05HX4–01

DATA LIST/ACTIVE TEST

1. DATA LIST

HINT:

Using the Intelligent Tester II 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. however, some item values may not be displayed for G.C.C. or Australia bound vehicles.

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 OFF.
(c) Connect the Intelligent Tester II to the DLC3.
(d) Turn the ignition switch ON.
(e) Turn ON the tester.
(f) Select the item ”Enter/ Diagnosis/ OBD·MOBD/ Power train/ Engine and ECT/ Data List”.
(g) Follow the instructions on the tester and read the Data List.

Intelligent Tester II Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
MIL	MIL/ ON or OFF	OFF	–
Fuel System Status (Bank 1)*1	Fuel system status (bank 1)/ OL: Open Loop CL: Closed Loop OL DRIVE: OL due to driving conditions (for example: during fuel enrichment) OL FAULT: OL due to detected system fault CL FAULT: CL is controlled by only one front HO2S (Other front HO2S malfunctions)	CL: Idling after warmed–up	–
Fuel System Status (Bank 2)*1	Fuel system status (bank 2)/ Same as bank 1	CL: Idling after warmed–up	–
Calculated Load	Engine load/ 0 to 100 % (100 % means fully open throttle)	13.5 to 17.5 %: idle (A/C OFF and shift position N) 12.5 to 16.5 %: 2,000 rpm (A/C OFF and shift position N)	–
Coolant Temp	Engine coolant temperature (ECT)/ –40 to 140°C (–40 to 284°F)	75 to 95°C (167 to 203°F): engine warmed–up	–40°C (–40°F) : ECT sensor circuit open 140°C (284°F) or more: ECT sensor circuit shorted
Short FT #1*1	Short–term fuel trim (FT) (bank 1)/ –100 to 0 %: injection volume decreased 0 to 100 %: injection volume increased	0 ± 20 %	–
Short FT #2*1	Short–term fuel trim (FT) (bank 2)/ Same as bank 1	0 ± 20 %	–
Long FT #1*1	Long–term fuel trim (FT) (bank 1) (learning value of fuel trim)/ –100 to 0 %: compensate to Lean 0 to 100 %: compensate to Rich 0 %: stoichiometric	0 ± 20 %	–
Long FT #2*1	Long–term fuel trim (FT) (bank 2)/ Same as the bank 1	0 ± 20 %	–
Engine Speed	Engine RPM/ 0 to 16383.75 rpm	600 to 800 rpm: idle after engine warmed–up	–

Intelligent Tester II Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
Vehicle Speed	Vehicle speed/ 0 to 255 km/h	Same as speedometer indication	–
IGN Advance	Ignition advanced timing (cylinder #1) /–64 to 63.5°	0 to 5°: Cranking 2 to 20°: Idle (A/C OFF Shift position N) 37 to 39°: 2,000 rpm (A/C OFF Shift position N)	–
Intake Air	Intake Air Temperature (IAT)/ –40 to 140°C (–40 to 284°F)	Same as ambient temperature	–40°C (–40°F) : IAT sensor circuit open 140°C (284°F) or more: IAT sensor circuit shorted
MAF	Air flow rate from Mass Air Flow (MAF) sensor/ 0 to 655.35 gm/s	4.6 to 5.6 gm/s: Idle	0 gm/s: MAF sensor power source circuit is open or VG circuit is open/shorted 160 gm/s or more: E2G circuit is open
Throttle POS	Throttle Position (TP)/ 0 to 100 %	8 to 20 %: throttle fully closed 64 to 96 %: throttle fully open	–
O2 FT B1 S1*1	Short–term fuel trim (bank 1)/ –100 to 99.2 %	0 ± 20 %	–
O2 FT B2 S2*1	Short–term fuel trim (bank 2)/ –100 to 99.2 %	0 ± 20 %	–
O2S B1 S1*1	HO2S voltage (bank 1 sensor 1)/ 0 to 1.275 V	0.1 to 0.9 V	–
O2S B2 S1*1	HO2S voltage (bank 2 sensor 1)/ 0 to 1.275 V	0.1 to 0.9 V	–
O2S B1 S2*1	HO2S voltage (bank 1 sensor 2)/ 0 to 1.275 V	0.1 to 0.9 V	–
O2S B2 S2*1	HO2S voltage (bank 2 sensor 2)/ 0 to 1.275 V	0.1 to 0.9 V	–
Engine Run Time	Time after engine start/ 0 to 65,535 sec	–	–
Running Time From MIL ON*2	Engine running time after MIL ON/0 to 65,535 min	0 min	–
MIL ON Run Distance*2	Distance after MIL ON/ 0 to 65,535 km	0 km	–
Time After DTC Cleared	Time after DTC clear/ 0 to 65,535 min	–	–
Distance from DTC Cleared	Distance after DTC clear/ 0 to 65,535 km	–	–
EVAP (Purge) VSV	Duty ratio of purge VSV/ 0 to 100 %	–	–
Catalyst Temperature (Bank 1 Sensor 1)*2	Calculated catalyst temperature (bank 1 sensor 1)/ –40 to 6,513.5°C	300 to 800°C: catalyst is warmed–up	–
Catalyst Temperature (Bank 2 Sensor 1)*2	Calculated catalyst temperature (bank 2 sensor 1)/ –40 to 6,513.5°C	300 to 800°C: catalyst is warmed–up	–
Catalyst Temperature (Bank 1 Sensor 2)*2	Calculated catalyst temperature (bank 1 sensor 2)/ –40 to 6,513.5°C	200 to 800°C: catalyst is warmed–up	–
Catalyst Temperature (Bank 2 Sensor 2)*2	Calculated catalyst temperature (bank 2 sensor 2)/ –40 to 6,513.5°C	200 to 800°C: catalyst is warmed–up	–

Intelligent Tester II Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
Battery Voltage	Battery voltage	11 to 14 V	–
Air–Fuel Ratio*1	Air–fuel ratio (A/F)/ 0 to 1.999 (1.0: stoichiometric [A/F = 14.5])	Approximately 1.0 at idling after engine warmed–up	Ex.: If "1.2" is indicated, A/F can be calculated as the follow A/F = 14.5 x 1.2 =17.4 (Lean)
Ambient Temperature	Ambient temperature/ –40 to 215°C	Same as ambient temperature	–40°C: Ambient temperature sensor open circuit 215°C: Ambient temperature sensor short circuit
Throttle Sensor Positioning	Absolute throttle position No. 1/ 100 %	8 to 20 %: throttle fully closed 64 to 96 %: throttle fully open	–
Throttle Sensor Positioning #2	Absolute throttle position No. 2/ 100 %	8 to 20 %: throttle fully closed 64 to 96 %: throttle fully open	–
Accelerator POS #1	Absolute accelerator pedal position No. 1 /100 %	10 to 22 %: accelerator pedal is released 54 to 86 %: accelerator pedal is fully depressed	–
Accelerator POS #2	Absolute accelerator pedal position No. 2 /100 %	12 to 42 %: accelerator pedal is released 66 to 98 %: accelerator pedal is fully depressed	–
Throttle Motor	Throttle actuator output/ 0 to 100 %	–	–
Knock Correction Leaning Value	Knock correction leaning value/ –64 to 1,984°Crankshaft Angle (CA)	–	–
Knock Feedback Value	Knock feedback value/ –64 to 1,984°CA	–	–
Purge Density Learning Value*1	Reducing injection volume during EVAP purge/ –50 to 350 %	–	–
Purge Flow*1	Rate with purge volume to MAF/ 0 to 100 %	–	–
Shift Position	Shift Position	–	–
A/T Oil Temperature	Transmission Fluid Temperature (TFT)/–40 to 215°C	–	–40°C: TFT sensor open circuit 215°C: TFT sensor short circuit
SPD (NO)	Output shaft speed/ 0 to 12,750 rpm	–	–
SPD (NT)	Turbine shaft speed/ 0 to 12,750 rpm	–	–
ECT Lock Up	Lock–up clutch/ ON/OFF	–	–
ST1	Brake pedal/ ON/OFF	ON: released OFF: depressed	–
Throttle Position Commanded Value	Commanded throttle position/ 0 to 5 V	–	–
Actuator Power Supply	Throttle actuator power supply/ ON/OFF	ON: ignition switch ON	–
OPN Malfunction	Throttle valve open malfunction/ ON/OFF	OFF	–
Accelerator POS No. 1	APP sensor No. 1 voltage/0 to 5 V	0.4 to 1.4 V: accelerator pedal is released 3.1 to 4.6 V: accelerator pedal is fully depressed	–

Intelligent Tester II Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
Accelerator POS No. 2	APP sensor No. 2 voltage/0 to 5 V	1.0 to 2.2 V: accelerator pedal is released 3.9 to 5.0 V: accelerator pedal is fully depressed	–
Throttle POS No. 1	TP sensor No. 1 voltage/0 to 5 V	0.4 to 1.4 V: throttle valve is fully closed 3.1 to 4.6 V: throttle valve is fully opened	–
Throttle POS No. 2	TP sensor No. 2 voltage/0 to 5 V	1.0 to 2.2 V: throttle valve is fully closed 3.9 to 5.0 V: throttle valve is fully opened	–
Throttle Requirement Position	Target throttle position/0 to 5 V	–	–
Throttle Motor Duty Ratio (Open)	Duty ratio to open throttle valve/ 0 to 100 %	–	–
Throttle Motor Duty Ratio (Close)	Duty ratio to close throttle valve/ 0 to 100 %	–	–
ETCS Actuator Power	ETCS power supply/ ON/OFF	ON	–
Throttle Motor	Current is sent to throttle actuator (ON/OFF)	–	–
Throttle Step POS	Throttle opening percentage/ 0 to 100 %	–	–
Throttle Aim Position	Target throttle opening percentage/ 0 to 100 %	–	–
Throttle Motor Current	Throttle actuator current/ 0 to 80 A	0 to 20 A	–
+BM Voltage	ETCS power supply voltage/ 0 to 20 V	–	–
Check Mode	Check mode	–	–
Starter Signal	Starter signal/ ON/OFF	ON: Cranking	–
Closed Throttle Position Switch	Closed throttle position switch (idle switch)/ ON/OFF	ON: throttle valve is closed	–
A/C Signal	A/C signal/ ON/OFF	ON: A/C switch is turned ON	–
Neutral Position Switch Signal	PNP switch/ ON/OFF	ON: shift position is P or D	–
Electrical Load Signal	Electrical load signal	ON: headlights or defogger is turned ON	–
Stop Light Switch	Stop lamp switch	ON: brake pedal is depressed	–
Idle Fuel Cut	Fuel cut on decelerating	ON: accelerator pedal is released at 3,000 rpm	–
FC TAU	Fuel cut on low load	ON: going down on a long slope	–
Fuel Pump Speed Control Status	Fuel pump speed ON/OFF	ON: low speed OFF: high speed	–
Fuel Pump Speed Status	Fuel pump ON/OFF	ON: ignition switch ON	–
EVAP (Purge) VSV	EVAP VSV/ ON (open)/OFF (close)	–	–
ACIS VSV	ACIS VSV/ ON (open)/OFF (close)	–	–
Electric Fan Motor	Cooling fan/ ON/OFF		–
TC and TE1	Connection of TC and TE1 on DLC3/ ON (connected)/OFF (disconnected	–	–
Initial Engine Coolant Temperature	ECT when engine starts	–	–

Intelligent Tester II Display	Measurement Item/ Range	Normal Condition	Diagnostic Note
Initial Intake Air Temperature	IAT when engine starts	–	–
Injector Volume (Cylinder 1)	Injection volume of cylinder #1	–	–
Injector	Injection period	1.3 to 2.8 ms: at idle, engine warmed–up, A/C OFF and shift position N	–
F/C IDL PROHBT	Idle fuel cut prohibit/ ON/OFF		–
TOTAL FT #1*3	Total fuel trim (bank 1)	0.5 to 1.4 at idle	Below 1.0: Fuel trim is to Lean 1.0 or more: Fuel trim is to Rich
TOTAL FT #2*3	Total fuel trim (bank 2)	0.5 to 1.4 at idle	Below 1.0: Fuel trim is to Lean 1.0 or more: Fuel trim is to Rich
MISFIRE RPM*2	Average engine RPM when misfire detected/ 0 to 6375 rpm	–	–
MISFIRE LOAD*2	Average engine load when misfire detected/ 0 to 3.98 g/rev	–	–
Cylinder #1 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #1	0	–
Cylinder #2 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #2	0	–
Cylinder #3 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #3	0	–
Cylinder #4 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #4	0	–
Cylinder #5 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #5	0	–
Cylinder #6 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #6	0	–
Cylinder #7 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #7	0	–
Cylinder #8 Misfire Rate*2	Misfire count per 200 revolutions on cylinder #8	0	–
All Cylinders Misfire Rate*2	Misfire count per 200 revolutions on all cylinders	0	–
Ignition*2	Ignition count	–	Misfire rate = misfire count/ignition count
Multiple Cylinders Misfire Rate*2	Multiple cylinder misfire count per 200 revolutions	0	–
Misfire Monitoring*2	Rate of misfire margin	More than 30 %	–
O2 LR B1 S1*2	HO2S (bank 1 sensor 1) voltage Lean to Rich switching time	Within 1 second	–
O2 LR B2 S1*2	HO2S (bank 2 sensor 1) voltage Lean to Rich switching time	Within 1 second	–
O2 RL B1 S1*2	HO2S (bank 1 sensor 1) voltage Rich to Lean switching time	Within 1 second	–
O2 RL B2 S1*2	HO2S (bank 2 sensor 1) voltage Rich to Lean switching time	Within 1 second	–

If no conditions are specifically stated for ”idling”, assume the shift lever is in the N or P position, and the A/C and all accessory switches are OFF.

*1: Except G.C.C.

*2: Europe

* Misfire margin indicates the possibility that misfires do not occur. The misfires are counted when the misfire margin is 0 % or less. There is little possibility of misfires if the misfire margin is less than 30 %. Misfire margin is calculated with the following arithmetic expression.

$$\text{Misfire margin (\%)} = \frac{\text{Fluctuation of engine revolution to interpret as misfire} - \text{Fluctuation of actual engine revolution}}{\text{Fluctuation of engine revolution to interpret as misfire}} \times 100$$

Displays during ACTIVE TEST:

Intelligent Tester II Display	Measurement Item / Range	Normal Condition	Diagnostic Note
VVT CHNG ANGL#1	VVT Actual Angle (Bank 1)/ 0 to 60°CA (Crankshaft Angle)	–	–
VVT CHNG ANGL#2	VVT Actual Angle (Bank 2)/ 0 to 60°CA (Crankshaft Angle)	–	–
VVT OCV DUTY B1	VVT OCV Operating Duty (Bank 1)/ 0 to 100 %	–	–
VVT OCV DUTY B2	VVT OCV Operating Duty (Bank 2)/ 0 to 100 %	–	–

2. ACTIVE TEST

HINT:

Performing the Intelligent Tester II Active Test allows relay, Vacuum Switching Valve (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) Connect the Intelligent Tester II to the DLC3.
(b) Turn the ignition switch ON.
(c) Enter the following menus: Enter/ Diagnosis/ OBD·MOBD/ Power train/ Engine and ECT/ Active Test.
(d) Follow the instructions on the tester and read the Active Test.

Intelligent Tester II Display	Test Part	Control Range	Diagnostic Note
Control the injection volume	Injection volume	–12.5 to 25 %	Perform the test within 3,000 rpm. Injection volume is gradually changed between –12.5 and 25 %.
Control the injection volume A/F sensor	Injection volume	Switching –12.5 or 25 %	Perform the test within 3,000 rpm. Following A/F CONTROL procedure enables to check and graph voltage outputs of HO2S.
Activate the VSV for intake control	ACIS VSV	ON/OFF	–
Activate the fuel speed control	Fuel pump speed control	ON (low speed)/ OFF (high speed)	–
Control the fuel pump/ speed	Fuel pump	ON/OFF	–
Control the VVT system (bank 1)	VVT OCV (bank 1)	ON/OFF	Engine stall or rough idle when the VVT OCV is turned ON.
Control the VVT system (bank 2)	VVT OCV (bank 2)	ON/OFF	Engine stall or rough idle when the VVT OCV is turned ON.
Control the VVT (bank 1)	VVT actuator (bank 1)	–128 to 127 % This valve added to present OCV control duty 100 %: maximum advance –100 %: maximum retard	Engine stall or rough idle when the VVT actuator is operated by 100 %. This test is possible during idle.
Control the VVT (bank 2)	VVT actuator (bank 2)	–128 to 127 % This valve added to present OCV control duty 100 %: maximum advance –100 %: maximum retard	Engine stall or rough idle when the VVT actuator is operated by 100 %. This test is possible during idle.

Intelligent Tester II Display	Test Part	Control Range	Diagnostic Note
Connect the TC and TE1	Connection TC and TE1	ON: TC and TE1 connected OFF: TC and TE1 disconnected	–
Control the idle fuel cut prohibit	Deceleration fuel cut prohibit	ON/OFF	–
Control the electric cooling fan	Cooling fan	ON/OFF	–
Activate the VSV for EVAP control	EVAP VSV	ON/OFF	–
Control the ETCS opening slow speed	Throttle actuator	ON: throttle valve opens slowly	This test is possible when the following conditions are met: • Ignition switch ON • Engine does not start • Fully depressing accelerator pedal (APP: 58 degrees or more)
Control the ETCS closing slow speed	Throttle actuator	ON: throttle valve closes slowly	Same as above
Control the ETCS opening fast speed	Throttle actuator	ON: throttle valve opens fast	Same as above
Control the ETCS closing fast speed	Throttle actuator	ON: throttle valve closes fast	Same as above
Control the cylinder #1 fuel cut	Cylinder #1 injector fuel cut	ON/OFF	This test is possible during vehicle stopping and engine idling.
Control the cylinder #2 fuel cut	Cylinder #2 injector fuel cut	ON/OFF	Same as above
Control the cylinder #3 fuel cut	Cylinder #3 injector fuel cut	ON/OFF	Same as above
Control the cylinder #4 fuel cut	Cylinder #4 injector fuel cut	ON/OFF	Same as above
Control the cylinder #5 fuel cut	Cylinder #5 injector fuel cut	ON/OFF	Same as above
Control the cylinder #6 fuel cut	Cylinder #6 injector fuel cut	ON/OFF	Same as above
Control the cylinder #7 fuel cut	Cylinder #7 injector fuel cut	ON/OFF	Same as above
Control the cylinder #8 fuel cut	Cylinder #8 injector fuel cut	ON/OFF	Same as above