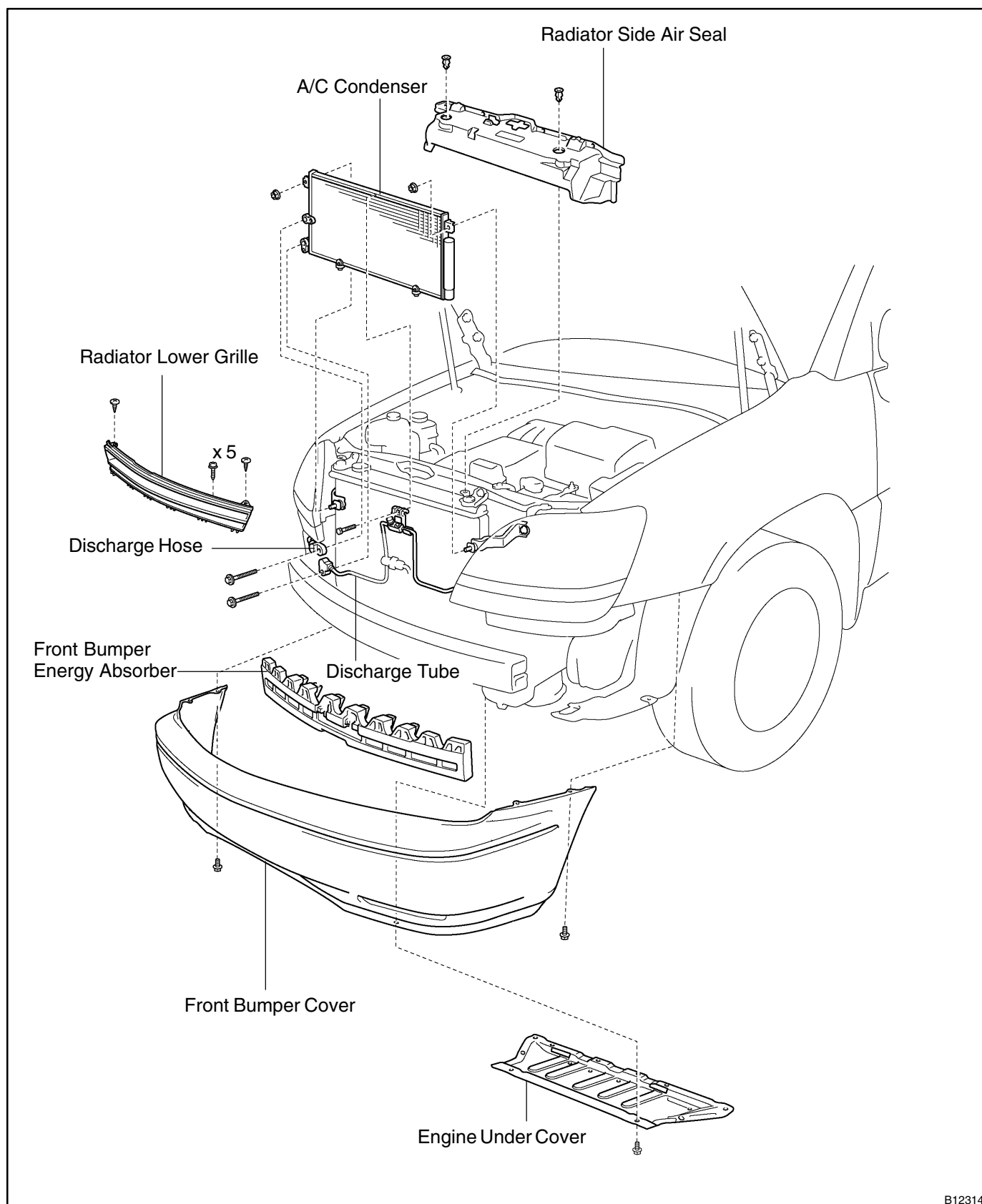
3. INSPECT COOLING SYSTEM FOR LEAKS

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

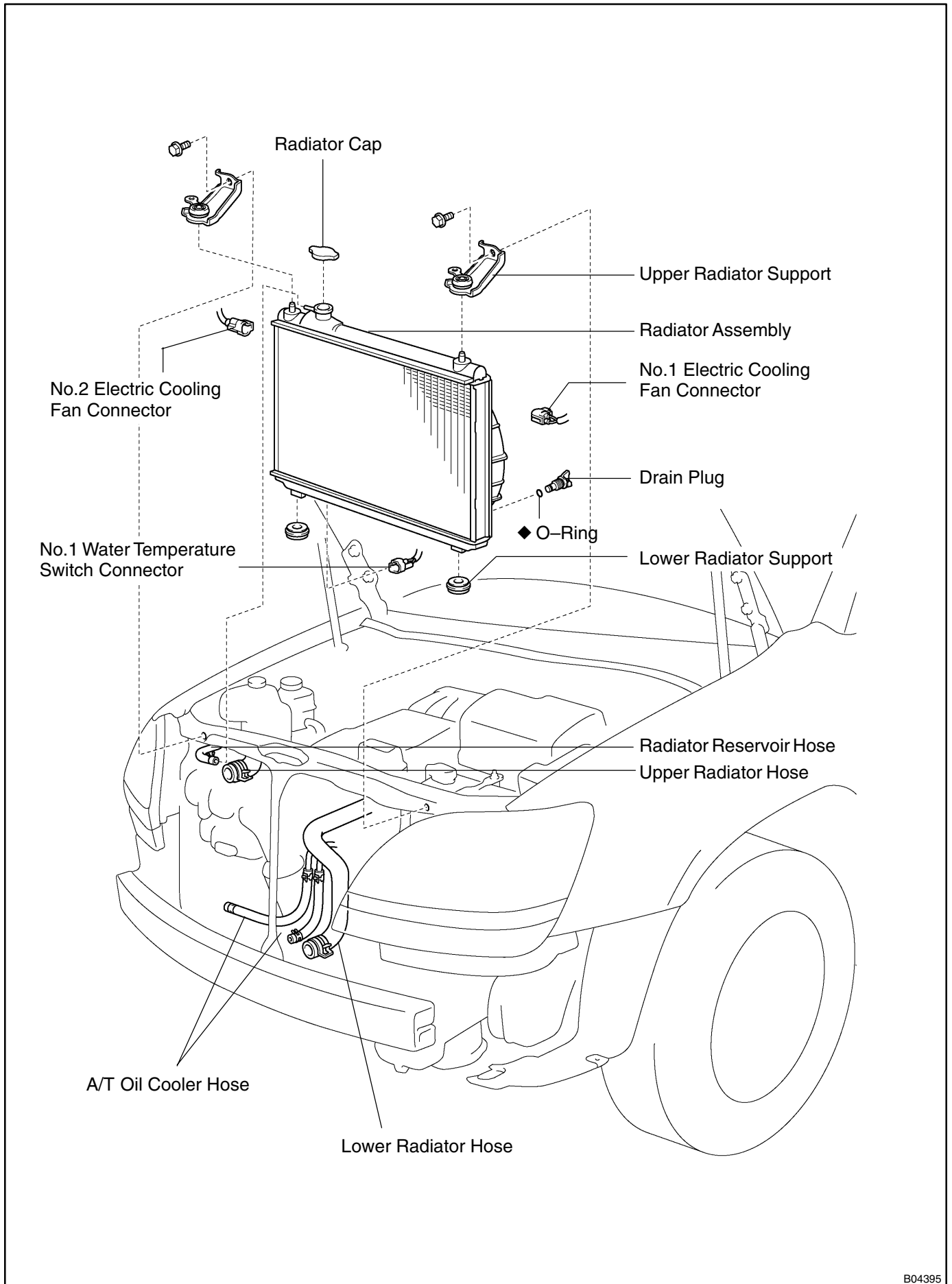
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

4. REINSTALL RADIATOR CAP

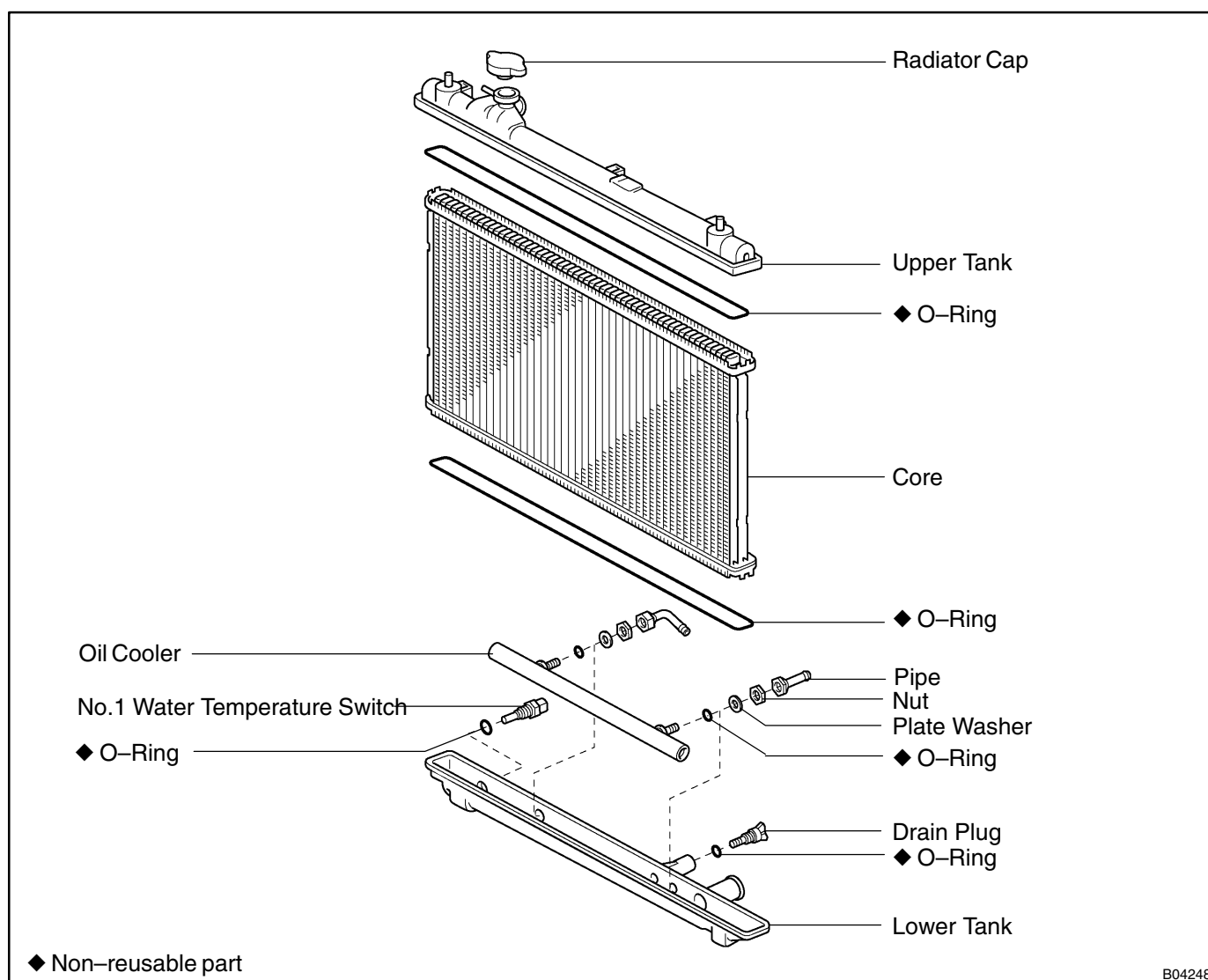
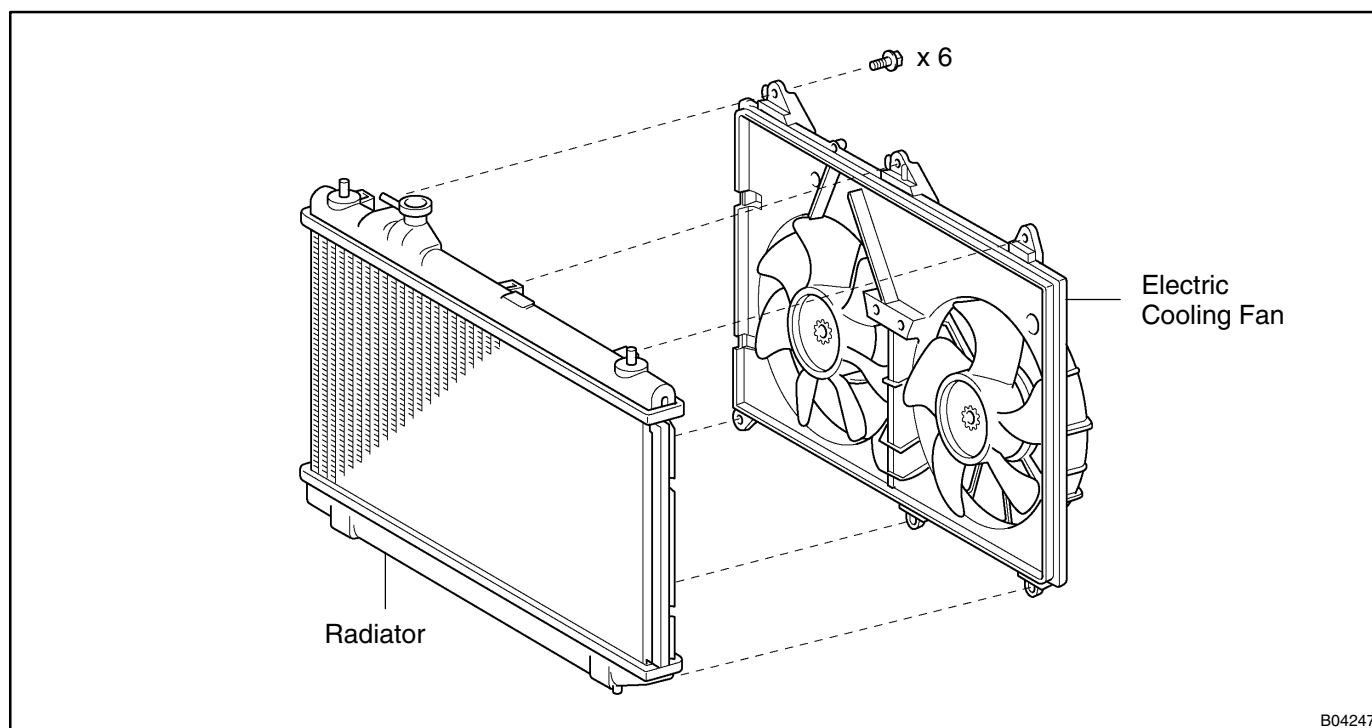
COMPONENTS



B12314



B04395



REMOVAL

HINT:

- AT the time of installation, please refer to the following items.
- Start the engine, and check for coolant and A/T fluid leaks.
- Check the A/T fluid level (See page DI-144).

1. REMOVE ENGINE UNDER COVER

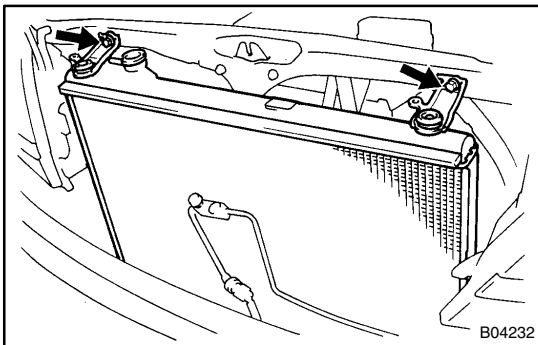
2. DRAIN ENGINE COOLANT

3. REMOVE A/C CONDENSER (See page AC-55)

4. REMOVE RADIATOR ASSEMBLY

(a) Disconnect these connectors and hoses:

- (1) Disconnect the No.1 electric cooling fan connector.
- (2) Disconnect the No.2 electric cooling fan connector.
- (3) Disconnect the No.1 water temperature switch connector.
- (4) Disconnect the upper radiator hose from radiator.
- (5) Disconnect the lower radiator hose from radiator.
- (6) Disconnect the radiator reservoir hose.
- (7) Disconnect the 2 oil cooler hoses from radiator.



(b) Remove the 2 bolts and 2 upper radiator supports.

Torque: 12.8 N·m (130 kgf·cm, 9 ft·lbf)

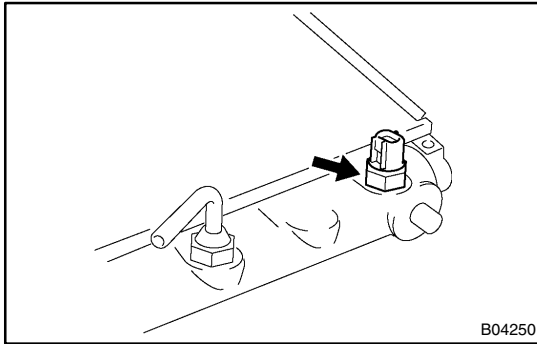
(c) Lift out the radiator assembly.

(d) Remove the 2 lower radiator supports.

5. REMOVE ELECTRIC COOLING FAN FROM RADIATOR

Remove the 6 bolts and cooling fan.

Torque: 5.0 N·m (50 kgf·cm, 44 in·lbf)



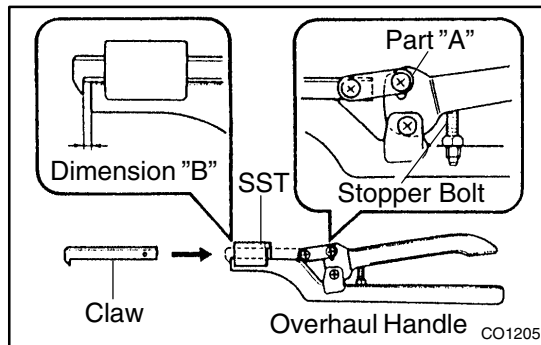
DISASSEMBLY

1. REMOVE NO.1 WATER TEMPERATURE SWITCH

- Remove the No.1 water temperature switch.
- Remove the O-ring.

2. REMOVE DRAIN PLUG

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



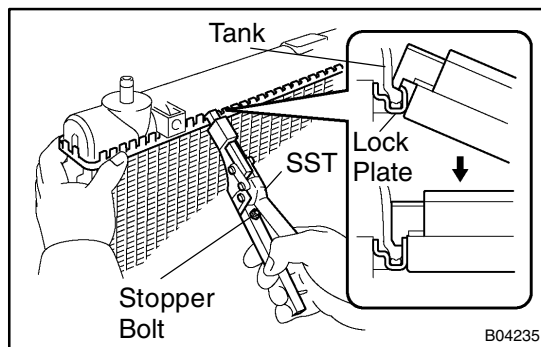
3. ASSEMBLE SST

SST 09230-01010

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

NOTICE:

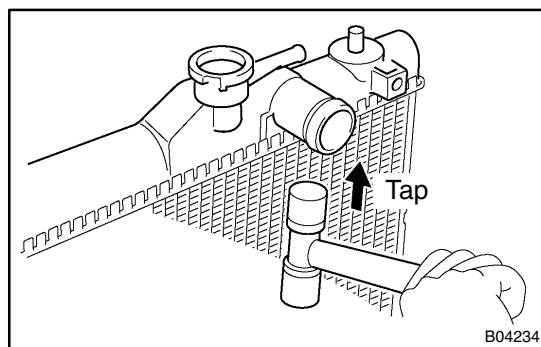
If this adjustment is not done the claw may be damaged.



4. UNCAULK LOCK PLATES

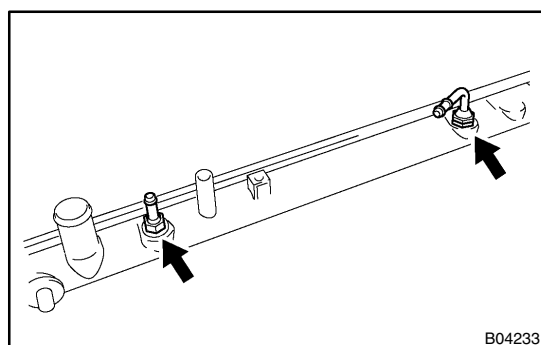
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

SST 09230-01010



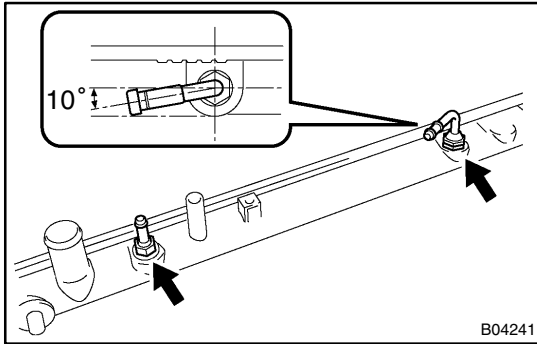
5. REMOVE TANKS AND O-RINGS

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



6. REMOVE OIL COOLER FROM LOWER TANK

- Loosen the nut, and remove the cooler pipe. Remove the 2 cooler pipes.
- Remove the 2 nuts and plate washers.
- Remove the oil cooler and 2 O-rings.



REASSEMBLY

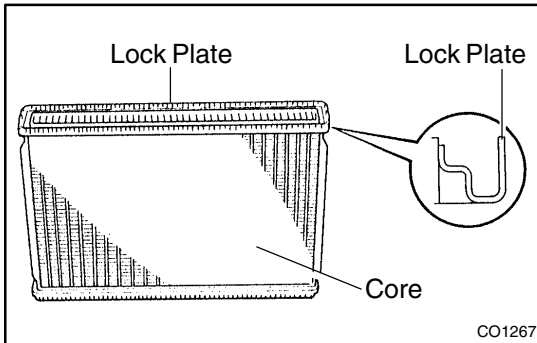
1. INSTALL OIL COOLER TO LOWER TANK

- Install 2 new O-rings to the oil cooler.
- Install the oil cooler to the lower tank with the 2 plate washers and nuts.

Torque: 8.3 N·m (85 kgf·cm, 74 in.-lbf)

- Install the cooler pipe in the direction indicated in the illustration.

Torque: 14.7 N·m (150 kgf·cm, 11 ft.-lbf)



2. INSPECT LOCK PLATE FOR DAMAGE

HINT:

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

NOTICE:

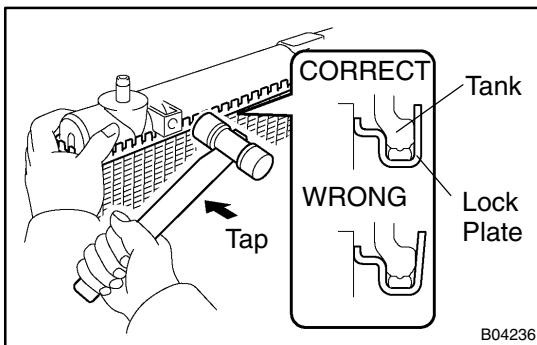
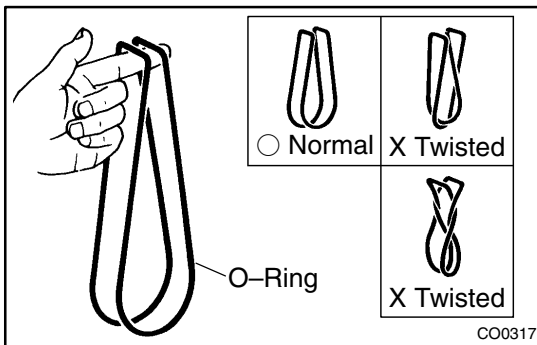
The radiator can only be recaulked 2 times. After the 2nd time, the radiator core must be replaced.

3. INSTALL NEW O-RINGS AND TANKS

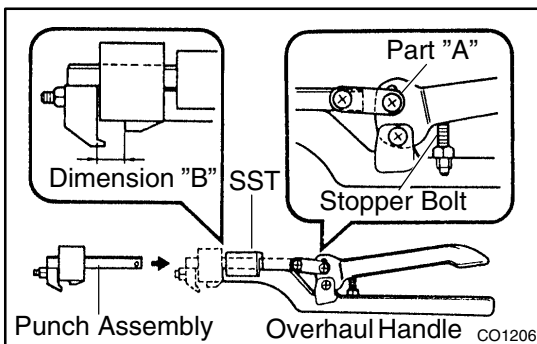
- After checking that there are no foreign objects in the lock plate groove, install the new O-ring without twisting it.

HINT:

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



- Install the tank without damaging the O-ring.
- Tap the lock plate with a soft-faced hammer so that there is no gap between it and the tank.

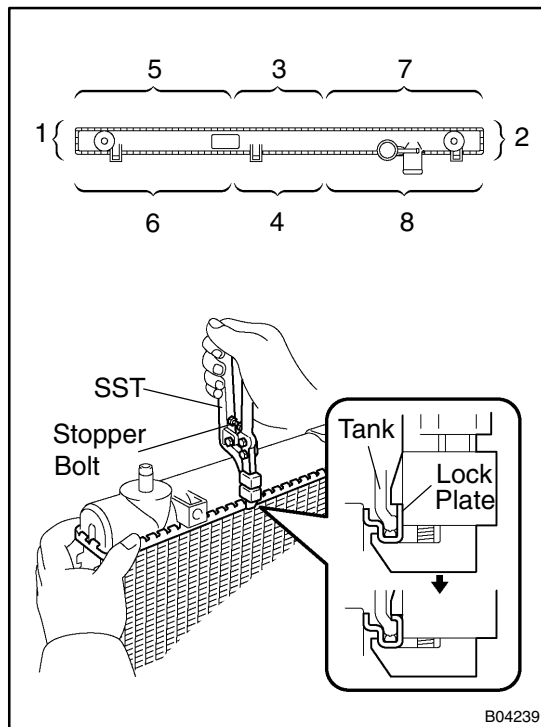


4. ASSEMBLE SST

SST 09230-01010, 09231-14010

- Install the punch assembly to the overhaul handle, inserting it in 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.

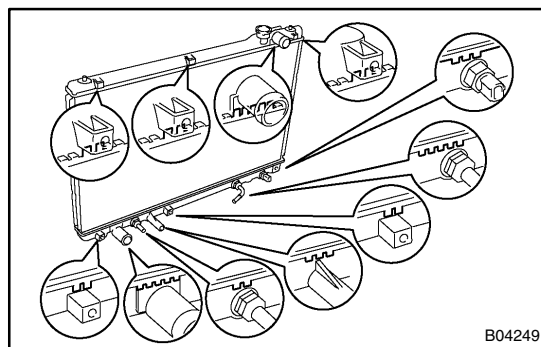
Dimension: 8.4 mm (0.331 in)



5. CAULK LOCK PLATE

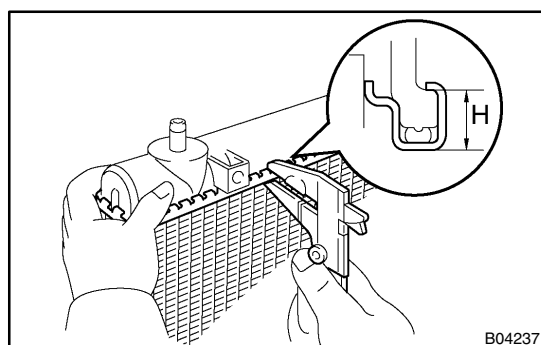
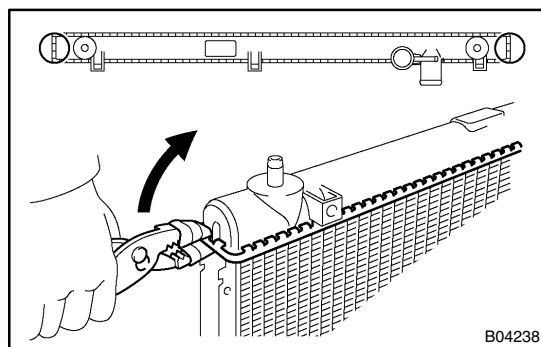
- (a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.

SST 09230-01010



HINT:

- Do not stake the areas protruding around the pipes, brackets or tank ribs.
- The points shown in the illustration and oil cooler near here cannot be staked with the SST. Use pliers or similar object and be careful not to damage the core plates.



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

Plate height: 7.40 – 7.80 mm (0.2913 – 0.3071 in.)

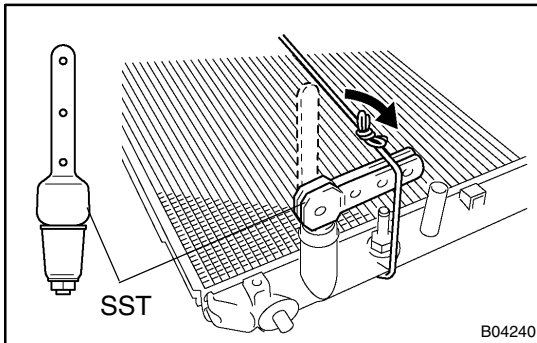
If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

6. INSTALL NO.1 WATER TEMPERATURE SWITCH

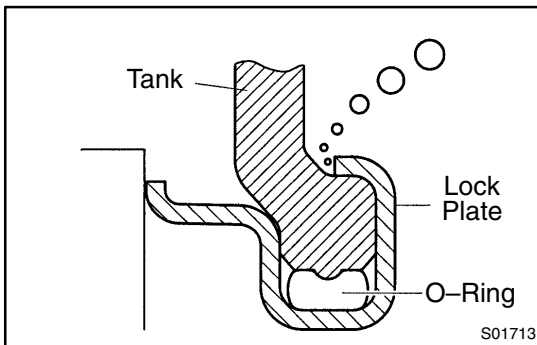
- (a) Install a new O-ring to the No.1 water temperature switch.
(b) Install the No.1 water temperature switch.

7. INSTALL DRAIN PLUG

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

**8. INSPECT FOR WATER LEAKS**

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



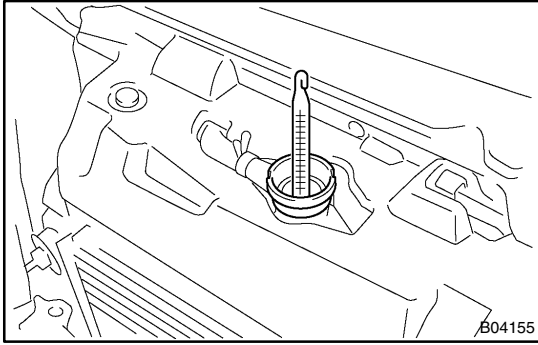
- (d) Inspect for leaks.

HINT:

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

INSTALLATION

Installation is in the reverse order of removal (See page CO-19).

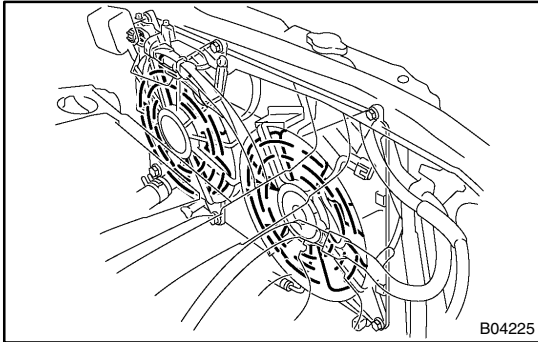


ELECTRIC COOLING FAN ON-VEHICLE INSPECTION

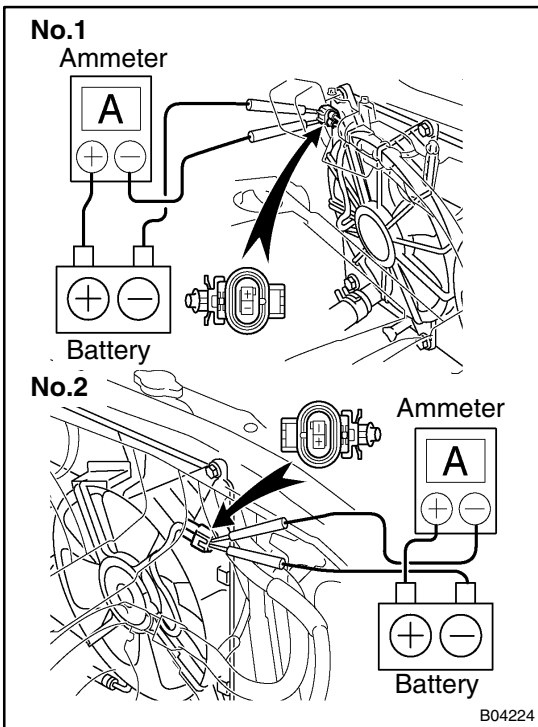
CO01K-02

1. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 98°C (208°F))

- (a) Start the engine, and raise coolant temperature to above 98°C (208°F).



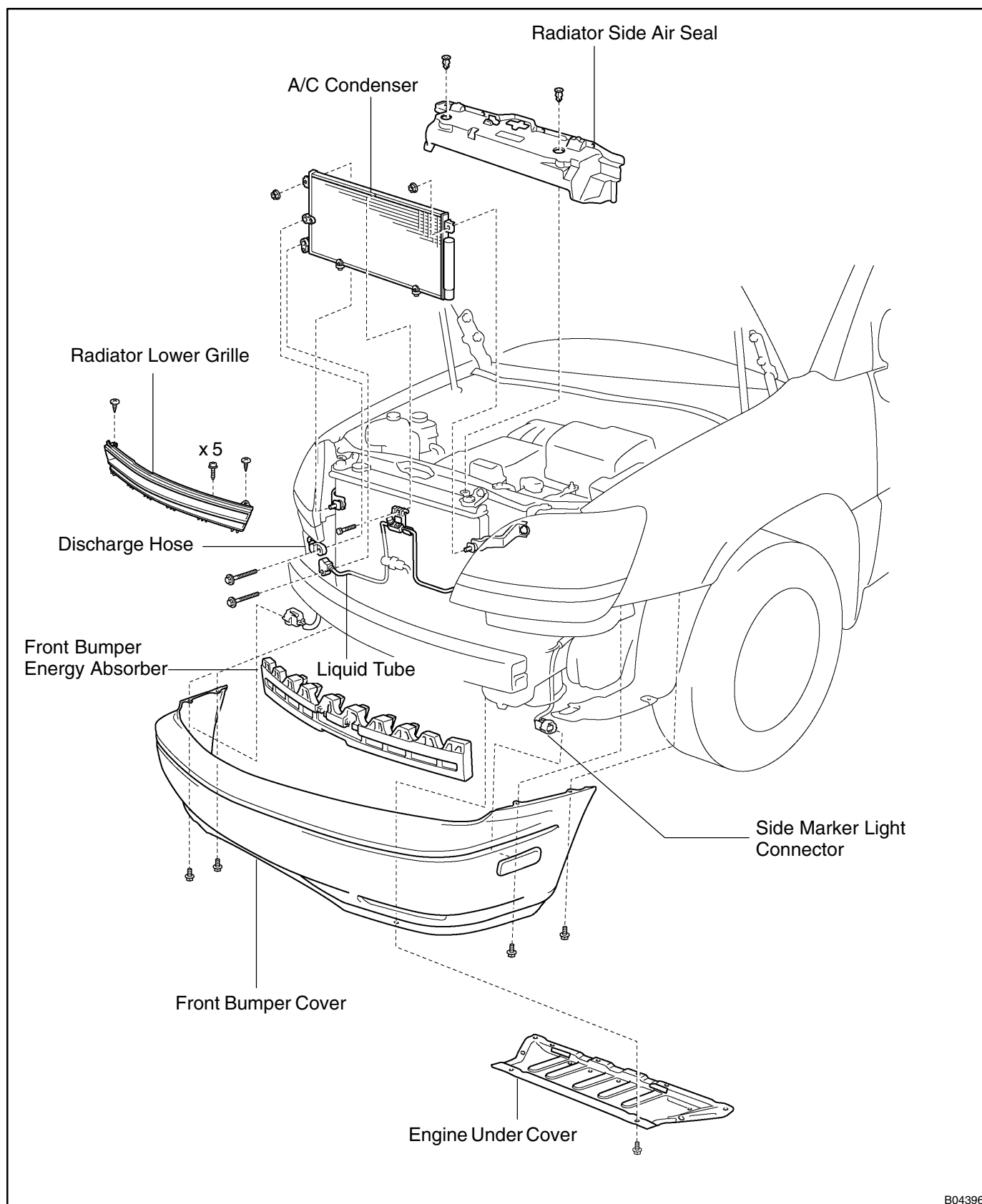
- (b) Check that the cooling fan rotates. If not, replace the No.1 water temperature switch.



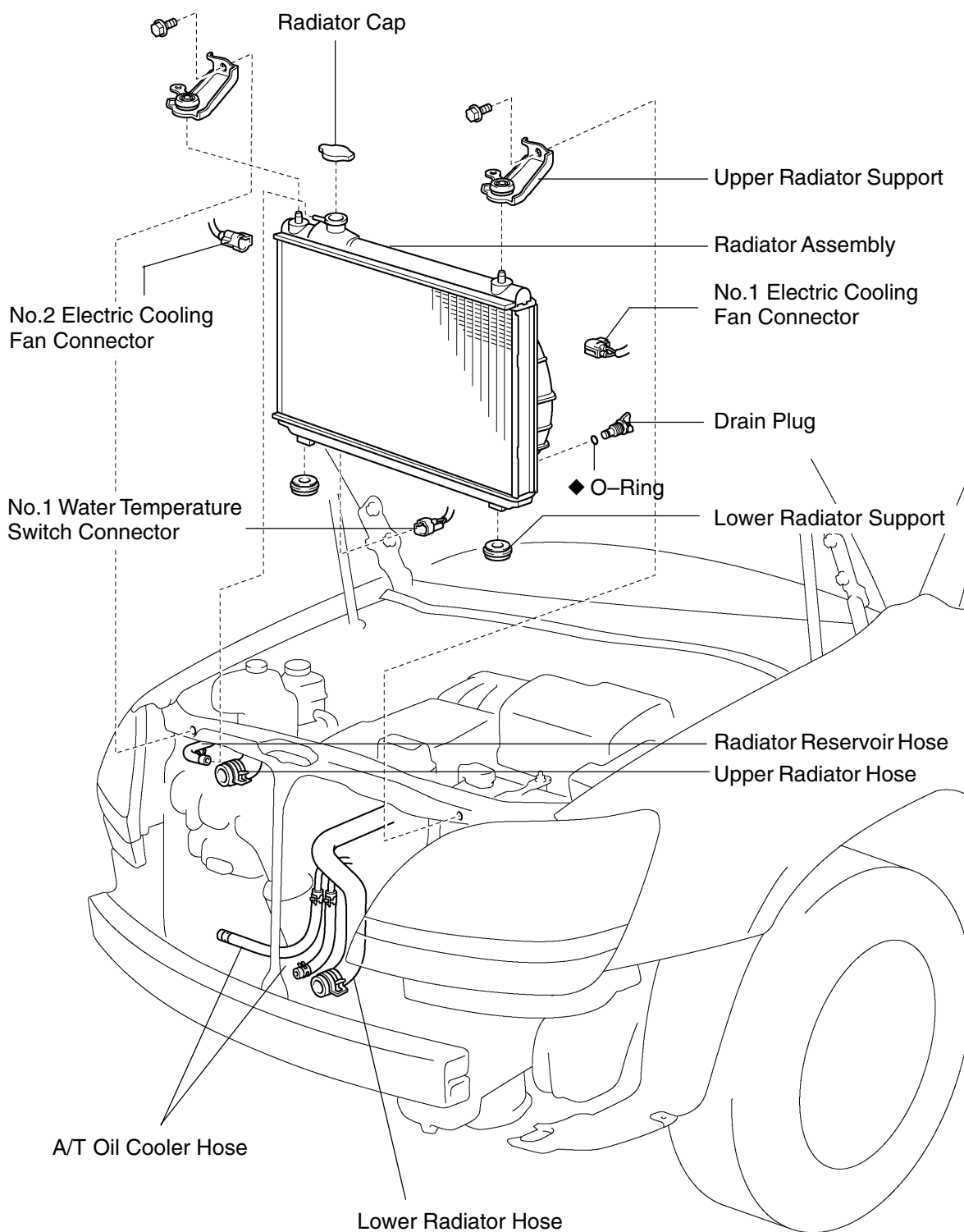
2. INSPECT COOLING FANS

- (a) Disconnect the cooling fan connector.
- (b) Connect battery and ammeter to the cooling fan connector.
- (c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.
Standard amperage: 8.5 – 11.5 A at 20°C (68°F)
- (d) Reconnect the cooling fan connector.

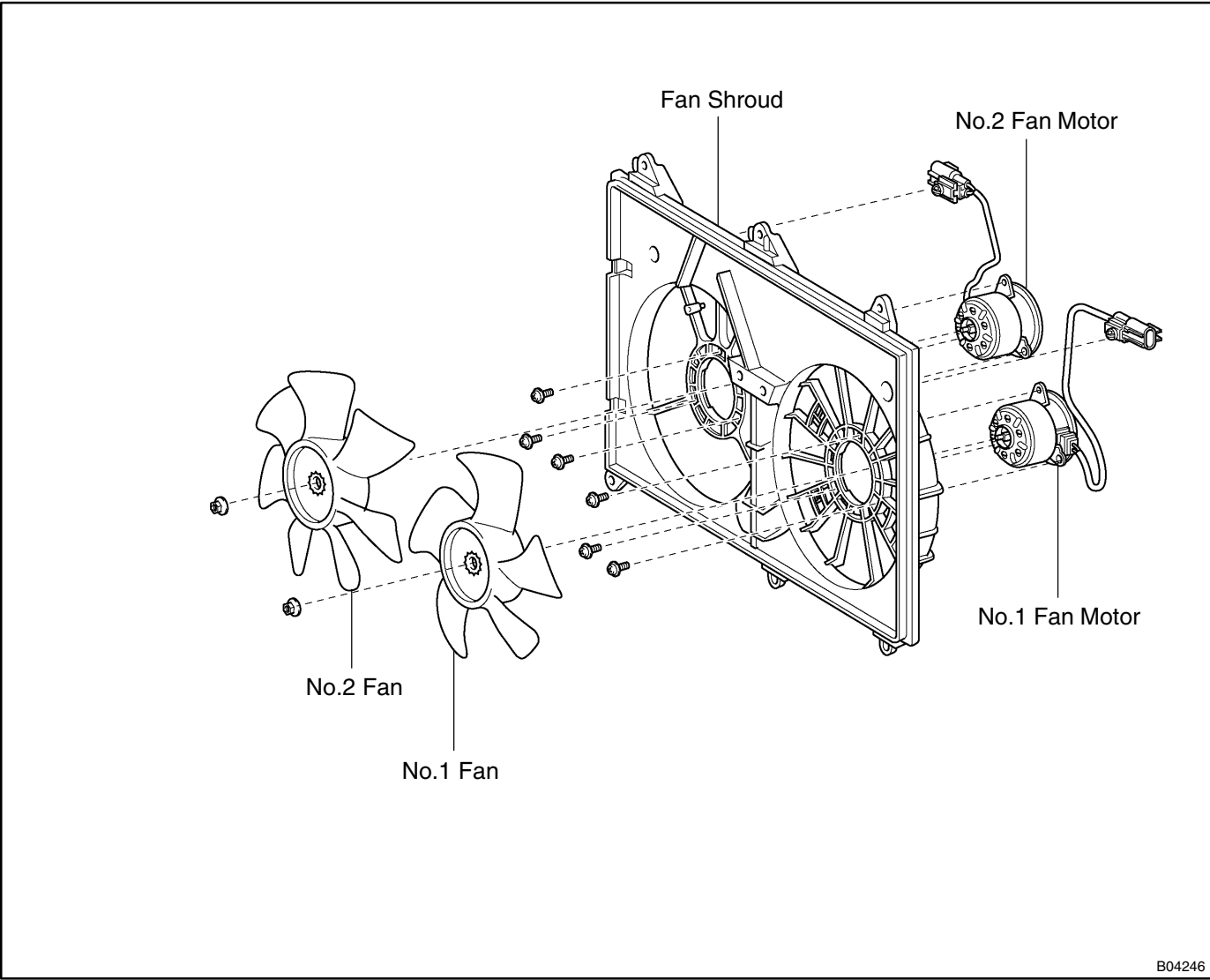
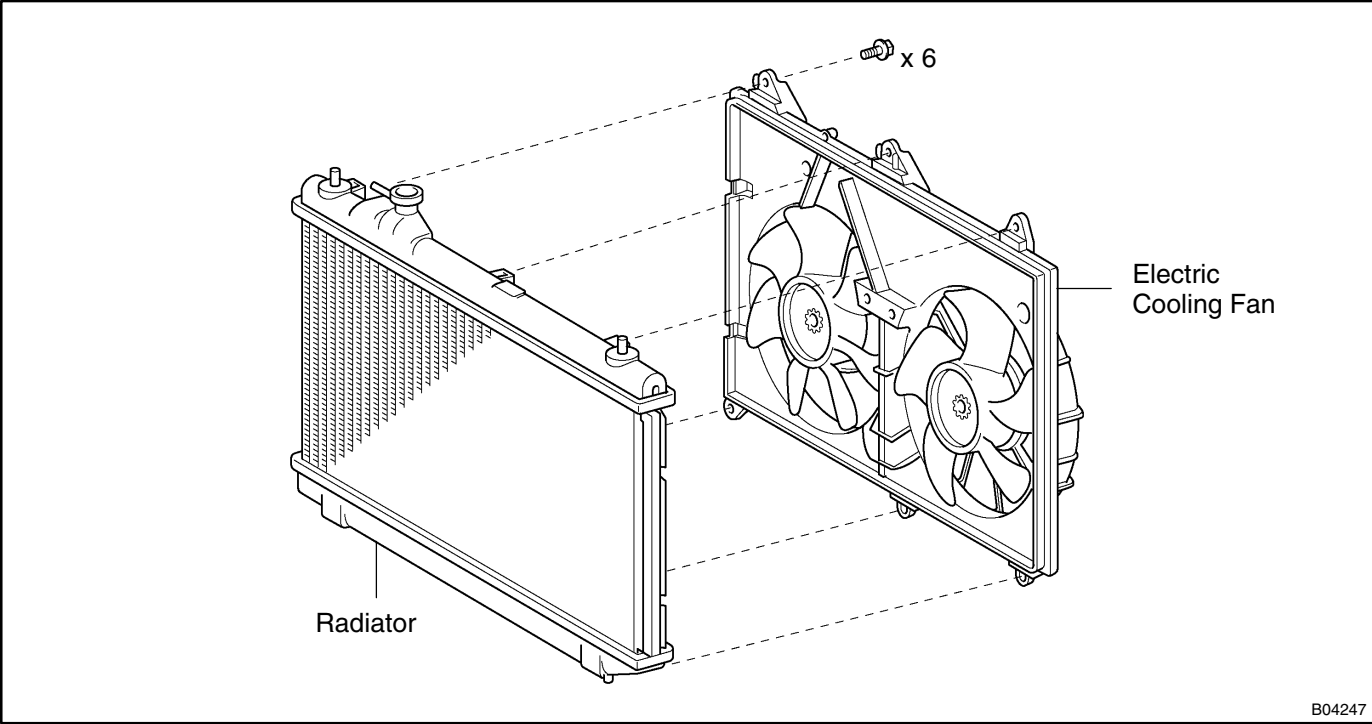
COMPONENTS

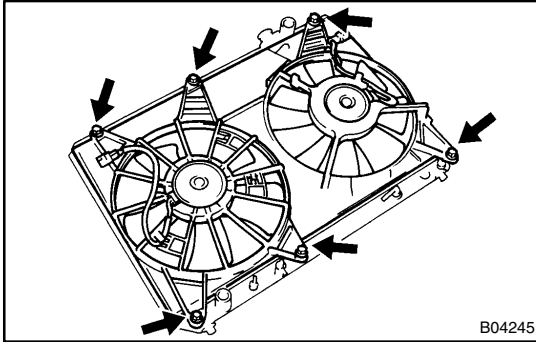


B04396



B04395



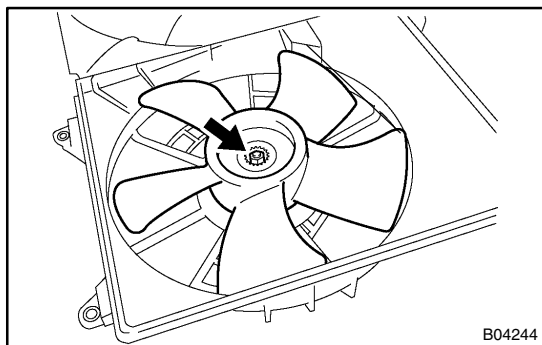


REMOVAL

1. REMOVE RADIATOR ASSEMBLY
(See page CO-19)
2. REMOVE ELECTRIC COOLING FAN FROM RADIATOR

Remove the 6 bolts and cooling fan.

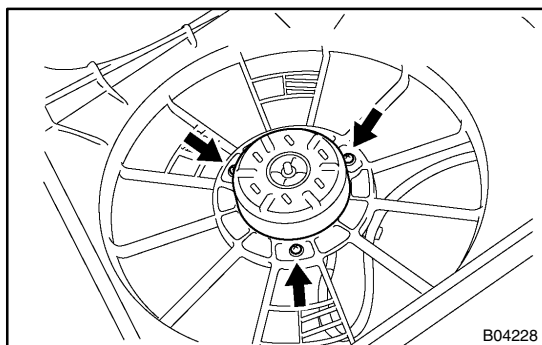
Torque: 5.0 N·m (50 kgf·cm, 44 in·lbf)



DISASSEMBLY

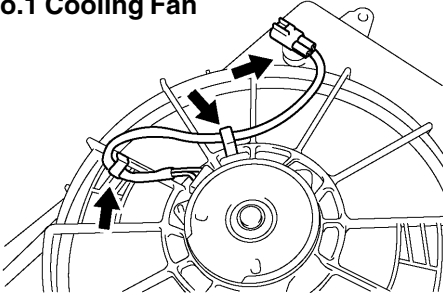
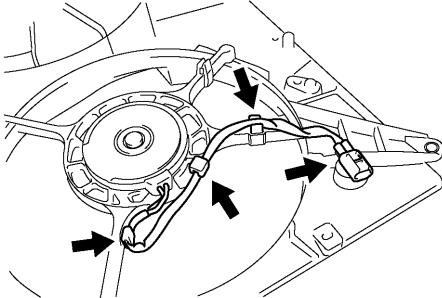
1. REMOVE FAN

Remove the nut and fan.



2. REMOVE FAN MOTOR

- (a) Disconnect the wire and connector holder from the fan shroud.
- (b) Remove the 3 screws and fan motor.

No.1 Cooling Fan**No.2 Cooling Fan**

B04227

REASSEMBLY

1. INSTALL FAN MOTOR

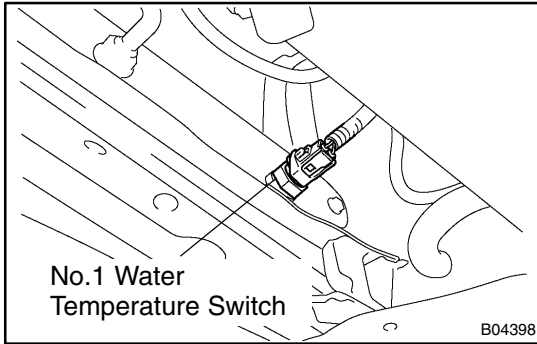
- (a) Install the fan motor with the 3 screws.
- (b) Install the wire and connector holder to the fan shroud.

2. INSTALL FAN

Install the fan with the nut.

INSTALLATION

Installation is in the reverse order of removal (See page CO-29).

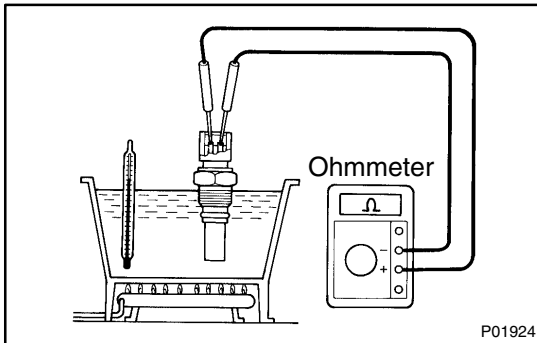


WATER TEMPERATURE SWITCH INSPECTION

CO15V-01

1. DRAIN ENGINE COOLANT
2. INSPECT NO.1 WATER TEMPERATURE SWITCH

- (a) Remove the No.1 water temperature switch.



- (b) Inspect the No.1 water temperature switch.
 - (1) Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is above 98°C (208°F).

If there is no continuity, replace the switch.

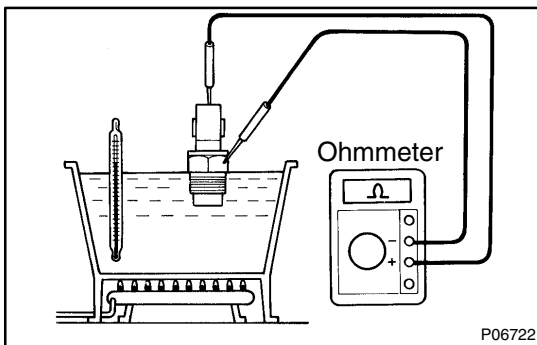
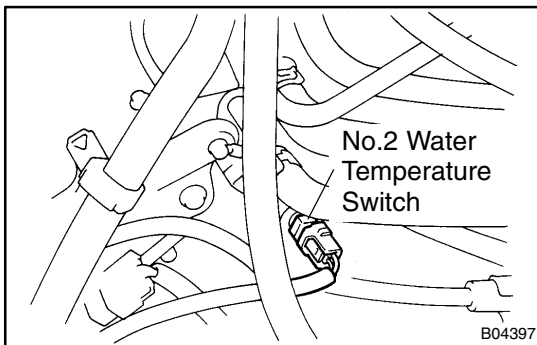
- (2) Check that there is no continuity, between the terminals when the coolant temperature is below 88°C (190°F).

If there is continuity, replace the switch.

- (c) Reinstall the No.1 water temperature switch.

3. INSPECT NO.2 WATER TEMPERATURE SWITCH

- (a) Remove the No.2 water temperature switch.



- (b) Inspect the No.2 water temperature switch.
 - (1) Using an ohmmeter, check that there is continuity between terminals when the coolant temperature is above 94°C (201°F).

If there is no continuity, replace the switch.

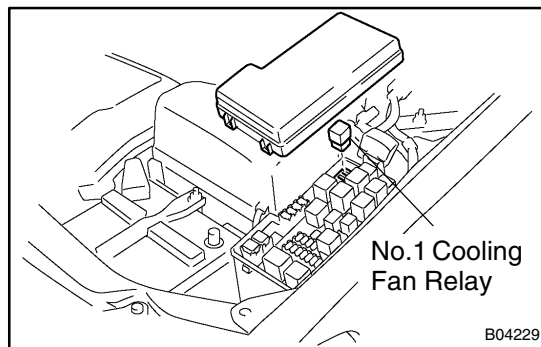
- (2) Check that there is no continuity between the terminals when the coolant temperature is below 83°C (181°F).

If there is continuity, replace the switch.

- (c) Reinstall the No.2 water temperature switch.

4. REFILL ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS

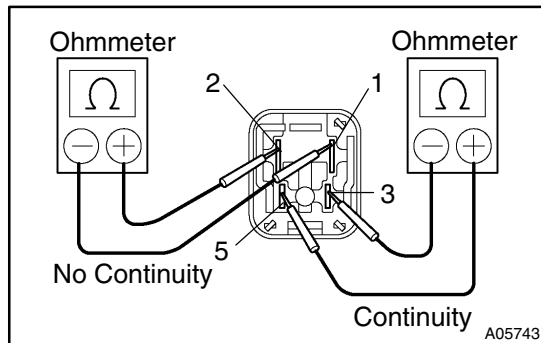


COOLING FAN RELAY INSPECTION

CO08H-02

1. INSPECT NO.1 COOLING FAN RELAY

- (a) Remove the No.1 cooling fan relay. (Marking: FAN NO.1)



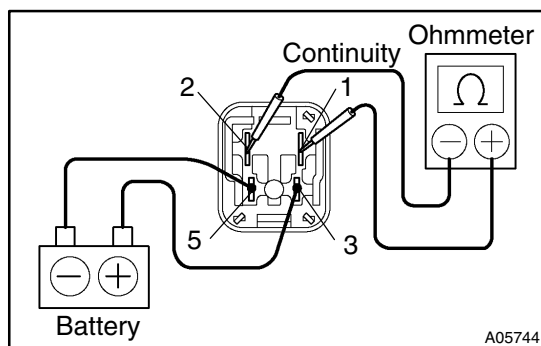
- (b) Inspect the No.1 cooling fan relay continuity.

- (1) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.

- (2) Check that there is no continuity between terminals 1 and 2.

If there is continuity, replace the relay.



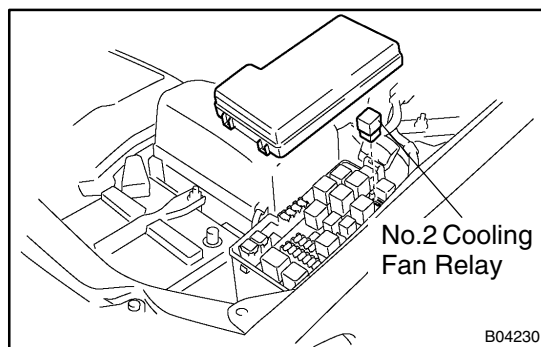
- (c) Inspect the No.1 cooling fan relay operation.

- (1) Apply battery voltage across terminals 3 and 5.

- (2) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

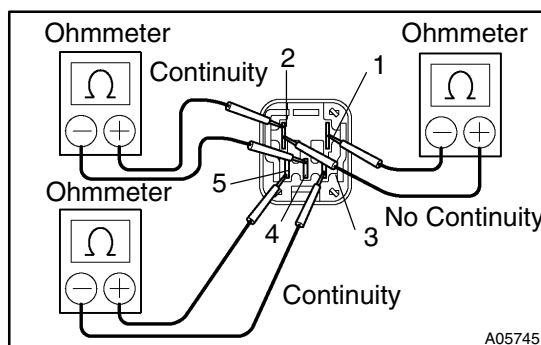
If there is no continuity, replace the relay.

- (d) Install the No.1 cooling fan relay.



2. INSPECT NO.2 COOLING FAN RELAY

- (a) Remove the No.2 cooling fan relay. (Marking: FAN NO.2)



- (b) Inspect the No.2 cooling fan relay continuity.

- (1) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

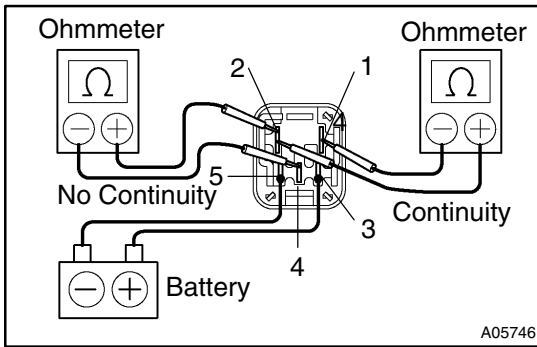
If there is no continuity, replace the relay.

- (2) Check that there is continuity between terminals 2 and 4.

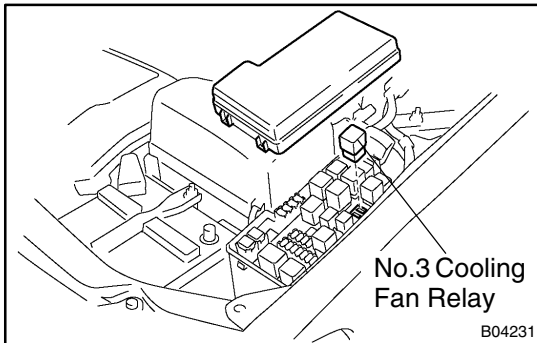
If there is no continuity, replace the relay.

- (3) Check that there is no continuity between terminals 1 and 2.

If there is continuity, replace the relay.

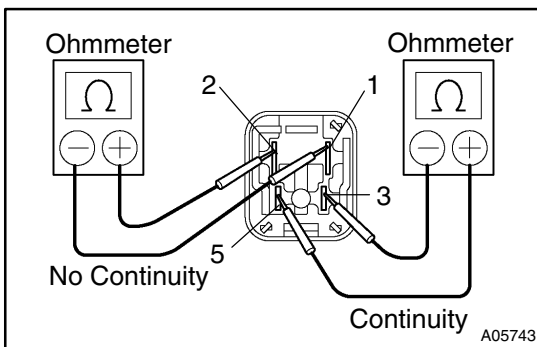


- (c) Inspect the No.2 cooling fan relay operation.
- (1) Apply battery voltage across terminals 3 and 5.
 - (2) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.
- If there is continuity, replace the relay.
- (3) Check that there is continuity between terminals 1 and 2.
- If there is no continuity, replace the relay.
- (d) Install the No.2 cooling fan relay.

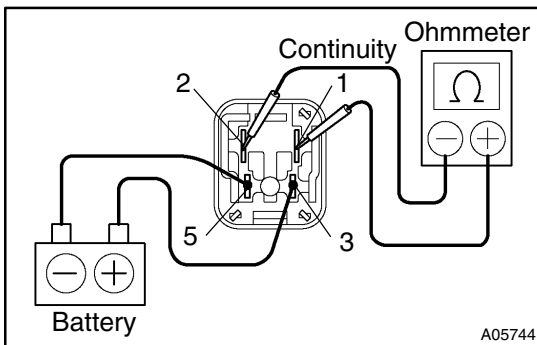


3. INSPECT NO.3 COOLING FAN RELAY

- (a) Remove the No.3 cooling fan relay. (Marking: FAN NO.3)



- (b) Inspect the No.3 cooling fan relay continuity.
- (1) Using an ohmmeter, check that there is continuity between terminals 3 and 5.
- If there is no continuity, replace the relay.
- (2) Check that there is no continuity between terminals 1 and 2.
- If there is continuity, replace the relay.



- (c) Inspect the No.3 cooling fan relay operation.
- (1) Apply battery voltage across terminals 3 and 5.
 - (2) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- If there is no continuity, replace the relay.
- (d) Install the No.3 cooling fan relay.