



The Check Engine Light Explained

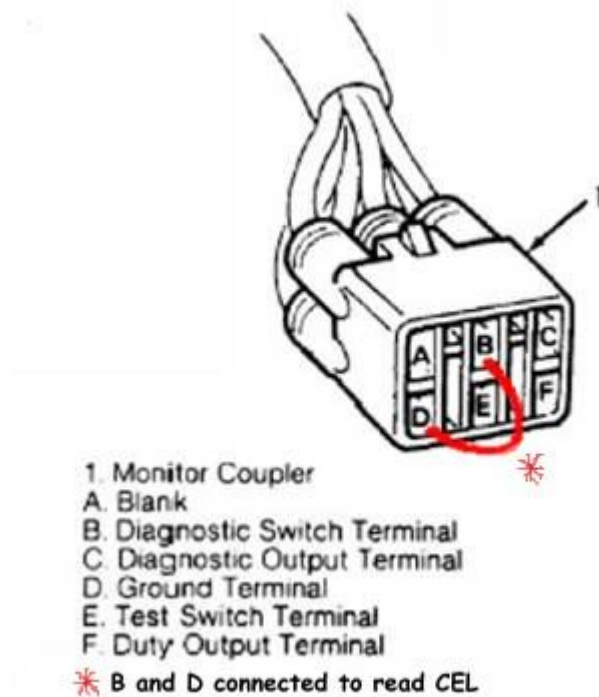
Note that the Check Engine Light (CEL) is also referred to as the Malfunction Indication lamp (MIL) in some documentation.

If the CEL) remains on during normal operation then the ECU has detected a possible fault. The fault codes can be read from the ECU using the Check Engine Light. Some models have an empty slot in the fuse box that requires a fuse to be inserted but most models have either a 4-pin or a 6-pin connector that requires a wire link to be inserted to place the ECU into test mode.

The following table lists many of the CEL fault codes, note that there are other fault codes that can only be accessed using a scan tool, those codes do not light the CEL.

Typical Connector locations:	
First gen. Vitara/Sidekick /Tracker	Underneath the bonnet either beside the battery or beside the (UK) drivers side headlamp.
Jimny	Behind glovebox
Baleno	Under bonnet, inside relay box
GV/Grand Vitara	Under bonnet beside ignition coil (if fitted)

Six pin connector:

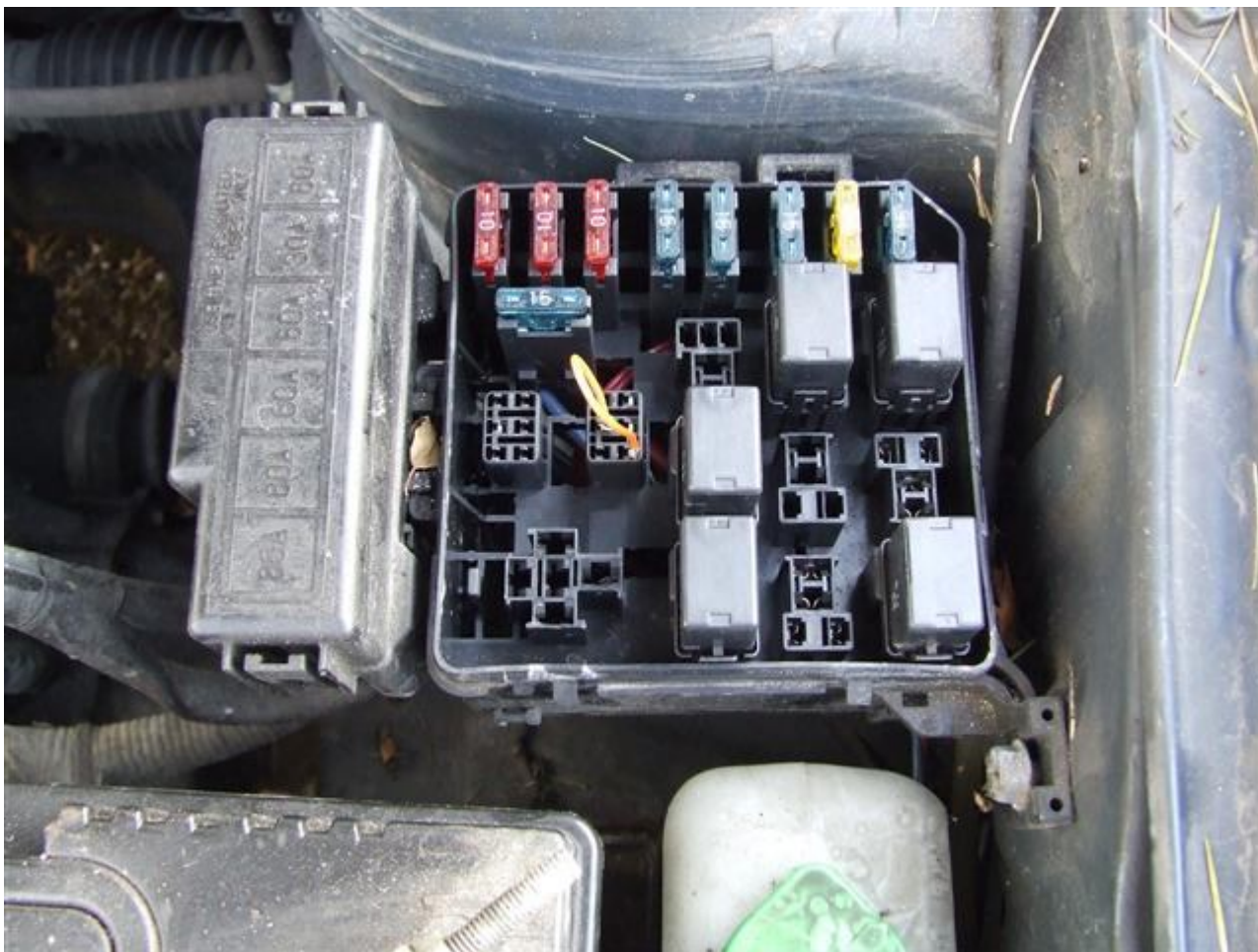


There are two input 'switches', the Diagnostic Switch Terminal (DST) and the Test Switch Terminal (TST) and two output lines the Diagnostic Output Terminal and the Duty Output terminal. The Diagnostic Output Terminal is simply a connection to the Check Engine Light (CEL). Diagnostic modes are selected by placing jumpers between the switch terminals and the ground terminal. The test modes are given in the table below. '0' represents a grounded input, '1' represents a non-grounded input.

Input Terminals		Output
DST (B)	TST (E)	
1	1	No Diagnostic Outputs*
1	0	Ignition Timing to Initial Settings
0	1	Diagnostic Codes Output on Diagnostic Output Terminal*, ISC Duty Cycle on Duty Check Terminal
0	0	Diagnostic Codes Output on Diagnostic Output terminal*, Injector Duty Cycle on Duty Check Terminal

* When CEL is ON this terminal will be 'High', when CEL is OFF this terminal will be 0V.

This is better illustrated by the image below which shows a jumper inserted in the diagnostic socket of a Suzuki Baleno:



Four pin connector:

The four pin connector is similar to the six pin connector. The Diagnostic switch terminal outputs the fault codes on the The Test Switch Terminal sets the ignition timing to base settings.

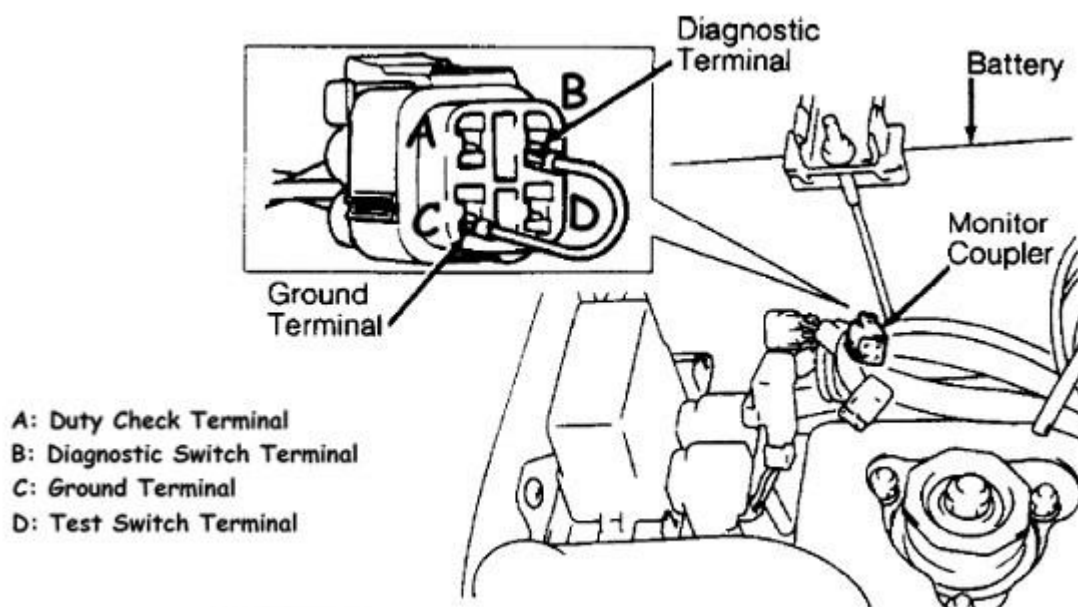


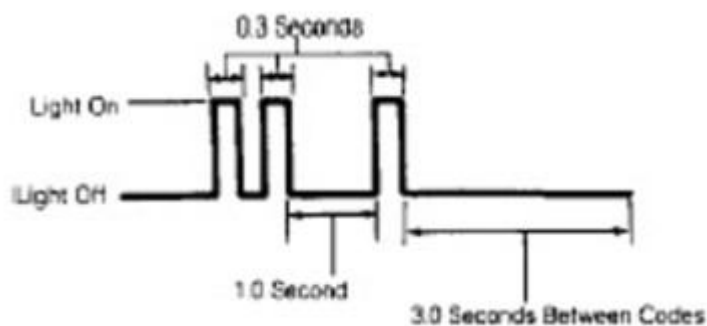
Fig. 2: Identifying Diagnostic Terminals

The test modes are shown in the table below. '0' represents a grounded input, '1' represents a non-grounded input.

Input Terminals		Output
DST (B)	TST (D)	
1	1	No Diagnostic Outputs
1	0	Ignition Timing to Initial Settings
0	1	Diagnostic Codes Output on CEL, ISC output on Duty Check Terminal
0	0	Diagnostic Codes Output on CEL, Injector Duty Cycle output on Duty Check Terminal

Fault Codes:

Fault codes are indicated by flashing the CEL as shown in the picture below. In this case the fault code '21' is being output. The light is switched ON twice in quick succession to indicate a 2. The light is then OFF for 1 sec and then flashed once to indicate a 1. There is then a 3 sec period with the light off before the next code is indicated. If there are no other codes then the sequence repeats.



The YouTube video below shows a Code 23 (ATS Signal High) being flashed on a Suzuki Baleno Check Engine Light. You will need to have ActiveX enabled to view this video.

Below is a description of the codes and some hints on fault diagnosis. In all cases there is a possibility that the ECU is damaged, however this is unlikely unless the CEL does not light, remains on permanently even with a jumper in the connector, or you have the main and fuel pump relays clicking continuously.

Diagnostic Code	Diagnostic Item	Possible Fault
12	Normal	No fault or fault in not monitored circuit
13	O2 Sensor	ECU will drive mixture rich or lean. If O2 reading doesn't change or is slow to change a fault is flagged
13	Barometric Sensor	Barometric sensor reading High or Low (Diesel)
14	Water Temperature Sensor	WTS signal High Open circuit sensor or bad ground
14	Needle Movement Sensor	Needle Movement Sensor High or Low (Diesel)
15	Water Temperature Sensor	WTS signal Low Short circuit in sensor or wiring shorted to ground
21	Throttle Position Sensor	TPS signal High TPS faulty or open circuit signal or ground connection
22	Throttle Position Sensor	TPS signal Low TPS faulty, short circuit signal or open circuit power connection
23	Air Temperature Sensor	ATS signal High ATS open circuit or bad ground
24	Vehicle Speed Sensor	VSS faulty, Broken Speedo cable
25	Air Temperature Sensor	ATS signal Low ATS short circuit, signal wire short circuit or open circuit power connection
26	O2 Sensor (Right bank)	V6 engines only If O2 reading doesn't change or is slow to change a fault is flagged
27	Compensation Resistance Signal (Diesel only?)	Open circuit or shorted
28	Glow Plug Relay Signal (Diesel only)	Open circuit or shorted
31	Manifold Pressure Sensor	MPS signal Low MPS faulty, open circuit power connection
31	Boost Sensor Signal (Turbo)	Boost sensor Signal Low Boost sensor faulty, open circuit power connection
32	Manifold Pressure Sensor	MPS signal Low MPS faulty, open circuit power connection
32	Boost Sensor Signal (Turbo)	Boost sensor Signal High Boost sensor faulty, open circuit ground connection
33	Volume Airflow Sensor	Volume Airflow Sensor too High or too Low Airflow sensor faulty or faulty wiring
33	Mass Airflow Sensor	MAF Signal High MAF faulty or bad ground connection
34	Mass Airflow Sensor	MAF Signal Low MAF faulty or bad power or signal connection

35	NE Sensor (Diesel only)	
37	ABS	ABS malfunction - does not set MIL!
41	Ignition Fail Safe Signal	Bad connection to noise suppressor, bad noise suppressor
41	Timer Control Valve Signal (Diesel only)	
42	Crank Angle Sensor	CAS signal not present during cranking, only shows while cranking! Faulty CAS or bad connection
43	Knock Sensor circuit malfunction	Faulty Knock Sensor or bad connection
43	Starter Signal (Diesel only?)	Starter signal on during engine running Starter signal off during cranking
44	Idle switch	Idle Switch Open Faulty Idle switch, badly adjusted TPS, open circuit signal or ground connection
45	Idle Switch	Idle Switch Closed Faulty Idle Switch, badly adjusted TPS or signal shorted to ground
46	IAC Valve	
47	CMP Sensor	camshaft Position Sensor
51	Exhaust Gas Recirc Valve	EGR modulator faulty, exhaust passageway clogged, bad VSV, vacuum leak, catalytic converter fault
52	Fuelling Fault	Bad injector, dirty injector, excessive fuel pressure
52	Spill Valve Signal (Diesel)	Stuck spill valve, open or shorted wiring
53	Ground Circuit Error	California ECU in non-Calif vehicle. Non-Calif ECU in Calif. vehicle
54	5th Gear Switch	
61	Shift Solenoid Valve A (#1) (A/T)	
62	Shift Solenoid Valve A (#1) (A/T)	
63	Shift Solenoid Valve B (#2) (A/T)	
64	Shift Solenoid Valve B (#2) (A/T)	
65	TCC Solenoid Valve Electrical (A/T)	
66	TCC Solenoid Valve Electrical (A/T)	
71	Test Switch	Test Switch Terminal Grounded (Samurai only?) Wire link still in diagnostic plug or signal shorted to ground
71	Memory Error (Late models)	ECU internal write error or checksum error

72	Transmission Range Switch circuit malfunction (A/T)	
73	Fuel Temperature Sensor (Diesel)	Fuel temp. sensor, open or shorted wiring
75	Output Speed sensor Circuit Malfunction (A/T)	
76	Input/turbine Speed sensor Malfunction (A/T)	
ON - Not Flashing	ECU	ECU Failed
Immobiliser		
81	Immobiliser/ECU	Immobiliser codes not matched (ECU side)
82	ECU	ECU Internal fault
83	Immobiliser/ECU	Serial Data Link
84	ECU	No Immobiliser codes registered in ECU

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Key Words

ECU ECM engine management control suzuki geo vitara sidekick tracker DSM MH6211 MH6111 air
temperature sensor repair caps ignition map 3d performance tuning diy efi water temperature manifold
pressure software pcb map reprogram datalog o2 sensor lambda egr tbi mpi repair rhinopower