

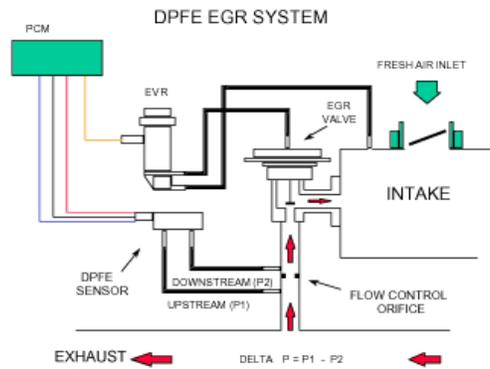


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OBD II Code Diagnosis Part II

As promised in last month's bulletin, we will focus this issue on diagnosing a Ford with a P0401, EGR Low Flow code.

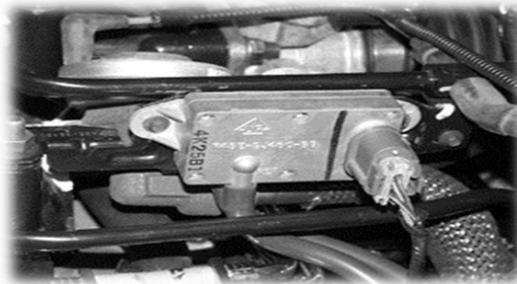
At first glance the task may seem long and difficult. Let's see how fast we can get to a diagnosis. A quick test drive with scanner hooked up and dialed in will help us verify the fault (the PCM should never command EGR at idle). EGR Command will confirm the PCM is working while monitoring the DPFE (Differential Pressure Feedback EGR) looking for a positive voltage change will confirm flow (no voltage change = no flow).



Now, that we have verified the fault we head back to the shop where a couple of quick tests should get us to the proper diagnosis. Without hooking up any more equipment we can easily determine if the fault is mechanical. Since our scan tool is already hooked up we'll search for a bi-directional control that will allow us to open the EGR valve while the car is at idle. Some scan tools may also allow us to monitor the DPFE during this test. If the valve opens and has flow the engine should run very rough or even stall. If there is no change in RPM then we have a restriction in the system or the valve did not lift. If the scan tool does not have an EGR test function then we can apply vacuum directly to the EGR valve and look for the same results.

The key to proper diagnosis is to understand how each test will result in information that leads us to the next test or final diagnosis. So let's see what we know to this point.

- The test drive allowed us to eliminate the PCM if it displayed a positive EGR - ON command when it would have normally occurred in the drive cycle. Monitoring the DPFE ([Image1](#)) and seeing no change in the voltage signal confirmed a fault existed. This signal should be about 1.0v EGR closed.



- The second test (in the bay) will result in providing our next task. If the valve did not open when commanded we will turn our attention back to the EVR or the valve itself. If it opened and we experienced a significant change in RPM then our attention moves to the DPFE. No change in RPM and a restriction becomes the focus.



If the results from the second test indicated that the valve did not open when commanded but will open when vacuum is applied then the EVR becomes the focus. The EVR is a vacuum switch controlled by the PCM. One side of the switch will have constant vacuum being fed to the EGR valve when the solenoid is opened. The electrical connector will be a two pin with power on one side and PCM controlled ground on the other.

If however the EGR valve does not open when we apply vacuum directly to it, the valve is most likely at fault. It should then be replaced and retest.

Let's say the valve does open when commanded and there is a significant decrease in rpm. Repeat this test while monitoring the DPFE for positive voltage change. If no voltage change occurs, check electrical signals to sensor (5v and ground), replace and retest.

The last scenario would be that the valve opens and there is little or no change in rpm. This will indicate a restriction in the system which usually comes in the form of hardened carbon deposits ([Image2](#)) in the small channels feeding the exhaust gas to the cylinders. Locate these areas, clean and retest.



In Part I of this series, I threw a little wrench in the works by adding the possibility of misfire codes along with a P0401 and asked if they may be related. The short answer is ... YES! The explanation as to how and why this may happen is a little longer. Some Intake manifold designs will have the exhaust gas running through ports to each individual cylinder. When one or more of these ports becomes restricted and EGR is commanded ON, all of the gas will flow to the open cylinders causing them to enter into a lean misfire. The PCM will recognize this and set the respective single cylinder misfire codes.

As you can see the process of diagnosing this code is fairly straight forward. Code Diagnostics involves understanding the system you are working on, what parameters the PCM is operating in and then performing the necessary tests to come to the proper diagnosis. Whether it is a P0401 or P0420 code the process is the same. We must find the root cause of the problem or we will be revisiting this same problem in the future.

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

Gary

