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Model Year: 2007	Model: Camry	Doc ID: RM000000PF5019X
Title: 2GR-FE ENGINE CONTROL SYSTEM: SFI SYSTEM: P0115: Engine Coolant Temperature Circuit Malfunction (2007 Camry)		

DTC	P0115	Engine Coolant Temperature Circuit Malfunction
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DTC	P0117	Engine Coolant Temperature Circuit Low Input
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DTC	P0118	Engine Coolant Temperature Circuit High Input
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DESCRIPTION

A thermistor is built into the Engine Coolant Temperature (ECT) sensor, of which the resistance value varies according to the ECT.

The structure of the sensor and its connection to the ECM are the same as those of the Intake Air Temperature (IAT) sensor.

When any of DTCs P0115, P0117 and P0118 are set, the ECM enters fail-safe mode. During fail-safe mode, the ECT is estimated to be 80°C (176°F) by the ECM. Fail-safe mode continues until a pass condition is detected.

DTC NO.	PROCEED TO	DTC DETECTION CONDITION	TROUBLE AREA
P0115	Step 1	Open or short in Engine Coolant Temperature (ECT) sensor circuit for 0.5 seconds (1 trip detection logic)	<ul style="list-style-type: none"> • Open or short in ECT sensor circuit • ECT sensor • ECM
P0117	Step 4	Short in Engine Coolant Temperature (ECT) sensor circuit for 0.5 seconds (1 trip detection logic)	<ul style="list-style-type: none"> • Short in ECT sensor circuit • ECT sensor • ECM

DTC NO.	PROCEED TO	DTC DETECTION CONDITION	TROUBLE AREA
P0118	Step 2	Open in Engine Coolant Temperature (ECT) sensor circuit for 0.5 seconds (1 trip detection logic)	<ul style="list-style-type: none"> • Open in ECT sensor circuit • ECT sensor • ECM

**When any of these DTCs are set, check the ECT by entering the following menus on the intelligent tester:
DIAGNOSIS / ENHANCED OBD II / DATA LIST / PRIMARY / COOLANT TEMP.**

TEMPERATURE DISPLAYED	MALFUNCTION
-40°C (-40°F)	Open circuit
140°C (284°F) or higher	Short circuit

MONITOR DESCRIPTION

The Engine Coolant Temperature (ECT) sensor is used to monitor the ECT. The ECT sensor has a thermistor with a resistance that varies according to the temperature of the engine coolant. When the coolant temperature drops, the resistance in the thermistor increases. When the temperature rises, the resistance drops. These variations in resistance are reflected in the output voltage from the sensor. The ECM monitors the sensor voltage and uses this value to calculate the ECT. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a fault in the ECT sensor and sets a DTC.

Example:

If the sensor output voltage is -40°C (-40°F) for 0.5 seconds or more, the ECM determines that there is an open in the ECT sensor circuit, and sets DTC P0118. Conversely, if the voltage output is more than 140°C (284°F) for 0.5 seconds or more, the ECM determines that there is a short in the sensor circuit, and sets DTC P0117.

If the malfunction is not repaired successfully, a DTC is set 0.5 seconds after the engine is next started.

MONITOR STRATEGY

Related DTCs	P0115: Engine coolant temperature sensor open/short (Fluctuating) P0117: Engine coolant temperature sensor short (Low electrical resistance) P0118: Engine coolant temperature sensor open (High electrical
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	resistance)
Required Sensors/Components (Main)	Engine coolant temperature sensor
Required Sensors/Components (Sub)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs are not present	None
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TYPICAL MALFUNCTION THRESHOLDS

P0115:

Engine coolant temperature sensor voltage	Less than 0.14 V, or more than 4.91 V
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P0117:

Engine coolant temperature sensor voltage	Less than 0.14 V
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P0118:

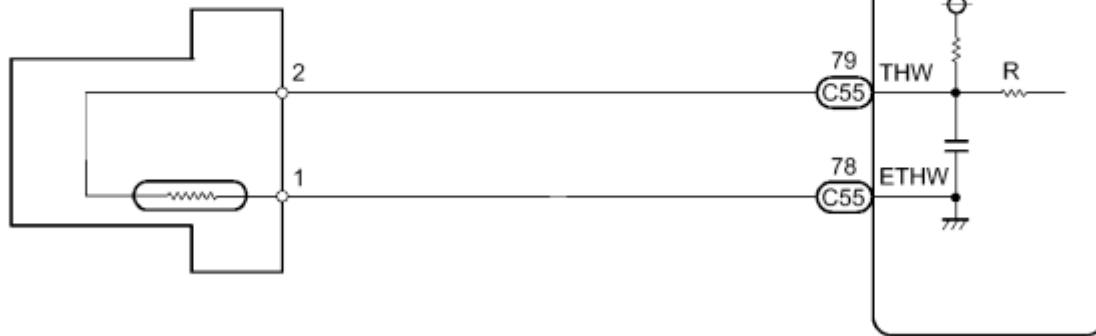
Engine coolant temperature sensor voltage	More than 4.91 V
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COMPONENT OPERATING RANGE

Engine coolant temperature sensor resistance	79 Ω to 156 k Ω [-40 to 140°C (-40 to 284°F)]
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WIRING DIAGRAM

C4
Engine Coolant Temperature Sensor



INSPECTION PROCEDURE

Read freeze frame data using the intelligent tester. The ECM records vehicle and driving condition information as freeze frame data the moment a DTC is stored. When troubleshooting, freeze frame data can be helpful in determining whether the vehicle was running or stopped, whether the engine was warmed up or not, whether the air-fuel ratio was lean or rich, as well as other data recorded at the time of a malfunction .

PROCEDURE

1.	CHECK DTC OUTPUT
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- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG).
- (c) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES.
- (d) Read the DTCs.

Result:

DISPLAY (DTC OUTPUT)	PROCEED TO
P0115	A
P0117	B
P0118	C

C ▶ **CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)**

B ▶ **CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)**

A
▼

2.	READ VALUE USING ENGINE COOLANT TEMPERATURE SENSOR (COOLANT TEMP)
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- (a) Connect the intelligent tester to the DLC3.
- (b) Turn the ignition switch on (IG).
- (c) Turn the tester on.
- (d) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST / PRIMARY / COOLANT TEMP.
- (e) Read the value displayed on the tester.

Standard:

Between 80°C and 97°C (176°F and 207°F) with warm engine.

Result:

TEMPERATURE DISPLAYED	PROCEED TO
-40°C (-40°F)	A
140°C (284°F) or higher	B
Between 80°C and 97°C (176°F and 207°F)	C

HINT:

- If there is an open circuit, the intelligent tester indicates -40°C (-40°F).
- If there is a short circuit, the intelligent tester indicates 140°C (284°F) or higher.

C ▶ **CHECK FOR INTERMITTENT PROBLEMS**

B ▶ **CHECK ENGINE COOLANT TEMPERATURE SENSOR (CHECK FOR SHORT IN SENSOR)**



