



Your Partner for Humidity and Flow Sensor Solutions

Liquid Flow Sensor Solutions

SENSIRION
THE SENSOR COMPANY

Inspiring Flow Sensor Technology

Process monitoring and feedback control are becoming increasingly important in all industries. As a result, flow sensors are now used in modern fluidic systems to ensure safe and reliable pumping and dispensing of liquids.

For more information please visit: www.sensirion.com/liquidflow

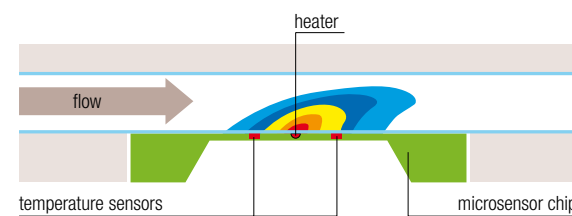
PATENTED TECHNOLOGY

Sensirion's CMOSens® flow sensor technology, based on a thermal microsensor with no moving parts, is most effective at very low flow rates. Our liquid flow sensors offer completely media-isolated flow sensing down to the nanoliter range. We offer our customers the world's smallest, most precise liquid flow sensors at the best value for money and inspire new approaches to design. The key element in our products is an integrated digital CMOSens® microchip bonded to the outside of the sensor's flow channel, which measures precisely through the wall of the flow channel (US patent 6,813,944). High reliability and perfect media compatibility make our sensors ideal for use in life sciences, factory automation and energy management applications.

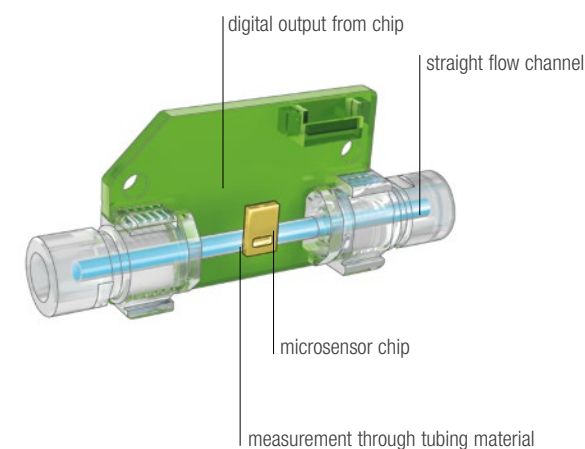
FAST, SMALL, RELIABLE

Sensirion's standard liquid flow sensors provide exceptional value for money and eliminate the need for investment in application-specific OEM sensor development. The inert, bio-compatible flow channel of the non-invasive sensors ensures excellent process compatibility by having neither moving parts nor obstacles. Digital or analog outputs are available for seamless integration. Straight fittings provide a quick assembly into the fluidic line, downmount fittings allow for easy installation in manifold systems. For more complex tasks, Sensirion is able to develop customized solutions.

Using capillaries with different diameters, Sensirion's flow sensors cover flow rate requirements over six orders of magnitude from 70 nl/min to 120 ml/min. In addition to the sensor element, the chip houses the complete digital intelligence and the memory necessary for signal linearization, temperature compensation and self-test algorithms.



Flow measurement principle



Mosquito drinking
ca. 10 µl/min



Drug injection
ca. 5 ml/min



Espresso machine
ca. 250 ml/min



Sensirion is able to measure flows from 70 nl/min up to 120 ml/min

Customized Solutions

CUSTOMIZED MICROFLUIDIC PLANAR PACKAGE DESIGN

Sometimes innovative ideas ask for new solutions and the team of experts at Sensirion is always keen on finding ways to make interesting applications happen through our technology. Customizations are made to fit special requirements, such as resistance to aggressive chemicals, limited space constraints or dedicated low-price and even disposable sensor designs for high-volume applications.

Our cutting-edge sensor technology and a wealth of experience in liquid flow sensing lead to many successful customer projects. Customized sensors are used in a variety of applications, such as medical devices, diagnostic equipment or process control. The essential goal is to understand the requirements of our customers and to skillfully implement the key benefits of our technology to their advantage:

LOW FLOW RATES

Years of experience and expertise combined with the high sensitivity of our sensors enables flow measurement in extremely low ranges, from nanoliters to milliliters per minute.

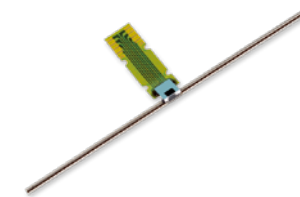
HIGH SPEED

The MEMS sensor integrated on a CMOS chip permits ultra-fast response times below 50 ms due to its small thermal mass.

FLEXIBILITY AND COST EFFICIENCY

With our advanced technology, we have the flexibility to address the customer's requirements in a way that ensures a customized sensor solution which is both high-performance and cost-efficient.

Measure through
tubing material...



...or inside microfluidic
substrates*



* original size

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 Flow Meters



SLQ-QT500

With a calibrated flow rate range of 3 to 120 ml/min and with only high-purity wetted materials such as quartz glass and PFA, this sensor is ideal for dispense applications in demanding fields such as the semiconductor industry. With its short response time, the dispense can be monitored with unsurpassed time resolution.



SLQ-QT105

Customized for hydrocarbon-based fluids such as photoresist, this sensor is ideal for use with demanding coating systems in the semiconductor industry. Like all Sensirion flow sensors, it has no moving parts and no obstacles in the flow path.



SLI SERIES

With the Sensirion flow sensor technology in a protective housing, the SLI Series is ideal for laboratory work and for use in automation industry. The SLI sensors are also available as FlowMeterKits with Windows PC Viewer and Logger software, and various fluidic connection material.



LS32-1500

This chemically resistant liquid flow sensor comes in a compact housing with high mechanical robustness. The wetted materials (high-performance stainless steel, PEEK, and PTFE) provide excellent bio-compatibility and exceptional chemical resistance. While being ideal for the biomedical market, it offers a cost-effective, compact and reliable solution for many applications with flow rates from 0 to 40 ml/min.



LG16/LG01 OEM SERIES

The small footprint of the LG16 series makes it the ideal choice for the integration of a flow sensor into OEM devices. It is available in a digital version with I²C communication and a 0-5 V analog output version. The LG01 is the perfect sensor for detection of flow, bubbles and leakage.



LPG10 OEM SERIES

The LPG10 series offers our smallest liquid flow sensors available today, enabling outstanding performance and speed in an incredibly small space. The innovative design features our highly sensitive microchip, measuring the flow in a planar microfluidic substrate from the outside of the flow channel. Fluidic ports on the bottom allow easy integration into manifold systems.

Semiconductor

Automation

Diagnostics

| | Model | Minimum Order Quantity | Full Scale Flow Rates | Accuracy of Reading | Bidirectional Operation | Media | Output | | | Maximum Cable Length | Tubing | Maximum Pressure | Model | nI/min | | µI/min | | | nI/min | | |
|-----------|-------------|------------------------|---|---------------------|-------------------------|--|--|---------|-------------|-------------------------------------|-------------------------------|------------------------|------------|------------------------|------------------------|------------------------|----|------------------------|------------------------|----|-----|
| | | | | | | | Analog | RS485 | I²C | | | | | 10 | 100 | 1 | 10 | 100 | 1 | 10 | 100 |
| SLG | SLG64-0075 | 1 piece | 5 µI/min H₂O 10 µI/min HC | 10% | yes | All media, calibration valid for H₂O & IPA | 0-10V | ✓ | ✓ | > 100 m for RS485, 30 cm for I²C | Outer Ø 1/16" | 1000 bar | SLG64-0075 | | | <div><div></div></div> | | | | | |
| SLI | SLI-0430 | 1 piece | 80 µI/min H₂O 500 µI/min HC | 5% | yes | All media, calibration valid for H₂O & IPA | 0-10V | ✓ | ✓ | > 100 m for RS485, 30 cm for I²C | Outer Ø 1/32", 1/16" or 1/8" | 50 bar | SLI-0430 | | | <div><div></div></div> | | | | | |
| | SLI-1000 | | 1 ml/min H₂O 10 ml/min HC | | | | | | | | | 12 bar | SLI-1000 | | | <div><div></div></div> | | | | | |
| | SLI-2000 | | 5 ml/min H₂O 80 ml/min HC | | | | | | | | | 12 bar | SLI-2000 | | | <div><div></div></div> | | | | | |
| SLQ | SLQ-QT105 | 1 piece | 120 ml/min HC | 10% | yes | Photoresist, Solvents, etc. | 0-10V | ✓ | | > 100 m for RS485, 30 cm for I²C | Inner Ø 3 mm, Outer Ø 4 mm | 12 bar | SLQ-QT105 | | | | | | <div><div></div></div> | | |
| | SLQ-QT500 | | 120 ml/min H₂O 120 ml/min H₂O | 10% | | All media, calibration valid for H₂O & IPA | 0-10V | ✓ | ✓ | > 100 m for RS485, 30 cm for I²C | Outer Ø 1/4" | 12 bar | SLQ-QT500 | | | <div><div></div></div> | | | | | |
| | SLQ-HC60 | | 80 ml/min HC | 10% | | Hydrocarbon-based liquids only, Calibration valid for IPA | 0-10V | | | 3 m | Outer Ø 1/8" | 5 bar | SLQ-HC60 | | | | | <div><div></div></div> | | | |
| LS32 | LS32-1500 | 20 pcs (OEM only) | 40 ml/min H₂O | 10% | yes | All media, calibration valid for H₂O | | | ✓ | 30 cm for I²C | Outer Ø 1/8" | 12 bar | LS32-1500 | | | | | | <div><div></div></div> | | |
| LG16 OEM | LG16-0025 | 100 pcs (OEM only) | 1.5 µI/min H₂O | 10% | yes | All media, calibration valid for H₂O | 0-5V | | ✓ | 30 cm for I²C | Outer Ø 1/32" | 200 bar | LG16-0025 | | <div><div></div></div> | | | | | | |
| | LG16-0150 | | 7 µI/min H₂O 70 µI/min HC | | | ✓ | Outer Ø 1/32" | 200 bar | LG16-0150 | | | <div><div></div></div> | | <div><div></div></div> | | | | | | | |
| | LG16-0430 | | 80 µI/min H₂O 500 µI/min HC | | | ✓ | Outer Ø 1/32" | 100 bar | LG16-0430 | | | <div><div></div></div> | | <div><div></div></div> | | | | | | | |
| | LG16-1000 | | 1 ml/min H₂O 10 ml/min HC | | | ✓ | Outer Ø 1/16" or 1/8" | 12 bar | LG16-1000 | | | <div><div></div></div> | | <div><div></div></div> | | | | | | | |
| | LG16-2000 | | 5 ml/min H₂O | | | ✓ | Outer Ø 1/16" or 1/8" | 5 bar | LG16-2000 | | | <div><div></div></div> | | <div><div></div></div> | | | | | | | |
| | LG16-2000HC | | 80 ml/min HC | | | ✓ | Outer Ø 1/16" or 1/8" | 5 bar | LG16-2000HC | | | <div><div></div></div> | | <div><div></div></div> | | | | | | | |
| LG01 OEM | LG01-2000 | 1 piece | Switch level: 0.25 ml/min or 4.5 ml/min | 10% | no | All media, calibration valid for H₂O | 0 V: no flow or bubble 5 V: flow above switch level | | | 3 m | Outer Ø 1/16" or 1/8" | 3 bar | LGG01-2000 | | | | | <div><div></div></div> | <div><div></div></div> | | |
| LPG10 OEM | LPG10-0500 | 100 pcs (OEM only) | 1 ml/min H₂O | 5% | yes | All media, calibration valid for H₂O | | | ✓ | 30 cm for I²C | Downmount | 10 bar | LPG10-0500 | | <div><div></div></div> | | | | | | |
| | LPG10-1000 | | 100 µI/min H₂O | | | All media, calibration valid for H₂O | | | ✓ | | | 3 bar | LPG10-1000 | | <div><div></div></div> | | | | | | |

Range of best accuracy ■ water (H₂O) ■ hydrocarbon (HC)

Sensing. Anytime. Anywhere.

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