

MAP SENSOR

MANIFOLD ABSOLUTE PRESSURE SENSOR
SENSOR PRESIÓN ABSOLUTA DEL MÚLTIPLE

TECHNICAL INFORMATION

ENGINE MANAGEMENT
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The Intake **Manifold Absolute Pressure Sensor (MAP)** is an important **Electronic Injection System Sensor**. It is a “**pressure gauge**” that turns the pressure measured at the intake manifold into electrical signals informing the ECU.

WHAT IS YOUR APPLICATION?

In electronic injection systems finds application in:

- Inlet manifold pressure (or depressure) measurement - **MAP**
- In the measurement of atmospheric pressure (altitude sensors - **BARO**)

WHAT IS THE ABSOLUTE PRESSURE SENSOR (MAP) FUNCTION?

The function of the **MAP Sensor** is to inform the ECU of the absolute pressure present in the intake manifold whose pressure is a measure of the engine load.

- This information is used in the calculation of the permitted air mass and in the calculation of the ignition point advance.

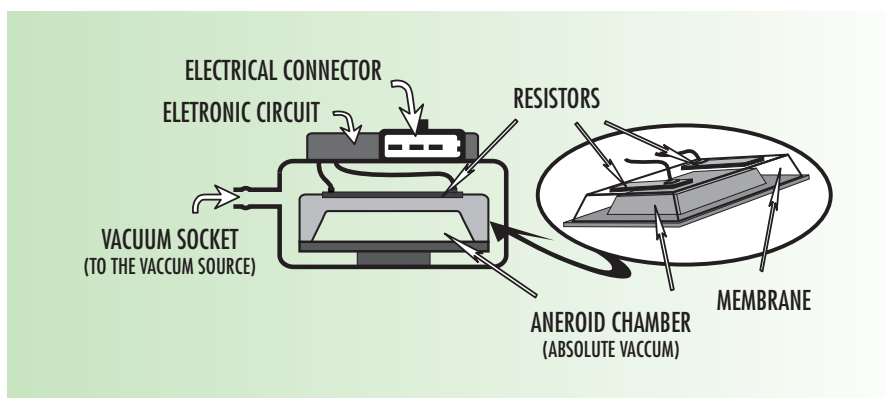
HOW DOES A MAP SENSOR WORK?

There are TWO TYPES of Sensors: **ANALOG AND DIGITAL**

PIEZO-RESISTIVE CAPSULE SENSOR **ANALOG MAP**

It consists of a ceramic diaphragm (**membrane**) whose surface resistors with piezoresistive properties are applied (**glued or screen printed**).

The electrical resistance of these resistors changes significantly when subjected to some kind of deformation. For example, when changing the dimensions of the diaphragm where they are applied. This is what happens when it deforms as a result of the pressure action outside the device.



THE DIAPHRAGM SEPARATES TWO CHAMBERS:

- One, sealed by a glass plate, contains absolute vacuum; it is called aneroid chamber.
- The other chamber is in direct communication with the vacuum source (manifold) through a hose.

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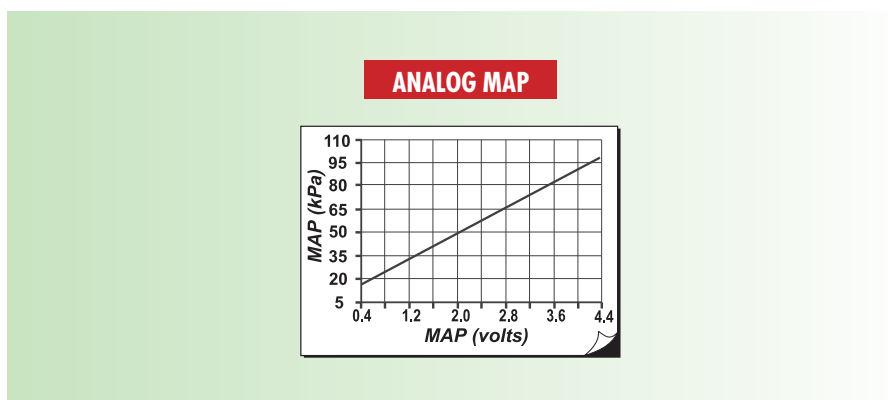
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The signal generated by the sensor is the result of the deformation suffered by the diaphragm when subjected to pressure variations.

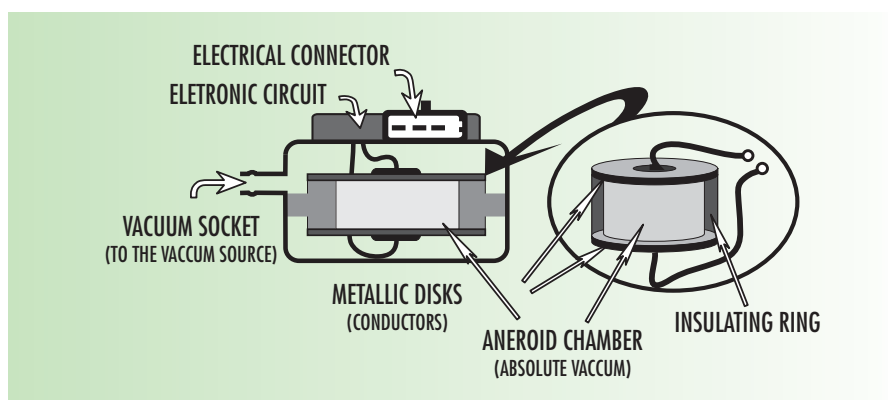
In its practical application, this type of sensor (**ANALOG SENSOR**) has an associated electronic circuit that transforms resistance variations (pressure variations) into electrical voltage variations.

The sensor is supplied with a reference voltage (**5V stabilized**) supplied by the control unit (ECU).



CAPACITIVE CAPSULE SENSOR DIGITAL MAP

In this device, two aluminum plates separated by an insulating ring containing a vacuum inside form an aneroid chamber.



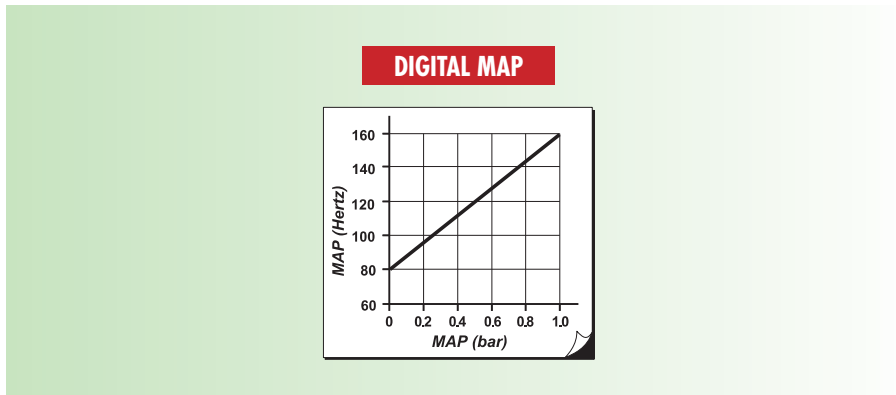
The set presents the electrical characteristics of a capacitor.

By changing the pressure to which the set is subjected, the electrical capacity of the capacitive capsule changes.

In the practical application of this principle, the sensor (**Digital Sensor**) has an associated electronic circuit that emits a pulsed signal (pulse train), which that frequency depends on the capsule capacity, the capsule, in turn, on the manifold pressure. (4) This type of sensor is found in the EEC-IV system.

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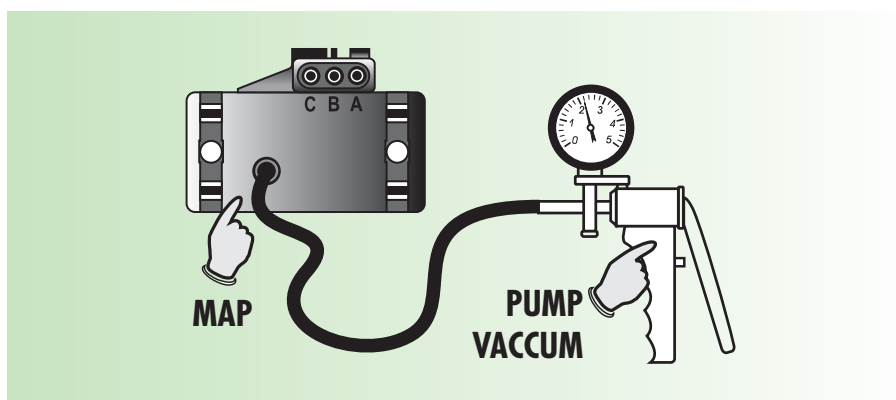
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VACUUM SENSOR

There are **PIEZORESISTIVE SENSORS** without aneroid chamber. In this case, the diaphragm has one of its faces subjected to the collector vacuum and the other to atmospheric pressure.

- This type of sensor measures depression comparing to atmospheric pressure. It is a **VACUUM SENSOR**.



WHAT IS COMBINED SENSOR? IS IT A MAP + TEMPERATURE SENSOR?

Currently, there are systems that use **ABSOLUTE PRESSURE SENSORS** located directly on the intake manifold. **THE PRESSURE SENSOR** is encapsulated together with the inlet **AIR TEMPERATURE SENSOR** in the same housing.

WHERE IT IS LOCATED?

The **MAP SENSOR** is located in **THE ENGINE'S VAULT**, **CONNECTED TO THE INTAKE MANIFOLD BY A HOSE** **APPROXIMATELY 30 CM LONG**.

The combined sensor (manifold pressure + air temperature) is mounted directly on the intake manifold.

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WHEN DOES THE MAP SENSOR NOT WORK?

It affects directly the calculation of the allowed air mass and therefore the amount of fuel injected. Therefore, depending on the failure type, the mixture may be enriched or depleted with effects on idling, throttle response and, fuel consumption.

When the sensor's fault results in an "out of range" fault condition (short circuit or open circuit), a fault code is registered in the ECU, which can be checked and fixed using a piece of test equipment (scanner). In this case, the system enters a state of emergency.

When the sensor's defect results in a "within operating range" fault condition, there is usually no fault code register on the ECU.

- However, the system may not work properly, as shown above.

HOW CAN I DIAGNOSE?

For the diagnose, a use of a scanner tool is recommended to check the parameters:

- "Absolute Pressure", "Collector Pressure", "MAP Sensor" or similar.

The displayed value can be a variable frequency, voltage, or a pressure value in **mmHg (millimeters of mercury)**, **psi (pounds per square inch)** or **kPa (kilopascal)**. For being a sensor that generates a voltage or variable frequency, it can only be verified with voltmeter or frequency meter, respectively.

For its verification, the sensor must be powered or connected to the circuit and, in this case, with the ignition on.

CHECK ENGINE LIGHT ACCESS CAN BE THE MAP SENSOR?

YES, MAY BE! It is very important to take a workshop as soon as possible to check out.

WARRANTY

All MTE-THOMSON products are **GUARANTEED FOR 01(ONE) YEAR** against defects from faulty materials or fabrication.

The guarantee is limited to the replacement of the faulty part; we cannot extend the guarantee to cover defects caused by misuse, neglect, accident or wear and tear. We cannot accept liability for consequential loss or damage which is claimed to have resulted from the use of one of our products.

More information:

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