
12 On Board Diagnosis (OBD) system - description and trouble code access

General information

1 The ECM contains a built-in self-diagnosis system which detects and identifies malfunctions occurring in the network. When the ECM detects a problem, three things happen: the CHECK ENGINE light comes on, the trouble is identified and a diagnostic code is recorded and stored. The ECM stores the failure code assigned to the specific problem area until the diagnosis system is canceled by removing the EFI fuse with the ignition switch off. **Note:** *There are several codes that will not set the CHECK ENGINE light when the code is stored in the ECM. It is a good idea to check for any trouble codes when the engine exhibits driveability problems.*

2 The CHECK ENGINE warning light, which is located on the instrument panel, comes on when the ignition switch is turned to ON and the engine is not running. When the engine is started, the warning light should go

Obtaining diagnostic code output

Refer to illustration 12.5

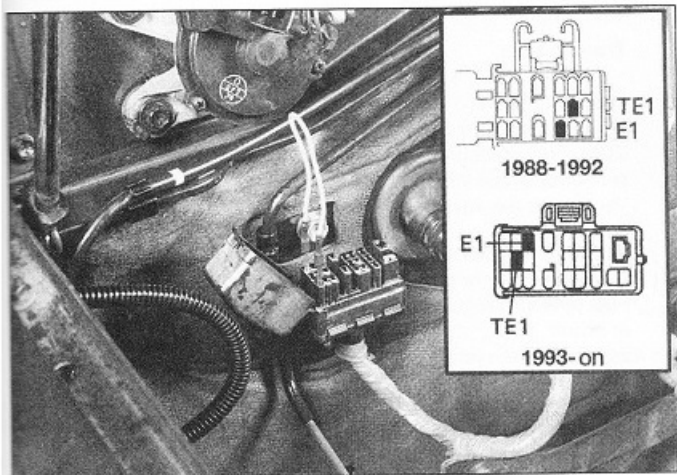
3 To obtain an output of diagnostic codes, verify first that the battery voltage is above 11 volts, the throttle is fully closed, the transmission is in Neutral, the accessory switches are off and the engine is at normal operating temperature.

4 Turn the ignition switch to ON (engine not running). Do not start the engine.

5 Use a jumper wire to bridge terminals TE1 and E1 of the test connector (**see illustration**). **Note:** *The self-diagnosis system can be accessed by using either test terminal number 1 (engine compartment) or test terminal number 2 (under driver's dash).*

6 Read the diagnosis code as indicated by the number of flashes of the "CHECK ENGINE" light on the dash. Normal system operation is indicated by Code No. 1 (no malfunctions) for all models. The "CHECK ENGINE" light displays a Code No. 1 by blinking once every 0.25 seconds. Each code will be displayed by first blinking the first digit of the code, then pause, and blink the second digit of the code. For example; Code 24 (IAT sensor) will flash two times, pause, and then flash four times. Each flash will be the exact same length but the distinction will be the pause that separates the digits of the code. Only Code 1 (normal operation) will flash continuously without a pause.

7 If there are any malfunctions in the system, their corresponding trouble codes are stored in computer memory and the light will blink the requisite number of times for the indicated trouble codes. If there's more than one trouble code in the memory, they'll be displayed in numerical order (from lowest to highest) with a pause between each one. After the code with the largest number of flashes has been displayed, there will be another pause and then the sequence will begin all over again. **Note:** *The diagnostic trouble Codes 25, 26, 27 and 71 use a special*



12.5 To access the self diagnosis system, locate the test connector in the engine compartment and using a jumper wire or paper clip, bridge terminals TE1 and E1

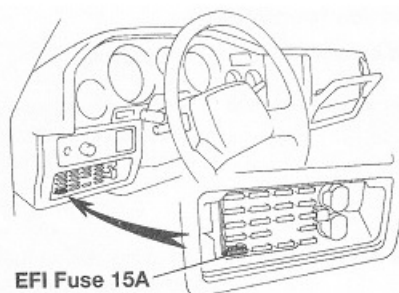
diagnostic capability called "two-trip detection logic". With this system, when a malfunction is first detected, it is temporarily stored into the ECM on the first trip. The engine must be turned off and the vehicle taken on another trip to allow the malfunction to be stored permanently in the ECM. This will distinguish a true problem from a false alarm on vehicles with these particular codes entered into the ECM. Normally the self-diagnosis system will detect the malfunctions, but in the event the home mechanic wants to double-check the diagnosis by canceling the codes and rechecking, then it will be necessary to go on two test drives to confirm any malfunctions with these particular codes.

8 To ensure correct interpretation of the flashing "CHECK ENGINE" light, watch carefully for the interval between the end of one code and the beginning of the next; otherwise, you will become confused by the apparent number of flashes and misinterpret the display (the length of this interval varies with the model year).

Canceling a diagnostic code

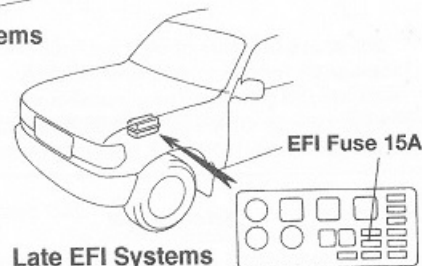
Refer to illustration 12.9

9 After the malfunctioning component has been repaired/renewed, the trouble codes stored in computer memory must be canceled. To accomplish this, simply remove the 15A EFI fuse (see illustration) for at least 10



Early EFI Systems

12.9 Location of the 15A EFI fuse that cancels the diagnostic codes



Late EFI Systems

seconds with the ignition switch off.

10 A stored code can also be canceled by removing the cable from the negative battery terminal, but other memory systems (such as the clock and radio presets) will also be canceled. **Caution:** If the stereo in your vehicle is equipped with an anti-theft system, make sure you have the correct activation code before disconnecting the battery.

11 If the diagnosis code is not canceled, it will be stored by the ECM and appear with any new codes in the event of future trouble.

12 Should it become necessary to work on engine components requiring removal of the battery terminal, always check to see if a diagnostic code has been recorded before disconnecting the battery.

Diagnostic Trouble Codes

Code	Circuit or system	Diagnosis	Trouble area
Code 1	Normal		The CHECK ENGINE light flashes on and off rapidly when no codes are identified
Code 11	ECM voltage	Power supply to ECM is momentarily interrupted	Battery connections Main relay ECM
Code 12	RPM signal	No rpm signal to the ECM within several seconds after the engine is cranked	Distributor or circuit Crankshaft position sensor or circuit ECM or circuit
Code 13	RPM signal	No rpm signal to the ECM with engine speed above 1,500 rpm	Distributor or circuit Crankshaft position sensor or circuit ECM or circuit
Code 14	Ignition signal	No ignition signal to the ECM	Igniter or circuit Ignition switch or circuit ECM Ignition coil
Code 21	Main oxygen sensor	Problem in the main oxygen sensor circuit	Main oxygen sensor or circuit ECM
Code 22	Coolant temperature	Open or short in the coolant temperature sensor circuit	Coolant temperature sensor or circuit ECM
Code 24	Inlet air temperature	Open or short in the inlet air sensor temperature sensor circuit	Inlet air temperature sensor or circuit ECM
Code 25	Oxygen sensor or circuit	An excessively lean air/fuel ratio has been indicated by the oxygen sensor circuit	Injector or circuit Oxygen sensor or circuit ECM. Fuel pressure regulator. Coolant temperature sensor or circuit inlet air temperature sensor or circuit Vacuum or exhaust leak. Contaminated fuel Ignition system
Code 26	Oxygen sensor or circuit	An overly rich air/fuel ratio has been indicated by the oxygen sensor circuit	Injector or injector circuit. Coolant temperature sensor or circuit Oxygen sensor or circuit. Inlet air temperature sensor or circuit Fuel pressure regulator. EVAP system. EGR system MAP sensor or circuit ECM. Air inlet system
Code 28	Post catalytic converter	Open or shorted circuit in the oxygen sensor	Sub-oxygen sensor or circuit Post catalytic converter. ECM Oxygen sensor circuit
Code 31	Airflow sensor	Open or short in Airflow sensor circuit	Airflow sensor or circuit ECM
Code 35	HAC sensor signal	Open or short in the altitude compensation circuit	ECM
Code 41	Throttle position sensor	Open or short in the throttle position sensor circuit	Throttle position sensor or circuit ECM
Code 42	Vehicle speed sensor	No speed signal for 8 seconds when the engine speed is between 3,000 and 5,000 rpm and the transmission is in gear	Vehicle speed sensor or circuit ECM Speedometer Instrument panel printed circuit
Code 43	Starter signal	No starter signal to the ECM until engine speed reaches 800 rpm with the vehicle	Starter signal circuit Ignition switch ECM

Code 51	Switch condition signal	No throttle position signal, gear selector signal or air conditioning signal to the ECM	Air conditioning switch or circuit Air conditioning amplifier Neutral Start switch Throttle Position sensor ECM
Code 52	#1 knock sensor signal (late EFI systems)	Open or short circuit in knock sensor circuit	Knock sensor or circuit ECM
Code 53	Knock sensor signal	Open or short circuit in knock sensor circuit	Knock sensor or circuit ECM
Code 55	#2 knock sensor signal (late EFI systems)	Open or short circuit in knock sensor circuit	Knock sensor or circuit ECM
Code 71	EGR system	EGR temperature signal is too low	EGR system (EGR valve, hoses, etc.) EGR temperature sensor or circuit EGR vacuum switching valve ECM
Code 81	TCM Communication (late EFI systems)	Open or short in ECT #1 sensor circuit	ECT #1 sensor or circuit
Code 83	TCM Communication (late EFI systems)	Open or short in ESA #1 sensor circuit	ESA #1 sensor or circuit
Code 84	TCM Communication (late EFI systems)	Open or short in ECT #2 sensor circuit	ESA #2 sensor or circuit
Code 85	TCM Communication (late EFI systems)	Open or short in ESA #3 sensor circuit	ESA #3 sensor or circuit