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Service Category: Engine/Hybrid System	Section: Engine Control	
Model Year: 2008	Model: LX570	Doc ID: RM000000SXS01AX
Title: 3UR-FE ENGINE CONTROL: SFI SYSTEM: DATA LIST / ACTIVE TEST (2008 LX570)		

DATA LIST / ACTIVE TEST

1. DATA LIST

HINT:

Using the Techstream to read the Data List allows the values or states of switches, sensors, actuators and other items to be read without removing any parts. This non-intrusive inspection can be very useful because intermittent conditions or signals may be discovered before parts or wiring is disturbed. Reading the Data List information early in troubleshooting is one way to save diagnostic time.

NOTICE:

In the table below, the values listed under "Normal Condition" are reference values. Do not depend solely on these reference values when deciding whether a part is faulty or not.

- Warm up the engine.
- Turn the engine switch off.
- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG).
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Data List / All Data.
- According to the display on the Techstream, read the Data List.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Injector (Port)	Injection period of the No. 1 cylinder/ Min.: 0 ms, Max.: 32.64 ms	2.0 to 4.0 ms: idling	-
IGN Advance	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	BTDC 5 to 15°: Idling	-
Calculate Load	Calculated load by ECM/ Min.: 0%, Max.: 100%	11 to 25%: Idling 12 to 26%: Running without load (2,500 rpm)	-
Vehicle Load	Vehicle load/ Min.: 0%, Max.: 25700%	Actual vehicle load	-
MAF	Air flow rate from Mass Air Flow (MAF) meter/ Min.: 0 g/sec., Max.: 655.35 g/sec.	4.0 to 8.0 g/sec.: Idling	If the mass air flow volume is approximately 0.0 g/sec.: The mass air flow meter power source circuit is open or shorted.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			- 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/ Min.: 0 rpm, Max.: 16383 rpm	650 to 750 rpm: Idling	-
Vehicle Speed	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	The speed is indicated on the speedometer.
Coolant Temp	Engine coolant temperature/ Min.: -40°C, Max.: 140°C	80 to 100°C (176 to 212°F): After warming up	If the value is -40°C (-40°F): the sensor circuit is open. If the value is 140°C (284°F): the sensor circuit is shorted.
Intake Air	Intake air temperature/ Min.: -40°C, Max.: 140°C	Equivalent to ambient air temperature	If the value is -40°C (-40°F): the sensor circuit is open. If the value is 140°C (284°F): the sensor circuit is shorted.
2nd Air System Status	Secondary air system status/ ON or OFF	ON: Secondary air system operation	-
Air-Fuel Ratio	Air fuel ratio: Min.: 0, Max.: 1.999	0.8 to 1.2: During idling	-
Purge Density Learn Value	Learning value of purge density/ Min.: -50, Max.: 350	Idling: -40 to 0%	The service data.
Evap Purge Flow	Purge flow/ Min.: 0%, Max.: 102.4%	0 to 100%: Idling	-
EVAP (Purge) VSV	Purge VSV control duty/ Min.: 0%, Max.: 100%	0 to 100%: During idling	The order signal from the ECM.
Vapor Pressure Pump	Vapor pressure/ Min.: 33.853 kPa, Max.: 125.596 kPa	Approximately 100 kPa: Engine switch on (IG)	The EVAP system pressure is monitored by the canister pressure sensor.
Vapor pressure (Calculated)	Calculated EVAP system pressure/ Min.: -5.632 kPa, Max.: 715.264 kPa	Approximately 100 kPa: Engine switch on (IG)	-
Knock Correct Learn Value	Correction learning value of knocking/ Min.: -64 CA, Max.: 1984 CA	0 to 22° CA: Driving, 70 km/h (44 mph)	The service data.
Knock Feedback Value	Feedback value of knocking/	-22 to 0° CA: Driving, 70 km/h (44 mph)	The service data.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: -64 CA, Max.: 1984 CA		
Clutch Current	Clutch current/ Min.: 0 A, Max.: 2.49 A	-	-
Accelerator Position No. 1	Absolute Accelerator Pedal Position (APP) No. 1/ Min.: 0%, Max.: 100%	10 to 22%: accelerator pedal released 54 to 86%: accelerator pedal fully depressed	-
Accelerator Position No. 2	Absolute APP No. 2/ Min.: 0%, Max.: 100%	12 to 42%: accelerator pedal released 66 to 98%: accelerator pedal fully depressed	-
Accelerator Position No. 1	APP sensor No. 1 voltage/ Min.: 0 V, Max.: 4.98 V	-	The ETCS freeze data.
Accelerator Position No. 2	APP sensor No. 2 voltage/ Min.: 0 V, Max.: 4.98 V	-	The ETCS freeze data.
Accelerator Position No. 1	APP sensor No. 1 voltage/ Min.: 0 V, Max.: 5 V	0.5 to 1.1 V: accelerator pedal released 2.6 to 4.5 V: accelerator pedal fully depressed	-
Accelerator Position No. 2	APP sensor No. 2 voltage/ Min.: 0 V, Max.: 5 V	1.2 to 2.0 V: accelerator pedal released 3.4 to 5.3 V: accelerator pedal fully depressed	-
Accelerator Idle Position	Whether or not accelerator pedal position sensor detecting idle/ ON or OFF	ON: Idling	-
Throttle Fully Close Learn	Throttle valve fully closed (learned value) Min.: 0 V, Max.: 5 V	0.4 to 0.8 V	-
Accel Fully Close #1 (AD)	Accelerator fully closed value No. 1 (AD)/ Min.: 0, Max.: 4.98 V	-	The ETCS service data.
Accel Fully Close Learn #1	Accelerator fully closed learning value No. 1/ Min.: 0, Max.: 124.512	-	The ETCS service data.
Accel Fully Close Learn #2	Accelerator fully closed learning value	-	The ETCS service data.

TESTER DISPLAY	MEASUREMENT ITEM RANGE Min.: 0, Max.: 124.512	NORMAL CONDITION	DIAGNOSTIC NOTE
Fail Safe Drive	Whether or not fail-safe function executed/ ON or OFF	ON: ETCS has failed	-
Fail Safe Drive (Main CPU)	Whether or not fail-safe function executed/ ON or OFF	ON: ETCS has failed	-
ST1	Brake pedal signal/ ON or OFF	ON: Brake pedal depressed	-
System Guard	System guard/ ON or OFF	-	The ETCS service data.
Open Side Malfunction	Open side malfunction/ ON or OFF	-	The ETCS service data.
Throttle Pos. Sensor Output	Absolute throttle position sensor/ Min.: 0%, Max.: 100%	10 to 24%: Throttle fully closed 64 to 96%: Throttle fully open	Read the value with intrusive operation (Active Test).
Throttle Idle Position	Whether or not throttle position sensor detecting idle/ ON or OFF	ON: Idling	-
Throttle Require Position	Throttle requirement position/ Min.: 0 V, Max.: 5 V	0.5 to 1.0 V: Idling	-
Throttle Sensor Position	Throttle sensor positioning/ Min.: 0%, Max.: 100%	10 to 18%: Idling	The calculated value based on VTA1.
Throttle Sensor Position #2	Throttle sensor positioning #2/ Min.: 0%, Max.: 100%	-	The calculated value based on VTA2.
Throttle Position No. 1	Throttle position sensor No. 1 output voltage/ Min.: 0 V, Max.: 4.98 V	-	The ETCS freeze data.
Throttle Position No. 2	Throttle position sensor No. 2 output voltage/ Min.: 0 V, Max.: 4.98 V	-	The ETCS freeze data.
Throttle Position No. 1	Throttle position No. 1/ 1/	0.5 to 1.2 V: Throttle fully closed	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: 0 V, Max.: 5 V	3.2 to 4.8 V: Throttle fully open	
Throttle Position No. 2	Throttle position No. 2/ Min.: 0 V, Max.: 5 V	2.0 to 2.9 V: Throttle fully closed 4.6 to 5.5 V: Throttle fully open	Read the value with intrusive operation (Active Test).
Throttle Position Command	Throttle position command value/ Min.: 0 V, Max.: 4.98 V	0.5 to 4.8 V	The ETCS service data.
Throttle Sens Open Pos #1	Throttle sensor opener position No. 1/ Min.: 0 V, Max.: 4.98 V	0.6 to 0.9 V	The ETCS service data.
Throttle Sens Open Pos #2	Throttle sensor opener position No. 2/ Min.: 0 V, Max.: 4.98 V	2.2 to 2.6 V	The ETCS service data.
Throttle Sens Open #1(AD)	Throttle sensor opener position No. 1 (AD)/ Min.: 0 V, Max.: 4.98 V	0.6 to 0.9 V	The ETCS service data.
Throttle Motor	Whether or not throttle actuator control permitted/ ON or OFF	ON: Idling	Read the value with the engine switch on (IG) (do not start the engine).
Throttle Motor Current	Throttle actuator current/ Min.: 0 A, Max.: 20 A	0 to 3.0 A: Idling	-
Throttle Motor DUTY	Throttle actuator/ Min.: 0%, Max.: 100%	0.5 to 40%: Idling	-
Throttle Motor Current	Throttle actuator current/ Min.: 0 A, Max.: 19.92 A	0 to 3.0 A: Idling	-
Throttle Motor Open Duty	Throttle actuator opening duty ratio/ Min.: 0%, Max.: 100%	0 to 40%: During idling	When the accelerator pedal is depressed, the duty ratio increased.
Throttle Motor Close Duty	Throttle actuator closed duty ratio/ Min.: 0%, Max.: 100%	0 to 40%: During idling	When the accelerator pedal is released quickly, the duty ratio increased.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Throttle Motor Duty (Open)	Throttle actuator duty ratio (open)/ Min.: 0%, Max.: 100%	-	The ETCS service data.
Throttle Motor Duty (Close)	Throttle actuator duty ratio (close)/ Min.: 0%, Max.: 100%	-	The ETCS service data.
O2S B1 S2	Heated oxygen sensor output voltage (for Bank 1 Sensor 2)/ Min.: 0 V, Max.: 1.275 V	0.1 to 0.9 V: Driving 70 km/h (44 mph)	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 voltage output of the sensor.
O2S B2 S2	Heated oxygen sensor output voltage (for Bank 2 Sensor 2)/ Min.: 0 V, Max.: 1.275 V	0.1 to 0.9 V: Driving 70 km/h (44 mph)	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 voltage output of the sensor.
AFS B1 S1	Air fuel ratio sensor output voltage (for Bank 1 Sensor 1)/ Min.: 0 V, Max.: 7.999 V	2.8 to 3.8 V: Idling	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 voltage output of the sensor.
AFS B2 S1	Air fuel ratio sensor output voltage (for Bank 2 Sensor 1)/ Min.: 0 V, Max.: 7.999 V	2.8 to 3.8 V: Idling	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 voltage output of the sensor.
AFS B2 S1	Air fuel ratio sensor current (for Bank 2 Sensor 1)/ Min.: -128 mA, Max.: 127.99 mA	-0.5 to 0.5 mA: Idling	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 current of the sensor.
Total FT #1	Total fuel trim of bank 1 Average value for fuel trim system of Bank 1/ Min.: -0.5, Max.: 0.496	-0.2 to 0.2: Idling	-
Total FT #2	Total fuel trim of bank 2 Average value for fuel trim system of Bank 2/	-0.2 to 0.2: Idling	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: -0.5, Max.: 0.496		
Short FT #1	Short-term fuel trim of Bank 1/ Min.: -100%, Max.: 99.2%	-20 to +20%	This item refers to the short-term fuel compensation used to maintain the air fuel ratio at the stoichiometric air-fuel ratio.
Long FT #1	Long-term fuel trim of Bank 1/ Min.: -100%, Max.: 99.2%	-20 to +20%	This item refers to the overall fuel compensation carried out in the long-term to compensate for a continual deviation of the short-term fuel trim from the central value.
Short FT #2	Short-term fuel trim of Bank 2/ Min.: -100%, Max.: 99.2%	-20 to +20%	This item refers to the short-term fuel compensation used to maintain the air fuel ratio at the stoichiometric air-fuel ratio.
Long FT #2	Long-term fuel trim of Bank 2/ Min.: -100%, Max.: 99.2%	-20 to +20%	This item refers to the overall fuel compensation carried out in the long-term to compensate for a continual deviation of the short-term fuel trim from the central value.
Fuel System Status (Bank 1)	Fuel system status (Bank 1)/ OL, CL, OL Drive, OL Fault or CL Fault	CL: Idling after warming up	• 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 (Bank 2)/ OL, CL, OL Drive, OL Fault or CL Fault	CL: Idling after warming up	• 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,

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
			which is used for fuel control, is malfunctioning.
AF Lambda B1 S1	Short-term fuel trim associated with the Bank 1 Sensor 1/ Min.: 0, Max.: 1.999	- Value less than 1 (0.000 to 0.999) = Rich - Stoichiometric air fuel ratio = 1 - Value more than 1 (1.001 to 1.999) = Lean	-
AFS B1 S1	Air fuel ratio sensor current Bank 1 Sensor 1/ Min.: -128 mA, Max.: 127.99 mA	-0.5 to 0.5 mA: Idling	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 current of the sensor.
AF FT B2 S1	Short-term fuel trim associated with the Bank 2 Sensor 1/ Min.: 0, Max.: 1.999	- Value less than 1 (0.000 to 0.999) = Rich - Stoichiometric air fuel ratio = 1 - Value more than 1 (1.001 to 1.999) = Lean	-
Catalyst Temp (B1 S1)	Catalyst temperature (Bank 1, Sensor 1)/ Min.: -40°C, Max.: 6513.5°C	-	-
Catalyst Temp (B2 S1)	Catalyst temperature (Bank 2, Sensor 1)/ Min.: -40°C, Max.: 6513.5°C	-	-
Catalyst Temp (B1 S2)	Catalyst temperature (Bank 1, Sensor 2)/ Min.: -40°C, Max.: 6513.5°C	-	-
Catalyst Temp (B2 S2)	Catalyst temperature (Bank 2, Sensor 2)/ Min.: -40°C, Max.: 6513.5°C	-	-
Sub O2S Impedance B1S2	Sub heated oxygen sensor impedance (Bank 1 Sensor 2)/ Min.: 0 Ω, Max.: 21247.68 Ω	5 to 15,000 Ω	After driving for approx. 10 min. in an urban area.
Sub O2S Impedance B2S2	Sub heated oxygen sensor impedance (Bank 2 Sensor 2)/	5 to 15,000 Ω	After driving for approx. 10 min. in an urban area.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: 0 Ω , Max.: 21247.68 Ω		
Initial Engine Coolant Temp	Initial engine coolant temperature/ Min.: -40°C, Max.: 120°C	Close to ambient air temperature	The service data.
Initial Intake Air Temp	Initial intake air temperature/ Min.: -40°C, Max.: 120°C	Close to ambient air temperature	The service data.
Injection Volum (Cylinder 1)	Injection volume (cylinder 1)/ Min.: 0 ml, Max.: 2.048 ml	0 to 0.5 ml	The quantity of fuel injection volume for 10 times.
Air pump pressure (absolute)	Air pump pressure (absolute)/ Min.: 0 kPa, Max.: 320 kPa	Atmospheric pressure +1 kPa or more: Air pump ON, Air switching valve open Close to atmospheric pressure: Air pump OFF, Air switching valve closed	Refer to DTC P2431  .
Air Pump Pulsation Pressure	Air pump pulsation pressure/ Min.: 0 kPa, Max.: 639.98 kPa	-	The cumulative pulsation pressure calculated by the ECM.  .
Air Pump2 Pressure (Absolute)	Air pump pressure (absolute)/ Min.: 0 kPa, Max.: 320 kPa	Atmospheric pressure +1 kPa or more: Air pump ON, Air switching valve open Close to atmospheric pressure: Air pump OFF, Air switching valve closed	Refer to DTC P2431  .
Air Pump2 Pulsation Pressure	Air pump pulsation pressure/ Min.: 0 kPa, Max.: 639.98 kPa	-	The cumulative pulsation pressure calculated by the ECM.  .
Power Steering Pressure	Power steering oil pressure/ Min.: -1.897 MPa, Max.: 12.799 MPa	Engine idling (Power steering not operating): 0 to 2 MPa	-
SPD (SP2)	Output shaft speed/ Min.: 0 km/h (0 mph), Max.: 255 km/h (158 mph)	Vehicle stopped: 0 km/h (0 mph) (output shaft speed is equal to vehicle speed)	-
SPD (NT)	Input shaft speed/ Min.: 0 rpm, Max.: 12750 rpm	Lock-up is ON (after warming up engine): Input turbine speed (NT) equal to engine speed	Data is displayed in increments of 50 rpm.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
		OFF (idling with shift lever in N): Input turbine speed (NT) nearly equal to engine speed	
ACC Relay	Acc relay status/ ON or OFF	ON: Cranking	-
Starter Relay	Starter relay status/ ON or OFF	ON: Cranking	-
Starter Signal	Starter signal/ ON or OFF	ON: Cranking	-
Starter Control	Starter switch status/ ON or OFF	ON: Cranking	-
Power Steering Switch	Power steering switch signal/ ON or OFF	ON: Power steering operation	-
Power Steering Signal	Power steering signal (history)/ ON or OFF	ON: When steering wheel first turned after battery terminals connected	This signal status is usually ON until the cables are disconnected from the battery terminals.
Closed Throttle Position SW	Closed throttle position switch/ ON or OFF	- ON: Throttle fully closed - OFF: Throttle open	-
A/C Signal	A/C switch status/ ON or OFF	ON: A/C ON	-
Neutral Position SW Signal	PNP switch status/ ON or OFF	ON: Shift lever in P or N	-
Electrical Load Signal	Electrical load signal/ ON or OFF	ON: Headlights or defogger turned on	-
Stop Light Switch	Stop light switch/ ON or OFF	ON: Brake pedal depressed	-
Immobiliser Communication	Immobiliser communication/ ON or OFF	ON: Normal	-
Fuel Cut Condition	Fuel cut condition/ ON or OFF	ON: Fuel cut operating	-
ETCS Actuator Power	Whether or not electric throttle control system power inputted/ ON or OFF	ON: Idling	-
+BM Voltage	+BM voltage/ Min.: 0, Max.: 19.92	10 to 15 V: Idling	The ETCS service data.
Battery Voltage	Battery voltage/ Min.: 0 V, Max.: 65.535 V	11 to 14 V: Idling	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Actuator Power Supply	Actuator power supply/ ON or OFF	ON: Idling	The ETCS service data.
Atmosphere Pressure	Atmospheric pressure/ Min.: 0 kPa, Max.: 255 kPa	Equivalent to atmospheric pressure (absolute pressure)	-
Secondary Air Control VSV	Secondary air injection system status	ON: Secondary air injection system operation	-
ACIS VSV	VSV status for ACIS control/ ON or OFF	-	The Active Test support data.
ACT VSV	A/C cut status for Active Test/ ON or OFF	-	The Active Test support data.
VVT Control Status (Bank 2)	VVT control status (Bank 2)/ ON or OFF	-	The Active Test support data.
EVAP Purge VSV	VSV status for EVAP control/ ON or OFF	-	The Active Test support data.
Fuel Pump/Speed Status	Fuel pump/speed status/ ON or OFF	-	The Active Test support data.
VVT Control Status (Bank 1)	Variable valve timing (VVT) control status (Bank 1)/ ON or OFF	-	The Active Test support data.
Vacuum Pump	Key-off EVAP system pump status/ ON or OFF	-	The Active Test support data.
EVAP System Vent Valve	Key-off EVAP system vent valve status/ ON or OFF	-	The Active Test support data.
TC and TE1	TC and TE1 terminal of DLC3/ ON or OFF	-	-
AI Test	AI operation prohibition/ READY or NOT RDY	READY	-
Engine Speed of Cyl #1	Engine speed for cylinder 1/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #2	Engine speed for cylinder 2/	-	Output only when Check the Cylinder Compression is performed using the

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	Min.: 0 rpm, Max.: 25600 rpm		Active Test.
Engine Speed of Cyl #3	Engine speed for cylinder 3/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #4	Engine speed for cylinder 4/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #5	Engine speed for cylinder 5/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #6	Engine speed for cylinder 6/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #7	Engine speed for cylinder 7/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Engine Speed of Cyl #8	Engine speed for cylinder 8/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
Av Engine Speed of All Cyl	Engine speed for all cylinders/ Min.: 0 rpm, Max.: 25600 rpm	-	Output only when Check the Cylinder Compression is performed using the Active Test.
VVT Aim Angle (Bank 1)*	VVT aim angle (Bank 1)/ Min.: 0%, Max.: 100%	0%: Idling	The VVT duty signal value during intrusive operation.
VVT Change Angle (Bank 1)*	VVT change angle (Bank 1)/ Min.: 0° FR, Max.: 60° FR	0 to 5° FR: Idling	The displacement angle during intrusive operation.
VVT OCV Duty (Bank 1)*	VVT OCV operation duty (Bank 1)/ Min.: 0%, Max.: 100%	0%: Idling	The requested duty value for intrusive operation.
VVT EX Hold Lrn Val (Bank 1)*	VVT exhaust hold duty ratio learning value (Bank 1)/ Min.: 0%, Max.: 100%	0 to 80%: Idling	-
VVT EX Chg Angle (Bank 1)*	VVT exhaust change angle (Bank 1)/	0 to 40°FR: Idling	The displacement angle during intrusive operation.

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
VVT EX OCV Duty (Bank 1)*	VVT exhaust OCV duty (Bank 1)/ Min.: 0%, Max.: 100%	0 to 100%: Idling	The requested duty value for intrusive operation.
VVT Aim Angle (Bank 2)*	VVT aim angle (Bank 2)/ Min.: 0%, Max.: 100%	0%: Idling	The VVT duty signal value during intrusive operation.
VVT Change Angle (Bank 2)*	VVT change angle (Bank 2)/ Min.: 0° FR, Max.: 60° FR	0 to 5° FR: Idling	The displacement angle during intrusive operation.
VVT OCV Duty (Bank 2)*	VVT OCV operation duty (Bank 2)/ Min.: 0%, Max.: 100%	0%: Idling	The requested duty value for intrusive operation.
VVT EX Hold Lrn Val (Bank 2)*	VVT exhaust hold duty ratio learning value (Bank 2)/ Min.: 0%, Max.: 100%	0 to 80%: Idling	-
VVT EX Chg Angle (Bank 2)*	VVT exhaust change angle (Bank 2)/ Min.: 0°FR, Max.: 60°FR	0 to 40°FR: Idling	The displacement angle during intrusive operation.
VVT EX OCV Duty (Bank 2)*	VVT exhaust OCV duty (Bank 2)/ Min.: 0%, Max.: 100%	0 to 100%: Idling	The requested duty value for intrusive operation.
Idle Fuel Cut	Fuel cut idle/ ON or OFF	ON: Fuel cut operation	Idle Fuel Cut is "ON" when the throttle valve is fully closed and the engine speed is more than 2,800 rpm.
FC TAU	Fuel cut TAU: Fuel cut during very light load/ ON or OFF	ON: Fuel cut operation	The fuel cut being performed under a very light load to prevent the engine combustion from becoming incomplete.
Ignition	Ignition counter/ Min.: 0, Max.: 800	0 to 800	-
Cylinder #1 Misfire Count to Cylinder #8 Misfire Count	Misfire count of the cylinder 1 to 8/ Min.: 0, Max.: 255	0%	This item is displayed only when idling the engine.
All Cylinders Misfire Count	All cylinders misfire count/ Min.: 0, Max.: 255	0 to 35	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
Multi Cylinders Misfire Count	Multiple cylinder misfire count/ Min.: 0 Max.:65535	0 to 65,535	-
Misfire RPM	Engine speed for first misfire range/ Min.: 0 rpm, Max.: 6375 rpm	0 rpm: Misfire 0	-
Misfire Load	Engine load for first misfire range/ Min.: 0 g/rev, Max.: 3.98 g/rev	0 g/rev: Misfire 0	-
Misfire Margin	Misfire monitoring/ Min.: -100%, Max.: 99.22%	-100 to 99.2%	The misfire detecting margin.
Catalyst OT MF F/C	Catalyst over temperature misfire prevention F/C/ 0: Not Avl, 1: Avail	Avail: Cat OT MF F/C available Not Avl: Cat OT MF F/C not available	-
Cat OT MF F/C History	Catalyst over temperature misfire prevention F/C history/ 0: OFF, 1: ON	ON: Fuel cut operation history exists	-
Cat OT MF F/C Cylinder #1	Display of fuel cut operation in No. 1 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #2	Display of fuel cut operation in No. 2 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #3	Display of fuel cut operation in No. 3 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #4	Display of fuel cut operation in No. 4 cylinder (if certain level of misfire malfunction is detected)/	ON: Fuel cut operating	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	ON or OFF		
Cat OT MF F/C Cylinder #5	Display of fuel cut operation in No. 5 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #6	Display of fuel cut operation in No. 6 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #7	Display of fuel cut operation in No. 7 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
Cat OT MF F/C Cylinder #8	Display of fuel cut operation in No. 8 cylinder (if certain level of misfire malfunction is detected)/ ON or OFF	ON: Fuel cut operating	-
# Codes	#Codes/ Min.: 0, Max.: 255	-	The number of stored DTCs.
Check Mode	Check mode/ 0: ON, 1: OFF	ON: Check mode ON	Refer to the Check Mode Procedure  .
SPD Test	Check mode result for vehicle speed sensor/ Compl or Incmpl	-	-
AS Test	Check mode result for secondary air injection system/ 0: Compl, 1: Incmpl	-	-
Misfire Test	Check mode result for misfire monitor/ 0: Compl, 1: Incmpl	-	-
OXS2 Test	Check mode result for heated oxygen sensor (Bank 2)/ 0: Compl, 1: Incmpl	-	-
OXS1 Test	Check mode result for heated oxygen sensor	-	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
	(Bank 1)/ 0: Compl, 1: Incmpl		
A/F Test Results (Bank 2)	Check mode result for air fuel ratio sensor (Bank 2)/ 0: Compl, 1: Incmpl	-	-
A/F Test Results (Bank 1)	Check mode result for air fuel ratio sensor (Bank 1)/ 0: Compl, 1: Incmpl	-	-
MIL	MIL status/ ON or OFF	ON: MIL on	-
MIL ON Run Distance	MIL on run distance/ Min.: 0 km, Max.: 65535 km	Distance after DTC stored	-
Running Time from MIL ON	Running time from MIL on/ Min.: 0 minute, Max.: 65535 minutes	Equivalent to running time after MIL on	-
Engine Run Time	Engine run time/ Min.: 0 seconds, Max.: 65535 seconds	Time after engine start	The service data.
Time after DTC Cleared	Time after DTC cleared/ Min.: 0 minutes, Max.: 65535 minutes	Equivalent to time after DTCs cleared	-
Distance from DTC Cleared	Distance after DTC cleared/ Min.: 0 km, Max.: 65535 km	Equivalent to drive distance after DTCs cleared	-
Warmup Cycle Cleared DTC	Warm-up cycle after DTC cleared/ Min.: 0, Max.: 255	-	The number of warm-up cycles after the DTC is cleared.
OBD Requirements	OBD requirement	OBD2	-
Number of Emission DTC	Emission related DTCs	-	The number of emission related DTCs.
Complete Parts Monitor	Comprehensive component monitor/ Not Avl or Avail	-	-
Fuel System Monitor	Fuel system monitor/ Not Avl or Avail	-	-
Misfire Monitor	Misfire monitor/ Not Avl or Avail	-	-
O2S(A/FS) Heater Monitor	O2S (A/FS) heater monitor/ Not Avl or Avail	-	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
O2S(A/FS) Heater Monitor	O2S (A/FS) heater monitor/ Compl or Incmpl	-	-
O2S(A/FS) Monitor	O2S (A/FS) monitor/ Not Avl or Avail	-	-
O2S(A/FS) Monitor	O2S (A/FS) monitor/ Compl or Incmpl	-	-
2nd Air Monitor	2nd air monitor/ Not Avl or Avail	-	-
2nd Air Monitor	2nd air monitor/ Compl or Incmpl	-	-
EVAP Monitor	EVAP monitor/ Not Avl or Avail	-	-
EVAP Monitor	EVAP monitor/ Compl or Incmpl	-	-
Catalyst Monitor	Catalyst monitor/ Not Avl or Avail	-	-
Catalyst Monitor	Catalyst monitor/ Compl or Incmpl	-	-
Component Monitor ENA	Comprehensive component monitor/ Unable or Enable	-	-
Component Monitor CMPL	Comprehensive component monitor/ Compl or Incmpl	-	-
Fuel System Monitor ENA	Fuel system monitor/ Unable or Enable	-	-
Fuel System Monitor CMPL	Fuel system monitor/ Compl or Incmpl	-	-
Misfire Monitor ENA	Misfire monitor/ Unable or Enable	-	-
Misfire Monitor CMPL	Misfire monitor/ Compl or Incmpl	-	-
EGR Monitor ENA	EGR monitor/ Unable or Enable	-	-
EGR Monitor CMPL	EGR monitor/ Compl or Incmpl	-	-
Heater Monitor ENA	O2S (A/FS) heater monitor/ Unable or Enable	-	-
Heater Monitor CMPL	O2S (A/FS) heater monitor/ Compl or Incmpl	-	-

TESTER DISPLAY	MEASUREMENT ITEM/RANGE	NORMAL CONDITION	DIAGNOSTIC NOTE
O2S(A/FS) Monitor ENA	O2S (A/FS) monitor/ Unable or Enable	-	-
O2S(A/FS) Monitor CMPL	O2S (A/FS) monitor/ Compl or Incmpl	-	-
A/C Monitor ENA	A/C monitor/ Unable or Enable	-	-
A/C Monitor CMPL	A/C monitor/ Compl or Incmpl	-	-
2nd Air Monitor ENA	2nd air monitor/ Unable or Enable	-	-
2nd Air Monitor CMPL	2nd air monitor/ Compl or Incmpl	-	-
EVAP Monitor ENA	EVAP monitor/ Unable or Enable	-	-
EVAP Monitor CMPL	EVAP monitor/ Compl or Incmpl	-	-
Heated Cat Monitor ENA	Heated catalyst monitor/ Unable or Enable	-	-
Heated Cat Monitor CMPL	Heated catalyst monitor/ Compl or Incmpl	-	-
Catalyst Monitor ENA	Catalyst monitor/ Unable or Enable	-	-
Catalyst Monitor CMPL	Catalyst monitor/ Compl or Incmpl	-	-
Model Code	Model code	-	Identifying the model code: URJ2###.
Engine Type	Engine type	-	Identifying the engine type: 3URFE.
Cylinder Number	Number of cylinders/ Min.: 0, Max.: 255	-	Identifying the number of cylinders: 8.
Transmission Type	Transmission type	-	Identifying the transmission type: ECT 6th.
Destination	Destination	-	Identifying the destination: A (America).
Model Year	Model year/ Min.: 1900, Max.: 2155	-	Identifying the model year: 200#.
System Identification	System identification	-	Identifying the engine system: Gasoline (gasoline engine).

HINT:

- Normal Condition: If no conditions are specifically stated for "idling", the shift lever is in N or P, the A/C switch is off and all accessory switches are off.
- *: Data List values are only displayed when performing the following Active Tests: Control the VVT Linear (Bank 1), Control the VVT Linear (Bank 2), Control the VVT Exhaust Linear (Bank 1) and Control the VVT Exhaust Linear (Bank 2). For other Active Tests, the Data List value will be 0.

2. ACTIVE TEST

HINT:

Using the Techstream to perform Active Tests allows relays, VSVs, actuators and other items to be operated without removing any parts. This non-intrusive functional inspection can be very useful because intermittent operation may be discovered before parts or wiring is disturbed. Performing Active Tests early in troubleshooting is one way to save diagnostic time. Data List information can be displayed while performing Active Tests.

- Warm up the engine.
- Turn the engine switch off.
- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG).
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Active Test.
- According to the display on the Techstream, perform the Active Test.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Injection Volume	Change injection volume	Between -12.5% and 24.8%	• All the injectors are tested at the same time. • Perform the test at less than 3,000 rpm. • The injection volume can be changed in 1% graduations within the control range.
Control the Injection Volume for A/F Sensor	Change injection volume	Lower by -12.5% or increase 24.8%	• Perform the test at less than 3,000 rpm. • Control the Injection Volume for A/F Sensor enables the checking and graphing of the A/F (Air Fuel Ratio) sensor voltage outputs. • To conduct the test, enter the following menus: Active Test / Control the Injection Volume for A/F Sensor / AFS B1 S1 and O2S B1 S2 or AFS B2 S1 and O2S B2 S2.
Activate the VSV for Secondary Air Control	Activate the Secondary Air System	ON/OFF	• Do not perform the test for 5 seconds or more. • After the test, do not perform the test again for 30 seconds.
Activate the VSV for Intake Control	Activate VSV for intake control	ON/OFF	-
Activate the VSV for Evap Control	Activate purge VSV control	ON/OFF	-

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the A/C Cut Signal	Control A/C cut signal	ON/OFF	-
Control the Fuel Pump / Speed	Activate fuel pump	ON/OFF	-
Connect the TC and TE1	Turn on and off TC and TE1 connection	ON/OFF	- ON: TC and TE1 are connected. - OFF: TC and TE1 are disconnected.
Control the Idle Fuel Cut Prohibit	Prohibit idling fuel cut control	ON/OFF	-
Prohibit the Catalyst OT Misfire prevent F/C	Prohibit catalyst overheat malfunction prevention fuel cut operation during misfire	ON: Fuel cut is prohibited	Confirm that the vehicle is stopped and the engine speed is 3,000 rpm or less.
Activate the Starter Relay	Activate the starter relay	ON/OFF	The engine is stopped.
Activate the ACC Cut Relay	Activate the ACC CUT relay	ON/OFF	The engine is stopped.
Control the ETCS Open/Close Slow Speed	Throttle actuator	ON: throttle valve opens slowly	This test is possible when the following conditions are met: - The engine switch is on (IG). - The engine does not start. - Fully depressing the accelerator pedal (APP: 58 degrees or more).
Control the ETCS Open/Close Fast Speed	Throttle actuator	ON: throttle valve opens fast	Same as above.
Control the VVT Linear (Bank 1)	Control Variable Valve Timing (VVT) [Bank 1]	-128 to 127% This valve added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	- The engine stalls or idles roughly when the VVT actuator is operated by 100%. - The test is possible during idle.
Control the VVT System (Bank 1)	Turn on and off Oil Control Valve (OCV)	ON/OFF	- The engine stalls or idles roughly when the OCV is turned on. - The engine runs or idles normally when the OCV is OFF.
Control the VVT Linear (Bank 2)	Control Variable Valve Timing (VVT) [Bank 2]	-128 to 127% This valve added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	- The engine stalls or idles roughly when the VVT actuator is operated by 100%. - The test is possible during idle.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the VVT System (Bank 2)	Turn on and off Oil Control Valve (OCV)	ON/OFF	- The engine stalls or idles roughly when the OCV is turned on. - The engine runs or idles normally when the OCV is OFF.
Control the VVT Exhaust Linear (Bank 1)	Control VVT (Bank 1)	-128 to 127% This valve added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	- The engine stalls or idles roughly when the VVT actuator is operated by 100%. - The test is possible while the engine is idling.
Control the VVT Exhaust Linear (Bank 2)	Control VVT (Bank 2)	-128 to 127% This valve added to present OCV control duty 100%: Maximum advance -100%: Maximum retard	- The engine stalls or idles roughly when the VVT actuator is operated by 100%. - The test is possible while the engine is idling.
Activate the Vacuum Pump	Activate leak detection pump (built into canister pump module)	ON/OFF	-
Activate the VSV for Vent Valve	Activate vent valve (built into canister pump module)	ON/OFF	-
Control the Cylinder #1 Fuel Cut	Cylinder #1 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #2 Fuel Cut	Cylinder #2 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #3 Fuel Cut	Cylinder #3 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #4 Fuel Cut	Cylinder #4 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #5 Fuel Cut	Cylinder #5 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #6 Fuel Cut	Cylinder #6 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the Cylinder #7 Fuel Cut	Cylinder #7 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTE
Control the Cylinder #8 Fuel Cut	Cylinder #8 injector fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Control the All Cylinders Fuel Cut	All cylinder fuel cut	ON/OFF	The test is possible while the vehicle is stopped and the engine is idling.*1
Check the Cylinder Compression*2	Check the cylinder compression pressure	ON/OFF	Fuel injection and ignition stop in all cylinders.

NOTICE:

- *1: If the display of the Data List Prohibit the Catalyst OT Misfire prevent F/C item is Not Avl, perform this Active Test with the vehicle stopped and the engine idling.
- *1: If the display of the Data List Prohibit the Catalyst OT Misfire prevent F/C item is Avail, perform this Active Test as described below.
 - Stop the engine and turn the engine switch on (IG) to turn Control the Cylinder#1 Fuel Cut (to Control the Cylinder#8 Fuel Cut) on.
 - Start the engine.

HINT:

***2: When cranking the engine, each cylinder measures the engine speed.**

In this Active Test, the fuel and ignition of all cylinders is cut, and cranking occurs for approximately 10 seconds. Then, each cylinder measures the engine speed. If a cylinder engine speed is higher than the other, that cylinder compression pressure is compared to the other, and whether or not the compression pressure is low can be determined.

- Warm up the engine.
- Turn the engine switch off.
- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG) and turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Active Test / Check the Cylinder Compression.

HINT:

To display the entire Data List, press the pull down menu button next to Primary. Then select Compression.

- While the engine is not running, press the RIGHT or LEFT button to change the Check the Cylinder Compression to ON.

HINT:

After performing the above procedure, the Active Test Check the Cylinder Compression will start. Fuel injection for all cylinders is prohibited, and each cylinder engine speed measurement will enter standby.

- Fully open the throttle.
- Crank the engine for about 10 seconds.
- Monitor the engine speed (Engine Speed of Cyl #1 to #8) displayed on the Techstream.

HINT:

At first, the Techstream display will show each cylinder engine speed measurement to be extremely high. After approximately 10 seconds of engine cranking, each cylinder engine speed measurement will change to the actual engine speed.

NOTICE:

- When the Check the Cylinder Compression test is OFF and the engine is cranked, the engine will start.
- If the Check the Cylinder Compression test needs to be performed after it is turned on and performed once, press Exit to return to the Active Test menu screen. Then perform the Check the Cylinder Compression test again.
- Use a fully-charged battery.

3. SYSTEM CHECK

HINT:

Performing a System Check enables the system, which consists of multiple actuators, to be operated without removing any parts. In addition, it can show whether or not any DTCs are stored, and can detect potential malfunctions in the system. The System Check can be performed with the Techstream.

- Connect the Techstream to the DLC3.
- Turn the engine switch on (IG).
- Turn the Techstream on.
- Enter the following menus: Powertrain / Engine and ECT / Utility.
- Perform the System Check by referring to the table below.

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTES
Evaporative System Check (Automatic Mode)	Perform 5 steps in order to operate EVAP key-off monitor automatically	35°C (95°F) or less	- If no DTCs are in the Pending menu after performing this test, the system is functioning normally. - Refer to the EVAP Inspection Procedure INFO.
Evaporative System Check (Manual Mode)	Perform 5 steps in order to operate EVAP key-off monitor manually	35°C (95°F) or less	- This is used to detect malfunctioning parts. - Refer to EVAP Inspection Procedure INFO.
Air Injection Check (Automatic Mode)	Perform secondary air injection system operation automatically	With warm engine, engine switch turned off once	- If no DTCs are in Pending after performing this test, the system is functioning normally. - Refer to the inspection procedure for secondary air injection system DTCs. - When performing the Air Injection Check operation after the battery cable has been reconnected, wait for 7 minutes with engine switch turned on (IG) or the engine running. - Turn the engine switch off when the System Check is finished.
Air Injection Check (Manual Mode)	Perform 7 operations in order to operate air injection system monitor manually	With warm engine, engine switch turned off once	- This is used to detect malfunctioning parts. - Refer to the inspection procedure for secondary air injection system DTCs. - When performing the Air Injection Check operation after the battery cable has been reconnected, wait for 7 minutes

TESTER DISPLAY	TEST PART	CONTROL RANGE	DIAGNOSTIC NOTES
			with engine switch turned on (IG) or the engine running. • Turn engine switch off when the System Check finishes.

