

Air flow meter

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An **air flow meter**, is a device that measures air flow, i.e. how much air is flowing through a tube. It does not measure the volume of the air passing through the tube, it measures the mass of air flowing through the device per unit time. Thus air flow meters are simply an application of mass flow meters for a special medium. Typically, mass air flow measurements are expressed in the units of kilograms per second (kg/s).

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In automobiles

An air flow meter is used in some automobiles to measure the quantity of air going into the internal combustion engine. All modern electronically controlled diesel engines use air flow meter, as it is the only possible means of determining the air intake for them. In the case of a petrol engine, the electronic control unit (ECU) then calculates how much fuel is needed to inject into the cylinder ports. In the diesel engine, the ECU meters the fuel through the injectors into the engines cylinders during the compression stroke.

The vane (flap) type air flow meters (Bosch L-Jetronic and early Motronic EFI systems or Hitachi) actually measure air volume, whereas the later "hot wire" and "hot film" air mass meters measure speed of air flow.

The flap type meter includes a spring which returns the internal flap to the initial position. Sometimes if the spring is tensioned too tightly, it can restrict the incoming air and it would cause the intake air speed to increase when not opened fully.

Differential pressure is also used for air flow measurement purposes.

Failures

Air flow meters may fail or wear out. When this happens, engine performance will often decrease significantly, engine emissions will be greatly increased, and usually the Malfunction Indicator Lamp (MIL) will illuminate. In most countries in Europe, and in places in the United States where emissions inspections are obligatory, a lit MIL is cause for a vehicle to fail the inspection. Some engines do not idle with an air flow meter failure.

Air flow meter for R&D of cars

In the development process of internal combustion engines with engine test stands, an air flow meter/air flow measuring unit is used for measuring the continuous gravimetric air consumption of combustion engines.

Industrial environments

Air flow meters monitor air (compressed, forced, or ambient) in many manufacturing processes. In many industries, preheated air (called "combustion air") is added to boiler fuel just before fuel ignition to ensure the proper ratio of fuel to air for an efficient flame. Pharmaceutical factories and coal pulverizers use forced air as a means to force particle movement or ensure a dry atmosphere. Air flow is also monitored in mining and nuclear environments to ensure the safety of people.

See also

- Anemometer
- List of sensors
- Mass flow sensor
- Category:Engines
- Category:Engine fuel system technology
- In-line flow meter
- Insertion flow meter
- Thermal mass flow meter

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Categories: Flow meters | Engine fuel system technology

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