Fuel System

Closed Loop Control

Excessive Time to Closed Loop

MONITOR DESCRIPTION

The ECM uses the air/fuel (A/F) sensor (or front oxygen sensor where equipped) to optimize the air/fuel mixture in closed–loop fuel control. This control helps decrease exhaust emissions by providing the catalyst with a nearly stoichiometric mixture.

In oxygen–sensor equipped vehicles, the sensor detects the oxygen level in the exhaust gas and the ECM uses this data to control the air/fuel ratio. The sensor output voltage ranges from 0 V to 1 V. If the signal voltage is less than 0.4 V, the air/fuel ratio is LEAN. If the signal voltage is more than 0.55 V, the air/fuel ratio is RICH. If the conditions for closed–loop fuel control are met and after a specified time–period, the sensor's output signal never indicates RICH, the ECM will conclude that closed–loop fuel control is malfunctioning. The ECM will illuminate the MIL and a DTC is set.

In A/F sensor equipped vehicles, the ECM calculates the A/F ratio in the exhaust stream from the sensor's output signal. When conditions for closed–loop fuel control are met and the sensor's response becomes very slow (calculated as the sensor's "locus" length), the ECM will conclude that closed–loop fuel control is malfunctioning. The ECM will illuminate the MIL and a DTC is set.

MONITOR STRATEGY

Related DTCs	P0125	Heated oxygen sensor no activity
Required sensors/Components	Main	Heated oxygen sensor
	Sub	Crankshaft position sensor, Vehicle speed sensor, Throttle position sensor
Frequency of operation	Once per driving cycle	
Duration	65 sec.	
MIL operation	Immediate	
Sequence of operation	None	

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See page In–4	
Time after the following conditions are met	50 sec.	–
Engine RPM	1,500 rpm	–
Vehicle speed	40 km/h (25 mph)	90 km/h (57 mph)
Time after engine start	20 to 180 sec.	–
Throttle position	Open (idle OFF)	

TYPICAL MALFUNCTION THRESHOLDS

Detection Criteria	Threshold
Oxygen sensor voltage	Less than 0.45 V

Fuel Trim

Fuel Trim Too LEAN/RICH

MONITOR DESCRIPTION

The engine control module (ECM) uses the air/fuel ratio (A/F) sensor (or front heated oxygen sensor where equipped) to optimize the air/fuel mixture in Closed−Loop fuel control. This control helps decrease exhaust emissions by providing the catalyst with a nearly stoichiometric mixture. Under Closed−Loop fuel control, fuel injection amounts that deviate from the ECM's estimated fuel amount will cause a change in the short− term fuel−trim compensation value. The long−term fuel−trim is adjusted when there are persistent deviations in the short−term fuel−trim values.

For the fuel−trim monitor, the ECM calculates the "smoothed fuel−trim learned−value". This value is the com- bination of smoothed short−term fuel−trim (fuel feed back compensation value) and smoothed long−term fuel−trim values. When the smoothed fuel−trim learned−value exceeds the DTC threshold, the ECM inter- prets this as a fault in the fuel system and sets a DTC.

MONITOR STRATEGY

Related DTCs	P0171 (Bank 1)	Fuel trim is too LEAN
	P0172 (Bank 1)	Fuel trim is too RICH
Required sensors/Components	Main	Heated oxygen sensor
	Sub	MAF sensor (or MAP sensor), ECT sensor, Crankshaft position sensor, VSV for EVAP
Frequency of operation	Continuous	
Duration	3 sec.	
MIL operation	2 driving cycles	
Sequence of operation	None	

TYPICAL ENABLING CONDITIONS

Item	Specification	
	Minimum	Maximum
The monitor will run whenever the following DTCs are not present	See page In−4	
Fuel system status	Closed Loop	
Engine	Warmed up	
EVAP system	OFF (Purge cut)	
Battery voltage	11 V	−
Either of following condition is met:		
Engine RPM	−	1,100 rpm
Intake air amount	0.14 g/rev.	−

Fuel System

TYPICAL MALFUNCTION THRESHOLDS

Model Year	Detection Criteria	Threshold
1996 to 1998	Smoothed fuel–trim learned–value	38 % or more (too LEAN)
		–38 % or less (too RICH)
1999 to 2003	Smoothed fuel–trim learned–value	35 % or more (too LEAN)
		–35 % or less (too RICH)