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Diagnostic Trouble Codes and Possible Causes

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All Toyota vehicles with electronic fuel injection utilize the Toyota EFI or TCCS engine management system. This system incorporates many features to enhance performance, emissions, and drivability. One feature is the **Self Diagnostic System**. The self diagnostic system monitors engine operations and when a particular sensor or input varies out of specified operating parameters, the "**Check Engine**" will be illuminated.

The check engine lamp alerts the driver or technician that a problem exists in the EFI/TCCS ECU or **Engine Control Unit** or "computer." When the check engine light is illuminated, it is indicating that a problem in the engine management system has been detected. At this time, a "code" may be stored in the ECU which pinpoints a possible component in the EFI/TCCS system. By checking the trouble codes, a possible problem could be narrowed down to a number of causes. While not an exact diagnostic tool, the check engine light and self-diagnostic system can get the individual working on his/her truck close to a possible fault, and, hopefully, to a successful repair.

Listed below are one and two digit trouble codes for the EFI/TCCS systems and *possible* causes. As mentioned above, this is not an exact science. Many other component failures can cause similar symptoms that can "mask" the actual cause. EFI/TCCS computer interrogation is one of the **last steps** to engine diagnostics. A thorough inspection of the simple items should be done prior to any computer-related repairs. Sometimes it's the simple things that will get ya'. In addition, use caution when working on the electrical system of your vehicle. Not only is the electrical system delicate to water, static electricity, and outright physical abuse, the ignition system puts out high voltage as well and you can be seriously injured if you do not exercise basic safety.

READING THE TROUBLE CODES

Reading the diagnostic trouble codes is very easy. You will need a paper clip to short the check connectors of the diagnostic connector. The diagnostic connector comes in two types. The early system is located on the inner-left fender well and is a round, green connector, usually located near the air cleaner. Simply jump the two terminals in this connector with the ignition switch in the "ON" position and the engine off. Later models, '87 and newer use a multiple terminal "**DIAGNOSTIC**" connector which is a small, rectangular-shaped grey "box", usually located near the right fender in the engine compartment. To get codes out of this type of connector, jump the "**TE1**" and "**E1**" terminals. Finding these terminals is easy as the inside cover of the diagnostic connector contains a schematic of the connector pinouts. If the underhood emission decal (VECI) is

--	13	<p>SAME AS ABOVE BUT AFTER ENGINE HAS RUN AT 1,000-1,500 RPM</p> <p>--DISTRIBUTOR/DISTRIBUTOR CIRCUIT</p> <p>--ECU</p>
3	14	<p>IGNITION SIGNAL--NO "IGF" SIGNAL TO ECU</p> <p>--IGNITER/IGNITER CIRCUIT</p> <p>--IGNITER AND IGNITION COIL/CIRCUIT</p> <p>--ECU</p>
5	21	<p>OXYGEN SENSOR SIGNAL/OXYGEN SENSOR HEATER SIGNAL</p> <p>OPEN OR SHORT IN OXYGEN SENSOR OR OXYGEN SENSOR SIGNAL</p>
4	22	<p>WATER TEMPERATURE SENSOR SIGNAL--OPEN OR SHORT IN WATER TEMP. SENSOR SIGNAL</p> <p>--WATER TEMPERATURE SENSOR CIRCUIT</p> <p>--WATER TEMPERATURE SENSOR</p> <p>--ECU</p>
8	24	<p>INTAKE AIR TEMPERATURE SENSOR SIGNAL--OPEN OR SHORT IN INTAKE AIR TEMP. SIGNAL</p> <p>--INTAKE AIR TEMPERATURE CIRCUIT</p> <p>--INTAKE AIR TEMPERATURE SENSOR</p> <p>--ECU</p>
--	25	<p>AIR/FUEL RATIO LEAN INDICATOR--LEAN SIGNAL SENT TO ECU FROM O2 SENSOR</p> <p>--INJECTOR FAULT(S)</p> <p>--FUEL PRESSURE</p> <p>--OXYGEN SENSOR</p> <p>--AIRFLOW METER OR MAP SENSOR</p> <p>--IGNITION</p> <p>--ECU</p>
--	26	<p>AIR/FUEL RATIO RICH INDICATOR</p> <p>--SAME AS ABOVE</p> <p>--COLD START INJECTOR</p>
--	27	<p>SUB-OXYGEN SENSOR CIRCUIT OR SUB-OXYGEN SENSOR HEATER CIRCUIT</p> <p>--SUB OXYGEN SENSOR/HEATER/CIRCUIT</p> <p>--ECU</p>

--	28	No.2 OXYGEN SENSOR/OXYGEN SENSOR HEATER --SAME AS CODE 21
2	31	MANIFOLD AND/OR AIRFLOW METER SENSOR SIGNAL CIRCUIT --AIRFLOW METER/CIRCUIT --MANIFOLD PRESSURE SENSOR/CIRCUIT --ECU
--	32	AIRFLOW METER SIGNAL (VANE-TYPE) --AIRFLOW METER./CIRCUIT --ECU
14	34	TURBOCHARGER PRESSURE--ABNORMAL TURBOCHARGER PRESSURE --TURBO CHARGER --AIRFLOW METER/MANIFOLD/TURBOCHARGER PRESSURE SENSOR --INTERCOOLER SYSTEM --ECU
--	35	TURBOCHARGER PRESSURE SENSOR SIGNAL --TURBOCHARGER PRESSURE SENSOR --ECU
7	41	THROTTLE POSITION SENSOR SIGNAL--OPEN OR SHORT IN TPS SIGNAL --TPS SENSOR --TPS SIGNAL/CIRCUIT --ECU
9	42	VEHICLE SPEED SENSOR SIGNAL CIRCUIT--NO SPD. SIGNAL FOR SEVERLA SECONDS WHILE VEHICLE IS OPERATED UNDER HEAVY LOAD (TPS/MAP/AIR FLOW INPUTS) --SPEED SENSOR/CIRCUIT --ECU
10	43	STARTER SIGNAL--NO "STA" SIGNAL TO ECU UNTIL ENGINE SPEED EXCEEDS 800RPM --IGNITION SWITCH/CIRCUIT --ECU
11	51	SWITCH SIGNALS IDL (tps) CONTACTS OFF, NEUTRAL START SWITCH OFF, A/C SWITCH "ON" SIGNAL TO ECU WITH DIAGNOSTIC CHECK CONNECTOR SHORTED

		--A/C SWITCH/CIRCUIT --A/C AMPLIFIER --TPS/CIRCUIT --NEUTRAL START SWITCH/CIRCUIT --ECU
12	52	KNOCK SENSOR SIGNAL--OPEN OR SHORT IN KNOCK SENSOR SIGNAL --KNOCK SENSOR/CIRCUIT ECU
13	53	KNOCK CONTROL SIGNAL IN ECU --ECU
--	71	EGR VALVE MALFUNCTION--EXHAUST GAS TEMPEATURE BELOW SPEC. FOR EGR CONTROL --EGR SYSTEM --EGR GAS TEMPERATURE SENSOR/CIRCUIT
--	72	AIR CONDITIONER COMPRESSOR RELAY/RELAY SIGNAL --A/C COMPRESSOR RELAY/CIRCUIT --ECU

While a lot of the possible faults in the EFI system point to the ECU iteself, it should be noted that ECU failure is not common. The ECU should be replaced only as a last resort or if all diagnoses points to a bad ECU. Usually, troublesome EFI problems are a result of poor grounds, shorted wiring, and bad connectons at sensors. When all else fails, carefully consult your factory repair manual. It contains more comprehensive diagnostic information and great electrical wiring diagrams.

Happy "Diagnosticating!"

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