SPECIAL INFORMATION

FLOWSIC100 Flare-XT Transmitter

POWERFUL. RELIABLE. RUGGED

Gas flow measuring instruments

SICK
Sensor Intelligence.

The measurement of flare gas can pose a serious challenge to operators and producers in the upstream market due to difficult conditions, heightened regulatory pressure, and reporting requirements.

- **Gas velocities of 0 m/s to 120 m/s**
- **Changing gas mixtures and contaminations**
- **Low measurement uncertainty**

Ultrasonic flow meters continue to set the standard in flow measurement when it comes to dynamic range and accuracy. With FLOWSIC100 Flare-XT Transmitter, SICK has developed a new generation of ultrasonic measuring devices that are reliable and accurate across a wide range of gas compositions, from very low flows to flow under upset conditions.

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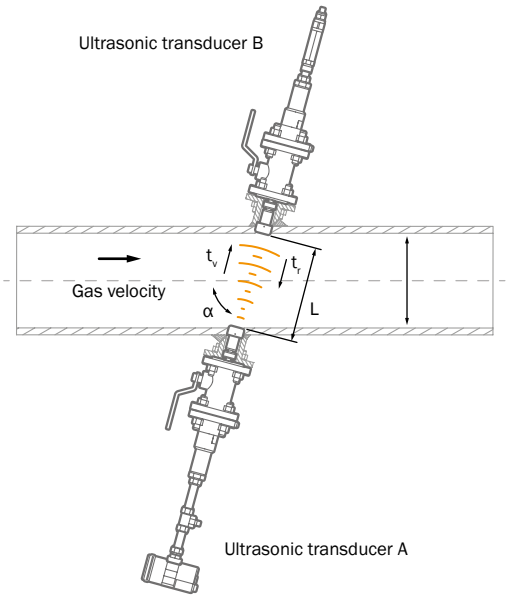
POWERFUL: CHANGING GAS COMPOSITION – NO ISSUES

Operating principle

Two ultrasonic transducers, which are installed at an angle to the gas flow, operate alternately as a transmitter and receiver. The signals transmitted through the gas accelerate in the direction of flow and decelerate against the direction of flow. The resulting difference in propagation (transit) times is used to determine the mean gas velocity.

The cross-sectional area is then used to compute the actual volumetric flow rate - neither pressure nor temperature transmitters are necessary.
The long measurement path is beneficial for accuracy compared to measurement at a single point.



$$v = \frac{L}{2 \bullet \cos \alpha} \bullet \left(\frac{1}{t_v} - \frac{1}{t_r} \right)$$

v = Gas velocity
L = Path length
α = Installation angle
t_v = Transit time with flow
t_r = Transit time against flow

Ultrasonic flare gas measurement is the only technology that can operate in a measuring span of up to 1:4000. There is no need to focus on a high or low flow condition as measurement speeds of 0.03 m/s ... 120 m/s are possible with FLOWSIC100 Flare-XT.

RELIABLE: VIRTUALLY MAINTENANCE-FREE – FOR MAXIMIZED UPTIME

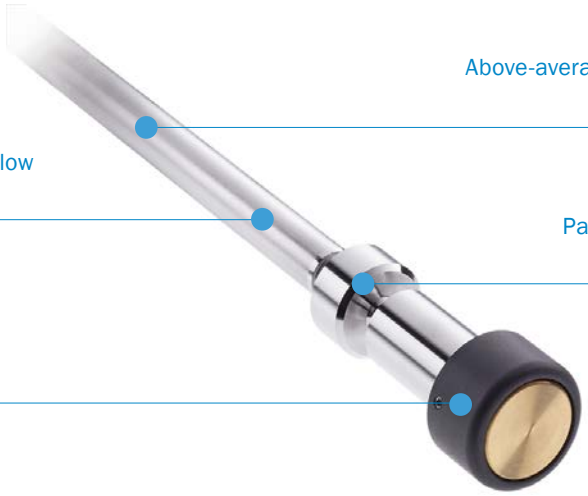
Some measurement principles, like thermal mass measurement, need clean gas to operate correctly. SICK's ultrasonic technology can overcome fouling or contamination on the sensors by automatically boosting the signal. This optimizes maintenance intervals, maximizes measurement uptime and reduces operating costs.

RUGGED: SENSORS MADE TO LAST - WITHOUT RECALIBRATION

SICK sensor technology

Thanks to advanced signal processing, the hermetically sealed high-performance ultrasonic sensor allows a very high resolution of the signals and measures reliably and accurately even at very low gas velocities close to zero.

FLOWSIC100 Flare-XT is also capable of performing measurements even under extreme conditions, with varying gas compositions and at high flow velocities. Developed specially for use with very high gas flows, measurement is also continuously available in the event of gas turbulence and emergency shutdown.



The right solution for every challenge

FLOWSIC100 Flare-XT F1F-S	FLOWSIC100 Flare-XT F1F-H	FLOWSIC100 Flare-XT F1F-P
Type: cross-duct measurement		Type: single-side probe
4“ ... 20“	22“ ... 86“	12“ ... 86“

No recalibration needed

Since flare gas measurement using the ultrasonic principle is independent from the gas composition, the SICK flare gas transmitter does not require recalibration.

A simple, on-demand field verification procedure proves that the measurement is valid.

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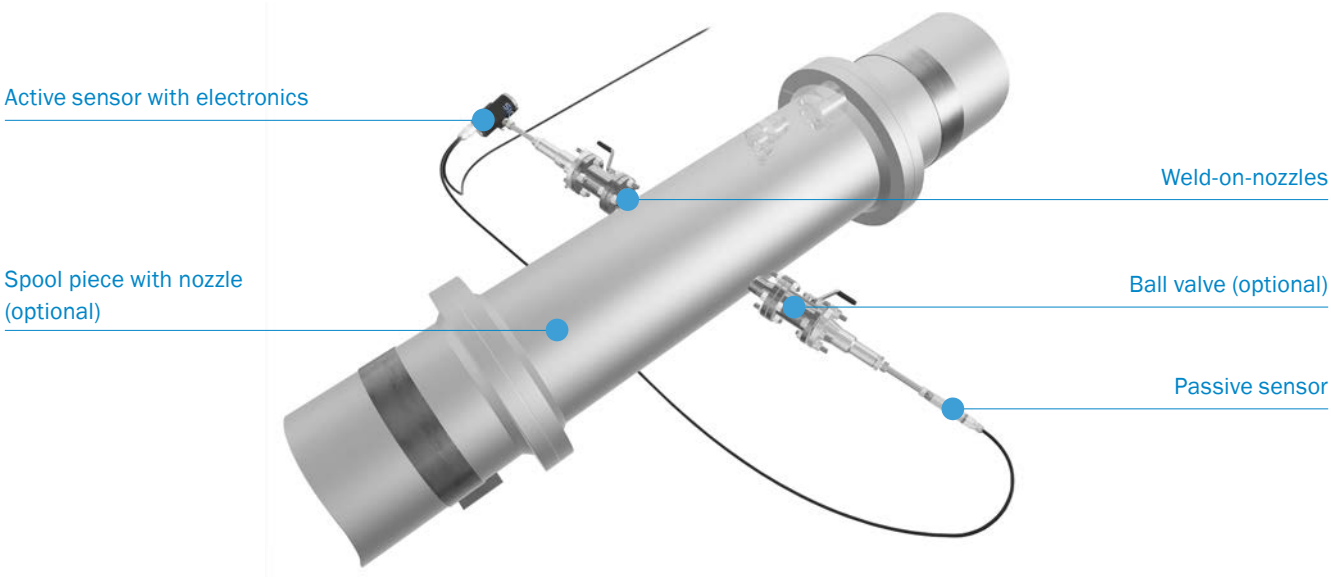
OVERVIEW MEASUREMENT POINT

- FLOWSIC100 Flare-XT Transmitter measurement solution consists of two ultrasonic sensors – an active and a passive unit. They are typically installed onto the existing pipeline using weld-on nozzles. An optional spool piece with pre-fabricated nozzles avoids on-site welding and ensures easy installation.
- The electronic housing of the active unit contains two cable entries – one for 24 V DC voltage supply and one for direct RS485 Modbus® data communication to your DCS / SCADA.
- Optional ball valves allow retraction of the sensors without interruption of the process.



SUPPORTING REGULATORY COMPLIANCE

Cutting-edge technology, designed to meet future environmental regulations

Environmental regulations are becoming stricter in many industries globally. Thanks to a combination of two individual measurement technologies, FLOWSIC100 Flare-XT sets new standards in the flare world.

State-of-the-art ultrasonic measurement is extended with SICK's patented ASC technology (active sound correlation). The measurement is continuously available in the event of gas turbulence and emergency shutdown.

Support through:

- **Accurate measurement**
- **Insensitive to fouling and contamination**
- **Uninterrupted measurement even if gas composition changes**
- **Measuring span up to 1:4000**
- **Range extension with ASC technology (active sound correlation)**

Detailed technical data

The exact device specifications and performance data of the product may deviate from the information provided here, and depend on the application in which the product is being used and the relevant customer specifications. Please contact your local SICK representative to inquire about FLOWSIC100 Flare-XT Transmitter performance for your application.

FLOWSIC100 Flare-XT Transmitter

Measured values	Mass flow rate, volumetric flow s. c. (standard condition), volumetric flow a. c. (actual condition), molecular weight, gas velocity, sound velocity
Measuring medium	Typical flare gas
Nominal pipe size 1-path measurement	 Cross-duct 4 ″ ... 86 ″ / Probe 12 ″ ... 86 ″
Measuring ranges [1]	0.03 m/s ... 120 m/s
Measuring span [1]	Up to 4000:1
Resolution	(acc. to JCGM 200:2012): +0.001 m/s
Uncertainty of measurement [1-3] Volumetric flow a. c. Mass flow rate	 2 % ... 5 % related to the measured value with ultrasonic technology (in the range ≥ 0.3 m/s to measuring range end value) 2.5 % ... 5.5 % related to the measured value with ultrasonic technology (in the range ≥ 0.3 m/s to measuring range end value)
Uncertainty of measurement ASC technology [1,2,5] Volumetric flow a. c.	 1 % ... 8 %
Ambient temperature Sensors, ignition group IIC T4	 –40 °C ... +70 °C –50 °C ... +70 °C (optional)
Gas temperature	Up to –196 °C ... +280 °C
Operating pressure	Up to 20 bar(g) (subject to temperature derating)
Conformities ATEX / IECEx NEC / CEC (US/CA)	 Zone 1 Class 1 Division 1 / Division 2
Enclosure rating	IP66 / IP67 according to IEC 60529, type 4 according to UL50E
Voltage supply	24 V DC
Interface	1 x Modbus® RS-485 RTU
Footnote	[1] Depending on the application conditions such as gas composition, process temperature, type of device, pipe diameter, etc. For mass flow, additionally selection and parameterization of the conversion algorithm as well as uncertainty of the pressure and temperature sensors. To be evaluated by SICK. [2] With fully developed turbulent flow profile. Typically 20D straight upstream and 5D straight downstream piping is required. [3] Below a specific threshold Reynolds number, only runtime effects and uncertainties of geometry, excluding contributions from the flow profile, are considered. [4] Depending on the capabilities of the selected flow lab. [5] Additional uncertainty. In the range 100 % ... 130 % of the last gas velocity measurable with ultrasonic transit time difference measurement.

Applications of FLOWSIC100 Flare-XT Transmitter in regulated environment

The gas flow measuring instrument can be applied in emission measurements which may be subject to one or more regulations in some jurisdictions. Compliance with all emissions regulations applicable at the installation site remains owner / operator responsibility. If designed and applied correctly SICK's ultrasonic flow technology will meet or exceed most performance requirements set forth by any regulatory authority. Please contact your SICK representative to inquire about the correct flare measurement solution which will meet the currently applicable requirements set forth by the authorities.

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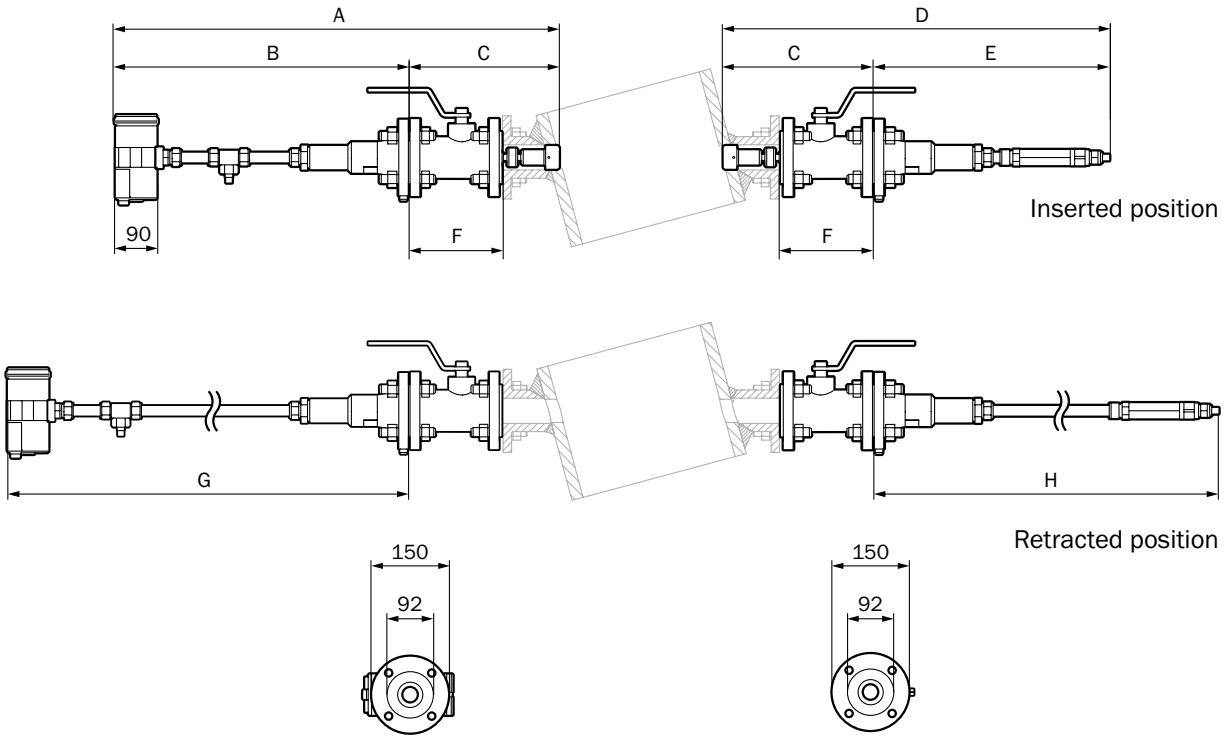
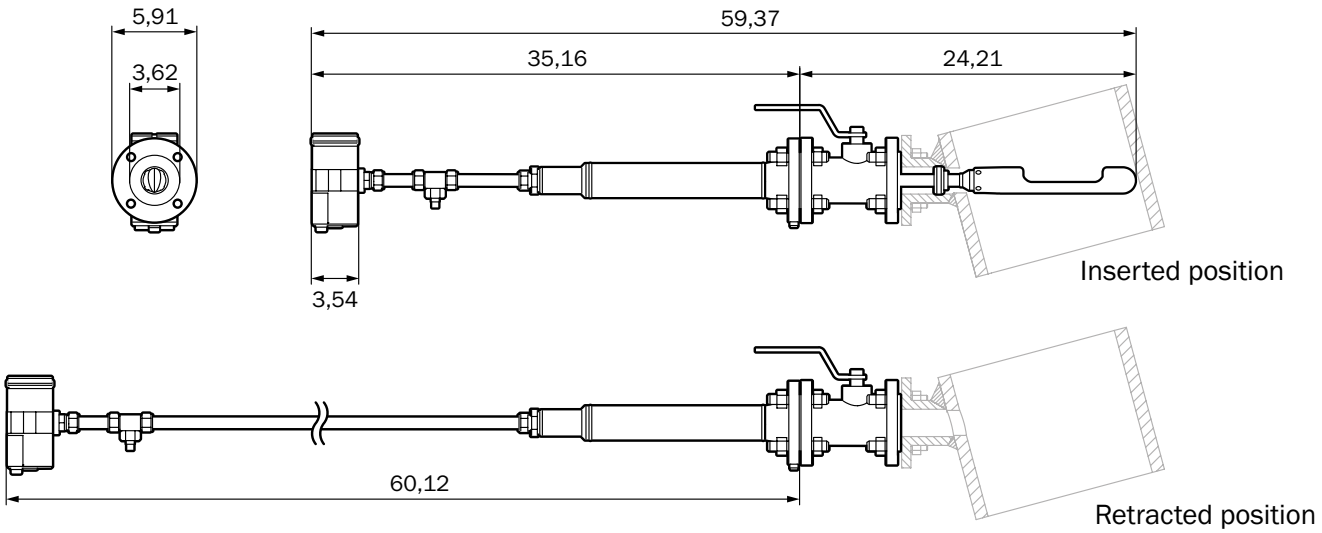
Dimensional drawings (dimensions in mm)

F1F-S/H (extended version / nominal pipe size 4 ″ - 86 ″)



Flare-XT	Dimensions							
	A	B	C	D	E	F	G	H
F1F-S	983	583	400	871	471	178	1055.5	944
F1F-H	846	448	398	919	518	178	851	917

F1F-P (nominal pipe size 12 ″ - 86 ″)



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SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 9,700 employees and over 50 subsidiaries and equity investments as well as numerous agencies worldwide, SICK is always close to its customers. A unique range of products and services creates the perfect basis for controlling processes securely and efficiently, protecting individuals from accidents, and preventing damage to the environment.

SICK has extensive experience in various industries and understands their processes and requirements. With intelligent sensors, SICK delivers exactly what the customers need. In application centers in Europe, Asia, and North America, system solutions are tested and optimized in accordance with customer specifications. All this makes SICK a reliable supplier and development partner.

Comprehensive services round out the offering: SICK LifeTime Services provide support throughout the machine life cycle and ensure safety and productivity.

That is "Sensor Intelligence."

Worldwide presence:

Australia, Austria, Belgium, Brazil, Canada, Chile, China, Czech Republic, Denmark, Finland, France, Germany, Great Britain, Hungary, Hong Kong, India, Israel, Italy, Japan, Malaysia, Mexico, Netherlands, New Zealand, Norway, Poland, Romania, Russia, Singapore, Slovakia, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Thailand, Turkey, United Arab Emirates, USA, Vietnam.

Detailed addresses and further locations → www.sick.com

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