

REPLACEMENT

1. REMOVE FRONT SPOILER COVER (w/ Front Spoiler)
2. REMOVE ENGINE UNDER COVER (w/ Cover)
3. DRAIN COOLANT (for Engine)

NOTICE:

Do not remove the reservoir tank cap, cylinder block drain cock plugs and radiator drain cock plug while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

- (a) Loosen the radiator drain cock plug and drain the coolant.

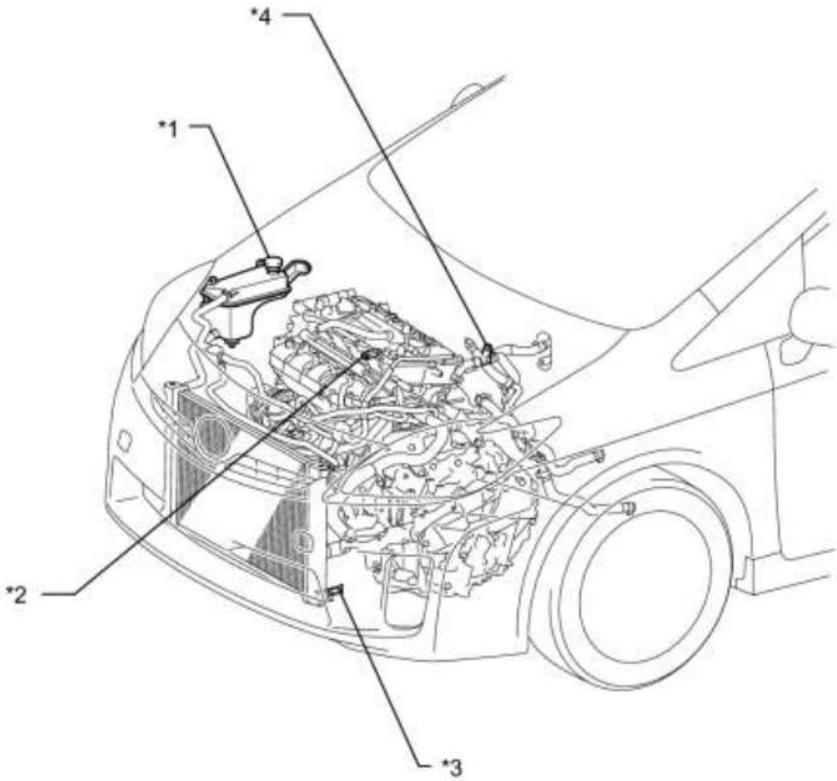
HINT:

Collect the coolant in a container and dispose of it according to the local regulations.

- (b) Loosen the cylinder block drain cock plug.

HINT:

The plug is on the back of the generator on the exhaust manifold side.



c

Text in Illustration

*1	Reservoir Tank Cap	*2	Cylinder Block Drain Cock Plug
*3	Radiator Drain Cock Plug	*4	Air Release Valve

4. ADD COOLANT (for Engine)

- (a) Tighten the radiator drain cock plug.
- (b) Tighten the cylinder block drain cock plug.

Torque: 13 N·m (130 kgf·cm, 9ft·lbf)

- (c) Remove the reservoir tank cap.
- (d) Connect the hose to the air release valve.
- (e) Loosen the air release valve.
- (f) Add TOYOTA Super Long Life Coolant (SLLC) to the reservoir tank filler opening until coolant overflows from the air release valve. Then tighten the air release valve.

Standard Capacity:

Item	Capacity
Engine coolant	w/ Exhaust Heat Recirculation System:
	7.3 liters (7.7 US qts, 6.4 Imp. qts)
	w/o Exhaust Heat Recirculation System:
	6.5 liters (6.8 US qts, 5.7 Imp. qts)

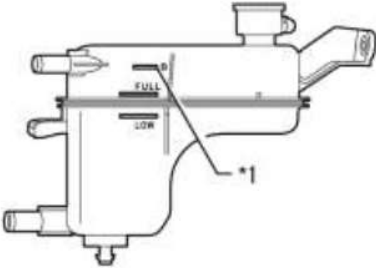
HINT:

- TOYOTA vehicles are filled with TOYOTA SLLC at the factory. In order to avoid damage to the engine cooling system and other technical problems, only use TOYOTA SLLC or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite, non-borate coolant with long-life hybrid organic acid technology (coolant with long-life hybrid organic acid technology is a combination of low phosphates and organic acids).
- Contact your TOYOTA dealer for further details.

NOTICE:

Never use water as a substitute for engine coolant.

(g) Disconnect the hose from the air release valve.



(h) Add coolant to B line of the reservoir tank.

Text in Illustration

*1	B Line
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(i) Squeeze the inlet and outlet radiator hoses several times by hand, and then check the level of the coolant.

If the coolant level is low, add coolant.

(j) Put the engine in inspection mode INFO.

(k) Install the reservoir tank cap, and warm up the engine sufficiently.

(l) Bleed air from the cooling system.

NOTICE:

- Before starting the engine, turn the A/C switch off.
- Adjust the heater control to the maximum hot setting.

- Adjust the blower speed to low setting.

(1) Warm up the engine until the thermostat opens. While the thermostat is open, allow the coolant to circulate for several minutes.

HINT:

The thermostat opening timing can be confirmed by squeezing the inlet radiator hose by hand, and sensing vibrations when the engine coolant starts to flow inside the hose.

When squeezing the radiator hose:

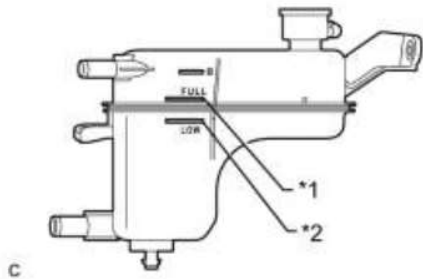
- Wear protective gloves.
- Be careful as the radiator hoses are hot.
- Keep your hands away from the radiator fan.

- (2) After the engine is warmed up, let it idle for 7 minutes or more.
- (3) Squeeze the inlet and outlet radiator hoses several times by hand to bleed air from the system.

When squeezing the radiator hose:

- Wear protective gloves.
- Be careful as the radiator hoses are hot.
- Keep your hands away from the radiator fan.

(m) After the engine has cooled down, check that the coolant level is between full and low.



Text in Illustration

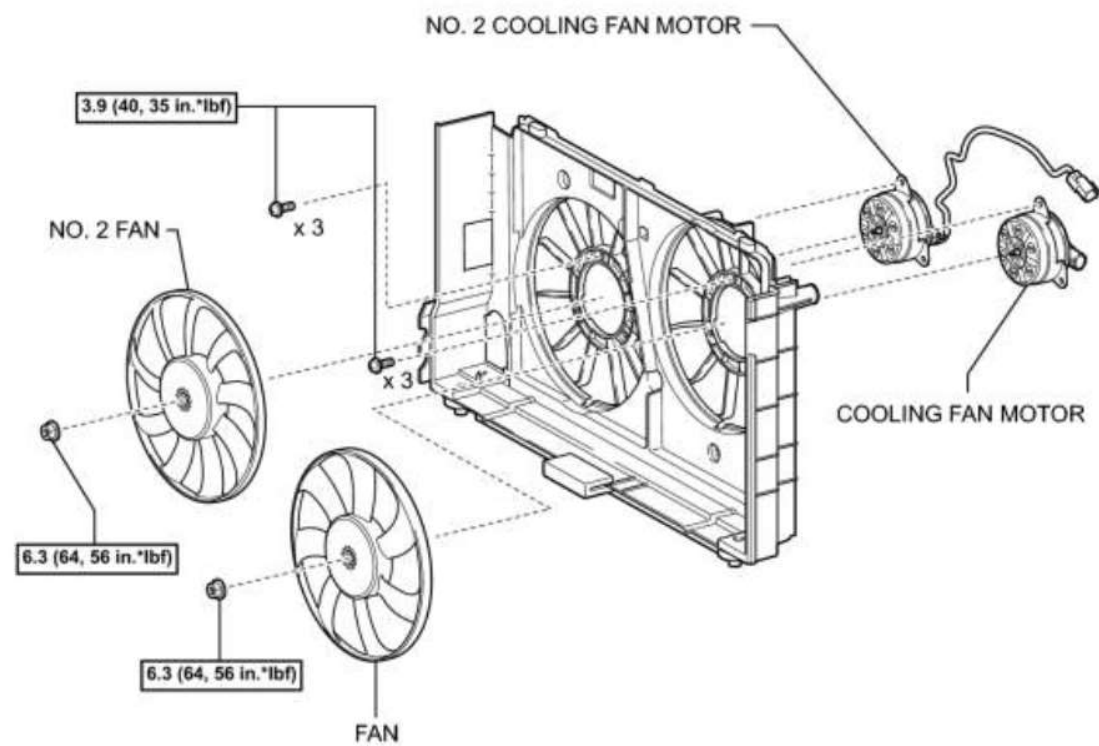
*1	Full Line
*2	Low Line

If the coolant level is low, add coolant to the full line on the reservoir tank.

5. INSPECT FOR COOLANT LEAK (for Engine)_INFO
6. INSTALL ENGINE UNDER COVER (w/ Cover)
7. INSTALL FRONT SPOILER COVER (w/ Front Spoiler)

COMPONENTS

ILLUSTRATION



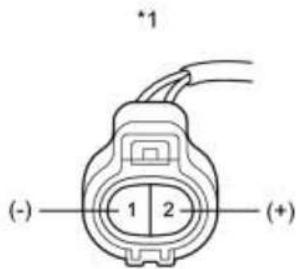
[N*m (kgf*cm, ft.*lbf)]: Specified torque

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ON-VEHICLE INSPECTION

1. INSPECT COOLING FAN MOTOR



(a) Check that the motor operates smoothly when the battery is connected to the cooling fan motor connector.

Text in Illustration

*1	Front view of wire harness connector (to Cooling Fan Motor)
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(b) Clamp the 400 A probe of an ammeter over the M+ wire of the cooling fan motor.

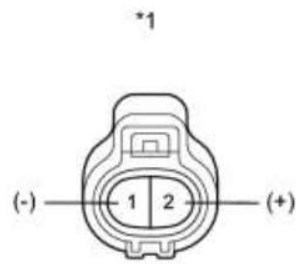
(c) Measure the current while the motor is operating.

Standard Current:

Item	Condition	Specified Condition
Cooling fan motor	20°C (68°F)	4.7 to 8.7 A at 12 V

If the result is not as specified, replace the cooling fan motor.

2. INSPECT NO. 2 COOLING FAN MOTOR



(a) Check that the motor operates smoothly when the battery is connected to the No. 2 cooling fan motor connector.

Text in Illustration

*1	Front view of wire harness connector (to No. 2 Cooling Fan Motor)
----	--

(b) Clamp the 400 A probe of an ammeter over the M+ wire of the No. 2 cooling fan motor.

(c) Measure the current while the motor is operating.

Standard Current:

Item	Condition	Specified Condition
No. 2 cooling fan motor	20°C (68°F)	4.7 to 8.7 A at 12 V

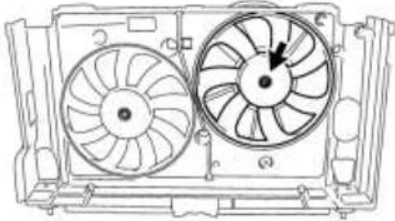
If the result is not as specified, replace the No. 2 cooling fan motor.

REMOVAL

1. REMOVE RADIATOR ASSEMBLY

HINT: INFO

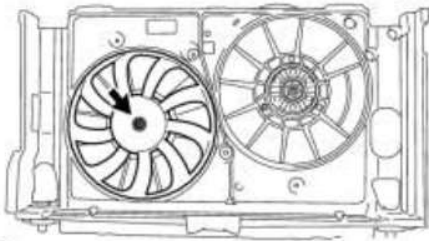
2. REMOVE FAN



(a) Remove the nut and fan.

C

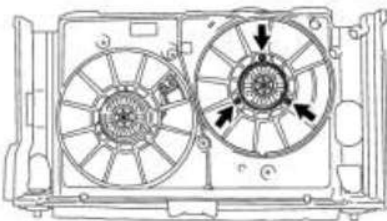
3. REMOVE NO. 2 FAN



(a) Remove the nut and No. 2 fan.

C

4. REMOVE COOLING FAN MOTOR

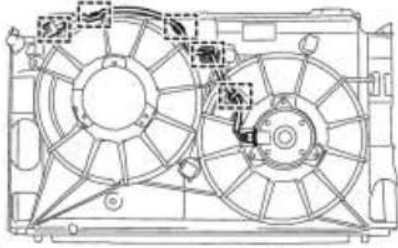


(a) Remove the 3 screws and cooling fan motor.

C

5. REMOVE NO. 2 COOLING FAN MOTOR

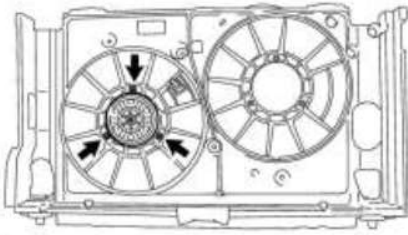
(a) Disconnect the 5 clamps.



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NOTICE:

Be careful not to damage the connector.

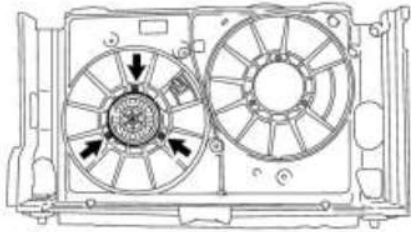


c

(b) Remove the 3 screws and No. 2 cooling fan motor.

INSTALLATION

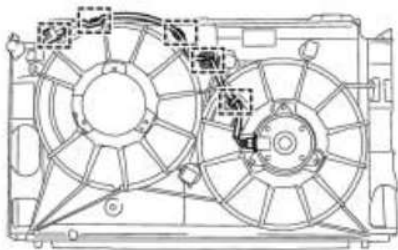
1. INSTALL NO. 2 COOLING FAN MOTOR



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(a) Install the No. 2 cooling fan motor with the 3 screws.

Torque: **3.9 N·m (40 kgf·cm, 35in·lbf)**



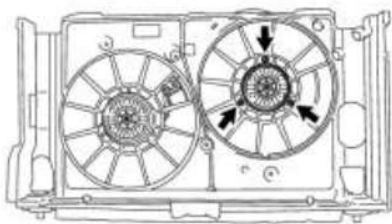
c

(b) Connect the 5 clamps.

NOTICE:

Be careful not to damage the connector.

2. INSTALL COOLING FAN MOTOR



c

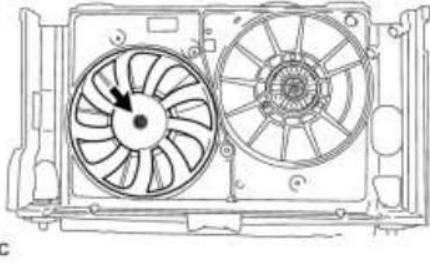
(a) Install the cooling fan motor with the 3 screws.

Torque: **3.9 N·m (40 kgf·cm, 35in·lbf)**

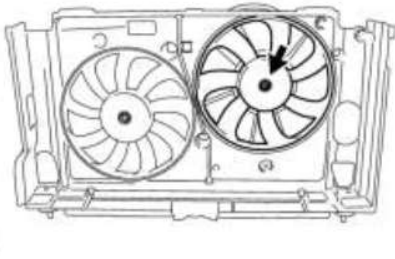
3. INSTALL NO. 2 FAN

(a) Install the No. 2 fan with the nut.

Torque: **6.3 N·m (64 kgf·cm, 56in·lbf)**



4. INSTALL FAN



(a) Install the fan with the nut.

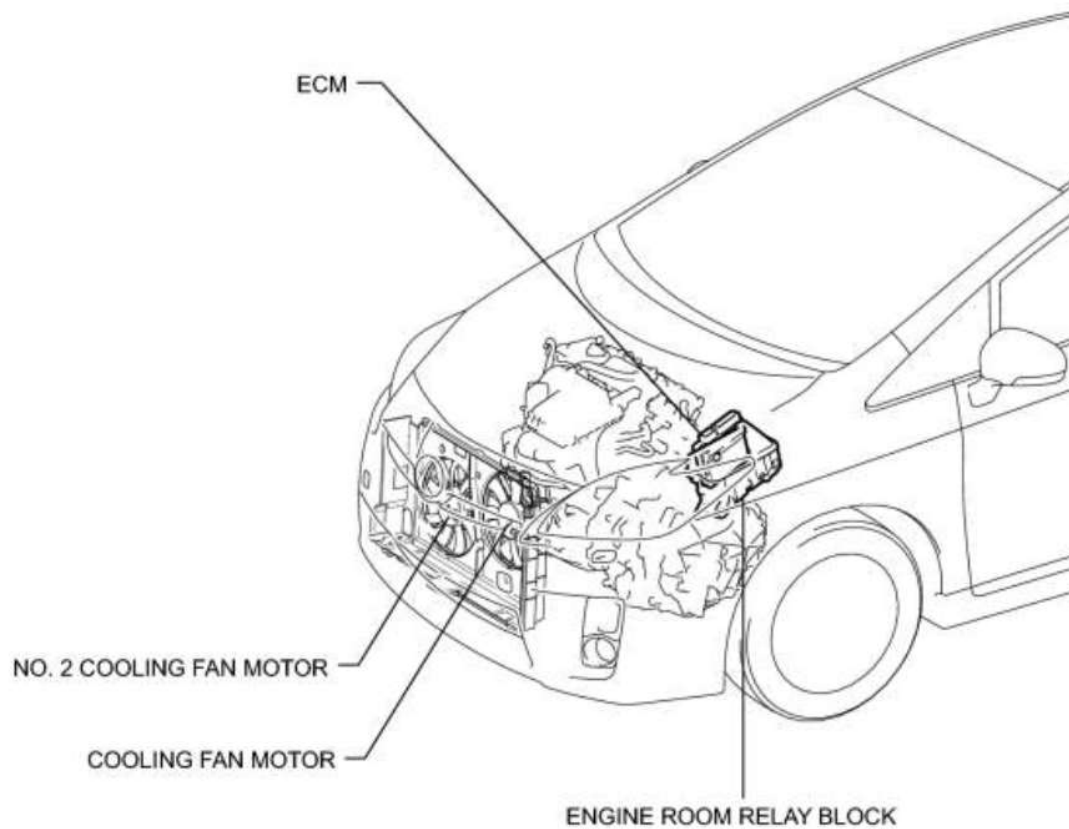
Torque: **6.3 N·m (64 kgf·cm, 56in·lbf)**

5. INSTALL RADIATOR ASSEMBLY

HINT: INFO

PARTS LOCATION

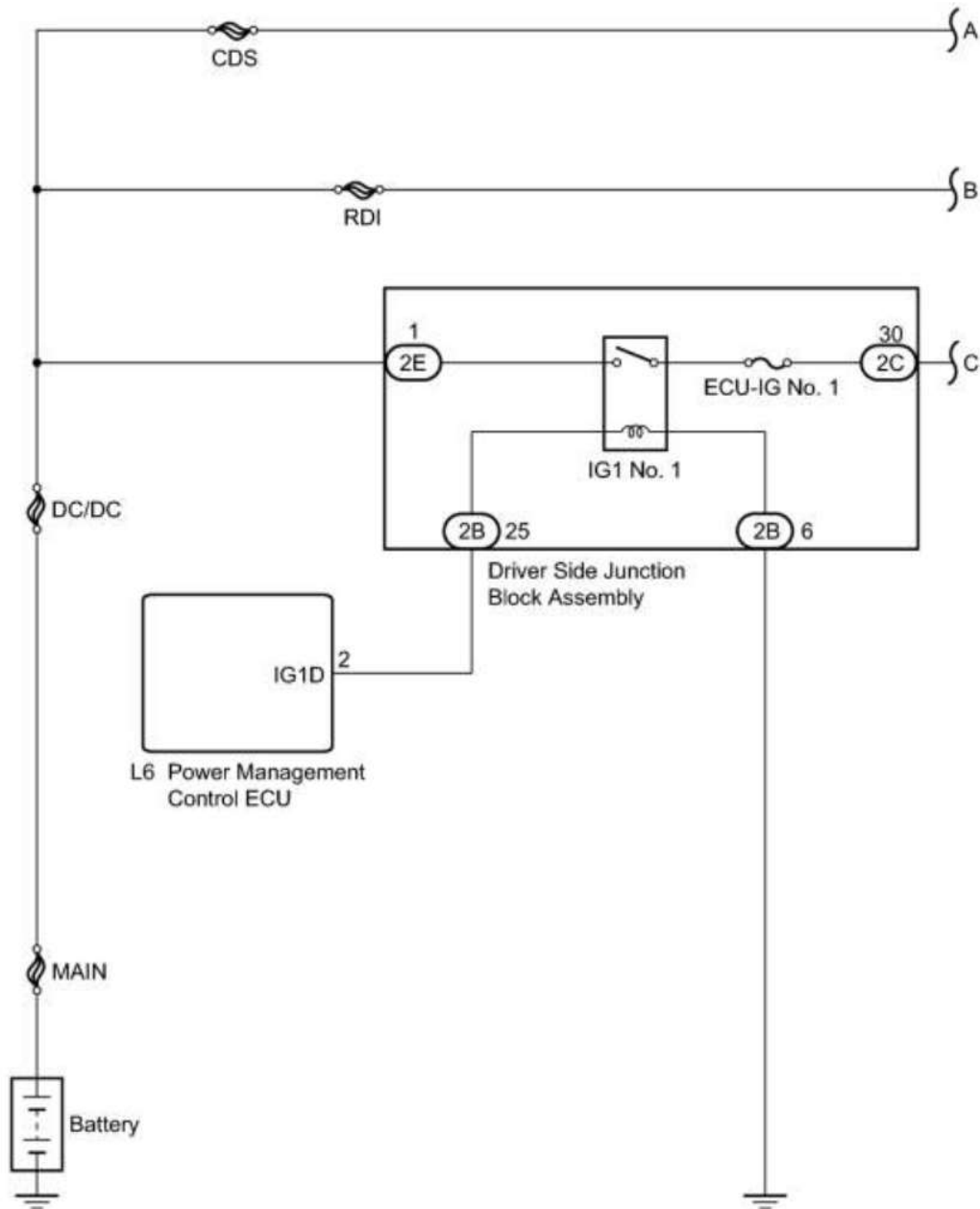
ILLUSTRATION



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SYSTEM DIAGRAM



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PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses related to this system before inspecting the suspected areas below.

Cooling Fan System

Symptom	Suspected Area	See page
Cooling fans do not operate (main and sub fans)	Cooling fan circuit	INFO
	FAN No. 3 relay	INFO
	Cooling fan motor	INFO
	No. 2 cooling fan motor	INFO
	Air conditioning system	INFO
	ECM	INFO
Cooling fan does not operate (main fan)	Engine coolant temperature sensor	INFO
	Cooling fan circuit	INFO
	FAN No. 1 relay	INFO
	FAN No. 2 relay	INFO
	Cooling fan motor	INFO
	ECM	INFO
Cooling fan does not operate (sub fan)	Cooling fan circuit	INFO
	No. 2 cooling fan motor	INFO
	Air conditioning system	INFO
	ECM	INFO
Cooling fans do not stop (main and sub fans)	Cooling fan circuit	INFO
	Air conditioning system	INFO
	FAN No. 3 relay	INFO
	ECM	INFO
Cooling fan does not stop (main fan)	Engine coolant temperature sensor	INFO
	Cooling fan circuit	INFO
	FAN No. 1 relay	INFO
	ECM	INFO
Cooling fan speed does not change (main and sub fans)	Engine coolant temperature sensor	INFO
	Cooling fan circuit	INFO
	FAN No. 2 relay	INFO
	ECM	INFO

ON-VEHICLE INSPECTION

1. INSPECT COOLING FAN SYSTEM

- (a) Connect the Techstream to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Enter the following menus: Powertrain / Engine / Active Test / Control the Electric Cooling Fan.
- (d) Check operation of the cooling fans while operating them using the Techstream. If the cooling fans do not operate, check the cooling fan circuit .

Cooling Fan Circuit

DESCRIPTION

The ECM turns on or off the fan relays using signals calculated from the engine coolant temperature, air conditioning switch (on/off), air conditioning refrigerant pressure, engine speed, and vehicle speed signals.

The ECM switches the circuit of the cooling fan motors between series and parallel by turning on or off the fan relays in order to control the speed of the cooling fan motors in two steps.

WIRING DIAGRAM

Refer to System Diagram .

INSPECTION PROCEDURE

NOTICE:

Inspect the fuses for circuits related to this system before performing the following inspection procedure.

PROCEDURE

1. PERFORM ACTIVE TEST USING TECHSTREAM (CONTROL THE ELECTRIC COOLING FAN)

- (a) Connect the Techstream to the DLC3.
- (b) Turn the power switch on (IG).
- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine and ECT / Active Test / Control the Electric Cooling Fan.

OK:

Tester Operation	Specified Condition
ON	Fans operate
OFF	Fans do not operate

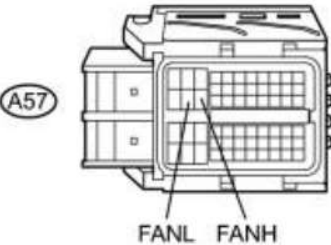
NG  [INSPECT ECM \(FANL AND FANH VOLTAGE\)](#)

OK  **PROCEED TO NEXT SUSPECTED AREA SHOWN IN PROBLEM SYMPTOMS TABLE**

2. INSPECT ECM (FANL AND FANH VOLTAGE)

- (a) Disconnect the ECM connector.

*1



N

- (b) Turn the power switch on (IG).
- (c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
A57-22 (FANH) - Body ground	Power switch on (IG)	11 to 14 V
A57-21 (FANL) - Body ground	Power switch on (IG)	11 to 14 V

Text in Illustration

*1	Front view of wire harness connector (to ECM)
----	--

- (d) Reconnect the ECM connector.

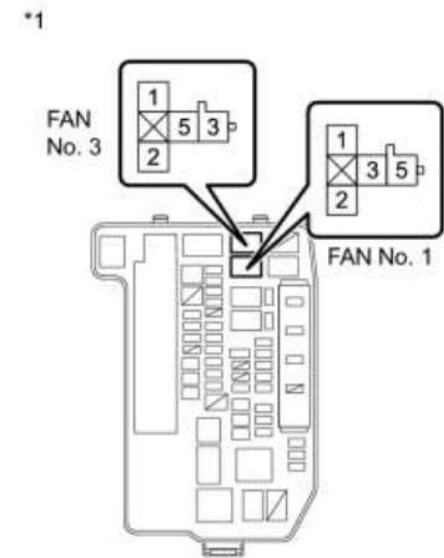
NG▶[CHECK FUSE \(ECU-IG NO. 1 FUSE VOLTAGE\)](#)

OK



3.	INSPECT ENGINE ROOM RELAY BLOCK (FAN NO. 1 RELAY AND FAN NO. 3 RELAY VOLTAGE)
----	---

- (a) Remove the FAN No. 1 relay and FAN No. 3 relay from the engine room relay block.



(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
3 (FAN No. 1 relay) - Body ground	Always	11 to 14 V
5 (FAN No. 3 relay) - Body ground	Always	11 to 14 V

Text in Illustration

*1	Engine Room Relay Block
----	-------------------------

(c) Reinstall the FAN No. 1 relay and FAN No. 3 relay.

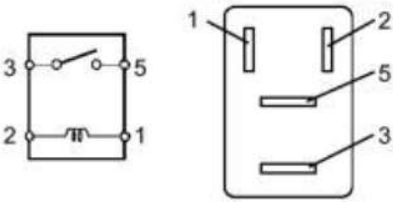
NG▶REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - ENGINE ROOM RELAY BLOCK)

OK



4.	INSPECT FAN NO. 1 RELAY
----	-------------------------

(a) Remove the FAN No. 1 relay from the engine room relay block.



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

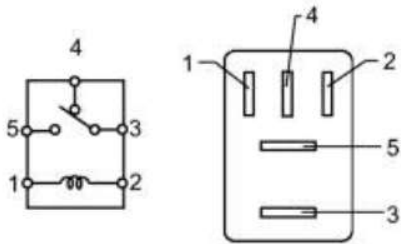
(c) Reinstall the FAN No. 1 relay.

NG▶REPLACE FAN NO. 1 RELAY

OK



5.	INSPECT FAN NO. 2 RELAY
----	-------------------------



(a) Remove the FAN No. 2 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage is not applied between terminals 1 and 2	Below 1 Ω
	Battery voltage is applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

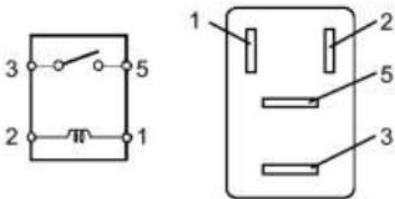
(c) Reinstall the FAN No. 2 relay.

NG▶ REPLACE FAN NO. 2 RELAY

OK



6. INSPECT FAN NO. 3 RELAY



(a) Remove the FAN No. 3 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

(c) Reinstall the FAN No. 3 relay.

NG▶ REPLACE FAN NO. 3 RELAY

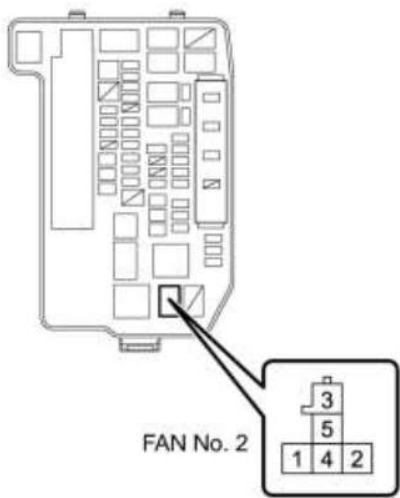
OK



7. CHECK HARNESS AND CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)

(a) Remove the FAN No. 2 relay from the engine room relay block.

*1



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
5 (FAN No. 2 relay) - Body ground	Always	Below 1 Ω

Text in Illustration

*1	Engine Room Relay Block
----	-------------------------

(c) Reinstall the FAN No. 2 relay.

NG▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (FAN NO. 2 RELAY - BODY GROUND)

OK



8.	INSPECT COOLING FAN MOTOR
----	---------------------------

(a) Disconnect the cooling fan motor connector.

*1



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(b) Check that the cooling fan motor operates smoothly when the battery is connected to the cooling fan motor connector.

(c) Measure the current while the motor is operating.

Standard Current:

Tester Connection	Condition	Specified Condition
1 - 2	Always	11.2 to 14.5 A

Text in Illustration

*1	Component without harness connected (Cooling Fan Motor)
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(d) Reconnect the cooling fan motor connector.

NG▶ REPLACE COOLING FAN MOTOR

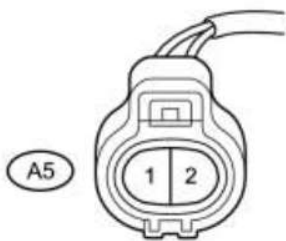
OK



9.	CHECK HARNESS AND CONNECTOR (COOLING FAN MOTOR - BODY GROUND)
----	---

(a) Disconnect the cooling fan motor connector.

*1



(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
A5-1 - Body ground	Always	Below 1 Ω

Text in Illustration

*1	Front view of wire harness connector (to Cooling Fan Motor)
----	--

(c) Reconnect the cooling fan motor connector.

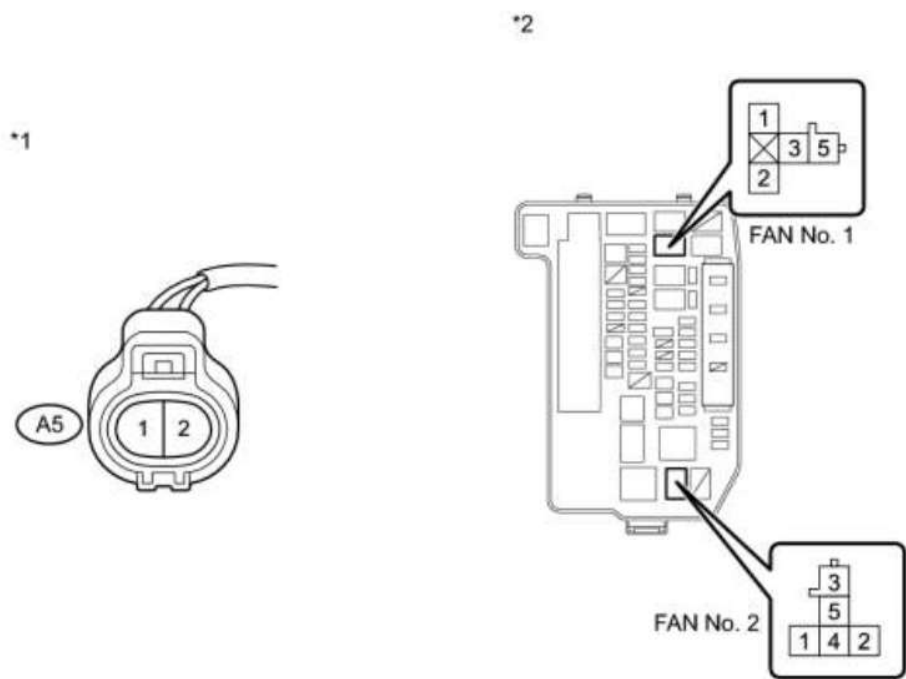
NG▶ REPAIR OR REPLACE HARNESS OR CONNECTOR (COOLING FAN MOTOR - BODY GROUND)

OK



10.	CHECK HARNESS AND CONNECTOR (COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)
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(a) Disconnect the cooling fan motor connector.



(b) Remove the FAN No. 1 relay and FAN No. 2 relay from the engine room relay block.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
A5-2 - 5 (FAN No. 1 relay)	Always	Below 1 Ω
A5-2 - 4 (FAN No. 2 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
A5-2 or 5 (FAN No. 1 relay) - Body ground	Always	10 kΩ or higher
A5-2 or 4 (FAN No. 2 relay) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to Cooling Fan Motor)
*2	Engine Room Relay Block

- (d) Reconnect the cooling fan motor connector.
- (e) Reinstall the FAN No. 1 relay and FAN No. 2 relay.

NG▶REPAIR OR REPLACE HARNESS OR CONNECTOR (COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)

OK



11.

INSPECT NO. 2 COOLING FAN MOTOR

*1



(a) Disconnect the No. 2 cooling fan motor connector.

c

- (b) Check that the No. 2 cooling fan motor operates smoothly when the battery is connected to the No. 2 cooling fan motor connector.
- (c) Measure the current while the motor is operating.

Standard Current:

Tester Connection	Condition	Specified Condition
1 - 2	Always	7.4 to 10.9 A

Text in Illustration

*1	Component without harness connected (No. 2 Cooling Fan Motor)
----	--

- (d) Reconnect the No. 2 cooling fan fan motor connector.

NG▶REPLACE NO. 2 COOLING FAN MOTOR

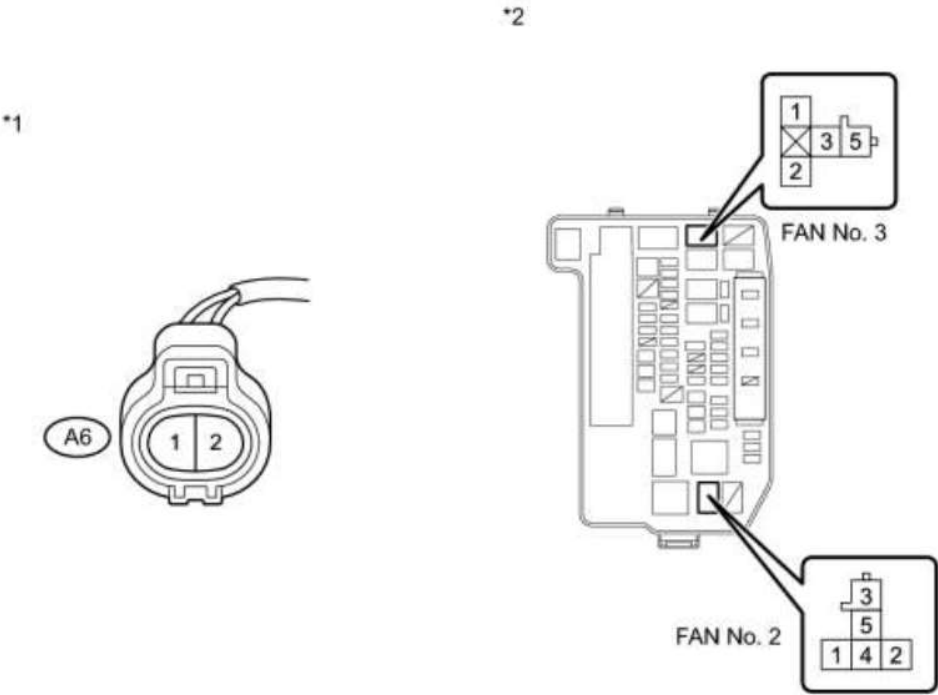
OK



12.

CHECK HARNESS AND CONNECTOR (NO. 2 COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)

(a) Disconnect the No. 2 cooling fan motor connector.



(b) Remove the FAN No. 2 relay and FAN No. 3 relay from the engine room relay block.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
A6-1 - 3 (FAN No. 2 relay)	Always	Below 1 Ω
A6-2 - 3 (FAN No. 3 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
A6-1 or 3 (FAN No. 2 relay) - Body ground	Always	10 kΩ or higher
A6-2 or 3 (FAN No. 3 relay) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to No. 2 Cooling Fan Motor)
*2	Engine Room Relay Block

- (d) Reconnect the No. 2 cooling fan motor connector.
- (e) Reinstall the FAN No. 2 relay and FAN No. 3 relay.

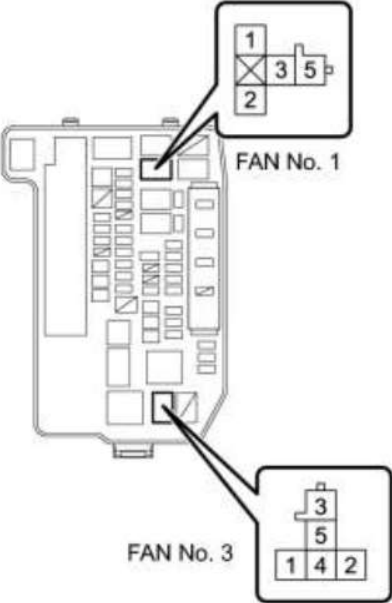
NG▶REPAIR OR REPLACE HARNESS OR CONNECTOR (NO. 2 COOLING FAN MOTOR - ENGINE ROOM RELAY BLOCK)

OK

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13.	INSPECT ENGINE ROOM RELAY BLOCK (FAN NO. 1 RELAY - FAN NO. 2 RELAY)
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*1



FAN No. 1

FAN No. 3

(a) Remove the FAN No. 1 relay and FAN No. 2 relay from the engine room relay block.

- (b) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
1 (FAN No. 1 relay) - 1 (FAN No. 2 relay)	Always	Below 1 Ω

Tester Connection	Condition	Specified Condition
2 (FAN No. 1 relay) - 2 (FAN No. 2 relay)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
1 (FAN No. 1 relay) or 1 (FAN No. 2 relay) - Body ground	Always	10 k Ω or higher
2 (FAN No. 1 relay) or 2 (FAN No. 2 relay) - Body ground	Always	10 k Ω or higher

Text in Illustration

*1	Engine Room Relay Block
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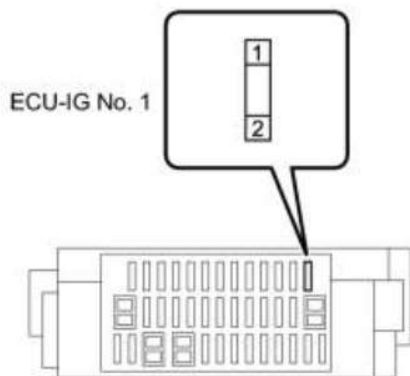
(c) Reinstall the FAN No. 1 relay and FAN No. 2 relay.

NG ► REPLACE ENGINE ROOM RELAY BLOCK

OK ► REPLACE ECM

14.	CHECK FUSE (ECU-IG NO. 1 FUSE VOLTAGE)
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*1



(a) Remove the ECU-IG No. 1 fuse from the instrument panel junction block.

c

(b) Turn the power switch on (IG).

(c) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Switch Condition	Specified Condition
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Tester Connection	Switch Condition	Specified Condition
1 (ECU-IG No. 1 fuse) - Body ground	Power switch on (IG)	11 to 14 V

Text in Illustration

*1	Driver Side Junction Block
----	----------------------------

(d) Reinstall the ECU-IG No. 1 fuse.

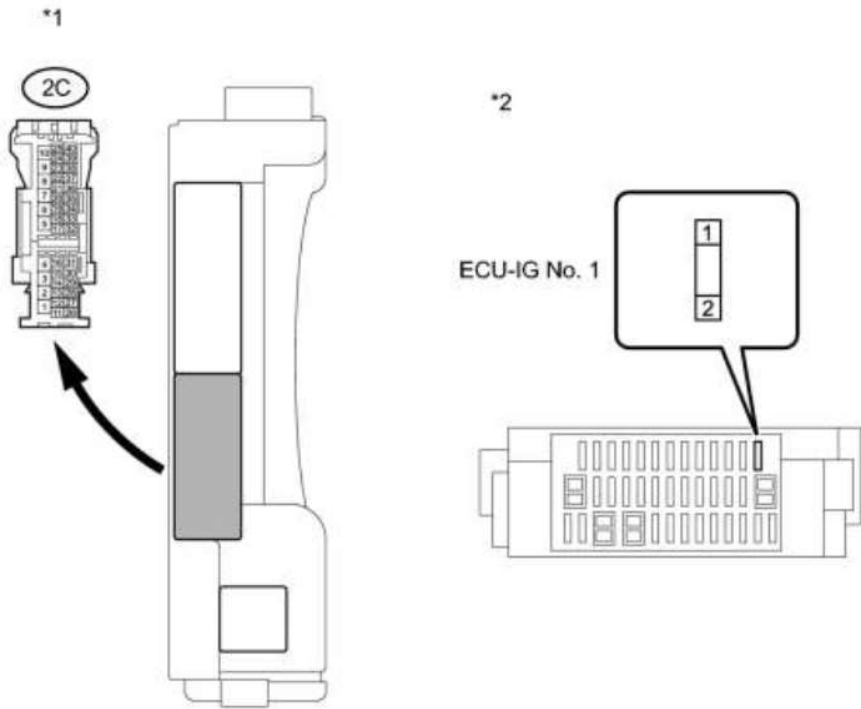
NG▶INSPECT DRIVER SIDE JUNCTION BLOCK ASSEMBLY (IG1 NO. 1 RELAY)

OK



15.	INSPECT DRIVER SIDE JUNCTION BLOCK ASSEMBLY
-----	---

(a) Disconnect the driver side junction block assembly connector.



(b) Remove the ECU-IG No. 1 fuse from the driver side junction block assembly.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
2C-30 - 2 (ECU-IG No. 1)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
2C-30 or 2 (ECU-IG No. 1) - Body ground	Always	10 k Ω or higher

Text in Illustration

*1	Component without harness connected (Driver Side Junction Block Assembly)	*2	Driver Side Junction Block Assembly
----	--	----	-------------------------------------

(d) Reconnect the ECU-IG No. 1 fuse.

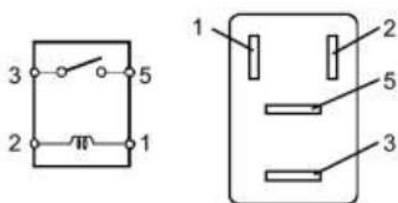
(e) Reconnect the Driver side junction block assembly connector.

NG  REPLACE DRIVER SIDE JUNCTION BLOCK ASSEMBLY

OK



16.	INSPECT FAN NO. 1 RELAY
-----	-------------------------



(a) Remove the FAN No. 1 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 k Ω or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

(c) Reinstall the FAN No. 1 relay.

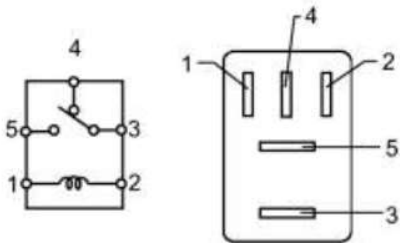
NG  REPLACE FAN NO. 1 RELAY

OK



17.

INSPECT FAN NO. 2 RELAY



(a) Remove the FAN No. 2 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage is not applied between terminals 1 and 2	Below 1 Ω
	Battery voltage is applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

(c) Reinstall the FAN No. 2 relay.

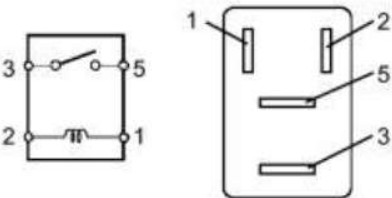
NG▶REPLACE FAN NO. 2 RELAY

OK



18.

INSPECT FAN NO. 3 RELAY



(a) Remove the FAN No. 3 relay from the engine room relay block.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

(c) Reinstall the FAN No. 3 relay.

NG▶REPLACE FAN NO. 3 RELAY

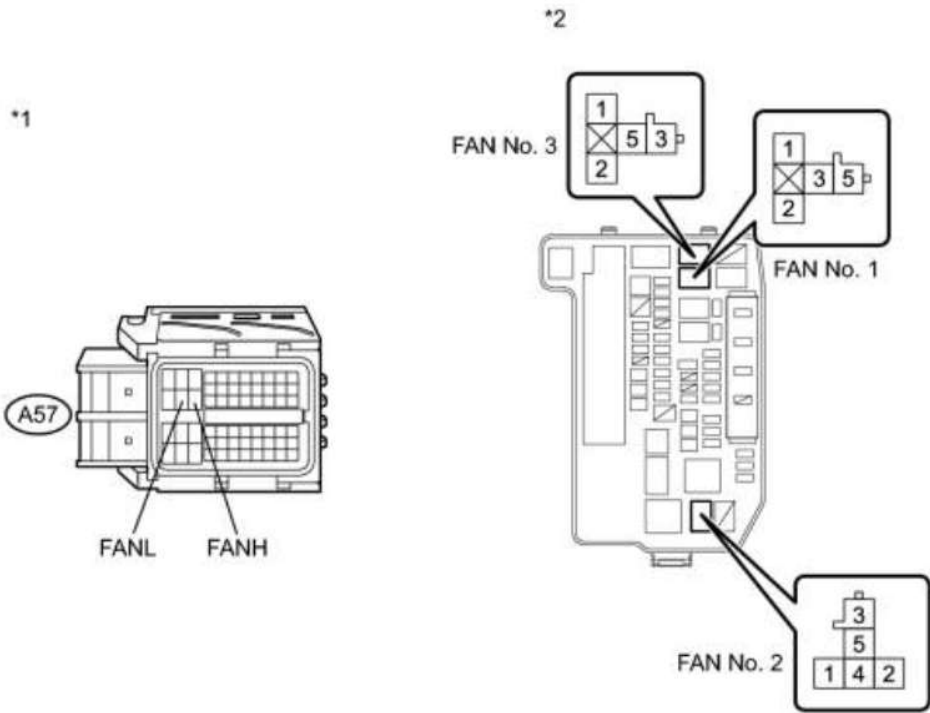
OK



19.

CHECK HARNESS AND CONNECTOR (ENGINE ROOM RELAY BLOCK - ECM)

(a) Remove the FAN No. 1 relay, FAN No. 2 relay and FAN No. 3 relay from the engine room relay block.



(b) Disconnect the ECM connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
2 (FAN No. 1 relay) - A57-22 (FANH)	Always	Below 1 Ω

Tester Connection	Condition	Specified Condition
2 (FAN No. 2 relay) - A57-22 (FANH)	Always	Below 1 Ω
2 (FAN No. 3 relay) - A57-21 (FANL)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
2 (FAN No. 1 relay) or A57-22 (FANH) - Body ground	Always	10 k Ω or higher
2 (FAN No. 2 relay) or A57-22 (FANH) - Body ground	Always	10 k Ω or higher
2 (FAN No. 3 relay) or A57-21 (FANL) - Body ground	Always	10 k Ω or higher

Text in Illustration

*1	Front view of wire harness connector (to ECM)
*2	Engine Room Relay Block

(d) Reinstall the FAN No. 1 relay, FAN No. 2 relay and FAN No. 3 relay.

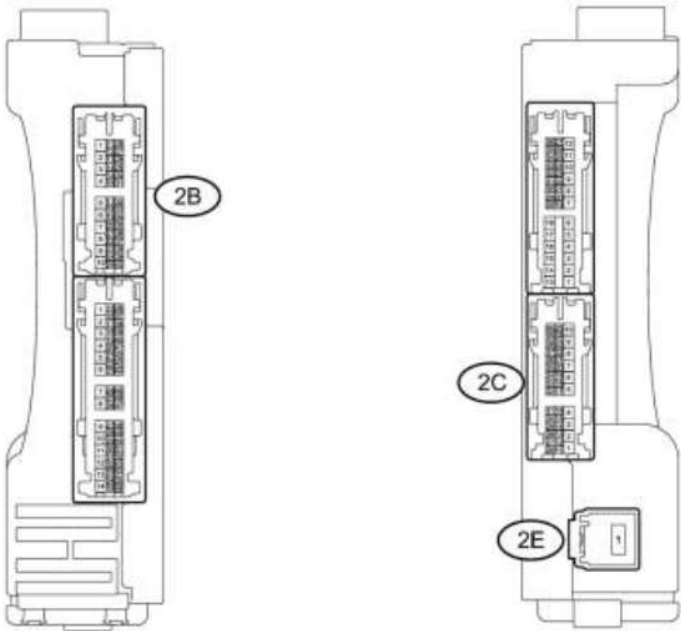
(e) Reconnect the ECM connector.

NG  REPAIR OR REPLACE HARNESS OR CONNECTOR (ENGINE ROOM RELAY BLOCK - ECM)
 OK  **REPAIR OR REPLACE HARNESS OR CONNECTOR (ECU-IG NO. 1 FUSE - ENGINE ROOM RELAY BLOCK)**

20.	INSPECT DRIVER SIDE JUNCTION BLOCK ASSEMBLY (IG1 NO. 1 RELAY)
-----	---

(a) Disconnect the driver side junction block assembly connector.

*1



c

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
2E-1 - 2C-30	Battery voltage is not applied between terminals 2B-25 - 2B-6	10 kΩ or higher
	Battery voltage is applied between terminals 2B-25 - 2B-6	Below 1 Ω

Text in Illustration

*1	Component without harness connected (to Driver Side Junction Block Assembly)
----	---

(c) Reconnect the driver side junction block assembly connector.

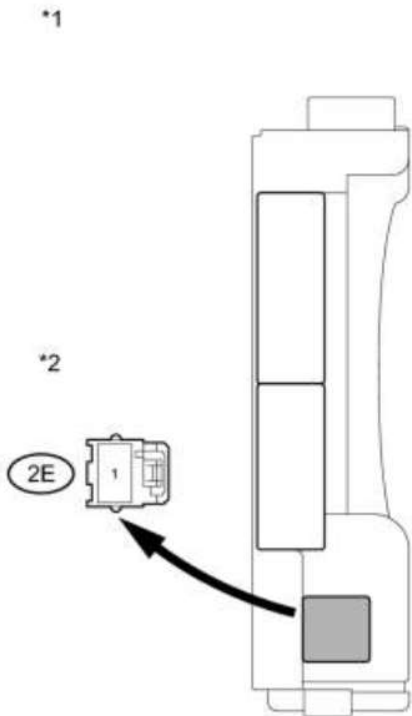
NG▶ REPLACE DRIVER SIDE JUNCTION BLOCK ASSEMBLY (IG1 NO. 1 RELAY)

OK



21.

INSPECT DRIVER SIDE JUNCTION BLOCK ASSEMBLY (IG1 NO. 1 RELAY VOLTAGE)



(a) Disconnect the driver side junction block assembly connector.

(b) Measure the voltage according to the value(s) in the table below.

Standard Voltage:

Tester Connection	Condition	Specified Condition
2E-1 - Body ground	Always	11 to 14 V

Text in Illustration

*1	Driver Side Junction Block Assembly
*2	Front view of wire harness connector (to Driver Side Junction Block Assembly)

(c) Reconnect the driver side junction block assembly connector.

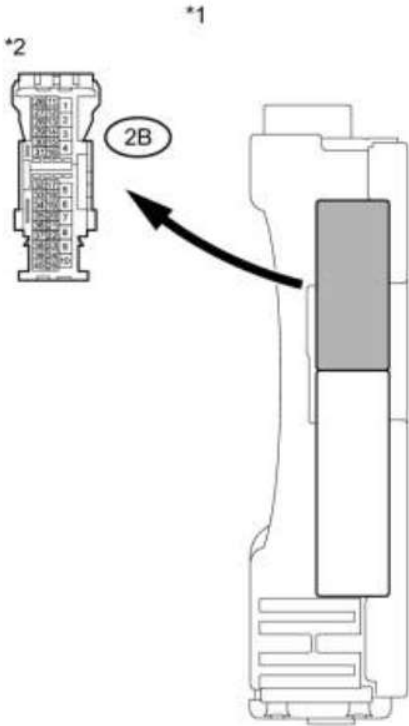
NG▶REPAIR OR REPLACE HARNESS OR CONNECTOR (BATTERY - DRIVER SIDE JUNCTION BLOCK ASSEMBLY)

OK



22.

CHECK HARNESS AND CONNECTOR (DRIVER SIDE JUNCTION BLOCK ASSEMBLY - BODY GROUND)



(a) Disconnect the driver side junction block assembly connector.

(b) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

Tester Connection	Condition	Specified Condition
2B-6 - Body ground	Always	Below 1 Ω

Text in Illustration

*1	Driver Side Junction Block Assembly
*2	Front view of wire harness connector (to Driver Side Junction Block Assembly)

(c) Reconnect the driver side junction block assembly connector.

NG

REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 NO. 1 RELAY - BODY GROUND)

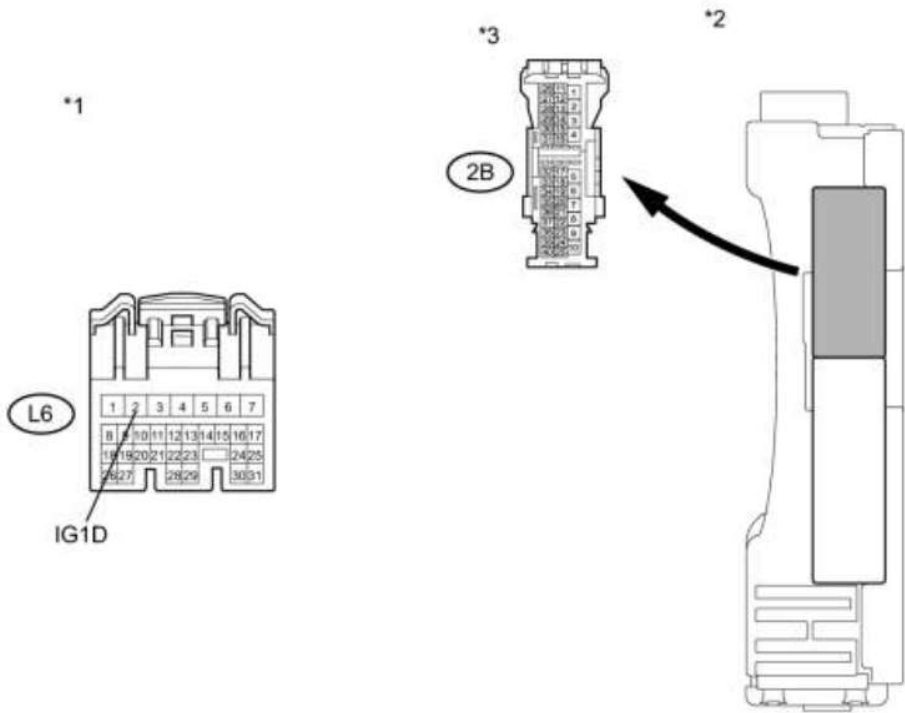
OK



23.

CHECK HARNESS AND CONNECTOR (IG1 NO. 1 RELAY - POWER MANAGEMENT CONTROL ECU)

(a) Disconnect the driver side junction block assembly connector.



(b) Disconnect the power management control ECU connector.

(c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
L6-2 (IG1D) - 2B-25	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Connection	Condition	Specified Condition
L6-2 (IG1D) or 2B-25 - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to Power Management Control ECU)	*2	Driver Side Junction Block Assembly
*3	Front view of wire harness connector (to Driver Side Junction Block Assembly)	-	-

(d) Reconnect the driver side junction block assembly connector.

(e) Reconnect the power management control ECU connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (IG1 NO. 1 RELAY - POWER MANAGEMENT CONTROL ECU)

OK ► **CHECK SMART KEY SYSTEM**

ON-VEHICLE INSPECTION

CAUTION:

Do not remove the radiator cap while the engine and radiator are still hot. Pressurized hot engine coolant and steam may be released and cause serious burns.

NOTICE:

Before performing each inspection, turn the A/C switch off.

1. INSPECT FOR COOLANT LEAK (for Engine)

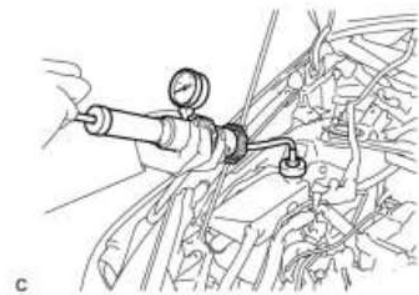
CAUTION:

Do not remove the reservoir tank cap while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

NOTICE:

Before performing each inspection, turn the A/C switch off.

(a) Remove the reservoir tank cap.



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

(c) Put the engine in inspection mode .

(d) Warm up the engine.

(e) Using the reservoir cap tester, increase the pressure inside the radiator to 108 kPa (1.1 kgf/cm², 16 psi), and check that the pressure does not drop. If the pressure drops, check the hoses, radiator, front exhaust pipe assembly and the heater hose around and water pump for leaks. If no external leaks are found, check the heater core, cylinder block and cylinder head.

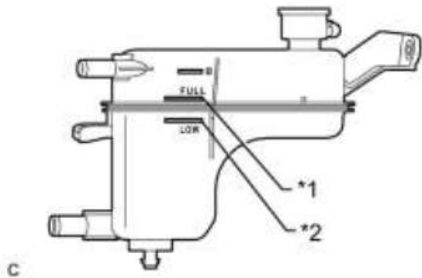
(f) Remove the radiator cap tester.

(g) Install the reservoir tank cap.

2. INSPECT RESERVOIR TANK ENGINE COOLANT LEVEL (for Engine)

(a) Check that the engine coolant level is between the low and full lines when the engine is cold.

Text in Illustration



*1	Full line
*2	Low line

HINT:

If the engine coolant level is low, check for leaks and add "TOYOTA Super Long Life Coolant" or similar high quality ethylene glycol based non-silicate, non-amine, non-nitrite and non-borate coolant with long-life hybrid organic acid technology to the full line.

3. INSPECT ENGINE COOLANT QUALITY (for Engine)

(a) Remove the reservoir tank cap.

CAUTION:

Do not remove the reservoir tank cap while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

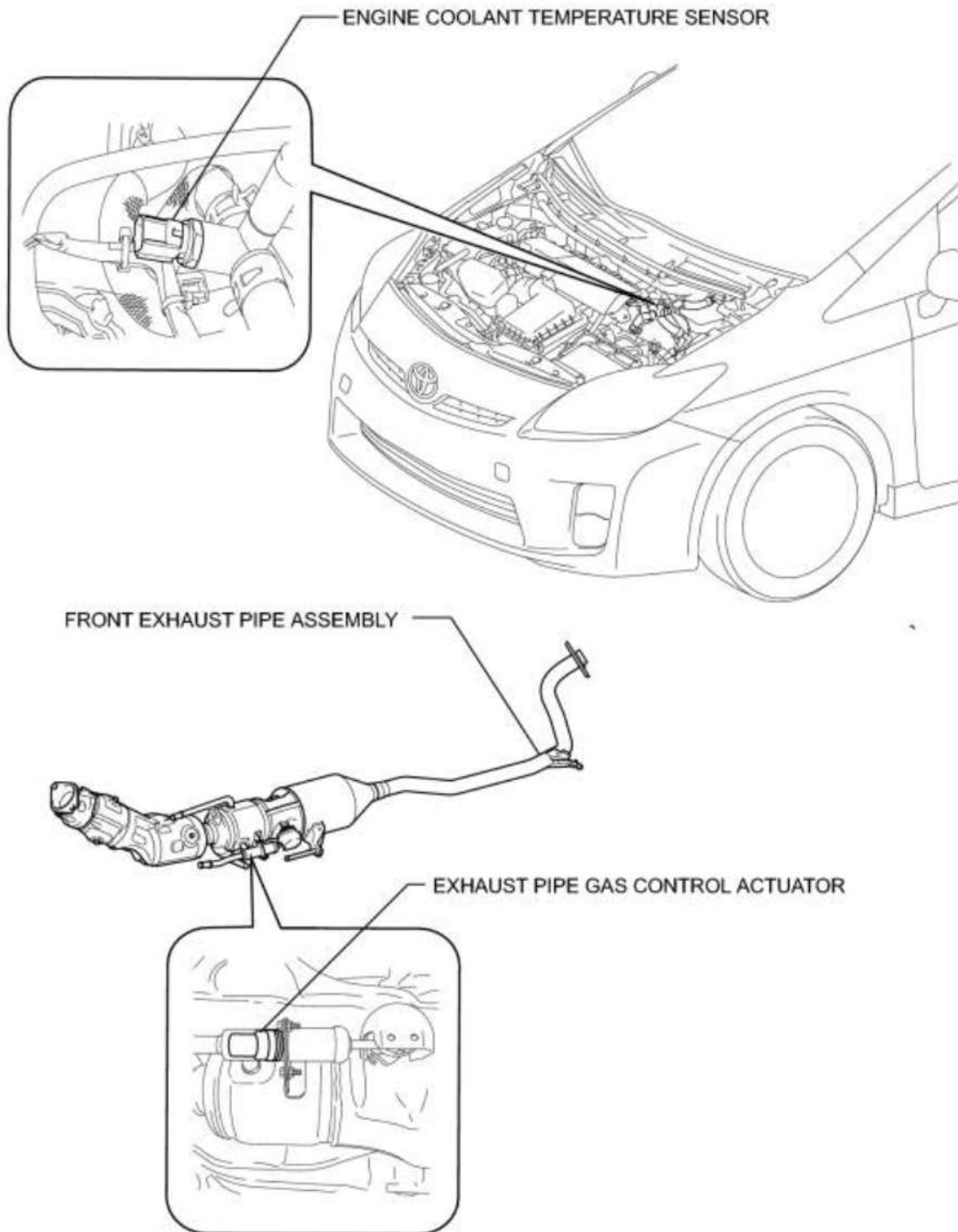
(b) Check if there are any excessive deposits of rust or scales around the radiator cap and radiator filler hole. Also, the coolant should be free of oil.

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

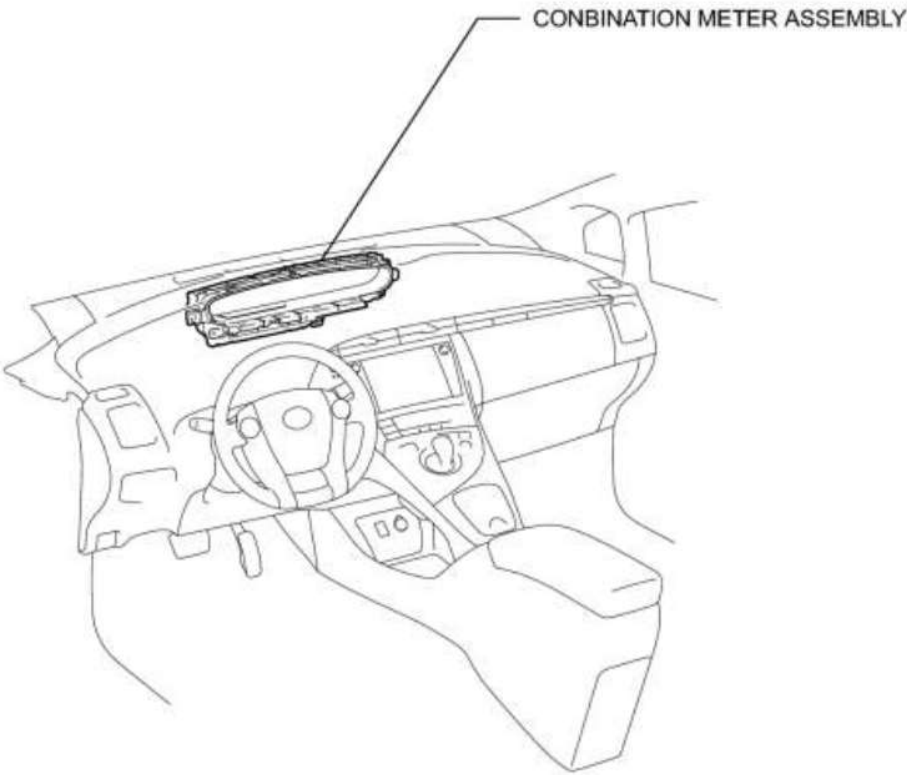
(c) Install the reservoir tank cap.

PARTS LOCATION

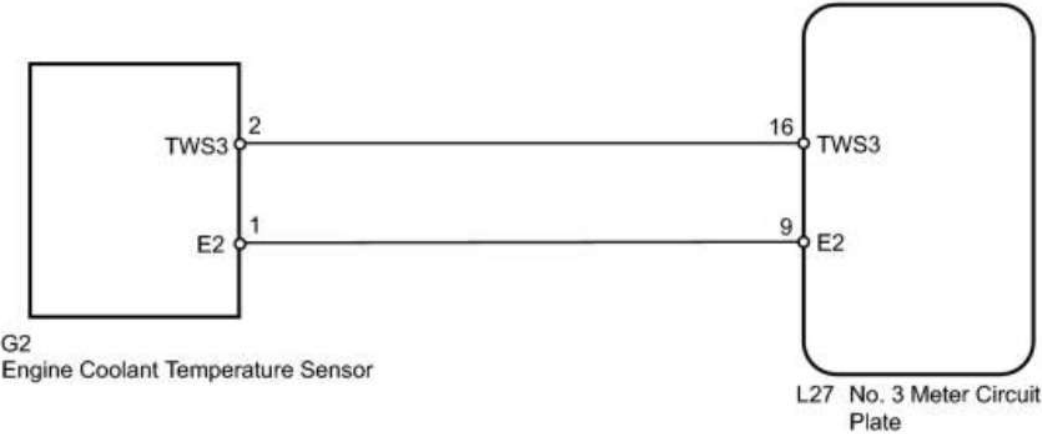
ILLUSTRATION



ILLUSTRATION



SYSTEM DIAGRAM



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PROBLEM SYMPTOMS TABLE

HINT:

- Use the table below to help determine the cause of problem symptoms. If multiple suspected areas are listed, the potential causes of the symptoms are listed in order of probability in the "Suspected Area" column of the table. Check each symptom by checking the suspected areas in the order they are listed. Replace parts as necessary.
- Inspect the fuses and relays related to this system before inspecting the suspected areas below.

Exhaust Heat Recirculation System

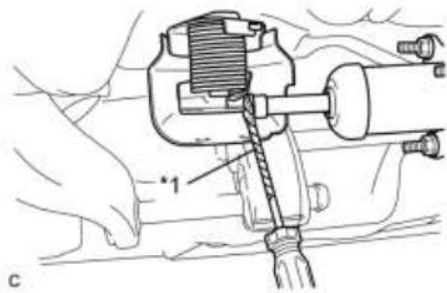
Symptom	Suspected Area	See page
Engine overheating	Engine coolant leaks (for engine side)	INFO
	Engine coolant leaks (for exhaust heat recirculation system)	INFO
	Front exhaust pipe assembly	INFO
	Exhaust pipe gas control actuator	INFO
	Exhaust heat recirculation system circuit	INFO
	Engine coolant temperature sensor (for exhaust heat recirculation system)	INFO

ON-VEHICLE INSPECTION

1. INSPECT FRONT EXHAUST PIPE ASSEMBLY

(a) Inspect exhaust flow control valve operation.

(1) Using a screwdriver, move the exhaust flow control valve from the bottom of the vehicle. Check that the valve moves smoothly.



Text in Illustration

*1	Protective Tape
----	-----------------

OK:

Valve moves smoothly.

(2) If the valve is stuck or does not move smoothly, replace the front exhaust pipe assembly INFO.

(b) Inspect the exhaust pipe gas control actuator.

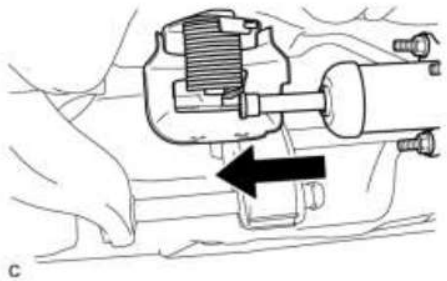
(1) Connect the Techstream to the DLC3.

(2) Turn the power switch on (IG) and turn the Techstream on.

(3) Enter the following menus: Powertrain / Engine and ECT / Data List / Coolant Temp.

(4) While checking the engine coolant temperature with the Techstream check the operation of the exhaust pipe gas control actuator rod when the temperature rises.

Standard:



Condition	Rod Operation
Cold (below approx. 71°C (160°F)) → Warmed up (approx. 80°C (176°F) or more)	Rod gradually extends as the temperature rises.

- After the engine has warmed up (thermostat temperature is approximately 80°C (176°F) or more), the rod should be extended approximately 7.2 mm (0.284 in.) or more compared to when the engine is cold (thermostat temperature is below 71°C (160°F)).
- The water temperature shown in the Data List may slightly deviate from the thermostat temperature. This is because the Data List value indicates the temperature detected by the water temperature sensor, which is mounted on the engine, while the thermostat is

positioned in the exhaust pipe gas control actuator.

- If it is difficult to check while the rod is operating, allow the engine to cool down until the water temperature matches the ambient temperature and then check the rod operation again.

(5) If the exhaust pipe gas control actuator rod does not move smoothly, replace the exhaust pipe gas control actuator INFO.

(6) Check for any cracks or damage on the exhaust pipe gas control actuator rod.

OK:

No cracks or damage is found.

(7) If any cracks or damage is found, replace the front exhaust pipe assembly INFO.

2. INSPECT FOR ENGINE COOLANT LEAK FROM FRONT EXHAUST PIPE ASSEMBLY

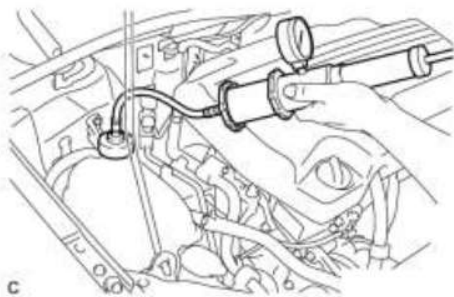
CAUTION:

Do not remove the reservoir tank cap while the engine and radiator are still hot. Pressurized, hot engine coolant and steam may be released and cause serious burns.

NOTICE:

Be sure to turn the A/C switch off before starting the following inspection.

(a) Turn the power switch off. Check for engine coolant leaks from the front exhaust pipe assembly and the heater hose around the engine coolant temperature sensor.



(b) Add engine coolant to the radiator and install the radiator cap tester.

(c) Pump it to 108 kPa (1.1 kgf/cm², 16 psi), then check that the pressure does not drop.

If the reading drops, check for leaks from the front exhaust pipe assembly and the heater hose around the engine coolant temperature sensor.

Exhaust Heat Recirculation System Circuit

DESCRIPTION

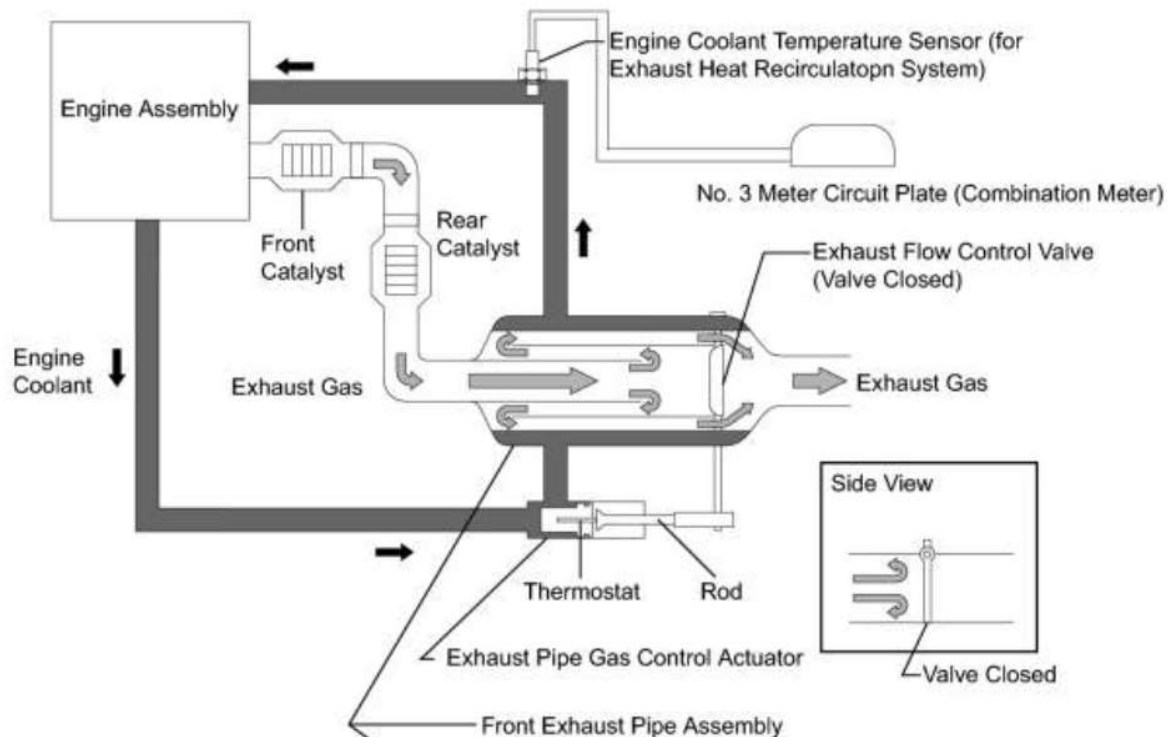
In the exhaust heat recirculation system, coolant is warmed up using conventionally wasted exhaust gas heat to accelerate engine warm-up time, enhancing fuel efficiency and heater performance.

The heat recirculator is positioned in the front exhaust pipe assembly after the catalyst. Coolant from the engine flows around the heat recirculator and then returns to the engine. If the engine is started while the engine is cold, the exhaust pipe gas control actuator rod is contracted and the exhaust flow control valve is closed, routing the exhaust gas around the heat recirculator to warm up the coolant.

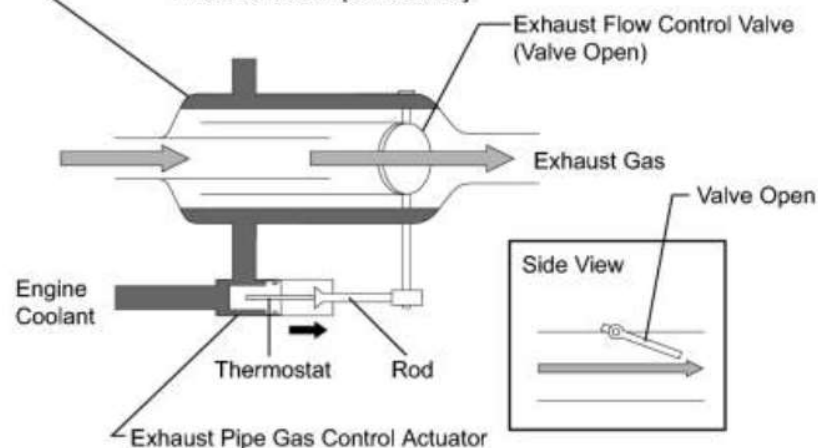
After the engine coolant temperature rises and the engine has warmed up, the heat of the coolant expands the thermostat and the exhaust pipe gas control actuator rod extends. This opens the exhaust flow control valve to switch to the normal exhaust gas path.

The exhaust flow control valve can also be opened by exhaust gas pressure to prevent insufficient acceleration performance when the engine is cold. In addition, to monitor the engine coolant temperature, a engine coolant temperature sensor (for exhaust heat recirculation system) is provided between the engine and the heat recirculator. The engine coolant temperature sensor (for exhaust heat recirculation system) has a built-in thermistor with a resistance that varies according to the temperature of the engine coolant. When the engine coolant temperature becomes low, the resistance of the thermistor increases. When the temperature becomes high, the resistance drops. These variations in resistance are transmitted to the No. 3 meter circuit plate as voltage changes. If the engine coolant temperature is excessively high (overheating), the water temperature indicator light in the No. 3 meter circuit plate illuminate to inform the driver of the malfunction.

Valve Closed:



Valve Open:



c

WIRING DIAGRAM

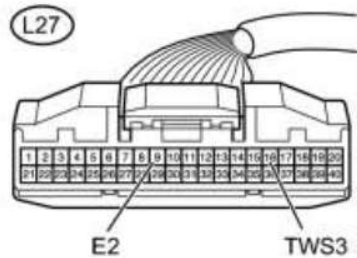
Refer to System Diagram [INFO](#).

INSPECTION PROCEDURE

PROCEDURE

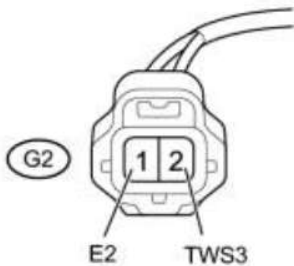
1. CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - COMBINATION METER)

*1



(a) Disconnect the engine coolant temperature sensor (for exhaust heat recirculation system) connector.

*2



- (b) Disconnect the No. 3 meter circuit plate connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance (Check for Open):

Tester Connection	Condition	Specified Condition
G2-2 (TWS3) - L27-16 (TWS3)	Always	Below 1 Ω
G2-1 (E2) - L27-9 (E2)	Always	Below 1 Ω

Standard Resistance (Check for Short):

Tester Condition	Condition	Specified Condition
G2-2 (TWS3) or L27-16 (TWS3) - Body ground	Always	10 kΩ or higher

Text in Illustration

*1	Front view of wire harness connector (to No. 3 Meter Circuit Plate)
*2	Front view of wire harness connector (to Engine Coolant temperature sensor)

(d) Reconnect the No. 3 meter circuit plate connector.

(e) Reconnect the engine coolant temperature sensor (for exhaust heat recirculation system) connector.

NG ► REPAIR OR REPLACE HARNESS OR CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - COMBINATION METER)

OK



2.

INSPECT ENGINE COOLANT TEMPERATURE SENSOR (FOR EXHAUST HEAT RECIRCULATION SYSTEM)

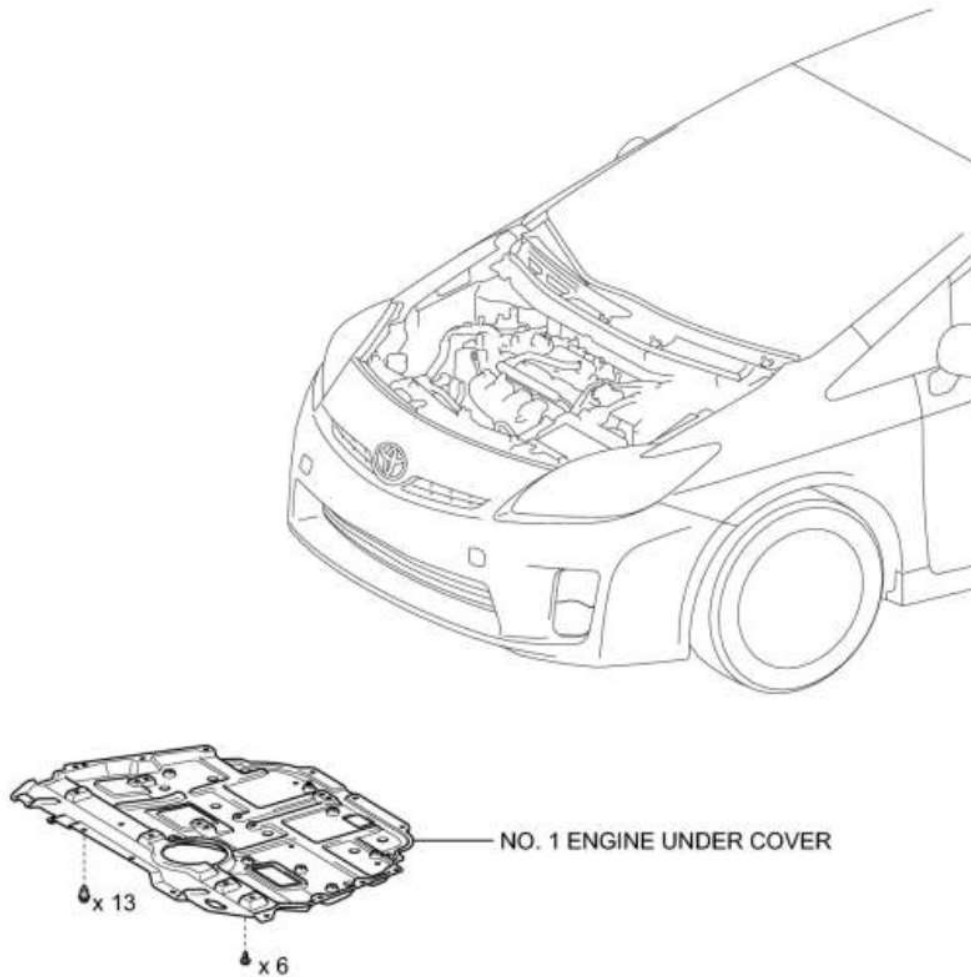
(a) Inspect the engine coolant temperature sensor (for exhaust heat recirculation system) .

NG ► REPLACE ENGINE COOLANT TEMPERATURE SENSOR (FOR EXHAUST HEAT RECIRCULATION SYSTEM)

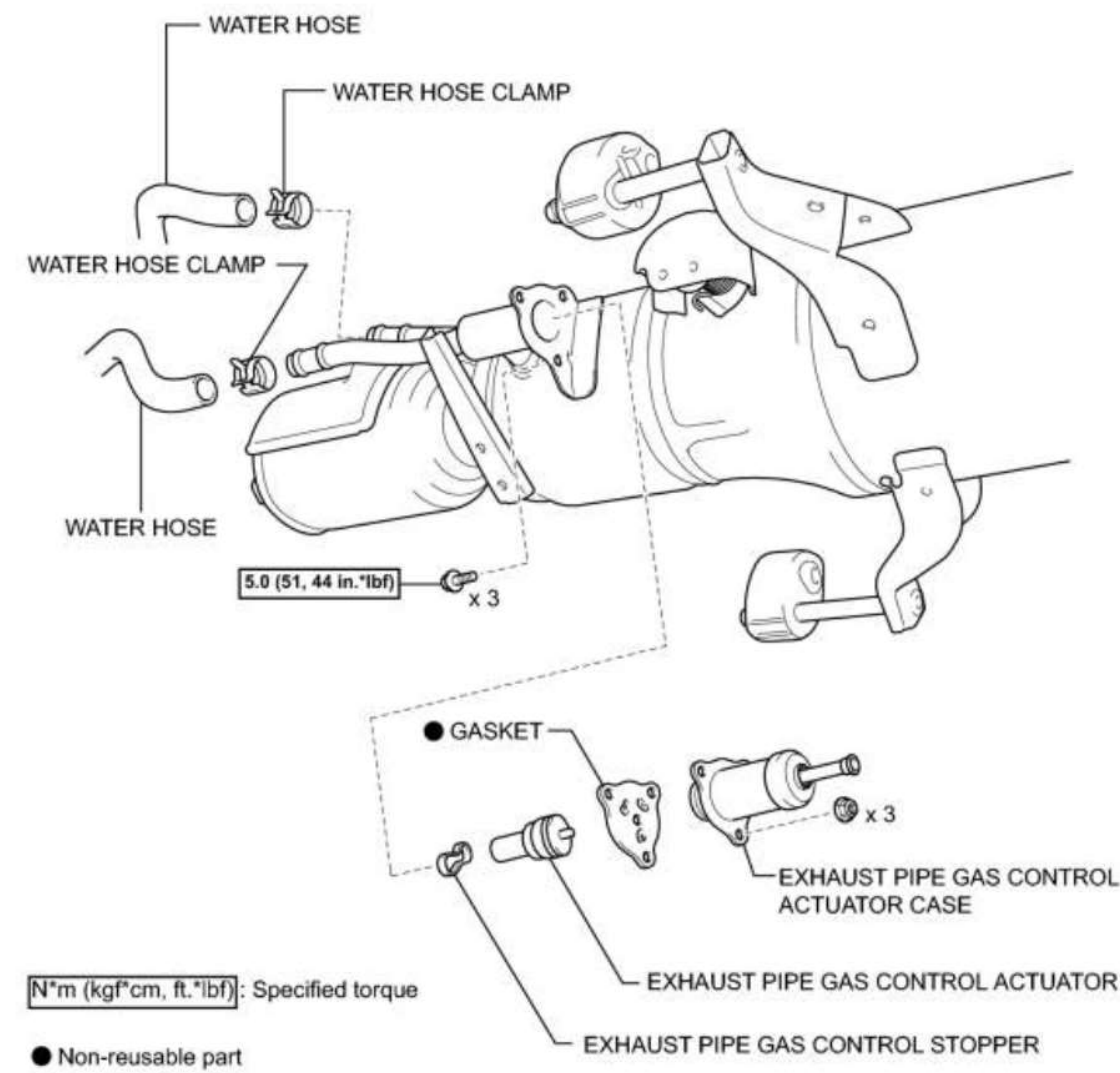
OK ► REPLACE NO. 3 METER CIRCUIT PLATE

COMPONENTS

ILLUSTRATION



ILLUSTRATION



c

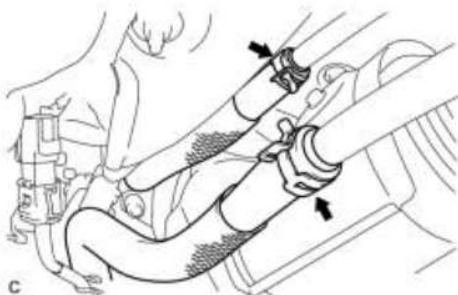
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REMOVAL

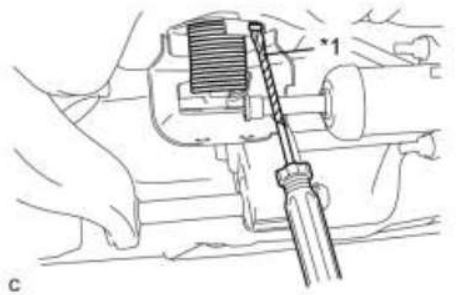
- 1. REMOVE NO. 1 ENGINE UNDER COVER
- 2. DRAIN ENGINE COOLANT (for Engine)_INFO
- 3. REMOVE EXHAUST PIPE GAS CONTROL ACTUATOR

NOTICE:

When removing the exhaust pipe gas control actuator, use caution because coolant may spill out from the exhaust heat recirculation system.



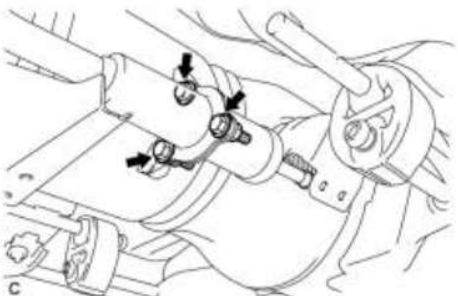
(a) Disconnect the 2 water hoses.



(b) Using a screwdriver with the tip taped, pry the portion indicated in the illustration to disengage the spring.

Text in Illustration

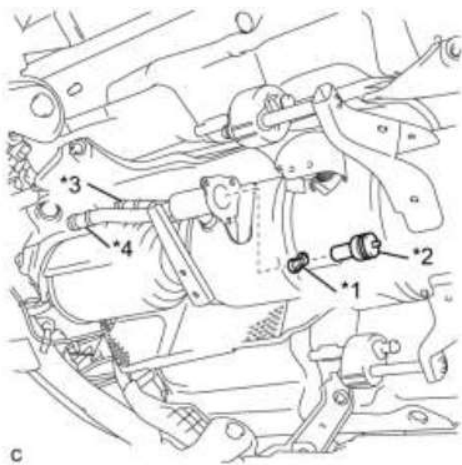
*1	Protective Tape
----	-----------------



(c) Remove the 3 bolts, 3 nuts, gasket and exhaust pipe gas control actuator case.

(d) While closing port A, apply compressed air to port B to remove the exhaust pipe gas control actuator shown in the illustration.

Text in Illustration



*1	Exhaust Pipe Gas Control Stopper
*2	Exhaust Pipe Gas Control Actuator
*3	Port A
*4	Port B

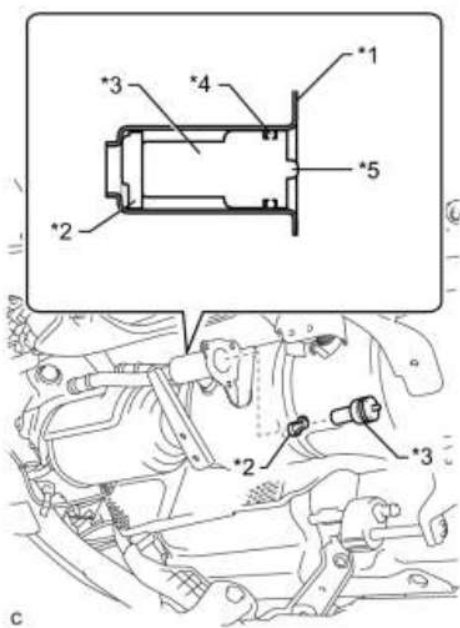
HINT:
Use a piece of cloth to catch the exhaust pipe gas control actuator.

INSTALLATION

1. INSTALL EXHAUST PIPE GAS CONTROL ACTUATOR

NOTICE:

When installing the water hose, ensure that the exhaust heat recirculation system is filled with coolant. Otherwise, the electric water pump may be damaged.



(a) Apply engine coolant to the O-ring.

Text in Illustration

*1	Exhaust Pipe Gas Control Actuator Case
*2	Exhaust Pipe Gas Control Stopper
*3	Exhaust Pipe Gas Control Actuator
*4	O-ring
*5	Piston

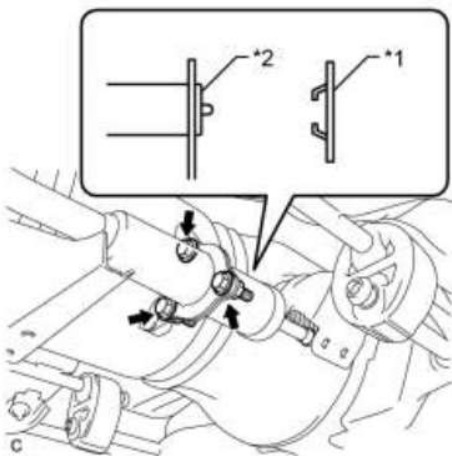
(b) Install the exhaust pipe gas control actuator and exhaust pipe gas control stopper.

NOTICE:

- Be sure to install the exhaust pipe gas control stopper in the correct direction.
- Check that the O-ring is not deformed, cracked or swollen.
- Be sure to install the exhaust pipe gas control actuator until it touches the exhaust pipe gas control stopper.
- When installing the exhaust pipe gas control actuator, do not push on the piston.
- Make sure that the exhaust pipe gas control actuator and the exhaust pipe gas control stopper are free of oil.

(c) Install a new gasket and the exhaust pipe gas control actuator case with the 3 bolts and 3 nuts.

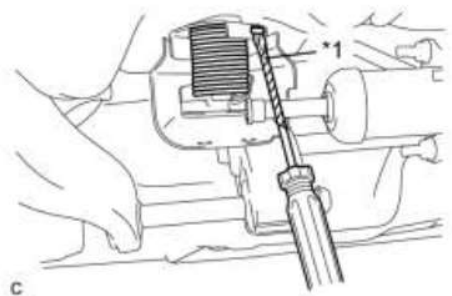
Text in Illustration



*1	Gasket
*2	Exhaust Pipe Gas Control Actuator

Torque: 5.0 N·m (51 kgf·cm, 44in·lbf)

- Be sure to install a new gasket in the correct direction.
- Make sure that the exhaust pipe gas control actuator case and the new gasket are free of oil.



(d) Using a screwdriver with the tip taped, pry the portion indicated in the illustration to engage the spring.

Text in Illustration

*1	Protective Tape
----	-----------------



(e) Connect the 2 water hoses.

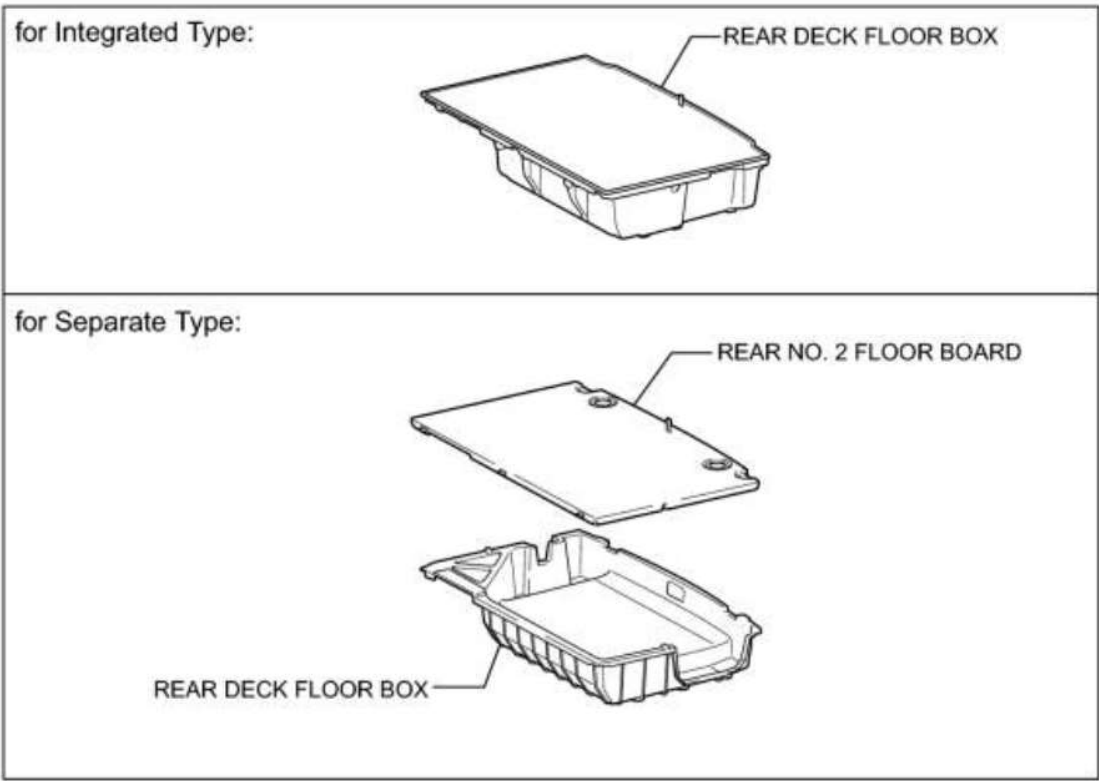
2. ADD ENGINE COOLANT (for Engine) INFO

3. INSPECT FOR COOLANT LEAK INFO

4. INSTALL NO. 1 ENGINE UNDER COVER

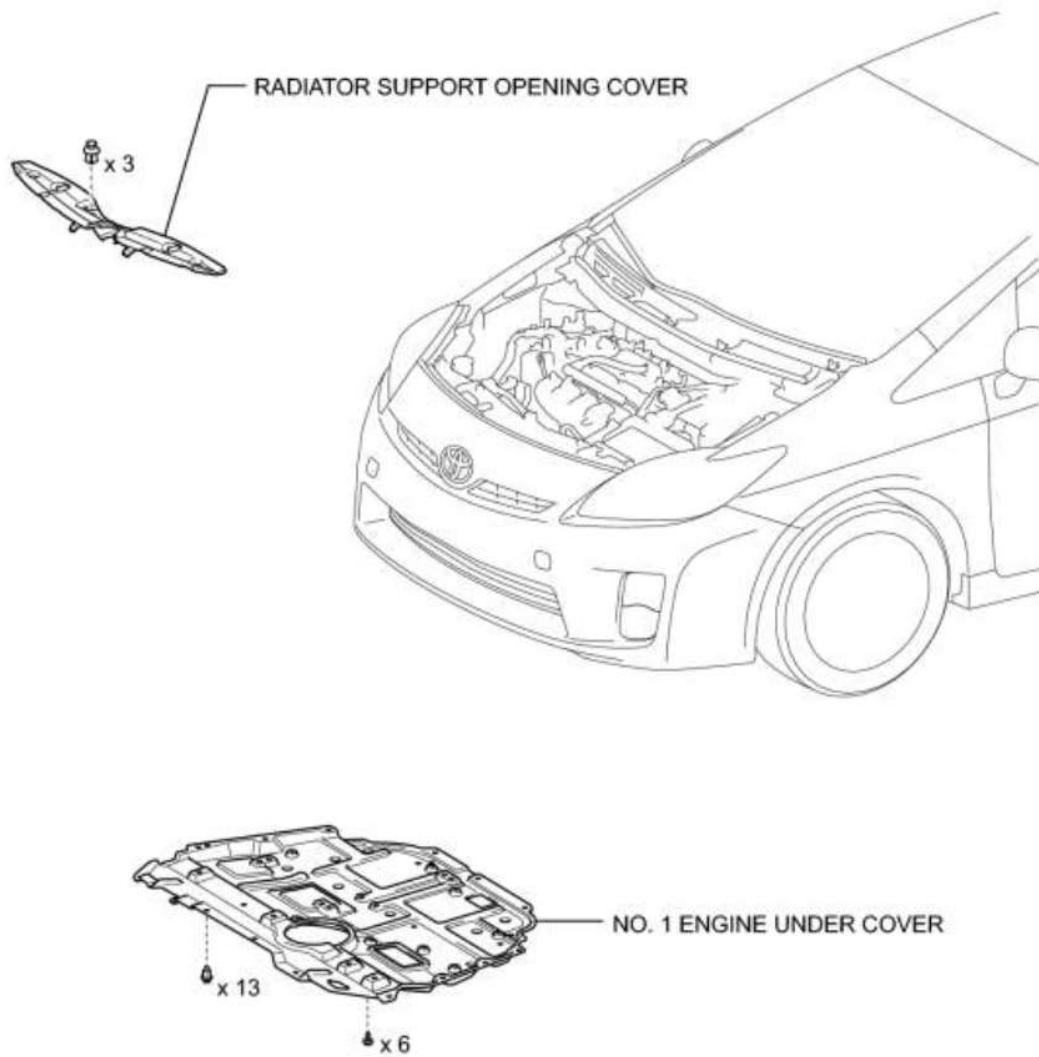
COMPONENTS

ILLUSTRATION

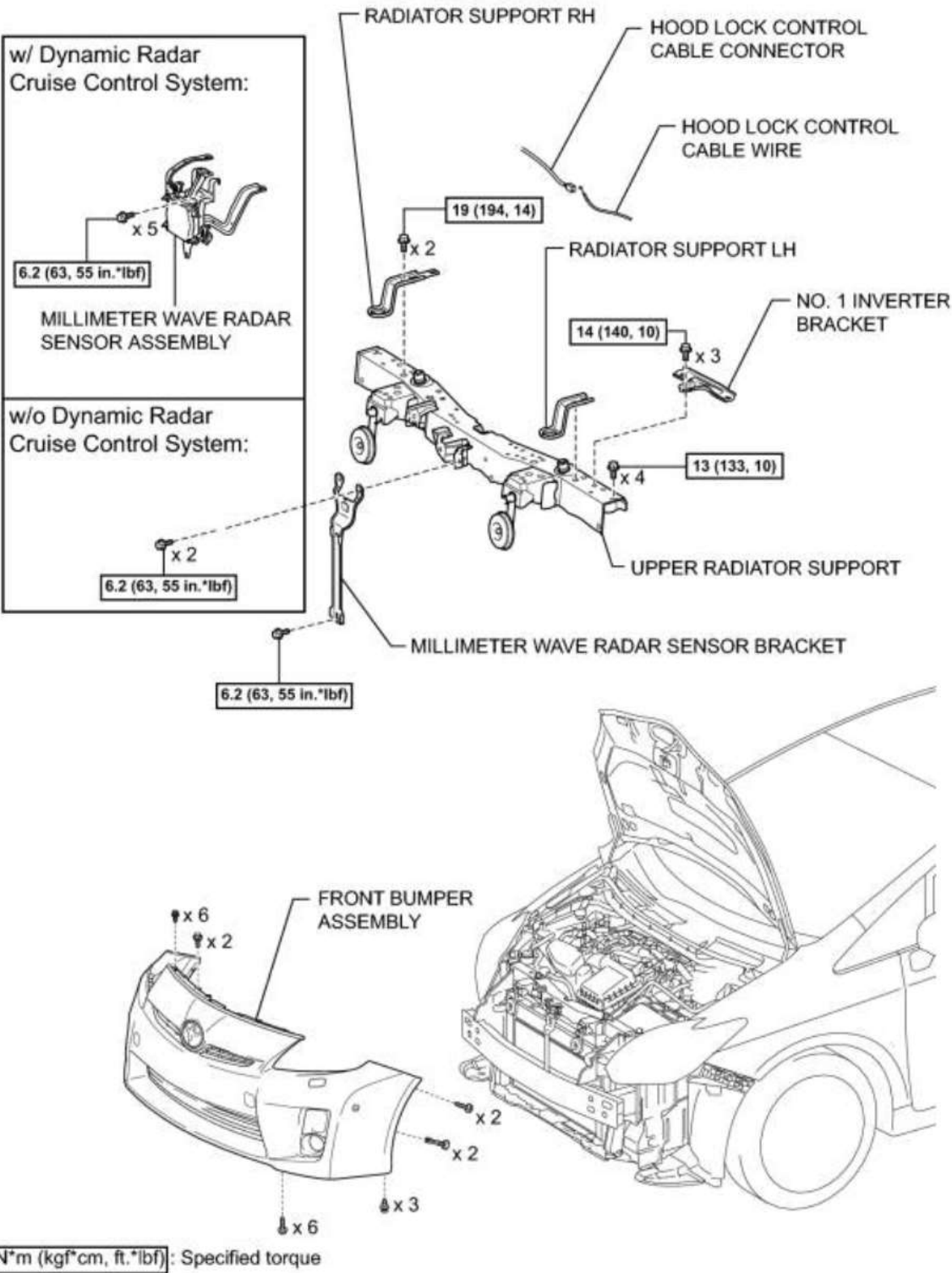


P

ILLUSTRATION

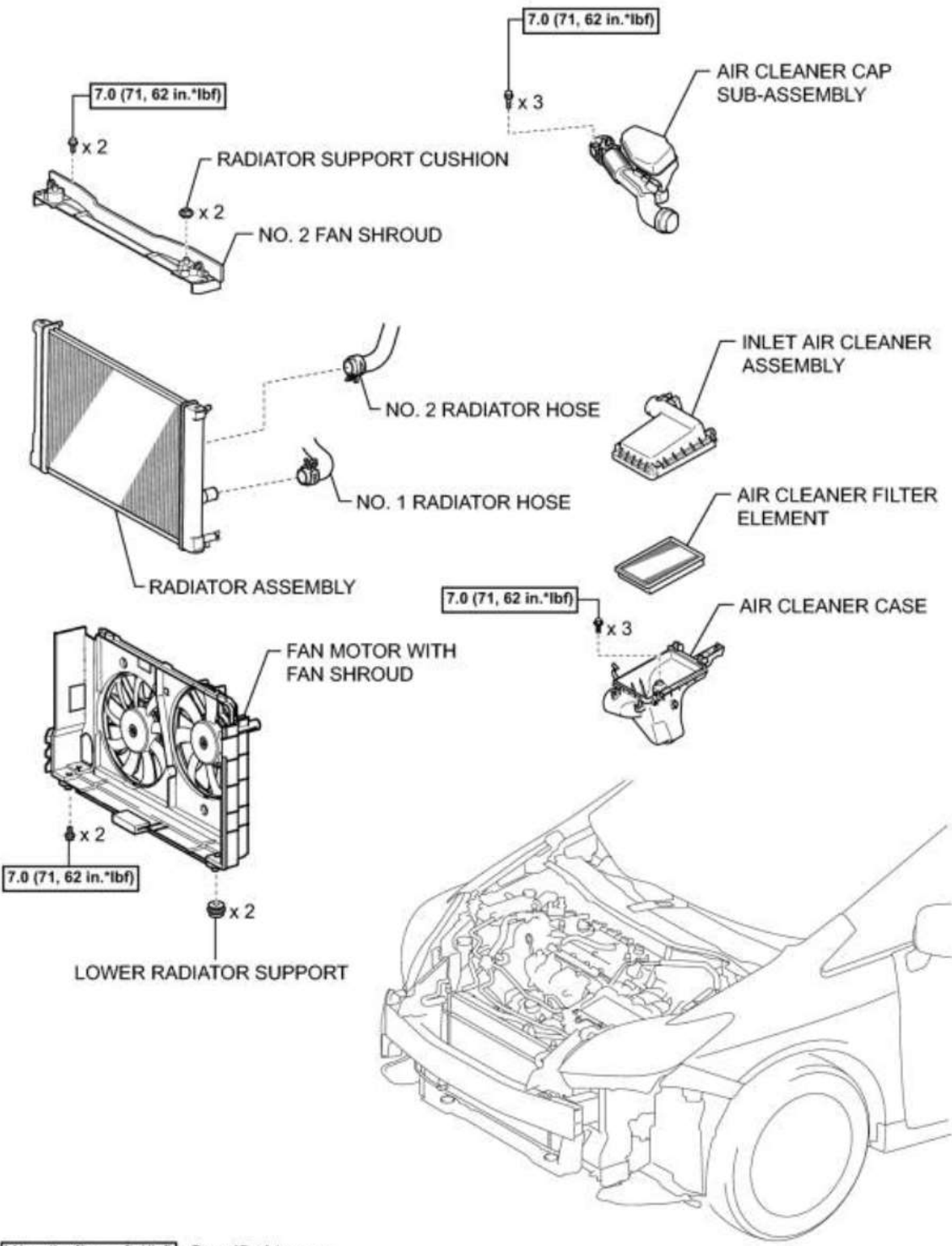


ILLUSTRATION



T

ILLUSTRATION



[N*m (kgf*cm, ft.*lbf)]: Specified torque

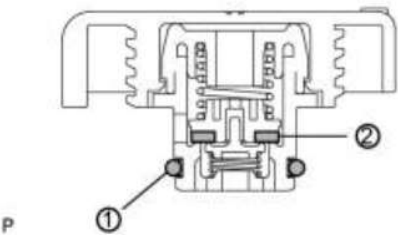
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ON-VEHICLE INSPECTION

1. CHECK RESERVE TANK CAP (for Engine)

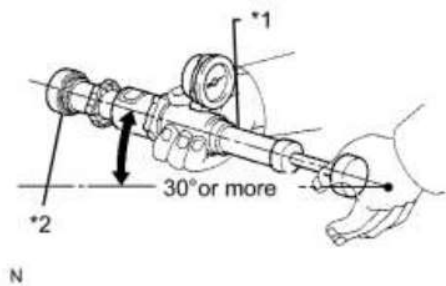
(a) Measure the valve opening pressure.



- (1) If there are water stains or foreign matter on O-ring 1, clean it with water and finger scouring.
- (2) Check that O-ring 1 is not deformed, cracked or swollen.
- (3) Apply engine coolant to O-ring 1 and rubber packing 2 before using a radiator cap tester.
- (4) When using the cap tester, tilt it upwards 30 degrees or more.
- (5) Pump the cap tester several times, and check the maximum pressure*1.

Text in Illustration

*1	Radiator Cap Tester
*2	Radiator Cap



Pumping speed:

1 pump per second

HINT:

*1: Even if the cap cannot maintain the maximum pressure, it is not a defect.

Judgment Criterion:

Item	Specified Condition
Standard value (for brand-new cap)	94 to 122 kPa (1.0 to 1.2 kgf/cm ² , 13.5 to 17 psi)

Minimum standard value (after using cap)	79 kPa (0.8 kgf/cm ² , 11.4 psi)
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If the maximum pressure is less than the minimum standard value, replace the radiator cap sub-assembly.

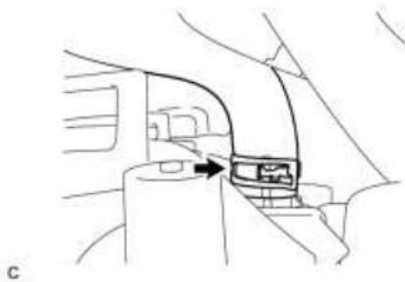
REMOVAL

1. REMOVE RADIATOR SUPPORT OPENING COVER_ INFO
2. REMOVE REAR NO. 2 FLOOR BOARD (for Separate Type)_ INFO
3. REMOVE REAR DECK FLOOR BOX_ INFO
4. REMOVE REAR NO. 3 FLOOR BOARD_ INFO
5. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

NOTICE:

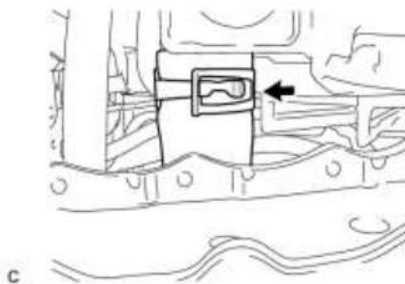
When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO.

6. REMOVE NO. 1 ENGINE UNDER COVER
7. DRAIN ENGINE COOLANT (for Engine)_ INFO
8. DISCONNECT NO. 1 RADIATOR HOSE



(a) Disconnect the No. 1 radiator hose from the radiator assembly.

9. DISCONNECT NO. 2 RADIATOR HOSE



(a) Disconnect the No. 2 radiator hose from the radiator assembly.

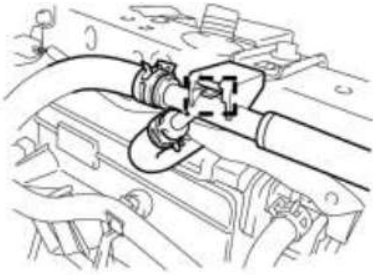
10. REMOVE FRONT BUMPER ASSEMBLY_ INFO

11. REMOVE MILLIMETER WAVE RADAR SENSOR ASSEMBLY (w/ Dynamic Radar Cruise Control System) INFO

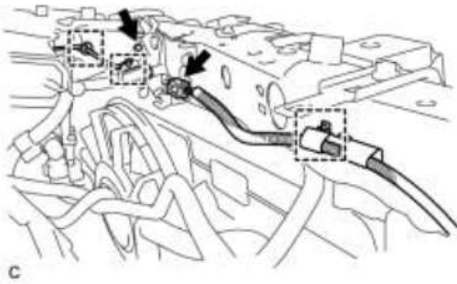
12. REMOVE MILLIMETER WAVE RADAR SENSOR BRACKET INFO

13. REMOVE NO. 1 INVERTER BRACKET INFO

14. REMOVE HOOD LOCK SUPPORT SUB-ASSEMBLY

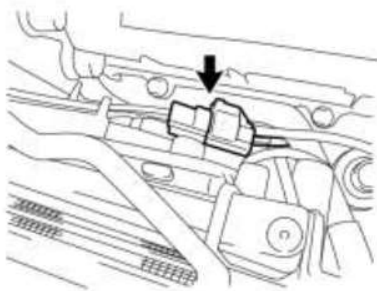


(a) Disconnect the water by-pass hose clamp from the radiator support RH.



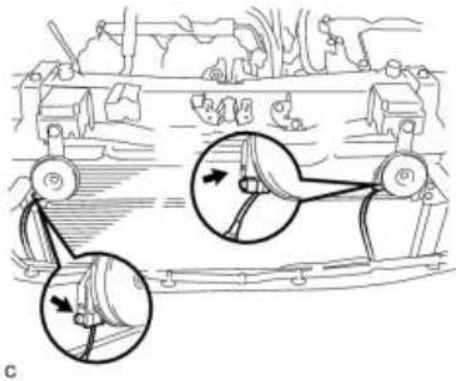
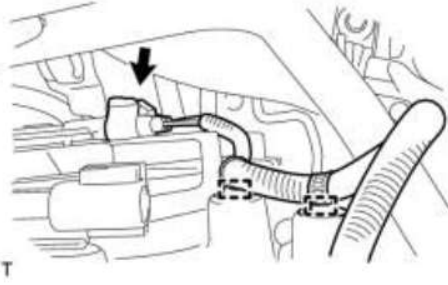
(b) Disconnect the hood lock connector and hood lock control cable wire.

(c) Disconnect the 3 wire harness clamps.

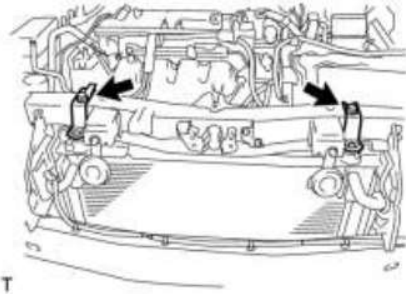


(d) Disconnect the connector from the No. 2 cooling fan motor.

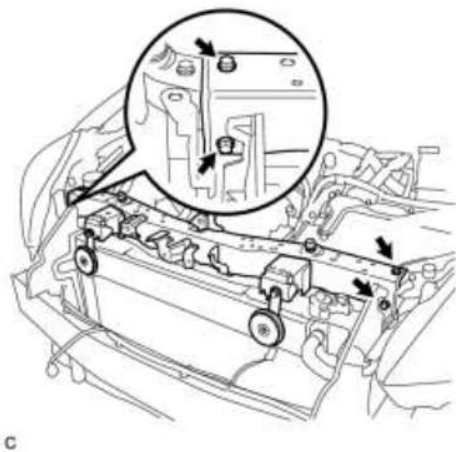
(e) Disconnect the 2 wire harness clamps and connector from the fan shroud and cooling fan motor.



(f) Disconnect the 2 horn connectors.



(g) Remove the 2 bolts, radiator support RH and radiator support LH with the 2 cushions from the upper radiator support.



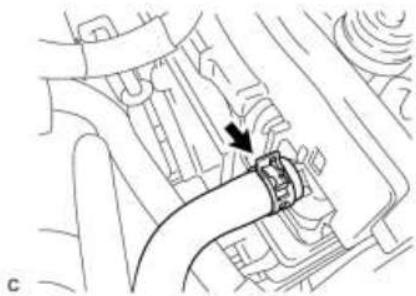
(h) Remove the 4 bolts and upper radiator support.

15. REMOVE AIR CLEANER CAP SUB-ASSEMBLY_ INFO

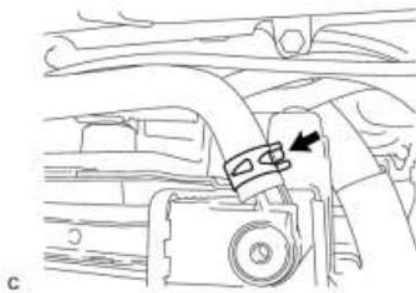
16. REMOVE INLET AIR CLEANER ASSEMBLY_ INFO

17. REMOVE AIR CLEANER CASE_ INFO

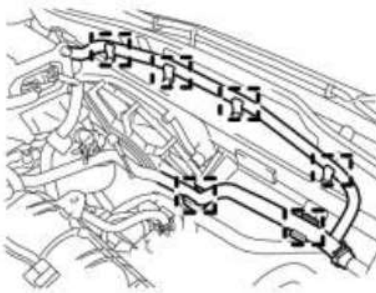
18. REMOVE NO. 2 FAN SHROUD



(a) Disconnect the No. 1 water by-pass hose from the radiator assembly.

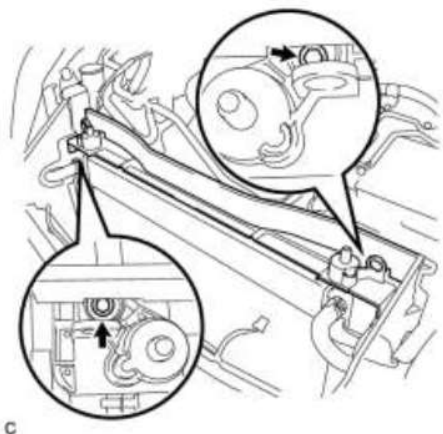


(b) Disconnect the water by-pass hose from the radiator assembly.

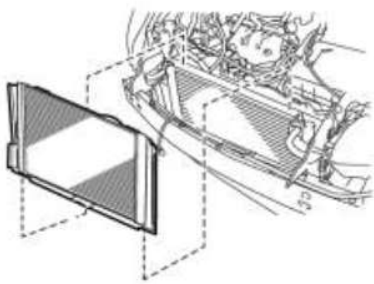


(c) Disconnect the 6 water by-pass hose clamps from the No. 2 fan shroud.

(d) Remove the 2 bolts and No. 2 fan shroud from the radiator assembly.



19. REMOVE RADIATOR ASSEMBLY

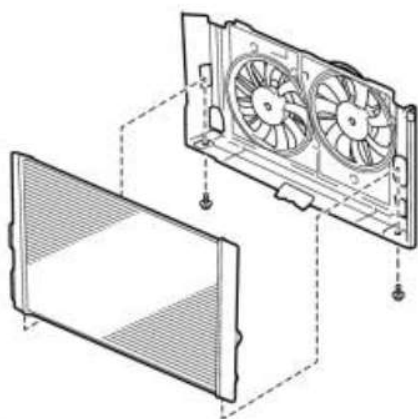


(a) Remove the radiator assembly with the fan shroud.

NOTICE:

For vehicles with the air conditioning system, do not apply any excessive force to the cooler condenser assembly or pipe when removing the radiator assembly.

(b) Remove the 2 lower radiator supports.

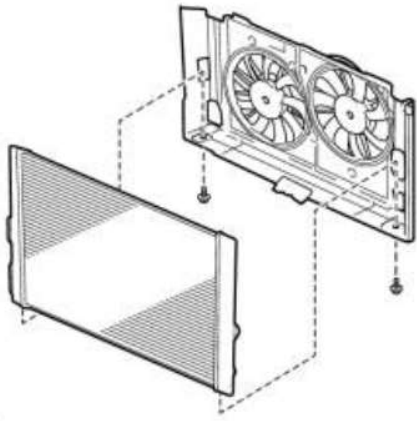


(c) Remove the 2 bolts.

(d) Remove the fan shroud from the radiator assembly.

INSTALLATION

1. INSTALL RADIATOR ASSEMBLY



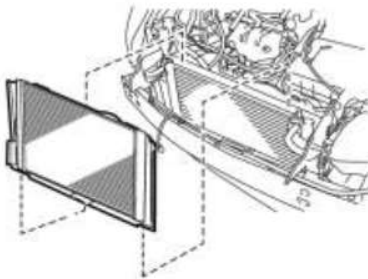
(a) Install the 2 bolts.

Torque: **7.0 N·m (71 kgf·cm, 62in·lbf)**

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(b) Install the fan shroud to the radiator assembly.

(c) Install the 2 lower radiator supports.



(d) Install the radiator assembly with the fan shroud.

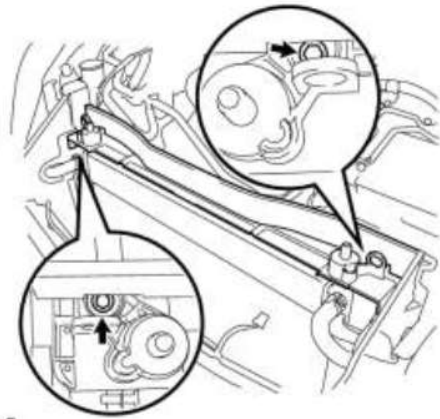
NOTICE:

For vehicles with the air conditioning system, do not apply any excessive force to the cooler condenser assembly or pipe when installing the radiator assembly.

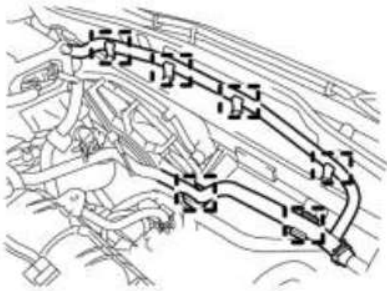
2. INSTALL NO. 2 FAN SHROUD

(a) Install the No. 2 fan shroud with the 2 bolts.

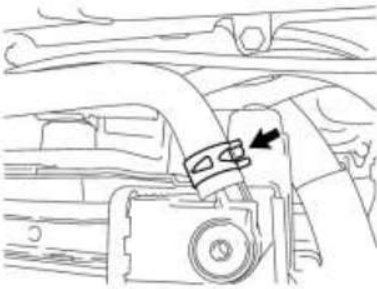
Torque: **7.0 N·m (71 kgf·cm, 62in·lbf)**



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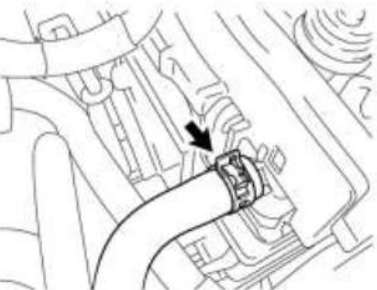


(b) Connect the 6 water by-pass hose clamps to the No. 2 fan shroud.



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(c) Connect the water by-pass hose to the radiator assembly.



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(d) Connect the No. 1 water by-pass hose to the radiator assembly.

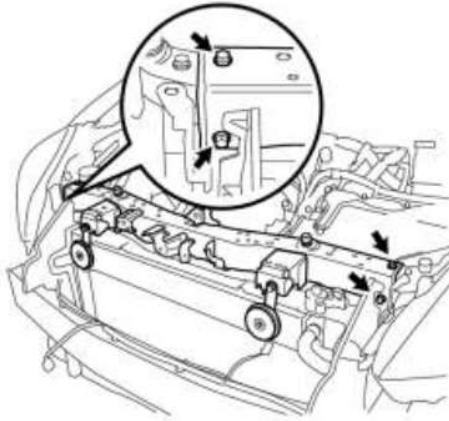
3. INSTALL AIR CLEANER CASE_ INFO

4. INSTALL INLET AIR CLEANER ASSEMBLY_ INFO

5. INSTALL AIR CLEANER CAP SUB-ASSEMBLY_

INFO

6. INSTALL HOOD LOCK SUPPORT SUB-ASSEMBLY

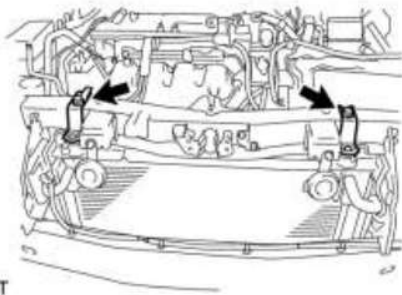


(a) Install the upper radiator support with the 4 bolts.

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

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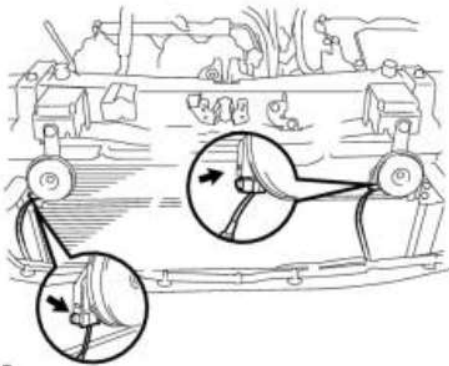
(b) Install the 2 cushions to the radiator support RH and radiator support LH.



(c) Install the radiator support RH and radiator support LH with the 2 bolts.

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

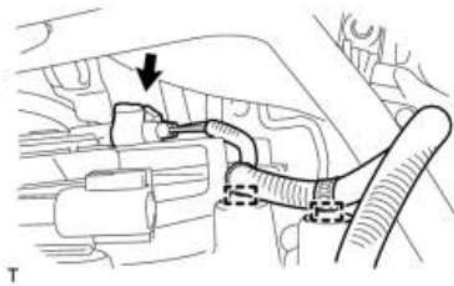
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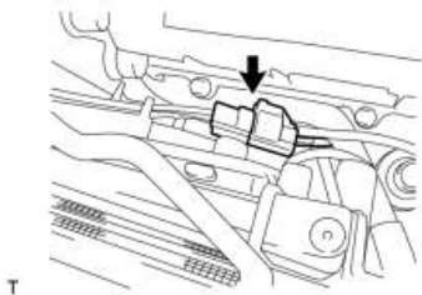
(d) Connect the 2 horn connectors.

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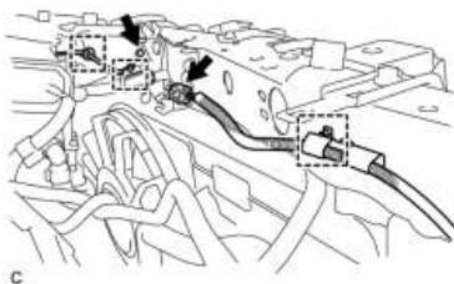
(e) Connect the 2 wire harness clamps and connector to the fan shroud and cooling fan motor.



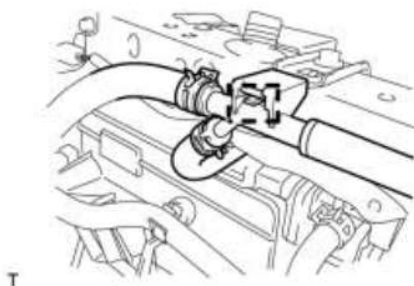
(f) Connect the connector to the No. 2 cooling fan motor.



(g) Connect the hood lock connector and hood lock control cable wire.



(h) Connect the 3 wire harness clamps.



(i) Connect the water by-pass hose clamp to the radiator support RH.

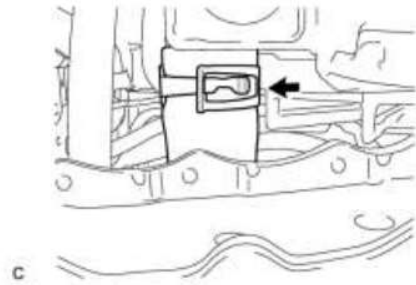
7. INSTALL NO. 1 INVERTER BRACKET_ [INFO](#)

8. INSTALL MILLIMETER WAVE RADAR SENSOR BRACKET_ [INFO](#)

9. INSTALL MILLIMETER WAVE RADAR SENSOR ASSEMBLY (w/ Dynamic Radar Cruise Control System)_ [INFO](#)

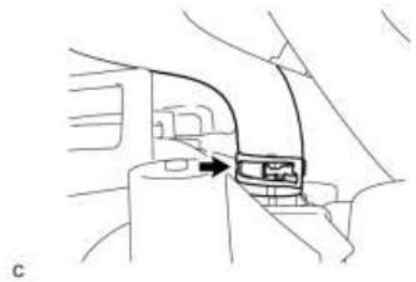
10. INSTALL FRONT BUMPER ASSEMBLY_ INFO

11. CONNECT NO. 2 RADIATOR HOSE



(a) Connect the No. 2 radiator hose to the radiator assembly with the clamp.

12. CONNECT NO. 1 RADIATOR HOSE



(a) Connect the No. 1 radiator hose to the radiator assembly with the clamp.

13. ADD ENGINE COOLANT (for Engine)_ INFO14. INSPECT FOR COOLANT LEAK (for Engine)_ INFO

15. INSTALL NO. 1 ENGINE UNDER COVER

16. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected INFO.

17. INSTALL REAR NO. 3 FLOOR BOARD_ INFO18. INSTALL REAR DECK FLOOR BOX_ INFO19. INSTALL REAR NO. 2 FLOOR BOARD (for Separate Type)_ INFO20. INSTALL RADIATOR SUPPORT OPENING COVER_ INFO21. ADD WASHER FLUID (w/ Headlight Cleaner System)_ INFO

22. PREPARE VEHICLE FOR FOG LIGHT AIM ADJUSTMENT (w/ Fog Light) 

23. PREPARE FOR FOG LIGHT AIMING 

24. INSPECT FOG LIGHT AIMING 

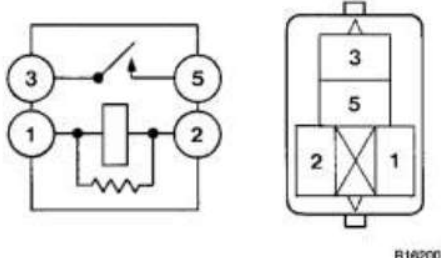
25. ADJUST FOG LIGHT AIMING 

ON-VEHICLE INSPECTION

1. INSPECT COOLING FAN RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



B16200

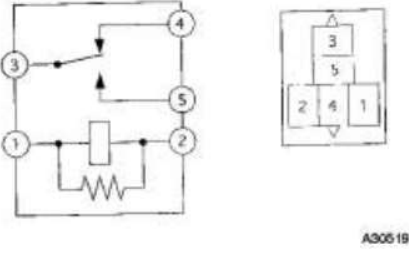
Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

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

2. INSPECT NO. 2 COOLING FAN RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



A30519

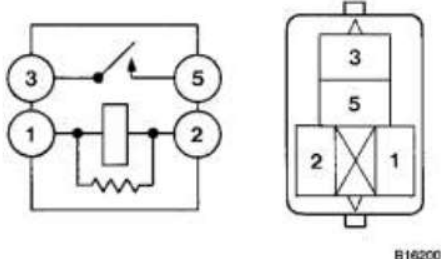
Tester Connection	Condition	Specified Condition
3 - 4	Battery voltage is not applied between terminals 1 and 2	Below 1 Ω
3 - 4	Battery voltage is applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher
3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω

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

3. INSPECT NO. 3 COOLING FAN RELAY

(a) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



B16200

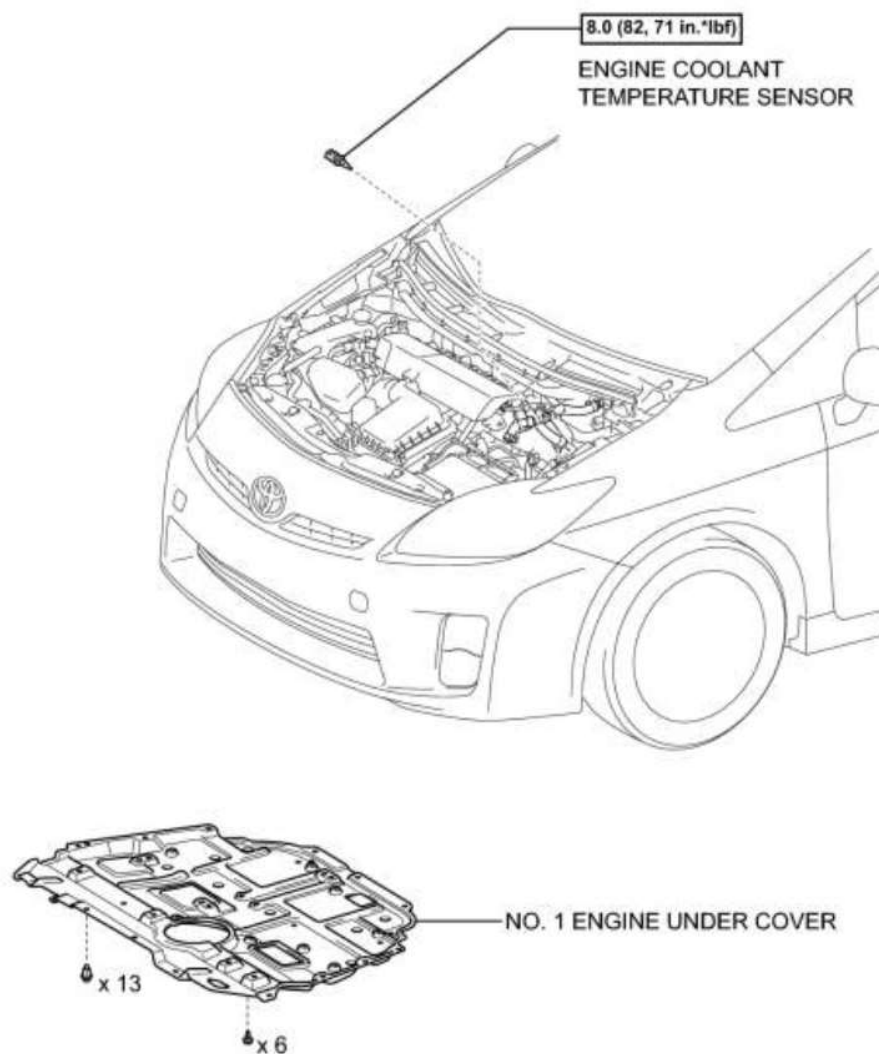
Tester Connection	Condition	Specified Condition
3 - 5	Battery voltage is not applied between terminals 1 and 2	10 kΩ or higher

3 - 5	Battery voltage is applied between terminals 1 and 2	Below 1 Ω
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If the result is not as specified, replace the cooling fan relay.

COMPONENTS

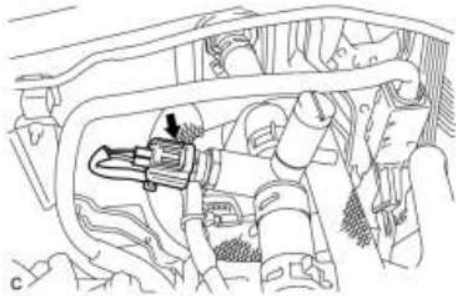
ILLUSTRATION



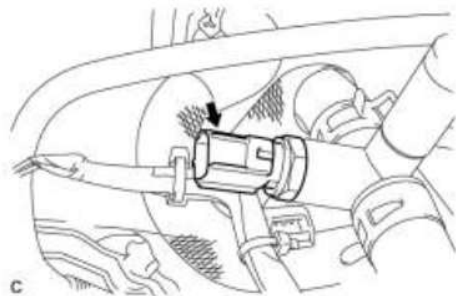
N*m (kgf*cm, ft.*lbf): Specified torque

REMOVAL

1. REMOVE NO. 1 ENGINE UNDER COVER
2. DRAIN ENGINE COOLANT (for Engine) INFO
3. REMOVE ENGINE COOLANT TEMPERATURE SENSOR



(a) Disconnect the engine coolant temperature sensor connector.



(b) Using a union nut wrench (19 mm), remove the engine coolant temperature sensor.

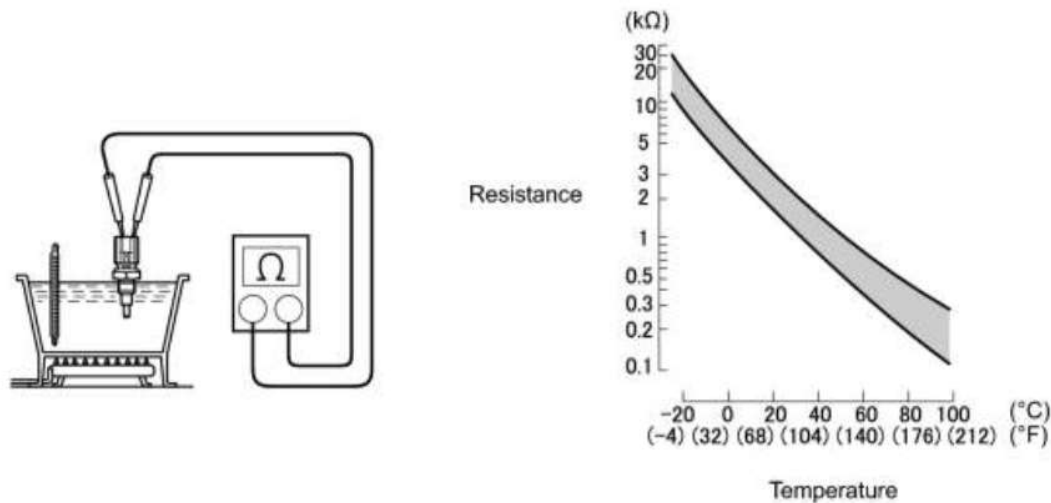
NOTICE:

Do not apply any excessive force to the heater pipe when removing the engine coolant temperature sensor.

INSPECTION

1. INSPECT ENGINE COOLANT TEMPERATURE SENSOR

(a) Measure the resistance according to the value(s) in the table below.



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Standard Resistance:

Condition	Specified Condition
Approximately 20°C (68°F)	2.32 to 2.59 kΩ
Approximately 80°C (176°F)	0.310 to 0.326 kΩ

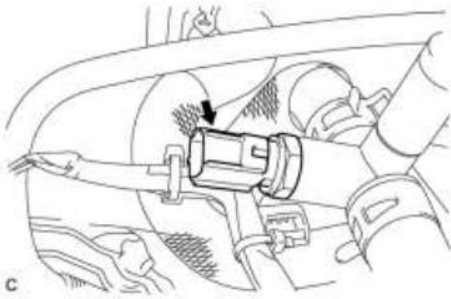
NOTICE:

When checking the engine coolant temperature sensor in water, keep the terminals dry. After the check, dry the engine coolant temperature sensor.

If the resistance is not as specified, replace the engine coolant temperature sensor.

INSTALLATION

1. INSTALL ENGINE COOLANT TEMPERATURE SENSOR

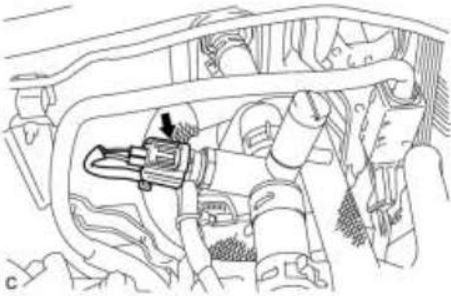


(a) Using a union nut wrench (19 mm), install the engine coolant temperature sensor.

Torque: **8.0 N·m (82 kgf·cm, 71in·lbf)**

NOTICE:

Do not apply any excessive force to the heater pipe when installing the engine coolant temperature sensor.



(b) Connect the engine coolant temperature sensor connector.

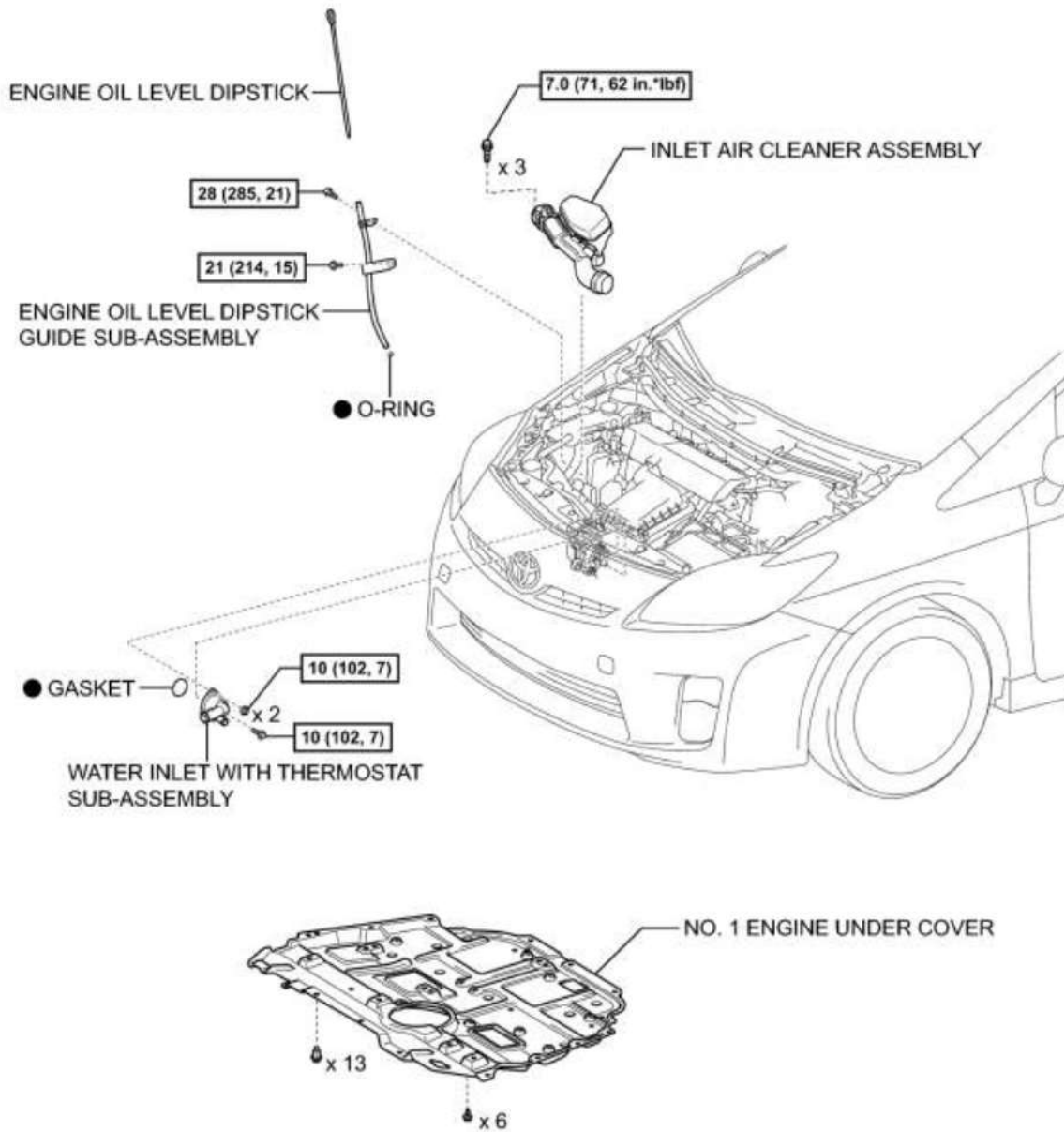
2. ADD ENGINE COOLANT (for Engine) INFO

3. INSPECT FOR COOLANT LEAK (for Engine) INFO

4. INSTALL NO. 1 ENGINE UNDER COVER

COMPONENTS

ILLUSTRATION



[N*m (kgf*cm, ft.*lbf)]: Specified torque

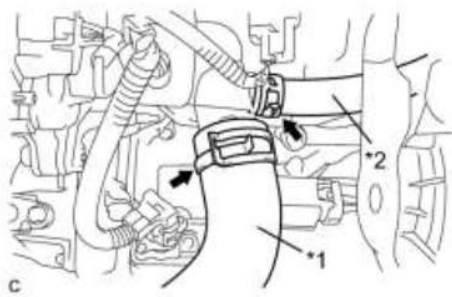
● Non-reusable part

REMOVAL

- 1. REMOVE NO. 1 ENGINE UNDER COVER
- 2. REMOVE INLET AIR CLEANER ASSEMBLY_ INFO
- 3. REMOVE ENGINE OIL LEVEL DIPSTICK GUIDE SUB-ASSEMBLY_ INFO
- 4. DRAIN ENGINE COOLANT (for Engine)_ INFO
- 5. REMOVE WATER INLET WITH THERMOSTAT SUB-ASSEMBLY

(a) Disconnect the No. 2 radiator hose and No. 3 water by-pass hose.

Text in Illustration

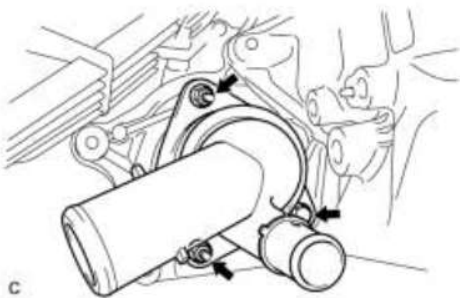


*1	No. 2 Radiator Hose
*2	No. 3 Water By-pass Hose

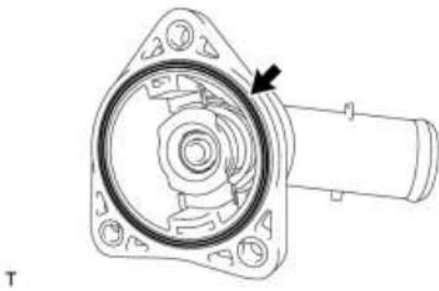
- Do not apply force to the water inlet with thermostat sub-assembly when disconnecting the No. 3 water by-pass hose.
- Do not damage the water inlet with thermostat sub-assembly.

HINT:

When disconnecting the No. 3 water by-pass hose, pinch the hose clamp, rotate the hose and pull it straight off the pipe.



(b) Remove the 2 nuts, bolt and water inlet with thermostat sub-assembly.



(c) Remove the gasket from the water inlet with thermostat sub-assembly.

INSPECTION

1. INSPECT WATER INLET WITH THERMOSTAT SUB-ASSEMBLY



(a) Immerse the water inlet with thermostat sub-assembly in water and then gradually heat the water.

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A75919

(b) Check the valve opening temperature of the water inlet with thermostat sub-assembly.

Valve opening temperature:

80 to 84°C (176 to 183°F)

HINT:

If the valve opening temperature is not as specified, replace the water inlet with thermostat sub-assembly.

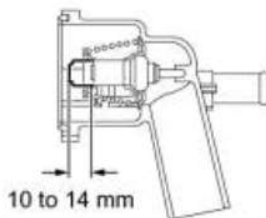
(c) Check the valve lift.

Valve lift:

10 to 14 mm (0.394 to 0.551 in.) at 95°C (203°F)

HINT:

If the valve lift is not as specified, replace the water inlet with thermostat sub-assembly.



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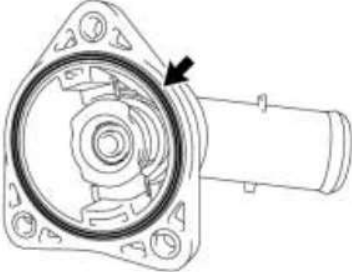
(d) Check that the valve is fully closed when the water inlet with thermostat sub-assembly is at low temperatures (below 77°C (171°F)).

HINT:

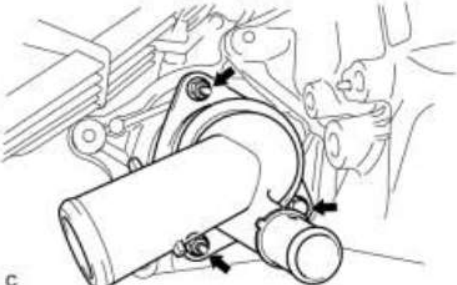
If it is not fully closed, replace the water inlet with thermostat sub-assembly.

INSTALLATION

1. INSTALL WATER INLET WITH THERMOSTAT SUB-ASSEMBLY

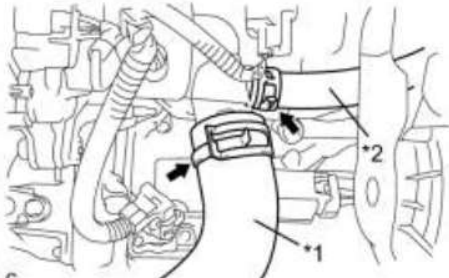


(a) Install a new gasket on the water inlet with thermostat sub-assembly.



(b) Install the water inlet with thermostat sub-assembly with the 2 nuts and bolt.

Torque: 10 N·m (102 kgf·cm, 7ft·lbf)



(c) Connect the No. 2 radiator hose and No. 3 water by-pass hose.

Text in Illustration

*1	No. 2 Radiator Hose
*2	No. 3 Water By-pass Hose

2. ADD ENGINE COOLANT (for Engine)_

INFO
3. INSPECT FOR COOLANT LEAK (for Engine)_

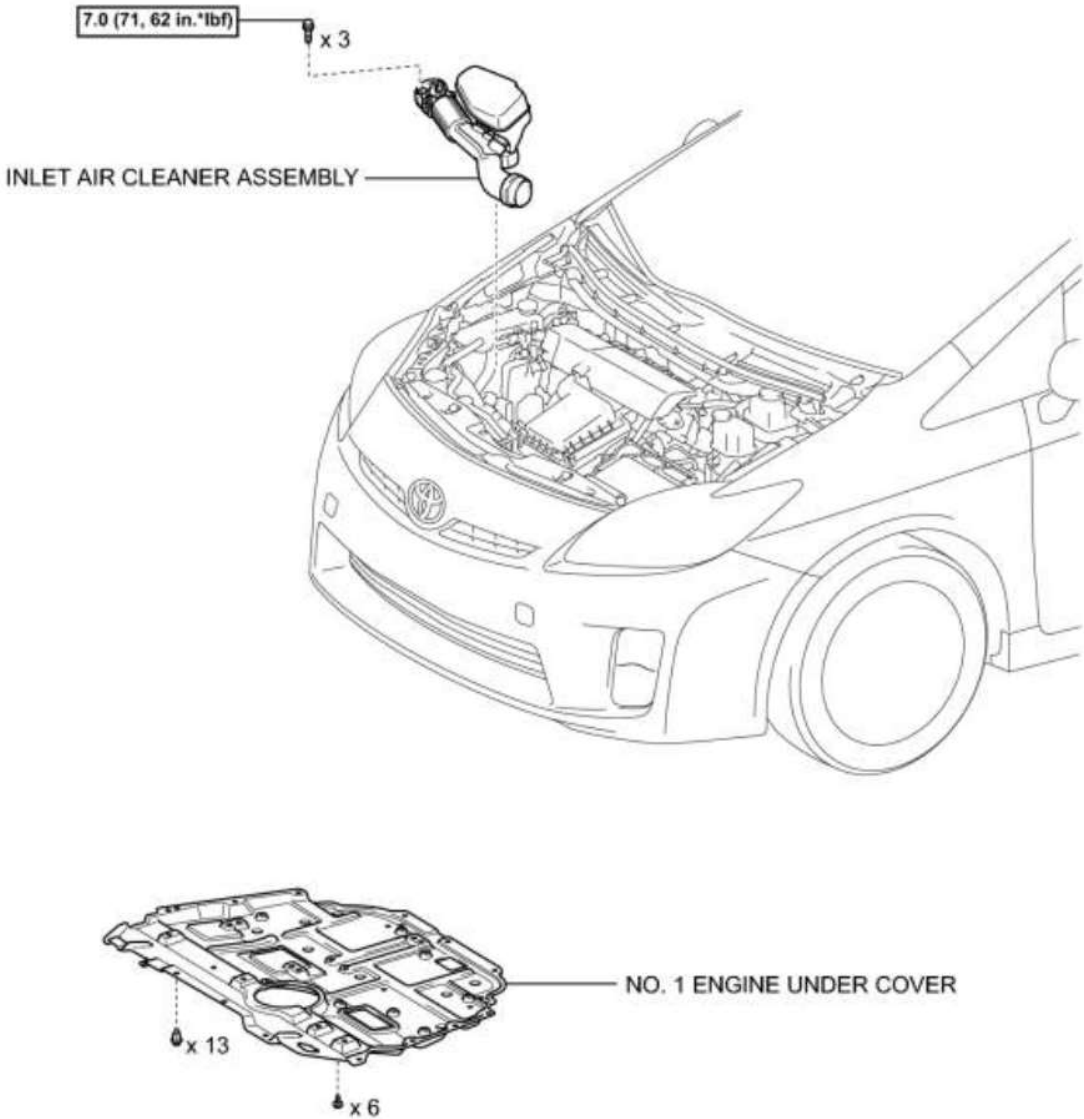
INFO
4. INSTALL ENGINE OIL LEVEL DIPSTICK GUIDE SUB-ASSEMBLY_

INFO
5. INSTALL INLET AIR CLEANER ASSEMBLY_

INFO
6. INSTALL NO. 1 ENGINE UNDER COVER

COMPONENTS

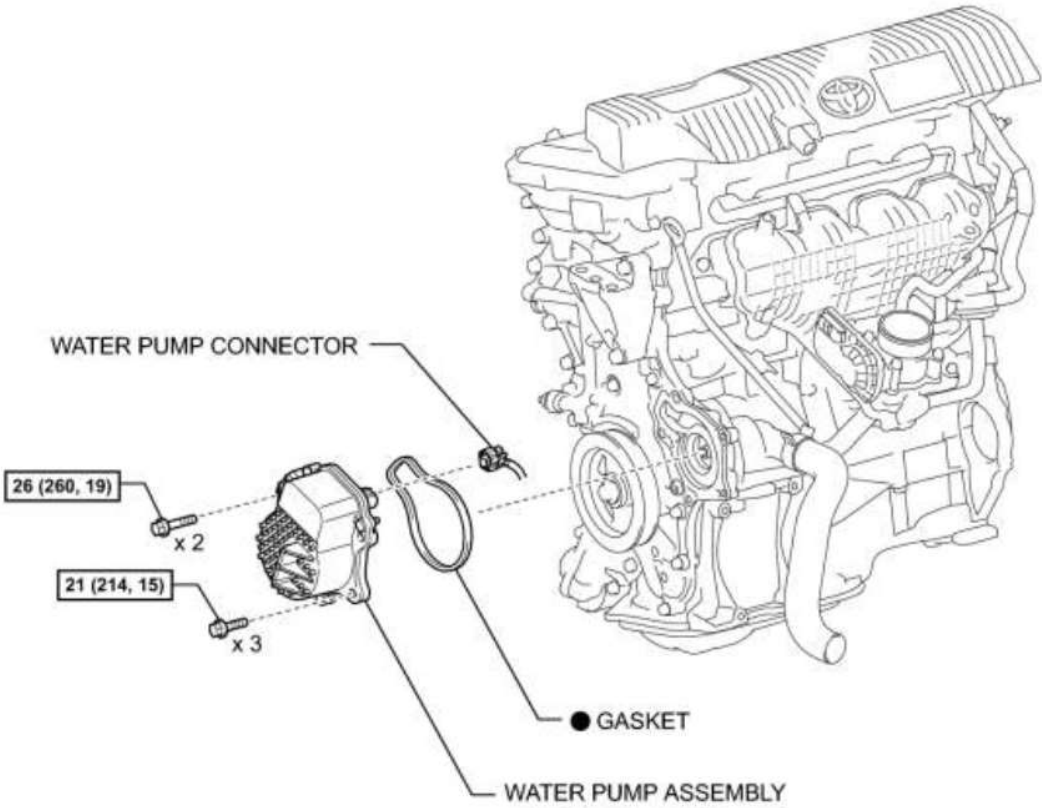
ILLUSTRATION



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

ILLUSTRATION



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REMOVAL

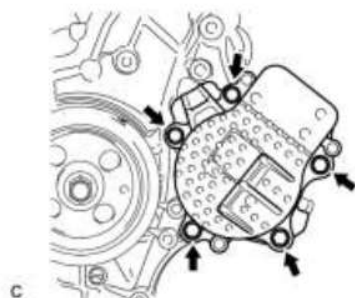
1. REMOVE NO. 1 ENGINE UNDER COVER

2. REMOVE INLET AIR CLEANER ASSEMBLY_ INFO

3. DRAIN COOLANT (for Engine)_ INFO

4. REMOVE WATER PUMP ASSEMBLY

(a) Disconnect the water pump connector from the water pump assembly.



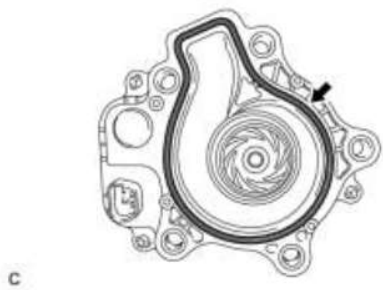
(b) Remove the 5 bolts and water pump assembly from the timing chain cover.



(c) Remove the water pump gasket from the water pump.

INSTALLATION

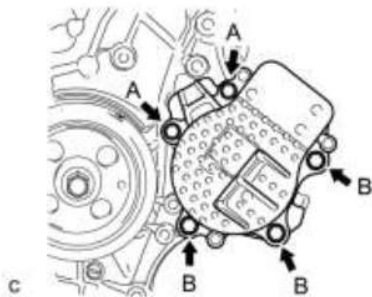
1. INSTALL WATER PUMP ASSEMBLY



(a) Install a new water pump gasket.

HINT:

Be sure to clean the contact surfaces.



(b) Install the water pump assembly to the timing chain cover with the 5 bolts.

Bolt A - Torque: **26 N·m (260 kgf·cm, 19ft·lbf)**

Bolt B - Torque: **21 N·m (214 kgf·cm, 15ft·lbf)**

Bolt Length:

Item	Length
Bolt A	35 mm (1.38 in.)
Bolt B	18 mm (0.709 in.)

(c) Connect the water pump connector to the water pump assembly.

2. ADD COOLANT (for Engine)

INFO
3. INSPECT FOR COOLANT LEAK (for Engine)

INFO
4. INSTALL INLET AIR CLEANER ASSEMBLY

INFO
5. INSTALL NO. 1 ENGINE UNDER COVER