Mass Flow Meters

- Excellent repeatability
- Fast response time
- Fully calibrated output
- Multi-gas option
- Customizable solutions

CMOSens®
TECHNOLOGY

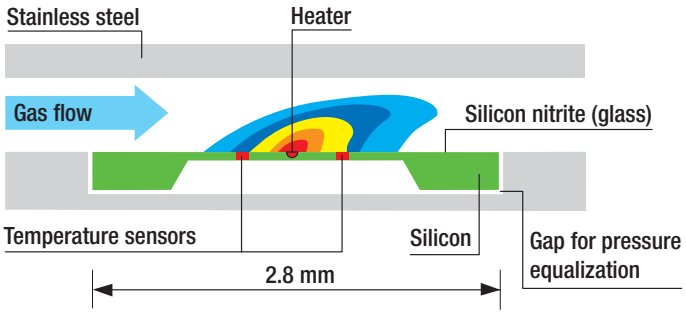
SENSIRION
THE SENSOR COMPANY

Mass Flow Meters for Gases

High Performance Gas Flow Measurement

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

EM1



Thermal measurement principle for CMOSens® flow sensors

Fast and Reliable EM1

The EM1 enables mass flow measurement with high accuracy and repeatability. Mounted in rugged, chemically inert housing, the CMOSens® EM1 mass flow meter is suitable for a wide range of applications. These include mass flow metering for process control, medical applications and fuel cells. The sensor housing can withstand overpressures of 8 bar (116 psi) and provides an optimized inlet for laminar flow conidtioning. The EM1 requires a supply voltage of 7–18V and offers an RS232 digital interface. I²C output is available on request.

Model	SFM4100	EM1				ASF1430
Version		H	L	R	V	
Flow range[1]	0…20 slm	0…50 sccm	0…500 sccm	0…20 slm	0…200 slm	0…400 sccm
Repeatability, % of reading	0.25 %	0.5 %	0.3 %	0.3 %	0.5 %	0.025 %
Accuracy, % of reading[2]	5.0 %	5.0 %	3.0 %	3.0 %	3.0 %	1.0 %
Accuracy, % of full scale[2]	0.25 %	0.05 %	0.075 %	0.03 %	0.05 %	0.05 %
Pressure drop at full flow	<25 mbar	<2 mbar	<2 mbar	<20 mbar	<100 mbar	<1.2 mbar
Interface (Input, Output)	digital, I²C	digital, RS232 (I²C on request)				digital, RS232
Response time	1.3 ms (at 10 bit)	5 ms (at 8 Bit)[3]				5 ms (at 8 Bit)
Chemical compatibility	Noncorrosive gases	Air, inert gases				Air, inert gases
Power supply	3.5..9 Vdc	7..18 Vdc				7..18 Vdc
Max. working pressure	6 bar	8 bar				1 bar
RoHS / WEEE compliant	yes	yes				yes
MOQ direct distribution	160	100				50
Eval-Kit / Starter-Kit	x	x				–
Recommended for:						
Medical	x	x	x	x	x	x
Analytical Instruments	x					x
Process Automation	x	x	x	x	x	x
OEM integration	x	x	x	x	x	x

[1] slm = standard liters per minute; sccm = standard cubic centimeters per minute

[2] wichever is bigger [3] faster response time available on request

Cost-Efficient Digital SFM4100

The SFM4100 is designed as a versatile OEM gas flow meter series for demanding applications. Compared to other thermal mass flow sensors (MEMS, hotwire or capillary type), the SFM4100 features an extended dynamic range, higher long-term stability, and excellent repeatability. It is designed to measure air and other nonaggressive gases with high accuracy. Each sensor can be calibrated for the use with multiple gases and for various flow ranges. It operates with a supply voltage from 5 to 9 V, and the sensor's digital I²C interface allows it to be embedded easily into a microprocessor environment. These characteristics make the SFM4100 an especially valuable device for anesthesia equipment and medical ventilators.

SFM4100

Highly Sensitive ASF1430

The ASF1430 provides highly accurate bi-directional mass flow measurement over a range of four orders of magnitude; from as low as 15 ul/min to as high as 400 ml/min. This sensitivity is unrivalled on the market. The housing allows for 1 bar overpressure and is ideally suited for applications where low flows are involved, such as leak detection and measurements in analytical instruments.

ASF1430

Innovation on Demand

Our cutting-edge sensor technology empowers us to meet complex requirements with innovative sensor solutions. Sensirion is ready and able to modify existing standard designs or develop new solutions tailored to specific customer needs.

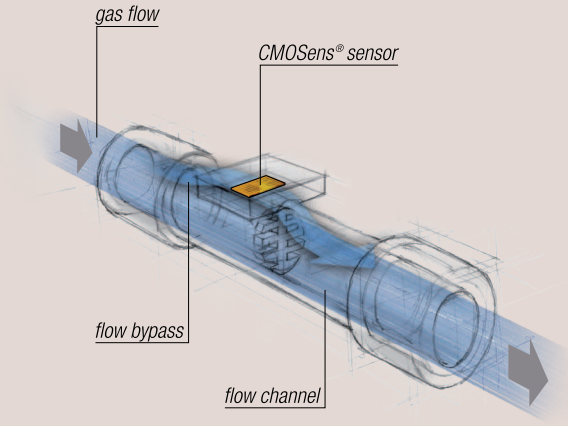
- **Low Pressure Drop Flow Sensors**
  For gas flow measurement applications where only a small pressure drop is acceptable, our technology permits customized solutions with direct flow elements that meet this requirement in an optimum fashion.

- **Gas Velocity Sensors**
  The sensors can be calibrated and configured for air speed measurements rather than mass flow. This provides the perfect solution for certain specific applications such as filter clogging detection.

- **Low Cost Flow Sensor Solutions**
  For requirements that are less technically demanding, customized sensors can be offered with a simple but effective housing and flow channel as a basis for integration in low cost systems.

Sensirion's flow sensors are ideally suited for various applications:

- Medical
- Analytical instruments
- Automotive
- Fuel cells
- Welding and cutting systems



Customized solution

About Sensirion

Sensirion AG, with headquarters in Staefa, Switzerland, is a leading manufacturer of CMOS sensor components and systems for a wide variety of OEM applications (e.g. in the medical, automotive, HVAC and consumer industries). Our current four business units focus on the following categories of high-quality products:

- **Humidity and temperature sensors**
- **Liquid flow sensors**
- **Gas flow sensor solutions (mass flow meters and controllers)**
- **Differential pressure sensors**

With a growing, highly qualified staff of more than 200 employees, Sensirion stands for continuous product innovation and excellent technical support. To provide international service with guaranteed high quality, we rely on a global sales and support network consisting of subsidiaries in the USA, China, Japan and Korea as well as about 10 independent distributors.

Our products are distinguished by their use of patented CMOSens® Technology, which integrates the sensor element and signal processing on a single chip. In the highly competitive global market, this system integration offers unbeatable customer benefits – in particular high reliability and precision at low cost.

Sensirion's competence as a reliable OEM partner is underlined by a distinct quality approach and a professional quality management system, which is certified in accordance with the ISO 9001 and ISO/TS 16949 standards.

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Certified Management System SQS ISO 9001

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