

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the Data List displayed on the intelligent tester II, you can read values including those of the switches, sensors, and actuator, without removing any parts. Reading the Data List as the first step of troubleshooting is one method to shorten 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 ignition switch to OFF.
- Connect the intelligent tester II to the DLC3.
- Turn the ignition switch to ON.
- Turn the intelligent tester II ON.
- Select the following menu items: Powertrain / Engine and ECT / Data List.
- Check the results by referring to the following table.

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Injector (INJECTOR)	Injection period of the No. 1 cylinder/ Min.: 0 ms, Max.: 32.6 ms	Idling: 1.92 to 3.37 ms	—
IGN Advance (IGN ADVANCE)	Ignition timing advance for No. 1 cylinder/ Min.: -64 deg., Max.: 63.5 deg.	Idling: BTDC 5 to 15°	—
CALC Load (CALC LOAD)	Calculated load by ECM/ Min.: 0 %, Max.: 100 %	• Idling: 3.3 to 26.7 % • Running without load (2,500 rpm): 12.0 to 14.7 %	—
AFM (AFM)	Air flow rate from MAF meter/ Min.: 0 g/s, Max.: 665.35 g/s	• Idling: M/T 0.54 to 4.33 gm/s A/T 0.58 to 4.67 gm/s • Running without load (2,500 rpm): 3.33 to 9.17 gm/s	If the value is approximately 0.0 g/s: • Mass air flow meter power source circuit is open • VG circuit is open or shorted If the value is 160.0 g/s or more: • E2G circuit is open
Engine SPD (ENGINE SPD)	Engine speed/ Min.: 0 rpm, Max.: 16,383 rpm	Idling: M/T 650 to 750 rpm A/T 550 to 750 rpm	—
Coolant Temp (COOLANT TEMP)	Engine coolant temperature/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	After warming up the engine: 80 to 95°C (176 to 203°F)	• If the value is -40°C (-40°F): sensor circuit is open • If the value is 140°C (284°F): sensor circuit is shorted
Intake Air (INTAKE AIR)	Intake air temperature/ Min.: -40°C (-40°F) Max.: 215°C (419°F)	Equivalent to ambient air temperature	• If the value is -40°C (-40°F): sensor circuit is open • If the value is 140°C (284°F): sensor circuit is shorted
Throttle POS (THROTTLE POS)	Absolute throttle position sensor/ Min.: 0 %, Max.: 100 %	• Throttle fully closed: 6 to 16 % • Throttle fully open: 64 to 98 %	Read the value with the ignition switch ON (Do not start engine)
Vehicle SPD (VEHICLE SPD)	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Actual vehicle speed	Speed indicated on the speedometer
Accelerator POS No.1 (ACCEL POS #1)	Accelerator pedal position sensor No.1 output voltage/ Min.: 0 V, Max.: 5 V	• Accelerator pedal released: 0.5 to 1.1 V • Accelerator pedal depressed: 2.6 to 4.5 V	Read the value with the ignition switch ON (Do not start engine)

DIAGNOSTICS – SFI SYSTEM (1AZ-FE)

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Accelerator POS No.2 (ACCEL POS #2)	Accelerator pedal position sensor No.2 output voltage/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> • Accelerator pedal released: 1.2 to 2.0 V • Accelerator pedal depressed: 3.4 to 5.3 V 	Read the value with the ignition switch ON (Do not start engine)
Throttle POS No.2 (THROTTLE POS #2)	Throttle position sensor No. 2 out- put voltage/ Min.: 0 V, Max.: 5 V	<ul style="list-style-type: none"> • Throttle fully closed: 2.1 to 3.1 V • Throttle fully open: 4.5 to 5.5 V 	Read the value with the ignition switch ON (Do not start engine)
Throttle Request POS (THROTTLE TARGT)	Throttle requirement position Min.: 0 V, Max.: 5 V	Idling: 0.4 to 1.1 V	—
Throttle Motor Open Duty (THROTL OPN DUTY)	Throttle motor opening duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully closed: 0 %	<ul style="list-style-type: none"> • When the accelerator pedal is depressed, duty ratio is in- creased • Read the value with the ignition switch ON (Do not start engine)
Throttle Motor Close Duty (THROTL CLS DUTY)	Throttle motor closed duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully closed: 0 %	<ul style="list-style-type: none"> • When the accelerator pedal is re- leased quickly, duty ratio is in- creased • Read the value with the ignition switch ON (Do not start engine)
Throttle Motor (THROTTLE MOT)	Whether or not throttle motor con- trol is permitted/ ON or OFF	Idling: ON	Read the value with the ignition switch ON (Do not start engine)
ETCS Actuator Power (+BM)	Whether or not electric throttle control system power is applied/ ON or OFF	Idling: ON	—
Accelerator IDL POS (ACCEL IDL POS)	Whether or not accelerator pedal position sensor is detecting engine idling/ ON or OFF	Idling: ON	—
Throttle IDL POS (THROTTL IDL POS)	Whether or not throttle position sensor is detecting engine idling/ ON or OFF	Idling: ON	—
Fail Safe Drive (FAIL #1)	Whether or not fail-safe function is executed/ ON or OFF	ETCS has failed: ON	—
Fail Safe Drive (Main CPU) (FAIL #2)	Whether or not fail-safe function is executed/ ON or OFF	ETCS has failed: ON	—
Throttle Closed Initial Value (THROTTL INITIAL)	Throttle fully closed (learned value) Min.: 0 V, Max.: 5 V	0.5 to 0.9 V	—
Accelerator Learned Value (ACCEL LEARN VAL)	Accelerator fully closed (learned value) Min.: 0 V, Max.: 5 V	0.4 to 0.8 V	—
Throttle Motor Current (THROTTLE MOT)	Throttle motor current Min.: 0 A, Max.: 20 A	Idling: 0 to 3.0 A	—
O2S B1 S2 (O2S B1 S2)	Heated oxygen sensor output volt- age for bank 1 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving (31 mph, 50 km/h): 0.1 to 0.9 V	Performing the Control the Injec- tion Volume (Inj Vol or A/F Control) function of the Active Test enables the technician to check voltage output of the sensor
AFS B1 S1 (AFS B1 S1)	A/F sensor output voltage for bank 1 sensor 1/ Min.: 0 V, Max.: 7.999 V	Idling 2.8 to 3.8 V	Performing the Control the Injec- tion Volume (Inj Vol or A/F Control) function of the Active Test enables the technician to check voltage output of the sensor

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition *1	Diagnostic Note
Short FT #1 (SHORT FT #1)	Short-term fuel trim of bank 1/ Min.: -100 %, Max.: 100 %	$0 \pm 20 \%$	This item is the short-term fuel compensation used to maintain the air-fuel ratio at stoichiometric air-fuel ratio
Long FT #1 (LONG FT #1)	Long-term fuel trim of bank 1/ Min.: -100 %, Max.: 99.2 %	$0 \pm 20 \%$	This item is overall long-term fuel compensation that helps to maintain air-fuel ratio at stoichiometric air-fuel ratio (steadies long term deviations of short-term fuel trim from central value)
TOTAL FT #1 (TOTAL FT #1)	Total fuel trim of bank 1/ Min.: 0.5, Max.: 1.496	Idling: 0.5 to 1.4	—
O2FT B1 S2 (O2FT B1 S2)	Short-term fuel trim associated with the bank 1 sensor 2/ Min.: -100 %, Max.: 100 %	$0 \pm 20 \%$	Same as SHORT FT #1
AF FT B1 S1 (AF FT B1 S1)	Short-term fuel trim associated with the bank 1 sensor 1/ Min.: 0, Max.: 1.999	<ul style="list-style-type: none"> • Value less than 1 (0.000 to 0.999) = Lean • Stoichiometric air-fuel ratio=1 • Value greater than 1 (1.001 to 1.999) = RICH 	—
FUEL SYS #1 (FUEL SYS #1)	Fuel system status (Bank1) / OL or CL or OL DRIVE or OL FAULT or CL FAULT	Idling after warming up: CL	<ul style="list-style-type: none"> • OL (Open Loop): Has not yet satisfied conditions for closed loop • CL (Closed Loop): Using the heated oxygen sensor as feed back for fuel control • OL DRIVE: Open loop due to driving conditions (fuel enrichment) • OL FAULT: Open loop due to detected system fault • CL FAULT: Closed loop but the heated oxygen sensor which is used for fuel control is malfunctioning
FC IDL (FC IDL)	Fuel cut idle/ ON or OFF	Fuel cut operation: ON	Fuel cut idle = "ON" when the throttle valve is fully closed and engine speed is over 1,500 rpm
MIL Status (MIL/WARN LIGHT)	MIL status/ ON or OFF	MIL ON: ON	—
Starter SIG (STARTER SIG)	Starter signal/ ON or OFF	Cranking: ON	—
A/C SIG (A/C SIG)	A/C signal/ ON or OFF	A/C ON: ON	—
PNP SW (PNP SW [NSW])	Park/Neutral position switch signal/ ON or OFF	P or N position: ON	—
Elect Load SIG (ELECT LOAD SIG)	Electrical load signal/ ON or OFF	<ul style="list-style-type: none"> • Tail lamp switch ON: ON • Defogger switch ON: ON 	—
Stop Light SW (STOP LIGHT SW)	Stop lamp switch/ ON or OFF	<ul style="list-style-type: none"> • Brake pedal depressed: ON • Brake pedal released: OFF 	—
PS Oil Press SW (PS OIL PRESS SW)	Power steering oil pressure switch signal/ ON or OFF	<ul style="list-style-type: none"> • While turning the steering wheel: ON • While not turning the steering wheel: OFF 	Idle-up control is performed when PS is ON
PS Signal (PS SIGNAL)	Power steering signal/ ON or OFF	When the steering wheel is turned	This signal is usually ON until the ignition switch is turned to OFF

Intelligent Tester II Display (Abbreviation)	Measurement Item/Range (Display)	Normal Condition ¹	Diagnostic Note
Fuel Pump (FUEL PUMP SPD)	Fuel pump/speed status/ ON/H or OFF/M, L	Idling: ON	—
A/C MAG Clutch (A/C MAG CLUTCH)	A/C magnet clutch status/ ON or OFF	A/C magnet clutch ON: ON	—
EVAP VSV (EVAP VSV)	EVAP VSV/ ON or OFF	VSV operating: ON	EVAP VSV is controlled by the ECM (ground side duty control)
VVT CTRL B1 (VVT CTRL B1)	VVT control status (bank 1)/ ON or OFF	VVT system in operation: ON	—
IGNITION (IGNITION)	Ignition counter/Min.: 0, Max.: 400	0 to 400	—
Cylinder #1, #2, #3, #4 Misfire Rate (CYL #1, #2, #3, #4)	Misfire ratio of the cylinder 1 to 4/ Min.: 0%, Max.: 50%	0 %	This item is displayed only when idling
MISFIRE LOAD (MISFIRE LOAD)	Engine load for first misfire range/ Min.: 0 g/rev, Max.: 3.98 g/rev	Misfire 0: 0 g/rev	—
MISFIRE RPM (MISFIRE RPM)	Engine RPM for first misfire range/ Min.: 0 rpm, Max.: 6,375 rpm	Misfire 0: 0 rpm	—
FC TAU (FC TAU)	Fuel cut TAU: Fuel cut during very light load/ON or OFF	Fuel cut operating: ON	Fuel cut is being performed under very light load to prevent engine combustion from becoming incom- plete
Check Mode (CHECK MODE)	Check mode/ ON or OFF	Check mode ON: ON	See page 05-22
Distance after MIL ON (MIL ON RUN DIST)	This parameter indicates the dis- tance travelled while MIL is acti- vated/ Min.: 0 km, Max.: 65,535 km	Distance after DTC is detected	—

*: If no conditions are specifically stated for "Idling", the shift lever is in the N or P position, the A/C switch is OFF and all accessory switches are OFF.

2. ACTIVE TEST

HINT:

Performing an Active Test using the intelligent tester II enables components including the relay, VSV and actuator, to be operated without removing any parts. Performing Active Test as a first step of troubleshooting is one method to shorten diagnostic time.

Data List is displayed during Active Test.

- (a) Warm up the engine.
- (b) Turn the ignition switch to OFF.
- (c) Connect the intelligent tester II to the DLC3.
- (d) Turn the ignition switch to ON.
- (e) Turn the intelligent tester II ON.
- (f) Select the following menu items: Powertrain / Engine and ECT / Active Test.
- (g) Perform Active Test by referring to the following table.

Intelligent Tester II Display	Test Details	Diagnostic Note
Injector Volume (INJ VOL)	[Test Details] Control the injection volume Min.: -12 %, Max.: 25 % [Vehicle Condition] Engine speed: 3,000 rpm or less	<ul style="list-style-type: none"> • All injectors are tested at once • Injection volume is gradually changed between -12 % and 25 %
A/F Control (A/F CONTROL)	[Test Details] Control the injection volume -12.5 or 25 % (Change the injection volume by 12.5 % or 25 %) [Vehicle Condition] Engine speed: 3,000 rpm or less	<p>The following A/F Control procedure enables the technician to check and graph the voltage outputs of both the A/F sensor and heated oxygen sensor</p> <p>To display the graph indication, select the following menu items: View / Line graph 1 or Line graph 2</p>
Fuel Pump Relay (FUEL PMP SP CTL)	[Test Details] Control the fuel pump speed ON or OFF	—
Purge VSV (EVAP (PURGE) VSV)	[Test Details] Activate the EVAP VSV control ON or OFF	—
A/C Magnetic Clutch Relay (A/C MAG CLUTCH)	[Test Details] Control the A/C magnet clutch ON or OFF	—
Fuel Pump (FUEL PUMP / SPD)	[Test Details] Control the fuel pump ON or OFF	—
VVT Control (Bank 1) (VVT CTRL B1)	[Test Details] Activate the VVT system (Bank 1) ON or OFF	<ul style="list-style-type: none"> • ON: Rough idle or engine stall • OFF: Normal engine speed
TE1 (TC) (TC/TE1)	[Test Details] Connect the TC and TE1 ON or OFF	—
FC IDL Prohibit (FC IDL PROHBT)	[Test Details] Control the idle fuel cut prohibition ON or OFF	During idling