ES

DIAGNOSIS SYSTEM

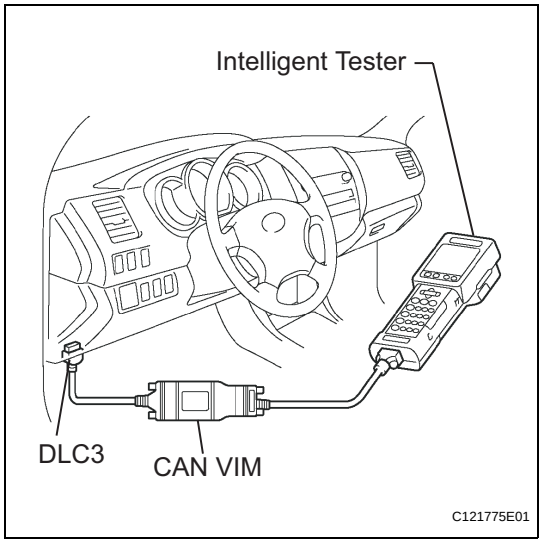
1. DESCRIPTION

When troubleshooting OBD II (On-Board Diagnostics) vehicles, a intelligent tester (complying with SAE J1987) must be connected to the DLC3 (Data Link Connector 3) of the vehicle. Various data in the vehicle's ECM (Engine Control Module) can be then read.

OBD II regulations require that the vehicle's on-board computer illuminates the MIL (Malfunction Indicator Lamp) on the instrument panel when the computer detects a malfunction in:

(a) The emission control systems and components

(b) The power train control components (which affect vehicle emissions)



(c) The computer itself

In addition, the applicable DTCs (Diagnostic Trouble Codes) prescribed by SAE J2012 are recorded on 3 consecutive trips, the MIL turns off automatically but the DTCs remain recorded in the ECM memory.

To check DTCs, connect a intelligent tester to the DLC3. The tester displays DTCs, freeze frame data, and a variety of engine data. The DTCs and freeze frame data can be erased with the tester (see page ES-40).

In order to enhance OBD function on vehicles and develop the Off-Board diagnosis system, CAN communication is introduced in this system (CAN: Controller Area Network). It minimizes a gap between technician skills and vehicle technology. CAN is a network, which uses a pair of data transmission lines, spanning multiple computers and sensors. It allows high speed communication between the systems and to simplify the wire harness connection.

Since this system is equipped with the CAN communication, connecting the CAN VIM (VIM: Vehicle Interface Module) with intelligent tester is necessary to display any information from the ECM. (Also the communication between the intelligent tester and the ECM uses CAN communication signal.) When confirming the DTCs and any data of the ECM, connect the CAN VIM between the DLC3 and the intelligent tester.

2. NORMAL MODE AND CHECK MODE

The diagnosis system operates in normal mode during normal vehicle use. In normal mode, 2 trip detection logic is used to ensure accurate detection of malfunctions. Check mode is also available as an option for technicians. In check mode, 1 trip detection logic is used for simulating malfunction symptoms and increasing the system's ability to detect malfunctions, including intermittent problems (intelligent tester only) (see page ES-43).

3. 2 TRIP DETECTION LOGIC

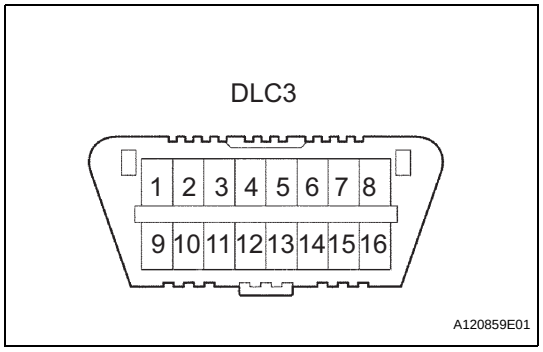
When a malfunction is first detected, the malfunction is temporarily stored in the ECM memory (1st trip). If the same malfunction is detected during the next subsequent drive cycle, the MIL is illuminated (2nd trip).

4. FREEZE FRAME DATA

Freeze frame data record the engine conditions (fuel system, calculated load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when a malfunction is detected. When troubleshooting, freeze frame data can help determine if the vehicle was running or stopped, if the engine was warmed up or not, if the air-fuel ratio was lean or rich, and other data from the time the malfunction occurred.

5. DLC3 (Data Link Connector 3)

The vehicle's ECM uses the ISO 15765-4 for communication protocol. The terminal arrangement of the DLC3 complies with SAE J1962 and matches the ISO 15765-4 format.



Symbols	Terminal No.	Name	Reference terminal	Result	Condition
SIL	7	Bus "+" line	5 - Signal ground	Pulse generation	During transmission
CG	4	Chassis ground	Body ground	1 Ω or less	Always
SG	5	Signal ground	Body ground	1 Ω or less	Always
BAT	16	Battery positive	Body ground	9 to 14 V	Always
CANH	6	CAN "High" line	CANL	54 to 69 Ω	Ignition switch OFF
CANH	6	CAN "High" line	Battery positive	1 MΩ or higher	Ignition switch OFF
CANH	6	CAN "High" line	CG	1 kΩ or higher	Ignition switch OFF
CANL	4	CAN "Low" line	Battery positive	1 MΩ or higher	Ignition switch OFF
CANL	4	CAN "Low" line	CG	1 kΩ or higher	Ignition switch OFF

HINT:

The DLC3 is the interface prepared for reading various data from the vehicle's ECM. After connecting the cable of a intelligent tester, turn the ignition switch to ON and turn the tester ON. If a communication failure message is displayed on the tester screen (on the tester: UNABLE TO CONNECT TO VEHICLE), a problem exists in either the vehicle or tester. In order to identify the location of the problem, connect the tester to another vehicle.

If communication is normal: Inspect the DLC3 on the original vehicle.

If communication is impossible: The problem is probably with the tester itself. Consult the Service Department listed in the instruction manual.

6. BATTERY VOLTAGE

Battery Voltage:

11 to 14 V

If the voltage is below 11 V, recharge the battery before proceeding.

7. MIL (Malfunction Indicator Lamp)

(a) The MIL is illuminated when the ignition switch is first turned to ON (the engine is not running).

(b) The MIL should turn off when the engine is started. If the MIL remains illuminated, the diagnosis system has detected a malfunction or abnormality in the system.

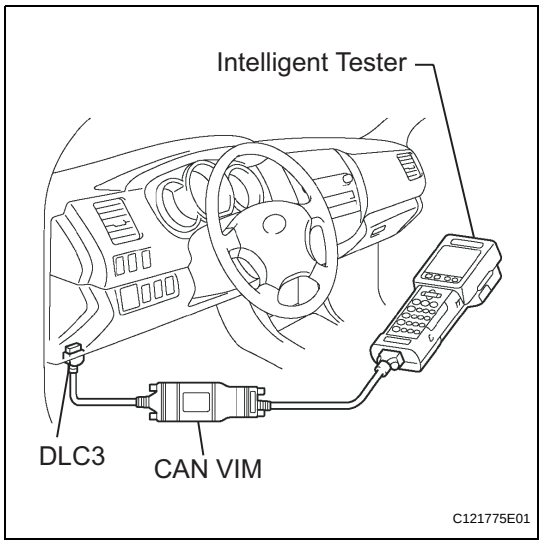
HINT:

If the MIL is not illuminated when the ignition switch is first turned to ON, check the MIL circuit (see page ES-439).

DTC CHECK / CLEAR

NOTICE:
When the diagnosis system is changed from normal mode to check mode or vice versa, all DTCs and freeze frame data recorded in normal mode are erased. Before changing modes, always check and make a note of DTCs and freeze frame data.
HINT:

- DTCs which are stored in the ECM can be displayed on a intelligent tester. A intelligent tester can display current and pending DTCs.
- Some DTCs are not set if the ECM does not detect the same malfunction again during a second consecutive driving cycle. However, such malfunctions, detected on only one occasion, are stored as pending DTCs.
- The pending DTCs are set when the malfunction is detected once.



1. CHECK DTC (Using a intelligent tester)
(a) Connect a intelligent tester to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the tester ON.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CURRENT CODES or PENDING CODES.
(e) Check DTCs and freeze frame data, and then write them down.
(f) Proceed to Diagnosis Trouble Code Chart to check the details of the DTCs (See page ES-54).

2. CLEAR DTC (Using the intelligent tester)
(a) Connect the intelligent tester to the DLC3.
(b) Turn the ignition switch to ON.
(c) Turn the tester ON.
(d) Select the following menu items: DIAGNOSIS / ENHANCED OBD II / DTC INFO / CLEAR CODES.
(e) Press the YES button.

3. CLEAR DTC (Without using the intelligent tester)
(a) Perform either one of the following operations.
(1) Disconnect the negative battery cable for more than 1 minute.
(2) Remove the EFI and ETCS fuses from the Relay Block (R/B) located inside the engine compartment for more than 1 minute.