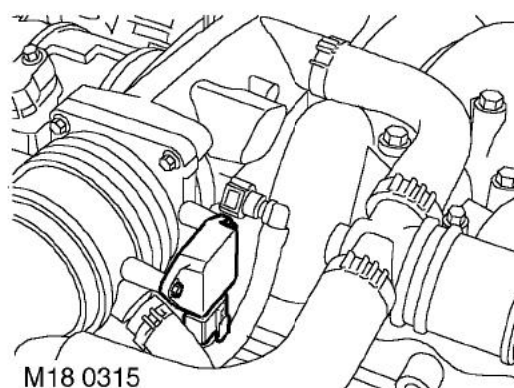


## ENGINE MANAGEMENT SYSTEM - V8

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### Throttle Position (TP) sensor (C0175)



The TP sensor is located on the throttle body assembly in the engine compartment. The ECM is able to determine the position of the throttle plate and the rate of change of its angle. The ECM processes the signal received from the TP sensor.

The TP sensor consists of a resistance track and a sliding contact connected to the throttle plate assembly. As the throttle is opened and closed the sliding contact moves along the resistance track to change the output voltage of the sensor. The ECM determines throttle plate position by processing this output voltage. The connection of the sensor to the throttle plate assembly is via a shaft.

The ECM is able to determine the closed throttle position, this enables the TP sensor to be fitted without the need for prior adjustment. The TP sensor signal has input into the ECM's fuelling strategy and also to determine closed throttle position for idle speed control. The TP sensor also supplies the ECM with information to enable the overrun fuel cut off strategy to be implemented. When the ECM receives closed throttle information from the TP sensor it closes the injectors for the duration of the closed throttle time.

The TP sensor signal is also used by the Electronic Automatic Transmission (EAT) ECU to determine the correct point for gear shifts and acceleration kickdown. The ECM also supplies the SLABS ECU with this TP sensor information as a PWM signal.

#### **Input/Output**

The TP sensor has electrical input and output. Input is a 5 volt supply via pin 10 of connector C0636 of the ECM. The signal output is via pin 24 of connector C0636 and is a varying voltage, less than 0.5V (closed throttle) and greater than 4.5V (wide open throttle) depending on throttle plate position. The TP sensor earth is via pin 25 of connector C0636 of the ECM, this acts as a screen to protect the integrity of the TP sensor signal.

The connector and sensor terminals are gold plated for corrosion and temperature resistance, care must be exercised while probing the connector and sensor terminals.

If the TP sensor signal fails, the ECM uses a default value derived from engine load and speed.

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

- Sensor open circuit.
- Short circuit to vehicle supply.
- Short circuit to vehicle earth.
- Signal out of parameters.
- Blocked air filter (load monitoring, ratio of the TP sensor to air flow).
- Restriction in air inlet (load monitoring, ratio of the TP sensor to air flow).
- Vacuum leak



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

- Engine performance concern.
- Delayed throttle response.
- Failure of emission control.
- Closed loop idle speed control inoperative.
- Automatic gearbox kickdown inoperative.
- Incorrect altitude adaptation.
- MIL illuminated (NAS only).

There are three throttle position sensor diagnostic checks:

- TP sensor signal is greater than the maximum threshold value – the engine speed must be greater than 400 rev/min for longer than 2 seconds and the signal must be greater than 96% for longer than 50 ms.
- TP sensor signal is less than the minimum threshold – the engine speed must be greater than 400 rev/min for longer than 2 seconds and the signal must be less than 4% for longer than 50 ms.
- Ratio of throttle position to mass of air flow – the calculated throttle angle must be outside limits when the engine speed is between 800 rev/min and 4000 rev/min, the engine load is between 2 and 6.5 and the coolant temperature is above -10°C (14°F).

Should a malfunction of the TP sensor occur the following fault codes may be evident and can be retrieved by TestBook.

P code	J2012 description	Land Rover description
P0101	Mass or volume air flow circuit range/performance problem	Load monitoring, the ratio of throttle position to air flow
P0122	TPS a circuit low input	Signal < minimum threshold
P0123	TPS a circuit high input	Signal > maximum threshold