

Your Partner for Humidity and Flow Sensor Solutions

Mass Flow Controllers for Gases

SENSIRION
THE SENSOR COMPANY

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:

- Ultra-fast settling time (< 50ms)
- Excellent accuracy and repeatability
- Wide control range (turndown ratio 1000:1)
- Long-term stability and reliability
- Optional multigas/multirange and gas recognition
- Customized solutions

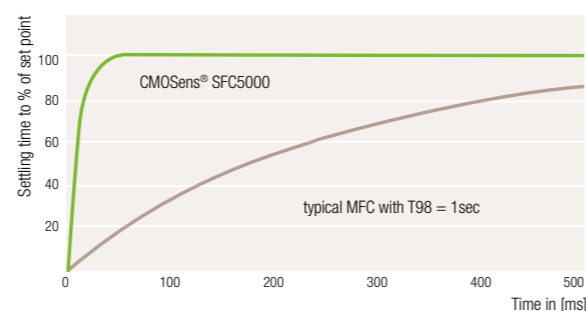
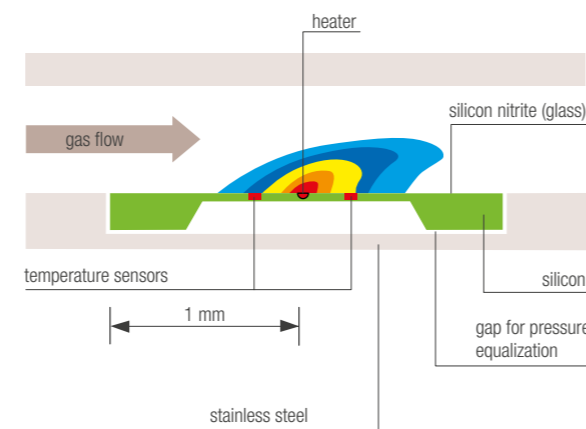
For more information, please visit: www.sensirion.com/massflowcontroller

UNIQUE MEASUREMENT PROPERTIES

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 microsensors (MEMS) that is integrated with the complete signal conditioning electronics on a single chip. Flow is measured using the thermal measurement principle (see illustration right) 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.

The mass flow controllers have an ultra-fast settling time of approximately 50 ms (see illustration right). The extensive control range of Sensirion's mass flow controllers is highly beneficial for applications with a wide dynamic gas flow range. Instead of employing two devices for the respective high and low flow ranges, a single SFC5400 device can efficiently cover a flow range of three 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. Another feature is gas recognition, which analyzes whether the activated gas calibration matches the media in the gas line. This is a safety feature which prevents incorrect operation as a result of user error.



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, which can then form the basis for a tailor-made solution. Thanks to our outstanding technology, our customers benefit from several advantages:

LOW FLOW CAPABILITIES

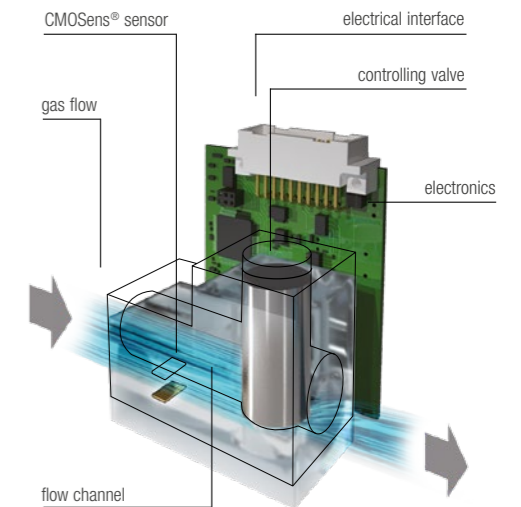
Our experience and expertise in fluid dynamics and flow channel design enable our mass flow controllers to control gas flows in extremely low ranges, down to fractions of milliliters per minute.

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 realize settling times of better than 50 ms, which remains unrivalled 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.



SENSIRION – THE SENSOR COMPANY

Sensirion is the leading manufacturer of high-quality sensors and sensor solutions for the measurement and control of humidity, and gas and liquid flows. Founded in 1998 as a spin-off from the Swiss Federal Institute of Technology (ETH), the company is based near Zurich, Switzerland, and has offices in North America, South Korea, Japan, China and Taiwan. The head office in Switzerland is responsible for research, development and production.

Millions of Sensirion's sensor components and solutions are used all over the world. Customers in various industries, including demanding mass markets such as the automotive and medical industries, rely on our products. Sensirion's success is based on the innovative CMOSens® Technology, which combines sensor and analysis electronics on a single semiconductor chip. This enables the low-cost production of a large number of high-quality units, making Sensirion a preferred supplier of microsensors and sensor solutions. With locations around the world and a seamless distribution network, we can provide the highest level of customer support at every stage of a project. The many awards we have won demonstrate that we are prepared to go the extra mile for our customers. We received the Ernst & Young Entrepreneur of the Year® 2010 award, which is presented to companies that have made a contribution to the competitiveness of the Swiss economy by means of personal commitment and a willingness to take risks.

Selection of Sensirion Mass Flow Controllers



VERSATILE SFC5400

The SFC5400 is the standardized version of Sensirion's digital mass flow controllers. It enables extremely precise and long-term stable measurement and control of mass flow over a wide control range (turndown ratio 1000:1). Based on the innovative CMOSens® Technology, it has an extremely fast response time. Best-in-class settling time of about 50 ms makes it the first choice for the most demanding applications. In addition, the SFC5400 mass flow

Diffusion Furnaces

controller features a multigas option with gas recognition and self-test capability. It is available with various communication interfaces (digital and analog) and mechanical fittings. The SFC5400 mass flow controller is the ideal solution for controlling and monitoring mass flow in diverse applications in the industrial and medical markets. The SFM5000 is a mass flow meter series based on Sensirion's mass flow controller platform with similar performance characteristics.

Medical



SFC5300 FOR HIGH VOLUME APPLICATIONS

The SFC5300 is a customizable version of Sensirion's mass flow controller. The compact product is characterized by a very attractive price. It is available in large quantities only. Various flow ranges from 1 sccm up to 10 slm as well as calibration for various gases are available. The specifications listed below represent an example of a possible product; customized solutions are available on request.



EK-F5X FOR EASY AND FAST TESTING

The EK-F5X evaluation kit is a simple test set for the evaluation and qualification of Sensirion's SFC5000 mass flow controllers and SFM5000 mass flow meters. Precise measurements for test purposes can be made quickly and inexpensively with this easy-to-use kit. The evaluation kit consists of a RS485-to-USB adapter cable, a 100/240V AC adapter, a USB memory stick with PC software and a RS485 based mass flow controller.

Deep Reactive Ion Etching

Analytical Instruments

Model	SFC5400 (SFM5400)		SFC5300 (SFM5300) - OEM
Flow range ¹	10, 50, 100, 200, 500 sccm	1, 2, 5, 10 slm	20, 50, 100, 200, 300 slm
Repeatability, % of reading ²	0.1 % s.p.		0.2 % s.p.
Repeatability, % of full scale ²	0.01 % FS		0.02 % FS
Accuracy, % of reading ³	0.8 % s.p.		2 % s.p.
Accuracy, % of full scale ³	0.08 % FS		0.2 % FS
Settling time, typ.	< 50 ms		< 100 ms
Pressure drop at max. full scale	< 2 bar		< 2 bar
Control range	1000:1 (digital interface)		1000:1
Communication interface	digital (RS485, IO-Link, DeviceNet) and analog (0...5 VDC, 0...10 VDC or 4...20 mA)		digital (RS485 & IO-Link)
Available calibrated gases	Air, N ₂ , H ₂ , O ₂ , He, Ar, Xe, Ne, CO ₂ , NH ₃ , SiH ₄ , O ₃ , CO, CH ₃ F, SF ₆ , CF ₄ , C ₄ F ₈ , N ₂ O and other gases on request		non-corrosive gases on request
Power supply nominal	14.0...26.0		14.0...26.0
Electric connector	Sub-D 9pin		Sub-D 9pin
Mounting, gas connection	Downmount, Swagelok, VCR, VCO, Legris, UNF Thread		Downmount
Max. working pressure	10 bar		10 bar
Leak rate	9x 10 ⁻⁹ mbar l/s		1x 10 ⁻⁶ mbar l/s
Operation temperature	0...50 °C / 32...122°F		0...50 °C / 32...122°F
Gas type switchable by software	on request		on request
Gas recognition	on request		on request

¹ slm= standard liters per minute, sccm= standard cubic centimeters per minute, ^{2,3} whichever is bigger

Fuel Cells

Sensing. Anytime. Anywhere.

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