2.3.3 EOBD

The EURO III emissions standard provides for introduction of an On-Board diagnostic system, the EOBD.

EOBD is required
- from January 1, 2000 for all new certified passenger vehicles and light utility vehicles with petrol engines
- from January 1, 2001 for all new registered passenger vehicles and light utility vehicles with petrol engines
- from January 1, 2003 for all new certified passenger vehicles and light utility vehicles with diesel engines
- from January 1, 2004 for all new registered passenger vehicles and light utility vehicles with diesel engines

Important note:
"Certified" in this sense means that the manufacturer must prove compliance with the standards and laws as part of a prototype certification test before introducing a new vehicle into the market for the first time.
The introduction of EOBD has produced the following consequences for vehicle manufacturers:
- standardised On-Board diagnostic system with fault code memory in each new registered vehicle
- unrestricted access over a standardised interface (diagnostic socket and protocol)
- an error scan tool applicable to all OBD vehicles
- uniform fault codes
- free availability of all data required for maintenance, diagnosis and repair

2.4 Scope and type of the diagnosis

The scope of the EOBD diagnosis basically corresponds to the American OBD II. It has, however, been "eased" in some points. There are some vehicle manufacturers that comply with the "OBD II" standard worldwide.

Component	Type of diagnosis
catalytic converter	• function • detection of ageing and contamination
lambda probe (pre and post catalyst probe)	• function • electric components for connection and continuity • detection of sluggishness ("ageing")
ignition system (uneven running)	• function • detection of ignition and combustion misfires
fuel supply/mixture formation	• map corrections (short and long-term adaptation)
fuel tank aeration and ventilation system ("AKF system")	• function • impermeability
fuel tank system	• impermeability by leak diagnosis[1)]
secondary air system	• electric components for connection and continuity • function • effectiveness[2)]
exhaust gas return system	• electric components for connection and continuity • function • effectiveness[2)]
all remaining exhaust gas relevant components such as: • air mass sensor • sensors for the engine temperature • sensor for intake air temperature • sensor for intake manifold pressure • sensor for absolute pressure • actuators	• electrical components for connection and continuity (earth connection, plus connection, interruption) • signals for plausibility (comprehensive components)
engine control unit	• self monitoring

[1)] Not required by EOBD if the tank seal is protected against loss.
[2)] Not required by EOBD.

2.5 Monitoring process

EOBD all exhaust gas relevant components and systems are monitored.
Certain components and systems are monitored continuously ("permanent monitoring").
Other components and systems are monitored only sporadically

2.5.1 Permanent monitoring (continuously monitored systems)

- uneven running
- (combustion/ignition misfires)
- fuel system
- (mixture adaptation, injection times)
- all electric circuits for exhaust gas relevant components
- signal characteristics of the lambda probe

Permanently monitored systems are monitored irrespective of the temperature and immediately after start-up.
Function errors lead to an immediate activation of the malfunction indicator lamp.

2.5.2 Cyclical monitoring (sporadically/occasionally monitored systems)

Systems and components with functions linked to certain operating conditions will be checked only after the appropriate operating points, engine speed, load or temperature threshold, have been run through.

The following are monitored cyclically:
- catalytic converter/catalytic converter heating
- lambda probe/lambda probe heating
- secondary air system (SLS)
- tank deflation/activated carbon filter system (AKF)
- exhaust gas recirculation (EGR)

2.5.3 Driving cycle

So that the diagnosis of a certain system can be run, exactly defined conditions must apply (driving cycle). These operating conditions for carrying out a safe monitoring are referred to as the "driving cycle".
For example, if a vehicle is being used only for short distances in city traffic, it can take a while until all the systems have been checked.

Important note:
This "driving cycle" is not identical to the "New European Driving Cycle (NEFZ)" as required for the prototype certification test of a vehicle.

2.5.4 Occasional shut-off of the diagnostic function

Misdiagnoses can occur under certain operating conditions. To prevent this, the diagnostic functions can be switched off by the manufacturer, for example, under the following conditions:
- fuel level lower than 20 % of the overall volume of the tank (only for OBD II)
- high elevations over 2.500 m above NN (sea level)
- ambient temperatures below -7 °C
- low battery voltage
- operation of an auxiliary drive unit (e.g. hydraulic cable winch)
- Uneven running detection can be switched off by the engine management when the road is not level (bad road surface) so that the roughness of the road will not be misinterpreted as a misfire.