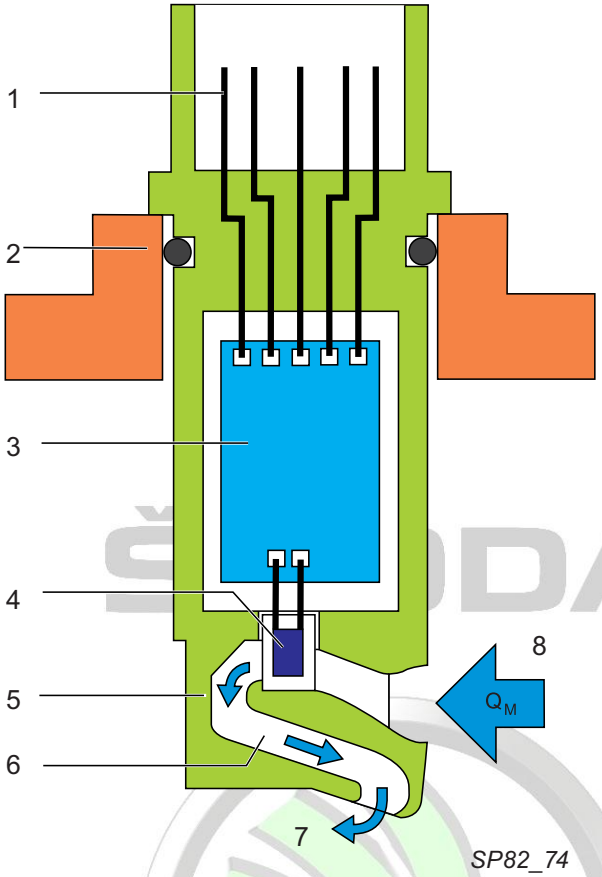
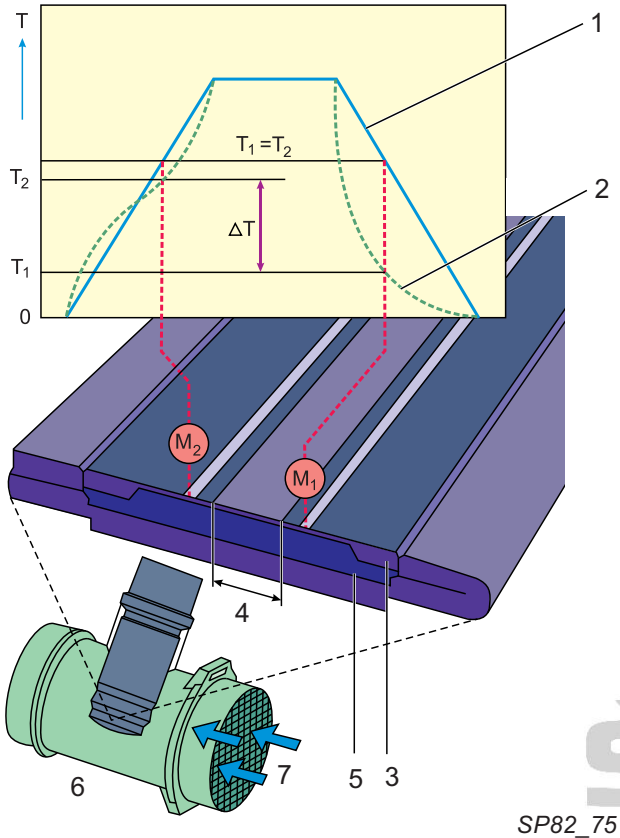
Hot-film air-mass meter HFM5

Structure and function principle

The air mass meter HFM5 is inserted into the suction pipe line behind the air purifier. The sensor consists of the member (4), around which flows the supplied air from the inlet chamber (8), as well as the evaluation electronics (3). The measuring elements are vacuum-metallised on the semiconductor substrate and the evaluation electronics on the ceramic substrate. The measuring channel (6) is shaped in such a way that eddy currents are prevented, thereby improving the stability against pulsating currents. This sender is the only one which detects a return flow.



1 Electrical connection (connector)
2 Measuring tube or wall lining of the air purifier
3 Evaluation electronics (hybrid circuit)
4 Measuring element of the sender
5 Sender housing
6 Measuring channel for the partial flow
7 Output of the measured partial flow Q_M
8 Input of the measured partial flow Q_M



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1	Temperature profile without flow
2	Temperature profile with flow
3	Measuring element of the sender
4	Heating zone
5	Diaphragm of the sender
6	Measuring tube with air-mass meter
7	Intake air flow
$M_{1,2}$	Measuring points
$T_{1,2}$	Temperature values in the measuring points $M_{1,2}$
Δ_T	Temperature difference

Principle:

The resistor located in the middle of the measuring element (3) heats the micro-mechanical diaphragm of the sender (5) and keeps it at a constant temperature. The temperature drops outside of this controlled zone (4).
Two resistors at the points **M_1** and **M_2** detect the temperature distribution on the diaphragm. In the idle state, the temperatures are the same (1). When the air flows via the measuring element, the temperatures (2) change, whereby on the intake side, the curve is steeper due to the cooling and on the other side, it flows better due to the measuring element that heats the air. The difference in temperatures at the points **M_1** and **M_2** is proportional to the resistance at the resistors. The corresponding voltage is finally converted in the control unit to the value of the air mass flow (kg/h) according to the stored characteristics.

Usage:
This sender is used for very accurate measurement of the partial air flow based on the total current that flows through the measuring tube or through the air purifier. Changes in the temperature of the intake air do not affect the measurement accuracy.