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## OBD II Code Diagnosis

If you have ever attended one of my classes you may have heard me quote an Instructor/Colleague of mine as saying "...If all you do is, replace components for codes set, you will be lucky if you fix 20% of the cars". That was 20 years ago... it still rings true today!

The advent of computerized engine control in the mid '80's changed the automotive industry. Slow at first, but within ten years it started to pick up steam. Technicians explored many paths in adapting to these changes. Some ignored them and hoped it was just a fad. Others watched, learned (a little) and then applied what they thought was good diagnostic processes. For some however, the writing was on the wall and they jumped in with both feet. Making the investment in tools, time and effort they learned all that they could and never looked back.

The single greatest tool at the technician's disposal suddenly became **code diagnosis**. For the first time we had a vehicle that in some small way could communicate with us and give us a hint as to what may be the cause of the problem. The only thing we needed to learn was that code retrieval is the beginning of the diagnostic process, not the end!

When the PCM chooses to display the MIL (Malfunction Indicator Lamp) and record a fault code, it is because the information it is receiving from a particular sensor or the reaction from a given actuator is not what it was programmed to see. As technicians, the first question we should ask ourselves is... is this a problem with **this** component or a **related** component or system.

Let's look at a P0401, EGR Low Flow code on a Ford as an example. This code is telling us that when the PCM commanded EGR (Exhaust Gas Recirculation) to occur, the feedback information it received indicated that little or no flow of exhaust gases into the combustion chambers occurred. Below is a list of the components that may be included in this process.

- PCM (provides EGR command and monitors results)
- EVR ( Actuator that supplies vacuum to EGR Valve)
- EGR Valve (vacuum operated valve that provides on/off between intake and exhaust)
- DPFE (pressure sensor that directly monitors flow)
- MAP (load sensor sometimes used to monitor flow by detecting change in manifold pressure)

Each one of these components could be the cause of a P0401 if it was to malfunction. Also we would need to consider any mechanical malfunctions such as carbon build-up, leaky hoses or tubes that may directly affect flow. The other item to consider would be a circuit malfunction (wires and connectors). I will concede that there are other codes that should be set if there was a circuit problem but I would never **assume** this to be true. What if I had a P0303 and P0306 (misfire cylinder #3 & #6) along with the P0401? Could they be related or do I treat them as separate faults?

In the next issue we will break down this code thoroughly and discuss all the scenarios that may have lead up to the PCM's decision to set the code and turn on the MIL. Also, as part of this series we will discuss the principles of OBD II codes and break down each character that defines them. We will also look at some of the most common codes and how to develop a plan to diagnose each one.

Cleaning up the environment...one converter at a time

Gary

