FLOWSIC100 Flare-XT

Gas flow measuring instruments

Powerful. Reliable. Rugged

- Comply with environmental regulations
- Maximum plant availability
- Ultrasonic sensors, Interface Unit, Spool Piece from a single source as well as globally available services
- Compatible with current and future communication architectures
- Independent maintenance through verification on demand and support when required
- Easy replacement of existing measurement systems, with suitable retrofit or upgrade solutions available



Endress+Hauser

People for Process Automation

FLOWSIC100 Flare-XT: Powerful. Reliable. Rugged.

Increasing competition in the process industry means that operations and service work have to be optimized continuously. When it comes to flare gas measurement, the new FLOWSIC100 Flare-XT makes cutting costs so easy. State-of-the-art ultrasonic measuring technology provides maximum performance and robustness.

As a result, the sensor continuously calculates accurate values even under extremely unstable conditions. In addition to this, thanks to i-diagnostics™, the system monitors itself and informs the user in real time when maintenance is required, making fixed service intervals a thing of the past. We think that's intelligent.



More Information online

Flare flow measurement is one of the most challenging flow applications since velocities and gas compositions may change rapidly. Discover how ultrasonic technology can solve these challenges.

www.endress.com/ultrasonic-flare-measurement

Flare gas measurement redefined: FLOWSIC100 Flare-XT

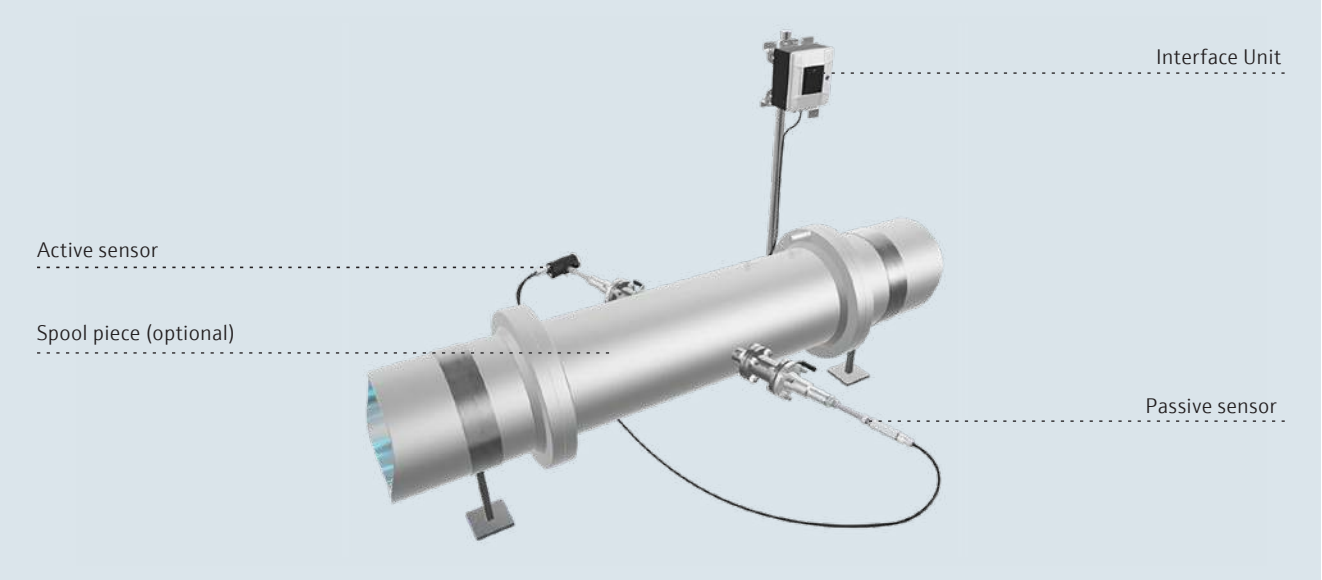
Dealing with difficult flare gas conditions, the requirements for measuring technology pose a challenge in the oil and gas and chemical and petrochemical industries:

- Gas velocities of 0 to 120 m/s (400 ft/s) or above
- Rapid changes in the gas velocity
- Rapidly changing gas mixtures, such as natural gas, hydrogen, carbon dioxide, etc.
- Wet and dirty conditions

Ultrasonic flowmeters continue to set the standard in flow measurement when it comes to dynamic range and accuracy. With FLOWSIC100 Flare-XT, we have developed a new generation of measuring device that works reliably and accurately even under extreme conditions. By combining two technologies in a single device, Endress+Hauser is extending the typical ultrasonic measurement range with the unique ASC technology (active sound correlation). FLOWSIC100 Flare-XT is installed in next to no time and constantly monitors itself thanks to the i-diagnostics™ function.

FLOWSIC100 Flare-XT at a glance:

- Measurement availability even at high gas velocities and with changing gas mixtures
- Proprietary measurement range extension for high flow velocities thanks to ASC technology (active sound correlation)
- Direct mass flow calculation without additional gas analyzers
- Intuitive FLOWgate™ software for commissioning, operation and diagnostics
- I-diagnostics™: self-monitoring, self-verification and predictive maintenance
- Individual application evaluation provides specific measurement performance





Flare gas measurement on offshore platforms ...



in chemical an petrochemical industries...



and LNG applications.

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. The measurement is continuously available in the event of emergency shutdowns, gas turbulence and high levels of background noise.

Sensor technology

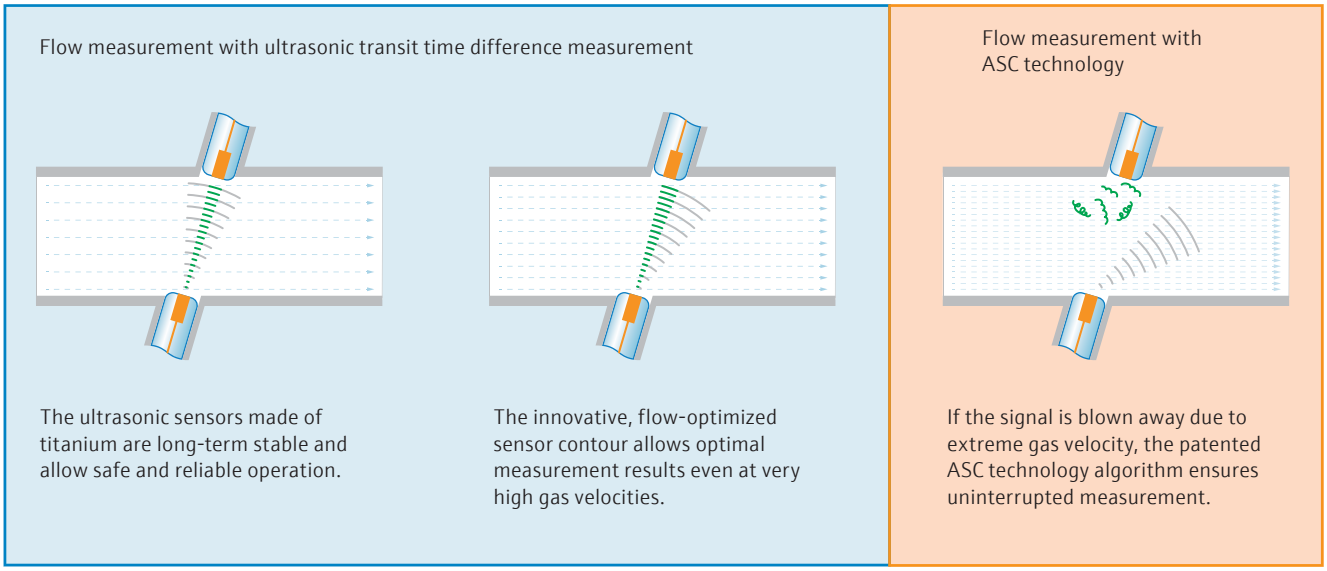
Thanks to advanced signal processing, the hermetically sealed high-performance ultrasonic sensor allows a very high resolution of the signals and measures reliably and accurately even at very low gas velocities close to zero.

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.



Range extension using patented ASC technology

Ensuring measurement availability even at the highest gas velocities is one of the most important characteristics of a flare measurement system. Thanks to its innovative ASC technology (active sound correlation), FLOWSIC100 Flare-XT is now extending the previous maximum flow range by up to 30%. ASC correlates the gas velocity with application-specific noise generated under high flow conditions. The patented ASC technology thus allows even better coverage of possible flare gas events.



Molar mass and mass flow calculation

FLOWSIC100 Flare-XT directly calculates molar mass and outputs mass flow for typical hydrocarbon flare gases. Patented algorithms auto-tune the device - no parameterization or additional gas analyzer is required.

Alternatively, gas chromatograph (GC) data can be input directly into the Interface Unit for maximum mass flow calculation accuracy.



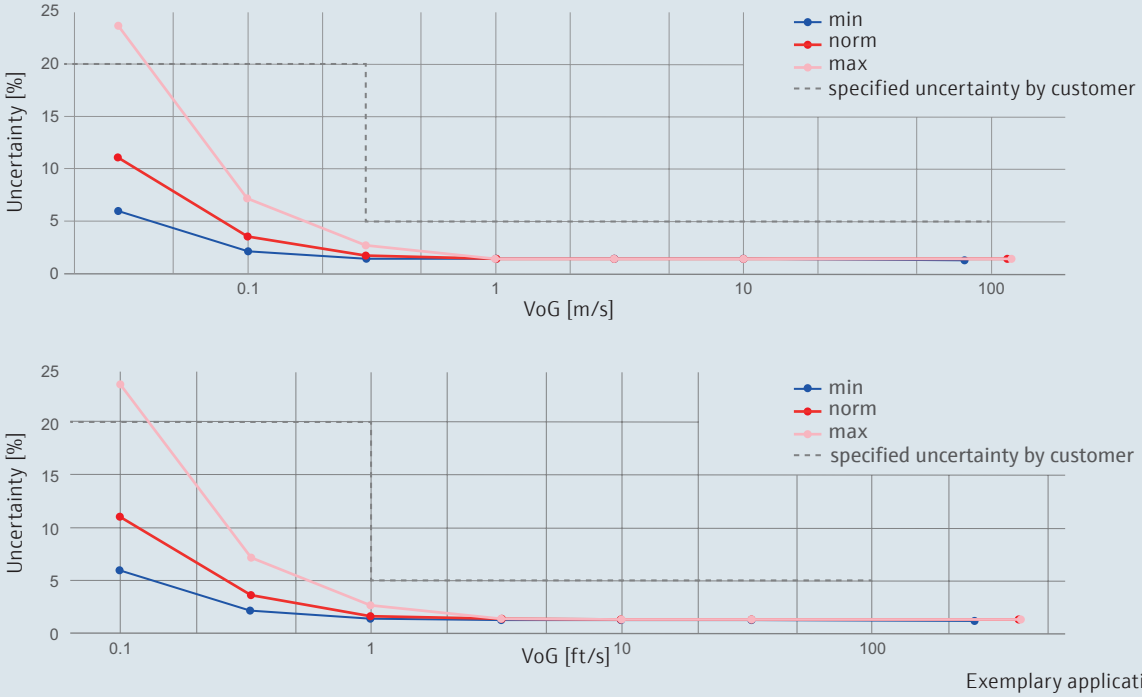
Save money with nitrogen (N_2) subtraction

Flare gas lines are often purged with nitrogen to maintain a steady flow and prevent ingression of ambient air. A common problem in the industry is that nitrogen influences the molar mass calculation while CO_2 emissions only result from hydrocarbon combustion. FLOWSIC100 Flare-XT can directly compensate for the nitrogen amount to correct the molar mass calculation.

Application consultation

Flare gas applications are one of the most challenging flow measurement tasks. Many different aspects, like gas matrix and gas condition, have an impact on ultrasonic measurement technology in general. Therefore we do not only extensively evaluate your individual application and select the right solution, but also comes up with a detailed measurability and uncertainty statement for FLOWSIC100 Flare-XT.

Uncertainty charts (SI units, imperial units)



Exemplary application evaluation

The right solution for every challenge

With us, flare gas measurement is easy. Thanks to the broad FLOWSIC100 Flare-XT portfolio, there is a measurement solution even for very challenging applications. Reliable gas flow measurement is ensured at all times. The optional 2-path version achieves high accuracies and maximum measurement availability through a redundant layout. The probe version is suitable for compact, one-sided fitting, which minimizes the installation work required.

A device retraction mechanism also allows sensors to be removed simply and quickly during operation.
The Interface Unit processes incoming signals and stores data parameters, such as molecular weight, mass flow and gas volume, as well as standardized reference values. FLOWSIC100 Flare-XT can be commissioned and maintained intuitively from a laptop or tablet thanks to the FLOWgate™ software.

Ultrasonic sensors

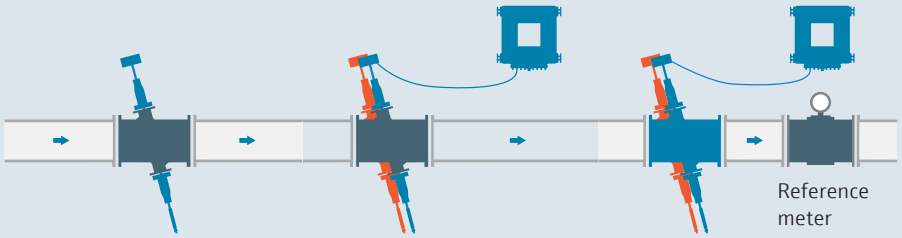
	F1F-S	F1F-H	F1F-M	F1F-P	F1F-R
					
Type	Cross-duct measurement			Single-side probe	
Pipe size 1-path	4" … 20"	22" … 86"		12" … 86"	
Pipe size 2-path (not for FLOWSIC100 Flare-XT Transmitter)	12" … 20"			16" … 86""	–
Speciality	Low-temperature applications	–	Suitable for low-temperature applications		
	Powerful, hermetically sealed titanium sensors				
	–	Complex gas compositions and challenging applications	–	Single-side installation, only one side access required. One single weld-on nozzle.	

Interface Units housing variants

	Zone 2 Ex ec	Zone 1 Ex db	Zone 1 Ex db eb
			
Equipment protection level	Increased safety	Flameproof	Flameproof and increased safety enclosure
Material offshore suitability	No – steel sheet housing 1.4016	Yes – aluminum EN AC-42100 (copper content <0.05%)	
Suitable for tropical environment	Yes, as standard		
Cable entries	Up to 8 x M20 + 1 x M25 or 8 x ½" NPT + 1 x ¾" NPT		

Product configurations

Blue parts: scope of delivery
Orange parts: additional set of matching sensors (2nd path)
Gray parts: optional parts



	Flare Transmitter	Flare Instrument	Flare Meter
Standard delivery scope	Sensors incl. interconnection cable		
	–	Interface Unit	
	Product and material certification		
	–		Flare meter fully assembled in measured Spool Piece
	–		Performance capability evaluation
Optional delivery scope	Performance capability evaluation		FLOW calibration
	–	Customized documentation	
	Customer service training		
	Accessory Spool Piece for installation without welding		–
I/O	Modbus® RTU	Modbus® RTU/TCP	
		Foundation Fieldbus	
		Analog incl. HART / digital / frequency	
Display	–	x	
Counter / logbook / data archives	–	x	
i-diagnostics™	–	x	
Voltage supply	24 V DC	24 V DC / 115 V ... 230 V AC	
Advantages	Lean measurement solution for basic requirements	Extended functionality	Extended functionality and lowest measurement uncertainty
Number of possible measuring paths	1-path	1-path / 2-path	
Measurement uncertainty	★	★★	★★★

Applicable installation equipment

	Flare Transmitter	Flare Instrument	Flare Meter
Weld-on nozzles	x		–
Nozzle installation tool	x		–
Ball valves	x		x
Weather and sun protection	optional		

Fit for the system environments of today and tomorrow

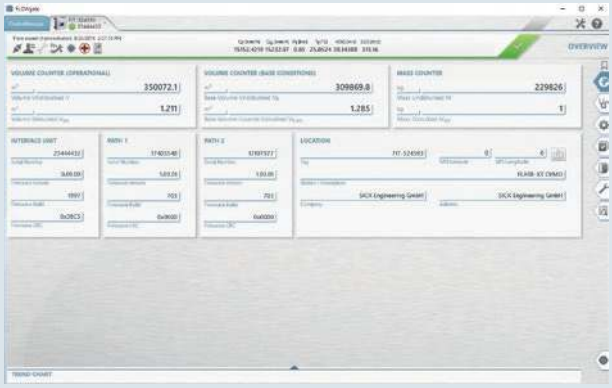
The powerful Interface Unit can be easily connected to a wide variety of systems and networks thanks to its numerous interfaces. Key parameters and measured value data such as volume flow, mass flow or molecular weight are reliably processed, evaluated and stored. In this respect, the internal memory makes it possible to permanently archive the data in a secure and structured manner.



Save costs with the right architecture: Thanks to rugged, digital communication, the Interface Unit can be installed up to 3280 ft away from the measurement point. There is therefore no longer any need for a local, flameproof and potentially expensive control unit.

Commissioning, parameterization and monitoring – easier than ever before with FLOWgate™

The intuitive software FLOWgate™ provides various solution assistants that support installation, monitoring and service. Thanks to the Interface Unit, instrument and meter configurations benefit from i-diagnostics™ functionality in FLOWgate™. This permits quick and uncomplicated system analysis. By means of graphically prepared data and trend analyses, measurement processes can be easily traced, status changes can be identified early on and reports can be compiled.



All relevant measured values are displayed on the overview page



Clear display of measured values and diagnostic data

From time-based to condition-based maintenance thanks to Interface Unit with i-diagnostics™







Predictive maintenance: flexible service intervals

The system permanently monitors parameters such as the “automatic gain control” or the “signal-to-noise ratio”. Based on existing data and the development of measured values, i-diagnostics™ provides reliable predictions and maintenance recommendations. System-critical operating conditions are thus avoided – and unplanned downtimes are prevented.

One-click verification report: instant device verification

On request, the system checks itself and logs its current status. Users thus have the uncomplicated option of creating verification documents to prove that all emission requirements have been met.

Automatic self-diagnosis

i-diagnostics™ links software and firmware intelligently: the self-monitoring system provides valuable data on the device status and shows all changes. Application errors are immediately detected and documented – there is no need for lengthy troubleshooting.

Retrofit solution for flare gas measuring devices

With our revamping solutions, converting an ultrasonic measurement for flare gas becomes child’s play. You keep your nozzles, your shut-off valves, your p/T transmitters and even your cabling: retrofitting your flare gas system with modern flare gas measurement technology has never been easier. Since you can continue to use the existing nozzles and shut-off valves, no hot tapping or pressure reduction on the flare gas line is required. Both cross-duct and single-sided installations with measurement angles of 45°, 60°, 75° and 90° are easily exchangeable.



In use all over the world. Based on the application experience of a global fleet of thousands of FLOWSIC100 Flare installations, the reinvented FLOWSIC100 Flare-XT is applicable for flare gas measurements worldwide.
The requirements of various directives and standards are observed (ISO 17089-2, EPA 40 CFR part 98, 30 CFR part 250, 40 CFR Part 60 Subpart Ja, MACT RSR 63.670, API 14.10, API 22.3, EU ETS etc.).
Explosion protection requirements: ATEX, CSA and IECEx and other local certifications.

FLOWSIC100 Flare-XT
Flare gas measurement redefined



Product Description

The gas flow measuring device FLOWSIC100 Flare-XT features a unique flow-optimized sensor design, which allows reliable measurements at high gas velocities and changing gas compositions. The rugged design and patented ASC-technology ensure improved measurement availability even under the most adverse conditions.

FLOWSIC100 Flare-XT observes several applicable standards and is suitable for use in new and existing plants. Measurement and diagnostic data are easily visualized by FLOWgate™ software. Thanks to the intelligent diagnostic function i-diagnostics™ the system checks itself and reports independently if maintenance is required.

At a glance

- Measurement availability under all operating conditions, at high gas velocities and with changing gas compositions
- Individual application evaluation
- i-diagnostics™ for self monitoring, easy verification and condition-based maintenance of the system
- Retrofit solutions for existing measurement systems

Your benefits

- Comply with environmental regulations
- Maximum plant availability
- Ultrasonic sensors, Interface Unit, Spool Piece from a single source as well as globally available services
- Compatible with current and future communication architectures
- Independent maintenance through verification on demand and support
- Easy replacement of existing measurement systems, with suitable retrofit or upgrade solutions available

Fields of application

- Flare gas measurement for the production and processing of natural gas and associated petroleum gases (APG) in oil production
- Flare gas measurement in chemical and petrochemical plants as well as refineries
- Measurement of LNG boil-off gas down to −195 °C (−320 °F)
- Plants onshore and offshore
- Flare gas containing H_2S, CO_2 and H_2

More Information online

For more information, enter the link or scan the QR code to get direct access to technical data, operating instructions, software, application examples, and much more.
www.endress.com/flowsic100flare-xt

Technical data

The precise device specifications and product performance data may vary and are dependent on the respective application and customer specifications.

FLOWSIC100 Flare-XT

Measured values	Mass flow rate, volumetric flow s. c. (standard condition), volumetric flow a. c. (actual condition), molecular weight, gas volume and mass, gas velocity, sound velocity
Number of measuring paths	Single path, dual path
Nominal pipe size	
1-path measurement	4" ... 86"
2-path measurement	12" ... 86"; 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 (0.1 ft/s ... 394 ft/s)
Measuring span [1]	Up to 4000 : 1
Repeatability	< 0.5 % of the measured value in the range ≥ 1 m/s (≥ 3.3 ft/s) (acc to ISO 5725-1; JCGM 200:2012)
Resolution	+ 0.001 m/s (+ 0.003 ft/s) (acc. to JCGM 200:2012)
Uncertainty of measurement [1-3]	
Volumetric flow a. c.	1 % ... 5 % Related to the measured value with ultrasonic technology (in the range ≥ 0.3 m/s (≥ 1 ft/s) to measuring range end value)
	0.5 % ... 1.5 % with Spool Piece and flow calibration Related to the measured value with ultrasonic technology (in the range ≥ 1.0 m/s (≥ 3.3 ft/s) to calibration range end value) [4]
Mass flow rate	2 % ... 5.5 % Related to the measured value with ultrasonic technology (in the range ≥ 0.3 m/s (≥ 1 ft/s) to measuring range end value)
	1.5 % ... 2 % with Spool Piece and flow calibration Related to the measured value with ultrasonic technology (in the range ≥ m/s (≥ 3.3 ft/s) to calibration range end value) [4]
Uncertainty of measurement ASC-technology [1,2,5]	
Volumetric flow a. c.	1 % ... 8 %
Ambient humidity	≤ 95 % Relative humidity
Conformities	ATEX: 2014/34/EU EMC: 2014/30/EU PED: 2014/68/EU
Electrical safety	IEC 61010-1
Footnote	[1] Depending on the application conditions, e.g. gas composition, process temperature, type of device, pipe diameter, etc. For mass flow additionally selection and parameterization of the conversion algorithm and uncertainty of pressure and temp. sensors. To be evaluated. [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 run time 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.

General technical information for ultrasonic sensors

Ambient temperature	
Sensors, ignition group IIC T4 Sensors, ignition group IIC T4	–40 °C ... +70 °C (–40 °F ... +158 °F) –50 °C ... +70 °C (–58 °F ... +158 °F) (optional)
Sensors, ignition group IIC T6 Sensors, ignition group IIC T6	–40 °C ... +55 °C (–40 °F ... +130 °F) –50 °C ... +55 °C (–58 °F ... +130 °F) (optional)
Storage temperature	–40 °C ... +70 °C (–40 °F ... +158 °F) –50 °C ... +70 °C (–58 °F ... +158 °F) (optional)
Enclosure rating	IP66/67 according to IEC 60529, type 4 according to UL50E
Flange Type	Class 150, Class 300, PN25
Dimensions (W x H x D)	For details see dimensional drawings

F1F-S + F1F-R + F1F-P

Operating pressure	up to 20 bar(g) (290 psi(g))
Ex-approvals	
IECEx	Ex db [ia Ga] IIC T6...T4 Ga/Gb
ATEX	II 1/2 G Ex db [ia Ga] IIC T6...T4 Ga/Gb
NEC/CEC (US/CA)	Class I, Division 1, Groups B, C, D, T6...T4 Ex db [ia Ga] IIB+H2 T6...T4 Ga/Gb Class I, Zone 0/1, AEx db [ia Ga] IIB+H2 T6...T4 Ga/Gb Class I, Division 2, Groups A, B, C, D, T6...T4 Ex ec [ia Ga] IIC T6...T4 Ga/Gc Class I, Zone 0/2, AEx ec [ia Ga] IIC T6...T4 Ga/Gc
Gas temperature	–196 °C ... +280 °C (–320 °F ... +536 °F)
Weight	12 kg (26 lbs) (pair of ultrasonic sensors)

F1F-M

Operating pressure	up to 20 bar(g) (290 psi(g))
Ex-approvals	
IECEx	Ex db [ia Ga] IIB T4 Ga/Gb
ATEX	II 1/2 G Ex db [ia Ga] IIB T4 Ga/Gb
NEC/CEC (US/CA)	Class I, Division 1, Groups C, D, T4 Ex db [ia Ga] IIB T4 Ga/Gb Class I, Zone 0/1, AEx db [ia Ga] IIB T4 Ga/Gb Class I, Division 2, Groups C, D, T4 Ex ec [ia Ga] IIB T4 Ga/Gc Class I, Zone 0/2, AEx ec [ia Ga] IIB T4 Ga/Gc
Gas temperature	–196 °C ... +280 °C (–320 °F ... +536 °F)
Weight	12 kg (26.5 lbs) (pair of ultrasonic sensors)

F1F-H

Operating pressure	ATEX / IECEx: up to 20 bar(g) (290 psi(g)) CSA: 16 bar(g) (232 psi(g))
Ex-approvals	
IECEx	Ex db IIC T6...T4 Gb
ATEX	II 2 G Ex db IIC T6...T4 Gb
NEC/CEC (US/CA)	Class I, Division 1, Groups B, C, D, T6...T4 Ex db IIB+H2 T6...T4 Gb Class I, Zone 1, AEx db IIB+H2 T6...T4 Gb Class I, Division 2, Groups A, B, C, D, T6...T4 Ex ec IIC T6...T4 Gc Class I, Zone 2, AEx ec IIC T6...T4 Gc
Gas temperature	–70 °C ... +280 °C (–94 °F ... +536 °F)
Weight	14 kg (31 lbs) (pair of ultrasonic sensors)

Interface Unit

Description	Unit for controlling the ultrasonic sensors and processing, evaluation and storage of measured value data
Ambient temperature	–40 °C ... +60 °C (–40 °F ... +140 °F) –40 °C ... +65 °C(–40 °F ... +149 °F) (optional (limited I/O))
Storage temperature	–40 °C ... +70 °C (–40 °F ... +158 °F)
Ambient pressure	80 kPa ... 110 kPa (0.8 bar ... 1.1 bar)
Ambient humidity	≤ 95 % relative humidity
Ex-approvals	
IECEx (Zone 1)	Ex db eb ia IIC T4 Gb Ex db ia IIC T4 Gb
ATEX (Zone 1)	II 2 G Ex db eb ia IIC T4 Gb II 2 G Ex db ia IIC T4 Gb
NEC/CEC (US/CA) (Zone 1)	Class I, Division 1, Groups B, C, D, T4 Ex db ia IIC T4 Gb Class I, Zone 1, AEx db ia IIC T4 Gb
IECEx (Zone 2)	Ex ec ia IIC T4 Gc
ATEX (Zone 2)	II 3 G Ex ec ia IIC T4 Gc
NEC/CEC (US/CA) (Zone 2)	Class I, Division 2, Groups A, B, C, D, T4 Ex ec ia IIC T4 Gc Class I, Zone 2, AEx ec ia IIC T4 Gc
Enclosure rating	IP66 acc. IEC 60529, Type 4X acc. UL50E
Analog outputs	Up to 6 outputs when using I/O modules (option) 16 bit: 4 mA ... 20 mA; 7 V DC ... 30 V DC In accordance with NAMUR NE43, passive, electrically insulated, reverse polarity protection
Analog inputs	Up to 6 inputs when using I/O modules (option) 24 bit: 4 mA ... 20 mA; 0 V ... 5 V DC In accordance with NAMUR NE43, passive, electrically insulated, reverse polarity protection
Switching output	Up to 6 outputs when using I/O modules (option), electrically isolated

Max. current	70 mA
Max. switching frequency	50 Hz
Max. input voltage	30 V DC
Max. Saturation voltage at output	0.5 V DC
	Switchable Namur/open collector, reverse polarity protection
Digital output / frequency output	Up to 12 digital outputs when using I/O modules (option), electrically isolated
Max. current	50 mA
Max. switching frequency	10 kHz
Max. input voltage	30 V DC
Max. saturation voltage at output	1.8 V DC
	Switchable Namur/open collector, reverse polarity protection
Digital inputs	Up to 6 inputs with use of I/O modules (option), electrically isolated For connecting volt-free contacts or active switching outputs
Min. input on voltage	2 V DC
Max. input off voltage	2.85 V DC
Max. clamping voltage	Max. clamping voltage 30 V DC
	Reverse voltage protection
Serial	✔ (3)
Type of fieldbus integration	RS-485, electrically isolated
Modbus	✔
Type of fieldbus integration	TCP RTU RS-485 ASCII RS-485
Ethernet	✔
Data transmission rate	10 Mbit/s ... 100 Mbit/s
HART®	✔
Type of fieldbus integration	HART® master for connecting external pressure and temperature transmitter HART® slave (for communication with control system)
Foundation Fieldbus	✔ (Option)
Data transmission rate	Clamping voltage: DC 9 V DC ... 32 V DC Current consumption: 18 mA FOUNDATION fieldbus™ H1, IEC 61158-2 with 31.25 kBit/s ITK 6.3 3 transducer blocks for process measurement variables, counter readings and diagnostic variables 8 AI blocks 1 PID block Compliant to NAMUR NE107
Optical interface	✔
Type of fieldbus integration	Service interface (IR, according to IEC 62056-21)
Indication	LCD: measuring values, system information, maintenance, need for maintenance, alarm
Operation	Software FLOWgate™ or operating panel on the LCD
Dimensions (W x H x D)	For details see dimensional drawings
Weight	
Zone 1/Div 1 Ex db version	17.5 kg (38.5 lbs)
Zone 1 Ex db eb version	23 kg (50.7 lbs)
Non-Ex/Zone 2	8 kg (17.6 lbs)

Electrical connection	
Voltage	115 V AC ... 230 V AC ±10% / 15 V DC ... 28 V DC
Frequency	AC variant: 50 Hz ... 60 Hz
Power consumption	≤ 18 W (AC variant) / ≤ 12 W (DC variant)
Options	Offshore version, sun and weather protection, tag plate, mounting set 2-inch-pipe installation, infrared-USB adapter, cable glands

Applications of FLOWSIC100 Flare-XT in regulated environment

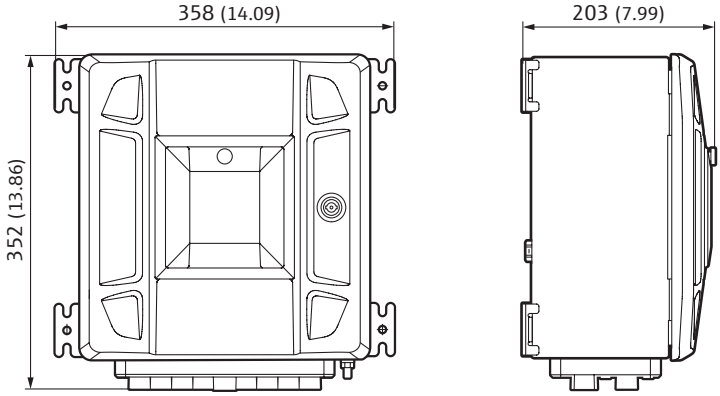
The gas flow measuring instrument can be applied in emission measurements which may be subject to one or more regulations in some jurisdictions. Compliance with all emissions regulations applicable at the installation site remains owner / operator responsibility. If designed and applied correctly our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

Order information

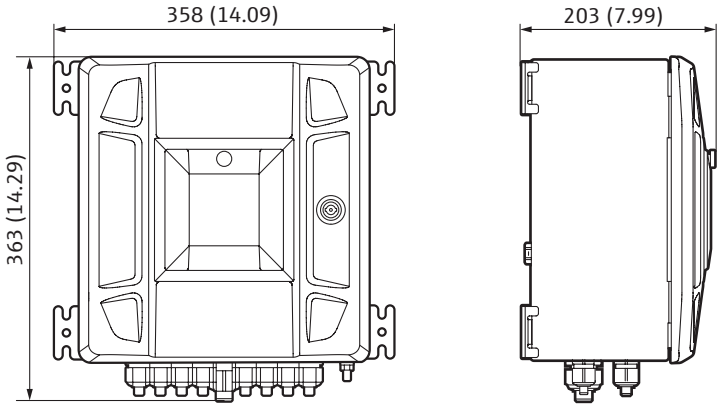
Our regional sales organization will be glad to advise you on which device configuration is best for you.

Dimensional drawings

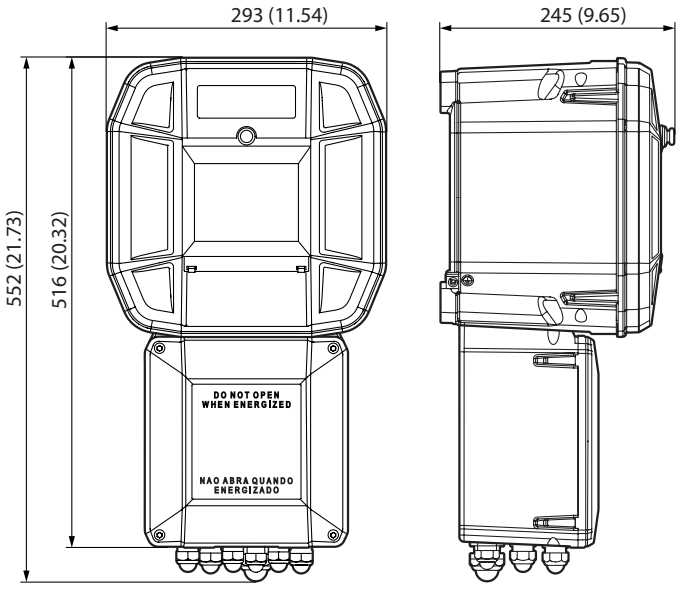
Interface Unit Cl. 1 Div. 2 (dimensions in mm (inch))



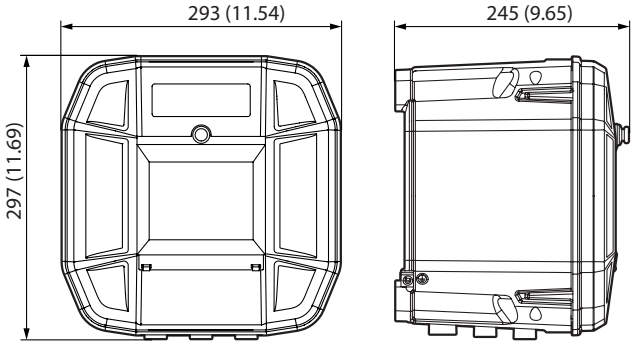
Interface Unit Zone 2 (dimensions in mm (inch))



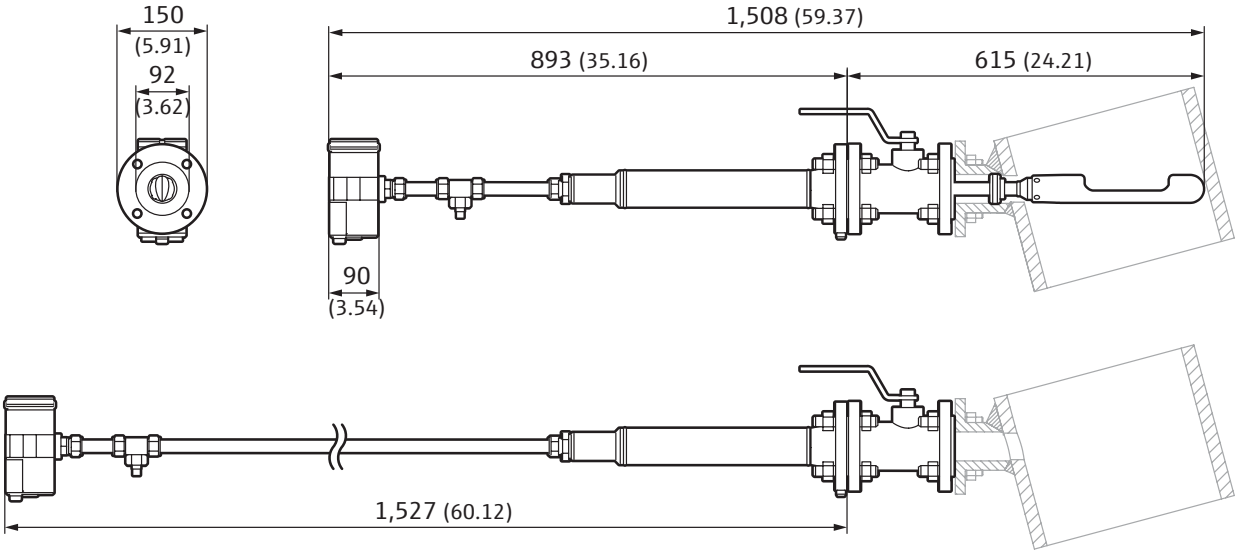
Interface Unit Zone 1 EXDE (dimensions in mm (inch))



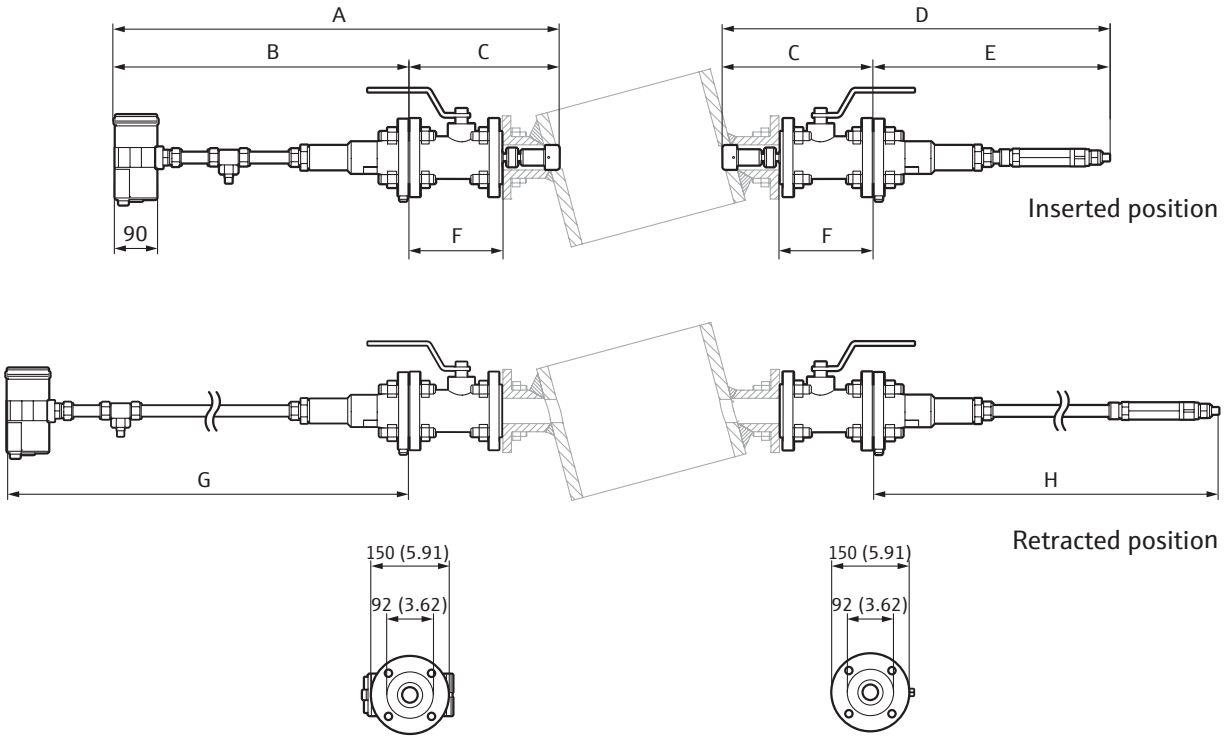
Interface Unit Cl.1 Div. 1 and Zone 1 EXD (dimensions in mm (inch))



F1F-P (dimensions in mm (inch))



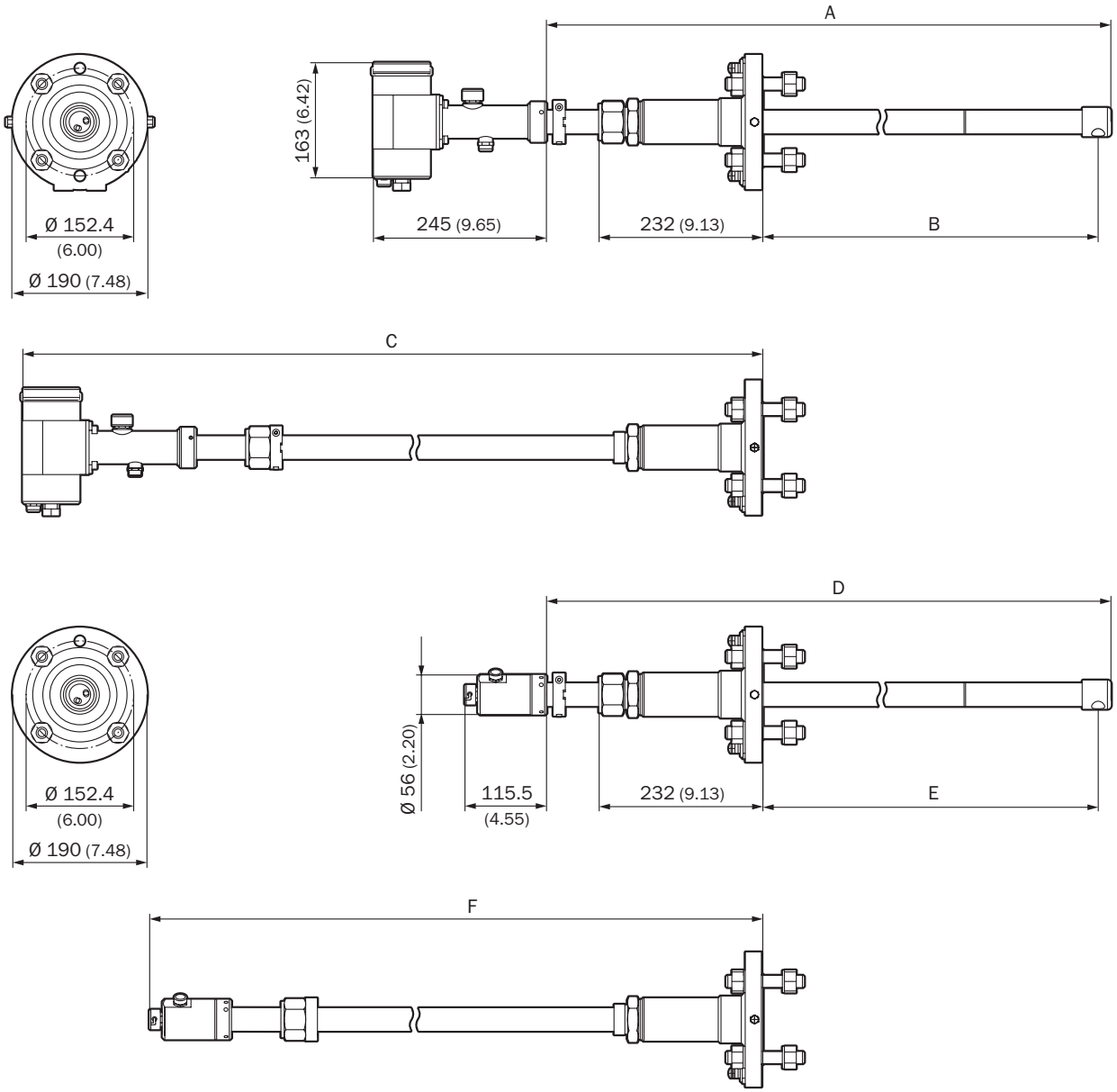
F1F-S/H (dimensions in mm (inch))



Flare-XT Extended version	Dimensions (in mm (inch))							
	A	B	C	D	E	F	G	H
F1F-S	983 (38.70)	583 (22.95)	400 (15.75)	871 (34.29)	471 (18.54)	178 (7.00)	1055.5 (41.55)	944 (37.16)
F1F-H	846 (33.31)	448 (17.64)	398 (15.67)	919 (36.18)	518 (20.39)	178 (7.00)	851 (33.50)	917 (36.10)

Flare-XT Compact version	Dimensions (in mm (inch))							
	A	B	C	D	E	F	G	H
F1F-S	883 (34.76)	583 (22.95)	300 (11.81)	771 (30.35)	471 (18.54)	178 (7.00)	955.5 (37.62)	844 (33.23)
F1F-H	746 (29.37)	448 (17.64)	298 (11.73)	819 (32.13)	518 (20.39)	178 (7.00)	751.5 (29.57)	817 (32.17)

F1F-R (dimensions in mm (inch))



Flare-XT F1F-R	Dimensions (in mm (inch))					
	A	B	C	D	E	F
Up to 24"	800 (31.5)	475 (18.7)	1,048 (41.25)	800 (31.5)	475 (18.7)	869 (334.2)
Up to 48"	922 (36.3)	597 (23.5)	1,170 (46.1)	922 (36.3)	597 (23.5)	991 (39.0)
Up to 86"	1,044 (41.1)	719 (28.3)	1,292 (50.9)	1,044 (41.1)	719 (28.3)	1,113 (43.8)

Gas Application Evaluation Datasheet (exemplary presentation)

FLOWtwin

Flare Project

Calculated flow ranges

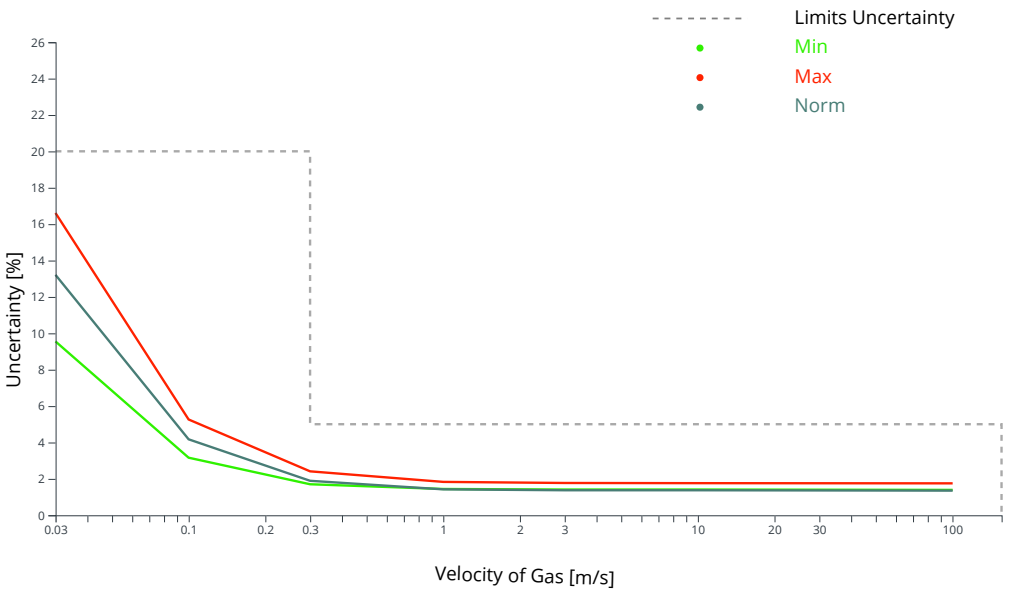
Ultrasonic transit time measurement	Min	Max	Norm
Max velocity (Vmax)	100.265 m/s	120.000 m/s	120.000 m/s
Max flowrate (Qmax)	26337.427 m³/h	31521.259 m³/h	31521.259 m³/h

Uncertainties

VOG	Flowrate	Measurement Uncertainty of Flow (2 σ) ¹		
Ultrasonic transit time measurement		Min	Max	Norm
0.03 m/s	7.88 m³/h	9.55 %	16.61 %	13.21 %
0.10 m/s	26.27 m³/h	3.16 %	5.26 %	4.17 %
0.30 m/s	78.80 m³/h	1.70 %	2.41 %	1.89 %
1.00 m/s	262.68 m³/h	1.44 %	1.83 %	1.42 %
3.00 m/s	788.03 m³/h	1.41 %	1.77 %	1.37 %
10.00 m/s	2626.77 m³/h	1.41 %	1.76 %	1.37 %
Vmax¹	Qmax¹	1.39 %	1.75 %	1.35 %

¹ For fully developed flow profiles.

Uncertainty Prediction



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