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Service Category: Engine/Hybrid System	Section: Engine Control	
Model Year: 2008	Model: LX570	Doc ID: RM000000PF505KX
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: DESCRIPTION (2008 LX570)		

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, whose resistance value varies according to the ECT, is built into the Engine Coolant Temperature (ECT) sensor.

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

HINT:

When any of DTCs P0115, P0117 and P0118 is stored, 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 CODE	DTC DETECTION CONDITION	TROUBLE AREA
P0115	An open or short in the Engine Coolant Temperature (ECT) sensor circuit for 0.5 seconds (1 trip detection logic).	- Open or short in Engine Coolant Temperature (ECT) sensor circuit - ECT sensor - ECM
P0117	A short in the ECT sensor circuit for 0.5 seconds (1 trip detection logic).	- Short in ECT sensor - ECT sensor - ECM
P0118	An open in the ECT sensor circuit for 0.5 seconds (1 trip detection logic).	- Open in ECT sensor circuit - ECT sensor - ECM

HINT:

When any of these DTCs is output, check the ECT by entering the following menus: Powertrain / Engine and ECT / Data List / All Data / 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 is low, the resistance in the thermistor increases. When the temperature is high, 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 stores DTC(s).

Example:

If the sensor output voltage is higher than 4.91 V for 0.5 seconds or more, the ECM determines that there is an open in the ECT sensor circuit, and stores DTC P0118. Conversely, if the voltage output is below 0.14 V for 0.5 seconds or more, the ECM determines that there is a short in the sensor circuit, and stores DTC P0117.

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

MONITOR STRATEGY

Related DTCs	P0115: ECT sensor range check (Fluctuating) P0117: ECT sensor range check (Low voltage) P0118: ECT sensor range check (High voltage)
Required Sensors/Components (Main)	ECT sensor
Required Sensors/Components (Related)	-
Frequency of Operation	Continuous
Duration	0.5 seconds
MIL Operation	Immediate
Sequence of Operation	None

TYPICAL ENABLING CONDITIONS

Monitor runs whenever following DTCs not stored	None
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TYPICAL MALFUNCTION THRESHOLDS

P0115:

ECT sensor voltage	Below 0.14 V, or higher than 4.91 V
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P0117:

ECT sensor voltage [ECT]	Below 0.14 V [Higher than 140°C (284°F)]
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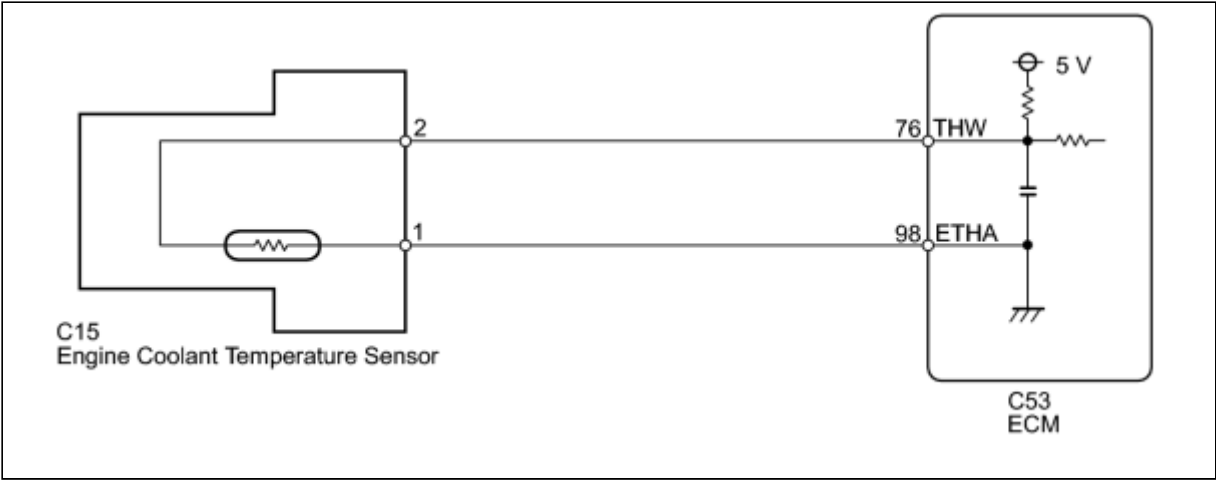
P0118:

ECT sensor voltage [ECT]	Higher than 4.91 V [Below -40°C (-40°F)]
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COMPONENT OPERATING RANGE

ECT sensor voltage [ECT]	0.14 to 4.91 V [-40 to 140°C (-40 to 284°F)]
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WIRING DIAGRAM



INSPECTION PROCEDURE

HINT:

Read freeze frame data using the Techstream. Freeze frame data records the engine condition when malfunctions are detected. When troubleshooting, freeze frame data can help determine if the vehicle was moving or stationary, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

PROCEDURE

1.	READ OUTPUT DTC
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG) and turn the Techstream on.
- (c) Enter the following menus: Powertrain / Engine and ECT / Trouble Codes.
- (d) Read DTCs.

Result

RESULT	PROCEED TO
P0115 is output	A
P0117 is output	B
P0118 is output	C



2.	READ VALUE USING TECHSTREAM (ENGINE COOLANT TEMPERATURE)
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- (a) Connect the Techstream to the DLC3.
- (b) Turn the engine switch on (IG).

- (c) Turn the Techstream on.
- (d) Enter the following menus: Powertrain / Engine and ECT / Data List / All Data / Coolant Temp.
- (e) Read the value displayed on the Techstream.
- Standard value:
- Between 80 and 100°C (167 and 212°F) with warm engine.

Result

RESULT	PROCEED TO
-40°C (-40°F)	A
140°C (284°F) or higher	B
Between 80 and 100°C (176 and 212°F)	C

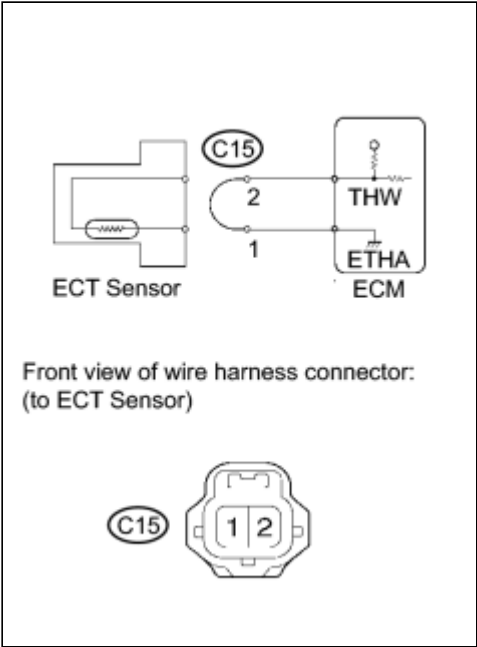
HINT:

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

A

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3.	READ VALUE USING TECHSTREAM (CHECK FOR OPEN IN WIRE HARNESS)
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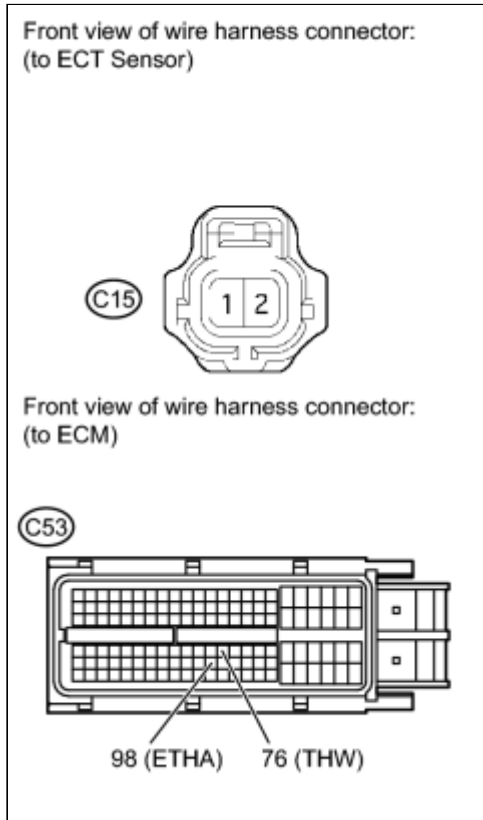
- (a) Disconnect the C15 Engine Coolant Temperature (ECT) sensor connector.
- (b) Connect terminals 1 and 2 of the ECT sensor connector on the wire harness side.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the engine switch on (IG).
- (e) Turn the Techstream on.

- (f) Enter the following menus: Powertrain / Engine and ECT / Data List / All Data / Coolant Temp.
- (g) Read the value displayed on the Techstream.
- Standard value:
- 140°C (284°F) or higher

OK

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4. CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)

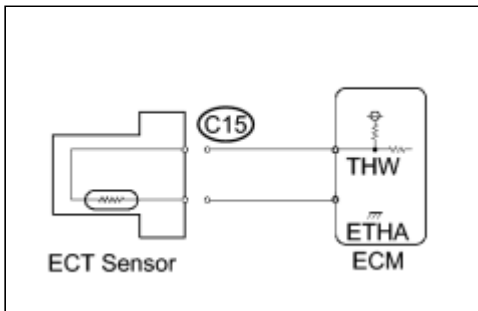


- (a) Disconnect the C15 ECT sensor connector.
- (b) Disconnect the C53 ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.
- Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C15-2 - C53-76 (THW)	Always	Below 1 Ω
C15-1 - C53-98 (ETHA)	Always	Below 1 Ω

OK

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9. READ VALUE USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)

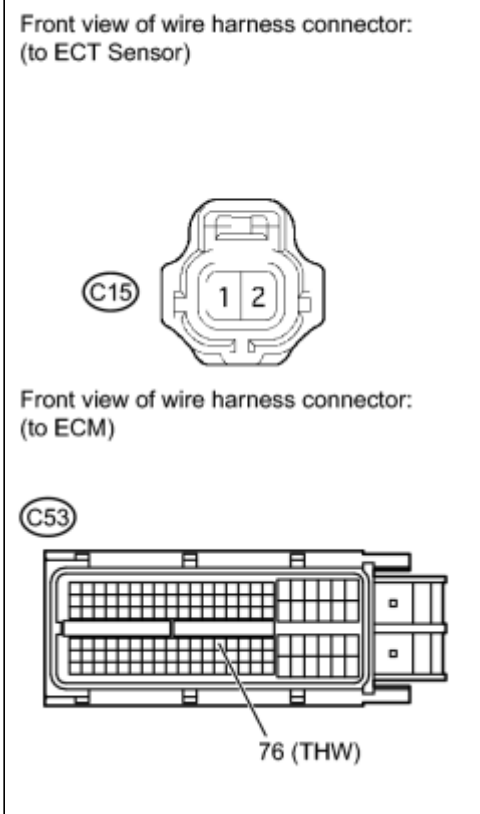
- (a) Disconnect the C15 ECT sensor connector.
- (b) Connect the Techstream to the DLC3.
- (c) Turn the engine switch on (IG).
- (d) Turn the Techstream on.
- (e) Enter the following menus: Powertrain / Engine and ECT / Data List / All Data / Coolant Temp.
- (f) Read the value displayed on the Techstream.

Standard value:

-40°C (-40°F)

OK

**10. CHECK HARNESS AND CONNECTOR (ENGINE COOLANT TEMPERATURE SENSOR - ECM)**



- (a) Disconnect the C15 ECT sensor connector.
- (b) Disconnect the C53 ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C15-2 or C53-76 (THW) - Body ground	Always	10 kΩ or higher

OK

