



DIAGNOSIS SYSTEM

DESCRIPTION

The ECM contains a built-in self-diagnosis system by which troubles with the engine signal network are detected and a Malfunction indicator lamp on the instrument panel lights up. By analyzing various signals as shown in the later table (See page [EG1-300](#)) the Engine Control Module (ECM) detects system malfunctions relating to the sensors or actuators.

In the normal mode, the self-diagnosis system monitors 14 items, indicated by code No. as shown in [EG1-300](#). A malfunction indicator lamp informs the driver that a malfunction has been detected. The light goes off automatically when the malfunction has been repaired. But the diagnostic trouble code(s) remains stored in the ECM memory (except for code Nos. 16). The ECM stores the code(s) until it is cleared by removing the EFI fuse with the ignition switch off.

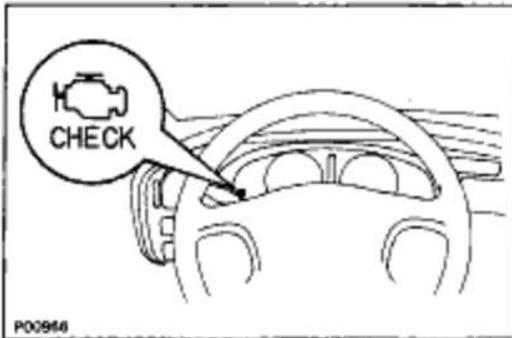
The diagnostic trouble code can be read by the number of blinks of the malfunction indicator lamp when TE1 and E1 terminals on the data link connector 1 or 2 are connected. When 2 or more codes are indicated, the lowest number (code) will appear first.

In the test mode, 9 items, indicated by code No. as shown in [EG1-300](#) are monitored. If a malfunction is detected in any one of the systems indicated by code Nos. 13, 22, 24, 25, 26, 27, 31, 41 and 71 the ECM lights the malfunction indicator lamp to warn the technician that malfunction has been detected. In this case, TE2 and E1 terminals on the data link connector 1 or 2 should be connected as shown later. (See page [EG1-298](#)).

In the test mode, even if the malfunction is corrected, the malfunction code is stored in the ECM memory even when the ignition switch is off (except code Nos. 43 and 51). This also applies in the normal mode. The diagnostic mode (normal or test) and the output of the malfunction indicator lamp can be selected by connecting the TE1, TE2 and E1 terminals on the data link connector 1 or 2, as shown later.

A test mode function has been added to the functions of the self-diagnostic system of the normal mode for the purpose of detecting malfunctions such as poor contact, which are difficult to detect in the normal mode. This function fills up the self-diagnosis system. The test mode can be implemented by the technician following the appropriate procedures of check terminal connection and operation described later.

(See page [EG1-298](#))



Diagnosis Inspection (Normal Mode) MALFUNCTION INDICATOR LAMP CHECK

1. The Malfunction indicator lamp will come on when the ignition switch is turned ON and the engine is not running.

HINT: If the malfunction indicator lamp does not light up, proceed to troubleshooting of the combination meter (See page [BE-64](#)).

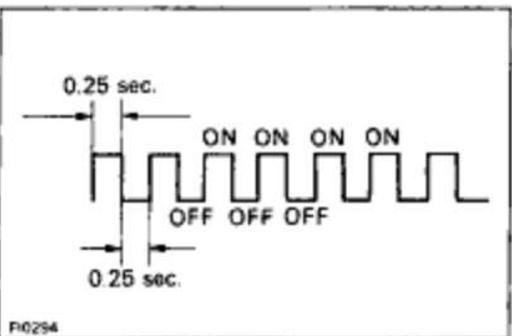
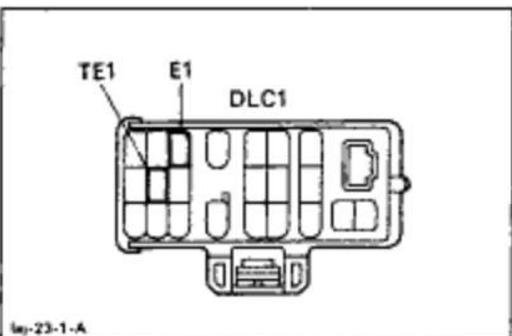
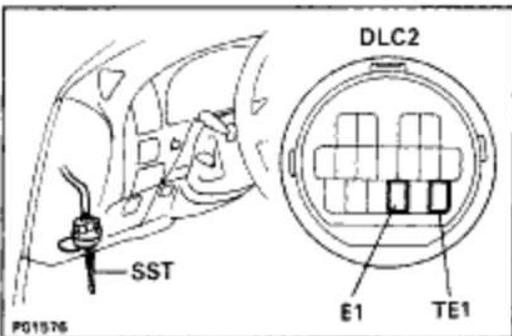
2. When the engine is started, the malfunction indicator lamp should go off.

If the light remains on, the diagnosis system has detected a malfunction or abnormality in the system.

DIAGNOSTIC TROUBLE CODE CHECK

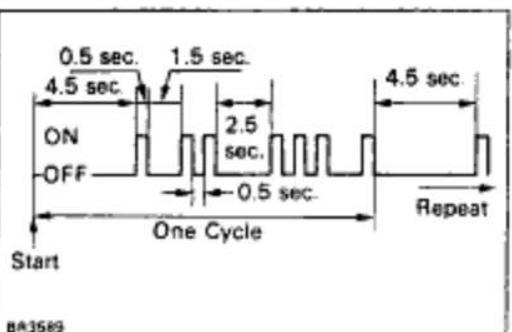
1. Turn ignition switch on.
2. Using SST, connect terminals between TE1 and E1 of data link connector 1 or 2.

SST 09843-18020



3. Read the diagnostic trouble code from malfunction indicator lamp.

HINT: If a diagnostic trouble code is not output, check the TE1 terminal circuit (See page [EG1-430](#)).



As an example, the blinking patterns for codes; normal, 12 and 31 are as shown on the illustration.

4. Check the details of the malfunction using the diagnostic trouble code table on page [EG1-300](#).

5. After completing the check, disconnect terminals TE1 and E1, and turn off the display.

HINT: In the event of 2 or more malfunction codes, indication will begin from the smaller numbered code and continue in order to the larger.

EG1-298

5S-FE ENGINE - DIAGNOSIS SYSTEM

Diagnosis Inspection (Test Mode)

Compared to the normal mode, the test mode has high sensing ability to detect malfunctions.

It can also detect malfunctions in the starter signal circuit, the IDL contact signal of the throttle position sensor, air conditioning signal and Park/Neutral Position switch signal. Furthermore, the same diagnostic items which are detected in the normal mode can also be detected in the test mode.

DIAGNOSTIC TROUBLE CODE CHECK

1. Initial conditions.

- Battery voltage 11 V or more.
- Throttle valve fully closed.
- Transmission in neutral position.
- Air conditioning switched off.

2. Turn ignition switch off.

3. Using SST, connect terminals TE2 and E1 of data link connector 1 or 2.

SST 09843-18020

4. Turn ignition switch on.

HINT:

- To confirm that the test mode is operating, check that the malfunction indicator lamp flashes when the ignition switch is turned to ON.
- If the malfunction indicator lamp does not flash, proceed to troubleshooting of the TE2 terminal circuit on page [EG1-430](#).

5. Start the engine.

6. Simulate the conditions of the malfunction described by the customer.

7. After the road test, using SST, connect terminals TE1 and E1 of data link connector 1 or 2.

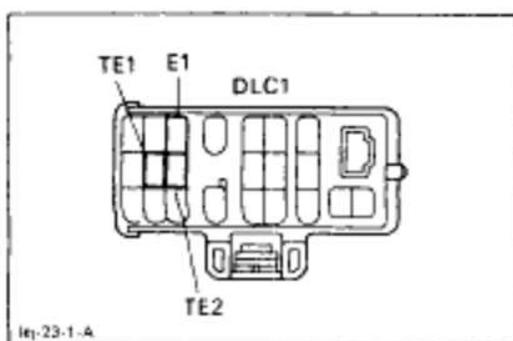
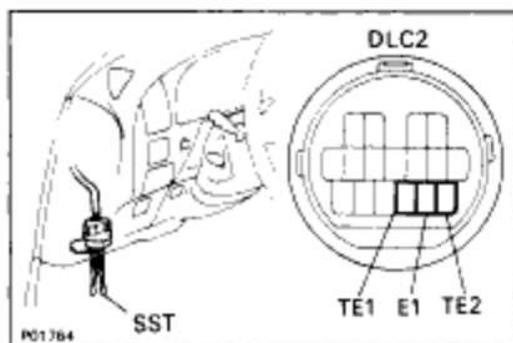
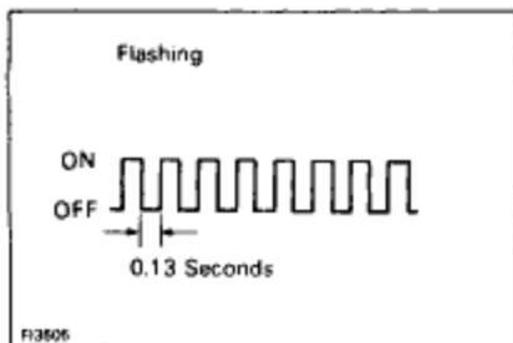
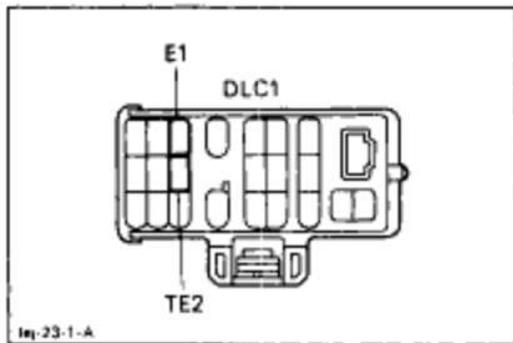
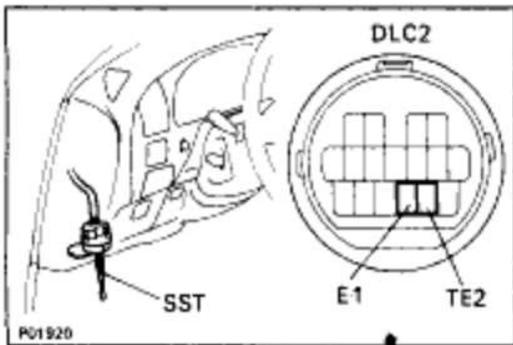
SST 09843-18020

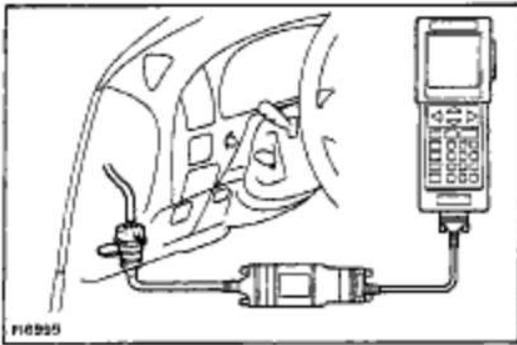
8. Read the diagnostic trouble code on malfunction indicator lamp on the combination meter (See page [EG1-297](#)).

9. After completing the check, disconnect terminals TE1, TE2 and E1, and turn off the display.

HINT:

- The test mode will not start if terminals TE2 and E1 are connected after the ignition switch is turned on.
- When vehicle speed is 3 mph (5 km/h) or below, diagnostic trouble code "42" (Vehicle speed signal) is output, but this is not abnormal.
- When the engine is not cranked, diagnostic trouble code "43" (Starter signal) output, but this is not abnormal.
- When the automatic transmission shift lever is in the "D", "2", "L" or "R" shift position, or when the air conditioning is on or when the accelerator pedal is depressed, code "51" (Switch condition signal) is output, but this is not abnormal.

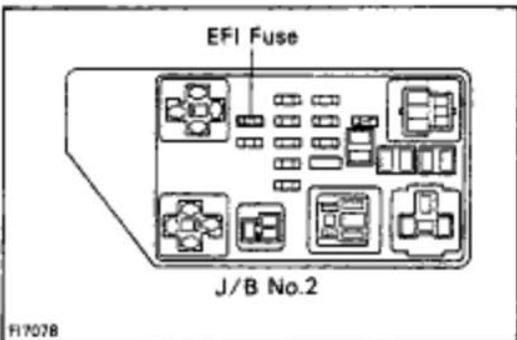




DIAGNOSTIC TROUBLE CODE CHECK USING TOYOTA HAND-HELD TESTER

1. Hook up the TOYOTA hand-held tester to the DLC2.
2. Read the diagnostic trouble codes by following the prompts on the tester screen.

Please refer to the TOYOTA hand-held tester operator's manual for further details.

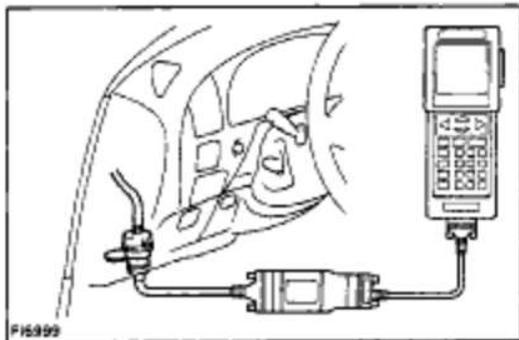


DIAGNOSTIC TROUBLE CODE CLEARANCE

1. After repair of the trouble areas, the diagnostic trouble code retained in the ECM memory must be cleared out by removing the E F I fuse (15A) from J/13 No. 2 for 10 seconds or more, with the ignition switch OFF.

HINT:

- Cancellation can also be done by removing the battery negative (-) terminal, but in this case, other memory systems (clock, etc.) will also be cancelled out.
 - If it is necessary to work on engine components requiring removal of the battery terminal, a check must first be made to see if a diagnostic trouble code has been recorded.
2. After cancellation, road test the vehicle to check that a normal code is now read on the malfunction indicator lamp.
If the same diagnostic trouble code appears, it indicates that the trouble area has not been repaired thoroughly.

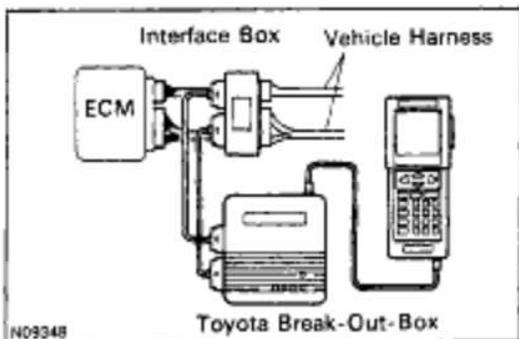


ECM DATA MONITOR USING TOYOTA HAND-HELD TESTER

1. Hook up the TOYOTA hand-held tester to the D LC2.
2. Monitor the ECM data by following the prompts on the tester screen.

HINT: TOYOTA hand-held tester has a "Snapshot" function which records the monitored data.

Please refer to the TOYOTA hand-held tester operator's manual for further details.



ECM TERMINAL VALUES MEASUREMENT USING TOYOTA BREAK-OUT-BOX AND TOYOTA HAND-HELD TESTER

1. Hook up the TOYOTA break-out-box and TOYOTA hand-held tester to the vehicle.
2. Read the ECM input/output values by following the prompts on the tester screen.

HINT: TOYOTA hand-held tester has "Snapshot" function. This records the measured values and is effective in the diagnosis of intermittent problems.

Please refer to the TOYOTA hand-held tester/Toyota break-out-box operator's manual for further details.