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Service Category: Engine/Hybrid System	Section: Engine Control	
Model Year: 2008	Model: LX570	Doc ID: RM000000PDS068X
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: FREEZE FRAME DATA (2008 LX570)		

FREEZE FRAME DATA

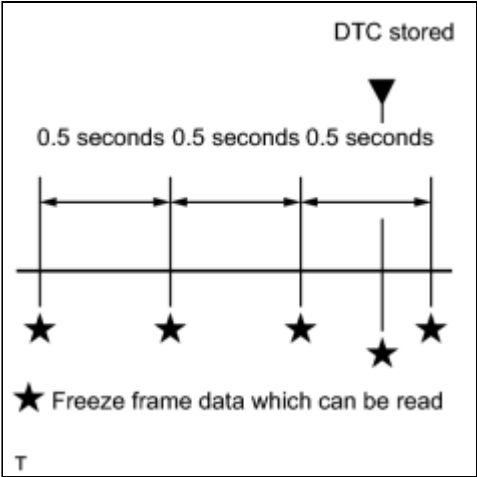
1. DESCRIPTION

Freeze frame data records the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, it can help determine if the vehicle was running or stopped, the engine was warmed up or not, the air-fuel ratio was Lean or Rich, and other data from the time the malfunction occurred.

HINT:

If it is impossible to duplicate the problem even though a DTC is output, confirm the freeze frame data.

The ECM records engine conditions in the form of freeze frame data every 0.5 seconds. Using the Techstream, 5 separate sets of freeze frame data can be checked.



2. LIST OF FREEZE FRAME DATA

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
Injector (Port)	Injection period of No. 1 cylinder	-
IGN Advance	Ignition advance	-
Calculate Load	Calculated load	Calculated load by the ECM.
Vehicle Load	Vehicle load	-
MAF	Mass air flow volume	If the mass air flow volume is approximately 0.0 g/sec.: - The mass air flow meter power source circuit is open or shorted. - The VG circuit is open or shorted. If the mass air flow volume is 160.0 g/sec. or more: - The E2G circuit is open.
Engine Speed	Engine speed	-
Vehicle Speed	Vehicle speed	Speed indicated on the speedometer.

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
Coolant Temp	Engine coolant temperature	If the value is -40°C (-40°F), the sensor circuit is open. If the value is 140°C (284°F) or higher, the sensor circuit is shorted.
Intake Air	Intake air temperature	If the value is -40°C (-40°F), the sensor circuit is open. If the value is 140°C (284°F) or higher, the sensor circuit is shorted.
2nd Air System Status	Second air system status	-
Air-Fuel Ratio	Ratio compared to stoichiometric level	-
Purge Density Learn Value	Learning value of purge density	-
Evap Purge Flow	Ratio of evaporative purge flow to intake air volume	-
EVAP (Purge) VSV	EVAP purge VSV duty ratio	-
Knock Correct Learn Value	Correction learning value of knocking	-
Knock Feedback Value	Feedback value of knocking	-
Accelerator Position No. 1	Absolute Accelerator Pedal Position (APP) No. 1	-
Accelerator Position No. 2	Absolute APP No. 2	-
Throttle Pos. Sensor Output	Throttle position	-
Throttle Sensor Position	Throttle sensor positioning	-
Throttle Sensor Position #2	Throttle sensor positioning #2	-
Throttle Motor DUTY	Throttle actuator	-
O2S B1 S2 O2S B2 S2	Heated oxygen sensor output	Performing the Control the Injection Volume or Control the Injection Volume for A/F Sensor function of the Active Test enables the technician to check the output voltage of the sensor.
AFS B1 S1 AFS B2 S1	A/F sensor output	Performing the Control the Injection Volume or Control the Injection Volume for A/F Sensor function of the Active Test enables the technician to check the output voltage of the sensor.
AFS B2 S1	A/F sensor current	-
Total FT #1 Total FT #2	Total fuel trim	-
Short FT #1	Short-term fuel trim	Short-term fuel compensation is used to maintain the air-fuel ratio at the stoichiometric air-fuel ratio.
Long FT #1	Long-term fuel trim	Overall fuel compensation is carried out in the long-term to compensate for a continual deviation of the short-term

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
		fuel trim from the central valve.
Short FT #2	Short-term fuel trim	Short-term fuel compensation is used to maintain the air-fuel ratio at the stoichiometric air-fuel ratio.
Long FT #2	Long-term fuel trim	Overall fuel compensation is carried out in the long-term to compensate for a continual deviation of the short-term fuel trim from the central valve.
Fuel System Status (Bank 1)	Fuel system status (for Bank 1)	• OL (Open Loop): Has not yet satisfied the conditions to go to closed loop. • CL (Closed Loop): Using the heated oxygen sensor as feedback for fuel control. • OLDrive: Open loop due to driving conditions (fuel enrichment). • OLFault: Open loop due to a detected system fault. • CLFault: Closed loop but the heated oxygen sensor, which is used for fuel control, is malfunctioning.
Fuel System Status (Bank 2)	Fuel system status (for Bank 2)	• OL (Open Loop): Has not yet satisfied the conditions to go to closed loop. • CL (Closed Loop): Using the heated oxygen sensor as feedback for fuel control. • OLDrive: Open loop due to driving conditions (fuel enrichment). • OLFault: Open loop due to a detected system fault. • CLFault: Closed loop but the heated oxygen sensor, which is used for fuel control, is malfunctioning.
AF Lambda B1 S1	Fuel trim at A/F sensor	-
AFS B1 S1	A/F sensor current	-
AF FT B2 S1	Fuel trim at A/F sensor	-
Catalyst Temp (B1 S1) Catalyst Temp (B2 S1)	Estimated catalyst temperature (for Sensor 1)	-
Catalyst Temp (B1 S2) Catalyst Temp (B2 S2)	Estimated catalyst temperature (for Sensor 2)	-
Sub O2S Impedance B1S2 Sub O2S Impedance B2S2	Sub heated oxygen sensor impedance (for Sensor 2)	-
Initial Engine Coolant Temp	Engine coolant temperature at engine start	-
Initial Intake Air Temp	Intake air temperature at engine start	-

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
Injection Volum (Cylinder 1)	Injection volume	-
Air pump pressure (absolute)	Air pump pressure	-
Air Pump Pulsation Pressure	Air pump pulsation pressure	-
Air Pump2 Pressure (Absolute)	Air pump pressure	-
Air Pump2 Pulsation Pressure	Air pump pulsation pressure	-
Power Steering Pressure	Power steering pressure sensor	-
SPD (SP2)	Output shaft speed	-
SPD (NT)	Input shaft speed	Data is displayed in increments of 50 rpm.
ACC Relay	ACC relay status	-
Starter Relay	Starter relay status	-
Starter Signal	Starter switch (STSW) signal	-
Starter Control	Starter switch status	-
Power Steering Switch	Power steering switch status	-
Power Steering Signal	Power steering signal (history)	This signal status is usually ON until the cables are disconnected from the battery terminals.
Closed Throttle Position SW	Closed throttle position switch	-
A/C Signal	A/C signal	-
Neutral Position SW Signal	Park/Neutral position (PNP) switch signal	-
Electrical Load Signal	Electrical load signal	-
Stop Light Switch	Stop light switch	-
Immobiliser Communication	Immobiliser communication	-
Fuel Cut Condition	Fuel cut condition	-
Battery Voltage	Battery voltage	-
Atmosphere Pressure	Atmosphere pressure	-
Secondary Air Control VSV	Secondary air injection system status	-
ACIS VSV	VSV for Acoustic Control Induction System (ACIS)	-
ACT VSV	A/C cut status for Active Test	-

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
VVT Control Status (Bank 2)	VVT control status	-
EVAP Purge VSV	EVAP Purge VSV	-
Fuel Pump/Speed Status	Fuel pump/speed status	-
VVT Control Status (Bank 1)	VVT control status	-
Vacuum Pump	Key-off EVAP system leak detection pump status	Refer to the EVAP System  .
EVAP System Vent Value	Key-off EVAP system vent valve status	-
TC and TE1	TC and CG (TE1) terminals of DLC3	-
AI Test	Secondary air injection system operation prohibit	-
Engine Speed of Cyl #1	Engine speed for cylinder 1	-
Engine Speed of Cyl #2	Engine speed for cylinder 2	-
Engine Speed of Cyl #3	Engine speed for cylinder 3	-
Engine Speed of Cyl #4	Engine speed for cylinder 4	-
Engine Speed of Cyl #5	Engine speed for cylinder 5	-
Engine Speed of Cyl #6	Engine speed for cylinder 6	-
Engine Speed of Cyl #7	Engine speed for cylinder 7	-
Engine Speed of Cyl #8	Engine speed for cylinder 8	-
Av Engine Speed of All Cyl	Engine speed for all cylinders	-
VVT Aim Angle (Bank 1)	VVT aim angle	-
VVT Change Angle (Bank 1)	VVT change angle	-
VVT OCV Duty (Bank 1)	VVT OCV operation duty	-
VVT Ex Hold Lrn Val (Bank 1)	VVT exhaust hold duty ratio learning value (Bank 1)	-
VVT Ex Chg Angle (Bank 1)	VVT exhaust change angle (Bank 1)	-
VVT Ex OCV Duty (Bank 1)	VVT exhaust OCV duty (Bank 1)	-

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
VVT Aim Angle (Bank 2)	VVT aim angle	-
VVT Change Angle (Bank 2)	VVT change angle	-
VVT OCV Duty (Bank 2)	VVT OCV operation duty	-
VVT Ex Hold Lrn Val (Bank 2)	VVT exhaust hold duty ratio learning value (Bank 2)	-
VVT Ex Chg Angle (Bank 2)	VVT exhaust change angle (Bank 2)	-
VVT Ex OCV Duty (Bank 2)	VVT exhaust OCV duty (Bank 2)	-
Idle Fuel Cut	Fuel cut idle	ON: when the throttle valve is fully closed and the engine speed is more than 3,500 rpm.
FC TAU	Fuel cut during very light load	Fuel cut being performed under a very light load to prevent the engine combustion from becoming incomplete.
Ignition	Ignition counter	-
Cylinder #1 Misfire Count	Cylinder #1 misfire	Only displayed during idling.
Cylinder #2 Misfire Count	Cylinder #2 misfire	Only displayed during idling.
Cylinder #3 Misfire Count	Cylinder #3 misfire	Only displayed during idling.
Cylinder #4 Misfire Count	Cylinder #4 misfire	Only displayed during idling.
Cylinder #5 Misfire Count	Cylinder #5 misfire	Only displayed during idling.
Cylinder #6 Misfire Count	Cylinder #6 misfire	Only displayed during idling.
Cylinder #7 Misfire Count	Cylinder #7 misfire	Only displayed during idling.
Cylinder #8 Misfire Count	Cylinder #8 misfire	Only displayed during idling.
All Cylinders Misfire Count	All cylinders misfire	Only displayed during idling.
Multi Cylinders Misfire Count	Multiple cylinder misfire	-
Misfire RPM	Engine speed when misfire occurred	-
Misfire Load	Engine load when misfire occurred	-
Misfire Margin	Margin to detect engine misfire	-
Catalyst OT MF F/C	Catalyst over temperature misfire prevention F/C	-

DISPLAY ITEM	MEASUREMENT ITEM	DIAGNOSTIC NOTE
Cat OT MF F/C History	Catalyst over temperature misfire prevention F/C history	-
Cat OT MF F/C Cylinder#1	Display of fuel cut operation in No. 1 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#2	Display of fuel cut operation in No. 2 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#3	Display of fuel cut operation in No. 3 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#4	Display of fuel cut operation in No. 4 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#5	Display of fuel cut operation in No. 5 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#6	Display of fuel cut operation in No. 6 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#7	Display of fuel cut operation in No. 7 cylinder (if certain level of misfire malfunction is detected)	-
Cat OT MF F/C Cylinder#8	Display of fuel cut operation in No. 8 cylinder (if certain level of misfire malfunction is detected)	-
Engine Run Time	Accumulated engine running time	-
Time after DTC Cleared	Cumulative time after DTC cleared	-
Distance from DTC Cleared	Accumulated distance from DTC cleared	-
Warmup Cycle Cleared DTC	Warm-up cycle after DTC cleared	-

