Gas flow sensors

For medical and industrial applications

SENSIRION

High performance gas flow measurement

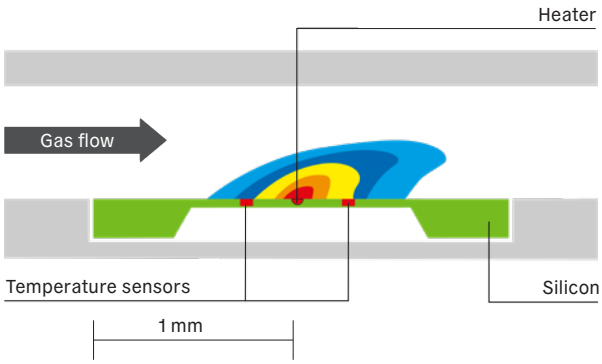
With our long history of designing mass flow solutions for medical technology and industrial automation, we are your ideal partner to support you in the development of new products. Sensirion offers gas flow sensors for diverse applications thanks to these key characteristics:

- Excellent repeatability
- Fast response time
- High sensitivity at low flows
- Wide dynamic range
- Reliability and robustness
- Bidirectionality

For more information, please visit: www.sensirion.com/gasflow

Unique measurement principle

Sensirion's gas flow sensors ensure fast, accurate and economical measurement of gas flow over a wide dynamic range. At the heart of every Sensirion flow sensor is a MEMS-based calorimetric microsensor, which measures the gas flow using the thermal measurement principle (see illustration). The sensor element is integrated with the signal conditioning electronics on a single chip. This unique technological approach – provided by innovative CMOSens® Technology – results in excellent performance and robustness at a very attractive cost. That is why today's leading manufacturers rely on Sensirion's highly sensitive flow meters.



Evaluation kits for fast and easy testing

The SEK-Flow Sensing evaluation kits are test sets for Sensirion's gas flow sensors. Precise test measurements can be made quickly and inexpensively with these ready-to-use kits. The evaluation kit consists of an adapter cable that allows you to connect the sensor directly to your computer. In some cases, our Sensirion sensor bridge multiplexer completes the kit. The viewer software can be downloaded from our website. The software allows measurements at various resolutions and displays mass flow in standard liters per minute (slm). Data can be logged and exported.

Products

Sensirion mass flow meters offer flow sensors that are temperature-compensated and fully calibrated. No further calibration and no drift compensation are needed. The SFMxxxx sensors are designed for high-volume production using an industry-proven technology with a track record of more than 20 years.

Flow sensors for
limited overpressure and dry gases

All flow sensors designed for ambient pressure and gases are designed for a lifetime of many years and provide high reliability, carefully chosen of materials and drift-free technology. The SFM3505 family has O-ring fittings for a compact form factor and can operate with up to 650 mbar overpressure. Its new flow body design makes its accuracy, noise and pressure drop unmatched over the large flow range of +/-300slm. Finally, the SFM3505-70-CO_2 offers a CO_2 flow sensor for up to 70 slm.

The SFM3003 series has medical cones fittings (compatible with ISO5356), is calibrated for Air, O_2 and mixtures thereof, and operates with up to 0.3 bar overpressure. There are three different versions available – with different flow rates and pressure drops (SFM3003-300-CL, SFM3003-300-CE and SFM3013-300-CL). Finally, a version with Heliox calibration also exists: SFM3013-300-CLM.

… ambient pressure and humid gases

Our flow sensors, which are designed for use with humid and condensing gases, can measure up to 250 slm. They have an integrated heater to prevent condensation on the chip, ensuring optimal performance in humid conditions. All the sensors have a connector design that allows for a clip-on cable and easy connection and disconnection. In certain applications (e.g., medical), contamination can occur. The SFM3x00-AW sensors can be washed or autoclaved, while the SFM3x0x-D sensors are single-use.

They come in two sizes: the SFM3304-D, with 22 mm medical cones and a dead volume below 10 ml and the SFM3400-AW/D, with 15 mm medical cones and a dead volume below 1 ml. The single-use sensors are also available in customized individual packaging.

… for high operating pressure

The SFM4xxx, SFM5xxx and SFM6xxx are your ideal solutions for applications where the pressure inside the sensor can reach several bars for several years. These particularly robust sensors have been designed to withstand harsher conditions and are calibrated for a large variety of gases. The SFM4300 can measure positive flows (up to 20 and 50 slm) of Air, O_2, CO_2 and N_2O and mixtures thereof.

The SFM6000 offers even smaller flow ranges, RS485 communication and exchangeable fittings. Finally, the SFM5xxx series, made with metal bodies, offers high-accuracy flow measurements for various flow ranges, at pressures up to 10 bar. The SFM5xxx and SFM6xxx are also available as mass flow controllers.

	Low pressure and dry gases		Low pressure and humid gases		High operating pressure, dry gases		
	SFM3003-300-CL	**SFM3505-300-X**	**SFM3304-250-D**	**SFM3400-33-D**	**SFM4300-20-O/P/B**	**SFM6000***	**SFM5400/5500***
Special feature	Many variants	Best performance	Heated sensor for humid applications		Calibrated for gas mixtures	RS485 interface and exchangable fittings	Metal body, exchangable fittings and most gas calibrations
Flow range	−30 to 300 slm	−150 to 300 slm	−250 to 250 slm	−33 to 33 slm	0 to 20 slm	0 to 5, 20 or 50 slm	various flow ranges from 0 to 50 sccm to 0 to 100 slm
Accuracy (typical)	2% m.v. up to 200 slm	1% m.v. over full range	3 % m.v. up to 100 slm	3% m.v. over full range	2% m.v. over full range (Air, O_2)	2% m.v. over full range (Air, O_2)	0.8% m.v. over full range (air, He, O_2)
Noise (N)/repeatability (R)	N: 1% m.v. up to 200 slm	N: 1% m.v. over full range	N: 0.5% m.v. up to 25 slm	N: 0.5% m.v. over full range	R: 0.21% m.v. over full range	R: 0.2% m.v. over full range	R: 0.1% m.v. over full range
Pressure drop	< 5 mbar at 200 slm	< 7.5 mbar at 200 slm	< 19 mbar at 200 slm	< 1 mbar at 25 slm	< 25 mbar at 20 slm	< 150 mbar at 50 slm	< 100 mbar at full flow
Fluidic interface	Medical cones 22 mm, O-rings	O-ring, 14 mm inlet diameter	Medical cones 22 mm	Medical cones 15 mm	O-ring 8 mm, push-in, Downmount	Push-in, Downmount	Legris OD 6 mm with exchangeable G 1/4" thread
Interface	I²C	I²C	I²C	I²C	I²C	RS485 and I²C	RS485, Modbus*, Analog*, DeviceNet* (*only for SFM5400)
Sampling time	0.5 ms	0.25 ms	0.5 ms	0.5 ms	0.5 ms	1 ms	1 ms
Calibrated for	O_2, Air and mixtures thereof	Air, O_2	Air	Air	Air, O_2, CO_2, N_2O and mixtures thereof	Air, O_2, CO_2, N_2O, Ar	Air/N_2, O_2, He, H_2, CH4, N_2O, Ar, CO_2
Power supply	2.7–5.5 V	3.2–3.4 V	3.15–3.45 V	4.75–5.25 V	3.0–5.5 V	22.8–25.2 V	15–24 V
Allowed overpressure	0.2 bar	0.65 bar	0.1 bar	0.1 bar	10 bar	10 bar	10 bar
Variants/other versions	SFM3003-300-CL: −30 to 300 slm SFM3003-300-CE: −150 to 300 slm SFM3003-300-CET: add'l gas temperature sensor SFM3013-300-CL: 1 bar overpressure SFM3013-300-CLM: Heliox calibration SFM3020: analog output	SFM3505-300: 2.3% typical SFM3505-300-X: 1% typical SFM3505-70-CO_2: CO_2 flow up to 70 slm	SFM3304-250-D: single-use SFM3300-250-AW: washable, autoclavable	SFM3400-33-D: single-use SFM3400-33-AW: washable, autoclavable	SFM4300-20-O/P/B: 20 slm range, O-ring/push-in/basemount fittings SFM4300-50-O/P/B: 50 slm range, only air and O_2, O-ring/push-in/basemount fittings	SFM6000D-5 slm: 5 slm range SFM6000D-20 slm: 20 slm range SFM6000D-50 slm: 50 slm range	SFM5500-50sccm: 50 sccm range SFM5500-0.5slm: 0.5 slm range SFM5500-2slm: 2 slm range SFM5500-10slm: 10 slm range

* All versions are also available as mass flow controllers

What we offer

Expert first contact

- Specialized and experienced sales force
- Worldwide presence with a global distribution network

Fast and easy product evaluation

- Comprehensive product portfolio
- Easy-to-use evaluation kits for effortless measurement during sensor evaluation
- Technical documents – data sheets, sample codes and application notes

Design-in support

- Assistance with integrating Sensirion's sensors into your application
- Proven best practices to ensure that your production concept accommodates the requirements of our gas flow sensors

Lifetime support

- Reliable and flexible production
- Sustainable product innovation roadmap to meet your future needs

Customized solutions

- Various flow rates
- A variety of gases (multigas option)
- Special form factor requirements

www.sensirion.com