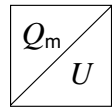


Hot-film air-mass meter, type HFM 2

Measurement of air-mass throughflow up to 1080 kg/h



- Measurement of air mass (gas mass) throughflow per unit of time, independent of density and temperature.
- Extensive measuring range.
- Highly sensitive, particularly for small changes in flow rate.
- Wear-free since there are no moving parts.
- Insensitive to dirt and contamination.



Application

Measurement of air-mass flow rate to provide data needed for clean combustion. Air-mass meters are suitable for use with other gaseous mediums.

Design and function

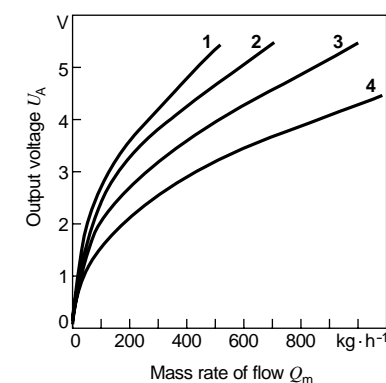
The sensor element comprises a ceramic substrate containing the following thick-film resistors which have been applied using silk-screen printing techniques: Air-temperature-sensor resistor R_{θ} , heater resistor R_H , sensor resistor R_S , and trimmer resistor R_1 .

The heater resistor R_H maintains the platinum metallic-film resistor R_S at a constant temperature above that of the incoming air. The two resistors are in close thermal contact.

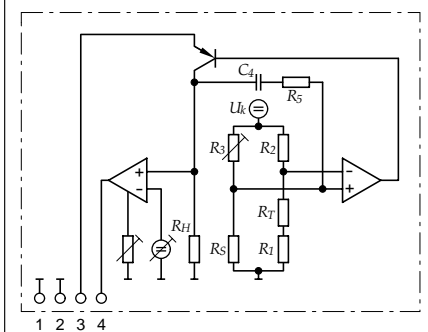
The temperature of the incoming air influences the resistor R_{θ} with which the trimmer resistor R_1 is connected in series. Throughout the complete operating-temperature range it compensates for the bridge circuit's temperature sensitivity. Together with R_2 and R_{θ} , R_1 forms one arm of the bridge circuit, while the auxiliary resistor R_3 and sensor resistor R_S form the other arm. The difference in voltage between the two arms is tapped off at the bridge diagonal and used as the measurement signal. The evaluation circuit is contained on a second thick-film substrate. Both hybrids are integrated in the plastic housing of the plug-in sensor.

The hot-film air-mass meter is a thermal flowmeter. The film resistors on the ceramic substrate are exposed to the air mass under measurement. For reasons associated with flow, this sensor is far less sensitive to contamination than, for example, a hot-wire air-mass meter, and there is no need for the ECU to incorporate a self-cleaning burn-off function.

Characteristic curves.



Operating principle.



Technical data / Range

Part number	0 280 217 102	0 280 217 120	0 280 217 519	0 280 217 801
Characteristic curve	1	2	3	4
Installation length L	mm	130	130	130
		96		
Air-flow measuring range	kg · h ⁻¹	10...350	10...480	12...640
				20...1080
Accuracy referred to measured value	%	±4	±4	±4
Supply voltage	V	14	14	14
Input current				
at 0 kg · h ⁻¹	A	≤ 0,25	≤ 0,25	≤ 0,25
at $Q_{m \text{ nom}}$	A	≤ 0,8	≤ 0,8	≤ 0,8
Time constant ¹⁾	ms	≤20	≤20	≤20
Temperature range				
Sustained	°C	-30...+110	-30...+110	-30...+110
Short-term	°C	-40...+125	-40...+125	-40...+125
Pressure drop				
at nominal air mass	hPa			
	mbar	<15	<15	<15
Vibration acceleration				
max.	m · s ⁻²	150	150	150

¹⁾ In case of sudden increase of the air-mass flow from 10 kg · h⁻¹ auf 0.7 $Q_{m \text{ nominal}}$, time required to reach 63% of the final value of the air-mass signal.