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OBDII and the New Clean Diesel

About a year ago we offered up two Tech Bulletins with new Diesels as the topic. TB-80019 (Feb 2010) dealt with new Diesel regulations while TB-80021 (April 2010) was dedicated to after-treatment systems. The talk today in all parts of the automotive world is that of fuel and powertrain alternatives and certainly new clean diesel must be part of that conversation.

Since our last discussion just about every manufacturer has released at least one new Diesel model. Acceptance of these new vehicles by the U.S. buying public has been slow but steady. Many of us remember the disastrous 80's version of the Diesel and sometimes these bad memories are hard to forget. However we are a nation of second chances and times being as they are, we are willing to give this old but greatly enhanced technology another try.

In our first two bulletins we talked about what to expect in the way of enhanced emission standards and testing regulations. We also spoke about what changes we would see in the after-treatment systems such as Diesel Oxidation Converters (DOC), Diesel Particulate Filters (DPF) and Selective Catalyst Reduction (SCR). Today we would like to delve a little deeper into these systems and see how OBDII might play a role.

As of model year 2007, all diesel-powered vehicles less than 14,000 lbs GVWR must meet OBDII requirements for monitoring of their emission control systems. OBDII has been at a "phase-in" mode since 1994 so the previous statement should not really come as a complete shock to those of us diagnosing these vehicles since the early '90's. California took the lead in '94 and the EPA followed close behind in '97 with light duty portion of the market (<8500 lbs GVW). However, when CARB added medium duty in 1997 (8500 – 14000lbs) the EPA was not quick to acknowledge this change and put off adding these vehicles until 2004.

As we found on gas-powered vehicles, early OBDII Diesel monitored systems and the corresponding test data will be suspect. Just because it has an OBDII connector doesn't mean it is fully OBDII compliant. By the 2007 model year we should find most of the data to be accurate. Here are some examples of Diesel specific monitors.

Glow Plug Monitor

OBDII for diesel requires that glow plug operation be monitored for any malfunction and that a code is stored and MIL illuminated.

Exhaust Gas Recirculation Monitor

On a diesel application the MAF sensor is used to determine EGR contribution when commanded on. The MAF measures the total amount of air coming into the engine. When EGR is applied, a drop in air flow would be recorded and the difference then calculated by the PCM to determine the amount of EGR contribution. Too low can cause a MIL to occur.

EGR Cooler Monitor

Diesels require a great deal of EGR and for it to be effective the gas needs to be cooled. To monitor this activity the PCM uses two temperature sensors mounted in the EGR gas stream. One on the manifold and one near the EGR valve. The temperature difference must meet a certain spec to pass the monitor. A reading out of the programmed threshold will trigger a MIL.

Diesel Oxidation Catalyst Efficiency Monitor

Unlike its gas-powered counterpart that uses oxygen storage to monitor the efficiency of the converters, the OBDII compliant Diesel uses temperature change. Typically this monitor will run during regeneration of the DPF. A small amount of fuel is injected into the combustion chamber when the exhaust valve is open. When this fuel makes its way into the DOC the catalyst will oxidize the excess Hydrocarbons causing the temperature in the converter to increase. The temperature is recorded on the inlet and outlet ends of the DOC and if it does not meet the programmed minimum, a Diagnostic Trouble Code (DTC) is recorded and the MIL is illuminated.

As with gasoline powered vehicles, diesels are going through many changes and the exhaust system is again playing a major role. Magnaflow will continue to stay on the cutting edge and always strive to get you the information you need to grow your business.

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

Gary

