Site = <https://www.pathpartnertech.com/automotive-obd-for-continuous-vehicle-monitoring/>

OBD stands for On-board diagnostics. OBD system refers to the in-vehicle system, which monitors and reports the status of the vehicle. With the help of OBD port and OBD Connector provides access to the various vehicle parameters like vehicle speed, emission data, engine data in the form of Diagnostic Trouble codes are possible.

The OBD system is designed to reduce emissions by monitoring the performance of Engine components.

**What are OBD-I and OBD-II?**

There are two kinds of OBD systems:

OBD-I: OBD systems developed throughout the 1980s are referred to as OBD-I.OBD-I systems are not standardized. It is difficult for a mechanic who wants to access diagnostic information has to buy a different tool for different vehicles.

OBD-2: In the early 1990s, SAE (Society of Automotive Engineers) and ISO issued standards for the interchange of digital information between ECUs and diagnostic scan tools. All OBD-II based vehicles are required to use standard diagnostic connectors and communicate via one of the standard OBD-II protocols. OBDII cars have a port under the dashboard on the driver’s side where the OBD connector is plugged in and, the owner gets the information regarding repairs of the vehicle subsystem. OBD provides access to status information for power Engine, Emission Control Systems, Vehicle identification number, Calibration Identification number, Ignition counter, Emissions Control system counters.

OBD system internally monitors various subsystems and reports if any malfunction is detected through vehicle diagnostics communication. It is a query-response communication. The external scan tool is connected to the internal vehicle system through the OBD port and OBD connector. CAN, LIN, Flexray, MOST are used for diagnostic communication.

#### Why is OBD needed?

* Help Technicians properly diagnose and repair complex problems.
* A robust Emission control system
* Effective and inexpensive emission inspections.
* Keep emissions low by detecting any problem in the emission control system in prior.
* Supports for the good lifetime period of vehicle and driver safety
* It eliminates the replacement of any vehicle subsystem by early detection of problems
* Prevent secondary Malfunctions
* Eliminates unnecessary repairs since the scan tool gives correct information where the problem exactly occurred.

#### OBD Diagnostic Procedure

* The system waits for the monitoring conditions.
* Observes signals coming directly from the component or related to the performance of the component
* Verifies functionality, i.e., checks whether it satisfies the malfunction criteria
* Notifies owner of the vehicle about the fault by MIL illumination, storing fault code/

OBD Dongle

OBD dongle is an adapter used to connect to the OBD port and provides diagnostic data to the Bluetooth connected computing device, i.e., smartphone, telematics control unit. It acts as an interface between the computer and ECU and translates messages from one protocol to another.

#### Illustration of how OBD Functions in the Catalyst Monitoring system

The exhaust and catalyst converter is used to safely move the exhaust gases away from the engine. OBD II equipped vehicles use upstream and downstream oxygen sensors, which are used to measure the oxygen content in the exhaust gases. These sensors are engine management feedback sensors that measure how efficiently fuel and air were burned in the combustion chamber. Exhaust gases coming out from the combustion chamber are sent to the catalyst combustion chamber, where these harmful gases are converted into harmless by absorbing nitrogen content and releases free oxygen. Downstream Oxygen sensors located behind the catalyst converter monitor converter efficiency. If the efficiency is less, the converter is not cleaning up the pollutants in the exhaust. The final emission of these exhaust gases through tailpipe to the atmosphere.

Oxygen sensor data is used to evaluate catalyst conversion performance. Based on these oxygen sensor data, one can correlate the exhaust tailpipe emissions with the catalyst system performance. When emissions exceed malfunction threshold, the OBD system turns on MIL and store fault information of the catalyst.