Low Pressure Fuel Rail Pressure Sensor (PFI Fuel Rail)

Fuel Rail Pressure Sensor B Check Operation:	
DTCs	P018C (low input), P018D (high input)
Monitor execution	continuous
Monitor Sequence	None
Sensors OK	not applicable
Monitoring Duration	8 seconds to register a malfunction

Typical FRP sensor check malfunction thresholds:
Voltage < 0.049 volts or voltage > 4.88 volts

Fuel Rail Pressure Sensor Transfer Function		
FRP volts = [Vref * (4 * Fuel Pressure / 70) + 0.50] / 5.00		
Volts	**A/D counts in PCM**	**Pressure, psi**
4.85	993	76.125
4.50	922	70
4.00	820	61.25
3.50	717	52.5
3.00	614	43.75
2.50	512	35
2.00	410	26.25
1.50	307	17.5
1.00	205	8.75
0.50	102	0
0.15	31	-6.125

Fuel Rail Pressure Control (Normal) Functional Check Operation:	
DTCs	P008A (Fuel Rail Pressure Too Low) P008B (Fuel Rail Pressure Too High)
Monitor execution	continuous
Monitor Sequence	P018C, P018D and P018B must complete
Sensors/Actuators OK	FRP
Monitoring Duration	not applicable

Typical Fuel Rail Pressure Control (Normal) Functional Check Entry Conditions:		
Entry Condition	Minimum	Maximum
High Pressure Pump Enabled	Enabled	
Fuel level	15%	

Fuel Pump Control Module

The FP signal is a duty cycle command sent from the PCM to the fuel pump control module. The fuel pump control module uses the FP command to operate the fuel pump at the speed requested by the PCM or to turn the fuel pump off. A valid duty cycle to command the fuel pump on, is in the range of 15-47%. The fuel pump control module doubles the received duty cycle and provides this voltage to the fuel pump as a percent of the battery voltage. When the ignition is turned on, the fuel pump runs for about 1 second and is requested off by the PCM if engine rotation is not detected.

FUEL PUMP DUTY CYCLE OUTPUT FROM PCM

FP Duty Cycle Command	PCM Status	Fuel Pump Control Module Actions
0-15%	Invalid off duty cycle	The fuel pump control module sends a 20% duty cycle signal on the fuel pump monitor (FPM) circuit. The fuel pump is off.
37%	Normal low speed operation.	The fuel pump control module operates the fuel pump at the speed requested. The fuel pump control module sends a 60% duty cycle signal on FPM circuit.
47%	Normal high speed operation.	The fuel pump control module operates the fuel pump at the speed requested. The fuel pump control module sends a 60% duty cycle signal on FPM circuit.
51-67%	Invalid on duty cycle.	The fuel pump control module sends a 20% duty cycle signal on the FPM circuit. The fuel pump is off.
67-83%	Valid off duty cycle	The fuel pump control module sends a 60% duty cycle signal on FPM circuit. The fuel pump is off.
83-100%	Invalid on duty cycle.	The fuel pump control module sends a 20% duty cycle signal on the FPM circuit. The fuel pump is off.

The fuel pump control module communicates diagnostic information to the PCM through the FPM circuit. This information is sent by the fuel pump control module as a duty cycle signal. The 5 duty cycle signals that may be sent are listed in the following table. Some vehicles, e.g. the 5.2L Mustang, use two fuel pump control modules to supply enough fuel to the engine. The fuel pump modules are the same, there are simply two of them (“A” and “B”). The second pump uses a different set of DTCs for the same set of faults. Both pumps are driven by the same PCM output.