Fuel System Monitor

The fuel system monitor is an on-board strategy designed to monitor the fuel control system. The fuel control system uses fuel trim tables stored in the powertrain control module (PCM) keep alive memory (KAM) to compensate for the variability that occurs in fuel system components due to normal wear and aging. Fuel trim tables are based on air mass. During closed-loop fuel control, the fuel trim strategy learns the corrections needed to correct a biased rich or lean fuel system. The correction is stored in the fuel trim tables. The fuel trim has 2 means of adapting: long term fuel trim and a short term fuel trim. Refer to Powertrain Control Software , Fuel Trim in this section. Long term fuel trim relies on the fuel trim tables and short term fuel trim refers to the desired air/fuel ratio parameter called LAMBSE. LAMBSE is calculated by the PCM from the heated oxygen sensor (HO2S) inputs and helps maintain a 14.7:1 air/fuel ratio during closed-loop operation. Short term fuel trim and long term fuel trim work together. If the HO2S indicates the engine is running rich, the PCM corrects the rich condition by moving the short term fuel trim into the negative range, less fuel to correct for a rich combustion. If after a certain amount of time the short term fuel trim is still compensating for a rich condition, the PCM learns this and moves the long term fuel trim into the negative range to compensate and allow the short term fuel trim to return to a value near 0%. Inputs from the engine coolant temperature (ECT) or cylinder head temperature (CHT), intake air temperature (IAT), mass air flow (MAF) sensors are required to activate the fuel trim system, which in turn activates the fuel system monitor. Once activated, the fuel system monitor looks for the fuel trim tables to reach the adaptive clip (adaptive limit) and LAMBSE to exceed a calibrated limit. The fuel system monitor stores the appropriate DTC when a concern is detected as described below.

1. The HO2S detects the presence of oxygen in the exhaust and provides the PCM with feedback indicating air/fuel ratio.

2. A correction factor is added to the fuel injector pulse width calculation and the mass air flow calculation, according to the long and short term fuel trims as needed to compensate for variations in the fuel system.

3. When deviation in the LAMBSE parameter increases, air/fuel control suffers and emissions increase. When LAMBSE exceeds a calibrated limit and the fuel trim table has clipped, the fuel system monitor sets a DTC as follows:

   The DTCs associated with the monitor detecting a lean shift in fuel system operation are P0171 (Bank 1) and P0174 (Bank 2).

   The DTCs associated with the monitor detecting a rich shift in fuel system operation are P0172 (Bank 1) and P0175 (Bank 2).

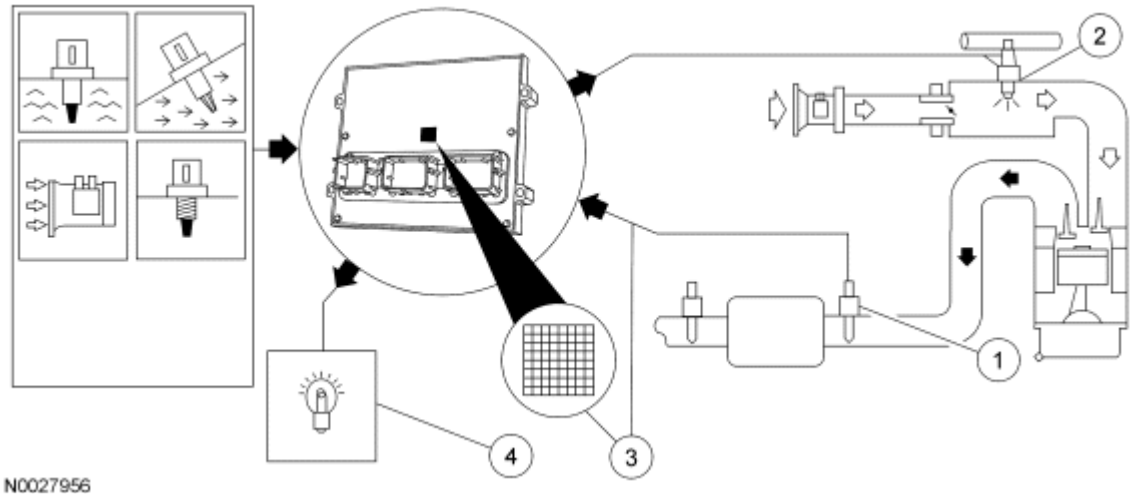
4. The malfunction indicator lamp (MIL) is activated after a concern is detected on two consecutive drive cycles.

Typical fuel system monitor entry conditions:

- RPM range greater than idle
- Air mass range greater than 5.67 g/sec (0.75 lb/min)
- Purge duty cycle of 0%

Typical fuel monitor thresholds:

- Lean Condition Concern: LONGFT greater than 25%, SHRTFT greater than 5%
- Rich Condition Concern: LONGFT less than 25%, SHRTFT less than 10%



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