05ESS-05

DATA LIST/ACTIIVE TEST/SYSTEM CHECK/SYSTEM CHECK

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 the 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 the these reference values when deciding whether a part is faulty or not.

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

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition*	Diagnostic Note
INJECTOR	Injection period/ Minimum: 0 ms, Maximum: 32.64 ms	Idling: 1.92 to 3.37 ms	-
IGN ADVANCE	Ignition timing advance/ Minimum: -64 deg., Maximum: 63.5 deg.	Idling: BTDC 5 to 15 deg.	-
CALC LOAD	Calculated load by ECM/ Minimum: 0 %, Maximum: 100 %	• Idling: 3.3 to 26.7 % • Racing without load (2500 rpm): 12.0 to 14.7 %	-
MAF	Air flow rate from MAF meter/ Minimum: 0 gm/s, Maximum: 655 gm/s	• Idling: 0.58 to 4.67 gm/second • Racing without load (2,500 rpm): 3.33 to 9.17 gm/second	If value is approximately 0.0 gm/s: • Mass air flow meter power source circuit open • VG circuit open or short If value is 160.0 gm/s or more: • EVG circuit open
ENGINE SPD	Engine Speed/ Minimum: 0 rpm, Maximum: 16,383 rpm	Idling: 550 to 750 rpm	-
COOLANT TEMP	Coolant temperature/ Minimum: -40°C, Maximum: 140°C	After warming up: 80 to 95˚C (176 to 203˚F)	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F) or more: sensor circuit is shorted
INTAKE AIR	Intake air temperature/ Minimum: -40°C, Maximum: 140°C	Equivalent to ambient temperature (after cold soak)	• If value is -40°C (-40°F): sensor circuit is open • If value is 140°C (284°F) or more: sensor circuit is shorted
THROTTLE POS	Absolute throttle position sensor/ Minimum: 0 %, Maximum: 100 %	• Throttle fully closed: 6 to 16 % • Throttle fully open: 64 to 98 %	Read value with 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/ Minimum: 0 km/h, Maximum: 255 km/h	Vehicle stopped: 0 km/h (0 mph)	Speed indicated on speedometer
ACCEL POS #1	Accelerator pedal position sensor No.1 output voltage/ Minimum: 0 V, Maximum: 5 V	• Accelerator released: 0.5 to 1.1 V • Accelerator depressed: 2.6 to 4.5 V	Read value with ignition switch ON (do not start engine)
ACCEL POS #2	Accelerator pedal position sensor No. 2 output voltage/ Minimum: 0 V, Maximum: 5 V	• Accelerator released: 1.2 to 2.0 V • Accelerator depressed: 3.4 to 5.3 V	Read value with 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/ Minimum: 0 V, Maximum: 5 V	• Throttle fully closed: 2.1 to 3.1 V • Throttle fully open: 4.5 to 5.5 V	Read value with ignition switch ON (do not start engine)
THROTTLE TARGT	Target position of throttle valve/ Minimum: 0 V, Maximum: 5 V	Idling: 0.4 to 1.1 V	Read value with ignition switch ON (do not start engine)
THROTTLE OPN DUTY	Throttle actuator opening duty ratio/ Minimum: 0 %, Maximum: 100 %	Throttle fully closed: 0 %	• When accelerator pedal is depressed, duty ratio is increased • Read value with ignition switch ON (do not start engine)
THROTTLE CLS DUTY	Throttle actuator closed duty ratio/ Minimum: 0 %, Maximum: 100 %	Throttle fully open: 0 %	• When accelerator pedal is quick released, duty ratio is increased • Read value with ignition switch ON (do not start engine)
THROTTLE MOT	Whether or not throttle actuator control is permitted/ ON or OFF	Idling: ON	Read value with ignition switch ON (do not start engine)
+BM	Whether or not electric throttle control system power is input/ ON or OFF	Idling: ON	-
VAPOR PRESS	Vapor Pressure/ Minimum: 97.175 kPa, Maximum: 103.425 kPa	Usable range: 60 to 110 kPa	Pressure inside of fuel tank as read by vapor pressure sensor
O2S B1 S2	Oxygen sensor output voltage of the bank 1 sensor 2/ Minimum: 0 V, Maximum: 1.275 V	Idling: 0.1 to 0.9 V	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of each sensor
AFS B1 S1	A/F sensor output voltage of the bank 1 sensor 1/ Minimum: 0 V, Maximum: 7.999 V	Idling: 2.8 to 3.8 V	Performing INJ VOL or A/F CONTROL function of ACTIVE TEST enables technician to check voltage output of each sensor
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 (learned value) Minimum: 0 V, Maximum: 5 V	0.5 to 0.9 V	—
ACCEL LEARN VAL	Accelerator fully closed (learned value) Minimum: 0 V, Maximum: 5 V	0.4 to 0.8 V	—
THROTTLE MOT	Throttle motor current Minimum: 0 A, Maximum: 20 A	Idling: 0 to 3.0 A	—
SHORT FT #1	Short term fuel trim of bank 1/ Minimum: -100 %, Maximum: 100 %	0 ± 20 %	This item is short-term fuel compensation used to maintain air-fuel ratio at stoichiometric air-fuel ratio
LONG FT #1	Long term fuel trim of bank 1/ Minimum: -100 %, Maximum: 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/ Minimum: 0.5, Maximum: 1.496	Idling: 0.5 to 1.4	-

Hand-held Tester Display	Measurement Item/Range (Display)	Normal Condition*	Diagnostic Note
AF FT B1 S1	Short term fuel trim associated with bank 1, sensor 1/ Minimum: 0, Maximum: 1.999	• 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 system status (Bank 1) / 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	-
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]	PNP 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	-
PS OIL PRESS SW	Power steering signal/ ON or OFF	• While turning steering wheel: ON • While not turning steering wheel: OFF	Idle-up control is performed when PS is ON
PS SIGNAL	Power steering signal/ ON or OFF	When steering wheel is turned	This signal is usually ON until Ignition switch is turned 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	EVAP VSV status control / ON or OFF	VSV operating: ON	EVAP VSV is controlled by ECM (ground side duty control)
VVT CTRL B1	VVT control status (Bank 1) / ON or OFF	VVT system operation: ON	-
IGNITION	Ignition counter/ Minimum: 0, Maximum: 400	0 to 400	-
CYL #1, #2, #3, #4	Misfire ratio of cylinder 1 to 4/ Minimum: 0 %, Maximum: 50 %	0 %	This item is displayed in only idling
MISFIRE LOAD	Engine load for first misfire range/ Minimum: 0 g/rev, Maximum: 3.98 g/rev.	Misfire 0: 0 g/rev.	—
MISFIRE RPM	Engine RPM for first misfire range/ Minimum: 0 rpm, Maximum: 6,375 rpm	Misfire 0: 0 rpm	—
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 05-40

HINT:
*: If no conditions are specifically stated for ”ldling”, 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 the hand-held tester ACTIVE TEST allows relay, VSV, actuator and other items to be operated without removing any parts. Performing the ACTIVE TEST early in troubleshooting is one way to shorten labor time. The DATA LIST can be displayed during the ACTIVE TEST.

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

Hand-held Tester Display	Test Details	Diagnostic Note
INJ VOL	[Test Details] Control injection volume Minimum: -12.5 %, Maximum: 25 % [Vehicle Condition] Engine speed: 3000 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 injection volume -12.5 or 25 % (change the injection volume -12.5 % or 25 %) [Vehicle Condition] Engine speed: 3000 rpm or less	Following A/F CONTROL procedure enables technician to check and graph voltage outputs of both A/F sensor and heated oxygen sensor For displaying the graph, enter ”ACTIVE TEST / A/F CONTROL / USER DATA”, select ”AFS B1S1 and O2S B1S2” by pressing ”YES” and push ”ENTER”, Then press ”F4”
EVAP VSV (ALONE)	[Test Details] Activate EVAP VSV control ON or OFF	-
A/C MAG CLUTCH	[Test Details] Control A/C magnet clutch ON or OFF	-
FUEL PUMP / SPD	[Test Details] Control fuel pump ON or OFF	-
VCUUM PUMP (ALONE)	[Test Details] Vacuum pump ON or OFF	-
VENT VALVE (ALONE)	[Test Details] Vent valve ON or OFF	-
VVT CTRL B1	[Test Details] Activate VVT system (Bank 1) ON or OFF	• ON: Rough idle or engine stall • OFF: Normal engine speed
TC/TE1	[Test Details] Connect TC and TE1 ON or OFF	-
FC IDL PROHBT	[Test Details] Control idle fuel cut prohibit ON or OFF	-

Hand-held Tester Display	Test Details	Diagnostic Note
TC/TE1	[Test Details] Connect TC and TE1 ON or OFF	-
FC IDL PROHBT	[Test Details] Control idle fuel cut prohibit ON or OFF	-

3. SYSTEM CHECK

HINT:

Performing the hand-held tester SYSTEM CHECK allows the system which is composed of multiple actuators to be operated without removing any parts.

Operate the system by performing SYSTEM CHECK and check for DTCs. And, potential malfunctions in the system can be detected on the tester.

(a) Connect the hand-held tester to the DLC3.

(b) Turn ON the ignition switch and the hand-held tester.

(c) Enter the following menus: DIAGNOSIS / ENHANCED OBD II / SYSTEM CHECK.

(d) According to the display on the tester, perform the ”SYSTEM CHECK.

Hand-held Tester Display	Test Details	Diagnostic Note
EVAP SYS CHECK (AUTO OPERATION)	EVAP key-off monitor is operated automatically by performing 7 steps in order. Fuel temperature: 35°C (95°F) or less is recommended	• If there is no DTC displayed on PENDING DTC after SYSTEM CHECK, system is functioning normally Refer to EVAP INSPECTION PROCEDURE (on page 05-317)
EVAP SYS CHECK (MANUAL OPERATION)	EVAP key-off monitor is operated manually by performing 7 steps in order. Fuel temperature: 35°C (95°F) or less is recommended	• Used to detect a malfunctioning part Refer to EVAP INSPECTION PROCEDURE (on page 05-317)