

# 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
- Small size and low weight

For more information, please visit: [www.sensirion.com/massflowcontroller](http://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.

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 Sensirion device can efficiently cover a flow range of several orders of magnitude.

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.

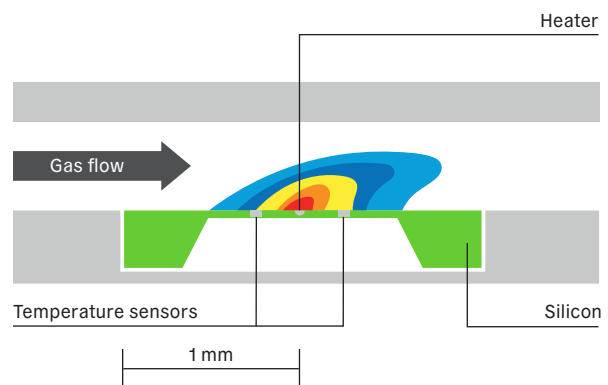


Figure 1

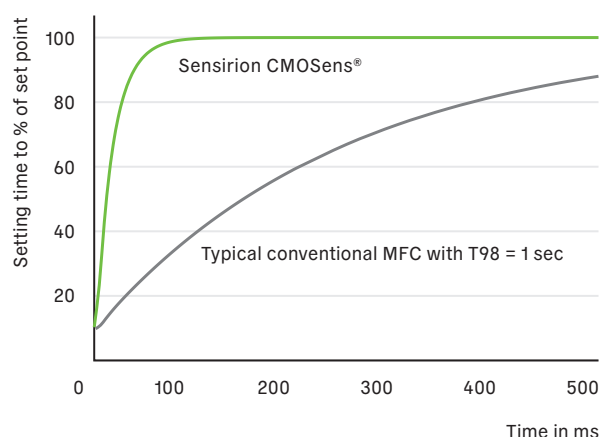


Figure 2

# Mass flow controllers



## SFC5500 for quick evaluation

- Available via catalogue distribution
- Special versions of SFC5400 with predefined digital configurations
- Calibrated for multiple gases and with exchangeable fittings



## SFC5400/5460 for highest performance and versatility

- Excellent accuracy and repeatability
- Very wide control range and ultra-fast settling time
- Various communication interfaces and mechanical fittings



## SFC5300/5330 for high volume applications

- Compact, lighter and reduced version of SFC5400
- Designed for cost-sensitive OEM projects
- Digital and downmount



## SFC6000 for best price-performance ratio

- Compact and lightweight
- Highly integrated with most robust supply chain
- Available via catalogue distribution

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

Product line	Performance Line					OEM Line	Basic Line
Model	SFC5500			SFC5400/SFC5460		SFC5300/SFC5330	SFC6000
Flow range <sup>1,4</sup>	50 sccm	0.5, 2, 10 slm	200 slm	50, 100, 200 sccm; 0.5, 1, 2, 5, 10 slm	20, 50, 100 slm	50, 100, 200 sccm; 0.5, 1, 2, 5 slm	0.5, 2, 5, 20, 50 slm
Repeatability, % of reading <sup>2</sup>	0.2% s.p.	0.1% s.p.	0.2% s.p.	0.1% s.p.	0.2% s.p.	0.2% s.p.	0.2% s.p.
Repeatability, % of full scale <sup>2</sup>	0.02% FS	0.01% FS	0.02% FS	0.01% FS	0.02% FS	0.02% FS	0.02% FS
Accuracy, % of reading <sup>3</sup>	2% s.p.	0.8% s.p.	1% s.p.	0.8% s.p.	1% s.p.	2% s.p.	2% s.p.
Accuracy, % of full scale <sup>3</sup>	0.2% FS	0.08% FS	0.1% FS	0.08% FS	0.1% FS	0.2% FS	0.2% FS
Settling time, typical	100 ms			100 ms (50 ms on request)			100 ms
Control range <sup>5</sup>	1000:1						500:1
Communication interface	RS485, DeviceNet			RS485, DeviceNet, Analog Voltage, Analog Current, (IO-Link on request)		RS485	RS485, I <sup>2</sup> C, Analog Voltage, (Profibus <sup>5</sup> )
Calibration gas	Air/N <sub>2</sub> , O <sub>2</sub> , H <sub>2</sub> , He, CH <sub>4</sub> , N <sub>2</sub> O, Ar, CO <sub>2</sub>		Air/N <sub>2</sub> , O <sub>2</sub>	Air/N <sub>2</sub> , O <sub>2</sub> , H <sub>2</sub> , He, CH <sub>4</sub> , N <sub>2</sub> O, Ar, CO <sub>2</sub> (SF <sub>6</sub> , CF <sub>4</sub> , C <sub>4</sub> F <sub>8</sub> , NH <sub>3</sub> , CO, CH <sub>3</sub> F, Xe, Ne, Kr and other on request)			Air/N <sub>2</sub> , O <sub>2</sub> , He, N <sub>2</sub> O, Ar, CO <sub>2</sub> and other on request
Mounting, gas connection	Legris, G ¼" Thread			Downmount, Swagelok, VCR, VCO, UNF Thread		Downmount	Legris, Downmount
Max working pressure	10 bar (145 psig)						
External leak rate	9 × 10 <sup>-9</sup> mbar l/s (He)	9 × 10 <sup>-6</sup> mbar l/s (He)	9 × 10 <sup>-9</sup> mbar l/s (He)	9 × 10 <sup>-6</sup> mbar l/s (He)	9 × 10 <sup>-9</sup> mbar l/s (He)	9 × 10 <sup>-9</sup> mbar l/s (He)	2 sccm
Leak rate through closed valve	1 × 10 <sup>-6</sup> mbar l/s (He)						
Nominal power supply	14.0 to 26.0 VDC						22.9 to 25.2 VDC
Operation	0 to 50 °C (32 to 122 °F)						5 to 50 °C (41 to 122 °F)

<sup>1</sup> slm = standard liters per minute, sccm= standard cubic centimeters per minute,

<sup>2,3</sup> whichever is higher, s.p.= in % of setpoint (s.p.) = measured value (m.v.) = of rate = of reading, FS = full scale,

<sup>4</sup> lower ranges on request

<sup>5</sup> available on request



## Mass flow meters



All our mass flow controllers are also available as mass flow meters – without a valve. These are our highest-performance flow meters with the best accuracy and high pressure resistance. They offer the same performance and configurability as their MFC variants.

## Evaluation Kit



Our evaluation kit EK-F5X can be used for easy and fast evaluation of our mass flow controllers and mass flow meters. The kit is easy to use and allows quick and simple precise measurements for testing purposes. The kit comes with a RS485-to-USB adapter cable, a 100/240 V AC adapter and a start-up guide.

## 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.

### 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.


### 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.

### 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.





Technology at heart,  
future in mind.