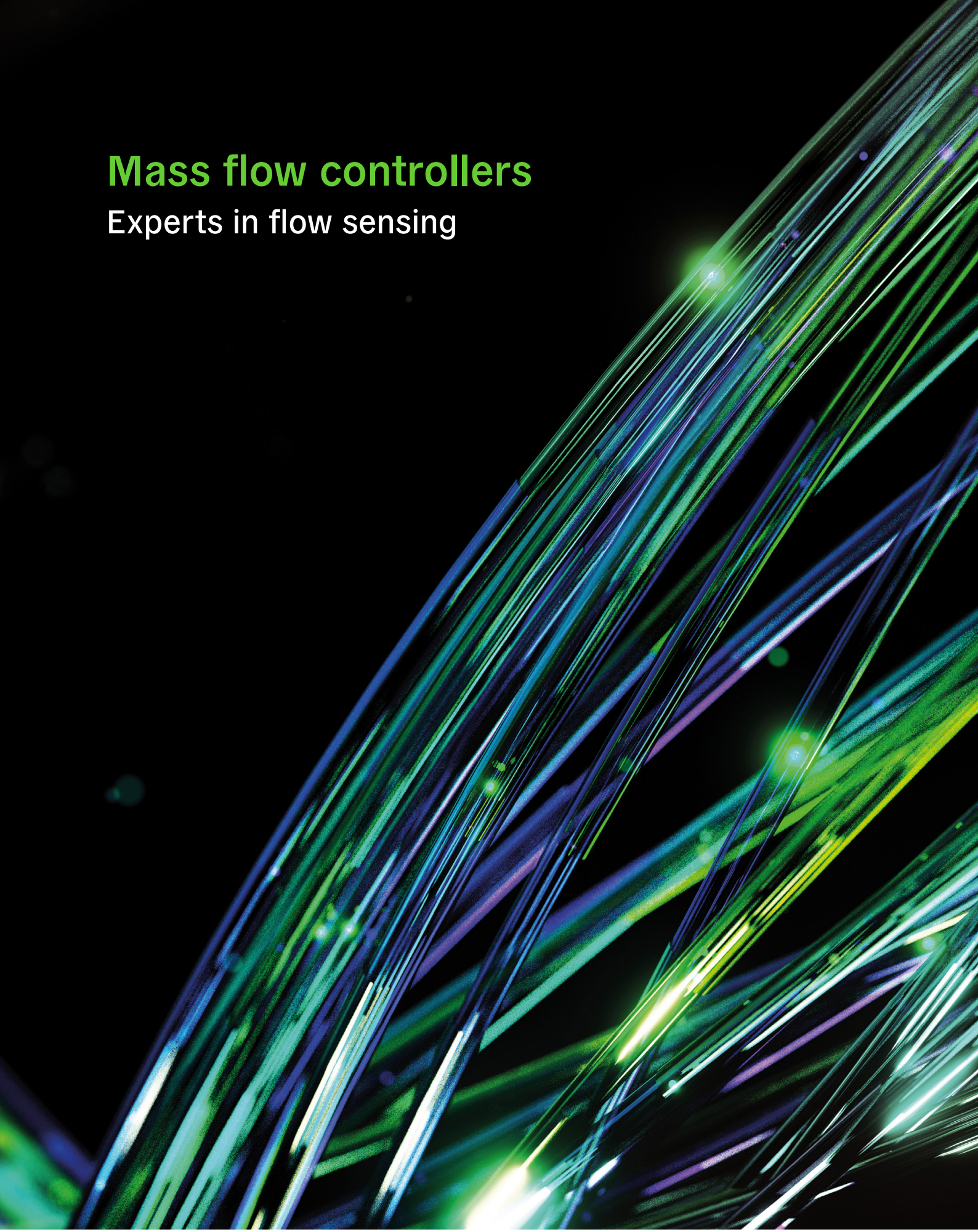
Mass flow controllers

Experts in flow sensing



SENSIRION

High-performance gas flow control

Our many years of experience in industrial automation and medical technology support your devices, machines and processes with optimal solutions. Sensirion's mass flow controllers are suitable for diverse applications and provide the following key features:

- Excellent repeatability (0.1% setpoint)
- Excellent accuracy (0.8% setpoint)
- Very wide control range (better than 1000:1)
- Ultra-fast settling time (down to 50 ms)
- No drift and no recalibration required in the field
- Mean Time Between Failures (MTBF) 169 years
- Optional multi-gas/multi-range
- NIST-traceable calibration
- Customized solutions

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

Unique measurement principle

Sensirion's mass flow controllers are characterized by fast and accurate control of gas flow over a wide dynamic range. Based on the innovative CMOSens® Technology, the heart of the mass flow controllers is a calorimetric microsensor (MEMS) that is integrated with the complete signal conditioning electronics on a single chip. Flow is measured using the thermal measurement principle (see figure 1) and efficient control is provided by a digital controlling circuit. This unique integrated technological approach results in excellent performance and reliability – at a very attractive cost. Once installed, Sensirion's mass flow controllers never have to be recalibrated in the field.

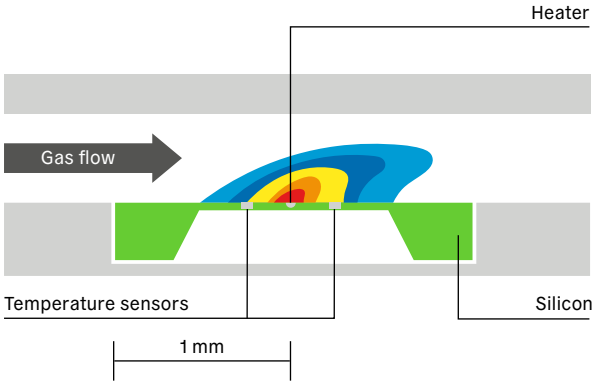


Figure 1

The mass flow controllers have an ultra-fast settling time of down to 50 ms (see figure 2) and a very wide dynamic range (better than 1000:1). The wide control range of Sensirion's mass flow controllers is highly beneficial for applications with a high span of flows. Instead of employing two devices for the high and low flow ranges, a single SFC5xxx device can efficiently cover a flow range of several orders of magnitude.

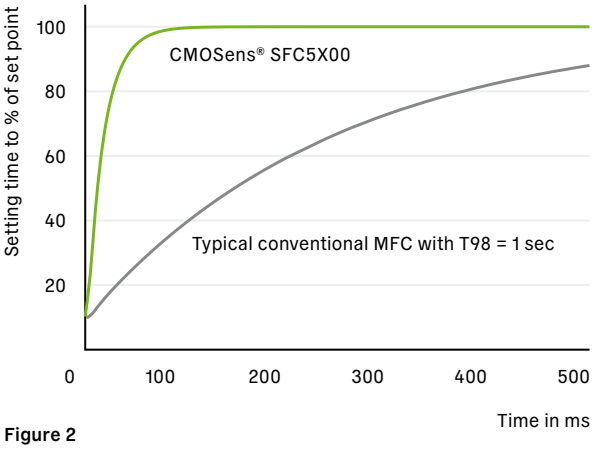


Figure 2

Sensirion's mass flow controllers can be equipped with a multi-gas feature, which enables the user to switch between a set of gas calibrations stored in the device memory. The device can also detect if the activated gas calibration matches the gas in the stream. Finally, a single instrument can be calibrated for multiple flow ranges to ensure the highest accuracy over the widest possible scale.

Products

SFC5400 for highest performance and versatility

- Excellent accuracy and repeatability
- Very wide control range and ultra-fast settling time
- No drift and no recalibration required in the field
- Various communication interfaces and mechanical fittings
- Multi-gas and multi-range option
- Also available as a mass flow meter

SFC5300 for high volume applications

- Compact, lighter and reduced version of the SFC5400 with digital interface
- Exclusively for cost-sensitive OEM projects with high unit quantities
- Various flow ranges from 50 sccm to 5 slm and calibration for various gases
- Also available as a mass flow meter

SFC5500 for first evaluation

- Available via catalogue distribution
- Special version of the SFC5400 with predefined digital configurations
- Calibrated for multiple gases and with exchangeable fittings
- For first evaluations and tests

EK-F5X for easy and fast testing

- Simple test set for the evaluation and qualification of the SFC5X00 mass flow controllers and SFM5X00 mass flow meters
- Precise measurements for testing purposes can be made quickly and inexpensively with this easy-to-use kit
- Content: a RS485-to-USB adapter cable, a 100/240 V AC adapter, a USB memory stick with PC software, start-up guide

Overview specifications. For detailed information, please refer to respective datasheets

Model	SFC5400		SFM 5400		SFC5300	SFM5300
Flow range[1, 4]	50, 100, 200, 500 sccm; 1, 2, 5, 10 slm	20, 50, 100 slm	50, 100, 200, 500 sccm; 1, 2, 5, 10 slm	20, 50, 100 slm	50, 100, 200, 500 sccm; 1, 2, 5 slm	
Repeatability, % of reading[2]	0.1% s.p.	0.2% s.p.	0.1% s.p.	0.2% s.p.	0.2% s.p.	
Repeatability, % of full scale[2]	0.01% FS	0.02% FS	0.01% FS	0.02% FS	0.02% FS	
Accuracy, % of reading[3]	0.8% s.p.	1% s.p.	0.8% s.p.	1% s.p.	2% s.p.	
Accuracy, % of full scale[3]	0.08% FS	0.1% FS	0.08% FS	0.1% FS	0.2% FS	
External leak rate	9×10^{-9} mbar l/s (He)	10×10^{-6} mbar l/s (He)	9×10^{-9} mbar l/s (He)	10×10^{-6} mbar l/s (He)	1×10^{-6} mbar l/s (He)	
Leak rate through closed valve	1×10^{-6} mbar l/s (He)	1×10^{-6} mbar l/s (He)	Not applicable for SFM	Not applicable for SFM	1×10^{-6} mbar l/s (He)	Not applicable for SFM flow meter version
Pressure drop at max full scale	< 2 bar	< 3 bar	< 0.1 bar	< 1 bar	< 2 bar	< 0.1 bar
Settling time for OEM	50 ms		Not applicable for SFM flow meter version		50 ms	Not applicable for SFM flow meter version
Settling time, typical	100 ms		Not applicable for SFM flow meter version		100 ms	Not applicable for SFM flow meter version
Control range	1000:1 (digital interface)		Not applicable for SFM flow meter version		1000:1	Not applicable for SFM flow meter version
Communication interface	Digital (RS485, IO-Link, DeviceNet) and analog (0 to 5 VDC, 0 to 10 VDC or 4 to 20 mA)				Digital (RS485 & IO-Link)	
Real gas calibration	Air/N_2, H_2, O_2, He, Ar, CO_2					
Gas conversion	SF_6, CF_4, $C4F_8$, NH_3, N_2O, CO, CH_4, CH_3F, Xe, Ne, Kr and other gases on request					
Nominal power supply	14.0 to 26.0 VDC					
Electric connector	D-Sub, 9 Pin					
Mounting, gas connection	Downmount, Swagelok, VCR, VCO, Legris, UNF Thread				Downmount	
Max working pressure	10 bar					
Operation temperature	0 to 50 °C/32 to 122 °F					
Gas type switchable by software	On request					

[1] slm = standard liters per minute, sccm= standard cubic centimeters per minute,
[2.3] whichever is higher, s.p.= in % of setpoint (s.p.) = measured value (m.v.) = of rate = of reading, FS = full scale,
[4] lower ranges on request

Customized solutions

Our cutting-edge sensor technology, combined with our wealth of experience as a solution provider, enables us to support high performance gas flow control systems with customized sensors and controllers. Our goal in doing so is to develop a deep understanding of the requirements of our customers that can then form the basis for a tailor-made solution. Thanks to our outstanding technology, our customers benefit from several advantages:

High-speed flow control

The MEMS sensor integrated on a CMOS chip permits ultra-fast response times due to its small thermal mass. Sensirion can achieve settling times of better than 50 ms, which remains unrivaled on the mass flow controller market.

Flexibility and cost efficiency

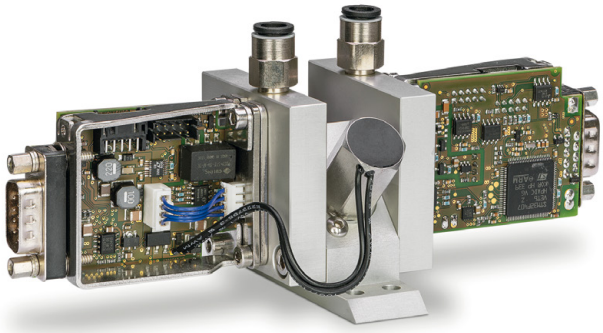
With our technology, we have the flexibility to address the customer's requirements in a way that ensures a customized sensor solution that is both high performance and cost efficient. In specific applications, emphasis can be made on performance or on price efficiency.

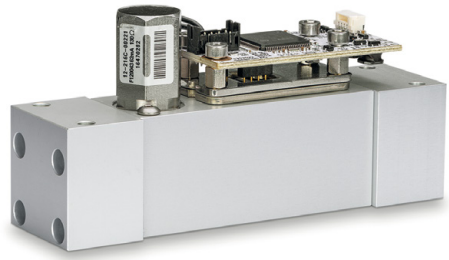
Low flow capabilities

Our experience and expertise in fluid dynamics and flow channel design enable our mass flow controllers to control gas flows in extremely low ranges, down to fractions of milliliters per minute.

Compact and lightweight

With a high level of integration, very compact and lightweight designs become possible. Different body materials can be applied to reduce weight to a minimum.





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