Mass Air Flow Sensor

HFM7-4.7 ID — hot-film metering of intake air mass flow and temperature

BOSCH

Original Bosch sensor · 0 281 006 258

One hot-film element in the intake duct measures the mass of the air, not just its volume, so the reading holds when temperature and altitude change. The signal is frequency-coded and covers −40 to +560 kg/h, including reverse flow, which means pulsation in the intake is measured with its direction rather than averaged away. Intake air temperature comes out of the same connector as a second, independent output.

480 kg/h	−40 … +560	≤ 18 hPa	± 2 %
nominal flow	kg/h measuring range	pressure drop at nominal	accuracy, 10 – 480 kg/h



HFM7-4.7 ID · plug-in sensor in cylinder housing

Key features

- Mass flow and intake temperature from one sensor
- Hot-film element — no moving parts in the air path
- Reverse flow measured, not averaged out
- Frequency output, period-coded across the range
- ≤ 18 hPa pressure drop at nominal flow
- Each unit trimmed in its own cylinder housing
- RB plug system, 6 – 17 V supply
- Protective cap fitted as shipped

How the measurement is made

Hot-film element

A heated film sits in a measuring channel fed from the main flow. Air passing over it takes heat away, and the heating current needed to hold the film at temperature is a direct measure of mass flow — not volume.

Reverse flow

Flow direction is part of the measurement, so backflow during intake pulsation is reported as negative flow. The range runs −40 to +560 kg/h and both magnitude and direction are output.

Two outputs

Mass air flow leaves as a frequency whose period is coded to the flow; intake air temperature leaves as a PWM duty. Both arrive on the same 4-pin RB connector, so the ECU needs no extra sensor.

Typical applications

Fuel-cell systems

Cathode air metering ahead of the stack

Engine intake

Petrol and diesel intake air mass

Intake development

Air box and duct work on the flow bench

Test benches

Reference air flow on dyno and rigs

Scope of supply

Sensor in size 4.7 cylinder housing with protective cap fitted; the flow characteristic is trimmed in the housing before dispatch. Bosch TCI 0 280 K01 839-000 and drawing 0 280 A02 973-000 are available on request.

Technical data

Bosch part number 0 281 006 258, type HFM7-4.7 ID, housing size 4.7. Accuracy figures apply at intake air 20 °C ± 1 K and 14 V ± 0.1 V supply unless a different condition is stated.

Pneumatic & thermal data

Item	Specification
Nominal mass air flow	480 kg/h
Measuring range	−40 … +560 kg/h, reverse flow included
Pressure drop at nominal flow	≤ 18 hPa
Accuracy, new part	± 2 % from 10 to 480 kg/h; ± 3 % at 8 and 560 kg/h
Accuracy vs intake temperature	± 2 % at 20 °C · ± 3 % at 10 / 30 °C · ± 4 % at −15 / 80 °C
Sensor temperature, continuous	−40 … +120 °C, with intake air ≤ 100 °C
Sensor temperature, short-term	+120 … +130 °C, intake air ≤ 130 °C — max. 3 min, 80 h in total
Housing	Size 4.7 cylinder housing, 96 mm overall length

Electrical data

Item	Specification
Supply voltage	14 V nominal — operating range 6 … 17 V
Current, normal operation	typ. < 0.06 A · max. < 0.1 A
Current, chip heater on	typ. < 0.08 A · max. < 0.15 A
Connector	RB 4-pin plug system; mating part per offer drawing
Mass air flow output	Frequency, period-coded to the flow
Intake air temperature output	PWM duty — 38 % at 20 °C, 62 % at 80 °C
Power-on time	Signal within ± 3 % of final value after ≤ 0.1 s

Mass air flow characteristic

Mass air flow (kg/h)	Signal period Tk (µs)	Tolerance (dm/m)
8	507.73	± 3 %
10	496.85	± 2 %
40	398.76	± 2 %
105	312.04	± 2 %
220	232.09	± 2 %
480	128.88	± 2 %
560	105.60	± 3 %

Note
Data taken from Bosch technical customer information 0 280 K01 839-000 and offer drawing 0 280 A02 973-000. Characteristic values are quoted at ambient temperature; the 80 °C curve differs and is available on request. Confirm the mating connector and installation position against the drawing before ordering.