PRODUCT INFORMATION

FLOWSIC100 Flare

RELIABLE GAS FLOW MEASUREMENT IN FLARE GAS APPLICATIONS

Gas flow measuring instruments

SICK
Sensor Intelligence.

MEASUREMENT CERTAINTY AND PRECISION EVEN UNDER EXTREME APPLICATION CONDITIONS – FLOWSIC100 FLARE.

The measurement of flare gas in the chemical and petrochemical industry is widely considered to be the leading discipline in gas flow measurement. In no other area do the application conditions and resulting requirements for measuring technology pose such a challenge.
The primary area of application involves calculating greenhouse gas emissions based on the amount of flare gas measured in accordance with regulatory requirements. FLOWSIC100 Flare has been developed for precisely this purpose.
State-of-the-art sensor technology and high-quality components ensure high accurate and reliable measurement with the utmost failure safety protection – even under extreme conditions on oil rigs and at remote oil fields. Even very low flow rates can be accurately detected, the measuring device is also suitable for continuous process monitoring and optimization as well as for detecting the smallest leaks in the flare gas network.

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Performance and durability

FLOWSIC100 Flare is based on more than 30 years of experience in ultrasonic sensor technology at SICK and offers outstanding performance and durability. Changing gas compositions and corrosive components have no impact on the measurements, as all parts that come into contact with the gas flow are made of resistant materials.

Reliable low flow measurements

A high signal time resolution combined with state-of-the-art signal processing mean that even very small amounts of gas can be detected accurately with flow velocities of close to zero. As a result, the measuring device offers excellent reliability when monitoring processes and detecting leakages in the flare gas system.

Works even under extreme conditions

The optimized sensor design even allows measurements to be taken during emergency system shutdowns and at extreme gas velocities of up to 120 m/s. In tandem with a high-speed measuring algorithm, the measuring process is also safeguarded in the event that conventional ultrasonic technology has failed due to extreme system noise and turbulence.

Excellent application reliability

The high power EX/EX-RE model is specially designed for use in pipes with large diameters of up to 72 inches and with extremely challenging gas compositions. Even flare gas with excessive contamination (e.g., associated gas) does not affect the measurement.
All device versions meet explosion protection requirements according to ATEX, CSA, and IECEx.

Comprehensive diagnostic functions

An automatic control cycle checks the device function periodically, while the integrated self-diagnosis continually monitors all important function parameters. In the event of impermissible deviations that could affect the measurement result, warning messages are generated so that maintenance can be planned in time. A special testing procedure allows the device functions to be verified according to factory standards with ease – even for quality assurance in the field.

Ideal configuration

FLOWSIC100 Flare is available as 1- or 2-path version. The 2-path version offers higher measurement accuracy even in the event that flow conditions are less than ideal. The FLOWSIC100 EX-PR probe version is a special device version providing simple and cost-saving installation on one side of the flare gas line. A device retraction mechanism allows sensors to be replaced quickly and simply during plant operation.

Product overview

FLOWSIC100 Flare is available in three different versions, each capable of overcoming all of the difficulties that arise from the measuring task. These include extreme flow conditions, challenging gas compositions, special installation and ambient conditions.

FLOWSIC100 EX-S

- Cross-duct high-speed version (patent pending)
- 90° nozzle installation
- Retractable under process conditions
- Hermetically sealed stainless steel and titanium probes
- ATEX, IECEx, and CSA approved for use in hazardous areas

FLOWSIC100 EX/EX-RE

- Cross-duct high-speed version for exceptionally large nominal pipe sizes and gaseous mixtures with a high CO_2 content (patent pending)
- Retractable under process conditions
- Hermetically sealed stainless steel and titanium probes
- ATEX, IECEx, and CSA approved for use in hazardous areas

FLOWSIC100 EX-PR

- High-speed probe version (patent pending)
- Single nozzle installation only
- Retractable under process conditions
- Hermetically sealed titanium probe
- ATEX, IECEx, and CSA approved for use in hazardous areas

CUTTING-EDGE ULTRASONIC TECHNOLOGY FOR ONE OF THE MOST DEMANDING APPLICATIONS IN GAS FLOW MEASUREMENT.

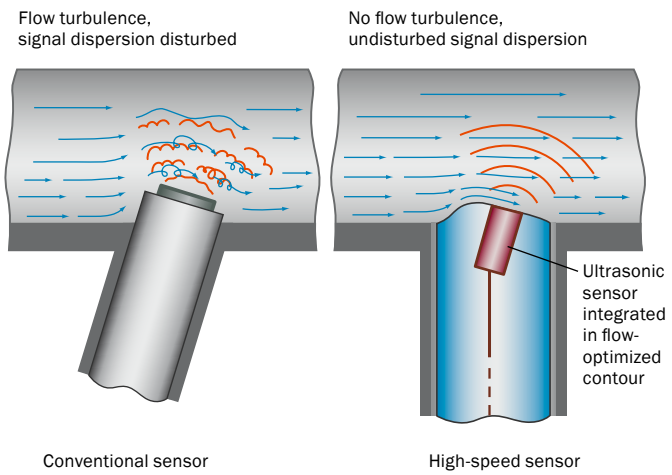
Ultrasonic technology by SICK

FLOWSIC100 Flare combines state-of-the-art ultrasonic sensor technology with proven, high-precision signal processing from the field of custody transfer measurement.
The ultrasonic sensors can operate even under atmospheric pressure conditions without any restrictions on performance. Under practical application conditions, the acoustic signal resolution reaches a value of up to +/- 5 ns, which enables gas velocities of up to 0.001 m/s to be detected, and the tiniest quantities of flare gas to be reliably recorded. To ensure this performance, every device in the FLOWSIC100 Flare series passes a specially developed testing procedure under zero point conditions, in which extremely demanding performance criteria must be met.

The upper measuring range presents yet a further challenge: In the case of emergency shutdowns in the flare gas system, the gas velocity can reach well over 100 m/s within just a few seconds, leading to heavy background noise, gas flow turbulence, and signal drift effects. This is where a good flow measuring device comes into its own. FLOWSIC100 Flare has already recorded low flow measurements in the flare gas system, now it is switching its attention to extreme measuring. Its unique, streamlined sensor design smoothens turbulence and minimizes background noise on the sensor surface. Even at 120 m/s.

High-speed sensor design

An innovative sensor design has been developed for the FLOWSIC100 Flare. The ultrasonic sensors are embedded in a flow-optimized contour that has been specially designed for high gas flows. The unique sensor design reduces flow noise and signal drift to a minimum and provides stable and reliable measured values. The optimized 2-stage signal algorithm offers optimum signal processing across the entire measuring range.



Outstanding reliability and durability

Significant fluctuations in gas compositions and/or corrosive process conditions are taken into account by selecting specially adapted ultrasonic sensors.
The broadband transmission behavior and large signal amplitudes ensure a reliable measuring operation in a variety of gas mixtures with a molecular weight of between 2 and 120 g/mol. The large signal range and good coverage of the SICK ultrasonic sensors are yet further factors of success for optimal functioning of the device.

Depending on the gaseous mixture, specially adapted switching frequencies with optimal transmission properties can be used. "High-power transducers" allow a cross-duct measurement in the case of nominal pipe sizes of up to 72 inches and sound-absorbing gases with an extremely high carbon dioxide content. The sensors are made exclusively in hermetically sealed, solid metal designs, preferably from titanium.
For particularly aggressive gas compositions, highly-resistant alloys (e.g., Hastelloy) are used to ensure durability.

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Device testing to factory standards

To provide regular evidence of its functionality, FLOWSIC100 Flare can also be checked in the field according to SICK factory standards. Zero point deviation and time-of-flight measurements are checked in a specially designed testing box and adjusted if necessary. By comparing the theoretical and measured speed of sound under defined test conditions (pressure, temperature, humidity), it is possible to assess the accuracy of the time-of-flight measurement and provide evidence of its zero point stability with ease.
Even if the measuring device cannot be removed from the measuring line, a periodic functional test is carried out via an integrated control cycle (zero point test, span test).

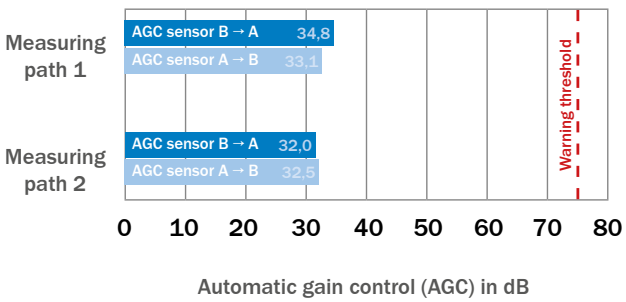
Continuous self-diagnosis

Using ultrasonic technology parameters such as automatic gain control, error rate, and signal-noise ratio, the device is automatically monitored for compliance with the permitted operating range using the integrated self-diagnosis. Impermissible deviations from the parameters can be signaled immediately by means of a continuous internal evaluation before the measuring function is even affected. This means that any signs of wear, sensor contamination, or background noise can be detected and eliminated as early as possible.

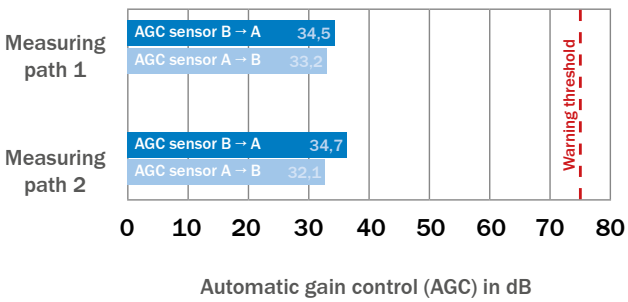
By comparing diagnostic values when commissioning the device ("fingerprint") and at any given point in the future, it is possible to continue to identify changes in process conditions. In this case, device performance can be ensured even under special challenging conditions by parameter optimization. Thus application reliability can be increased. Under conditions where conventional ultrasonic technology has already failed.

Device diagnosis by evaluating gain control values using the example of a 2-path measuring system and a measuring operation of one year

Automatic gain control (AGC) during device commissioning



Automatic gain control (AGC) after one year of measuring operation



FLARE GAS MEASURING DEVICE RETROFIT SOLUTION THE FLOWSIC100 FLARE 90°UPGRADE KIT

Retrofitting an ultrasonic flare gas meter installation is child‘s play with the SICK retrofit solution. Keep your nozzles, shut-off valves, p/T transmitters and even cabling and revamp your flare gas system with the latest flare gas meter technology of SICK.
Since the existing nozzles and shut-off valves can be used, no hot-tapping or depressurization of the flare gas line is needed.

Rugged transducers you can trust

The rugged transducers of the 90° upgrade kit are made to last! Even under extreme application conditions up to 180 m/s (590 ft/s), the transducers won´t break. That is ensured by the unique robust barrel design and the fully titanium construction. Vibration resistance analysis and extensive laboratory testing prove the extraordinary durability of the transducers and give you peace of mind.

Annual recalibration – not required

SICK ultrasonic flare measuring devices are drift-free and have virtually no need for maintenance. The continuous self-diagnosis constantly monitors the measuring device function and reliability.
Whenever the measuring device performance changes, you will be informed prior to any signal loss. With the FLOWSIC100 Flare, no periodic calibration is needed.

Service yourself – verification when you want it – support when you need it

In addition to the internal check cycle, SICK makes it possible to validate the measuring device function with an optional zero flow box. Whenever your local plant or area regulations require you to prove the measuring device function, you can do it yourself and save money on service expenditures. Of course, the experienced SICK customer service can also help you with your regular checks – the carefree solution.

Retrofitting while the system is running

Installation of the sender/receiver units on the existing nozzles makes it possible to retrofit without depressurization of the flare gas line. Welding is not required. With the adapter plate included in the delivery, the MCUP can be installed in the same place as the previously installed electronics unit. This reduces installation effort to a minimum. Keep installed pressure and temperature transmitters and connect them to the MCUP using already existing cables. You can also continue to use the communication cable to the SCADA system. Retrofitting a measurement system has never been so easy.

Solid cylinder construction

Installation after retrofitting

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Measurement performance even under extreme conditions

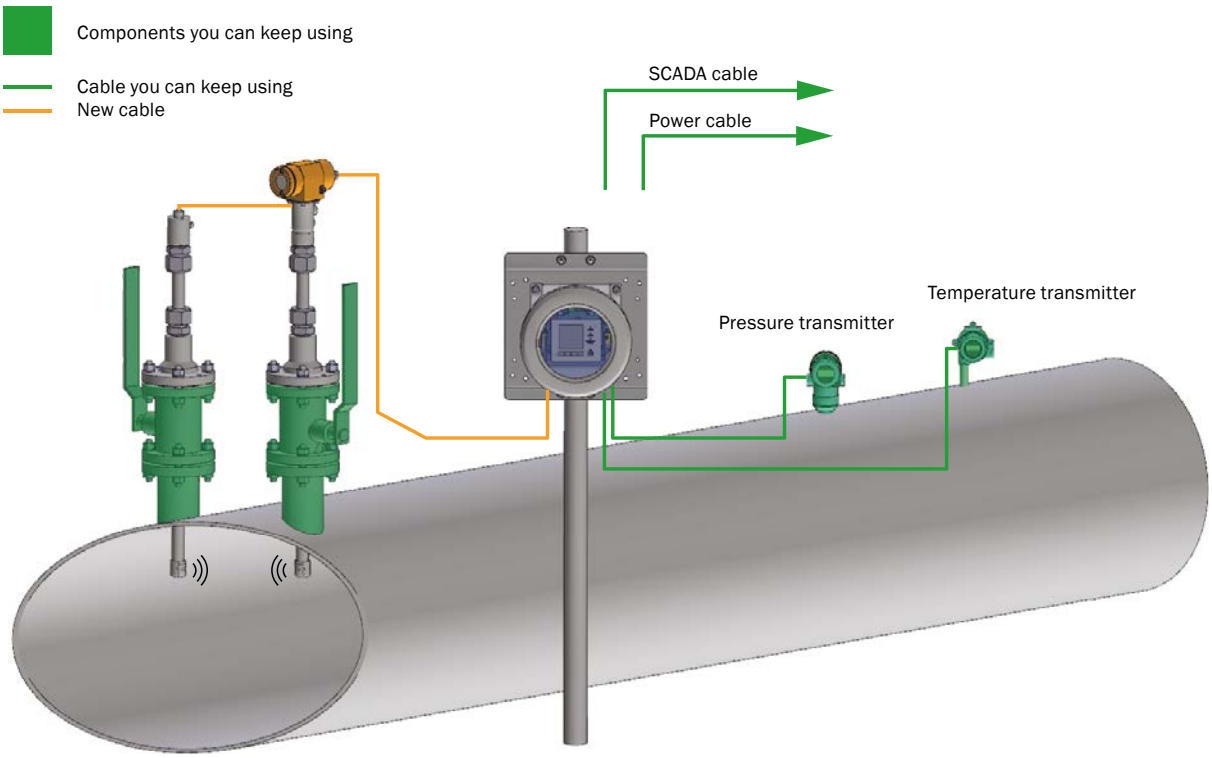
The outstanding ultrasonic transducer technology combined with state-of-the-art signal processing gives you the best measurement performance at very low speeds close to zero. Even during emergency shutdown events and at extremely high speeds, the measuring device stays accurate due to its optimized sensor shape in combination with high-speed measurement algorithms.

Kit components

- Multi control unit (MCUP)
- Ultrasonic sender/receiver units
- Mounting accessories
- Sender/receiver unit connection cables
- Sender/receiver units connection cables - MCUP (optional)

Components you can keep using

- Nozzles
- Shut-off Valves
- p/ T transmitters
- Most of the cabling



RELIABLE GAS FLOW MEASUREMENT IN FLARE GAS APPLICATIONS

Product description

The FLOWSIC100 Flare product family features a unique flow-optimized sensor design. This innovative design minimizes flow-generated noise and signal drift when gas velocities are particularly high. Modern signal processing and high-efficiency transducers enable high time resolution for signals and thus deliver accurate measurements, even at extremely low gas flow rates.

The standard system configuration includes two sender/receiver units or one measuring probe and the MCUP control unit. The MCUP unit is used to input and output signals; to calculate reference values (normalization), molecular weight and mass flow; to record gas volumes; and to provide user-friendly control via the LCD display.

At a glance

- High-resolution measurement and short response time
- Innovative sensor design for very high gas velocities
- Optimal signal transmission even under atmospheric pressure
- Detached installation of the control unit up to 1,000 m away
- Single and multi-path configuration, opt. Probe version
- Zero point test in the field according to factory standard
- Control cycle for automatic self-diagnosis / signal optimization

Your benefits

- Reliable process monitoring due to exact measurement near the zero point
- High measurement availability even in the case of emergency shutdowns with gas velocities of up to 120 m/s
- Cost savings due to detached installation of the control unit possible in the safe area
- System solution for the control of three different measuring points with a common control unit
- Cost savings due to one-sided installation when using FLOWSIC100 EX-PR probe version
- Optimal device performance due to continual function monitoring and extended diagnostic functions in the field

More information

→ www.sick.com/FLOWSIC100_Flare

For more information, simply visit the above link to obtain direct access to technical data, CAD design models, operating instructions, software, application examples, and much more.

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Subject to change without notice

Fields of application

- Emissions control for accounting of CO_2 emissions
- Detection of flare gas leaks
- Monitoring of steam injection when burning flare gas
- Monitoring of gas losses
- Exact mass balance and process optimization

Detailed technical data

The precise device specifications and product performance data may vary and are dependent on the respective application and customer specifications. Please contact your local SICK representative to inquire about the FLOWSIC100 Flare performance for your application.

FLOWSIC100 Flare system

Measurands	Mass flow, volumetric flow at actual and standard conditions, molecular weight, gas volume and mass, gas velocity, gas temperature, speed of sound
Number of measuring paths	1, 2
Nominal pipe size	
1-path measurement	4 ″ ... 72 ″
2-path measurement	12 ″ ... 72 ″ Other nominal sizes on request
Measurement principle	Ultrasonic transit time difference measurement, ASC-technology (active sound correlation)
Measuring medium	Typical flare gas
Measuring ranges [1]	0.03 m/s ... 120 m/s
Measuring span [1]	Up to 4000:1
Repeatability	(acc to ISO 5725-1; JCGM 200:2012): < 0.5 % of the measured value in the range ≥ 1 m/s
Resolution	(acc. to JCGM 200:2012): + 0.001 m/s
Uncertainty of measurement [1-3]	
Volumetric flow a. c.	1 % ... 5 % Related to the measured value (in the range ≥ 0.3 m/s to measuring range end value) 0,5 % ... 1,5 % with Spool Piece and flow calibration Related to the measured value (in the range ≥ 1 m/s to calibration range end value) [4]
Mass flow rate a.c.	2 % ... 5,5 % Related to the measured value (in the range ≥ 0.3 m/s to measuring range end value) 1,5 % ... 2 % with Spool Piece and flow calibration Related to the measured value (in the range ≥ 1 m/s to calibration range end value) [4]
Uncertainty of measurement ASC-technology (Active Sound Correlation) [1,5]	
Volumetric flow a. c.	1 % ... 8 %
Gas temperature	
Standard:	–70 °C ... +180 °C
High-temperature zone 1:	–70 °C ... +280 °C
High-temperature zone 2:	–70 °C ... +260 °C
Low temperature:	–196 °C ... +100 °C not for FLOWSIC100 EX/EX-RE zone 1 / class I, division 1
Operating pressure	–0.5 bar (g) to 16 bar (g) FLOWSIC100 EX-S 90°: –0.5 bar (g) to 19 bar (g) Temperature dependent. For details, see section Application ranges.

Ambient temperature	
Sensors, ignition group IIC T4:	–40 °C ... +70 °C
Sensors, ignition group IIC T4:	–50 °C ... +70 °C, optional
Sensors, ignition group IIC T6:	–40 °C ... +55 °C
Sensors, ignition group IIC T6:	–50 °C ... +55 °C optional
Storage temperature	–40 °C ... +70 °C –50 °C ... +70 °C optional
Ambient humidity	≤ 95% relative humidity
Electrical safety	CE
	[1] Depending on the application conditions such as gas composition, temperature, device type, nominal pipe diameter, etc. To be evaluated by SICK. [2] For ultrasonic time difference measurement at fully developed flow profile [3] The exemplary uncertainty statement according to GUM (Guide to the Expression of Uncertainty in Measurement): ISO/IEC Guide 98-3:2008-09 assumes a gas temperature of 20°C, ambient pressure, a typical molecular weight of greater than 27g/mol and a nominal diameter greater than 8“. [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.

FLOWSIC100 EX-S

Ex-approvals	
IECEx	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors
ATEX	II 1/2 G Ex d [ia Ga] IIC T4 Ga/Gb II 1/2 G Ex d e [ia Ga] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors II 3 G Ex nA IIC T4 Gc
NEC/CEC (US/CA)	Cl I, div1 group B, C, D T4 Ex/AEx d [ia] IIB + H2 T4 optional: temperature class T6 Cl I, div2 group A, B, C, D T4 Ex/AEx nA [ia] IIC T4 optional: temperature class T6
INMETRO	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors
Enclosure rating	
ATEX zone 1 with terminal box	IP65
ATEX zone 1 without terminal box	IP65 / IP67
ATEX zone 2 with terminal box	IP65
NEC/CEC (US/CA)	Housing type 4, IP65
INMETRO	IP65 / IP67
Dimensions (W x H x D)	Details, see dimensional drawings
Weight	≤ 11 kg

FLOWSIC100 EX-S 90°

Ex-approvals	
IECEx	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors

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ATEX	II 1/2 G Ex d [ia Ga] IIC T4 Ga/Gb II 1/2 G Ex d e [ia Ga] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors II 3 G Ex nA IIC T4 Gc
NEC/CEC (US/CA)	Cl I, div1 group B, C, D T4; Ex/AEx x d [ia] IIB + H2 T4 optional: temperature class T6 Cl I, div2 group A, B, C, D T4; Ex/AEx x nA [ia] IIC T4 optional: temperature class T6
INMETRO	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors
Enclosure rating	
ATEX zone 1 with terminal box	IP65
ATEX zone 1 without terminal box	IP65 / IP67
ATEX zone 2 with terminal box	IP65
NEC/CEC (US/CA)	Housing type 4, IP65
INMETRO	IP65 / IP67
Dimensions (W x H x D)	Details, see dimensional drawings
Weight	≤ 12 kg

FLOWSIC100 EX/EX-RE

Ex-approvals	
IECEx	Ex d IIC T4 optional: temperature class T6
ATEX	II 2G Ex d IIC T4 II 2G Ex de IIC T4 optional: temperature class T6 II 3 G Ex nA IIC T4 Gc
NEC/CEC (US/CA)	Cl I, div1 group B, C, D T4 Ex/AEx d IIB + H2 T4 optional: temperature class T6 Cl I, div2 group A, B, C, D T4 Ex/AEx nA IIC T4 optional: temperature class T6
INMETRO	Ex d IIC T4 optional: temperature class T6
Enclosure rating	
ATEX zone 1 with terminal box	IP65
ATEX zone 1 without terminal box	IP65 / IP67
Version for Ex zone 2	IP65
NEC/CEC (US/CA)	Housing type 6, IP65/67, single seal
INMETRO	IP65 / IP67
Dimensions (W x H x D)	Details, see dimensional drawings
Weight	≤ 14 kg

FLOWSIC100 EX-PR

Ex-approvals	
IECEx	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors
ATEX	II 1/2 G Ex d [ia Ga] IIC T4 Ga/Gb II 1/2 G Ex d e [ia Ga] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors II 3 G Ex nA IIC T4 Gc

NEC/CEC (US/CA)	Cl I, div1 group B, C, D T4 Ex/AEx d [ia] IIB + H2 T4 optional: temperature class T6 Cl I, div2 group A, B, C, D T4 Ex/AEx nA [ia] IIC T4 optional: temperature class T6
INMETRO	Ex d [ia] IIC T4 Ga/Gb optional: temperature class T6; Ex zone 0 for ultrasonic sensors
Enclosure rating	
ATEX zone 1 with terminal box	IP65
ATEX zone 1 without terminal box	IP65 / IP67
Version for Ex zone 2	IP65
NEC/CEC (US/CA)	Housing type 4, IP65
INMETRO	IP65 / IP67
Dimensions (W x H x D)	Details, see dimensional drawings
Weight	≤ 32 kg

MCUP control unit

Description	Unit for controlling the sender/receiver units, and offsetting, evaluating, and outputting measured value data
Ambient temperature	
MCUP control unit (non-Ex):	–40 °C ... +60 °C
MCUP control unit (Cl I, div2, zone 2, 115/230 V AC):	–25 °C ... +60 °C
MCUP control unit (Cl I, div2, zone 2, 24 V DC):	–40 °C ... +60 °C
MCUP control unit (Cl I, div1, group A, B, C, D):	–25 °C ... +50 °C
MCUP control unit (Cl I, div1, group C, D):	–50 °C ... +50 °C
MCUP control unit (Ex zone 1):	–40 °C ... +55 °C for ATEX/IECEx devices
MCUP control unit (Ex zone 1):	–55 °C ... +55 °C for ATEX/IECEx devices, 24 V DC on request
Ex-approvals	
IECEx	Ex de IIC T6
ATEX	II 2G Ex de IIC T6 II 3 G Ex nA II T4
NEC/CEC (US/CA)	CSA Cl 1, div2; Cl1, zone 2 group A, B, C, D T4 Ex/AEx nA IIC T4
Enclosure rating	
Version for Ex zone 1	IP66
Version for Ex zone 2, div2, div1	Housing type 4 or 4X/IP66
Version for nonhazardous areas	IP66
19" version	IP20
Analog outputs	1 output: 0/2/4 ... 22 mA, 500 Ω in acc. with NAMUR NE43; up to 7 outputs when using I/O modules (option)
Analog inputs	2 inputs: 0 ... 5 V 0 ... 10 V or 2 inputs: 0 ... 20 mA without galvanic isolation; up 12 inputs when using I/O modules (option)

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Digital outputs	5 relay contacts: + 48 V DC, 1 A volt-free; for status signals; up to 7 outputs when using I/O modules (option); pulse/frequency output (option) 5 relay contacts: / 30 V DC, 1 A MCUP for zone 2/Div2; volt-free; for status signals; up to 7 outputs for using I/O modules (option); pulse/frequency output (option)
Digital inputs	2 inputs: for connecting volt-free contacts
USB	✔
Function	Connection to SOPAS ET software
Serial	✔
Type of fieldbus integration	RS-232 RS-485
Function	Connection to SOPAS ET software Internal system bus
Ethernet	✔
Type of fieldbus integration	Via optional interface module
Function	Connection to SOPAS ET software
Modbus	✔
Type of fieldbus integration	ASCII RS-485 (via optional interface module; standard for 90° upgrade kit) RTU RS-485 (via optional interface module; standard for 90° upgrade kit) TCP (via optional interface module; standard for 90° upgrade kit)
HART	✔
Type of fieldbus integration	Via optional interface module
PROFIBUS DP	✔
Type of fieldbus integration	Via optional interface module
Foundation Fieldbus	✔
Type of fieldbus integration	Via optional interface module
Indicator	LC display Status LEDs: "Power," "Maintenance," and "Fault"
Operation	Via LC display or SOPAS ET software
Dimensions (W x H x D)	Details, see dimensional drawings
Weight	Zone 1, housing size 4: ± 14 kg Zone 1, housing size 6: ± 18 kg Zone 1, stainless-steel housing: ± 70 kg Zone 2 and versions without Ex-protection: ± 5 kg 19″ rack housing: ± 6 kg CSA Cl I, div 1, housing size 4: ± 12 kg CSA Cl I, div 1, housing size 6: ± 16 kg
Electrical connection	
Voltage	Version for nonhazardous areas: 90 to 250 V AC Version for Ex zone 1: 90 to 250 V AC Version for Ex zone 2, div2, div1: 115 V AC / 230 V AC Version for Ex zone Cl1, div1: 100 to 240 V
	Versions optionally available with 24 V DC
Frequency	50 Hz / 60 Hz
Power consumption	≤ 20 W
Options	Interface module(s) I/O module(s)

Applications of FLOWSIC100 Flare in regulated environment

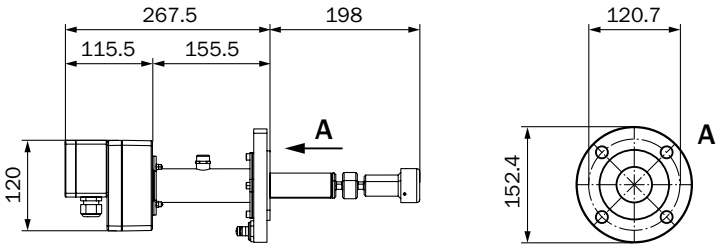
The flow meter can be applied in emission measurements which may be subject to one or more regulations in some jurisdictions. Compliance to all emissions regulations applicable at the installation site remains owner / operator responsibility. If designed and applied correctly SICK's ultrasonic flow technology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

Ordering information

Our regional sales organization will be glad to advise you on which device configuration is best for you.

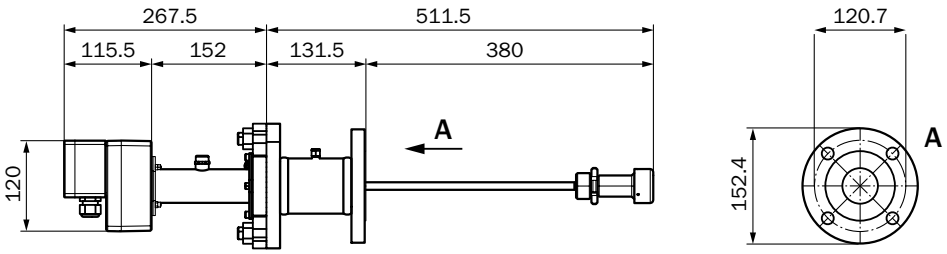
Dimensional drawings (dimensions in mm)

FLOWSIC100 EX, sender/receiver unit, not retractable



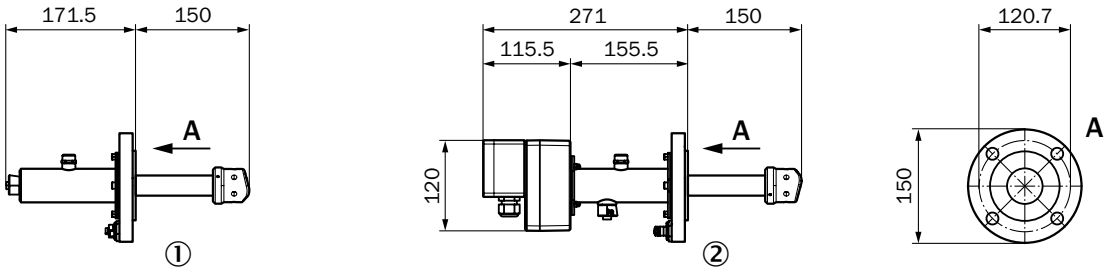
Sender/receiver unit (digital) with electronic unit for ATEX zone 2

FLOWSIC100 EX-RE, sender/receiver unit, retractable



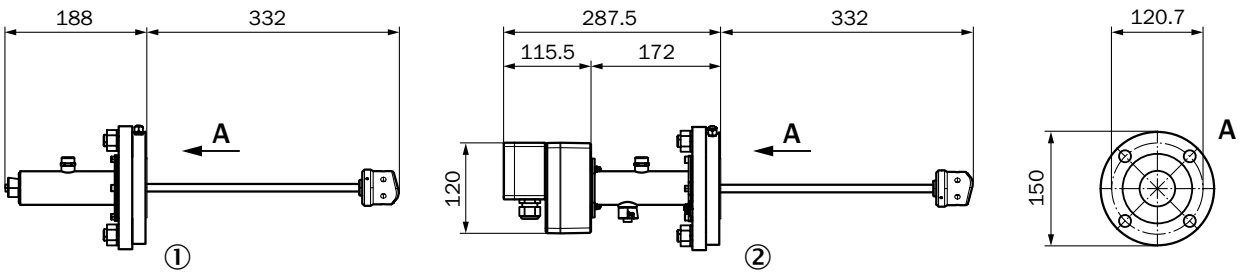
Sender/receiver unit (digital) with electronic unit for ATEX zone 2

FLOWSIC100 EX-S, sender/receiver unit, not retractable



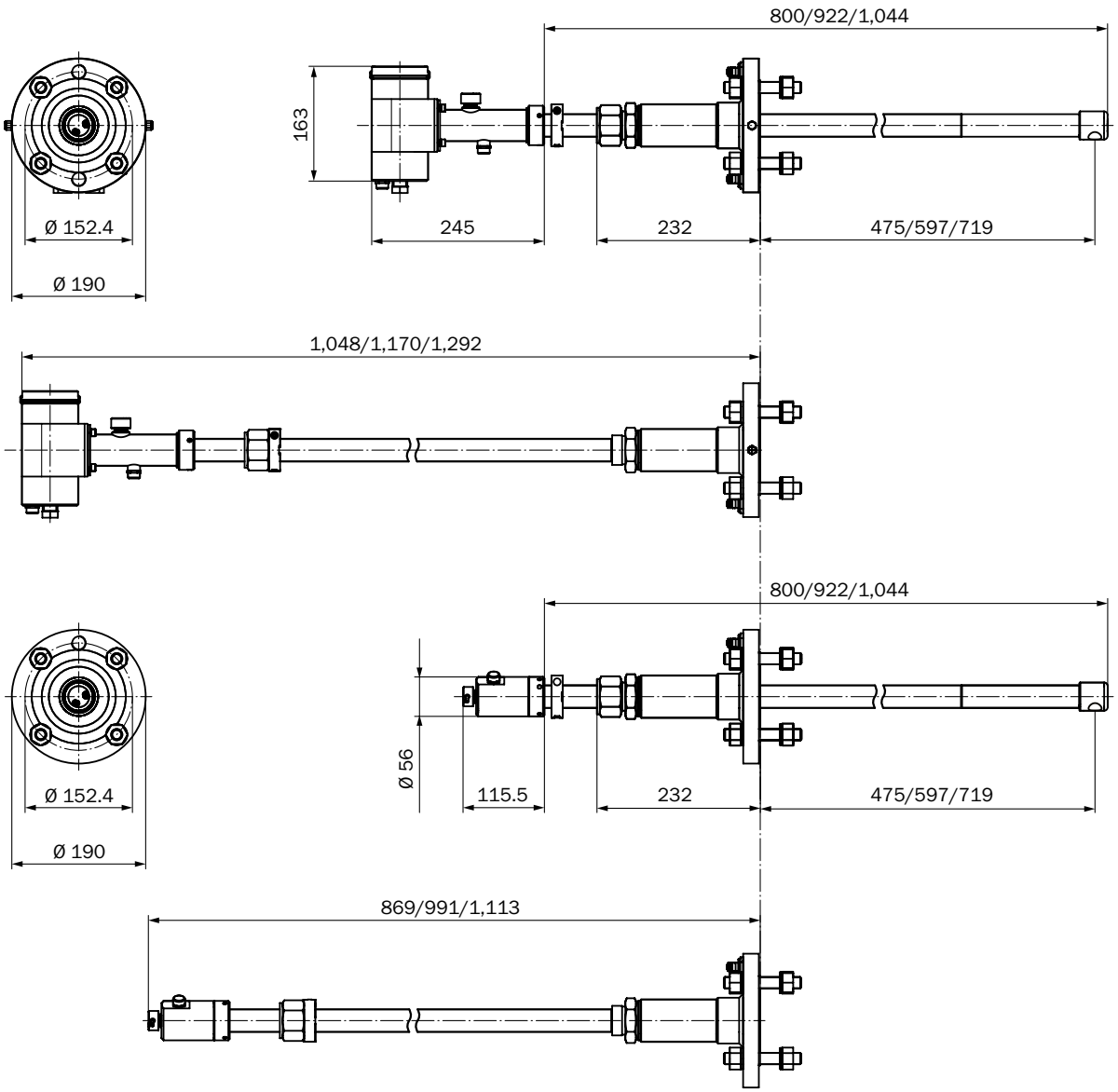
① Sender/receiver unit (analog) for ATEX Ex zone 1, Ex zone 2, and CSA Cl I, div 1/div 2
② Sender/receiver unit (digital) for ATEX Ex zone 2

FLOWSIC100 EX-S, sender/receiver unit, retractable

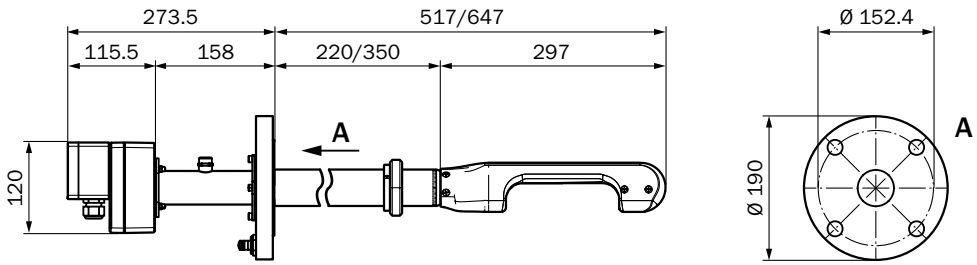


① Sender/receiver unit (analog) for ATEX Ex zone 1, Ex zone 2, and CSA Cl I, div 1/div 2
② Sender/receiver unit (digital) for ATEX Ex zone 2

FLOWSIC100 EX-S 90°, sender/receiver unit

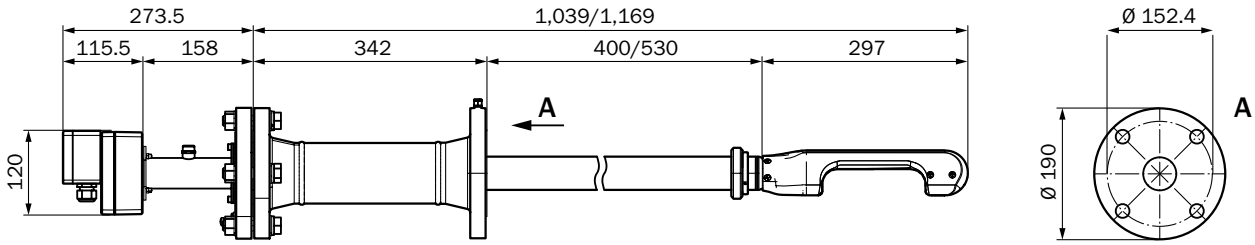


FLOWSIC100 EX-PR, sender/receiver unit, not retractable



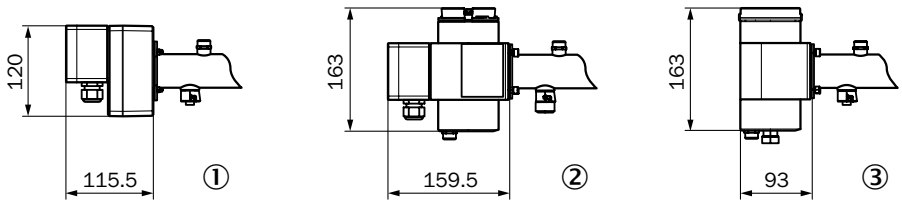
Sender/receiver unit (digital) with electronic unit for ATEX zone 2: Nominal length 220 mm for pipe diameters up to 48″; nominal length 350 mm for pipe diameters > 48″ to 72″

FLOWSIC100 EX-PR, sender/receiver unit, retractable



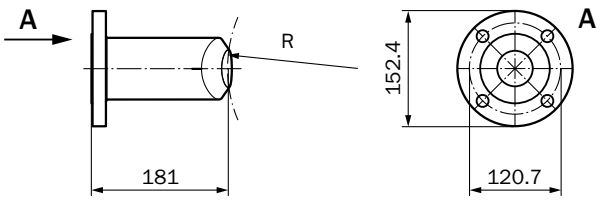
Sender/receiver unit (digital) with electronic unit for ATEX zone 2: Nominal length 400 mm for pipe diameters up to 48″; nominal length 530 mm for pipe diameters > 48″ to 72″

Electronics units of the sender/receiver units (digital)

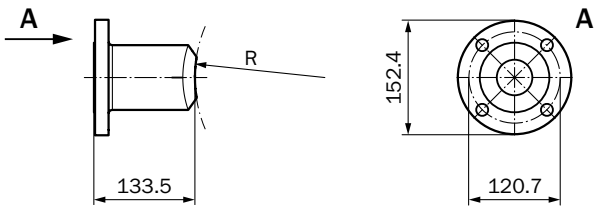


① Electronics unit of the sender/receiver unit (digital) for ATEX zone 2
② Electronics unit of the sender/receiver unit (digital) for ATEX zone 1
③ Electronics unit for the sender/receiver unit (digital) for ATEX/IECEx zone 1 and CSA CI I, div 1/div 2

Mounting stud for FLOWSIC100 EX



Mounting stud for FLOWSIC100 EX-S



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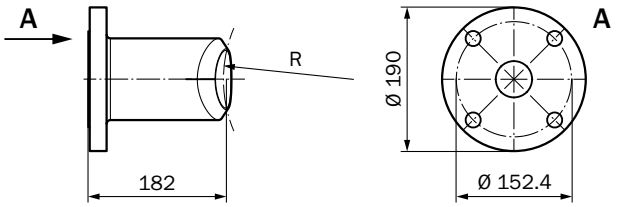
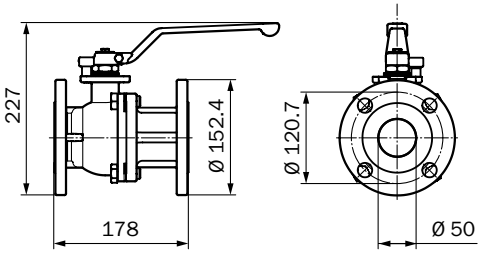
Mounting stud for FLOWSIC100 EX-PR

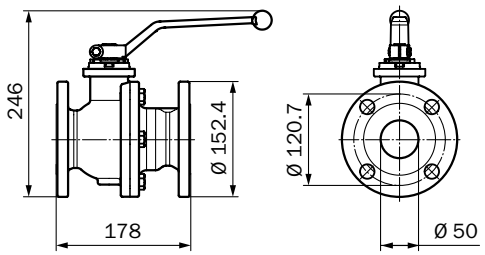


Ball valve, 2" version for standard temperatures



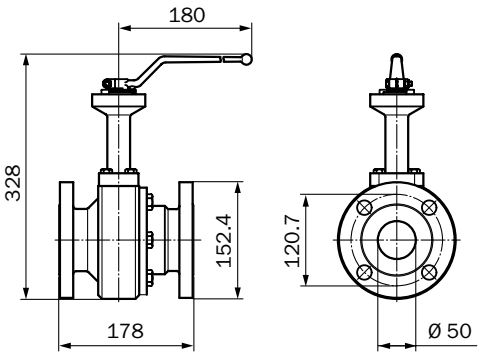
For FLOWSIC100 EX-S, EX and EX-RE

Ball valve, 2" version for high temperatures



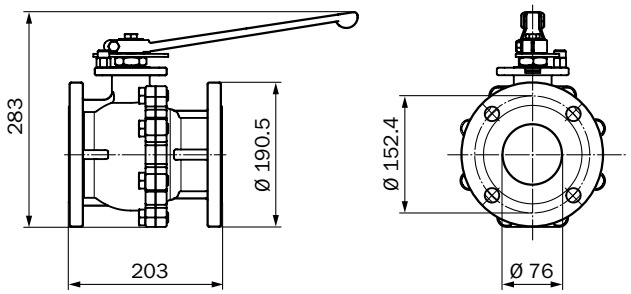
For FLOWSIC100 EX-S, EX and EX-RE

Ball valve, 2" version for low temperatures



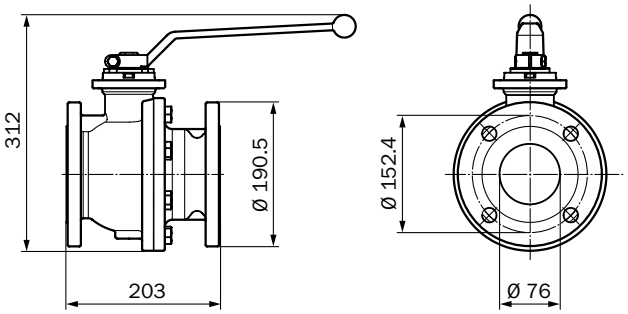
For FLOWSIC100 EX-S, EX and EX-RE

Ball valve, 3" version for standard temperatures



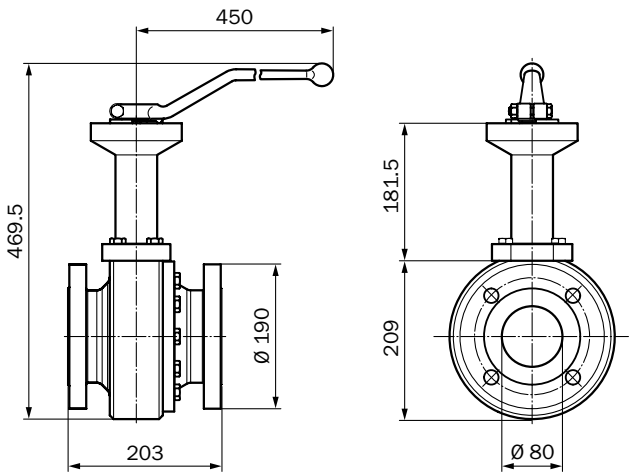
For FLOWSIC100 EX-PR

Ball valve, 3" version for high temperatures



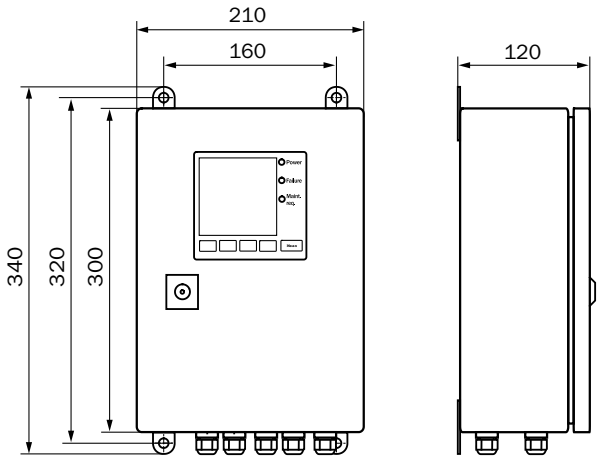
For FLOWSIC100 EX-PR

Ball valve, 3" version for low temperatures

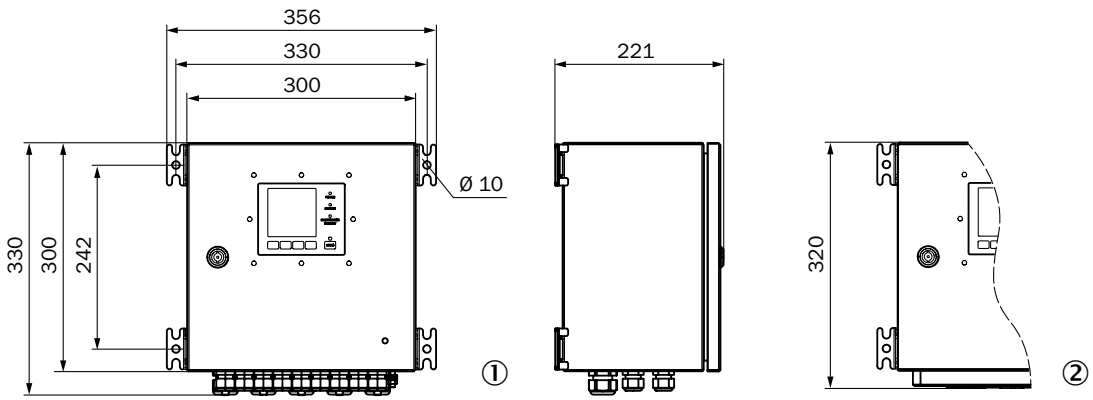


For FLOWSIC100 EX-PR

MCUP control unit; wall housing, compact version (only for nonhazardous areas)

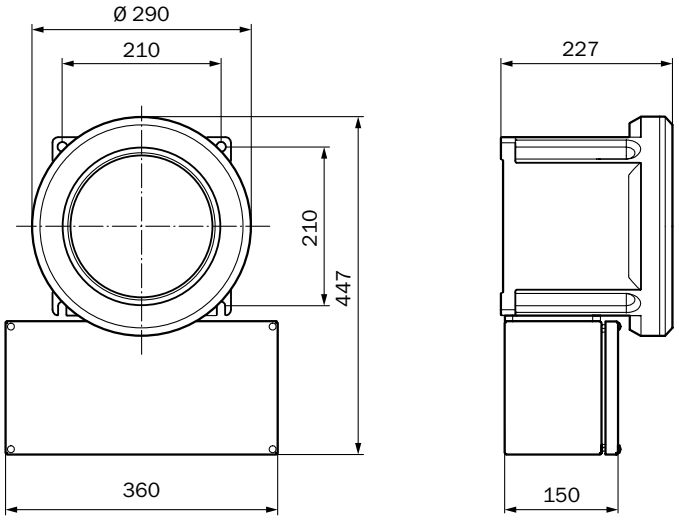


MCUP control unit, wall housing, medium version

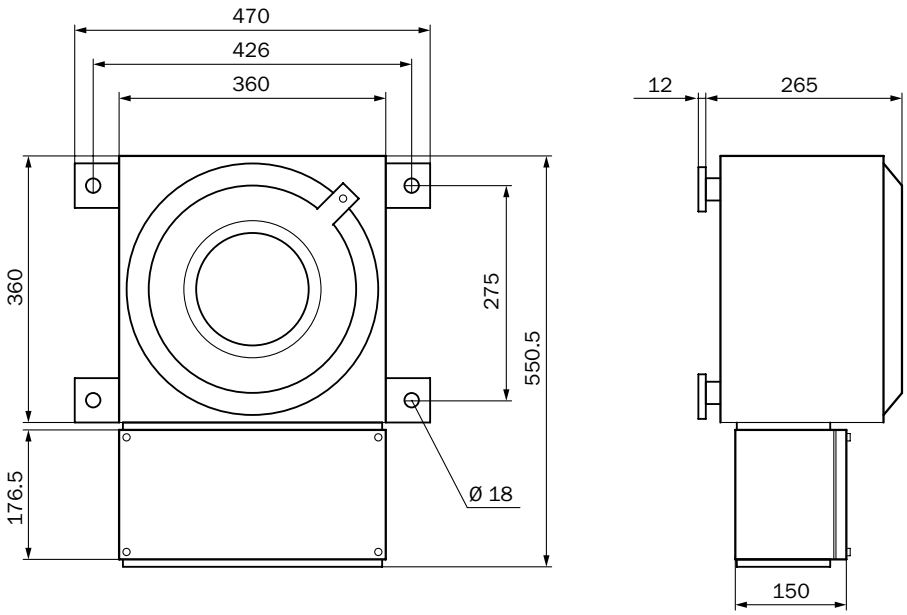


① Wall housing for ATEX zone 2 and nonhazardous areas
② Wall housing for CSA Cl I, div2

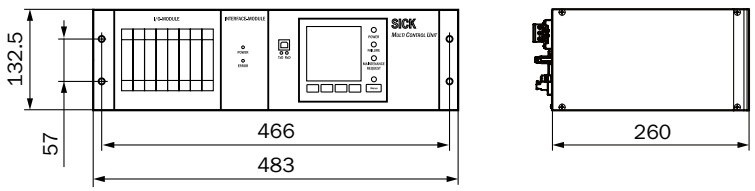
MCUP control unit; wall housing Ex d/Ex e, size 4, aluminum, ATEX zone 1



MCUP control unit; wall housing Ex d/Ex e, stainless steel, ATEX zone 1

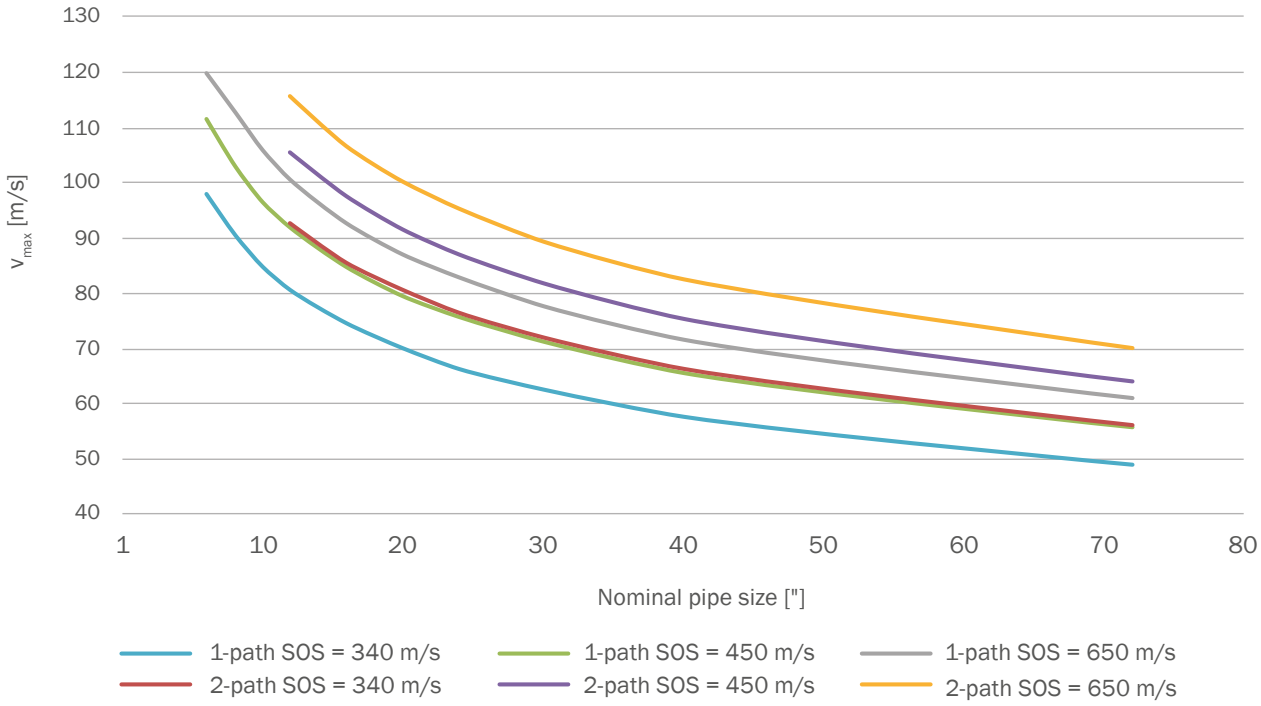


MCUP control unit; 19" rack housing (only for nonhazardous areas)



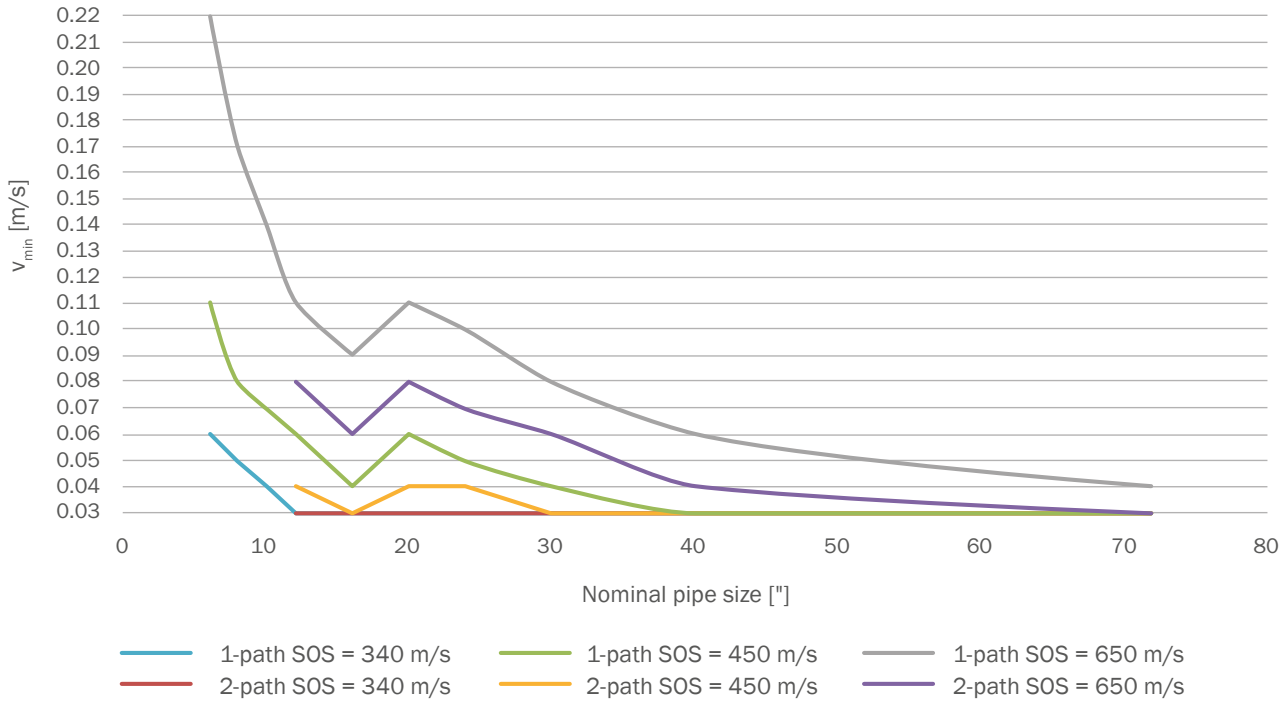
APPLICATION RANGES

V_{max} of 1-path and 2-path solutions dependent on Speed of Sound (SOS)



V_{min} at 20% uncertainty of 1-path and 2-path solutions dependent on Speed of Sound

Hot Tapped / Dry Calibrated / Flow Calibrated



V_{min} exemplary – 4" ... 16": EX-S with transducers for standard temperature range, 20" ... 72": EX-RE

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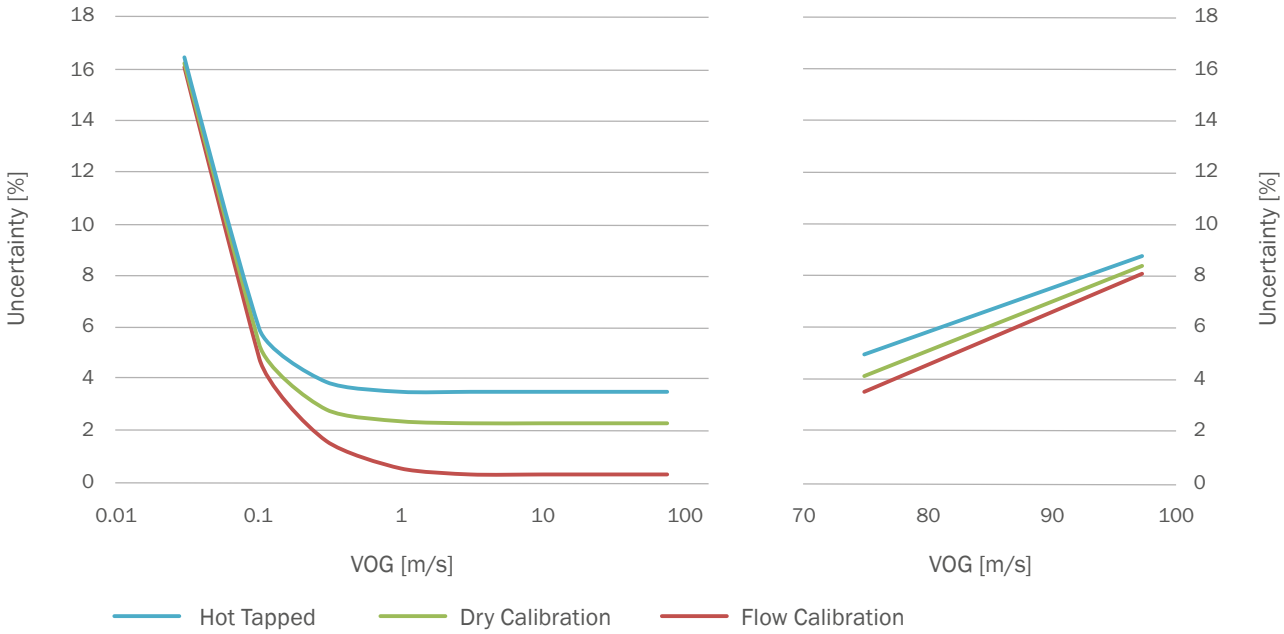
Subject to change without notice

Uncertainty of volume flow as a function of velocity of gas (VOG)

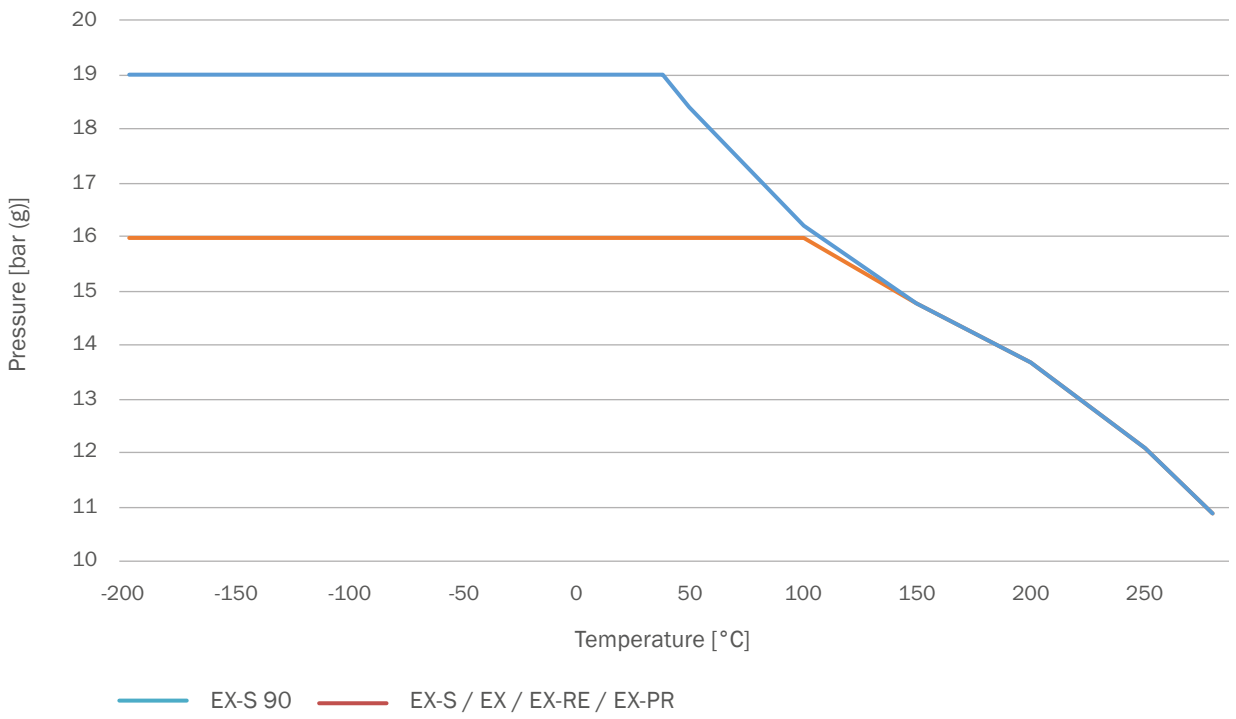
Ultrasonic measurement

ASC-technology
(Additional uncertainty onto ultrasonic measurement.)



This exemplary uncertainty statement according to GUM (Guide to the Expression of Uncertainty in Measurement): ISO/IEC Guide 98-3:2008-09 shows a EX-S 80 in 1-path, 16" nominal pipe size configuration and assumes a gas temperature of 20 °C, ambient pressure, a typical molecular weight of greater than 27 g/mol.

Derating pressure resistance



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