

I'm not robot!

A3, TT, A4, A5, A6, A8, Q5, Q7: A Class, C Class, E Class, GLK Class, CLS, Sprinter; Astra H, Astra J, Insignia, Corsa D, Signum, Vectra C, Zafira B, Mokka, Meriva B; 9-3, 9-5; Altea, Leon, Toledo, Exeo, Ibiza; Octavia, Superb, Yeti, Fabia, Roomster; Beetle, Eos, Golf V, Golf VI, Jetta III, Jetta IV, Scirocco, Phaeton, Touareg, Passat, Polo, Caddy III, Touran, Tiguan Every Engine Sensor ExplainedIn this video, every single car engine sensor is explained. For each sensor we'll be explaining what it does, how does it do it, where is the sensor location and what happens if the sensor goes bad. There are also OBD2 error codes for all the sensors. For example: P0335, P0118, P0131, P0340, P0300, P0102, P0113, etc.Related: OBD / OBD-II Diagnostic Trouble Code DatabaseSo the next time you have a problem with one of your sensors you will know what's happening, why is it happening, where is the sensor, and what will happen if you don't fix it.To make the video simple and logical its been grouped into 5 sensor categories.Position Sensors (crankshaft position sensor, camshaft position sensor, throttle position sensor)Air flow Sensors (mass air flow sensor MAF, vane air flow meter)Pressure Sensors (MAP or manifold absolute pressure sensor, oil pressure sensor, fuel pressure sensor)Temperature Sensors (IAT or intake air temperature sensor, coolant temperature sensor, fuel temperature sensor, oil temperature sensor)Air Fuel Ratios, Emissions and Others (oxygen O2 sensor both wide band and narrow band, egt or exhaust gas temperature sensor, nitrogen oxide or nox sensor for SCR selective catalyst reduction and the knock sensor)We'll see how each sensor communicates with the ECU and how each sensor is a piece of the puzzle. When they all work together correctly, the ECU gets to see the big picture and accurately and efficiently manage the operation of the engine.For example, the crankshaft position sensor tells the ECU where the piston is so the ECU knows WHEN to inject the fuel. Airflow sensors like the Mass airflow sensor or the map sensor tell the ECU how much air is coming into the engine so the ECU knows HOW MUCH fuel to inject. The throttle position sensor and the intake air temperature sensor tell the ECU the load placed on the engine and the intake air temp which further improves the accuracy of the injection.The final stream of information necessary for injection accuracy comes from the fuel pressure sensor which lets the ECU calculate exactly how long it needs to keep the injectors open in order to deliver the precise quantity of fuel needed.In case something does go wrong, we have the lifesaver sensors like the knock or oil pressure sensors. The knock sensor listens for knock or abnormal combustion and if it detects it warns the ECU and the ECU in a matter of milliseconds retards ignition timing and/or adds fuel to prevent knock from occurring again.The oil pressure and oil temperature sensors make sure that the engine oil, the lifeblood of the engine, is within functional parameters. As soon as it even briefly drifts out of expected values the ECU can protect the engine and warn the driver.All in all modern cars (and engine swapped hot rods) are a moving world of information where a large number of sensors rapidly provides endless amounts of data that gets interpreted at lightning speeds by the ECU where it triggers a sea of different actions that keep you moving smoothly and safely along the road all while preserving efficiency and minimizing emissions.Engine Sensors Explained0:57 Crankshaft position sensor02:54 Camshaft position sensor03:58 Throttle position sensor TPS05:44 Mass air flow sensor MAF07:39 Vane air flow meter AFM08:44 Manifold absolute pressure sensor MAP10:27 Oil pressure sensor11:55 Fuel pressure sensor12:34 Intake air temperature sensor IAT14:09 Coolant temperature sensor15:22 Fuel temperature sensor16:16 Oil temperature sensor17:24 Oxygen O2 sensor20:18 Exhaust gas temperature sensor EGT22:05 Nitrogen oxide sensor NOX23:01 Knock sensor24:07 Quick recap of key sensors Follow Us on Flipboard engine image by goce risteski from Fotolia.com Complex computer controls make modern auto engines practically sentient in their ability to recognize external and internal stimuli and adapt to accommodate them. The engine's sensors are its eyes and ears; if any one of them were to fail, the engine would have to "fly blind" and fall back on preprogrammed parameters. Furthermore, modern engineering allows the auto engine to interface with chassis and transmission controllers to offer the best performance for any conditions. An engine needs three basic things to function: a correct ratio of air to fuel, a well-timed spark to ignite it, and self-diagnostics to ensure that oil flows and the temperature remains stable. Every single sensor on the engine itself is there solely to provide the computer with real-time information on airflow, air/fuel ratio and crankshaft/camshaft position so that it can adjust fuel injection and spark timing. Mass airflow (MAF) systems use a heated sensor in the engine's intake duct to calculate the amount of air going in, a throttle position sensor to determine how far the gas pedal is depressed, and one or more oxygen sensors to decide whether or not the engine is getting the right amount of fuel for the air ingested. A crankshaft/camshaft position sensor tells the computer where the pistons are in their stroke, which determines fuel injection and spark timing. Manifold air pressure (MAP) systems work on a slightly different principle. MAP systems don't measure airflow directly; they use an intake-manifold mounted pressure sensor and air temperature sensor to determine air density and engine demand. The computer uses this information to extrapolate for the amount of air and fuel the engine should need for a given RPM. MAP systems work well for unmodified engines, but (because they are preprogrammed with the engine's parameters) are often incompatible with aftermarket modifications like larger camshafts, turbochargers and superchargers. There are two basic types of crankshaft/camshaft position sensors, magnetic and Hall Effect. Magnetic sensors work on the principle that metal passing in front of a magnetic field causes changes in the magnet field. The engine uses a gear-like wheel passing in front of the magnet to cause variations in the field, which tells the engine how fast the engine rotates. Hall Effect sensors work on a related principle, but sense current reversions caused by the passing gear-wheel. Oxygen sensors represent a science in and of themselves, and rely on a fascinating electrochemical phenomena wherein certain crystals (like cubic zirconia) actually produce an electrical current when heated. Exhaust gas temperature rises linearly with fuel-to-air ratio; thus, oxygen sensors can indirectly determine air/fuel ratio by reading exhaust heat. High temperatures mean too much fuel, low temperatures mean too little. Fun fact: oxygen sensors are the only sensors in your car that produce their own voltage. A modern car's Engine Management System consists of various electronic and electrical components. Moreover, these comprise engine sensors, relays, and actuators. They provide the car's Engine Control Unit with vital data parameters essential to govern various engine functions effectively. Generally speaking, Engine sensors are electro-mechanical devices that monitor various engine parameters. An engine uses different types of sensors such as Thermocouples, Resistance Temperature Detectors (RTDs), and Hall Effect sensors. Various Engine Sensors Types of Sensors: Furthermore, a thermocouple sensor is a temperature measuring device. It converts temperature into an electric charge. Besides, thermo-couples use two different conductors. Moreover, these conductors contact each other at one or more spots. Thus, they produce voltage. In turn, they send the signal in the form of an electric current to the ECU. Manufacturers commonly use Thermo-couples as temperature sensors. They measure and control the temperature, such as in the case of Engine Coolant Temperature. Besides, RTDs or Resistance Temperature Detectors also measure the temperature. However, they do so by correlating the resistance of the RTD element with temperature. However, pure metals such as platinum, nickel, or copper make the RTD element. For example, an air conditioning evaporator unit uses this type of probe sensor. AC Temperature Sensor Furthermore, a Hall-Effect sensor comprises a transducer. However, it varies its output voltage according to the magnetic field. Typically, Hall-Effect sensors detect speed or velocity. For example, positioning applications in automobiles use this type of sensor. So, manufacturers used them for detecting the crankshaft speed or its position. Besides, the engine sensors provide the Engine Management System with vital data parameters in real-time. Further, these engine sensors continuously monitor the engine parameters. They also provide the ECU with changes that occur in the data from time to time. Based on these inputs, the ECU re-calculates the correct air-fuel ratio. In addition, it re-calculates the ignition timing. Besides, it also calculates and supplies the proper amount of fuel to the engine under various load conditions. A Modern-day Car Has The Following Sensors: SL. Name of the Sensor Purpose 01Air-fuel Ratio MeterIt monitors the correct air-fuel ratio for the engine02Engine Speed SensorIt monitors engine speed03Throttle Position SensorFurther, it monitors the position of the throttle in an engine04Crank Position SensorMonitors piston's TDC position in the engine05Cam Position SensorFurther, it monitors the position of valves in the engine06Knock SensorDetects engine knocking because of timing advance07Engine Coolant Temperature SensorMoreover, it measures the engine temperature08Manifold Absolute Pressure or MAP SensorUsed to regulate fuel metering09Mass Air Flow or MAF SensorFurther, it notifies the mass of air entering the engine to ECU10Oxygen/O2/Lambda SensorIt monitors the amount of oxygen in the exhaust11Fuel Pressure SensorAdditionally, it measures pressure in the fuel system12Vehicle Speed Sensor (VSS)Measures the speed of a vehicle Furthermore, the ECU sends signals to various relays and actuators after calculating the fuel quantity. They include the Ignition Circuit, Spark Plugs, Fuel Injectors, Engine Idling Air Control valve, and Exhaust Gas Re-circulation (EGR) valve. Thus, it extracts the best possible engine performance while keeping emissions as low as possible. Since all the engine sensors connect to the ECU, it can also monitor them for malfunction. Besides, the ECU collects signals from faulty engine sensors. Then again, the ECU stores them in its memory. So, you can diagnose these faults through two methods. Firstly, by reading the ECU memory with the help of 'fault codes.' Or thru' sophisticated engine diagnostic equipment supplied by vehicle manufacturers. For more information, please click here. Keep reading: How the Engine Immobiliser works? >>

1. **Introduction**

The purpose of this document is to provide a comprehensive overview of the current state of the project, including the progress made, challenges encountered, and the proposed next steps. This document is intended for the project team and stakeholders.

2. **Project Overview**

The project aims to develop a new software application that will streamline the workflow of our organization. The primary objectives are to improve efficiency, reduce errors, and enhance user experience. The project is currently in the development phase, with the core functionality being implemented.

3. **Progress Report**

The development team has successfully completed the initial design and architecture phases. The core functionality, including user authentication, data management, and reporting, has been implemented. The user interface has been designed and is currently being tested. The project is on track to meet the deadline.

4. **Challenges and Risks**

There are several challenges and risks associated with the project. The most significant challenge is the complexity of the data management system, which requires a high level of expertise. Another challenge is the limited resources available for the project. The risks include delays in the development process, budget overruns, and the potential for user dissatisfaction.

5. **Next Steps**

The next steps for the project are to complete the development of the core functionality, conduct thorough testing, and deploy the application to the production environment. The project team will continue to monitor the progress and address any issues that arise.

6. **Conclusion**

The project is making significant progress and is on track to meet the deadline. The project team is committed to delivering a high-quality software application that will meet the needs of our organization. The project is a testament to the team's hard work and dedication.

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