

The ECM is connected to the engine sensors which allow it to monitor the engine operating conditions. The ECM processes these signals and decides the actions necessary to maintain optimum engine performance in terms of driveability, fuel efficiency and exhaust emissions. The memory of the ECM is programmed with instructions for how to control the engine, this known as the strategy. The memory also contains data in the form of maps which the ECM uses as a basis for fueling and emission control. By comparing the information from the sensors to the data in the maps, the ECM is able to calculate the various output requirements. The ECM contains an adaptive strategy which updates the system when components vary due to production tolerances or ageing.

The ECM receives a vehicle speed signal. Vehicle speed is an important input to the ECM strategies. The frequency of this signal changes according to road speed.

CRANKSHAFT POSITION SENSOR (CKP)



E86091

The CKP sensor is located at the rear of the engine block on the left hand side. The sensor tip is aligned with a magnetic trigger which is attached to the crankshaft. The reluctor is a press fit on the end of the crankshaft. The trigger wheel must be carefully aligned to the crankshaft to ensure correct timing. The sensor produces a square wave signal, the frequency of which is proportional to engine speed.

The ECM monitors the CKP sensor signal and can detect engine over-speed. The ECM counteracts engine over-speed by gradually fading out speed synchronized functions. The CKP sensor is a Hall effect sensor. The sensor measures the magnetic field variation induced by the magnetized trigger wheel.

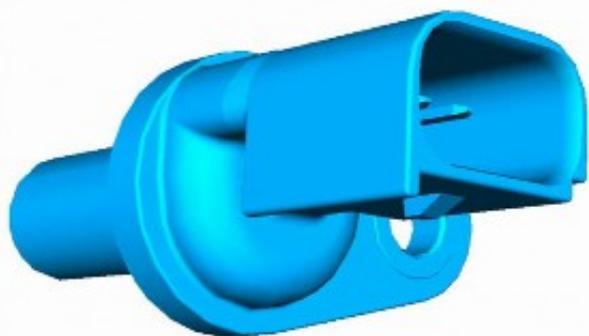
The trigger wheel has two missing teeth representing 12° of crankshaft rotation. The two missing teeth provide a reference point for the angular position of the crankshaft.

When the space with the two missing teeth pass the sensor tip, a gap in the signal is produced which the ECM uses to determine the crankshaft position. The air gap between the sensor tip and the ring is important to ensure correct signals are output to the ECM. The recommended air gap between the CKP sensor and the trigger wheel is 0.4 mm- 1.5 mm.

The ECM uses the signal from the CKP sensor for the following functions:

- Synchronisation.
- Determine fuel injection timing.
- Enable the fuel pump relay circuit (after the priming period).
- Produce an engine speed signal which is broadcast on the controller area network (CAN) bus for use by other systems.

CMP



E86092

The CMP is located towards the rear of the left hand side of the cylinder head. The sensor tip protrudes through the face to pick up on the reluctor behind the camshaft pulley.