Liquid Flow Sensor Solutions

Experts for Smart Sensor Solutions

SENSIRION
THE SENSOR COMPANY

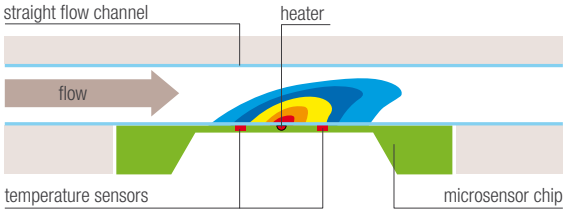
Inspiring Liquid Flow Sensor Technology

Sensirion's liquid flow meters establish new standards wherever monitoring of low liquid flow rates, liquid handling and liquid dispensing is important. Our unique CMOSens® Technology allows bidirectional liquid flow measurement through the wall of the sensor's flow channel from hundreds of milliliters per minute down to single-digit nanoliters per minute. Applications in fields like medical devices, diagnostics as well as process and automation technology benefit daily from our safe and reliable sensor solutions.

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

PATENTED TECHNOLOGY

Sensirion's CMOSens® flow sensor technology is based on a thermal microsensor and is most effective at very low flow rates. The key element in our products is an integrated digital CMOSens® microchip bonded to the outside of the sensor's flow channel that measures precisely through the wall of the flow channel. Our liquid flow meters offer completely media-isolated flow sensing with no moving parts or obstacles in the flow path. We offer our customers the world's smallest and most precise liquid flow meters and inspire new designs and applications throughout all industries. High reliability and perfect media compatibility make our sensors ideal for use in medical and life sciences, diagnostics, factory automation and energy management applications.

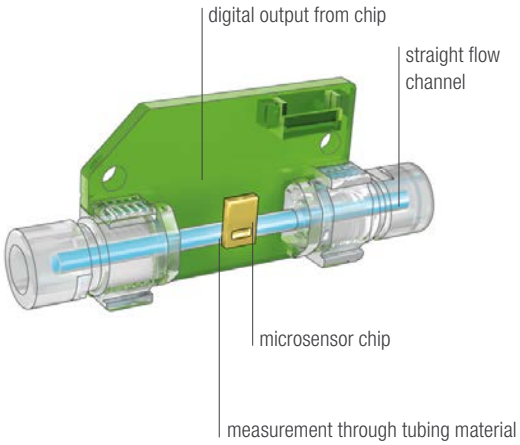


Flow measurement principle

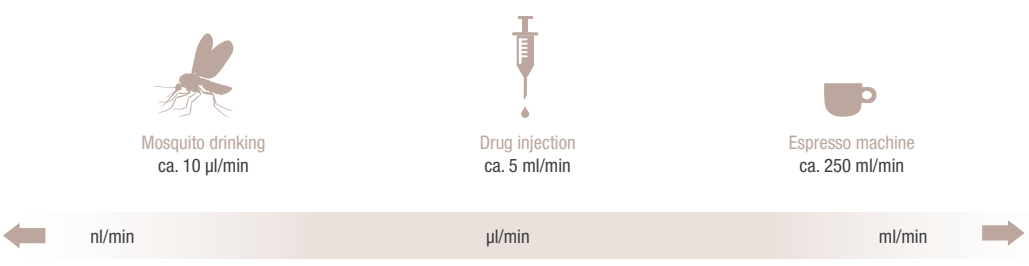
FAST, SMALL, RELIABLE

Sensirion's standard liquid flow meters provide exceptional value for money and eliminate the need for investment in application-specific OEM sensor development. Inert wetted materials ensure excellent process compatibility, industry-standard fluidic fittings enable quick assembly into the fluidic line, and downmount fittings allow compact installation in manifold systems. Through the use of capillaries with different diameters, Sensirion's liquid flow meters cover flow rates over six orders of magnitude from single-digit nanoliters up to a few hundred milliliters per minute.

In addition to the sensor element, the CMOSens® chip integrates the complete digital intelligence and memory for signal linearization, temperature compensation and self-test algorithms. Different digital (I²C, RS485, USB) or analog output options are available for easy testing and seamless integration. Please contact our experts to discuss possible options for customized solutions: info@sensirion.com



Schematic layout of a liquid flow meter



Sensirion is able to measure flow rates from single-digit nl/min up to several hundred ml/min.
Contact us if you require higher flow rates.

Selection of Sensirion's Liquid Flow Meters

SLG SERIES

SLG liquid flow meters for ultra-low flow rates (down to single-digit nanoliters per minute) are the perfect solution for dynamic liquid flow monitoring at high pressures and/or low flow rates, such as cutting-edge UHPLC applications. The fused silica flow channel withstands pressures of up to 1,200 bar.

SLI/SLS SERIES

With Sensirion's flow meter technology in a protective housing, SLI/SLS liquid flow meters are ideal for laboratory work and for use in the automation industry. In combination with the SCC1 sensor cables, they provide RS485, analog or USB output for reliable communication in harsh environments.

SLQ-QT500

Calibrated for flow rates up to 120 ml/min with the exclusive use of high-purity wetted materials (quartz glass, PFA), this sensor is ideal for demanding dispensing processes in the semiconductor industry and for the measurement of liquids with high viscosity or containing particles.

	Model	Full Scale Flow Rates	Typ. Accuracy of Measured Value	Bidirectional Operation	Output			Maximum Cable Length	Fluidic Connector Ports	Maximum Pressure
					Analog	RS485	I²C			
SLG	**SLG-0025**	1.5 µl/min H_2O	10 %	Yes	0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C	Stainless steel 10-32 coned port for 1/16" OD tubing	1200 bar
	SLG-0075	5 µl/min H_2O	10 %		0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C		1200 bar
	SLG-0150	8 µl/min H_2O	5 %		0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C		500 bar
SLI	**SLI-0430**	80 µl//min H_2O 500 µl/min HC	5 %	Yes	0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C	1/4"-28 flat-bottom port for 1/16" or 1/8" OD tubing	50 bar
	SLI-1000	1 ml/min H_2O 10 ml/min HC								12 bar
	SLI-2000	5 ml/min H_2O 80 ml/min HC								12 bar
SLS	**SLS-1500**	40 ml/min H_2O	5 %	Yes	0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C	1/4"-28 flat-bottom port for 1/8" OD tubing	12 bar
SLQ	**SLQ-QT105**	120 ml/min HC	10 %	Yes	0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C	Super 300 type pillar fitting 4 x 3 mm	12 bar
	SLQ-QT500	120 ml/min H_2O 120 ml/min HC	10 %		0 to 10V	✓	✓	> 100 m for RS485, 30 cm for I²C	PFA tube with 6.35 mm (1/4") OD, 4.35 mm ID	12 bar
SLF3x	**SLF3S-1300F**	40 ml/min H_2O 40 ml/min HC	5 % 10 %	Yes			✓	30 cm for I²C	1/4"-28 flat-bottom port for 1/8" OD tubing	12 bar
	SLF3S-0600F	2000 µl/min H_2O 2000 µl/min HC	5 % 10 %				✓	30 cm for I²C	1/4"-28 flat-bottom port for 1/16" or 1/8" OD tubing	12 bar
LS32	**LS32-1500**	40 ml/min H_2O	5 %	Yes			✓	30 cm for I²C	1/4"-28 flat-bottom port for 1/8" OD tubing	12 bar
LG16	**LG16-0025**	1.5 µl/min H_2O	10 %	Yes			✓	30 cm for I²C	UNF 6-40 coned port for 1/32" OD tubing	200 bar
	LG16-0150	7 µl/min H_2O 70 µl/min HC	5 %				✓			200 bar
	LG16-0430	80 µl/min H_2O 500 µl/min HC					✓			100 bar
	LG16-1000	1 ml/min H_2O 10 ml/min HC					✓		1/4"-28 flat-bottom port for 1/16" or 1/8" OD tubing	15 bar
	LG16-2000	5 ml/min H_2O					✓			15 bar
	LG16-2000HC	80 ml/min HC					✓			15 bar
LG01	**LG01-2000**	Switch level: 0.25 ml/min or 4.5 ml/min	10 %	No	0V: no flow or bubble 5V: flow above switch level			3 m	1/4"-28 flat-bottom port for 1/16" or 1/8" OD tubing	3 bar
LPG10	**LPG10-1000**	1 ml/min H_2O	5 %	Yes			✓	30 cm for I²C	Downmount	3 bar
LD20	**LD20-2600B**	1,000 ml/h H_2O	5 %	Yes			✓	30 cm for I²C	Barbed fittings	3 bar
	LD20-0600L	20 ml/h H_2O		Yes			✓		Luer lock	3 bar

SLF3X SERIES

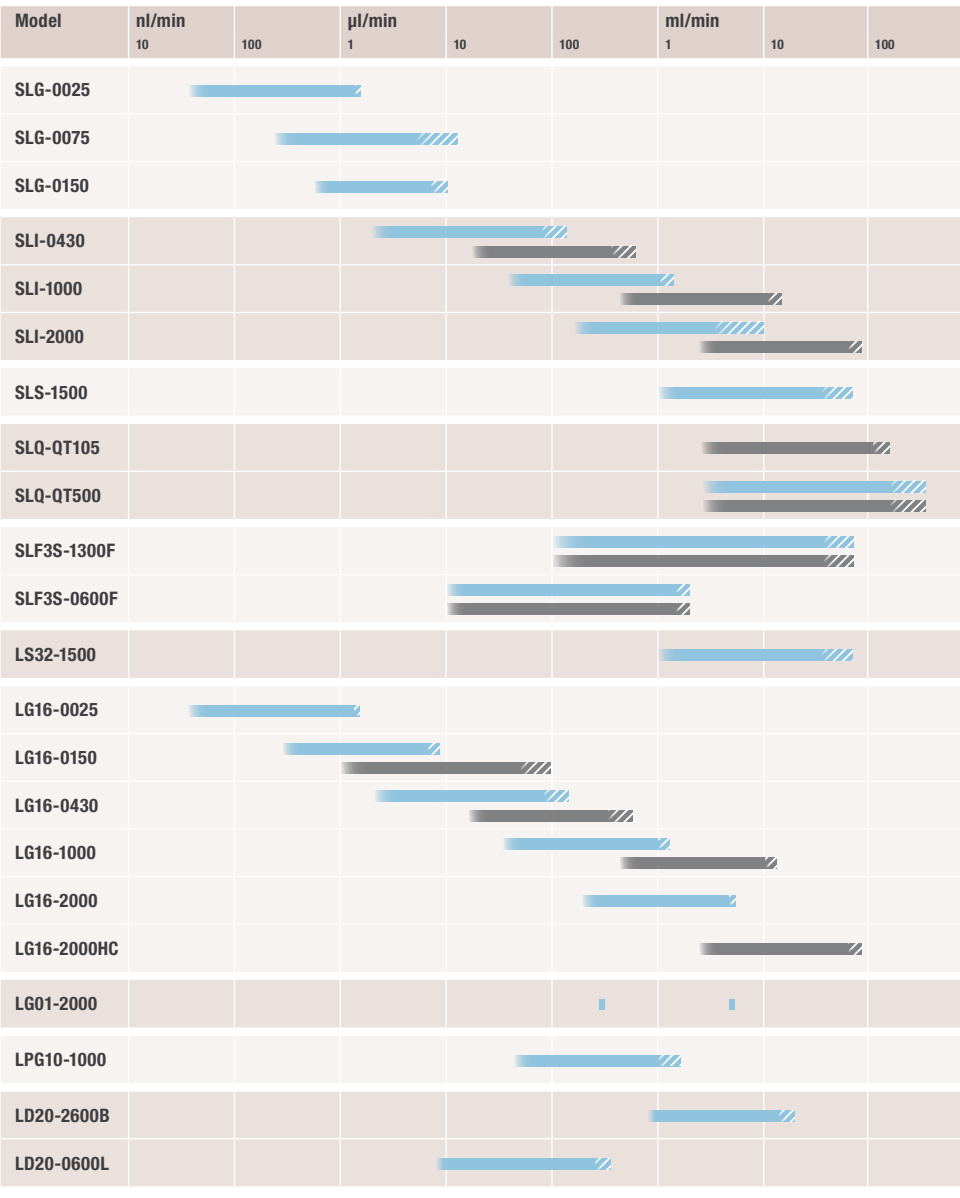
The SLF3x series takes the well-established functionality to the next level in the price-performance ratio. In addition to an unprecedented turndown ratio reaching up to 40 ml/min, the sensor series maximizes safety, stability and long-term reliability in a vast range of high-volume OEM applications.

LS32-1500

The LS32-1500 comes in a compact housing with high mechanical robustness. The wetted materials provide exceptional chemical resistance. In addition to its suitability for the biomedical market, it is a compact and reliable solution for many applications with flow rates of up to 40 ml/min.

LG16 SERIES/LG01

Inert wetted materials and ultra-low flow capabilities make the LG16 series a versatile addition to demanding OEM applications. The LG01 liquid flow switch enables straightforward event detection of flow, bubbles and leakages.



Calibrated flow rates for water (H_2O) hydrocarbons (HC)

LPG10 SERIES

The LPG10 series represents our smallest liquid flow sensors and enables outstanding performance and speed in a very small form factor. The innovative design enables flow measurement in a planar microfluidic glass substrate. Downmount fluidic ports allow compact integration into manifold systems.

LD20 SERIES

The LD20 sensors measure liquid flow rates of up to 1,000 ml/h at the point of interest, enabling a more direct and effective patient treatment. It combines Sensirion's proven sensing technology with a single-use design for high-volume applications in the biomedical, life sciences and food industry sectors.

Liquid Flow Meter Kits

SLF3x Evaluation Kit

In order to conduct initial measurements quickly and easily, all our SLI, SLS, SLG, and SLQ liquid flow meters can be ordered as part of a Liquid Flow Meter Kit. In addition to the liquid flow meter of your choice, the kit also contains USB and analog interface cables for electrical connection, viewer and logging software, and a set of fluidic connectors. For liquid flow sensors of the LPG10, the LD20 and the SLF3x series, we offer specific Evaluation Kits that contain additional accessories for mounting support and electrical connection.

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

Analytical Instruments

Semiconductors

Diagnostics

Customized Solutions

Innovative ideas sometimes demand new solutions and Sensirion's sensor experts are always keen on finding ways to make interesting applications happen through our technology. Customized solutions can be designed for special requirements, such as flow rates, limited space constraints, resistance to aggressive chemicals, and dedicated low-price and even disposable sensor designs for high-volume applications.

Our cutting-edge sensor technology and unique expertise in liquid flow sensing has led to many successful customer projects. The essential goal is to understand the requirements of our customers and to implement the key benefits of our technology skillfully to their advantage: modification of the packaging, the wetted materials, the fluidic or electrical interface, improvement of the dead volume or pressure resistance of the sensor.

LOW FLOW RATES

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

HIGH SPEED

The MEMS sensor integrated on a CMOS chip permits ultra-fast response times – as fast as 20 ms – due to its small thermal mass.

FLEXIBILITY AND COST EFFICIENCY

With our advanced technology, we have the flexibility to address customer requirements to ensure a customized sensor solution that is both high-performance and cost-efficient.

Automation

Medical

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