

1. How to read ECU fault codes. 1KZ-TE & D4D

The ability to self diagnose and store faults as an extractable code is a great feature of modern engine management systems.

It assists us to trouble shoot what is an increasingly complex system and is especially handy for finding the cause of those intermittent problems that would otherwise drive us insane trying to find.

Despite the 1kz-te being an old school technology engine its engine management is relatively sophisticated (It can be thought of as single point electronic fuel injection)

The codes stored in the ECU can be easily extracted at home and are displayed via the engine check light on the instrument cluster.

The codes can be read by shorting out pin 4 and 13 on the (16 pin) DLC3 connector located under the fuse box on the driver's side of the dash.(13 (Tc) and 4 (CG))

A short piece of wire can be used to short the pins (tin the ends with solder and keep it in your tool kit)

Steps:

- 1) Make sure the ignition is OFF, throttle closed, Aircon OFF and if it's automatic have it in P.
- 2) Turn the ignition ON but don't crank or start the engine.
- 3) Put the jumper wire across the connector pins. (pin 4 and pin 13)
- 4) Read codes displayed via the engine check light.
- 5) Disconnect the wire when finished extracting codes and turn the ignition off.

Reading Codes:

Codes are read by the flashing of the "Check Engine" light on the instrument cluster.

If there are no codes held in the ECU then the light will have a continuous flash, on for $\frac{1}{4}$ second, off for $\frac{1}{4}$ second.

All the codes are two digit numbers. The first flash is 4.5 seconds from when you short the pins. It stays on for $\frac{1}{2}$ a second then off for $\frac{1}{2}$ a second. Then the first digit of the code will flash, followed by a 1.5 second pause then the second digit will flash.

Example:

4x flashes.... 1.5 second pause...2x flashes. Would be code 42.

If there is only one code there will be a 4.5 second pause before the code will be repeated.

If more codes are present the codes the pause between codes will be 2.5 seconds.

To clear the codes from the memory of the ECU remove the fuse labeled "ECD" from the fuse box in the engine bay. Leave it out for 60 seconds.

(Don't clear the memory by removing the battery or you will have to reset the clock, radio and windows)

Codes and what sensor/circuit it relates too:

1KZ-TE diagnostic codes:

- 12 = No RPM signal during cranking.
- 13 = No RPM signal after cranking and engine reaches 680rpm+
- 14 = Timing control signal (crankshaft angle 7 deg or more out from target)
- 15 = Throttle control motor (no signal)
- 16 = Auto trans control signal
- 18 = Spill control valve (no signal)
- 19 = Accel pedal position sensor (no signal)
- 22 = Coolant temp sensor
- 24 = Intake air temp sensor.
- 32 = Correction resistor signal.
- 33 = Intake constrictor control signal.
- 35 = Boost pressure sensor.
- 39 = Fuel temp sensor.
- 41 = Throttle position sensor.
- 42 = Vehicle speed sensor.
- 43 = Starter signal to ECU.
- 51 = Switch control system
- 96 = EGR valve lift sensor.
- 99 = Engine immobilizer.

D4D diagnostic codes:

Extracting ECU trouble codes from D4D powered Prado's via the engine check light uses exactly the same method as shown for the 1KZ-TE above.

Those of you with a Scan Gauge or similar OBD reader will get codes displayed on the screen of the unit. These codes are in a slightly different format (letter "P" followed by a four digit number).

D4D engine management fault codes:

The first code is that shown via an OBD reader, the second code shown (in brackets) is shown via the engine check light.

P0045 (34) - Boost control solenoid circuit malfunction

P0087 (49) - Fuel rail pressure sensor or rail pressure too low.

P0088 (49) - Fuel rail pressure too high.

P0093 (78) - Fuel system leak (Large leak)

P0095 (23) - Intake air temperature sensor circuit (open/short/failure)

P0097 (23) - Intake air temp circuit low input.

P0098 (23) - Intake temperature sensor circuit high input.

P0100 (31) - Mass air flow meter or circuit (open/short/failure)

P0102 (31) - Air flow meter circuit low input.

P0103 (31) - Air flow meter circuit high input.

P0105 (31) - Manifold absolute pressure sensor circuit (short/open/failure)

P0107 (31) - Manifold absolute pressure sensor circuit low input.

P0108 (31) - Manifold absolute pressure sensor circuit high input.

P0110 (24) - Intake air temperature circuit (open/short/failure)

P0112 (24) - Intake air temperature circuit low input

P0113 (24) - Intake air temperature circuit high input.

P0115 (22) - Coolant temperature circuit (open/short/failure).

P0117 (22) - Coolant temperature circuit low input.

P0118 (22) - Coolant temperature circuit high input.

P0168 (39) - Fuel temperature too high.

P0180 (39) - Fuel temp sensor "A" (open/short/failure)

P0182 (39) - Fuel temp sensor "A" low input.

P0183 (39) - Fuel temp sensor "A" high input.

P0190 (49) - Fuel rail pressure sensor circuit (open/short/failure)

P0191 (49) - Fuel rail pressure sensor circuit performance/range

P0192 (49) - Fuel rail pressure sensor circuit input low.

P0193 (49) - Fuel rail pressure sensor circuit high input.

P0200 (97) - Injector circuit (open/short/failure)

P0234 (34) - Turbo over boost condition.

P0299 (34) - Turbo under boost condition.

P0335 (12,13) - Crankshaft position sensor circuit "A" (open/short/failure).

P0339 (13) - Crankshaft position sensor circuit "A" intermittent fault.

P0340 (12) - Crankshaft position sensor circuit "A" no signal after cranking.

P0400 (71) - EGR position sensor (valve out of position)

P0405 (96) - EGR position sensor low input.

P0406 (96) - EGR position sensor high input.

P0488 (15) - EGR throttle position sensor/motor/circuit fault.

P0500 (42) - Vehicle speed sensor "A" (open/short/failure)

P0504 (51) - Brake switch.

P0607 (89) - Control module fault (ECM internal fault)

P0627 (78) - Fuel pump control circuit (open/short/failure)

P1229 (78) - Fuel pump fail.

P1251 (34) - Turbocharger stepper motor circuit (intermittent fault)

P1271 - Fuel regulator circuit malfunction. (open/short/failure)

P1272 - Fuel pressure regulator malfunction (simultaneously with P1271)

P1601 (89) - Injector correction circuit (E-prom)

P1611 (17) - ECM run pulse.

P2008 (58) - Intake manifold runner control circuit (open/short/failure)

P2120 (19) - Throttle/pedal position sensor "D" (open/short/fail)

P2121 (19) - Throttle/pedal position sensor "D" (range/performance)

P2122 (19) - Throttle/pedal position sensor "D" low input.

P2123 (19) - Throttle/pedal position sensor "D" input high.

P2125 (19) - Throttle/pedal position sensor "E" (open/short/fail)

P2127 (19) - Throttle/pedal position sensor "E" low input.

P2128 (19) - Throttle/pedal position sensor "E" high input.

P2138 (19) - Throttle/pedal position sensor "D" and "E" voltage correlation.

P2226 (105) - ECM barometric pressure circuit.

P2228 (105) - ECM barometric pressure circuit low input.

P2229 (105) - ECM barometric pressure circuit high input.

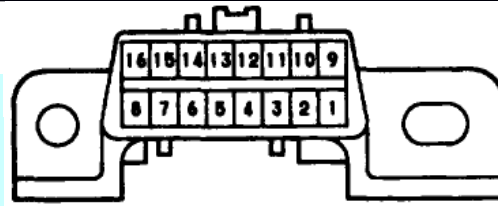
U0001 (102) - ECM open or short.

B2799 (99) - Engine immobilizer malfunction.

1998 Toyota Camry XLE Sedan V6-2995cc 3.0L DOHC MFI

Testing and Inspection

- ↳ How to Display and Read Diagnostic Trouble Codes
- ↳ **Without Scan Tool**



DLC3

TOYOTA does not provide a procedure for reading diagnostic trouble codes without a scan tool.

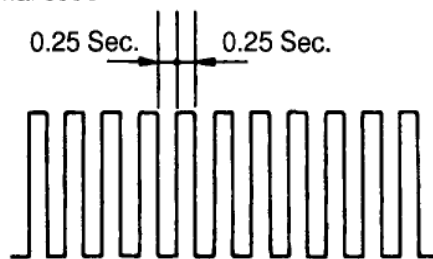
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Testing and Inspection

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Checking For DTC (Using Diagnosis Check Wire)

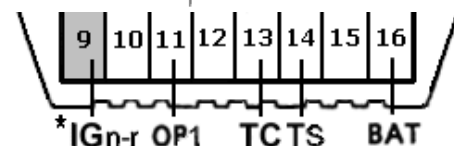
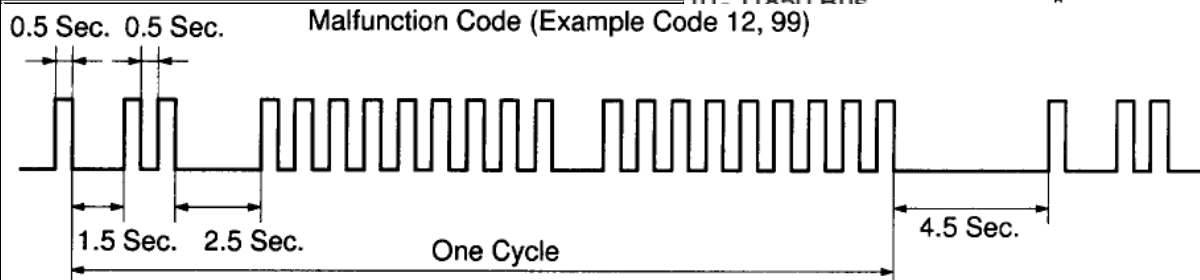
- (1) Turn ignition switch ON.
- (2) Using SST, connect between terminals **13 (Tc)** and **4 (CG)** of Data Link Connector No.3.
- (3) Read the diagnostic trouble code from malfunction indicator lamp.

2-J1850 Bus+
5-Signal Ground
6-

Note. Only On "Old" Toyotas

7-ISO 9141-2 K Line (SIL)
10-J1850 Bus-

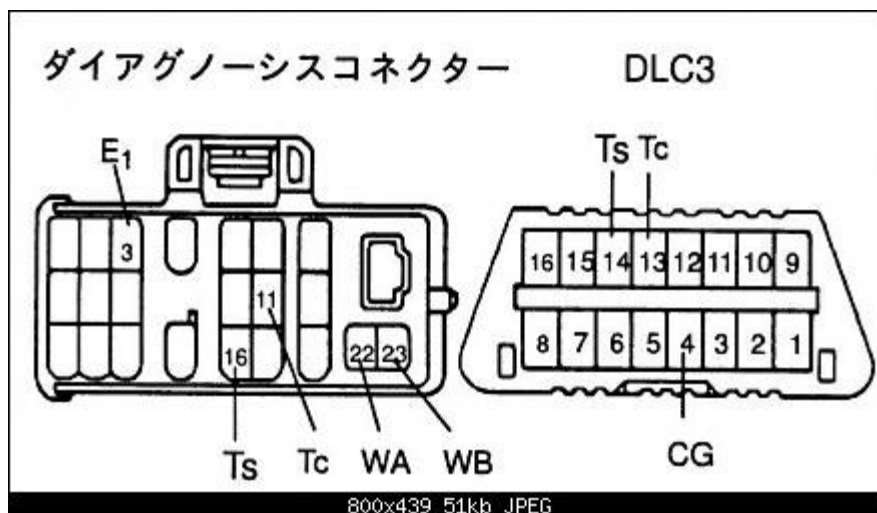
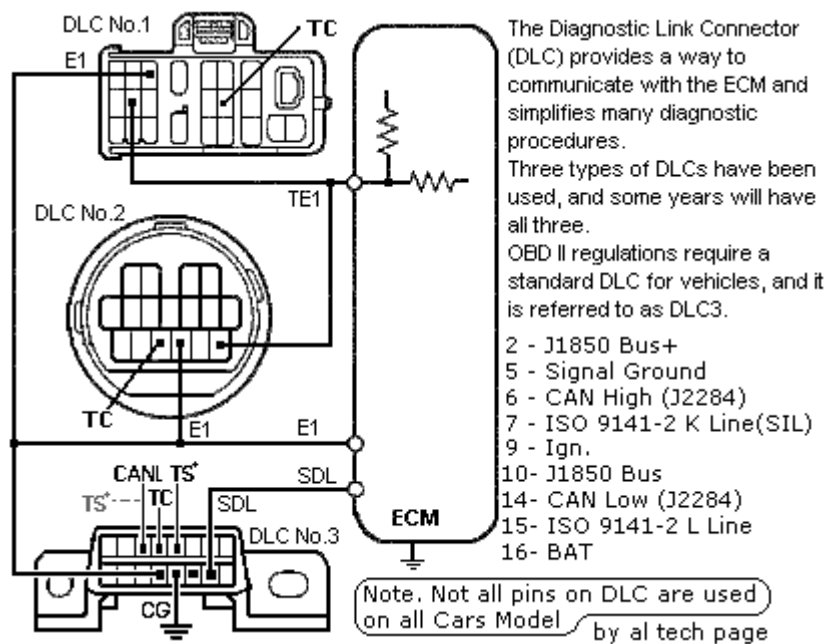
Code 12 And 99

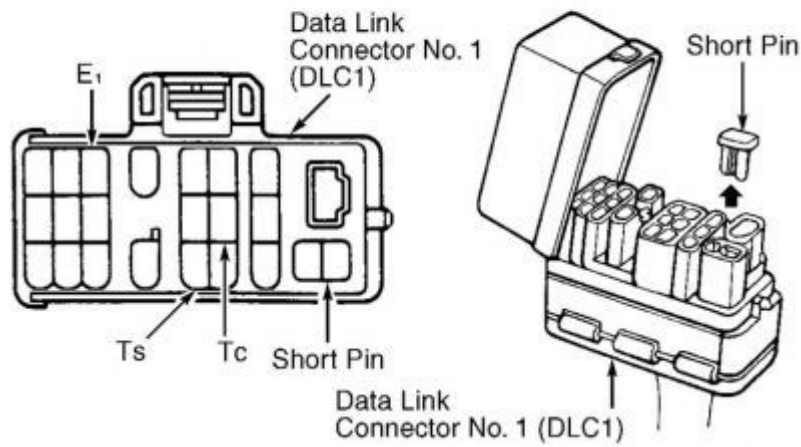


As an example, the blinking patterns for codes; normal, 12 and 99 are as shown in the illustration.

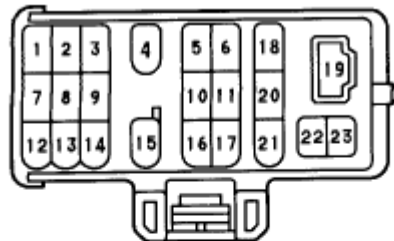
After completing the check, disconnect terminals 13 (TC) and 4 (CG) and turn OFF.

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.





Date Link Connector 1



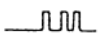
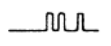
1. FP - fuel pump power	13. VF1 - O2 feedback
2. _____	14. VF2 - O2 feedback
3. E1 - common	15. OX2 - rear sensor
4. OX1- front sensor	16. TS - ABS ECU
5. AB - ctr. AB sensor	17. TT
6. _____	18. _____
7. _____	19. IG $\ominus$ - ign.coil neg.
8. TE1 - DTC output	20. _____
9. _____	21. _____
10. _____	22. WA - ABS ECU
11. TC - cruise ctrl ECU	23. WB - ABS relay
12. +B - 12 volts (pos.)	

Toyota 1989-95 MODELS

1. Make sure the battery voltage is at least 11 volts.
2. Make sure the throttle valve is fully closed.
3. Place the gear shift lever in Neutral. Turn all accessories off.
4. The engine should be at normal operating temperature.
5. Using a jumper wire, connect terminals TE1 and E1 of the Data Link Connector 1 (DLC1).
6. Turn the ignition switch *ON*, but do not start the engine. Read the diagnostic code by the counting the number of flashes of the malfunction indicator lamp.
7. Codes will flash in numerical order. If no faults are stored, the lamp flashes continuously every $\frac{1}{2}$ second. This is sometimes called the Normal or System Clear signal.
8. After the diagnosis check, turn the ignition *OFF* and remove the jumper wire.
9. Compare the codes found to the applicable diagnostic code chart. If necessary, refer to the individual component tests in this section. If the component tests are OK, test the wire harness and connectors for shorts, opens and poor connections

The data link connector is a small gray or black box under the hood labeled DIAGNOSTICS. Flip the lid and the terminals are labeled.

Fig. 2: The DLC1 is located in the engine compartment, on the side of the fuse block

Code No.	Number of blinks Malfunction Indicator Lamp	System	MIL	Diagnosis	Trouble Area
—	 FI1401	Normal	—	No trouble code is recorded.	—
12	 FI1389	RPM Signal	ON	No NE signal is input to the ECM for 2 secs. or more after STA turns ON.	• Open or short in NE circuit • Distributor • Open or short in STA circuit • ECM
13	 FI1390	RPM Signal	ON	NE signal is not input to ECM for 300 msec. or more when engine speed is 1,500 rpm or more.	• Open or short in NE circuit • Distributor • ECM
14	 FI1391	Ignition Signal	ON	IGF signal from igniter is not input to ECM for 4 consecutive ignition.	• Open or short in IGF or IGT circuit from igniter to ECM • Igniter • ECM
21	 FI1400	Main Oxygen Sensor Signal	ON	(1) Open or short in heater circuit of main oxygen sensor for 500 msec. or more. (HT) (2) At normal driving speed (below 60 mph and engine speed is above 1,700 rpm), amplitude of main oxygen sensor signal (OX1) is reduced to between 0.35—0.70 V continuously for 60 secs. or more.	• Open or short in heater circuit of main oxygen sensor • Main oxygen sensor heater • ECM • Open or short in main oxygen sensor circuit • Main oxygen sensor • ECM
22	 FI1392	Engine Coolant Temp. Sensor Signal	ON	Open or short in engine coolant temp. sensor circuit for 500 msec. or more. (THW)	• Open or short in engine coolant temp. sensor circuit • Engine coolant temp. sensor • ECM
24	 FI1611	Intake Air Temp. Sensor Signal	ON	Open or short in intake air temp. sensor circuit for 500 msec. or more. (THA)	• Open or short in intake air temp. circuit • Intake air temp. sensor • ECM
25	 FI2562	Air-Fuel Ratio Lean Mal-function	ON	(1) Oxygen sensor output is less than 0.45 V for at least 90 secs. when oxygen sensor is warmed up (racing at 2,000 rpm). —Only for code 25. (2) When the air-fuel compensation value fluctuates more than 20% from the ECM set range within 60 secs. period while driving at 15 km/h (9 mph) or more at coolant temp. of 70°C (158°F) or above.	• Engine ground bolt loose • Open in E1 circuit • Open in injector circuit • Fuel line pressure (Injector blockage, etc.) • Open or short in oxygen sensor circuit • Oxygen sensor • Ignition system • Engine coolant temp. sensor • Volume air flow meter (Air intake) • ECM
26	 FI2563	Air-Fuel Ratio Rich Mal-function	ON	When the air-fuel compensation value fluctuates more than 20% from the ECM set range within 60 secs. period while driving at 15 km/h (9 mph) or more at coolant temp. of 70°C (158°F) or above.	• Engine ground bolt loose • Open in E1 circuit • Short in injector circuit • Fuel line pressure (Injector leakage, etc.) • Open or short in cold start injector circuit • Cold start injector • Open or short in oxygen sensor circuit • Oxygen sensor • Engine coolant temp. sensor • Volume air flow meter • Compression pressure • ECM

Code No.	Number of blinks Malfunction Indicator Lamp	System	MIL	Diagnosis	Trouble Area
27	 FI3294	Sub-Oxygen Sensor Signal	ON	(1) When sub-oxygen sensor is warmed up and full acceleration continued for 2 seconds, output of main oxygen sensor is 0.45 V or more (rich) and output of sub-oxygen sensor is 0.45 V or less (lean). (OX2) (2) Open or short detected continuously for 500 msec. or more in sub-oxygen sensor heater circuit	• Short or open in sub-oxygen sensor circuit • Sub-oxygen sensor • Open or short in sub-oxygen sensor heater • ECM
31	 FI1394	Volume Air Flow Meter Signal	ON	Open or short detected continuously for 500 msec. or more in volume air flow meter circuit • Open — VC or E2 • Short — VC—E2 or VS—VC	• Open or short in volume air flow meter circuit • Volume air flow meter • ECM
41	 FI1396	Throttle Position Sensor Signal	ON	Open or short detected in throttle position sensor signal (VTA) for 500 msec. or more.	• Open or short in throttle position sensor circuit • Throttle position sensor • ECM
42	 FI1397	Vehicle Speed Sensor Signal	OFF	SPD signal is not input to the ECM for at least 8 seconds during high load driving with engine speed between 2,200 rpm and 5,000 rpm.	• Open or short in vehicle speed sensor circuit • Vehicle speed sensor • ECM
43	 FI1398	Starter Signal	OFF	Starter signal (STA) is not input to ECM even once until engine reaches 800 rpm or more when cranking.	• Open or short in starter signal circuit • Open or short in IG SW or main relay circuit • ECM
52	 FI1618	Knock Sensor Signal	ON	With engine speed 2,000 rpm or more signal from knock sensor is not input to ECM for 25 revolution. (KNK)	• Open or short in knock sensor circuit • Knock sensor (looseness, etc.) • ECM
53	 FI1619	Knock Control Signal	ON	The engine control computer (for knock control) malfunction is detected.	• ECM
71	 FI2622	EGR System Malfunction	ON	With the coolant temp. at 65°C (149°F) or more, 50 seconds from start of EGR operation. The EGR gas temp. is less than 70°C (158°F) and the EGR gas temp. has risen less than 3°C during the 50 seconds.	• Open in EGR gas temp. sensor circuit • Open in VSV circuit for EGR • EGR vacuum hose disconnected, valve stuck • Clogged in EGR gas passage • ECM
51	 FI1399	Switch Condition Signal	OFF	Displayed when IDL contact OFF or shift position in "R", "D", "2", or "1" ranges with the check terminals E1 and TE1 connected.	• Throttle position sensor IDL circuit • PNP switch circuit • Accelerator pedal, cable • ECM



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