COOLANT

CO066–03

INSPECTION

HINT:

Check the coolant level when the engine is cold.

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

The engine coolant level should be between the ”LOW” and ”FULL” lines.

If low, check for leaks and add ”Toyota Long Life Coolant” or equivalent up to the ”FULL” line.

2. CHECK ENGINE COOLANT QUALITY

(a) Remove the radiator cap.

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, replace the coolant.

(c) Reinstall the radiator cap.

CO067–03

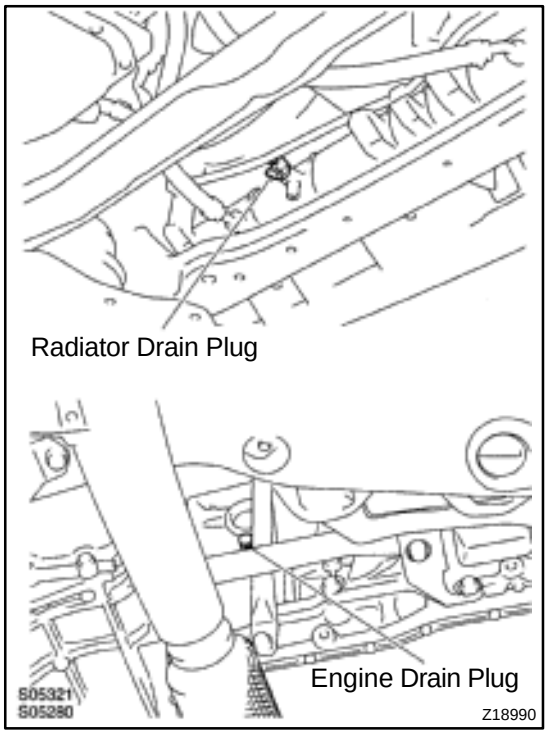
REPLACEMENT

1. DRAIN ENGINE COOLANT

(a) Remove the radiator cap.

CAUTION:

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



(b) Loosen the radiator drain plug (on the right side of the radiator lower tank) and engine drain plug (on the left rear of the cylinder block), and drain the coolant.

(c) Close the drain plugs.

Torque: 25 N·m (250 kgf·cm, 18 ft·lbf) for engine

2. FILL ENGINE COOLANT

(a) Slowly fill the system with coolant.

- Use of improper coolants may damage engine cooling system.
- Use ”Toyota Long Life Coolant” or equivalent and mix it with plan water according to the manufacturer’s directions.
- Using of coolant which includes more than 50 % (freezing protection down to –35˚C (–31˚F) or 60 % (freezing protection down to –50˚C (–58˚F)) of ethylene–glycol is recommended but not more than 70 %.

NOTICE:

- **Do not use an alcohol type coolant or plain water alone.**
- **The coolant should be mixed with plain water (preferably demineralized water or distilled water).**

Capacity:

w/ Oil cooler	6.9 litters (7.3 US qts, 6.1 Imp. qts)
w/o Oil cooler	6.2 litters (6.5 US qts, 5.4 Imp. qts)

(b) Install the radiator cap.

(c) Start the engine, and bleed the cooling system.

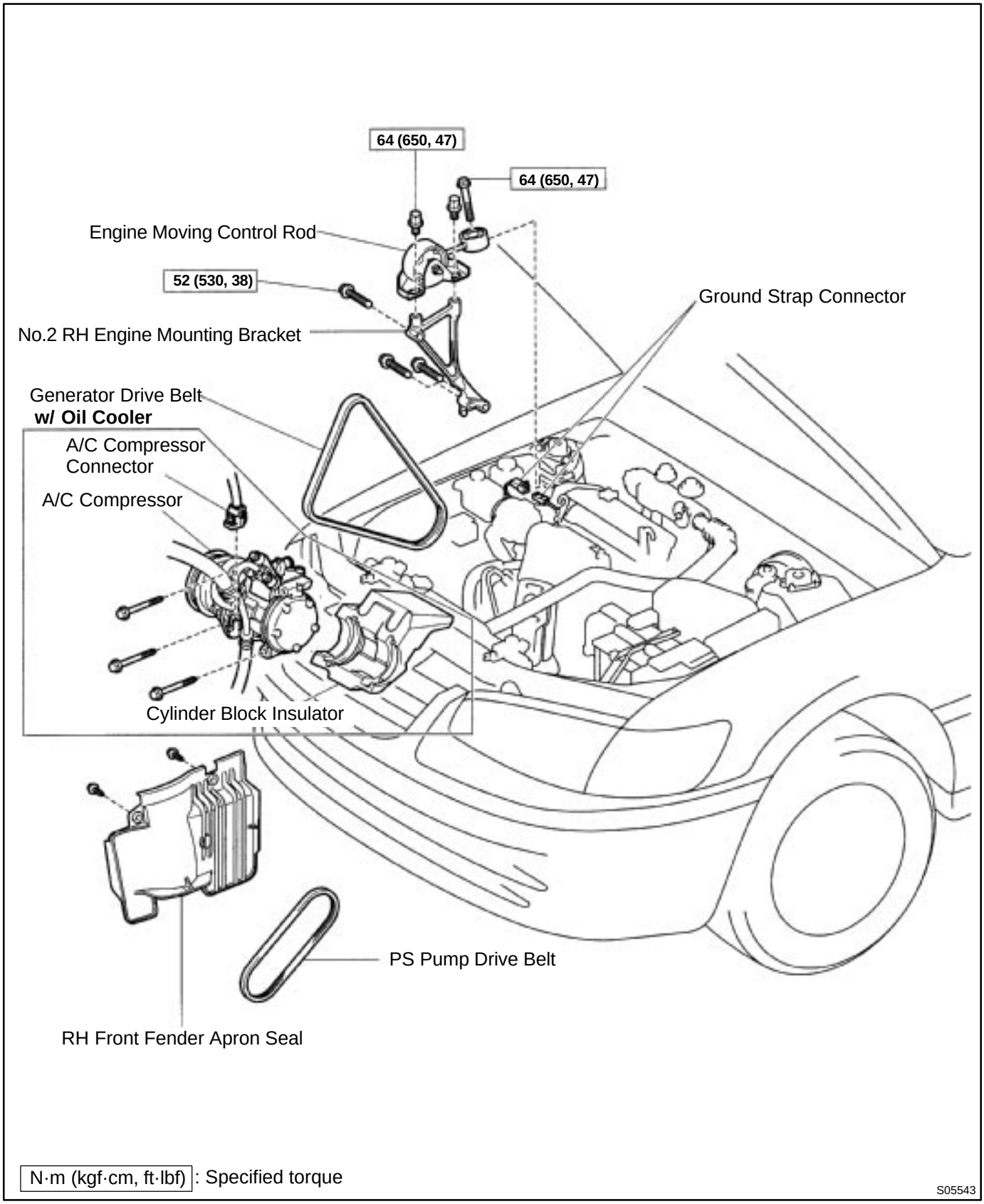
(d) Refill the radiator reservoir with coolant until it reaches the ”FULL” line.

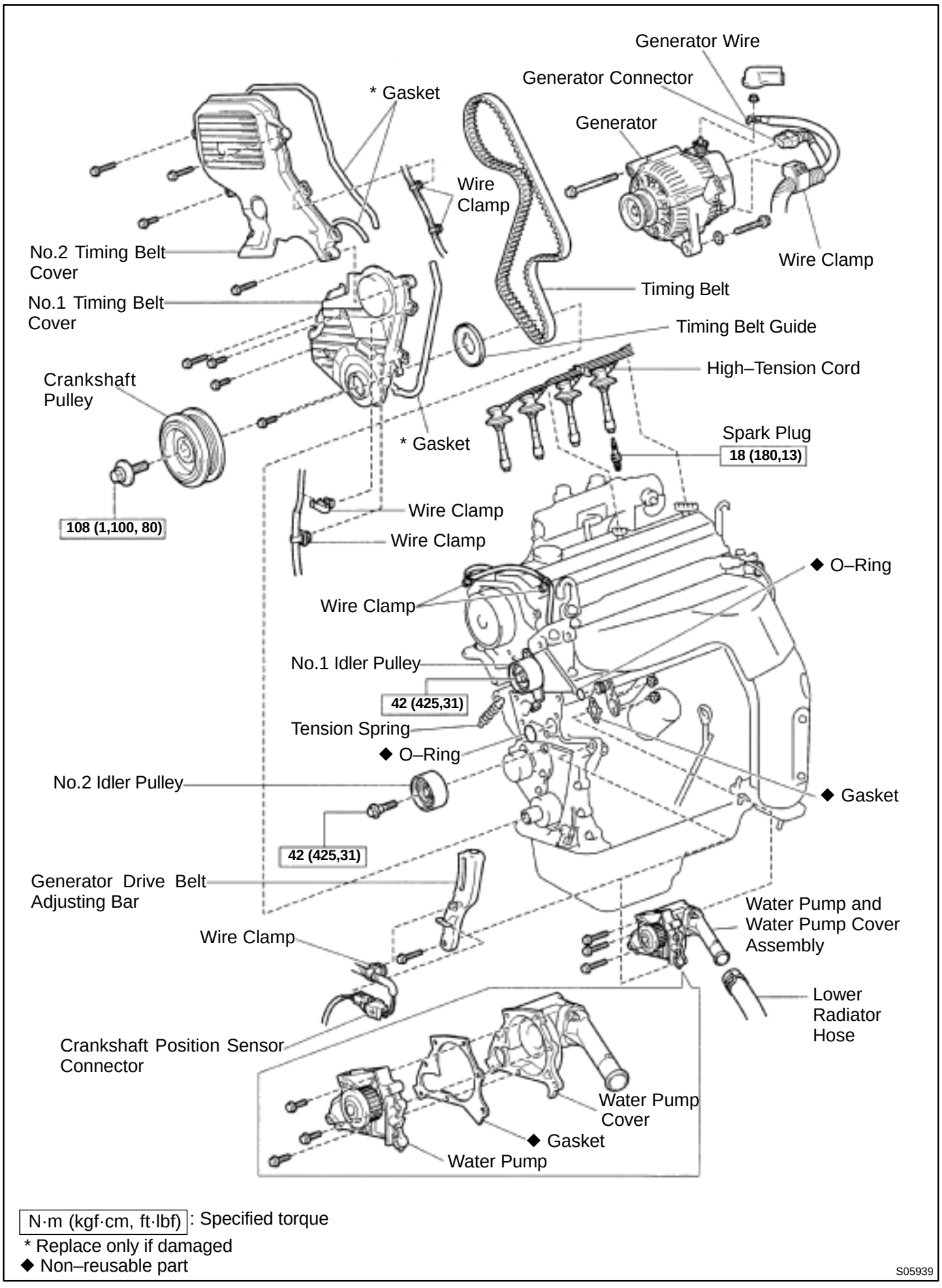
3. CHECK FOR COOLANT LEAKS

WATER PUMP

COMPONENTS

CO068–03





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

* Replace only if damaged

◆ Non–reusable part

S05939

CO069–04

REMOVAL

1. DRAIN ENGINE COOLANT

2. REMOVE TIMING BELT (See page EM–17)

3. DISCONNECT LOWER RADIATOR HOSE FROM WATER OUTLET

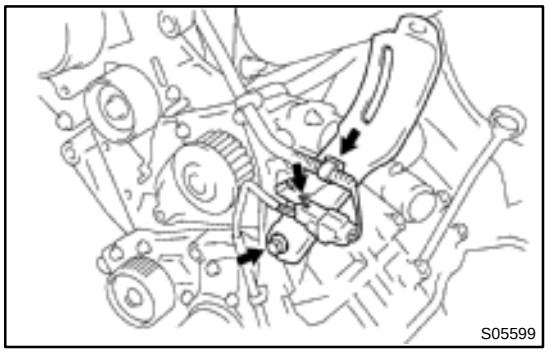
4. REMOVE TIMING BELT TENSION SPRING

Loosen the No.1 idler pulley bolt, and remove the tension spring.

5. REMOVE NO.2 IDLER PULLEY

Remove the bolt and idler pulley.

6. w/ Oil Cooler:
REMOVE A/C COMPRESSOR (See page EM–69)

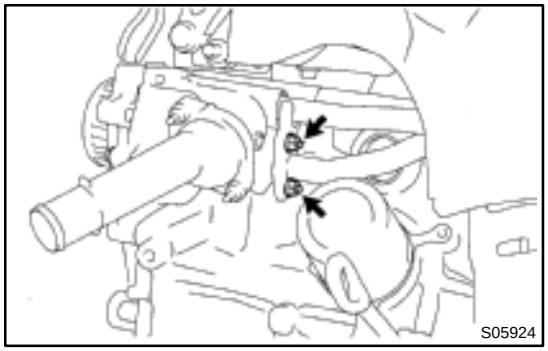


7. REMOVE GENERATOR DRIVE BELT ADJUSTING BAR

(a) Disconnect the engine wire clamp from the adjusting bar.

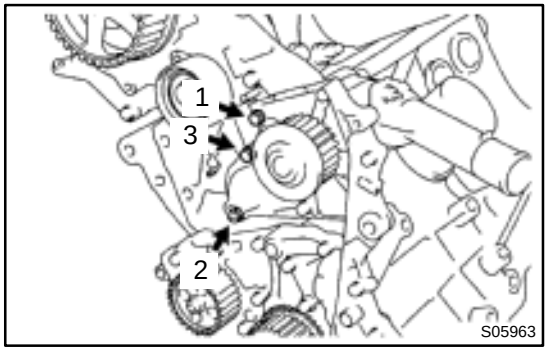
(b) Disconnect the crankshaft position sensor connector from the bracket on the adjusting bar.

(c) Remove the bolt and adjusting bar.

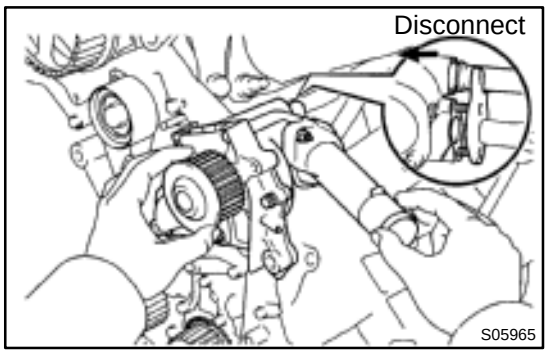


8. REMOVE WATER PUMP AND WATER PUMP COVER ASSEMBLY

(a) Remove the 2 nuts holding the water pump to the water bypass pipe.



(b) Remove the 3 bolts in the sequence shown.



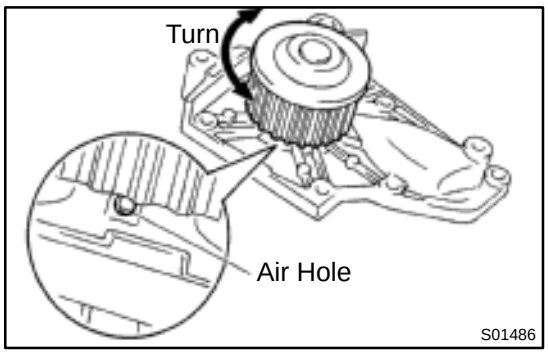
(c) Disconnect the water pump cover from the water bypass pipe, and remove the water pump and water pump cover assembly.

(d) Remove the gasket and 2 O–rings from the water pump and water bypass pipe.

9. REMOVE WATER PUMP FROM WATER PUMP COVER

Remove the 3 bolts, water pump and gasket.

CO06A–03



INSPECTION

1. INSPECT WATER PUMP

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

If leakage is found, replace the water pump.

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

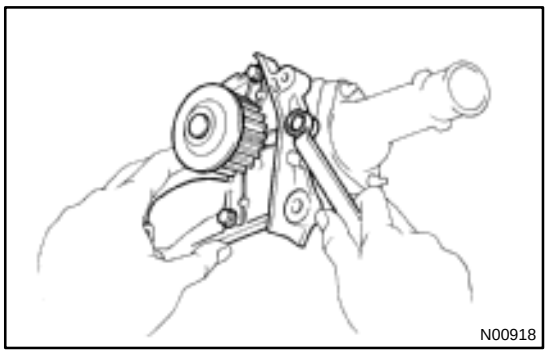
(b) Turn the pulley, and check that the water pump bearing moves smoothly and quietly.

If necessary, replace the water pump.

2. INSPECT TIMING BELT COMPONENTS
(See page EM–22)

CO06B–03

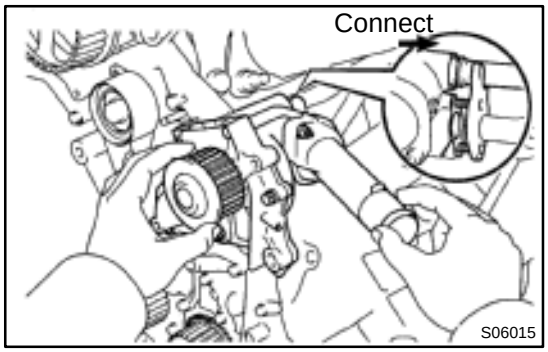
INSTALLATION



1. INSTALL WATER PUMP TO WATER PUMP COVER

Install a new gasket and the water pump with the 3 bolts.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)



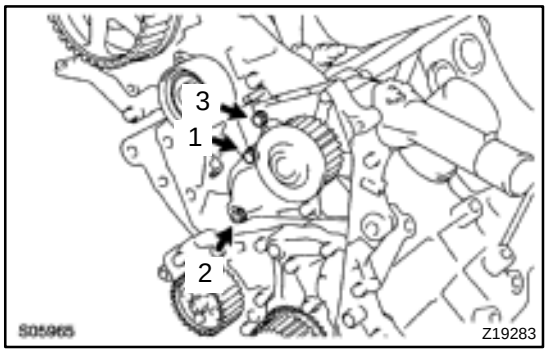
2. INSTALL WATER PUMP AND WATER PUMP COVER ASSEMBLY

(a) Install new O–ring and gasket to water pump cover.

(b) Install a new O–ring to the water bypass pipe.

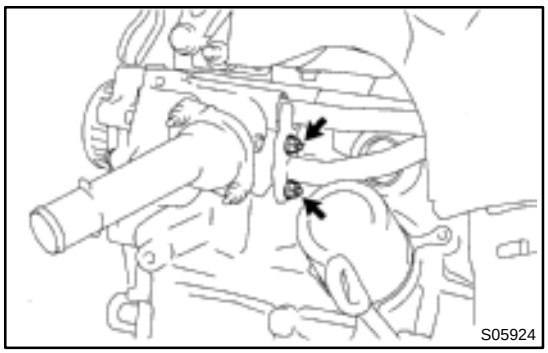
(c) Apply soapy water to the O–ring on the water bypass pipe.

(d) Connect the water pump cover to the water bypass pipe. Do not install the nuts yet.



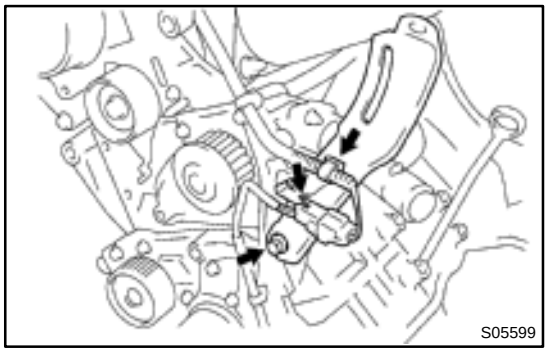
(e) Install the water pump with the 3 bolts. Tighten the bolts in the sequence shown.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)



(f) Install the 2 nuts holding the water pump cover to the water bypass pipe.

Torque: 9.3 N·m (95 kgf·cm, 82 in.·lbf)



3. INSTALL GENERATOR DRIVE BELT ADJUSTING BAR

(a) Install the adjusting bar with the bolt.

Torque: 22 N·m (224 kgf·cm, 16 ft·lbf)

(b) Install the engine wire clamp to the adjusting bar.

(c) Install the crankshaft position sensor connector to the bracket on the adjusting bar.

4. w/ Oil Cooler:

INSTALL A/C COMPRESSOR (See page EM–75)

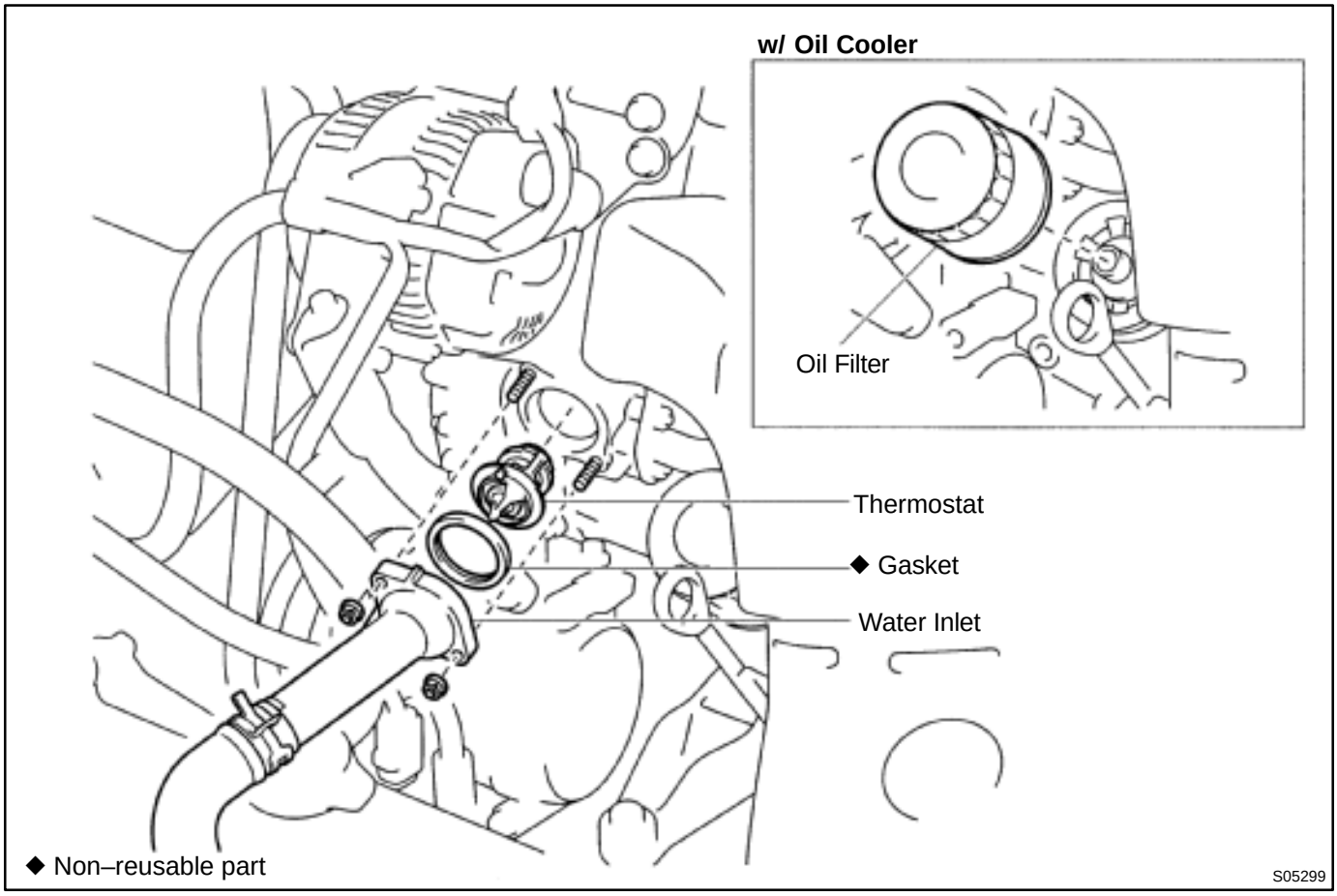
5. INSTALL NO.2 IDLER PULLEY (See page EM–23)

6. INSTALL TIMING BELT TENSION SPRING (See page EM–23)
7. CONNECT LOWER RADIATOR HOSE TO WATER INLET
8. INSTALL TIMING BELT (See page EM–23)
9. FILL WITH ENGINE COOLANT
10. START ENGINE AND CHECK FOR COOLANT LEAKS

THERMOSTAT

COMPONENTS

CO06C–03



CO06D–03

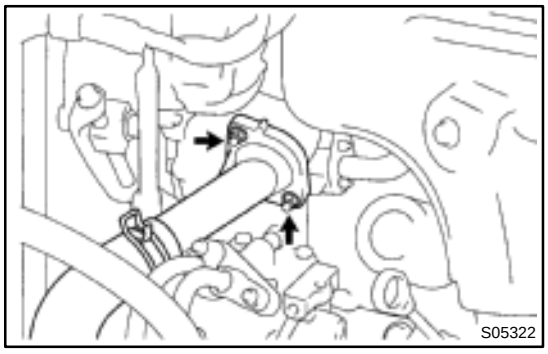
REMOVAL

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. w/ Oil Cooler:
REMOVE OIL FILTER (See page LU–2)

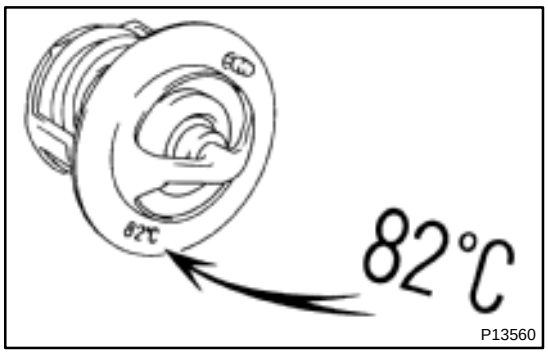


3. REMOVE WATER INLET AND THERMOSTAT

(a) Remove the 2 nuts, and disconnect the water inlet from the water pump cover.

(b) Remove the thermostat.

(c) Remove the gasket from the thermostat.

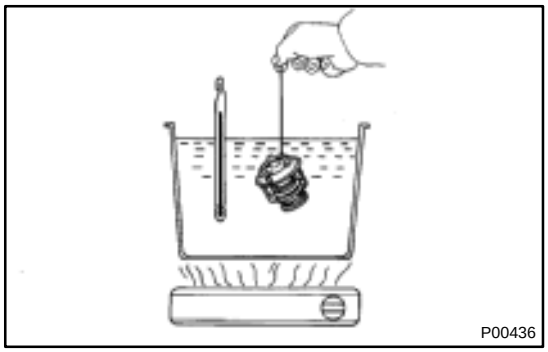


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature. CO06E–03

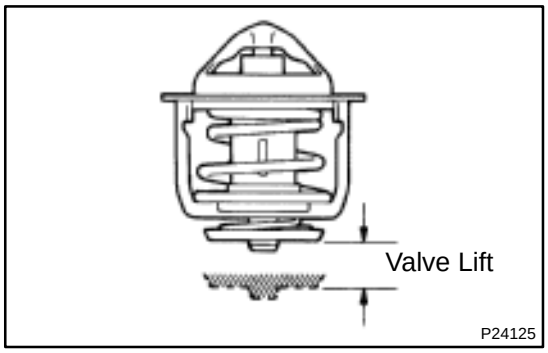


(a) Immerse the thermostat in water and gradually heat the water.

(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.

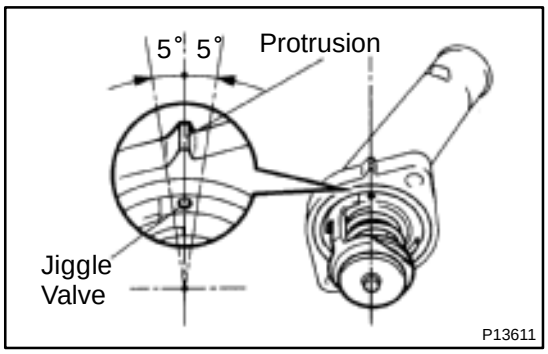
Valve lift: 8 mm (0.31 in.) or more at 95˚C (203˚F)

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 40˚C (104˚F)).

If not closed, replace the thermostat.

CO0SN–01



INSTALLATION

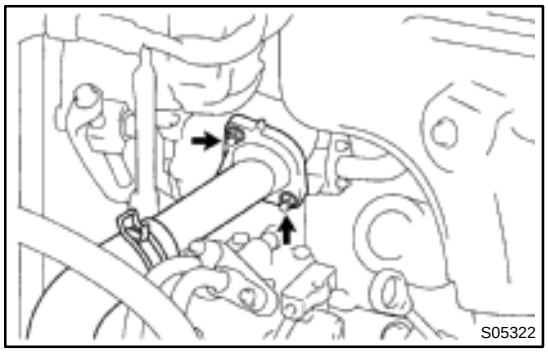
1. PLACE THERMOSTAT IN WATER INLET

(a) Install a new gasket to the thermostat.

(b) Align the jiggle valve of the thermostat with the protrusion of the water inlet, and insert the thermostat in the water inlet.

HINT:

The jiggle valve may be set within 5° of either side of the prescribed position.



2. INSTALL WATER INLET AND THERMOSTAT

Install the water inlet and thermostat with the 2 nuts.

Torque: 8.8 N·m (90 kgf·cm, 78 in.·lbf)

3. w/ Oil Cooler:

INSTALL OIL FILTER (See page LU–2)

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS

6. CHECK ENGINE OIL LEVEL

RADIATOR

CO06G–03

ON–VEHICLE CLEANING

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.)

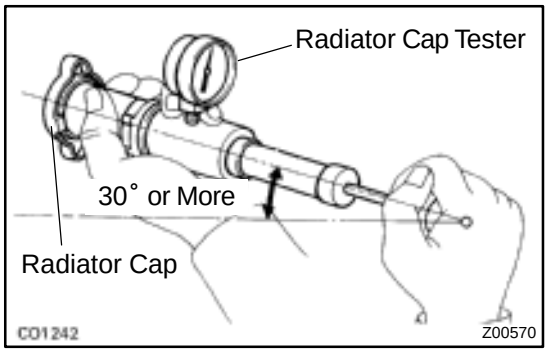
CO06H–04

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.**
- **Before using a radiator cap tester, wet the relief valve and pressure valve with engine coolant or water.**
- **When performing steps (a) and (b) below, keep the tester at an angle of over 30˚ above the horizontal.**

(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:

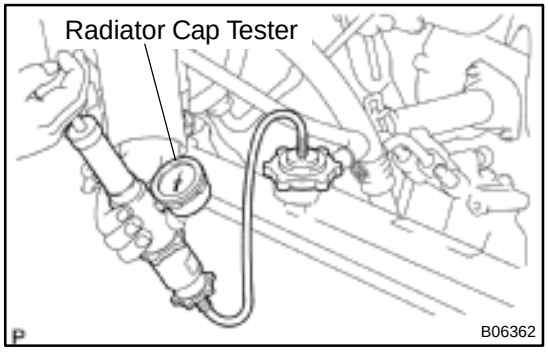
This pump speed is for the first pump only (in order to close the vacuum valve). After this, the pump speed can be reduced.

Standard opening pressure:
74 – 103 kPa (0.75 – 1.05 kgf/cm^2, 10.7 – 14.9 psi)
Minimum opening pressure:
59 kPa (0.6 kgf/cm^2, 8.5 psi)

HINT:

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

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



3. INSPECT COOLING SYSTEM FOR LEAKS

(a) Fill the radiator with coolant, and attach a radiator cap tester.

(b) Warm up the engine.

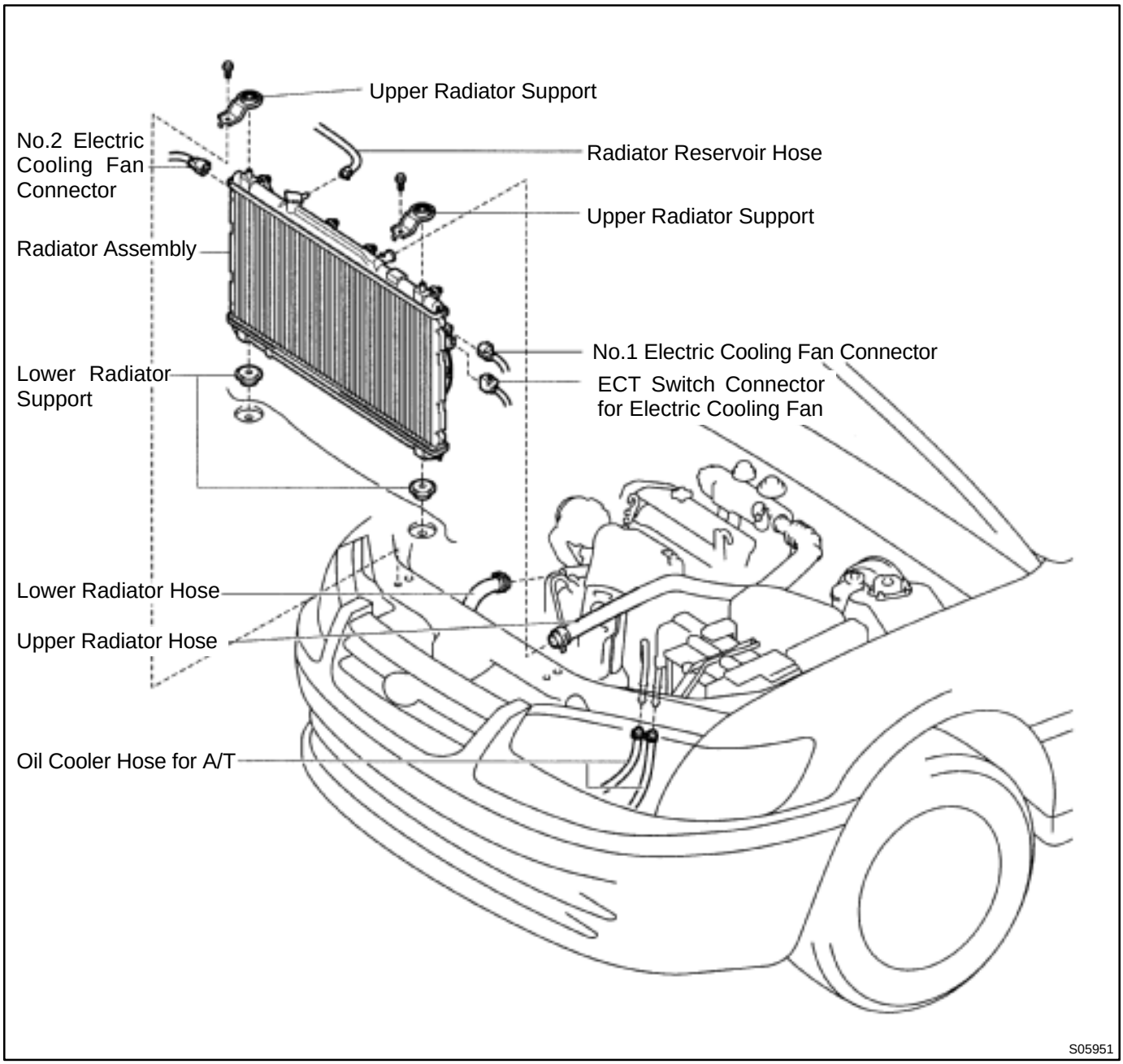
(c) Pump it to 118 kPa (1.2 kgf/cm^2, 17.1 psi), and check that the pressure does not drop.

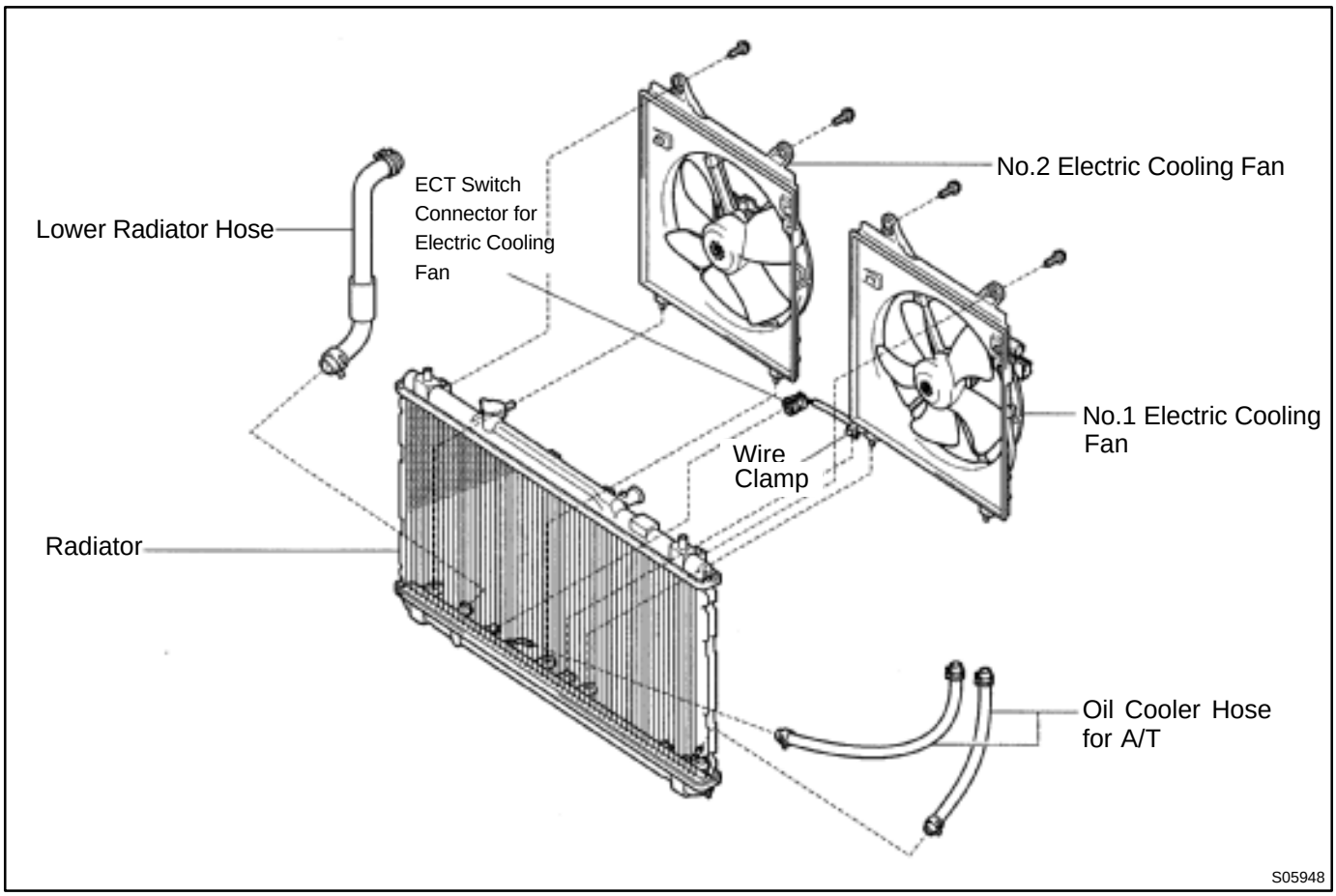
If the pressure drops, check the hoses, radiator or water pump for leaks. If no external leaks are found, check the heater core, cylinder block and head.

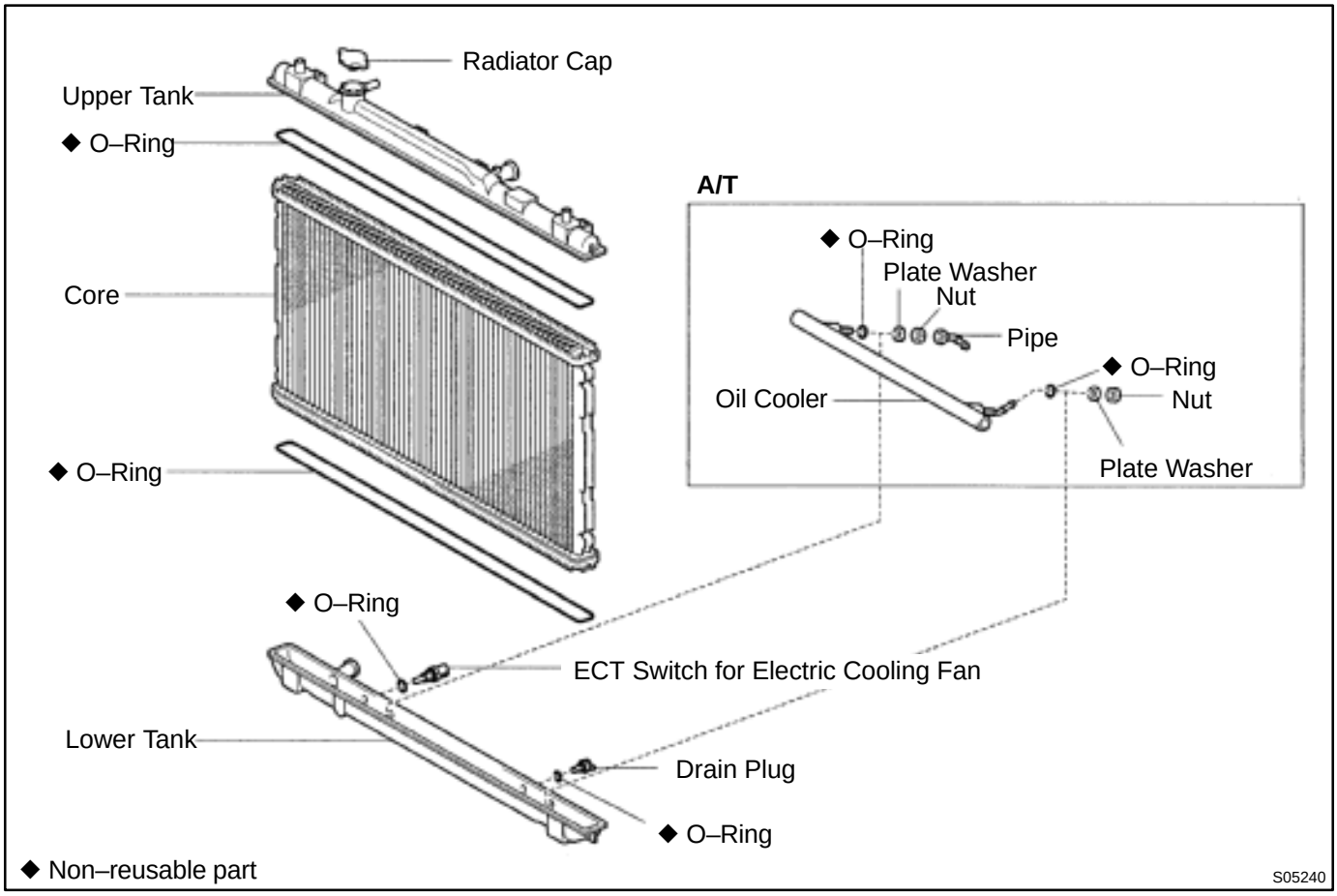
4. REINSTALL RADIATOR CAP

CO06I–03

COMPONENTS




Lower Radiator Hose
ECT Switch Connector for Electric Cooling Fan
No.2 Electric Cooling Fan
No.1 Electric Cooling Fan
Wire Clamp
Radiator
Oil Cooler Hose for A/T
S05948


Radiator Cap
Upper Tank
◆ O–Ring
Core
◆ O–Ring
A/T
◆ O–Ring
Plate Washer
Nut
Pipe
◆ O–Ring
Oil Cooler
Nut
Plate Washer
◆ O–Ring
ECT Switch for Electric Cooling Fan
Lower Tank
Drain Plug
◆ O–Ring
◆ Non–reusable part
S05240

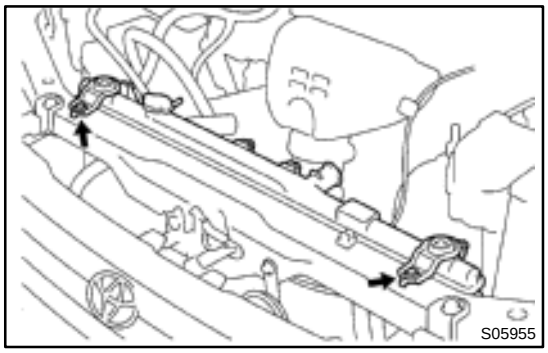
CO06J–04

REMOVAL

1. DRAIN ENGINE COOLANT

2. REMOVE RADIATOR ASSEMBLY

(a) Disconnect the No.1 electric cooling fan connector.
(b) Disconnect the No.2 electric cooling fan connector.
(c) Disconnect the ECT switch connector for the electric cooling fan.
(d) Disconnect the upper radiator hose from the radiator.
(e) Disconnect the lower radiator hose from the water inlet.
(f) Disconnect the radiator reservoir hose from the radiator.
(g) A/T:
Disconnect the 2 oil cooler hoses from the oil cooler pipes.


S05955

(h) Remove the 2 bolts and 2 upper radiator supports.
(i) Remove the radiator assembly.
(j) Remove the 2 lower radiator supports.
(k) Remove the lower radiator hose from the radiator.
(l) A/T:
Remove the 2 oil cooler hoses from the radiator.

3. REMOVE NO.1 ELECTRIC COOLING FAN FROM RADIATOR

(a) Disconnect the ECT switch connector for the cooling fan.
(b) Disconnect the ECT switch wire clamp for the cooling fan from the bracket of the radiator.
(c) Remove the 2 bolts and cooling fan.

4. REMOVE NO.2 ELECTRIC COOLING FAN FROM RADIATOR

Remove the 2 bolts and cooling fan.

CO06K–03

DISASSEMBLY

1. REMOVE ECT SWITCH

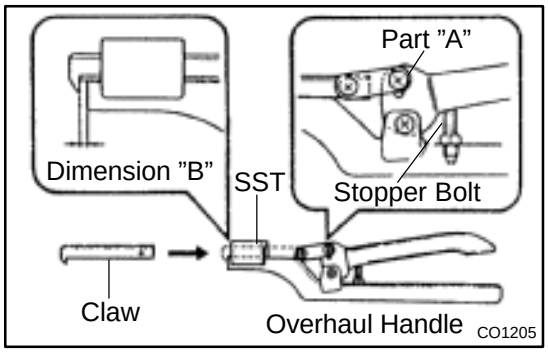
(a) Remove the ECT switch.

(b) Remove the O–ring.

2. REMOVE DRAIN PLUG

(a) Remove the drain plug.

(b) Remove the O–ring.



3. ASSEMBLE SST

SST 09230–01010

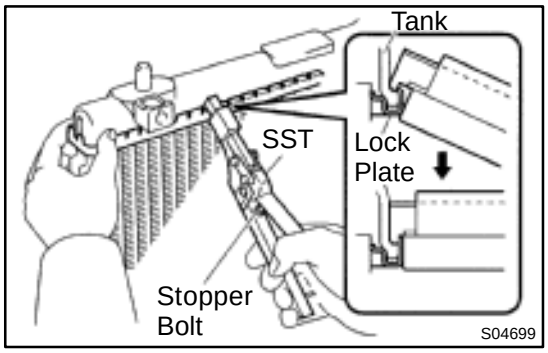
(a) Install the claw to the overhaul handle, inserting it in the hole in part ”A” as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” is as shown in the illustration.

Dimension: 0.2 – 0.3 mm (0.008 – 0.012 in)

NOTICE:

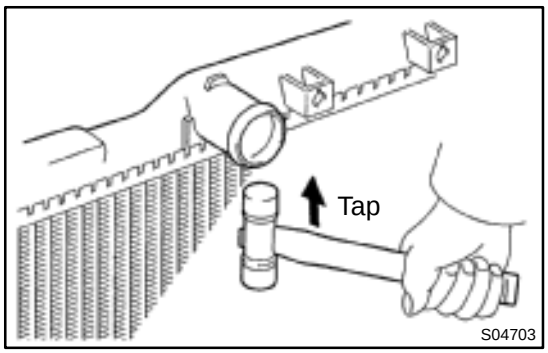
If this adjustment is not done the claw may be damaged.



4. UNCAULK LOCK PLATES

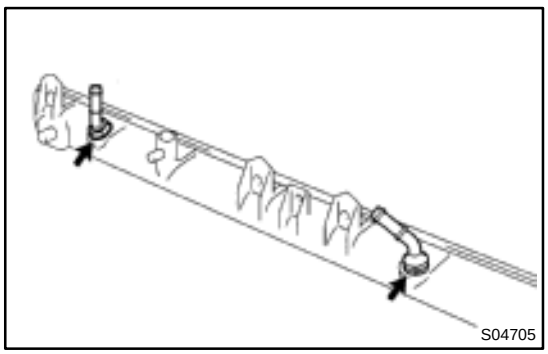
Using SST to release the caulking, squeeze the handle until stopped by the stopper bolt.

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. A/T:

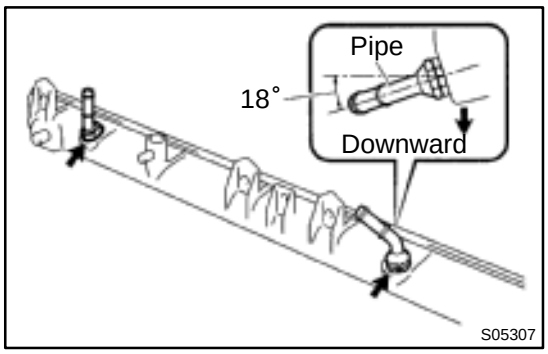
REMOVE OIL COOLER FROM LOWER TANK

(a) Loosen the nut, and remove the cooler pipe.

(b) Remove the 2 nuts and plate washers.

(c) Remove the oil cooler and 2 O–rings.

CO06L–04



REASSEMBLY

1. A/T:

INSTALL OIL COOLER TO LOWER TANK

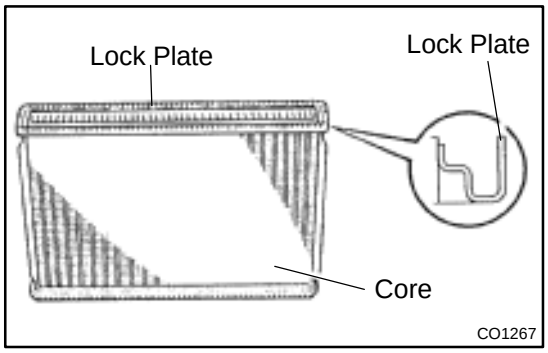
(a) Install 2 new O–rings to the oil cooler.

(b) 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)

(c) Install the cooler pipe in the direction indicated in the illustration.

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



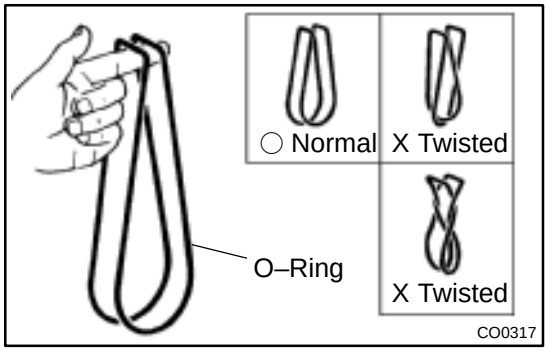
2. INSPECT LOCK PLATE FOR DAMAGE

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.

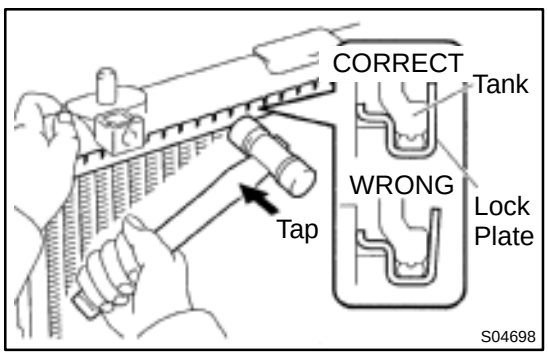


3. INSTALL NEW O–RINGS AND TANKS

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

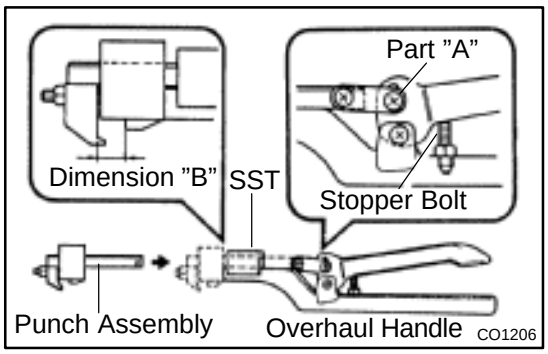
HINT:

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



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

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



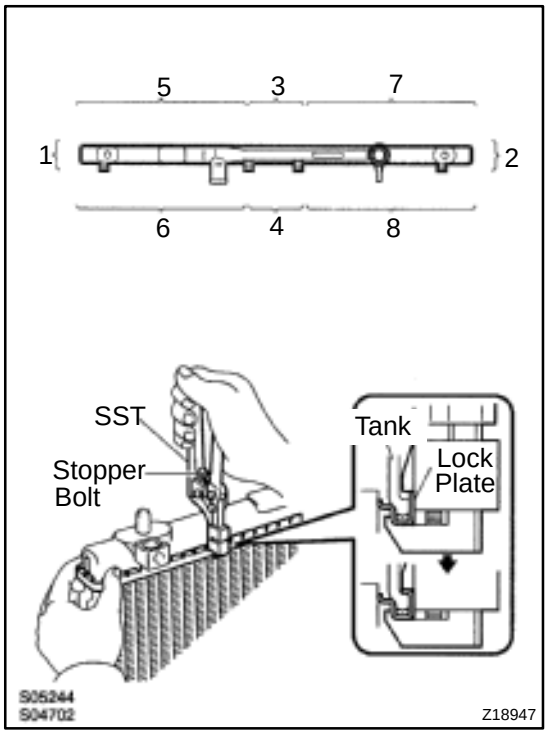
4. ASSEMBLE SST

SST 09230–01010, 09231–14010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part ”A” as shown in the illustration.

(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” is as shown in the illustration.

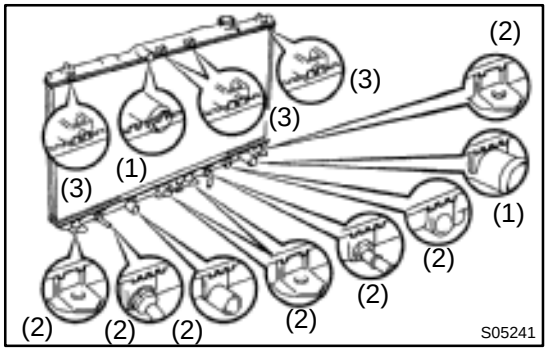
Dimension: 8.4 mm (0.331 in)



5. CAULK LOCK PLATE

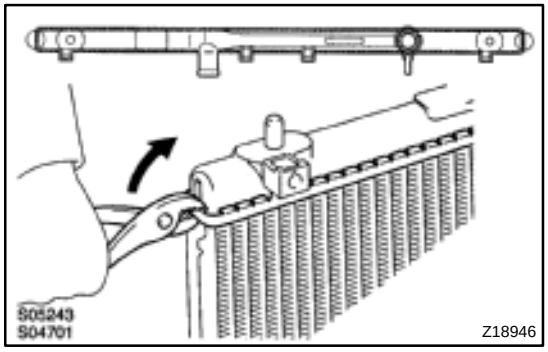
(a) Lightly press SST against the lock plate in the order shown in the illustration. After repeating this a few times, fully caulk the lock plate by squeezing the handle until stopped by the stopper plate.

SST 09230–01010

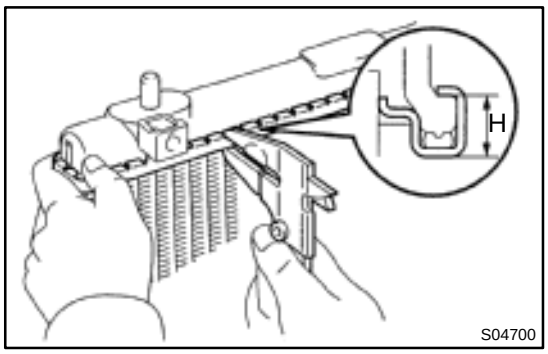


HINT:

- Do not stake the areas protruding around the pipes, brackets or tank ribs.



- The points shown in the illustration and oil cooler near here (A/T) 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 ECT SWITCH

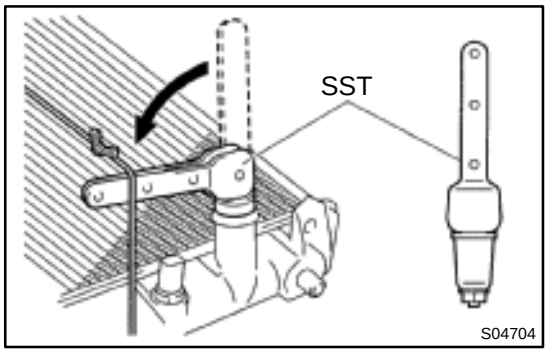
(a) Install a new O–ring to the ECT switch.

(b) Install the ECT 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

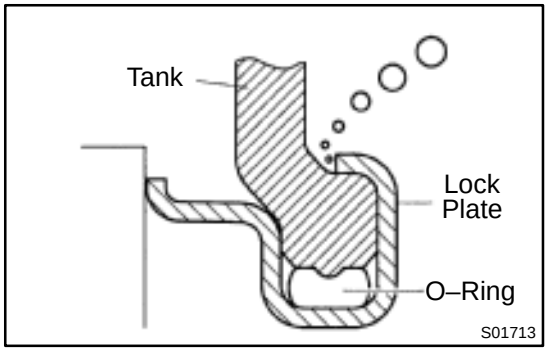
(a) Plug the inlet and outlet pipes of the radiator with SST.

SST 09230–01010

(b) Using a radiator cap tester, apply pressure to the radiator.

Test pressure: 177 kPa (1.8 kgf/cm^2, 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.

CO06M–03

INSTALLATION

1. INSTALL NO.1 ELECTRIC COOLING FAN TO RADIATOR

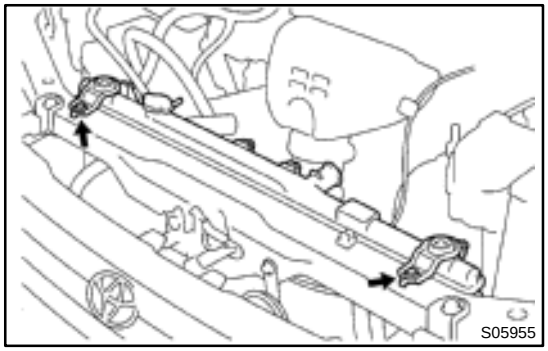
(a) Attach the lower side of the cooling fan to the bracket of the radiator.
(b) Install the cooling fan with the 2 bolts.
(c) Connect the ECT switch connector for the cooling fan.
(d) Install the ECT switch wire clamp for the cooling fan to the bracket of the radiator.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

2. INSTALL NO.2 ELECTRIC COOLING FAN TO RADIATOR

(a) Attach the lower side of the cooling fan to the bracket of the radiator.
(b) Install the cooling fan with the 2 bolts.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

3. INSTALL RADIATOR ASSEMBLY

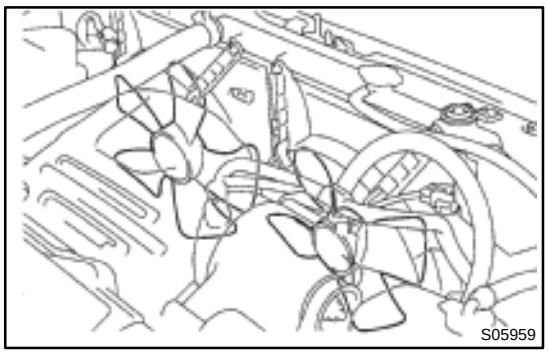
(a) Install the lower radiator hose to the radiator.
(b) A/T:
Install the 2 oil cooler hoses to the radiator.
(c) Install the 2 lower radiator supports to the radiator.
(d) Attach the 2 lower radiator supports on the radiator to the body brackets.

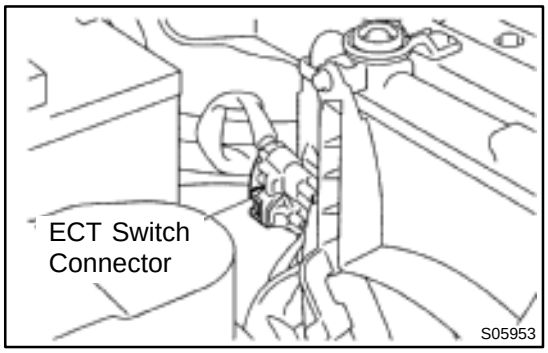


(e) Install the 2 upper radiator supports with the 2 bolts.
Torque: 12.8 N·m (130 kgf·cm, 9 ft·lbf)
(f) Connect the upper radiator hose to the radiator.
(g) Connect the lower radiator hose to the water inlet.
(h) Connect the radiator reservoir hose to the radiator.
(i) A/T:
Connect the 2 oil cooler hoses to the oil cooler pipes.
(j) Connect the No.1 electric cooling fan connector.
(k) Connect the No.2 electric cooling fan connector.
(l) Connect the ECT switch connector for the electric cooling fan.

4. FILL WITH ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS





ELECTRIC COOLING FAN

CO06N–03

ON–VEHICLE INSPECTION

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

(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.

If not, check the cooling fan relay and ECT switch, and check for a separated connector or severed wire between the cooling fan relay and ECT switch.

(c) Disconnect the ECT switch connector.

(d) Check that the cooling fan rotates.

If not, check the fan main relay, cooling fan relay, cooling fan, fuses, and check for short circuit between the cooling fan relay and ECT switch.

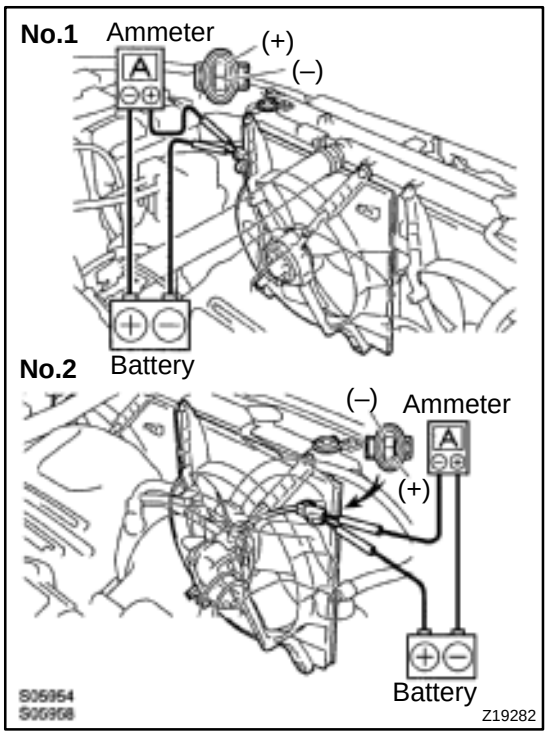
(e) Reconnect the ECT switch connector.

2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 93˚C (199˚F))

(a) Start the engine, and raise coolant temperature to above 93˚C (199˚F).

(b) Check that the cooling fan rotates.

If not, replace the ECT switch.



3. INSPECT COOLING FANS

(a) Disconnect the cooling fan connector.

(b) Connect battery and ammeter to the connector.

(c) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

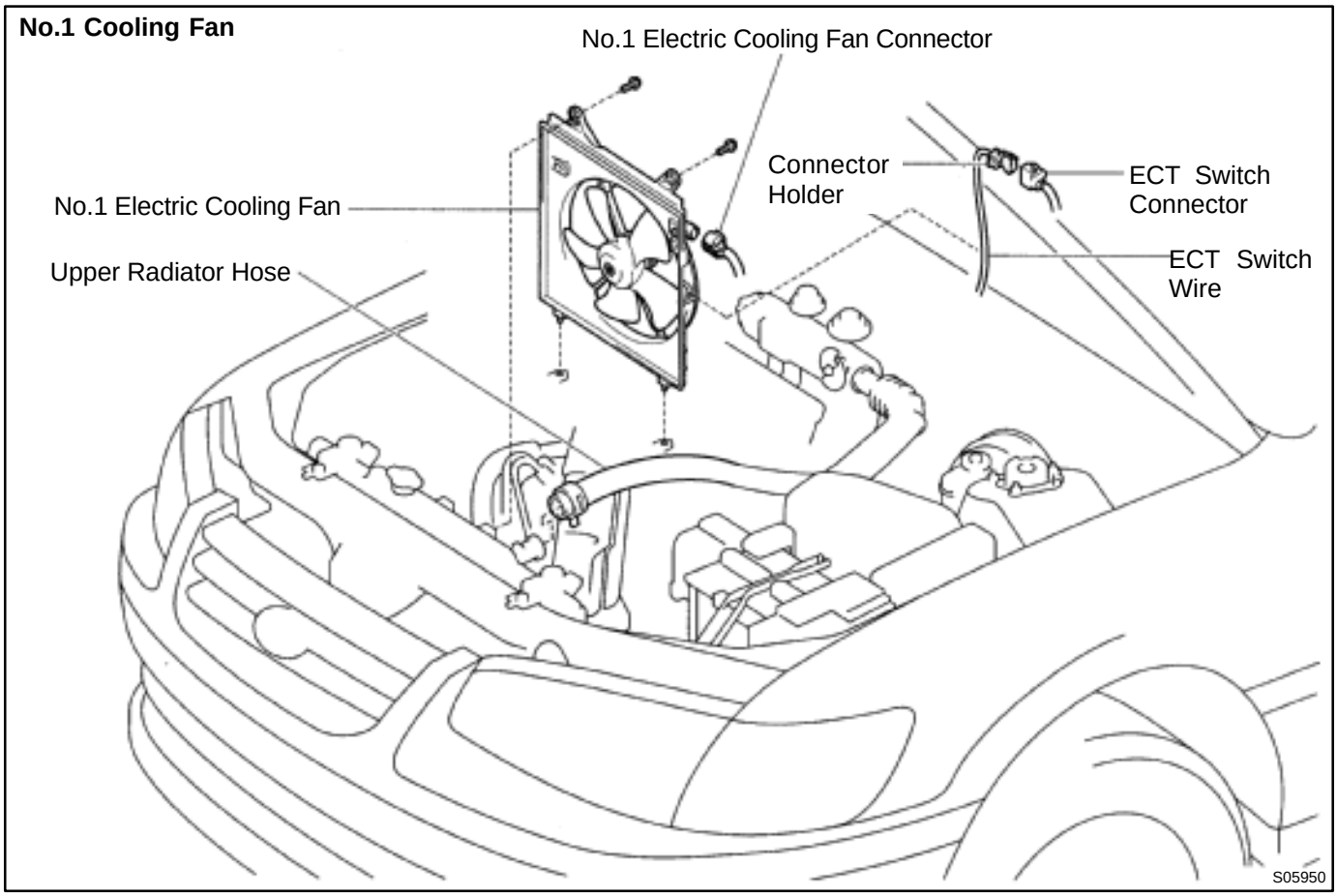
Standard amperage: 4.9 – 8.5 A

(d) Reconnect the cooling fan connector.

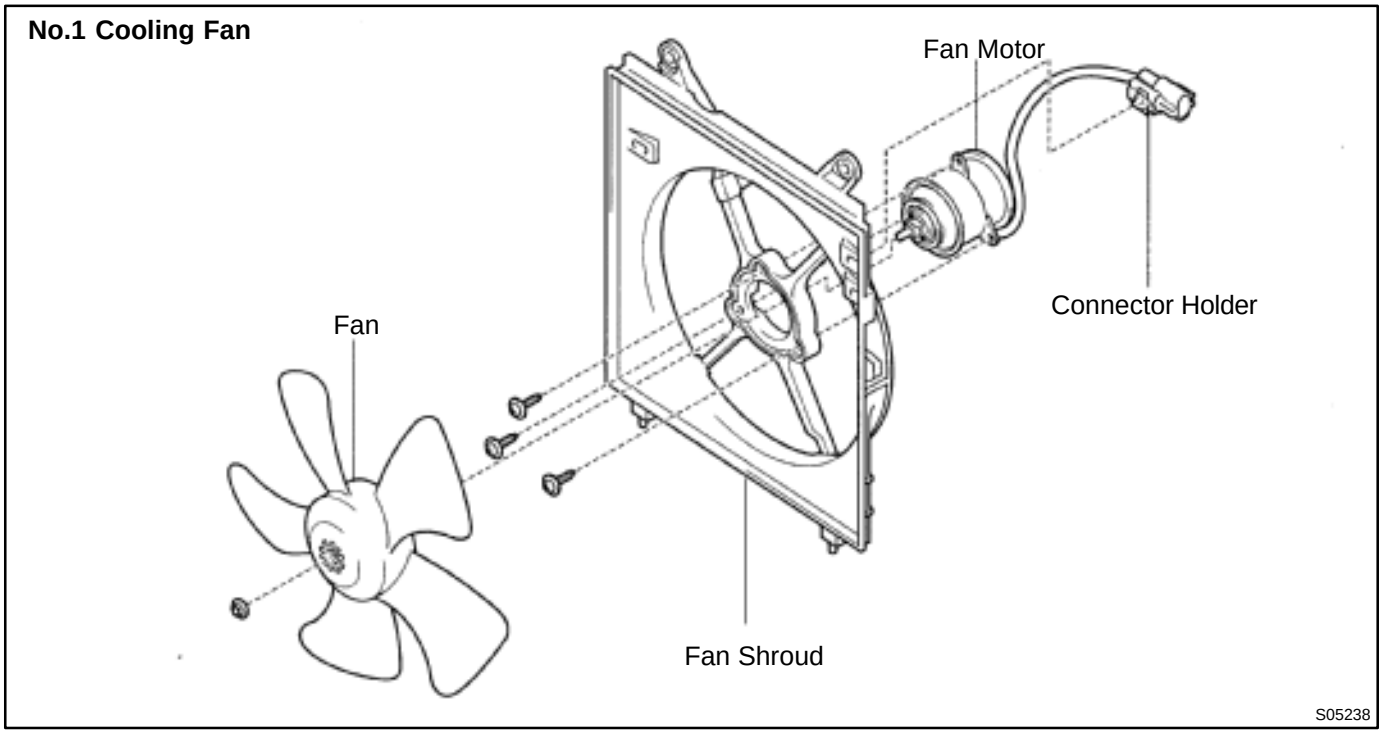
CO06O–03

COMPONENTS

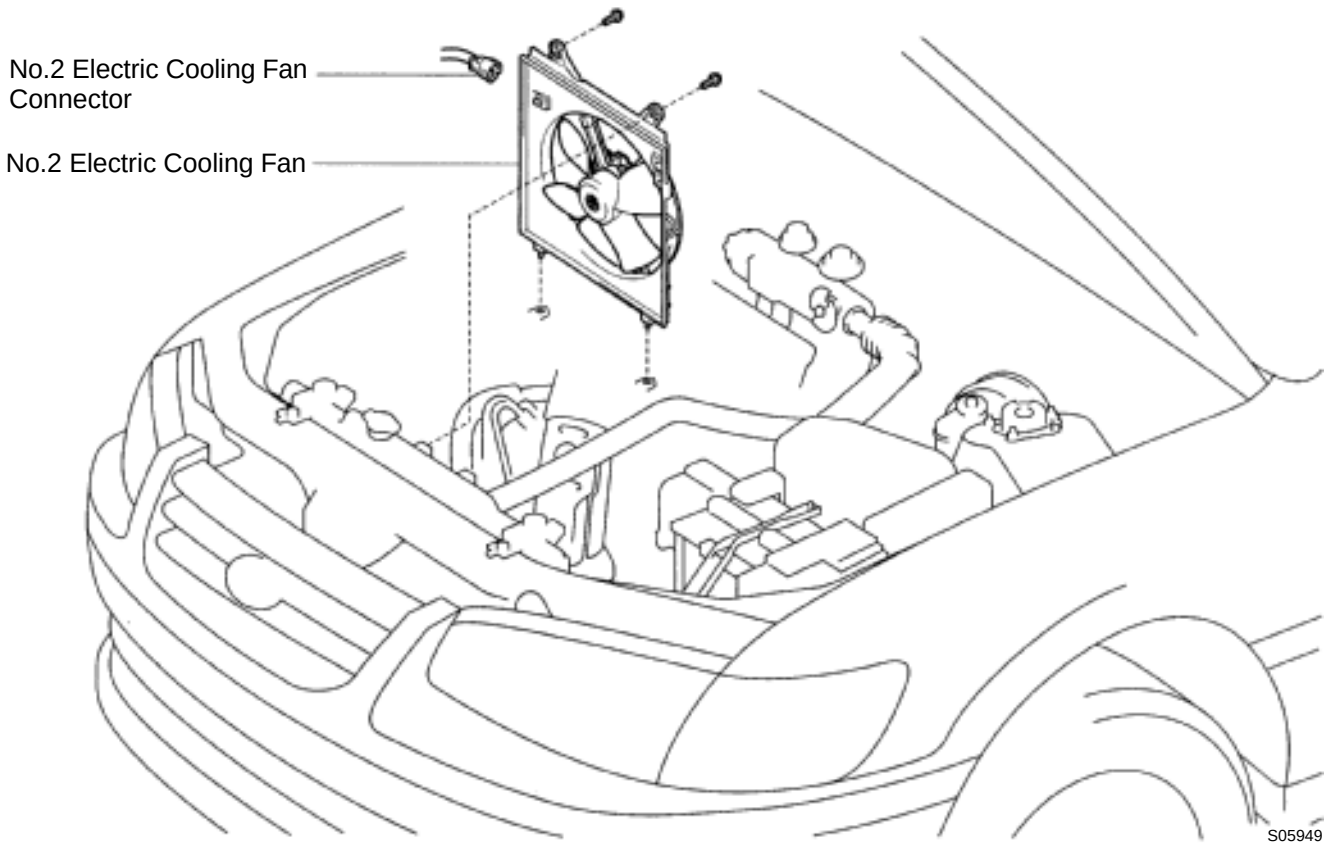
No.1 Cooling Fan



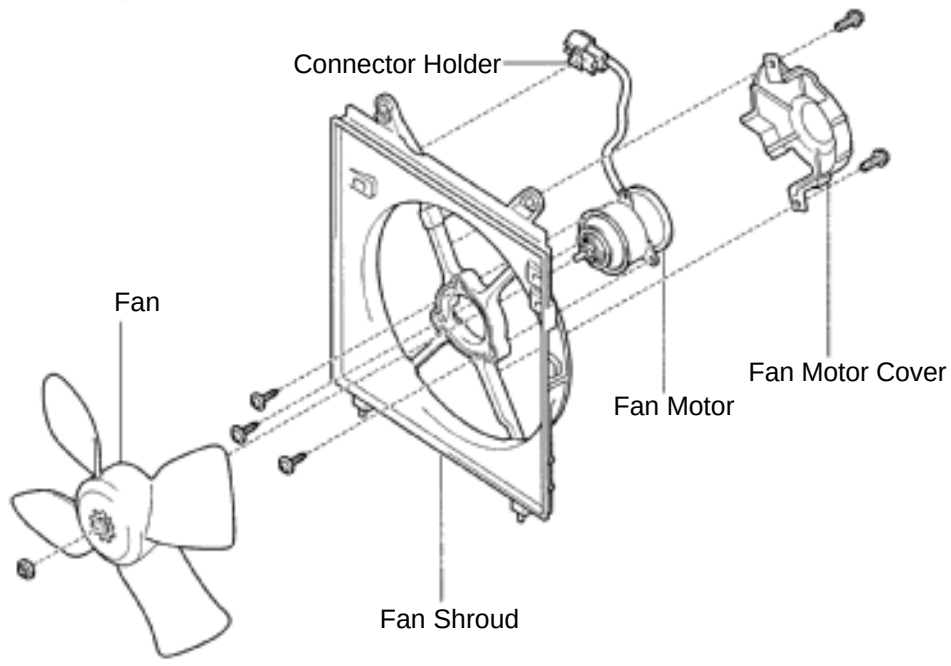
No.1 Cooling Fan



No.2 Cooling Fan



No.2 Cooling Fan



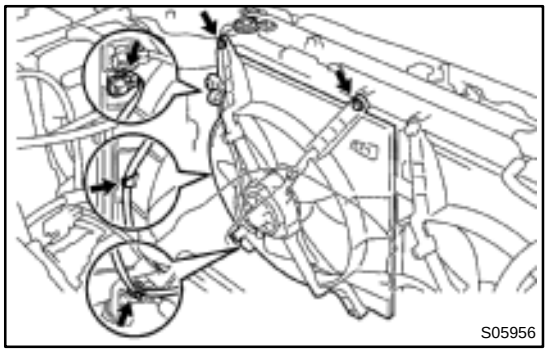
CO06P–03

REMOVAL

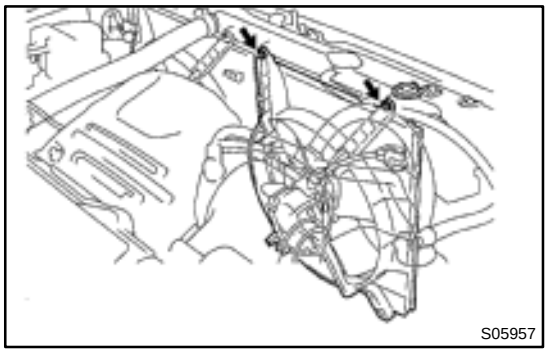
1. REMOVE NO.1 COOLING FAN

(a) Drain the engine coolant.

(b) Disconnect the upper radiator hose from the radiator.



(c) Remove the No.1 cooling fan.
  (1) Disconnect the cooling fan connector.
  (2) Disconnect the ECT switch connector.
  (3) Remove the 2 bolts, and disconnect the cooling fan from the radiator.
  (4) Disconnect the connector holder and wire for the ECT switch from the fan shroud, and remove the cooling fan.

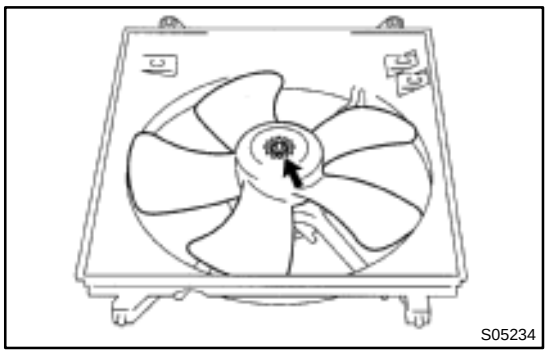


2. REMOVE NO.2 COOLING FAN

(a) Disconnect the cooling fan connector.

(b) Remove the 2 bolts and cooling fan.

CO06Q–03



DISASSEMBLY

1. REMOVE FAN

Remove the nut and fan.

2. No.2 Cooling Fan:
REMOVE FAN MOTOR COVER

Remove the 2 screws and motor cover.

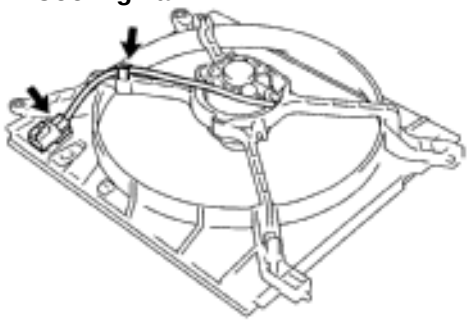
3. REMOVE FAN MOTOR

(a) Disconnect the wire and connector holder from the fan shroud.

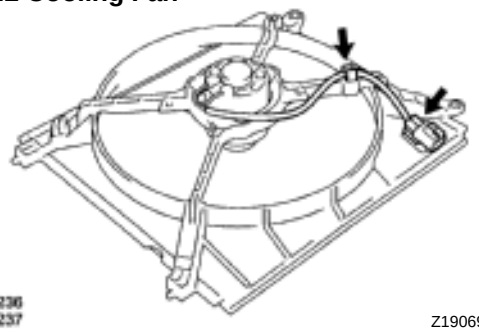
(b) Remove the 3 screws and fan motor.

CO06R–04

No.1 Cooling Fan



No.2 Cooling Fan



S05236
S05237
Z19069

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.

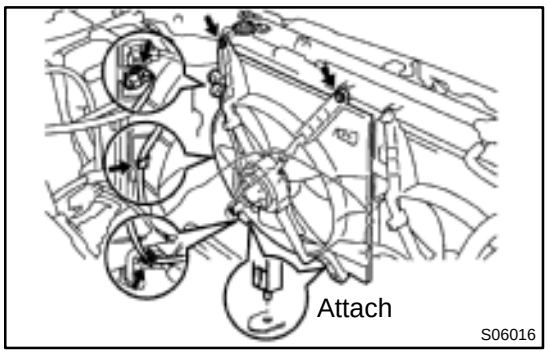
2. No.2 Cooling Fan:
INSTALL FAN MOTOR COVER

Install the motor cover with the 2 screws.

3. INSTALL FAN

Install the fan with the nut.

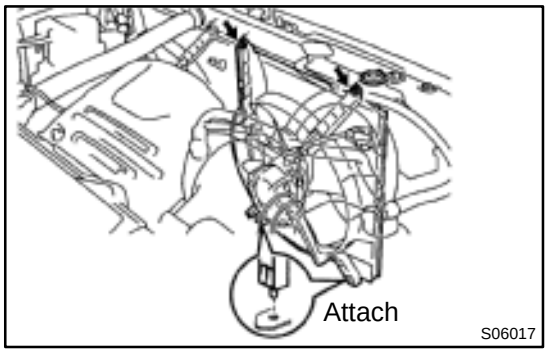
CO06S–03



INSTALLATION

1. INSTALL NO.1 COOLING FAN

(a) Install the No.1 cooling fan.
  (1) Attach the lower side of the cooling fan to the bracket of the radiator.
  (2) Install the cooling fan with the 2 bolts.
  Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)
  (3) Install the wire and connector holder for the ECT switch to the fan shroud.
  (4) Connect the cooling fan connector.
  (5) Connect the ECT switch connector.
(b) Connect the upper radiator hose to the radiator
(c) Fill with engine coolant
(d) Start the engine and check for coolant leaks



2. INSTALL NO.2 COOLING FAN

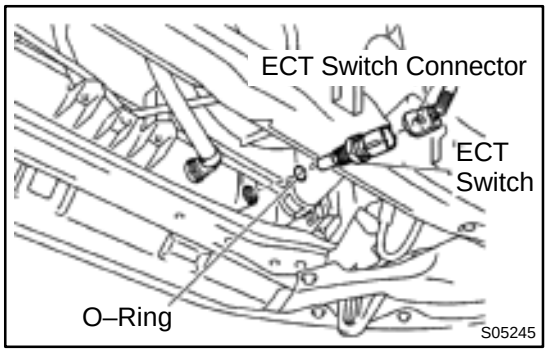
(a) Attach the lower side of the cooling fan to the bracket of the radiator.
(b) Install the cooling fan with the 2 bolts.
  Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)
(c) Connect the cooling fan connector.

ENGINE COOLANT TEMPERATURE (ECT) SWITCH

CO06T–03

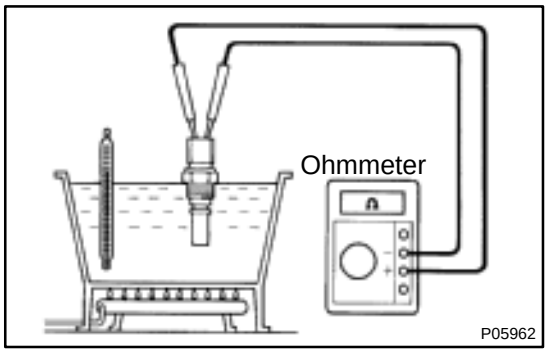
INSPECTION

1. DRAIN ENGINE COOLANT



2. REMOVE ECT SWITCH

(a) Disconnect the connector.
(b) Remove the ECT switch.
(c) Remove the O–ring from the ECT switch.



3. INSPECT ECT SWITCH

(a) Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is above 93˚C (199˚F).

If there is continuity, replace the switch.

(b) Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is below 83˚C (181˚F).

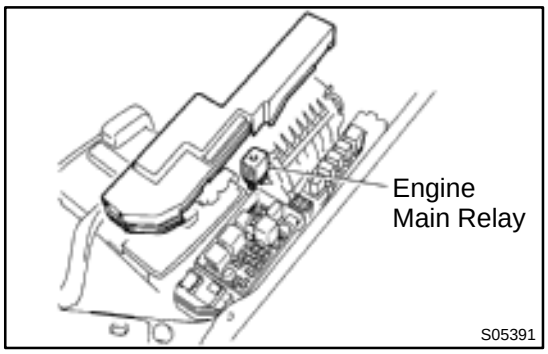
If there is no continuity, replace the switch.

4. REINSTALL ECT SWITCH

(a) Install a new O–ring to the ECT switch.
(b) Install the ECT switch.
(c) Connect the connector.

5. REFILL WITH ENGINE COOLANT

6. START ENGINE AND CHECK FOR COOLANT LEAKS



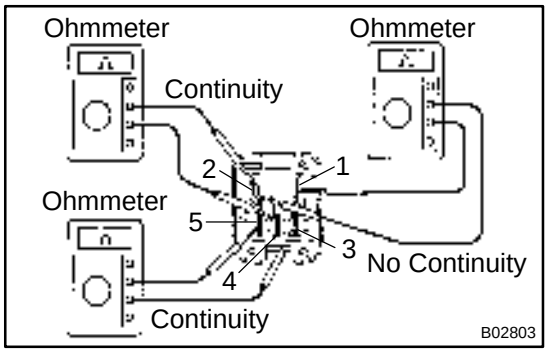
ENGINE MAIN RELAY

CO06U–03

INSPECTION

1. REMOVE RELAY BOX COVER

2. REMOVE ENGINE MAIN RELAY (Marking: ENGINE MAIN)



3. INSPECT ENGINE MAIN RELAY

(a) Inspect the relay continuity.

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

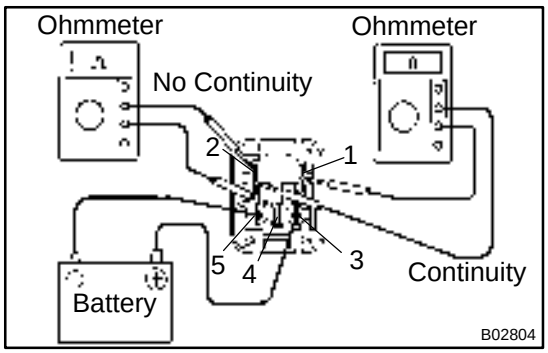
If there is no continuity, replace the relay.

(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.



(b) Inspect the relay operation.

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

(2) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.

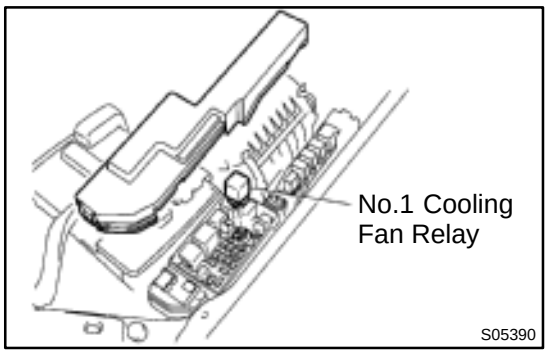
If there is continuity, replace the relay.

(3) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

4. REINSTALL ENGINE MAIN RELAY

5. REINSTALL RELAY BOX COVER



COOLING FAN RELAY

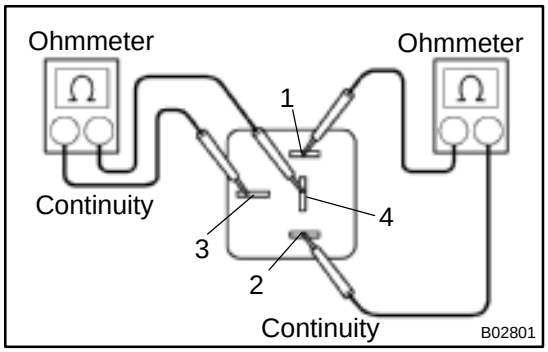
CO06V–03

INSPECTION

1. INSPECT NO.1 COOLING FAN RELAY

(a) Remove the relay box cover.

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



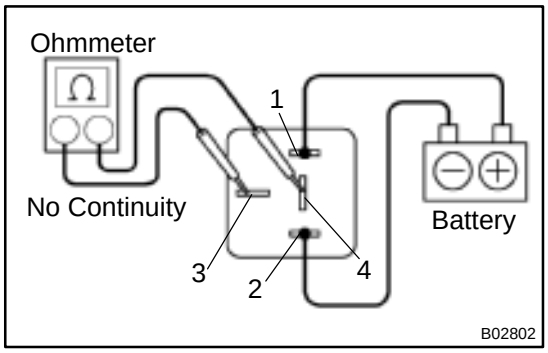
(c) Inspect the No.1 cooling fan relay continuity.

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

If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.



(d) Inspect the No.1 cooling fan relay operation.

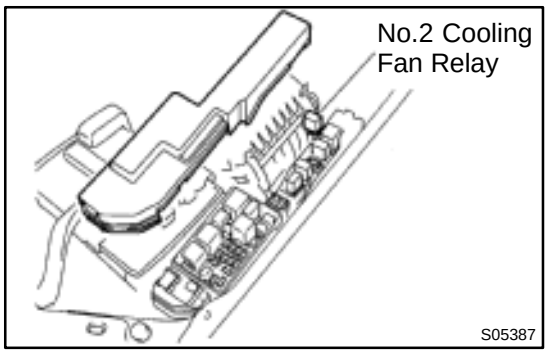
(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

(e) Reinstall the No.1 cooling fan relay

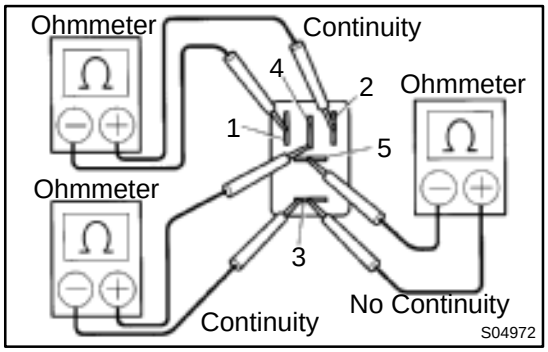
(f) Reinstall the relay box cover.



2. INSPECT NO.2 COOLING FAN RELAY

(a) Remove the relay box cover.

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



(c) Inspect the No.2 cooling fan relay continuity.

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

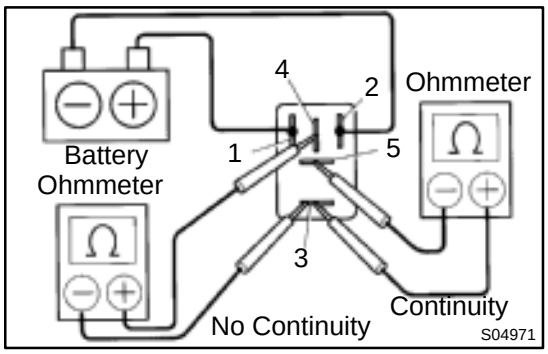
If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

(3) Check that there is no continuity between terminals 3 and 5.

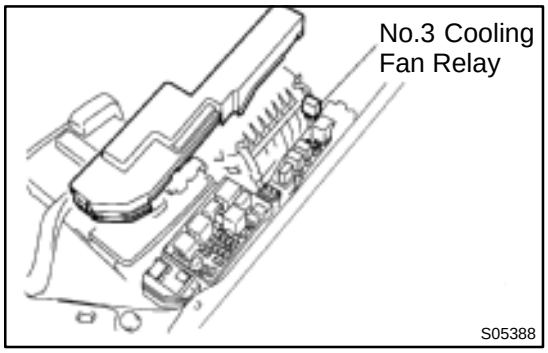
If there is continuity, replace the relay.



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

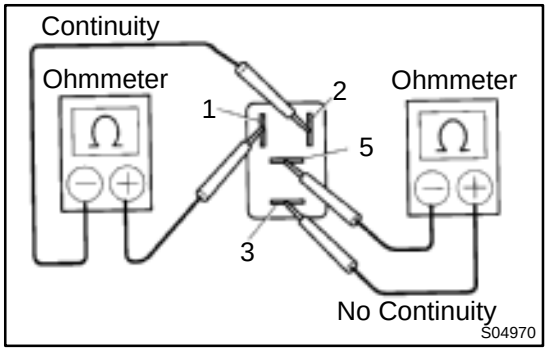
If there is continuity, replace the relay.
  (3) Check that there is continuity between terminals 3 and 5.

If there is no continuity, replace the relay.
(e) Reinstall the No.2 cooling fan relay.
(f) Reinstall the relay box cover.



3. INSPECT NO.3 COOLING FAN RELAY

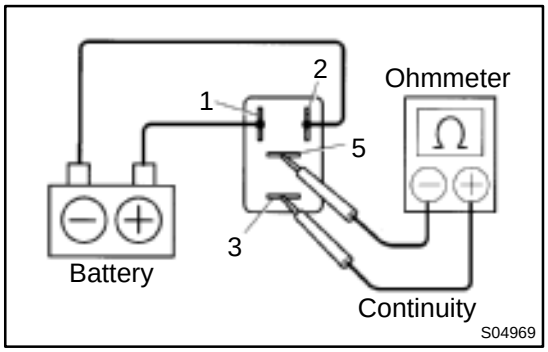
(a) Remove the relay box cover.
(b) Remove the No.3 cooling fan relay. (Marking: FAN NO.3)



(c) Inspect the No.3 cooling fan relay continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.
  (2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



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

If there is no continuity, replace the relay.
(e) Reinstall the No.3 cooling fan relay.
(f) Reinstall the relay box cover.

COOLANT

CO03B–04

INSPECTION

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 ”Toyota Long Life Coolant” or Equivalent up to the ”FULL” line.

2. CHECK ENGINE COOLANT QUALITY

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

CAUTION:

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

(b) There should not be any excessive deposits of rust or scale around the radiator cap or water outlet 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.

CO03C–04

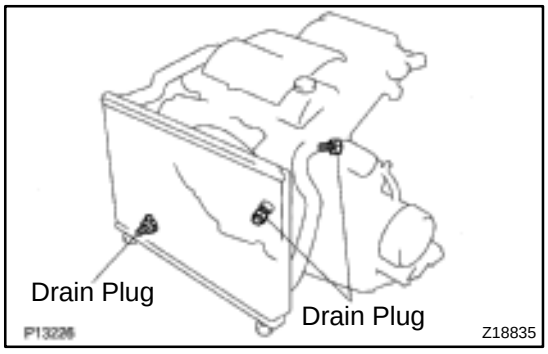
REPLACEMENT

1. DRAIN ENGINE COOLANT

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

CAUTION:

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



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

(c) Close the drain plugs.

Torque:
RH engine drain plug on EGR cooler:
7 N·m (70 kgf·cm, 61 in.·lbf)
LH engine drain plug on union:
13 N·m (130 kgf·cm, 9 ft·lbf)

2. FILL ENGINE COOLANT

(a) Slowly fill the system with coolant.

- Use of improper coolants may damage engine cooling system.
- Use ”Toyota Long life Coolant” or equivalent and mix it with plan water according to the manufacturer’s directions.
- Using of coolant which includes more than 50 % (freezing protection down to –35˚C (–31˚F) or 60 % (freezing protection down to –50˚C (–58˚F)) of ethylene–glycol is recommended but not more than 70 %.

NOTICE:

- **Do not use an alcohol type coolant or plain water alone.**
- **The coolant should be mixed with plain water (preferably demineralized water or distilled water).**
  Capacity: 9.2 liters (9.7 US qts, 8.1 lmp. 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.

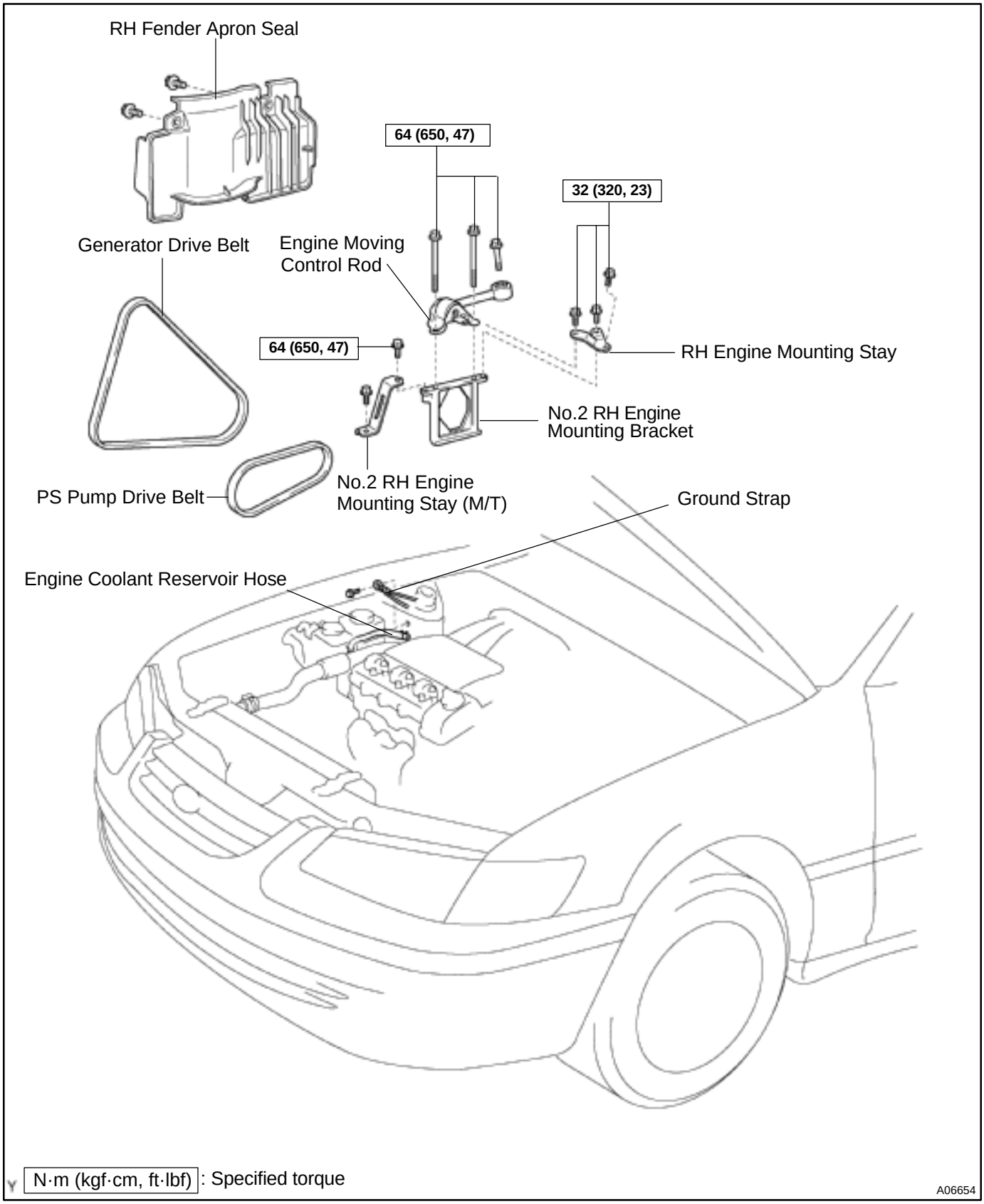
3. CHECK ENGINE COOLANT FOR LEAKS

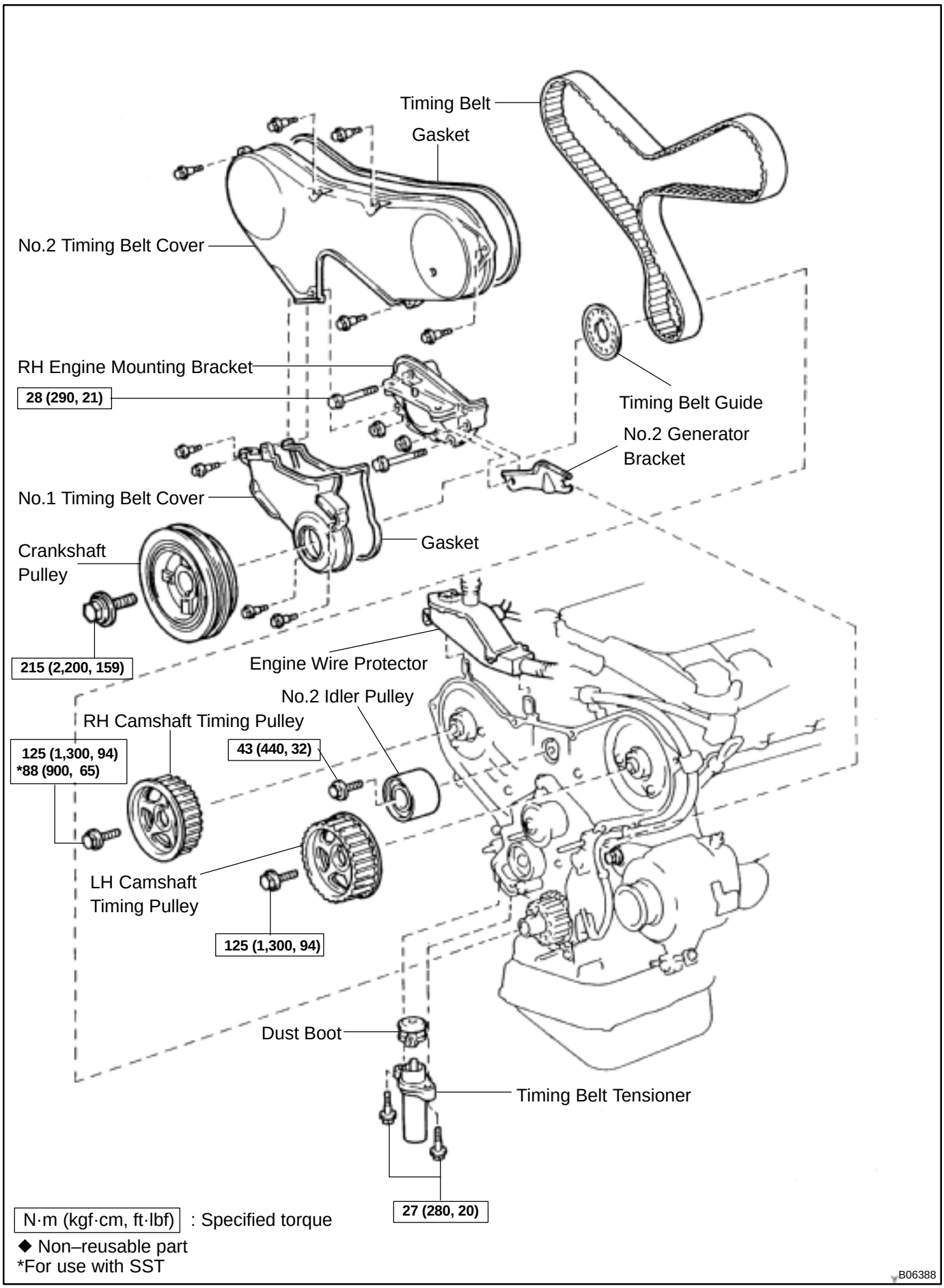
4. CHECK ENGINE COOLANT SPECIFIC GRAVITY CORRECTLY

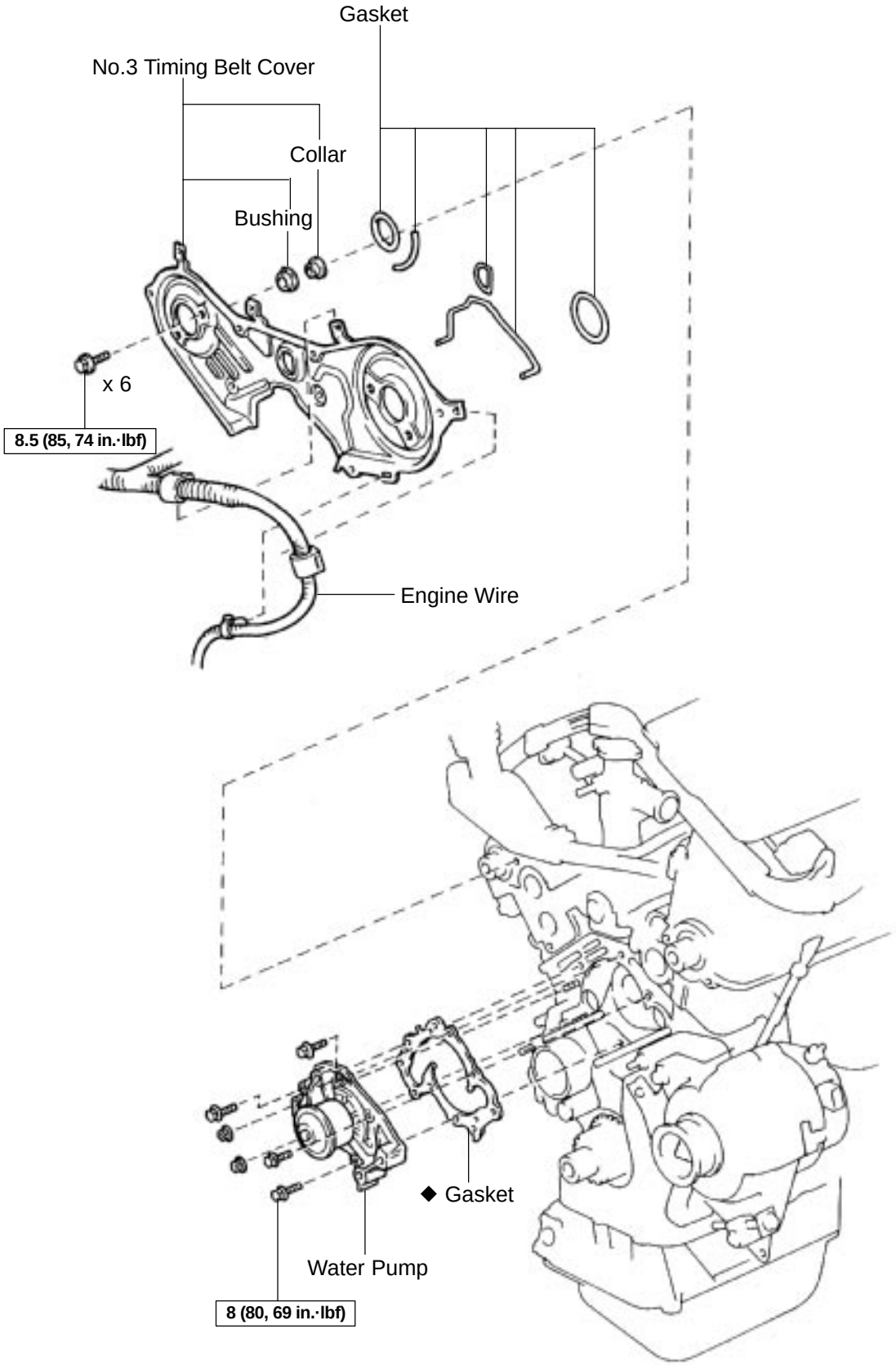
WATER PUMP

COMPONENTS

CO03D–04




Timing Belt
Gasket
No.2 Timing Belt Cover
RH Engine Mounting Bracket
28 (290, 21)
Timing Belt Guide
No.2 Generator Bracket
No.1 Timing Belt Cover
Gasket
Crankshaft Pulley
215 (2,200, 159)
Engine Wire Protector
No.2 Idler Pulley
RH Camshaft Timing Pulley
125 (1,300, 94)
*88 (900, 65)
43 (440, 32)
LH Camshaft Timing Pulley
125 (1,300, 94)
Dust Boot
Timing Belt Tensioner
27 (280, 20)
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
*For use with SST
B06388



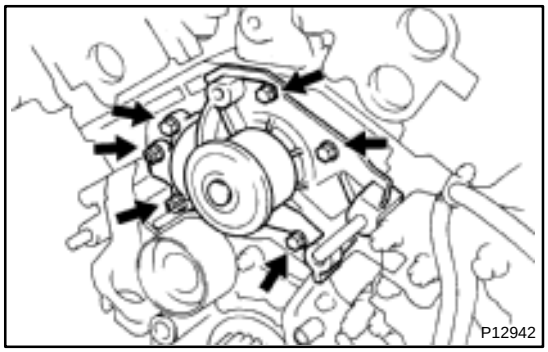
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B04403

CO03E–03

REMOVAL

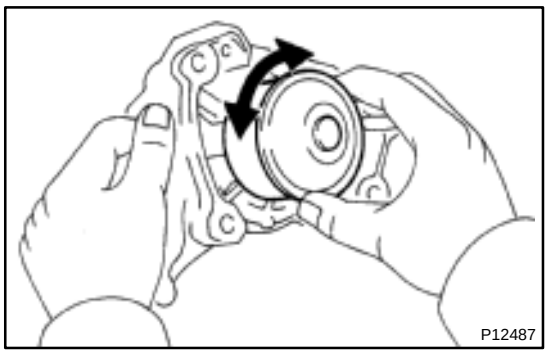
1. DRAIN ENGINE COOLANT
2. REMOVE TIMING BELT (See page EM–15)
3. REMOVE CAMSHAFT TIMING PULLEYS (See page EM–15)
4. REMOVE NO.2 IDLER PULLEY (See page EM–15)
5. REMOVE NO.3 TIMING BELT COVER (See page EM–32)



6. REMOVE WATER PUMP

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

CO03F–03



INSPECTION

1. INSPECT WATER PUMP

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

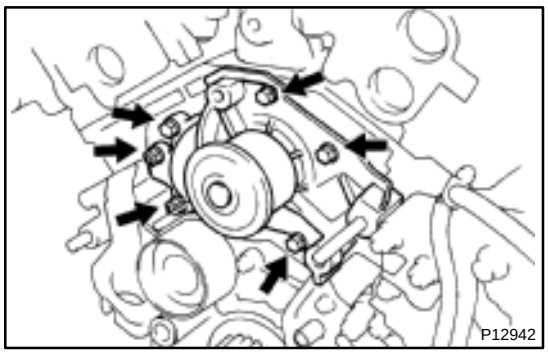
If leakage is found, replace the water pump.

(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–19)

CO0SO–01



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–57)

3. INSTALL NO.2 IDLER PULLEY
(See page EM–21)

4. INSTALL CAMSHAFT TIMING PULLEYS
(See page EM–21)

5. INSTALL TIMING BELT
(See page EM–21)

6. FILL WITH ENGINE COOLANT

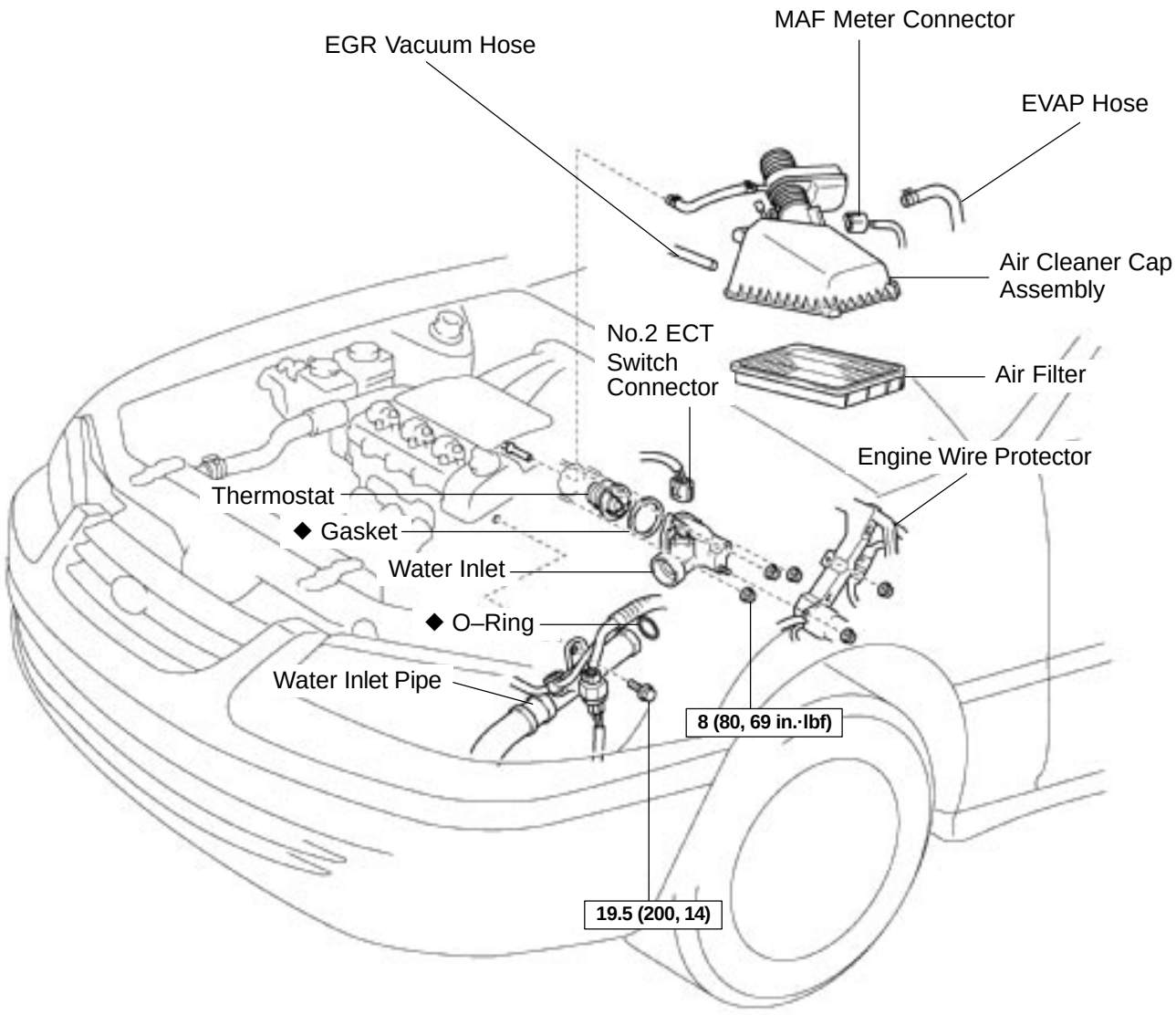
7. START ENGINE AND CHECK FOR LEAKS

8. RECHECK ENGINE COOLANT LEVEL

THERMOSTAT

CO03H–03

COMPONENTS



N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part

B06397

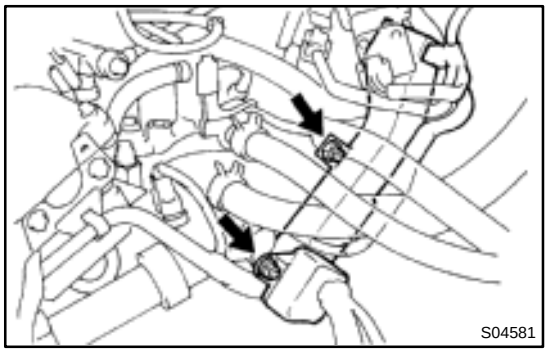
CO03I–03

REMOVAL

HINT:

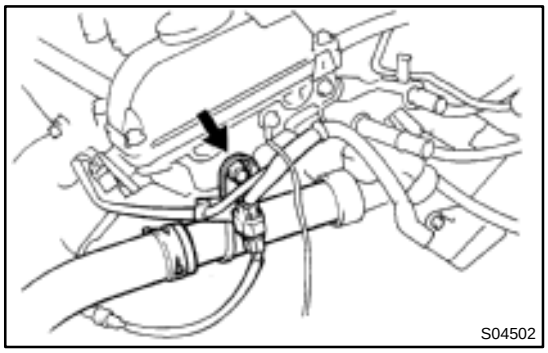
Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. **DRAIN ENGINE COOLANT**
2. **REMOVE AIR CLEANER CAP ASSEMBLY AND AIR FILTER**
3. **DISCONNECT NO.2 ECT SWITCH CONNECTOR**



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

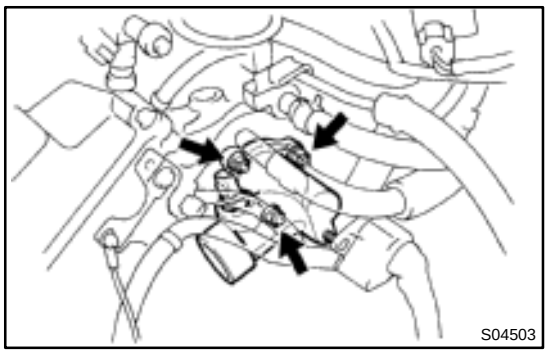
Remove the 2 nuts, and disconnect the engine wire protector from the water inlet and cylinder head.



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.

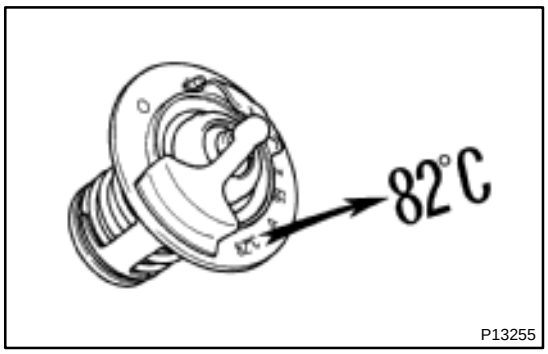


6. **REMOVE WATER INLET AND THERMOSTAT**

(a) Remove the 3 nuts, water inlet and thermostat.

(b) Remove the gasket from the thermostat.

CO03J–03

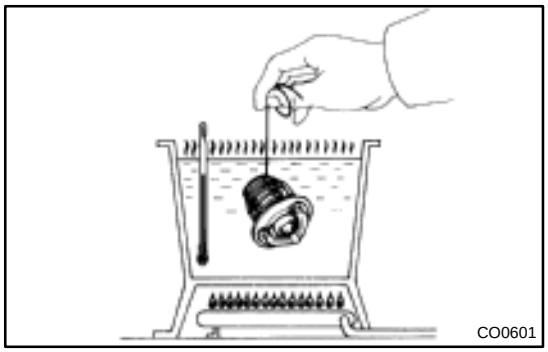


INSPECTION

INSPECT THERMOSTAT

HINT:

The thermostat is numbered with the valve opening temperature.

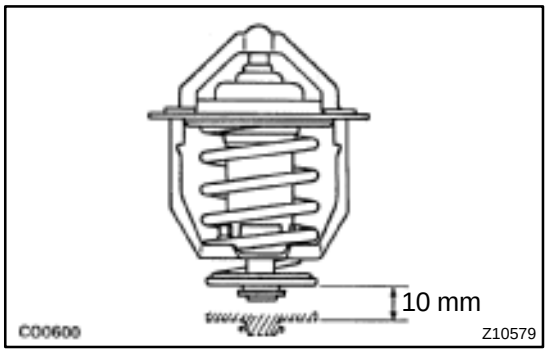


(a) Immerse the thermostat in water and gradually heat the water.

(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)).

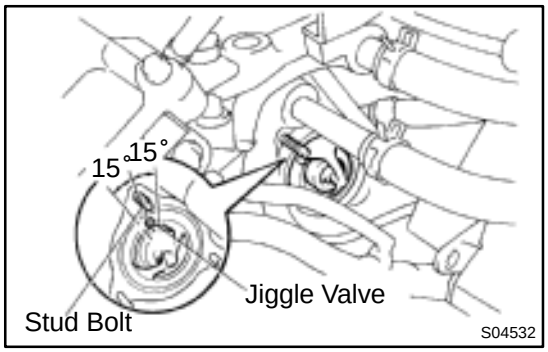
If not closed, replace the thermostat.

CO03K–03

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 NO.2 ECT SWITCH CONNECTOR

6. REINSTALL AIR FILTER AND AIR CLEANER CAP ASSEMBLY

7. FILL WITH ENGINE COOLANT

8. START ENGINE AND CHECK FOR LEAKS

9. RECHECK ENGINE COOLANT LEVEL

RADIATOR

CO03L–03

ON–VEHICLE CLEANING

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)

CO03M–03

ON–VEHICLE INSPECTION

1. REMOVE RADIATOR CAP

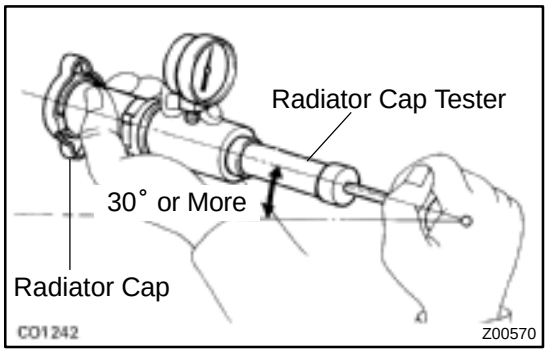
CAUTION:

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 blow 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:

83 – 113 kPa (0.85 – 1.15 kgf/cm^2, 12.1 – 16.4 psi)

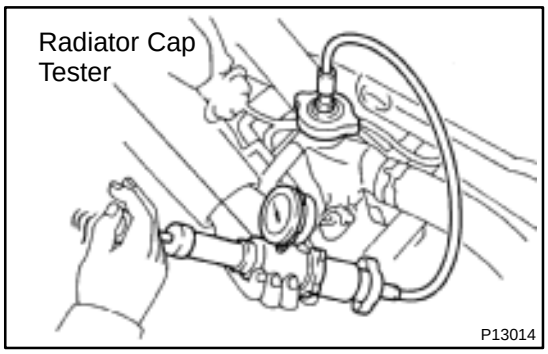
Minimum opening pressure:

69 kPa (0.7 kgf/cm^2, 10.0 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.

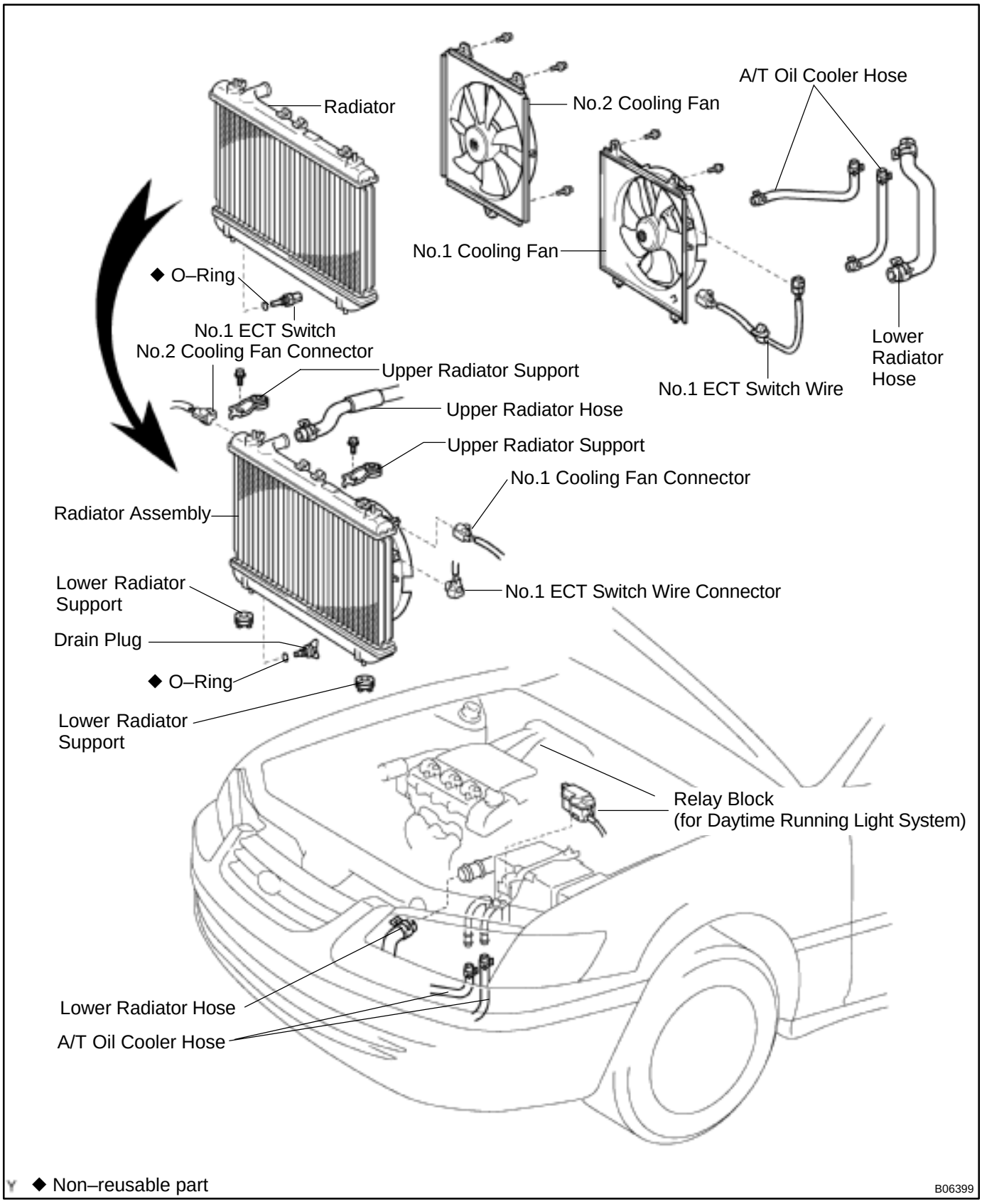
(c) Pump it to 127 kPa (1.3 kgf/cm^2, 18.5 psi), and check that the pressure does not drop.

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 cylinder head.

4. REINSTALL RADIATOR CAP

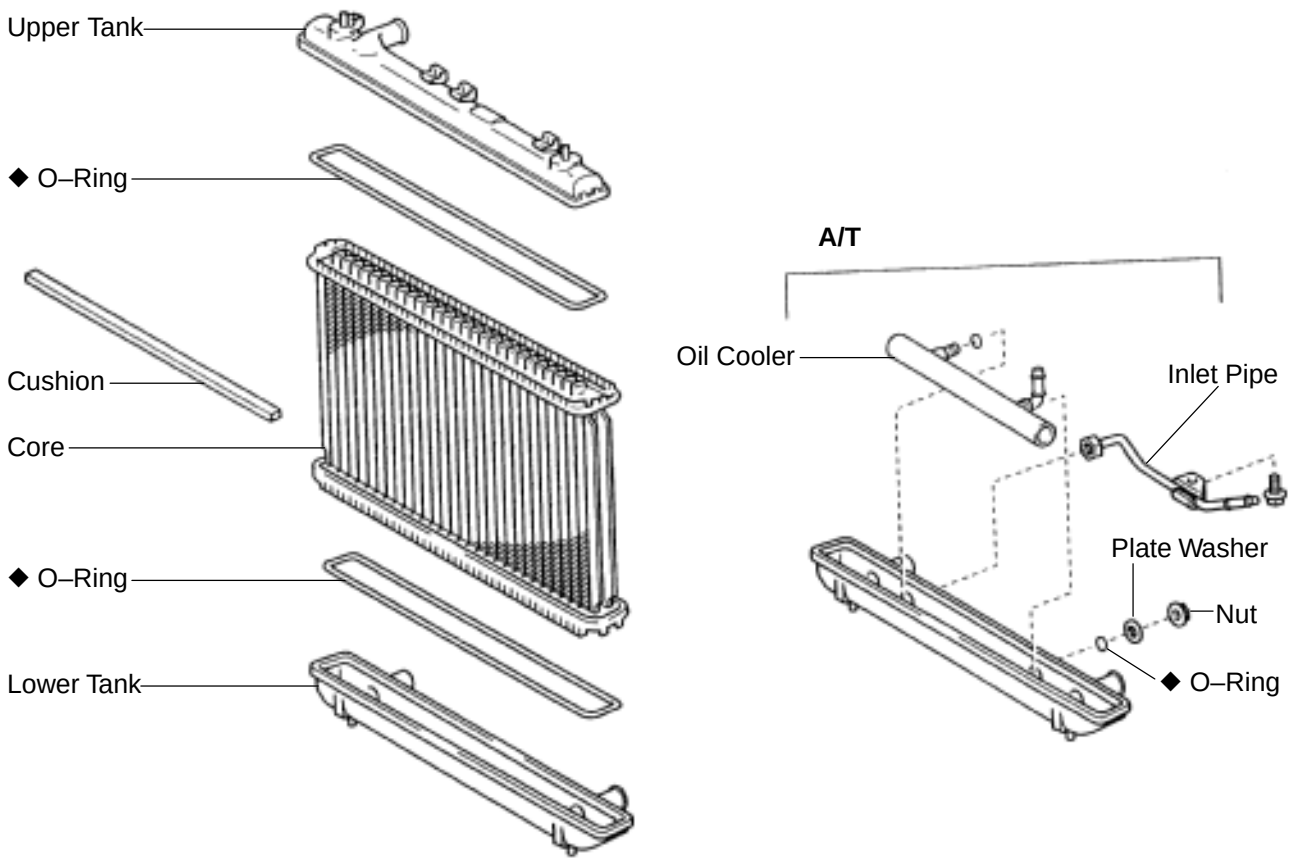
CO03N–03

COMPONENTS



◆ Non–reusable part

B06399



◆ Non–reusable part

S04606

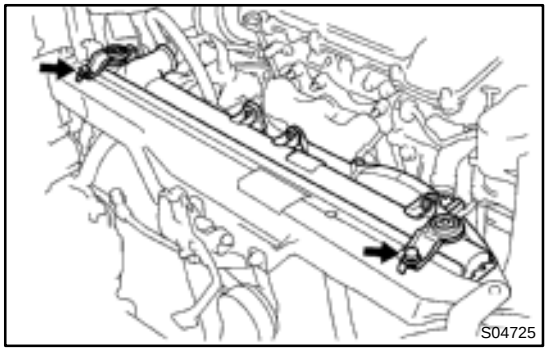
CO03O–03

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–438)

1. **DRAIN ENGINE COOLANT**
2. **CANADA:**
   DISCONNECT RELAY BLOCK (FOR DAYTIME RUNNING LIGHT SYSTEM) FROM BATTERY HOLD–DOWN CLAMP
3. **DISCONNECT UPPER RADIATOR HOSE FROM RADIATOR**
4. **DISCONNECT LOWER RADIATOR HOSE FROM WATER INLET PIPE**
5. **DISCONNECT A/T OIL COOLER HOSES FROM OIL COOLER PIPES**
6. **DISCONNECT NO.1 AND NO.2 COOLING FAN CONNECTORS**
7. **DISCONNECT NO.1 ECT SWITCH WIRE CONNECTOR**

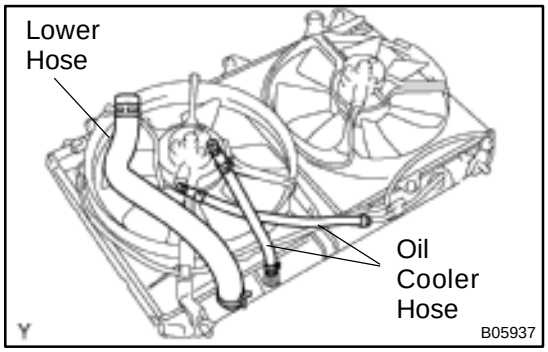


8. **REMOVE RADIATOR AND COOLING FANS ASSEMBLY**

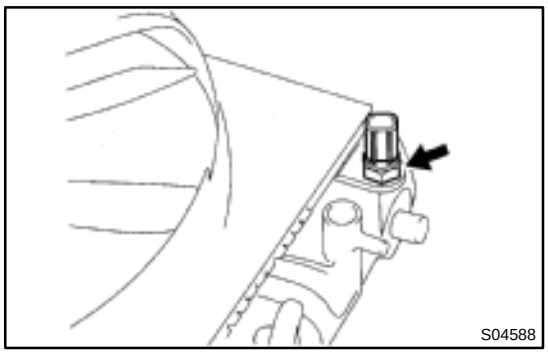
(a) Remove the 2 bolts and 2 upper supports.
Torque: 12.8 N·m (130 kgf·cm, 9 ft·lbf)

(b) Lift out the radiator, and remove the radiator and cooling fans assembly.

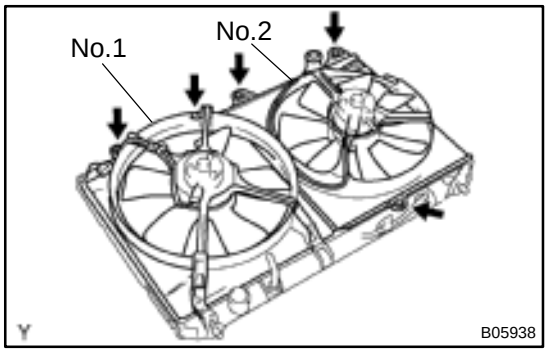
(c) Remove the 2 lower supports.



9. **REMOVE A/T OIL COOLER HOSES FROM RADIATOR**
10. **REMOVE LOWER RADIATOR HOSE FROM RADIATOR**



11. REMOVE NO.1 ECT SWITCH



12. REMOVE NO.1 COOLING FAN FROM RADIATOR

Remove the 2 bolts and cooling fan.

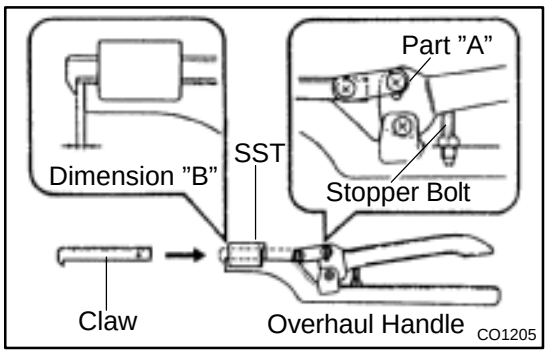
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

13. REMOVE NO.2 COOLING FAN FROM RADIATOR

Remove the 3 bolts and cooling fan.

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

CO03P–03



DISASSEMBLY

1. REMOVE CUSHION FROM RADIATOR

2. ASSEMBLE SST

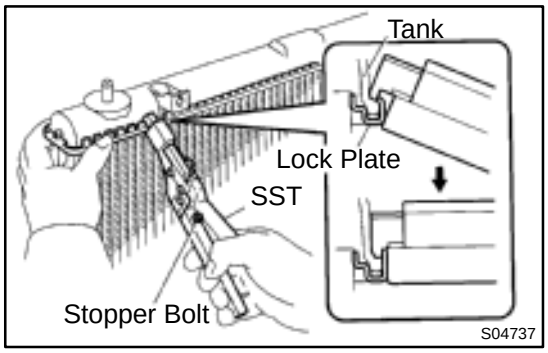
SST 09230–01010

(a) Install the claw to the overhaul handle, inserting it in the hole in part ”A” as shown in the diagram.

(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram is 0.2 – 0.5 mm (0.008 – 0.020 in.).

NOTICE:

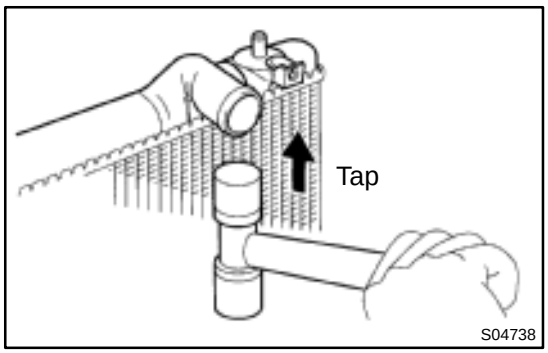
If this adjustment is not done, the claw may be damaged.



3. UNCAULK LOCK PLATES

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

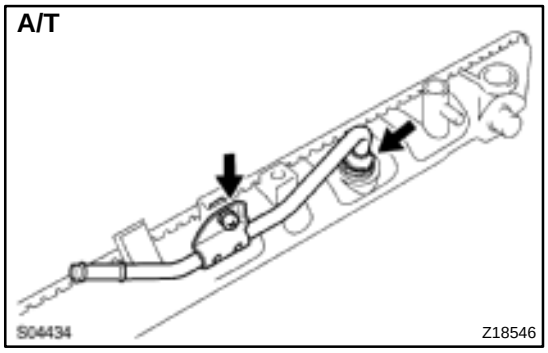
SST 09230–01010



4. REMOVE TANKS AND O–RINGS

(a) Lightly tap the bracket of the radiator (or radiator hose inlet or outlet) with a soft–faced hammer and remove the tank.

(b) Remove the O–ring.



5. A/T:

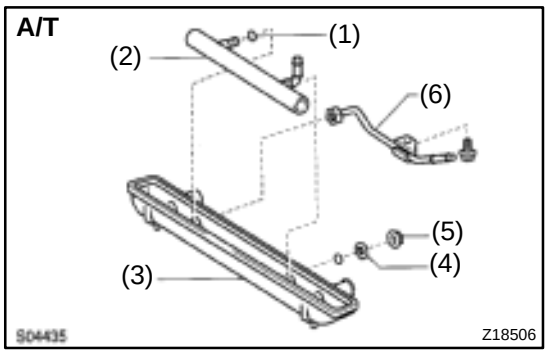
REMOVE OIL COOLER FROM LOWER TANK

(a) Remove the pipe.

(b) Remove the nuts and plate washers.

(c) Remove the oil cooler and O–rings.

CO03Q–03



REASSEMBLY

1. A/T:

INSTALL OIL COOLER TO LOWER TANK

(a) Clean the O–ring contact surface of the lower tank and oil cooler.

(b) Install a new O–rings (1) to the oil cooler (2).

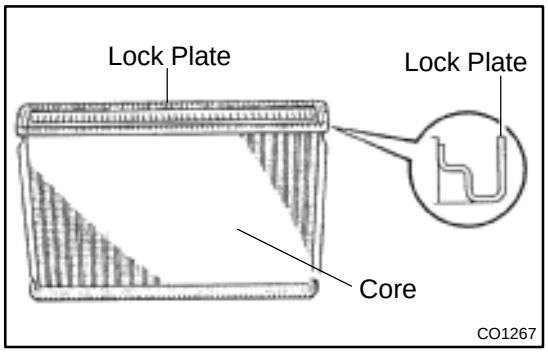
(c) Install the oil cooler with the O–rings to the lower tank (3).

(d) Install the plate washers (4), and nuts (5). Torque the nuts.

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

(e) Install the pipe (6).

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



2. INSPECT LOCK PLATE

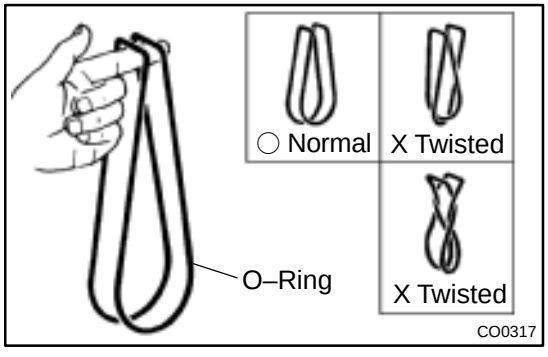
Inspect the lock plate for damage.

HINT:

- If the sides of the lock plate groove are deformed, reassembly of the tank will be impossible.
- 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, Therefore, repair or replace if necessary.

NOTICE:

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

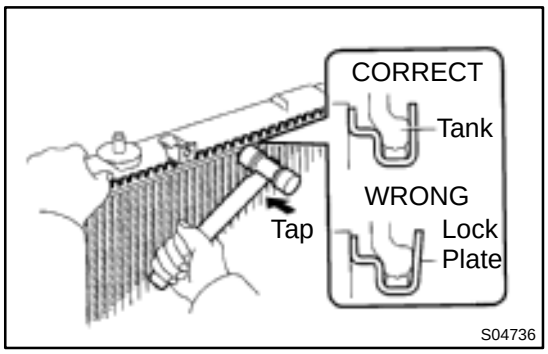


3. INSTALL NEW O–RINGS AND TANKS

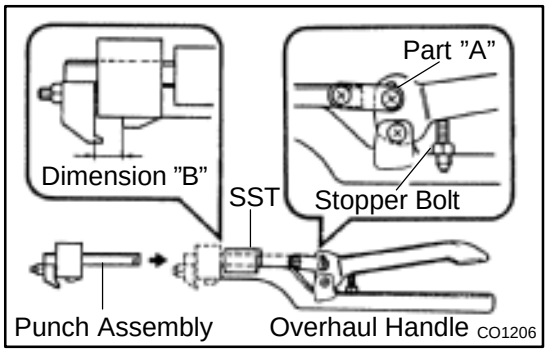
(a) After checking that there are no foreign objects in the lock plate groove, install the new O–ring without twisting it.

HINT:

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



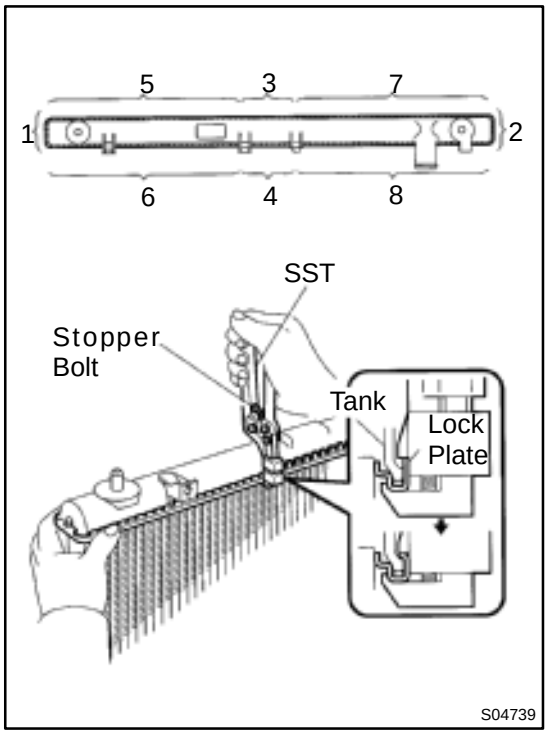
(b) Install the tank without damaging the O–ring.
(c) Tap the lock plate with a soft–faced hammer so that there is no gap between it and the tank.



4. ASSEMBLE SST

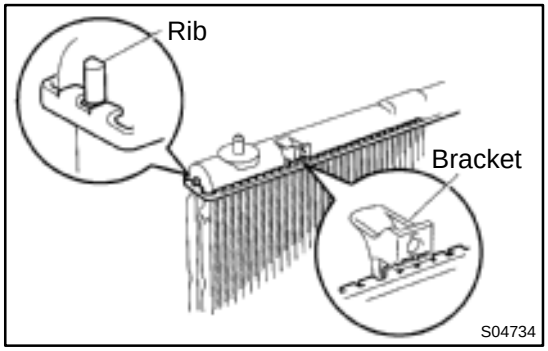
SST 09230–01010, 09231–14010

(a) Install the punch assembly to the overhaul handle, inserting it in the hole in part ”A” as shown in the illustration.
(b) While gripping the handle, adjust the stopper bolt so that dimension ”B” shown in the diagram.
Dimension ”B”: 8.4 mm (0.34 in.)



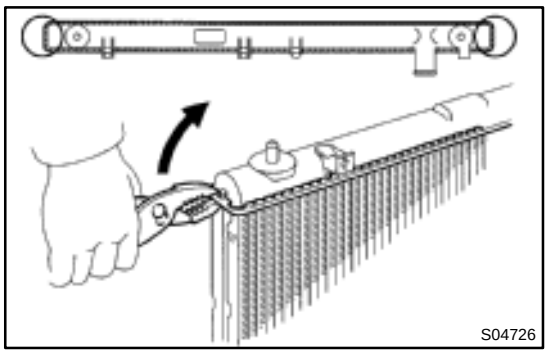
5. CAULK LOCK PLATE

(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

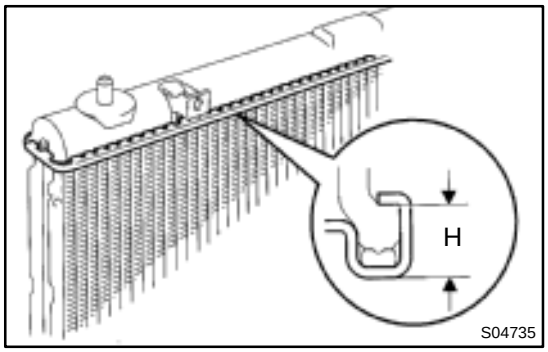


HINT:

◆ Do not stake the areas protruding around the pipes, brackets or tank ribs.



◆ The points shown in the rib sides and oil cooler near here cannot be staked with SST. Use pliers or similar object and be careful not to damage the core plates.



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

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

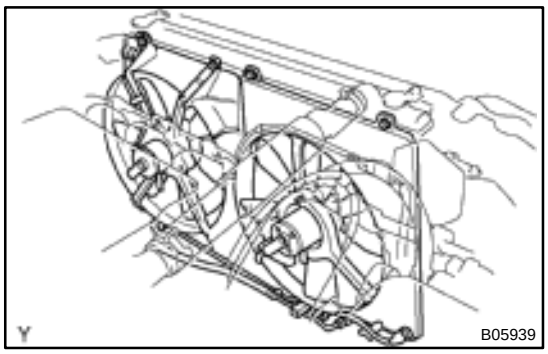
If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

6. INSTALL CUSHION

CO03R–01

INSTALLATION

Installation is in the reverse order of removal. (See page CO–18)



ELECTRIC COOLING FAN

CO03S–03

ON–VEHICLE INSPECTION

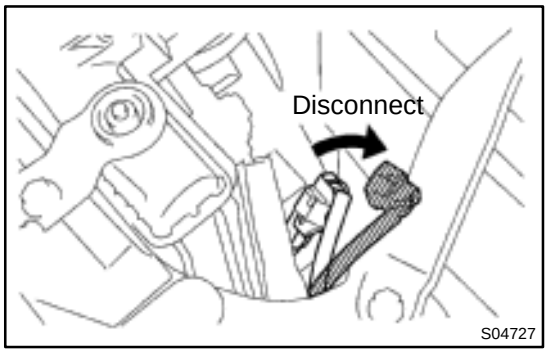
1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 88˚C (190˚F))

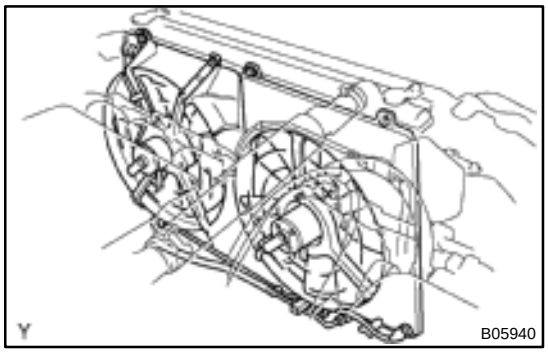
(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.

If not, check the cooling fan relay and ECT switch, and check for a separated connector or severed wire between the cooling fan relay and ECT switch.

(c) Disconnect the No.1 ECT switch connector.





(d) Check that the cooling fan rotates.

If not, check the fuses, engine main relay, cooling fan relay, cooling fan, and check for a short circuit between the cooling fan relay and ECT switch.

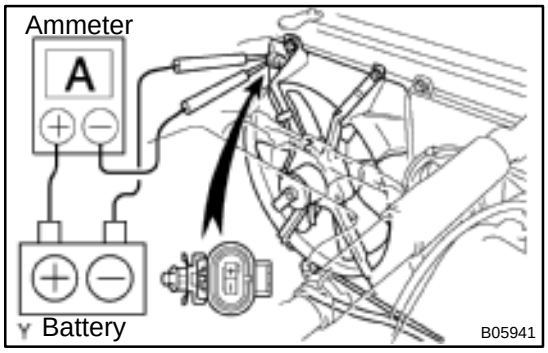
(e) Reconnect the No.1 ECT switch connector.

2. 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 ECT switch.



3. INSPECT NO.1 COOLING FAN

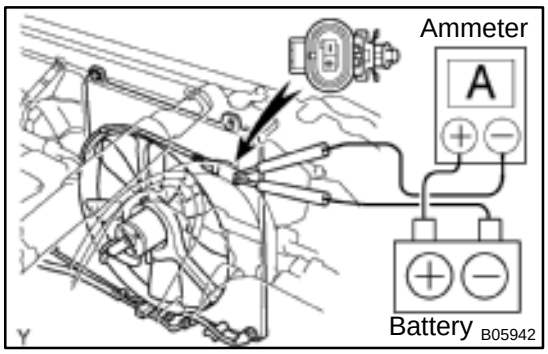
(a) Disconnect the cooling fan connector.

(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: 8.3 – 11.3 A at 20˚C (68˚F)

(d) Reconnect the cooling fan connector.



4. INSPECT NO.2 COOLING FAN

(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.

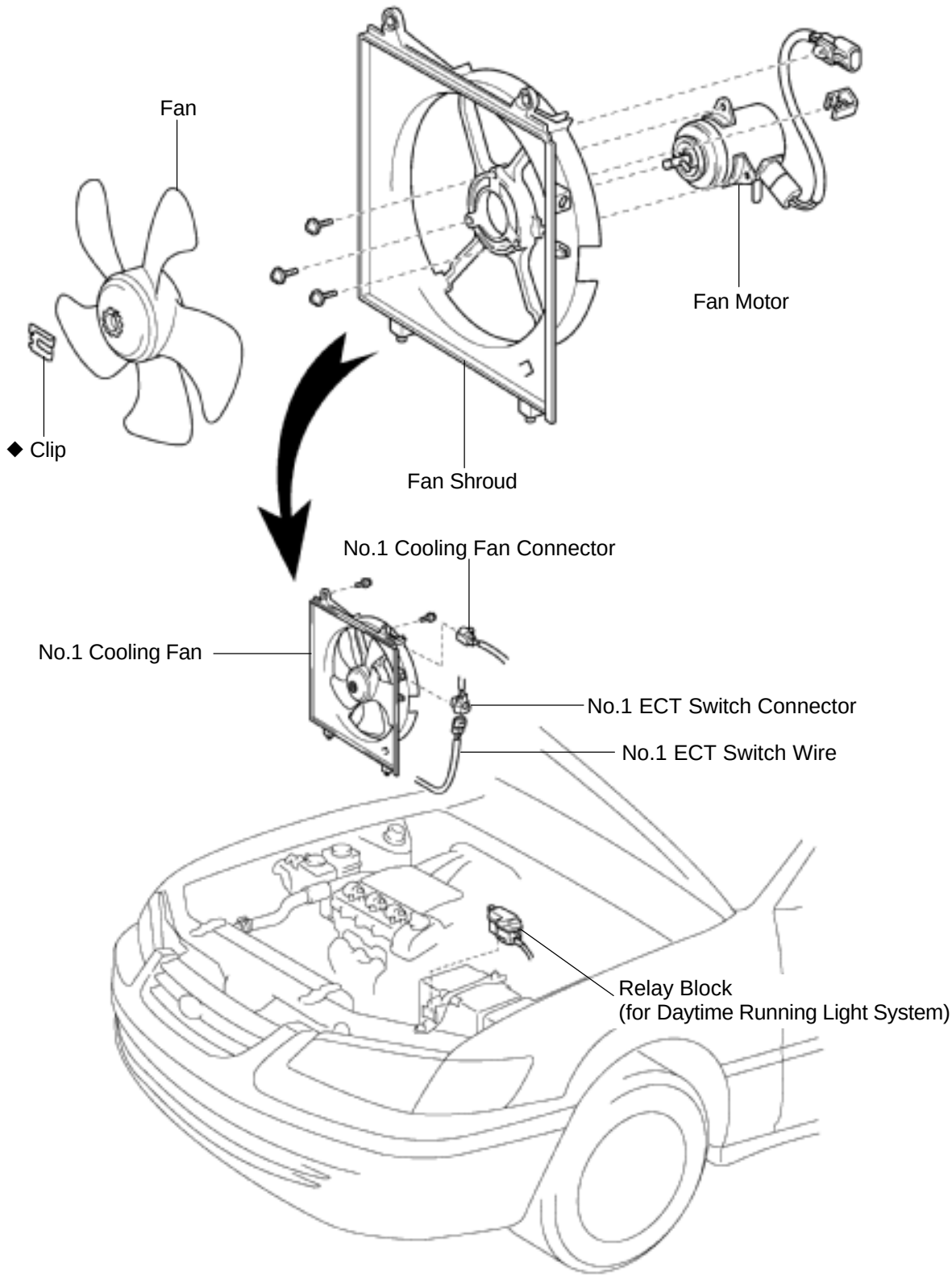
Standard amperage: 8.3 – 11.3 A at 20˚C (68˚F)

(d) Reconnect the cooling fan connector.

CO03T–03

COMPONENTS

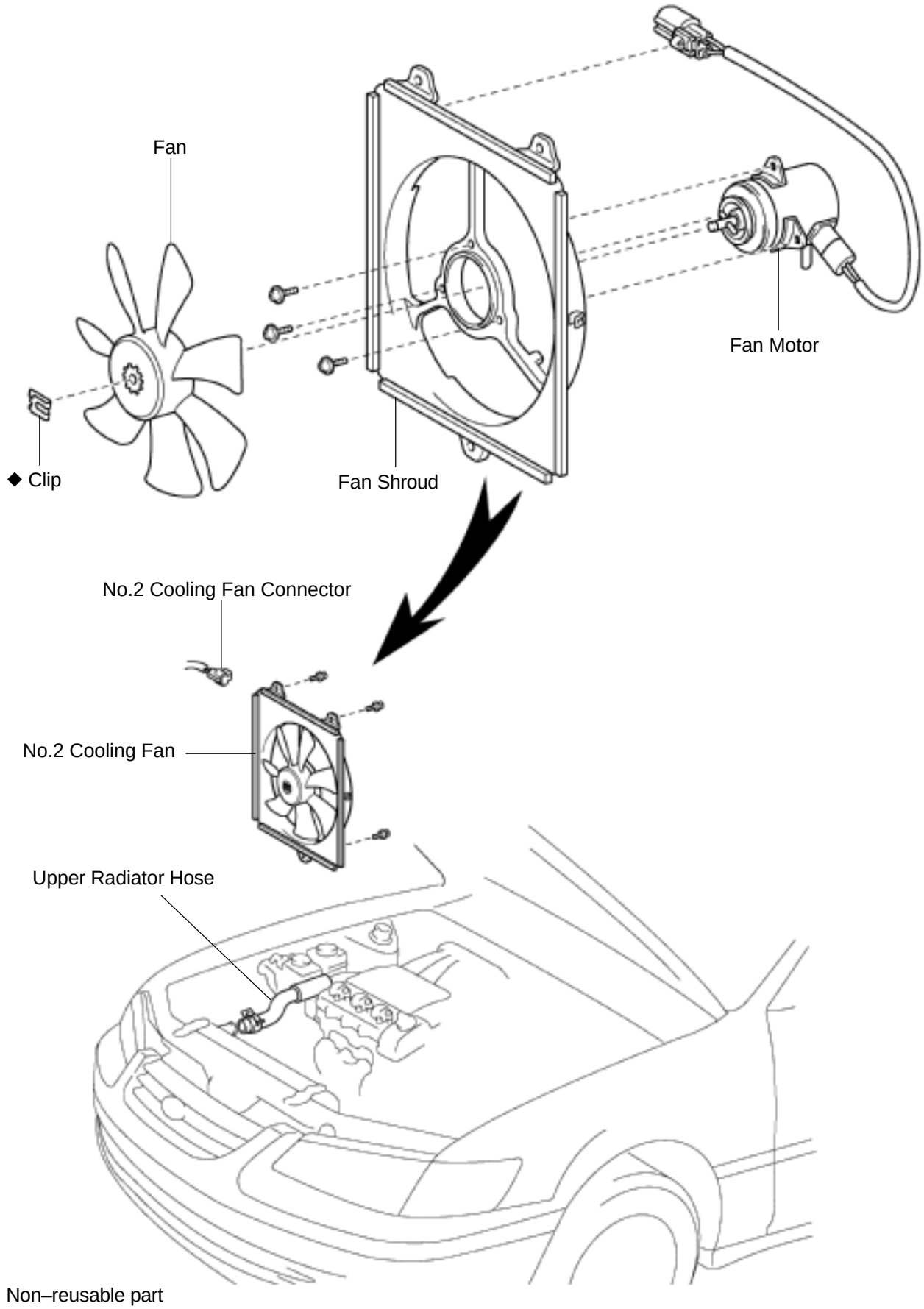
No.1



◆ Non–reusable part

B06400

No.2


Fan
Fan Motor
◆ Clip
Fan Shroud
No.2 Cooling Fan Connector
No.2 Cooling Fan
Upper Radiator Hose
◆ Non–reusable part
B06402

CO03U–03

REMOVAL

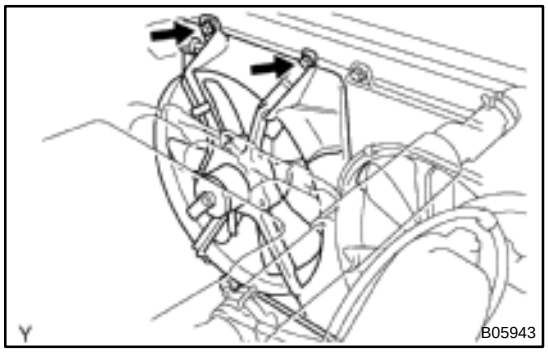
1. REMOVE NO.1 COOLING FAN

(a) Canada:
Disconnect the relay block (for daytime running light system) from the battery hold–down clamp.

(b) Disconnect the cooling fan connector.

(c) Disconnect the No.1 ECT switch wire connector.

(d) Disconnect the No.1 ECT switch wire clamps.



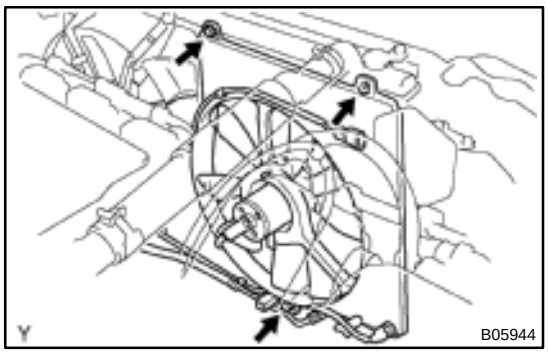
(e) Remove the 2 bolts and cooling fan.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

2. REMOVE NO.2 COOLING FAN

(a) Drain the engine coolant.

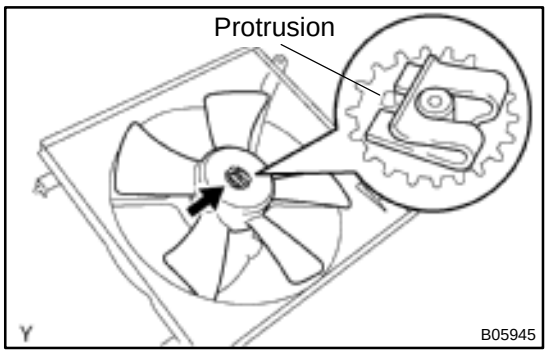
(b) Disconnect the upper radiator hose from the radiator.

(c) Disconnect the cooling fan connector.



(d) Remove the 3 bolts and cooling fan.
Torque: 5.0 N·m (50 kgf·cm, 44 in.·lbf)

CO03V–03



DISASSEMBLY

1. REMOVE NO.1 COOLING FAN

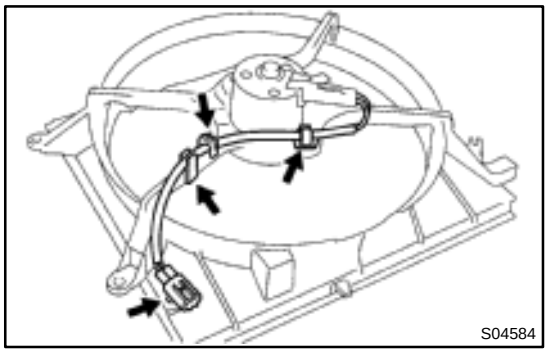
(a) Remove the clip and fan.

NOTICE:

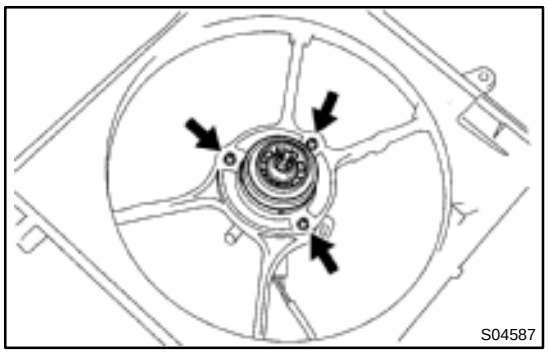
When removing the clip and fan, do not apply too much force to the motor shaft. And do not scratch the motor shaft.

HINT:

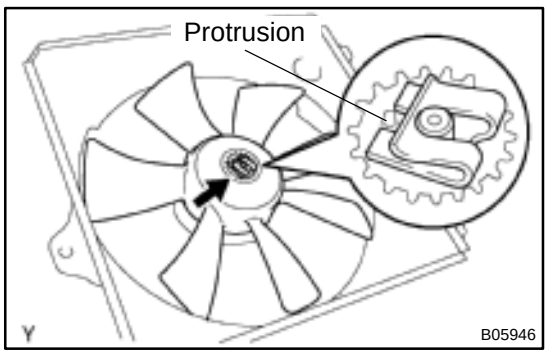
At the time of installation, please refer to the following items. Install a new clip from the side opposite the protrusion on the fan.



(b) Disconnect the lead wire from the fan shroud.



(c) Remove the 3 screws and fan motor.



2. REMOVE NO.2 COOLING FAN

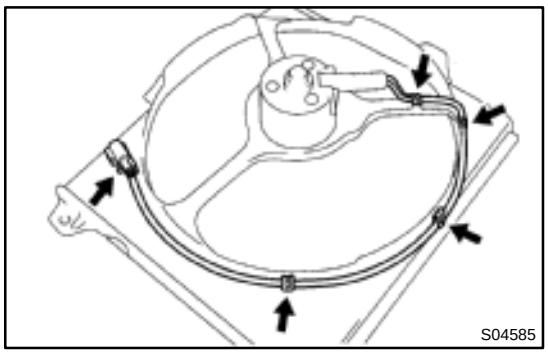
(a) Remove the clip and fan.

NOTICE:

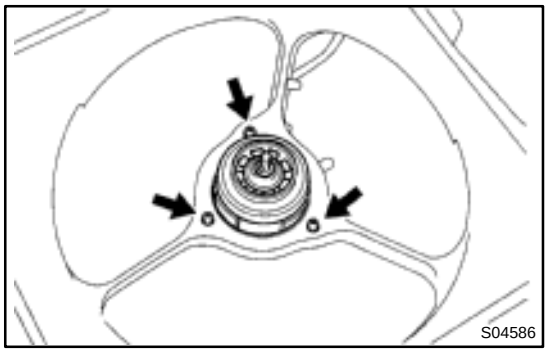
When removing the clip and fan, do not apply too much force to the motor shaft. And do not scratch the motor shaft.

HINT:

At the time of installation, please refer to the following items. Install a new clip from the side opposite the protrusion on the fan.



(b) Disconnect the lead wire from the fan shroud.



(c) Remove the 3 screws and fan motor.

CO03W–01

REASSEMBLY

Reassembly is in the reverse order of disassembly. (See page CO–30)

CO03X–01

INSTALLATION

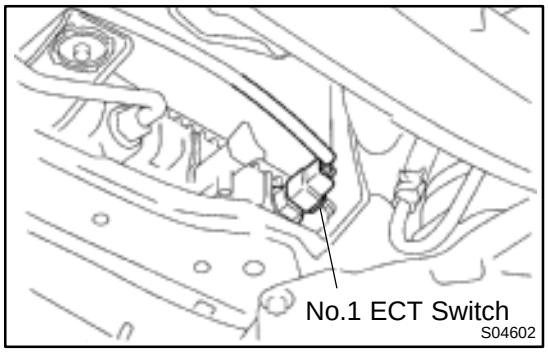
Installation is in the reverse order of removal. (See page CO–29)

ENGINE COOLANT TEMPERATURE (ECT) SWITCH

CO03Y–04

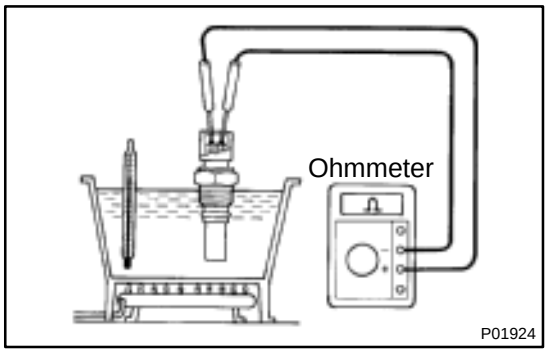
INSPECTION

1. DRAIN ENGINE COOLANT



2. INSPECT NO.1 ECT SWITCH

(a) Remove the No.1 ECT switch.



(b) Inspect the No.1 ECT switch.

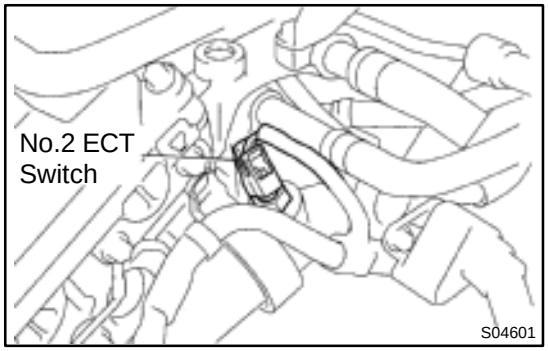
(1) Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is above 98˚C (208˚F).

If there is continuity, replace the switch.

(2) Check that there is continuity, between the terminals when the coolant temperature is below 88˚C (190˚F).

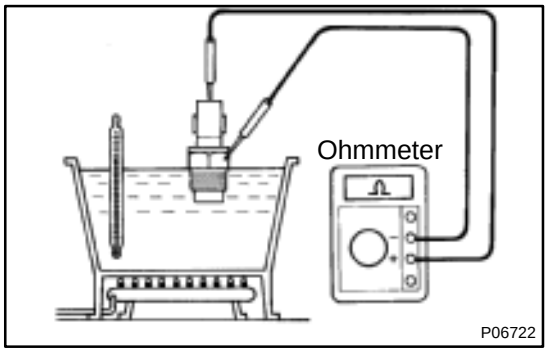
If there is no continuity, replace the switch.

(c) Reinstall the No.1 ECT switch.



3. INSPECT NO.2 ECT SWITCH

(a) Remove the No.2 ECT switch.



(b) Inspect the No.2 ECT 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.

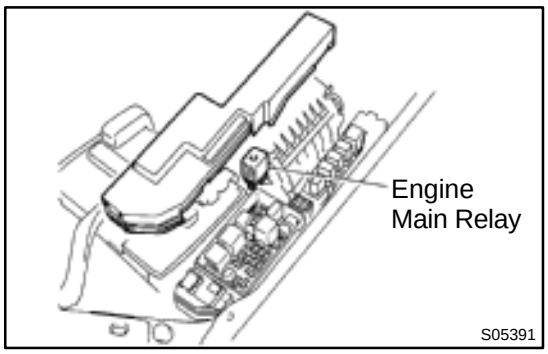
(2) Check that there is no continuity between the terminals when the coolant temperature is below 83˚C (181˚F).

If there is continuity, replace the switch.

(c) Reinstall the No.2 ECT switch.

4. REFILL ENGINE COOLANT

5. START ENGINE AND CHECK FOR COOLANT LEAKS



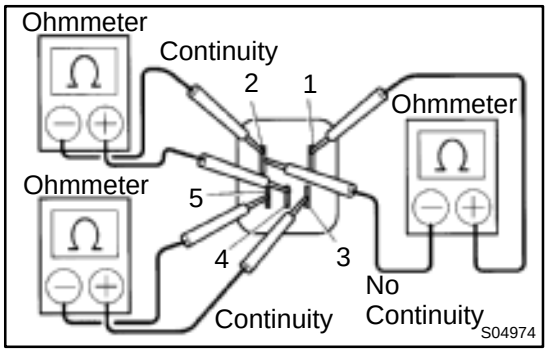
ENGINE MAIN RELAY

CO03Z–03

INSPECTION

1. REMOVE RELAY BOX COVER

2. REMOVE ENGINE MAIN RELAY (Marking: ENGINE MAIN)



3. INSPECT RELAY CONTINUITY

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

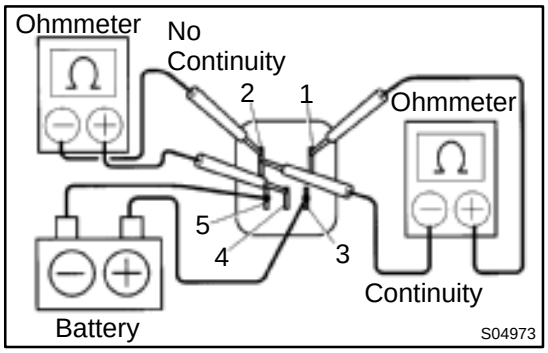
If there is no continuity, replace the relay.

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

If there is no continuity, replace the relay.

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

If there is continuity, replace the relay.



4. INSPECT RELAY OPERATION

(a) Apply battery positive voltage across terminals 3 and 5.

(b) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.

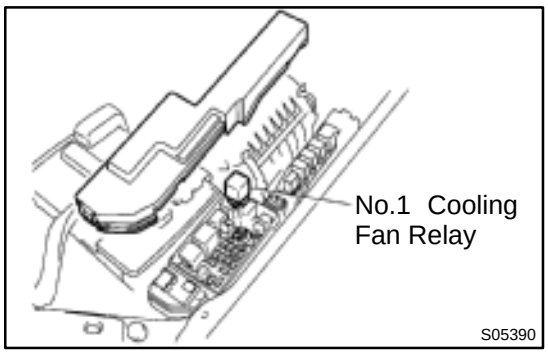
If there is continuity, replace the relay.

(c) Check that there is continuity between terminals 1 and 2.

If there is no continuity, replace the relay.

5. REINSTALL ENGINE MAIN RELAY

6. REINSTALL RELAY BOX COVER



COOLING FAN RELAY

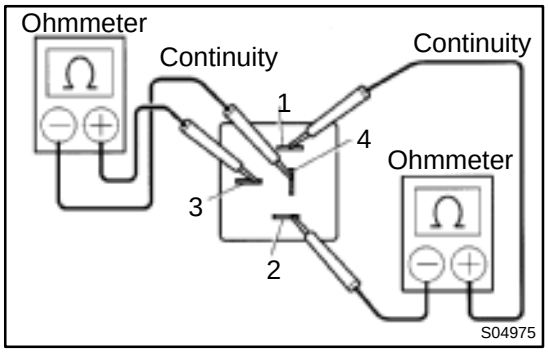
CO040–03

INSPECTION

1. REMOVE RELAY BOX COVER

2. INSPECT NO.1 COOLING FAN RELAY

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



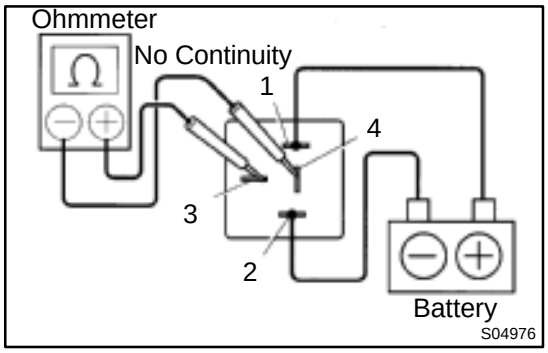
(b) Inspect the No.1 cooling fan relay continuity.

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

If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.



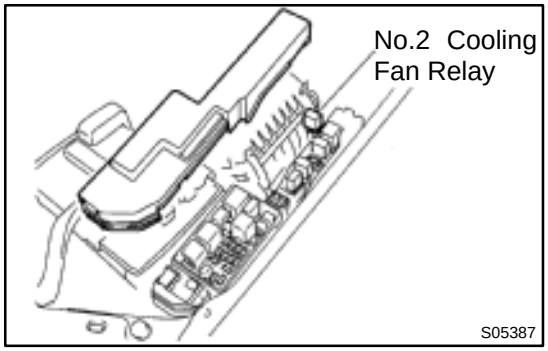
(c) Inspect the No.1 cooling fan relay operation.

(1) Apply battery positive voltage across terminals 1 and 2.

(2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

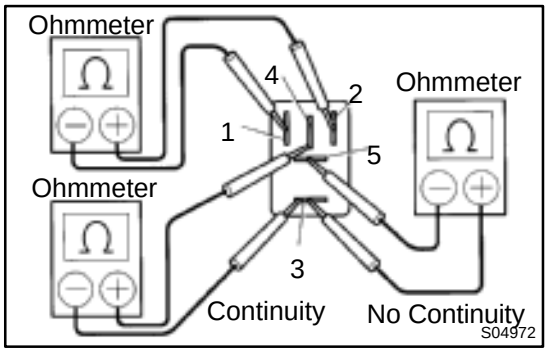
If there is continuity, replace the relay.

(d) Reinstall the No.1 cooling fan relay.



3. 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 1 and 2.

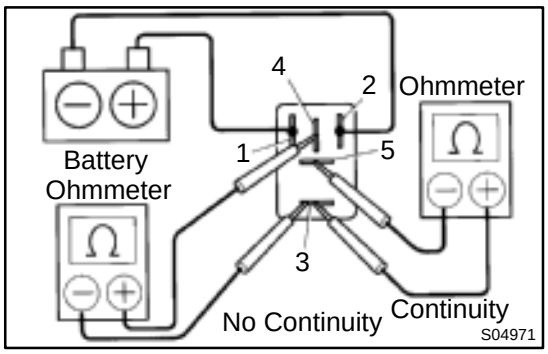
If there is no continuity, replace the relay.

(2) Check that there is continuity between terminals 3 and 4.

If there is no continuity, replace the relay.

(3) Check that there is no continuity between terminals 3 and 5.

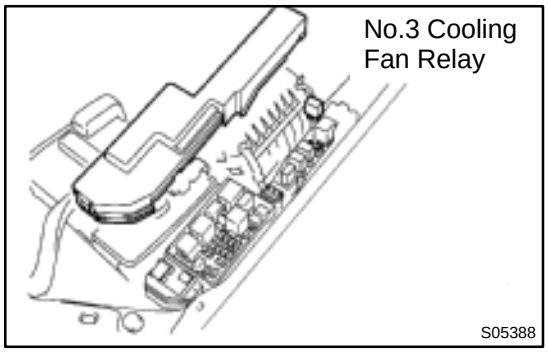
If there is continuity, replace the relay.



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

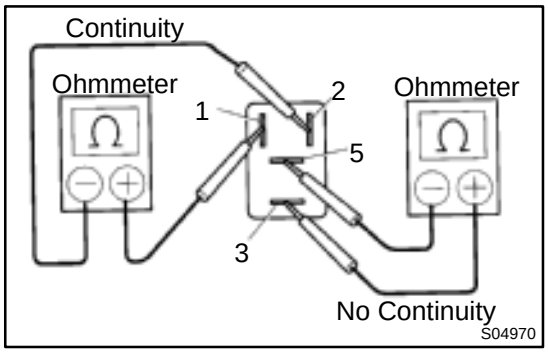
If there is continuity, replace the relay.

(d) Reinstall the No.2 cooling fan relay.



4. INSPECT NO.3 COOLING FAN RELAY

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

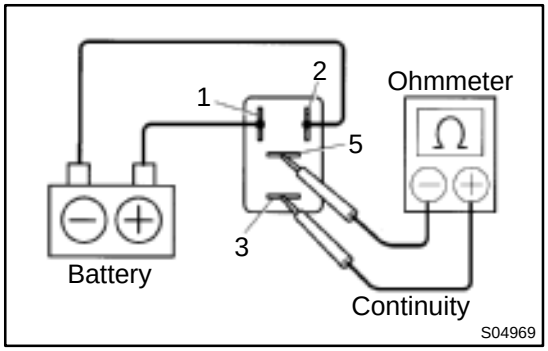


(b) Inspect the No.3 cooling fan relay continuity.
(1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

If there is mo continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 and 5.

If there is continuity, replace the relay.



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

If there is no continuity, replace the relay.

(d) Reinstall the No.3 cooling fan relay.

5. REINSTALL RELAY BOX COVER