



SERIAL DIAGNOSTICS

The rumours concerning my retirement from PMM Tech topics was greatly exaggerated, so with that in mind I thought we should take a look at Serial Diagnostics. Code reading is an expression best consigned to history; serial communication has developed over past years into a powerful diagnostic tool.

Consider the vehicle as a computer communicating through an information highway or Can bus (controller area network). Information is transmitted through all on board systems but only shared by interested parties. Just like your desktop PC the operating software and data can be programmed using an appropriate serial tool through the vehicle serial port. In effect vehicles and key components, like control PCMs can be manufactured all the same and then programmed to suit the specific vehicle specification or customers preferences.

Specialist companies Eg.Revo (see our web-site) are having great success in transforming vehicle performance by modifying the operating perimeters through the serial port.

Do not focus only focus on engine management but the entire vehicle systems, we have seen a big increase in other systems repairs like SRS, transmission and ABS.

Before we move on to a more detailed look at the implications of EOBD and Can interfacing let's spare a thought for the type of tool you will require.

I intend to avoid naming specific manufactures, so as not to be bias, the choice within our own workshop is based on my personal requirements and prompted by the type of service we offer and market penetration in our area.

Expect to pay considerably more for what I call second generation tools, these tools are Multi functional and programmable via the Internet or flash card offering total vehicle communication close to the OE. Specification.

Avoid some of the tempting special prices of older generation tools their software and operating platforms are at the end of their development life and will not sustain future profitable use.

Consider the application list carefully ensuring the menu is genuine and not hollow. Obtain the tool of your choice for an extended evaluation period or seek advice from an independent end user.

Some of the key functions you will require are as follows,

- 1) Full EOBD compatibility
- 2) CAN BUS Interfacing
- 3) DTC Read and erase
- 4) Live Data with selectable extended menus
- 5) Record or snapshot facility to capture transient errors
- 6) Ability to download PC Data base and printer
- 7) Ability to communicate with all on board systems
- 8) Ability to programme controllers and components
- 9) Ability to programme transponder keys, not just copy existing keys
- 10) Ability to adjust and reset parameters

Don't expect one single manufacturer to offer total functionality on all vehicles, you may need to consider multiple systems specialising in neich market sector.
Finally before moving on ensure you charge a realistic price for using your scan tool, lets stop stabbing each other in the back and establish a structured and professional standard and to hell with the rest.

EOBD (European on-board diagnostics) was introduced many years ago and is continually updated, stage 4 comes into effect from 01/01/05. Many technicians feel that since it's introduction diagnostics have become easier, I disagree.

Accessibility and generic DTC list are certainly more convenient, however the devil is in the detail. Current EOBD systems provide much more information, which must be interpreted carefully, demanding a greater systems Knowledge by the technician (not a bad thing)

A DTC mil warning light may not be displayed for any number of reasons despite effecting derivability.

The mil lamp will illuminate and remain on only when the vehicle has completed two successive drive cycles, during such cycles an identical error must be seen in order to illuminate the MIL.

Some errors may not be identified by the MIL provided that the vehicle default thresholds maintain the emissions within FTP limits (Federal test procedure
When an error is seen a fault code often called P code is raised. EOBD generic codes are identified as PO codes (PO240). These generic codes apply world-wide. However manufacturer specific codes often not interpreted by scan tools are identified as P1 codes (P1240)

Three specific groups identify diagnostic codes.

P) Power train

B) Body

C) Chassis

The power train codes can be further broken down into sub groups

O) entire electronic system

1/2) fuel air control

3) Ignition system misfire

4) auxiliary emission control

5) idle speed and cruise control

6) ECM inputs and outputs

7) transmission

8) other Powertrain

DTCs are stored in a number of locations, modes 1through 9 depending upon their symptoms they include

Mode 2) freezes frame data

Mode3) DTCs

Mode 5) O2 sensor monitoring

Mode 6) non-continuous monitored systems

Mode 7) continuous monitored systems

You must investigate all locations especially with intermittent or transient errors, derivability errors may have occurred due to sensor range errors.

It may be possible to clear them however if the fault has not been repaired they will return upon completion of two drive cycles.

The definition of a drive cycle is a little misleading, it is a set of complex perimeters unlikely to be achieved whilst driving around the block.

Readiness test are an internal audit function that cannot be re-set by a scan tool.

PCM must see normal control parameters for two successful drive cycles, hence despite having carried out a repair the readiness test may indicate not complete.

In some US states a vehicle will not pass the federal test unless all readiness flags are clear, be warned, what happens over there today comes here tomorrow.

CAN NETWORKING

Just an overview for now this subject is worth a full topic.

DTCs can be scanned within all on-board Can systems through the gateway interface (instrumentation assembly).

However for full access, and to clear DTCs it is normally necessary following repairs, to exit Can and re-enter through the appropriate control system module.

Access to the Can interface allows testing of devices and components within the chassis and instrumentation systems.

For example you can operate a light switch and monitor the PCM input via the scan tool, or switch on a rear stop lamp via the scan tool thus testing the integrity of the Can highway.

Despite all the improvements afforded by current EOBD diagnostics, like me you have no doubt being faced with errors not reported through the serial port, or have been logged by what I call collateral components not directly responsible for the fault.

This brings me back to the comment I made earlier demanding skilful interpretation and systems knowledge by the technician.

There is no short cut to experience the purchase of a scan tool must be supported by extensive information systems training, and careful interpretation.

When the going gets tough are YOU up for it?