

Oil Level Sensor

For the purpose of monitoring the engine oil level, the engine oil symbol lights red to indicate "oil pressure too low" or yellow to indicate "oil level too low". The "oil pressure too low" warning always has priority. The engine oil symbol lights yellow if the oil level is detected as being too low yet the oil pressure is still maintained. Once recognized, the "oil loss" status is stored and also indicated while driving until the ignition is switched off (ignition lock in position 0). If "oil minimum reached" is recognized, this status is indicated for 30 seconds after turning off the engine. Failure of the oil level sensor is signalled after approx. 25 - 30 seconds when the ignition key is turned to position 2 (terminal 15) and oil pressure is applied (engine running). If the sensor fails while driving, this status is not indicated via the oil level warning. This oil level warning has become necessary due to the extension of the oil change cycle (25 000 km).

Sensor function

The oil level is monitored by an active oil level sensor that sends a signal via a line to the instrument cluster. The signal is routed via the DME control unit, however, it is only looped through.

The oil level sensor supplies a signal with varying pulse width and frequency. The frequency is between 1 Hz and 10 Hz. The measuring principle of the thermal oil level sensor is based on the change in the heating and cooling time of the sensor element located in the engine oil. The High time (pulse ON period) and the Low time (pulse OFF period) correspond to the heating and cooling periods (sensor is cooled by the oil) of the sensor heating element. The High time is dependent on the engine oil temperature and the Low time on the oil level.

The currents and times in the sensor element are also influenced by the current oil temperature and driving dynamics. The oil level is determined from the Low times based on a characteristic map. The level is high at a Low time of approx. 200 ms and low at approx. 750 ms cooling duration. The heating-up time is dependent on the engine oil temperature and is within the time range from 5 ms to 100 ms. The heating-up and cooling-down times must be evaluated for the purpose of assessing the oil level. After a defined warm-up phase, this evaluation recognizes two statuses, i.e. "oil minimum reached" and "oil loss detected".

Fault codes are entered in the instrument cluster if the sensor fails or is faulty.