

Information about the new European OBD (Some is from directive 98/69/EC)

OBD is defined as: "**OBD**",

"an on-board diagnostic system for emission control which has the capability of identifying the likely area of malfunction by means of fault codes stored in computer memory."

What can be controlled by EOBD:

Defective catalyst

Defective lambdasensor

Engine misfire

Defective fuel- / airregulation

Failure in a component, that will cause increased emissions, above the limits

If the EOBD MIL is on, the following data must be saved in a Freeze Frame:

The saved engine data must include, but not limited to this:

Calculated load

Engine speed

Fuel/Air regulation **Fuel Trim**, (if available)

Fuel pressure (if available)

Intake manifold pressure (if available)

Vehicle speed (if available)

Engine coolant temperature

Fuel control system status(**Open-loop, Closed-loop**), (if available)

The failure code, that caused the the freeze frame saved

The following signals are available through the diagnostic connector:

Diagnose-failure codes

Engine coolant temperature

Fuel control system status (closed loop, open loop, other)

Fuel trim (if available)

Ignition timing advance

Intake air temperature

Manifold air pressure (if available)

Air flow rate

Engine speed

Throttle position sensor

Secondary air status (upstream, downstream or atmosphere)

Calculated load value

Vehicle speed (if available)

Fuel pressure (if available)

Mode 9 data

Display of Software Calibration Identification number (CID) that identifies the software within the EOBD PCM (2005).

Fx. Alfa 147: 1037360484011000 (Bosch Eprom # 1 037 360 484).

Display of the Vehicle Identification Number (VIN) stored by the EOBD PCM.

Display of Calibration Verification Number that determines whether emission-related calibrations within the ECU software have been altered.

Fault code storage

The OBD system must record code(s) indicating the status of the emission-control system.

Separate status codes must be used to identify correctly functioning emission control systems and those emission control systems which need further vehicle operation to be fully evaluated.

Fault codes that cause MI activation due to deterioration or malfunction or permanent emission default modes of operation must be stored and that fault code must identify the type of malfunction.

At the same time the distance travelled by the vehicle since the MI was activated must be available at any instant through the serial port on the standard link connector, from 2003 if the vehicles is fitted with an electronic speed input. All cars from 2005.

Extinguishing the MI

For misfire malfunctions at levels likely to cause catalyst damage (as specified by the manufacturer), the MI may be switched to the normal mode of activation if the misfire is not present any more, or if the engine is operated after changes to speed and load conditions where the level of misfire will not cause catalyst damage.

For all other malfunctions, the MI may be de-activated after three subsequent sequential driving cycles during which the monitoring system responsible for activating the MI ceases to detect the malfunction and if no other malfunction has been identified that would independently activate the MI.

Erasing a fault code

The OBD system may erase a fault code and the distance travelled and freeze-frame information if the same fault is not re-registered in at least 40 engine warm-up cycles.

Informationdata

No later than three months after the manufacturer has provided any authorised dealer or repair shop within the Community with repair information, the manufacturer shall make that information

(including all subsequent amendments and supplements) available upon reasonable and non-discriminatory payment and shall notify the approval authority accordingly.

A manufacturer may disable the OBD system if its ability to monitor is affected by low fuel levels. Disablement must not occur when the fuel tank level is above 20 % of the nominal capacity of the fuel tank.

A manufacturer may disable the OBD system at ambient engine starting temperatures below 266 °K (-7 °C) or at elevations over 2 500 metres above sea level provided the manufacturer submits data and/or an engineering evaluation which adequately demonstrate that monitoring would be unreliable when such conditions exist. A manufacturer may also request disablement of the OBD system at other ambient engine starting temperatures if he demonstrates to the authority with data and/or an engineering evaluation that misdiagnosis would occur under such conditions.

MIL

The MI (normal yellow light) may not be red. The MI must flash if there is a failure (engine misfire) If the ECU is in default mode, the MI must be activated, if the emissions are too high.

Warm-up cycle

Means sufficient vehicle operation such that the coolant temperature has risen by at least 22 °C, from engine starting and reaches a minimum temperature of 343 °K (70 °C).

Permanent emission default mode

Refers to a case where the engine management controller permanently switches to a setting that does not require an input from a failed component or system where such a failed component or system would result in an increase in emissions from the vehicle to a level above the limits given in table 1.

Limits where the MI must be activated, for passenger cars below 2500 kg:(Gasoline / Diesel)

CO g/km	HC g/km	NOx g/km	PM g/km
3,2 / 3,2	0,4 / 0,4	0,6 / 1,2	- / 0,18

Table 1

Some dates for EOBD:

2001	2002	2003	2004	2005
Gasoline cars less than 2500kg	Gasoline cars more than 2500kg	Mileage after DTC Lamp on	Diesel less than 2500kg, < 6 pass. total	Software Calibration Identification number

Fuel/Air regulation:

Short Time Fuel Trim and Long Time Fuel Trim

The figures are: -100 % 0 % +100 %

If the intake on an engine has a leak, STFT will increase due to the increase of fuel compared to default programmed values, e.g. to +10%, if the leak is constant, LTFT will change to e.g. +10% and STFT will decrease to ca. 0

The first cars with ISO15765 CAN for EOBD diagnostics are out on the street now from august 2002.

Ford Fiesta

Opel Vectra

Mazda 6

From 2008 there must be ISO15765 CAN for OBD-II in all vehicles.

In 1985 CARB (California Air Research Board) made regulations for OBDI cars from 1988.
In 1989 made regulations for OBDII cars from 1994.

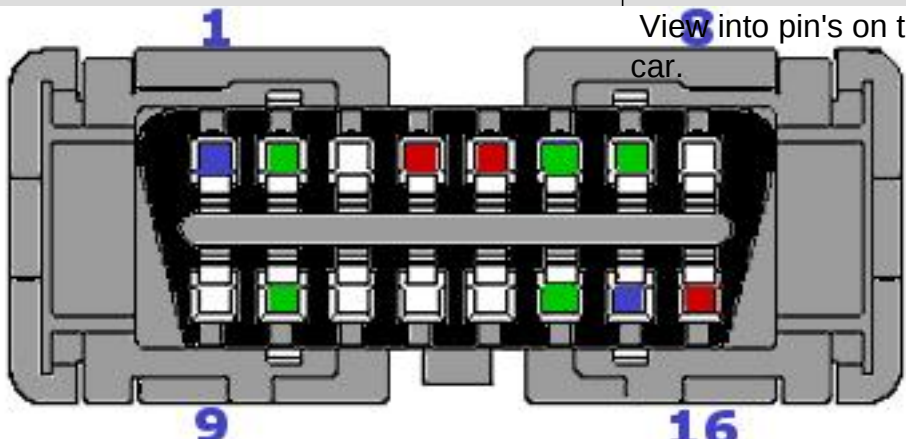
Diagnostic connector

There are 4 communication standards, with 3 different interfaces for EOBD

ISO 9141-2, with 1 or 2 connection/s, 10.4 Kbps	Pin 7 (K-line) + maybe pin 15 (L-line, initialization)
ISO 14230, Road Vehicles - Diagnostic Systems - KeyWord Protocol 2000 , 10.4	Pin 7

EOBD information

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Kbps	
ISO 11519-4 (SAE J1850), with 2 connections, 41.6 Kbps PWM [1]	Pin 2 (Bus+) + pin 10 (Bus-)
ISO 11519-4 (SAE J1850), with 1 connection, 10.4 Kbps VPW [2], 3 byte header + CRC, no "checksum" or "inter-byte separation" (In Frame response byte ?)	Pin 2 (Bus+)
ISO 15765-4, Road Vehicles - Diagnostics on CAN, HiSpeed 250/500 kbit/s	Pin 6 CAN_H line + pin 14 CAN_L line
SAE J2411, GM single wire CAN (Ign. for VW/Audi/Seat/Skoda)	Pin 1
Chrysler, CCD+ (not OBD)	Pin 3
Chrysler, CCD- (not OBD)	Pin 11
Chassis ground	Pin 4
Signal ground	Pin 5
Battery + 12V	Pin 16
 View into pin's on the OBD connector in the car.	

[1] PWM = Pulse Width Modulation

[2] VPW = Variable Pulse Width modulation