

Actuators + Sensors

The vehicle sensors

While actuators (also known as converters) convert electrical signals (e.g. into movement, pressure or temperature), a sensor “feels” these temperatures, the pressure or acceleration and translates them into electrical signals. Actuators + sensors are increasingly important for engine management in modern engines to provide flexible systems with the necessary impulses for optimal engine control. Sensor failures can often result in significant problems in the control system or even expensive total failure of the drive. Herth+Buss therefore offers a large number of sensors for a wide range of vehicles, the most important of which are outlined below with details of their functional operation and dangers in the event of failure.



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Sensor, wheel speed

It records the speed of the wheel. ABS, ESP and ASR rely on plausible wheel speed values. Failure is a high safety risk. As with most of the other sensors, the main causes of failure are electrical or mechanical faults. One specific fault in wheel speed sensors may be increased wheel bearing clearance.

Signs of failure:
Failure of ABS, ESP and ASR.

Article number: 7066...
J590... – J593...



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Mass air flow meter

It is a flow meter which determines the mass of air flowing through per time unit. If the supplied air mass per cylinder fill is not optimal in conjunction with the fuel mixture, the fuel does not burn completely. The engine control unit detects this fault and activates the emergency mode. Possible failure causes include: wear or soiling on the mass air flow meter by dirt particles and oil vapours.

Signs of failure:
The emission level increases and the maximum performance values are not achieved. The engine indicator light shows an error.

Article number: 70640...
J568...



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EGR valves

The exhaust gas recirculation (EGR) valve is fitted in all motor vehicles that comply with the Euro 4 emissions standard. The valve feeds small quantities of exhaust gases back into the combustion chamber. After a certain running time, EGR valves are at severe risk of failure, as they are subject to heavy demands in terms of sooting and high thermal loads.

Signs of failure:
Increased fuel consumption, bad throttle response and high emission values. Control lamps can indicate the fault.

Article numbers: 70671...



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Knock sensor

It acts as the “ear” of an electronic assembly, which records engine vibrations or vibrations of combustion engines. If the knock sensor registers a knock in the engine, the engine control unit adjusts the ignition point towards “late” until no more knocking noises can be heard. The ignition point approaches “early” until knocking noises can be heard again. For in-line engines (small engines), one knock sensor is usually sufficient, for V engines

or boxer engines, two or even more are required. Engine knocking is caused by compression-ignitions of the mixture in the tail gas area. These mainly occur when fuel with a low octane number is used.

Signs of failure:

In the event of a failure in the knock sensor, the engine control unit switches to emergency mode and delays the ignition to a maximum permissible value.

This results in reduced performance and increased emission values.

Article number: 70620...
J567...



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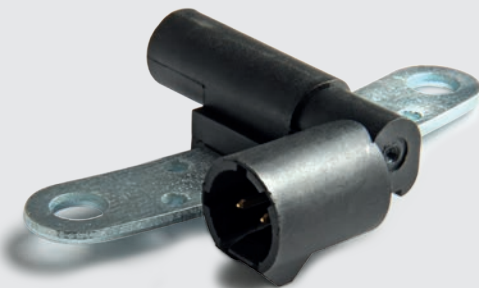
Pulse generator, crankshaft

The pulse generator (also known as TDC sensor) records information such as engine speed and crankshaft position and is a pulse generator for ignition triggering. Using the engine speed as an example, this speed is the main control variable for ignition control. Possible causes include: a short circuit in the winding, an open circuit, mechanical damage to the gear rim

or heavy soiling. Inductive or hall sensors can be used depending on the manufacturer and system.

Signs of failure:
If the sensor stops working, the engine may fail and an error code is saved.

Article numbers: 70610... J566...



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Sensor, camshaft position

Camshaft sensors work in conjunction with the crankshaft sensor to define the first cylinder precisely, thereby identifying the injection sequence. They therefore serve to record the exact position of the camshaft and now usually work in accordance with the hall principle. Possible causes of the fault include mechanical damage, a break in the sensor wheel, internal short circuits or interruptions in the connection to the control unit.

Signs of failure:
A defect in the camshaft sensor is indicated by the engine control light lighting up, an error code being saved and the control unit running in emergency mode.

Article number: 70630...
J563...



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Coolant temperature sensor

Records the operating temperature of the engine via the circulating cooling water. Functional operation is differentiated between: NTC – negative temperature coefficient (resistance reduces when the temperature increases) or PTC – positive temperature coefficient (resistance increases as the temperature increases).

Signs of failure:
A sensor failure often makes itself felt through problems in the starting process, increased idling speed, a rise in fuel consumption and a significant deterioration in exhaust emission values.

Article number: 70511...
J562...



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Idle speed control valves

Whether it is heated seats, electric seat adjustment or climate control, the number of loads in a vehicle is constantly rising. The idle speed control valve maintains the engine at a constant speed when idling, depending on the engine temperature. Idle speed control valves also fail through use over time.

Signs of failure:
Problems in the starting process, unsteady idling speed and “sawing” of the engine are indications of a fault.

Article number: 706720...



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Sensor, manifold pressure

The sensor measures the absolute pressure in the manifold after the throttle and thereby also the engine load. It is therefore used to calculate the optimal fuel injection quantity. The causes of failure and functional problems are similar to the throttle sensor.

Signs of failure:
Starting problems, increased fuel consumption, bad throttle response or “baulking” and stuttering in the engine.

Article number: 70670...



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Sensor, oil pressure

It permanently measures the engine oil pressure and warns the driver of insufficient lubrication via an indicator light.

Signs of failure:
Failure to comply could result in a complete engine failure.

Article number: 70542...



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Lambda sensors

Regulated catalytic converters have been used in vehicle construction to reduce exhaust emissions for over 20 years. The regulating sensor installed in front of the catalytic converter measures the residual oxygen content in the exhaust gas. The lambda sensor generates a lower or a higher voltage depending on the levels measured, which is then passed on to the engine control unit (ECU) as a signal. The engine control unit uses this information to set the optimal mixture of fuel and air. The diagnostic sensor

installed behind the catalytic converter checks that the catalytic converter is working effectively. If the ECU detects a deviation based on these measurement results, a warning light appears to indicate that a visit to the workshop is needed.

Signs of failure:
Increased fuel consumption due to incorrect measurement results.

Article number: J146... – J148...

