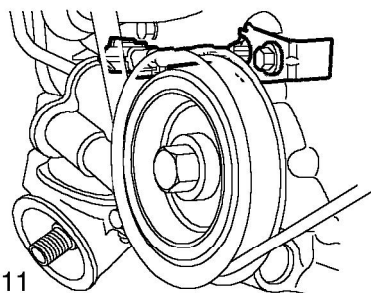




**Camshaft Position (CMP) sensor (C0176)**



M18 0311

The CMP sensor is located on the front of the engine, above and behind the crankshaft pulley. The CMP sensor is a Hall effect sensor producing four pulses for every two crankshaft revolutions. The sensor is positioned close to the camshaft gear wheel, the gear wheel has four slots machined at 90° intervals. This allows the ECM to recognise 4 individual cylinders every camshaft revolution or all 8 cylinders every crankshaft revolution.

The CMP sensor Hall effect works as a magnetic switch. It switches battery voltage on or off depending on the position of the camshaft gear wheel in relationship to the sensor.

The ECM uses this signal for cylinder recognition to control sequential fuel injection, engine knock and diagnostic purposes.

**Input/Output**

Electrical input to the camshaft position sensor is from fuse 2 located in engine compartment fuse box. One output is sensor earth, the other is the signal output to the ECM via pin 20 of connector C0636.

The CMP sensor can fail the following ways or supply incorrect signal:

- Sensor open circuit.
- Short circuit to vehicle battery supply.
- Short circuit to vehicle earth.
- Incorrect fitting of the sensor.
- Excessive camshaft gear wheel tolerance.
- Excessive camshaft endfloat.
- Camshaft and crankshaft misalignment.
- Speed signal correlation with CKP sensor signal.
- Cam wheel magnetised / residual magnetism

In the event of a CMP sensor signal failure any of the following symptoms may be observed:

- Ignition timing reverts to default values from ECM memory.
- Loss of cylinder correction.
- Loss of active knock control.
- Loss of active knock control diagnostics.
- Loss of cylinder identification for misfire diagnostics.
- Loss of quick synchronisation of crankshaft and camshaft for cranking/ start up.
- Fuel injection could be 360° out of phase.
- Front HO<sub>2</sub>S sensor ageing period diagnostic disabled (NAS only)

Should a malfunction of the component occur the following fault code may be evident and can be retrieved by TestBook:

P code	J2012 description	Land Rover description
P0340	Camshaft position sensor circuit malfunction	Open/short circuit to vehicle supply or earth

The fault condition has to be detected for more than 100 cam pulses (25 revolutions) when the engine speed is greater than 500 rev/min.