OBDII Scanner Tool

User's Manual

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SCAN-DIY CR-PRO USER'S MANUAL

SCAN-DIY Code reader-Pro

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1- Introduction

1.1The Product Features :

	Codereader	Codereader-Pro
Displays the DTC definitions on screen unlike previous models	Yes	Yes
works with CAN - equipped vehicles	Yes	Yes
Reads and clears all generic, and some manufacturer, specific DTCs	Yes	Yes
Resets check engine lights	Yes	Yes
Views OBD - II Freeze Frame data	Yes	Yes
Determines the Malfunction Indicator lamp (MIL) status	No	Yes
I/M readiness status	No	Yes
Retrieves the Vehicle Identification Number (VIN)	No	Yes
Scanning live data	No	Yes
Saves scanning Data	Yes	Yes

The Product Kit Includes:

Features:

Display: 128x64 pixel LCD （FSTN）with contrast adjustment and backlight
Easy - to - Read screen and also saves up to 38 scans for later viewing.
Operating temperature:-20℃ - 50 ℃(- 4℉ to 122 ℉)
Operation Voltage : DC 9 ~15V provided by vehicle battery

Support Protocol:

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1） SAE-J1850 PWM
2） SAE-J1850 VPW
3） KWP2000（ISO-14230）
4） ISO-9141
5） CAN BUS （ISO-15765-4）
6） EOBD-II

- ✓ - Supports ISO, VPW and PWM bus systems as well as can-bus systems
- ✓ -U.S. Models - European - Japanese - Asian - German - Korean:
- ✓ - Suitable for almost all cars after 2001 （EOBD-II） .
- ✓ - GM '96 - Current Year (OBD-II)
- ✓ - Ford '96 - Current Year (OBD-II)
- ✓ - Chrysler '96 - Current Year (OBD-II)
- ✓ - Toyota '96 - Current Year (OBD-II)
- ✓ - Honda '96 - Current Year (OBD-II)
- ✓ - NISSAN '96 - Current Year (OBD-II)
- ✓ -All other - Asian and European '96 - Current Year (OBD-II)

1.2 Safety Precautions

For your safety, read this manual thoroughly before operating your Scan Tool. Always refer to and follow safety messages and test procedures provided by the manufacturer of the vehicle or equipment being tested.
The safety messages presented below and throughout this user's manual are reminders to the operator to exercise extreme care when using this test instrument.

Read All Instructions

Read, understand and follow all safety messages and instructions in this manual and on the test equipment. Safety messages in this section of the manual contain a signal word with a three-part message and, in some instances, an icon.

Safety Messages

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Safety messages are provided to help prevent personal injury and

equipment damage. All safety messages are introduced by a signal word. The signal word indicates the level of the hazard in a situation. The types of safety messages are.

DANGER **Indicates a possible hazardous situation which, if not avoided, will result in death or serious injury to operator or bystanders.**

WARNING **Indicates a possible hazardous situation which, if not avoided, could result in death or serious injury to operator or bystanders.**

CAUTION **Indicates a possible hazardous situation which, if not avoided, may result in moderate or minor injury to operator or bystanders.**

IMPORTANT **Indicates a condition which, if not avoided, may result in damage to test equipment or vehicle.**

Safety Precautions

3 Safety Type:

Safety messages contain three different type：

- Normal type states the hazard.
- **Bold** type states how to avoid the hazard.
- *Italic* type states the possible consequences of not avoiding the hazard.

Icons used:

An icon, when present, gives a graphical description of a potential hazard.

Example:

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Engine systems can malfunction expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

Safety goggles and protective gloves must be Worn by the operator and any bystanders. Even if everyday eyeglasses have impact resistant lenses, they are NOT safety glasses.

Engine systems that malfunction can cause injury.

Safety Precautions

Risk of electric shock.
• Do not exceed voltage limits between inputs indicated in the Specifications.
• Use extreme caution when working with circuits that have voltage greater than 60 volts DC or 24 volts AC.
Electric shock can cause injury.

Risk of explosion.

• Safety goggles and protective clothing must be worn by the operator and any bystanders.

- Even if everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

• Do not use this scan tool in environments where explosive vapors may collect.
These areas include:

- below-ground pits.
- confined areas.
- areas that are less than 18 inches above floor.

- **Use this Scan Tool in locations with mechanical ventilation providing at least 4 air changes per hour.**
- **Flammable fuel and vapors can ignite.**
- **Do not smoke, strike a match, or cause a spark in the vicinity of the battery. Battery gases can ignite.**

Safety Precautions

- **Avoid making an accidental connection between the battery terminals. Do not place uninsulated metal tools on the battery.**
- **When removing battery cables, remove the ground cable first.**
- **Avoid sparks when connecting or disconnecting power leads to the battery.**
- **Make sure ignition is off, headlights and other accessories are off and vehicle doors are closed before disconnecting the battery cables.**

- This also helps prevent damage to on-board computer systems.

- **Always disconnect the battery ground connections before servicing electrical system components.**

Explosion can cause injury.

Risk of poisoning.

- **Use this Scan Tool in locations with mechanical**

ventilation providing at least 4 air changes per hour. Engine exhaust contains odorless gas which can be lethal.

- **Route the exhaust outside while testing with the engine running.**

Poisoning can result in death or serious injury.

Safety Precautions

Battery acid is a highly corrosive sulfuric acid. **!**

- **Safety goggles and protective gloves must be worn by the operator and any bystanders.**

- Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

•Make sure someone can hear you or is close nough to provide aid when working near a battery.

- **Have plenty of fresh water and soap nearby.**

- If battery acid contacts skin, clothing, or eyes, flush exposed area with soap and water for 10 minutes. Seek medical help.

- **Do not touch eyes while working near battery.**

Battery acid can burn eyes and skin.

Safety Precautions

Risk of fire.

- **Safety goggles and protective clothing must be worn by the operator and any bystanders.**
- Even if your everyday glasses have impact esistant lenses, they are NOT safety glasses, and may not provide adequate protection.

- **Do not position your head directly in front of or Over the throttle body.**

- **Do not pour gasoline down the throttle body When cranking or running the engine, when working with fuel delivery systems or any open fuel line.**
- Engine backfire can occur when the air cleaner is Out of position.

- **Do not use fuel injector cleaning solvents When performing diagnostic testing.**

- **Keep cigarettes, sparks, open flame and other sources of ignition away from vehicle.**

- **Keep a dry chemical (Class B) fire extinguisher Rated for gasoline, chemical and electrical fires in work area.**

Fire can cause death or serious injury.

Risk of flying particles.

- **Safety goggles and protective gloves must be Worn by the operator and any bystanders while using electrical equipment.**
  - Electrical equipment or rotating engine parts can cause flying particles.
  - Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

Flying particles can cause eye injury.

Safety Precautions

Risk of burns.

• Batteries can produce a short-circuit current high enough to weld jewelry to metal.

- Remove jewelry such as rings, bracelets and watches before working near batteries.
Short circuits can cause injury.

Risk of burns.

• Do not remove radiator cap unless engine is cold.

- Pressurized engine coolant may be hot.

• Do not touch hot exhaust systems, manifolds, engines, radiators, sample probe.

• Wear insulated gloves when handling hot engine components.

• Tester leads can become hot after extended testing in close proximity to manifolds.

Hot components can cause injury.

Risk of expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.

• Safety goggles and protective clothing must be worn by the operator and any bystanders.

- Even if your everyday glasses have impact resistant lenses, they are NOT safety glasses, and may not provide adequate protection.

• Engine systems can malfunction, expelling fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris.
Fuel, oil vapors, hot steam, hot toxic exhaust gases, acid, refrigerant and other debris can cause serious injury.

Safety Precautions

Engine compartment contains electrical Onnections and hot or moving parts.

•Keep yourself, test leads, clothing and other bjects clear of electrical connections and hot or moving engine parts.

• Do not wear watches, rings, or loose fitting clothing when working in an engine compartment.

• Do not place tools or test equipment on fenders or other places in engine compartment.
• Barriers are recommended to help identify danger zones in test area.

• Prevent personnel from walking through test area.
Contacting electrical connections and hot or moving parts can cause injury.

Risk of injury.

- **The Scan Tool should be operated by qualified personnel only.**
- **Use the scan tool only as described in the user's manual.**
- **Use only manufacturer's recommended attachments.**

• Do not operate the Scan Tool with damaged cables.

• Do not operate the Scan Tool if it has been dropped or damaged, until examined by a qualified service representative.

Operation of the Scan Tool by anyone other than qualified personnel may result in injury.

Safety Precautions

WARNING **Risk of unexpected vehicle movement.**

- **Block drive wheels before performing a test with engine running.**
- **Unless instructed otherwise:**

- set parking brake
- put gear selector in neutral for manual transmissions
- put gear selector in park for automatic transmissions
- disconnect release mechanism on the automatic parking brake release for testing and reconnect when testing is completed.

- **Do not leave a running engine unattended.**

A moving vehicle can cause injury.
Risk of equipment or circuit damage.

CAUTION

- **Unless specifically directed by manufacturer, make sure ignition is off before connecting or disconnecting connectors or any vehicle electrical terminals.**
- **Do not create a short between battery terminals with a jumper wire or tools.**

Improper equipment use can cause equipment or circuit damage.

Safety Precautions

CAUTION

Misdiagnosis may lead to incorrect or improper repair and/or adjustment.

• Do not rely on erratic, questionable, or obviously erroneous test information or results.

- If test information or results are erratic, questionable, or obviously erroneous, make sure all connections and data entry information are correct and test procedures were performed correctly.
- If test information or results are still suspicious, do not use them for diagnosis.

Improper repair and/or adjustment may cause vehicle or equipment damage or unsafe operation.

Some vehicles are equipped with air bags.

• Follow service manual warnings when working around air bag components or wiring.

DANGER

- If service manual instructions are not followed, an air bag may deploy unexpectedly, resulting in injury.
- Note an air bag can still deploy several minutes after ignition key is off (or even if vehicle battery is disconnected) because of a special energy reserve module.

An airbag opening can cause injury.

1.3 *Vehicle Service Information*

The following is a list of web sites and phone numbers where electronic engine control (EEC) diagnostic information is available.

✓ Some manuals may be available at your local dealer, auto parts stores or local public libraries.

Domestic Vehicles	Web Site	Phone Number
General Motors		
Chevrolet	www.chevrolet.com	1-800-551-4123
Pontiac	www.pontiac.com	1-800-551-4123
Oldsmobile	www.oldsmobile.com	1-800-551-4123
Buick	www.buick.com	1-800-551-4123
Cadillac	www.cadillac.com	1-800-333-4CAD
Saturn	www.saturn.com	1-800-553-6000
Ford		
Ford	www.ford.com	1-800-392-3673
Lincoln	www.lincoln.com	1-800-392-3673
Mercury	www.mercury.com	1-800-392-3673
Chrysler		
Chrysler	www.chrysler.com	1-800-348-4696
Dodge	www.dodge.com	1-800-348-4696
Plymouth	Not Available	1-800-348-4696
Eagle	Not Available	1-800-348-4696
European Vehicles		
Audi	www.audi.com	1-800-544-8021
Volkswagen	www.vw.com	1-800-544-8021
BMW	www.bmw.com	1-201-307-4000
MINI	www.mini.com	1-201-307-4000
Jaguar	www.jaguar.com	1-800-4-JAGUAR
Volvo	www.volvo.com	1-800-458-1552
Mercedes-Benz	www.mercedes-benz.com	1-800-367-6372
Land Rover	www.landrover.com	1-800-637-6837
Porsche	www.porsche.com	1-800-PORSCHE
Saab	www.saab.com	1-800-955-9007
Asian Vehicles		
Acura	www.acura.com	1-800-999-1009
Honda	www.honda.com	1-800-999-1009
Lexus	www.lexus.com	1-800-255-3987
Scion	www.scion.com	1.866.70.SCION
Toyota	www.toyota.com	1-800-GO-TOYOTA
Hyundai	www.hyundai.com	1-800-633-5151
Infiniti	www.infiniti.com	1-800-662-6200
Nissan	www.nissanusa.com	1-800-nissan1
Kia	www.kia.com	1-800-333-4542
Mazda	www.mazda.com	1-800-222-5500
Daewoo	www.daewoo.com	1-822-759-2114

Subaru	www.subaru.com	1-800-SUBARU3
Isuzu	www.isuzu.com	1-800-255-6727
Geo	Not Available	Not Available
Mitsubishi	www.mitsubishi.com	1-888-MITSU2004
Suzuki	www.suzukiauto.com	1-800-934-0934

Other Manuals

Chilton Book Company	www.chiltonsonline.com	1-800-347-7707
Haynes Publications	www.haynes.com	1-800-242-4637
Bentley Publishers	www.bentleypublishers.com	1-800-423-4595

Repair Information Programs

Mitchell	www.mitchell1.com	1-888-724-6742
ALLDATA	www.alldata.com	1-800-697-2533

Suitable Manual Titles

Diagnostic Service Manuals
Power Train Codes and Oxygen Sensors
Automotive Emission Control Manual
Fuel Injection
Automotive Electrical Manual
Automotive Electrics and Electronics
Automotive Sensors
Electronic Transmission Control
Emission Control Technology
Engine Management
or similar titles...

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1.4 Introduction to On-Board Diagnostics OBD II

On-board diagnostics version II (OBD II) is a system that the Society of Automotive Engineers (SAE) developed to standardize automotive electronic diagnosis.

Beginning in 1996, most new vehicles sold in the United States were fully OBD II compliant.

✓ Technicians can now use the same tool to test any OBD II compliant vehicle without special adapters. SAE established guidelines that provide:

- ❒ A universal connector, called the DLC, with dedicated pin assignments.
- ❒ A standard location for the DLC, visible under the dash on driver's side.
- ❒ A standard list of diagnostic trouble codes (DTCs) used by all manufacturers.
- ❒ A standard list of parameter identification (PID) data used by all manufacturers.
- ❒ Ability for vehicle systems to record operating conditions when a fault occurs.
- ❒ Expanded diagnostic capabilities that records a code whenever a condition occurs that affects vehicle emissions.
- ❒ Ability to clear stored codes from the vehicle's memory with a Scan Tool.

SAE Publications

SAE has published hundreds of pages of text defining a standard communication protocol that establishes hardware, software, and circuit parameters of OBD II systems.

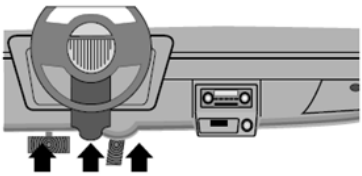
• SAE publishes recommendations, not laws, but the Environmental Protection Agency (EPA) and California Air Resources Board (CARB) made many of SAE's recommendations legal requirements.

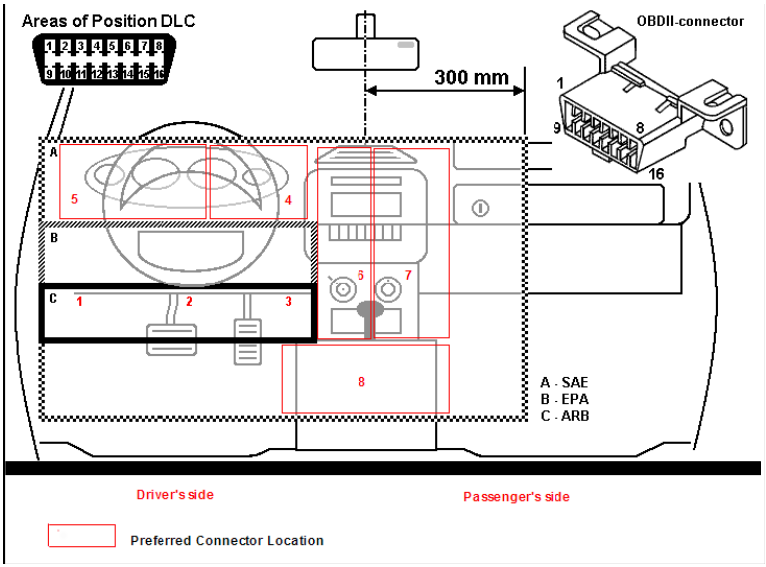
1.4.1 Diagnostic Link Connector (DLC)

The Data Link Connector (DLC) is used with scan tool to communicate with the vehicle's control module.

✓ Data Link Connector Location.

- ❒ Under dashboard on driver side of vehicle.
- ❒ If Data Link Connector is not located under dashboard, a label should be there telling location.





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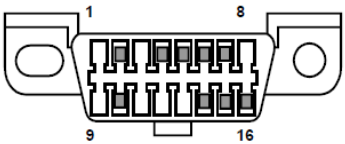
1.4.2 Data Link Connector (DLC) Pins

Data Link Connector (DLC) Pins



1 - Manufacturer Reserved
2 - J1850 Bus+
3 - Manufacturer Reserved
4 - Chassis Ground
5 - Signal Ground
6 - CAN High, J-2284
7 - K Line, ISO 9141-2 & ISO/DIS 14230-4
8 - Manufacturer Reserved
9 - Manufacturer Reserved
10 - J1850 Bus-
11 - Manufacturer Reserved
12 - Manufacturer Reserved
13 - Manufacturer Reserved
14 - CAN Low, J-2284
15 - L Line, ISO 9141-2 & ISO/DIS 14230-4
16 - Battery Power

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1.4.3 OBD Diagnostic Trouble Codes(DTCs)

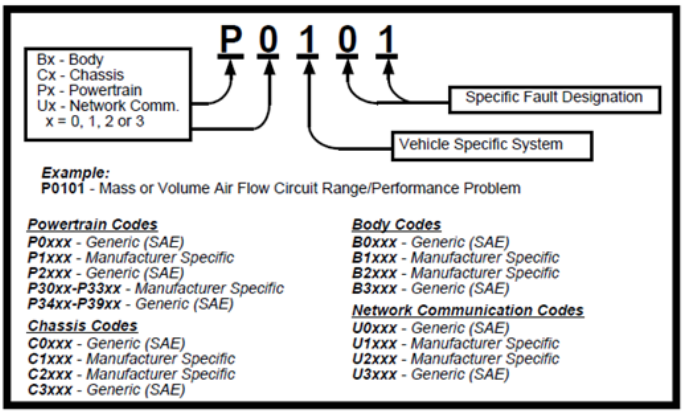
Diagnostic Trouble Codes are how OBDII identifies and communicates to you with the on board computer. When the computer recognizes and identifies a problem, a DTC for the fault is stored in its memory. These codes are intended to help the user to determine the root cause of the problem.
These **OBDII DTC** codes are made up of:

- The **1st** character in the DTC indicates a letter which identifies the "main system" where the fault occurred (Powertrain, Body, Chassis or Network)
- The **2nd** character is a numerical digit which identifies "Generic or Manufacturer Specific"
- The **3rd** character is also a numerical digit which identifies the specific systems or sub-systems where the problem is located.
- The **4th** and **5th** characters are also numerical digits which identifies the section of the system that is malfunctioning.

✓ DTCs are used to help determine the cause of a problem or problems with a vehicle.

❒ DTCs consist of a five-digit alphanumeric code.

❒ The DTCs format and general code types are shown below.



Within each category (Power train, Chassis, Body and Network) of DTCs there are assigned ranges for different vehicle systems.

Lower	Upper	Assigned DTC System
P0000	P00FF	Fuel Air Metering Auxiliary Emission Controls
P0100	P02FF	Fuel Air Metering
P0300	P03FF	Ignition System or Misfire
P0400	P04FF	Auxiliary Emission Controls
P0500	P05FF	Vehicle Speed Idle Control Auxiliary Inputs
P0600	P06FF	Computer and Auxiliary Outputs
P0700	P09FF	Transmission
P0A00	P0AFF	Hybrid Propulsion
P1000	P10FF	Manufacturer Control Fuel & Air Metering, Auxiliary Emission Controls
P1100	P12FF	Manufacturer Control Fuel & Air Metering
P1300	P13FF	Manufacturer Control Ignition System or Misfire
P1400	P14FF	Manufacturer Control Auxiliary emission Controls
P1500	P15FF	Manufacturer Cntrl Veh.Spd. Idle Speed Control Auxiliary Inputs

Lower	Upper	Assigned DTC System
P1600	P16FF	Manufacturer Control Auxiliary Inputs Auxiliary Outputs
P1700	P19FF	Manufacturer Control Transmission
P2000	P22FF	Fuel Air Metering Auxiliary emission Controls
P2300	P23FF	Ignition System or Misfire
P2400	P24FF	Auxiliary Emission Controls
P2500	P25FF	Auxiliary Inputs
P2600	P26FF	Computer and Auxiliary Outputs
P2700	P27FF	Transmission
P2900	P32FF	Fuel Air Metering Auxiliary Emission Controls
P3300	P33FF	Ignition System
P3400	P34FF	Cylinder Deactivation
U0000	U00FF	Network Electrical
U0100	U02FF	Network Communication
U0300	U03FF	Network Software
U0400	U04FF	Network Data

✓ J2012 and ISO 15031-6 are standards for all DTCs, established by the SAE, International Organization for Standardization (ISO) and other governing bodies.

- ❒ Codes and definitions assigned by these specifications are known as Generic OBD II codes.
- ❒ OBD II requires compliance to these standards for all cars, light trucks, APVs, MPVs, and SUVs sold in the United States.
- ❒ Codes not reserved by the SAE are reserved for the manufacturer and referred to as Manufacturer Specific Codes.

2 Using The Scan Tool

2.1 -The Scan Tool

Figure 1

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2.2 Display Menu:

1.  SCAN CAR
   - ➔  READ DTCs
   - ➔  ERASE DTCs
   - ➔  LIVE DATA
   - ➔  FREEZE FRAME
   - ➔  MIL STATUS (Malfunction Indicator Lamp)
   - ➔  I/M READINESS
   - ➔  VEHICLE INFORMATION

2.  LAST SCAN
   - ➔  LAST DTCS
   - ➔  LAST FREEZE FRAME
   - ➔  LAST MIL STATUS
   - ➔  LAST I/M Readiness
   - ➔  LAST VEHICLE INFORMATION

3.  SELECT M.F(SELECT MANUFACTORY)
4.  SETTING
   - ➔  Adjustments
   - ➔  About

 Page DOWN

 Page UP

 Selects Designation

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2.3 -Keypad Functions:

Power ON or OFF button

YES button to confirm selection

NO button to cancel this operation and Return previous menu

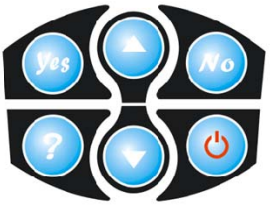

Figure 2

Help button for abbreviation query.
Suggestion: more help button for higher word efficiency While Indecisive indication.

Page Up button for menu roll up

Page Down button for menu roll down

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2.4-Display Functions:

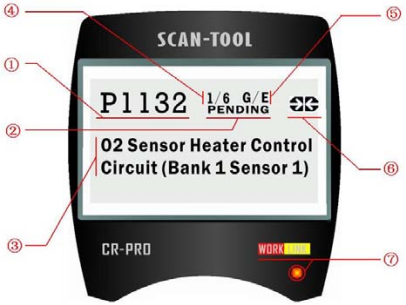

Figure 3

① **Diagnostic Trouble Codes Display Area.**
When the DTC reader found a fault code in the PCM, it will display here. Each fault is assigned a code number that is specific to the fault.

② **PENDING Icon:**
Indicates the currently display DTC is a "Pending" Code.

③ **DTC Definitions:**
Information on DTC definitions, Freeze Frame data and test messages are displayed here.

④ **DTC Number Sequence:**
The DTC reader assigns a code sequence number to each DTC found in the vehicle's PCM. The sequence will start from 1. This number will indicate which code is currently displayed. / **DTC Enumerator** Indicates the total number of codes retrieved from the vehicle's computer.

⑤ **G/E instruction:**
Generic DTC / Enhanced DTC

⑥ **Link Icon:**
Indicates whether that the DTC Reader is communicating with the vehicle's computer or not.

⑦ **LED instruction:**
Color changing display to indicate the Scan Tool system status.
RED-SYSTEM Working
YELLOW- Establishing a communication with the vehicle and PENDING Code

2.5-Getting Started:

Before you use Scan Tool on the vehicle, please ensure that mechanical problems such as low oil level, damaged hoses, wiring or electrical connections are fixed FIRST. They may cause a fault code to set.

The following Areas need to be checked before starting any test:

- The levels of engine oil, power steering fluid, transmission fluid (if auto transmission), engine coolant and other fluids must be at proper level. Top up if necessary.
- Check the condition of air hoses and the air filter must be cleaned. Replace if necessary.
- Make sure the timing belts are in good conditions and properly tensioned.
- Make sure the spark plugs are cleaned and in good condition. Check for loose, damaged, disconnected or missing plug cables.
- Make sure that all mechanical linkages to the engine sensors (throttle, gearshift position, transmission, etc) are secure and properly connected. Refer to Service Manuals for locations.
- Check all electrical wirings and harnesses for proper connections and condition of its insulation.
- Check all rubber hoses (radiator) and steel hoses (vacuum and fuel) for leaks, cracks, blockage or other damages.
- Make sure the engine is mechanically sound. Do a compression check, engine vacuum check, timing check, etc.
- Always refer to the manufacturer's Service Manual if you are not sure of the repair procedures.

2.6-Settings: Adjustments

To enter the MENU Mode:

1、 Once the Scan Tool is powered up through the DLC connection, the first the screen will light. The second , Press Button within two seconds, the wake up screen will display as below: (**Figure 4)**

Figure 4

2、 After a few seconds, it will switch to: "carmaker select": (**Figure 5)**

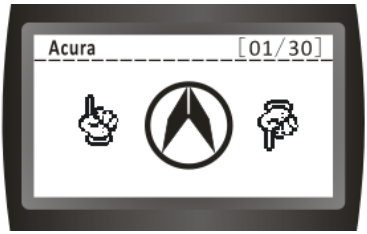

Figure 5

3,Press OR button, the screen will change to: "Scan function": (**Figure 6)**

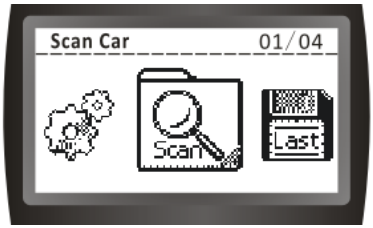

Figure 6

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4 、 Press  button, the screen will change to: " System setting" (**Figure 7)**

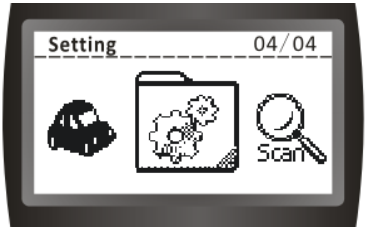

Figure 7

5、 Press  button, the screen will change to: "contrast adjust ion" (**Figure 8)**

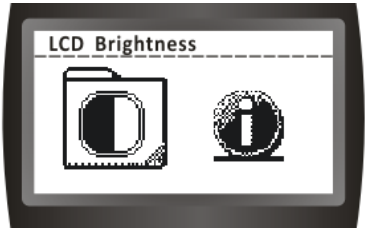

Figure 8

6、 Press  button, the screen will change to: (**Figure 9)**

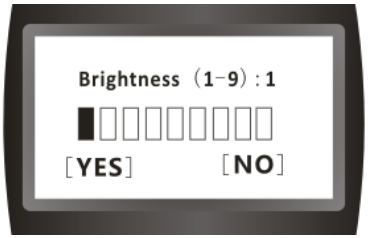

Figure 9

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7、 Press  or  button, button to increase or decrease the Brightness ranges from **1** to **9.**

8、Once the brightness adjustment had been selected to your desired setting, press YES button to exit to the main Menu.

9、To exit totally, press  button, Exit Menu.

2.7-About

Enter the Setting Menu, (**Figure 10)**

Press  button.

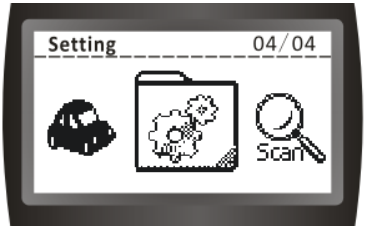

Figure 10

The screen will change to: (**Figure 11)**

Press  or  button :

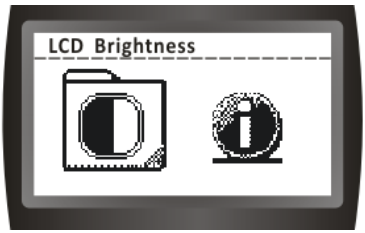

Figure 11

The screen will change to: (**Figure 12)**

Press  button.

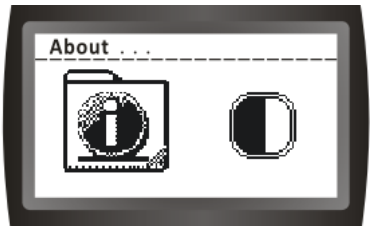

Figure 12

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The screen will change to: (**Figure 13)**

SW: Scan tool Software Number
HW: Scan tool Hardware Number
SN: Scan tool Serial Number
DTC Loaded: DTC Loaded quantity

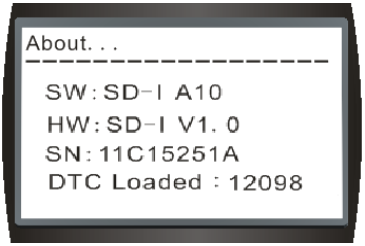

Figure 13

To exit totally, press  button, Exit Menu.

2.8-Malfunction Indicator Lamp (MIL):

When the vehicle on board computer detects a problem in the emission related systems or components, its diagnostic program will assign a fault code (DTC) and store it in its memory. It also records a "Freeze Frame" of the conditions present when the fault was found and set the malfunction indicator lamp (MIL) alight. Some faults require detection for two trips in a row before the MIL is turned on.

Three typical examples of MIL are shown below:

Definition of Trip

'A Trip' is define as a Key-ON, Key-OFF event in which the powertrain control module (PCM) detects the following:

- Engine coolant temperature should exceed 70°C
- Engine coolant temperature should change more than 20°C after starting the engine.
- Engine speed should go over 400 RPM.

When the powertain control module (PCM) detects a fault during the 1st trip, the DTC and the corresponding 'Freeze Frame' data are stored in the PCM's memory. The MIL will not light up until the fault is again detected during the 2nd trip. Certain DTCs are capable of turning the MIL on or blinking during the first trip.

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3 Vehicle Diagnostic

3.1 SCAN CAR

When everything had been confirmed and checked as mentioned in **Getting Started**, the testing operation can be carried out.

1. Locate the vehicle Diagnostic Link Connector (DLC) and make sure that the ignition switch is in OFF position. (**Figure 14)**

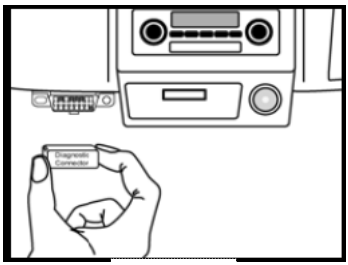
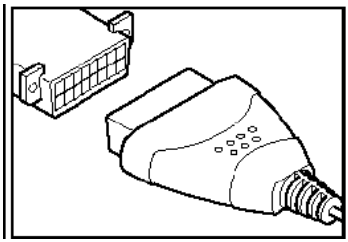


Figure 14



2. C onnect the Scan Tool cable connector to the vehicle's DLC. (**Figure 15)**
   - If problem of connecting, rotate it to 180° and try again.

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3. When the connection has been established, Press button, the Scan tool will light up and it will display as below: (**Figure 16)**

Figure 16

4. After a few seconds, it will switch to: (**Figure 17)**

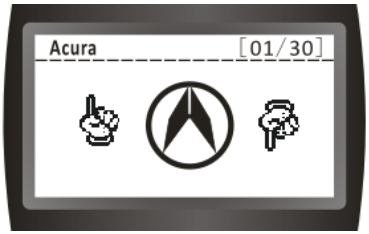

Figure 17

5.If the vehicle Diagnostic Protocol is OBD-II/EOBD-II，But the DTC Code **is MANUFACTORY**，Please press UP or DN button，then press yes , the screen will change to: (**Figure 18)**

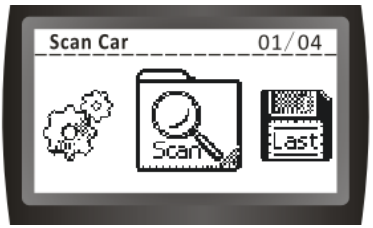

Figure 18

Otherwise Press NO jump to Select MF

6. Turn the ignition on.
DO NOT start the engine. (**Figure 19)**

Figure 19

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7. Press the button once, the Scan tool will automatically starts to Link up to the vehicle's computer and search which type of communication protocol it is using. Once the Scan tool identifies the computer's communications protocol, a communication Link is established.
   The protocol type will be shown on the LCD display: (**Figure 20)**

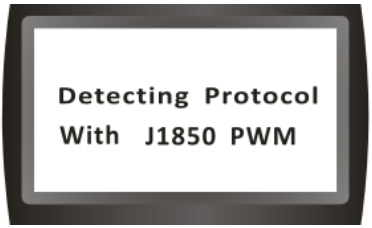

Figure 20

8. After a few seconds, the screen will change to: wait the Scan Tool will retrieve and display any Diagnostic Trouble Codes, Freeze Frame data Live Data....from the vehicles computer memory. (**Figure 21)**

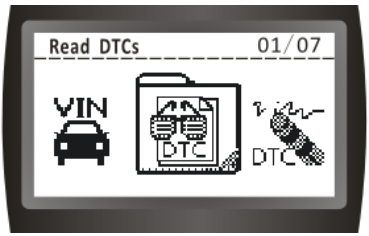

Figure 21

9. If the Scan tool fails to link up with the vehicle's computer, it will show a message as displayed on the LCD screen: (**Figure 22)**

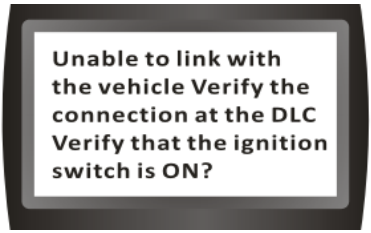

Figure 22

Cause:
1. DLC invalid link
2. Car Key is not on
3. The car diagnostic protocol is not international standard.

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3.1.1-1)READ DTCs

✓ The ***READ DTCs*** function allows the Scan Tool to read the DTCs from the vehicle's control modules. DTCs are used to help determine the cause of a problem or problems with a vehicle. These codes cause the control module to illuminate the malfunction indicator lamp (MIL) when emission-related or driveability fault occurs. MIL is also known as service engine soon or check engine lamp.

✓ ***READ DTCs*** can be done with the key on engine off (KOEO) or with the key on engine running (KOER).

Press  button the screen will change to: (**Figure 23)**

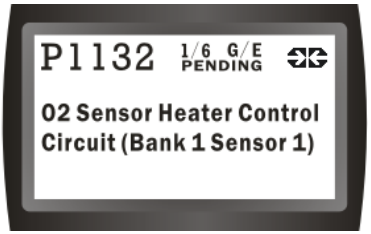

Figure 23

Press  button, View more help information: (**Figure 24)**

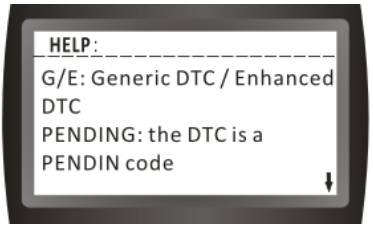

Figure 24

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3.1.2-2) ERASE DTCs

The ***ERASE DTCs*** function deletes DTCs and ***I/M Readiness*** data from vehicle's control module(s). Perform this function with KOEO. **Do not start the engine.**

✓ The ***ERASE DTCs*** function may also erase ***View Freeze Data.....*** esults depending on vehicle.

✓ The ***ERASE DTCs*** function sets monitors to ***inc***.

Back to the Previous Menu, Select Erase DTCs: (**Figure 25)**

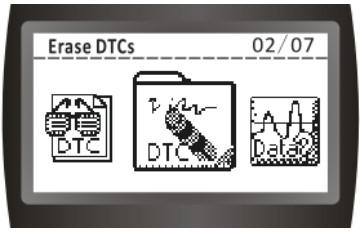

Figure 25

Press button the screen will change to: (**Figure 26)**

Erase DTC Press YES, Otherwise Press NO

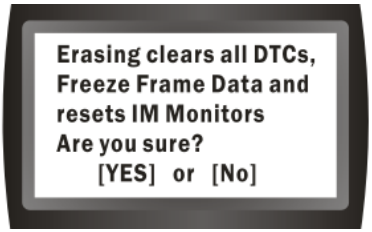

Figure 26

Press button the screen will change to: (**Figure 27)**

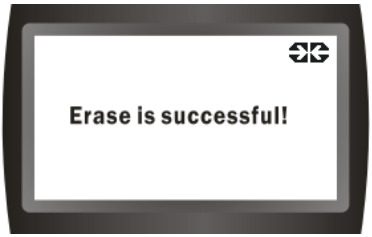

Figure 27

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3.1.3-3) LIVE DATA

The ***LIVE DATA*** function allows real time viewing of the vehicles computer module's PID data. As the computer monitors the vehicle, information is simultaneously transmitted to scan tool.

Back to the Previous Menu, Select Live Data: (**Figure 28)**

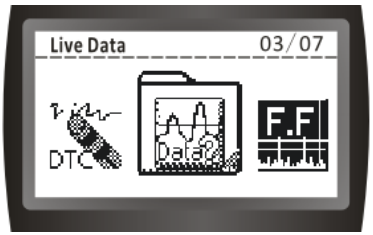

Figure 28

Press button the screen will change to: (**Figure 29)**

Use the and arrow keys to view other sensors.

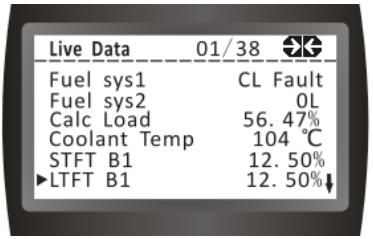

Figure 29

Press button, View more Help information: (**Figure 30)**

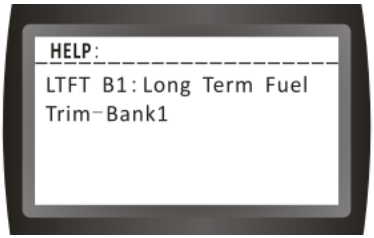

Figure 30

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3.1.3.1-OBD-II Generic Operational Data Items

Mass Air Flow (Grams/Sec) Range: **0 to 105 gr/sec**
High Perf. Vehicles: 0 to 255 gr/sec
Mass air flow sensor input is used by the ECM to calculate fuel delivery. As the air flow increases, the fuel delivery must also increase. Displayed in grams per second.

Calculated Load Value Range: **0% to 100%**
An indication of the current airflow divided by peak airflow, where peak airflow is corrected for altitude, if available. This value is not engine specific. It gives the service technician an indication of the percent of engine capacity being used (with a full load as 100%).

Commanded Secondary Air Status
Commanded Secondary Air provided to the exhaust system.

Engine Coolant Temperature Range: **-40 C to 215 C**
The temperature of the vehicle coolant is used to determine when to transition into closed loop and to calculate spark advance during cold starts. The PCM converts the voltage from the sensor to a temperature.

Engine RPM - Engine Speed reading displayed in revolutions per minute.

Fuel Pressure (Gage) Range: **0 to 765 kPaG**
Fuel pressure of the fuel delivery system.

Fuel System Status-Information describing the operation of the fuel control.

Open loop - Operating condition during engine warm up/idle in which the fuel mixture isn't being corrected to compensate for a rich/lean condition.

Closed Loop - Operating condition in which the fuel mixture is being corrected for a rich/lean condition.

OL Drive - Vehicle in Open Loop due to driving conditions (power enrichment, deceleration).

OL Fault - Vehicle in Open Loop due to a detected system fault.

CL O2 Fault - Vehicle in Closed Loop, but a fault with at least one oxygen sensor - may be using simple oxygen sensor for fuel control.

Ignition Timing Advance Range: **-64 to 63.5**
The relationship between ignition timing and top dead center, displayed in crankshaft degrees.

3.1.3.2-OBD-II GENERIC OPERATIONAL DATA ITEMS (CONT.)

Intake Air Temperature Range: -40 C to 215 C
Temperature of the air drawn through a cleaner and distributed to each cylinder for use in combustion.

Intake Manifold Pressure Range: 10 to 105 kPa, or 0 to 5 Volts
The manifold absolute pressure displayed in kilopascals or volts. A low reading will indicate that the pressure is low (vacuum is high) and a high reading will indicate that the pressure is high (vacuum is low).

Long Term Fuel Trim (Bank 1 / Bank 2)
Long Term adjustments to the Bank 1 fuel calibration schedule which compensate for vehicle differences and gradual changes that occur over time. Range: -100.00% to 99.92% (-100% indicating a maximum lean condition, 99.92% indicating a maximum rich condition, and 0% indicating no adjustment).

OBD-II Require
Requirement level for the On Board Diagnostics designed for the vehicle.

OBD-II (CARB) - Vehicle designed with OBD requirements for California Air Resource Board OBD-II.

OBD (Fed EPA) - Vehicle designed with OBD requirements for Federal EPA OBD.

OBD and OBD-II - Vehicle designed with OBD requirements for OBD and OBD-II.

OBD-I - Vehicle designed with OBD requirements for OBD-I.

Not Intended - Vehicle not intended to meet any OBD requirements.

Oxygen Sensor
The detection of Oxygen (O2) content in the exhaust gases. The sensor readings are used by the ECM to help calculate the air-fuel mixture to maintain proper vehicle performance.

Short Term Fuel Trim (Bank 1/2)
Dynamic or instantaneous adjustments to the Bank 1 base fuel schedule. Range: -100.00% to 99.92% (-100% indicating a maximum lean condition, 99.92% indicating a maximum rich condition, and 0% indicating no adjustment).
Vehicle Speed (MPH) - Sensor reading displayed in miles per hour.

3.1.4-4) FREEZE FRAME

When an emission-related fault occurs, certain vehicle conditions are recorded by the on-board computer. This information is referred to as Freeze frame data. ***FREEZE FRAME*** is a snapshot of the operating conditions at the time of an emission-related fault.

- ✓ ***FREEZE FRAME*** can be overwritten by faults with a higher priority.
- ✓ If codes were erased, ***FREEZE FRAME*** may not be stored in vehicle memory depending on vehicle.

Back to the Previous Menu, Select Freeze Frame: (**Figure 31)**

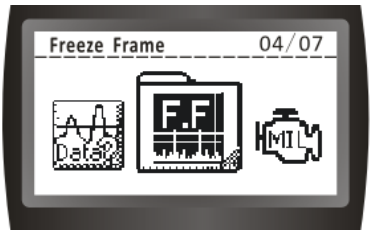

Figure 31

Press button the screen will change to:

Use the and arrow keys to view other sensors. (**Figure 32)**

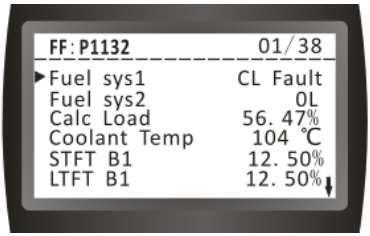

Figure 32

Press button, View more help information: (**Figure 33)**

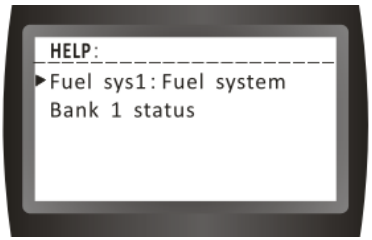

Figure 33

3.1.5-5)MIL STATUS

Back to the Previous Menu, Select MIL Status: (**Figure 34)**

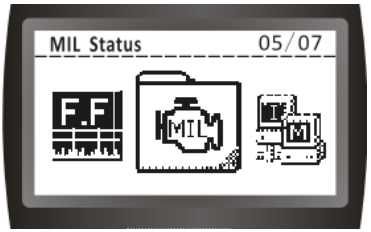

Figure 34

Press  button the screen will change to: (**Figure 35)**

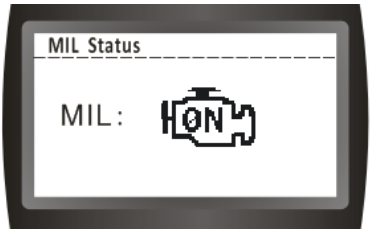

Figure 35

If the system is normal. the screen will change to: (**Figure 36)**

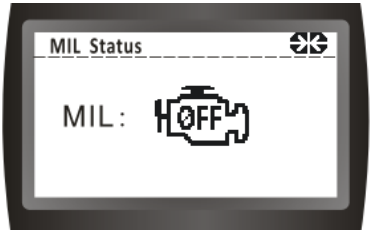

Figure 36

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3.1.6-6)I/M Readiness

The ***I/M Readiness*** (Inspection / Maintenance) function is used to view a **snapshot** of the operations for the emission system on OBD II vehicles.

- ✓ I/M Readiness is a very useful function. To guarantee no faults exist make sure all monitors are ok or n/a and no DTC's exist.
- ✓ Refer to the vehicles service manual for the drive cycle operation.
- ✓ During normal driving conditions, the vehicle's computer scans the emission system. After a specific amount of drive time (each monitor has specific driving conditions and time required), the computer's monitors decide if the vehicles emission system is working correctly or not as well as detecting out of range values. When the monitor's status is:
  - **Has Run -** vehicle was driven enough to complete the onitor.
  - **Has Not Run -** vehicle was not driven enough to complete the monitor.
  - **Don't support-** vehicle does not support that monitor.
- ✓ Depending on vehicle, disconnecting or a discharged battery may erase DTCs and clear monitor status.
- ✓ Monitors may be cleared by:
  - ❒ Erasing codes
  - ❒ Vehicle control modules losing power
- ✓ ***I/M Readiness*** can be done with the KOER or KOEO.

Abbreviations and names for OBD II Monitors supported by the Scan Tool are shown below. They are required by the United States Environmental Protection Agency (EPA). Not all monitors are supported by all vehicles.

Abbreviated Name	Expanded Name
- **MIS**	**Misfire Monitor**
- **FUE**	**Fuel System Monitor**
- **CCM**	**Comprehensive Components Monitor**
- **CAT**	**Catalyst Monitor**
- **HCA**	**Heated Catalyst Monitor**
- **EVA**	**Evaporative System Monitor**
- **AIR**	**Secondary Air System Monitor**
- **ACR**	**Air Conditioning Refrigerant Monitor**
- **O2S**	**Oxygen Sensor Monitor**
- **HTR**	**Oxygen Sensor Heater Monitor**
- **EGR**	**Exhaust Gas Recirculation System Monitor**

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Back to the Previous Menu, Select I/M Readiness: (**Figure 37**)

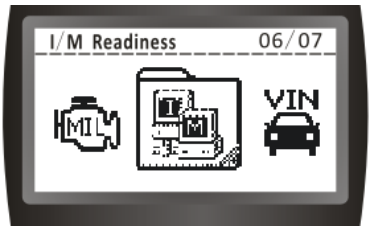

Figure 37

Press button the screen will change to: (**Figure 38**)

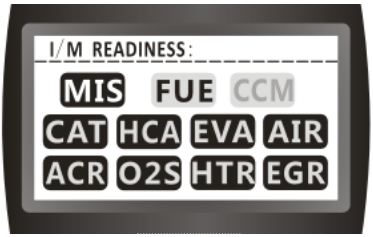

Figure 38

Press button, View more help information: (**Figure 39**)

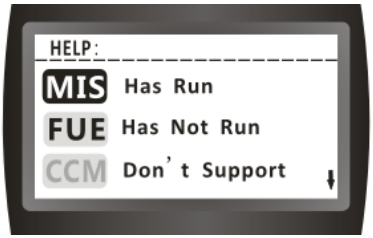

Figure 39

Use the and arrow keys

To view more help: (**Figure 40**)

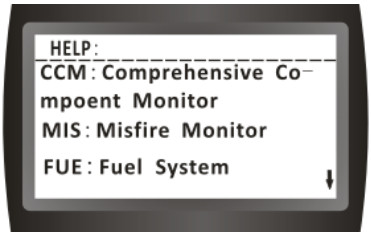

Figure 40

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3.1.7-7) VEHICLE INFORMATION (VIN)

The ***Vehicle Info*** function allows the Scan Tool to request the vehicle's VIN number, calibration ID(s) which identifies software version in vehicle control module(s), and calibration verification numbers (CVN(s).)

- ✓ ***Vehicle Info*** function applies to model year 2000 and newer OBD II compliant vehicles.
- ✓ The Scan Tool cannot verify if data is correct for scanned vehicles.
- ✓ CVNs are calculated values required by OBD II regulations.
- ✓ The CVN calculation may take several minutes.
- ✓ CVNs are reported to determine if emission-related calibrations have been changed. Multiple CVNs may be reported for a control module.

Back to the Previous Menu, Select Vehicle info: (**Figure 41)**

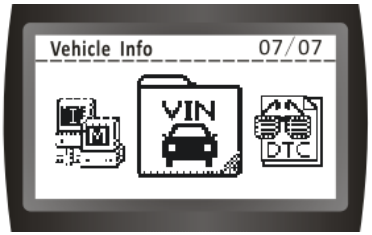

Figure 41

Press  button the screen will change to: Vehicle info(**Figure 42)**

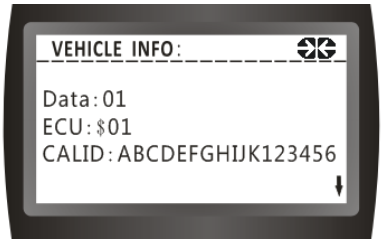

Figure 42

Use the  and  arrow keys

to View more information: (**Figure43)**

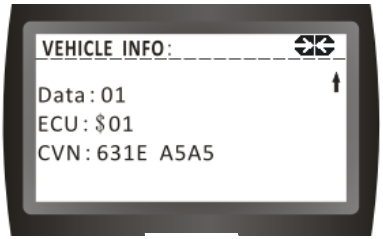

Figure 43

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3.2 LAST SCAN:

The Scan Tool auto save the last test communication mode and car model, which will simply use for the next test until changing.
The Scan Tool also auto save last test course to the ROM of Scan Tool until next test covering, which could easy review the history data before next test

Auto saving items:

- Last DTCs
- Last Freeze Frame
- Last MIL Status
- Last Readiness
- Last Vehicle info

Back to Main Menu, Select LAST SCAN: (**Figure 44)**

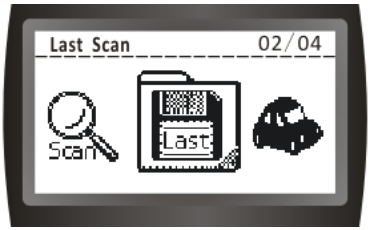

Figure 44

Press  button the screen will change to:

Use the  and  arrow keys to Select. (**Figure 45)**

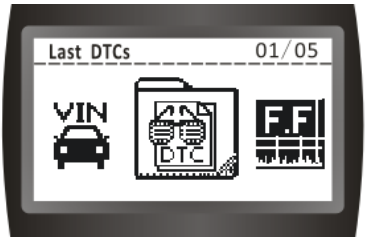

Figure 45

Or Last Freeze Frame (**Figure 46)**

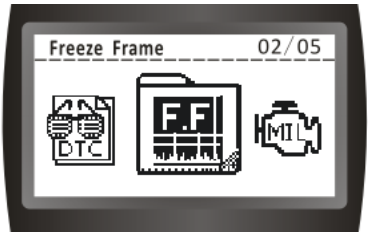

Figure 46

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Or Last MIL Status: (**Figure 47**)

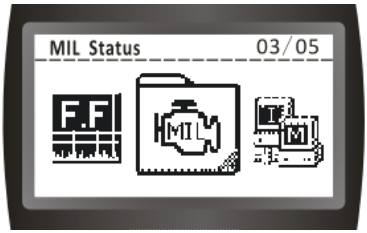

Figure 47

Or Last Readiness: (**Figure 48**)

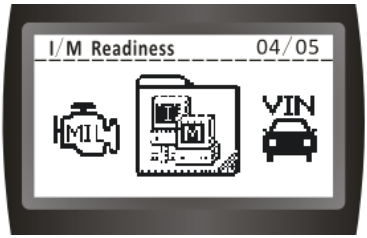

Figure 48

Or Last Vehicle info: (**Figure 49**)

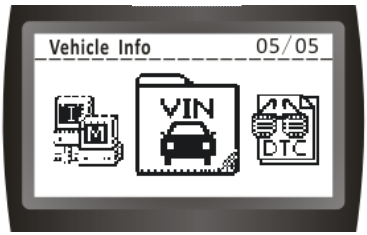

Figure 49

To View more information.

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3.3-Select M.F (SELECT MANUFACTORY)

Manufacturer controlled codes (non-uniform DTCs)
Areas within each alpha designator have been made available for manufacturer-controlled DTCs. These are fault codes that will not generally be used by a majority of the manufacturers due to basic system differences, implementation differences, or diagnostic strategy differences. Each vehicle manufacturer or supplier who designs and specifies diagnostic algorithms, software, and diagnostic trouble codes are strongly encouraged to remain consistent across their product line when assigning codes in the manufacturer controlled area. For powertrain codes, the same groupings should be used as in the ISO /SAE controlled area, i.e. 100's and 200's for fuel and air metering, 300's for ignition system or misfire, etc.
Code groupings for non-powertrain codes will be specified at a later date.
While each manufacturer has the ability to define the controlled DTCs to meet their specific controller algorithms, all DTC words shall meet ISO 15031-2.

Exact car Selection help more help info.

To enter the MENU Mode:
1.

Once the Scan Tool is powered up through the DLC connection, Press .

Button, the wake up

screen will display as below: (**Figure 50)**

Figure 50

After a few seconds, it will switch to:

Use the  and  arrow keys

to Select. (**Figure 51)**

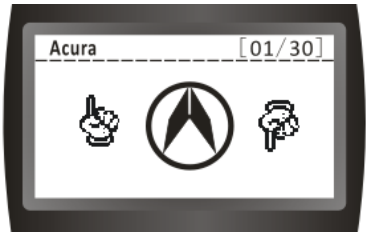

Figure 51

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Back to Main Menu, Select M.F (**Figure 52)**

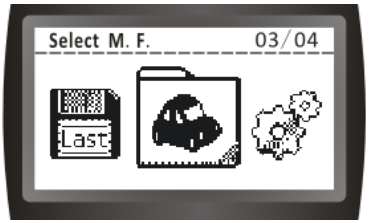

Figure 52

Press button the screen will change to:

Use the and arrow keys to Select. (**Figure 53)**

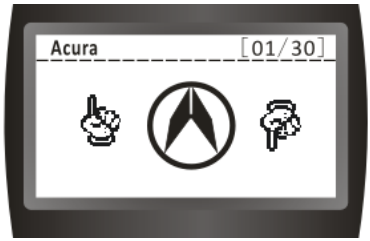

Figure 53

3.3.1-SUPPORT MANUFACTORY

[0]- Generic
[1]- Acura
[2]- Alfa Romeo
[3]- Audi
[4]- BMW
[5]- Chrysler
[6]- Ford
[7]- Ford Diesel
[8]- Geo
[9]- GM
[10]- Honda
[11]- Hyundai
[12]- Infiniti
[13]- Isuzu
[14]- Jaguar
[15]- Kia
[16]- Land Rover
[17]- Lexus
[18]- Mazda
[19]- Mercedes
[20]- Mitsubishi
[21]- Nissan
[22]- Porsche
[23]- Saab
[24]- Saturn
[25]- Subaru
[26]- Suzuki
[27]- Toyota
[28]- Volkswagen
[29]- Volvo
[30]- Others

Reference Appendix A–SUPPORT MANUFACTORY VEHICLE（part）

4 Appendix

4.1 Appendix A – PID Definitions

Global PID Definitions

All global parameter identification (PID) data listed were verified on actual vehicles to guarantee accuracy. PID definitions were obtained from reliable sources and are accurate at time of printing. It is possible that some newer vehicles may contain data different from what is listed. Always refer to vehicle service manual for manufacturer specific PIDs.

Remember; always refer the applicable service manual for detailed diagnostic procedures when troubleshooting PID values.

Types of Data Parameters

INPUT: These data parameters are obtained from sensor circuit outputs. Sensor circuit outputs are inputs to the vehicles PCM. For example, if oxygen sensor circuit was generating a 400mV signal, then the code reader would read O2S (v).40.

OUTPUT: These data parameters are outputs or commands that come directly from control module(s). For example, the ignition spark advance is controlled by PCM, on most vehicles, monitoring this PID shows spark output from PCM.

CALCULATED VALUE: These data parameters are calculated after analyzing various inputs to the vehicles control module(s). For example, the engine load. The PCM calculates this from sensor inputs and displays in a percentage.

PCM VALUE: Information that is stored in the control module(s) memory and determined to be useful to service technician. An example of this is TROUBLE CODE values, the DTC that caused a freeze frame capture.

NOTE: Several different causes can have the same parameter indication. For information on diagnostics consult applicable service anuals.

NOTE: The Scan Tool **only** displays the PID's the vehicle supports.

PID Definitions

Global Data Parameter List:

ABS FRP
Absolute Fuel Rail Pressure

ABS LOAD
Absolute Load Value

ABSLT TPS
Absolute Throttle Position

ACC POS x
Accelerator Position x

BARO PRS
Barometric Pressure

CALC LOAD
Calculated Engine Load

CAT TEMP xy
Cataltic Converter Temperature Bank x, Sensor y

CLR DST
Distance Since Codes Cleared

CLR TIM
Time Since Clear Code

CMD EQ RAT
Commanded Equivalence Ratio

COOLANT
Engine Coolant

EGR CMD
Commanded Exhaust Gas Recirculation

EGR ERR
Exhaust Gas Recirculation Error

ENG RUN
Engine Run Time

ENGINE
Engine Speed

EQ RAT
Oxygen Sensor Equivalence Ratio

EVAP REQ
Commanded Evaporative Emission System Purge (0-100%)

EVAP VP
Evaporative Emission System Vapor Pressure

FUEL LVL
Fuel Level

FUEL PRES
Fuel System Pressure

FUEL SYS x
Fuel System x Loop Status

IAT
Intake Air Temperature

IGN ADV
Ignition Advance

LT FTRM x
Bank x Long Term Air To Fuel Ratio Correction Factor

MAF
Mass Air Flow Sensor

MAP
Manifold Absolute Pressure

MIL DIST
Distance Since Malfunction Indicator Lamp Came On

MIL STATUS
Malfunction Indicator Lamp Light Status

MIL TIM
Distance Travelled Or Time Since Malfunction Indicator Lamp Was Activated

O2S
O2 Sensor Output

OBD2 STAT
On Board Diagnostics 2 System Type

OUTSID AIR
Outside Air Temperature

PTO STATUS
Power Take Off Status

REL FRP
Relative Fuel Rail Pressure or Vacuum

REL TPS
Relative Or Learned Throttle Position

SECOND AIR
Secondary Air Pump Status

ST FTRM
Short Term Fuel Trim

ST FTRM x
Short Term Fuel Trim Bank x
THR POS x
Throttle Position x
THROT CMD
Throttle Actuator Commanded
TRIPS SNC CLR
Warmups Since Erase Codes

TROUB CODE
Diagnostic Trouble Code That Set Freeze Frame
VEH SPEED
Vehicle Speed
VPWR
Vehicle Power

4.2-Appendix B – Glossary

A/C:
Air Conditioner
A/D:
Analog to Digital
A/F:
Air/Fuel ratio. The proportion of air and fuel delivered to the cylinder for combustion. For example, an A/F ratio of 14:1 denotes 14 times as much air as fuel in the mixture. Ideally the A/F ratio is 14.7:1.
ABS:
Anti-lock Brake System
A/C Clutch Relay:
The PCM uses this relay to energize the A/C clutch, turning the A/C compressor on or off.
A/C Pressure Sensor:
Measures air conditioning refrigerant pressure and sends a voltage signal to the PCM.
A/C Pressure Switch:
A mechanical switch connected to the A/C refrigerant line. The switch is activated (sending a signal to the PCM) when the A/C refrigerant pressure becomes too low or high.
Actuator:
Actuators such as relays, solenoids, and motors allow the PCM to control the operation of vehicle systems.
Air Injection Reaction (AIR) System:
An emission control system operated by the PCM. During cold starts, an air pump injects outside air into the exhaust manifold to help burn hot exhaust gases. This reduces pollution and speeds warm-up of oxygen sensors and catalytic converters. After the engine is warm, the air will either be dumped back to the atmosphere (or into the air cleaner assembly) or sent to the catalytic converter.
APP:
Acceleration Pedal Position (Sensor)
ASR:
Acceleration Slip Regulation

AFC:
Air Flow Control
ALDL:
Assembly Line Diagnostic Link. Former name for GM (only) Data Link Connector, the connector socket into which the scan tool plug is inserted; sometimes used to refer to any pre-OBD II computer signals

Bank x:
The standard way of referring to the bank of cylinders containing cylinder #x. In-line engines have only one bank of cylinders. Most commonly used to identify the location of oxygen sensors. See **O2S**, **Sensor x**, **Sensor x**.
BARO:
Barometric Pressure Sensor. See **MAP Sensor**.
BBV:
Brake Boost Vacuum (Sensor
BCM:
Body Control Module
Boost Control Solenoid:
A solenoid that is energized by the PCM, in order to control turbo/supercharger boost pressure.
Brake Switch Signal:
An input signal to the PCM indicating that the brake pedal is being pressed. This signal is typically used to disengage Cruise Control systems and Torque Converter Clutch (TCC) solenoids. See also **TCC**.

CAM:
Camshaft Position Sensor. Sends a frequency signal to the PCM in order to synchronize fuel injector and spark plug firing.
Catalytic Converter:
Designed to reduce exhaust emissions.
CAN:
Controller Area Network
CARB:
California Air Resources Board. Governing body for emissions control in California.
CFI:
Central Fuel Injection (a.k.a. Throttle Body Fuel Injection TBI)
CFI:
Continuous Fuel Injection
CKP REF:
Crankshaft Position Reference.
CKP:
Crankshaft Position. See **CPS**.
CKT:

Circuit
Closed Loop (CL):
A feedback system that uses the O2 Sensor(s) to monitor the results of combustion. Based on the signal(s) from the O2 sensor(s), the PCM modifies the air/fuel mixture to maintain optimum performance with lowest emissions. In closed loop mode, the PCM can fine tune control of a system to achieve an exact result.
CMP:
Camshaft Position Sensor
CO:
Carbon Monoxide; odorless gas produced by incomplete combustion.
Code Scanner:
A device that interfaces with and communicates information via a data link.
Continuous Memory Codes:
See **Pending Codes**.
CPS:
Crankshaft Position Sensor. Sends a frequency signal to the PCM. It is used to reference fuel injector operation and synchronize spark plug firing on distributorless ignition systems (DIS).
CTS:
Coolant Temperature Sensor. A resistance sensor that sends a voltage signal to the PCM indicating the temperature of the coolant. This signal tells the PCM whether the engine is cold or warm.
CVRTD:
Continuous Variable Real Time Damping

D/R:
Drive/Reverse
Data Link Connector (DLC):
Connector providing access and/or control of the vehicle information, operating conditions, and diagnostic information. Vehicles with OBD II use a 16-pin connector located in the passenger compartment.
Data Stream:
The actual data communications sent from the vehicle's PCM to the data connector.
DEPS:
Digital Engine Position Sensor.
Detonation:
See **Knock**.
DI/DIS:
Direct Ignition/Distributorless Ignition System. A system that produces the ignition spark without the use of a distributor.
DPFE:
Differential Pressure Feedback – Exhaust Gas Recirculation Sensor
Driving Cycle - A specific sequence of start-up, warm-up and driving tasks that tests all OBD II functions

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DTC:
Diagnostic Trouble Code. An alphanumeric identifier for a fault condition identified by the On Board Diagnostic System.
Duty Cycle:
A term applied to signals that switch between on and off. Duty cycle is the percentage of time the signal is on. For example, if the signal is on only one fourth of the time, then the duty cycle is 25%. The PCM uses duty cycle type signals to maintain precise control of an actuator.
EBCM:
Electronic Brake Control Module
EBTCM:
Electronic Brake/Traction Control Module
ECM
Engine Control Module *or* Electronic Control Module
ECT:
Engine Coolant Temperature sensor. See **CTS**.
EEPROM or E^2PROM
Electrically Erasable Programmable Read Only Memory
EFE:
Early Fuel Evaporation
EFI:
Electronic Fuel Injection. Any system where a computer controls fuel delivery to the engine by using fuel injectors.
EGR:
Exhaust Gas Recirculation. The PCM uses the EGR system to recirculate exhaust gases back into the intake manifold to reduce emissions. EGR is used only during warm engine cruise conditions.
EMR:
Electronic Module Retard
EOP:
Engine Oil Pressure (Switch)
EOT
Engine Oil Temperature (Sensor)
EPA:
Environmental Protection Agency.
ESC:
Electronic Spark Control. An ignition system function that warns the PCM when knock is detected. The PCM then retards spark timing to eliminate the knocking condition.
EST:
Electronic Spark Timing. An ignition system that allows the PCM to control spark advance timing. The PCM determines optimum spark timing from sensor information — engine speed, throttle position, coolant temperature, engine load, vehicle speed, Park/Neutral switch position, and knock sensor condition.
EVAP:
Evaporative Emissions System.

FC:
Fan Control
Freeze Frame:
A block of memory containing DTCs of the vehicle operating conditions for a specific time.
FTP:
Federal Test Procedure. Strict test of vehicle's emissions.

Fuel Trim:
Engine computer function that keeps the air/fuel mixture as close to the ideal 14.7:1 stoichiometric ratio as possible

Ground (GND):
An electrical conductor used as a common return for an electric circuit(s) and with a relative zero potential (voltage).

Hall Effect Sensor:
Any of a type of sensor utilizing a permanent magnet and a transistorized Hall Effect switch. Hall Effect type sensors may be used to measure speed and position of the crankshaft or camshaft — for spark timing and fuel injector control.
HC:
Hydrocarbons
HEI:
High Energy Ignition
HO2S:
Heated Oxygen Sensor. See **O2S**.
HVAC:
Heating, Ventilation & Air Conditioning (System)

I/M:
Inspection and Maintenance. An emission control program.
IAC:
Idle Air Control. A device mounted on the throttle body which adjusts the amount of air bypassing a closed throttle so that the PCM can control idle speed.
IAT:
Intake Air Temperature (Sensor)
ICM:
Ignition Control Module.
IMRC:
Intake Manifold Runner Control
IPC:
Instrument Panel Cluster
ISC:
Idle Speed Control. A small electric motor mounted on the throttle body and

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controlled by the PCM. The PCM can control idle speed by commanding the ISC to adjust its position.

ISO:
International Organization of Standardization also know as International Standards Organization.

ISO 9141:
International Standards Organization OBDII communication mode, used by Chrysler and most foreign cars. One of three hardware layers defined by OBD II

J1850PWM:
(Pulse Width Modulated) SAE-established OBD II communication standard used by Ford domestic cars and light trucks. One of three hardware layers defined by OBD II

J1850VPW:
(Variable Pulse Width Modulated) SAE-established OBD II communication standard used by GM cars and light trucks. One of three hardware layers defined by OBD II

J1962 – SAE:
established standard for the connector plug layout used for all OBD II scan tools

J1978 – SAE:
established standard for OBD II scan tools

J1979 – SAE:
established standard for diagnostic test modes

J2012 – SAE:
established standard accepted by EPA as the standard test report language for emission tests

KAM:
Keep Alive Memory

Knock Sensor (KS):
Used to detect engine detonation or knock. The sensor contains a piezoelectric element and is threaded into the engine block. Special construction makes the element sensitive only to engine vibrations associated with detonation.

Knock:
Uncontrolled ignition of the air/fuel mixture in the cylinder. Also referred to as detonation or ping. Knock indicates extreme cylinder pressures or "hotspots" which are causing the air/fuel mixture to detonate prematurely.

KOEO:
Key On Engine Off. Turn the ignition key to on, but don't start engine.

KOER:
Key On Engine Running. Start the vehicle.

LCD:
Liquid Crystal Display

LTFT:
Long Term Fuel Trim

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M/T:
Manual transmission or manual transaxle.
MAF:
Mass Air Flow (sensor). Measures the amount and density of air entering the engine and sends a frequency or voltage signal to the PCM. The PCM uses this signal in its fuel delivery calculations.
MAP:
Manifold Absolute Pressure (sensor). Measures intake manifold vacuum or pressure and sends a frequency or voltage signal (depending on sensor type) to the PCM. This gives the PCM information on engine load for control of fuel delivery, spark advance, and EGR flow.
MAT:
Manifold Air Temperature (sensor). A resistance sensor in the intake manifold that sends a voltage signal to the PCM indicating the temperature of the incoming air. The PCM uses this signal for fuel delivery calculations.
MIL:
Malfunction Indicator Lamp. The MIL is most commonly known as the Check Engine or Service Engine Soon light. A required on-board indicator to alert the driver of an emission-related malfunction.
Misfire:
Caused by the air fuel ratio being incorrect.
Monitor:
A test performed by the on-board computer to verify proper operation of emission-related systems or components.
MPFI or MFI:
Multi-Port Fuel Injection. MPFI is a fuel injection system using one (or more) injector(s) for each cylinder. The injectors are mounted in the intake manifold, and fired in groups rather than individually.

NOx:
Oxides of Nitrogen. The system EGR and Camshafts injects exhaust gases into the intake manifold to reduce these gases at the tailpipe.

O2S:
Oxygen Sensor. Generates a voltage of 0.6 to 1.1 volts when the exhaust gas is rich (low oxygen content). The voltage changes to 0.4 volts or less when the exhaust gas is lean (high oxygen content). This sensor only operates after it reaches a temperature of approximately 349ºC (660ºF). O2 sensors are usually found both upstream and downstream of the catalytic converter. The PCM uses these sensors to fine tune the air-fuel ratio and to monitor the efficiency of the catalytic converter. See **Bank 1**, **Bank 2**, **Sensor 1**, **Sensor 2**.
OBD II:
On-Board Diagnostics, Second Generation. OBD II is a U.S. Government-mandated standard requiring all cars and light trucks to have a common data connector, connector location, communication protocol, DTCs

and code definitions. OBD II first appeared on vehicles in late 1994, and is required to be present on all cars sold in the US after January 1, 1996.

ODM:
Output Device Monitor.

Open Loop (OL):
A control system mode that does not monitor the output to verify if the desired results were achieved. A fuel delivery system usually operates in open loop mode during cold engine warm-up because the oxygen sensors are not yet ready to send a signal. Without the oxygen sensor signal, the computer cannot check the actual results of combustion.

PCM:
Powertrain Control Module. The brains of the engine and transmission control systems housed in a metal box with a number of sensors and actuators connected via a wiring harness. Its job is to control fuel delivery, idle speed, spark advance timing, and emission systems. The PCM receives information from sensors, then energizes various actuators to control the engine. The PCM is also known as the ECM (Engine Control Module).

PCV:
Positive Crankcase Ventilation

Pending Codes:
Also referred to as Continuous Memory codes and Maturing Diagnostic Trouble Codes. Pending Codes may be set by emission related powertrain components and systems. If the fault does not occur after a certain number of drive cycles, the code is erased from memory.

PID:
Parameter Identification. Identifies an address in memory which contains vehicle operating information.

PNP:
Park/Neutral Position. A switch that tells the PCM when the gear shift lever is in the Park or Neutral position. When in Park or Neutral, the PCM operates the engine in an idle mode.

PROM:
Programmable Read-Only Memory. The PROM contains programming information the PCM needs to operate a specific vehicle model/engine combination.

Proprietary Readings:
Parameters shown by on-board computers which are not required by OBD II, but included by manufacturer to assist in trouble-shooting specific vehicles.

PSPS:
Power Steering Pressure Switch

Purge Solenoid:
Controls the flow of fuel vapors from the carbon canister to the intake manifold. The canister collects vapors evaporating from the fuel tank, preventing them from escaping to the atmosphere and causing pollution. During warm engine cruise conditions, the PCM energizes the Purge Solenoid so the trapped vapors

are drawn into the engine and burned.
PTC:
Pending Trouble Code
PWM:
Pulse Width Modulated
PZM:
Platform Zone Module
QDM:
Quad Driver Module
RAM:
Random Access Memory
Relay:
An electromechanical device in which connections in one circuit are switched.
Reluctance Sensor:
A type of sensor typically used to measure crankshaft or camshaft speed and/or position, driveshaft speed, and wheel speed.
ROM:
Read-Only Memory. Permanent programming information stored inside the PCM, containing the information the PCM needs to operate a specific vehicle model/engine combination.
RPM:
Revolutions Per Minute

SAE:
Society of Automotive Engineers.
Scan Tool:
A device that interfaces with and communicates information on a data link.
SDM:
Sensing and Diagnostic Module
Sensor x:
A standard term used to identify the location of oxygen sensors. Sensor 1 is located upstream of the catalytic converter. See **O2S**, **Bank 1**, **Bank 2**.
Sensor:
Any device that reports information to the PCM. The job of the sensor is to convert a parameter such as engine temperature into an electrical signal that the PCM can understand.
SES:
Service Engine Soon dash light, now referred to as MIL
SFI or SEFI:
Sequential Fuel Injection or Sequential Electronic Fuel Injection. A fuel injection system that uses one or more injectors for each cylinder. The injectors are mounted in the intake manifold and are fired individually.
Solenoid:
A device consisting of an electrical coil which when energized, produces a magnetic field in a plunger, which is pulled to a central position. A solenoid may be used as an actuator in a valve or switch.

STFT:
Short Term Fuel Trim.
STS:
Service Throttle Soon

TAC:
Throttle Actuator Control
TBI:
Throttle Body Injection. A fuel injection system having one or more injectors mounted in a centrally located throttle body, as opposed to positioning the injectors close to an intake valve port. TBI is also called Central Fuel Injection (CFI) in some vehicles.
TCC:
Torque Converter Clutch
TCM:
Transmission Control Module
TCS:
Traction Control System for PCM and brakes
TDC:
Top Dead Center. When a piston is at its uppermost position in the cylinder.
TFP:
Transmission Fluid Pressure
TFT:
Transmission Fluid Temperature (Sensor)
Throttle Body:
A device which performs the same function as a carburetor in a fuel injection system. On a throttle body injection (TBI) system, the throttle body is both the air door and the location of the fuel injectors. On port fuel injection systems (PFI, MPFI, SFI, etc.), the throttle body is simply an air door. Fuel is not added until the injectors at each intake port are activated. In each case, the throttle body is attached to the accelerator pedal.
TPS:
Throttle Position Sensor. Potentiometer-type sensor connected to the throttle shaft. Its voltage signal output increases as the throttle is opened. The PCM uses this signal to control many systems such as idle speed, spark advance, fuel delivery, etc.
Traction Assist:
Assist in traction with brakes only.
Trip:
Vehicle operation for a period of time so the systems can be monitored.
TTS:
Transmission Temperature Sensor. A resistance sensor mounted in the transmission housing in contact with the transmission fluid. It sends a voltage signal to the PCM indicating the temperature of the transmission.

VECI:

Vehicle Emission Control Information. A decal located in the engine compartment containing information about the emission control systems found on the vehicle. The VECI is the authoritative source for determining whether a vehicle is OBD II compliant.

VIN:

Vehicle Identification Number. This is the factory-assigned vehicle serial number. This number is stamped on a number of locations throughout the vehicle, but the most prominent location is on top of the dashboard on the driver's side, visible from outside the car. The VIN includes information about the car, including where it was built, body and engine codes, options, and a sequential build number.

VSS:

Vehicle Speed Sensor. Sends a frequency signal to the PCM. The frequency increases as the vehicle moves faster to give the PCM vehicle speed information used to determine shift points, engine load, and cruise control functions.

VTD:

Vehicle Theft Deterrent

Warm-up Cycle:

Warm-up cycle is when the engine coolant temperature rises at least 40 degrees above that at engine start up.

WOT:

Wide-Open Throttle. The vehicle operating condition brought about when the throttle is completely (or nearly) open. The PCM typically delivers extra fuel to the engine and de-energizes the A/C compressor at this time for acceleration purposes. The PCM uses a switch or the TPS to identify the WOT condition.

4.3 -Appendix C –SUPPORT MANUFACTORY VEHICLE（part）

Note: **Specific parameters supported are dependent on; year and make, engine, transmission, options, etc.**

A

Acura 2.3CL
Acura 2.5TL
Acura 3.0CL
Acura 3.2CL
Acura 3.2TL
Acura 3.5RL
Acura Integra
Acura MDX
Acura NSX
Acura RSX
Acura SLX
Acura TSX

Audi A3
Audi A4
Audi A6
Audi A8
Audi A8L Audi All road
Audi Cabriolet
Audi S4
Audi S6
Audi S8
Audi TT

B

BMW 320i
BMW 320iA
BMW 323i
BMW 323Ti
BMW 325Ci
BMW 325i
BMW 330Ci
BMW 330i
BMW 530i
BMW 545i
BMW 745i
BMW 745Li
BMW 760Li
BMW M3
BMW X3
BMW X5
BMW Z3
BMW Z4
Buick Allure Buick LaCrosse
Buick LeSabre
Buick Park Avenue
Buick Rainier
Buick Rendezvous 3.6
Buick Terraza

C

Cadillac Catera
Cadillac CTS
Cadillac DeVille
Cadillac DHS
Cadillac DTS
Cadillac Seville
Cadillac STS
Cadillac XLR

Chevrolet Astro, AWD
Chevrolet Avalanche
Chevrolet Aveo
Chevrolet B7-Chassis
Chevrolet Blazer, 2WD, 4WD
Chevrolet C-Series
Chevrolet C1500, 2WD
Chevrolet C2500 2WD, 08600
Chevrolet C3500, 2WD
Chevrolet Camaro
Chevrolet Cavalier
Chevrolet Cobalt 2.0L, 2.2L
Chevrolet Colorado
Chevrolet Corvette
Chevrolet Equinox
Chevrolet Express, Acces
Chevrolet G2500 Van
Chevrolet Impala
Chevrolet K1500
Chevrolet K2500 O8600
Chevrolet K3500
Chevrolet Lumina
Chevrolet Malibu
Chevrolet MD B7-Chassis
Chevrolet MD C-Series
Chevrolet MD T-Series
Chevrolet MD W4 Series
Chevrolet MD WT5500
Chevrolet Medium Duty
Chevrolet Metro
Chevrolet Monte Carlo

Chevrolet Prizm
Chevrolet S-10 2WD
Chevrolet S10
Chevrolet Silv O8600 GVW
Chevrolet Silv. 2500 HD
Chevrolet Silv. 3500 2WD
Chevrolet Silverado
Chevrolet SSR
Chevrolet Suburban
Chevrolet Tahoe
Chevrolet Tracker
Chevrolet Trailblazer
Chevrolet Uplander
Chevrolet Venture
Chevrolet W4 Series
Chevrolet WT5500
Chrysler 300 Tour. AWD
Chrysler 300 Touring
Chrysler 300M
Chrysler Cirrus
Chrysler Concorde
Chrysler Crossfire
Chrysler Intrepid
Chrysler LHS
Chrysler Neon
Chrysler Pacifica, AWD

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Chrysler Sebring Convertible, Coupe, Sedan
Chrysler Town & Country
Chrysler Voyager

D

Daewoo Lanos
Daewoo Leganza
Daewoo Nubira
Dodge Avenger
Dodge Caravan
Dodge Colt
Dodge Dakota 4X2, 4X4
Dodge Durango 4X2, 4X4
Dodge Grand Caravan
Dodge Intrepid
Dodge Magnum,
AWD Dodge Neon
Dodge Ram 1500 4X2, 4X4
Dodge Ram 2500 4X2, 4X4
Dodge Ram 3500 4X2, 4X4
Dodge Ram SRT-10
Dodge Ram Van 1500, 2500, 3500
Dodge Ram Wagon 1500, 2500, 3500
Dodge Sprinter
Dodge SRT-4
Dodge Stealth
Dodge Stratus, Cuope, Sedan
Dodge Viper

E

Eagle Summit
Eagle Talon

F

Ford Aspire
Ford Club Wagon
Ford Contour
Ford Crown Victoria
Ford E-Super Duty
Ford Econoline, E150, E250
Ford Econoline E350, E450
Ford Escape
Ford Escort
Ford Excursion
Ford Exp Sport Trac
Ford Expedition
Ford Explorer, Sport, Postal
Ford F-150, Heritage, Reg. Cab
Ford F-150 Supr Cab
Ford F-250, Reg. Cab,
Ford F-250 Supr Cab
Ford Five Hundred
Ford Focus
Ford Ford GT
Ford Freestar
Ford Freestyle
Ford Motorhome
Ford Mustang
Ford Ranger
Ford Super Club
Ford Super Van
Ford SuperDuty
Ford Taurus
Ford Thunderbird
Ford Windstar
Ford ZX2

G

Geo Metro
Geo Prizm
Geo Tracker

GM of Canada Firefly
GMC C-Series
GMC C1500
GMC C2500 O8600
GMC C3500
GMC Canyon
GMC Envoy, XL, XUV
GMC Jimmy, 2WD, 4WD
GMC Jimmy 4X2, 4x4
GMC K1500, 4WD
GMC K2500 O8600
GMC K2500 U8600
GMC K3500, 4WD
GMC MD B7-Chassis
GMC MD C-Series
GMC MD T-Series
GMC MD W4 Series
GMC MD WT5500
GMC Medium Duty
GMC P35 Comm

GMC Safari, AWD, RWD
GMC Savana
GMC Sierra
GMC Sierra 2500 HD, 2WD
GMC Sierra 3500 HD, 4WD
GMC Sierra C3 AWD
GMC Sierra Denali
GMC Sierra PHT
GMC Sonoma, 3WD, 4WD
GMC Suburban 2WD, 4WD
GMC Suburban O8600
GMC Suburban U8600
GMC T-Series
GMC W4 Series
GMC WT5500
GMC Yukon, 2WD, 4WD
GMC Yukon Denali
GMC Yukon XL
GMC Yukon XL 2WD
GMC Yukon XL 4WD
GMC Yukon XLDenali

H

Honda Accord
Honda Civic
Honda CR-V
Honda Element
Honda Insight
Honda Odyssey
Honda Passport 2WD
Honda Passport 4WD
Honda Pilot
Honda Prelude
Honda S2000
Hummer H2

Hyundai Accent
Hyundai Elantra
Hyundai Elantra Wagon
Hyundai Santa Fe
Hyundai Sonata
Hyundai Tiburon
Hyundai Tuscon
Hyundai XG300
Hyundai XG350

I

Infiniti FX35
Infiniti FX45
Infiniti G20
Infiniti G20t
Infiniti G35
Infiniti I30
Infiniti I30t
Infiniti I35
Infiniti M45
Infiniti Q45
Infiniti Q45t
Infiniti QX4
Infiniti QX56

Isuzu Amigo
Isuzu Ascender
Isuzu Axiom
Isuzu Hombre
Isuzu Oasis

J

Jaguar S-Type
Jaguar X-Type
Jaguar XJ
Jaguar XK
Jeep Cherokee
Jeep Grand Cherokee
Jeep Liberty
Jeep Liberty 4x2, 4X4
Jeep Wrangler

K

Kia Amanti
Kia Optima
Kia Rio
Kia Rio Cinco
Kia Sedona
Kia Sephia
Kia Sorento
Kia Spectra
Kia Sportage

L

Land Rover Discovery
Land Rover Freelander
Land Rover Range Rover 75
Lexus ES 300
Lexus ES 330
Lexus ES300
Lexus GS 300
Lexus GS 430
Lexus GS300
Lexus GS400
Lexus GX 470
Lexus GX 470
Lexus IS 300
Lexus LS 430
Lexus LS400
Lexus LX 470
Lexus LX450
Lexus LX470
Lexus RX 300
Lexus SC 430
Lexus SC300
Lexus SC400

Lincoln Aviator
Lincoln Blackwood
Lincoln Continental
Lincoln LS
Lincoln Navigator
Lincoln Town Car

M

Mazda 626
Mazda B-2300
Mazda B-2500
Mazda B-3000
Mazda B-4000
Mazda Mazda3
Mazda Mazda6
Mazda Miata
Mazda Miata
Mazda Spd
Mazda Miata MX-5
Mazda Millenia
Mazda MPV
Mazda Protege
Mazda Tribute

Mercedes Benz C200 K
Mercedes Benz C200 KT
Mercedes Benz C240 (203)
Mercedes Benz C32 AMG (203)
Mercedes Benz C320 (203)
Mercedes Benz C43 AMG (202)
Mercedes Benz C55 AMG
Mercedes Benz CL200 K
Mercedes Benz CL230 K
Mercedes Benz CL500 (140)
Mercedes Benz CL500 (215)
Mercedes Benz CL55 AMG (215)
Mercedes Benz CL600 (140)
Mercedes Benz CL600 (215)
Mercedes Benz CL600 (215)
Mercedes Benz CLK320 (208)
Mercedes Benz CLK430 (208)
Mercedes Benz CLK500 (208)
Mercedes Benz CLK55AMG (208)
Mercedes Benz E320 (210)
Mercedes Benz E430 (210)
Mercedes Benz E500 (210)
Mercedes Benz E55 AMG (210)
Mercedes Benz G500 (463)
Mercedes Benz G55 AMG (463)
Mercedes Benz ML320 (163)
Mercedes Benz ML350 (163)
Mercedes Benz ML430 (163)
Mercedes Benz ML500 (163)
Mercedes Benz ML55 AMG (163)
Mercedes Benz S430 (220)
Mercedes Benz S500 (220)
Mercedes Benz S500L
Mercedes Benz S55 AMG (220)
Mercedes Benz S600 (220)
Mercedes Benz S600L
Mercedes Benz SL350
Mercedes Benz SL500 (129)
Mercedes Benz SL55 AMG (129)
Mercedes Benz SL600 (129)
Mercedes Benz SLK200K
Mercedes Benz SLK230 (170)
Mercedes Benz SLK320 (170)
Mercedes Benz SLK320 AMG
Mercedes Benz SLK32AMG (170)
Mercedes Benz SLK350

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Mercury Grand Marquis
Mercury Marauder
Mercury Mariner
Mercury Montego
Mercury Monterey
Mercury Mountaineer
Mercury Mystique
Mercury Sable
Mercury Villager

Mitsubishi 3000GT

Mitsubishi 3000GT Spyder
Mitsubishi Diamante
Mitsubishi Eclipse
Mitsubishi Eclipse Spyder
Mitsubishi Endeavor
Mitsubishi Galant
Mitsubishi Lancer
Mitsubishi Mirage
Mitsubishi Montero
Mitsubishi Montero Sport
Mitsubishi Outlander

N

Nissan 350Z
Nissan Altima
Nissan Frontier
Nissan Maxima
Nissan Murano
Nissan PathfindArmada

Nissan Pathfinder
Nissan Quest
Nissan Sentra
Nissan Titan
Nissan Xterra

O

Oldsmobile Alero
Oldsmobile Aurora
Oldsmobile Bravada

Oldsmobile Cutlass
Oldsmobile Eighty Eight
Oldsmobile Intrigue
Oldsmobile LSS

P

Pontiac Aztek
Pontiac Bonneville
Pontiac Firebird
Pontiac G6
Pontiac Grand Am
Pontiac Grand Prix
Pontiac GTO
Pontiac Montana
Pontiac Montana SV6
Pontiac Pursuit
Pontiac Sunfire
Pontiac Vibe
Pontiac Vibe 1.8L LV6

Porsche 911
Porsche 911 Carrera
Porsche Boxster
Porsche Cayenne

Plymouth Breeze
Plymouth Colt

Plymouth Grand Voyager
Plymouth Neon
Plymouth Prowler
Plymouth Voyager

S

Saab Saab 9-3
Saab Saab 9-5

Saturn Ion, 2.0L, 2.2L
Saturn LS, LW
Saturn Relay
Saturn SC1, SC2

Saturn SL, SC, SW
Saturn SL1, SL2
Saturn SW1, SW2
Saturn VUE

Scion TC
Scion xA

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Scion xB

Subaru Baja
Subaru Forester
Subaru Impreza
Subaru Legacy
Subaru Outback
Subaru SVX

Suzuki Aerio
Suzuki Esteem
Suzuki Forenza
Suzuki Grand Vitara
Suzuki Sidekick
Suzuki Swift
Suzuki Verona
Suzuki Vitara
Suzuki X-90
Suzuki XL-7

T

Toyota 4-Runner
Toyota Avalon
Toyota Camry
Toyota Camry Solara
Toyota Celica
Toyota Corolla
Toyota Echo
Toyota Highlander
Toyota Land Cruiser
Toyota Matrix
Toyota MR2
Toyota MR2 Spyder
Toyota Paseo
Toyota Previa
Toyota Rav4
Toyota Sequoia
Toyota Sienna
Toyota T-100
Toyota Tacoma
Toyota Tercel
Toyota Tundra

V

Volkswagen Beetle
Volkswagen Bora
Volkswagen Eurovan L5
Volkswagen Eurovan VR6
Volkswagen Golf A3
Volkswagen Golf A4
Volkswagen GTI
Volkswagen Jetta A3
Volkswagen Jetta A4
Volkswagen Passat
Volkswagen Touareg
Volvo C70
Volvo S40
Volvo S60
Volvo S80
Volvo V40
Volvo V70
Volvo XC70
Volvo XC90

- Supports ISO, VPW and PWM bus systems as well as can bus systems
- U.S. Models - European - Japanese - Asian - German - Korean:
- Suitable for almost all cars after 1996 .
- GM '96 - Current Year (OBD-II)
- Ford '96 - Current Year (OBD-II)
- Chrysler '96 - Current Year (OBD-II)
- Toyota '96 - Current Year (OBD-II)
- Honda '96 - Current Year (OBD-II)
- NISSAN '96 - Current Year (OBD-II)
-All other - Asian and European '96 - Current Year (OBD-II/EOBD-II)

Note: If communication failed, please confirm use the international standard in SAE or ISO Diagnostic protocol.

4.4-Appendix D –Common OBDII DTC Definitions reference (part):

P0000 No Diagnostic Trouble Codes Found
P0001 Fuel Volume Regulator Control -Circuit Open
P0002 Fuel volume Regulator Control -Circuit Range/Performance
P0003 Fuel Volume Regulator Control -Circuit Low
P0004 Fuel Volume Regulator Control -Circuit High
P0005 Fuel Shut-off Valve -Circuit Open
P0006 Fuel Shut-off Valve -Circuit Low
P0007 Fuel Shut-off Valve -Circuit High
P0008 Engine Position System Performance Bank 1
P0009 Engine Position System Performance Bank 2
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)

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P0052 HO2S Heater Control Circuit High (Bank 2 Sensor 1)
P0056 HO2S Heater Control Circuit (Bank 2 Sensor 2)
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
P0101 Mass or Volume Air Flow Circuit Range/Performance Problem
P0102 Mass or Volume Air Flow Circuit Low Input
P0103 Mass or Volume Air Flow Circuit High Input
P0104 Mass or Volume Air Flow Circuit Intermittent
P0105 Manifold Absolute Pressure/Barometric Pressure Circuit
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
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

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
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 (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)
P0134 O2 Sensor Circuit No Activity Detected (Bank 1 Sensor 1)
P0135 O2 Sensor Heater Circuit (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 (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 (Bank 1 Sensor 3)
P0148 Fuel Delivery Error
P0149 Fuel Timing Error
P0150 O2 Sensor Circuit (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 (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 (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)
P0167 O2 Sensor Heater Circuit (Bank 2 Sensor 3)
P0168 Fuel Temperature Too High
P0169 Incorrect Fuel Composition
P0170 Fuel Trim (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
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
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
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
P0191 Fuel Rail Pressure Sensor Circuit Range/Performance
P0192 Fuel Rail Pressure Sensor Circuit Low In put
P0193 Fuel Rail Pressure Sensor Circuit High Input
P0194 Fuel Rail Pressure Sensor Circuit Intermittent
P0195 Engine Oil Temperature Sensor
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
P0200 Injector Circuit
P0201 Injector Circuit - Cylinder 1
P0202 Injector Circuit - Cylinder 2
P0203 Injector Circuit - Cylinder 3

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P0204 Injector Circuit - Cylinder 4
P0205 Injector Circuit - Cylinder 5
P0206 Injector Circuit - Cylinder 6
P0207 Injector Circuit - Cylinder 7
P0208 Injector Circuit - Cylinder 8
P0209 Injector Circuit - Cylinder 9
P0210 Injector Circuit - Cylinder 10
P0211 Injector Circuit - Cylinder 11
P0212 Injector Circuit - Cylinder 12
P0213 Cold Start Injector 1
P0214 Cold Start Injector 2
P0215 Engine Shutoff Solenoid
P0216 Injector/Injection Timing Control Circuit
P0217 Engine Coolant over Temperature Condition
P0218 Transmission Fluid over Temperature Condition
P0219 Engine over Speed Condition
P0220 Throttle/Pedal Position Sensor/Switch "B" Circuit
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
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
P0230 Fuel Pump Primary Circuit
P0231 Fuel Pump Secondary Circuit Low
P0232 Fuel Pump Secondary Circuit High
P0233 Fuel Pump Secondary Circuit Intermittent
P0234 Turbo/Super Charger Over boost Condition
P0235 Turbo/Super Charger Boost Sensor "A" Circuit
P0236 Turbo/Super Charger Boost Sensor "A" Circuit Range/Performance
P0237 Turbo/Super Charger Boost Sensor "A" Circuit Low
P0238 Turbo/Super Charger Boost Sensor "A" Circuit High
P0239 Turbo/Super Charger Boost Sensor "B" Circuit
P0240 Turbo/Super Charger Boost Sensor "B" Circuit Range/Performance
P0241 Turbo/Super Charger Boost Sensor "B" Circuit Low
P0242 Turbo/Super Charger Boost Sensor "B" Circuit High
P0243 Turbo/Super Charger Wastegate Solenoid "A"
P0244 Turbo/Super Charger Wastegate Solenoid "A" Range/Performance
P0245 Turbo/Super Charger Wastegate Solenoid "A" Low
P0246 Turbo/Super Charger Wastegate Solenoid "A" High
P0247 Turbo/Super Charger Wastegate Solenoid "B"

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P0248 Turbo/Super Charger Wastegate Solenoid "B" Range/Performance
P0249 Turbo/Super Charger Wastegate Solenoid "B" Low
P0250 Turbo/Super Charger Wastegate Solenoid "B" High
P0251 Injection Pump Fuel Metering Control "A" (Cam/rotor/Injector)
P0252 Injection Pump Fuel Metering Control "A" Range/Performance (Cam/Rotor/Injector)
P0253 Injection Pump Fuel Metering Control "A" Low (Cam/Rotor/Injector)
P0254 Injection Pump Fuel Metering Control "A" High (Cam/Rotor/Injector)
P0255 Injection Pump Fuel Metering Control "A" Intermittent (Cam/Rotor/Injector)
P0256 Injection Pump Fuel Metering Control "B" (Cam/Rotor/Injector)
P0257 Injection Pump Fuel Metering Control "B" Range/Performance
P0258 Injection Pump Fuel Metering Control "B" Low (Cam/Rotor/Injector)
P0259 Injection Pump Fuel Metering Control "B" High (Cam/Rotor/Injector)
P0260 Injection Pump Fuel Metering Control "B" Intermittent (Cam/Rotor/Injector)
P0261 Cylinder 1 Injector Circuit Low
P0262 Cylinder 1 Injector Circuit High
P0263 Cylinder 1 Contribution/Balance
P0264 Cylinder 2 Injector Circuit Low
P0265 Cylinder 2 Injector Circuit High
P0266 Cylinder 2 Contribution/Balance
P0267 Cylinder 3 Injector Circuit Low
P0268 Cylinder 3 Injector Circuit High
P0269 Cylinder 4 Contribution/Balance
P0270 Cylinder 4 Injector Circuit Low
P0271 Cylinder 4 Injector Circuit High
P0272 Cylinder 4 Contribution/Balance
P0273 Cylinder 5 Injector Circuit Low
P0274 Cylinder 5 Injector Circuit High
P0275 Cylinder 5 Contribution/Balance
P0276 Cylinder 6Injector Circuit Low
P0277 Cylinder 6 Injector Circuit High
P0278 Cylinder 6 Contribution/Balance
P0279 Cylinder 7 Injector Circuit Low
P0280 Cylinder 7 Injector Circuit High
P0281 Cylinder 7 Contribution/Balance
P0282 Cylinder 8 Injector Circuit Low
P0283 Cylinder 8 Injector Circuit High
P0284 Cylinder 8 Contribution/Balance
P0285 Cylinder 9 Injector Circuit Low
P0286 Cylinder 9 Injector Circuit High
P0287 Cylinder 9 Contribution/Balance
P0288 Cylinder 10 Injector Circuit Low
P0289 Cylinder 10 Injector Circuit High
P0290 Cylinder 10 Contribution/Balance

P0291 Cylinder 11 Injector Circuit Low
P0292 Cylinder 11 Injector Circuit High
P0293 Cylinder 11 Contribution/Balance
P0294 Cylinder 12 Injector Circuit Low
P0295 Cylinder 12 Injector Circuit High
P0296 Cylinder 12 Contribution/Balance
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
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 (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 Input Intermittent (Bank 1 or Single Sensor)
P0330 Knock Sensor 2 Circuit (Bank 2)
P0331 Knock Sensor 2 Circuit Range/Performance (Bank 2)
P0332 Knock Sensor 2 Circuit Low Input (Bank 2)
P0333 Knock Sensor 2 Circuit High Input (Bank 2)
P0334 Knock Sensor 2 Circuit Input Intermittent (Bank 2)
P0335 Crankshaft Position Sensor A Circuit
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 "A" Circuit (Bank 1 or Single Sensor)
P0341 Camshaft Position Sensor "A" Circuit Range/Performance (Bank 1 or Single

Sensor)
P0342 Camshaft Position Sensor "A" Circuit Low Input (Bank 1 or Single Sensor)
P0343 Camshaft Position Sensor "A" Circuit High Input (Bank 1 or Single Sensor)
P0344 Camshaft Position Sensor "A" Circuit Intermittent (Bank 1 or Single Sensor)
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
P0351 Ignition Coil "A" Primary/Secondary Circuit
P0352 Ignition Coil "B" Primary/Secondary Circuit
P0353 Ignition Coil "C" Primary/Secondary Circuit
P0354 Ignition Coil "D" Primary/Secondary Circuit
P0355 Ignition Coil "F" Primary/Secondary Circuit
P0356 Ignition Coil "F" Primary/Secondary Circuit
P0357 Ignition Coil "G" Primary/Secondary Circuit
P0358 Ignition Coil "H" Primary/Secondary Circuit
P0359 Ignition Coil "I" Primary/Secondary Circuit
P0360 Ignition Coil "J" Primary/Secondary Circuit
P0361 Ignition Coil "K" Primary/Secondary Circuit
P0362 Ignition Coil "L" Primary/Secondary Circuit
P0365 Camshaft Position Sensor "B" Circuit (Bank 1)
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"
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 Pulse
P0375 Timing Reference High Resolution Signal "B"
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 "A"
P0381 Glow Plug/Heater Indicator Circuit
P0382 Glow Plug/Heater Circuit "B"
P0385 Crankshaft Position Sensor "B" Circuit
P0386 Crankshaft Position Sensor "B" Circuit Range/Performance
P0387 Crankshaft Position Sensor "B" Circuit Low Input
P0388 Crankshaft Position Sensor "B" Circuit High Input

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P0389 Crankshaft Position Sensor "B" Circuit Intermittent
P0390 Camshaft Position Sensor "B" Circuit
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
P0401 Exhaust Gas Recirculation Flow Insufficient Detected
P0402 Exhaust Gas Recirculation Flow Excessive Detected
P0403 Exhaust Gas Recirculation Control Circuit
P0404 Exhaust Gas Recirculation Control 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
P0411 Secondary Air Injection System Incorrect Flow Detected
P0412 Secondary Air Injection System Switching Valve "A" Circuit
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
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
P0419 Secondary Air injection System Relay "B" Circuit
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)
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
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
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
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
P0450 Evaporative Emission Control System Pressure Sensor
P0451 Evaporative Emission Control System Pressure Sensor Range/Performance
P0452 Evaporative Emission Control System Pressure Sensor Low Input
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
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 EVAP Purge Flow Sensor Circuit
P0466 EVAP Purge Flow Sensor Circuit Range/Performance
P0467 EVAP Purge Flow Sensor Circuit Low Input
P0468 EVAP Purge Flow Sensor Circuit High Input
P0469 EVAP Purge Flow Sensor Circuit Intermittent
P0470 Exhaust Pressure Sensor
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
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
P0481 Cooling Fan 2 Control Circuit
P0482 Cooling Fan 3 Control Circuit
P0483 Cooling Fan Rationality Check

P0484 Cooling Fan Circuit Over Current
P0485 Cooling Fan Power/Ground Circuit
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
P0501 Vehicle Speed Sensor Range/Performance
P0502 Vehicle Speed Sensor Circuit Low Input
P0503 Vehicle Speed Sensor Intermittent/Erratic/High
P0505 Idle Control System
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
P0512 Starter Request Circuit
P0513 Incorrect Irnmobilizer 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 Sensor/Switch Circuit
P0521 Engine Oil Pressure Sensor/Switch Range/Performance
P0522 Engine Oil Pressure Sensor/Switch Low Voltage
P0523 Engine Oil Pressure Sensor/Switch High Voltage
P0524 Engine Oil Pressure Too Low
P0530 A/C Refrigerant Pressure Sensor Circuit
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
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
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
P0561 System Voltage Unstable
P0562 System Voltage Low
P0563 System Voltage High
P0564 Cruise Control Multi-Function Input Signal
P0565 Cruise Control On Signal
P0566 Cruise Control Off Signal
P0567 Cruise Control Resume Signal
P0568 Cruise Control Set Signal
P0569 Cruise Control Coast Signal
P0570 Cruise Control Acceleration Signal
P0571 Cruise Control/Brake Switch A Circuit
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
P0578 Through P0580 Reserved for Cruise Control Codes
P0600 Serial Communication Link
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 (Module Identification Defined by SAE J1979)
P0606 ECM/PCM Processor
P0607 Control Module Performance
P0608 Control Module VSS Output "A"
P0609 Control Module VSS Output "B"
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
P0621 Generator Lamp "L" Terminal Control Circuit
P0622 Generator Field "F" Terminal Control Circuit
P0623 Generator Lamp Control Circuit
P0624 Fuel Cap Lamp Control Circuit
P0630 VIN Not Programmed or Mismatch - ECM/PCM

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P0631 VIN Not Programmed or Mismatch - TCM
P0635 Power Steering Control Circuit
P0836 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
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 (ML) Control Circuit
P0654 Engine RPM Output Circuit
P0655 Engine Hot Lamp Output Control Circuit
P0656 Fuel Level Output Circuit
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 (MIL Request)
P0701 Transmission Control System Range/Performance
P0702 Transmission Control System Electrical
P0703 Torque Converter/Brake Switch B Circuit
P0704 Clutch Switch In put 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
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
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
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
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
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 "A"
P0746 Pressure Control Solenoid "A" Performance or Stuck Off
P0747 Pressure Control Solenoid "A" Stuck On
P0748 Pressure Control Solenoid "A" Electrical
P0749 Pressure Control Solenoid "A" Intermittent
P0750 Shift Solenoid "A"
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"
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"
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 "C"
P0766 Shift Solenoid "D" Performance or Stuck Off

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P0767 Shift Solenoid "D" Stuck On
P0768 Shift Solenoid "D" Electrical
P0769 Shift Solenoid "D" Intermittent
P0770 Shift Solenoid "E"
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
P0781 1-2 Shift
P0782 2-3 Shift
P0783 3-4 Shift
P0784 4-5 Shift
P0785 Shift/Timing Solenoid
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
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
P0803 1-4 Upshift (Skip Shift) Solenoid Control Circuit
P0804 1-4 Upshift (Skip Shift) Lamp Control Circuit
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

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P0813 Reverse Output Circuit
P0814 Transmission Range Display Circuit
P0815 Upshift Switch Circuit
P0816 Downshift Switch Circuit
P0817 Starter Disable Circuit
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
P0850 Park/Neutral Position Switch Input Circuit
P0851 Park/Neutral Position Switch Input Circuit Low
P0852 Park/Neutral Position Switch Input Circuit High
P0853 Drive Switch Input Circuit
P0854 Drive Switch Input Circuit Low
P0855 Drive Switch Input Circuit High
P0856 Traction Control Input Signal
P0857 Traction Control Input Signal Range/Performance
P0858 Traction Control Input Signal Low
P0859 Traction Control Input Signal High
P0860 Gear Shift Module Communication Circuit
P0861 Gear Shift Module Communication Circuit Low

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P0862 Gear Shift Module Communication Circuit High
P0863 (TCM) Transmission Control Module Communication Circuit
P0864 (TCM) Transmission Control Module Communication Circuit Range/Performance
P0865 (TCM) Transmission Control Module Communication Circuit Low
P0866 (TCM) Transmission Control Module Communication Circuit High
P0867 Transmission Fluid Pressure
P0868 Transmission Fluid Pressure Low
P0869 Transmission Fluid Pressure High
P0870 Transmission Fluid Pressure Sensor/Switch C Circuit
P0871 Transmission Fluid Pressure Sensor/Switch C Circuit Range/Performance
P0872 Transmission Fluid Pressure Sensor/Switch C Circuit Low
P0873 Transmission Fluid Pressure Sensor/Switch C Circuit High
P0874 Transmission Fluid Pressure Sensor/Switch C Circuit Intermittent
P0875 Transmission Fluid Pressure Sensor/Switch D Circuit
P0876 Transmission Fluid Pressure Sensor/Switch D Circuit Range/Performance
P0877 Transmission Fluid Pressure Sensor/Switch D Circuit Low
P0878 Transmission Fluid Pressure Sensor/Switch D Circuit High
P0879 Transmission Fluid Pressure Sensor/Switch D Circuit Intermittent
P0880 TCM Transmission Control Module Power Input Signal
P0881 TCM Transmission Control Module Power Input Signal Range/Performance
P0882 TCM Transmission Control Module Power Input Signal Low
P0883 TCM Transmission Control Module Power Input Signal High
P0884 TCM Transmission Control Module Power Input Signal Intermittent
P0885 TCM Transmission Control Module Power Relay Control Circuit/Open
P0886 TCM Transmission Control Module Power Relay Control Circuit Low
P0887 TCM Transmission Control Module Power Relay Control Circuit High
P0888 TCM Transmission Control Module Power Relay Sense Circuit
P0889 TCM Transmission Control Module Power Relay Sense Circuit Range/Performance
P0890 TCM Transmission Control Module Power Relay Sense Circuit Low
P0891 TCM Transmission Control Module Power Relay Sense Circuit High
P0892 TCM Transmission Control Module Power Relay Sense Circuit Intermittent
P0893 Multiple Gears Engaged
P0894 Transmission Component Slipping
P0895 Shift Time Too Short
P0896 Shift Time Too Long
P0897 Transmission Fluid Deteriorated
P0898 Transmission Control System MIL Request Circuit Low
P0899 Transmission Control System MIL Request Circuit High
P0900 Clutch Actuator Circuit/Open
P0901 Clutch Actuator Circuit Range/Performance
P0902 Clutch Actuator Circuit Low
P0903 Clutch Actuator Circuit High
P0904 Transmission Gate Select Position Circuit
P0905 Transmission Gate Select Position Circuit Range/Performance

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P0906 Transmission Gate Select Position Circuit Low
P0907 Transmission Gate Select Position Circuit High
P0908 Transmission Gate Select Position Circuit Intermittent
P0909 Transmission Gate Select Control Error
P0910 Transmission Gate Select Actuator Circuit/Open
P0911 Transmission Gate Select Actuator Circuit Range/Performance
P0912 Transmission Gate Select Actuator Circuit Low
P0913 Transmission Gate Select Actuator Circuit High
P0914 Gear Shift Position Circuit
P0915 Gear Shift Position Circuit Range/Performance
P0916 Gear Shift Position Circuit Low
P0917 Gear Shift Position Circuit High
P0918 Gear Shift Position Circuit Intermittent
P0919 Gear Shift Position Control Error
P0920 Gear Shift Forward Actuator Circuit/Open
P0921 Gear Shift Forward Actuator Circuit Range/Performance
P0922 Gear Shift Forward Actuator Circuit Low
P0923 Gear Shift Forward Actuator Circuit High
P0924 Gear Shift Reverse Actuator Circuit/Open
P0925 Gear Shift Reverse Actuator Circuit Range/Performance
P0926 Gear Shift Reverse Actuator Circuit Low
P0927 Gear Shift Reverse Actuator Circuit High
P0928 Gear Shift Lock Solenoid Control Circuit/Open
P0929 Gear Shift Lock Solenoid Control Circuit Range/Performance
P0930 Gear Shift Lock Solenoid Control Circuit Low
P0931 Gear Shift Lock Solenoid Control Circuit High
P0932 Hydraulic Pressure Sensor Circuit
P0933 Hydraulic Pressure Sensor Circuit Range/Performance
P0934 Hydraulic Pressure Sensor Circuit Low
P0935 Hydraulic Pressure Sensor Circuit High
P0936 Hydraulic Pressure Sensor Circuit Intermittent
P0937 Hydraulic Oil Temperature Sensor Circuit
P0938 Hydraulic Oil Temperature Sensor Circuit Range/Performance
P0939 Hydraulic Oil Temperature Sensor Circuit Low
P0940 Hydraulic Oil Temperature Sensor Circuit High
P0941 Hydraulic Oil Temperature Sensor Circuit Intermittent
P0942 Hydraulic Pressure Unit
P0943 Hydraulic Pressure Unit Cycling Period Too Short
P0944 Hydraulic Pressure Unit Loss of Pressure
P0945 Hydraulic Pump Relay Circuit/Open
P0946 Hydraulic Pump Relay Circuit Range/Performance
P0947 Hydraulic Pump Relay Circuit Low
P0948 Hydraulic Pump Relay Circuit High
P0949 ASM Auto Shift Manual Adaptive Learning Not Complete

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P0950 ASM Auto Shift Manual Control Circuit
P0951 ASM Auto Shift Manual Control Circuit Range/Performance
P0952 ASM Auto Shift Manual Control Circuit Low
P0953 ASM Auto Shift Manual Control Circuit High
P0954 ASM Auto Shift Manual Control Circuit Intermittent
P0955 ASM Auto Shift Manual Mode Circuit
P0956 ASM Auto Shift Manual Mode Circuit Range/Performance
P0957 ASM Auto Shift Manual Mode Circuit Low
P0958 ASM Auto Shift Manual Mode Circuit High
P0959 ASM Auto Shift Manual Mode Circuit Intermittent
P0960 Pressure Control Solenoid A Control Circuit/Open
P0961 Pressure Control Solenoid A Control Circuit Range/Performance
P0962 Pressure Control Solenoid A Control Circuit Low
P0963 Pressure Control Solenoid A Control Circuit High
P0964 Pressure Control Solenoid B Control Circuit/Open
P0965 Pressure Control Solenoid B Control Circuit Range/Performance
P0966 Pressure Control Solenoid B Control Circuit Low
P0967 Pressure Control Solenoid B Control Circuit High
P0968 Pressure Control Solenoid C Control Circuit/Open
P0969 Pressure Control Solenoid C Control Circuit Range/Performance
P0970 Pressure Control Solenoid C Control Circuit Low
P0971 Pressure Control Solenoid C Control Circuit High
P0972 Shift Solenoid A Control Circuit Range/Performance
P0973 Shift Solenoid A Control Circuit Low
P0974 Shift Solenoid A Control Circuit High
P0975 Shift Solenoid B Control Circuit Range/Performance
P0976 Shift Solenoid B Control Circuit Low
P0977 Shift Solenoid B Control Circuit High
P0978 Shift Solenoid C Control Circuit Range/Performance
P0979 Shift Solenoid C Control Circuit Low
P0980 Shift Solenoid C Control Circuit High
P0981 Shift Solenoid D Control Circuit Range/Performance
P0982 Shift Solenoid D Control Circuit Low
P0983 Shift Solenoid D Control Circuit High
P0984 Shift Solenoid E Control Circuit Range/Performance
P0985 Shift Solenoid E Control Circuit Low
P0986 Shift Solenoid E Control Circuit High
P0987 Transmission Fluid Pressure Sensor/Switch E Circuit
P0988 Transmission Fluid Pressure Sensor/Switch E Circuit Range/Performance
P0989 Transmission Fluid Pressure Sensor/Switch E Circuit Low
P0990 Transmission Fluid Pressure Sensor/Switch E Circuit High
P0991 Transmission Fluid Pressure Sensor/Switch E Circuit Intermittent
P0992 Transmission Fluid Pressure Sensor/Switch F Circuit
P0993 Transmission Fluid Pressure Sensor/Switch F Circuit Range/Performance

P0994 Transmission Fluid Pressure Sensor/Switch F Circuit Low
P0995 Transmission Fluid Pressure Sensor/Switch F Circuit High
P0996 Transmission Fluid Pressure Sensor/Switch F Circuit Intermittent
P0997 Shift Solenoid F Control Circuit Range/Performance
P0998 Shift Solenoid F Control Circuit Low
P0999 Shift Solenoid F Control Circuit High

4.5-Appendix E –What is EOBD,EOBD2 and OBD-II

What is EOBD?

EOBD is an abbreviation of **E**uropean **O**n-**B**oard **D**iagnostics.

All petrol cars sold within Europe since 1 Jan 2001, and diesel cars manufactured from 2003, must have on-board diagnostic systems to monitor engine emissions.

These systems were introduced in line with **European Directive 98/69/EC** to monitor and reduce emissions from cars.

All such cars must also have a standard EOBD diagnostic socket that provides access to this system (as shown below).

For information on the pins used within the port:

The EOBD / ODBII 16-pin diagnostic connector (DLC)

Where is the connector?

The EOBD connector is required by the Directive to be located within the passenger compartment of the car, within reach of the driver's seat. Tools should not be required to reveal the connector, but it may have a removeable cover over it.

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What does the connector look like?

The connector has the following shape:

Which pins contacts should be present on the connector?

Different pins on the connector are used by different manufacturers. There are 5 pinout combinations within the standard, each of which uses a specific communications protocol. These are listed below:

Protocol	Connector pins used
J1850 VPW	2, 4, 5, and 16, but not 10
ISO 9141-2	4, 5, 7, 15 (see below) and 16
J1850 PWM	2, 4, 5, 10 and 16
KWP2000 (ISO 14230)	4, 5, 7, 15 (see below) and 16
CAN (Controller Area Network)	4, 5, 6, 14 and 16

Note: For ISO/KWP2000 communications, **pin 15** (L-line) is not always required. Pin 15 was used on earlier ISO/KWP2000 cars to "wake-up" the ECU before communication could begin on pin 7 (K-Line). Later cars tend to communicate using only pin 7 (K-Line).

Rover and MG cars: We have noticed that many Rover and MG models do not have pin 5 (Signal Ground). This can prevent some diagnostic tools from 'powering up' where they use pin 5 as the ground for the circuitry.

What are each of the pins used for?

The pins are used as follows:

Pin	Use
2	J1850 Bus+
4	Chassis Ground
5	Signal Ground

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6	CAN High (J-2284)
7	ISO 9141-2 K Line and ISO/DIS 14230-4
10	J1850 Bus
14	CAN Low (J-2284)
15	ISO 9141-2 L Line and ISO/DIS 14230-4
16	Battery power

Additional pins may be wired on your car - these may be used by manufacturers for other purposes.

Which protocol is used by each manufacturer?

As a rough guide, the protocols are generally found on cars from the following manufacturers:

Protocol	Manufacturers
J1850 VPW	General Motors, Chrysler…
J1850 PWM	Ford models to 2003 with EEC-V engine management system, this includes: Ford **Cougar** (all UK models), Ford **Puma** (1.6 and 1.7), Ford **Fiesta** Zetec models to 2003, Ford **Mondeo** Zetec models to 2003, Ford **Focus** to 2003 (and some of the newer Ford-based **Jaguars**, e.g. S-Type)…
ISO / KWP	Most European and Asian manufacturers, e.g. Alfa Romeo, Audi, BMW, Citroen, Fiat, Honda, Hyundai, Jaguar (X300, XK series and X-Type), Jeep, Kia, Land Rover, Mazda, Mercedes, Mitsubishi, Nissan, Peugeot, Renault, Saab, Skoda, Subaru, Toyota, Vauxhall, Volkswagen (VW), Volvo …
CAN	Ford 2004+ Fiesta, Fusion, Mondeo, Focus models

Mazda RX-8...
Vauxhall Vectra 2003+ model

Most new models from approx. 2004 - CAN must be used for EOBD engine diagnostics by all manufacturers by 2008…

.

Only the latest scan tools and code readers can be relied upon to read the diagnostic information through the EOBD socket.

'Check Engine' light

The 'Check Engine' warning light on the dashboard is often the first an owner knows about a problem with their car.

This provides very little information to the owner, or to the garage asked to investigate the problem.

Problem diagnosis

With the modern tools, skilled technicians should be able to diagnose and solve many of the problems, which prior to this, required the sophisticated console tools of main dealers.

New technology

The introduction of European on-board diagnostics standards has opened up new opportunities for car garages and owners.

A range of low-cost tools are now available to read and clear error codes, to view live/stored readings from sensors within the car, and to switch off the 'Check Engine' light.

What information is available?

EOBD systems monitor and store information from sensors throughout the car, e.g. air flow sensors and oxygen sensors.

Sensor values outside an acceptable range trigger a Diagnostic Trouble Code (DTC). The Scan tools can help you read and interpret these codes, and view the live sensor output.

EOBD or OBD II?

On-Board Diagnostics, or OBD, was the name given to the early emission control and engine-management systems introduced in cars. There is no single OBD standard - each manufacturer often using quite different systems (even between individual car models).

OBD systems have been developed and enhanced, in line with United States government requirements, into the current OBD II standard.

The OBD II Federal requirements apply to cars sold in the United States from 1996.

EOBD is the European equivalent of the American OBD II standard, which applies to petrol cars sold in Europe from 2001 (and diesel cars 3 years later).

Why do OBDII and EOBD tools not work on all cars from 1996 in the UK and Europe?

Some of our most frequently asked questions on our OBDII and EOBD tools are:

"I have seen these/similar products advertised as working on all 1996 and newer cars - why don't yours?"

**"I've just bought an OBDII/EOBD tool from someone else that was advertised as working with all 1996 and newer cars.
Why doesn't it work on my [1999 Vauxhall Vectra]?"**

Here is the answer...

In 1996 in the United States, a Federal Law came into force requiring **all US-sold cars** to be OBDII compliant. Most OBDII tools are therefore advertised as working with all cars from 1996.

The OBDII Federal Law applied **only to cars sold in the US**.

In the UK and the rest of Europe, our equivalent law (European On-Board Diagnostics, or EOBD) did not come into force, and more importantly, was not fully implemented by our car manufacturers, until 2001 for petrol cars

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(2003/4 for diesels).

Where an OBDII tool is sold in the UK/Europe claiming to work on all cars from 1996, this is highly **unlikely to be the case**.

Even where a seemingly identical car may have been sold in Europe and the US before 2001, from our own testing and research, it is rarely the case that the European model will be OBDII/EOBD compliant.

The fact that we sell these tools as only working with 2001 and newer petrols (and similarly 2003/4 diesels) is due to the fact that we are being honest in the coverage, rather than simply duplicating the sales information from the US.

So do these tools work with any UK/European cars before 2001?

Yes they do, but certainly not across the board, and very rarely back as far as 1996. A few manufacturers that we know have some OBDII/EOBD support (on petrol models) before 2001 are listed below:

Ford (most petrol cars using the EEC-V engine management system)
Jaguar (most models from the beginning of the X300 series)
Volvo (some models)

A few examples of manufacturers that we have had very little success connecting OBDII/EOBD tools on pre-2001 models are:

Vauxhall
Peugeot
Citroen
Fiat

Please be aware that we do not try to sell these tools as something they are not.

What is EOBD2?

EOBD2 is **not** a new version of EOBD.

Where EOBD stands for 'European On-Board Diagnostics', EOBD2 actually stands for 'Enhanced On-Board Diagnostics, Second Generation'.

EOBD2 tends to refer to manufacturer-specific features available on some OBDII/EOBD tools to access additional parameters/information from a car, over

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and above the normal parameters and information available within the EOBD/OBDII standard.

EOBD2 features are normally highly manufacturer-specific, and will usually only be available for a certain car manufacturer, e.g. Ford.

There are, as such, no 'EOBD2 cars', i.e. cars that require an EOBD2 tool to access their diagnostics information. EOBD2 functionality might however allow more information to be extracted from an EOBD/OBDII compliant car.

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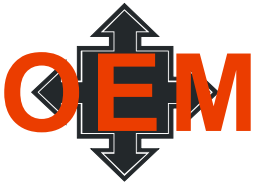
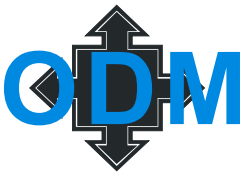
4.6 We provide OEM&ODM SERVICE



Our OEM service will research; your brand is our professional technology.



ODM your achievements; our accurate programming

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