COOLING

COOLANT CO–1
WATER PUMP CO–2
RADIATOR CO–3
ELECTRIC COOLING FAN CO–6
COOLING FAN RELAY CO–10

REFER TO 3S–FE ENGINE REPAIR MANUAL (Pub No. RM395E)

NOTE: The above pages contain only the points which differ from the above listed manual.

COOLANT

CO0FI–01

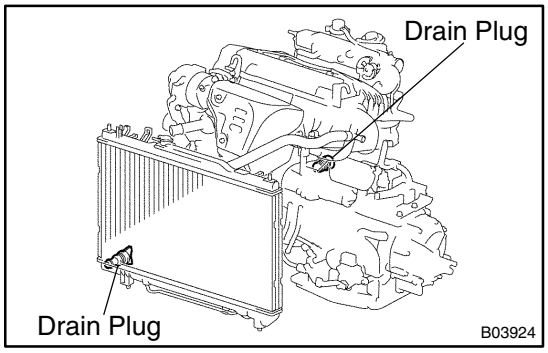
REPLACEMENT

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 a good brand of ethylene–glycol base 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:

w/ Heater	M/T	7.5 litters (7.9 US qts, 6.6 Imp. qts)
	A/T	7.6 litters (8.0 US qts, 6.7 Imp. qts)
w/o Heater	M/T	6.7 litters (7.1 US qts, 5.9 Imp. qts)
	A/T	6.8 litters (7.2 US qts, 6.0 Imp. qts)

(b) Install the radiator cap.

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

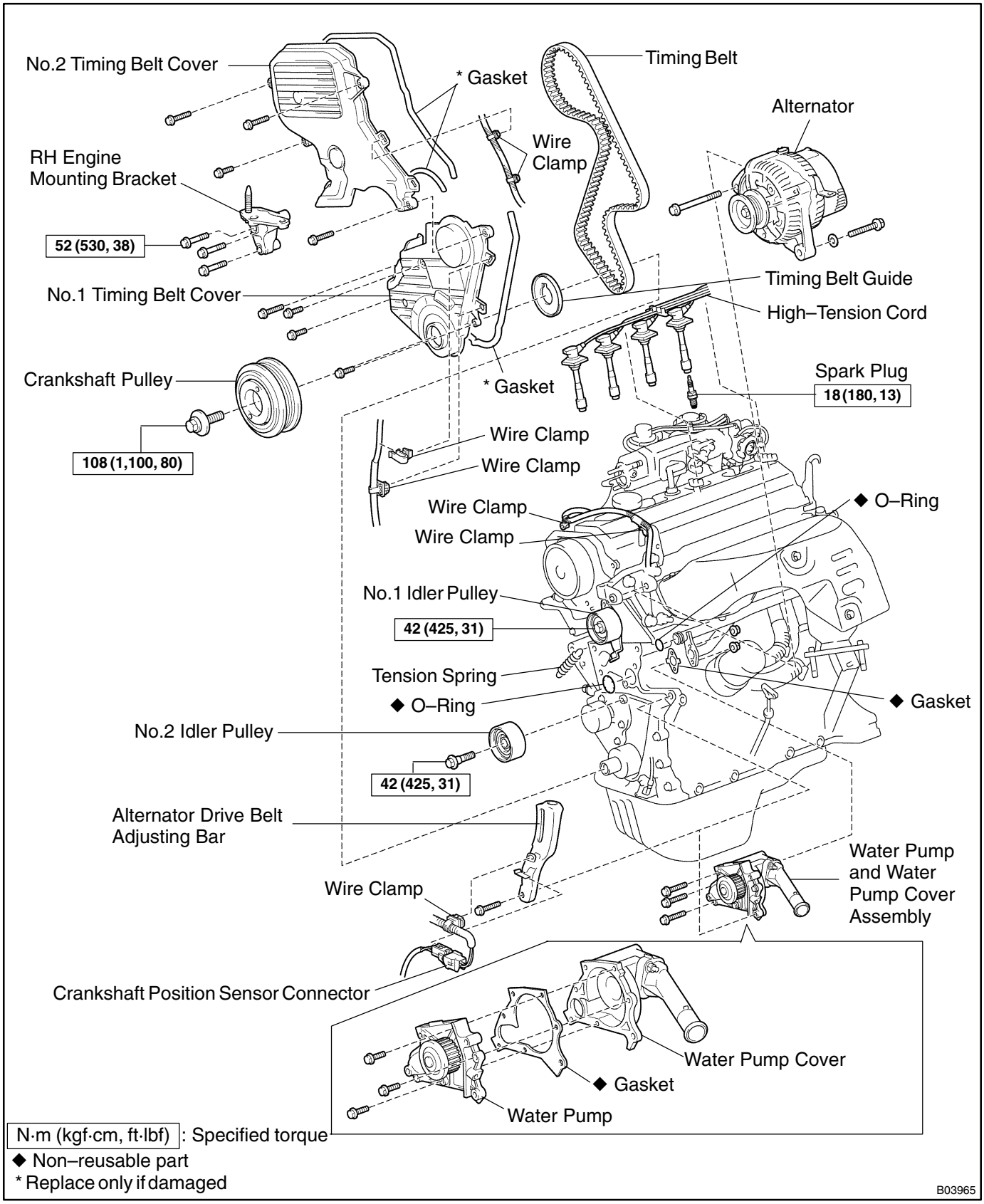
(d) Refill the radiator reservoir with coolant until it reaches the "FULL" line.

3. CHECK FOR COOLANT LEAKS

WATER PUMP

COMPONENTS

CO0FJ–01



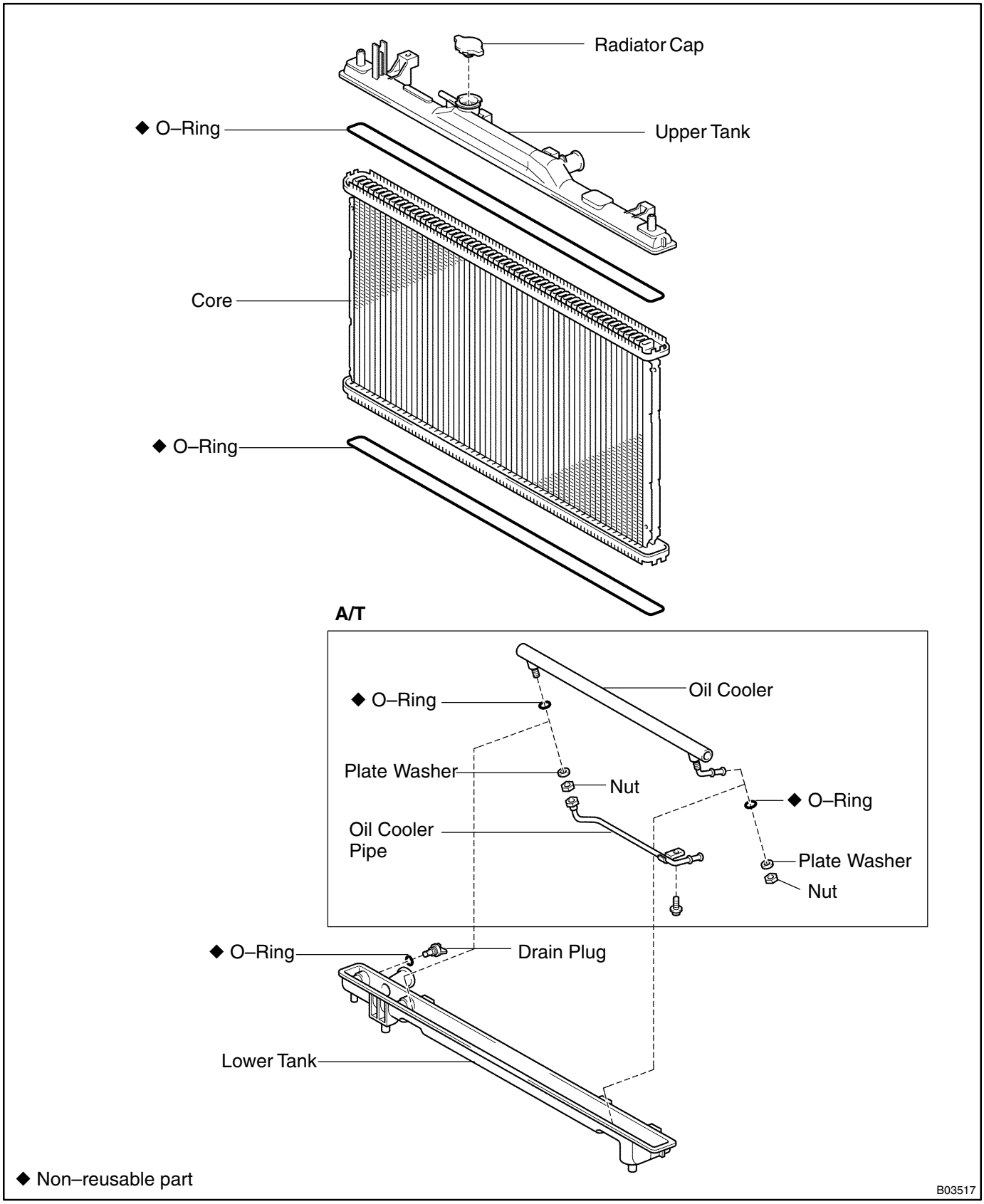
N·m (kgf·cm, ft·lbf) : Specified torque
◆ Non–reusable part
* Replace only if damaged

B03965

RADIATOR

COMPONENTS

CO0FF–01



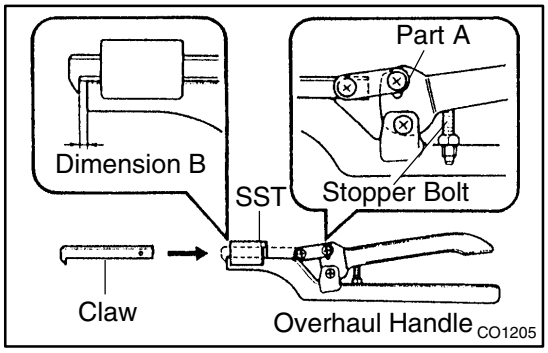
CO0FG–01

DISASSEMBLY

1. REMOVE RADIATOR CAP

2. REMOVE DRAIN PLUG

3. REMOVE WATER TEMPERATURE SWITCH



4. 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 B: 0.2 – 0.3 mm (0.008 – 0.012 in.)

NOTICE:

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

5. UNCAULK LOCK PLATES

6. REMOVE TANKS AND O–RINGS

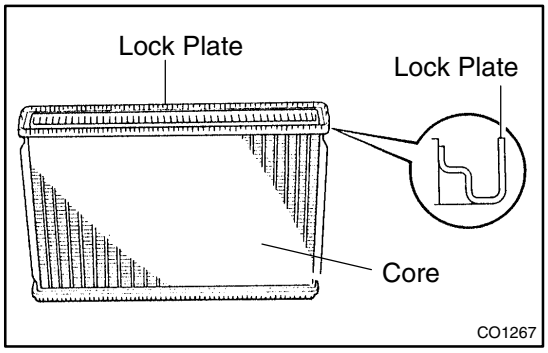
7. A/T:

REMOVE OIL COOLER FROM LOWER TANK

CO0FH–01

REASSEMBLY

1. A/T:
INSTALL OIL COOLER TO LOWER TANK



2. INSPECT LOCK PLATE FOR DAMAGE

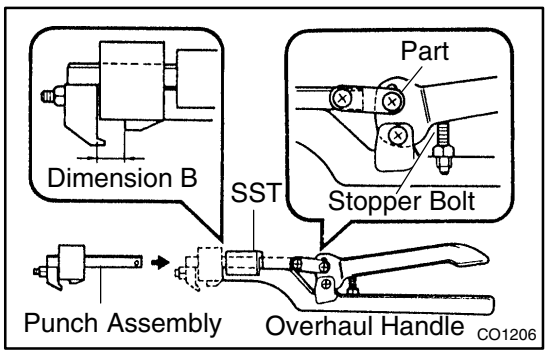
HINT:

- 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

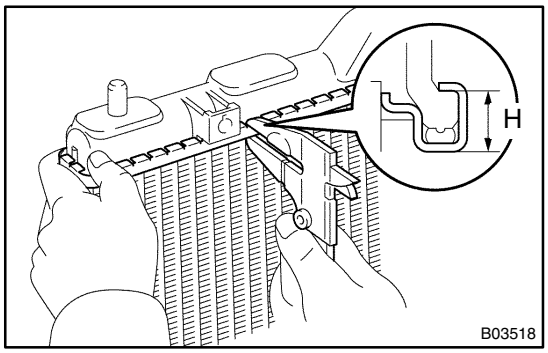


4. ASSEMBLE SST

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 B: 8.4 mm (0.331 in.)



5. CAULK LOCK PLATE

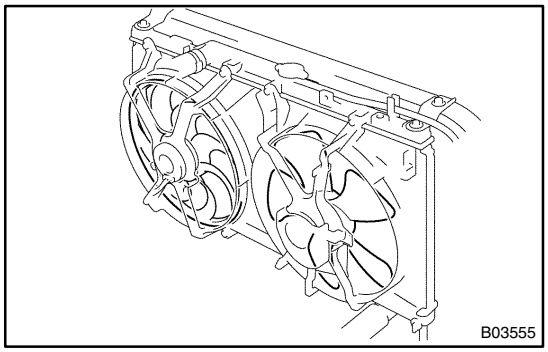
Check the lock plate height (H) after completing the caulking.
Plate height (H): 7.40 – 7.80 mm (0.2913 – 0.3071 in.)
If not within the specified height, adjust the stopper bolt of the handle again and caulk again.

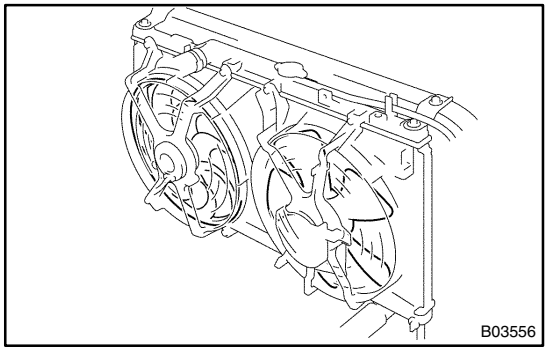
6. INSTALL WATER TEMPERATURE SWITCH

7. INSTALL DRAIN PLUG

8. INSTALL RADIATOR CAP

9. INSPECT FOR WATER LEAKS





ELECTRIC COOLING FAN

CO0FK–01

ON–VEHICLE INSPECTION

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 98˚C (208.4˚F))

(a) Turn the ignition switch ON.

(b) Check that the cooling fan stops.

If not, check the cooling fan relay and water temperature sensor, and check for a separated connector or severed wire between the cooling fan relay and water temperature sensor.

(c) Disconnect the water temperature sensor connector.

(d) Check that the cooling fan rotates.

If not, check the fuses, cooling fan relay, engine ECU and cooling fan, and check for a short circuit between the cooling fan relay and water temperature sensor.

(e) Reconnect the water temperature sensor connector.

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

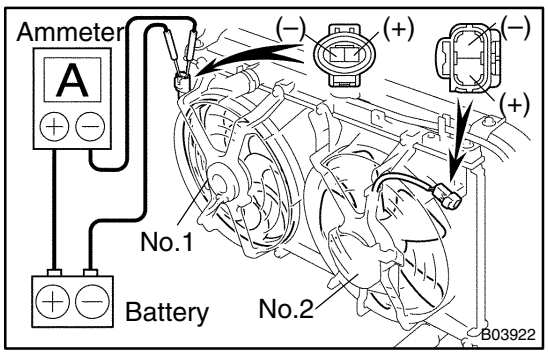
(a) Start the engine, and raise coolant temperature to above 100˚C (212˚F).

HINT:

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

(b) Check that the cooling fan rotates.

If not, replace the water temperature sensor.



3. 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:

No.1	BOSCH made	4.8 A
	DENSO made M/T	5.0 – 7.0 A
	A/T	8.6 – 11.6 A
No.2		4.2 – 7.8 A

(d) Reconnect the cooling fan connector.

4. INSPECT WATER TEMPERATURE SENSOR
(See page FI–51)

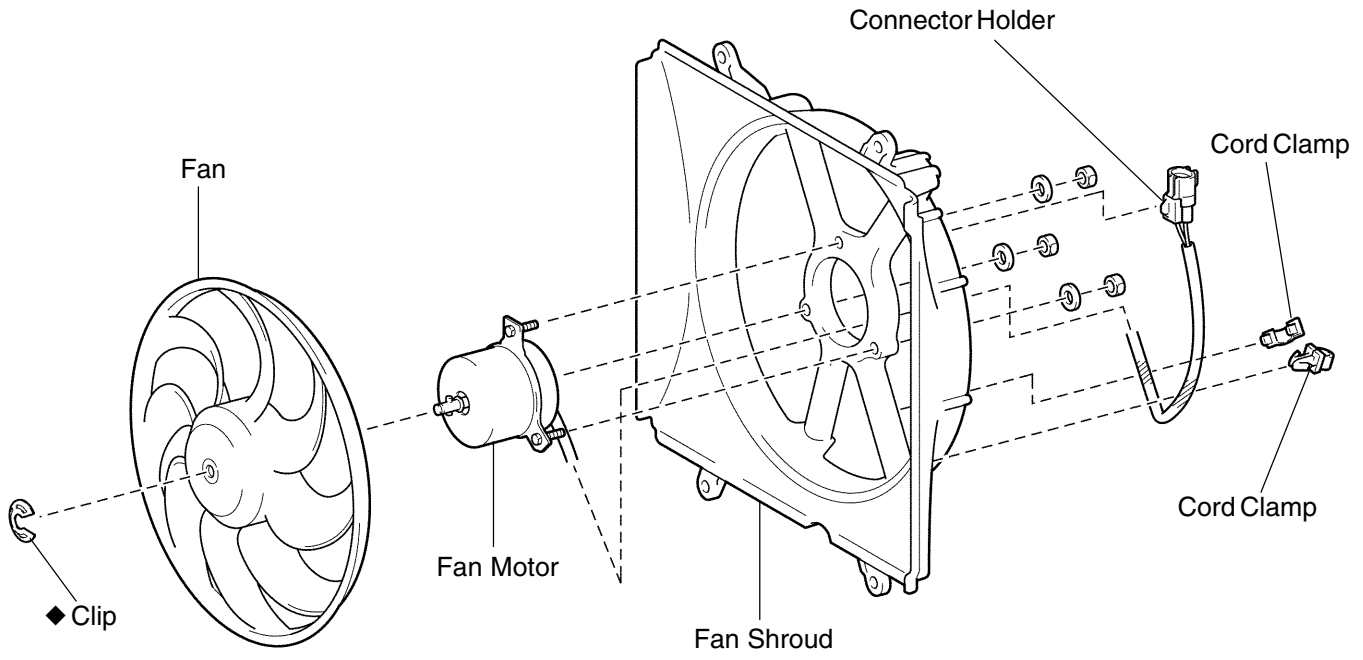
5. INSPECT ENGINE ECU

Check the voltage between ECU terminals FAN and E1.
(See page DI–18)

CO0FL–01

COMPONENTS

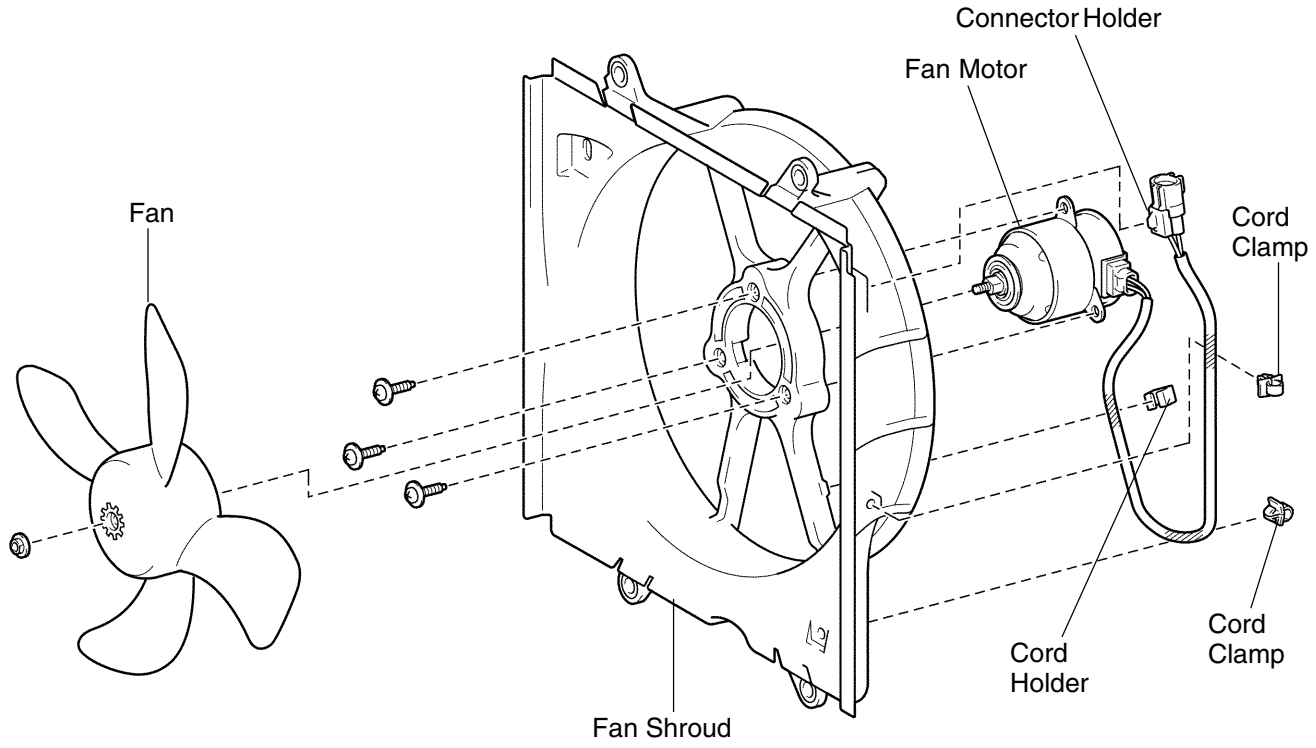
No.1 Cooling Fan (BOSCH Made)



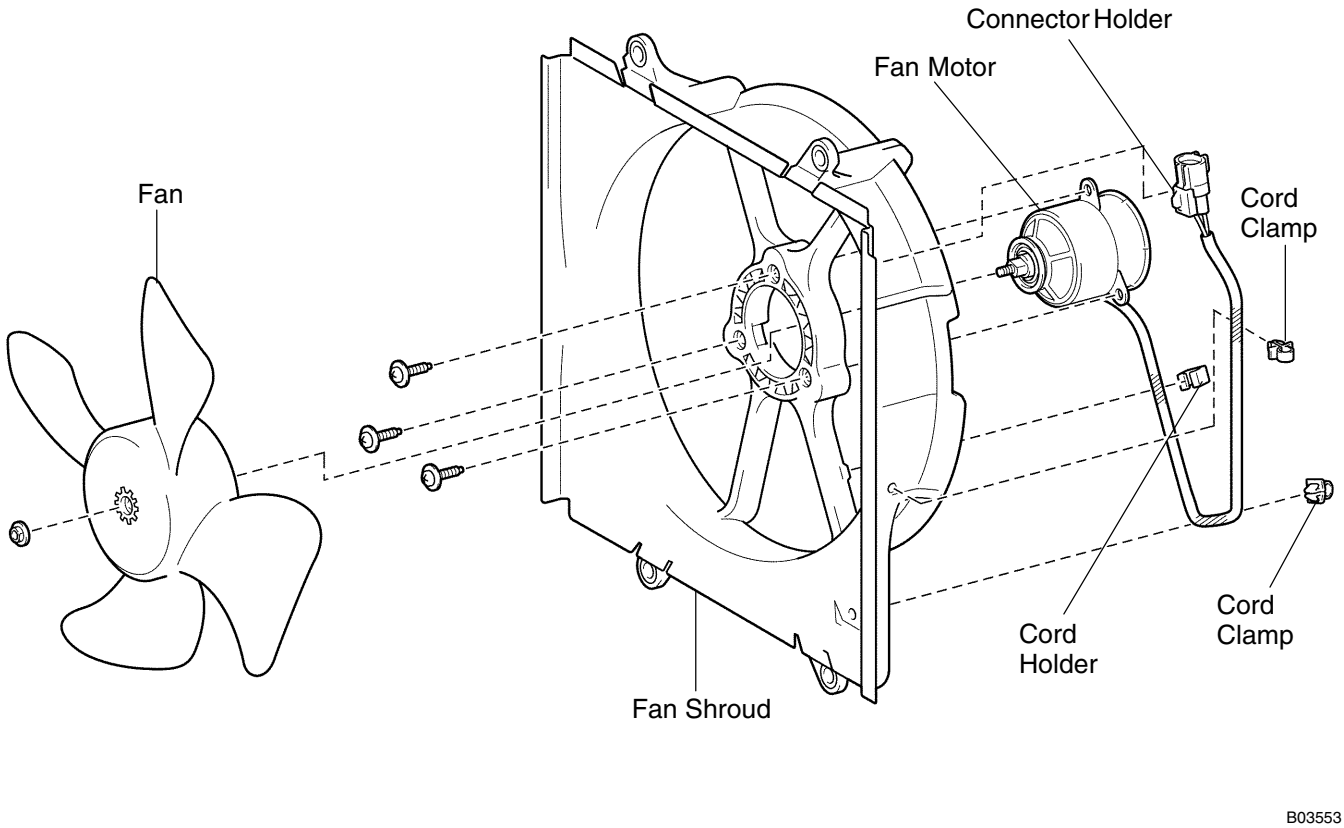
◆ Non–reusable part

B03552

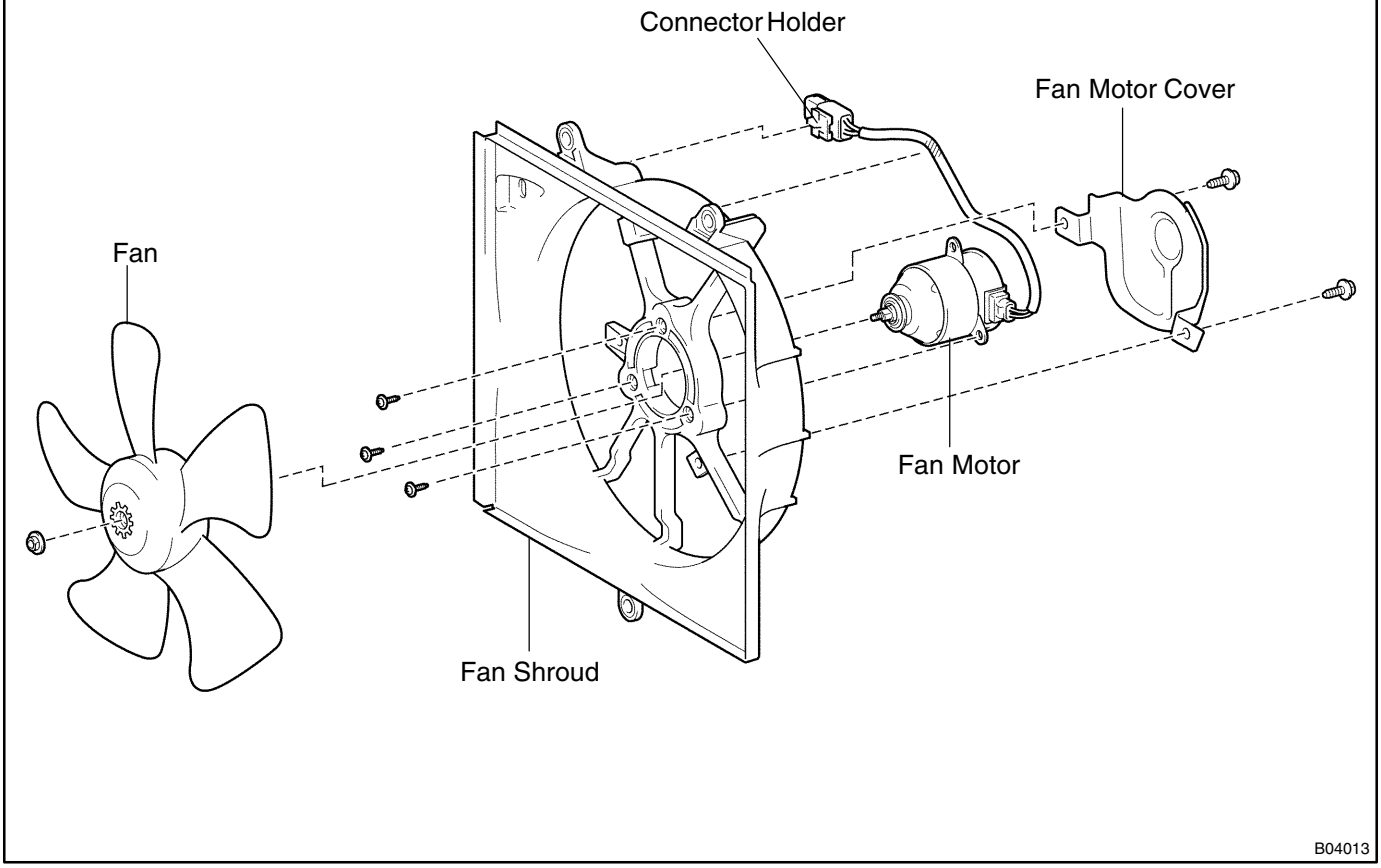
No.1 Cooling Fan (DENSO Made for M/T)

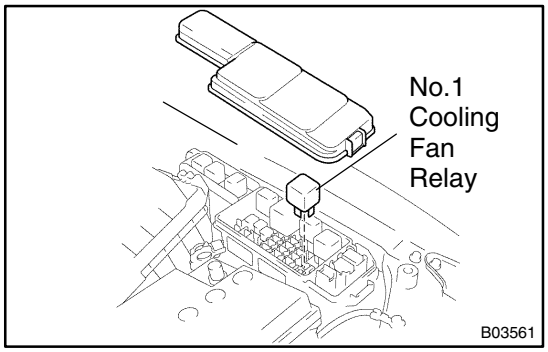


No.1 Cooling Fan (DENSO Made for A/T)



No.2 Cooling Fan





COOLING FAN RELAY

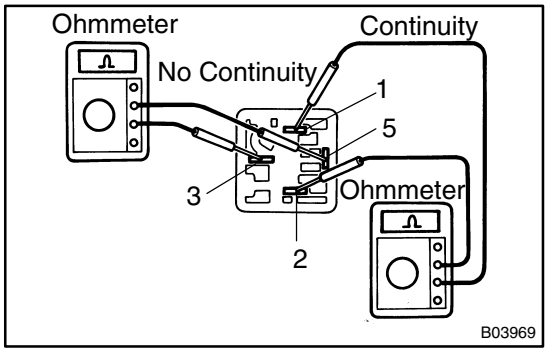
CO0FM–01

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)



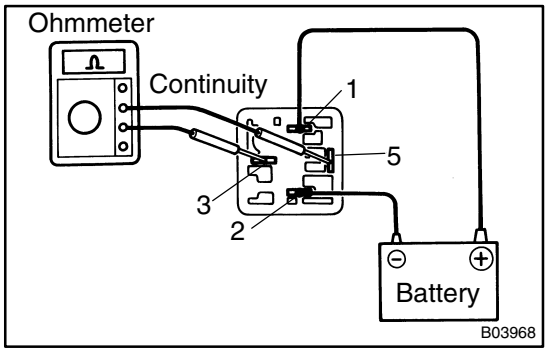
(c) Inspect the No.1 cooling fan relay continuity.

(1) Using an ohmmeter, check that there is continuity between terminals 1 (86) and 2 (85).

If there is no continuity, replace the relay.

(2) Check that there is no continuity between terminals 3 (30) and 5 (87).

If there is continuity, replace the relay.



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

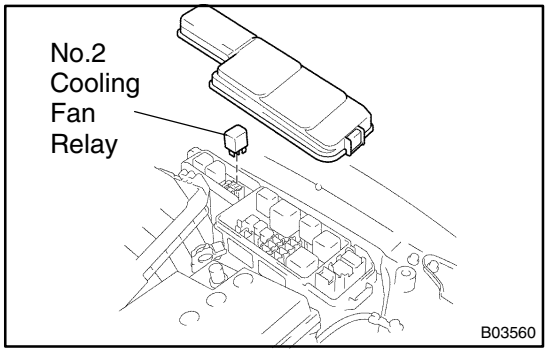
(1) Apply battery voltage across terminals 1 (86) and 2 (85).

(2) Using an ohmmeter, check that there is continuity between terminals 3 (30) and 5 (87).

If there is no continuity, replace the relay.

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

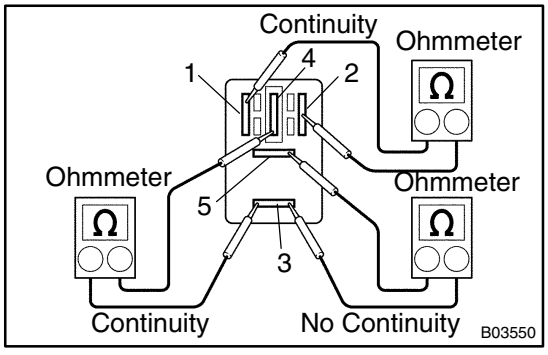
(f) Reinstall the relay box cover.



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.

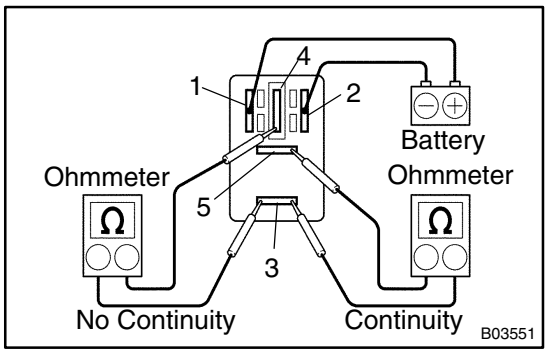
If there is no continuity, replace the relay.

(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.



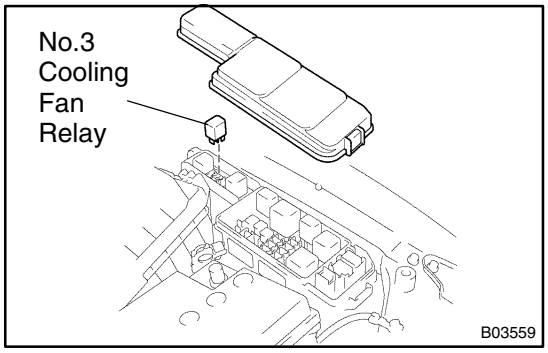
(d) Inspect the No.2 cooling fan relay operation.
  (1) Apply battery voltage across terminals 1 and 2.
  (2) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If there is continuity, replace the relay.

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

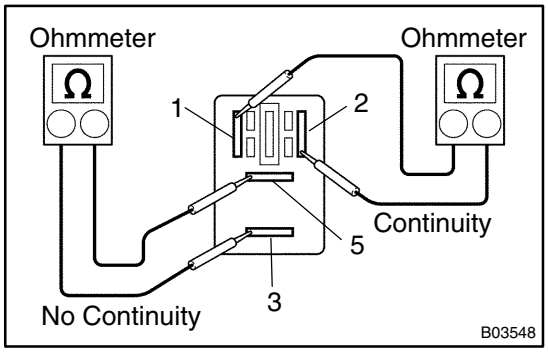
If there is no continuity, replace the relay.

(e) Reinstall the No.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)

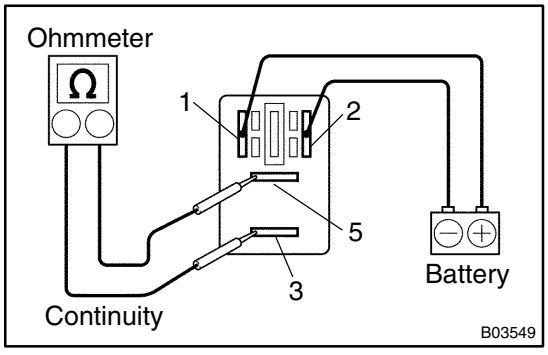


(c) Inspect the No.3 cooling fan relay continuity.
  (1) Using an ohmmeter, check that there is continuity between terminals 1 and 2.

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 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.