

ENGINE — COOLING SYSTEM

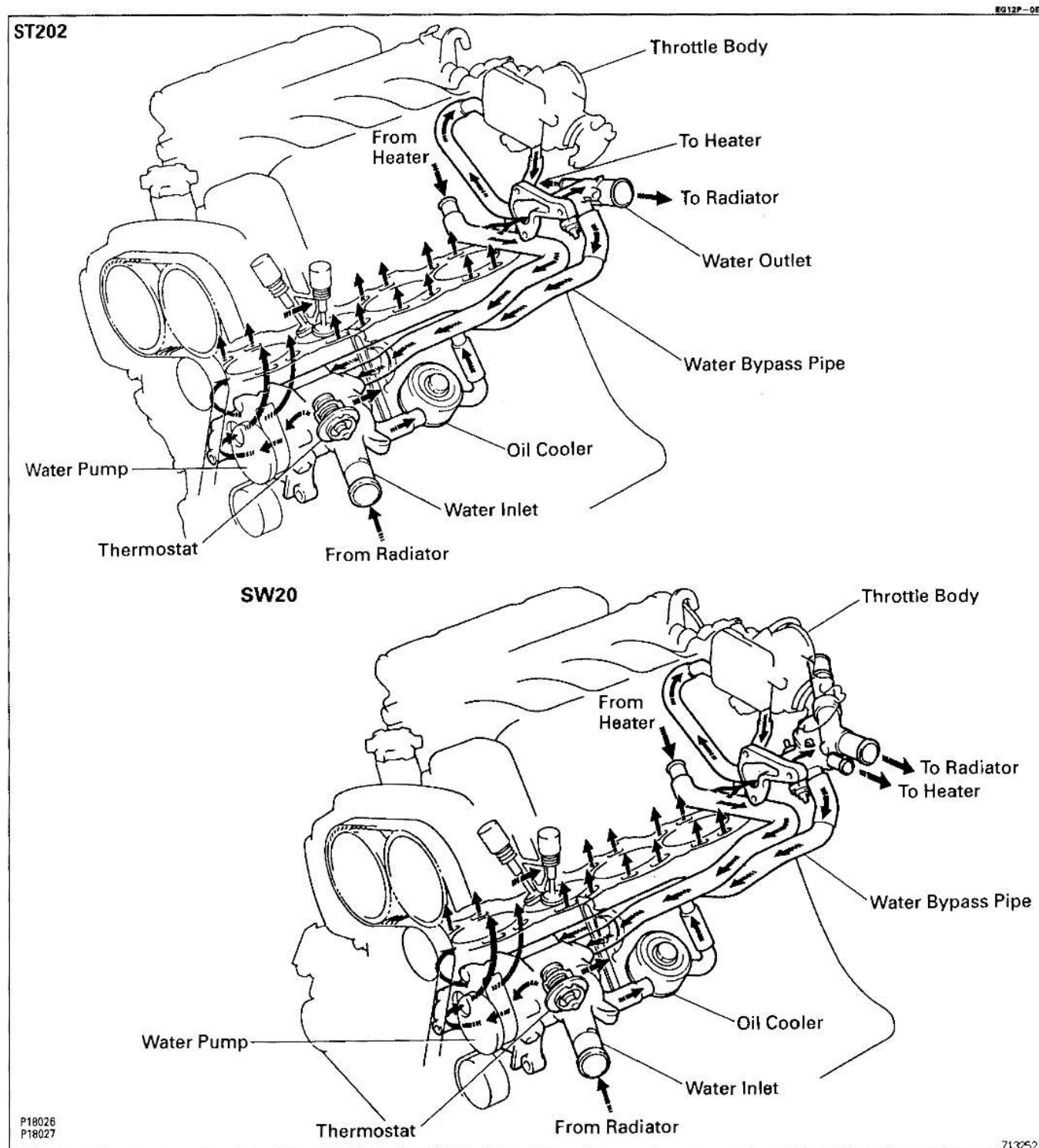
COOLING SYSTEM

DESCRIPTION

This engine utilizes a pressurized forced circulation cooling system which includes a thermostat equipped with a bypass valve mounted on the inlet side. EG12N-05

OPERATION

EG



EG-298**ENGINE — COOLING SYSTEM**

The cooling system is composed of the water jacket (inside the cylinder block and cylinder head), radiator, water pump, thermostat, electric fan, hoses and other components.

Coolant which is heated in the water jacket is pumped to the radiator, through which the electric fan draws air to cool the coolant as it passes through. Coolant which has been cooled is then sent back to the engine by the water pump, where it cools the engine.

The water jacket is a network of channels in the shell of the cylinder block and cylinder head through which coolant passes. It is designed to provide adequate cooling of the cylinders and combustion chambers which become heated during engine operation.

EG**RADIATOR (ST202)**

The radiator performs the function of cooling the coolant which has passed through the water jacket and become hot, and it is mounted in the front of the vehicle. The radiator consists of an upper tank and lower tank, and a core which connects the 2 tanks. The upper tank contains the inlet for coolant from the water jacket and the filler inlet. It also has a hose attached through which excess coolant or steam can flow. The lower tank has an outlet and drain cock for the coolant. The core contains many tubes through which coolant flows from the upper tank to the lower tank as well as to cooling fins which radiate heat away from the coolant in the tubes. The air drawn through the radiator by the electric fan, as well as the wind generated by the vehicle's motion, passes through the radiator, cooling the coolant. A fan with an electric motor is mounted behind the radiator to assist the flow of air through the radiator. The fan operates when the engine coolant temperature becomes high in order to prevent it from becoming too high.

RADIATOR (SW20)

The radiator cools the coolant which has passed through the water jacket and become hot, and it is mounted in the front of the vehicle. The MR2 radiator is different from that in other models, in that it is a cross flow type in which the coolant flows horizontally. It includes side tanks and a core which connects them. The inlet for coolant from the water jacket and the drain cock for draining out coolant are located in the left tank. The outlet coolant and an air drain, which facilitates the supply of coolant to the engine are located in the right tank. The core contains many tubes through which coolant flows from the left tank to the right tank as well as cooling fins which radiate heat away from the coolant in the tubes. Air drawn in by the electric cooling fan, as well as the wind generated by the vehicle's motion, passes through the radiator, cooling the coolant heated in the water jacket as it passes through the tubes in the core. A fan with an electric motor is mounted behind the radiator to assist the flow of air through the radiator. The fan operates when the coolant temperature becomes high in order to prevent it from becoming too high.

RADIATOR CAP (ST202), WATER FILLER CAP (SW20)

The radiator (water filler) cap is a pressure type cap which seals the radiator resulting in pressurization of the radiator as the coolant expands. The pressurization prevents the coolant from boiling even when the coolant temperature exceeds 100°C (212°F). A relief valve (pressurization valve) and a vacuum valve (negative pressure valve) are built into the radiator (water filler) cap. The relief valve opens and lets steam escape through the overflow pipe when the pressure generated inside the cooling system exceeds the limit (coolant temperature: 110 – 120°C (230 – 248°F), pressure: 59 – 103 kPa (0.60 – 1.05 kgf/cm², 8.5 – 14.9 psi). The vacuum valve opens to alleviate the vacuum which develops in the coolant system after the engine is stopped and the coolant temperature drops. The valve's opening allows the coolant in the reservoir tank to return to the cooling system.

ENGINE — COOLING SYSTEM**EG-299****RADIATOR RESERVOIR**

The reservoir is used to catch coolant which overflows the cooling system as a result of volumetric expansion when the coolant is heated. The coolant in the reservoir returns to the radiator when the coolant temperature drops, thus keeping the radiator full at all times and avoiding needless coolant loss.

Check the reservoir level to learn if the coolant needs to be replenished.

WATER PUMP

The water pump is used for forced circulation of coolant through the cooling system. It is mounted on the front of the cylinder block and driven by a timing belt.

**THERMOSTAT**

The thermostat has a wax type bypass valve and is mounted in the water inlet housing. The thermostat includes a type of automatic valve operated by fluctuations in the coolant temperature. This valve closes when the coolant temperature drops, preventing the circulation of coolant through the engine and thus permitting the engine to warm up rapidly. The valve opens when the coolant temperature has risen, allowing the circulation of coolant. Wax inside the thermostat expands when heated and contracts when cooled. Heating the wax thus generates pressure which overpowers the force of the spring which keeps the valve closed, thus opening the valve. When the wax cools, its contraction allows the force of the spring to take effect once more, closing the valve. The thermostat in this engine operates at a temperature of 82°C (180°F).

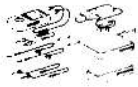
EG-300

ENGINE — COOLING SYSTEM

PREPARATION

RECOMMENDED TOOLS

EG12V-07

	09082-00050 TOYOTA Electrical Tester Set	
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EG

EQUIPMENT

EG12W-01

Heater	
Radiator cap tester	
Thermometer	
Torque wrench	

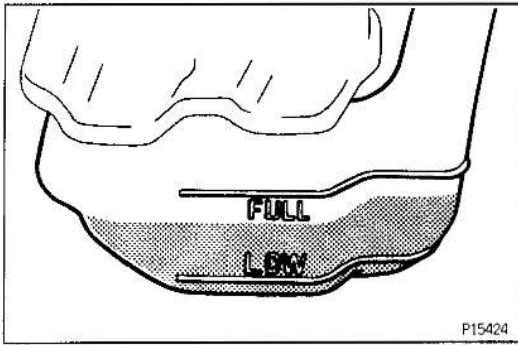
COOLANT

EG12X-0A

Item		Capacity	Classification
Engine coolant (w/ Heater)	ST202	7.0 liters (7.4 US qts, 6.2 Imp. qts)	Ethylene—glycol base
	SW20	13.7 liters (14.4 US qts, 12.1 Imp. qts)	

ENGINE — COOLING SYSTEM

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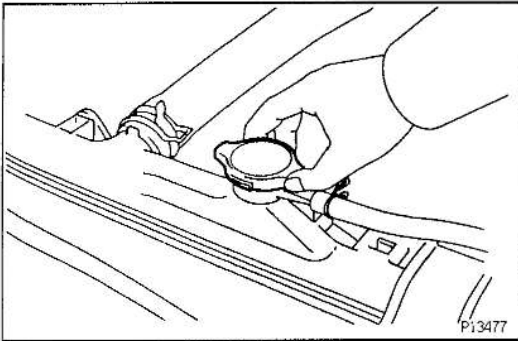
COOLANT CHECK (ST202)

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 engine coolant up to the "FULL" line.

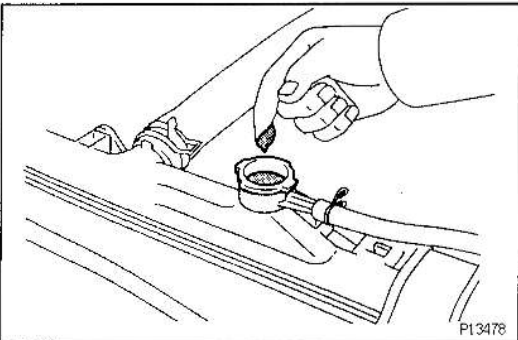
EG



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.



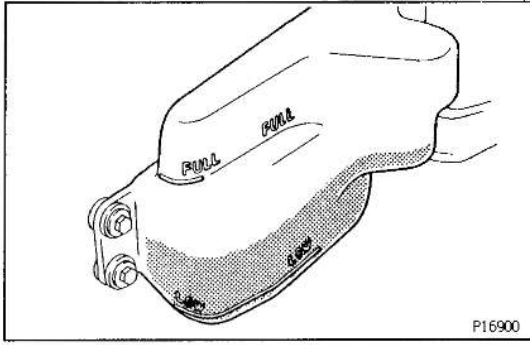
(b) There should not be any excessive deposits of rust or scale around the radiator cap or water filler hole, and the coolant should be free from oil.

If excessively dirty, replace the coolant.

(c) Reinstall the radiator cap.

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ENGINE — COOLING SYSTEM

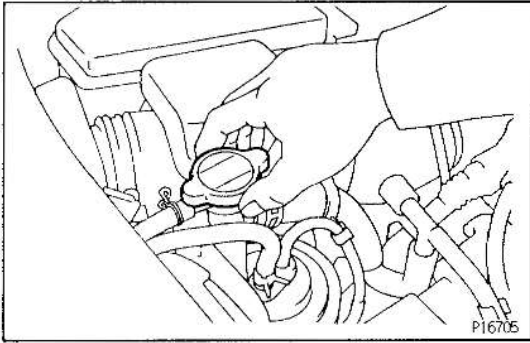


COOLANT CHECK (SW20)

1. CHECK ENGINE COOLANT LEVEL AT RADIATOR RESERVOIR

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

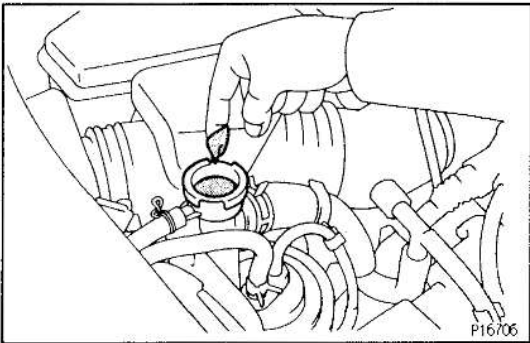
If low, check for leaks and add engine coolant up to the "FULL" line.



2. CHECK ENGINE COOLANT QUALITY

(a) Remove the water filler cap.

CAUTION: To avoid the danger of being burned, do not remove the water filler 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 water filler cap or water filler hole, and the coolant should be free from oil. If excessively dirty, replace the coolant.

(c) Reinstall the water filler cap.

ENGINE — COOLING SYSTEM

COOLANT REPLACEMENT (ST202)

EG321-06

1. DRAIN ENGINE COOLANT

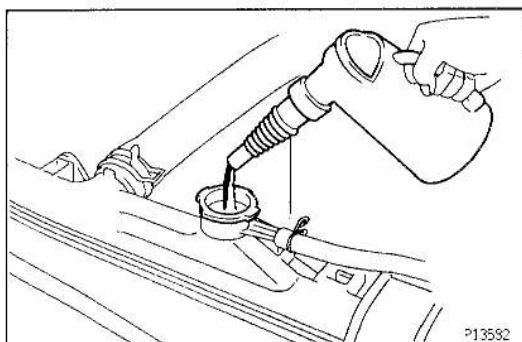
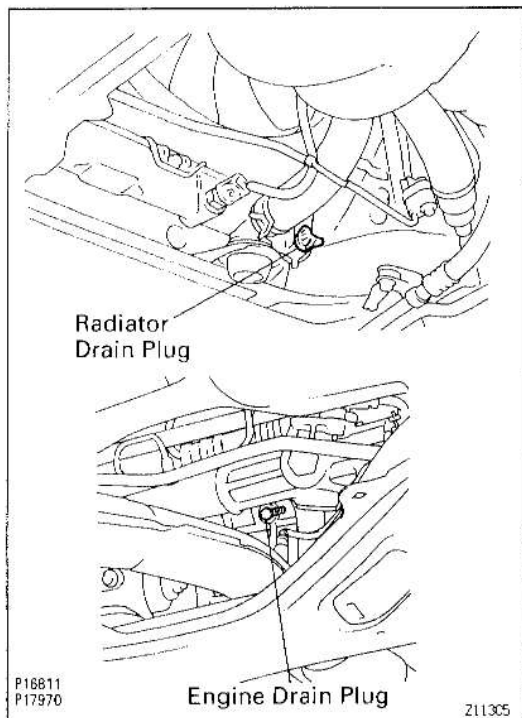
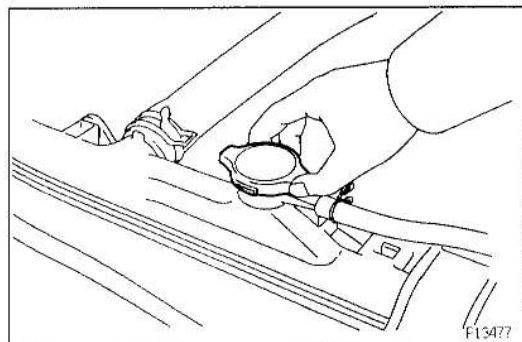
- (a) Remove the radiator cap.

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.

EG

- (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 (Engine): 25 N·m (250 kgf·cm, 18 ft·lbf)



2. FILL ENGINE COOLANT

- (a) Slowly fill the system with coolant.

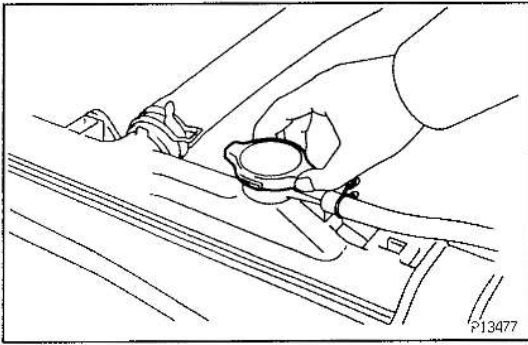
- Use a good brand of ethylene—glycol base coolant and mix it according to the manufacturer's directions.
- Using coolant which includes more than 50 % ethylene—glycol (but not more than 70 %) is recommended.

NOTICE:

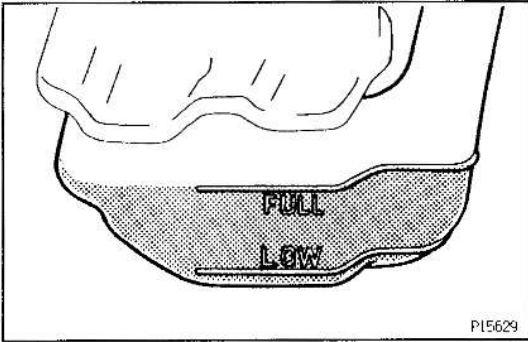
- Do not use an alcohol type coolant.
- The coolant should be mixed with demineralized water or distilled water.

Capacity (w/ Heater):

7.0 liters (7.4 US qts, 6.2 Imp. qts)

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- (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 ENGINE COOLANT FOR LEAKS

ENGINE — COOLING SYSTEM

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COOLANT REPLACEMENT (SW20)

NOTICE:

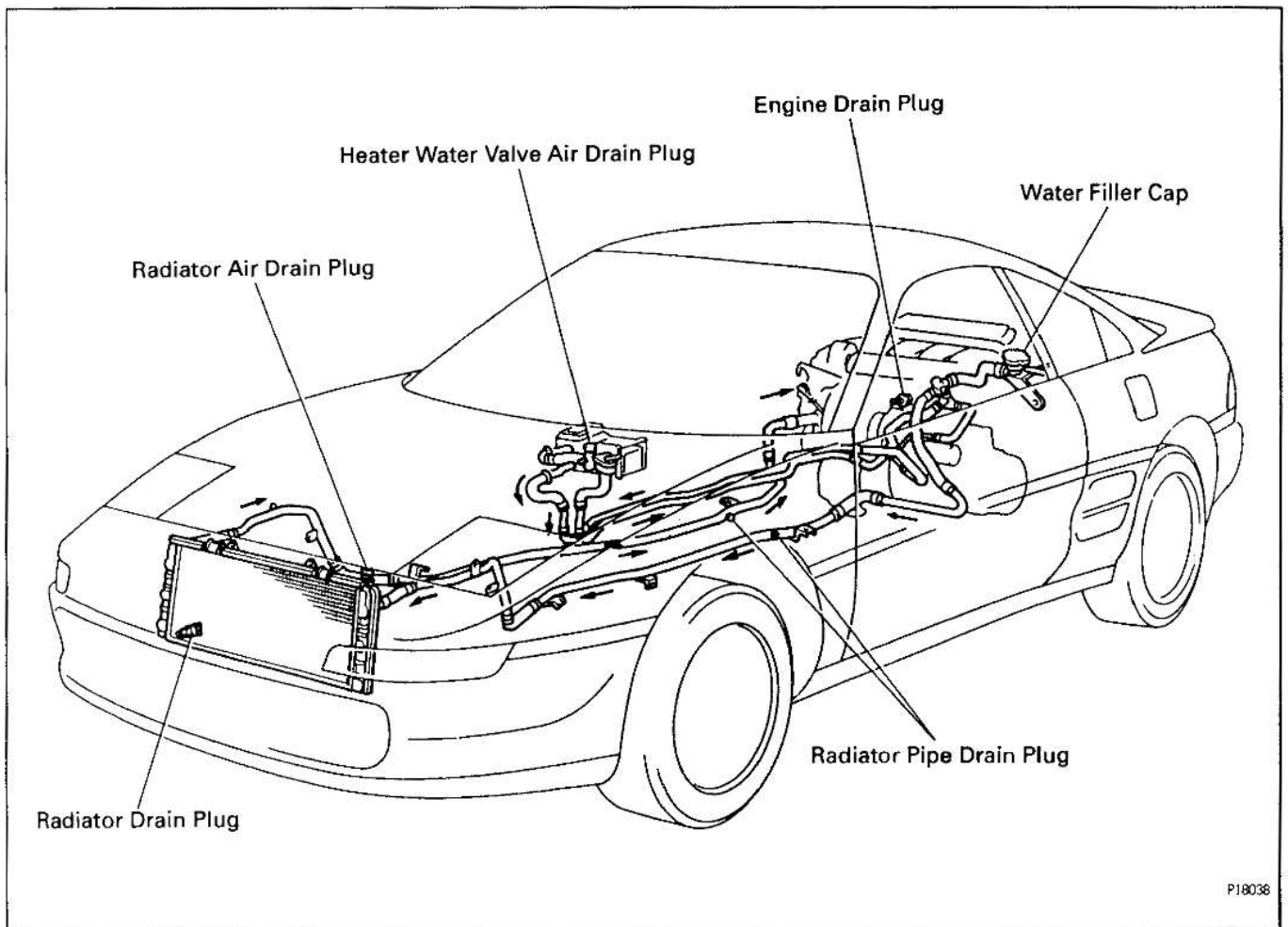
EG132-03

- To avoid the danger of burns, do not begin work until the engine and coolant have properly cooled down.
- To ensure that coolant is poured in properly, perform the operation on a level area. Performing work with the vehicle inclined may cause improper removal of coolant or improper air removal when pouring coolant.
- After replacing the coolant, check the water level in the water filler and reservoir tank once or twice within 500 km (311 miles) of driving or within one week.

EG

COOLANT CIRCUIT

EG134-02



P18038

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ENGINE — COOLING SYSTEM

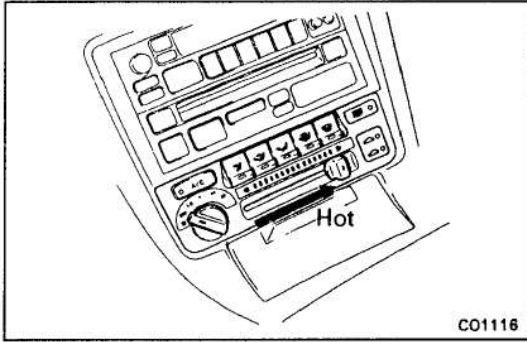
EG136-04

ENGINE COOLANT DRAINAGE

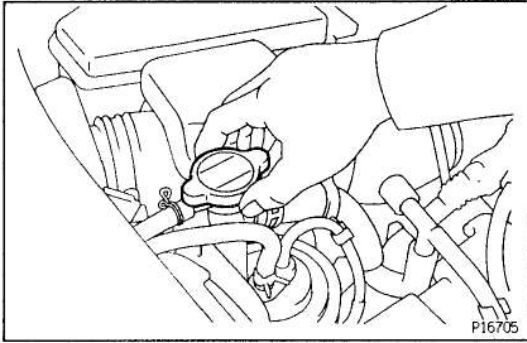
1. REMOVE REAR FUEL TANK PROTECTOR

2. DRAIN ENGINE COOLANT

(a) Set the heater control lever to hot.



EG



(b) Remove the water filler cap.

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

(c) Remove the drain cocks (engine, radiator and radiator pipes), and drain the coolant.

(d) Close the drain plugs.

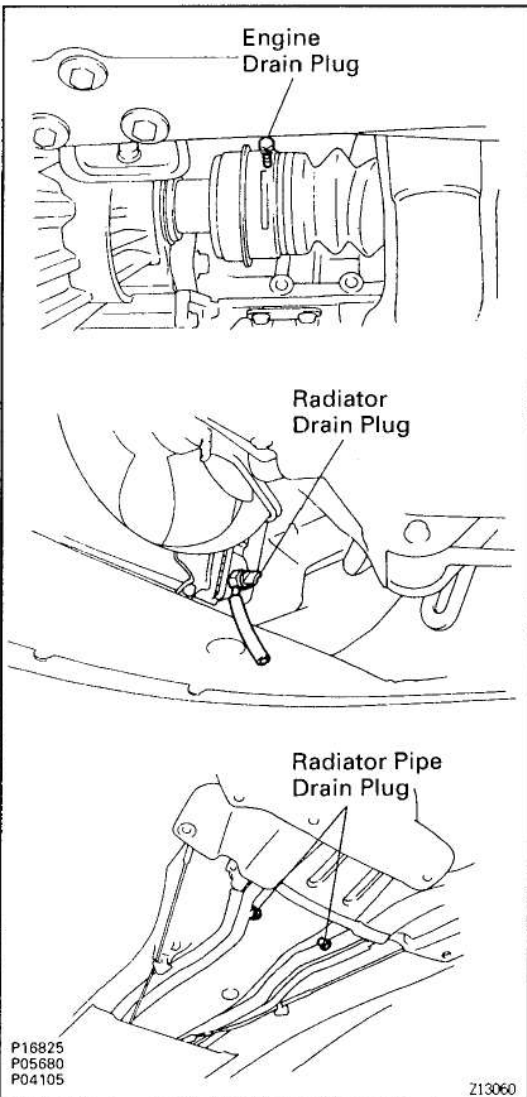
Torque:

Engine

25 N·m (250 kgf·cm, 18 ft·lbf)

Radiator pipe

17 N·m (170 kgf·cm, 12 ft·lbf)

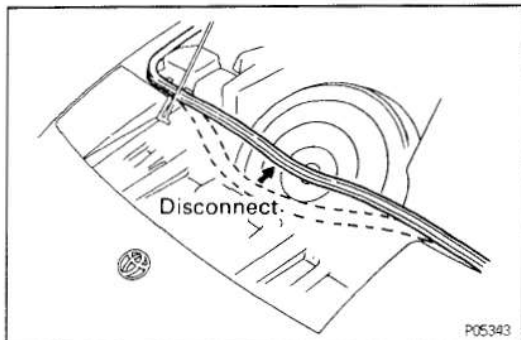


ENGINE — COOLING SYSTEM**EG-307**

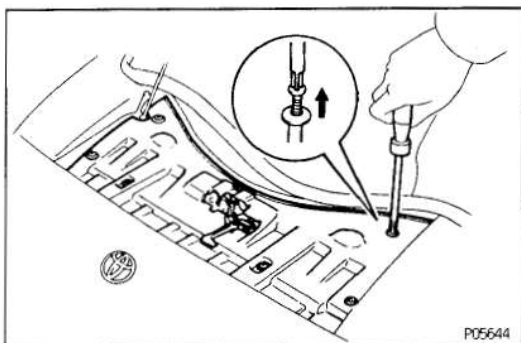
EG197-06

ENGINE COOLANT REFILL**EG**

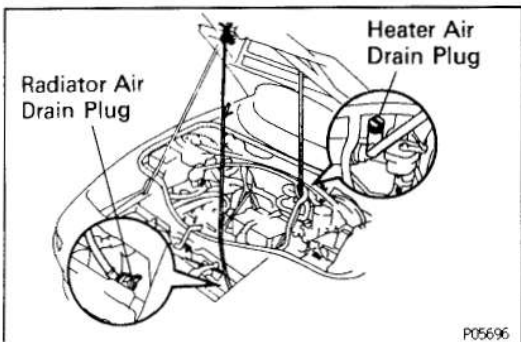
- 1. REMOVE SPARE TIRE**
- 2. REMOVE DASH PANEL FRONT TRIM COVER**

**3. REMOVE UPPER RADIATOR SUPPORT SEAL**

- (a) Disconnect the hood weatherstrip.

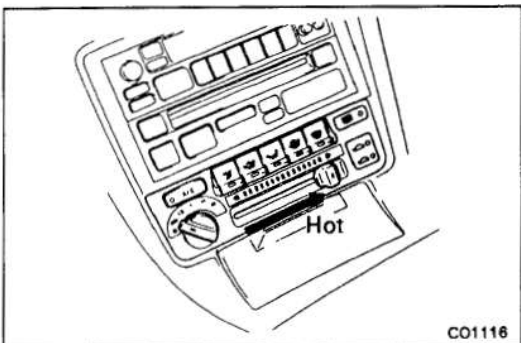


- (b) Remove the 7 clips.
- (c) Remove the 2 hood lock mounting bolts, and remove the support seal.

**4. SET SERVICE HOSES**

- (a) Connect the service hoses to the air drain plugs of the radiator and heater water valve.
- (b) Suspend the opposite ends the front hood as shown in the illustration.

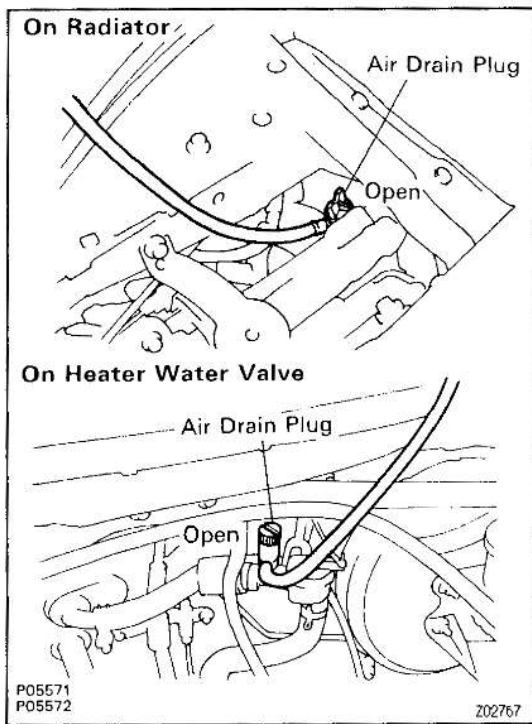
NOTICE: Do not close—off or pinch any of the service hoses.

**5. FILL WITH ENGINE COOLANT**

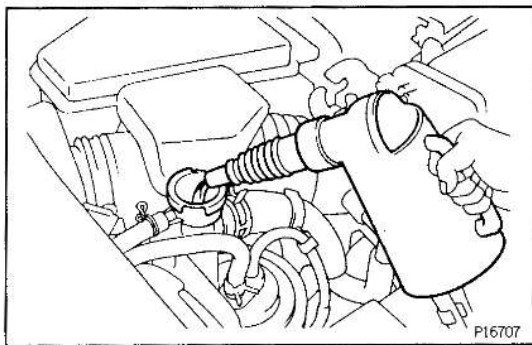
- (a) Set the heater control lever to hot.

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ENGINE — COOLING SYSTEM



- (b) Open the air drain plugs of the radiator or heater water valve above 3 turns.



- (c) 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.

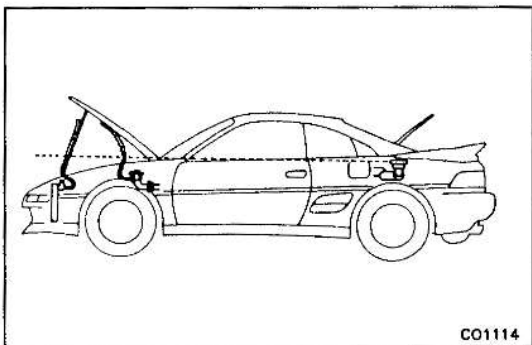
NOTICE:

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

Capacity (w/ Heater):

13.7 liters (14.4 US qts, 12.1 Imp. qts)

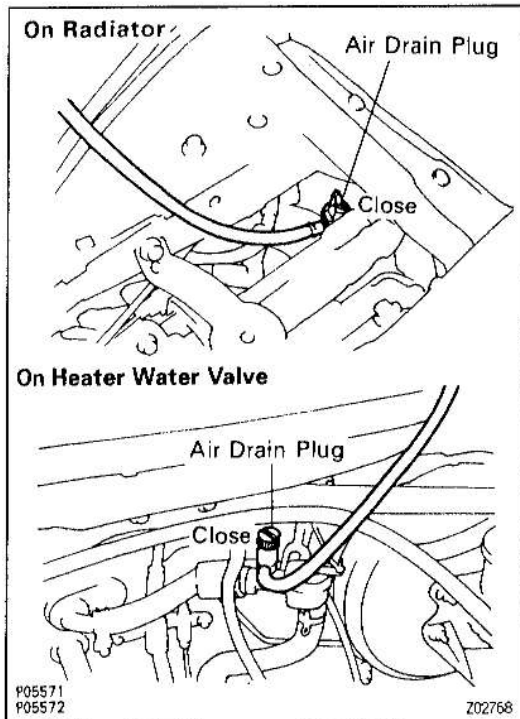
- (d) Check that air is absent from the air drain plugs of the radiator and heater water valve while filling the water filler inlet to the top with coolant.



- (e) Visually check that the level of coolant in the air drain service hoses of the radiator and heater water valve are the same as in the water filler.

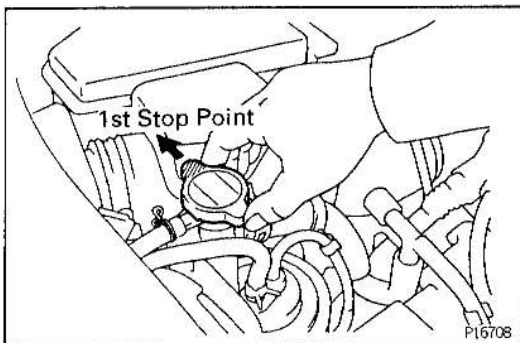
NOTICE: If the water level of coolant in the air drain service hose is clear, air removal has been incomplete, so check if the service hose is crushed or bent, then perform step (c).

ENGINE — COOLING SYSTEM

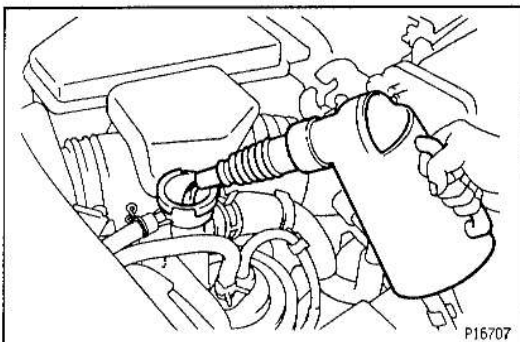


- (f) When the coolant level in the air drain service hoses stops dropping, close the air drain plugs of the radiator and heater water valve.

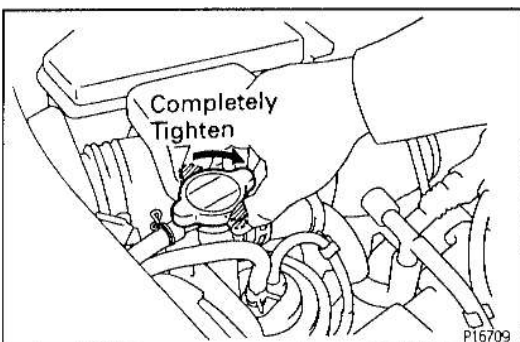
EG



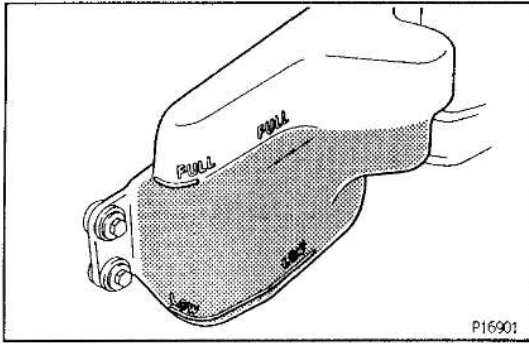
- (g) Fasten the water filler cap to the 1st stop point.
NOTICE: Do not tighten the water filler cap completely (to the 2nd stop point).
- (h) Start the engine, and run at idle for approx. 3 minutes, and stop the engine.



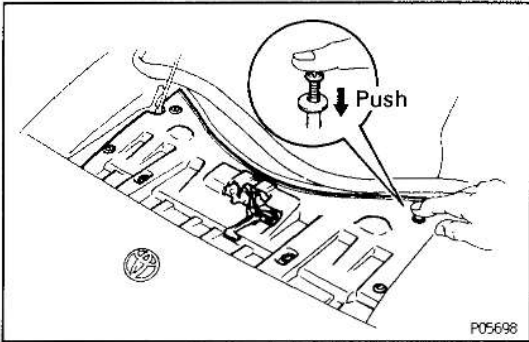
- (i) Add more coolant, and repeat steps (h) and (i).
HINT: By performing steps (h) and (i), 0.2 – 0.5 liters (0.2 – 0.5 US qts, 0.2 – 0.4 Imp. qts) can normally be added.
- (j) Check that coolant level in the water filler has not dropped.
If the coolant level has dropped, add coolant and repeat the steps from (g) onward.



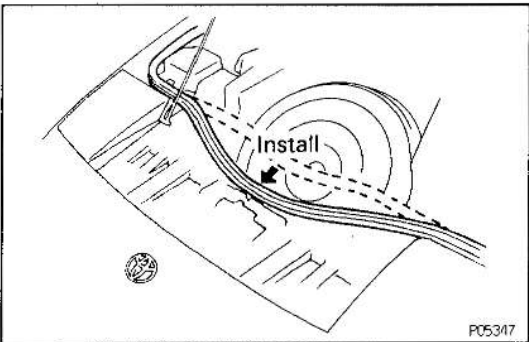
- (k) Completely tighten the water filler cap.

EG-310**ENGINE — COOLING SYSTEM****EG**

- (l) Fill coolant into the reservoir tank up to the "FULL" line.
- (m) Check coolant for leaks.

**6. INSTALL UPPER RADIATOR SUPPORT SEAL**

- (a) Temporarily install the hood lock with the RH side bolt.
- (b) Place the support seal in position.
- (c) Install the hood lock with the 2 bolts.
- (d) Install the 7 clips.



- (e) Install the hood weatherstrip.

- 7. REINSTALL SPARE TIRE**
- 8. REINSTALL DASH PANEL FRONT TRIM COVER**
- 9. REINSTALL REAR FUEL TANK PROTECTOR**

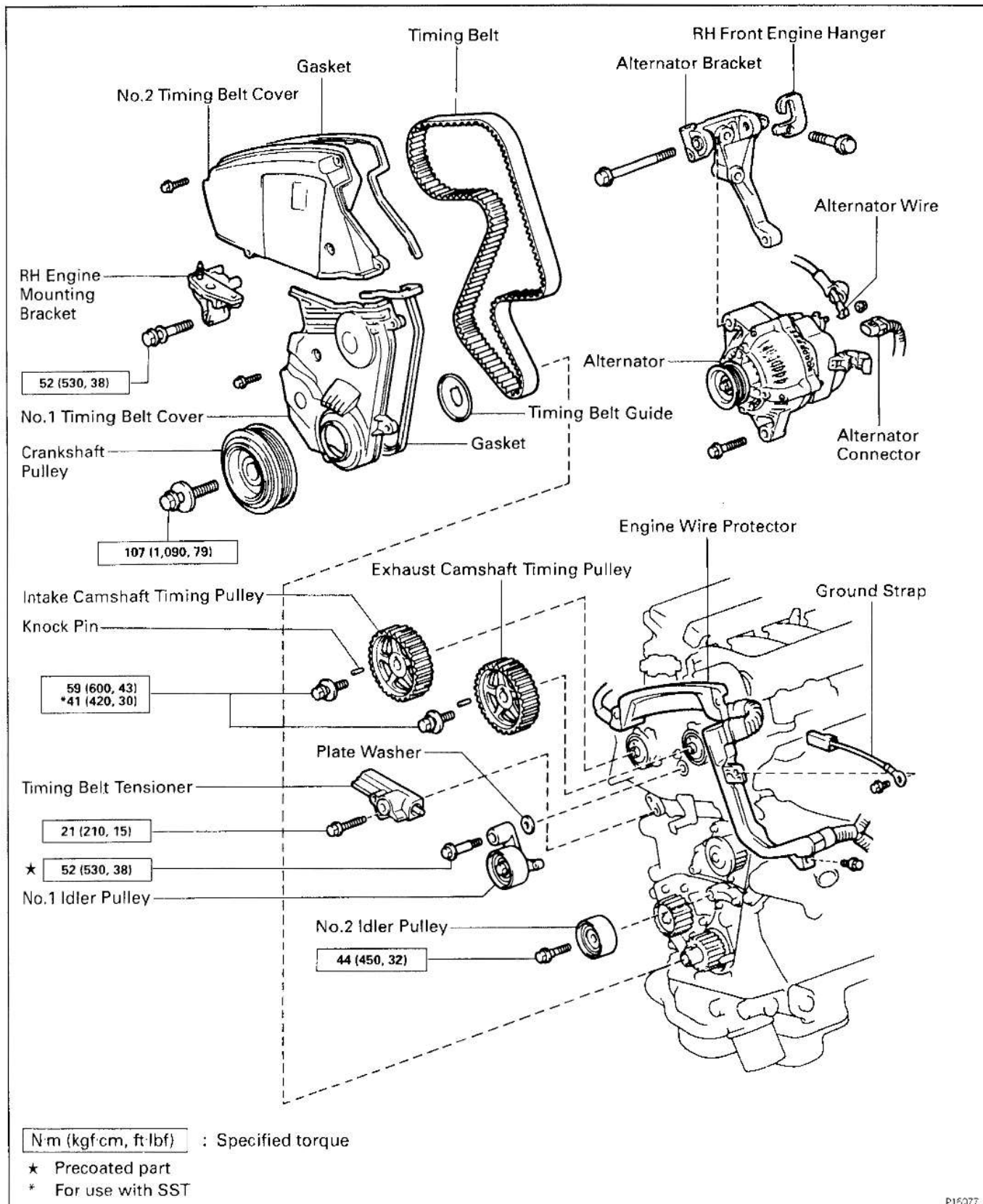
ENGINE — COOLING SYSTEM

EG-311

WATER PUMP COMPONENTS FOR REMOVAL AND INSTALLATION (ST202)

EG138-03

EG

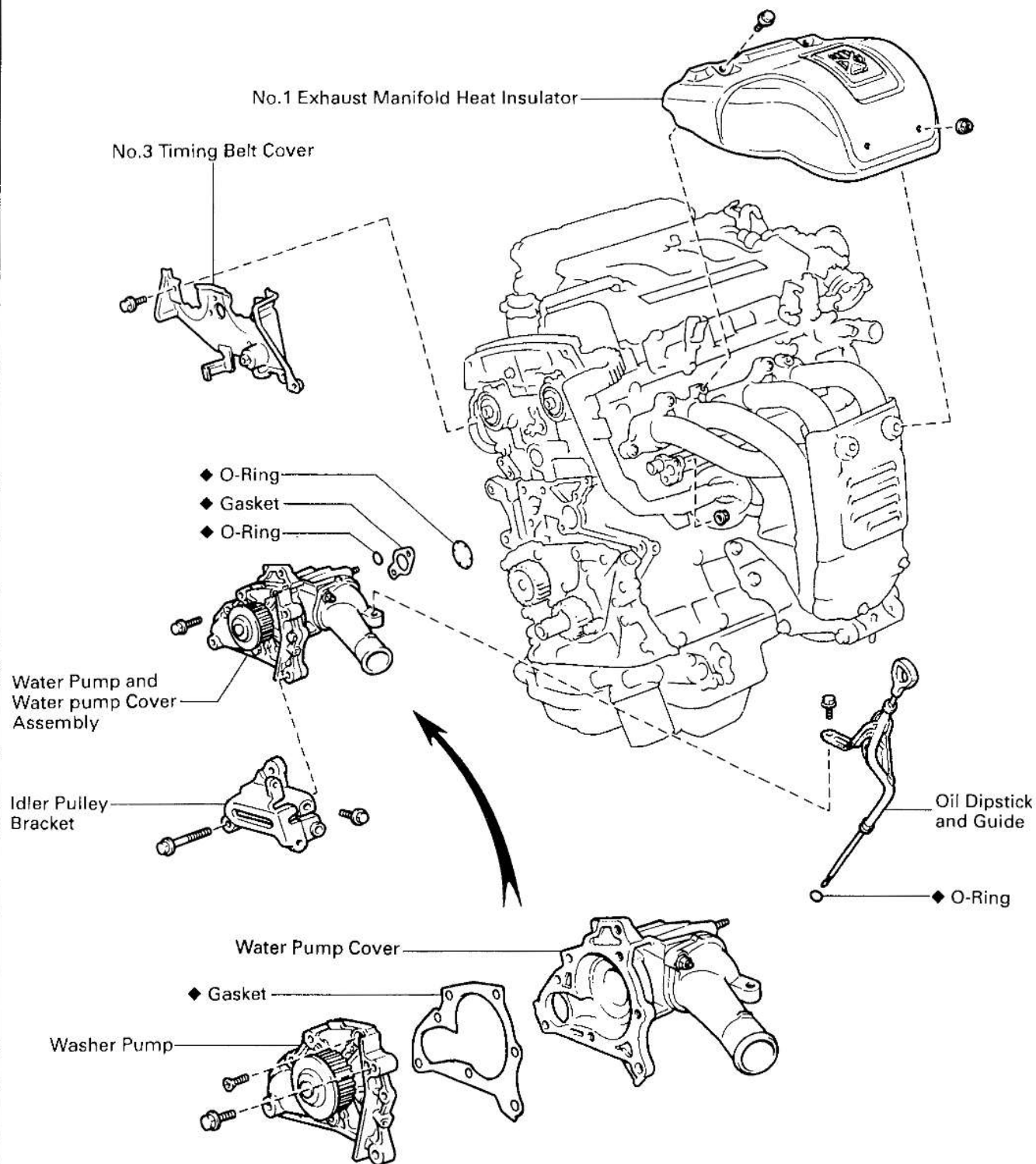


P16077

EG-312

ENGINE — COOLING SYSTEM

EG



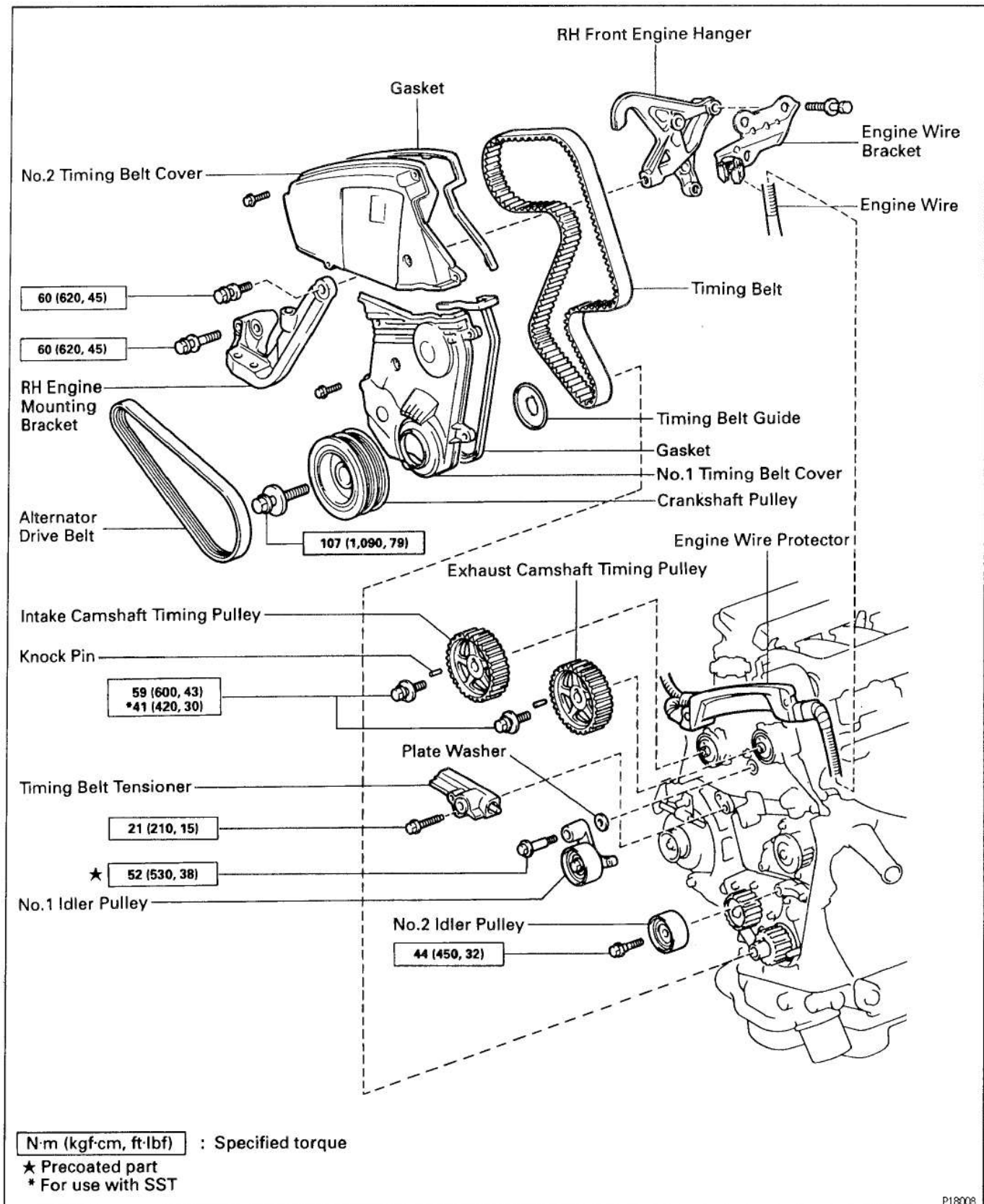
P16979

ENGINE — COOLING SYSTEM

EG138-04

COMPONENTS FOR REMOVAL AND
INSTALLATION (SW20)

EG

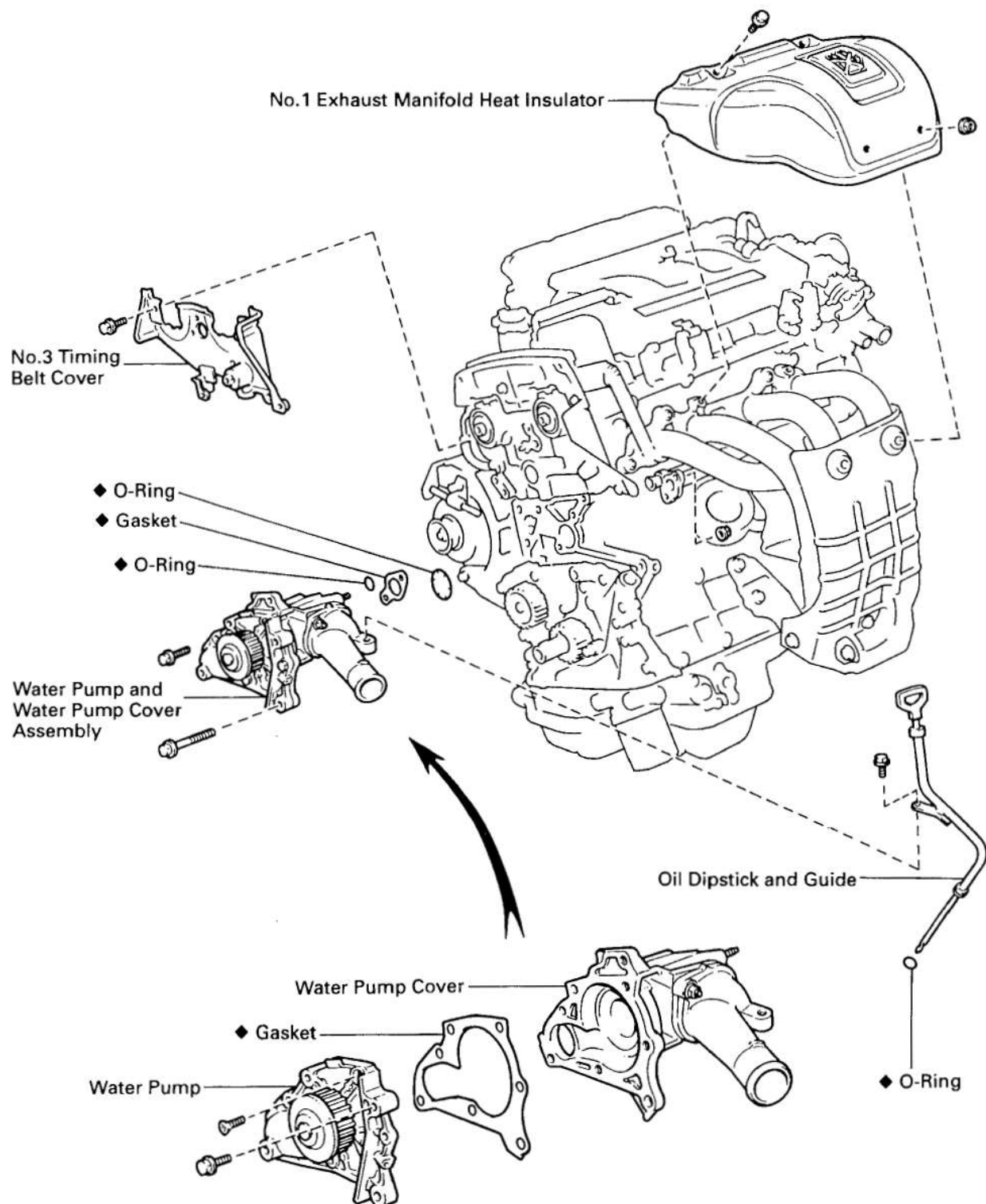


P18008

EG-314

ENGINE — COOLING SYSTEM

EG

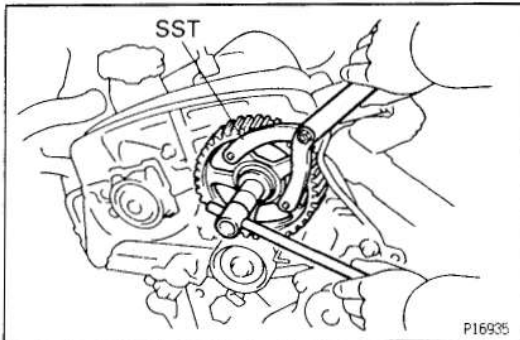


◆ Non-reusable part

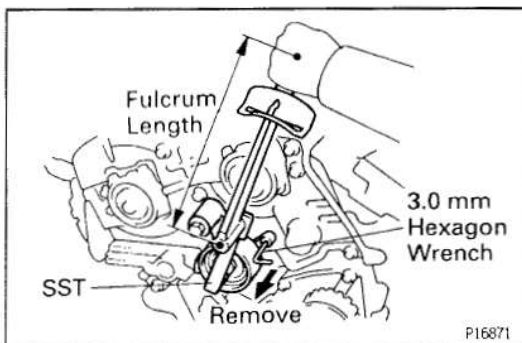
P18019

ENGINE — COOLING SYSTEM**EG-315**

EG417-01

WATER PUMP REMOVAL**(See Components for Removal and Installation)****1. DRAIN ENGINE COOLANT****2. REMOVE TIMING BELT****(See steps 1 to 6 and 8 to 13 on pages EG-49 to 54)****EG****3. REMOVE EXHAUST CAMSHAFT TIMING PULLEY**

- (a) Using SST, loosen the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
- (b) Remove the bolt, timing pulley and knock pin.

**4. REMOVE NO.1 IDLER PULLEY**

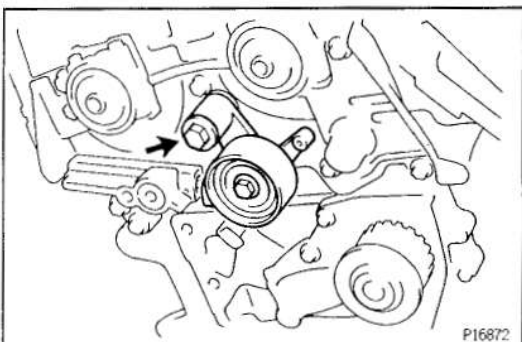
- (a) Turn the No.1 idler pulley bolt to obtain the specified torque or less, and remove the 3.0 mm hexagon wrench.

Torque:**69 N·m (700 kgf·cm, 51 ft·lbf)****48 N·m (490 kgf·cm, 35 ft·lbf) for SST****HINT (On vehicle):**

- Use SST.

SST 09249-63010

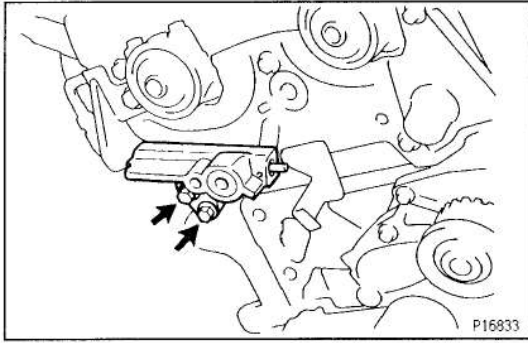
- Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).



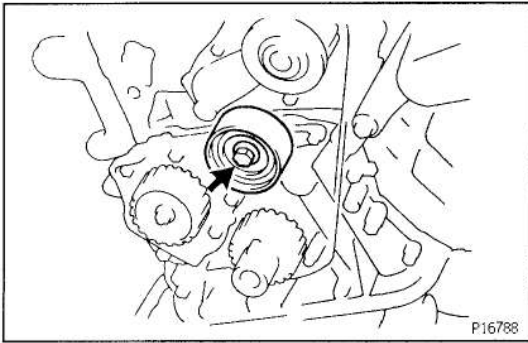
- (b) Remove the pivot bolt, pulley and plate washer.

EG-316**ENGINE — COOLING SYSTEM**

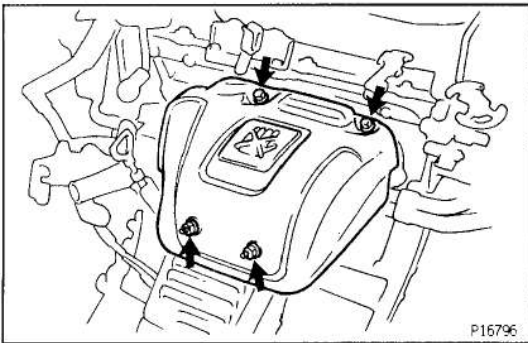
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**5. REMOVE TIMING BELT TENSIONER**

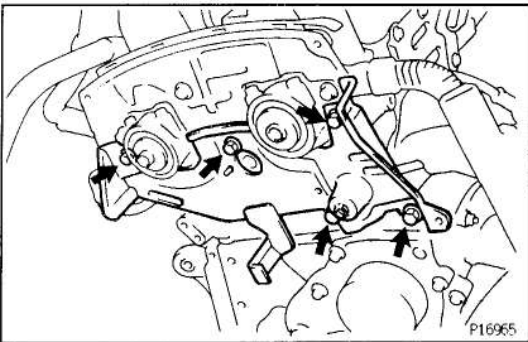
Remove the 2 bolts and tensioner.

**6. REMOVE NO.2 IDLER PULLEY**

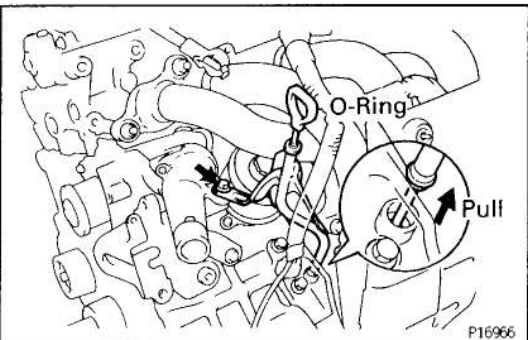
Remove the bolt and pulley.

7. DISCONNECT LOWER RADIATOR HOSE FROM WATER OUTLET**8. REMOVE NO.1 EXHAUST MANIFOLD HEAT INSULATOR**

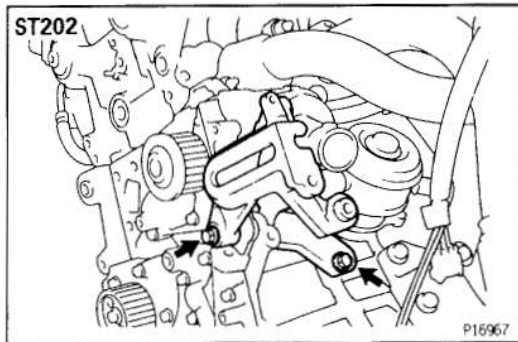
Remove the 2 bolts, 2 nuts and heat insulator.

**9. REMOVE NO.3 TIMING BELT COVER**

Remove the 5 bolts and timing belt cover.

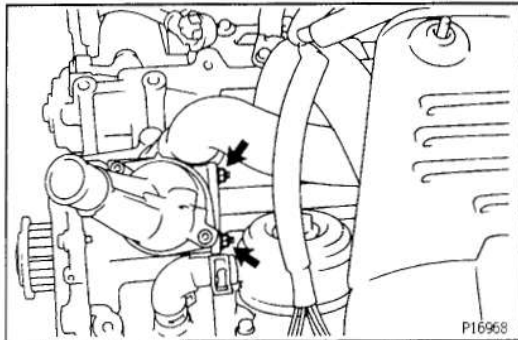
**10. REMOVE OIL DIPSTICK AND GUIDE**

- (a) Remove the bolt.
- (b) Pull out the oil dipstick guide, and remove it and the oil dipstick.
- (c) Remove the O—ring from the oil dipstick guide.

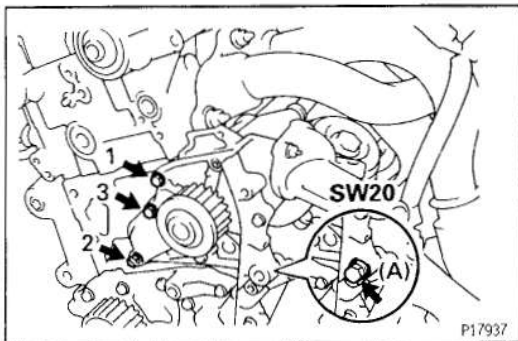
ENGINE — COOLING SYSTEM**EG-317****11. ST202:****REMOVE IDLER PULLEY BRACKET FOR ALTERNATOR DRIVE BELT**

Remove the 2 bolts and idler pulley bracket.

EG

**12. REMOVE WATER PUMP AND WATER PUMP COVER ASSEMBLY**

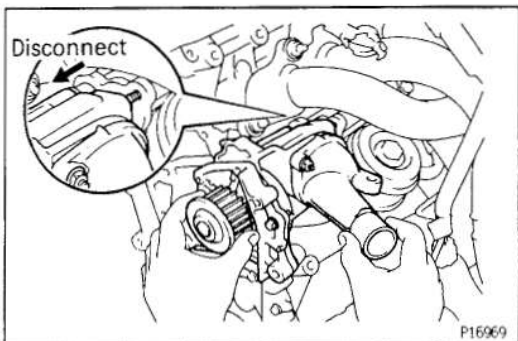
- (a) Remove the 2 nuts holding the water pump to the water bypass pipe.



- (b) SW20 w/o A/C:

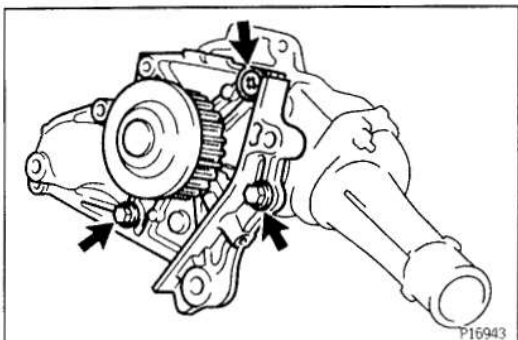
Remove the bolt (A).

- (c) Loosen and remove the 3 bolts in the sequence shown.



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

- (e) Remove the gasket and 2 O-rings from the water pump and water bypass pipe.

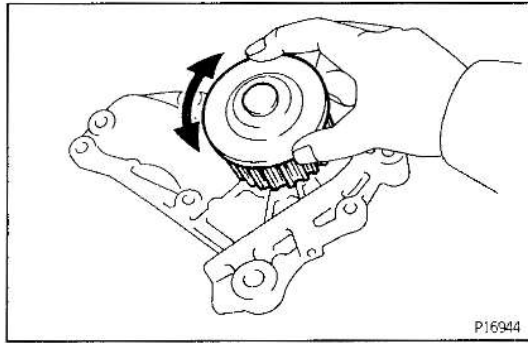
**13. REMOVE WATER PUMP FROM WATER PUMP COVER**

Remove the 2 bolts and screw, water pump and gasket.

EG-318

ENGINE — COOLING SYSTEM

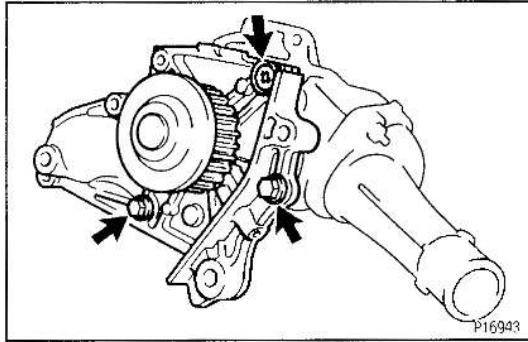
EG18A-08



WATER PUMP INSPECTION

INSPECT WATER PUMP

Turn the pulley and check that the water pump bearing moves smoothly and quietly.



WATER PUMP INSTALLATION

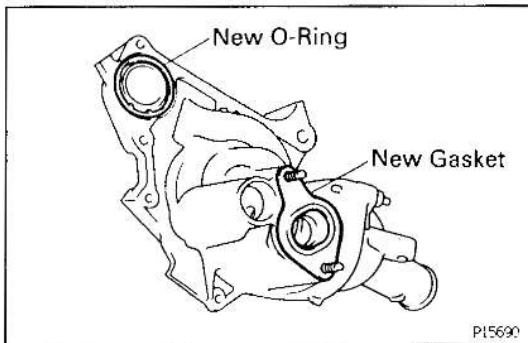
EG418-01

(See Components for Removal and Installation)

1. INSTALL WATER PUMP TO WATER PUMP COVER

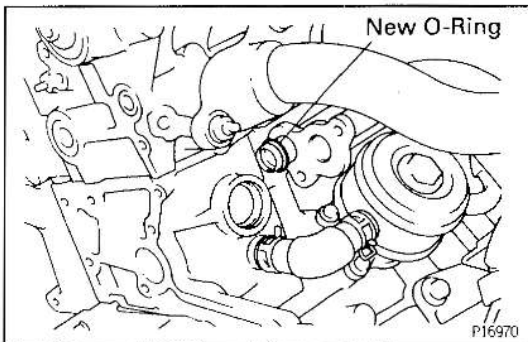
Install a new gasket and the water pump with the 2 bolts and screw.

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



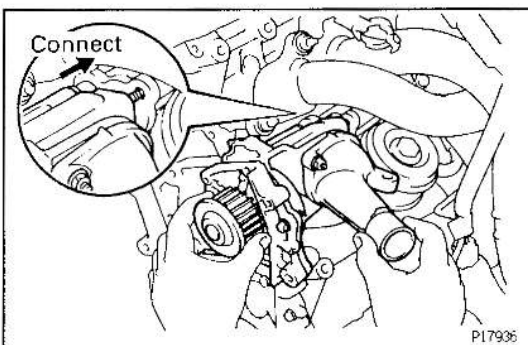
2. INSTALL WATER PUMP AND WATER PUMP COVER ASSEMBLY

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



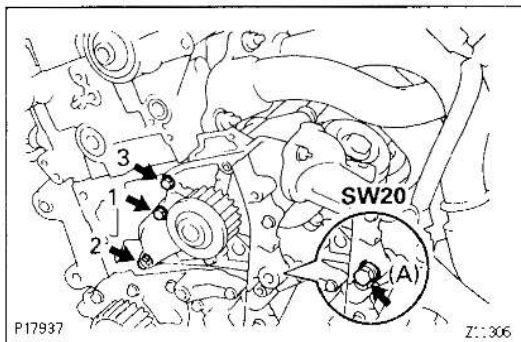
(b) Install a new O-ring to the water bypass pipe.

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



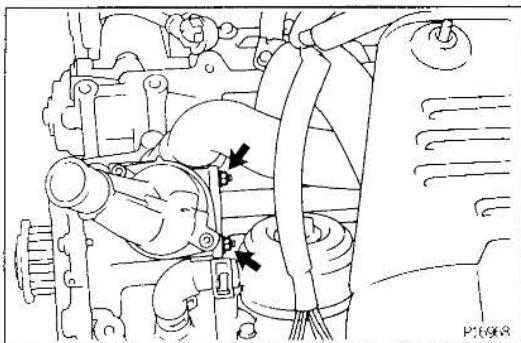
(d) Connect the water pump cover to the water bypass pipe. Do not install the nuts yet.

ENGINE — COOLING SYSTEM

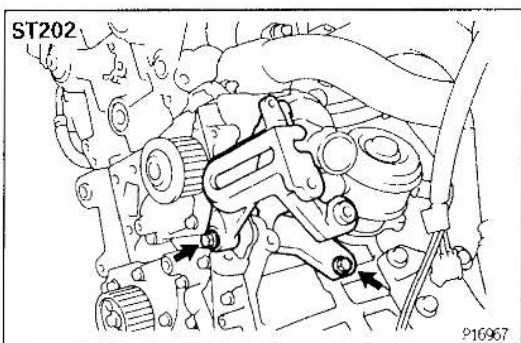


- (e) Install the water pump with the 3 bolts. Tighten the bolts in the sequence shown.
Torque: 7.5 N·m (76 kgf·cm, 66 in.-lbf)
- (f) SW20 w/o A/C:
Install the bolt (A).
Torque: 19 N·m (190 kgf·cm, 14 ft-lbf)

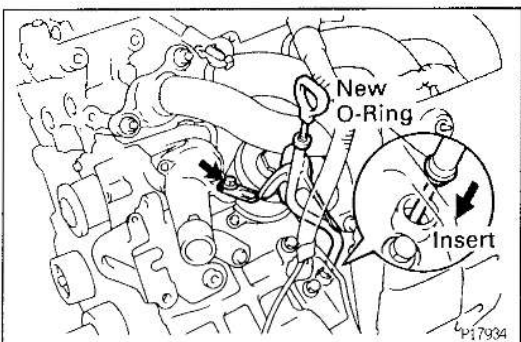
EG



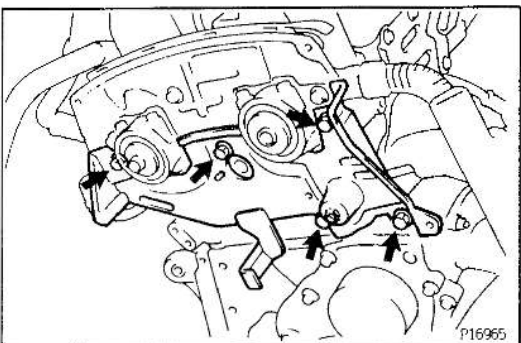
- (g) Install the 2 nuts holding the water pump cover to the water bypass pipe.
Torque: 10 N·m (100 kgf·cm, 7 ft-lbf)



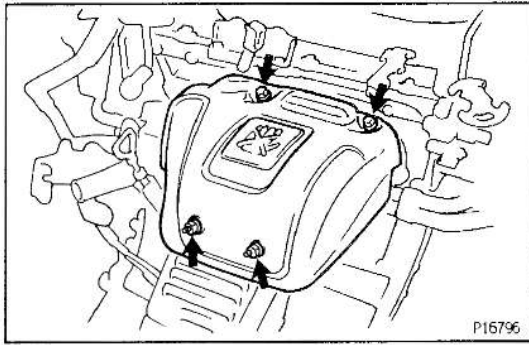
- 3. ST202:**
INSTALL IDLER PULLEY BRACKET FOR ALTERNATOR DRIVE BELT
Install the idler pulley bracket with the 2 bolts.
Torque:
 Water pump side
 19 N·m (190 kgf·cm, 14 ft-lbf)
 Cylinder block side
 23 N·m (230 kgf·cm, 17 ft-lbf)



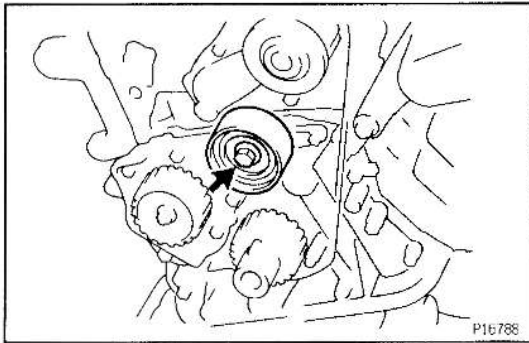
- 4. INSTALL OIL DIPSTICK AND GUIDE**
- (a) Install a new O—ring to the oil dipstick guide.
(b) Apply soapy water to the O—ring.
(c) Insert the oil dipstick guide into the guide hole of the cylinder block.
(d) Install the oil dipstick and guide with the bolt.



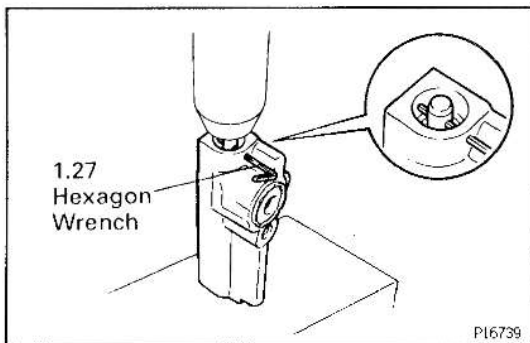
- 5. INSTALL NO.3 TIMING BELT COVER**
Install the timing belt cover with the 5 bolts.
Torque: 8.0 N·m (82 kgf·cm, 71 in.-lbf)
- 6. CONNECT LOWER RADIATOR HOSE TO WATER INLET**

EG-320**ENGINE — COOLING SYSTEM****7. INSTALL NO.1 EXHAUST MANIFOLD HEAT INSULATOR**

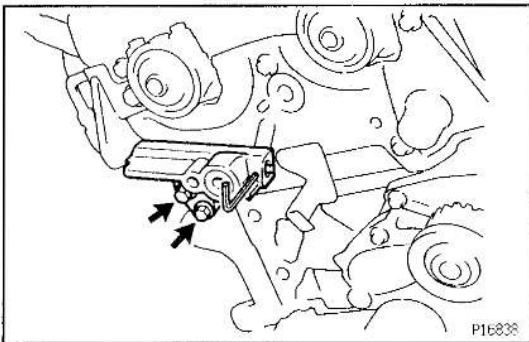
Install the heat insulator with the 2 bolts and 2 nuts.
Torque: 20 N·m (200 kgf·cm, 15 ft·lbf)

**8. INSTALL NO.2 IDLER PULLEY**

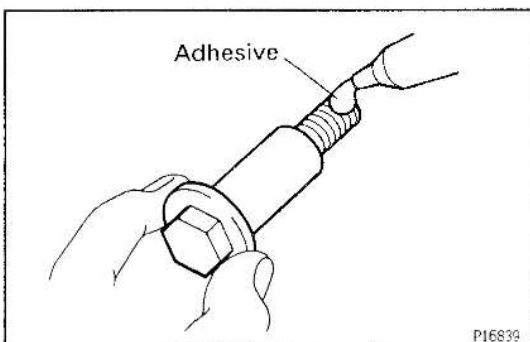
- (a) Install the pulley with the bolt.
Torque: 44 N·m (450 kgf·cm, 32 ft·lbf)
- (b) Check that the idler pulley moves smoothly.

**9. SET TIMING BELT TENSIONER**

- (a) Using a press, slowly press in the push rod using 981 — 9,807 N (100 — 1,000 kgf, 220 — 2,205 lbf) of force.
- (b) Align the holes of the push rod and housing, pass a 1.27 mm hexagon wrench through the holes to keep the setting position of the push rod.
- (c) Release the press.

**10. INSTALL TIMING BELT TENSIONER**

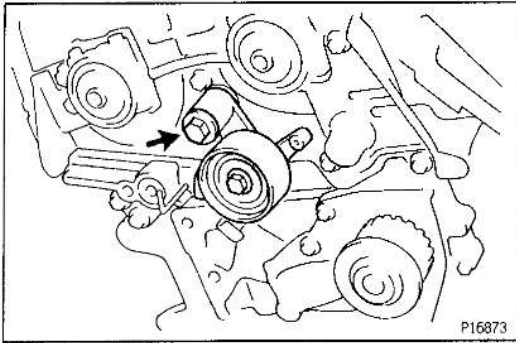
Install the tensioner with the 2 bolts.
Torque: 21 N·m (210 kgf·cm, 15 ft·lbf)

**11. INSTALL NO.1 IDLER PULLEY**

- (a) Apply adhesive to 2 or 3 threads of the pivot bolt.

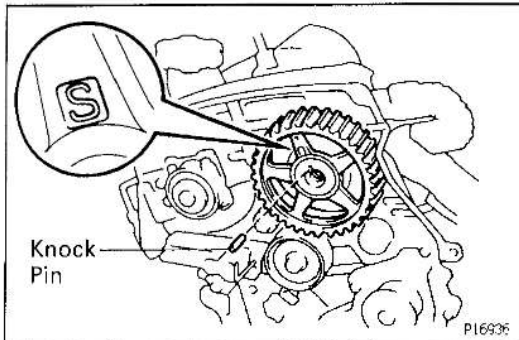
Adhesive:

Part No. 08833—00080, THREE BOND 1344,
LOCTITE 242 or equivalent

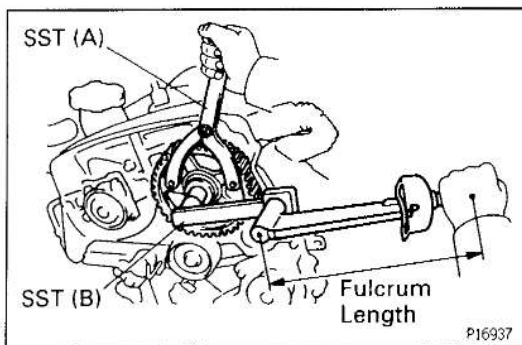
ENGINE — COOLING SYSTEM

- (b) Install the plate washer and pulley with the pivot bolt.
Torque: 52 N·m (530 kgf·cm, 38 ft·lbf)
- (c) Check that the idler pulley moves smoothly.

EG

**12. INSTALL EXHAUST CAMSHAFT TIMING PULLEY**

- (a) Slide the timing pulley onto the camshaft, facing mark "S" outward.
- (b) Align the pin holes of the camshaft and timing pulley, and insert the knock pin.



- (c) Using SST (A), install the pulley bolt.
SST 09960-10010 (09962-01000, 09963-01000)
Torque:

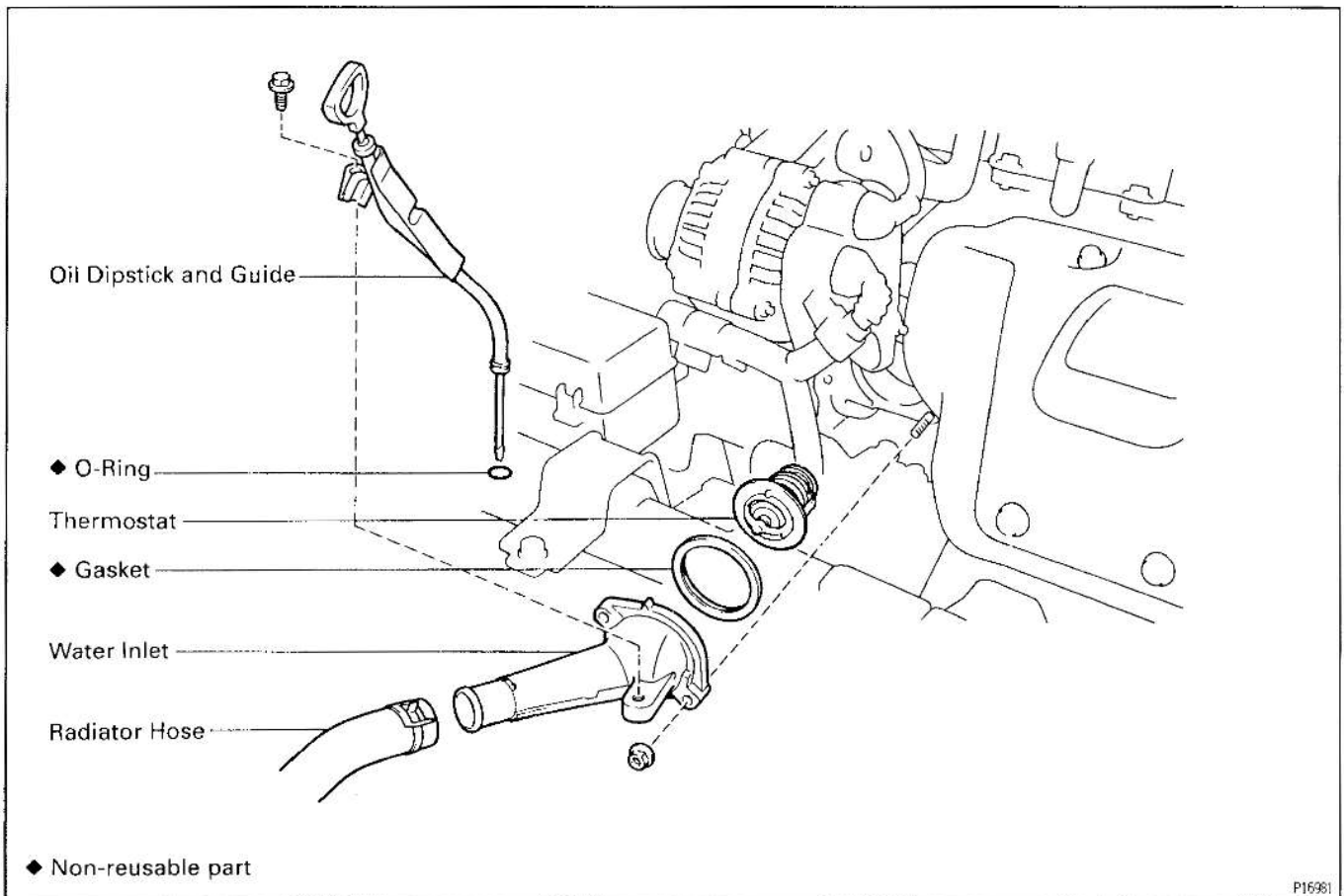
59 N·m (600 kgf·cm, 43 ft·lbf)**41 N·m (420 kgf·cm, 30 ft·lbf) for SST****HINT (On vehicle):**

- Use SST (B).
- SST 09249-63010
- Use a torque wrench with a fulcrum length of 340 mm (13.39 in.).

13. INSTALL TIMING BELT**(See steps 7 to 12 and 14 to 20 on pages EG-59 to 65)****14. FILL WITH ENGINE COOLANT****15. START ENGINE AND CHECK FOR COOLANT LEAKS**

THERMOSTAT COMPONENTS FOR REMOVAL AND INSTALLATION

EQ180-06



THERMOSTAT REMOVAL

EQ419-01

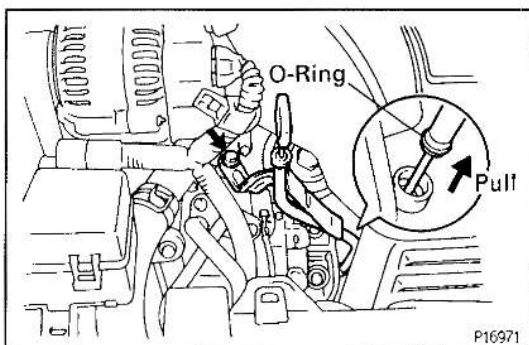
(See Components for Removal and Installation)

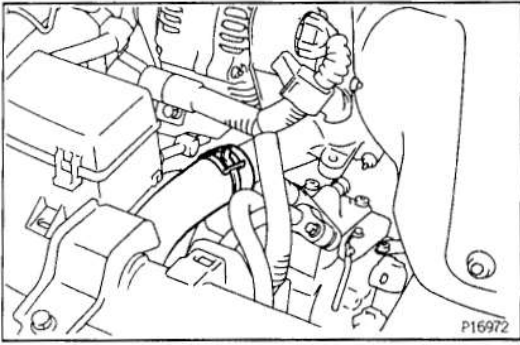
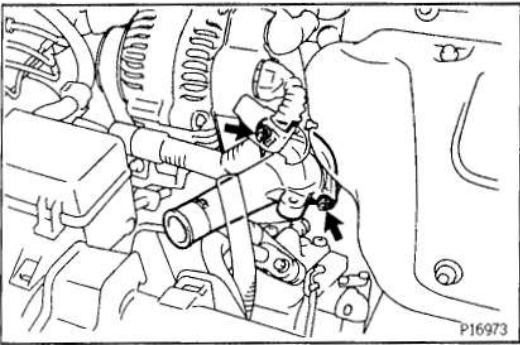
HINT: Removal of the thermostat would have an adverse effect, causing a lowering of cooling efficiency. Do not remove the thermostat, even if the engine tends to overheat.

1. DRAIN ENGINE COOLANT

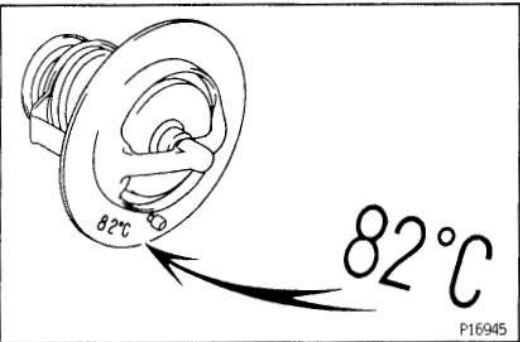
2. REMOVE OIL DIPSTICK AND GUIDE

- Remove the bolt.
- Pull out the oil dipstick guide, and remove it and the oil dipstick.
- Remove the O-ring from the oil dipstick guide.



ENGINE – COOLING SYSTEM**EG-323****3. DISCONNECT RADIATOR HOSE FROM WATER INLET****EG****4. REMOVE WATER INLET AND THERMOSTAT**

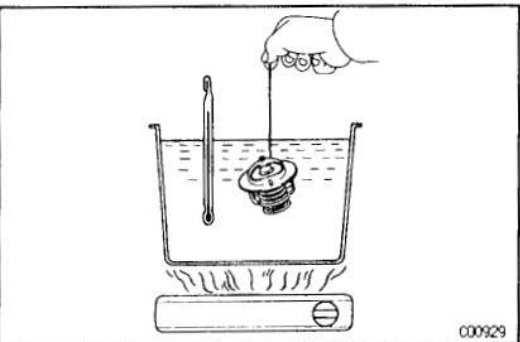
- (a) Remove the 2 nuts, water inlet and thermostat.
- (b) Remove the gasket from the thermostat.

**THERMOSTAT INSPECTION**

EG19H-08

INSPECT THERMOSTAT

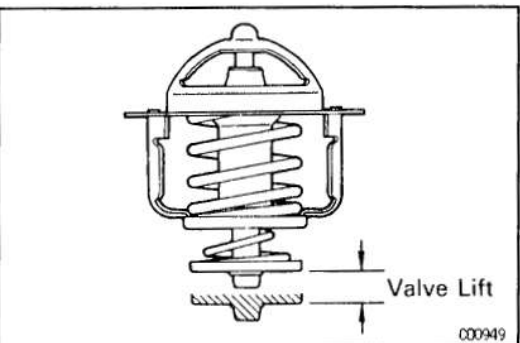
HINT: The thermostat is numbered with the valve opening temperature.



- (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 mm (0.39 in.) or more at 95°C (203°F)**

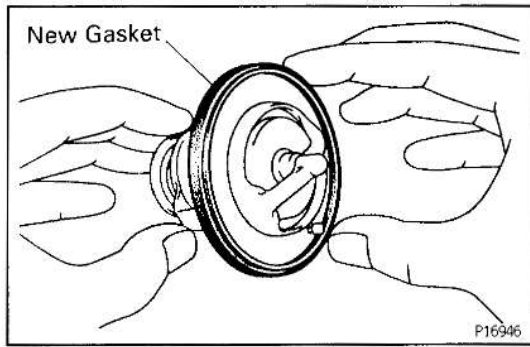
If the valve lift is not as specified, replace the thermostat.

- (d) Check that the valve spring is tight when the thermostat is fully closed.

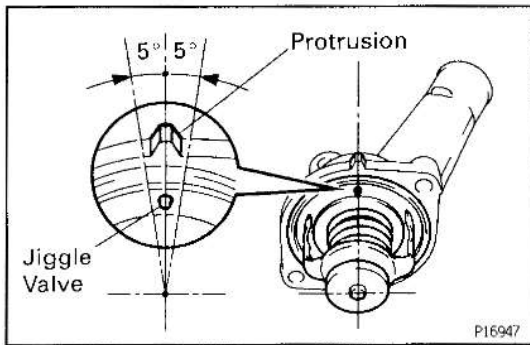
If not closed, replace the thermostat.

EG-324**ENGINE — COOLING SYSTEM**

EG324-02

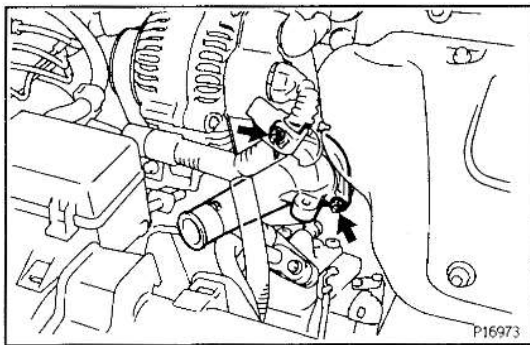
**THERMOSTAT INSTALLATION****(See Components for Removal and Installation)****1. PLACE THERMOSTAT IN WATER PUMP**

- (a) Install a new gasket to the thermostat.



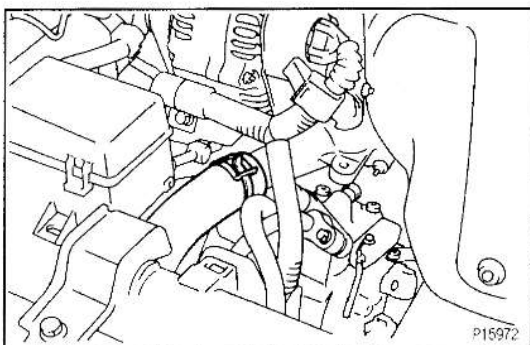
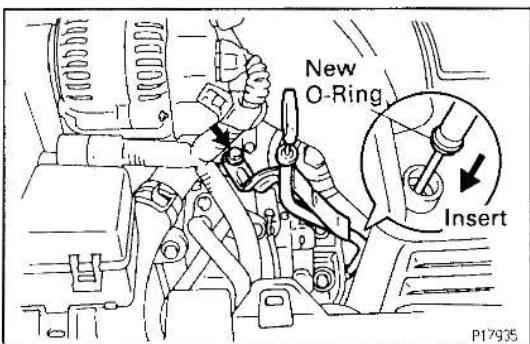
- (b) Align the jiggle valve of the thermostat with the protrusion of the water inlet, and insert the thermostat in the water inlet.

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: 9.0 N·m (92 kgf·cm, 80 in·lbf)

**3. CONNECT RADIATOR HOSE TO WATER INLET****4. INSTALL OIL DIPSTICK AND GUIDE**

- (a) Install a new O—ring to the oil dipstick guide.
 (b) Apply soapy water to the O—ring.
 (c) Insert the oil dipstick guide into the guide hole of the cylinder block.
 (d) Install the oil dipstick and guide with the bolt.

5. FILL WITH ENGINE COOLANT**6. START ENGINE AND CHECK FOR LEAKS****7. CHECK ENGINE OIL LEVEL**

ENGINE — COOLING SYSTEM

RADIATOR (ST202)

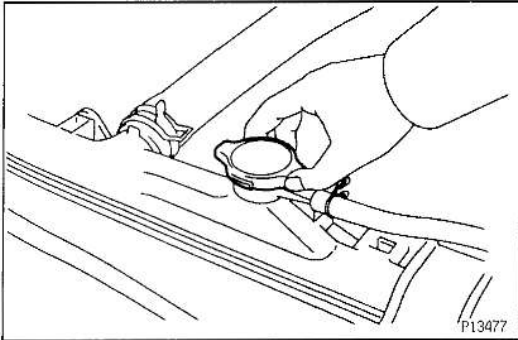
RADIATOR CLEANING

EG2UP-04

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

NOTICE: If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. If the cleaner nozzle pressure is 2,942 — 3,432 kPa (30 — 35 kgf/cm², 427 — 498 psi), keep a distance of at least 40 — 50 cm (15.75 — 19.69 in.) between the radiator core and cleaner nozzle.

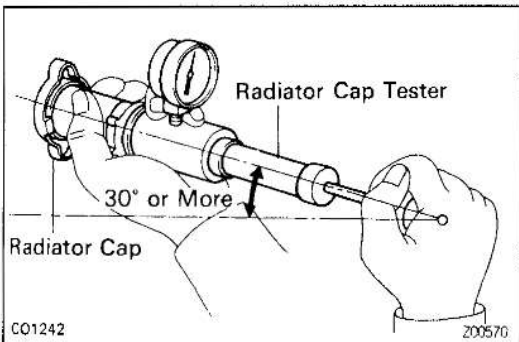
EG



RADIATOR 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: When performing steps (a) and (b) below, keep the radiator pump 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 relief valve.

Pump speed:

1 push/3 seconds or more

NOTICE: Push the pump at a constant speed.

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

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

Pump speed:

1st time

1 push/1 second or less

2nd time or more

Any speed

Standard opening pressure:

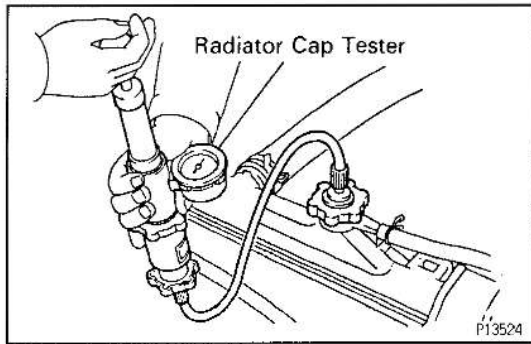
74 — 103 kPa

(0.75 — 1.05 kgf/cm², 10.7 — 14.9 psi)

Minimum opening pressure:

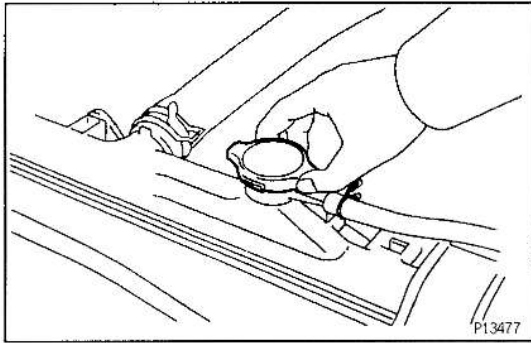
59 kPa (0.6 kgf/cm², 8.5 psi)

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

EG-326**ENGINE — COOLING SYSTEM****3. INSPECT COOLING SYSTEM FOR LEAKS**

- (a) Fill the radiator with coolant, and attach a radiator cap tester to the water filler.
- (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 cylinder head.

4. REINSTALL RADIATOR CAP

RADIATOR

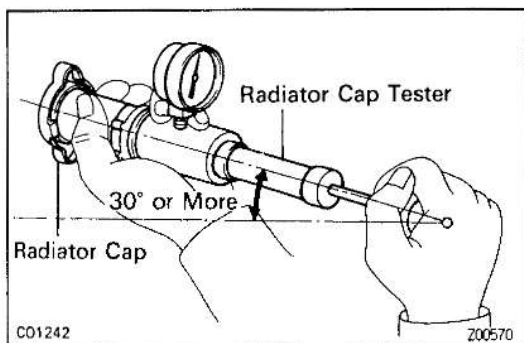
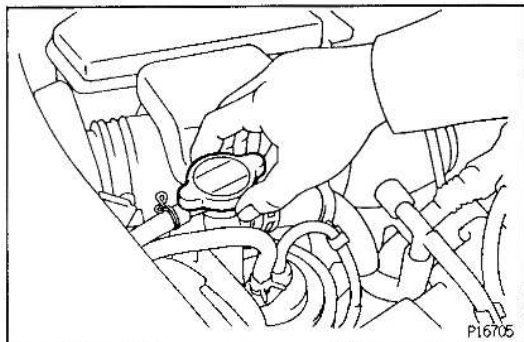
(SW20)

RADIATOR CLEANING

EG2UP-08

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

NOTICE: If using a high pressure type cleaner, be careful not to deform the fins of the radiator core. If the cleaner nozzle pressure is 2,942 – 3,432 kPa (30 – 35 kgf/cm², 427 – 498 psi), keep a distance of at least 40 – 50 cm (15.75 – 19.69 in.) between the radiator core and cleaner nozzle.



RADIATOR INSPECTION

1. REMOVE WATER FILLER CAP

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

2. INSPECT WATER FILLER CAP

NOTICE: When performing steps (a) and (b) below, keep the radiator pump 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 relief valve.

Pump speed:

1 push/3 seconds or more

NOTICE: Push the pump at a constant speed.

If air is not coming from the relief valve, replace the water filler cap.

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

Pump speed:

1st time

1 push/1 second or less

2nd time or more

Any speed

Standard opening pressure:

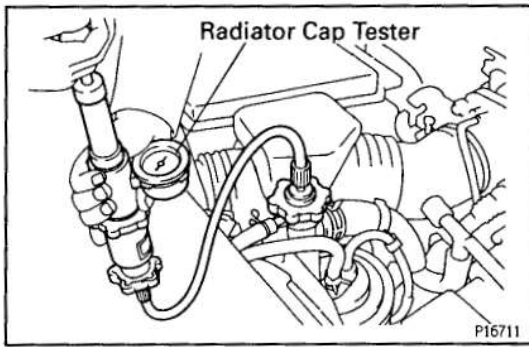
74 – 103 kPa

(0.75 – 1.05 kgf/cm², 10.7 – 14.9 psi)

Minimum opening pressure:

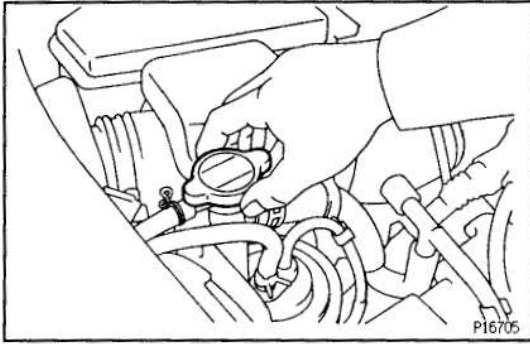
59 kPa (0.6 kgf/cm², 8.5 psi)

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

EG-328**ENGINE — COOLING SYSTEM****3. INSPECT COOLING SYSTEM FOR LEAKS**

- (a) Fill the system with coolant, and attach a radiator cap tester to the water filler.
- (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 cylinder head.

4. REINSTALL WATER FILLER CAP

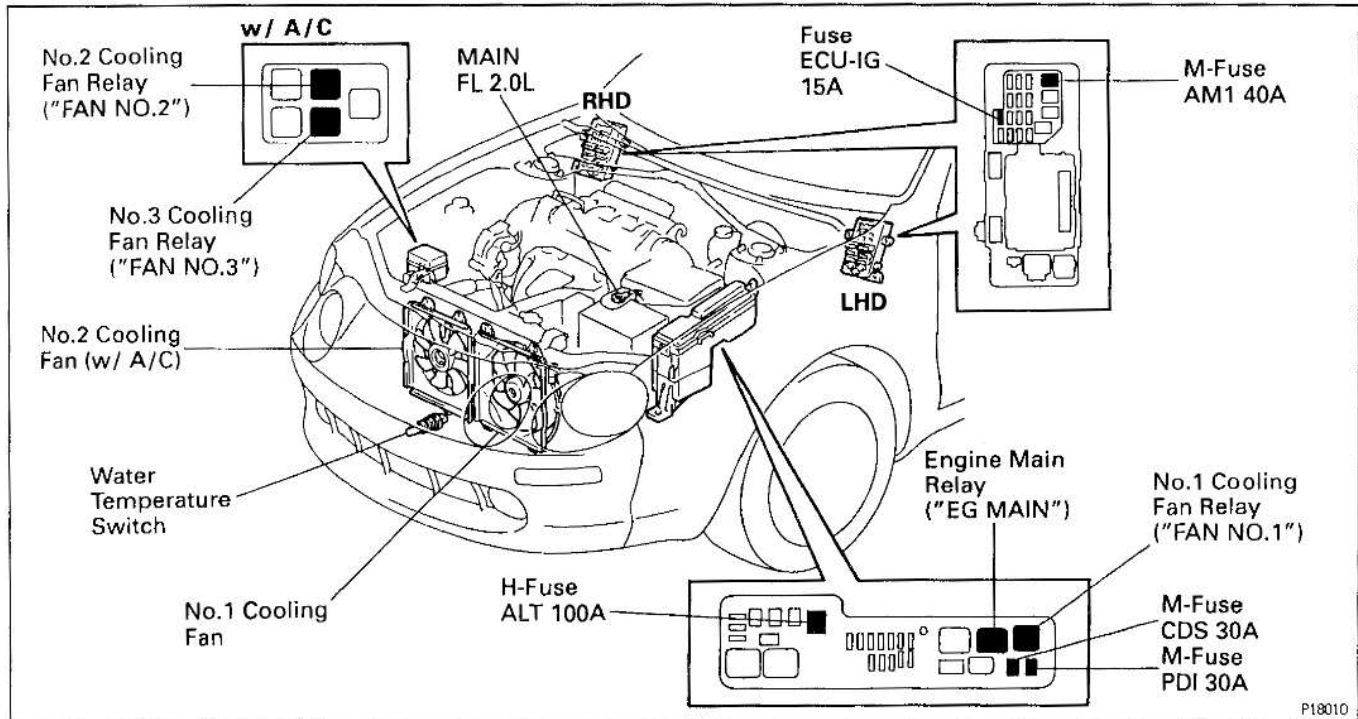
EG

ENGINE — COOLING SYSTEM

EG-329

ELECTRIC COOLING FAN (ST202) Part Location

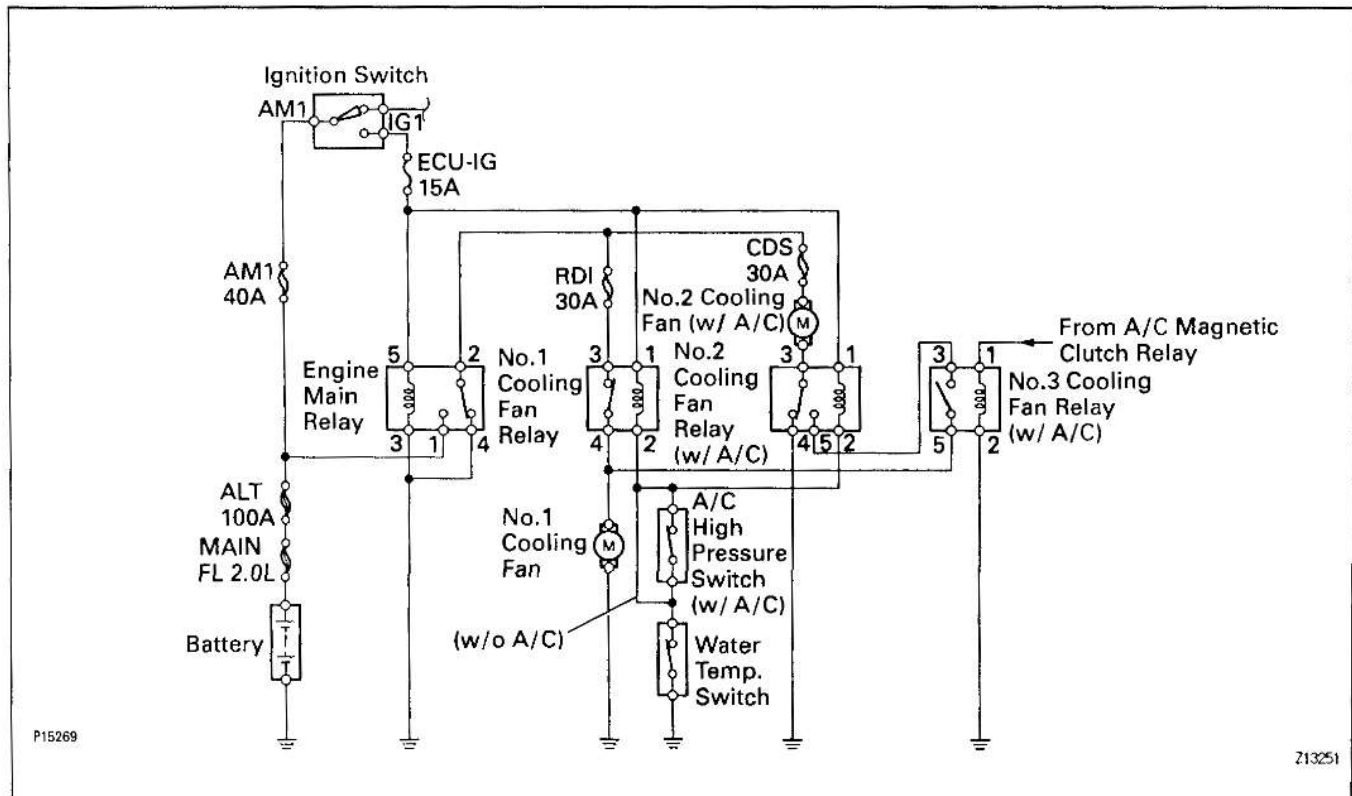
EG078-12



P18010

System Circuit

EG07C-0W



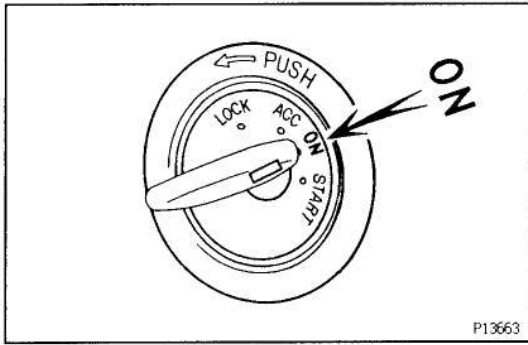
P15269

Z13251

EG-330

ENGINE — COOLING SYSTEM

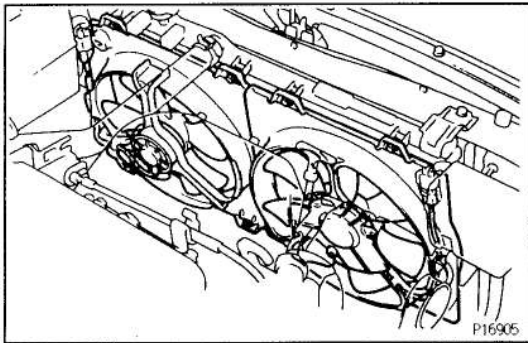
EG148-06



On – Vehicle Inspection

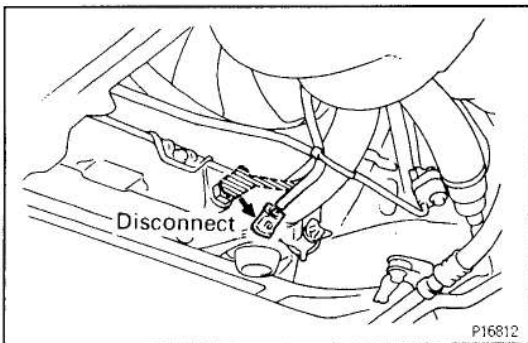
1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

(a) Turn the ignition switch ON.

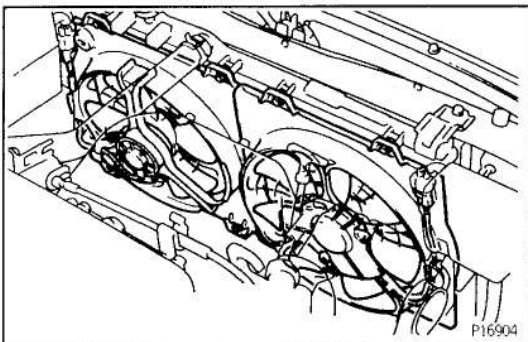


(b) Check that the cooling fan stops.

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

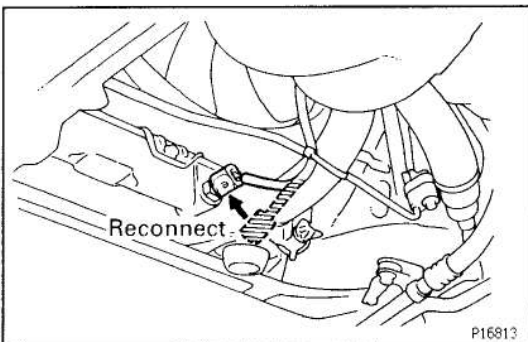


(c) Disconnect the water temperature switch connector.

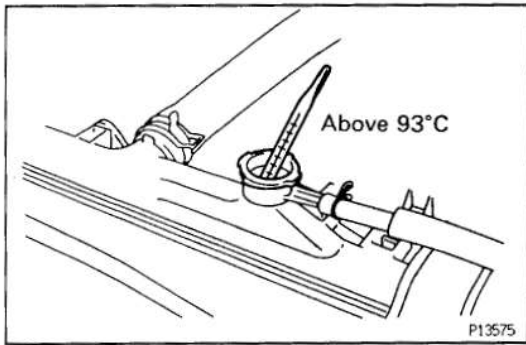


(d) Check that the cooling fan rotates.

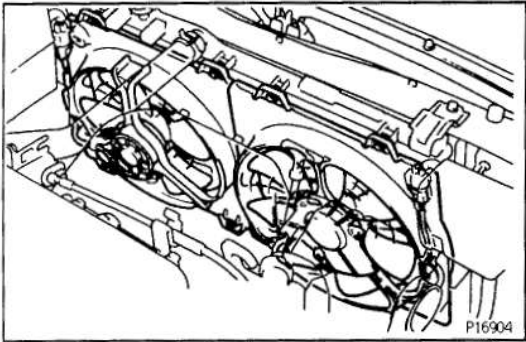
If not, check the fan main relay, cooling fan relay, cooling fan, fuses, and check for short circuit between the cooling fan relay and water temperature switch.



(e) Reconnect the water temperature switch connector.

ENGINE — COOLING SYSTEM**EG-331****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).

EG

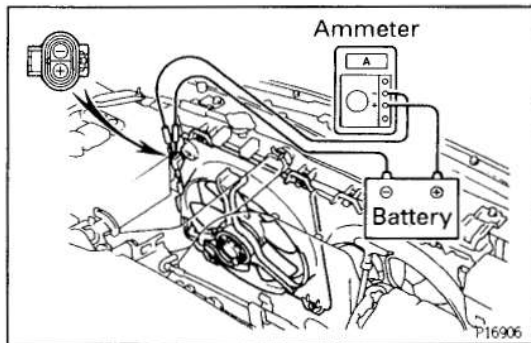
- (b) Check that the cooling fan rotates.
If not, replace the water temperature switch.

EG-332**ENGINE — COOLING SYSTEM**

EG41A-01

No.1 Cooling Fan**NO.1 COOLING FAN INSPECTION****1. DISCONNECT COOLING FAN CONNECTOR**

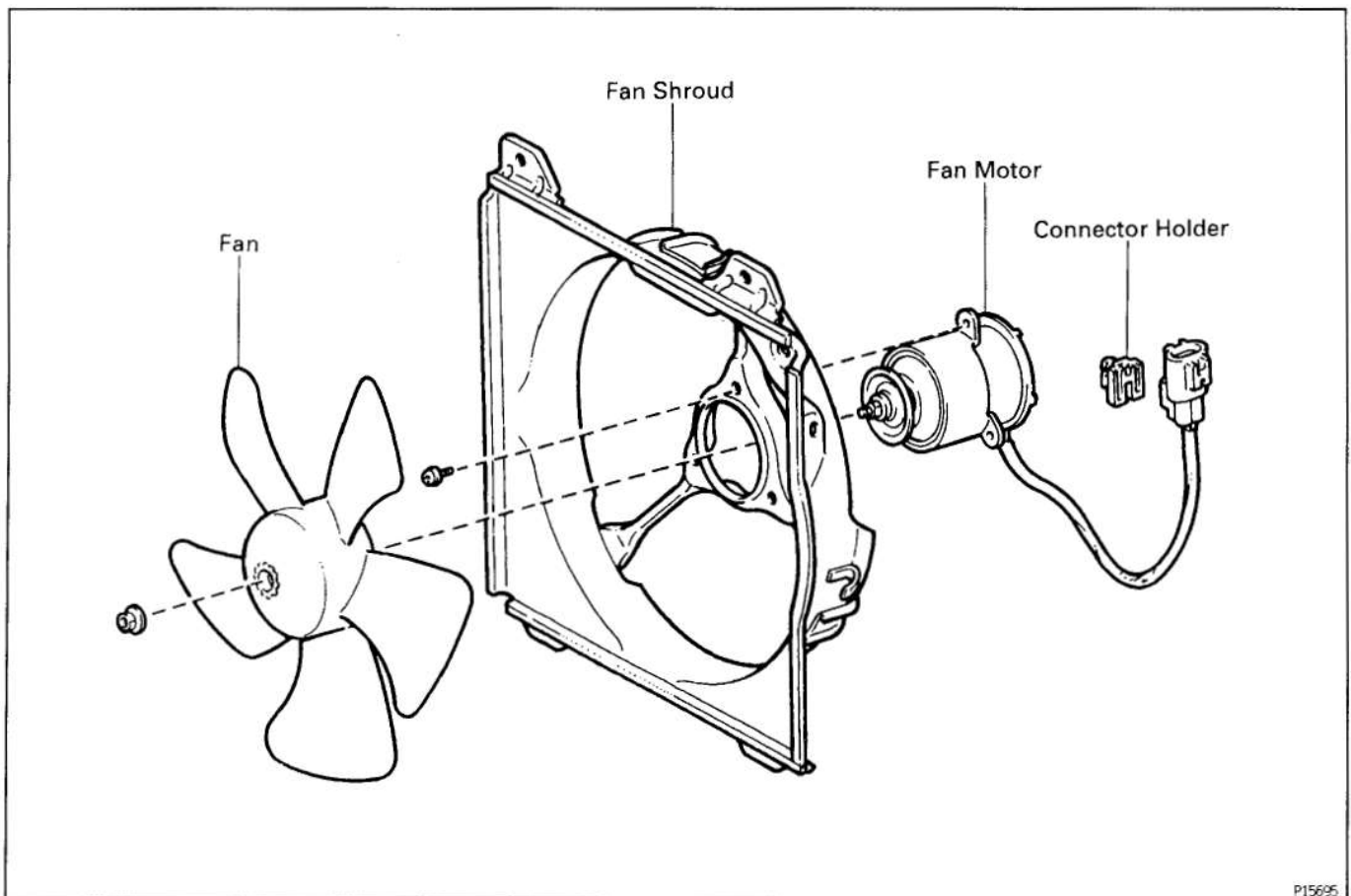
EG

**2. INSPECT NO.1 COOLING FAN**

- (a) Connect battery and ammeter to the cooling fan connector.
- (b) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage:**5.7 – 7.7 A****3. RECONNECT COOLING FAN CONNECTOR****COMPONENTS FOR DISASSEMBLY AND ASSEMBLY**

EG078-18

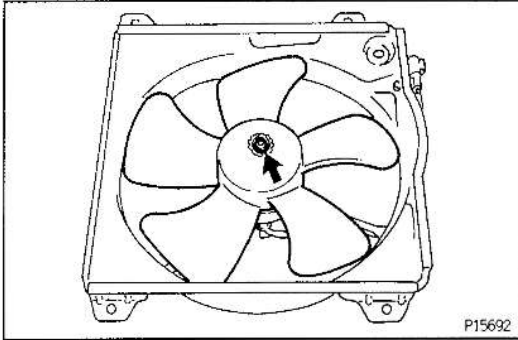


ENGINE — COOLING SYSTEM**EG-333**

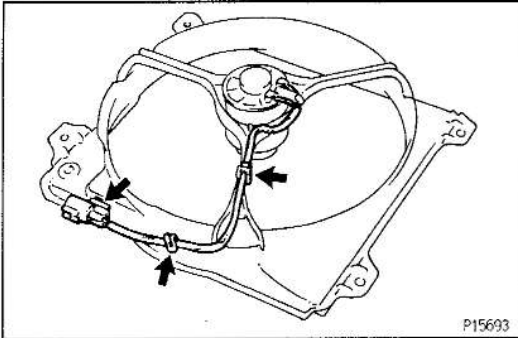
EG18X-06

NO.1 COOLING FAN DISASSEMBLY**(See Components for Disassembly and Assembly)****1. REMOVE FAN**

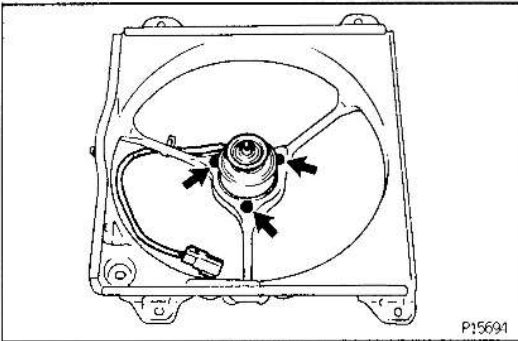
Remove the nut and fan.

**2. REMOVE FAN MOTOR**

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



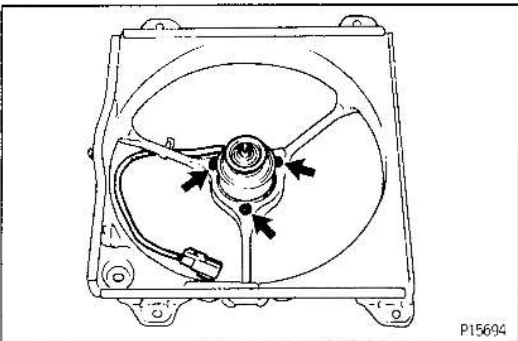
(b) Remove the 3 screws and fan motor.

**NO.1 COOLING FAN ASSEMBLY**

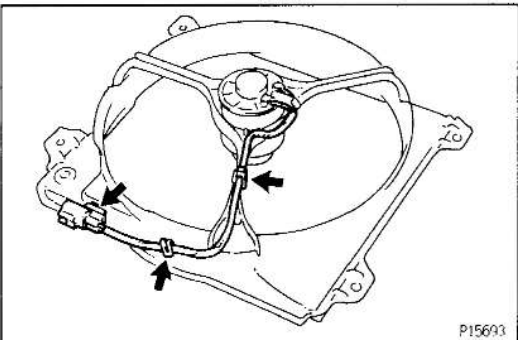
EG18Y-06

(See Components for Disassembly and Assembly)**1. INSTALL FAN MOTOR**

(a) Install the fan motor with the 3 screws.

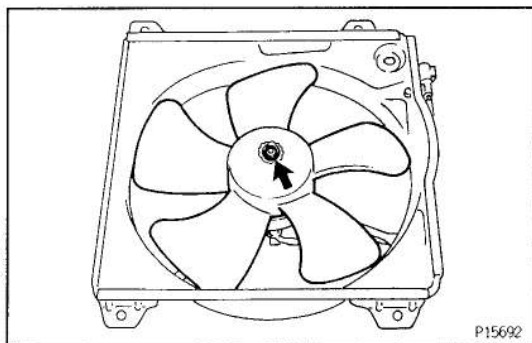


(b) Install the wire and connector to the fan shroud.



EG

EG-334**ENGINE — COOLING SYSTEM**

**2. INSTALL FAN**

Install the fan with the nut.

EG

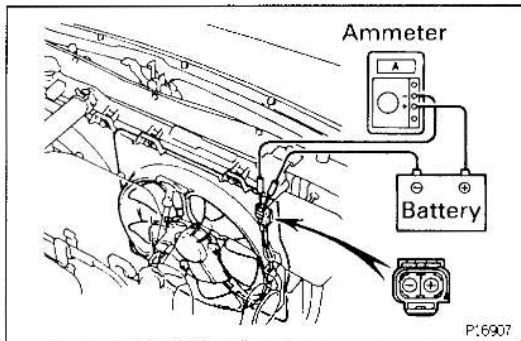
ENGINE – COOLING SYSTEM

EG-335

EG418-01

No.2 Cooling Fan (w/ A/C)**NO.2 COOLING FAN INSPECTION****1. DISCONNECT COOLING FAN CONNECTOR**

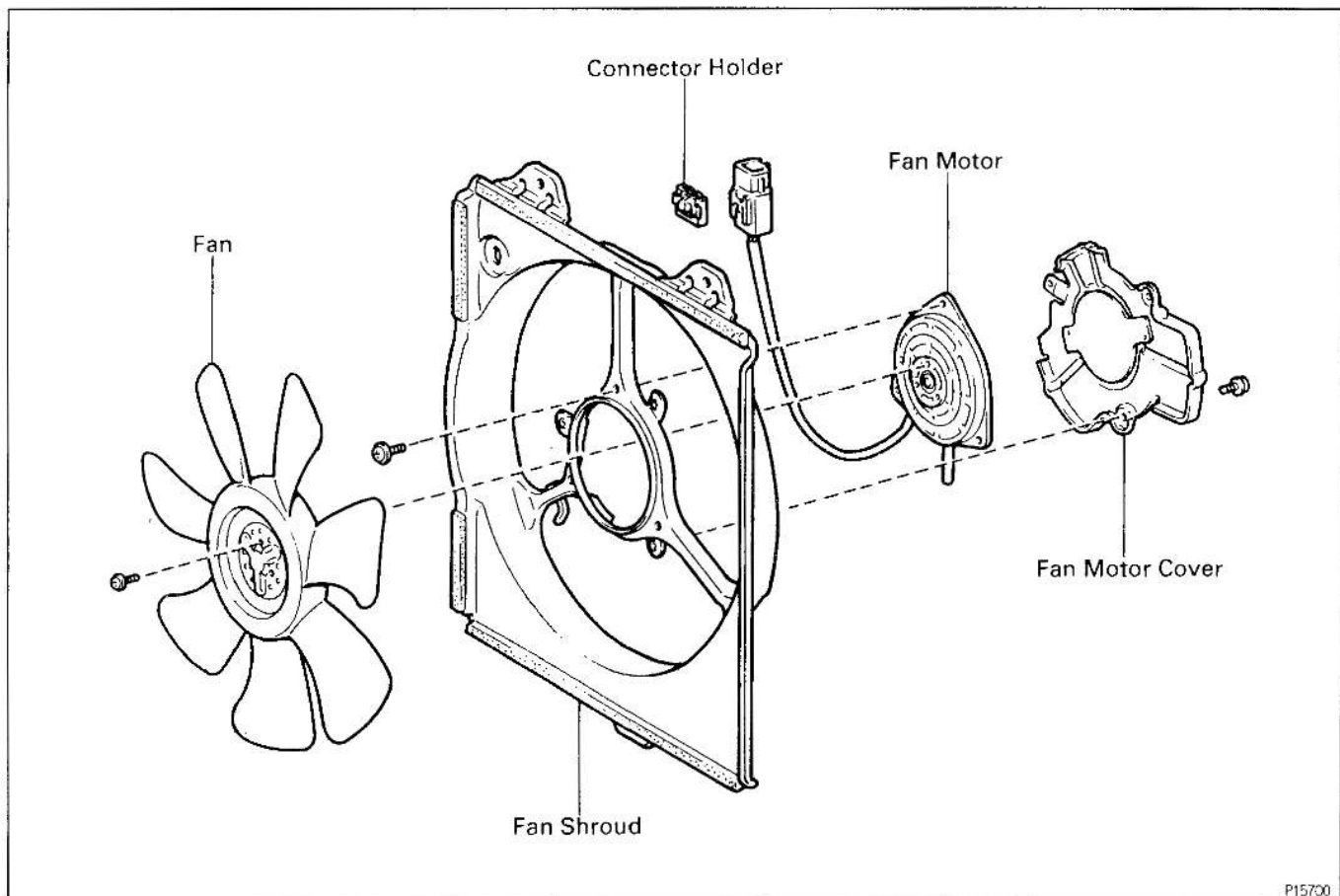
EG

**2. INSPECT NO.2 COOLING FAN**

- (a) Connect battery and ammeter to the cooling fan connector.
- (b) Check that the cooling fan rotates smoothly, and check the reading on the ammeter.

Standard amperage:**5.7 – 7.7 A****3. RECONNECT COOLING FAN CONNECTOR****COMPONENTS FOR DISASSEMBLY AND ASSEMBLY**

EG070-0E

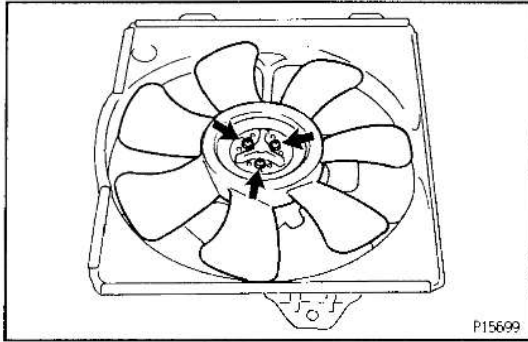


P15700

EG-336

ENGINE — COOLING SYSTEM

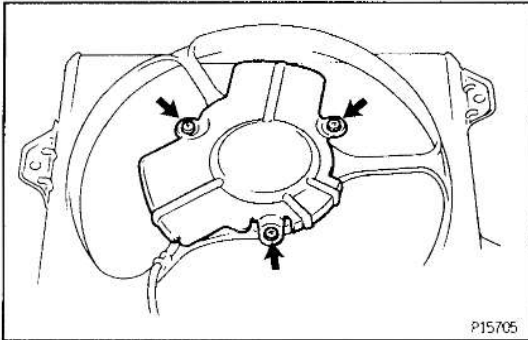
EG336-04

**NO.2 COOLING FAN DISASSEMBLY**

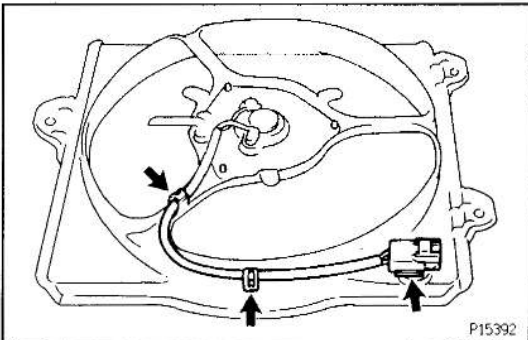
(See Components for Disassembly and Assembly)

1. REMOVE FAN

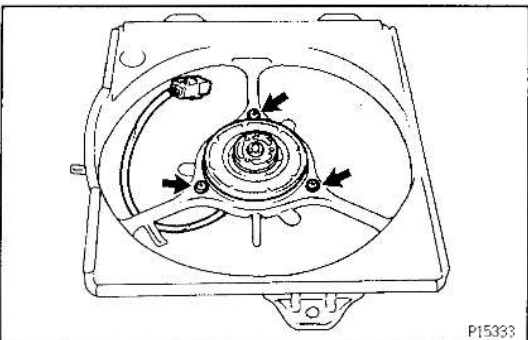
Remove the 3 screws and fan.

**2. REMOVE FAN MOTOR COVER**

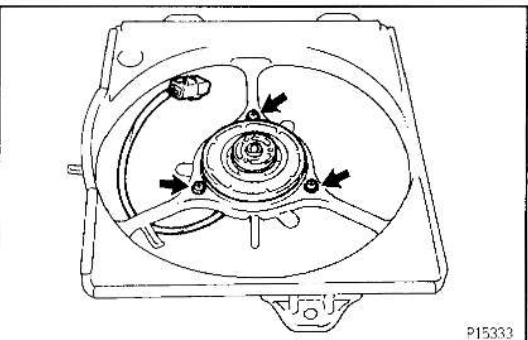
Remove the 3 screws and motor cover.

**3. REMOVE FAN MOTOR**

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



(b) Remove the 3 screws and fan motor.

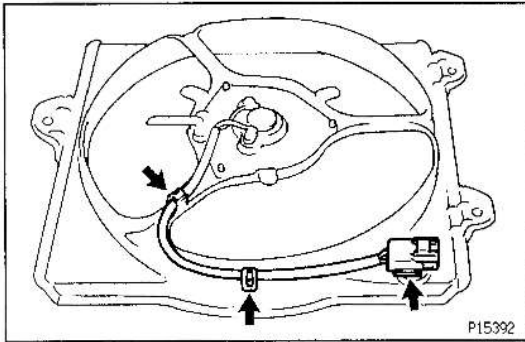
**NO.2 COOLING FAN ASSEMBLY**

EG336-03

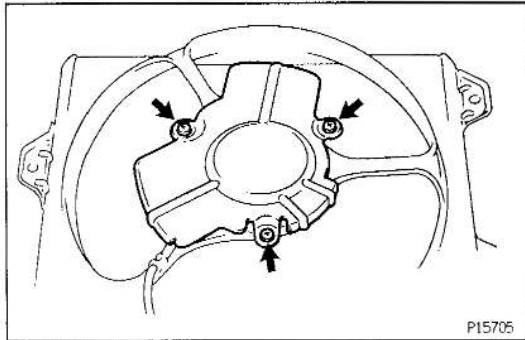
(See Components for Disassembly and Assembly)

1. INSTALL FAN MOTOR

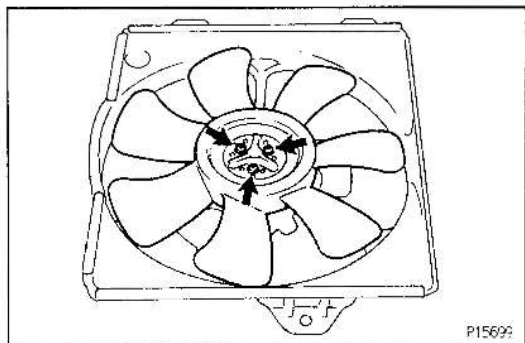
(a) Install the fan motor with the 3 screws.

ENGINE — COOLING SYSTEM**EG-337**

(b) Install the wire and connector to the fan shroud.

EG**2. INSTALL FAN MOTOR COVER**

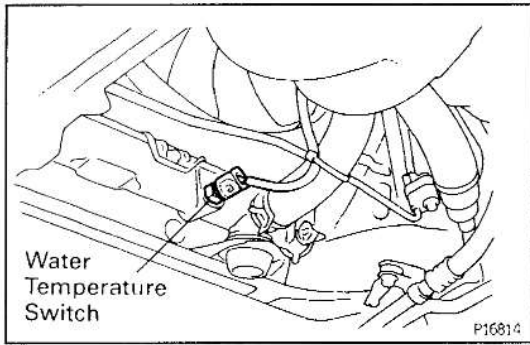
Install the motor cover with the 3 screws.

**3. INSTALL FAN**

Install the fan with the 3 screws.

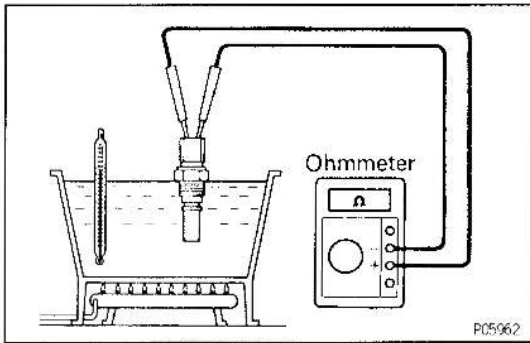
EG-338**ENGINE -- COOLING SYSTEM**

EG14J-06



Water Temperature Switch WATER TEMPERATURE SWITCH INSPECTION

1. DRAIN ENGINE COOLANT
2. REMOVE WATER TEMPERATURE SWITCH



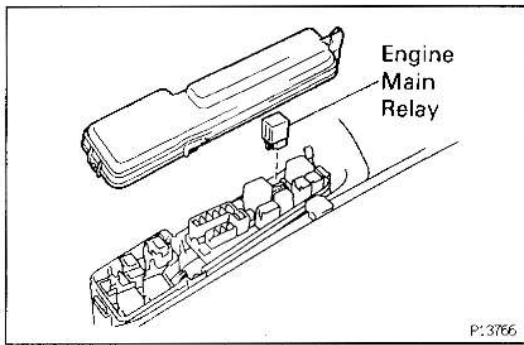
3. INSPECT WATER TEMPERATURE SWITCH

- (a) Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is above 93°C (199°F).
 - (b) Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is below 83°C (181°F).
- If continuity is not as specified, replace the switch.

4. REINSTALL WATER TEMPERATURE SWITCH
5. REFILL WITH ENGINE COOLANT
6. START ENGINE AND CHECK FOR COOLANT LEAKS

ENGINE — COOLING SYSTEM

ENGINE-01

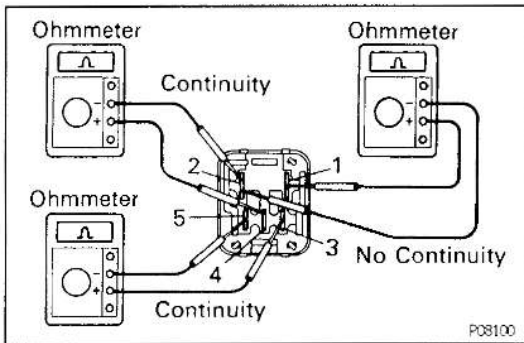


Engine Main Relay ("EG MAIN")

ENGINE MAIN RELAY INSPECTION

1. REMOVE RELAY BOX COVER
2. REMOVE ENGINE MAIN RELAY

EG

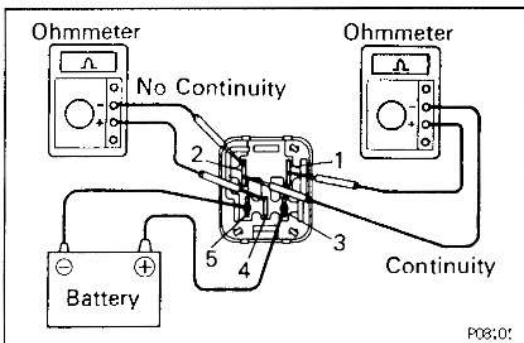


3. INSPECT ENGINE MAIN RELAY

A. Inspect relay continuity

- (a) Using an ohmmeter, check that there is continuity between terminals 3 and 5.
- (b) Check that there is continuity between terminals 2 and 4.
- (c) Check that there is no continuity between terminals 1 and 2.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

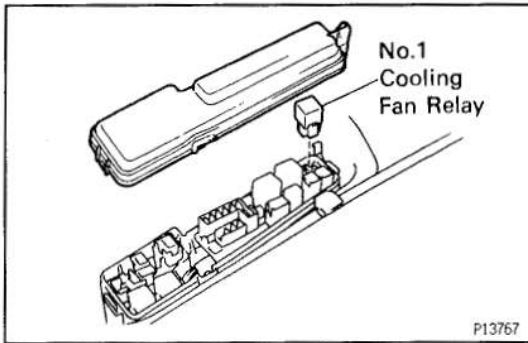
- (a) Apply battery voltage across terminals 3 and 5.
- (b) Using an ohmmeter, check that there is no continuity between terminals 2 and 4.
- (c) Check that there is continuity between terminals 1 and 2.

If operation is not as specified, replace the relay.

4. REINSTALL ENGINE MAIN RELAY
5. REINSTALL RELAY BOX COVER

EG-340**ENGINE – COOLING SYSTEM**

EG3MF-01

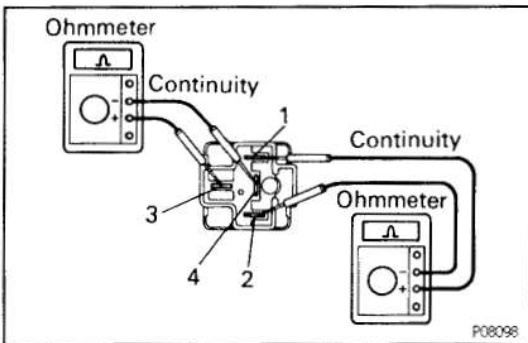
**No.1 Cooling Fan Relay ("FAN NO.1")****NO.1 COOLING FAN RELAY INSPECTION**

1. REMOVE RELAY BOX COVER
2. REMOVE NO.1 COOLING FAN RELAY

3. INSPECT NO.1 COOLING FAN RELAY**A. Inspect relay continuity**

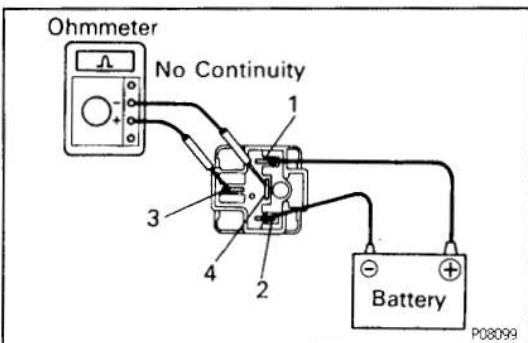
- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- (b) Check that there is continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.

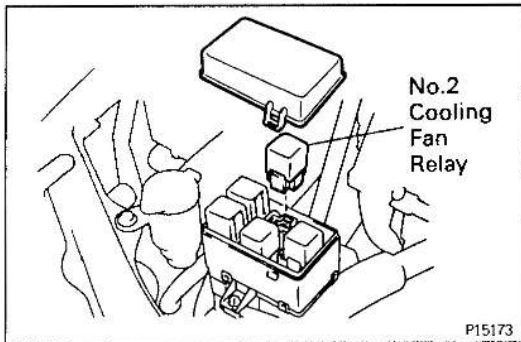
**B. Inspect relay operation**

- (a) Apply battery voltage across terminals 1 and 2.
- (b) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.

**4. REINSTALL NO.1 COOLING FAN RELAY****5. REINSTALL RELAY BOX COVER**

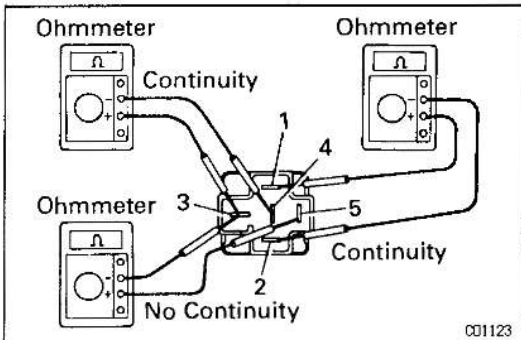
EG

ENGINE — COOLING SYSTEM**EG-341**

No.2 Cooling Fan Relay ("FAN NO.2") (w/ A/C)

NO.2 COOLING FAN RELAY INSPECTION

- 1. REMOVE RELAY BOX COVER**
- 2. REMOVE NO.2 COOLING FAN RELAY**

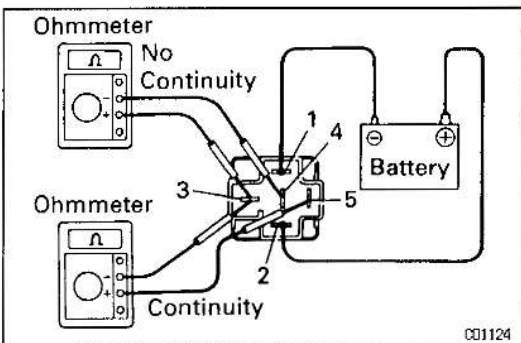


3. INSPECT NO.2 COOLING FAN RELAY

A. Inspect relay continuity

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- (b) Check that there is continuity between terminals 3 and 4.
- (c) Check that there is no continuity between terminals 3 and 5.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

- (a) Apply battery voltage across terminals 1 and 2.
- (b) Using an ohmmeter, check that there is no continuity between terminals 3 and 4.
- (c) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

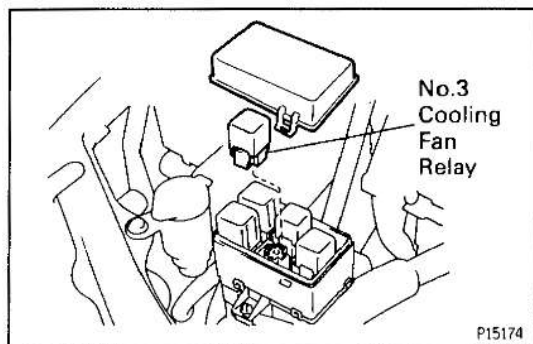
If operation is not as specified, replace the relay.

- 4. REINSTALL NO.2 COOLING FAN RELAY**
- 5. REINSTALL RELAY BOX COVER**

EG-342

ENGINE — COOLING SYSTEM

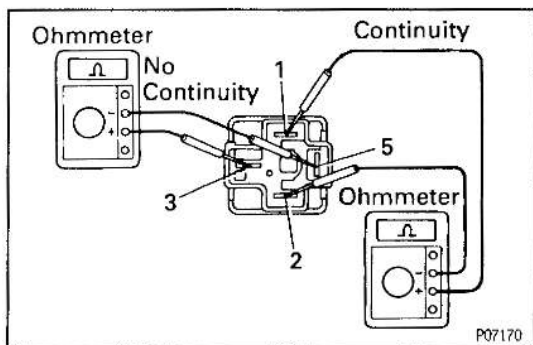
EG342H-01



No.3 Cooling Fan Relay ("FAN NO.3") (w/ A/C)

NO.3 COOLING FAN RELAY INSPECTION

1. REMOVE RELAY BOX COVER
2. REMOVE NO.3 COOLING FAN RELAY

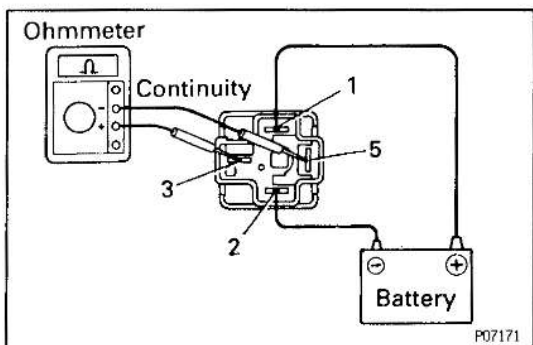


3. INSPECT NO.3 COOLING FAN RELAY

A. Inspect relay continuity

- (a) Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- (b) Check that there is no continuity between terminals 3 and 5.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

- (a) Apply battery voltage across terminals 1 and 2.
- (b) Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If operation is not as specified, replace the relay.

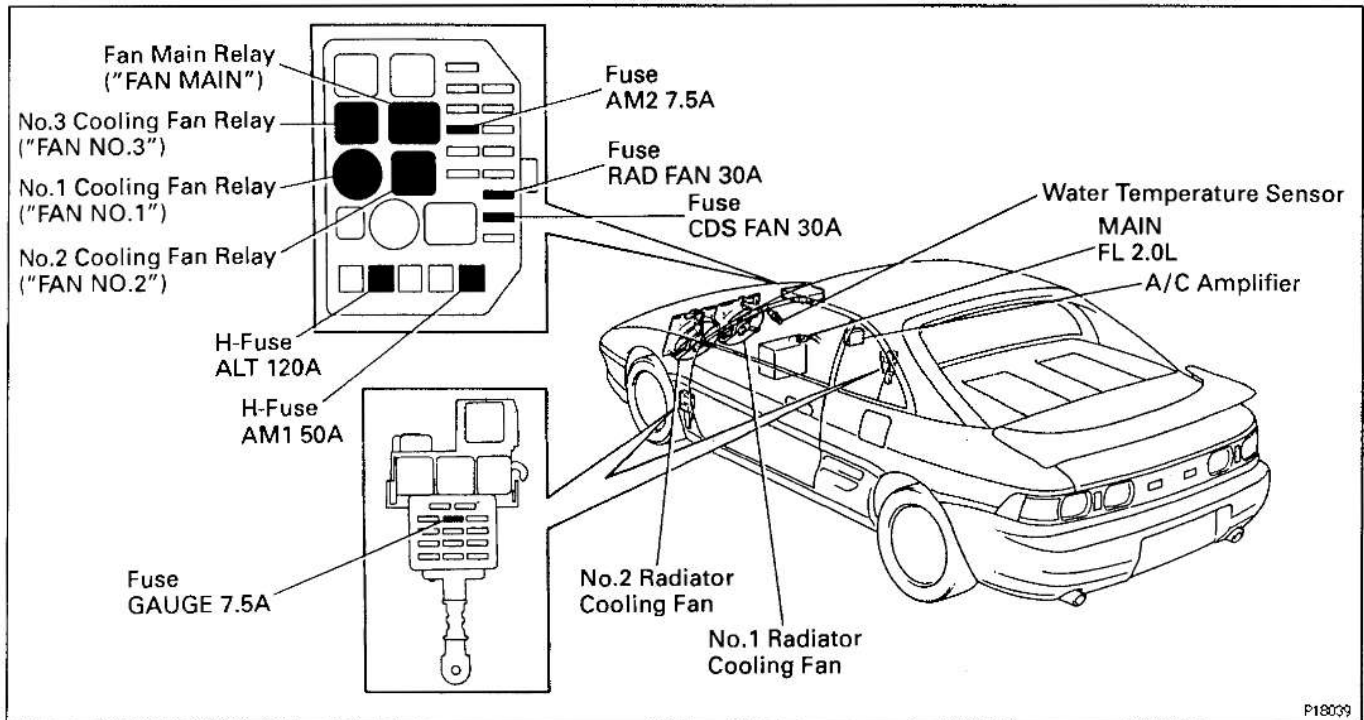
4. REINSTALL NO.3 COOLING FAN RELAY
5. REINSTALL RELAY BOX COVER

EG

ENGINE — COOLING SYSTEM

RADIATOR ELECTRIC COOLING FAN (SW20 w/ A/C) Part Location

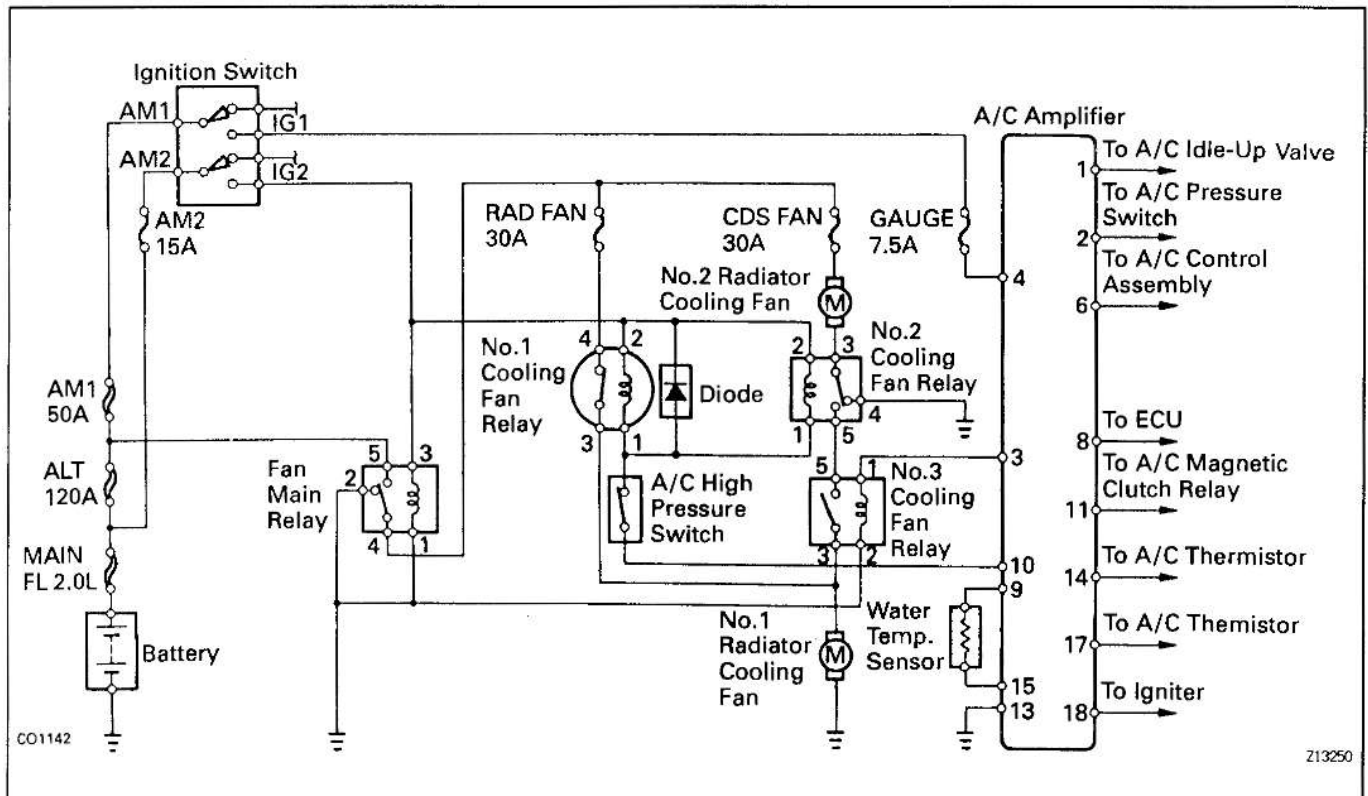
EG078-14



P18099

System Circuit

EG076-0X

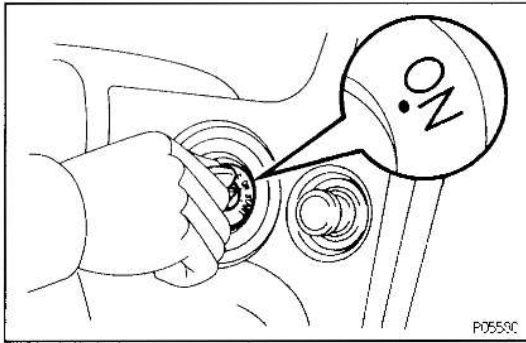


CO1142

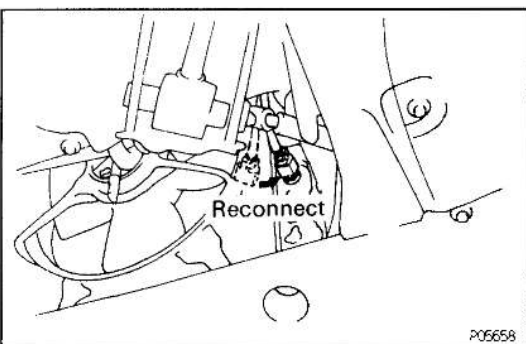
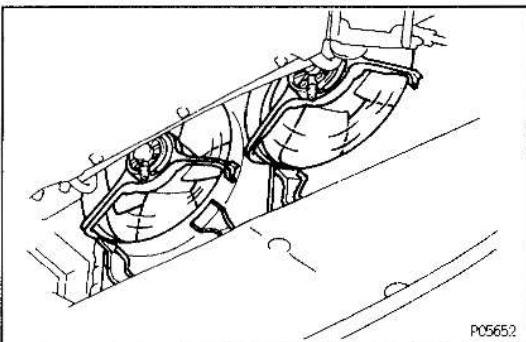
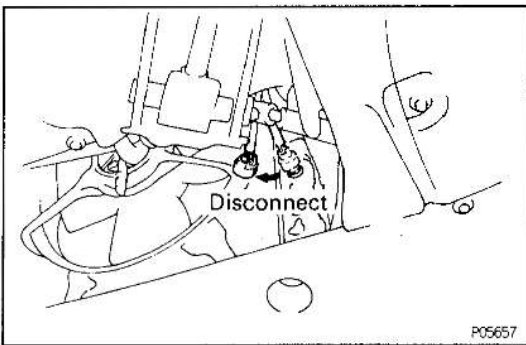
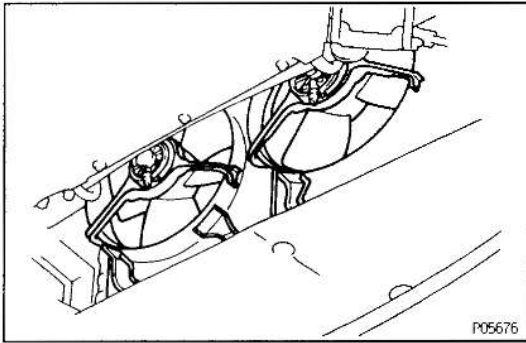
Z13250

EG-344**ENGINE – COOLING SYSTEM**

EG02N-04

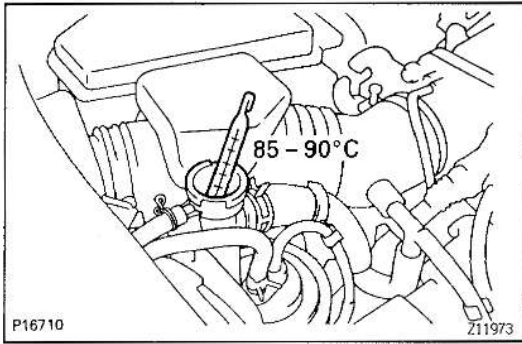
**On – Vehicle Inspection****1. INSPECT COOLING FAN OPERATION AT LOW TEMPERATURE (Below 85°C (185°F))**

- (a) Turn the ignition switch ON.
- (b) Check that the cooling fans stops.
If not, check the cooling fan relays 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 fans rotates.
If not, check the fuses, fan main relay, cooling fan relays, A/C amplifier, cooling fan, and check for a short circuit between the cooling fan relay and water temperature sensor.
- (e) Reconnect the water temperature sensor connector.

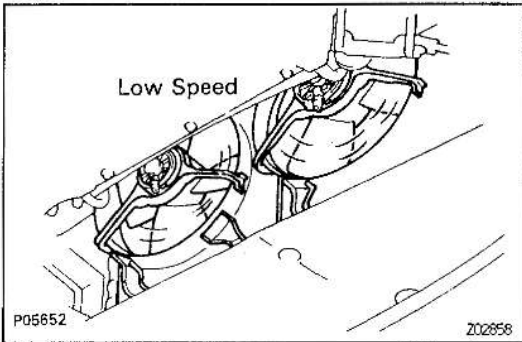


ENGINE — COOLING SYSTEM

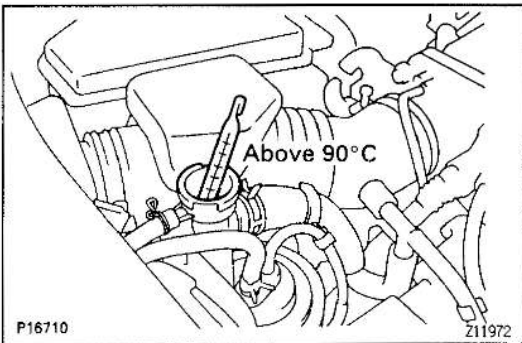
EG

**2. INSPECT COOLING FAN OPERATION AT HIGH TEMPERATURE (85 – 90°C (185 – 194°F))**

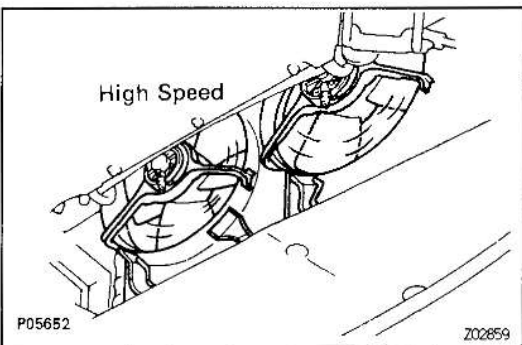
- (a) Start the engine, and raise coolant temperature to 85 – 90°C (185 – 194°F).



- (b) Check that the cooling fans rotates at low speed. If not, replace the water temperature sensor.

**3. INSPECT COOLING FAN OPERATION AT HIGH TEMPERATURE (Above 90°C (194°F))**

- (a) Start the engine, and raise coolant temperature to above 90°C (194°F).

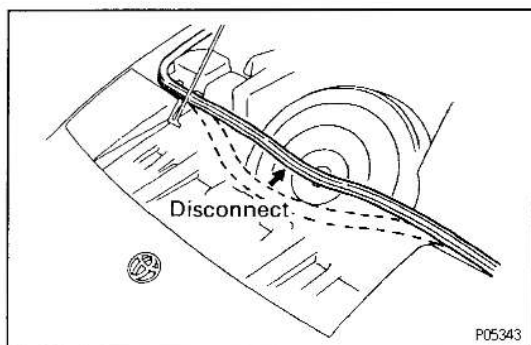


- (b) Check that the cooling fans rotates at high speed. If not, replace the water temperature sensor.

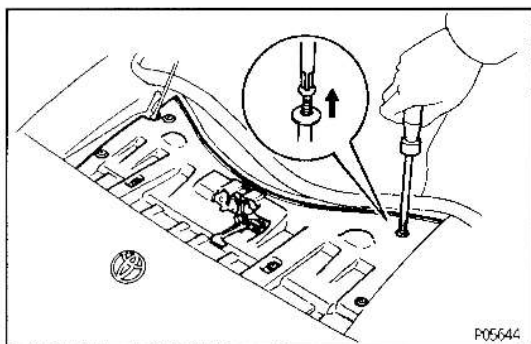
EG-346**ENGINE — COOLING SYSTEM**

EG41C-01

EG

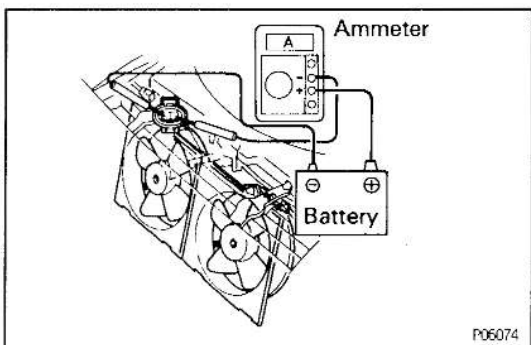
**Cooling Fans****COOLING FANS INSPECTION****1. REMOVE UPPER RADIATOR SUPPORT SEAL**

- (a) Disconnect the hood weatherstrip.



- (b) Remove the 7 clips.

- (c) Remove the 2 hood lock mounting bolts, and remove the support seal.

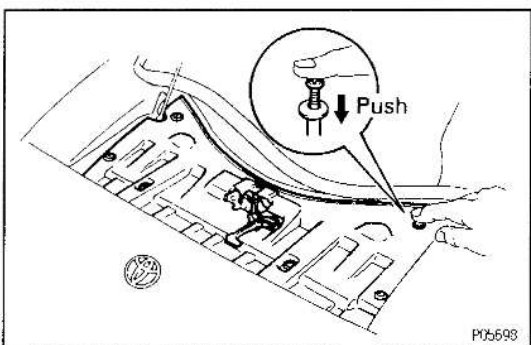
2. DISCONNECT COOLING FAN CONNECTORS**3. INSPECT COOLING FANS**

- (a) Connect battery and ammeter to the cooling fan connector.

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

Standard amperage:

8.6 — 11.6 A

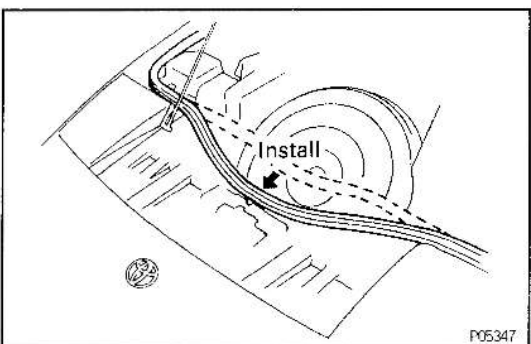
4. RECONNECT COOLING FAN CONNECTORS**5. REINSTALL UPPER RADIATOR SUPPORT SEAL**

- (a) Temporarily install the hood lock with the RH side bolt.

- (b) Place the support seal in position.

- (c) Install the hood lock with the 2 bolts.

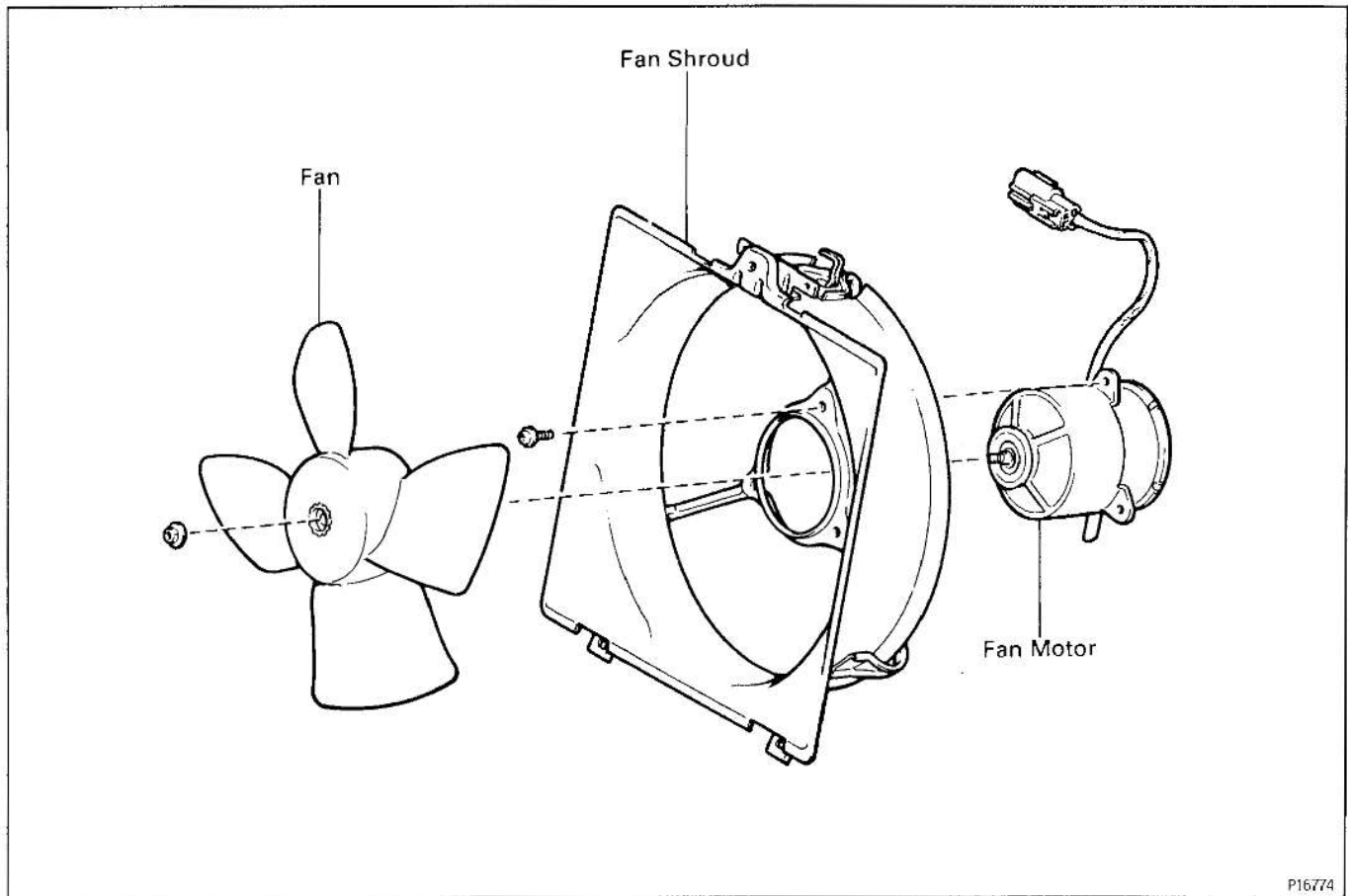
- (d) Install the 7 clips.



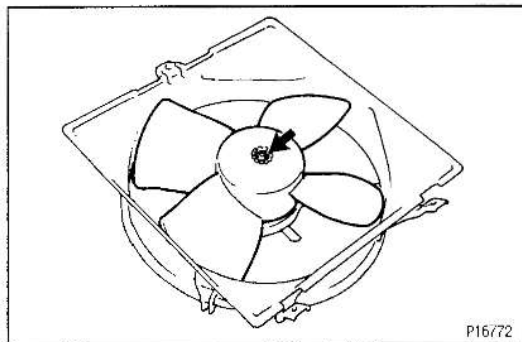
- (e) Install the hood weatherstrip.

ENGINE — COOLING SYSTEM**COMPONENTS FOR DISASSEMBLY AND ASSEMBLY**

EG079-0F



EG

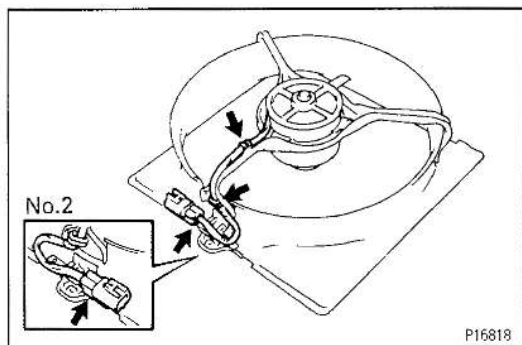
**COOLING FAN DISASSEMBLY**

EG02R-03

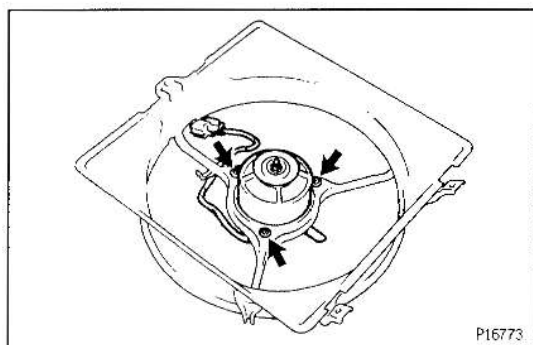
(See Components for Disassembly and Assembly)

1. REMOVE FAN

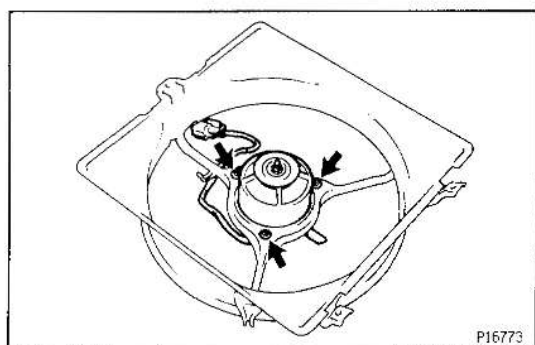
Remove the nut and fan.

**2. REMOVE FAN MOTOR**

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

EG-348**ENGINE — COOLING SYSTEM**

(b) Remove the 3 screws and fan motor.

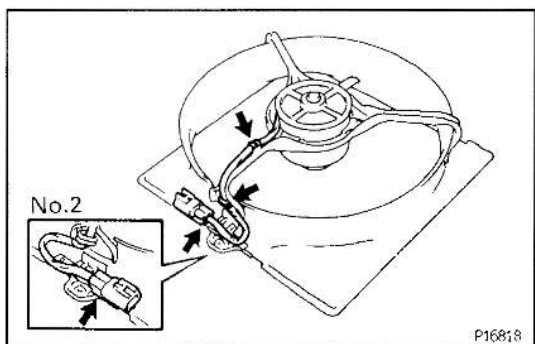
**COOLING FAN ASSEMBLY**

E0028-04

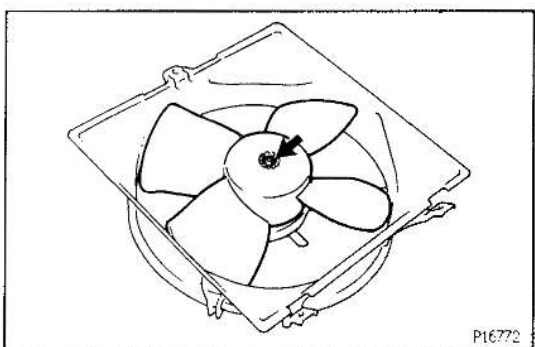
(See Components for Disassembly and Assembly)

1. INSTALL FAN MOTOR

(a) Install the fan motor with the 3 screws.



(b) Install the wire and connector to the fan shroud.

**2. INSTALL FAN**

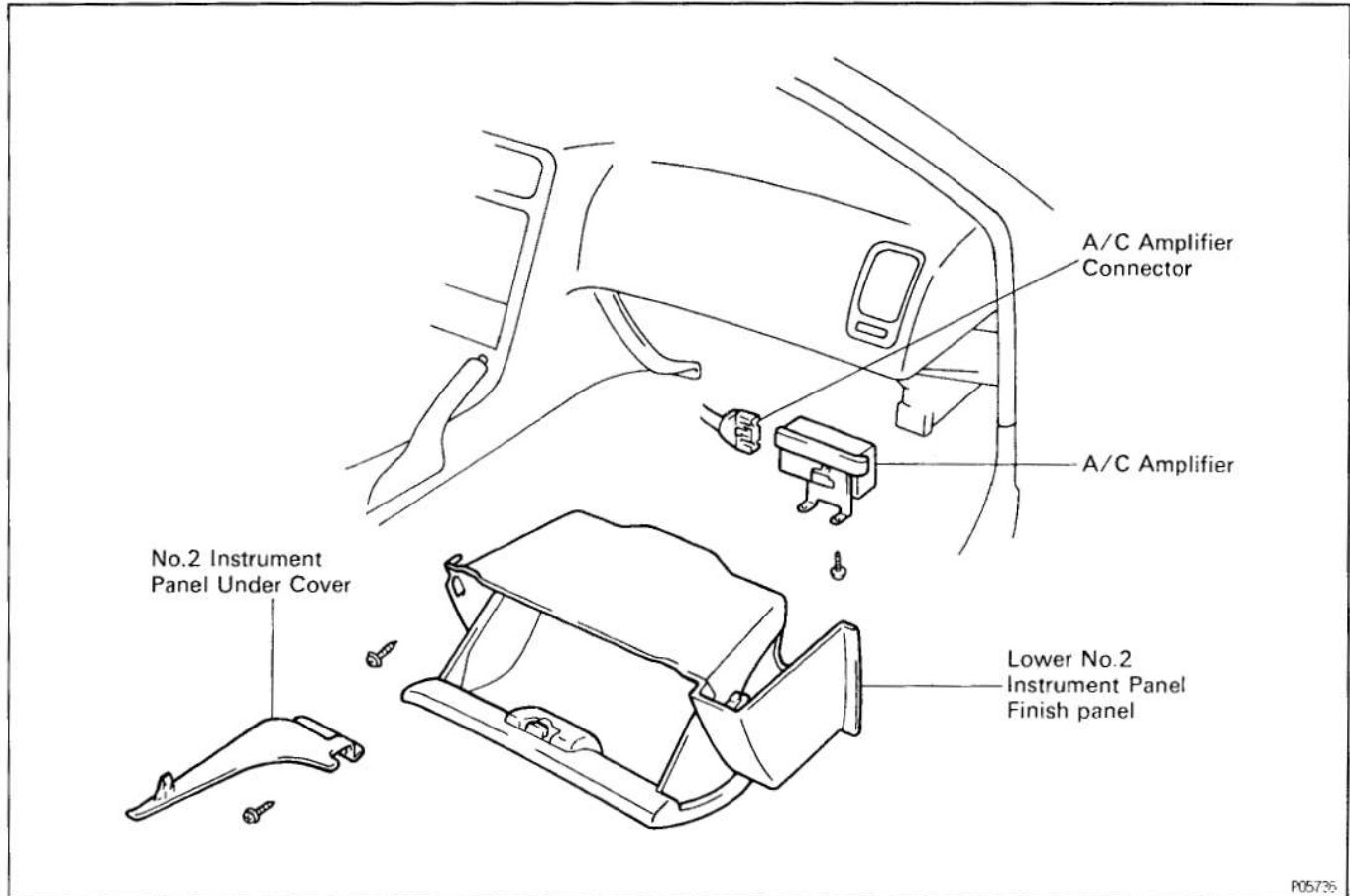
Install the fan with the nut.

ENGINE — COOLING SYSTEM**EG-349**

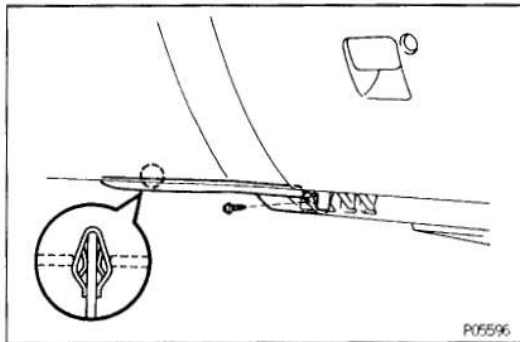
EG07G-04

A/C Amplifier COMPONENTS FOR REMOVAL AND INSTALLATION

EG



P05735



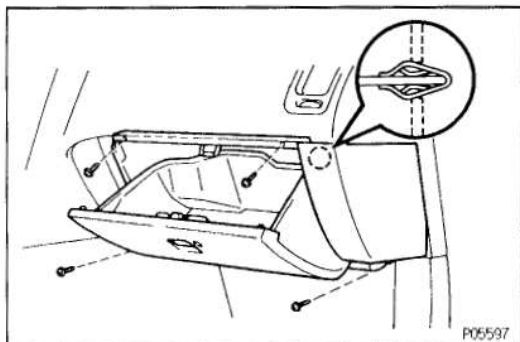
P05596

A/C AMPLIFIER INSPECTION

EG41D-01

1. REMOVE NO.2 INSTRUMENT PANEL UNDER COVER

- (a) Remove the screw.
- (b) Remove the under cover by pulling it.



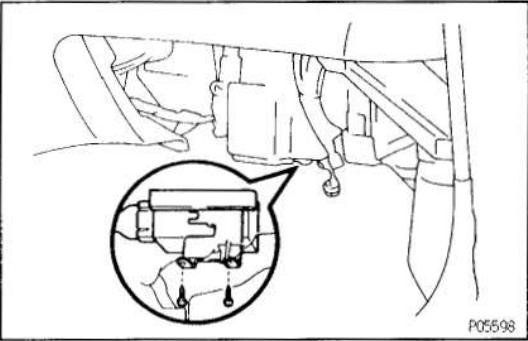
P05597

2. REMOVE LOWER NO.2 INSTRUMENT FINISH PANEL

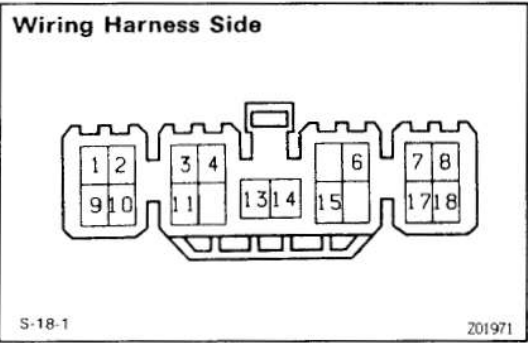
- (a) Remove the 4 screws.
- (b) Remove the finish panel by pulling it.

EG-350

ENGINE – COOLING SYSTEM

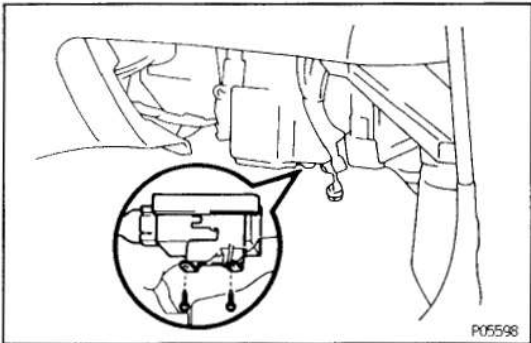


- 3. DISCONNECT A/C AMPLIFIER CONNECTOR**
- (a) Remove the 2 screws, and disconnect the A/C amplifier from the cooler unit.
 - (b) Disconnect the A/C amplifier connector.

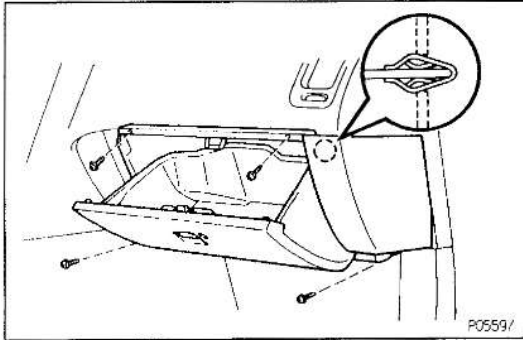


- 4. INSPECT A/C AMPLIFIER**
- Check the connector on the wiring harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	3 – Ground	–		Continuity
Voltage	4 – Ground	Ignition switch ON		Battery voltage
Resistance	9 – 15	Coolant temp.	85°C (185°F)	Approx. 1.35 kΩ
			90°C (194°F)	Approx. 1.19 kΩ
			95°C (203°F)	Approx. 1.05 kΩ
Voltage	10 – Ground	Ignition switch ON		Battery voltage
Continuity	13 – Ground	–		Continuity

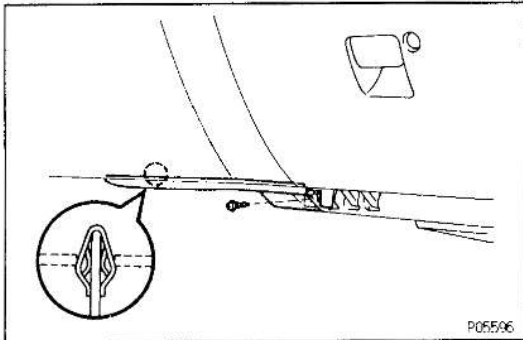


- 5. DISCONNECT A/C AMPLIFIER CONNECTOR**
- (a) Connect the A/C amplifier connector.
 - (b) Install the A/C amplifier with the 2 screws.

ENGINE — COOLING SYSTEM**6. REINSTALL LOWER NO.2 INSTRUMENT FINISH PANEL**

- (a) Attach the finish panel to the instrument panel with the clips.
- (b) Install the 4 screws.

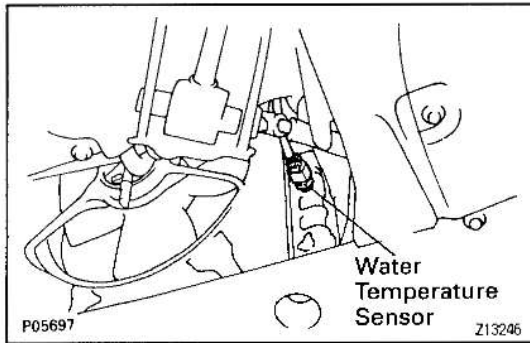
EG

**7. REINSTALL NO.2 INSTRUMENT PANEL UNDER COVER**

- (a) Attach the finish panel to the instrument panel with the clip.
- (b) Install the screw.

EG-352**ENGINE — COOLING SYSTEM**

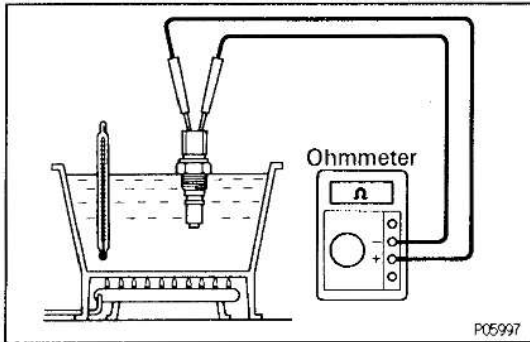
EQ41E-01



Water Temperature Sensor

WATER TEMPERATURE SENSOR INSPECTION

1. DRAIN ENGINE COOLANT FROM RADIATOR
2. REMOVE WATER TEMPERATURE SENSOR



3. INSPECT WATER TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

At 85°C (185°F)

Approx. 1.35 kΩ

At 90°C (194°F)

Approx. 1.19 kΩ

At 95°C (203°F)

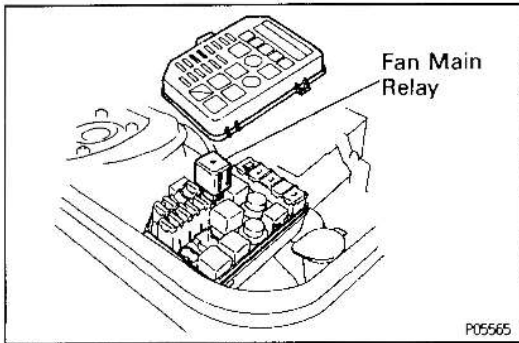
Approx. 1.05 kΩ

If resistance is not as specified, replace the sensor.

4. REINSTALL WATER TEMPERATURE SENSOR
5. REFILL WITH ENGINE COOLANT
6. START ENGINE AND CHECK FOR COOLANT LEAKS

ENGINE — COOLING SYSTEM

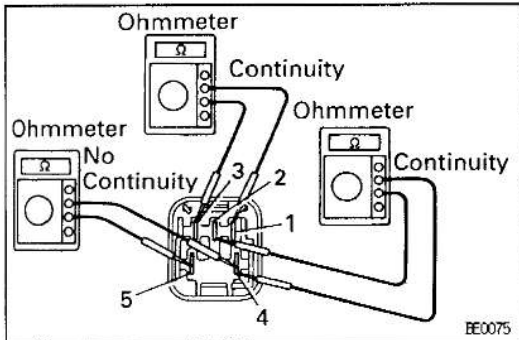
EG41F-01



Fan Main Relay ("FAN MAIN") FAN MAIN RELAY INSPECTION

1. REMOVE FAN MAIN RELAY

EG

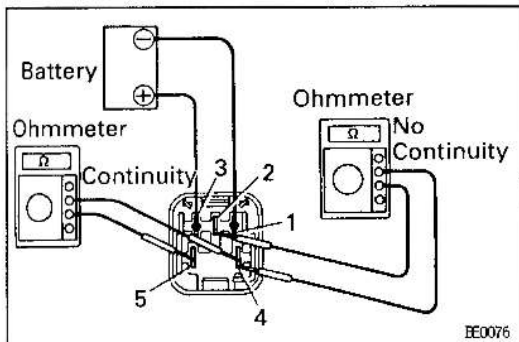


2. INSPECT FAN MAIN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 3.
- Check that there is continuity between terminals 2 and 4.
- Check that there is no continuity between terminals 4 and 5.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

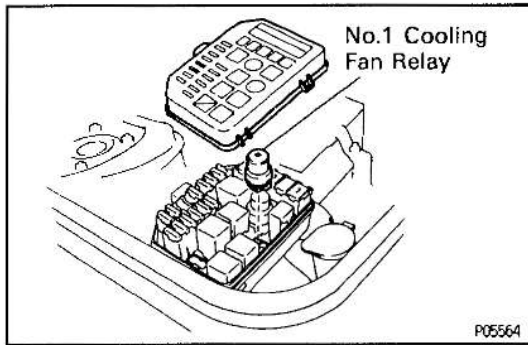
- Apply battery voltage across terminals 1 and 3.
- Using an ohmmeter, check that there is no continuity between terminals 2 and 4.
- Check that there is continuity between terminals 4 and 5.

If operation is not as specified, replace the relay.

3. REINSTALL FAN MAIN RELAY

EG-354**ENGINE — COOLING SYSTEM**

EG412-01



No.1 Cooling Fan Relay ("FAN NO.1")

NO.1 COOLING FAN RELAY INSPECTION

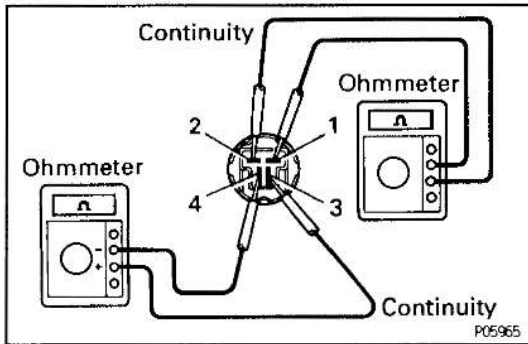
1. REMOVE NO.1 COOLING FAN RELAY

2. INSPECT NO.1 COOLING FAN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.

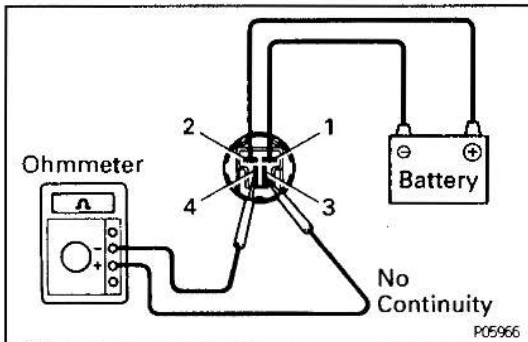
If continuity is not as specified, replace the relay.



B. Inspect relay operation

- Apply battery voltage across terminals 1 and 2.
- Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.

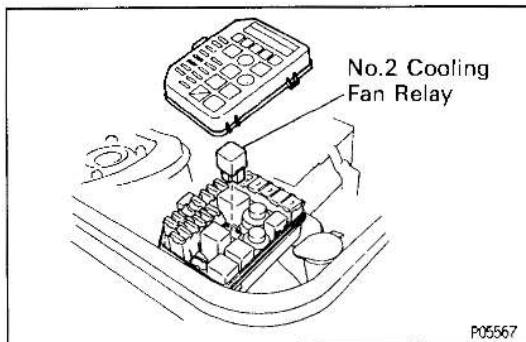


3. REINSTALL NO.1 COOLING FAN RELAY

EG

ENGINE — COOLING SYSTEM

EG41H-01

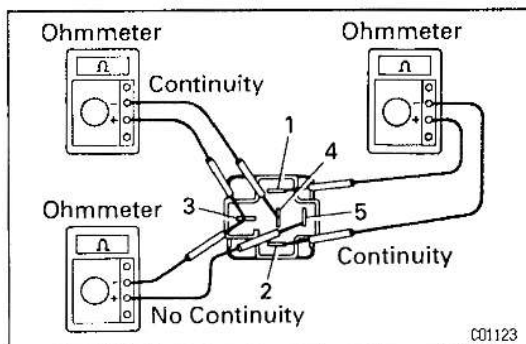


No.2 Cooling Fan Relay ("FAN NO.2")

NO.2 COOLING FAN RELAY INSPECTION

1. REMOVE NO.2 COOLING FAN RELAY

EG

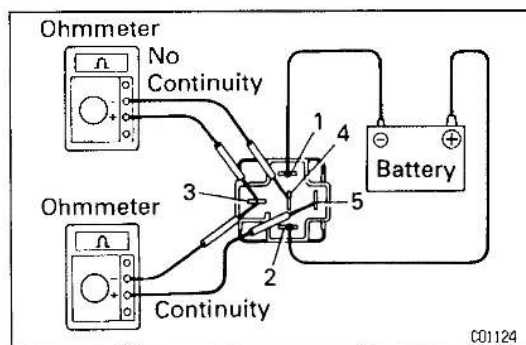


2. INSPECT NO.2 COOLING FAN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.
- Check that there is no continuity between terminals 3 and 5.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

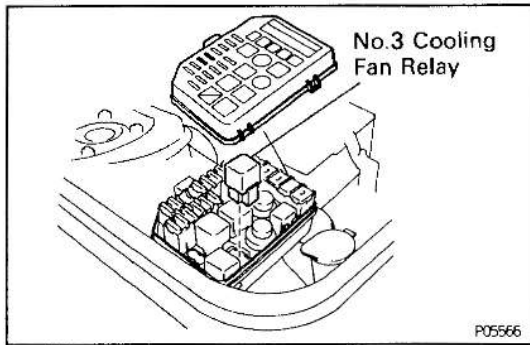
- Apply battery voltage across terminals 1 and 2.
- Using an ohmmeter, check that there is no continuity between terminals 3 and 4.
- Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If operation is not as specified, replace the relay.

3. REINSTALL NO.2 COOLING FAN RELAY

EG-356**ENGINE — COOLING SYSTEM**

EQ41J-01



No.3 Cooling Fan Relay ("FAN NO.3")

NO.3 COOLING FAN RELAY INSPECTION

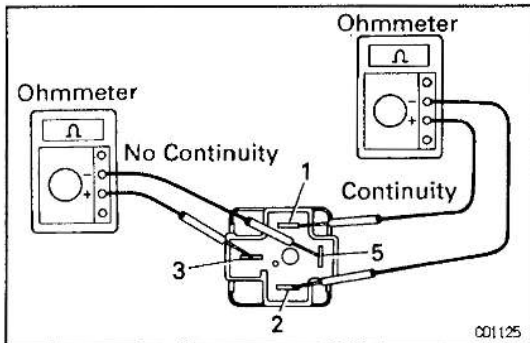
1. REMOVE NO.3 COOLING FAN RELAY

2. INSPECT NO.3 COOLING FAN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is no continuity between terminals 3 and 5.

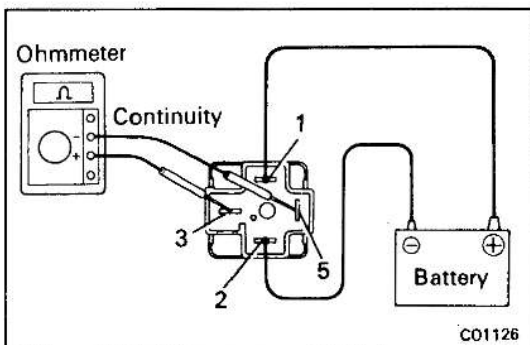
If continuity is not as specified, replace the relay.



B. Inspect relay operation

- Apply battery voltage across terminals 1 and 2.
- Using an ohmmeter, check that there is continuity between terminals 3 and 5.

If operation is not as specified, replace the relay.

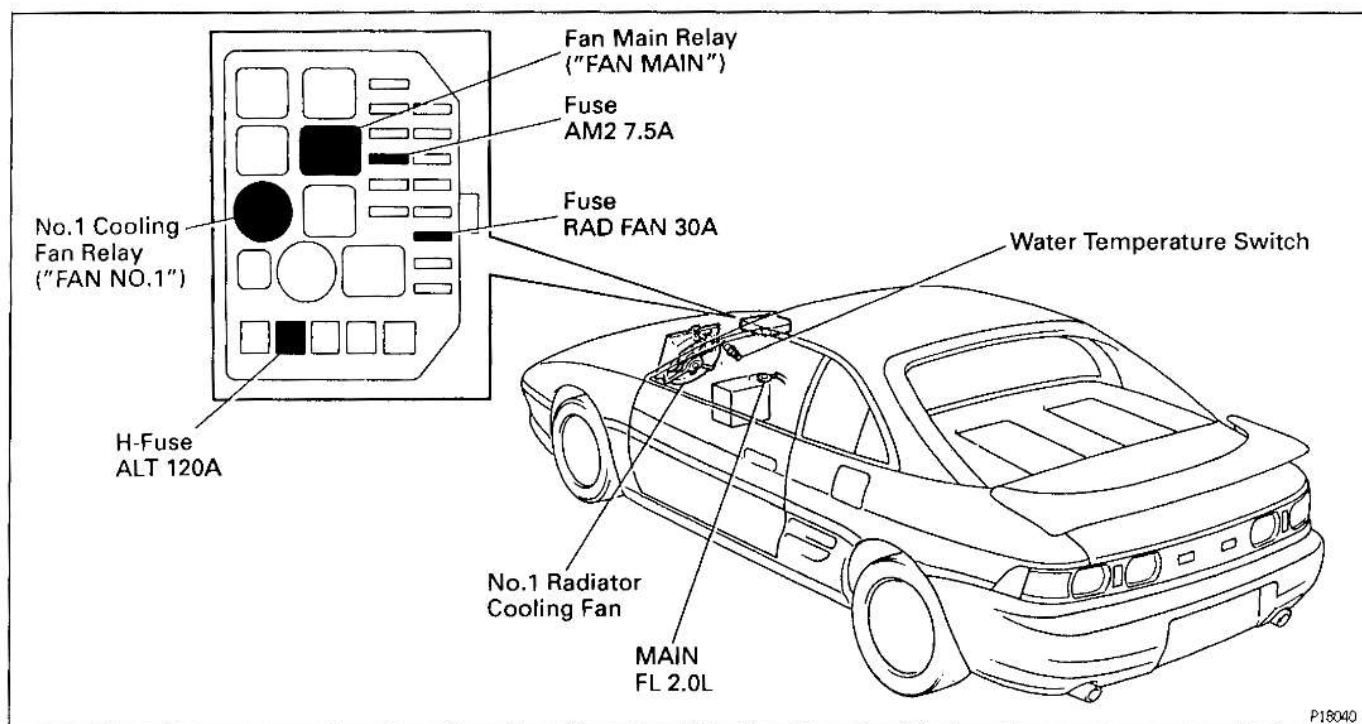


3. REINSTALL NO.3 COOLING FAN RELAY

ENGINE – COOLING SYSTEM

RADIATOR ELECTRIC COOLING FAN (SW20 w/o A/C) Part Location

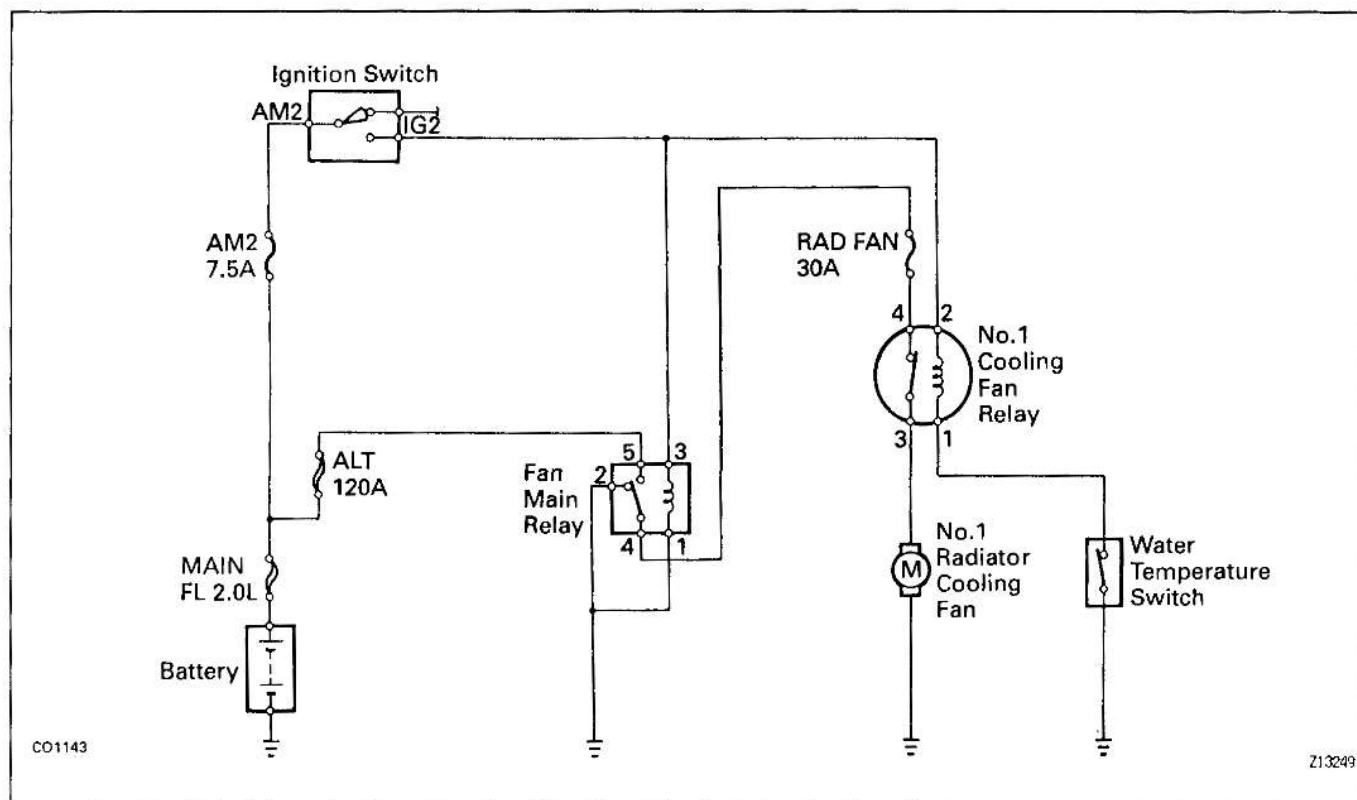
EG07B-1B



P15040

System Circuit

EG07C-0Y



C01143

Z13249

EG-358

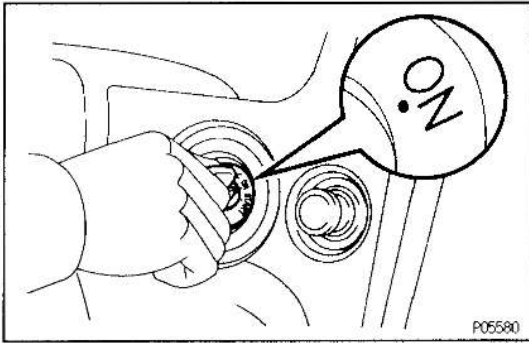
ENGINE — COOLING SYSTEM

EG100-04

On – Vehicle Inspection

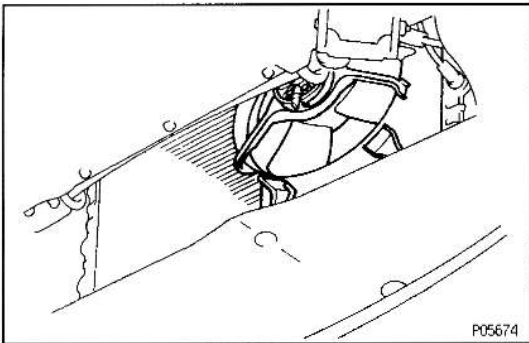
1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 83°C (181°F))

(a) Turn the ignition switch ON.

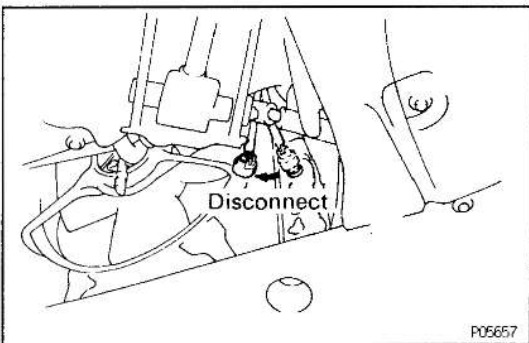


(b) Check that the cooling fan stops.

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

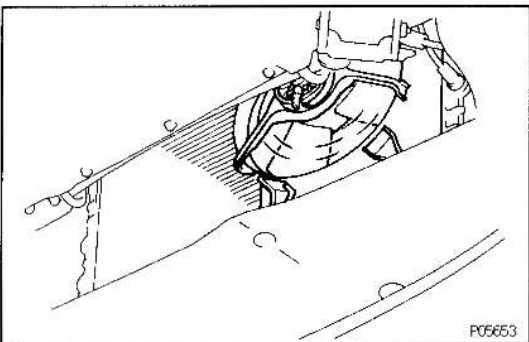


(c) Disconnect the water temperature switch connector.

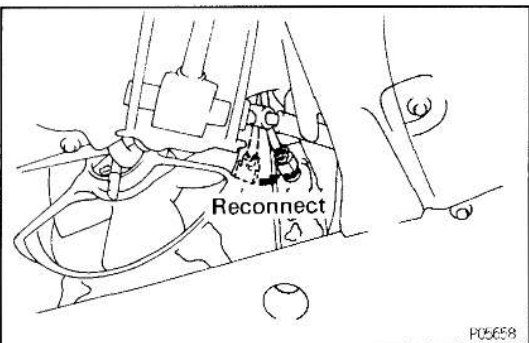


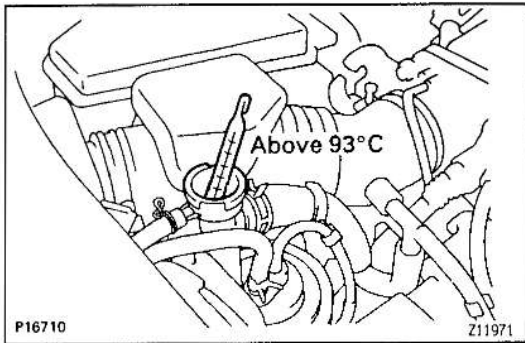
(d) Check that the cooling fan rotates.

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

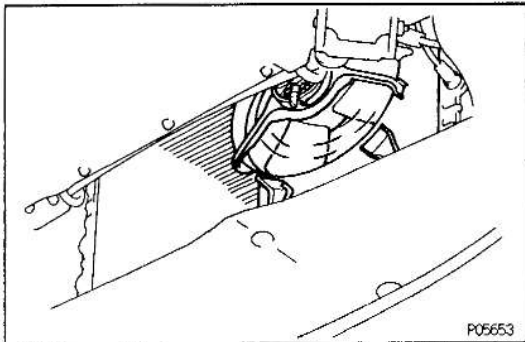


(e) Reconnect the water temperature switch connector.



ENGINE — COOLING SYSTEM**EG-359****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).

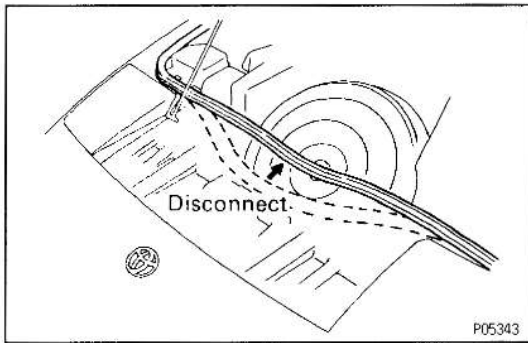
EG

- (b) Check that the cooling fan rotates.
If not, replace the water temperature switch.

EG-360

ENGINE — COOLING SYSTEM

EQ41K-01

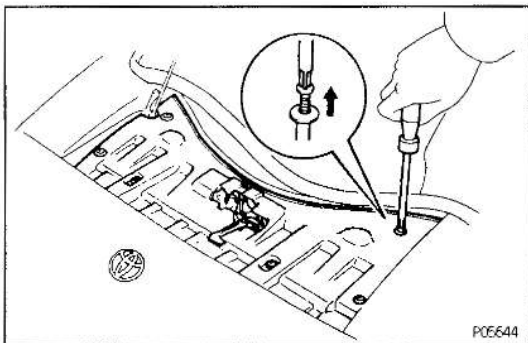


Cooling Fan

COOLING FAN INSPECTION

1. REMOVE UPPER RADIATOR SUPPORT SEAL

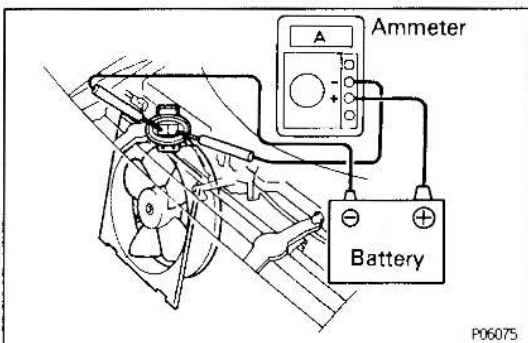
- (a) Disconnect the hood weatherstrip.



- (b) Remove the 7 clips.

- (c) Remove the 2 hood lock mounting bolts, and remove the support seal.

2. DISCONNECT COOLING FAN CONNECTOR



3. INSPECT COOLING FAN

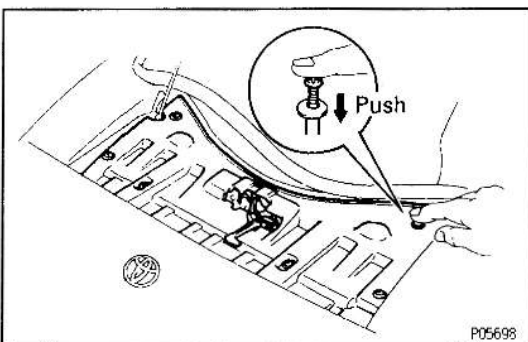
- (a) Connect battery and ammeter to the cooling fan connector.

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

Standard amperage:

8.6 – 11.6 A

4. RECONNECT COOLING FAN CONNECTOR



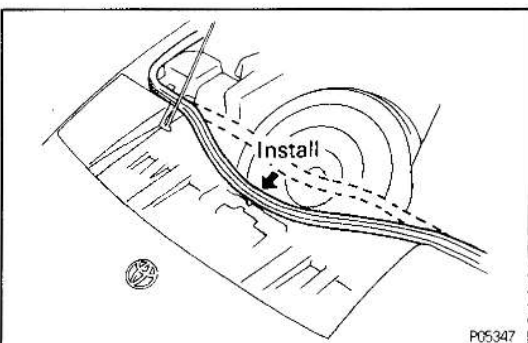
5. REINSTALL UPPER RADIATOR SUPPORT SEAL

- (a) Temporarily install the hood lock with the RH side bolt.

- (b) Place the support seal in position.

- (c) Install the hood lock with the 2 bolts.

- (d) Install the 7 clips.



- (e) Install the hood weatherstrip.

ENGINE — COOLING SYSTEM**EG-361****COMPONENTS FOR DISASSEMBLY AND
ASSEMBLY**

EG102-03

(See page EG—347)

COOLING FAN DISASSEMBLY

EG103-03

(See page EG—347)

EG

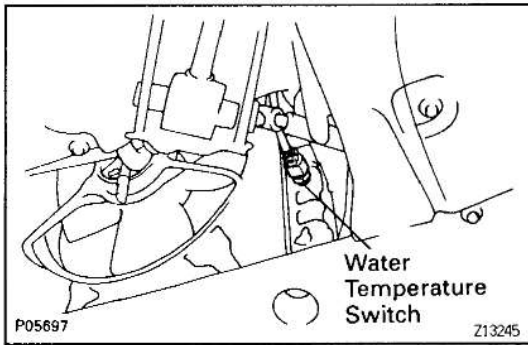
COOLING FAN ASSEMBLY

EG07J-06

(See page EG—348)

EG-362**ENGINE — COOLING SYSTEM**

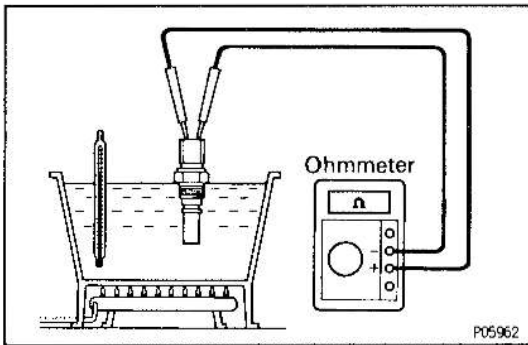
EG106-03



Water Temperature Switch

WATER TEMPERATURE SWITCH INSPECTION

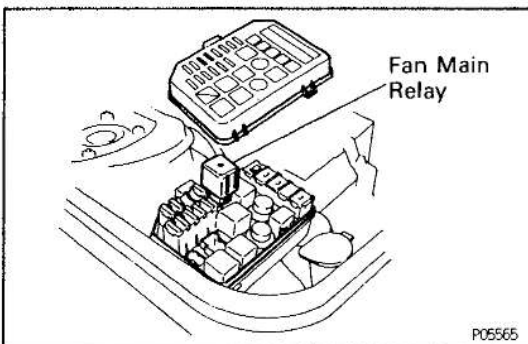
1. DRAIN ENGINE COOLANT
2. REMOVE WATER TEMPERATURE SWITCH



3. INSPECT WATER TEMPERATURE SWITCH

- (a) Using an ohmmeter, check that there is no continuity between the terminals when the coolant temperature is above 93°C (199°F).
 - (b) Using an ohmmeter, check that there is continuity between the terminals when the coolant temperature is below 83°C (181°F).
- If continuity is not as specified, replace the switch.

4. REINSTALL WATER TEMPERATURE SWITCH
5. REFILL WITH ENGINE COOLANT
6. START ENGINE AND CHECK FOR COOLANT LEAKS

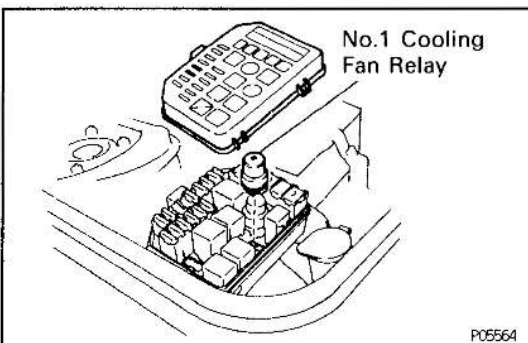


Fan Main Relay ("FAN MAIN")

FAN MAIN RELAY INSPECTION

(See page EG-353)

EG106-03



No.1 Cooling Fan Relay ("FAN NO.1")

NO.1 COOLING FAN RELAY INSPECTION

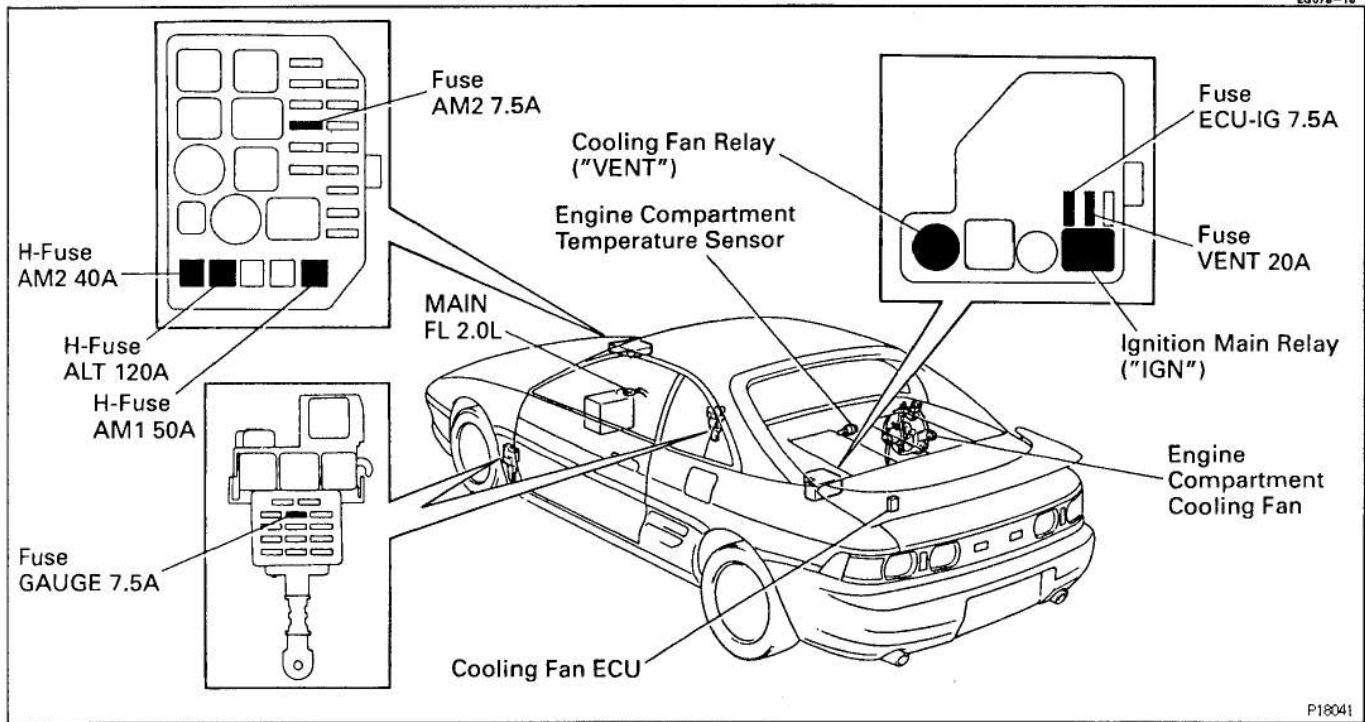
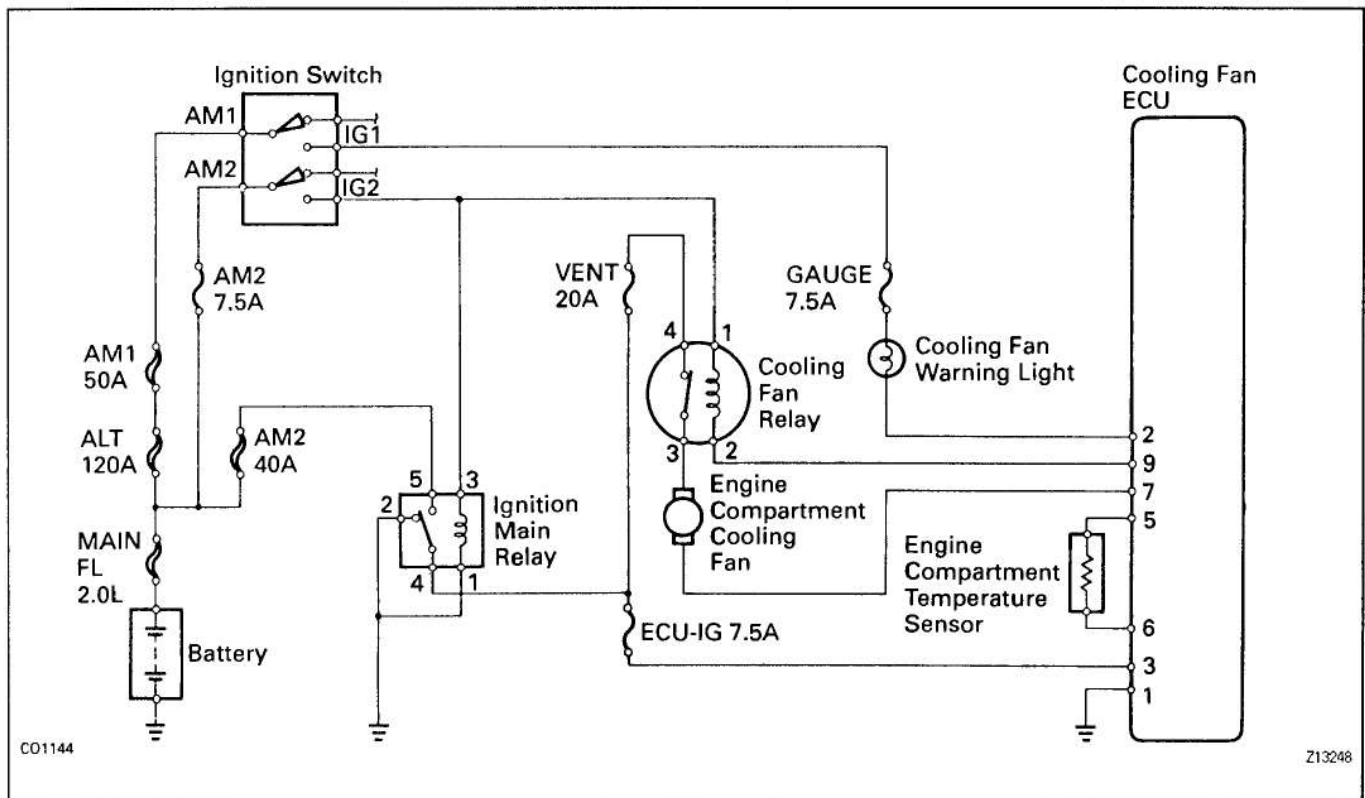
(See page EG-354)

EG107-03

ENGINE — COOLING SYSTEM

ENGINE COMPARTMENT ELECTRIC COOLING FAN (SW20)

Part Location

**System Circuit**

EG-364

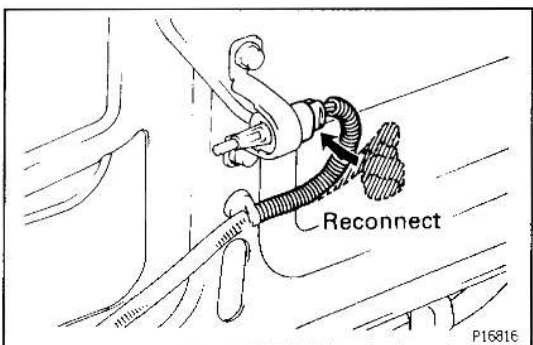
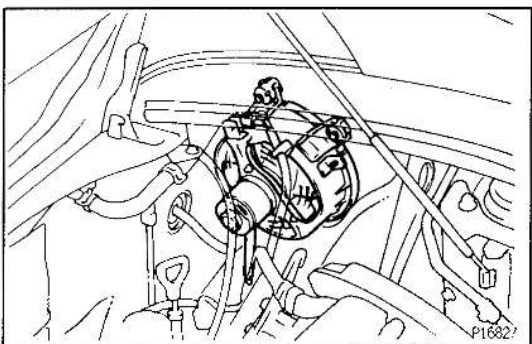
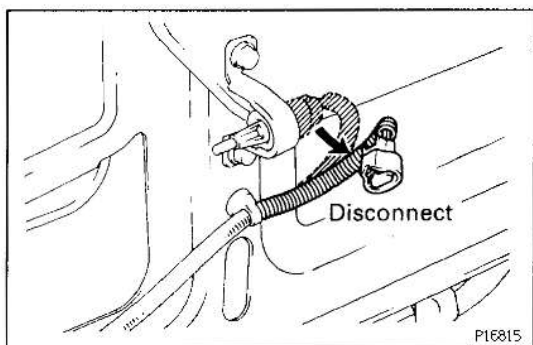
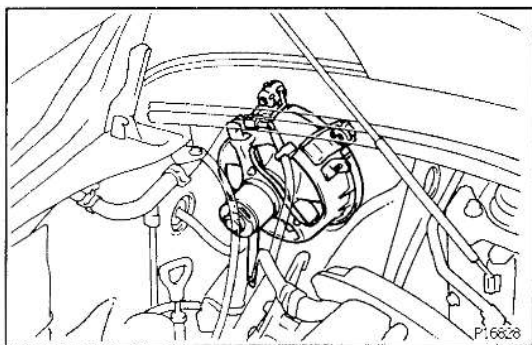
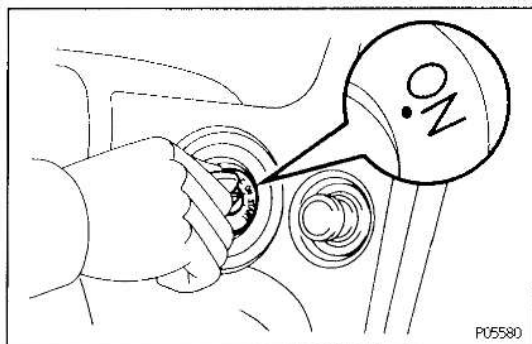
ENGINE — COOLING SYSTEM

EQ10K-08

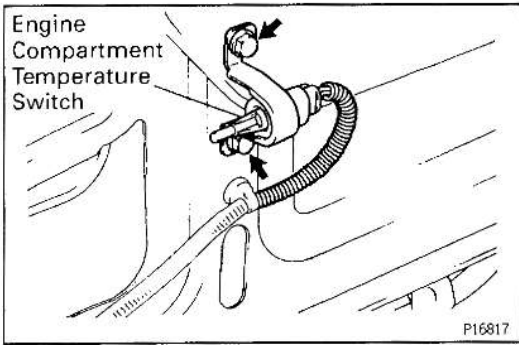
On – Vehicle Inspection

1. CHECK COOLING FAN OPERATION WITH LOW TEMPERATURE (Below 45.5°C (113.9°F))

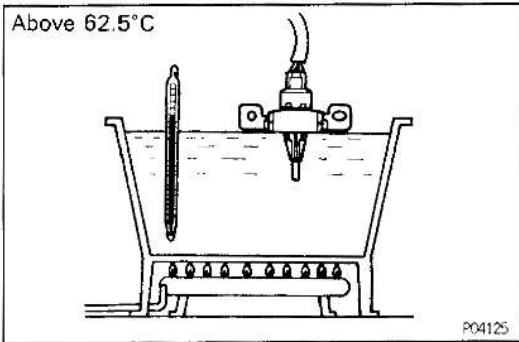
- (a) Turn the ignition switch ON.
- (b) Check that the cooling fan stops.
If not, check the cooling fan relay and engine compartment temperature switch, and check for a separated connector or severed wire between the cooling fan relay and engine compartment temperature sensor.
- (c) Disconnect the engine compartment temperature sensor connector.
- (d) Check that the cooling fan rotates.
If not, check the fan main relay, cooling fan relay, cooling fan ECU, cooling fan, fuses, and check for short circuit between the cooling fan relay and engine compartment temperature sensor.
- (e) Turn the ignition switch OFF.
- (f) Reconnect the engine compartment temperature sensor connector.



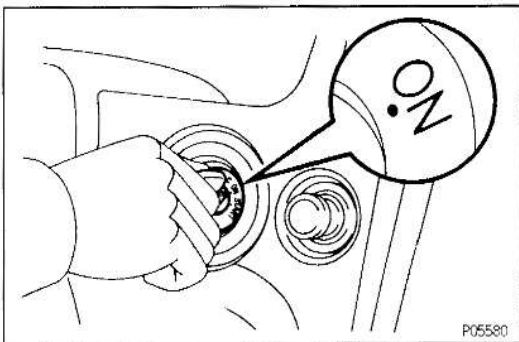
EG

ENGINE — COOLING SYSTEM**2. CHECK COOLING FAN OPERATION WITH HIGH TEMPERATURE (Above 62.5° C (144.5° F))**

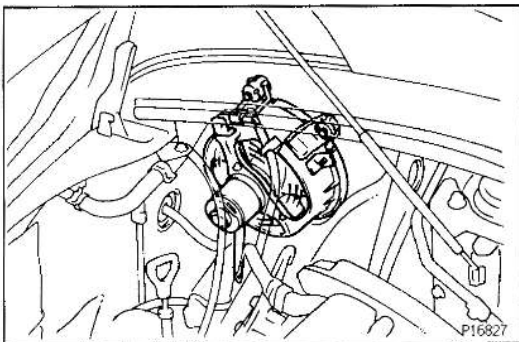
- (a) Remove the 2 bolts, and disconnect the engine compartment temperature sensor from the engine hood.



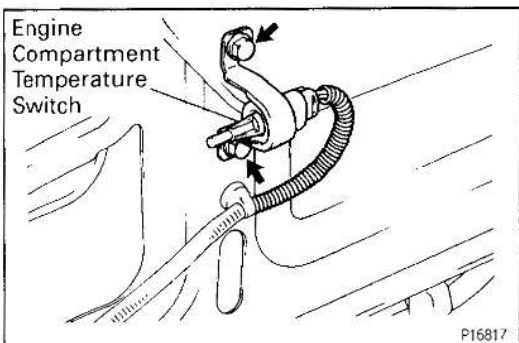
- (b) Heat the engine compartment temperature sensor to above 62.5° C(144.5° F).



- (c) Turn the ignition switch ON.



- (d) Check that the cooling fan rotates.
If not, replace the engine compartment temperature switch.

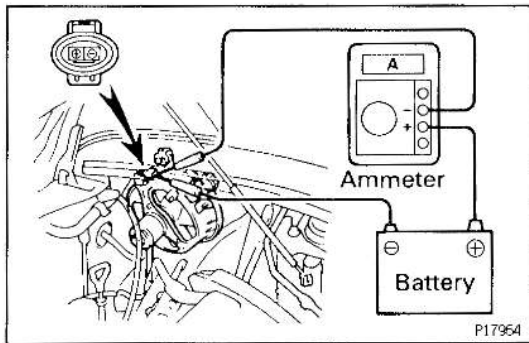


- (e) Reinstall the engine compartment temperature sensor with the 2 bolts.

EG

Cooling Fan**COOLING FAN INSPECTION****1. DISCONNECT COOLING FAN CONNECTOR**

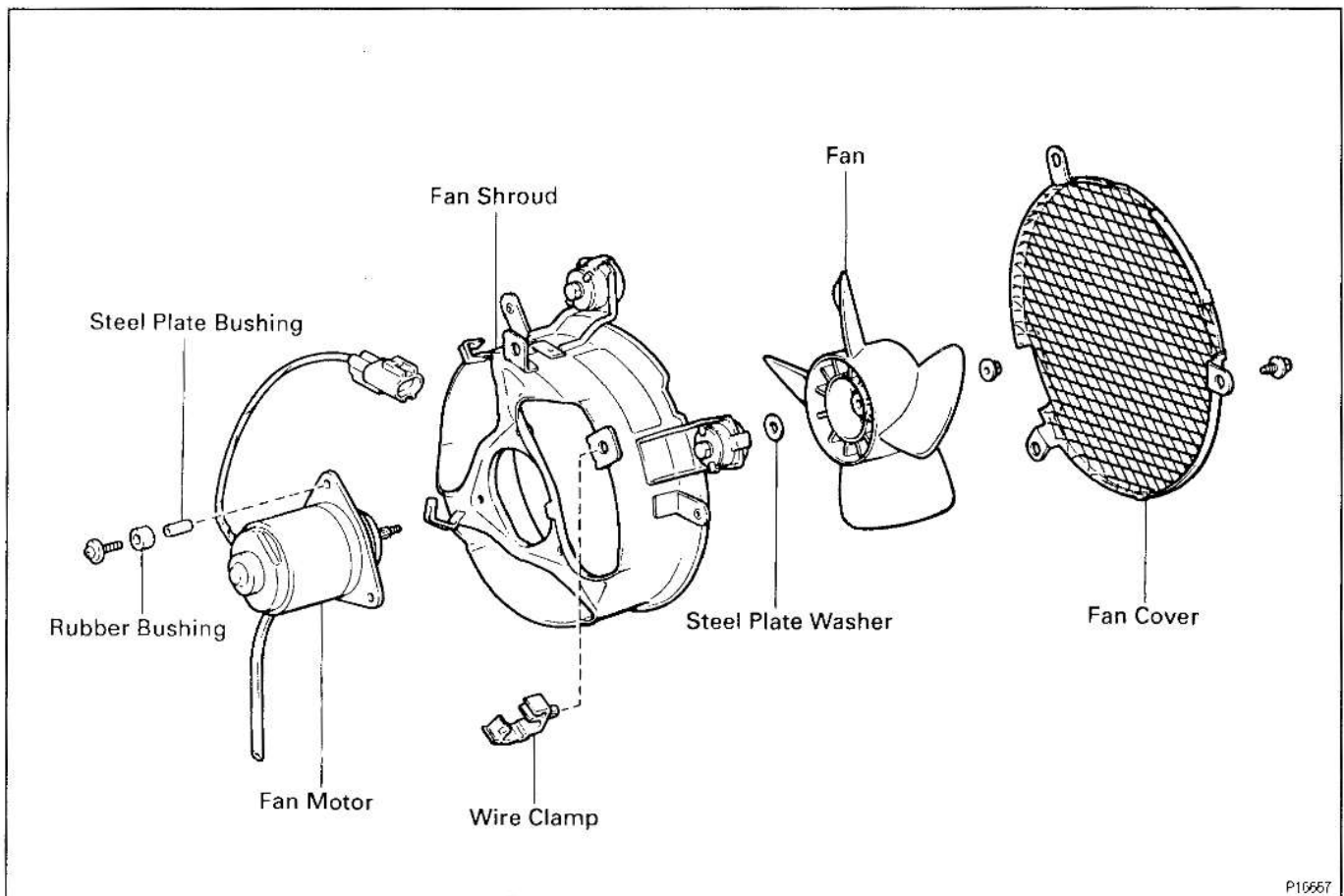
EG

**2. INSPECT COOLING FAN**

- (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:**1.7 – 2.9 A****3. RECONNECT COOLING FAN CONNECTOR****COMPONENTS FOR DISASSEMBLY AND ASSEMBLY**

EG078-17

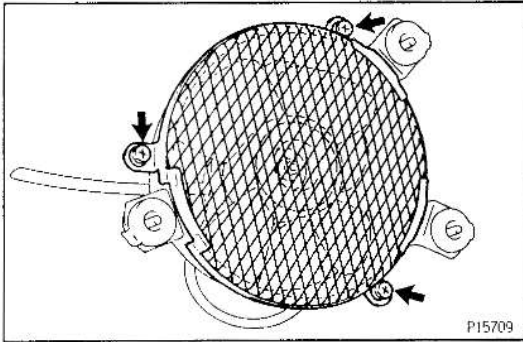


ENGINE — COOLING SYSTEM**EG-367**

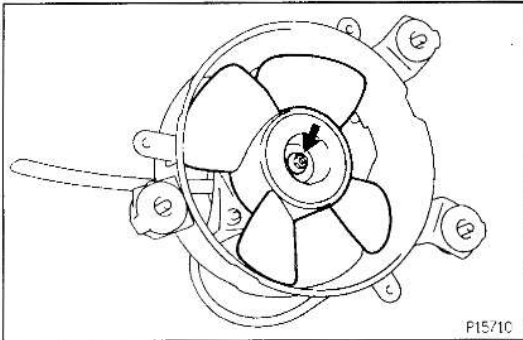
EG41M-01

COOLING FAN DISASSEMBLY**(See Components for Disassembly and Assembly)****1. REMOVE FAN COVER**

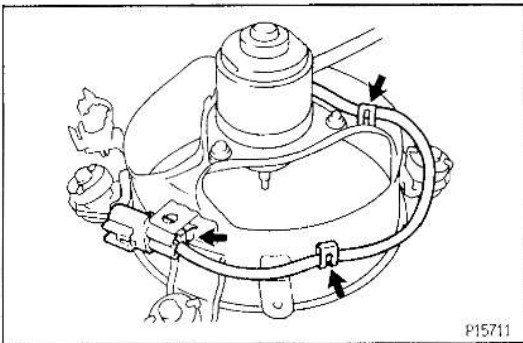
Remove the 3 screws and fan cover.

**2. REMOVE FAN**

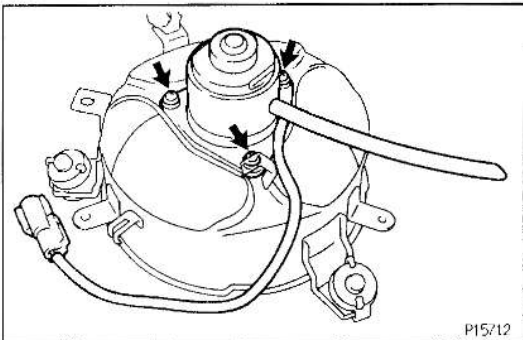
Remove the nut, fan and steel plate washer.

**3. REMOVE FAN MOTOR**

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



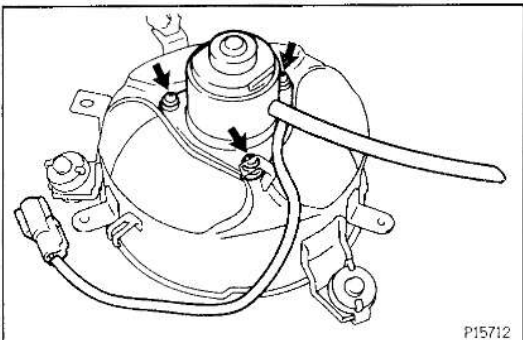
(b) Remove the 3 screws, rubber bushings, steel plate bushings and motor.

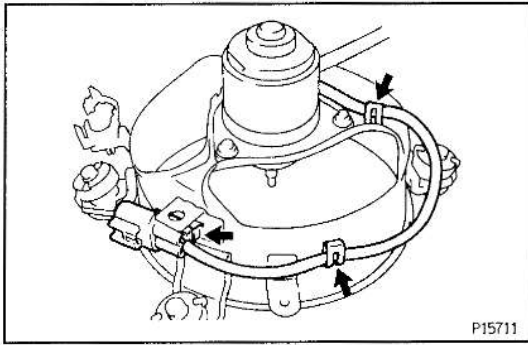
**COOLING FAN ASSEMBLY**

EG41M-01

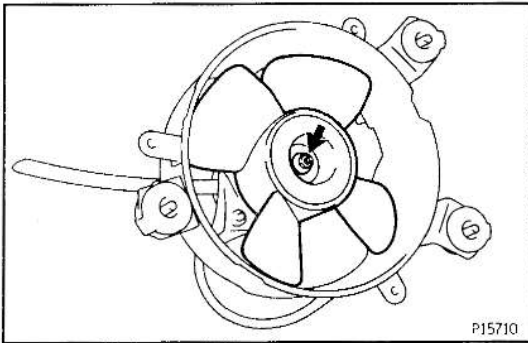
(See Components for Disassembly and Assembly)**1. INSTALL FAN MOTOR**

(a) Install the fan motor with the 3 steel plate bushings, rubber bushings and screws.

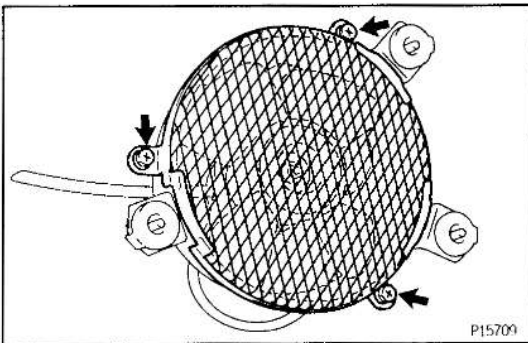


EG-368**ENGINE — COOLING SYSTEM****EG**

(b) Install the wire and connector to the fan shroud.

**2. INSTALL FAN**

Install the fan with the steel plate washer and nut.

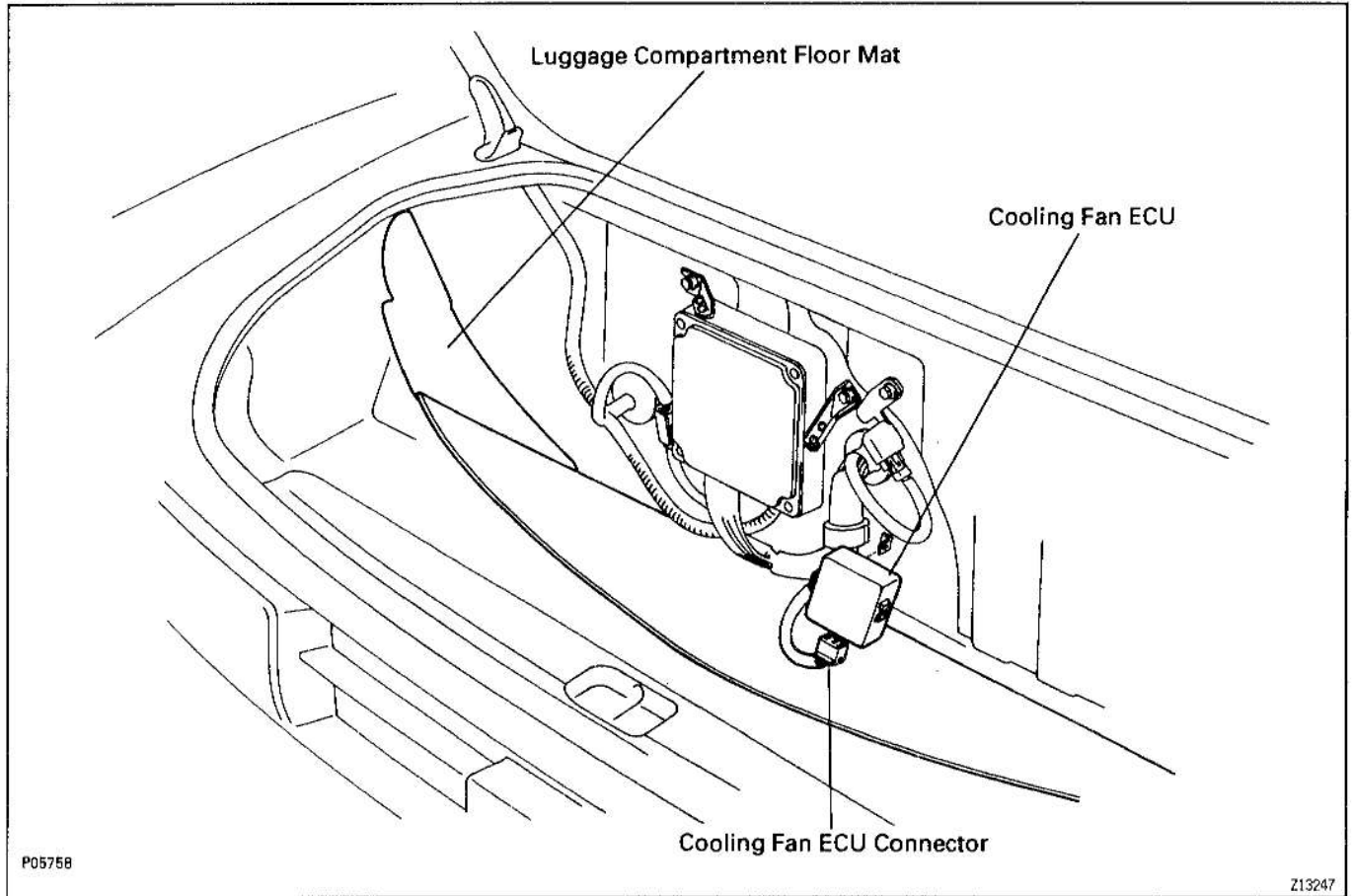
**3. INSTALL FAN COVER**

Install the fan cover with the 3 screws.

ENGINE — COOLING SYSTEM**EG-369**

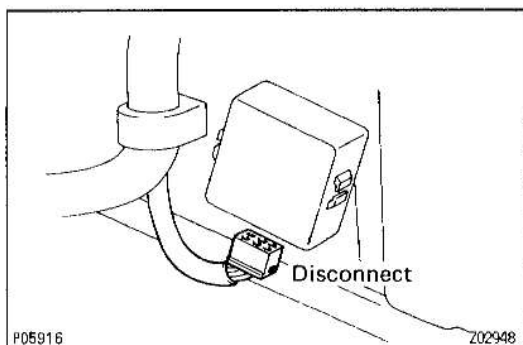
B407B-1B

Cooling Fan ECU COMPONENTS FOR REMOVAL AND INSTALLATION

**EG****COOLING FAN ECU INSPECTION**

BQ41P-01

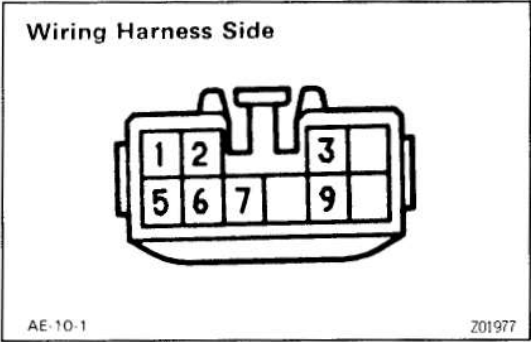
1. **DISCONNECT FRONT SIDE OF LUGGAGE LUGGAGE COMPARTMENT FLOOR MAT FROM PARTITION PANEL**



2. **DISCONNECT COOLING FAN ECU CONNECTOR**

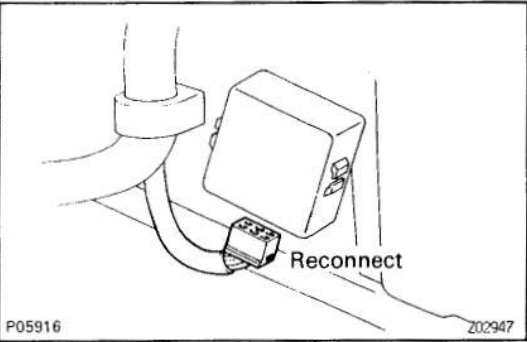
EG-370

ENGINE — COOLING SYSTEM



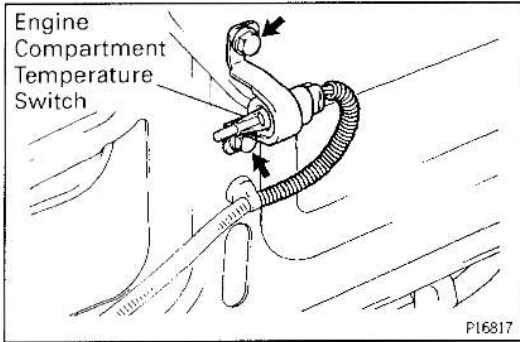
- 3. INSPECT COOLING FAN ECU**
- Check the connector on the wiring harness side as shown in the chart.

Check for	Tester connection	Condition		Specified value
Continuity	1 – Ground	–		Continuity
Voltage	2 – Ground	Ignition switch ON		Battery voltage
Voltage	3 – Ground	Ignition switch ON		Battery voltage
Resistance	5 – 6	Coolant temp.	20°C (68°F)	Approx. 2.45 kΩ
			57.5°C (135.5°F)	Approx. 0.63 kΩ
			80°C (176°F)	Approx. 0.32 kΩ
Voltage	7 – Ground	Ignition switch ON		Battery voltage
Continuity	9 – Ground	Ignition switch ON		Battery voltage



- 4. RECONNECT COOLING FAN ECU CONNECTOR**
- 5. REINSTALL LUGGAUGE COMPARTMENT FLOOR MAT**

ENGINE – COOLING SYSTEM



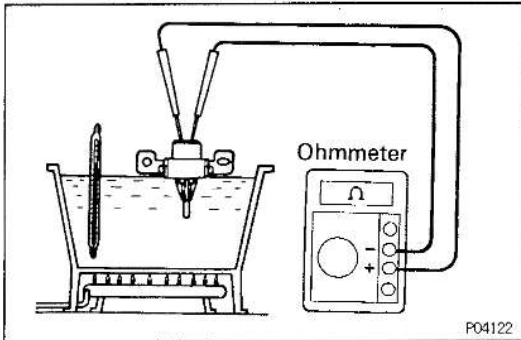
Engine Compartment Temperature Sensor

ENGINE COMPARTMENT TEMPERATURE SENSOR INSPECTION

1. REMOVE ENGINE COMPARTMENT TEMPERATURE SENSOR

- Disconnect the sensor connector.
- Remove the 2 bolts and sensor.

EG



2. INSPECT ENGINE COMPARTMENT TEMPERATURE SENSOR

Using an ohmmeter, measure the resistance between the terminals.

Resistance:

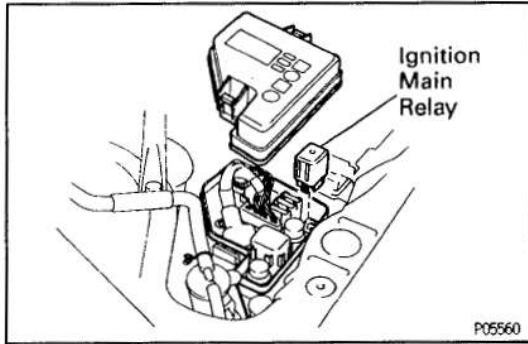
- At 20°C (68°F)
Approx. 2.45 kΩ
- At 57.5°C (135.5°F)
Approx. 0.63 kΩ
- At 80°C (176°F)
Approx. 0.32 kΩ

If resistance is not as specified, replace the sensor.

3. REINSTALL ENGINE COMPARTMENT TEMPERATURE SENSOR

EG-372**ENGINE — COOLING SYSTEM**

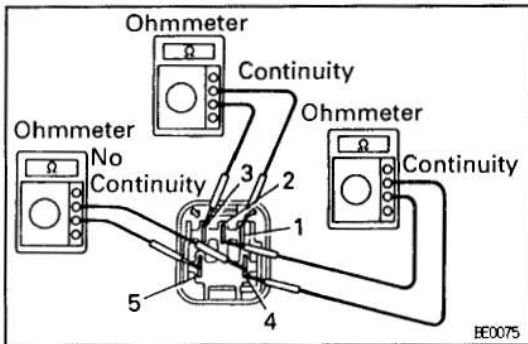
EG41R-01



Ignition Main Relay ("IGN")

IGNITION MAIN RELAY INSPECTION

1. REMOVE IGNITION MAIN RELAY

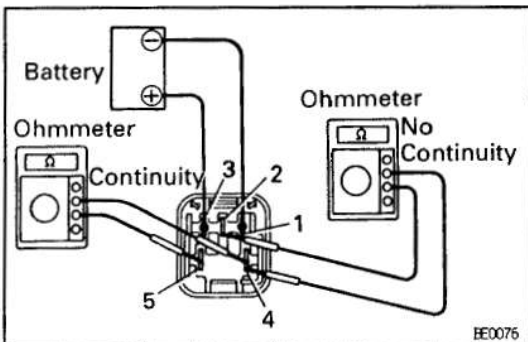


2. INSPECT IGNITION MAIN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 3.
- Check that there is continuity between terminals 2 and 4.
- Check that there is no continuity between terminals 4 and 5.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

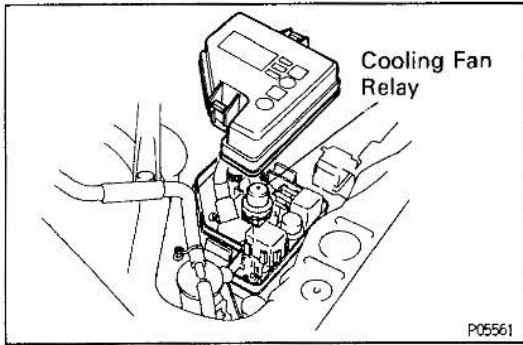
- Apply battery voltage across terminals 1 and 3.
- Using an ohmmeter, check that there is no continuity between terminals 2 and 4.
- Check that there is continuity between terminals 4 and 5.

If operation is not as specified, replace the relay.

3. REINSTALL IGNITION MAIN RELAY

ENGINE – COOLING SYSTEM**EG-373**

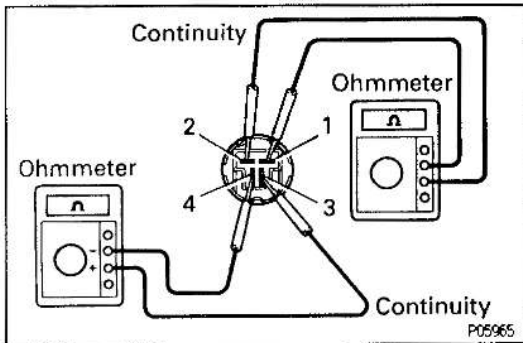
EG418-01



Cooling Fan Relay ("VENT")

COOLING FAN RELAY INSPECTION

1. REMOVE COOLING FAN RELAY

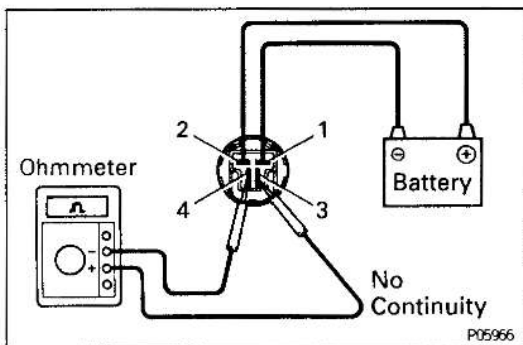


2. INSPECT COOLING FAN RELAY

A. Inspect relay continuity

- Using an ohmmeter, check that there is continuity between terminals 1 and 2.
- Check that there is continuity between terminals 3 and 4.

If continuity is not as specified, replace the relay.



B. Inspect relay operation

- Apply battery voltage across terminals 1 and 2.
- Using an ohmmeter, check that there is no continuity between terminals 3 and 4.

If operation is not as specified, replace the relay.

3. REINSTALL COOLING FAN RELAY

EG-374

ENGINE — COOLING SYSTEM

SERVICE SPECIFICATIONS

SERVICE DATA

EG07L-00

Thermostat	Valve opening temperature	80 — 84°C (176 — 183°F)
	Valve lift at 95°C (203°F)	10 mm (0.39 in.) or more
Radiator cap	Relief valve opening pressure STD	74 — 103 kPa (0.75 — 1.05 kgf/cm ² , 10.7 — 14.9 psi)
	Limit	59 kPa (0.6 kgf/cm ² , 8.5 psi)
Electric cooling fan (ST202)	Rotating amperage	5.7 — 7.7 A
Radiator electric cooling fan (SW20)	Rotating amperage	8.6 — 11.6 A
Engine compartment cooling fan (SW20)	Rotating amperage	1.7 — 2.9 A
Water temperature sensor (SW20 w/ A/C)	Resistance at 85°C (185°F)	Approx. 1.35 kΩ
	at 90°C (194°F)	Approx. 1.19 kΩ
	at 95°C (203°F)	Approx. 1.05 kΩ
Engine compartment temperature sensor (SW20)	Resistance at 20°C (68°F)	Approx. 2.45 kΩ
	at 57.5°C (135.5°F)	Approx. 0.63 kΩ
	at 80°C (176°F)	Approx. 0.32 kΩ

TORQUE SPECIFICATIONS

EG07M-0T

Part tightened	N·m	kgf·cm	ft·lbf
Cylinder block x Drain plug	25	250	18
Radiator pipe x Drain plug (SW20)	17	170	12
Water pump x Water pump cover	8.8	90	78 in·lbf
Water pump x Cylinder block	10 mm head	7.5	66 in·lbf
	12 mm head (SW20 w/o A/C)	19	14
Water bypass pipe x Water pump cover	10	100	7
Idler pulley bracket for alternator drive belt x Cylinder block (ST202)	Water pump side	23	17
	Cylinder block side	19	14
No.3 timing belt cover x Cylinder head	8.0	82	71 in·lbf
No.1 exhaust manifold heat insulator x Exhaust manifold	20	200	15
No.2 idler pulley x Oil pump	44	450	32
Timing belt tensioner x Cylinder head	21	210	15
No.1 idler pulley x Cylinder head	52	530	38
Camshaft timing pulley x Camshaft		59	43
	for SST	41	30
Water inlet x Water pump cover	9.0	92	80 in·lbf