



Air Flow Sensor (MAF)

General

The air flow sensor records the incoming air flow. It is constructed of a duct style housing with a flow rectifier, sensor protection and a sensor module. The air flow sensor is fitted into the inlet pipe between the air filter housing and inlet manifold.



Function

Two metal film resistors, fitted on a glass membrane, situated in the air flow. The first resistor (RT) is a temperature sensor and measures the air temperature. The second resistor (RS) measures the air flow. Depending on air mass drawn into the resistor RS is cooled down. To compensate for the constant temperature difference between the resistors RT and RS the current flow through the resistor RS must be regulated. This heating current is the measured variable of the air flow drawn in by the engine. This measurement is needed by the ECU to assist in calculating the fuel injection.

Effects of failure

A faulty air flow sensor can cause the following:

- engine stalls or the ECU switches to limp mode
- engine warning light illumination

Causes of failure:

- bad connection at the plug
- damaged measuring elements
- mechanical damaged (vibrations, accident)
- range drift of the measurement elements (wrong scope pattern)



Diagnostics

For fault recognition consider the following system tests:

1. Check electrical lead for correct fitting and contact
2. Check air flow sensor for damage
3. Check measurement elements for damage
4. Measurement of the operation voltage, ignition on (wiring diagram needed for pin definition), measured value: 7.5...14 V
5. Measurement of the output voltage, engine runs (wiring diagram needed for pin definition), measured value: 0.... 5 V
6. Check the wiring harness between the sensor plug and the removed ECU plug for short circuit to earth and continuity, measurement with an ohmmeter between sensor plug and vehicle ground, measured value: >30 Mohm, measurement between sensor and ECU plug, measured value: < 1 ohm
7. Electronic check of the air flow sensor by the ECU. If there is a failure the ECU stores a fault/trouble code and the engine warning light is illuminated. The fault/trouble code can be read out with a code reader or a diagnostic test equipment.