DIGITAL OBDII CODE READER

OWNER'S MANUAL

The Easiest And Best Way To Troubleshoot 1996 and Newer OBD II Vehicles!

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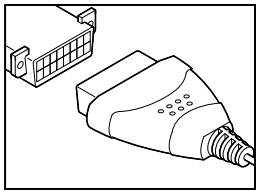
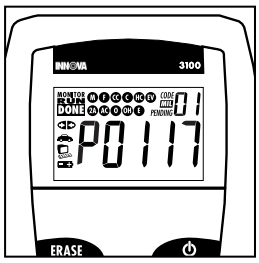
You Can Do It!

1 Connect Code Reader to Vehicle's Test Connector



- Turn the ignition key to the "On" position.
- Turn the Code Reader “On”.
- Press the LINK button.
- The Code Reader will link to the vehicle's computer and retrieve any stored codes.
- Displays Inspection and Maintenance Readiness status

2 Read Diagnostic Trouble Codes



- The codes are displayed on the Code Reader’s LCD display screen.

3 Pinpoint Problem Areas

- Locate fault code(s) in the Fault Code Definition list.

1

1.1 SAFETY PRECAUTIONS

To avoid personal injury, instrument damage and/or damage to equipment under test; do not operate the OBD II Code Reader before reading this manual.

This manual describes common test procedures used by experienced service personnel and technicians. Many test procedures require precautions to avoid accidents that can result in personal injury, and/or vehicle or equipment damage. Always read your vehicle's service manual and follow it's safety precautions before any test or service procedure is performed.

a. When an engine is running, it produces carbon monoxide (a toxic and poisonous gas). To prevent serious injury or death from carbon monoxide poisoning, operate a vehicle **ONLY** in a **well-ventilated** area.

b. To protect your eyes from propelled objects as well as hot or caustic liquids, **always** wear **approved** safety eye protection.

c. When an engine is running, several objects rotate at a very high rate of speed (coolant fan, pulleys, fan belt etc.). To avoid serious injury, always be conscious of moving parts, and keep a safe distance from all these items as well as other potentially moving objects.

d. Engine parts become extremely hot when the engine is running. To prevent severe burns, avoid contact with hot engine parts.

e. Before starting an engine for troubleshooting, make sure the parking brake is engaged. Put the transmission in "park" (for automatic transmission) or "neutral" (for manual transmission). Block the drive wheels with a suitable blocking device.

f. Connecting or disconnecting test equipment when the ignition is "**on**" can cause a spark. This spark is potentially damaging to the test equipment and to the vehicle's electronic components. Always turn the ignition "**off**" before connecting or disconnecting any test equipment.

g. To prevent damage to the on-board computer when taking vehicle electrical measurements, always use a digital multimeter with at least 10 Megohms of impedance.

h. The vehicle's battery produces highly flammable hydrogen gas. To prevent an explosion, keep all sparks, high temperature items or open flames away from the battery.

i. Don't wear loose clothing or jewelry when working on an engine. Loose clothing can get caught on the fan, pulleys, belts, etc. Jewelry is highly conductive, and can cause a severe burn if it makes contact between a power source and ground.

1.2 VEHICLE SERVICE MANUALS

It is recommended that you consult the manufacturer's service manual for your vehicle before any test or repair procedures are performed.

Contact your local car dealership, auto parts store or bookstore for availability of these manuals. The following companies publish valuable repair manuals:

- **Haynes Publications**
  861 Lawrence Drive
  Newbury Park, California 91320
  Phone: CA 800-442-9637
- **Mitchell International**
  14145 Danielson Street
  Poway, California 92064
  Phone: 888-724-6742
- **Motor Publications**
  5600 Crooks Road, Suite 200
  Troy, Michigan 48098
  Phone: 800-426-6867

FACTORY SOURCES
Ford, GM, Chrysler, Honda, Isuzu
Hyundai and Subaru Service Manuals

- **Helm Inc.**
  14310 Hamilton Avenue
  Highland Park, Michigan 48203
  Phone: 800-782-4356

1.3 GENERAL INFORMATION

This Code Reader and manual are designed for use both by consumers with little or no experience in retrieving codes, or by experienced technicians desiring a more in-depth explanation of OBD II system basics.

If you are having problems with your vehicle and only want to know if any Diagnostic Trouble Codes are present in the vehicle's computer system, go directly to paragraph 4.2 and follow the simple directions to retrieve the codes. The codes retrieved, and their definitions, will give you valuable information and a starting point from which to proceed to the next step.

Once the codes have been retrieved, you can choose to:

- **Take your vehicle to an Automotive Service Center for repair:** Take your vehicle, a copy of the completed Preliminary Vehicle Diagnosis Worksheet (see page 1-5) and codes retrieved to your technician for evaluation. This will demonstrate to your technician that you are an informed motorist and will also assist him in pinpointing the location of the problem.
- **Attempt to fix the problem yourself:** If you choose to fix the problem yourself, **read** and follow all of the manual's recommendations and procedures.

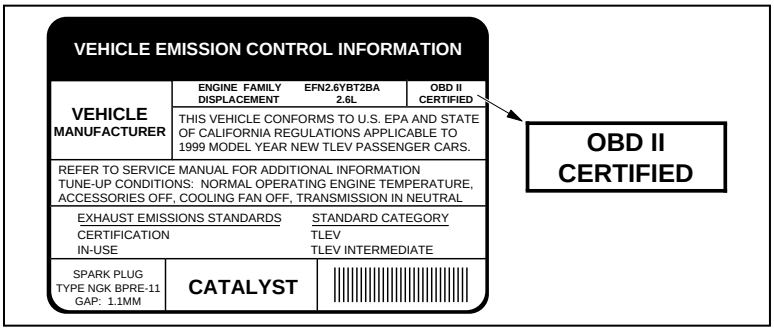
1.4 VEHICLES COVERED

- The 3100 OBD II Code Reader is designed to work on all OBD II compliant vehicles. All 1996 and newer vehicles (cars and light trucks) sold in the United States are OBD II compliant.

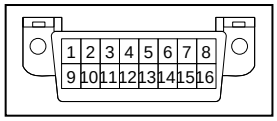
  NOTE: *Federal law requires that all 1996 and newer cars and light trucks sold in the United States must be OBD II compliant; this includes all* ***Domestic****,* ***Asian*** *and* ***European*** *vehicles.*

- Some 1994 and 1995 vehicles are OBD II compliant. To find out if a 1994 or 1995 vehicle is OBD II compliant, check the following:

1. **The Vehicle Emissions Control Information (VECI) Label.** This label is located under the hood or by the radiator of most vehicles. If the vehicle is OBD II compliant, the label will state "**OBD II Certified**".



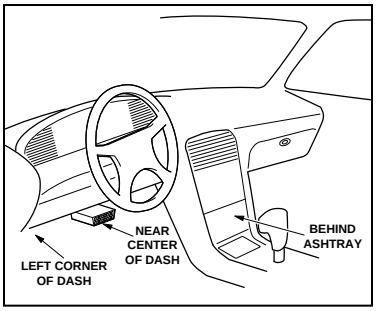
2. Government Regulations require that all OBD II compliant vehicles **must** have a "common" sixteen-pin **Data Link Connector (DLC)**.



NOTE: *Some 1994 and 1995 vehicles have 16-pin connectors but are not OBD II compliant, only the ones where the Vehicle Emissions Control Label states that, they are "OBD II Certified".*

1.4.1 Data Link Connector (DLC) Location

The sixteen-pin DLC is usually located under the instrument panel (dash), within 12 inches (300 mm) of center of the panel, on the drivers side of most vehicles. It should be easily accessible and visible from a kneeling position outside the vehicle with the door open.



NOTE: *On some Asian and European vehicles the DLC is located behind the "ashtray" (the ashtray must be removed to access it) or on the far left corner of the dash. If the DLC cannot be located, consult the vehicle's service manual for the location.*

1.5 PRELIMINARY VEHICLE DIAGNOSIS WORKSHEET

The purpose of this form is to help you gather preliminary information on your vehicle before you retrieve codes. By having a complete account of your vehicle's current problem(s), you will be able to systematically pinpoint the problem(s) by comparing your answers to the fault codes you retrieve. You can also provide this information to your mechanic to assist in diagnosis and help avoid costly and unnecessary repairs. It is important for you to complete this form to help you and/or your mechanic have a clear understanding of your vehicle's problems.

NAME:

DATE:

VIN*:

YEAR:

MAKE:

MODEL:

ENGINE SIZE:

VEHICLE MILEAGE:

*VIN: Vehicle Identification Number, found at the base of the windshield on a metallic plate, or at the driver door latch area (consult your vehicle owner's manual for location).

TRANSMISSION:

- ❑ Automatic
- ❑ Manual

Please check all applicable items in each category.

DESCRIBE THE PROBLEM:

WHEN DID YOU FIRST NOTICE THE PROBLEM:

- ❑ Just Started
- ❑ Started Last Week
- ❑ Started Last Month
- ❑ Other:

LIST ANY REPAIRS DONE IN THE PAST SIX MONTHS:

PROBLEMS STARTING

- ❑ No symptoms
- ❑ Will not crank
- ❑ Cranks, but will not start
- ❑ Starts, but takes a long time

ENGINE QUITS OR STALLS

- ❑ No symptoms
- ❑ Right after starting
- ❑ When shifting into gear
- ❑ During steady-speed driving
- ❑ Right after vehicle comes to a stop
- ❑ While idling
- ❑ During acceleration
- ❑ When parking

IDLING CONDITIONS

- ❑ No symptoms
- ❑ Is too slow at all times
- ❑ Is too fast
- ❑ Is sometimes too fast or too slow
- ❑ Is rough or uneven
- ❑ Fluctuates up and down

RUNNING CONDITIONS

- ❑ No symptoms
- ❑ Runs rough
- ❑ Lacks power
- ❑ Bucks and jerks
- ❑ Poor fuel economy
- ❑ Hesitates or stumbles on accelerations
- ❑ Backfires
- ❑ Misfires or cuts out
- ❑ Engine knocks, pings or rattles
- ❑ Surges
- ❑ Dieseling or run-on

AUTOMATIC TRANSMISSION PROBLEMS (if applicable)

- ❑ No symptoms
- ❑ Shifts too early or too late
- ❑ Changes gear incorrectly
- ❑ Vehicle does not move when in gear
- ❑ Jerks or bucks

PROBLEM OCCURS

- ❑ Morning
- ❑ Afternoon
- ❑ Anytime

ENGINE TEMPERATURE WHEN PROBLEM OCCURS

- ❑ Cold
- ❑ Warm
- ❑ Hot

DRIVING CONDITIONS WHEN PROBLEM OCCURS

- ❑ Short - less than 2 miles
- ❑ 2 ~ 10 miles
- ❑ Long - more than 10 miles
- ❑ Stop and go
- ❑ While turning
- ❑ While braking
- ❑ At gear engagement
- ❑ With A/C operating
- ❑ With headlights on
- ❑ During acceleration
- ❑ Mostly driving downhill
- ❑ Mostly driving uphill
- ❑ Mostly driving level
- ❑ Mostly driving curvy roads
- ❑ Mostly driving rough roads

DRIVING HABITS

- ❑ Mostly city driving
- ❑ Highway
- ❑ Park vehicle inside
- ❑ Park vehicle outside
- ❑ Drive less than 10 miles per day
- ❑ Drive 10 to 50 miles per day
- ❑ Drive more than 50 miles per day

GASOLINE USED

- ❑ 87 Octane
- ❑ 89 Octane
- ❑ 91 Octane
- ❑ More than 91 Octane

WEATHER CONDITIONS WHEN PROBLEM OCCURS

- ❑ 32 ~ 55° F (0 ~ 13° C)
- ❑ Below freezing (32° F / 0° C)
- ❑ Above 55° F (13° C)

CHECK ENGINE LIGHT / DASH WARNING LIGHT

- ❑ Sometimes ON
- ❑ Always ON
- ❑ Never ON

PECULIAR SMELLS

- ❑ "Hot"
- ❑ Sulfur ("rotten egg")
- ❑ Burning rubber
- ❑ Gasoline
- ❑ Burning oil
- ❑ Electrical

STRANGE NOISES

- ❑ Rattle
- ❑ Knock
- ❑ Squeak
- ❑ Other

2

2.1 HISTORY OF COMPUTER ENGINE CONTROLS

As a result of increased air pollution (smog) in large cities, such as Los Angeles, the State of California (California Air Resources Board - **CARB**) as well as the Federal Government (Environmental Protection Agency - **EPA**) established new regulations and air pollution standards to deal with the problem.

The mechanical engine controls in existence at the time (ignition points, mechanical spark advance and the carburetor) responded too slowly to engine driving needs or conditions to properly control fuel delivery and spark timing. This made it very difficult for vehicle manufacturers to meet the new Vehicle Emission Standards (precise fuel delivery and spark timing are critical for lower vehicle emissions).

In order to comply with the stricter State and Federal emission standards, a new Engine Control System had to be designed. The new system had to:

- Respond instantly to supply the engine with the proper mixture (ratio) of air and fuel for any driving condition (idle, cruising, low-speed driving, high-speed driving etc.).
- Calculate instantly the best time to "ignite" the air/fuel mixture to get maximum efficiency from the engine.
- Accomplish the above two items without affecting vehicle performance or fuel economy.

In addition to the above items, an Emissions Control System had to be designed and integrated into the engine controls to further reduce engine emissions. To further complicate matters, the energy crisis of the early 1970's caused a sharp increase in fuel prices over a short period of time. As a result, vehicle manufacturers were not only required to comply with the new emission standards, they also had to make their vehicles more fuel-efficient. Most vehicles were required to meet a miles-per-gallon (MPG) standard set by the U.S. Federal Government.

2.1.1 Introduction of Electronic Engine Controls

Vehicle Computer Control Systems can perform millions of calculations in one second, making them an ideal substitution for the much slower mechanical engine controls. By switching from mechanical engine controls to electronic engine controls, vehicle manufacturers were able to control fuel delivery and spark timing as well as other engine functions (some newer Computer Control Systems also control transmission, brakes, charging, body and suspension systems) more precisely. This

made it possible for vehicle manufacturers to comply with the new, tougher emission and fuel efficiency standards mandated by State and Federal Governments.

2.1.2 The Basic Engine Computer Control System

The main purpose of the vehicle's Computer Control System is to provide maximum engine performance with the least amount of air pollution and the best fuel efficiency possible.

The Computer Control System consists of the on-board computer, and several related control devices (sensors, switches, and actuators). Most on-board computers are located inside the vehicle behind the dashboard, under the passenger's or driver's seat, or behind the right kick panel. Some manufacturers may still position it in the engine compartment. The sensors, switches, and actuators are devices such as oxygen sensors, coolant temperature sensors, throttle position sensors, fuel injectors, etc., that are located throughout the engine, and are connected by electrical wiring to the on-board computer.

The on-board computer is the heart of the Computer Control System. The computer contains several programs with pre-programmed reference values for air/fuel ratio, spark or ignition timing, injector pulse width (how much fuel is injected into the engine), engine speed, etc., for all possible driving conditions (idle, low speed driving, high-speed driving, low load, high load, etc.). The pre-programmed reference values represent the ideal air/fuel mixture, spark timing, transmission gear selection, etc., for any driving condition. These values are programmed at the factory and are specific to each vehicle model.

The on-board computer receives information (inputs) from sensors and switches located throughout the engine. These devices monitor critical engine conditions (coolant temperature, engine speed, engine load, throttle position, air/fuel ratio etc.). The computer compares the actual values received from these sensors with the reference values that are programmed in it's memory, and makes corrections as needed so that the sensor values always match the pre-programmed reference values for that particular driving condition.

Since vehicle operating conditions are constantly changing, the computer continuously makes adjustments or corrections (especially to the air/fuel mixture and spark timing) to keep all the engine systems operating within the pre-programmed reference values.

NOTE: *The computer does not make the adjustments or corrections directly. It commands other devices such as the fuel injectors, idle air control, EGR valve or Ignition Module to perform these functions. These devices are called Actuators because they initiate an action in response to the commands of the computer.*

2.2. ON-BOARD DIAGNOSTICS-FIRST GENERATION (OBD I)

- Beginning in 1988 California's Air Resources Board (CARB), and later, the Federal Government's Environmental Protection Agency (EPA), required vehicle manufacturers to include a self diagnostic program capable of identifying an emissions-related fault in a system in their On-board Computers. The first generation of Onboard Diagnostics came to be known as **OBD I**.
- OBD I is a set of self-testing or self-diagnosing instructions that are programmed into the vehicle's on-board computer.
- The program is specifically designed to detect failures in the sensors, actuators, switches and wiring of the various vehicle emissions-related systems (fuel injection system, ignition system, EGR system, catalytic converter etc.). If the computer detects a failure in any one of these components or systems, it alerts the driver by illuminating a light on the dash (the light will illuminate **only** if it is an emissions-related problem).
- The computer also assigns a numeric code (OBD I systems utilized a 2 or 3 digit code) for each specific problem that it detects, and stores these codes in it's memory for later retrieval. The codes can be retrieved from the computer's memory with the use of a device called a "Code Reader" or a "Scan Tool".

  NOTE: *With the exception of some 1994 and 1995 vehicles most vehicles from about 1982 to 1995 are equipped with* ***OBD I*** *systems.*

2.3 ON-BOARD DIAGNOSTICS-SECOND GENERATION (OBD II)

2.3.1 The reason for OBD II systems

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

- A significant number of these vehicles had deteriorating or degrading emissions-related components that were causing an increase in emissions.
- Because these components were degrading and not failing completely, they were not setting codes (OBD I systems do not detect degrading components).
- The emission checks being conducted at that time were not adequate to detect some of these problems (emission checks did not test for loaded dyno simulated driving conditions). A significant number of these vehicles with degrading, and sometimes non-operating components, such as the Evaporative Emission Control System or Secondary Air Systems, were passing Emissions Tests (some of these problems only occur when the vehicle is being driven and under load).
- 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, California Air Resources Board (CARB) and the Federal Government's Environmental Protection Agency (EPA) passed new laws, test procedures and regulations that required vehicle manufacturers to equip their new vehicles with devices capable of complying with all of the new emission standards and regulations. It was also decided that a new upgraded or 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 II)**".

2.3.2 OBD II System Objectives

The primary objective of the OBD II system is to comply with the new regulations and emission standards established by California's Air Resources Board (CARB) and the Federal Government's Environmental Protection Agency (EPA).

The Main Objectives of the OBD II System are:

- To detect the degradation and/or failure of an emissions-related component or system 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 have a Diagnostic Link Connector (DLC) that is common (the same shape and size) for all vehicles (before OBD II, DLC's were of different shapes and sizes).
- To have all vehicle manufacturers utilize a common code number, code definition and language to describe a particular fault. Before OBD II, each vehicle manufacturer used their own code number, code definition and language to describe the same fault.
- To expand the operation of the Malfunction Indicator Lamp (MIL).
- To have standardization of communication procedures and protocols between the diagnostic equipment (Scan Tools, Code Readers etc.) and the vehicle's on-board computer.

NOTE: *The OBD II System is an enhancement of the OBD I System. In addition to performing all the functions of the OBD I System, the OBD II System has been enhanced with new Diagnostic Programs that closely monitor the functions of the 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.*

2.4 OBD II TERMINOLOGY

In order to better understand OBD II systems, you should become familiar with the following terms and their definitions. Read and reference this list as needed to aid in the understanding of OBD II systems.

- **Powertrain Control Module (PCM)** - The PCM is the OBD II accepted term for the vehicle's "on-board computer". As the name implies the PCM, in addition to

controlling the engine management and emissions systems, also takes an active role in controlling the powertrain (transmission) operation. Most PCM's also have the ability to communicate with other computers on the vehicle (ABS, ride control, body etc.).

NOTE: *For clarity and ease of understanding,* ***computer*** *and* ***PCM*** *are used interchangeably throughout this manual.*

- **Monitor** - Monitors are a set of "diagnostic strategies" programmed into the PCM. The PCM utilizes these special programs to run diagnostic tests, and to monitor the operation of the vehicle's emissions-related components or systems to ensure they are operating correctly and within the vehicle's manufacturer specifications. As of this writing, a maximum of eleven Monitors are utilized in OBD II systems. Additional Monitors will be added by Government regulations as the OBD II system expands and matures. **Not all vehicles support all eleven Monitors.**
- **Enabling Criteria** - Each Monitor is specifically designed to monitor the operation and to run diagnostic tests on a *specific* part of the vehicle's emissions system (EGR system, oxygen sensor, catalytic converter, etc.). A set of "conditions" or "driving procedures", also called "**Enabling Criteria**", are required before the vehicle's computer can command a Monitor to run tests on a particular part of the emissions system. 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 of a particular part of the vehicle's emission system. Others might require a set of complex procedures, such as, starting the vehicle when cold, bringing it to operating temperature, then driving the vehicle under specific conditions (accelerating, decelerating, cruising, etc.) before the Monitor can run and complete its diagnostic testing on its associated part of the emissions system.
- **Monitor Has/Has Not Run** - The terms "Monitor has run" or "Monitor has not run" are used throughout this manual. "**Monitor <u>has</u> run**", means the PCM **has** utilized 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 <u>not</u> run**" means the PCM **has not** yet

utilized that particular Monitor to perform diagnostic testing on its associated part of the emissions system.

- **Trip** - A "Trip" for a particular Monitor is a drive cycle where the vehicle is driven in such a way that all the Enabling Criteria for that 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**" and it is considered to have successfully completed when all the Enabling Criteria for that particular Monitor to run and complete its diagnostic testing were met by the time the vehicle is powered down (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 will vary.
- **OBD II Drive Cycle** - An OBD II Drive Cycle is an extended set of driving procedures that takes into consideration the various types of driving conditions encountered in real life, such as starting the vehicle when it is cold, driving the vehicle at a steady speed (cruising), accelerating and decelerating etc. An OBD II Drive Cycle begins when the vehicle is first 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** it's applicable Monitors to run and complete their Diagnostic Testing. Not all driving trips qualify as an OBD II Drive Cycle. Only those trips that provide the Enabling Criteria for **all** Monitors applicable to the vehicle to run and complete their individual Diagnostic Tests. OBD II Drive Cycle requirements and procedures for all Monitors to run vary from one model of vehicle to another. Vehicle manufacturers set these procedures. Consult your vehicle's service manual for OBD II Drive Cycle procedures.

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

- **Warm-up Cycle** - A Warm-up Cycle is defined as vehicle operation (after an engine off period) where the engine temperature rises at least 40°F (22°C) from the temperature present when the vehicle was first started **and** the engine temperature reaches at least 160°F (70°C). The PCM uses warm-up cycles as a counter to automatically erase a specific code and pertinent data from it's memory when no faults specific to the original problem are detected within a specified number of warm-up cycles.

3

3.1. DIAGNOSTIC TROUBLE CODES (DTC'S)

Diagnostic Trouble Codes are codes that identify a particular problem area and are intended as a guide to the proper service procedure described in the vehicle's service manual. **Do not** replace parts or components based only on DTC's without first consulting the vehicle's service manual for proper testing procedures for that particular system, circuit or component.

a. Diagnostic trouble codes are alphanumeric codes that are used to identify a problem that is present on any of the systems that are monitored by the on-board computer (PCM).

b. Each trouble code is assigned a message that explains the circuit, component or system area where the problem was detected.

c. OBD II diagnostic trouble codes are composed of five characters; one letter followed by four digits (see example on next page):

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

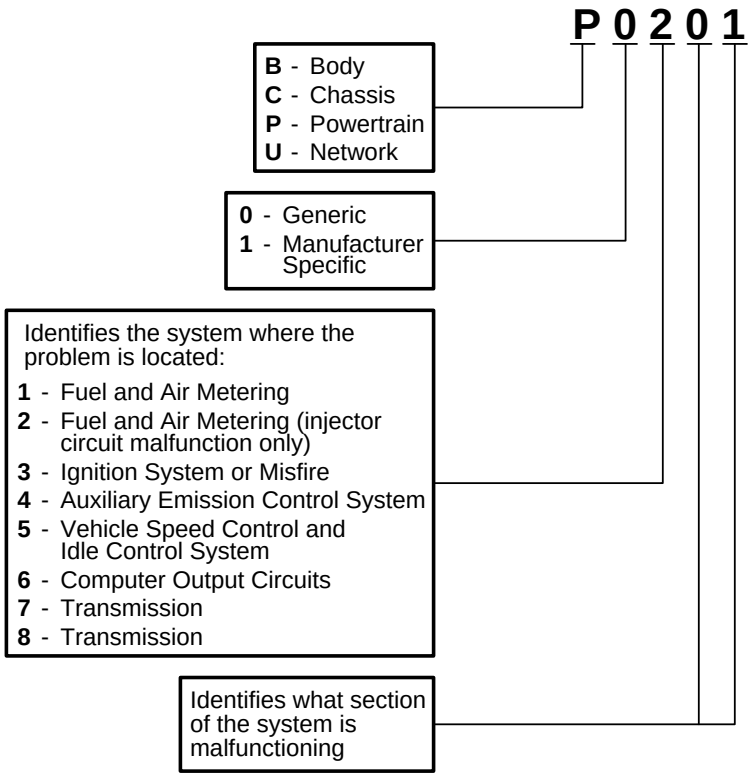
  NOTES:

  Generic diagnostic trouble codes are codes that have been standardized to be used by all vehicle manufacturers. The standards for generic trouble codes, as well as their definitions, are set by the Society of Automotive Engineers (SAE).

  *Manufacturer Specific diagnostic trouble codes 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 II emission standards, but manufacturers are free to expand beyond the **required** computer on-board diagnostics to make their systems easier to diagnose.*
- 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 what section of the system is malfunctioning.

OBD II DTC EXAMPLE

P0201 - Injector Circuit Malfunction, Cylinder 1



3.1.1. DIAGNOSTIC TROUBLE CODES (DTC's) AND MIL STATUS

When the vehicle's on-board computer detects a failure on an emissions-related component or system, OBD II regulations require that the computer's internal diagnostic program assign a diagnostic trouble code (DTC) that identifies the system (and the part of the system) where the malfunction was detected. The diagnostic program is also required to save the code in the computer's memory, record a "Freeze Frame" of conditions present when the fault was detected, and to command the Malfunction Indicator Lamp (MIL) "On" (some faults require detection for two consecutive trips before the MIL is turned on).

NOTE: *The "Malfunction Indicator Lamp" (MIL) is the new accepted universal term to describe the lamp that illuminates on the dash to warn the driver that an emissions-related fault has been detected. For ease of customer understanding, manufacturers may still identify this lamp using the terms "Check Engine light" or "Service Engine Soon light".*

There are two categories of DTC's utilized for emissions-related faults: Type "A" and Type "B". Type "A" codes are One Trip DTC's; Type "B" DTC's are usually Two Trip DTC's.

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

- The computer activates or commands the MIL "On" immediately when the failure is first detected.
- If the detected failure causes a severe misfire that may cause damage to the catalytic converter, the MIL will "flash" **once per second** and will continue flashing as long as the severe misfire condition exists. If the condition that could cause catalytic converter damage is no longer present, the MIL will revert to a "steady" On condition.
- A Diagnostic Trouble Code is saved in the computer's memory for later retrieval.
- A "Freeze Frame" (snap shot) of the conditions present in the engine or emissions system the **instant** the MIL was commanded "On" is recorded and 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 detected on the First Trip, the following events take place:

- The computer sets a Pending DTC, but the MIL is not commanded "On" at this time, and no "Freeze Frame" data is recorded. The Pending DTC is saved in the computer's memory for later retrieval.
- If the failure **is detected** on the second consecutive trip, the MIL is commanded "On" and "Freeze Frame" data is recorded and saved in the computer's memory.
- If the failure is **no longer detected** on the second consecutive Trip, the Pending DTC is erased from the computer's memory.

The MIL will stay illuminated on Type "A" and Type "B" codes until one of the following conditions occurs:

- If the conditions that caused the MIL to illuminate are no longer present for the next three consecutive trips, the PCM will automatically turn the MIL "Off" (if no other emissions-related faults are present). However, the DTC's will stay in the computer's memory for 40 warm-up cycles (80 warm-up cycles for fuel and misfire faults) and will automatically erase if the associated specific fault is not detected again during that period of time.
- Misfire and fuel system faults require three "similar conditions" Trips before the MIL is turned "Off". "Similar conditions" Trips are trips where the engine load, RPM and temperature are similar to the conditions present when the fault was first detected.

NOTE: *In addition to the DTC's staying in the computer's memory after the MIL has been turned "Off", Freeze Frame data, and manufacturer specific enhanced data also stay in the computer's memory. This data can only be retrieved by utilizing more sophisticated testing equipment, such as an OBD II Scan Tool.*

- Erasing the Diagnostic Trouble codes from the PCM's memory can also turn off the MIL. See paragraph 4.2.3, "Erasing Diagnostic Trouble Codes", before any codes are erased from the computer's memory. If a Code Reader or a Scan Tool is used to erase the codes, Freeze Frame data as well as other manufacturer specific enhanced data will also be erased.

3.2 OBD II MONITORS

To verify 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 diagnostic program inside the on-board computer contains several procedures and diagnostic strategies. Each procedure or diagnostic strategy is designed to monitor the operation of, and run Diagnostic Tests on, a specific emissions-related component or system to ensure the system is operating correctly and within the manufacturer's specifications. On OBD II systems, these procedures and diagnostic strategies are called "Monitors".

- As of this writing, a maximum of eleven Monitors are utilized in OBD II systems. Additional Monitors will be added by Government regulations as the OBD II system expands and matures. **Not all vehicles support 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 continuously monitor their associated components and/or systems for proper operation. Continuous Monitors run continuously when the engine is in operation. 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. The Non-Continuous Monitors perform and complete their Diagnostic 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 paragraph 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 for shorts, opens, out of range value, functionality and rationality*.

* **Rationality:** Each input signal is compared against all other inputs and information 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 all 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), and it 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 utilizes 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 compensate 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 compensate by adding or subtracting fuel as needed, up to a certain percent. If the correction needed is too large and exceeds the time and percent allocated by the program, a fault is indicated by the PCM.

  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 inside the cylinder fails to ignite. The misfire Monitor uses crankshaft speed fluctuations to detect an engine misfire. When a cylinder misfires, it no longer contributes to the speed of the engine, and a decrease in engine speed will occur every time that particular cylinder (or cylinders) misfire. The misfire Monitor is designed to detect engine speed fluctuations and to determine from which cylinder (or cylinders) the misfire is coming from, as well as how severe the misfire is. There are three types of engine misfires, Types 1, 2, and 3.

  - Type 1 and Type 3 misfires are two-trip monitors. If a fault is detected on the first trip, the PCM will temporarily save this fault in it's memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, under similar conditions of engine speed, load and temperature, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

- Type 2 misfires are the most severe and will command the MIL to illuminate on the first Trip when the misfire is detected. If the computer determines that a Type 2 misfire is very severe, and capable of causing catalytic converter damage, it will command the MIL to "flash" once per second as soon as the misfire is detected. When the damaging misfire is no longer present, the MIL will stop flashing and will revert to steady "On" condition.

- **Catalyst Monitor** - The catalytic converter is a device that is installed downstream of the exhaust manifold to help oxidize (burn) the unburned fuel (hydrocarbons-HC) and partially burned fuel (Carbon Monoxide-CO) leftover from the combustion process. To accomplish this heat (about 600° F) and catalyst materials (platinum, palladium, rhodium, alumina and cerium) inside the converter react with the exhaust gases to oxidize (burn) HC and CO, and in the process, it converts these polluting gases into the non-polluting or less polluting gases carbon dioxide (CO2) and water (H20). Catalytic converters also reduce Oxides of Nitrogen (NOx) by converting them to less polluting gases (NOx reacts with CO to form N2, CO2, and O2). Some materials (alumina or cerium) inside the catalytic converter also have the ability to store oxygen (O2), and then release it as needed to oxidize HC and CO.

  The computer checks the efficiency of the catalytic converter by monitoring the two oxygen sensors that are utilized in the system, one before (upstream) the converter and the other located after (downstream) the converter. If the catalytic converter loses its ability to store oxygen, the downstream oxygen sensor signal voltage waveform becomes almost identical to the upstream oxygen sensor signal, and the monitor will fail the test.

  The Catalyst Monitor is a "Two Trip" Monitor. If a fault is detected on the first trip, the PCM will temporarily save this fault in its memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

- **Heated Catalyst Monitor** - Operation of the "heated" catalytic converter is basically the same as the catalytic converter described above. The main difference is that a Heater is added to bring the catalytic converter to it's operating temperature much 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 described previously, and also tests the catalytic converter's heater for proper operation. This Monitor is also a "Two Trip" Monitor, as described above.

- **Exhaust Gas Recirculation (EGR) Monitor** - The Exhaust Gas Recirculation (EGR) system helps to reduce the formation of Oxides of Nitrogen (NOx) during the combustion process. Temperatures above 2500°F cause nitrogen and oxygen to combine and form NOx in the combustion chamber. To reduce NOx formation, combustion temperatures must be maintained 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 process reduces combustion temperatures by up to 500°F. The PCM determines the time, duration and the amount of exhaust gas to be recirculated back to the intake manifold. The EGR Monitor performs EGR system function tests at predetermined times during vehicle operation.

  The EGR Monitor is a "Two Trip" Monitor. If a fault is detected on the first trip, the PCM will temporarily save this fault in it's memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

- **Evaporative System (EVAP) Monitor** - OBD II vehicles are equipped with a fuel Evaporative system (EVAP) which helps prevent fuel vapors from evaporating into the atmosphere. The EVAP system carries fumes from the fuel tank to the engine where they are burned during engine 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 via hoses or tubes and are stored in the charcoal canister. The PCM controls the flow of fuel vapors from the charcoal canister to the engine via a purge solenoid. The PCM energizes or de-energizes (depending on solenoid design) the purge solenoid, which 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 PCM runs this Monitor once per trip.

The EVAP Monitor is a "Two Trip" Monitor. If a fault is detected on the first trip, the PCM will temporarily save this fault in its memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

- **Air Conditioning (A/C) Monitor** - The A/C Monitor detects 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 II systems of these vehicles to detect for refrigerant leaks.
  2. Use R-134 refrigerant (instead of R12) with no Monitor required.

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

- **Oxygen Sensor Monitor** - The Oxygen Sensor monitors the amount of oxygen in the vehicle's exhaust, generates a varying voltage signal of up to one volt (based on the amount of oxygen present in the exhaust gas) and forwards this signal to the PCM. The PCM uses this signal to make corrections to the air/fuel mixture. If the exhaust gas contains a large amount of oxygen (indicating a lean air/fuel mixture),

the oxygen sensor generates a “low” voltage signal. If the exhaust gas contains very little oxygen (indicating a rich mixture condition), the oxygen sensor generates a “high” voltage signal. A 450mV signal equates to the most efficient, and least polluting, ideal 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 PCM to enter into closed loop operation. The oxygen sensor only functions when the PCM is in closed loop. A properly operating oxygen sensor reacts quickly to any change of 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 detected on the first trip, the PCM will temporarily save this fault in its memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL “On” and the code will be saved in it’s long term memory.

- **Oxygen Sensor Heater Monitor** - 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 (the vehicle also goes to open loop operation at other times such as heavy load and full throttle conditions) before it reaches normal operating temperature. When the vehicle is operating in open loop, the oxygen sensor signal is ignored by the PCM 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 PCM uses the oxygen sensor signal for air/fuel mixture corrections.

  In order for the PCM to enter closed loop operation, the oxygen sensor must reach a temperature of at least 600°F. The main purpose of the oxygen sensor

heater is to help the oxygen sensor reach and maintain it's minimum operating temperature (600° F) more quickly, to bring the vehicle into closed loop operation as soon as possible. The Oxygen Sensor Heater Monitor tests the operation of the oxygen sensor's heater.

The Oxygen Sensor Heater Monitor is a "Two Trip" Monitor. If a fault is detected on the first trip, the PCM will temporarily save this fault in its memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

- **Secondary Air System Monitor** - When a cold engine is first started, it operates in open loop mode. During open loop operation, the engine usually runs rich. A vehicle running rich wastes fuel and increases emissions, particularly carbon monoxide (CO) and some hydrocarbons (HC). 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 (CO) and hydrocarbons (HC) left over from the combustion process during the warm up period (without oxygen the catalytic converter cannot oxidize CO and HC).
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, system functionality, and performs a series of tests to identify faults in the system. The PCM runs this Monitor once per trip.

The Secondary Air System Monitor is a "Two Trip" monitor. If a fault is detected on the first trip, the PCM will temporarily save this fault in its memory as a Pending Code (the MIL will be off at this time). If the fault is detected again on the second consecutive trip, the PCM will command the MIL "On" and the code will be saved in it's long term memory.

3.3 OBD II REFERENCE TABLE

The table below lists current OBD II 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

4

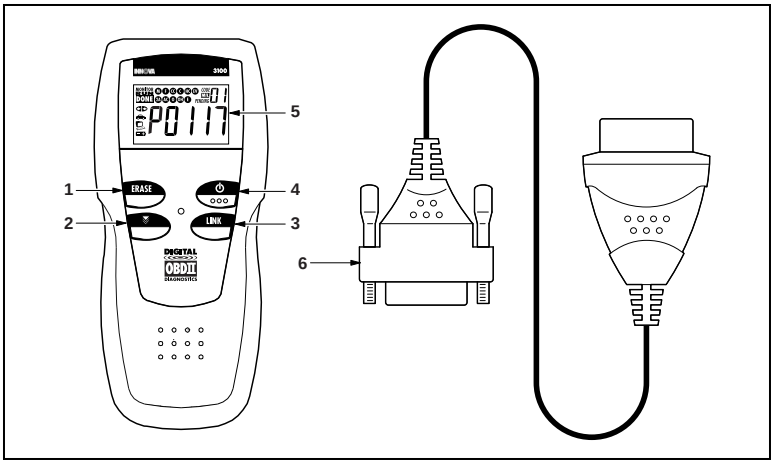
4.1 ABOUT THE CODE READER

This Code Reader is designed to retrieve Powertrain Control Module (PCM) Diagnostic Trouble Codes (DTC's) and to provide an indication of I/M Readiness Monitor Status.

4.1.1 Battery Replacement

1. Locate the battery cover on the back of the Code Reader.
2. Lift the battery cover off (use your finger or a small coin).
3. Replace batteries with three AAA-size batteries (for longer life, use Alkaline-type batteries).
4. Reinstall the battery cover on the back of the Code Reader.

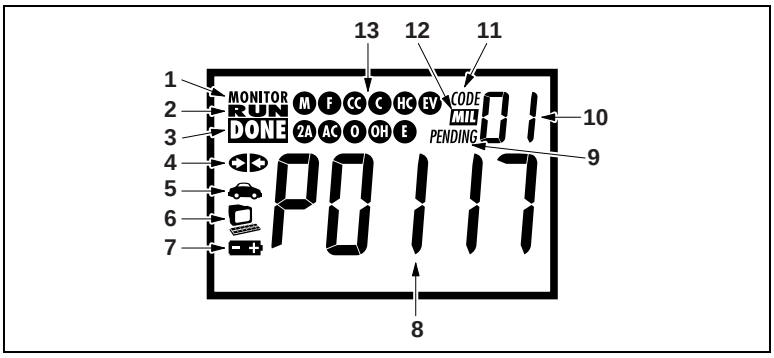
4.1.2 Code Reader Controls and Indicators



1. **ERASE button** - Erases Diagnostic Trouble Codes (DTC's) and "Freeze Frame" data, and resets Monitor status.
2. **SCROLL button** - Scrolls the LCD Display to view the Diagnostic Trouble Codes (when more than one DTC is present).
3. **LINK button** - Links the Code Reader with the vehicle's PCM to retrieve any DTC's that are present in the PCM's memory and to view I/M Readiness Monitor Status.
4. **POWER button** - Turns the Code Reader "On" and "Off".

5. **LCD Display** - Displays test results, Code Reader functions and Monitor status information. See paragraph 4.1.3 for details.
6. **CABLE** - Connects the Code Reader to the vehicle's Data Link Connector (DLC).

4.1.3 DISPLAY FUNCTIONS



1. **MONITOR icon** - Identifies the Monitor Icon area.
2. **RUN icon** - Indicates the Monitor RUN status of all the Monitors that apply to the vehicle under test.
3. **DONE icon** - When visible, indicates that all the Monitors that apply to the vehicle under test have run and completed their Diagnostic Testing. DONE is only visible when all supported Monitors have completed their testing.

   NOTE: *Items 1 through 3 are associated with INSPECTION and MAINTENANCE (I/M) READINESS STATUS. Some states (and eventually* ***most*** *states) will require that all vehicle Monitors have run and completed their Diagnostic Testing before a vehicle can be tested for Emissions (Smog check).*
4. **Link icon** - Indicates whether or not the Code Reader is communicating (linked) with the vehicle's on-board computer. When visible, the Code Reader is communicating (linked) with the PCM. If the Link icon is not visible, the Code Reader is not communicating (not linked) to the PCM.
5. **Vehicle icon** - Indicates whether or not the Code Reader is being properly powered through the vehicle's Data Link Connector (DLC). A visible icon indicates that the Code Reader is being powered through the vehicle's DLC connector.

6. **Computer icon** - This function is for future expansion to a computer link.
7. **Code Reader Internal Battery icon** - When visible, indicates a "low" Code Reader battery condition.
8. **DTC Display Area** - Displays the Diagnostic Trouble Code (DTC) number. Each particular fault is assigned a Code Number that is specific to that fault.
9. **Pending icon** - Identifies if the currently displayed DTC is a Pending Code.
10. **Code Number Sequence** - The Code Reader assigns a sequence number to each DTC that is present in the PCM's memory, in ascending order, starting with "01". This helps keep track of the number of DTC's present in the PCM's memory. Code number "01" will always be the highest priority code, and the one for which "Freeze Frame" data has been stored.
    NOTE: *If "01" is a pending code, no "Freeze Frame" data will be stored in memory.*
11. **CODE icon** - Identifies the Code Number Sequence display area.
12. **MIL icon** - Indicates the status of the Malfunction Indicator Lamp (MIL). The MIL icon is visible only when a DTC has commanded the MIL to illuminate on the vehicle's dash.
13. **Monitor icons** - Indicates which Monitors are supported by the vehicle under test, and whether or not the associated Monitor has run its diagnostic testing (Monitor status). When a Monitor icon is solid, it indicates that the associated Monitor has completed it's diagnostic testing. When a Monitor icon is flashing, it indicates that the vehicle supports the associated Monitor, but the Monitor has not yet run its diagnostic testing. On OBD II systems, a maximum of eleven Monitors are utilized. **Not all vehicles support all eleven Monitors.** When the Code Reader is linked to a vehicle, only the icons for Monitors that are supported by the vehicle under test are visible on the display. Following is a list of Monitor icons and their associated Monitors.

M = Misfire Monitor
F = Fuel System Monitor
CC = Comprehensive Component Monitor
C = Catalyst Monitor
HC = Heated Catalyst Monitor
EV = Evaporative System Monitor
2A = Secondary Air System Monitor
AC = Air Conditioning System Refrigerant (R-12) Monitor
O = Oxygen Sensor Monitor
OH = Oxygen Sensor Heater Monitor
E = Exhaust Gas Recirculation (EGR) Monitor

4.2 RETRIEVING DIAGNOSTIC TROUBLE CODES (DTC's)

4.2.1 Before You Begin

Fix any known mechanical problems before performing any test.

Perform a thorough vehicle inspection before starting any test procedures. Loose or damaged hoses, wiring or electrical connectors are often responsible for poor engine performance, and in some instances they may cause a "false" fault code.

Please read your vehicle's service manual for proper connection of vacuum hoses, electrical wiring and wiring harness connectors. Check the following areas:

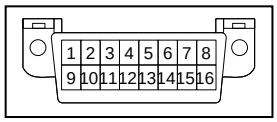
- All fluid levels - check the engine, power steering, transmission (if applicable), coolant and other engine fluids.
- Air cleaner and ducts - check for holes, rips, cracks, excessive dirt in filter, and for disconnected ducts.
- Belts - check for cracked, torn, brittle, loose or missing belts.
- Mechanical linkage (throttle, gearshift position, transmission, etc.) associated with sensors - refer to your vehicle's service manual for locations.
- Rubber and steel hoses (vacuum/fuel) - check for leaks, cracks, blockage or any other damage, and for proper routing.
- Spark plugs and wires - check for damaged, loose, disconnected or missing spark plug wires.
- Battery terminals - make sure battery terminals are clean and tight; check for corrosion or broken connections. Verify proper battery and charging system voltage.

- Electrical connectors and wiring - make sure wire insulation is in good condition and there are no exposed wires.
- Verify that the engine is mechanically sound. If necessary, perform a compression check, engine vacuum check, timing check (if applicable), etc.

4.2.2 Code Retrieval Procedure

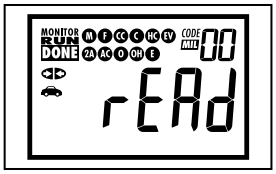
IMPORTANT: Retrieving and utilizing Diagnostic Trouble Codes (DTC's) for troubleshooting vehicle operation is only one part of an overall diagnostic strategy. Never replace a part based only on the Diagnostic Trouble Code Definition. Always consult the vehicle's service manual for more detailed testing instructions. Each DTC has a set of testing procedures, instructions and flow charts that must be followed to confirm the exact location of the problem. This type of information is found in the vehicle's service manual.

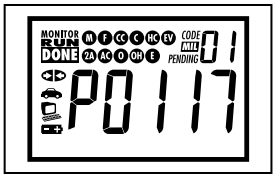
1. Turn the ignition off.
2. Locate the vehicle's 16-pin Data Link Connector (DLC). See paragraph 1.4.1 for connector location.



3. Connect the OBD II Code Reader cable connector to the vehicle's DLC. The cable connector is keyed and will only fit one way.
   - If you have problems connecting the Code Reader to the DLC, rotate the Code Reader's cable connector 180° and try again.
   - If you still experience problems, check the DLC on the vehicle and on the Code Reader. You may have to refer to your vehicle's service manual to properly check the vehicle's DLC.
4. Press the Code Reader's **POWER** button.
   - The Vehicle icon should display at this time to acknowledge a good power connection. If the vehicle icon is not displayed, recheck the cable connections at the Code Reader and the vehicle's DLC.
5. Turn the ignition on. **DO NOT** start the engine.

Retrieving Codes





6. Press and release the Code Reader's **LINK** button.

- The LCD display will indicate "**rEAd**".
- After 4~5 seconds, the Code Reader will **retrieve** and **display** any Diagnostic Trouble Codes that are in the vehicle's computer memory.

NOTE: *The Code Reader will display a code **only** if codes are present in the vehicle's computer memory. If no codes are present, a "**0**" will be displayed. The Code Reader is capable of retrieving and holding in memory up to 32 codes, for immediate or later viewing.*

7. Read the Diagnostic Trouble Code on the LCD display.

- If the code retrieved is a pending code, the **PENDING** icon will show on the LCD display.

NOTE: *The Code Reader will automatically re-link to the vehicle's computer every 15 seconds to refresh the data being retrieved. When data is being refreshed, a single beep will sound, and "**rEAd**" will be shown on the LCD display for approximately 5~6 seconds. The Code Reader will then beep twice and return to displaying codes. This action will keep repeating as long as the Code Reader is in communication with the vehicle's computer.*

8. To view additional DTC's (if more than one code is present) press and release the **SCROLL** button, as necessary, until all the codes have been displayed.

- Whenever the **SCROLL** function is used to view additional codes, the Code Reader's communication link with the vehicle's computer disconnects. To re-establish communication, you must press the **LINK** button again.

9. To prolong battery life, the Code Reader will automatically turn "Off" approximately one minute after it is disconnected from the vehicle. The codes retrieved (if any) will remain in the Code Reader's memory, and may be viewed at any time by turning the unit "On". **If the Code Reader batteries are removed, or if the Code Reader is re-linked to a vehicle to retrieve codes, any prior codes in it's memory are automatically cleared.**

- Refer to paragraph 4.4 for Diagnostic Trouble Code definitions. Match the retrieved DTC(s) with those listed, read the associated definition(s), and consult the vehicle's service manual for further evaluation.

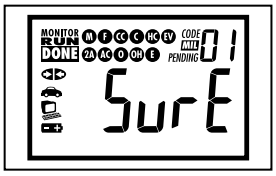
4.2.3 Erasing Diagnostic Trouble Codes (DTC's)

CAUTION: When the Code Reader's ERASE function is used to erase the DTC's from the vehicle's on-board computer, "Freeze Frame" data and manufacturer-specific enhanced data are also erased, and the I/M Readiness Monitor Status for all vehicle Monitors is reset to not RUN or not COMPLETE status.

- If you plan to take the vehicle to a Service Center for repair, **DO NOT** erase the codes from the vehicle's computer. If the codes are erased, valuable information that might help the technician troubleshoot the problem will also be erased.
- Use your judgement and always keep the above in mind when erasing DTC's.

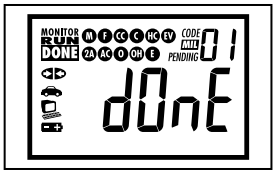
Erase (clear) Diagnostic Trouble Codes from the computer's memory as follows:

1. If not connected already, connect the Code Reader to the vehicle's DLC, and turn the ignition "On".
   NOTE: *If the Code Reader is already connected and linked to the vehicle's computer, proceed directly to step 4. If not, continue to step 2.*
2. Press the Code Reader's **POWER** button to turn the Code Reader "On".
3. Turn the ignition on. **DO NOT** start the engine. Press and release the Code Reader's **LINK** button to establish communication with the vehicle's computer.
4. Press and release the Code Reader's **ERASE** button. The LCD display will indicate "**SurE**" for your confirmation.



   - If you change your mind and *do not* wish to continue erasing the codes, press the **LINK** button to return to the code retrieval function.

- If you *do* wish to continue erasing (clearing) codes from the vehicle's computer, press and hold the **ERASE** button until the LCD display indicates "**dOnE**". When "**dOnE**" appears on the LCD display, all retrievable information, including DTCs, has been cleared from the vehicle's computer memory.



4.3 INSPECTION AND MAINTENANCE (I/M)

- I/M is an Inspection and Maintenance program legislated by the Government to meet federal clean-air standards.
- The program requires that a vehicle to be taken periodically (once every year or once every two years) to an Emissions Station for an "Emissions Test" or "Smog Check", where the emissions-related components and systems are inspected and tested for proper operation.

4.3.1 Enhanced Inspection and Maintenance (I/M)

On OBD II systems, the I/M program is enhanced by requiring vehicles to meet stricter test standards. One of the tests instituted by the Federal Government is called I/M 240. On I/M 240, the vehicle under test is driven under different speeds and load conditions on a dynamometer for 240 seconds, while the vehicle's emissions are measured.

NOTE: *Emission tests vary depending on the geographic or regional area in which the vehicle is registered. If the vehicle is registered in a highly urbanized area, the I/M 240 is probably the type of test required. If the vehicle is registered in a rural area, then a basic no-load test will probably be required.*

4.3.2 I/M Readiness Monitors

I/M Readiness indicates whether or not the various emissions-related systems on the vehicle are operating properly and are ready for Inspection and Maintenance testing.

State and federal governments enacted Regulations, Procedures and Emission Standards to ensure that all emissions-related components and systems are **constantly** or **periodically** monitored, tested and diagnosed whenever the vehicle is in operation. It also requires vehicle manufacturers to

automatically detect and report any problems or faults that may increase the vehicle's emissions to an unacceptable level.

The vehicle's emissions control system consists of several components or sub-systems (Oxygen Sensor, Catalytic Converter, EGR, Fuel System, etc.) that perform different functions, with the sole purpose of reducing vehicle emissions.

To have an efficient Vehicle Emission Control System, all the emissions-related components and systems must work correctly whenever the vehicle is in operation.

To comply with State and Federal Government regulations, vehicle manufacturers designed a series of special computer programs called "Monitors" which are programmed in the vehicle's computer. Each of these Monitors (there is a maximum of eleven Monitors as of this writing) is specifically designed to **constantly** or **periodically** run tests and diagnostics on a specific emissions-related component or system (Oxygen Sensor, Catalytic Converter, EGR Valve, Fuel System etc.) to ensure their proper operation.

NOTE: *Each Monitor has a specific function to test and diagnose only it's designated emissions-related component or system. The names of the Monitors (Oxygen Sensor Monitor, Catalyst Monitor, EGR Monitor, Misfire Monitor, etc.) describe which component or system each Monitor is designated to test and diagnose.*

4.3.3 Retrieving I/M Readiness Monitor Status Information

The purpose of the I/M Readiness Monitor Status is to indicate which of the vehicle's Monitors have run and completed their diagnosis and testing (as described above), and which ones have not yet run and completed testing and diagnosis of their designated sections of the vehicle's emissions system.

It is important to know the status of a Monitor. Example: If the Oxygen Sensor Monitor has not performed diagnostics and testing of the oxygen sensor, you will not know whether or not the oxygen sensor is operating properly. The Oxygen Sensor Monitor must perform it's diagnosis and testing before the working status of the oxygen sensor is known. The Oxygen Sensor Monitor activates the oxygen sensor to monitor its function. If its function is within specifications, no further action is taken. If a fault is detected, the Monitor reports it by generating Diagnostic Trouble Code(s) and illuminating the MIL on the dash.

- When a vehicle first comes from the factory, all the Monitors will indicate a DONE status, indicating that all Monitors have run and completed their diagnostic testing. The DONE status will remain in the computer's memory indefinitely, unless the Diagnostic Trouble Codes are erased or the vehicle's computer memory is cleared.

4.3.4 Using the I/M Readiness Monitor Status to Confirm a Repair

The I/M Readiness Monitor Status function can be used (after repair of a fault has been performed) to confirm that the repair has been performed correctly, and/or to check for Monitor Run Status. Use the following procedure to determine I/M Readiness Monitor Status:

1. Using retrieved Diagnostic Trouble Codes (DTC's) and code definitions as a guide, and following manufacturer's repair procedures, repair the fault or faults as instructed.
2. After the fault or faults have been repaired, connect the Code Reader to the vehicle's DLC and erase the code or codes from the vehicle's computer memory.
   - Write the codes down on a piece of paper for reference before erasing.
   - See paragraph 4.2.3 for procedures to erase DTC's from the vehicle's on-board computer.
3. After the erase procedure is performed most of the Monitor icons on the Code Reader's LCD display will be flashing. Leave the Code Reader connected to the vehicle, and perform a Trip Drive Cycle for each "flashing" Monitor:

NOTE: *Misfire, Fuel and Comprehensive Component Monitors run continuously and their icons will always be on solid, even after the erase function is performed.*

- Each DTC is associated with a specific Monitor. Consult the vehicle's service manual to identify the Monitor (or Monitors) associated with the faults that were repaired. Follow the manufacturer's procedures to perform a Trip Drive Cycle for the appropriate Monitors.
- While observing the Monitor icons on the Code Reader's LCD display, perform a Trip Drive Cycle for the appropriate Monitor or Monitors.

WARNING: If the vehicle needs to be driven in order to perform a Trip Drive Cycle, ALWAYS have a second person help you. One person should drive the vehicle while the other person observes the Monitor icons on the Code Reader for Monitor RUN status. Trying to drive and observe the Code Reader at the same time is dangerous and could cause a serious traffic accident.

4. When a Monitor's Trip Drive Cycle is performed properly, the Monitor icon on the Code Reader's LCD display will change from a "flashing" to a "solid" condition, indicating that the Monitor has run and completed it's diagnostic testing.

   - If, after the Monitor has run, the MIL on the vehicle's dash is not illuminated and no codes associated with that particular Monitor are present in the vehicle's computer, the repair was successful.
   - If, after the monitor has run, the MIL on the vehicle's dash illuminates and/or a DTC associated with that Monitor is present in the vehicle's computer, the repair was unsuccessful. Consult the vehicle's service manual and recheck repair procedures.

4.3.5 Retrieving I/M Readiness Monitor Status

- If the Code Reader is being used to retrieve I/M Readiness Monitor status, follow the code retrieval procedures in paragraph 4.2.2.
- View the Monitor icons on the Code Reader's LCD display.
- If a Monitor icon is on **Solid**, it indicates the associated Monitor has run and completed its diagnostic testing.
- If a Monitor icon is **Flashing**, it indicates the associated Monitor has not yet run and completed its diagnostic testing.
- If all the Monitor icons are Solid, and **DONE** is also displayed on the Code Reader's LCD display, it indicates that all the Monitors that are applicable to the vehicle under test have run and completed their diagnostic testing and the I/M Monitor Readiness is Completed.

NOTE: *When Diagnostic Trouble Codes are erased from the vehicle's computer memory, the I/M Readiness Monitor Status program resets status of all the Monitors to a not run "flashing"*

condition. To set all of the Monitors to a DONE status, an OBD II Drive Cycle must be performed. Consult your vehicle's service manual for information on how to perform an OBD II Drive Cycle for the vehicle under test.

5 DTC Definitions

5.1 DIAGNOSTIC TROUBLE CODE DEFINITIONS

The following Diagnostic Trouble Code Definitions lists represent the most complete information available at the time this manual was written. OBD II is an evolving system, and new codes and definitions will be added as the system matures. ALWAYS consult the vehicle's service manual for code definitions not included in these lists. For additional information, please visit our web site at www.CodeReader.com

The following code definition lists provide both **Generic Diagnostic Trouble Code Definitions** and **Manufacturer Specific Diagnostic Trouble Code Definitions** for the following vehicles:

- **OBD II Powertrain "GENERIC" (P0XXX) Diagnostic Trouble Codes.** OBD II Generic Diagnostic Trouble Codes and their definitions apply to all makes and models of import and domestic vehicles that are "OBD II COMPLIANT".
- **OBD II Powertrain "MANUFACTURER SPECIFIC" (P1XXX) Diagnostic Trouble Codes.** OBD II Manufacturer Specific Diagnostic Trouble Codes and their definitions apply only to vehicles produced by the specific manufacturer (Ford, GM, Toyota etc.).
- ***NOTE:*** *This manual supplies* ***"Manufacturer Specific"*** *Diagnostic Trouble Code Definitions for the following vehicles* ***only:*** ***CHRYSLER, FORD, GENERAL MOTERS, HONDA*** *and* ***TOYOTA****. For Manufacturer Specific Code Definitions that are not on these lists and/or Body, Chassis and Network Diagnostic Trouble Code definitions, consult the vehicle's service manual.*

5.2 GENERIC CODES

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

Code	Definition
P0057	HO2S Heater Control Circuit Low (Bank 2 Sensor 2)
P0058	HO2S Heater Control Circuit High (Bank 2 Sensor 2)
P0062	HO2S Heater Control Circuit (Bank 2 Sensor 3)
P0063	HO2S Heater Control Circuit Low (Bank 2 Sensor 3)
P0064	HO2S Heater Control Circuit High (Bank 2 Sensor 3)
P0065	Air Assisted Injector Control Range/Performance
P0066	Air Assisted Injector Control Circuit or Circuit Low
P0067	Air Assisted Injector Control Circuit High
P0070	Ambient Air Temperature Sensor Circuit
P0071	Ambient Air Temperature Sensor Range/Performance
P0072	Ambient Air Temperature Sensor Circuit Low Input
P0073	Ambient Air Temperature Sensor Circuit High Input
P0074	Ambient Air Temperature Sensor Circuit Intermittent
P0075	Intake Valve Control Solenoid Circuit (Bank 1)
P0076	Intake Valve Control Solenoid Circuit Low (Bank 1)
P0077	Intake Valve Control Solenoid Circuit High (Bank 1)
P0078	Exhaust Valve Control Solenoid Circuit (Bank 1)
P0079	Exhaust Valve Control Solenoid Circuit Low (Bank 1)
P0080	Exhaust Valve Control Solenoid Circuit High (Bank 1)
P0081	Intake Valve Control Solenoid Circuit (Bank 2)
P0082	Intake Valve Control Solenoid Circuit Low (Bank 2)
P0083	Intake Valve Control Solenoid Circuit High (Bank 2)
P0084	Exhaust Valve Control Solenoid Circuit (Bank 2)
P0085	Exhaust Valve Control Solenoid Circuit Low (Bank 2)
P0086	Exhaust Valve Control Solenoid Circuit High (Bank 2)
P0100	Mass or Volume Air Flow Circuit Malfunction
P0101	Mass or Volume Circuit Range Performance Problem
P0102	Mass or Volume Circuit Low Input
P0103	Mass or Volume Circuit High Input
P0104	Mass or Volume Circuit Intermittent
P0105	Manifold Absolute Pressure/Barometric Pressure Circuit Malfunction

Code	Definition
P0106	Manifold Absolute Pressure/Barometric Pressure Circuit Range/Performance Problem
P0107	Manifold Absolute Pressure/Barometric Pressure Circuit Low Input
P0108	Manifold Absolute Pressure/Barometric Pressure Circuit High Input
P0109	Manifold Absolute Pressure/Barometric Pressure Circuit Intermittent
P0110	Intake Air Temperature Circuit Malfunction
P0111	Intake Air Temperature Circuit Range/Performance Problem
P0112	Intake Air Temperature Circuit Low Input
P0113	Intake Air Temperature Circuit High Input
P0114	Intake Air Temperature Circuit Intermittent
P0115	Engine Coolant Temperature Circuit Malfunction
P0116	Engine Coolant Temperature Circuit Range/Performance Problem
P0117	Engine Coolant Temperature Circuit Low Input
P0118	Engine Coolant Temperature Circuit High Input
P0119	Engine Coolant Temperature Circuit Intermittent
P0120	Throttle/Pedal Position Sensor/Switch A Circuit Malfunction
P0121	Throttle/Pedal Position Sensor/Switch A Circuit Range/Performance Problem
P0122	Throttle/Pedal Position Sensor/Switch A Circuit Low Input
P0123	Throttle/Pedal Position Sensor/Switch A Circuit High Input
P0124	Throttle/Pedal Position Sensor/Switch A Circuit Intermittent
P0125	Insufficient Coolant Temperature for Closed Loop Fuel Control
P0126	Insufficient Coolant Temperature for Stable Operation
P0127	Intake Air Temperature Too High
P0128	Coolant Thermostat (Coolant Temperature Below Thermostat Regulating Temperature)
P0130	O2 Sensor Circuit Malfunction (Bank 1 Sensor 1)
P0131	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 1)
P0132	O2 Sensor Circuit High Voltage (Bank 1 Sensor 1)
P0133	O2 Sensor Circuit Slow Response (Bank 1 Sensor 1)

Code	Definition
P0134	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)
P0135	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)
P0136	O2 Sensor Circuit Malfunction (Bank 1 Sensor 2)
P0137	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 2)
P0138	O2 Sensor Circuit High Voltage (Bank 1 Sensor 2)
P0139	O2 Sensor Circuit Slow Response (Bank 1 Sensor 2)
P0140	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 2)
P0141	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 2)
P0142	O2 Sensor Circuit Malfunction (Bank 1 Sensor 3)
P0143	O2 Sensor Circuit Low Voltage (Bank 1 Sensor 3)
P0144	O2 Sensor Circuit High Voltage (Bank 1 Sensor 3)
P0145	O2 Sensor Circuit Slow Response (Bank 1 Sensor 3)
P0146	O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 3)
P0147	O2 Sensor Heater Circuit Malfunction (Bank 1 Sensor 3)
P0148	Fuel Delivery Error
P0149	Fuel Timing Error
P0150	O2 Sensor Circuit Malfunction (Bank 2 Sensor 1)
P0151	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 1)
P0152	O2 Sensor Circuit High Voltage (Bank 2 Sensor 1)
P0153	O2 Sensor Circuit Slow Response (Bank 2 Sensor 1)
P0154	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 1)
P0155	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)
P0156	O2 Sensor Circuit Malfunction (Bank 2 Sensor 2)
P0157	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 2)
P0158	O2 Sensor Circuit High Voltage (Bank 2 Sensor 2)
P0159	O2 Sensor Circuit Slow Response (Bank 2 Sensor 2)
P0160	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 2)
P0161	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 2)
P0162	O2 Sensor Circuit Malfunction (Bank 2 Sensor 3)
P0163	O2 Sensor Circuit Low Voltage (Bank 2 Sensor 3)
P0164	O2 Sensor Circuit High Voltage (Bank 2 Sensor 3)
P0165	O2 Sensor Circuit Slow Response (Bank 2 Sensor 3)
P0166	O2 Sensor Circuit No Activity Detected (Bank 2 Sensor 3)

Code	Definition
P0167	O2 Sensor Heater Circuit Malfunction (Bank 2 Sensor 3)
P0168	Fuel Temperature Too High
P0169	Incorrect Fuel Composition
P0170	Fuel Trim Malfunction (Bank 1)
P0171	System too Lean (Bank 1)
P0172	System too Rich (Bank 1)
P0173	Fuel Trim Malfunction (Bank 2)
P0174	System too Lean (Bank 2)
P0175	System too Rich (Bank 2)
P0176	Fuel Composition Sensor Circuit Malfunction
P0177	Fuel Composition Sensor Circuit Range/Performance
P0178	Fuel Composition Sensor Circuit Low Input
P0179	Fuel Composition Sensor Circuit High Input
P0180	Fuel Temperature Sensor A Circuit Malfunction
P0181	Fuel Temperature Sensor A Circuit Range/Performance
P0182	Fuel Temperature Sensor A Circuit Low Input
P0183	Fuel Temperature Sensor A Circuit High Input
P0184	Fuel Temperature Sensor A Circuit Intermittent
P0185	Fuel Temperature Sensor B Circuit Malfunction
P0186	Fuel Temperature Sensor B Circuit Range/Performance
P0187	Fuel Temperature Sensor B Circuit Low Input
P0188	Fuel Temperature Sensor B Circuit High Input
P0189	Fuel Temperature Sensor B Circuit Intermittent
P0190	Fuel Rail Pressure Sensor Circuit Malfunction
P0191	Fuel Rail Pressure Sensor Circuit Range/Performance
P0192	Fuel Rail Pressure Sensor Circuit Low Input
P0193	Fuel Rail Pressure Sensor Circuit High Input
P0194	Fuel Rail Pressure Sensor Circuit Intermittent
P0195	Engine Oil Temperature Sensor Malfunction
P0196	Engine Oil Temperature Sensor Range/Performance
P0197	Engine Oil Temperature Sensor Low
P0198	Engine Oil Temperature Sensor High
P0199	Engine Oil Temperature Sensor Intermittent

Code	Definition
P0200	Injector Circuit Malfunction
P0201	Injector Circuit Malfunction - Cylinder 1
P0202	Injector Circuit Malfunction - Cylinder 2
P0203	Injector Circuit Malfunction - Cylinder 3
P0204	Injector Circuit Malfunction - Cylinder 4
P0205	Injector Circuit Malfunction - Cylinder 5
P0206	Injector Circuit Malfunction - Cylinder 6
P0207	Injector Circuit Malfunction - Cylinder 7
P0208	Injector Circuit Malfunction - Cylinder 8
P0209	Injector Circuit Malfunction - Cylinder 9
P0210	Injector Circuit Malfunction - Cylinder 10
P0211	Injector Circuit Malfunction - Cylinder 11
P0212	Injector Circuit Malfunction - Cylinder 12
P0213	Cold Start Injector 1 Malfunction
P0214	Cold Start Injector 2 Malfunction
P0215	Engine Shutoff Solenoid Malfunction
P0216	Injection Timing Control Circuit Malfunction
P0217	Engine Overtemp Condition
P0218	Transmission Over Temperature Condition
P0219	Engine Overspeed Condition
P0220	Throttle/Pedal Position Sensor/Switch B Circuit Malfunction
P0221	Throttle/Pedal Position Sensor/Switch B Circuit Range/Performance Problem
P0222	Throttle/Pedal Position Sensor/Switch B Circuit Low Input
P0223	Throttle/Pedal Position Sensor/Switch B Circuit High Input
P0224	Throttle/Pedal Position Sensor/Switch B Circuit Intermittent
P0225	Throttle/Pedal Position Sensor/Switch C Circuit Malfunction
P0226	Throttle/Pedal Position Sensor/Switch C Circuit Range/Performance Problem
P0227	Throttle/Pedal Position Sensor/Switch C Circuit Low Input
P0228	Throttle/Pedal Position Sensor/Switch C Circuit High Input
P0229	Throttle/Pedal Position Sensor/Switch C Circuit Intermittent

Code	Definition
P0230	Fuel Pump Primary Circuit Malfunction
P0231	Fuel Pump Secondary Circuit Low
P0232	Fuel Pump Secondary Circuit High
P0233	Fuel Pump Secondary Circuit Intermittent
P0234	Engine Overboost Condition
P0235	Turbocharger Boost Sensor A Circuit Malfunction
P0236	Turbocharger Boost Sensor A Circuit Range/Performance
P0237	Turbocharger Boost Sensor A Circuit Low
P0238	Turbocharger Boost Sensor A Circuit High
P0239	Turbocharger Boost Sensor B Circuit Malfunction
P0240	Turbocharger Boost Sensor B Circuit Range/Performance
P0241	Turbocharger Boost Sensor B Circuit Low
P0242	Turbocharger Boost Sensor B Circuit High
P0243	Turbocharger Wastegate Solenoid A Malfunction
P0244	Turbocharger Wastegate Solenoid A Range/Performance
P0245	Turbocharger Wastegate Solenoid A Low
P0246	Turbocharger Wastegate Solenoid A High
P0247	Turbocharger Wastegate Solenoid B Malfunction
P0248	Turbocharger Wastegate Solenoid B Range/Performance
P0249	Turbocharger Wastegate Solenoid B Low
P0250	Turbocharger Wastegate Solenoid B High
P0251	Injection Pump A Rotor/Cam Malfunction
P0252	Injection Pump A Rotor/Cam Range/Performance
P0253	Injection Pump A Rotor/Cam Low
P0254	Injection Pump A Rotor/Cam High
P0255	Injection Pump A Rotor/Cam Intermitted
P0256	Injection Pump B Rotor/Cam Malfunction
P0257	Injection Pump B Rotor/Cam Range/Performance
P0258	Injection Pump B Rotor/Cam Low
P0259	Injection Pump B Rotor/Cam High
P0260	Injection Pump B Rotor/Cam Intermitted
P0261	Cylinder 1 Injector Circuit Low
P0262	Cylinder 1 Injector Circuit High

Code	Definition
P0263	Cylinder 1 Contribution/Balance Fault
P0264	Cylinder 2 Injector Circuit Low
P0265	Cylinder 2 Injector Circuit High
P0266	Cylinder 2 Contribution/Balance Fault
P0267	Cylinder 3 Injector Circuit Low
P0268	Cylinder 3 Injector Circuit High
P0269	Cylinder 3 Contribution/Balance Fault
P0270	Cylinder 4 Injector Circuit Low
P0271	Cylinder 4 Injector Circuit High
P0272	Cylinder 4 Contribution/Balance Fault
P0273	Cylinder 5 Injector Circuit Low
P0274	Cylinder 5 Injector Circuit High
P0275	Cylinder 5 Contribution/Balance Fault
P0276	Cylinder 6 Injector Circuit Low
P0277	Cylinder 6 Injector Circuit High
P0278	Cylinder 6 Contribution/Balance Fault
P0279	Cylinder 7 Injector Circuit Low
P0280	Cylinder 7 Injector Circuit High
P0281	Cylinder 7 Contribution/Balance Fault
P0282	Cylinder 8 Injector Circuit Low
P0283	Cylinder 8 Injector Circuit High
P0284	Cylinder 8 Contribution/Balance Fault
P0285	Cylinder 9 Injector Circuit Low
P0286	Cylinder 9 Injector Circuit High
P0287	Cylinder 9 Contribution/Balance Fault
P0288	Cylinder 10 Injector Circuit Low
P0289	Cylinder 10 Injector Circuit High
P0290	Cylinder 10 Contribution/Balance Fault
P0291	Cylinder 11 Injector Circuit Low
P0292	Cylinder 11 Injector Circuit High
P0293	Cylinder 11 Contribution/Balance Fault
P0294	Cylinder 12 Injector Circuit Low
P0295	Cylinder 12 Injector Circuit High

Code	Definition
P0296	Cylinder 12 Contribution/Balance Fault
P0298	Engine Oil Over Temperature
P0300	Random/Multiple Cylinder Misfire Detected
P0301	Cylinder 1 Misfire Detected
P0302	Cylinder 2 Misfire Detected
P0303	Cylinder 3 Misfire Detected
P0304	Cylinder 4 Misfire Detected
P0305	Cylinder 5 Misfire Detected
P0306	Cylinder 6 Misfire Detected
P0307	Cylinder 7 Misfire Detected
P0308	Cylinder 8 Misfire Detected
P0309	Cylinder 9 Misfire Detected
P0310	Cylinder 10 Misfire Detected
P0311	Cylinder 11 Misfire Detected
P0312	Cylinder 12 Misfire Detected
P0313	Misfire Detected with Low Fuel
P0314	Single Cylinder Misfire (Cylinder not specified)
P0320	Ignition/Distributor Engine Speed Input Circuit Malfunction
P0321	Ignition/Distributor Engine Speed Input Circuit Range/Performance
P0322	Ignition/Distributor Engine Speed Input Circuit No Signal
P0323	Ignition/Distributor Engine Speed Input Circuit Intermittent
P0324	Knock Control System Error
P0325	Knock Sensor 1 Circuit Malfunction (Bank 1 or Single Sensor)
P0326	Knock Sensor 1 Circuit Range/Performance (Bank 1 or Single Sensor)
P0327	Knock Sensor 1 Circuit Low Input (Bank 1 or Single Sensor)
P0328	Knock Sensor 1 Circuit High Input (Bank 1 or Single Sensor)
P0329	Knock Sensor 1 Circuit Intermittent (Bank 1 or Single Sensor)
P0330	Knock Sensor 2 Circuit Malfunction (Bank 2)
P0331	Knock Sensor 2 Circuit Range/Performance (Bank 2)
P0332	Knock Sensor 2 Circuit Low Input (Bank 2)

Code	Definition
P0333	Knock Sensor 2 Circuit High Input (Bank 2)
P0334	Knock Sensor 2 Circuit Intermittent (Bank 2)
P0335	Crankshaft Position Sensor A Circuit Malfunction
P0336	Crankshaft Position Sensor A Circuit Range/Performance
P0337	Crankshaft Position Sensor A Circuit Low Input
P0338	Crankshaft Position Sensor A Circuit High Input
P0339	Crankshaft Position Sensor A Circuit Intermittent
P0340	Camshaft Position Sensor Circuit Malfunction
P0341	Camshaft Position Sensor Circuit Range/Performance
P0342	Camshaft Position Sensor Circuit Low Input
P0343	Camshaft Position Sensor Circuit High Input
P0344	Camshaft Position Sensor Circuit Intermittent
P0345	Camshaft Position Sensor "A" Circuit (Bank 2)
P0346	Camshaft Position Sensor "A" Circuit Range/Performance (Bank 2)
P0347	Camshaft Position Sensor "A" Circuit Low Input (Bank 2)
P0348	Camshaft Position Sensor "A" Circuit High Input (Bank 2)
P0349	Camshaft Position Sensor "A" Circuit Intermittent (Bank 2)
P0350	Ignition Coil Primary/Secondary Circuit Malfunction
P0351	Ignition Coil A Primary/Secondary Circuit Malfunction
P0352	Ignition Coil B Primary/Secondary Circuit Malfunction
P0353	Ignition Coil C Primary/Secondary Circuit Malfunction
P0354	Ignition Coil D Primary/Secondary Circuit Malfunction
P0355	Ignition Coil E Primary/Secondary Circuit Malfunction
P0356	Ignition Coil F Primary/Secondary Circuit Malfunction
P0357	Ignition Coil G Primary/Secondary Circuit Malfunction
P0358	Ignition Coil H Primary/Secondary Circuit Malfunction
P0359	Ignition Coil I Primary/Secondary Circuit Malfunction
P0360	Ignition Coil J Primary/Secondary Circuit Malfunction
P0361	Ignition Coil K Primary/Secondary Circuit Malfunction
P0362	Ignition Coil L Primary/Secondary Circuit Malfunction
P0365	Camshaft Position Sensor "B" Circuit (Bank 1)

Code	Definition
P0366	Camshaft Position Sensor "B" Circuit Range/Performance (Bank 1)
P0367	Camshaft Position Sensor "B" Circuit Low Input (Bank 1)
P0368	Camshaft Position Sensor "B" Circuit High Input (Bank 1)
P0369	Camshaft Position Sensor "B" Circuit Intermittent (Bank 1)
P0370	Timing Reference High Resolution Signal A Malfunction
P0371	Timing Reference High Resolution Signal A Too Many Pulses
P0372	Timing Reference High Resolution Signal A Too Few Pulses
P0373	Timing Reference High Resolution Signal A Intermittent/ Erratic Pulses
P0374	Timing Reference High Resolution Signal A No Pulses
P0375	Timing Reference High Resolution Signal B Malfunction
P0376	Timing Reference High Resolution Signal B Too Many Pulses
P0377	Timing Reference High Resolution Signal B Too Few Pulses
P0378	Timing Reference High Resolution Signal B Intermittent/ Erratic Pulses
P0379	Timing Reference High Resolution Signal B No Pulses
P0380	Glow Plug/Heater Circuit Malfunction
P0381	Glow Plug/Heater Indicator Circuit Malfunction
P0382	Glow Plug/Heater Circuit "B" Malfunction
P0385	Crankshaft Position Sensor B Circuit Malfunction
P0386	Crankshaft Position Sensor B Circuit Range/Performance
P0387	Crankshaft Position Sensor B Circuit Low Input
P0388	Crankshaft Position Sensor B Circuit High Input
P0389	Crankshaft Position Sensor B Circuit Intermittent
P0390	Camshaft Position Sensor "B" Circuit (Bank 2)
P0391	Camshaft Position Sensor "B" Circuit Range/Performance (Bank 2)
P0392	Camshaft Position Sensor "B" Circuit Low Input (Bank 2)
P0393	Camshaft Position Sensor "B" Circuit High Input (Bank 2)
P0394	Camshaft Position Sensor "B" Circuit Intermittent (Bank 2)
P0400	Exhaust Gas Recirculation Flow Malfunction
P0401	Exhaust Gas Recirculation Flow Insufficient Detected

Code	Definition
P0402	Exhaust Gas Recirculation Flow Excessive Detected
P0403	Exhaust Gas Recirculation Circuit Malfunction
P0404	Exhaust Gas Recirculation Circuit Range/Performance
P0405	Exhaust Gas Recirculation Sensor A Circuit Low
P0406	Exhaust Gas Recirculation Sensor A Circuit High
P0407	Exhaust Gas Recirculation Sensor B Circuit Low
P0408	Exhaust Gas Recirculation Sensor B Circuit High
P0409	Exhaust Gas Recirculation Sensor "A" Circuit
P0410	Secondary Air Injection System Malfunction
P0411	Secondary Air Injection System Incorrect Flow Detected
P0412	Secondary Air Injection System Switching Valve A Circuit Malfunction
P0413	Secondary Air Injection System Switching Valve A Circuit Open
P0414	Secondary Air Injection System Switching Valve A Circuit Shorted
P0415	Secondary Air Injection System Switching Valve B Circuit Malfunction
P0416	Secondary Air Injection System Switching Valve B Circuit Open
P0417	Secondary Air Injection System Switching Valve B Circuit Shorted
P0418	Secondary Air Injection System Relay "A" Circuit Malfunction
P0419	Secondary Air Injection System Relay "B" Circuit Malfunction
P0420	Catalyst System Efficiency Below Threshold (Bank 1)
P0421	Warm Up Catalyst Efficiency Below Threshold (Bank 1)
P0422	Main Catalyst Efficiency Below Threshold (Bank 1)
P0423	Heated Catalyst Efficiency Below Threshold (Bank 1)
P0424	Heated Catalyst Temperature Below Threshold (Bank 1)
P0425	Catalyst Temperature Sensor (Bank 1)
P0426	Catalyst Temperature Sensor Range/Performance (Bank 1)
P0427	Catalyst Temperature Sensor Low Input (Bank 1)
P0428	Catalyst Temperature Sensor High Input (Bank 1)

Code	Definition
P0429	Catalyst Heater Control Circuit (Bank 1)
P0430	Catalyst System Efficiency Below Threshold (Bank 2)
P0431	Warm Up Catalyst Efficiency Below Threshold (Bank 2)
P0432	Main Catalyst Efficiency Below Threshold (Bank 2)
P0433	Heated Catalyst Efficiency Below Threshold (Bank 2)
P0434	Heated Catalyst Temperature Below Threshold (Bank 2)
P0435	Catalyst Temperature Sensor (Bank 2)
P0436	Catalyst Temperature Sensor Range/Performance (Bank 2)
P0437	Catalyst Temperature Sensor Low Input (Bank 2)
P0438	Catalyst Temperature Sensor High Input (Bank 2)
P0439	Catalyst Heater Control Circuit (Bank 2)
P0440	Evaporative Emission Control System Malfunction
P0441	Evaporative Emission Control System Incorrect Purge Flow
P0442	Evaporative Emission Control System Leak Detected (small leak)
P0443	Evaporative Emission Control System Purge Control Valve Circuit Malfunction
P0444	Evaporative Emission Control System Purge Control Valve Circuit Open
P0445	Evaporative Emission Control System Purge Control Valve Circuit Shorted
P0446	Evaporative Emission Control System Vent Control Circuit Malfunction
P0447	Evaporative Emission Control System Vent Control Circuit Open
P0448	Evaporative Emission Control System Vent Control Circuit Shorted
P0449	Evaporative Emission Control System Vent Valve/ Solenoid Circuit Malfunction
P0450	Evaporative Emission Control System Pressure Sensor Malfunction
P0451	Evaporative Emission Control System Pressure Sensor Range/Performance
P0452	Evaporative Emission Control System Pressure Sensor Low Input

Code	Definition
P0453	Evaporative Emission Control System Pressure Sensor High Input
P0454	Evaporative Emission Control System Pressure Sensor Intermittent
P0455	Evaporative Emission Control System Leak Detected (gross leak)
P0456	Evaporative Emission Control System Leak Detected (very small leak)
P0457	Evaporative Emission Control System Leak Detected (fuel cap loose/off)
P0460	Fuel Level Sensor Circuit Malfunction
P0461	Fuel Level Sensor Circuit Range/Performance
P0462	Fuel Level Sensor Circuit Low Input
P0463	Fuel Level Sensor Circuit High Input
P0464	Fuel Level Sensor Circuit Intermittent
P0465	Purge Flow Sensor Circuit Malfunction
P0466	Purge Flow Sensor Circuit Range/Performance
P0467	Purge Flow Sensor Circuit Low Input
P0468	Purge Flow Sensor Circuit High Input
P0469	Purge Flow Sensor Circuit Intermittent
P0470	Exhaust Pressure Sensor Malfunction
P0471	Exhaust Pressure Sensor Range/Performance
P0472	Exhaust Pressure Sensor Low
P0473	Exhaust Pressure Sensor High
P0474	Exhaust Pressure Sensor Intermittent
P0475	Exhaust Pressure Control Valve Malfunction
P0476	Exhaust Pressure Control Valve Range/Performance
P0477	Exhaust Pressure Control Valve Low
P0478	Exhaust Pressure Control Valve High
P0479	Exhaust Pressure Control Valve Intermittent
P0480	Cooling Fan 1 Control Circuit Malfunction
P0481	Cooling Fan 2 Control Circuit Malfunction
P0482	Cooling Fan 3 Control Circuit Malfunction
P0483	Cooling Fan Rationality Check Malfunction

Code	Definition
P0484	Cooling Fan Circuit Over Current
P0485	Cooling Fan Power/Ground Circuit Malfunction
P0486	Exhaust Gas Recirculation Sensor "B" Circuit
P0487	Exhaust Gas Recirculation Throttle Position Control Circuit
P0488	Exhaust Gas Recirculation Throttle Position Control Range/ Performance
P0491	Secondary Air Injection System (Bank 1)
P0492	Secondary Air Injection System (Bank 2)
P0500	Vehicle Speed Sensor Malfunction
P0501	Vehicle Speed Sensor Range/Performance
P0502	Vehicle Speed Sensor Circuit Low Input
P0503	Vehicle Speed Sensor Intermittent/Erratic/High
P0505	Idle Control System Malfunction
P0506	Idle Control System RPM Lower Than Expected
P0507	Idle Control System RPM Higher Than Expected
P0508	Idle Control System Circuit Low
P0509	Idle Control System Circuit High
P0510	Closed Throttle Position Switch Malfunction
P0512	Starter Request Circuit
P0513	Incorrect Immobilizer Key ("Immobilizer" pending SAE J1930 approval)
P0515	Battery Temperature Sensor Circuit
P0516	Battery Temperature Sensor Circuit Low
P0517	Battery Temperature Sensor Circuit High
P0520	Engine Oil Pressure/Switch Circuit Malfunction
P0521	Engine Oil Pressure/Switch Range/Performance
P0522	Engine Oil Pressure/Switch Low Voltage
P0523	Engine Oil Pressure/Switch High Voltage
P0524	Engine Oil Pressure Too Low
P0530	A/C Refrigerant Pressure Sensor Circuit Malfunction
P0531	A/C Refrigerant Pressure Sensor Circuit Range/Performance
P0532	A/C Refrigerant Pressure Sensor Circuit Low Input
P0533	A/C Refrigerant Pressure Sensor Circuit High Input

Code	Definition
P0534	Air Conditioner Refrigerant Charge Loss
P0540	Intake Air Heater Circuit
P0541	Intake Air Heater Circuit Low
P0542	Intake Air Heater Circuit High
P0544	Exhaust Gas Temperature Sensor Circuit (Bank 1)
P0545	Exhaust Gas Temperature Sensor Circuit Low (Bank 1)
P0546	Exhaust Gas Temperature Sensor Circuit High (Bank 1)
P0547	Exhaust Gas Temperature Sensor Circuit (Bank 2)
P0548	Exhaust Gas Temperature Sensor Circuit Low (Bank 2)
P0549	Exhaust Gas Temperature Sensor Circuit High (Bank 2)
P0550	Power Steering Pressure Sensor Circuit Malfunction
P0551	Power Steering Pressure Sensor Circuit Range/Performance
P0552	Power Steering Pressure Sensor Circuit Low Input
P0553	Power Steering Pressure Sensor Circuit High Input
P0554	Power Steering Pressure Sensor Circuit Intermittent
P0560	System Voltage Malfunction
P0561	System Voltage Unstable
P0562	System Voltage Low
P0563	System Voltage High
P0564	Cruise Control Multi-Function Input Signal
P0565	Cruise Control On Signal Malfunction
P0566	Cruise Control Off Signal Malfunction
P0567	Cruise Control Resume Signal Malfunction
P0568	Cruise Control Set Signal Malfunction
P0569	Cruise Control Coast Signal Malfunction
P0570	Cruise Control Accel Signal Malfunction
P0571	Cruise Control/Brake Switch A Circuit Malfunction
P0572	Cruise Control/Brake Switch A Circuit Low
P0573	Cruise Control/Brake Switch A Circuit High
P0574	Cruise Control System - Vehicle Speed Too High
P0575	Cruise Control Input Circuit
P0576	Cruise Control Input Circuit Low
P0577	Cruise Control Input Circuit High

Code	Definition
P0578-P0580	Reserved for Cruise Control Codes
P0600	Serial Communication Link Malfunction
P0601	Internal Control Module Memory Check Sum Error
P0602	Control Module Programming Error
P0603	Internal Control Module Keep Alive Memory (KAM) Error
P0604	Internal Control Module Random Access Memory (RAM) Error
P0605	Internal Control Module Read Only Memory (ROM) Error
P0606	PCM Processor Fault
P0607	Control Module Performance
P0608	Control Module VSS Output "A" Malfunction
P0609	Control Module VSS Output "B" Malfunction
P0610	Control Module Vehicle Options Error
P0615	Starter Relay Circuit
P0616	Starter Relay Circuit Low
P0617	Starter Relay Circuit High
P0618	Alternative Fuel Control Module KAM Error
P0619	Alternative Fuel Control Module RAM/ROM Error
P0620	Generator Control Circuit Malfunction
P0621	Generator Lamp "L" Control Circuit Malfunction
P0622	Generator Field "F" Control Circuit Malfunction
P0623	Generator Lamp Control Circuit
P0624	Fuel Cap Lamp Control Circuit
P0630	VIN Not Programmed or Mismatch - ECM/PCM
P0631	VIN Not Programmed or Mismatch - TCM
P0635	Power Steering Control Circuit
P0636	Power Steering Control Circuit Low
P0637	Power Steering Control Circuit High
P0638	Throttle Actuator Control Range/Performance (Bank 1)
P0639	Throttle Actuator Control Range/Performance (Bank 2)
P0640	Intake Air Heater Control Circuit
P0645	A/C Clutch Relay Control Circuit

Code	Definition
P0646	A/C Clutch Relay Control Circuit Low
P0647	A/C Clutch Relay Control Circuit High
P0648	Immobilizer Lamp Control Circuit ("Immobilizer" pending SAE J1930 approval)
P0649	Speed Control Lamp Control Circuit
P0650	Malfunction Indicator Lamp (MIL) Control Circuit Malfunction
P0654	Engine RPM Output Circuit Malfunction
P0655	Engine Hot Lamp Output Control Circuit Malfunction
P0656	Fuel Level Output Circuit Malfunction
P0660	Intake Manifold Tuning Valve Control Circuit (Bank 1)
P0661	Intake Manifold Tuning Valve Control Circuit Low (Bank 1)
P0662	Intake Manifold Tuning Valve Control Circuit High (Bank 1)
P0663	Intake Manifold Tuning Valve Control Circuit (Bank 2)
P0664	Intake Manifold Tuning Valve Control Circuit Low (Bank 2)
P0665	Intake Manifold Tuning Valve Control Circuit High (Bank 2)
P0700	Transmission Control System Malfunction
P0701	Transmission Control System Range/Performance
P0702	Transmission Control System Electrical
P0703	Torque Converter/Brake Switch B Circuit Malfunction
P0704	Clutch Switch Input Circuit Malfunction
P0705	Transmission Range Sensor Circuit Malfunction (PRNDL Input)
P0706	Transmission Range Sensor Circuit Range/Performance
P0707	Transmission Range Sensor Circuit Low Input
P0708	Transmission Range Sensor Circuit High Input
P0709	Transmission Range Sensor Circuit Intermittent
P0710	Transmission Fluid Temperature Sensor Circuit Malfunction
P0711	Transmission Fluid Temperature Sensor Circuit Range/ Performance
P0712	Transmission Fluid Temperature Sensor Circuit Low Input
P0713	Transmission Fluid Temperature Sensor Circuit High Input
P0714	Transmission Fluid Temperature Sensor Circuit Intermittent
P0715	Input/Turbine Speed Sensor Circuit Malfunction

Code	Definition
P0716	Input/Turbine Speed Sensor Circuit Range/Performance
P0717	Input/Turbine Speed Sensor Circuit No Signal
P0718	Input/Turbine Speed Sensor Circuit Intermittent
P0719	Torque Converter/Brake Switch B Circuit Low
P0720	Output Speed Sensor Circuit Malfunction
P0721	Output Speed Sensor Circuit Range/Performance
P0722	Output Speed Sensor Circuit No Signal
P0723	Output Speed Sensor Circuit Intermittent
P0724	Torque Converter/Brake Switch B Circuit High
P0725	Engine Speed Input Circuit Malfunction
P0726	Engine Speed Input Circuit Range/Performance
P0727	Engine Speed Input Circuit No Signal
P0728	Engine Speed Input Circuit Intermittent
P0730	Incorrect Gear Ratio
P0731	Gear 1 Incorrect Ratio
P0732	Gear 2 Incorrect Ratio
P0733	Gear 3 Incorrect Ratio
P0734	Gear 4 Incorrect Ratio
P0735	Gear 5 Incorrect Ratio
P0736	Reverse Incorrect Ratio
P0737	TCM Engine Speed Output Circuit
P0738	TCM Engine Speed Output Circuit Low
P0739	TCM Engine Speed Output Circuit High
P0740	Torque Converter Clutch Circuit Malfunction
P0741	Torque Converter Clutch Circuit Performance or Stuck Off
P0742	Torque Converter Clutch Circuit Stuck On
P0743	Torque Converter Clutch Circuit Electrical
P0744	Torque Converter Clutch Circuit Intermittent
P0745	Pressure Control Solenoid Malfunction
P0746	Pressure Control Solenoid Performance or Stuck Off
P0747	Pressure Control Solenoid Stuck On
P0748	Pressure Control Solenoid Electrical
P0749	Pressure Control Solenoid Intermittent

Code	Definition
P0750	Shift Solenoid A Malfunction
P0751	Shift Solenoid A Performance or Stuck Off
P0752	Shift Solenoid A Stuck On
P0753	Shift Solenoid A Electrical
P0754	Shift Solenoid A Intermittent
P0755	Shift Solenoid B Malfunction
P0756	Shift Solenoid B Performance or Stuck Off
P0757	Shift Solenoid B Stuck On
P0758	Shift Solenoid B Electrical
P0759	Shift Solenoid B Intermittent
P0760	Shift Solenoid C Malfunction
P0761	Shift Solenoid C Performance or Stuck Off
P0762	Shift Solenoid C Stuck On
P0763	Shift Solenoid C Electrical
P0764	Shift Solenoid C Intermittent
P0765	Shift Solenoid D Malfunction
P0766	Shift Solenoid D Performance or Stuck Off
P0767	Shift Solenoid D Stuck On
P0768	Shift Solenoid D Electrical
P0769	Shift Solenoid D Intermittent
P0770	Shift Solenoid E Malfunction
P0771	Shift Solenoid E Performance or Stuck Off
P0772	Shift Solenoid E Stuck On
P0773	Shift Solenoid E Electrical
P0774	Shift Solenoid E Intermittent
P0775	Pressure Control Solenoid "B"
P0776	Pressure Control Solenoid "B" Performance or Stuck Off
P0777	Pressure Control Solenoid "B" Stuck On
P0778	Pressure Control Solenoid "B" Electrical
P0779	Pressure Control Solenoid "B" Intermittent
P0780	Shift Malfunction
P0781	1-2 Shift Malfunction
P0782	2-3 Shift Malfunction

Code	Definition
P0783	3-4 Shift Malfunction
P0784	4-5 Shift Malfunction
P0785	Shift/Timing Solenoid Malfunction
P0786	Shift/Timing Solenoid Range/Performance
P0787	Shift/Timing Solenoid Low
P0788	Shift/Timing Solenoid High
P0789	Shift/Timing Solenoid Intermittent
P0790	Normal/Performance Switch Circuit Malfunction
P0791	Intermediate Shaft Speed Sensor Circuit
P0792	Intermediate Shaft Speed Sensor Circuit Range/Performance
P0793	Intermediate Shaft Speed Sensor Circuit No Signal
P0794	Intermediate Shaft Speed Sensor Circuit Intermittent
P0795	Pressure Control Solenoid "C"
P0796	Pressure Control Solenoid "C" Performance or Stuck Off
P0797	Pressure Control Solenoid "C" Stuck On
P0798	Pressure Control Solenoid "C" Electrical
P0799	Pressure Control Solenoid "C" Intermittent
P0801	Reverse Inhibit Control Circuit Malfunction
P0803	1-4 Upshift (Skip Shift) Solenoid Control Circuit Malfunction
P0804	1-4 Upshift (Skip Shift) Lamp Control Circuit Malfunction
P0805	Clutch Position Sensor Circuit
P0806	Clutch Position Sensor Circuit Range/Performance
P0807	Clutch Position Sensor Circuit Low
P0808	Clutch Position Sensor Circuit High
P0809	Clutch Position Sensor Circuit Intermittent
P0810	Clutch Position Control Error
P0811	Excessive Clutch Slippage
P0812	Reverse Input Circuit
P0813	Reverse Output Circuit
P0814	Transmission Range Display Circuit
P0815	Upshift Switch Circuit
P0816	Downshift Switch Circuit
P0817	Starter Disable Circuit

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

5.3 MANUFACTURER SPECIFIC CODES - CHRYSLER

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

Code	Definition
P1389	No ASD relay output voltage at PCM
P1390	Timing belt skipped one tooth or more
P1391	Intermittent loss of CMP or CKP
P1398	Mis-Fire Adaptive Numerator at Limit (PCM is unable to learn the crank sensors signal for use in preparation for misfire diagnostics
P1399	Wait to start lamp circuit
P1403	No 5 volt feed to EGR
P1475	Auxiliary 5 volt supply is too high
P1476	Too little secondary air
P1477	Too much secondary air
P1478	Battery Temp Sensor Volts out of limit
P1479	Transmission Fan Relay Circuit
P1480	PCV Solenoid Circuit
P1481	EATX (Electronic Automatic Transaxle) RPM pulse generator performance
P1482	Catalyst Temperature Sensor Circuit shorted low
P1483	Catalyst Temperature Sensor Circuit shorted high
P1484	Catalytic Converter overheat detected
P1485	Air injection solenoid circuit
P1486	EVAP Leak Monitor found a pinched hose
P1487	Hi Speed Fan #2 Circuit
P1488	Auxiliary 5 volt supply output is too low
P1489	High speed fan control relay circuit
P1490	Low speed fan control relay circuit
P1491	Radiator fan relay control circuit
P1492	Ambient/ Battery Temp sensor input voltage too high
P1493	Ambient/ Battery Temp sensor input voltage too low
P1494	Leak detection pump pressure switch or mechanical fault
P1495	Leak detection pump solenoid circuit
P1496	5 volt supply, output too low
P1498	High speed radiator fan ground control relay circuit
P1500	General alternator 'FR' Terminal circuit fault

Code	Definition
P1594	Charging system voltage too high
P1595	Speed control solenoid circuits
P1596	Speed control switch always high
P1597	Speed control switch always low
P1598	A/C pressure sensor input voltage too high
P1599	A/C pressure sensor input voltage too low
P1680	Clutch released switch circuit
P1681	No I/P Cluster CCD/ J1850 messages received
P1682	Charging system voltage too low
P1683	Speed control servo power control circuit
P1684	The battery has been disconnected within the last 50 starts
P1685	The SKIM (Smart Key Immobilizer Module) has received an invalid key
P1686	No SKIM (Smart Key Immobilizer Module) bus message received
P1687	No Mechanical Instrument cluster bus message
P1688	Internal Fuel injection pump controller failure
P1689	No communication between the ECM and injection pump module
P1690	Fuel injection pump CKP sensor does not agree with the ECM CKP sensor
P1691	Fuel injection pump controller calibration error
P1692	Fault in companion Engine control module
P1693	A companion DTC was set in both the ECM and PCM
P1694	No CCD message from PCM- Aisin transmission
P1695	No CCD message from body control module
P1696	PCM failure EEPROM write denied
P1697	PCM Failure SRI (Service Reminder Indicator) mileage not stored
P1698	No CCD message from TCM
P1719	Skip shift solenoid circuit
P1740	TCC solenoid or overdrive solenoid performance
P1756	Governor pressure not equal to target at 15-20 psi

Code	Definition
P1757	Governor pressure is above 3 PSI when 0 PSI is requested
P1762	Governor pressure sensor offset improper voltage
P1763	Governor pressure sensor voltage to high
P1764	Governor pressure sensor voltage to low
P1765	Transmission 12 volt supply relay control circuit
P1899	Park/ Neutral switch stuck in park or gear

5.4 MANUFACTURER SPECIFIC CODES - FORD

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

Code	Definition
P1133	Bank 1 Fuel Control Shifted Lean (FAOSC)
P1134	Bank 1 Fuel Control Shifted Rich (FAOSC)
P1135	Pedal Position Sensor A Circuit Intermittent
P1137	Lack of HO2S12 Switches - Sensor Indicates Lean
P1138	Lack of HO2S12 Switches - Sensor Indicates Rich
P1139	Water in Fuel Indicator Circuit
P1140	Water in Fuel Condition
P1141	Fuel Restriction Indicator Circuit
P1142	Fuel Restriction Condition
P1150	Lack of HO2S21 Switches - Fuel Trim At Limit
P1151	Lack of HO2S21 Switches - Sensor Indicates Lean
P1152	Lack of HO2S21 Switches - Sensor Indicates Rich
P1153	Bank 2 Fuel Control Shifted Lean (FAOSC)
P1154	Bank 2 Fuel Control Shifted Rich (FAOSC)
P1155	Alternative Fuel Control Module Has Activated the MIL
P1157	Lack of HO2S22 Switches - Sensor Indicates Lean
P1158	Lack of HO2S22 Switches - Sensor Indicates Rich
P1168	Fuel Rail Pressure Sensor In Range But Low
P1169	Fuel Rail Pressure Sensor In Range But High
P1170	Engine Shut Off Solenoid
P1171	Rotor Sensor
P1172	Rotor Control
P1173	Rotor Calibration
P1174	Cam Sensor
P1175	Cam Control
P1176	Cam Calibration
P1177	Synchronization
P1178	Boltup Limits
P1180	Fuel Delivery System - Low
P1181	Fuel Delivery System - High
P1183	Engine Oil Temperature Sensor Circuit
P1184	Engine Oil Temperature Sensor Out Of Self Test Range

Code	Definition
P1185	Fuel Pump Temperature Sensor High
P1186	Fuel Pump Temperature Sensor Low
P1187	Variant Selection
P1188	Calibration Memory
P1189	Pump Speed Signal
P1190	Calibration Resistor Out Of Range
P1191	Key Line Voltage
P1192	V External
P1193	EGR Driver Over Current
P1194	ECM/PCM A/D Converter
P1195	SCP HBCC Chip Failed to Initialize
P1196	Key Off Voltage High
P1197	Key Off Voltage Low
P1198	Pump Rotor Control Underfueling
P1209	Injector Control Pressure Peak Delta Test Fault
P1210	Injector Control Pressure Above Expected Level
P1211	Injector Control Pressure Above/Below Desired
P1212	Injector Control Pressure Not At Expected Level
P1214	Pedal Position Sensor B Circuit Intermittent
P1215	Pedal Position Sensor C Circuit Low Input
P1216	Pedal Position Sensor C Circuit High Input
P1217	Pedal Position Sensor C Circuit Intermittent
P1218	CID High
P1219	CID Low
P1220	Series Throttle Control System
P1221	Traction Control System
P1222	Pedal Position Sensor B Circuit Low Input
P1222	Traction Control Output Circuit
P1223	Pedal Position Sensor B Circuit High Input
P1224	Throttle Position Sensor B Out Of Self Test Range
P1227	Wastegate Failed Closed (Over pressure)
P1228	Wastegate Failed Open (Under pressure)

Code	Definition
P1229	Charge Air Cooler Pump Driver
P1230	Fuel Pump Low Speed Malfunction (VLCM)
P1231	Fuel Pump Secondary Circuit Low, High Speed (VLCM)
P1232	Fuel Pump Speed Primary Circuit (Two speed fuel pump)
P1233	Fuel Pump Driver Module Disabled or Off Line (Fuel Pump Driver Module)
P1234	Fuel Pump Driver Module Disabled or Off Line (Fuel Pump Driver Module)
P1235	Fuel Pump Control Out Of Range (Fuel Pump Driver Module/VLCM)
P1236	Fuel Pump Control Out Of Range (Fuel Pump Driver Module)
P1237	Fuel Pump Secondary Circuit (Fuel Pump Driver Module)
P1238	Fuel Pump Secondary Circuit (Fuel Pump Driver Module)
P1239	Speed Fuel Pump Positive Feed
P1243	Second Fuel Pump Fault or Ground Fault
P1244	Alternator Load High Input
P1245	Alternator Load Low Input
P1246	Alternator Load Input
P1247	Turbo Boost Pressure Low
P1248	Turbo Boost Pressure Not Detected
P1249	Wastegate Control Valve Performance
P1252	Pedal Correlation PDS1 and LPDS High
P1253	Pedal Correlation PDS1 and LPDS Low
P1254	Pedal Correlation PDS2 and LPDS High
P1255	Pedal Correlation PDS2 and LPDS Low
P1256	Pedal Correlation PDS1 and HPDS
P1257	Pedal Correlation PDS2 and HPDS
P1258	Pedal Correlation PDS1 and PDS2
P1260	Theft Detected, Vehicle Immobilized
P1261	Cylinder #1 High To Low Side Short
P1262	Cylinder #2 High To Low Side Short
P1263	Cylinder #3 High To Low Side Short

Code	Definition
P1264	Cylinder #4 High To Low Side Short
P1265	Cylinder #5 High To Low Side Short
P1266	Cylinder #6 High To Low Side Short
P1267	Cylinder #7 High To Low Side Short
P1268	Cylinder #8 High To Low Side Short
P1270	Engine RPM or Vehicle Speed Limiter Reached
P1271	Cylinder #1 High To Low Side Open
P1272	Cylinder #2 High To Low Side Open
P1273	Cylinder #3 High To Low Side Open
P1274	Cylinder #4 High To Low Side Open
P1275	Cylinder #5 High To Low Side Open
P1276	Cylinder #6 High To Low Side Open
P1277	Cylinder #7 High To Low Side Open
P1278	Cylinder #8 High To Low Side Open
P1280	Injector Control Pressure Out Of Range Low
P1281	Injector Control Pressure Out Of Range High
P1282	Excessive Injector Control Pressure
P1283	Injector Pressure Regulator Circuit
P1284	Aborted KOER - Injector Control Pressure Failure
P1285	Cylinder Head Overtemperature Condition
P1286	Fuel Pulsewidth In Range But Lower Than Expected
P1287	Fuel Pulsewidth In Range But Higher Than Expected
P1288	Cylinder Head Temperature Sensor Out Of Self Test Range
P1289	Cylinder Head Temperature Sensor Circuit High Input
P1290	Cylinder Head Temperature Sensor Circuit Low Input
P1291	Injector High Side Short To GND Or VBATT - Bank 1
P1292	Injector High Side Short To GND Or VBATT - Bank 2
P1293	Injector High Side Open - Bank 1
P1294	Injector High Side Open - Bank 2
P1295	Injector Multiple Faults - Bank 1
P1296	Injector Multiple Faults - Bank 2
P1297	Injector High Side Switches Shorted Together

Code	Definition
P1298	Injector Driver Module Failure
P1299	Cylinder Head Overtemperature Protection Active
P1300	Boost Calibration Fault
P1301	Boost Calibration High
P1302	Boost Calibration Low
P1303	Exhaust Gas Recirculation Calibration Fault
P1304	Exhaust Gas Recirculation Calibration High
P1305	Exhaust Gas Recirculation Calibration Low
P1306	Kickdown Relay Pull-in Circuit
P1307	Kickdown Relay Hold Circuit
P1309	Misfire Monitor AICE Chip Fault, Misfire Monitor Disabled
P1310	Ionization Misfire Detection Module Fault
P1311	Ionization Misfire Detection Module Communication Fault
P1316	IDM Codes Detected
P1340	Camshaft Position Sensor B Circuit
P1351	Ignition Diagnostic Monitor Input Circuit
P1352	Ignition Coil A Primary Circuit
P1353	Ignition Coil B Primary Circuit
P1354	Ignition Coil C Primary Circuit
P1355	Ignition Coil D Primary Circuit
P1356	Ignition Diagnostic Monitor Indicates Engine Not Turning
P1357	Ignition Diagnostic Monitor Pulsewidth Not Defined
P1358	Ignition Diagnostic Monitor Signal Out Of Self Test Range (no CPU OK)
P1359	Spark Output Circuit
P1360	Ignition Coil A Secondary Circuit
P1361	Ignition Coil B Secondary Circuit
P1362	Ignition Coil C Secondary Circuit
P1363	Ignition Coil D Secondary Circuit
P1364	Ignition Coil Primary Circuit
P1365	Ignition Coil Secondary Circuit
P1366	Ignition Spare

Code	Definition
P1367	Ignition Spare
P1368	Ignition Spare
P1369	Engine Temperature Light Circuit
P1380	Camshaft Position Actuator Circuit (Bank 1)
P1381	Camshaft Position Timing Over Advanced (Bank 1)
P1383	Camshaft Position Timing Over Retarded (Bank 1)
P1385	Camshaft Position Actuator Circuit (Bank 2)
P1386	Camshaft Position Timing Over Advanced (Bank 2)
P1388	Camshaft Position Timing Over Retarded (Bank 2)
P1390	Octane Adjust Service Pin In Use/Circuit Open
P1400	Differential Pressure Feedback EGR Circuit Low Input
P1401	Differential Pressure Feedback EGR Circuit High Input
P1402	Exhaust Gas Recirculation Metering Orifice Restricted
P1403	Differential Pressure Feedback Sensor Hoses Reversed
P1404	EGR Temperature Sensor Circuit
P1405	Differential Pressure Feedback Sensor Upstream Hose Off Or Plugged
P1406	Differential Pressure Feedback Sensor Downstream Hose Off Or Plugged
P1407	Exhaust Gas Recirculation No Flow Detected
P1408	Exhaust Gas Recirculation Flow Out Of Self Test Range
P1409	EGR Vacuum Regulator Solenoid Circuit
P1410	Auxiliary Air Cleaner Inlet Control Circuit
P1411	Secondary Air Injection Incorrect Downstream Flow Detected
P1413	Secondary Air Injection Monitor Circuit Low Input
P1414	Secondary Air Injection Monitor Circuit High Input
P1431	Misfire Monitor Disabled, Unable to Learn Trigger Wheel Profile
P1442	Evaporative Emission Control System Control Leak Detected
P1443	Evaporative Emission Control System Control Valve
P1444	Purge Flow Sensor Circuit Low Input

Code	Definition
P1445	Purge Flow Sensor Circuit High Input
P1450	Unable to Bleed Up Fuel Tank Vacuum
P1451	Evaporative Emission Control System Vent Control Circuit
P1452	Unable to Bleed Up Fuel Tank Vacuum
P1455	Evaporative Emission Control System Control Leak Detected (gross leak/no flow)
P1457	Unable to Pull Fuel Tank Vacuum
P1460	Wide Open Throttle A/C Cutout Circuit
P1461	A/C Pressure Sensor Circuit High Input
P1462	A/C Pressure Sensor Circuit Low Input
P1463	A/C Pressure Sensor Insufficient Pressure Change
P1464	A/C Demand Out Of Self Test Range
P1465	A/C Relay Circuit
P1466	A/C Refrigerant Temperature Sensor Circuit
P1469	Rapid A/C Cycling
P1473	Fan Circuit Open (VLCM)
P1474	Fan Control Primary Circuit
P1479	High Fan Control Primary Circuit
P1480	Fan Secondary Low With Low Fan On
P1481	Fan Secondary Low With High Fan On
P1482	SCP
P1483	Brake Pedal Input Short To Battery
P1484	Fan Driver Circuit Open To Power Ground (VLCM)
P1485	Brake Pedal Input Short To Battery
P1500	Vehicle Speed Sensor
P1501	Vehicle Speed Sensor Out Of Self Test Range
P1502	Vehicle Speed Sensor Intermittent
P1504	Idle Air Control Circuit
P1505	Idle Air Control System At Adaptive Clip
P1506	Idle Air Control Overspeed Error
P1507	Idle Air Control Underspeed Error
P1512	Intake Manifold Runner Control Stuck Closed (Bank 1)

Code	Definition
P1513	Intake Manifold Runner Control Stuck Closed (Bank 2)
P1516	Intake Manifold Runner Control Input Error (Bank 1)
P1517	Intake Manifold Runner Control Input Error (Bank 2)
P1518	Intake Manifold Runner Control Stuck Open (Bank 1)
P1519	Intake Manifold Runner Control Stuck Closed (Bank 2)
P1520	Intake Manifold Runner Control Circuit
P1530	A/C Clutch Circuit Open (VLCM)
P1532	Intake Manifold Communication Control Circuit (Bank 2)
P1533	Air Assisted Injector Circuit
P1534	Restraint Deployment Indicator Circuit
P1537	Intake Manifold Runner Control Stuck Open (Bank 1)
P1538	Intake Manifold Runner Control Stuck Open (Bank 2)
P1539	A/C Clutch Circuit Overcurrent/Short (VLCM)
P1549	Intake Manifold Communication Control Circuit (Bank 1)
P1550	Power Steering Pressure Sensor Out Of Self Test Range
P1565	Speed Control Command Switch Out Of Range High
P1566	Speed Control Command Switch Out Of Range Low
P1567	Speed Control Output Circuit
P1568	Speed Control Unable To Hold Speed
P1572	Brake Pedal Switch Circuit
P1573	Throttle Position Not Available
P1574	Throttle Position Sensor Outputs Disagree
P1575	Pedal Position Out Of Self Test Range
P1576	Pedal Position Not Available
P1577	Pedal Position Sensor Outputs Disagree
P1578	ETC Power Less Than Demand
P1579	ETC In Power Limiting Mode
P1580	Electronic Throttle Monitor PCM Override
P1581	Electronic Throttle Monitor Malfunction
P1582	Electronic Throttle Monitor Data Available
P1583	Electronic Throttle Monitor Cruise Disablement
P1584	Throttle Control Detected ETB Malfunction

Code	Definition
P1585	Throttle Control Malfunction
P1586	Electronic Throttle To PCM Communication Error
P1587	Throttle Control Modulated Command Malfunction
P1588	Throttle Control Detected Loss Of Return Spring
P1589	Throttle Control Unable To Control To Desired Throttle Angle
P1605	Keep Alive Memory Test Failure
P1610	SBDS Interactive Codes
P1611	SBDS Interactive Codes
P1612	SBDS Interactive Codes
P1613	SBDS Interactive Codes
P1614	SBDS Interactive Codes
P1615	SBDS Interactive Codes
P1616	SBDS Interactive Codes
P1617	SBDS Interactive Codes
P1618	SBDS Interactive Codes
P1618	SBDS Interactive Codes
P1619	SBDS Interactive Codes
P1620	SBDS Interactive Codes
P1625	Fan Driver Circuit Open to Power B+ (VLCM)
P1626	A/C Circuit Open to Power B+ (VLCM)
P1633	Keep Alive Power Voltage Too Low
P1635	Tire/Axle Out of Acceptable Range
P1636	Inductive Signature Chip Communication Error
P1639	Vehicle ID Block Corrupted, Not Programmed
P1640	Powertrain DTCs Available In Another Control Module (Ref. PID 0946)
P1641	Fuel Pump Primary Circuit
P1642	CAN Link Circuit
P1642	Fuel Pump Monitor Circuit Low Input [DTC will be deleted on next version]
P1643	CAN Link ECM/TCM Circuit/Network

Code	Definition
P1643	Fuel Pump Monitor Circuit Low Input[DTC will be deleted on next version]
P1644	Fuel Pump Speed Control Circuit
P1650	Power Steering Pressure Switch Out Of Self Test Range
P1651	Power Steering Pressure Switch Input
P1656	CAN Link PCM/PCM Circuit Network
P1657	CAN Link Chip Malfunction
P1700	Transmission Indeterminate Failure (Failed to Neutral)
P1701	Reverse Engagement Error
P1702	Transmission Range Sensor Circuit Intermittent
P1703	Brake Switch Out Of Self Test Range
P1704	Transmission Range Circuit Not Indicating Park/Neutral During Self Test
P1705	Transmission Range Circuit Not Indicating Park/Neutral During Self Test
P1709	Park Neutral Position Switch Out Of Self Test Range
P1711	Transmission Fluid Temperature Sensor Out Of Self Test Range
P1712	Transmission Torque Reduction Request Signal
P1713	Transmission Fluid Temperature Sensor In Range Failure (<50 deg F)
P1714	Shift Solenoid A Inductive Signature
P1715	Shift Solenoid B Inductive Signature
P1716	Shift Solenoid C Inductive Signature
P1717	Shift Solenoid D Inductive Signature
P1718	Transmission Fluid Temperature Sensor In Range Failure (>250 deg F)
P1727	Coast Clutch Solenoid Inductive Signature
P1728	Transmission Slip
P1729	4x4L Switch
P1731	1-2 Shift Malfunction
P1732	2-3 Shift Malfunction
P1733	3-4 Shift Malfunction
P1740	Torque Converter Clutch Solenoid Inductive Signature

Code	Definition
P1741	Torque Converter Clutch Solenoid Control Error
P1742	Torque Converter Clutch Solenoid Circuit Failed On
P1743	Torque Converter Clutch Solenoid Circuit Failed On
P1744	Torque Converter Clutch Solenoid Circuit Performance
P1746	Pressure Control Solenoid A Open Circuit
P1747	Pressure Control Solenoid A Short Circuit
P1749	Pressure Control Solenoid A Failed Low
P1751	Shift Solenoid A Performance
P1754	Coast Clutch Solenoid Circuit
P1756	Shift Solenoid B Performance
P1760	Pressure Control Solenoid A Short Circuit Intermittent
P1761	Shift Solenoid C Performance
P1762	Overdrive Band Failed Off
P1766	Shift Solenoid D Performance
P1767	Torque Converter Clutch Circuit
P1768	Performance/Normal/Winter Mode Input
P1770	Clutch Solenoid Circuit
P1780	Transmission Control Switch (O/D Cancel) Circuit Out Of Self Test Range
P1781	4X4L Circuit Out Of Self Test Range
P1782	Performance/Economy Switch Circuit Out Of Self Test Range
P1783	Transmission Overtemperature Condition
P1784	Transmission Mechanical Failure - First and Reverse
P1785	Transmission Mechanical Failure - First and Second
P1786	3-2 Downshift Error
P1787	2-1 Downshift Error
P1788	Pressure Control Solenoid B Open Circuit
P1789	Pressure Control Solenoid B Short Circuit
P1795	Inconsistent CAN Level
P1804	4-Wheel Drive High Indicator Circuit Open or Shorted To Ground
P1806	4-Wheel Drive High Indicator Short To Battery

Code	Definition
P1808	4-Wheel Drive Low Indicator Circuit Open or Short To Ground
P1810	4-Wheel Drive Low Indicator Short To Battery
P1812	4-Wheel Drive Mode Select Switch Circuit Open
P1815	4-Wheel Drive Mode Select Switch Circuit Short To Ground
P1819	Neutral Safety Switch Input Short To Ground
P1820	Transfer Case LO To HI Shift Relay Circuit Open Or Short To Ground
P1822	Transfer Case LO To HI Shift Relay Coil Short To Battery
P1824	4-Wheel Drive Electric Clutch Relay Open Or Short To Ground
P1826	4-Wheel Drive Electric Clutch Relay Short To Battery
P1828	Transfer Case HI To LO Shift Relay Coil Circuit Open Or Short To Ground
P1830	Transfer Case HI To LO Shift Relay Coil Circuit Short To Battery
P1832	Transfer Case 4-Wheel Drive Solenoid Circuit Open or Short To Ground
P1834	Transfer Case 4-Wheel Drive Solenoid Circuit Short To Battery
P1838	No Shift Motor Movement Detected
P1846	Transfer Case Contact Plate ‘A’ Circuit Open
P1850	Transfer Case Contact Plate ‘B’ Circuit Open
P1854	Transfer Case Contact Plate ‘C’ Circuit Open
P1858	Transfer Case Contact Plate ‘D’ Circuit Open
P1866	Transfer Case Cannot Be Shifted
P1867	Transfer Case Contact Plate General Circuit Failure
P1876	Transfer Case 2-Wheel Drive Solenoid Circuit Open Or Short To Ground
P1877	Transfer Case 2-Wheel Drive Solenoid Circuit Short To Battery
P1881	Engine Coolant Level Switch Circuit
P1882	Engine Coolant Level Switch Circuit Short To Ground
P1883	Engine Coolant Level Switch Circuit

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

5.5 MANUFACTURER SPECIFIC CODES - GENERAL MOTORS

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

Code	Definition
P1187	Engine Oil Pressure Sensor Circuit Voltage Low (1997 Corvette)
P1188	Engine Oil Temperature Sensor Circuit Voltage High (except 1997 Corvette)
P1188	Engine Oil Pressure Sensor Circuit Voltage High (1997 Corvette)
P1189	Engine Oil Pressure Switch Circuit
P1200	Injector Control Circuit
P1214	Injection Pump Timing Offset
P1215	Generator Driver Circuit
P1216	Fuel Solenoid Response Time Too Short
P1217	Fuel Solenoid Response Time Too Long
P1218	Injection Pump Calibration Circuit
P1220	Throttle Position (TP) Sensor 2 Circuit Fault
P1221	TP Sensor 1, 2 Performance
P1222	Injector Control Circuit Intermittent
P1250	Early Fuel Evaporative (EFE) Heater Circuit
P1257	Boost Control Condition/Supercharge System Overboost
P1260	Fuel Pump Speed Relay Control Circuit
P1271	Accelerator Pedal Position Sensor 1-2 Correlation
P1272	Accelerator Pedal Position Sensor 2-3 Correlation
P1273	Accelerator Pedal Position Sensor 1-3 Correlation
P1275	Boost Control Condition (except 1997-98 Corvette)
P1275	Accelerator Pedal Positioning (APP) Sensor 1 Circuit (1997-98 Corvette)
P1276	Accelerator Pedal Positioning (APP) Sensor 1 Circuit Performance
P1280	Accelerator Pedal Positioning (APP) Sensor 2 Circuit
P1281	Accelerator Pedal Positioning (APP) Sensor 2 Circuit Performance
P1285	Accelerator Pedal Positioning (APP) Sensor 2 Circuit
P1286	Accelerator Pedal Positioning (APP) Sensor 2 Circuit Performance
P1300	Ignition Coil 1 Primary Feedback Circuit

Code	Definition
P1305	Ignition Coil 2 Primary Feedback Circuit
P1310	Ignition Coil 3 Primary Feedback Circuit
P1315	Ignition Coil 4 Primary Feedback Circuit
P1320	ICM 4X Reference Circuit Too Many Pulses (except 1996-98 4.0L)
P1320	ICM 4X Reference Circuit Intermittent No Pulses (1996-98 4.0L)
P1323	ICM 24X Reference Circuit Low Frequency
P1335	Crankshaft Positioning Sensing Circuit
P1336	CKP System Variation Not Learned
P1345	Camshaft To Crankshaft Position Correlation Fault
P1346	CKP Sensor System Variation Not Learned/ Intake Camshaft Position Performance
P1349	Intake Camshaft Position System
P1350	Ignition Control System
P1351	Ignition Control Circuit Voltage High (except 1998 3.1L)
P1351	Ignition Control Circuit Open (1998 3.1L)
P1352	Bypass Circuit Open Or Voltage High
P1359	Ignition Coil Group 1 Control Circuit
P1360	Ignition Coil group 2 Control Circuit
P1361	IC Circuit Not Toggling
P1361	Ignition Control Circuit Voltage Low (Distributor Ignition)
P1362	Bypass Circuit Shorted Or Voltage Low
P1370	ICM 4X Reference Too Many Pulses
P1371	ICM 4X Reference Too Few Pulses (except Caprice, Fleetwood, Impala SS & Roadmaster)
P1371	Distributor Ignition Low Resolution Circuit (Caprice, Fleetwood, Impala SS & Roadmaster)
P1372	CKP Sensor A-B Correlation
P1374	3X Reference Circuit
P1375	ICM 24X Reference Voltage Too High
P1376	Ignition Ground Circuit
P1377	ICM Cam Pulse To 4X Reference Pulse Comparison

Code	Definition
P1380	ABS/EBCM/EB(T)CM DTC Detected/Rough Road Data Unusable
P1381	Misfire Detected No EBCM/EB(T)CM/PCM Serial Data
P1401	Exhaust Gas Recirculation (EGR) flow test fault
P1403	EGR Error
P1404	EGR Valve Closed Pintle Position
P1404	EGR Valve Stuck Open Or Circuit Performance
P1405	EGR Error
P1406	EGR Valve Pintle Position Circuit
P1408	MAP Sensor Circuit
P1410	Fuel Tank Pressure System
P1415	AIR System Bank 1
P1416	AIR System Bank 2
P1431	Fuel Level Sensor 2 Circuit Performance
P1432	Fuel Level Sensor 2 Circuit Voltage Low
P1433	Fuel Level Sensor 2 Circuit Voltage High
P1441	EVAP System Flow During Non-Purge
P1442	EVAP Vacuum Switch Circuit
P1450	BARO Sensor Circuit
P1451	BARO Sensor Circuit
P1460	Cooling Fan Circuit (except Catera)
P1460	Misfire Detected With Low Fuel (Catera)
P1483	Engine Cooling System Performance
P1500	Starter Signal Circuit
P1501	Theft Deterrent System
P1502	Theft Deterrent System No Password Received
P1503	Theft Deterrent System Password Improper
P1508	Idle Air Control (IAC) System Low RPM
P1509	IAC System High RPM
P1510	Back-Up Power Supply
P1511	Throttle Control System- Backup System Performance
P1514	TAC System MAF Performance

Code	Definition
P1515	Command vs Actual Throttle Position Performance (PCM)
P1516	Command vs Actual Throttle Position Performance (TAC Module)
P1517	TAC Module Processor
P1518	PCM To TAC Module Serial Data Circuit
P1519	Throttle Actuator Control Module
P1520	Park/Neutral Position Switch Circuit, Gear Indicator System
P1523	Throttle Closed Position Performance
P1524	TPS Learned Closed Throttle Angle Degrees Out Of Range
P1526	TPS Learn Not Completed
P1527	Trans Range/Pressure Switch Comparison
P1530	Ignition Timing Adjustment Switch Circuit
P1530	A/C Refrigerant Pressure Sensor Error
P1531	Low Air Conditioning Refrigerant Charge
P1532	A/C Evaporator Temperature Circuit Voltage Low
P1533	A/C Low Side Temperature Sensor Circuit
P1535	A/C/ High Side Temperature Sensor Circuit
P1536	A/C System ECT Overtemperature
P1537	A/C Request Circuit Voltage Low
P1538	A/C Request Circuit Voltage High
P1539	A/C High Pressure Switch Circuit Voltage High
P1540	A/C System High Pressure
P1542	A/C System High Pressure/High Temperature
P1543	A/C System Performance
P1545	A/C Clutch Relay Control Circuit
P1546	A/C Clutch Relay Control Circuit Voltage Low (except 1996-98 Camaro/Firebird & 1997-98 Corvette)
P1546	A/C Clutch Status Circuit Voltage Low (1996-98 Camaro/ Firebird & 1997-98 Corvette)
P1550	Stepper Motor Speed Control
P1554	Speed Control Status Circuit
P1555	Electronic Variable Orifice Fault (Saturn)

Code	Definition
P1558	Speed Control (SPS Low)
P1560	Speed Control System/Transaxle Not In Drive
P1561	Speed Control Vent Solenoid
P1562	Speed Control Vacuum Solenoid
P1564	Speed Control System/Vehicle Acceleration Too High (except Catera)
P1564	ECM Battery Voltage Loss (Catera)
P1565	Speed Control Servo Position Sensor
P1566	Speed Control System/Engine RPM Too High
P1567	Speed Control Switches/ABCS Active
P1568	Speed Control (SPS High)
P1570	Speed Control System/Traction Control Active
P1571	TCS Desired Torque Circuit (except 4.0L, 4.6L & 1997-98 5.7L Corvette)
P1571	Traction Control System PWM Circuit No Frequency (4.0L & 4.6L)
P1571	ASR Desired Torque (1997-98 5.7L Corvette)
P1572	Traction Control System Active Circuit Voltage Low Too Long
P1573	PCM/EBTCM Serial Data Circuit
P1573	Engine Hot Lamp Control Circuit
P1574	EBTCM System/Stop Lamp Circuit Voltage High (except 1997-98 Corvette)
P1574	Stop Lamp Control Circuit (1997-98 Corvette)
P1575	Extended Travel Brake Switch Circuit Voltage High
P1576	Brake Booster Vacuum Sensor Circuit Voltage High
P1577	Brake Booster Vacuum Sensor Circuit Voltage Low
P1578	Brake Booster Vacuum Sensor Circuit Low Vacuum
P1579	Park/Neutral To Drive/Reverse At High Throttle Angle
P1580	Cruise Control Module Move Circuit, Low Voltage
P1581	Cruise Control Module Move Circuit, High Voltage
P1582	Cruise Control Module Direction Circuit, Low Voltage
P1583	Cruise Control Module Direction Circuit, High Voltage
P1584	Cruise Control Disabled

Code	Definition
P1585	Cruise Control Inhibit Output Circuit
P1586	Cruise Control Brake Switch 2 Circuit
P1599	Engine Stall Or Near Stall Detected
P1600	PCM Battery
P1600	Serial Communication Between PCM & TCM
P1601	Loss of Serial Communication (Except Catera)
P1601	ECM Overtemperature
P1602	Loss Of EBC/EBTCM Serial Data (Except Catera)
P1602	KS Module Circuit (Catera)
P1603	Loss Of SDM Serial Data
P1604	Loss of IPC Serial Data
P1605	Loss of HVAC Serial Data
P1607	Engine Oil Level Switch Circuit
P1610	Loss Of PZM Serial Data (1996-97 Except 1997 Cutlass & Malibu)
P1610	Failure With Body Function Controller (1997 Cutlass & Malibu)
P1610	Standard Body Module Series Data CKT (1998)
P1611	Loss Of CVRTD Serial Data
P1617	Engine Oil Level Switch Circuit
P1619	Engine Oil Lite Monitor Reset Circuit
P1620	Low Engine Coolant Level (Saturn)
P1621	PCM Memory Performance (Except 1998 5.7L)
P1621	VCM EEPROM Performance (1998 5.7L)
P1623	PCM Prom Error/ Transaxle Temperature Pull-Up Resistor Fault (Saturn Z body)
P1624	Customer Snapshot Data Available (Saturn)
P1625	TCM Flash Checksum Fault (Saturn)
P1626	Theft Deterrent System Fuel Enable Circuit
P1627	A/D Performance
P1628	PCM Engine Control Temp Pull-Up Resistor
P1629	Theft Deterrent System Fuel Enable Circuit Improper Signal Detected During Engine Cranking (Except 1997-98 2.2L, 2.4L, 3.1L & 3.8L)

Code	Definition
P1629	Theft Deterrent Crank Signal Malfunction (1997-98 2.2L, 2.4L, 3.1L & 3.8L)
P1630	Theft Deterrent System/PCM/VCM in Learn Mode
P1631	Theft Deterrent System Password Improper
P1632	Theft Deterrent System Fuel Disabled
P1633	Ignition Supplemental Power Circuit Voltage Low
P1634	Ignition 1 Power Circuit Voltage Low
P1635	5 Volt Reference (A Or 1) Circuit
P1637	Alternator L Terminal Circuit
P1638	Alternator F Terminal Circuit
P1639	5 Volt Reference (B Or 2) Circuit
P1640	Driver 1 Input Voltage High
P1641	MIL Control Circuit (Except 5.7L VINs P & 5 & 1998 3.1L & 3.8L)
P1641	Fan Control Relay 1 Control Circuit (5.7L VINs P & 5)
P1641	A/C Relay Control Circuit (1998 3.1L & 3.8L)
P1642	Vehicle Speed Output Circuit (Except 3.4L, 5.7L VINs P & 5 & 1998 3.8L)
P1642	Fan Control Relay 2 & 3 Control Circuit (5.7L VINs P & 5)
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)

Code	Definition
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)
P1664	Skip Shift 1-4 Upshift Lamp Control Circuit
P1665	DBCM/DBTCM Serial Data Circuit (1996-97)
P1665	EVAP Vent Valve Solenoid Control Circuit (1998)
P1667	Reverse Inhibitor Solenoid Control Circuit (1996-97)
P1667	Fuel Pump Speed Control Circuit (1998)
P1670	QDM 4 Circuit
P1671	MIL Control Circuit
P1671	Oil Change Lamp Control Circuit
P1672	Low Engine Oil Level Lamp Circuit
P1673	Engine Hot Lamp Control Circuit
P1674	Tachometer Control Circuit

Code	Definition
P1675	EVAP Vent Solenoid Control Circuit
P1676	EVAP Canister Purge Solenoid Control CKT
P1689	TCS Delivered Torque Control Circuit
P1700	MIL Requested By TCM
P1701	MIL Request Circuit
P1740	Torque Management Request Circuits, Transmission & Traction Control (Except Catera)
P1740	Torque Control/Management Request Circuits (Catera)
P1760	Transmission Control Module Supply Voltage Interrupted
P1780	Park Neutral Position Switch Circuit
P1781	Engine Torque Signal Circuit
P1792	ECM To Transmission Control Module Engine Coolant Signal
P1800	ECM To Transmission Control Module Engine Coolant Signal
P1810	ATF Pressure Manual Valve Position Switch Malfunction
P1811	Long Shift & Max Adapt
P1812	TOT Condition
P1814	Torque Converter Overstress
P1819	Internal Mode Switch - No Start
P1820	Internal Mode Switch Circuit 'A' Low
P1822	Internal Mode Switch Circuit 'B' Low
P1823	Internal Mode Switch Circuit 'P' Low
P1825	Internal Mode Switch - Invalid Range
P1826	Internal Mode Switch - Invalid Range
P1835	Kickdown Switch Circuit
P1842	1-2 Shift Solenoid Circuit Low Input
P1843	1-2 Shift Solenoid Circuit High Input
P1845	2-3 Shift Solenoid Circuit Low Input
P1847	2-3 Shift Solenoid Circuit High Input
P1850	Brake Band Apply Solenoid
P1860	TCC PWM Solenoid Circuit
P1864	TCC Enable Solenoid Circuit

Code	Definition
P1868	Transmission Fluid Life
P1870	Trans Component Slipping
P1875	4WD Low Switch Circuit Electrical
P1886	Transaxle Shift, Timing Solenoid Performance
P1887	TCC Release Switch Malfunction
P1890	Throttle Position Signal Input
P1895	Engine Torque Delivered Circuit

5.6 MANUFACTURER SPECIFIC CODES - HONDA

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

Code	Definition
P1381	Cylinder Position Sensor Intermittent Interruption
P1382	Cylinder Position Sensor No Signal
P1456	EVAP Emission Control System Leak Detected (Fuel Tank System)
P1457	EVAP Emission Control System Leak Detected (Control Canister System)
P1459	EVAP Emission Purge Flow Switch Malfunction
P1491	EGR valve Lift Insufficient Detected
P1498	EGR Valve Lift Sensor High Voltage
P1508	IAC Valve Circuit Failure
P1509	IAC Valve Circuit Failure
P1519	Idle Air Control Valve Circuit Failure
P1607	EGM/PGM Internal Circuit Failure A
P1655	SEA/SEFA/TMA/TMB Signal Line Failure
P1660	A/T FI Signal A Circuit Failure
P1681	A/T FI Signal A Low Input
P1682	A/T FI Signal A High Input
P1686	A/T FI Signal B Low Input
P1687	A/T FI Signal B Low Input

5.7 MANUFACTURER SPECIFIC CODES - TOYOTA

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

Code	Definition
P1340	Igniter Circuit Malfunction No. 8 (1998-2000 Land Cruiser & 2000 Tundra)
P1346	VVT Sensor /Camshaft Position Sensor Circuit Range/ Performance Problem (Bank 1)
P1349	VVT System Malfunction
P1400	Sub-Throttle Position Sensor Malfunction
P1401	Sub-Throttle Position Sensor Range/Performance Problem
P1405	Turbo Pressure Sensor Circuit Malfunction
P1406	Turbo Pressure Sensor Range/Performance Problem
P1410	EGR Valve Position Sensor Circuit Malfunction
P1411	EGR Valve Position Sensor Circuit Ranger/Performance
P1500	Starter Signal Circuit Malfunction
P1510	Boost Pressure Control Circuit Malfunction
P1511	Boost Pressure Low Malfunction
P1512	Boost Pressure High Malfunction
P1520	Stop Lamp Switch Signal Malfunction
P1565	Cruise Control Main Switch Circuit Malfunction
P1600	ECM BATT Malfunction
P1605	Knock Control CPU Malfunction
P1630	Traction Control System Malfunction
P1633	ECM Malfunction ECTS Circuit
P1645	Body ECU Malfunction
P1652	IACV Control Circuit Malfunction
P1656	OCV Circuit Malfunction
P1658	Waste Gate Valve Control Circuit Malfunction
P1661	EGR Circuit Malfunction
P1662	EGR By-Pass Valve Control Circuit Malfunction
P1690	OCV Circuit Malfunction
P1692	OCV Open Malfunction
P1693	OCV Closed Malfunction
P1780	PNP Switch Malfunction

6

6.1 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. All replacement parts, whether new or re-manufactured, 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.

6.2 SERVICE PROCEDURES

If you have any questions, please contact your local store, distributor or the Service Center.

USA & Canada:

(800) 544-4124 (9:00-4:00, Monday-Friday PST)

All others: (714) 241-6802 (9:00-4:00, Monday-Friday PST)

FAX: (714) 432-7910 (24 hr.)

For technical support and information on UPDATES and OPTIONAL ACCESSORIES, visit on the Web at www.CodeReader.com or contact us through Fax: (714) 432-7511; Phone: 1-800-544-4124 or (714) 241-6805 (7AM-4PM Pacific Standard Time).

Warranty and Service

WE EMPLOY TECHNICIANS CERTIFIED BY ASE ONLY.
LET US SHOW YOU THEIR CREDENTIALS.

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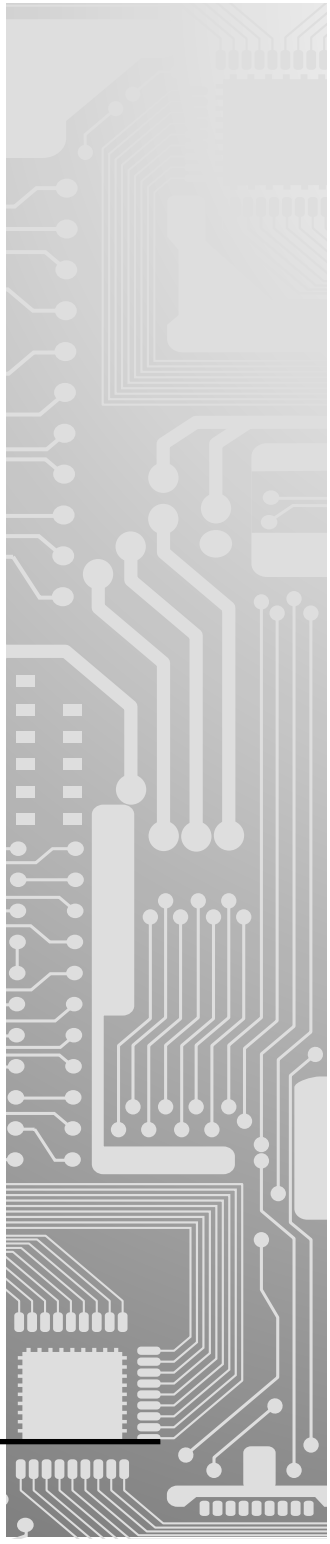

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Instruction MRP #93-0178