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In addition to performing all the functions of the OBD 1 System, the OBD 2 System has been enhanced with new Diagnostic Programs. These programs closely monitor the functions of various emissions-related components and systems (as well as other systems) and make this information readily available (with the proper equipment) to the technician for evaluation.

*The OBD 2 System is an enhancement of the OBD 1 System.*



The California Air Resources Board (CARB) conducted studies on OBD 1 equipped vehicles. The information that was gathered from these studies showed the following:

- A large number of vehicles had deteriorating or degraded emissions-related components. These components were causing an increase in emissions.
- Because OBD 1 systems only detect failed components, the degraded components were not setting codes.
- Some emissions problems related to degraded components only occur when the vehicle is being driven under a load. The emission checks being conducted at the time were not performed under simulated driving conditions. As a result, a significant number of vehicles with degraded components were passing Emissions Tests.
- Codes, code definitions, diagnostic connectors, communication protocols and emissions terminology were different for each manufacturer. This caused confusion for the technicians working on different make and model vehicles.

To address the problems made evident by this study, CARB and the EPA passed new laws and standardization requirements. These laws required that vehicle manufacturers to equip their new vehicles with devices capable of meeting all of the new emissions standards and regulations. It was also decided that an enhanced on-board diagnostic system, capable of addressing all of these problems, was needed. This new system is known as "**On-Board Diagnostics Generation Two (OBD 2)**." The primary objective of the OBD 2 system is to comply with the latest regulations and emissions standards established by CARB and the EPA.

The Main Objectives of the OBD 2 System are:

- To detect degraded and/or failed emissions-related components or systems that could cause tailpipe emissions to exceed by 1.5 times the Federal Test Procedure (FTP) standard.
- To expand emissions-related system monitoring. This includes a set of computer run diagnostics called Monitors. Monitors perform diagnostics and testing to verify that all emissions-related components and/or systems are operating correctly and within the manufacturer's specifications.
- To use a standardized Diagnostic Link Connector (DLC) in all vehicles. (Before OBD 2, DLCs were of different shapes and sizes.)
- To standardize the code numbers, code definitions and language used to describe faults. (Before OBD 2, each vehicle manufacturer used their own code numbers, code definitions and language to describe the same faults.)
- To expand the operation of the Malfunction Indicator Lamp (MIL).
- To standardize communication procedures and protocols between the diagnostic equipment (Scan Tools, Code Readers etc.) and the vehicle's on-board computer.

## OBD 2 Terminology

The following terms and their definitions are related to OBD 2 systems. Read and reference this list as needed to aid in the understanding of OBD 2 systems.

- **Powertrain Control Module (PCM)** - The PCM is the OBD 2 accepted term for the vehicle's "on-board computer." In addition to controlling the engine management and emissions systems, the PCM also participates in controlling the powertrain (transmission) operation. Most PCMs also have the ability to communicate with other computers on the vehicle (ABS, ride control, body etc.).
- **Monitor** - Monitors are "diagnostic routines" programmed into the PCM. The PCM utilizes these programs to run diagnostic tests, and to monitor operation of the vehicle's emissions-related components or systems to ensure they are operating correctly and within the vehicle's manufacturer specifications. Currently, up to eleven Monitors are used in OBD 2 systems. Additional Monitors will be added as the OBD 2 system is further developed.



*Not all vehicles support all eleven Monitors.*

- **Enabling Criteria** - Each Monitor is designed to test and monitor the operation of a specific part of the vehicle's emissions system (EGR system, oxygen sensor, catalytic converter, etc.). A specific set of "conditions" or "driving procedures" must be met before the computer can command a Monitor to run tests on its related system. These "conditions" are known as "**Enabling Criteria**." The requirements and procedures vary for each Monitor. Some Monitors only require the ignition key to be turned "**On**" for them to run and complete their diagnostic testing. Others may require a set of complex procedures, such as, starting the vehicle when cold, bringing it to operating temperature, and driving the vehicle under specific conditions before the Monitor can run and complete its diagnostic testing.
- **Monitor Has/Has Not Run** - The terms "Monitor has run" or "Monitor has not run" are used throughout this manual. "**Monitor has run**," means the PCM **has** commanded a particular Monitor to perform the required diagnostic testing on a system to ensure the system is operating correctly (within factory specifications). The term "**Monitor has not run**" means the PCM **has not** yet commanded a particular Monitor to perform diagnostic testing on its associated part of the emissions system.
- **Trip** - A Trip for a particular Monitor requires that the vehicle is driven in such a way that all the "Enabling Criteria" for the Monitor to run and complete its diagnostic testing are met. The "Trip Drive Cycle" for a particular Monitor begins when the ignition key is turned "**On**." It is successfully completed when all the "Enabling Criteria" for the Monitor to run and complete its diagnostic testing are met by the time the ignition key is turned "**Off**." Since each of the eleven monitors is designed to run diagnostics and testing on a different part of the engine or emissions system, the "Trip Drive Cycle" needed for each individual Monitor to run and complete varies.
- **OBD 2 Drive Cycle** - An OBD 2 Drive Cycle is an extended set of driving procedures that takes into consideration the various types of driving conditions encountered in real life. These conditions may include starting the vehicle when it is cold, driving the vehicle at a steady speed (cruising), accelerating, etc. An OBD 2 Drive Cycle begins when the ignition key is turned "On" (when cold) and ends when the vehicle has been driven in such a way as to have all the "Enabling Criteria" met for **all** its applicable Monitors. Only those trips that provide the Enabling Criteria for **all** Monitors applicable to the vehicle to run and complete their individual diagnostic tests qualify as an OBD 2 Drive Cycle. OBD 2 Drive Cycle requirements vary from one model of vehicle to another. Vehicle manufacturers set these procedures. Consult your vehicle's service manual for OBD 2 Drive Cycle procedures.



Do not confuse a "Trip" Drive Cycle with an OBD 2 Drive Cycle. A Trip Drive Cycle provides the "Enabling Criteria" for **one** specific Monitor to run and complete its diagnostic testing. An OBD 2 Drive Cycle must meet the "Enabling Criteria" for **all** Monitors on a particular vehicle to run and complete their diagnostic testing.

- **Warm-up Cycle** - Vehicle operation after an engine off period where engine temperature rises at least 40°F (22°C) from its temperature before starting, **and** reaches at least 160°F (70°C). The PCM uses warm-up cycles as a counter to automatically erase a specific code and related data from its memory. When no faults related to the original problem are detected within a specified number of warm-up cycles, the code is erased automatically.

## DIAGNOSTIC TROUBLE CODES (DTCs)

Diagnostic Trouble Codes (DTCs) are meant to guide you to the proper service procedure in the vehicle's service manual. **DO NOT** replace parts based only on DTCs without first consulting the vehicle's service manual for proper testing procedures for that particular system, circuit or component.

*Diagnostic Trouble Codes (DTCs) are codes that identify a specific problem area.*

DTCs are alphanumeric codes that are used to identify a problem that is present in any of the systems that are monitored by the on-board computer (PCM). Each trouble code has an assigned message that identifies the circuit, component or system area where the problem was found.



OBD 2 diagnostic trouble codes are made up of five characters:

- The 1st character is a **letter**. It identifies the "main system" where the fault occurred (Body, Chassis, Powertrain, or Network).
- The 2nd character is a **numeric digit**. It identifies the "type" of code (Generic or Manufacturer-Specific).

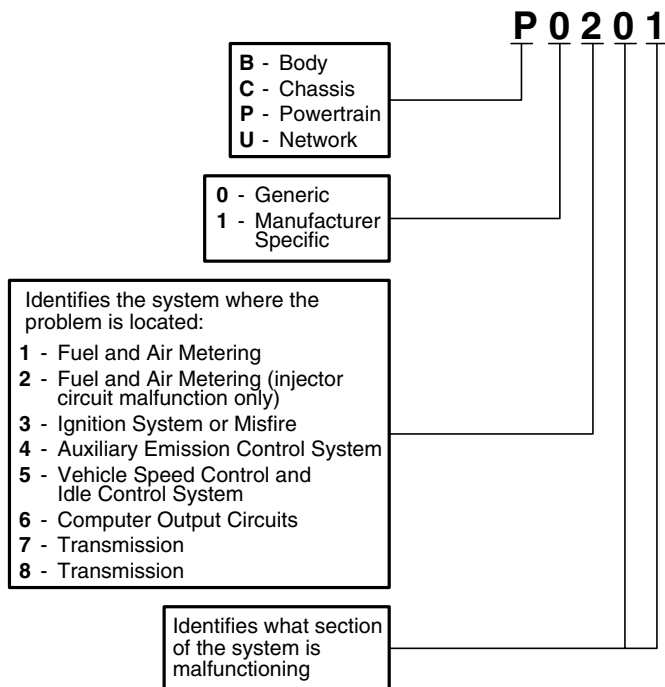


**Generic DTCs** are codes that are used by all vehicle manufacturers. The standards for generic DTCs, as well as their definitions, are set by the Society of Automotive Engineers (SAE).

**Manufacturer-Specific DTCs** are codes that are controlled by the vehicle manufacturer. The Federal Government does not require manufacturer-specific codes in order to comply with the new OBD 2 emissions standards. However, manufacturers are free to expand beyond the required codes to make their systems easier to diagnose.

### OBD 2 DTC EXAMPLE

P0201 - Injector Circuit Malfunction, Cylinder 1



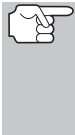
- The 3rd character is a **numeric digit**. It identifies the specific system or sub-system where the problem is located.
- The 4th and 5th characters are **numeric digits**. They identify the section of the system that is malfunctioning.

### DTCs and MIL Status

When the vehicle's on-board computer detects a failure in an emissions-related component or system, the computer's internal diagnostic program assigns a diagnostic trouble code (DTC) that points to the system (and subsystem) where the fault was found. The diagnostic program saves the

code in the computer's memory. It records a "Freeze Frame" of conditions present when the fault was found, and lights the Malfunction Indicator Lamp (MIL). Some faults require detection for two trips in a row before the MIL is turned on.





The "Malfunction Indicator Lamp" (MIL) is the accepted term used to describe the lamp on the dashboard that lights to warn the driver that an emissions-related fault has been found. Some manufacturers may still call this lamp a "Check Engine" or "Service Engine Soon" light.

There are two types of DTCs used for emissions-related faults: Type "A" and Type "B." Type "A" codes are "One-Trip" codes; Type "B" DTCs are usually Two-Trip DTCs.

When a **Type "A"** DTC is found on the First Trip, the following events take place:

- The computer commands the MIL "On" when the failure is first found.
- If the failure causes a severe misfire that may cause damage to the catalytic converter, the MIL "flashes" **once per second**. The MIL continues to flash as long as the condition exists. If the condition that caused the MIL to flash is no longer present, the MIL will light "steady" On.
- A DTC is saved in the computer's memory for later retrieval.
- A "Freeze Frame" of the conditions present in the engine or emissions system when the MIL was ordered "On" is saved in the computer's memory for later retrieval. This information shows fuel system status (closed loop or open loop), engine load, coolant temperature, fuel trim value, MAP vacuum, engine RPM and DTC priority.

When a **Type "B"** DTC is found on the First Trip, the following events take place:

- The computer sets a Pending DTC, but the MIL is not ordered "On." "Freeze Frame" data is not recorded at this time. The Pending DTC is saved in the computer's memory for later retrieval.
- If the failure **is found** on the second consecutive trip, the MIL is ordered "On." "Freeze Frame" data is saved in the computer's memory.
- If the failure **is not found** on the second Trip, the Pending DTC is erased from the computer's memory.

The MIL will stay lit for both Type "A" and Type "B" codes until one of the following conditions occurs:

- If the conditions that caused the MIL to light are no longer present for the next three trips in a row, the computer automatically turns the MIL "Off" if no other emissions-related faults are present. However, the DTCs remain in the computer's memory for 40 warm-up cycles (80 warm-up cycles for fuel and misfire faults). The DTCs are automatically erased if the fault that caused them to be set is not detected again during that period.

- Misfire and fuel system faults require three trips with "similar conditions" before the MIL is turned "Off." These are trips where the engine load, RPM and temperature are similar to the conditions present when the fault was first found.



*After the MIL has been turned off, DTCs, Freeze Frame data, and manufacturer-specific enhanced data stay in the computer's memory. This data can only be retrieved by using equipment such as a Scan Tool.*

- Erasing the DTCs from the computer's memory can also turn off the MIL. See ERASING DIAGNOSTIC TROUBLE CODES (DTCs) on page 20, before erasing codes from the computer's memory. If a Code Reader or Scan Tool is used to erase the codes, Freeze Frame data as well as other manufacturer-specific enhanced data will also be erased.

## OBD 2 MONITORS

To ensure the correct operation of the various emissions-related components and systems, a diagnostic program was developed and installed in the vehicle's on-board computer. The program has several procedures and diagnostic strategies. Each procedure or diagnostic strategy is made to monitor the operation of, and run diagnostic tests on, a specific emissions-related component or system. These tests ensure the system is running correctly and is within the manufacturer's specifications. On OBD 2 systems, these procedures and diagnostic strategies are called "Monitors."

Currently, a maximum of eleven Monitors are used in OBD 2 systems. Additional monitors may be added as a result of Government regulations as the OBD 2 system grows and matures. Not all vehicles use all eleven Monitors.

Monitor operation is either "**Continuous**" or "**Non-Continuous**," depending on the specific monitor.

### Continuous Monitors

Three of these Monitors are designed to constantly monitor their associated components and/or systems for proper operation. Continuous Monitors run constantly when the engine is running. The Continuous Monitors are:

1. Comprehensive Component Monitor (CCM)
2. Misfire Monitor
3. Fuel System Monitor

### Non-Continuous Monitors

The other eight Monitors are "non-continuous" Monitors. "Non-continuous" Monitors perform and complete their testing once per trip. The "non-continuous" Monitors are:



1. Oxygen Sensor Monitor
2. Oxygen Sensor Heater Monitor
3. Catalyst Monitor
4. Heated Catalyst Monitor
5. EGR System Monitor
6. EVAP System Monitor
7. Secondary Air System Monitor
8. Air Conditioning (A/C) Monitor

The following provides a brief explanation of the function of each Monitor:

- **Comprehensive Component Monitor (CCM)** - This Monitor continuously checks all inputs and outputs from sensors, actuators, switches and other devices that provide a signal to the computer. The Monitor checks for shorts, opens, out of range value, functionality and "rationality."



**Rationality:** Each input signal is compared against all other inputs and against information in the computer's memory to see if it makes sense under the current operating conditions. Example: The signal from the throttle position sensor indicates the vehicle is in a wide-open throttle condition, but the vehicle is really at idle, and the idle condition is confirmed by the signals from all other sensors. Based on the input data, the computer determines that the signal from the throttle position sensor is not rational (does not make sense when compared to the other inputs). In this case, the signal would fail the rationality test.

The CCM may be either a "One-Trip" or a "Two-Trip" Monitor, depending on the component.

- **Fuel System Monitor** - This Monitor uses a Fuel System Correction program, called Fuel Trim, inside the on-board computer. Fuel Trim is a set of positive and negative values that represent adding or subtracting fuel from the engine. This program is used to correct for a lean (too much air/not enough fuel) or rich (too much fuel/not enough air) air-fuel mixture. The program is designed to add or subtract fuel, as needed, up to a certain percent. If the correction needed is too large and exceeds the time and percent allowed by the program, a fault is indicated by the computer.

The Fuel System Monitor may be a "One-Trip" or "Two-Trip" Monitor, depending on the severity of the problem.

- **Misfire Monitor** - This Monitor continuously checks for engine misfires. A misfire occurs when the air-fuel mixture in the cylinder does not ignite. The misfire Monitor uses changes in crankshaft speed to sense an engine misfire. When a cylinder misfires, it no longer contributes to the speed of the engine, and engine speed decreases each time the affected cylinder(s) misfire. The misfire Monitor is designed to sense engine speed fluctuations and determine from which cylinder(s) the misfire is coming, as well as how bad the misfire is. There are three types of engine misfires, Types 1, 2, and 3.

- Type 1 and Type 3 misfires are two-trip monitor faults. If a fault is sensed on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The MIL is not commanded on at this time. If the fault is found again on the second trip, under similar conditions of engine speed, load and temperature, the computer commands the MIL "On," and the code is saved in its long term memory.

- Type 2 misfires are the most severe type of misfire. When a Type 2 misfire is sensed on the first trip, the computer commands the MIL to light when the misfire is sensed. If the computer determines that a Type 2 misfire is severe, and may cause catalytic converter damage, it commands the MIL to "flash" once per second as soon as the misfire is sensed. When the misfire is no longer present, the MIL reverts to steady "On" condition.

- **Catalyst Monitor** - The catalytic converter is a device that is installed downstream of the exhaust manifold. It helps to oxidize (burn) the unburned fuel (hydrocarbons) and partially burned fuel (carbon monoxide) left over from the combustion process. To accomplish this, heat and catalyst materials inside the converter react with the exhaust gases to burn the remaining fuel. Some materials inside the catalytic converter also have the ability to store oxygen, and release it as needed to oxidize hydrocarbons and carbon monoxide. In the process, it reduces vehicle emissions by converting the polluting gases into carbon dioxide and water.

The computer checks the efficiency of the catalytic converter by monitoring the oxygen sensors used by the system. One sensor is located before (upstream of) the converter; the other is located after (downstream of) the converter. If the catalytic converter loses its ability to store oxygen, the downstream sensor signal voltage becomes almost the same as the upstream sensor signal. In this case, the monitor fails the test.

The Catalyst Monitor is a "Two-Trip" Monitor. If a fault is found on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the computer commands the MIL "On" and saves the code in its long-term memory.

- **Heated Catalyst Monitor** - Operation of the "heated" catalytic converter is similar to the catalytic converter. The main difference is that a heater is added to bring the catalytic converter to its operating temperature more quickly. This helps reduce emissions by reducing the converter's down time when the engine is cold. The Heated Catalyst Monitor performs the same diagnostic tests as the catalyst Monitor, and also tests the catalytic converter's heater for proper operation. This Monitor is also a "Two-Trip" Monitor.
- **Exhaust Gas Recirculation (EGR) Monitor** - The Exhaust Gas Recirculation (EGR) system helps reduce the formation of Oxides of Nitrogen during combustion. Temperatures above 2500°F cause nitrogen and oxygen to combine and form Oxides of Nitrogen in the combustion chamber. To reduce the formation of Oxides of Nitrogen, combustion temperatures must be kept below 2500°F. The EGR system recirculates small amounts of exhaust gas back into the intake manifold, where it is mixed with the incoming air/fuel mixture. This reduces combustion temperatures by up to 500°F. The computer determines when, for how long, and how much exhaust gas is recirculated back to the intake manifold. The EGR Monitor performs EGR system function tests at preset times during vehicle operation. The EGR Monitor is a "Two-Trip" Monitor. If a fault is found on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the computer commands the MIL "On," and saves the code in its long-term memory.
- **Evaporative System (EVAP) Monitor** - OBD 2 vehicles are equipped with a fuel Evaporative system (EVAP) that helps prevent fuel vapors from evaporating into the air. The EVAP system carries fumes from the fuel tank to the engine where they are burned during combustion. The EVAP system may consist of a charcoal canister, fuel tank cap, purge solenoid, vent solenoid, flow monitor, leak detector and connecting tubes, lines and hoses. Fumes are carried from the fuel tank to the charcoal canister by hoses or tubes. The fumes are stored in the charcoal canister. The computer controls the flow of fuel vapors from the charcoal canister to the engine via a purge solenoid. The computer energizes or de-energizes the purge solenoid (depending on solenoid design). The purge solenoid opens a valve to allow engine vacuum to draw the fuel vapors from the canister into the engine where the vapors are burned. The EVAP Monitor checks for proper fuel vapor flow to the engine, and pressurizes the system to test for leaks. The computer runs this Monitor once per trip. The EVAP Monitor is a "Two-Trip" Monitor. If a fault is found on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the PCM commands the MIL "On," and saves the code in its long-term memory.

- **Air Conditioning (A/C) Monitor** - The A/C Monitor senses leaks in air conditioning systems that utilize R-12 refrigerant. Vehicle manufacturers have been given two options:

1. Use R-12 refrigerant in their A/C systems, and integrate an A/C Monitor in the OBD 2 systems of these vehicles to detect for refrigerant leaks; or
2. Use R-134 refrigerant instead of R12. The A/C Monitor is not required on these vehicles.

To date, all vehicle manufacturers have opted to use R-134 in their A/C systems. As a result, this Monitor has not yet been implemented.

- **Oxygen Sensor Heater Monitor** - The Oxygen Sensor Heater Monitor tests the operation of the oxygen sensor's heater. There are two modes of operation on a computer-controlled vehicle: "open-loop" and "closed-loop." The vehicle operates in open-loop when the engine is cold, before it reaches normal operating temperature. The vehicle also goes to open-loop mode at other times, such as heavy load and full throttle conditions. When the vehicle is running in open-loop, the oxygen sensor signal is ignored by the computer for air/fuel mixture corrections. Engine efficiency during open-loop operation is very low, and results in the production of more vehicle emissions.

Closed-loop operation is the best condition for both vehicle emissions and vehicle operation. When the vehicle is operating in closed-loop, the computer uses the oxygen sensor signal for air/fuel mixture corrections.

In order for the computer to enter closed-loop operation, the oxygen sensor must reach a temperature of at least 600°F. The oxygen sensor heater helps the oxygen sensor reach and maintain its minimum operating temperature (600° F) more quickly, to bring the vehicle into closed-loop operation as soon as possible.

The Oxygen Sensor Heater Monitor is a "Two-Trip" Monitor. If a fault is found on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the computer commands the MIL "On," and saves the code in its long-term memory.

- **Oxygen Sensor Monitor** - The Oxygen Sensor monitors how much oxygen is in the vehicle's exhaust. It generates a varying voltage of up to one volt, based on how much oxygen is in the exhaust gas, and sends the signal to the computer. The computer uses this signal to make corrections to the air/fuel mixture. If the exhaust gas has a large amount of oxygen (a lean air/fuel mixture), the oxygen sensor generates a "low" voltage signal. If the exhaust gas has very little oxygen (a rich mixture condition), the oxygen sensor generates a "high" voltage signal. A 450mV signal indicates the most efficient, and least polluting, air/fuel ratio of 14.7 parts of air to one part of fuel.

The oxygen sensor must reach a temperature of at least 600-650°F, and the engine must reach normal operating temperature, for the computer to enter into closed-loop operation. The oxygen sensor only functions when the computer is in closed-loop. A properly operating oxygen sensor reacts quickly to any change in oxygen content in the exhaust stream. A faulty oxygen sensor reacts slowly, or its voltage signal is weak or missing.

The oxygen sensor is a "Two-Trip" monitor. If a fault is found on the first trip, the computer temporarily saves the fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the computer commands the MIL "On," and saves the code in its long-term memory.

- **Secondary Air System Monitor** - When a cold engine is first started, it runs in open-loop mode. During open-loop operation, the engine usually runs rich. A vehicle running rich wastes fuel and creates increased emissions, such as carbon monoxide and some hydrocarbons. A Secondary Air System injects air into the exhaust stream to aid catalytic converter operation:

1. It supplies the catalytic converter with the oxygen it needs to oxidize the carbon monoxide and hydrocarbons left over from the combustion process during engine warm-up.
2. The extra oxygen injected into the exhaust stream also helps the catalytic converter reach operating temperature more quickly during warm-up periods. The catalytic converter must heat to operating temperature to work properly.

The Secondary Air System Monitor checks for component integrity and system operation, and tests for faults in the system. The computer runs this Monitor once per trip.

The Secondary Air System Monitor is a "Two-Trip" monitor. If a fault is found on the first trip, the computer temporarily saves this fault in its memory as a Pending Code. The computer does not command the MIL on at this time. If the fault is sensed again on the second trip, the computer commands the MIL "On," and saves the code in its long-term memory.

### OBD 2 Reference Table

The table below lists current OBD 2 Monitors, and indicates the following for each Monitor:

- A** Monitor Type (how often does the Monitor run; Continuous or Once per trip)
- B** Number of trips needed, with a fault present, to set a pending DTC
- C** Number of consecutive trips needed, with a fault present, to command the MIL "On" and store a DTC
- D** Number of trips needed, with no faults present, to erase a Pending DTC
- E** Number and type of trips or drive cycles needed, with no faults present, to turn off the MIL
- F** Number of warm-up periods needed to erase the DTC from the computer's memory after the MIL is turned off

Name of Monitor	A	B	C	D	E	F
Comprehensive Component Monitor	Continuous	1	2	1	3	40
Misfire Monitor (Type 1 and 3)	Continuous	1	2	1	3 - similar conditions	80
Misfire Monitor (Type 2)	Continuous		1		3 - similar conditions	80
Fuel System Monitor	Continuous	1	1 or 2	1	3 - similar conditions	80
Catalytic Converter Monitor	Once per trip	1	2	1	3 trips	40
Oxygen Sensor Monitor	Once per trip	1	2	1	3 trips	40
Oxygen Sensor Heater Monitor	Once per trip	1	2	1	3 trips	40
Exhaust Gas Recirculation (EGR) Monitor	Once per trip	1	2	1	3 trips	40
Evaporative Emissions Controls Monitor	Once per trip	1	2	1	3 trips	40
Secondary Air System (AIR) Monitor	Once per trip	1	2	1	3 trips	40

**DIAGNOSTIC TROUBLE CODE DEFINITIONS**

This section provides the most complete lists of DTC definitions available at the time of publication. OBD 2 is an evolving system; new codes and definitions are added as the system grows. **ALWAYS** check your vehicle's service manual for code definitions that are not listed here. This section contains both "Generic" and "Manufacturer Specific" DTC definitions:

- **OBD 2 Powertrain "Generic" DTC Definitions** apply to all makes and models of import and domestic vehicles that are "OBD 2 COMPLIANT." These DTCs always start with "P0."
- **OBD 2 Powertrain "Manufacturer Specific" DTC Definitions** apply only to vehicles made by a specific manufacturer. These DTCs always start with "P1." Some codes may have more than one definition. BE SURE to use the correct definition for your vehicle make, model and year.



*This manual provides "Manufacturer Specific" DTC definitions for CHRYSLER, FORD, GENERAL MOTORS, HONDA and TOYOTA only. For DTC definitions that are not in these lists, and/or for Body, Chassis and Network DTC definitions, reference your vehicle's service manual.*

**GENERIC DTC DEFINITIONS**

<b>Code</b>	<b>Definition</b>
<b>P0010</b>	"A" Camshaft Position - Actuator Circuit (Bank 1)
<b>P0011</b>	"A" Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)
<b>P0012</b>	"A" Camshaft Position - Timing Over-Retarded (Bank 1)
<b>P0013</b>	"B" Camshaft Position - Actuator Circuit (Bank 1)
<b>P0014</b>	"B" Camshaft Position - Timing Over-Advanced or System Performance (Bank 1)
<b>P0015</b>	"B" Camshaft Position - Timing Over-Retarded (Bank 1)
<b>P0020</b>	"A" Camshaft Position - Actuator Circuit (Bank 2)
<b>P0021</b>	"A" Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)
<b>P0022</b>	"A" Camshaft Position - Timing Over-Retarded (Bank 2)
<b>P0023</b>	"B" Camshaft Position - Actuator Circuit (Bank 2)
<b>P0024</b>	"B" Camshaft Position - Timing Over-Advanced or System Performance (Bank 2)
<b>P0025</b>	"B" Camshaft Position - Timing Over-Retarded (Bank 2)
<b>P0030</b>	HO2S Heater Control Circuit (Bank 1 Sensor 1)
<b>P0031</b>	HO2S Heater Control Circuit Low (Bank 1 Sensor 1)
<b>P0032</b>	HO2S Heater Control Circuit High (Bank 1 Sensor 1)
<b>P0033</b>	Turbo Charger Bypass Valve Control Circuit
<b>P0034</b>	Turbo Charger Bypass Valve Control Circuit Low
<b>P0035</b>	Turbo Charger Bypass Valve Control Circuit High
<b>P0036</b>	HO2S Heater Control Circuit (Bank 1 Sensor 2)
<b>P0037</b>	HO2S Heater Control Circuit Low (Bank 1 Sensor 2)
<b>P0038</b>	HO2S Heater Control Circuit High (Bank 1 Sensor 2)
<b>P0042</b>	HO2S Heater Control Circuit (Bank 1 Sensor 3)
<b>P0043</b>	HO2S Heater Control Circuit Low (Bank 1 Sensor 3)
<b>P0044</b>	HO2S Heater Control Circuit High (Bank 1 Sensor 3)
<b>P0050</b>	HO2S Heater Control Circuit (Bank 2 Sensor 1)
<b>P0051</b>	HO2S Heater Control Circuit Low (Bank 2 Sensor 1)
<b>P0052</b>	HO2S Heater Control Circuit High (Bank 2 Sensor 1)
<b>P0056</b>	HO2S Heater Control Circuit (Bank 2 Sensor 2)
<b>P0057</b>	HO2S Heater Control Circuit Low (Bank 2 Sensor 2)



<b>Code</b>	<b>Definition</b>
<b>P0058</b>	HO2S Heater Control Circuit High (Bank 2 Sensor 2)
<b>P0062</b>	HO2S Heater Control Circuit (Bank 2 Sensor 3)
<b>P0063</b>	HO2S Heater Control Circuit Low (Bank 2 Sensor 3)
<b>P0064</b>	HO2S Heater Control Circuit High (Bank 2 Sensor 3)
<b>P0065</b>	Air Assisted Injector Control Range/Performance
<b>P0066</b>	Air Assisted Injector Control Circuit or Circuit Low
<b>P0067</b>	Air Assisted Injector Control Circuit High
<b>P0070</b>	Ambient Air Temperature Sensor Circuit
<b>P0071</b>	Ambient Air Temperature Sensor Range/Performance
<b>P0072</b>	Ambient Air Temperature Sensor Circuit Low Input
<b>P0073</b>	Ambient Air Temperature Sensor Circuit High Input
<b>P0074</b>	Ambient Air Temperature Sensor Circuit Intermittent
<b>P0075</b>	Intake Valve Control Solenoid Circuit (Bank 1)
<b>P0076</b>	Intake Valve Control Solenoid Circuit Low (Bank 1)
<b>P0077</b>	Intake Valve Control Solenoid Circuit High (Bank 1)
<b>P0078</b>	Exhaust Valve Control Solenoid Circuit (Bank 1)
<b>P0079</b>	Exhaust Valve Control Solenoid Circuit Low (Bank 1)
<b>P0080</b>	Exhaust Valve Control Solenoid Circuit High (Bank 1)
<b>P0081</b>	Intake Valve Control Solenoid Circuit (Bank 2)
<b>P0082</b>	Intake Valve Control Solenoid Circuit Low (Bank 2)
<b>P0083</b>	Intake Valve Control Solenoid Circuit High (Bank 2)
<b>P0084</b>	Exhaust Valve Control Solenoid Circuit (Bank 2)
<b>P0085</b>	Exhaust Valve Control Solenoid Circuit Low (Bank 2)
<b>P0086</b>	Exhaust Valve Control Solenoid Circuit High (Bank 2)
<b>P0100</b>	Mass or Volume Air Flow Circuit Malfunction
<b>P0101</b>	Mass or Volume Circuit Range Performance Problem
<b>P0102</b>	Mass or Volume Circuit Low Input
<b>P0103</b>	Mass or Volume Circuit High Input
<b>P0104</b>	Mass or Volume Circuit Intermittent
<b>P0105</b>	Manifold Absolute Pressure/Barometric Pressure Circuit Malfunction
<b>P0106</b>	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance Problem

# DTC Definitions

GENERIC (P0107 - P0136)

<b>Code</b>	<b>Definition</b>
<b>P0107</b>	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input
<b>P0108</b>	Manifold Absolute Pressure/Barometric Pressure Circuit High Input
<b>P0109</b>	Manifold Absolute Pressure/Barometric Pressure Circuit Intermittent
<b>P0110</b>	Intake Air Temperature Circuit Malfunction
<b>P0111</b>	Intake Air Temperature Circuit Range/Performance Problem
<b>P0112</b>	Intake Air Temperature Circuit Low Input
<b>P0113</b>	Intake Air Temperature Circuit High Input
<b>P0114</b>	Intake Air Temperature Circuit Intermittent
<b>P0115</b>	Engine Coolant Temperature Circuit Malfunction
<b>P0116</b>	Engine Coolant Temperature Circuit Range/Performance Problem
<b>P0117</b>	Engine Coolant Temperature Circuit Low Input
<b>P0118</b>	Engine Coolant Temperature Circuit High Input
<b>P0119</b>	Engine Coolant Temperature Circuit Intermittent
<b>P0120</b>	Throttle/Pedal Position Sensor/Switch A Circuit Malfunction
<b>P0121</b>	Throttle/Pedal Position Sensor/Switch A Circuit Range/Performance Problem
<b>P0122</b>	Throttle/Pedal Position Sensor/Switch A Circuit Low Input
<b>P0123</b>	Throttle/Pedal Position Sensor/Switch A Circuit High Input
<b>P0124</b>	Throttle/Pedal Position Sensor/Switch A Circuit Intermittent
<b>P0125</b>	Insufficient Coolant Temperature for Closed Loop Fuel Control
<b>P0126</b>	Insufficient Coolant Temperature for Stable Operation
<b>P0127</b>	Intake Air Temperature Too High
<b>P0128</b>	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)
<b>P0130</b>	O2 Sensor Circuit Malfunction (Bank 1 Sensor 1)
<b>P0131</b>	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)
<b>P0132</b>	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)
<b>P0133</b>	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)
<b>P0134</b>	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)
<b>P0135</b>	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)
<b>P0136</b>	O2 Sensor Circuit Malfunction (Bank 1 Sensor 2)

<b>Code</b>	<b>Definition</b>
<b>P0137</b>	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)
<b>P0138</b>	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)
<b>P0139</b>	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)
<b>P0140</b>	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 2)
<b>P0141</b>	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)
<b>P0142</b>	O2 Sensor Circuit Malfunction (Bank 1 Sensor 3)
<b>P0143</b>	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 3)
<b>P0144</b>	O2 Sensor Circuit High Voltage (Bank 1 Sensor 3)
<b>P0145</b>	O2 Sensor Circuit Slow Response (Bank 1 Sensor 3)
<b>P0146</b>	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 3)
<b>P0147</b>	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 3)
<b>P0148</b>	Fuel Delivery Error
<b>P0149</b>	Fuel Timing Error
<b>P0150</b>	O2 Sensor Circuit Malfunction (Bank 2 Sensor 1)
<b>P0151</b>	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1)
<b>P0152</b>	O2 Sensor Circuit High Voltage (Bank 2 Sensor 1)
<b>P0153</b>	O2 Sensor Circuit Slow Response (Bank 2 Sensor 1)
<b>P0154</b>	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 1)
<b>P0155</b>	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)
<b>P0156</b>	O2 Sensor Circuit Malfunction (Bank 2 Sensor 2)
<b>P0157</b>	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 2)
<b>P0158</b>	O2 Sensor Circuit High Voltage (Bank 2 Sensor 2)
<b>P0159</b>	O2 Sensor Circuit Slow Response (Bank 2 Sensor 2)
<b>P0160</b>	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 2)
<b>P0161</b>	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)
<b>P0162</b>	O2 Sensor Circuit Malfunction (Bank 2 Sensor 3)
<b>P0163</b>	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 3)
<b>P0164</b>	O2 Sensor Circuit High Voltage (Bank 2 Sensor 3)
<b>P0165</b>	O2 Sensor Circuit Slow Response (Bank 2 Sensor 3)
<b>P0166</b>	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 3)
<b>P0167</b>	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 3)
<b>P0168</b>	Fuel Temperature Too High
<b>P0169</b>	Incorrect Fuel Composition
<b>P0170</b>	Fuel Trim Malfunction (Bank 1)

# **DTC Definitions**

**GENERIC (P0171 - P0204)**

<b>Code</b>	<b>Definition</b>
<b>P0171</b>	System too Lean (Bank 1)
<b>P0172</b>	System too Rich (Bank 1)
<b>P0173</b>	Fuel Trim Malfunction (Bank 2)
<b>P0174</b>	System too Lean (Bank 2)
<b>P0175</b>	System too Rich (Bank 2)
<b>P0176</b>	Fuel Composition Sensor Circuit Malfunction
<b>P0177</b>	Fuel Composition Sensor Circuit Range/Performance
<b>P0178</b>	Fuel Composition Sensor Circuit Low Input
<b>P0179</b>	Fuel Composition Sensor Circuit High Input
<b>P0180</b>	Fuel Temperature Sensor A Circuit Malfunction
<b>P0181</b>	Fuel Temperature Sensor A Circuit Range/Performance
<b>P0182</b>	Fuel Temperature Sensor A Circuit Low Input
<b>P0183</b>	Fuel Temperature Sensor A Circuit High Input
<b>P0184</b>	Fuel Temperature Sensor A Circuit Intermittent
<b>P0185</b>	Fuel Temperature Sensor B Circuit Malfunction
<b>P0186</b>	Fuel Temperature Sensor B Circuit Range/Performance
<b>P0187</b>	Fuel Temperature Sensor B Circuit Low Input
<b>P0188</b>	Fuel Temperature Sensor B Circuit High Input
<b>P0189</b>	Fuel Temperature Sensor B Circuit Intermittent
<b>P0190</b>	Fuel Rail Pressure Sensor Circuit Malfunction
<b>P0191</b>	Fuel Rail Pressure Sensor Circuit Range/Performance
<b>P0192</b>	Fuel Rail Pressure Sensor Circuit Low Input
<b>P0193</b>	Fuel Rail Pressure Sensor Circuit High Input
<b>P0194</b>	Fuel Rail Pressure Sensor Circuit Intermittent
<b>P0195</b>	Engine Oil Temperature Sensor Malfunction
<b>P0196</b>	Engine Oil Temperature Sensor Range/Performance
<b>P0197</b>	Engine Oil Temperature Sensor Low
<b>P0198</b>	Engine Oil Temperature Sensor High
<b>P0199</b>	Engine Oil Temperature Sensor Intermittent
<b>P0200</b>	Injector Circuit Malfunction
<b>P0201</b>	Injector Circuit Malfunction - Cylinder 1
<b>P0202</b>	Injector Circuit Malfunction - Cylinder 2
<b>P0203</b>	Injector Circuit Malfunction - Cylinder 3
<b>P0204</b>	Injector Circuit Malfunction - Cylinder 4

<b>Code</b>	<b>Definition</b>
<b>P0205</b>	Injector Circuit Malfunction - Cylinder 5
<b>P0206</b>	Injector Circuit Malfunction - Cylinder 6
<b>P0207</b>	Injector Circuit Malfunction - Cylinder 7
<b>P0208</b>	Injector Circuit Malfunction - Cylinder 8
<b>P0209</b>	Injector Circuit Malfunction - Cylinder 9
<b>P0210</b>	Injector Circuit Malfunction - Cylinder 10
<b>P0211</b>	Injector Circuit Malfunction - Cylinder 11
<b>P0212</b>	Injector Circuit Malfunction - Cylinder 12
<b>P0213</b>	Cold Start Injector 1 Malfunction
<b>P0214</b>	Cold Start Injector 2 Malfunction
<b>P0215</b>	Engine Shutoff Solenoid Malfunction
<b>P0216</b>	Injection Timing Control Circuit Malfunction
<b>P0217</b>	Engine Overtemp Condition
<b>P0218</b>	Transmission Over Temperature Condition
<b>P0219</b>	Engine Overspeed Condition
<b>P0220</b>	Throttle/Pedal Position Sensor/Switch B Circuit Malfunction
<b>P0221</b>	Throttle/Pedal Position Sensor/Switch B Circuit Range/ Performance Problem
<b>P0222</b>	Throttle/Pedal Position Sensor/Switch B Circuit Low Input
<b>P0223</b>	Throttle/Pedal Position Sensor/Switch B Circuit High Input
<b>P0224</b>	Throttle/Pedal Position Sensor/Switch B Circuit Intermittent
<b>P0225</b>	Throttle/Pedal Position Sensor/Switch C Circuit Malfunction
<b>P0226</b>	Throttle/Pedal Position Sensor/Switch C Circuit Range/ Performance Problem
<b>P0227</b>	Throttle/Pedal Position Sensor/Switch C Circuit Low Input
<b>P0228</b>	Throttle/Pedal Position Sensor/Switch C Circuit High Input
<b>P0229</b>	Throttle/Pedal Position Sensor/Switch C Circuit Intermittent
<b>P0230</b>	Fuel Pump Primary Circuit Malfunction
<b>P0231</b>	Fuel Pump Secondary Circuit Low
<b>P0232</b>	Fuel Pump Secondary Circuit High
<b>P0233</b>	Fuel Pump Secondary Circuit Intermittent
<b>P0234</b>	Engine Overboost Condition
<b>P0235</b>	Turbocharger Boost Sensor A Circuit Malfunction
<b>P0236</b>	Turbocharger Boost Sensor A Circuit Range/Performance

# **DTC Definitions**

**GENERIC (P0237 - P0270)**

<b>Code</b>	<b>Definition</b>
<b>P0237</b>	Turbocharger Boost Sensor A Circuit Low
<b>P0238</b>	Turbocharger Boost Sensor A Circuit High
<b>P0239</b>	Turbocharger Boost Sensor B Circuit Malfunction
<b>P0240</b>	Turbocharger Boost Sensor B Circuit Range/Performance
<b>P0241</b>	Turbocharger Boost Sensor B Circuit Low
<b>P0242</b>	Turbocharger Boost Sensor B Circuit High
<b>P0243</b>	Turbocharger Wastegate Solenoid A Malfunction
<b>P0244</b>	Turbocharger Wastegate Solenoid A Range/Performance
<b>P0245</b>	Turbocharger Wastegate Solenoid A Low
<b>P0246</b>	Turbocharger Wastegate Solenoid A High
<b>P0247</b>	Turbocharger Wastegate Solenoid B Malfunction
<b>P0248</b>	Turbocharger Wastegate Solenoid B Range/Performance
<b>P0249</b>	Turbocharger Wastegate Solenoid B Low
<b>P0250</b>	Turbocharger Wastegate Solenoid B High
<b>P0251</b>	Injection Pump A Rotor/Cam Malfunction
<b>P0252</b>	Injection Pump A Rotor/Cam Range/Performance
<b>P0253</b>	Injection Pump A Rotor/Cam Low
<b>P0254</b>	Injection Pump A Rotor/Cam High
<b>P0255</b>	Injection Pump A Rotor/Cam Intermitted
<b>P0256</b>	Injection Pump B Rotor/Cam Malfunction
<b>P0257</b>	Injection Pump B Rotor/Cam Range/Performance
<b>P0258</b>	Injection Pump B Rotor/Cam Low
<b>P0259</b>	Injection Pump B Rotor/Cam High
<b>P0260</b>	Injection Pump B Rotor/Cam Intermitted
<b>P0261</b>	Cylinder 1 Injector Circuit Low
<b>P0262</b>	Cylinder 1 Injector Circuit High
<b>P0263</b>	Cylinder 1 Contribution/Balance Fault
<b>P0264</b>	Cylinder 2 Injector Circuit Low
<b>P0265</b>	Cylinder 2 Injector Circuit High
<b>P0266</b>	Cylinder 2 Contribution/Balance Fault
<b>P0267</b>	Cylinder 3 Injector Circuit Low
<b>P0268</b>	Cylinder 3 Injector Circuit High
<b>P0269</b>	Cylinder 3 Contribution/Balance Fault
<b>P0270</b>	Cylinder 4 Injector Circuit Low

<b>Code</b>	<b>Definition</b>
<b>P0271</b>	Cylinder 4 Injector Circuit High
<b>P0272</b>	Cylinder 4 Contribution/Balance Fault
<b>P0273</b>	Cylinder 5 Injector Circuit Low
<b>P0274</b>	Cylinder 5 Injector Circuit High
<b>P0275</b>	Cylinder 5 Contribution/Balance Fault
<b>P0276</b>	Cylinder 6 Injector Circuit Low
<b>P0277</b>	Cylinder 6 Injector Circuit High
<b>P0278</b>	Cylinder 6 Contribution/Balance Fault
<b>P0279</b>	Cylinder 7 Injector Circuit Low
<b>P0280</b>	Cylinder 7 Injector Circuit High
<b>P0281</b>	Cylinder 7 Contribution/Balance Fault
<b>P0282</b>	Cylinder 8 Injector Circuit Low
<b>P0283</b>	Cylinder 8 Injector Circuit High
<b>P0284</b>	Cylinder 8 Contribution/Balance Fault
<b>P0285</b>	Cylinder 9 Injector Circuit Low
<b>P0286</b>	Cylinder 9 Injector Circuit High
<b>P0287</b>	Cylinder 9 Contribution/Balance Fault
<b>P0288</b>	Cylinder 10 Injector Circuit Low
<b>P0289</b>	Cylinder 10 Injector Circuit High
<b>P0290</b>	Cylinder 10 Contribution/Balance Fault
<b>P0291</b>	Cylinder 11 Injector Circuit Low
<b>P0292</b>	Cylinder 11 Injector Circuit High
<b>P0293</b>	Cylinder 11 Contribution/Balance Fault
<b>P0294</b>	Cylinder 12 Injector Circuit Low
<b>P0295</b>	Cylinder 12 Injector Circuit High
<b>P0296</b>	Cylinder 12 Contribution/Balance Fault
<b>P0298</b>	Engine Oil Over Temperature
<b>P0300</b>	Random/Multiple Cylinder Misfire Detected
<b>P0301</b>	Cylinder 1 Misfire Detected
<b>P0302</b>	Cylinder 2 Misfire Detected
<b>P0303</b>	Cylinder 3 Misfire Detected
<b>P0304</b>	Cylinder 4 Misfire Detected
<b>P0305</b>	Cylinder 5 Misfire Detected
<b>P0306</b>	Cylinder 6 Misfire Detected

# **DTC Definitions**

**GENERIC (P0307 - P0344)**

<b>Code</b>	<b>Definition</b>
<b>P0307</b>	Cylinder 7 Misfire Detected
<b>P0308</b>	Cylinder 8 Misfire Detected
<b>P0309</b>	Cylinder 9 Misfire Detected
<b>P0310</b>	Cylinder 10 Misfire Detected
<b>P0311</b>	Cylinder 11 Misfire Detected
<b>P0312</b>	Cylinder 12 Misfire Detected
<b>P0313</b>	Misfire Detected with Low Fuel
<b>P0314</b>	Single Cylinder Misfire (Cylinder not specified)
<b>P0320</b>	Ignition/Distributor Engine Speed Input Circuit Malfunction
<b>P0321</b>	Ignition/Distributor Engine Speed Input Circuit Range/ Performance
<b>P0322</b>	Ignition/Distributor Engine Speed Input Circuit No Signal
<b>P0323</b>	Ignition/Distributor Engine Speed Input Circuit Intermittent
<b>P0324</b>	Knock Control System Error
<b>P0325</b>	Knock Sensor 1 Circuit Malfunction (Bank 1 or Single Sensor)
<b>P0326</b>	Knock Sensor 1 Circuit Range/Performance (Bank 1 or Single Sensor)
<b>P0327</b>	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)
<b>P0328</b>	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)
<b>P0329</b>	Knock Sensor 1 Circuit Intermittent (Bank 1 or Single Sensor)
<b>P0330</b>	Knock Sensor 2 Circuit Malfunction (Bank 2)
<b>P0331</b>	Knock Sensor 2 Circuit Range/Performance (Bank 2)
<b>P0332</b>	Knock Sensor 2 Circuit Low Input (Bank 2)
<b>P0333</b>	Knock Sensor 2 Circuit High Input (Bank 2)
<b>P0334</b>	Knock Sensor 2 Circuit Intermittent (Bank 2)
<b>P0335</b>	Crankshaft Position Sensor A Circuit Malfunction
<b>P0336</b>	Crankshaft Position Sensor A Circuit Range/Performance
<b>P0337</b>	Crankshaft Position Sensor A Circuit Low Input
<b>P0338</b>	Crankshaft Position Sensor A Circuit High Input
<b>P0339</b>	Crankshaft Position Sensor A Circuit Intermittent
<b>P0340</b>	Camshaft Position Sensor Circuit Malfunction
<b>P0341</b>	Camshaft Position Sensor Circuit Range/Performance
<b>P0342</b>	Camshaft Position Sensor Circuit Low Input
<b>P0343</b>	Camshaft Position Sensor Circuit High Input
<b>P0344</b>	Camshaft Position Sensor Circuit Intermittent



<b>Code</b>	<b>Definition</b>
<b>P0345</b>	Camshaft Position Sensor "A" Circuit (Bank 2)
<b>P0346</b>	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)
<b>P0347</b>	Camshaft Position Sensor "A" Circuit Low Input (Bank 2)
<b>P0348</b>	Camshaft Position Sensor "A" Circuit High Input (Bank 2)
<b>P0349</b>	Camshaft Position Sensor "A" Circuit Intermittent (Bank 2)
<b>P0350</b>	Ignition Coil Primary/Secondary Circuit Malfunction
<b>P0351</b>	Ignition Coil A Primary/Secondary Circuit Malfunction
<b>P0352</b>	Ignition Coil B Primary/Secondary Circuit Malfunction
<b>P0353</b>	Ignition Coil C Primary/Secondary Circuit Malfunction
<b>P0354</b>	Ignition Coil D Primary/Secondary Circuit Malfunction
<b>P0355</b>	Ignition Coil E Primary/Secondary Circuit Malfunction
<b>P0356</b>	Ignition Coil F Primary/Secondary Circuit Malfunction
<b>P0357</b>	Ignition Coil G Primary/Secondary Circuit Malfunction
<b>P0358</b>	Ignition Coil H Primary/Secondary Circuit Malfunction
<b>P0359</b>	Ignition Coil I Primary/Secondary Circuit Malfunction
<b>P0360</b>	Ignition Coil J Primary/Secondary Circuit Malfunction
<b>P0361</b>	Ignition Coil K Primary/Secondary Circuit Malfunction
<b>P0362</b>	Ignition Coil L Primary/Secondary Circuit Malfunction
<b>P0365</b>	Camshaft Position Sensor "B" Circuit (Bank 1)
<b>P0366</b>	Camshaft Position Sensor "B" Circuit Range/Performance (Bank 1)
<b>P0367</b>	Camshaft Position Sensor "B" Circuit Low Input (Bank 1)
<b>P0368</b>	Camshaft Position Sensor "B" Circuit High Input (Bank 1)
<b>P0369</b>	Camshaft Position Sensor "B" Circuit Intermittent (Bank 1)
<b>P0370</b>	Timing Reference High Resolution Signal A Malfunction
<b>P0371</b>	Timing Reference High Resolution Signal A Too Many Pulses
<b>P0372</b>	Timing Reference High Resolution Signal A Too Few Pulses
<b>P0373</b>	Timing Reference High Resolution Signal A Intermittent/ Erratic Pulses
<b>P0374</b>	Timing Reference High Resolution Signal A No Pulses
<b>P0375</b>	Timing Reference High Resolution Signal B Malfunction
<b>P0376</b>	Timing Reference High Resolution Signal B Too Many Pulses
<b>P0377</b>	Timing Reference High Resolution Signal B Too Few Pulses

# DTC Definitions

GENERIC (P0378 - P0415)

<b>Code</b>	<b>Definition</b>
<b>P0378</b>	Timing Reference High Resolution Signal B Intermittent/Erratic Pulses
<b>P0379</b>	Timing Reference High Resolution Signal B No Pulses
<b>P0380</b>	Glow Plug/Heater Circuit Malfunction
<b>P0381</b>	Glow Plug/Heater Indicator Circuit Malfunction
<b>P0382</b>	Glow Plug/Heater Circuit "B" Malfunction
<b>P0385</b>	Crankshaft Position Sensor B Circuit Malfunction
<b>P0386</b>	Crankshaft Position Sensor B Circuit Range/Performance
<b>P0387</b>	Crankshaft Position Sensor B Circuit Low Input
<b>P0388</b>	Crankshaft Position Sensor B Circuit High Input
<b>P0389</b>	Crankshaft Position Sensor B Circuit Intermittent
<b>P0390</b>	Camshaft Position Sensor "B" Circuit (Bank 2)
<b>P0391</b>	Camshaft Position Sensor "B" Circuit Range/Performance (Bank 2)
<b>P0392</b>	Camshaft Position Sensor "B" Circuit Low Input (Bank 2)
<b>P0393</b>	Camshaft Position Sensor "B" Circuit High Input (Bank 2)
<b>P0394</b>	Camshaft Position Sensor "B" Circuit Intermittent (Bank 2)
<b>P0400</b>	Exhaust Gas Recirculation Flow Malfunction
<b>P0401</b>	Exhaust Gas Recirculation Flow Insufficient Detected
<b>P0402</b>	Exhaust Gas Recirculation Flow Excessive Detected
<b>P0403</b>	Exhaust Gas Recirculation Circuit Malfunction
<b>P0404</b>	Exhaust Gas Recirculation Circuit Range/Performance
<b>P0405</b>	Exhaust Gas Recirculation Sensor A Circuit Low
<b>P0406</b>	Exhaust Gas Recirculation Sensor A Circuit High
<b>P0407</b>	Exhaust Gas Recirculation Sensor B Circuit Low
<b>P0408</b>	Exhaust Gas Recirculation Sensor B Circuit High
<b>P0409</b>	Exhaust Gas Recirculation Sensor "A" Circuit
<b>P0410</b>	Secondary Air Injection System Malfunction
<b>P0411</b>	Secondary Air Injection System Incorrect Flow Detected
<b>P0412</b>	Secondary Air Injection System Switching Valve A Circuit Malfunction
<b>P0413</b>	Secondary Air Injection System Switching Valve A Circuit Open
<b>P0414</b>	Secondary Air Injection System Switching Valve A Circuit Shorted
<b>P0415</b>	Secondary Air Injection System Switching Valve B Circuit Malfunction

<b>Code</b>	<b>Definition</b>
<b>P0416</b>	Secondary Air Injection System Switching Valve B Circuit Open
<b>P0417</b>	Secondary Air Injection System Switching Valve B Circuit Shorted
<b>P0418</b>	Secondary Air Injection System Relay "A" Circuit Malfunction
<b>P0419</b>	Secondary Air Injection System Relay "B" Circuit Malfunction
<b>P0420</b>	Catalyst System Efficiency Below Threshold (Bank 1)
<b>P0421</b>	Warm Up Catalyst Efficiency Below Threshold (Bank 1)
<b>P0422</b>	Main Catalyst Efficiency Below Threshold (Bank 1)
<b>P0423</b>	Heated Catalyst Efficiency Below Threshold (Bank 1)
<b>P0424</b>	Heated Catalyst Temperature Below Threshold (Bank 1)
<b>P0425</b>	Catalyst Temperature Sensor (Bank 1)
<b>P0426</b>	Catalyst Temperature Sensor Range/Performance (Bank 1)
<b>P0427</b>	Catalyst Temperature Sensor Low Input (Bank 1)
<b>P0428</b>	Catalyst Temperature Sensor High Input (Bank 1)
<b>P0429</b>	Catalyst Heater Control Circuit (Bank 1)
<b>P0430</b>	Catalyst System Efficiency Below Threshold (Bank 2)
<b>P0431</b>	Warm Up Catalyst Efficiency Below Threshold (Bank 2)
<b>P0432</b>	Main Catalyst Efficiency Below Threshold (Bank 2)
<b>P0433</b>	Heated Catalyst Efficiency Below Threshold (Bank 2)
<b>P0434</b>	Heated Catalyst Temperature Below Threshold (Bank 2)
<b>P0435</b>	Catalyst Temperature Sensor (Bank 2)
<b>P0436</b>	Catalyst Temperature Sensor Range/Performance (Bank 2)
<b>P0437</b>	Catalyst Temperature Sensor Low Input (Bank 2)
<b>P0438</b>	Catalyst Temperature Sensor High Input (Bank 2)
<b>P0439</b>	Catalyst Heater Control Circuit (Bank 2)
<b>P0440</b>	Evaporative Emission Control System Malfunction
<b>P0441</b>	Evaporative Emission Control System Incorrect Purge Flow
<b>P0442</b>	Evaporative Emission Control System Leak Detected (small leak)
<b>P0443</b>	Evaporative Emission Control System Purge Control Valve Circuit Malfunction
<b>P0444</b>	Evaporative Emission Control System Purge Control Valve Circuit Open
<b>P0445</b>	Evaporative Emission Control System Purge Control Valve Circuit Shorted

# DTC Definitions

GENERIC (P0446 - P0473)

<b>Code</b>	<b>Definition</b>
<b>P0446</b>	Evaporative Emission Control System Vent Control Circuit Malfunction
<b>P0447</b>	Evaporative Emission Control System Vent Control Open
<b>P0448</b>	Evaporative Emission Control System Vent Control Circuit Shorted
<b>P0449</b>	Evaporative Emission Control System Vent Valve/Solenoid Circuit Malfunction
<b>P0450</b>	Evaporative Emission Control System Pressure Sensor Malfunction
<b>P0451</b>	Evaporative Emission Control System Pressure Sensor Range/Performance
<b>P0452</b>	Evaporative Emission Control System Pressure Sensor Low Input
<b>P0453</b>	Evaporative Emission Control System Pressure Sensor High Input
<b>P0454</b>	Evaporative Emission Control System Pressure Sensor Intermittent
<b>P0455</b>	Evaporative Emission Control System Leak Detected (gross leak)
<b>P0456</b>	Evaporative Emission Control System Leak Detected (very small leak)
<b>P0457</b>	Evaporative Emission Control System Leak Detected (fuel cap loose/off)
<b>P0460</b>	Fuel Level Sensor Circuit Malfunction
<b>P0461</b>	Fuel Level Sensor Circuit Range/Performance
<b>P0462</b>	Fuel Level Sensor Circuit Low Input
<b>P0463</b>	Fuel Level Sensor Circuit High Input
<b>P0464</b>	Fuel Level Sensor Circuit Intermittent
<b>P0465</b>	Purge Flow Sensor Circuit Malfunction
<b>P0466</b>	Purge Flow Sensor Circuit Range/Performance
<b>P0467</b>	Purge Flow Sensor Circuit Low Input
<b>P0468</b>	Purge Flow Sensor Circuit High Input
<b>P0469</b>	Purge Flow Sensor Circuit Intermittent
<b>P0470</b>	Exhaust Pressure Sensor Malfunction
<b>P0471</b>	Exhaust Pressure Sensor Range/Performance
<b>P0472</b>	Exhaust Pressure Sensor Low
<b>P0473</b>	Exhaust Pressure Sensor High

<b>Code</b>	<b>Definition</b>
<b>P0474</b>	Exhaust Pressure Sensor Intermittent
<b>P0475</b>	Exhaust Pressure Control Valve Malfunction
<b>P0476</b>	Exhaust Pressure Control Valve Range/Performance
<b>P0477</b>	Exhaust Pressure Control Valve Low
<b>P0478</b>	Exhaust Pressure Control Valve High
<b>P0479</b>	Exhaust Pressure Control Valve Intermittent
<b>P0480</b>	Cooling Fan 1 Control Circuit Malfunction
<b>P0481</b>	Cooling Fan 2 Control Circuit Malfunction
<b>P0482</b>	Cooling Fan 3 Control Circuit Malfunction
<b>P0483</b>	Cooling Fan Rationality Check Malfunction
<b>P0484</b>	Cooling Fan Circuit Over Current
<b>P0485</b>	Cooling Fan Power/Ground Circuit Malfunction
<b>P0486</b>	Exhaust Gas Recirculation Sensor "B" Circuit
<b>P0487</b>	Exhaust Gas Recirculation Throttle Position Control Circuit
<b>P0488</b>	Exhaust Gas Recirculation Throttle Position Control Range/Performance
<b>P0491</b>	Secondary Air Injection System (Bank 1)
<b>P0492</b>	Secondary Air Injection System (Bank 2)
<b>P0500</b>	Vehicle Speed Sensor Malfunction
<b>P0501</b>	Vehicle Speed Sensor Range/Performance
<b>P0502</b>	Vehicle Speed Sensor Circuit Low Input
<b>P0503</b>	Vehicle Speed Sensor Intermittent/Erratic/High
<b>P0505</b>	Idle Control System Malfunction
<b>P0506</b>	Idle Control System RPM Lower Than Expected
<b>P0507</b>	Idle Control System RPM Higher Than Expected
<b>P0508</b>	Idle Control System Circuit Low
<b>P0509</b>	Idle Control System Circuit High
<b>P0510</b>	Closed Throttle Position Switch Malfunction
<b>P0512</b>	Starter Request Circuit
<b>P0513</b>	Incorrect Immobilizer Key ("Immobilizer" pending SAE J1930 approval)
<b>P0515</b>	Battery Temperature Sensor Circuit
<b>P0516</b>	Battery Temperature Sensor Circuit Low
<b>P0517</b>	Battery Temperature Sensor Circuit High

# **DTC Definitions**

**GENERIC (P0520 - P0569)**

<b>Code</b>	<b>Definition</b>
<b>P0520</b>	Engine Oil Pressure/Switch Circuit Malfunction
<b>P0521</b>	Engine Oil Pressure/Switch Range/Performance
<b>P0522</b>	Engine Oil Pressure/Switch Low Voltage
<b>P0523</b>	Engine Oil Pressure/Switch High Voltage
<b>P0524</b>	Engine Oil Pressure Too Low
<b>P0530</b>	A/C Refrigerant Pressure Sensor Circuit Malfunction
<b>P0531</b>	A/C Refrigerant Pressure Sensor Circuit Range/Performance
<b>P0532</b>	A/C Refrigerant Pressure Sensor Circuit Low Input
<b>P0533</b>	A/C Refrigerant Pressure Sensor Circuit High Input
<b>P0534</b>	Air Conditioner Refrigerant Charge Loss
<b>P0540</b>	Intake Air Heater Circuit
<b>P0541</b>	Intake Air Heater Circuit Low
<b>P0542</b>	Intake Air Heater Circuit High
<b>P0544</b>	Exhaust Gas Temperature Sensor Circuit (Bank 1)
<b>P0545</b>	Exhaust Gas Temperature Sensor Circuit Low (Bank 1)
<b>P0546</b>	Exhaust Gas Temperature Sensor Circuit High (Bank 1)
<b>P0547</b>	Exhaust Gas Temperature Sensor Circuit (Bank 2)
<b>P0548</b>	Exhaust Gas Temperature Sensor Circuit Low (Bank 2)
<b>P0549</b>	Exhaust Gas Temperature Sensor Circuit High (Bank 2)
<b>P0550</b>	Power Steering Pressure Sensor Circuit Malfunction
<b>P0551</b>	Power Steering Pressure Sensor Circuit Range/Performance
<b>P0552</b>	Power Steering Pressure Sensor Circuit Low Input
<b>P0553</b>	Power Steering Pressure Sensor Circuit High Input
<b>P0554</b>	Power Steering Pressure Sensor Circuit Intermittent
<b>P0560</b>	System Voltage Malfunction
<b>P0561</b>	System Voltage Unstable
<b>P0562</b>	System Voltage Low
<b>P0563</b>	System Voltage High
<b>P0564</b>	Cruise Control Multi-Function Input Signal
<b>P0565</b>	Cruise Control On Signal Malfunction
<b>P0566</b>	Cruise Control Off Signal Malfunction
<b>P0567</b>	Cruise Control Resume Signal Malfunction
<b>P0568</b>	Cruise Control Set Signal Malfunction
<b>P0569</b>	Cruise Control Coast Signal Malfunction

<b>Code</b>	<b>Definition</b>
<b>P0570</b>	Cruise Control Accel Signal Malfunction
<b>P0571</b>	Cruise Control/Brake Switch A Circuit Malfunction
<b>P0572</b>	Cruise Control/Brake Switch A Circuit Low
<b>P0573</b>	Cruise Control/Brake Switch A Circuit High
<b>P0574</b>	Cruise Control System - Vehicle Speed Too High
<b>P0575</b>	Cruise Control Input Circuit
<b>P0576</b>	Cruise Control Input Circuit Low
<b>P0577</b>	Cruise Control Input Circuit High
<b>P0578- P0580</b>	Reserved for Cruise Control Codes
<b>P0600</b>	Serial Communication Link Malfunction
<b>P0601</b>	Internal Control Module Memory Check Sum Error
<b>P0602</b>	Control Module Programming Error
<b>P0603</b>	Internal Control Module Keep Alive Memory (KAM) Error
<b>P0604</b>	Internal Control Module Random Access Memory (RAM) Error
<b>P0605</b>	Internal Control Module Read Only Memory (ROM) Error
<b>P0606</b>	PCM Processor Fault
<b>P0607</b>	Control Module Performance
<b>P0608</b>	Control Module VSS Output "A" Malfunction
<b>P0609</b>	Control Module VSS Output "B" Malfunction
<b>P0610</b>	Control Module Vehicle Options Error
<b>P0615</b>	Starter Relay Circuit
<b>P0616</b>	Starter Relay Circuit Low
<b>P0617</b>	Starter Relay Circuit High
<b>P0618</b>	Alternative Fuel Control Module KAM Error
<b>P0619</b>	Alternative Fuel Control Module RAM/ROM Error
<b>P0620</b>	Generator Control Circuit Malfunction
<b>P0621</b>	Generator Lamp "L" Control Circuit Malfunction
<b>P0622</b>	Generator Field "F" Control Circuit Malfunction
<b>P0623</b>	Generator Lamp Control Circuit
<b>P0624</b>	Fuel Cap Lamp Control Circuit
<b>P0630</b>	VIN Not Programmed or Mismatch - ECM/PCM
<b>P0631</b>	VIN Not Programmed or Mismatch - TCM
<b>P0635</b>	Power Steering Control Circuit

# DTC Definitions

GENERIC (P0636 - P0711)

<b>Code</b>	<b>Definition</b>
<b>P0636</b>	Power Steering Control Circuit Low
<b>P0637</b>	Power Steering Control Circuit High
<b>P0638</b>	Throttle Actuator Control Range/Performance (Bank 1)
<b>P0639</b>	Throttle Actuator Control Range/Performance (Bank 2)
<b>P0640</b>	Intake Air Heater Control Circuit
<b>P0645</b>	A/C Clutch Relay Control Circuit
<b>P0646</b>	A/C Clutch Relay Control Circuit Low
<b>P0647</b>	A/C Clutch Relay Control Circuit High
<b>P0648</b>	Immobilizer Lamp Control Circuit ("Immobilizer" pending SAE J1930 approval)
<b>P0649</b>	Speed Control Lamp Control Circuit
<b>P0650</b>	Malfunction Indicator Lamp (MIL) Control Circuit Malfunction
<b>P0654</b>	Engine RPM Output Circuit Malfunction
<b>P0655</b>	Engine Hot Lamp Output Control Circuit Malfunction
<b>P0656</b>	Fuel Level Output Circuit Malfunction
<b>P0660</b>	Intake Manifold Tuning Valve Control Circuit (Bank 1)
<b>P0661</b>	Intake Manifold Tuning Valve Control Circuit Low (Bank 1)
<b>P0662</b>	Intake Manifold Tuning Valve Control Circuit High (Bank 1)
<b>P0663</b>	Intake Manifold Tuning Valve Control Circuit (Bank 2)
<b>P0664</b>	Intake Manifold Tuning Valve Control Circuit Low (Bank 2)
<b>P0665</b>	Intake Manifold Tuning Valve Control Circuit High (Bank 2)
<b>P0700</b>	Transmission Control System Malfunction
<b>P0701</b>	Transmission Control System Range/Performance
<b>P0702</b>	Transmission Control System Electrical
<b>P0703</b>	Torque Converter/Brake Switch B Circuit Malfunction
<b>P0704</b>	Clutch Switch Input Circuit Malfunction
<b>P0705</b>	Transmission Range Sensor Circuit Malfunction (PRNDL Input)
<b>P0706</b>	Transmission Range Sensor Circuit Range/Performance
<b>P0707</b>	Transmission Range Sensor Circuit Low Input
<b>P0708</b>	Transmission Range Sensor Circuit High Input
<b>P0709</b>	Transmission Range Sensor Circuit Intermittent
<b>P0710</b>	Transmission Fluid Temperature Sensor Circuit Malfunction
<b>P0711</b>	Transmission Fluid Temperature Sensor Circuit Range/ Performance



<b>Code</b>	<b>Definition</b>
<b>P0712</b>	Transmission Fluid Temperature Sensor Circuit Low Input
<b>P0713</b>	Transmission Fluid Temperature Sensor Circuit High Input
<b>P0714</b>	Transmission Fluid Temperature Sensor Circuit Intermittent
<b>P0715</b>	Input/Turbine Speed Sensor Circuit Malfunction
<b>P0716</b>	Input/Turbine Speed Sensor Circuit Range/Performance
<b>P0717</b>	Input/Turbine Speed Sensor Circuit No Signal
<b>P0718</b>	Input/Turbine Speed Sensor Circuit Intermittent
<b>P0719</b>	Torque Converter/Brake Switch B Circuit Low
<b>P0720</b>	Output Speed Sensor Circuit Malfunction
<b>P0721</b>	Output Speed Sensor Circuit Range/Performance
<b>P0722</b>	Output Speed Sensor Circuit No Signal
<b>P0723</b>	Output Speed Sensor Circuit Intermittent
<b>P0724</b>	Torque Converter/Brake Switch B Circuit High
<b>P0725</b>	Engine Speed Input Circuit Malfunction
<b>P0726</b>	Engine Speed Input Circuit Range/Performance
<b>P0727</b>	Engine Speed Input Circuit No Signal
<b>P0728</b>	Engine Speed Input Circuit Intermittent
<b>P0730</b>	Incorrect Gear Ratio
<b>P0731</b>	Gear 1 Incorrect Ratio
<b>P0732</b>	Gear 2 Incorrect Ratio
<b>P0733</b>	Gear 3 Incorrect Ratio
<b>P0734</b>	Gear 4 Incorrect Ratio
<b>P0735</b>	Gear 5 Incorrect Ratio
<b>P0736</b>	Reverse Incorrect Ratio
<b>P0737</b>	TCM Engine Speed Output Circuit
<b>P0738</b>	TCM Engine Speed Output Circuit Low
<b>P0739</b>	TCM Engine Speed Output Circuit High
<b>P0740</b>	Torque Converter Clutch Circuit Malfunction
<b>P0741</b>	Torque Converter Clutch Circuit Performance or Stuck Off
<b>P0742</b>	Torque Converter Clutch Circuit Stuck On
<b>P0743</b>	Torque Converter Clutch Circuit Electrical
<b>P0744</b>	Torque Converter Clutch Circuit Intermittent
<b>P0745</b>	Pressure Control Solenoid Malfunction
<b>P0746</b>	Pressure Control Solenoid Performance or Stuck Off

# DTC Definitions

GENERIC (P0747 - P0780)

<b>Code</b>	<b>Definition</b>
<b>P0747</b>	Pressure Control Solenoid Stuck On
<b>P0748</b>	Pressure Control Solenoid Electrical
<b>P0749</b>	Pressure Control Solenoid Intermittent
<b>P0750</b>	Shift Solenoid A Malfunction
<b>P0751</b>	Shift Solenoid A Performance or Stuck Off
<b>P0752</b>	Shift Solenoid A Stuck On
<b>P0753</b>	Shift Solenoid A Electrical
<b>P0754</b>	Shift Solenoid A Intermittent
<b>P0755</b>	Shift Solenoid B Malfunction
<b>P0756</b>	Shift Solenoid B Performance or Stuck Off
<b>P0757</b>	Shift Solenoid B Stuck On
<b>P0758</b>	Shift Solenoid B Electrical
<b>P0759</b>	Shift Solenoid B Intermittent
<b>P0760</b>	Shift Solenoid C Malfunction
<b>P0761</b>	Shift Solenoid C Performance or Stuck Off
<b>P0762</b>	Shift Solenoid C Stuck On
<b>P0763</b>	Shift Solenoid C Electrical
<b>P0764</b>	Shift Solenoid C Intermittent
<b>P0765</b>	Shift Solenoid D Malfunction
<b>P0766</b>	Shift Solenoid D Performance or Stuck Off
<b>P0767</b>	Shift Solenoid D Stuck On
<b>P0768</b>	Shift Solenoid D Electrical
<b>P0769</b>	Shift Solenoid D Intermittent
<b>P0770</b>	Shift Solenoid E Malfunction
<b>P0771</b>	Shift Solenoid E Performance or Stuck Off
<b>P0772</b>	Shift Solenoid E Stuck On
<b>P0773</b>	Shift Solenoid E Electrical
<b>P0774</b>	Shift Solenoid E Intermittent
<b>P0775</b>	Pressure Control Solenoid "B"
<b>P0776</b>	Pressure Control Solenoid "B" Performance or Stuck Off
<b>P0777</b>	Pressure Control Solenoid "B" Stuck On
<b>P0778</b>	Pressure Control Solenoid "B" Electrical
<b>P0779</b>	Pressure Control Solenoid "B" Intermittent
<b>P0780</b>	Shift Malfunction

<b>Code</b>	<b>Definition</b>
<b>P0781</b>	1-2 Shift Malfunction
<b>P0782</b>	2-3 Shift Malfunction
<b>P0783</b>	3-4 Shift Malfunction
<b>P0784</b>	4-5 Shift Malfunction
<b>P0785</b>	Shift/Timing Solenoid Malfunction
<b>P0786</b>	Shift/Timing Solenoid Range/Performance
<b>P0787</b>	Shift/Timing Solenoid Low
<b>P0788</b>	Shift/Timing Solenoid High
<b>P0789</b>	Shift/Timing Solenoid Intermittent
<b>P0790</b>	Normal/Performance Switch Circuit Malfunction
<b>P0791</b>	Intermediate Shaft Speed Sensor Circuit
<b>P0792</b>	Intermediate Shaft Speed Sensor Circuit Range/Performance
<b>P0793</b>	Intermediate Shaft Speed Sensor Circuit No Signal
<b>P0794</b>	Intermediate Shaft Speed Sensor Circuit Intermittent
<b>P0795</b>	Pressure Control Solenoid "C"
<b>P0796</b>	Pressure Control Solenoid "C" Performance or Stuck Off
<b>P0797</b>	Pressure Control Solenoid "C" Stuck On
<b>P0798</b>	Pressure Control Solenoid "C" Electrical
<b>P0799</b>	Pressure Control Solenoid "C" Intermittent
<b>P0801</b>	Reverse Inhibit Control Circuit Malfunction
<b>P0803</b>	1-4 Upshift (Skip Shift) Solenoid Control Circuit Malfunction
<b>P0804</b>	1-4 Upshift (Skip Shift) Lamp Control Circuit Malfunction
<b>P0805</b>	Clutch Position Sensor Circuit
<b>P0806</b>	Clutch Position Sensor Circuit Range/Performance
<b>P0807</b>	Clutch Position Sensor Circuit Low
<b>P0808</b>	Clutch Position Sensor Circuit High
<b>P0809</b>	Clutch Position Sensor Circuit Intermittent
<b>P0810</b>	Clutch Position Control Error
<b>P0811</b>	Excessive Clutch Slippage
<b>P0812</b>	Reverse Input Circuit
<b>P0813</b>	Reverse Output Circuit
<b>P0814</b>	Transmission Range Display Circuit
<b>P0815</b>	Upshift Switch Circuit
<b>P0816</b>	Downshift Switch Circuit

# **DTC Definitions**

GENERIC (P0817 - P0849)

<b>Code</b>	<b>Definition</b>
<b>P0817</b>	Starter Disable Circuit
<b>P0818</b>	Driveline Disconnect Switch Input Circuit
<b>P0820</b>	Gear Lever X-Y Position Sensor Circuit
<b>P0821</b>	Gear Lever X Position Circuit
<b>P0822</b>	Gear Lever Y Position Circuit
<b>P0823</b>	Gear Lever X Position Circuit Intermittent
<b>P0824</b>	Gear Lever Y Position Circuit Intermittent
<b>P0825</b>	Gear Lever Push-Pull Switch (Shift Anticipate)
<b>P0830</b>	Clutch Pedal Switch "A" Circuit
<b>P0831</b>	Clutch Pedal Switch "A" Circuit Low
<b>P0832</b>	Clutch Pedal Switch "A" Circuit High
<b>P0833</b>	Clutch Pedal Switch "B" Circuit
<b>P0834</b>	Clutch Pedal Switch "B" Circuit Low
<b>P0835</b>	Clutch Pedal Switch "B" Circuit High
<b>P0836</b>	Four Wheel Drive (4WD) Switch Circuit
<b>P0837</b>	Four Wheel Drive (4WD) Switch Circuit Range/Performance
<b>P0838</b>	Four Wheel Drive (4WD) Switch Circuit Low
<b>P0839</b>	Four Wheel Drive (4WD) Switch Circuit High
<b>P0840</b>	Transmission Fluid Pressure Sensor/Switch "A" Circuit
<b>P0841</b>	Transmission Fluid Pressure Sensor/Switch "A" Circuit Range/ Performance
<b>P0842</b>	Transmission Fluid Pressure Sensor/Switch "A" Circuit Low
<b>P0843</b>	Transmission Fluid Pressure Sensor/Switch "A" Circuit High
<b>P0844</b>	Transmission Fluid Pressure Sensor/Switch "A" Circuit Intermittent
<b>P0845</b>	Transmission Fluid Pressure Sensor/Switch "B" Circuit
<b>P0846</b>	Transmission Fluid Pressure Sensor/Switch "B" Circuit Range/ Performance
<b>P0847</b>	Transmission Fluid Pressure Sensor/Switch "B" Circuit Low
<b>P0848</b>	Transmission Fluid Pressure Sensor/Switch "B" Circuit High
<b>P0849</b>	Transmission Fluid Pressure Sensor/Switch "B" Circuit Intermittent

**MANUFACTURER SPECIFIC CODES - CHRYSLER**

<b>Code</b>	<b>Definition</b>
<b>P1103</b>	Turbocharger Waste Gate Actuator Malfunction
<b>P1104</b>	Turbocharger Waste Gate Solenoid Malfunction
<b>P1105</b>	Fuel Pressure Solenoid Malfunction
<b>P1195</b>	Slow Switching O2 Sensor Bank One Sensor One During catalyst monitoring
<b>P1196</b>	Slow Switching O2 Sensor Bank two Sensor one During catalyst monitoring
<b>P1197</b>	Slow Switching O2 Sensor Bank One Sensor two During catalyst monitoring
<b>P1198</b>	Radiator Temperature Sensor Input voltage too high
<b>P1199</b>	Radiator Temperature Sensor Input voltage too low
<b>P1281</b>	Engine is cold too long
<b>P1282</b>	Fuel Pump Relay control circuit
<b>P1283</b>	Idle select signal invalid
<b>P1284</b>	Fuel Injection pump battery voltage sensor out of range
<b>P1285</b>	Fuel Injection pump controller always on
<b>P1286</b>	Accelerator Position Sensor (APPS) supply voltage too high
<b>P1287</b>	Fuel Injection pump Controller Supply voltage low
<b>P1288</b>	Intake manifold short runner tuning valve solenoid circuit
<b>P1289</b>	Manifold tune valve solenoid circuit
<b>P1290</b>	CNG Fuel system pressure too high
<b>P1291</b>	No Temp rise seen from intake heaters
<b>P1292</b>	CNG Pressure sensor voltage too high
<b>P1293</b>	CNG Pressure sensor voltage too low
<b>P1294</b>	Target idle not reached
<b>P1295</b>	No 5 volts to TP sensor
<b>P1296</b>	No 5 volts to MAP sensor
<b>P1297</b>	No change in MAP sensor from start to run
<b>P1298</b>	lean operation at wide open throttle
<b>P1299</b>	Vacuum Leak detected (IAC fully seated)
<b>P1300</b>	Ignition timing adjustment circuit failure
<b>P1388</b>	Auto shutdown relay control circuit
<b>P1389</b>	No ASD relay output voltage at PCM

# DTC Definitions

CHRYSLER (P1390 - P1596)

<b>Code</b>	<b>Definition</b>
<b>P1390</b>	Timing belt skipped one tooth or more
<b>P1391</b>	Intermittent loss of CMP or CKP
<b>P1398</b>	Mis-Fire Adaptive Numerator at Limit (PCM is unable to learn the crank sensors signal for use in preparation for misfire diagnostics)
<b>P1399</b>	Wait to start lamp circuit
<b>P1403</b>	No 5 volt feed to EGR
<b>P1475</b>	Auxiliary 5 volt supply is too high
<b>P1476</b>	Too little secondary air
<b>P1477</b>	Too much secondary air
<b>P1478</b>	Battery Temp Sensor Volts out of limit
<b>P1479</b>	Transmission Fan Relay Circuit
<b>P1480</b>	PCV Solenoid Circuit
<b>P1481</b>	EATX (Electronic Automatic Transaxle) RPM pulse generator performance
<b>P1482</b>	Catalyst Temperature Sensor Circuit shorted low
<b>P1483</b>	Catalyst Temperature Sensor Circuit shorted high
<b>P1484</b>	Catalytic Converter overheat detected
<b>P1485</b>	Air injection solenoid circuit
<b>P1486</b>	EVAP Leak Monitor found a pinched hose
<b>P1487</b>	Hi Speed Fan #2 Circuit
<b>P1488</b>	Auxiliary 5 volt supply output is too low
<b>P1489</b>	High speed fan control relay circuit
<b>P1490</b>	Low speed fan control relay circuit
<b>P1491</b>	Radiator fan relay control circuit
<b>P1492</b>	Ambient/ Battery Temp sensor input voltage too high
<b>P1493</b>	Ambient/ Battery Temp sensor input voltage too low
<b>P1494</b>	Leak detection pump pressure switch or mechanical fault
<b>P1495</b>	Leak detection pump solenoid circuit
<b>P1496</b>	5 volt supply, output too low
<b>P1498</b>	High speed radiator fan ground control relay circuit
<b>P1500</b>	General alternator 'FR' Terminal circuit fault
<b>P1594</b>	Charging system voltage too high
<b>P1595</b>	Speed control solenoid circuits
<b>P1596</b>	Speed control switch always high

<b>Code</b>	<b>Definition</b>
<b>P1597</b>	Speed control switch always low
<b>P1598</b>	A/C pressure sensor input voltage too high
<b>P1599</b>	A/C pressure sensor input voltage too low
<b>P1680</b>	Clutch released switch circuit
<b>P1681</b>	No I/P Cluster CCD/ J1850 messages received
<b>P1682</b>	Charging system voltage too low
<b>P1683</b>	Speed control servo power control circuit
<b>P1684</b>	The battery has been disconnected within the last 50 starts
<b>P1685</b>	The SKIM (Smart Key Immobilizer Module) has received an invalid key
<b>P1686</b>	No SKIM (Smart Key Immobilizer Module) bus message received
<b>P1687</b>	No Mechanical Instrument cluster bus message
<b>P1688</b>	Internal Fuel injection pump controller failure
<b>P1689</b>	No communication between the ECM and injection pump module
<b>P1690</b>	Fuel injection pump CKP sensor does not agree with the ECM CKP sensor
<b>P1691</b>	Fuel injection pump controller calibration error
<b>P1692</b>	Fault in companion Engine control module
<b>P1693</b>	A companion DTC was set in both the ECM and PCM
<b>P1694</b>	No CCD message from PCM- Aisin transmission
<b>P1695</b>	No CCD message from body control module
<b>P1696</b>	PCM failure EEPROM write denied
<b>P1697</b>	PCM Failure SRI (Service Reminder Indicator) mileage not stored
<b>P1698</b>	No CCD message from TCM
<b>P1719</b>	Skip shift solenoid circuit
<b>P1740</b>	TCC solenoid or overdrive solenoid performance
<b>P1756</b>	Governor pressure not equal to target at 15-20 psi
<b>P1757</b>	Governor pressure is above 3 PSI when 0 PSI is requested
<b>P1762</b>	Governor pressure sensor offset improper voltage
<b>P1763</b>	Governor pressure sensor voltage to high
<b>P1764</b>	Governor pressure sensor voltage to low
<b>P1765</b>	Transmission 12 volt supply relay control circuit
<b>P1899</b>	Park/ Neutral switch stuck in park or gear

**MANUFACTURER SPECIFIC CODES - FORD**

<b>Code</b>	<b>Definition</b>
<b>P1000</b>	OBID Systems Readiness Test Not Complete
<b>P1001</b>	KOER Not Able to Complete, KOER Aborted
<b>P1100</b>	Mass Air Flow Sensor Circuit Intermittent
<b>P1101</b>	Mass Air Flow Sensor Out Of Self Test Range
<b>P1105</b>	Dual Alternator Upper Fault
<b>P1106</b>	Dual Alternator Lower Fault
<b>P1107</b>	Dual Alternator Lower Circuit
<b>P1108</b>	Dual Alternator Lower Circuit
<b>P1109</b>	Intake Air Temperature B Circuit Intermittent
<b>P1111</b>	System Pass
<b>P1112</b>	Intake Air Temperature Circuit Intermittent
<b>P1114</b>	Intake Air Temperature B Circuit Low Input (Super/Turbo Charged engines)
<b>P1115</b>	Intake Air Temperature B Circuit High Input (Super/Turbo Charged engines)
<b>P1116</b>	Engine Coolant Temperature Sensor Out Of Self Test Range
<b>P1117</b>	Engine Coolant Temperature Sensor Circuit Intermittent
<b>P1118</b>	Manifold Air Temperature Circuit Low Input
<b>P1119</b>	Manifold Air Temperature Circuit High Input
<b>P1120</b>	Throttle Position Sensor A Out Of Range Low (Ratch too low)
<b>P1121</b>	Throttle Position Sensor A Inconsistent With Mass Air Flow Sensor
<b>P1122</b>	Pedal Position Sensor A Circuit Low Input
<b>P1123</b>	Pedal Position Sensor A Circuit High Input
<b>P1124</b>	Throttle Position Sensor A Out Of Self Test Range
<b>P1125</b>	Throttle Position Sensor A Intermittent
<b>P1127</b>	Exhaust Not Warm, Downstream O2 Sensor Not Tested
<b>P1128</b>	Upstream HO2S Sensors Swapped
<b>P1129</b>	Downstream HO2S Sensors Swapped
<b>P1130</b>	Lack Of HO2S11 Switches - Fuel Trim At Limit
<b>P1131</b>	Lack Of HO2S11 Switches - Sensor Indicates Lean
<b>P1132</b>	Lack Of HO2S11 Switches - Sensor Indicates Rich
<b>P1133</b>	Bank 1 Fuel Control Shifted Lean (FAOSC)



<b>Code</b>	<b>Definition</b>
<b>P1134</b>	Bank 1 Fuel Control Shifted Rich (FAOSC)
<b>P1135</b>	Pedal Position Sensor A Circuit Intermittent
<b>P1137</b>	Lack of HO2S12 Switches - Sensor Indicates Lean
<b>P1138</b>	Lack of HO2S12 Switches - Sensor Indicates Rich
<b>P1139</b>	Water in Fuel Indicator Circuit
<b>P1140</b>	Water in Fuel Condition
<b>P1141</b>	Fuel Restriction Indicator Circuit
<b>P1142</b>	Fuel Restriction Condition
<b>P1150</b>	Lack of HO2S21 Switches - Fuel Trim At Limit
<b>P1151</b>	Lack of HO2S21 Switches - Sensor Indicates Lean
<b>P1152</b>	Lack of HO2S21 Switches - Sensor Indicates Rich
<b>P1153</b>	Bank 2 Fuel Control Shifted Lean (FAOSC)
<b>P1154</b>	Bank 2 Fuel Control Shifted Rich (FAOSC)
<b>P1155</b>	Alternative Fuel Control Module Has Activated the MIL
<b>P1157</b>	Lack of HO2S22 Switches - Sensor Indicates Lean
<b>P1158</b>	Lack of HO2S22 Switches - Sensor Indicates Rich
<b>P1168</b>	Fuel Rail Pressure Sensor In Range But Low
<b>P1169</b>	Fuel Rail Pressure Sensor In Range But High
<b>P1170</b>	Engine Shut Off Solenoid
<b>P1171</b>	Rotor Sensor
<b>P1172</b>	Rotor Control
<b>P1173</b>	Rotor Calibration
<b>P1174</b>	Cam Sensor
<b>P1175</b>	Cam Control
<b>P1176</b>	Cam Calibration
<b>P1177</b>	Synchronization
<b>P1178</b>	Boltup Limits
<b>P1180</b>	Fuel Delivery System - Low
<b>P1181</b>	Fuel Delivery System - High
<b>P1183</b>	Engine Oil Temperature Sensor Circuit
<b>P1184</b>	Engine Oil Temperature Sensor Out Of Self Test Range
<b>P1185</b>	Fuel Pump Temperature Sensor High
<b>P1186</b>	Fuel Pump Temperature Sensor Low
<b>P1187</b>	Variant Selection

# DTC Definitions

FORD (P1188 - P1232)

<b>Code</b>	<b>Definition</b>
<b>P1188</b>	Calibration Memory
<b>P1189</b>	Pump Speed Signal
<b>P1190</b>	Calibration Resistor Out Of Range
<b>P1191</b>	Key Line Voltage
<b>P1192</b>	V External
<b>P1193</b>	EGR Driver Over Current
<b>P1194</b>	ECM/PCM A/D Converter
<b>P1195</b>	SCP HBCC Chip Failed to Initialize
<b>P1196</b>	Key Off Voltage High
<b>P1197</b>	Key Off Voltage Low
<b>P1198</b>	Pump Rotor Control Underfueling
<b>P1209</b>	Injector Control Pressure Peak Delta Test Fault
<b>P1210</b>	Injector Control Pressure Above Expected Level
<b>P1211</b>	Injector Control Pressure Above/Below Desired
<b>P1212</b>	Injector Control Pressure Not At Expected Level
<b>P1214</b>	Pedal Position Sensor B Circuit Intermittent
<b>P1215</b>	Pedal Position Sensor C Circuit Low Input
<b>P1216</b>	Pedal Position Sensor C Circuit High Input
<b>P1217</b>	Pedal Position Sensor C Circuit Intermittent
<b>P1218</b>	CID High
<b>P1219</b>	CID Low
<b>P1220</b>	Series Throttle Control System
<b>P1221</b>	Traction Control System
<b>P1222</b>	Pedal Position Sensor B Circuit Low Input
<b>P1222</b>	Traction Control Output Circuit
<b>P1223</b>	Pedal Position Sensor B Circuit High Input
<b>P1224</b>	Throttle Position Sensor B Out Of Self Test Range
<b>P1227</b>	Wastegate Failed Closed (Over pressure)
<b>P1228</b>	Wastegate Failed Open (Under pressure)
<b>P1229</b>	Charge Air Cooler Pump Driver
<b>P1230</b>	Fuel Pump Low Speed Malfunction (VLCM)
<b>P1231</b>	Fuel Pump Secondary Circuit Low, High Speed (VLCM)
<b>P1232</b>	Fuel Pump Speed Primary Circuit (Two speed fuel pump)

<b>Code</b>	<b>Definition</b>
<b>P1233</b>	Fuel Pump Driver Module Disabled or Off Line (Fuel Pump Driver Module)
<b>P1234</b>	Fuel Pump Driver Module Disabled or Off Line (Fuel Pump Driver Module)
<b>P1235</b>	Fuel Pump Control Out Of Range (Fuel Pump Driver Module/VLCM)
<b>P1236</b>	Fuel Pump Control Out Of Range (Fuel Pump Driver Module)
<b>P1237</b>	Fuel Pump Secondary Circuit (Fuel Pump Driver Module)
<b>P1238</b>	Fuel Pump Secondary Circuit (Fuel Pump Driver Module)
<b>P1239</b>	Speed Fuel Pump Positive Feed
<b>P1243</b>	Second Fuel Pump Fault or Ground Fault
<b>P1244</b>	Alternator Load High Input
<b>P1245</b>	Alternator Load Low Input
<b>P1246</b>	Alternator Load Input
<b>P1247</b>	Turbo Boost Pressure Low
<b>P1248</b>	Turbo Boost Pressure Not Detected
<b>P1249</b>	Wastegate Control Valve Performance
<b>P1252</b>	Pedal Correlation PDS1 and LPDS High
<b>P1253</b>	Pedal Correlation PDS1 and LPDS Low
<b>P1254</b>	Pedal Correlation PDS2 and LPDS High
<b>P1255</b>	Pedal Correlation PDS2 and LPDS Low
<b>P1256</b>	Pedal Correlation PDS1 and HPDS
<b>P1257</b>	Pedal Correlation PDS2 and HPDS
<b>P1258</b>	Pedal Correlation PDS1 and PDS2
<b>P1260</b>	Theft Detected, Vehicle Immobilized
<b>P1261</b>	Cylinder #1 High To Low Side Short
<b>P1262</b>	Cylinder #2 High To Low Side Short
<b>P1263</b>	Cylinder #3 High To Low Side Short
<b>P1264</b>	Cylinder #4 High To Low Side Short
<b>P1265</b>	Cylinder #5 High To Low Side Short
<b>P1266</b>	Cylinder #6 High To Low Side Short
<b>P1267</b>	Cylinder #7 High To Low Side Short
<b>P1268</b>	Cylinder #8 High To Low Side Short
<b>P1270</b>	Engine RPM or Vehicle Speed Limiter Reached
<b>P1271</b>	Cylinder #1 High To Low Side Open

# DTC Definitions

FORD (P1272 - P1306)

<b>Code</b>	<b>Definition</b>
<b>P1272</b>	Cylinder #2 High To Low Side Open
<b>P1273</b>	Cylinder #3 High To Low Side Open
<b>P1274</b>	Cylinder #4 High To Low Side Open
<b>P1275</b>	Cylinder #5 High To Low Side Open
<b>P1276</b>	Cylinder #6 High To Low Side Open
<b>P1277</b>	Cylinder #7 High To Low Side Open
<b>P1278</b>	Cylinder #8 High To Low Side Open
<b>P1280</b>	Injector Control Pressure Out Of Range Low
<b>P1281</b>	Injector Control Pressure Out Of Range High
<b>P1282</b>	Excessive Injector Control Pressure
<b>P1283</b>	Injector Pressure Regulator Circuit
<b>P1284</b>	Aborted KOER - Injector Control Pressure Failure
<b>P1285</b>	Cylinder Head Overtemperature Condition
<b>P1286</b>	Fuel Pulsewidth In Range But Lower Than Expected
<b>P1287</b>	Fuel Pulsewidth In Range But Higher Than Expected
<b>P1288</b>	Cylinder Head Temperature Sensor Out Of Self Test Range
<b>P1289</b>	Cylinder Head Temperature Sensor Circuit High Input
<b>P1290</b>	Cylinder Head Temperature Sensor Circuit Low Input
<b>P1291</b>	Injector High Side Short To GND Or VBATT - Bank 1
<b>P1292</b>	Injector High Side Short To GND Or VBATT - Bank 2
<b>P1293</b>	Injector High Side Open - Bank 1
<b>P1294</b>	Injector High Side Open - Bank 2
<b>P1295</b>	Injector Multiple Faults - Bank 1
<b>P1296</b>	Injector Multiple Faults - Bank 2
<b>P1297</b>	Injector High Side Switches Shorted Together
<b>P1298</b>	Injector Driver Module Failure
<b>P1299</b>	Cylinder Head Overtemperature Protection Active
<b>P1300</b>	Boost Calibration Fault
<b>P1301</b>	Boost Calibration High
<b>P1302</b>	Boost Calibration Low
<b>P1303</b>	Exhaust Gas Recirculation Calibration Fault
<b>P1304</b>	Exhaust Gas Recirculation Calibration High
<b>P1305</b>	Exhaust Gas Recirculation Calibration Low
<b>P1306</b>	Kickdown Relay Pull-in Circuit

<b>Code</b>	<b>Definition</b>
<b>P1307</b>	Kickdown Relay Hold Circuit
<b>P1309</b>	Misfire Monitor AICE Chip Fault, Misfire Monitor Disabled
<b>P1310</b>	Ionization Misfire Detection Module Fault
<b>P1311</b>	Ionization Misfire Detection Module Communication Fault
<b>P1316</b>	IDM Codes Detected
<b>P1340</b>	Camshaft Position Sensor B Circuit
<b>P1351</b>	Ignition Diagnostic Monitor Input Circuit
<b>P1352</b>	Ignition Coil A Primary Circuit
<b>P1353</b>	Ignition Coil B Primary Circuit
<b>P1354</b>	Ignition Coil C Primary Circuit
<b>P1355</b>	Ignition Coil D Primary Circuit
<b>P1356</b>	Ignition Diagnostic Monitor Indicates Engine Not Turning
<b>P1357</b>	Ignition Diagnostic Monitor Pulsewidth Not Defined
<b>P1358</b>	Ignition Diagnostic Monitor Signal Out Of Self Test Range (no CPU OK)
<b>P1359</b>	Spark Output Circuit
<b>P1360</b>	Ignition Coil A Secondary Circuit
<b>P1361</b>	Ignition Coil B Secondary Circuit
<b>P1362</b>	Ignition Coil C Secondary Circuit
<b>P1363</b>	Ignition Coil D Secondary Circuit
<b>P1364</b>	Ignition Coil Primary Circuit
<b>P1365</b>	Ignition Coil Secondary Circuit
<b>P1366</b>	Ignition Spare
<b>P1367</b>	Ignition Spare
<b>P1368</b>	Ignition Spare
<b>P1369</b>	Engine Temperature Light Circuit
<b>P1380</b>	Camshaft Position Actuator Circuit (Bank 1)
<b>P1381</b>	Camshaft Position Timing Over Advanced (Bank 1)
<b>P1383</b>	Camshaft Position Timing Over Retarded (Bank 1)
<b>P1385</b>	Camshaft Position Actuator Circuit (Bank 2)
<b>P1386</b>	Camshaft Position Timing Over Advanced (Bank 2)
<b>P1388</b>	Camshaft Position Timing Over Retarded (Bank 2)
<b>P1390</b>	Octane Adjust Service Pin In Use/Circuit Open
<b>P1400</b>	Differential Pressure Feedback EGR Circuit Low Input

# DTC Definitions

FORD (P1401 - P1469)

<b>Code</b>	<b>Definition</b>
<b>P1401</b>	Differential Pressure Feedback EGR Circuit High Input
<b>P1402</b>	Exhaust Gas Recirculation Metering Orifice Restricted
<b>P1403</b>	Differential Pressure Feedback Sensor Hoses Reversed
<b>P1404</b>	EGR Temperature Sensor Circuit
<b>P1405</b>	Differential Pressure Feedback Sensor Upstream Hose Off Or Plugged
<b>P1406</b>	Differential Pressure Feedback Sensor Downstream Hose Off Or Plugged
<b>P1407</b>	Exhaust Gas Recirculation No Flow Detected
<b>P1408</b>	Exhaust Gas Recirculation Flow Out Of Self Test Range
<b>P1409</b>	EGR Vacuum Regulator Solenoid Circuit
<b>P1410</b>	Auxiliary Air Cleaner Inlet Control Circuit
<b>P1411</b>	Secondary Air Injection Incorrect Downstream Flow Detected
<b>P1413</b>	Secondary Air Injection Monitor Circuit Low Input
<b>P1414</b>	Secondary Air Injection Monitor Circuit High Input
<b>P1431</b>	Misfire Monitor Disabled, Unable to Learn Trigger Wheel Profile
<b>P1442</b>	Evaporative Emission Control System Control Leak Detected
<b>P1443</b>	Evaporative Emission Control System Control Valve
<b>P1444</b>	Purge Flow Sensor Circuit Low Input
<b>P1445</b>	Purge Flow Sensor Circuit High Input
<b>P1450</b>	Unable to Bleed Up Fuel Tank Vacuum
<b>P1451</b>	Evaporative Emission Control System Vent Control Circuit
<b>P1452</b>	Unable to Bleed Up Fuel Tank Vacuum
<b>P1455</b>	Evaporative Emission Control System Control Leak Detected (gross leak/no flow)
<b>P1457</b>	Unable to Pull Fuel Tank Vacuum
<b>P1460</b>	Wide Open Throttle A/C Cutout Circuit
<b>P1461</b>	A/C Pressure Sensor Circuit High Input
<b>P1462</b>	A/C Pressure Sensor Circuit Low Input
<b>P1463</b>	A/C Pressure Sensor Insufficient Pressure Change
<b>P1464</b>	A/C Demand Out Of Self Test Range
<b>P1465</b>	A/C Relay Circuit
<b>P1466</b>	A/C Refrigerant Temperature Sensor Circuit
<b>P1469</b>	Rapid A/C Cycling

<b>Code</b>	<b>Definition</b>
<b>P1473</b>	Fan Circuit Open (VLCM)
<b>P1474</b>	Fan Control Primary Circuit
<b>P1479</b>	High Fan Control Primary Circuit
<b>P1480</b>	Fan Secondary Low With Low Fan On
<b>P1481</b>	Fan Secondary Low With High Fan On
<b>P1482</b>	SCP
<b>P1483</b>	Brake Pedal Input Short To Battery
<b>P1484</b>	Fan Driver Circuit Open To Power Ground (VLCM)
<b>P1485</b>	Brake Pedal Input Short To Battery
<b>P1500</b>	Vehicle Speed Sensor
<b>P1501</b>	Vehicle Speed Sensor Out Of Self Test Range
<b>P1502</b>	Vehicle Speed Sensor Intermittent
<b>P1504</b>	Idle Air Control Circuit
<b>P1505</b>	Idle Air Control System At Adaptive Clip
<b>P1506</b>	Idle Air Control Overspeed Error
<b>P1507</b>	Idle Air Control Underspeed Error
<b>P1512</b>	Intake Manifold Runner Control Stuck Closed (Bank 1)
<b>P1513</b>	Intake Manifold Runner Control Stuck Closed (Bank 2)
<b>P1516</b>	Intake Manifold Runner Control Input Error (Bank 1)
<b>P1517</b>	Intake Manifold Runner Control Input Error (Bank 2)
<b>P1518</b>	Intake Manifold Runner Control Stuck Open (Bank 1)
<b>P1519</b>	Intake Manifold Runner Control Stuck Closed (Bank 2)
<b>P1520</b>	Intake Manifold Runner Control Circuit
<b>P1530</b>	A/C Clutch Circuit Open (VLCM)
<b>P1532</b>	Intake Manifold Communication Control Circuit (Bank 2)
<b>P1533</b>	Air Assisted Injector Circuit
<b>P1534</b>	Restraint Deployment Indicator Circuit
<b>P1537</b>	Intake Manifold Runner Control Stuck Open (Bank 1)
<b>P1538</b>	Intake Manifold Runner Control Stuck Open (Bank 2)
<b>P1539</b>	A/C Clutch Circuit Overcurrent/Short (VLCM)
<b>P1549</b>	Intake Manifold Communication Control Circuit (Bank 1)
<b>P1550</b>	Power Steering Pressure Sensor Out Of Self Test Range
<b>P1565</b>	Speed Control Command Switch Out Of Range High
<b>P1566</b>	Speed Control Command Switch Out Of Range Low

# DTC Definitions

FORD (P1567 - P1625)

<b>Code</b>	<b>Definition</b>
<b>P1567</b>	Speed Control Output Circuit
<b>P1568</b>	Speed Control Unable To Hold Speed
<b>P1572</b>	Brake Pedal Switch Circuit
<b>P1573</b>	Throttle Position Not Available
<b>P1574</b>	Throttle Position Sensor Outputs Disagree
<b>P1575</b>	Pedal Position Out Of Self Test Range
<b>P1576</b>	Pedal Position Not Available
<b>P1577</b>	Pedal Position Sensor Outputs Disagree
<b>P1578</b>	ETC Power Less Than Demand
<b>P1579</b>	ETC In Power Limiting Mode
<b>P1580</b>	Electronic Throttle Monitor PCM Override
<b>P1581</b>	Electronic Throttle Monitor Malfunction
<b>P1582</b>	Electronic Throttle Monitor Data Available
<b>P1583</b>	Electronic Throttle Monitor Cruise Disablement
<b>P1584</b>	Throttle Control Detected ETB Malfunction
<b>P1585</b>	Throttle Control Malfunction
<b>P1586</b>	Electronic Throttle To PCM Communication Error
<b>P1587</b>	Throttle Control Modulated Command Malfunction
<b>P1588</b>	Throttle Control Detected Loss Of Return Spring
<b>P1589</b>	Throttle Control Unable To Control To Desired Throttle Angle
<b>P1605</b>	Keep Alive Memory Test Failure
<b>P1610</b>	SBDS Interactive Codes
<b>P1611</b>	SBDS Interactive Codes
<b>P1612</b>	SBDS Interactive Codes
<b>P1613</b>	SBDS Interactive Codes
<b>P1614</b>	SBDS Interactive Codes
<b>P1615</b>	SBDS Interactive Codes
<b>P1616</b>	SBDS Interactive Codes
<b>P1617</b>	SBDS Interactive Codes
<b>P1618</b>	SBDS Interactive Codes
<b>P1618</b>	SBDS Interactive Codes
<b>P1619</b>	SBDS Interactive Codes
<b>P1620</b>	SBDS Interactive Codes
<b>P1625</b>	Fan Driver Circuit Open to Power B+ (VLCM)



<b>Code</b>	<b>Definition</b>
<b>P1626</b>	A/C Circuit Open to Power B+ (VLCM)
<b>P1633</b>	Keep Alive Power Voltage Too Low
<b>P1635</b>	Tire/Axle Out of Acceptable Range
<b>P1636</b>	Inductive Signature Chip Communication Error
<b>P1639</b>	Vehicle ID Block Corrupted, Not Programmed
<b>P1640</b>	Powertrain DTCs Available In Another Control Module (Ref. PID 0946)
<b>P1641</b>	Fuel Pump Primary Circuit
<b>P1642</b>	CAN Link Circuit
<b>P1642</b>	Fuel Pump Monitor Circuit Low Input [DTC will be deleted on next version]
<b>P1643</b>	CAN Link ECM/TCM Circuit/Network
<b>P1643</b>	Fuel Pump Monitor Circuit Low Input[DTC will be deleted on next version]
<b>P1644</b>	Fuel Pump Speed Control Circuit
<b>P1650</b>	Power Steering Pressure Switch Out Of Self Test Range
<b>P1651</b>	Power Steering Pressure Switch Input
<b>P1656</b>	CAN Link PCM/PCM Circuit Network
<b>P1657</b>	CAN Link Chip Malfunction
<b>P1700</b>	Transmission Indeterminate Failure (Failed to Neutral)
<b>P1701</b>	Reverse Engagement Error
<b>P1702</b>	Transmission Range Sensor Circuit Intermittent
<b>P1703</b>	Brake Switch Out Of Self Test Range
<b>P1704</b>	Transmission Range Circuit Not Indicating Park/Neutral During Self Test
<b>P1705</b>	Transmission Range Circuit Not Indicating Park/Neutral During Self Test
<b>P1709</b>	Park Neutral Position Switch Out Of Self Test Range
<b>P1711</b>	Transmission Fluid Temperature Sensor Out Of Self Test Range
<b>P1712</b>	Transmission Torque Reduction Request Signal
<b>P1713</b>	Transmission Fluid Temperature Sensor In Range Failure (<50 deg F)
<b>P1714</b>	Shift Solenoid A Inductive Signature
<b>P1715</b>	Shift Solenoid B Inductive Signature
<b>P1716</b>	Shift Solenoid C Inductive Signature

# DTC Definitions

FORD (P1717 - P1785)

<b>Code</b>	<b>Definition</b>
<b>P1717</b>	Shift Solenoid D Inductive Signature
<b>P1718</b>	Transmission Fluid Temperature Sensor In Range Failure (>250 deg F)
<b>P1727</b>	Coast Clutch Solenoid Inductive Signature
<b>P1728</b>	Transmission Slip
<b>P1729</b>	4x4L Switch
<b>P1731</b>	1-2 Shift Malfunction
<b>P1732</b>	2-3 Shift Malfunction
<b>P1733</b>	3-4 Shift Malfunction
<b>P1740</b>	Torque Converter Clutch Solenoid Inductive Signature
<b>P1741</b>	Torque Converter Clutch Solenoid Control Error
<b>P1742</b>	Torque Converter Clutch Solenoid Circuit Failed On
<b>P1743</b>	Torque Converter Clutch Solenoid Circuit Failed On
<b>P1744</b>	Torque Converter Clutch Solenoid Circuit Performance
<b>P1746</b>	Pressure Control Solenoid A Open Circuit
<b>P1747</b>	Pressure Control Solenoid A Short Circuit
<b>P1749</b>	Pressure Control Solenoid A Failed Low
<b>P1751</b>	Shift Solenoid A Performance
<b>P1754</b>	Coast Clutch Solenoid Circuit
<b>P1756</b>	Shift Solenoid B Performance
<b>P1760</b>	Pressure Control Solenoid A Short Circuit Intermittent
<b>P1761</b>	Shift Solenoid C Performance
<b>P1762</b>	Overdrive Band Failed Off
<b>P1766</b>	Shift Solenoid D Performance
<b>P1767</b>	Torque Converter Clutch Circuit
<b>P1768</b>	Performance/Normal/Winter Mode Input
<b>P1770</b>	Clutch Solenoid Circuit
<b>P1780</b>	Transmission Control Switch (O/D Cancel) Circuit Out Of Self Test Range
<b>P1781</b>	4X4L Circuit Out Of Self Test Range
<b>P1782</b>	Performance/Economy Switch Circuit Out Of Self Test Range
<b>P1783</b>	Transmission Overtemperature Condition
<b>P1784</b>	Transmission Mechanical Failure - First and Reverse
<b>P1785</b>	Transmission Mechanical Failure - First and Second

<b>Code</b>	<b>Definition</b>
<b>P1786</b>	3-2 Downshift Error
<b>P1787</b>	2-1 Downshift Error
<b>P1788</b>	Pressure Control Solenoid B Open Circuit
<b>P1789</b>	Pressure Control Solenoid B Short Circuit
<b>P1795</b>	Inconsistent CAN Level
<b>P1804</b>	4-Wheel Drive High Indicator Circuit Open or Shorted To Ground
<b>P1806</b>	4-Wheel Drive High Indicator Short To Battery
<b>P1808</b>	4-Wheel Drive Low Indicator Circuit Open or Short To Ground
<b>P1810</b>	4-Wheel Drive Low Indicator Short To Battery
<b>P1812</b>	4-Wheel Drive Mode Select Switch Circuit Open
<b>P1815</b>	4-Wheel Drive Mode Select Switch Circuit Short To Ground
<b>P1819</b>	Neutral Safety Switch Input Short To Ground
<b>P1820</b>	Transfer Case LO To HI Shift Relay Circuit Open Or Short To Ground
<b>P1822</b>	Transfer Case LO To HI Shift Relay Coil Short To Battery
<b>P1824</b>	4-Wheel Drive Electric Clutch Relay Open Or Short To Ground
<b>P1826</b>	4-Wheel Drive Electric Clutch Relay Short To Battery
<b>P1828</b>	Transfer Case HI To LO Shift Relay Coil Circuit Open Or Short To Ground
<b>P1830</b>	Transfer Case HI To LO Shift Relay Coil Circuit Short To Battery
<b>P1832</b>	Transfer Case 4-Wheel Drive Solenoid Circuit Open or Short To Ground
<b>P1834</b>	Transfer Case 4-Wheel Drive Solenoid Circuit Short To Battery
<b>P1838</b>	No Shift Motor Movement Detected
<b>P1846</b>	Transfer Case Contact Plate 'A' Circuit Open
<b>P1850</b>	Transfer Case Contact Plate 'B' Circuit Open
<b>P1854</b>	Transfer Case Contact Plate 'C' Circuit Open
<b>P1858</b>	Transfer Case Contact Plate 'D' Circuit Open
<b>P1866</b>	Transfer Case Cannot Be Shifted
<b>P1867</b>	Transfer Case Contact Plate General Circuit Failure
<b>P1876</b>	Transfer Case 2-Wheel Drive Solenoid Circuit Open Or Short To Ground
<b>P1877</b>	Transfer Case 2-Wheel Drive Solenoid Circuit Short To Battery
<b>P1881</b>	Engine Coolant Level Switch Circuit
<b>P1882</b>	Engine Coolant Level Switch Circuit Short To Ground

# ***DTC Definitions***

**FORD (P1883 - P1901)**

<b>Code</b>	<b>Definition</b>
<b>P1883</b>	Engine Coolant Level Switch Circuit
<b>P1884</b>	Engine Coolant Level Lamp Circuit Short To Ground
<b>P1891</b>	Transfer Case Contact Plate Ground Return Open Circuit
<b>P1900</b>	Output Shaft Speed Sensor Circuit Intermittent
<b>P1901</b>	Turbine Shaft Speed Sensor Circuit Intermittent

## MANUFACTURER SPECIFIC CODES - GENERAL MOTORS

<b>Code</b>	<b>Definition</b>
<b>P1031</b>	H02 Sensor Heater Control Circuit Problem
<b>P1106</b>	MAP Sensor Circuit Intermittent High or Low Voltage
<b>P1107</b>	MAP Sensor Circuit Intermittent Voltage Low
<b>P1108</b>	BARO to MAP Signal Circuit Comparison Too High
<b>P1111</b>	IAT Sensor Circuit Intermittent Voltage High
<b>P1112</b>	IAT Sensor Circuit Intermittent Voltage Low (except Catera)
<b>P1112</b>	Intake Plenum Switchover Valve Control (Catera)
<b>P1113</b>	Intake Resonance Switchover Valve Control
<b>P1114</b>	ECT Sensor Circuit Intermittent Voltage Low
<b>P1115</b>	ECT Sensor Circuit Intermittent Voltage High
<b>P1120</b>	Throttle Positioning Sensor 1 Circuit
<b>P1121</b>	Throttle Positioning Sensor 1,2 Circuit Performance/ Fuel Injector Secondary System Circuit Low
<b>P1122</b>	TPS Circuit Intermittent Voltage Low
<b>P1125</b>	APP System
<b>P1133</b>	HO2S/O2S Insufficient Switching Sensor 1 Or Bank 1 Sensor 1
<b>P1134</b>	HO2S Transition Time Ratio Bank 1 Sensor 1
<b>P1137</b>	HO2 Sensor Low Voltage During Power Enrichment
<b>P1138</b>	HO2 Sensor High Voltage During Decel Fuel Cutoff
<b>P1139</b>	HO2S Insufficient Switching Bank 1 Sensor 2
<b>P1140</b>	HO2S Transition Time Ratio Bank 1 Sensor 2
<b>P1141</b>	HO2 Sensor Heater Control Circuit (Bank 1 Sensor 2)
<b>P1153</b>	HO2S Insufficient Switching Bank 2 Sensor 1
<b>P1154</b>	HO2S Transition Time Ratio Bank 2 Sensor 1
<b>P1158</b>	HO2 Sensor Shift Rich (Bank 2 Sensor 2)/ Engine Metal Over-Temperature Protection
<b>P1161</b>	HO2 Sensor Heater Control Circuit (Bank 2 Sensor 2)
<b>P1171</b>	Fuel System Lean During Acceleration
<b>P1187</b>	Engine Oil Temperature Sensor Circuit Voltage Low (except 1997 Corvette)
<b>P1187</b>	Engine Oil Pressure Sensor Circuit Voltage Low (1997 Corvette)
<b>P1188</b>	Engine Oil Temperature Sensor Circuit Voltage High (except 1997 Corvette)

# DTC Definitions

GENERAL MOTORS (P1188 - P1320)

<b>Code</b>	<b>Definition</b>
<b>P1188</b>	Engine Oil Pressure Sensor Circuit Voltage High (1997 Corvette)
<b>P1189</b>	Engine Oil Pressure Switch Circuit
<b>P1200</b>	Injector Control Circuit
<b>P1214</b>	Injection Pump Timing Offset
<b>P1215</b>	Generator Driver Circuit
<b>P1216</b>	Fuel Solenoid Response Time Too Short
<b>P1217</b>	Fuel Solenoid Response Time Too Long
<b>P1218</b>	Injection Pump Calibration Circuit
<b>P1220</b>	Throttle Position (TP) Sensor 2 Circuit Fault
<b>P1221</b>	TP Sensor 1, 2 Performance
<b>P1222</b>	Injector Control Circuit Intermittent
<b>P1250</b>	Early Fuel Evaporative (EFE) Heater Circuit
<b>P1257</b>	Boost Control Condition/Supercharge System Overboost
<b>P1260</b>	Fuel Pump Speed Relay Control Circuit
<b>P1271</b>	Accelerator Pedal Position Sensor 1-2 Correlation
<b>P1272</b>	Accelerator Pedal Position Sensor 2-3 Correlation
<b>P1273</b>	Accelerator Pedal Position Sensor 1-3 Correlation
<b>P1275</b>	Boost Control Condition (except 1997-98 Corvette)
<b>P1275</b>	Accelerator Pedal Positioning (APP) Sensor 1 Circuit (1997-98 Corvette)
<b>P1276</b>	Accelerator Pedal Positioning (APP) Sensor 1 Circuit Performance
<b>P1280</b>	Accelerator Pedal Positioning (APP) Sensor 2 Circuit
<b>P1281</b>	Accelerator Pedal Positioning (APP) Sensor 2 Circuit Performance
<b>P1285</b>	Accelerator Pedal Positioning (APP) Sensor 2 Circuit
<b>P1286</b>	Accelerator Pedal Positioning (APP) Sensor 2 Circuit Performance
<b>P1300</b>	Ignition Coil 1 Primary Feedback Circuit
<b>P1305</b>	Ignition Coil 2 Primary Feedback Circuit
<b>P1310</b>	Ignition Coil 3 Primary Feedback Circuit
<b>P1315</b>	Ignition Coil 4 Primary Feedback Circuit
<b>P1320</b>	ICM 4X Reference Circuit Too Many Pulses (except 1996-98 4.0L)
<b>P1320</b>	ICM 4X Reference Circuit Intermittent No Pulses (1996-98 4.0L)

<b>Code</b>	<b>Definition</b>
<b>P1323</b>	ICM 24X Reference Circuit Low Frequency
<b>P1335</b>	Crankshaft Positioning Sensing Circuit
<b>P1336</b>	CKP System Variation Not Learned
<b>P1345</b>	Camshaft To Crankshaft Position Correlation Fault
<b>P1346</b>	CKP Sensor System Variation Not Learned/ Intake Camshaft Position Performance
<b>P1349</b>	Intake Camshaft Position System
<b>P1350</b>	Ignition Control System
<b>P1351</b>	Ignition Control Circuit Voltage High (except 1998 3.1L)
<b>P1351</b>	Ignition Control Circuit Open (1998 3.1L)
<b>P1352</b>	Bypass Circuit Open Or Voltage High
<b>P1359</b>	Ignition Coil Group 1 Control Circuit
<b>P1360</b>	Ignition Coil group 2 Control Circuit
<b>P1361</b>	IC Circuit Not Toggling
<b>P1361</b>	Ignition Control Circuit Voltage Low (Distributor Ignition)
<b>P1362</b>	Bypass Circuit Shorted Or Voltage Low
<b>P1370</b>	ICM 4X Reference Too Many Pulses
<b>P1371</b>	ICM 4X Reference Too Few Pulses (except Caprice, Fleetwood, Impala SS & Roadmaster)
<b>P1371</b>	Distributor Ignition Low Resolution Circuit (Caprice, Fleetwood, Impala SS & Roadmaster)
<b>P1372</b>	CKP Sensor A-B Correlation
<b>P1374</b>	3X Reference Circuit
<b>P1375</b>	ICM 24X Reference Voltage Too High
<b>P1376</b>	Ignition Ground Circuit
<b>P1377</b>	ICM Cam Pulse To 4X Reference Pulse Comparison
<b>P1380</b>	ABS/EBCM/EB(T)CM DTC Detected/Rough Road Data Unusable
<b>P1381</b>	Misfire Detected No EBCM/EB(T)CM/PCM Serial Data
<b>P1401</b>	Exhaust Gas Recirculation (EGR) flow test fault
<b>P1403</b>	EGR Error
<b>P1404</b>	EGR Valve Closed Pintle Position
<b>P1404</b>	EGR Valve Stuck Open Or Circuit Performance
<b>P1405</b>	EGR Error
<b>P1406</b>	EGR Valve Pintle Position Circuit

# **DTC Definitions**

**GENERAL MOTORS (P1408 - P1527)**

<b>Code</b>	<b>Definition</b>
<b>P1408</b>	MAP Sensor Circuit
<b>P1410</b>	Fuel Tank Pressure System
<b>P1415</b>	AIR System Bank 1
<b>P1416</b>	AIR System Bank 2
<b>P1431</b>	Fuel Level Sensor 2 Circuit Performance
<b>P1432</b>	Fuel Level Sensor 2 Circuit Voltage Low
<b>P1433</b>	Fuel Level Sensor 2 Circuit Voltage High
<b>P1441</b>	EVAP System Flow During Non-Purge
<b>P1442</b>	EVAP Vacuum Switch Circuit
<b>P1450</b>	BARO Sensor Circuit
<b>P1451</b>	BARO Sensor Circuit
<b>P1460</b>	Cooling Fan Circuit (except Catera)
<b>P1460</b>	Misfire Detected With Low Fuel (Catera)
<b>P1483</b>	Engine Cooling System Performance
<b>P1500</b>	Starter Signal Circuit
<b>P1501</b>	Theft Deterrent System
<b>P1502</b>	Theft Deterrent System No Password Received
<b>P1503</b>	Theft Deterrent System Password Improper
<b>P1508</b>	Idle Air Control (IAC) System Low RPM
<b>P1509</b>	IAC System High RPM
<b>P1510</b>	Back-Up Power Supply
<b>P1511</b>	Throttle Control System- Backup System Performance
<b>P1514</b>	TAC System MAF Performance
<b>P1515</b>	Command vs Actual Throttle Position Performance (PCM)
<b>P1516</b>	Command vs Actual Throttle Position Performance (TAC Module)
<b>P1517</b>	TAC Module Processor
<b>P1518</b>	PCM To TAC Module Serial Data Circuit
<b>P1519</b>	Throttle Actuator Control Module
<b>P1520</b>	Park/Neutral Position Switch Circuit, Gear Indicator System
<b>P1523</b>	Throttle Closed Position Performance
<b>P1524</b>	TPS Learned Closed Throttle Angle Degrees Out Of Range
<b>P1526</b>	TPS Learn Not Completed
<b>P1527</b>	Trans Range/Pressure Switch Comparison



<b>Code</b>	<b>Definition</b>
<b>P1530</b>	Ignition Timing Adjustment Switch Circuit
<b>P1530</b>	A/C Refrigerant Pressure Sensor Error
<b>P1531</b>	Low Air Conditioning Refrigerant Charge
<b>P1532</b>	A/C Evaporator Temperature Circuit Voltage Low
<b>P1533</b>	A/C Low Side Temperature Sensor Circuit
<b>P1535</b>	A/C/ High Side Temperature Sensor Circuit
<b>P1536</b>	A/C System ECT Overtemperature
<b>P1537</b>	A/C Request Circuit Voltage Low
<b>P1538</b>	A/C Request Circuit Voltage High
<b>P1539</b>	A/C High Pressure Switch Circuit Voltage High
<b>P1540</b>	A/C System High Pressure
<b>P1542</b>	A/C System High Pressure/High Temperature
<b>P1543</b>	A/C System Performance
<b>P1545</b>	A/C Clutch Relay Control Circuit
<b>P1546</b>	A/C Clutch Relay Control Circuit Voltage Low (except 1996-98 Camaro/Firebird & 1997-98 Corvette)
<b>P1546</b>	A/C Clutch Status Circuit Voltage Low (1996-98 Camaro/ Firebird & 1997-98 Corvette)
<b>P1550</b>	Stepper Motor Speed Control
<b>P1554</b>	Speed Control Status Circuit
<b>P1555</b>	Electronic Variable Orifice Fault (Saturn)
<b>P1558</b>	Speed Control (SPS Low)
<b>P1560</b>	Speed Control System/Transaxle Not In Drive
<b>P1561</b>	Speed Control Vent Solenoid
<b>P1562</b>	Speed Control Vacuum Solenoid
<b>P1564</b>	Speed Control System/Vehicle Acceleration Too High (except Catera)
<b>P1564</b>	ECM Battery Voltage Loss (Catera)
<b>P1565</b>	Speed Control Servo Position Sensor
<b>P1566</b>	Speed Control System/Engine RPM Too High
<b>P1567</b>	Speed Control Switches/ABCS Active
<b>P1568</b>	Speed Control (SPS High)
<b>P1570</b>	Speed Control System/Traction Control Active
<b>P1571</b>	TCS Desired Torque Circuit (except 4.0L, 4.6L & 1997-98 5.7L Corvette)

# DTC Definitions

GENERAL MOTORS (P1571 - P1610)

<b>Code</b>	<b>Definition</b>
<b>P1571</b>	Traction Control System PWM Circuit No Frequency (4.0L & 4.6L)
<b>P1571</b>	ASR Desired Torque (1997-98 5.7L Corvette)
<b>P1572</b>	Traction Control System Active Circuit Voltage Low Too Long
<b>P1573</b>	PCM/EBTCM Serial Data Circuit
<b>P1573</b>	Engine Hot Lamp Control Circuit
<b>P1574</b>	EBTCM System/Stop Lamp Circuit Voltage High (except 1997-98 Corvette)
<b>P1574</b>	Stop Lamp Control Circuit (1997-98 Corvette)
<b>P1575</b>	Extended Travel Brake Switch Circuit Voltage High
<b>P1576</b>	Brake Booster Vacuum Sensor Circuit Voltage High
<b>P1577</b>	Brake Booster Vacuum Sensor Circuit Voltage Low
<b>P1578</b>	Brake Booster Vacuum Sensor Circuit Low Vacuum
<b>P1579</b>	Park/Neutral To Drive/Reverse At High Throttle Angle
<b>P1580</b>	Cruise Control Module Move Circuit, Low Voltage
<b>P1581</b>	Cruise Control Module Move Circuit, High Voltage
<b>P1582</b>	Cruise Control Module Direction Circuit, Low Voltage
<b>P1583</b>	Cruise Control Module Direction Circuit, High Voltage
<b>P1584</b>	Cruise Control Disabled
<b>P1585</b>	Cruise Control Inhibit Output Circuit
<b>P1586</b>	Cruise Control Brake Switch 2 Circuit
<b>P1599</b>	Engine Stall Or Near Stall Detected
<b>P1600</b>	PCM Battery
<b>P1600</b>	Serial Communication Between PCM & TCM
<b>P1601</b>	Loss of Serial Communication (Except Catera)
<b>P1601</b>	ECM Overtemperature
<b>P1602</b>	Loss Of EBC/EBTCM Serial Data (Except Catera)
<b>P1602</b>	KS Module Circuit (Catera)
<b>P1603</b>	Loss Of SDM Serial Data
<b>P1604</b>	Loss of IPC Serial Data
<b>P1605</b>	Loss of HVAC Serial Data
<b>P1607</b>	Engine Oil Level Switch Circuit
<b>P1610</b>	Loss Of PZM Serial Data (1996-97 Except 1997 Cutlass & Malibu)
<b>P1610</b>	Failure With Body Function Controller (1997 Cutlass & Malibu)

<b>Code</b>	<b>Definition</b>
<b>P1610</b>	Standard Body Module Series Data CKT (1998)
<b>P1611</b>	Loss Of CVRTD Serial Data
<b>P1617</b>	Engine Oil Level Switch Circuit
<b>P1619</b>	Engine Oil Lite Monitor Reset Circuit
<b>P1620</b>	Low Engine Coolant Level (Saturn)
<b>P1621</b>	PCM Memory Performance (Except 1998 5.7L)
<b>P1621</b>	VCM EEPROM Performance (1998 5.7L)
<b>P1623</b>	PCM Prom Error/ Transaxle Temperature Pull-Up Resistor Fault (Saturn Z body)
<b>P1624</b>	Customer Snapshot Data Available (Saturn)
<b>P1625</b>	TCM Flash Checksum Fault (Saturn)
<b>P1626</b>	Theft Deterrent System Fuel Enable Circuit
<b>P1627</b>	A/D Performance
<b>P1628</b>	PCM Engine Control Temp Pull-Up Resistor
<b>P1629</b>	Theft Deterrent System Fuel Enable Circuit Improper Signal Detected During Engine Cranking (Except 1997-98 2.2L, 2.4L, 3.1L & 3.8L)
<b>P1629</b>	Theft Deterrent Crank Signal Malfunction (1997-98 2.2L, 2.4L, 3.1L & 3.8L)
<b>P1630</b>	Theft Deterrent System/PCM/VCM in Learn Mode
<b>P1631</b>	Theft Deterrent System Password Improper
<b>P1632</b>	Theft Deterrent System Fuel Disabled
<b>P1633</b>	Ignition Supplemental Power Circuit Voltage Low
<b>P1634</b>	Ignition 1 Power Circuit Voltage Low
<b>P1635</b>	5 Volt Reference (A Or 1) Circuit
<b>P1637</b>	Alternator L Terminal Circuit
<b>P1638</b>	Alternator F Terminal Circuit
<b>P1639</b>	5 Volt Reference (B Or 2) Circuit
<b>P1640</b>	Driver 1 Input Voltage High
<b>P1641</b>	MIL Control Circuit (Except 5.7L VINs P & 5 & 1998 3.1L & 3.8L)
<b>P1641</b>	Fan Control Relay 1 Control Circuit (5.7L VINs P & 5)
<b>P1641</b>	A/C Relay Control Circuit (1998 3.1L & 3.8L)
<b>P1642</b>	Vehicle Speed Output Circuit (Except 3.4L, 5.7L VINs P & 5 & 1998 3.8L)
<b>P1642</b>	Fan Control Relay 2 & 3 Control Circuit (5.7L VINs P & 5)

# DTC Definitions

GENERAL MOTORS (P1642 - P1663)

Code	Definition
P1642	AIR Control Circuit (3.4L)
P1642	Change Oil Lamp Control Circuit (1998 3.1L Lumina & Monte Carlo)
P1643	Fuel Pump PWM Control Circuit (Except 5.7L VINs P & 5)
P1643	Engine RPM Output Circuit (5.7L VINs P & 5)
P1644	Delivered Torque Output Circuit
P1645	Boost Control Solenoid Circuit (Except 4.0L & 4.6L)
P1645	EVAP Solenoid Output Circuit (4.0L & 4.6L)
P1646	Boost Control Solenoid Control Circuit (Except 4.0L & 4.6L)
P1646	EVAP Vent Valve Output Circuit (4.0L & 4.6L)
P1650	Driver 2 Input Voltage High
P1651	Fan On Relay Control Circuit/Output Driver Module (Quad Driver) 'B' Quickset Fault (Saturn)
P1651	Fan 1 Relay Control Circuit
P1652	Fan 2 Relay Control Circuit (Except Cadillac & Corvette)
P1652	VSS Output Circuit (1996 Corvette)
P1652	Powertrain Induced Chassis Pitch Output Circuit (1997- 98 Corvette)
P1652	Lift/Drive Output Circuit (Cadillac)
P1653	TCS Delivered Torque Control Circuit (Except Caprice, Roadmaster & 1998 3.8L)
P1653	Oil Level Lamp Control Circuit (Caprice, Fleetwood & Roadmaster)
P1653	Fuel Level Output Control Circuit (1998 3.8L)
P1654	A/C Relay Control Circuit (Except 4.0L & 4.6L)
P1654	Cruise Disable Output Circuit (4.0L & 4.6L)
P1655	EVAP Purge Solenoid Control Circuit
P1656	Wastegate Solenoid Control Circuit
P1657	Skip Shift 1-4 Upshift
P1660	Cooling Fan Control Circuits
P1661	MIL Control Circuit
P1662	Speed Control Inhibit Control Circuit
P1663	Alternator Lamp Control Circuit (Except Caprice, Fleetwood & Roadmaster)
P1663	Change Oil Lamp Control Circuit (Caprice, Fleetwood & Roadmaster)

<b>Code</b>	<b>Definition</b>
<b>P1664</b>	Skip Shift 1-4 Upshift Lamp Control Circuit
<b>P1665</b>	DBCM/DBTCM Serial Data Circuit (1996-97)
<b>P1665</b>	EVAP Vent Valve Solenoid Control Circuit (1998)
<b>P1667</b>	Reverse Inhibitor Solenoid Control Circuit (1996-97)
<b>P1667</b>	Fuel Pump Speed Control Circuit (1998)
<b>P1670</b>	QDM 4 Circuit
<b>P1671</b>	MIL Control Circuit
<b>P1671</b>	Oil Change Lamp Control Circuit
<b>P1672</b>	Low Engine Oil Level Lamp Circuit
<b>P1673</b>	Engine Hot Lamp Control Circuit
<b>P1674</b>	Tachometer Control Circuit
<b>P1675</b>	EVAP Vent Solenoid Control Circuit
<b>P1676</b>	EVAP Canister Purge Solenoid Control CKT
<b>P1689</b>	TCS Delivered Torque Control Circuit
<b>P1700</b>	MIL Requested By TCM
<b>P1701</b>	MIL Request Circuit
<b>P1740</b>	Torque Management Request Circuits, Transmission & Traction Control (Except Catera)
<b>P1740</b>	Torque Control/Management Request Circuits (Catera)
<b>P1760</b>	Transmission Control Module Supply Voltage Interrupted
<b>P1780</b>	Park Neutral Position Switch Circuit
<b>P1781</b>	Engine Torque Signal Circuit
<b>P1792</b>	ECM To Transmission Control Module Engine Coolant Signal
<b>P1800</b>	ECM To Transmission Control Module Engine Coolant Signal
<b>P1810</b>	ATF Pressure Manual Valve Position Switch Malfunction
<b>P1811</b>	Long Shift & Max Adapt
<b>P1812</b>	TOT Condition
<b>P1814</b>	Torque Converter Overstress
<b>P1819</b>	Internal Mode Switch - No Start
<b>P1820</b>	Internal Mode Switch Circuit 'A' Low
<b>P1822</b>	Internal Mode Switch Circuit 'B' Low
<b>P1823</b>	Internal Mode Switch Circuit 'P' Low
<b>P1825</b>	Internal Mode Switch - Invalid Range

# ***DTC Definitions***

**GENERAL MOTORS (P1826 - P1895)**

<b>Code</b>	<b>Definition</b>
<b>P1826</b>	Internal Mode Switch - Invalid Range
<b>P1835</b>	Kickdown Switch Circuit
<b>P1842</b>	1-2 Shift Solenoid Circuit Low Input
<b>P1843</b>	1-2 Shift Solenoid Circuit High Input
<b>P1845</b>	2-3 Shift Solenoid Circuit Low Input
<b>P1847</b>	2-3 Shift Solenoid Circuit High Input
<b>P1850</b>	Brake Band Apply Solenoid
<b>P1860</b>	TCC PWM Solenoid Circuit
<b>P1864</b>	TCC Enable Solenoid Circuit
<b>P1868</b>	Transmission Fluid Life
<b>P1870</b>	Trans Component Slipping
<b>P1875</b>	4WD Low Switch Circuit Electrical
<b>P1886</b>	Transaxle Shift, Timing Solenoid Performance
<b>P1887</b>	TCC Release Switch Malfunction
<b>P1890</b>	Throttle Position Signal Input
<b>P1895</b>	Engine Torque Delivered Circuit

**MANUFACTURER SPECIFIC CODES - HONDA**

<b>Code</b>	<b>Definition</b>
<b>P1106</b>	BARO Circuit Range/Performance
<b>P1107</b>	BARO Circuit Low Input
<b>P1108</b>	BARO Circuit High Input
<b>P1121</b>	Throttle Position Lower Than Expected
<b>P1122</b>	Throttle Position Higher Than Expected
<b>P1128</b>	MAP Lower Than Expected
<b>P1129</b>	MAP Higher Than Expected
<b>P1149</b>	Primary HO2S (Sensor 1) Circuit Range/Performance Problem
<b>P1162</b>	Primary HO2S (No. 1) Circuit Malfunction
<b>P1163</b>	Primary HO2S (No. 1) Circuit Slow Response
<b>P1164</b>	Primary HO2S (No. 1) Circuit Range/Performance
<b>P1165</b>	Primary HO2S (No. 1) Circuit Range/Performance
<b>P1166</b>	Primary HO2S (No. 1) Heater System Electrical
<b>P1167</b>	Primary HO2S (No. 1) Heater System
<b>P1168</b>	Primary HO2S (No. 1) LABEL Low Input
<b>P1169</b>	Primary HO2S (No. 1) LABEL High Input
<b>P1253</b>	VTEC System Malfunction
<b>P1257</b>	VTEC System Malfunction
<b>P1258</b>	VTEC System Malfunction
<b>P1259</b>	VTEC System Malfunction
<b>P1297</b>	Electrical Load Detector Circuit Low Input
<b>P1298</b>	Electrical Load Detector Circuit High Input
<b>P1300</b>	Multiple Cylinder Misfire Detected
<b>P1336</b>	CSF Sensor Intermittent Interruption
<b>P1337</b>	CSF Sensor No Signal
<b>P1359</b>	CKP/TDC Sensor Connector Disconnection
<b>P1361</b>	TDC Sensor Intermittent Interruption
<b>P1362</b>	TDC Sensor No Signal
<b>P1366</b>	TDC Sensor No. 2 Intermittent Interruption
<b>P1367</b>	TDC Sensor No. 2 Signal
<b>P1381</b>	Cylinder Position Sensor Intermittent Interruption
<b>P1382</b>	Cylinder Position Sensor No Signal

# ***DTC Definitions***

**HONDA (P1456 - P1687)**

<b>Code</b>	<b>Definition</b>
<b>P1456</b>	EVAP Emission Control System Leak Detected (Fuel Tank System)
<b>P1457</b>	EVAP Emission Control System Leak Detected (Control Canister System)
<b>P1459</b>	EVAP Emission Purge Flow Switch Malfunction
<b>P1491</b>	EGR valve Lift Insufficient Detected
<b>P1498</b>	EGR Valve Lift Sensor High Voltage
<b>P1508</b>	IAC Valve Circuit Failure
<b>P1509</b>	IAC Valve Circuit Failure
<b>P1519</b>	Idle Air Control Valve Circuit Failure
<b>P1607</b>	EGM/PGM Internal Circuit Failure A
<b>P1655</b>	SEA/SEFA/TMA/TMB Signal Line Failure
<b>P1660</b>	A/T FI Signal A Circuit Failure
<b>P1681</b>	A/T FI Signal A Low Input
<b>P1682</b>	A/T FI Signal A High Input
<b>P1686</b>	A/T FI Signal B Low Input
<b>P1687</b>	A/T FI Signal B Low Input



**MANUFACTURER SPECIFIC CODES - TOYOTA**

<b>Code</b>	<b>Definition</b>
<b>P1100</b>	BARO Sensor Circuit malfunction
<b>P1120</b>	Accelerator Pedal Position Sensor Circuit Malfunction
<b>P1121</b>	Accelerator Pedal Position Sensor Range/Performance Problem
<b>P1125</b>	Throttle Control Motor Circuit Malfunction
<b>P1126</b>	Magnetic Clutch Circuit Malfunction
<b>P1127</b>	ETCS Actuator Power Source Circuit Malfunction
<b>P1128</b>	Throttle Control Motor Lock Malfunction
<b>P1129</b>	Electric Throttle Control System Malfunction
<b>P1130</b>	Air-Fuel Sensor Circuit Range/Performance
<b>P1133</b>	Air-Fuel Sensor Circuit Response Malfunction
<b>P1135</b>	Air-Fuel Sensor Heater Circuit Response Malfunction
<b>P1150</b>	A/F Sensor Circuit Range/Performance Malfunction
<b>P1153</b>	A./F Sensor Circuit Response Malfunction
<b>P1155</b>	A/F Sensor Heater Circuit Malfunction
<b>P1200</b>	Fuel Pump Relay Circuit Malfunction
<b>P1300</b>	Igniter Circuit Malfunction No. 1
<b>P1305</b>	Igniter Circuit Malfunction No. 2 (1998-2000 Land Cruiser, 2000 Celica & Tundra)
<b>P1310</b>	Igniter Circuit Malfunction No. 2 (Except 1998-2000 Land Cruiser, 2000 Celica & Tundra)
<b>P1310</b>	Igniter Circuit Malfunction No. 3 (1998-2000 Land Cruiser, 2000 Celica & Tundra)
<b>P1315</b>	Igniter Circuit Malfunction No. 4 (1998-2000 Land Cruiser, 2000 Celica & Tundra)
<b>P1320</b>	Igniter Circuit Malfunction No. 5 (1998-2000 Land Cruiser & 2000 Tundra)
<b>P1325</b>	Igniter Circuit Malfunction No. 6 (1998-2000 Land Cruiser & 2000 Tundra)
<b>P1330</b>	Igniter Circuit Malfunction No. 7 (1998-2000 Land Cruiser & 2000 Tundra)
<b>P1335</b>	No CKP Sensor Signal Engine Running
<b>P1340</b>	Igniter Circuit Malfunction No. 8 (1998-2000 Land Cruiser & 2000 Tundra)
<b>P1346</b>	VVT Sensor /Camshaft Position Sensor Circuit Range/ Performance Problem (Bank 1)

# ***DTC Definitions***

**TOYOTA (P1349 - P1780)**

<b>Code</b>	<b>Definition</b>
<b>P1349</b>	VVT System Malfunction
<b>P1400</b>	Sub-Throttle Position Sensor Malfunction
<b>P1401</b>	Sub-Throttle Position Sensor Range/Performance Problem
<b>P1405</b>	Turbo Pressure Sensor Circuit Malfunction
<b>P1406</b>	Turbo Pressure Sensor Range/Performance Problem
<b>P1410</b>	EGR Valve Position Sensor Circuit Malfunction
<b>P1411</b>	EGR Valve Position Sensor Circuit Ranger/Performance
<b>P1500</b>	Starter Signal Circuit Malfunction
<b>P1510</b>	Boost Pressure Control Circuit Malfunction
<b>P1511</b>	Boost Pressure Low Malfunction
<b>P1512</b>	Boost Pressure High Malfunction
<b>P1520</b>	Stop Lamp Switch Signal Malfunction
<b>P1565</b>	Cruise Control Main Switch Circuit Malfunction
<b>P1600</b>	ECM BATT Malfunction
<b>P1605</b>	Knock Control CPU Malfunction
<b>P1630</b>	Traction Control System Malfunction
<b>P1633</b>	ECM Malfunction ECTS Circuit
<b>P1645</b>	Body ECU Malfunction
<b>P1652</b>	IACV Control Circuit Malfunction
<b>P1656</b>	OCV Circuit Malfunction
<b>P1658</b>	Waste Gate Valve Control Circuit Malfunction
<b>P1661</b>	EGR Circuit Malfunction
<b>P1662</b>	EGR By-Pass Valve Control Circuit Malfunction
<b>P1690</b>	OCV Circuit Malfunction
<b>P1692</b>	OCV Open Malfunction
<b>P1693</b>	OCV Closed Malfunction
<b>P1780</b>	PNP Switch Malfunction

## INTRODUCTION

This Glossary contains definitions for abbreviations and terms you may find in this manual or in your vehicle service manual.

## GLOSSARY OF TERMS AND ABBREVIATIONS

**CARB** – California Air Resources Board

**CCM** – Central Control Module

**Computer Control System** – An electronic control system, consisting of an on-board computer and related sensors, switches and actuators, used to ensure peak performance and fuel efficiency while reducing pollutants in the vehicle's emissions.

**DIY** – Do-It-Yourself

**DLC** – Data Link Connector

**Drive Cycle** – An extended set of driving procedures that takes into consideration the various types of driving conditions encountered in real life.

**Driving Condition** – A specific environmental or operation condition under which a vehicle is operated; such as starting the vehicle when cold, driving at steady speed (cruising), accelerating, etc.

**DTC(s)** – Diagnostic Trouble Code(s)

**EGR** – Exhaust Gas Recirculation

**EPA** – Environmental Protection Agency

**EVAP** – Evaporative Emissions System

**Fault Code** – See DTCs

**Freeze Frame** – A digital representation of engine and/or emissions system conditions present when a fault code was recorded.

**FTP** – Fuel Tank Pressure

**Generic Code** – A DTC that applies to all OBD 2 compliant vehicles.

**I/M Readiness** – An indication of whether or not a vehicle's emissions-related system are operating properly and are ready for Inspection and Maintenance testing.

**I/M Test / Emissions Test / Smog Check** – A functional test of a vehicle to determine if tailpipe emissions are within Federal/State/Local requirements.

**LCD** – Liquid Crystal Display

**LED** – Light Emitting Diode

**Manufacturer Specific Code** – A DTC that applies only to OBD 2 compliant vehicles made by a specific manufacturer.

**MIL** – Malfunction Indicator Lamp (also referred to as “Check Engine” light)

**OBD 1** – On-Board Diagnostics Version 1 (also referred to as “OBD I”)

**OBD 2** – On-Board Diagnostics Version 2 (also referred to as “OBD II”)

**On-Board Computer** – The central processing unit in the vehicle’s computer control system.

**PCM** – Powertrain Control Module

**Pending Code** – A code recorded on the “first trip” for a “two-trip” code. If the fault that caused the code to be set is not detected on the second trip, the code is automatically erased.

**Trip Drive Cycle** – Vehicle operation that provides the necessary driving condition to enable a vehicle Monitor to run and complete its diagnostic testing.

**VECI** – Vehicle Emission Control Information Decal

## LIMITED ONE YEAR WARRANTY

The Manufacturer warrants to the original purchaser that this unit is free of defects in materials and workmanship under normal use and maintenance for a period of one (1) year from the date of original purchase.

If the unit fails within the one (1) year period, it will be repaired or replaced, at the Manufacturer's option, at no charge, when returned prepaid to the Service Center with Proof of Purchase. The sales receipt may be used for this purpose. Installation labor is not covered under this warranty. All replacement parts, whether new or remanufactured, assume as their warranty period only the remaining time of this warranty.

This warranty does not apply to damage caused by improper use, accident, abuse, improper voltage, service, fire, flood, lightning, or other acts of God, or if the product was altered or repaired by anyone other than the Manufacturer's Service Center.

The Manufacturer, under no circumstances shall be liable for any consequential damages for breach of any written warranty of this unit. This warranty gives you specific legal rights, and you may also have rights, which vary from state to state. This manual is copyrighted with all rights reserved. No portion of this document may be copied or reproduced by any means without the express written permission of the Manufacturer. THIS WARRANTY IS NOT TRANSFERABLE. For service, send via U.P.S. (if possible) prepaid to Manufacturer. Allow 3-4 weeks for service/repair.

## SERVICE PROCEDURES

If you have any questions, require technical support or information on UPDATES and OPTIONAL ACCESSORIES, please contact your local store, distributor or the Service Center.

### **USA & Canada:**

(800) 544-4124 (6:00 AM-6:00 PM, 7 days a week PST)

**All others:** (714) 241-6802 (6:00 AM-6:00 PM, 7 days a week PST)

**FAX:** (714) 432-3979 (24 hr.)

**Web:** [www.innova.com](http://www.innova.com)



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