DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the hand–held tester DATA LIST allows switch, sensor, actuator and other item values to be read without removing any parts. Reading DATA LIST early in troubleshooting is one way to shorten labor 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.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the hand–held tester or the OBD II scan tool to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the hand–held tester ON.
(f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / DATA LIST.
(g) According to the display on the tester, perform DATA LIST.

Hand–held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
INJECTOR	Injection period of the No. 1 cylinder/ Min.: 0 ms, Max.: 32.64 ms	Idling: 2.1 to 3.9 ms	—
IGN ADVANCE	Ignition timing advance for No. 1 cylinder/ Min.: –64 deg., Max.: 63.5 deg.	Idling: BTDC 5 to 15˚	—
CALC LOAD	Calculated load by engine ECM/ Min.: 0 %, Max.: 100 %	• Idling: 12.0 to 18.0 % • Running without load (2,500 rpm): 11.0 to 17.0 %	—
MAF	Air flow rate from MAF meter/ Min.: 0 gm/s, Max.: 655 gm/s	• Idling: 4 to 6 gm/s • Running without load (2,500 rpm): 13 to 20 gm/s	If value is approximately 0.0 gm/s: • Open in mass air flow meter power source circuit • Open or short VG circuit If value is 271.0 gm/s or more: • Open in E2G circuit
ENGINE SPD	Engine speed/ Min.: 0 rpm, Max.: 16,383 rpm	Idling: 650 to 750 rpm	—
COOLANT TEMP	Coolant temperature/ Min.: –40 °C, Max.: 140 °C	After warming up: 80 to 95˚C (176 to 203˚F)	If value is –40 °C or 140 °C, sensor circuit is open or shorted
INTAKE AIR	Intake air temperature/ Min.: –40 °C, Max.: 140 °C	Equivalent to ambient air temperature (after cold soak)	If value is –40 °C or 140 °C, sensor circuit is open or shorted
THROTTLE POS	Absolute throttle position sensor/ Min.: 0 %, Max.: 100 %	• Throttle fully closed: 10 to 24 % • Throttle fully open: 64 to 96 %	Read value when ignition switch ON (Do not start engine)
CTP SW	Closed throttle position switch/ ON or OFF	• Throttle fully closed: ON • Throttle open: OFF	—
VEHICLE SPD	Vehicle speed/ Min.: 0 km/h, Max.: 255 km/h	Vehicle stopped: 0 km/h (0 mph)	—
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 value when ignition switch ON (Do not start engine)
ACCEL POS #2	Accelerator pedal position sensor No.2 output voltage/ Min.: 0 V, Max.: 5 V	• Accelerator pedal released: 1.2 to 2.0 V • Accelerator pedal depressed: 3.4 to 5.3 V	Read value when ignition switch ON (Do not start engine)

Hand–held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
THROTTLE POS #2	Throttle position sensor No.2 output voltage/ Min.: 0 V, Max.: 5 V	• Throttle fully closed: 2.1 to 3.1 V • Throttle fully open: 4.5 to 5.5 V	Read value when ignition switch ON (Do not start engine)
THROTTLE TARGT	Target position of throttle valve/ Min.: 0 V, Max.: 5 V	Idling: 0.4 to 1.1 V	—
THROTTLE OPN DUTY	Throttle motor opening duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully closed: 0 %	• When accelerator pedal is depressed, duty ratio is increased • Read value when ignition switch ON (Do not start engine)
THROTTLE CLS DUTY	Throttle motor closed duty ratio/ Min.: 0 %, Max.: 100 %	Throttle fully closed: 0 %	• When accelerator pedal is quick released, duty ratio is increased • Read value when ignition switch ON (Do not start engine)
THROTTLE MOT	Whether or not throttle motor control is permitted/ ON or OFF	Idling: ON	Read value when ignition switch ON (Do not start engine)
+BM	Whether or not electric throttle control system power is inputted/ ON or OFF	Idling: ON	—
ACCEL IDL POS	Whether or not accelerator pedal position sensor is detecting idle/ ON or OFF	Idling: ON	—
THROTTLE IDL POS	Whether or not throttle position sensor is detecting idle/ ON or OFF	Idling: ON	—
FAIL #1	Whether or not fail safe function is executed/ ON or OFF	ETCS has failed: ON	—
FAIL #2	Whether or not fail safe function is executed/ ON or OFF	ETCS has failed: ON	—
THROTTLE INITIAL	Throttle fully closed learning value Min.: 0 V, Max.: 5 V	0.5 to 0.9 V	—
ACCEL LEARN VAL	Accelerator fully closed learning value Min.: 0 V, Max.: 5 V	0.4 to 0.8 V	—
THROTTLE MOT	Throttle motor current Min.: 0 A, Max.: 20 A	Idling: 0 to 3.0 A	—
O2S B1 S1	Heated oxygen sensor output voltage of the bank 1 sensor 1/ Min.: 0 V, Max.: 1.275 V	Idling: 0.1 to 0.9 V	—
O2S B1 S2	Heated oxygen sensor output voltage of the bank 1 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving (31 mph, 50 km/h): 0.1 to 0.9 V	—
O2S B2 S1	Heated oxygen sensor output voltage of the bank 2 sensor 1/ Min.: 0 V, Max.: 1.275 V	Idling: 0.1 to 0.9 V	—
O2S B2 S2	Heated oxygen sensor output voltage of the bank 2 sensor 2/ Min.: 0 V, Max.: 1.275 V	Driving (31 mph, 50 km/h): 0.1 to 0.9 V	—
VAPOR PRESS	Vapor Pressure/ Min.: –4.125 kPa, Max.: 2.125 kPa	Fuel tank cap removed: 0 kPa	Pressure inside fuel tank is monitored by the vapor pressure sensor
SHORT FT #1	Short term fuel trim of bank 1/ Min.: –100 %, Max.: 100%	0 ± 20 %	This item is short–term fuel compensation used to maintain air–fuel ratio at stoichiometric air–fuel ratio

Hand–held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
LONG FT #1	Long term fuel trim of bank 1/ Min.: –100 %, Max.: 100 %	0 ± 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 fuel trim of bank 1/ Min.: 0.5, Max.: 1.496	Idling: 0.5 to 1.4	—
SHORT FT #2	Short term fuel trim of bank 2/ Min.: –100 %, Max.: 100 %	0 ± 20 %	This item is short–term fuel compensation used to maintain air–fuel ratio at stoichiometric air–fuel ratio
LONG FT #2	Long term fuel trim of bank 2/ Min.: –100 %, Max.: 100 %	0 ± 20 %	This item is overall long–term fuel compensation that helps to maintain air–fuel ratio at stoichiometric air–fuel ratio (steadies long term deviation of short–term fuel trim from central value)
TOTAL FT #2	Total fuel trim of bank 2/ Min.: 0.5, Max.: 1.496	Idling: 0.5 to 1.4	—
O2FT B1 S1	Short term fuel trim associated with the bank 1, sensor 1/ Min.: –100 %, Max.: 100 %	0 ± 20 %	Same as SHORT FT #1
O2FT B1 S2	Short term fuel trim associated with the bank 1, sensor 2/ Min.: –100 %, Max.: 100 %	0 ± 20 %	Same as SHORT FT #1
O2FT B2 S1	Short term fuel trim associated with the bank 2, sensor 1/ Min.: –100 %, Max.: 100 %	0 ± 20 %	Same as SHORT FT #2
O2FT B2 S2	Short term fuel trim associated with the bank 2, sensor 2/ Min.: –100 %, Max.: 100 %	0 ± 20 %	Same as SHORT FT #2
FUEL SYS #1	Fuel system status (Bank1) / OL or CL or OL DRIVE or OL FAULT or CL FAULT	Idling after warming up: CL	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using heated oxygen sensor(s) 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 one of heated oxygen sensors, which is used for fuel control, is malfunctioning

Hand–held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
FUEL SYS #2	Fuel system status (Bank2) / OL or CL or OL DRIVE or OL FAULT or CL FAULT	Idling after warming up: CL	• OL (Open Loop): Has not yet satisfied conditions to go closed loop • CL (Closed Loop): Using heated oxygen sensor(s) 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 one of heated oxygen sensors, which is used for fuel control, is malfunctioning
FC IDL	Idle fuel cut/ ON or OFF	Fuel cut operation: ON	FC IDL = ”ON” when throttle valve is fully closed and engine speed is over 1,500 rpm
MIL	MIL status/ ON or OFF	MIL ON: ON	—
O2 LR B1 S1	Response time of the heated oxygen sensor, lean to rich (bank 1 sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 msec.	—
O2 LR B2 S1	Response time of the heated oxygen sensor, lean to rich (bank 2 sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 msec.	—
O2 RL B1 S1	Response time of the heated oxygen sensor, rich to lean (bank 1 sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 msec.	—
O2 RL B2 S1	Response time of the heated oxygen sensor, rich to lean (bank 2 sensor 1)/ Min.: 0 ms, Max.: 16,711 ms	Idling after warming up: 0 to 1,000 msec.	—
STARTER SIG	Starter signal/ ON or OFF	Cranking: ON	—
A/C SIG	A/C signal/ ON or OFF	A/C ON: ON	—
PNP SW [NSW]	Park/neutral position switch signal/ ON or OFF	P or N position: ON	—
ELECT LOAD SIG	Electrical load signal/ ON or OFF	Defogger switch ON: ON	—
STOP LIGHT SW	Stop lamp switch/ ON or OFF	• Brake pedal depressed: ON • Brake pedal released: OFF	—
FUEL PUMP SP CTL	Fuel pump speed control status/ ON or OFF	Idling: ON Cranking: OFF	—
FUEL PUMP / SPD	Fuel pump/speed status/ ON/H or OFF/M,L	Idling: ON	—
A/C MAG CLUTCH	A/C magnet clutch status/ ON or OFF	A/C magnet clutch ON: ON	—
EVAP VSV	VSV status for EVAP control/ ON or OFF	VSV operating: ON	VSV for EVAP is controlled by the ECM (ground side duty control)
IGNITION	Ignition counter/ Min.: 0, Max.: 800	0 to 800	—
CYL #1, #2, #3, #4, #5, #6, #7, #8	Misfire ratio of the cylinder 1 to 8/ Min.: 0 %, Max.: 50 %	0 %	This item is displayed in only idling

Hand–held Tester Display	Measurement Item/Range (Display)	Normal Condition *	Diagnostic Note
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 incomplete
CHECK MODE	Check mode/ ON or OFF	Check mode ON: ON	See page 05–38

*: 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 ACTIVE TEST using the hand–held tester allows the relay, VSV, actuator and so on to operate without parts removal. Performing the ACTIVE TEST as a first step of troubleshooting is one of the method to shorten the labor time.

It is possible to display DATA LIST during ACTIVE TEST.

(a) Warm up the engine.
(b) Turn the ignition switch to OFF.
(c) Connect the hand–held tester to the DLC3.
(d) Turn the ignition switch to ON.
(e) Turn the hand–held tester ON.
(f) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / ACTIVE TEST.
(g) According to the display on the tester, perform the ACTIVE TEST.

Hand–held Tester Display	Test Details	Diagnostic Note
INJ VOL	[Test Details] Control the injection volume Min.: –12.5 %, Max.: 24.8 %0 [Vehicle Condition] Engine speed: 3,000 rpm or less	• All injectors are tested at once • Injection volume is gradually changed between –12.5 and 25 %
A/F CONTROL	[Test Details] Control the injection volume –12.5 or 25 % (Change the injection volume to –12.5 % or 25 %) [Vehicle Condition] Engine speed: 3,000 rpm or less	Following A/F CONTROL procedure enables the technician to check and graph voltage outputs of both the heated oxygen sensor To display the enter ACTIVE TEST / A/F CONTROL / USER DATA, select ”O2S B1S1 and B1S2” or ”O2S B2S1 and B2S2” by pressing ”YES” followed by ”ENTER” and then ”F4”
CAN CTRL VSV	[Test Details] Activate the VSV for canister control ON or OFF	—
EVAP VSV (ALONE)	[Test Details] Activate the VSV for EVAP control ON or OFF	—
A/C MAG CLUTCH	[Test Details] Control the A/C magnet clutch ON or OFF	—
FUEL PUMP / SPD	[Test Details] Control the fuel pump ON or OFF	—
FUEL PMP SP CTL	[Test Details] Control the fuel pump speed ON or OFF	—

TC/TE1	[Test Details] Connect the TC and TE1 ON or OFF	—
FC IDL PROHBT	[Test Details] Control the idle fuel cut prohibit ON or OFF	—