

4.13 Knock Sensor

4.13.1 Description

The ECM uses active knock control, which serves to prevent engine damaging pre-ignition or detonation under all operating conditions enabling the engine to operate without additional safety margins. For the ECM to be able to determine the point at which a cylinder is pre-detonating, 2 piezo ceramic sensors are mounted on the engine block. Each sensor monitors all 4 cylinders in a bank (i.e. cylinders 1, 3, 5 & 7, and cylinders 2, 4, 6 and 8) by converting the engine block noise into a suitable electrical signal, which is then transmitted back to the ECM via a shielded cable. The signal is then processed within the ECM to identify the data that characterises knocking.

There are three knock sensor diagnostic checks during which a fault is detected if: -

1. The sensor signal is less than the minimum engine rpm dependant threshold.
2. The sensor signal is greater than the maximum engine rpm dependant threshold.
3. The error counter for the verification of knock internal circuitry is exceeded.

Knock Sensor								
Component/ System	Fault Codes	Monitoring Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameter	Enable Conditions	Time Required	MIL Illumination
Knock Sensor Bank 1 Bank 2 Bank 1 Bank 2	P0327	sensor reference voltage check	sensor reference voltage (10 samples)	from <2.44 mV at 2000 rpm	knock control engine speed	active (for at least 50 engine revolutions) > 2200 rpm (and not changing dynamically)	approximately 20 engine revolutions/ continuous	No MIL illumination
	P0332			to <25.02mV at 5200 rpm				
	P0328			from >207.5mV at 2000 rpm				
	P0333	to >622.6mV at 5200 rpm						
	P0606	response to test Signal	integrator output (3 samples)	< 3.51V	ECT	> 60 °C	approximately 740 engine revolutions/ continuous	
	null test	integrator output (3 samples)	> 0.353V					
	OR	integrator change AND engine speed	> 45.5V/sec < 4200 rpm					

If the above table does not include details of the following enabling conditions: - IAT, ECT, vehicle speed range, and time after engine start-up then the state of these parameters has no influence upon the execution of the monitor.