

Datasheet SFM3000

Low Pressure Drop Digital Flow Meter

- Low pressure drop
- Flow range: +/- 200 slm (bidirectional)
- Accuracy 1.5% m.v. (typical)
- Very fast update time (0.5ms)
- Fully calibrated & temperature compensated
- Zero offset, no drift



Product Summary

The SFM3000 sensor is Sensirion's digital flow meter designed for high-volume applications. It measures the flow rate of **air, oxygen and other non-aggressive gases** with superb accuracy. A special design of the flow channel results in the very low pressure drop through the flow body of the sensor making it extremely suitable for very demanding applications, such as medical ventilation and respiratory applications.

The SFM3000 operates from a 5 Volt supply voltage and features a digital 2-wire I²C interface. The measurement results are internally **linearized** and **temperature compensated**.

The outstanding performance of this sensor is based on Sensirion's patented **CMOSens® sensor technology**, which combines the sensor element, signal processing and digital calibration on a single microchip. The flow rate of the gas is measured by a thermal sensor element which assures **very fast signal processing time and bi-directional measurement with best-in-class accuracy**.

The well-proven CMOS technology is perfectly suited for high-quality mass production and is the ideal choice for demanding and cost-sensitive OEM applications.

Applications

- Medical
- Process automation
- Burner control
- Fuel cell control
- Spectroscopy
- Environment monitoring
- Laboratory

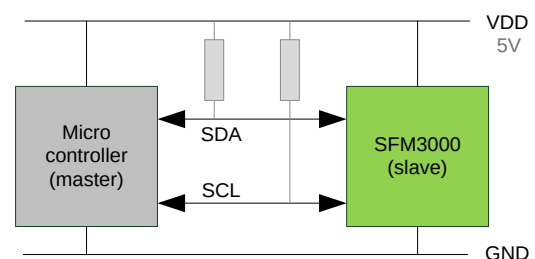
OEM options

A variety of custom options can be implemented for high-volume OEM applications (custom flow rates, calibration for other gases, different body form factor etc.). Contact Sensirion for more information.

Sensor chip

The SFM3000 flow meter features a fifth-generation silicon sensor chip SF05. In addition to a thermal mass flow sensor element, the chip contains an amplifier, A/D converter, EEPROM memory, digital signal processing circuitry, and interface. Due to seamless integration of signal acquisition and processing on the single silicon die significant performance and cost benefits are achieved.

Connection diagram



SFM3000 with bidirectional digital communication (I²C bus)

1. Sensor performance

1.1 Physical specifications ¹

Parameter	Condition	Value		Unit
Flow Ranges	Air/N ₂ /O ₂	-200 ... +200 ²		slm ³
Update Time	14 bit	0.5		ms
		Max.	Typ.	
Accuracy ^{4,5,6,7}	span	± 2.5	± 1.5	% m.v. ⁸
	offset	± 0.1	± 0.05	slm
Repeatability ^{4,7}	span	± 1	± 0.5	% m.v.
	offset	± 0.05	± 0.02	slm
Noise Level ^{4,7}	span	± 1	± 0.5	% m.v.
	offset	± 0.1	± 0.05	slm
Accuracy Shift Due to Temperature Variation ⁹	span	± 0.75	± 0.25	% m.v./10°C
	offset	± 0.0	± 0.0	slm
Position sensitivity ¹⁰	non-horizontal position	< 0.05		slm
Pressure Drop	@60slm	< 100 / < 0.4		Pa / inH ₂ O
	@200slm	< 600 / < 2.4		

1.2 Media compatibility and materials

Parameter	Value
Calibration ¹¹	Air, N ₂ , O ₂
Media Compatibility	Air (non-condensing), N ₂ , O ₂ , non- aggressive gases
Wetted Materials	PPE+PS blend (medical grade: biocompatible; ISO 10993 or USP Class VI), Si, Si ₃ N ₄ , SiO _x , Gold, Epoxy, Polyurethane, stainless steel (annealed)
RoHS, REACH	RoHS and REACH compliant
Sensor Weight with Cap	< 18 gram

1.3 Temperature and pressure conditions

Parameter	Condition	Value	Unit
Calibrated Temperature Range ¹¹	T(environment) = T(gas)	-20 ... +80	°C
Operating Temperature Range ¹¹	Non-condensing	-20 ... +80	°C
Storage Temperature	Non-condensing	-20 ... +80	°C
Operating Pressure Range	absolute	0.7 – 1.3	bar
Operating Overpressure	gauge	± 0.2	bar
Burst Overpressure	gauge	> 1	bar

¹ Unless otherwise noted, all sensor specifications are valid at 25°C with Vdd = 5V and absolute pressure = 966 mbar.

² Other calibration ranges are available for large volume projects

³ In standard liter per minute at 20°C and 1013 mbar

⁴ With ideal inlet and outlet conditions, at VDD = 5V, 25°C, absolute pressure = 966 mbar

⁵ Including offset, non-linearity, hysteresis

⁶ Sensor position horizontal (see Section 4.1)

⁷ Span or offset value, whichever is larger

⁸ In % of measured value (m.v.) = of rate = of reading

⁹ Shift due to temperature variation compared to calibration temperature

¹⁰ See Section 4.1

¹¹ Contact Sensirion for information about other gases, wider calibrated and operating temperature ranges