



F10534

DIAGNOSIS SYSTEM

DESCRIPTION

When troubleshooting OBD II vehicles, the only difference from the usual troubleshooting procedure is that you connect to the vehicle the OBD II scan tool complying with SAE J1978 or TOYOTA hand-held tester, and read off various data output from the vehicle's ECM.

OBD II regulations require that the vehicle's on-board computer lights up the Malfunction Indicator Lamp (MIL) on the instrument panel when the computer detects a malfunction in the computer itself or in drive system components which affect vehicle emissions. In addition to the MIL lighting up when a malfunction is detected, the applicable diagnostic trouble codes prescribed by SAE J2012 are recorded in the ECM memory. (See page [EG-220](#))

If the malfunction does not reoccur in 3 trips, the MIL goes off but the diagnostic trouble codes remain recorded in the ECM memory.

To check the diagnostic trouble codes, connect the OBD II scan tool or TOYOTA hand-held tester to Data Link Connector 3 (DLC 3) on the vehicle. The OBD II scan tool or TOYOTA hand-held tester also enables you to erase the diagnostic trouble codes and check freeze frame data and various forms of engine data. (For operating instructions, see the OBD II scan tool's instruction book.)

Diagnostic trouble codes include SAE controlled codes and Manufacturer controlled codes.

SAE controlled codes must be set as prescribed by the SAE, while Manufacturer controlled codes can be set freely by the manufacturer within the prescribed limits.

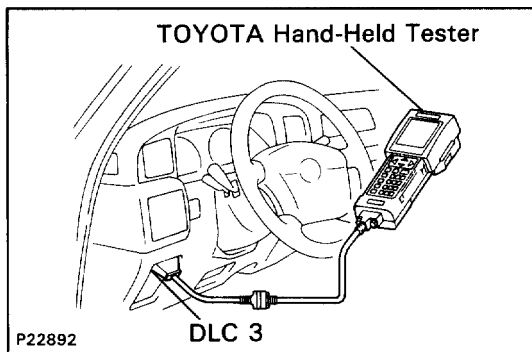
(See diagnostic trouble code chart on page [EG-220](#))

The diagnosis system operates in normal mode during normal vehicle use. It also has a check mode for technicians to simulate malfunction symptoms and troubleshoot. Most diagnostic trouble codes use 2 trip detection logic* to prevent erroneous detection and ensure thorough malfunction detection. By switching the ECM to check mode when troubleshooting, the technician can cause the MIL to light up for a malfunction that is only detected once or momentarily. (TOYOTA hand-held tester only) (See page [EG-218](#))

* 2 trip detection logic

When a logic malfunction is first detected, the malfunction is temporarily stored in the ECM memory. If the same malfunction is detected again during the second drive test, this second detection causes the MIL to light up.

The 2 trip repeats the same mode a 2nd time. (However, the IG switch must be turned OFF between the 1st trip and 2nd trip).



P22892

Freeze frame data:

Freeze frame data records the engine condition when a misfire (DTC P0300 ~ P0306) or fuel trim malfunction (DTC P0170), or other malfunction (first malfunction only), is detected.

Because freeze frame data records the engine conditions (fuel system, calculator load, engine coolant temperature, fuel trim, engine speed, vehicle speed, etc.) when the malfunction is detected, when troubleshooting it is useful for determining whether the vehicle was running or stopped, the engine warmed up or not, the air-fuel ratio lean or rich, etc. at the time of the malfunction.

Priorities for Troubleshooting

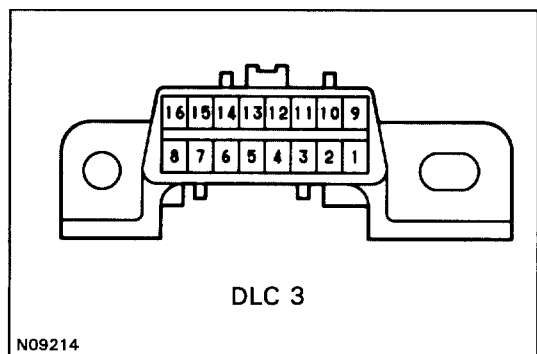
If troubleshooting priorities for multiple diagnostic codes are given in the applicable diagnostic chart, these should be followed.

If no instructions are given troubleshoot diagnostic trouble codes according to the following priorities.

- (1) Diagnostic trouble codes other than fuel trim malfunction (DTC P0170), EGR (DTC P0401, P0402), and misfire (DTC P0300 ~ P0306).
- (2) Fuel trim malfunction (DTC P0170), and EGR (DTC P0401, P0402).
- (3) Misfire (DTC P0300 ~ P0306).

DATA LINK CONNECTOR 3 INSPECTION

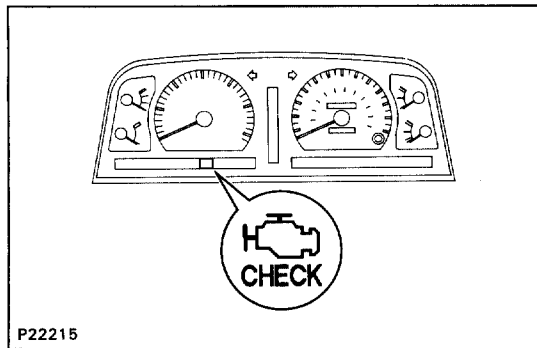
The vehicle's ECM uses V.P.W. (Variable Pulse Width) for communication to comply with SAE J1850. The terminal arrangement of DLC 3 complies with SAE J1962 and matches the V.P.W. format.



Terminal No.	Connection	Voltage or Resistance	Condition
2	Bus $\oplus$ Line	Pulse generation	During transmission
4	Chassis Ground	$\leftrightarrow$ Body Ground 1 Ω or less	Always
5	Signal Ground	$\leftrightarrow$ Body Ground 1 Ω or less	Always
16	Battery Positive	$\leftrightarrow$ Body Ground 9 ~ 14 V	Always

HINT: If your display shows "UNABLE TO CONNECT TO VEHICLE" when you have connected the cable of the OBD II scan tool or TOYOTA hand-held tester to DLC 3, turned the ignition switch ON and operated the scan tool, there is a problem on the vehicle side or tool side.

- 1) If communication is normal when the tool is connected to another vehicle, inspect DLC 3 on the original vehicle.
- 2) If communication is still not possible when the tool is connected to another vehicle, the problem is probably in the tool itself, so consult the Service Department listed in the tool's instruction manual.



Diagnosis Inspection (Normal Mode)

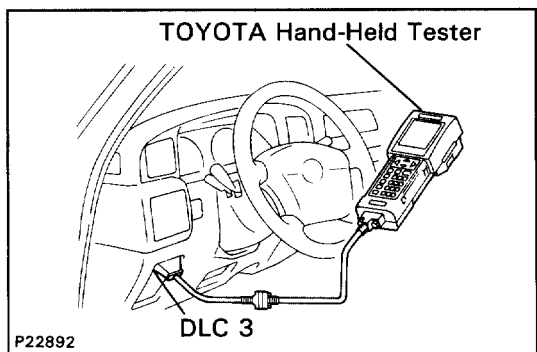
MALFUNCTION INDICATOR LAMP CHECK

1. The Malfunction Indicator Lamp comes on when the ignition switch is turned ON and the engine is not running.
HINT: If the Malfunction Indicator Lamp does not light up, troubleshoot the combination meter (See page [BE-33](#)).
2. When the engine is started, the Malfunction Indicator Lamp should go off. If the lamp remains on, the diagnosis system has detected a malfunction or abnormality in the system.

DIAGNOSTIC TROUBLE CODE CHECK

NOTICE (TOYOTA hand-held tester only): When the diagnosis system is switched from normal mode to check mode, it erases all diagnostic trouble codes and freeze frame data recorded in normal mode. So before switching modes, always check the diagnostic trouble codes and freeze frame data, and note them down.

1. Prepare the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester.
2. Connect the OBD II scan tool or TOYOTA hand-held tester to DLC 3 in the fuse box at the lower left of the instrument panel.
3. Turn the ignition switch ON and turn the OBD II scan tool or TOYOTA hand-held tester switch ON.
4. Use the OBD II scan tool or TOYOTA hand-held tester to check the diagnostic trouble codes and freeze frame data, note them down. (For operating instructions, see the OBD II scan tool's instruction book.)
5. See page EG-220 to confirm the details of the diagnostic trouble codes.



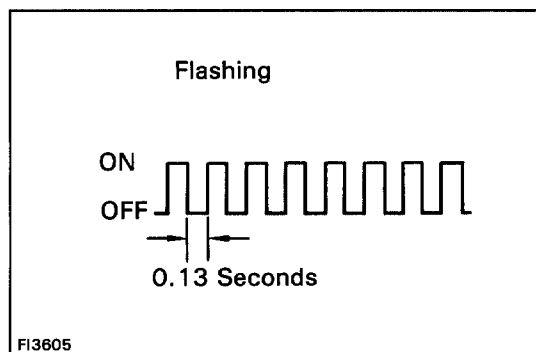
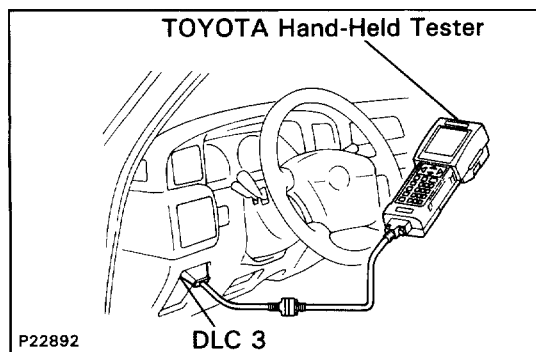
NOTICE: When simulating symptoms with an OBD II scan tool (excluding TOYOTA hand-held tester) to check the diagnostic trouble codes, use normal mode. For codes on the diagnostic trouble code chart subject to "2 trip detection logic", turn the ignition switch OFF after the symptom is simulated the first time. Then repeat the simulation process again. When the problem has been simulated twice, the MIL lights up and the diagnostic trouble codes are recorded in the ECM.

Diagnosis Inspection (Check Mode)

TOYOTA HAND-HELD TESTER only

Compared to the normal mode, the check mode has an increased sensitivity to detect malfunctions.

Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the check mode.



DIAGNOSTIC TROUBLE CODE CHECK

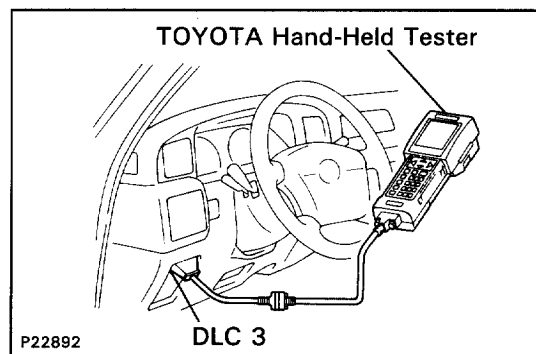
1. Initial conditions.
 - (a) Battery positive voltage 11 V or more.
 - (b) Throttle valve fully closed.
 - (c) Transmission in park or neutral position.
 - (d) Air conditioning switched OFF.
2. Turn ignition switch OFF.
3. Prepare the TOYOTA hand-held tester.
4. Connect the TOYOTA hand-held tester to DLC 3 in the fuse box at the lower left of the instrument panel.
5. Turn the ignition switch ON and switch the TOYOTA handheld tester ON.
6. Switch the TOYOTA hand-held tester normal mode to check mode. (Check that the MIL flashes).
7. Start the engine. (The MIL goes out after the engine start.)
8. Simulate the conditions of the malfunction described by the customer.

NOTICE: Leave the ignition switch ON until you have checked the diagnostic trouble codes, etc.

9. After simulating the malfunction conditions, use the TOYOTA hand-held tester diagnosis selector to check the diagnostic trouble codes and freeze frame data, etc.

HINT: Take care not to turn the ignition switch OFF. Turning the ignition switch OFF switches the diagnosis system from check mode to normal mode, so all diagnostic codes, etc. are erased.

10. After checking the diagnostic trouble code, inspect the applicable circuit.



DIAGNOSTIC TROUBLE CODE CLEARANCE

The following actions will erase the diagnostic trouble codes and freeze frame data.

1. Operating the OBD II scan tool (complying with SAE J1978) or TOYOTA hand-held tester to erase the codes. (See the OBD II scan tool's instruction book for operating instructions.)
2. Disconnecting the battery terminals or EFI fuse.

NOTICE: If the TOYOTA hand-held tester switches the ECM from normal mode to check mode or vice-versa, or if the ignition switch is turned from ON to ACC or OFF during check mode, the diagnostic trouble codes and freeze frame data will be erased.