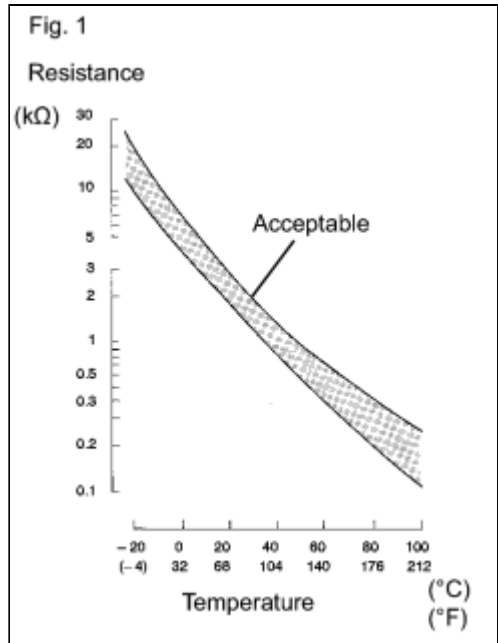


Last Modified: 11-27-2007		1.6 C
Service Category: Engine/Hybrid System	Section: Engine Control	
Model Year: 2008	Model: LX570	Doc ID: RM000000PF3058X
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: DESCRIPTION (2008 LX570)		

DTC	P0110	Intake Air Temperature Circuit Malfunction
DTC	P0112	Intake Air Temperature Circuit Low Input
DTC	P0113	Intake Air Temperature Circuit High Input

DESCRIPTION



The Intake Air Temperature (IAT) sensor, mounted on the Mass Air Flow (MAF) meter, monitors the IAT. The IAT sensor has a built-in thermistor with a resistance that varies according to the temperature of the intake air. When the IAT is low, the resistance of the thermistor increases. When the temperature is high, the resistance drops. These variations in resistance are transmitted to the ECM as voltage changes (See Fig. 1).

The IAT sensor is powered by a 5 V supply from the THA terminal of the ECM, via resistor R.

Resistor R and the IAT sensor are connected in series. When the resistance value of the IAT sensor changes, according to changes in the IAT, the voltage at terminal THA also varies. Based on this signal, the ECM increases the fuel injection volume when the engine is cold to improve driveability.

HINT:

When any of DTCs P0110, P0112 and P0113 is stored, the ECM enters fail-safe mode. During fail-safe mode, the IAT is estimated to be 20°C (68°F) by the ECM. Fail-safe mode continues until a pass condition is detected.

DTC CODE	DTC DETECTION CONDITION	TROUBLE AREA
P0110	An open or short in the Intake Air Temperature (IAT) sensor circuit for 0.5 seconds (1 trip detection logic).	• Open or short in Intake Air Temperature (IAT) sensor circuit • IAT sensor (built into Mass Air Flow [MAF] meter) • ECM
P0112	A short in the IAT sensor circuit for 0.5 seconds (1 trip detection logic).	• Short in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM
P0113	An open in the IAT sensor circuit for 0.5 seconds (1 trip detection logic).	• Open in IAT sensor circuit • IAT sensor (built into MAF meter) • ECM

HINT:

When any of these DTCs are output, check the IAT by entering the following menus: Powertrain / Engine and ECT / All Data / Intake Air.

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

MONITOR DESCRIPTION

The ECM monitors the sensor voltage and uses this value to calculate the IAT. When the sensor output voltage deviates from the normal operating range, the ECM interprets this as a malfunction in the IAT sensor and stores a DTC.

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 IAT sensor circuit, and stores DTC P0113. Conversely, if the output voltage is below 0.18 V for 0.5 seconds or more, the ECM determines that there is a short in the sensor circuit, and stores DTC P0112.

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

MONITOR STRATEGY

Related DTCs	P0110: IAT sensor range check (Fluctuating) P0112: IAT sensor range check (Low voltage) P0113: IAT sensor range check (High voltage)
Required Sensors/Components (Main)	IAT 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

P0110:

IAT sensor voltage	Below 0.18 V, or higher than 4.91 V
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P0112:

IAT sensor voltage [IAT]	Below 0.18 V [Higher than 140°C (284°F)]
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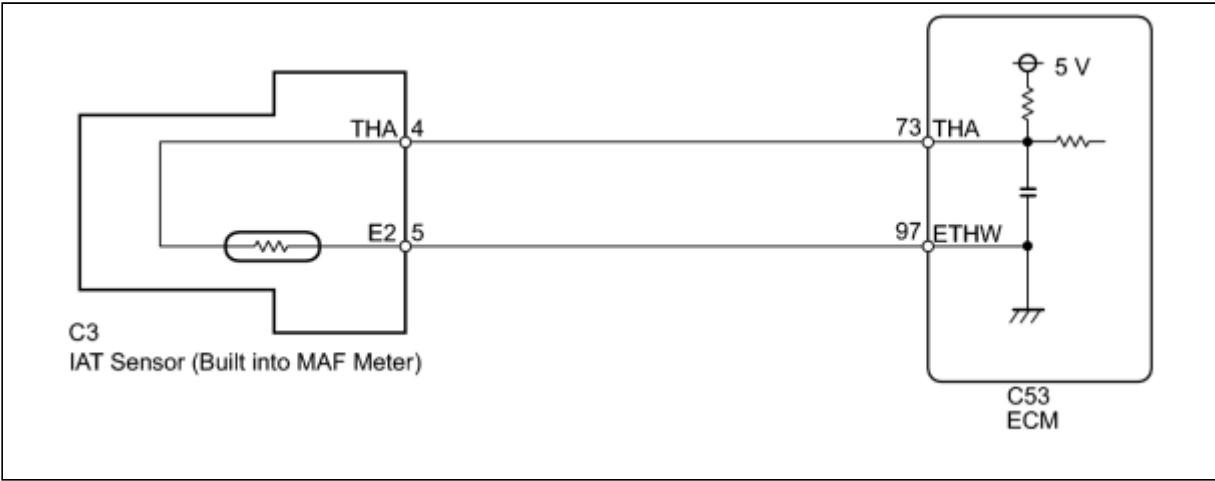
P0113:

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

IAT sensor voltage [IAT]	0.18 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
P0110 is output	A
P0112 is output	B
P0113 is output	C

A**2. READ VALUE USING TECHSTREAM (INTAKE AIR TEMPERATURE)**

- (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 / All Data / Intake Air.
- (e) Read the value displayed on the Techstream.

Standard:

Same as actual Intake Air Temperature (IAT).

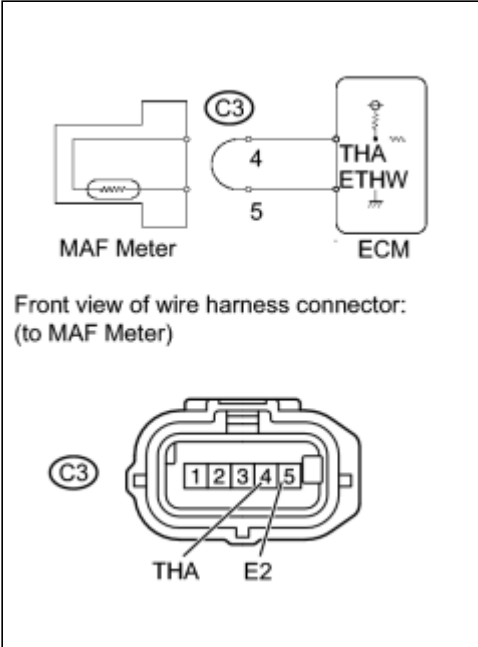
Result

RESULT	PROCEED TO
-40°C (-40°F)	A
140°C (284°F) or higher	B
Same as actual IAT	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**3. READ VALUE USING TECHSTREAM (CHECK FOR OPEN IN WIRE HARNESS)**



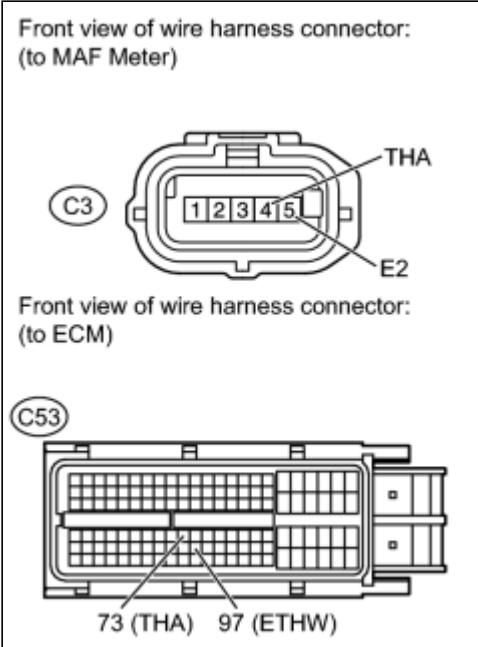
- (a) Disconnect the C3 Mass Air Flow (MAF) meter connector.
- (b) Connect terminals 4 (THA) and 5 (E2) of the MAF meter wire harness side connector.
- (c) Connect the Techstream to the DLC3.
- (d) Turn the engine switch on (IG).
- (e) Turn the Techstream on.
- (f) Enter the following menus: Powertrain / Engine and ECT / All Data / Intake Air.
- (g) Read the value displayed on the Techstream.

Standard value:
140°C (284°F) or higher

OK

▼

4.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
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- (a) Disconnect the C3 MAF meter connector.
- (b) Disconnect the C53 ECM connector.
- (c) Measure the resistance according to the value(s) in the table below.

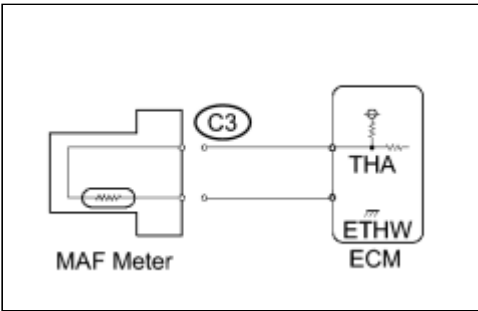
Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
C3-4 (THA) - C53-73 (THA)	Always	Below 1 Ω
C3-5 (E2) - C53-97 (ETHW)	Always	Below 1 Ω

OK

▼

9. PERFORM ACTIVE TEST USING TECHSTREAM (CHECK FOR SHORT IN WIRE HARNESS)



- (a) Disconnect the C3 MAF meter 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 / All Data / Intake Air.

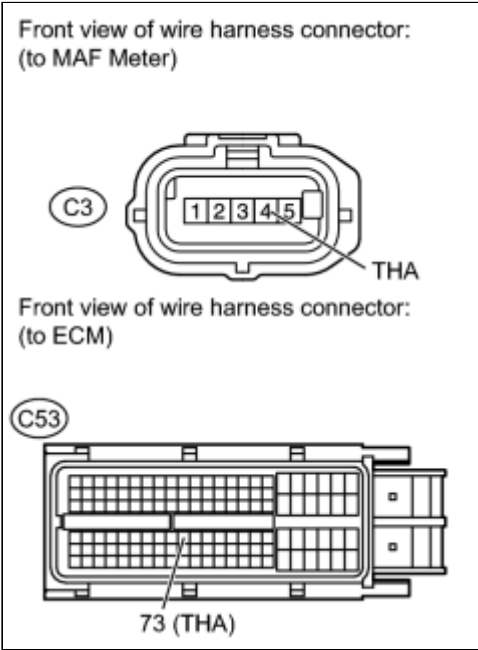
(f) Read the value displayed on the Techstream.

Standard value:
-40°C (-40°F)

OK

▼

10.	CHECK HARNESS AND CONNECTOR (MASS AIR FLOW METER - ECM)
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- (a) Disconnect the C3 MAF meter 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
C3-4 (THA) or C53-73 (THA) - Body ground	Always	10 kΩ or higher

OK

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