PRODUCT INFORMATION

FLOWSIC30

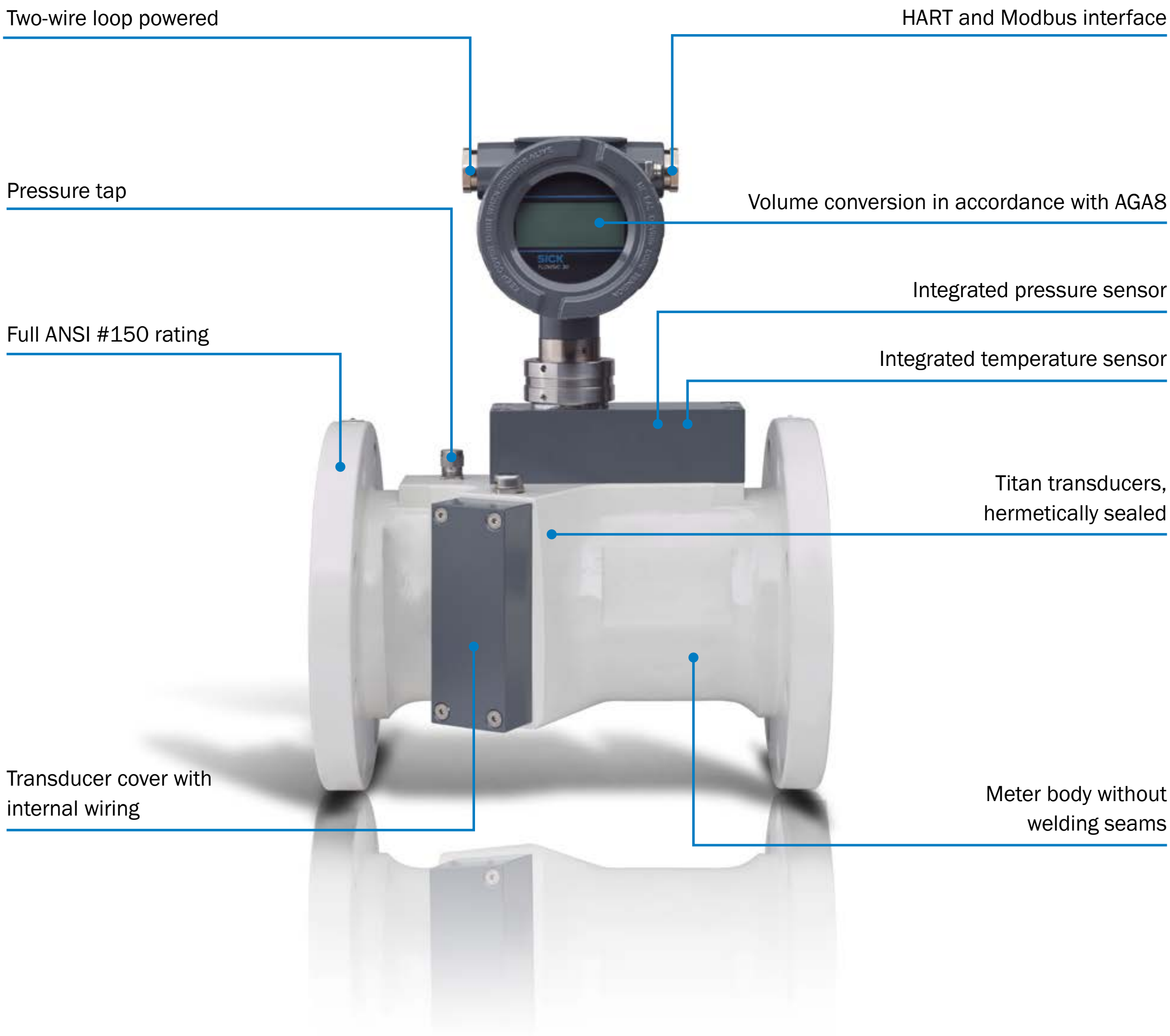
INTELLIGENT AND ROBUST UPSTREAM GAS FLOW MEASUREMENT

Gas flow meters

SICK
Sensor Intelligence.

COST EFFICIENCY IN ULTRASONIC BASED WELLHEAD METERING

Coal seam gas makes up a large majority of the huge unconventional gas reservoirs worldwide and plays an increasingly important role in global energy supply. Thousands of wells have to be drilled to produce this gas, each with varying quality, impurities and unpredictable flow rates during well lifetime. A rugged wellhead meter which operates reliably under these conditions, which covers the entire range of well flow rates and lowers costs because it is practically maintenance-free can make a considerable contribution to profitability. Ultrasonic gas flow meters are ideally suited for this task and SICK is a leading provider for that technology. With our extensive experience in natural gas measurement, even with dirty and wet gases, we have developed a customized gas flow meter for upstream applications. The FLOWSIC30 – a meter which unites reliability and longevity for long unmanned operation in remote locations.



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Reliability is decisive

Wellhead maintenance is cost-intensive, particularly when they are located in remote areas. The FLOWSIC30 requires practically no maintenance since it does not have any moving parts or wear and tear parts. Without flow obstructions and due to the retracted sensor positions in the meter body, the influence of contamination on the measurement is limited. The sensor pockets are enlarged so liquids can easily drain off. This ensures reliable measurement results with long-term stability without regular maintenance.

Continuous measurements under all conditions

SICK has more than 15 years of experience in the field with its gas flow meters for applications in gas production. We have gathered extensive experience in these worldwide installations and are continuously improving our meters. In a wide range of field installation as well as in the framework of international research projects, SICK ultrasonic sensors have proven that they can overcome challenges such as contamination, liquids and oil in the gas flow. This knowledge was used in the development of the FLOWSIC30 - a meter designed for wellhead metering under harsh ambient conditions.

Fast, easy and safe integration

Two major aspects drive wellhead skid design: Safety and cost. With full ANSI Class 150 rating and a carbon steel meter body without welding seams, FLOWSIC30 can be easily integrated into standard piping skids without restrictions. In order to lower costs, meter commissioning has been kept simple and can be completed in just a few steps. An integrated pressure- and temperature transmitter, minimal power consumption of less than 65 mW and the two-wire loop power concept reduce wiring and require only a minimal RTU infrastructure – a contribution to profitable wellhead skids.

Diagnostics not only for the meter

The FLOWSIC30 diagnostics continuously monitor the meter performance and, in the event that they find something which requires detailed fault diagnosis from the operator, output warnings. With the optional RS485 interface, the powerful FLOWgate device software can be used to access detailed diagnostic data and to access the event log of the device as well as the data archive. In addition, FLOWSIC30 is equipped with unique wet gas detection which delivers valuable information for well monitoring. Wet gas detection indicates relevant volumes of liquid in the gas flow and enables the operator to take measures if relevant liquid volumes in the gas are indicated. That is Sensor Intelligence.

Diverse digital communication

Measurement values and diagnostic values are typically led to a DCS or SCADA system via a remote terminal unit. In the standard configuration, the FLOWSIC30 is equipped with a loop-powered 4...20 mA HART-compatible interface which uses the standardized commands for transmission of measurement values. The FLOWSIC30 can optionally be ordered with a Modbus RS485 interface, which has become an oil and gas industry standard, to enable complete (remote) access with the FLOWgate software. Thanks to these diverse communication options, the FLOWSIC30 can be integrated easily into existing communication networks.

Volume correction in accordance with AGA8

To compare gas flows of different wells and to adjust them according to the different stages of the gas production process, they are usually converted to standard volumes by taking pressure, temperature and compressibility into account. The FLOWSIC30 is optionally available with integrated volume correction in accordance with AGA report no. 8. It therefore delivers flow values in accordance with common standards. Pressure and Temperature can be either measured by the internally integrated sensors or be read in from an external sensor via HART or Modbus.

VERSATILE GAS FLOW METER FOR MEASURING TASKS IN GAS PRODUCTION

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Product description

Ultrasonic gas flow meter FLOWSIC30 is designed for use in natural gas production applications such as coal seam gas. The dual-path meter comes with a robust carbon steel meter body and full-titanium transducers. The ultrasonic measurement technology has no moving parts and is virtually maintenance free. The rugged design with integrated wires protects the meter from harsh ambient conditions while the large turn-down ratio typically covers all flow rates from a gas production well. FLOWSIC30 is equipped with integrated diagnostics that monitor the meter status and indicate the presence of liquids in the gas stream. With integrated pressure- and temperature measurement and volume conversion according AGA 8 it provides standard flow readings and reduces installation efforts. Power consumption of only 65 mW and the two-wire loop powered concept make integration easy while HART® and Modbus communication provide versatility in data transfer.

At a glance

- High turndown ratio
- Designed for wet gas applications
- Intelligent meter diagnostics incl. wet-gas detection
- Possibility for remote monitoring thanks to digital interfaces
- Two-wire-transmitter with digital HART® interface
- Full integration of pressure- and temperature measurement, volume conversion and energy flow rate calculation

Your benefits

- No plate changes required – one gas flow meter for the complete well lifetime
- No pressure loss – due to ultrasonic measurement principle
- Optimum availability – almost wear-free operation, no liquid build up in the meter and the possibility of remote monitoring
- Highly reliable – continuous measurement even under challenging process conditions
- Long service life – wet gas capable ultrasonic sensors made of titanium
- Full process control and predictable service – due to intelligent meter diagnostics
- Low installation efforts – integration of pressure- and temperature measurement, HART®-interface and commissioning assistant

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Fields of application

- Wellhead metering in coal seam gas production
- Natural gas measurement up- and downstream of separators
- Replacement of orifice measurements

Detailed technical data

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

System

Measurands	Volume s.c., volume a.c., Volume flow s.c., volume flow a.c., gas pressure, gas temperature, speed of sound, methane content, energy flow rate
Number of measuring paths	2
Measurement principle	Ultrasonic transit time difference measurement
Measuring medium	Coal seam gas, natural gas, methane
Measuring ranges	
3” - operational volume flow: Q_{min} ... Q_{max}:	12 ... 850 m^3/h
3” - operational volume flow: Q_t:	60 m^3/h
4” - operational volume flow: Q_{min} ... Q_{max}:	20 ... 1,600 m^3/h
4” - operational volume flow: Q_t:	100 m^3/h
Repeatability	≤ 0.5% of the measured value
Measurement accuracy	
Wet-gas tolerant:	
Operational volume flow, Q_t ... Q_{max}	≤ ± 1.5%
Operational volume flow, Q_{min} ... Q_t	≤ ± 3%
Wet-gas robust:	
Operational volume flow, Q_t ... Q_{max}	≤ ± 2%
Operational volume flow, Q_{min} ... Q_t	≤ ± 4%
	Reference conditions: Dry air at ambient pressure and ambient temperature Verified with pipe configurations according to OIML R-137:2012 Annex B (mild)
Diagnostic functions	Integrated device diagnosis Wet gas detection
Gas temperature	–10 °C ... +80 °C
Operating pressure	0 bar (g) ... 19.6 bar (g)
Nominal pipe size	DN80 / 3”, schedule STD DN100 / 4”, schedule STD
Ambient temperature	–25 °C ... +60 °C
Storage temperature	–25 °C ... +70 °C
Ambient humidity	≤ 95% Relative humidity
Ex approvals	
IECEx	Ex db eb ia [ia] IIA T4 Gb
ATEX	II 2G Ex db eb ia [ia] IIA T4 Gb
Enclosure rating	IP66 / IP67
Analog outputs	1 output: 4 ... 20 mA
Modbus	✔
Remarks	Option
Type of fieldbus integration	RTU RS-485
HART®	compatible
Dimensions (W x H x D)	See dimensional drawings

→ **www.sick.com/FLOWSIC30**

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.

Weight	3”: 28 kg 4”: 32 kg
Material	Meter body: LTCS (ASTM A352 Gr. LCC or ASTM 350 LF2 or equivalent)
Electrical connection	
Voltage	18 ... 30 V DC Via analog loop, 2-conductor concept
Power consumption	< 65 mW
Process connections	Connection flange: 3″ / 4″ ANSI B16.5, class 150 RF

Volume correction

Accuracy	≤ ± 0.5% Depending on the measurement accuracy of the pressure measurement
Correction method	PTZ (option) TZ (option)
Compressibility	AGA 8 Gross method 1 AGA 8 Gross method 2

Integrated temperature sensor

Description	Digital sensor, mounted in thermowell
Measuring ranges	
Temperature	–10 ... +80 °C
Measurement accuracy	≤ ± 0.3% The measured value in K

Integrated pressure sensor

Description	Digital sensor gauge pressure (option)
Measuring ranges	
Pressure	0 ... 2,000 kPa
Measurement accuracy	≤ ± 0.1% Relative to the measuring range limit value

Ordering information

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

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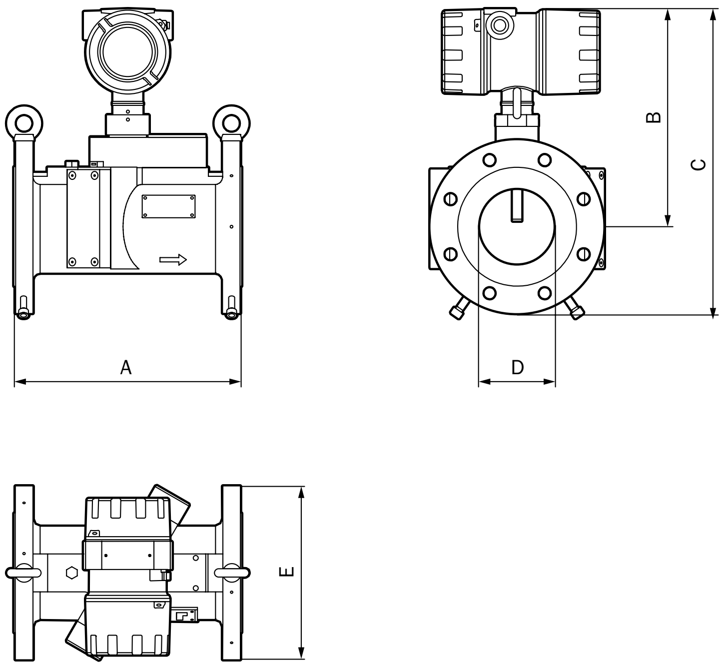
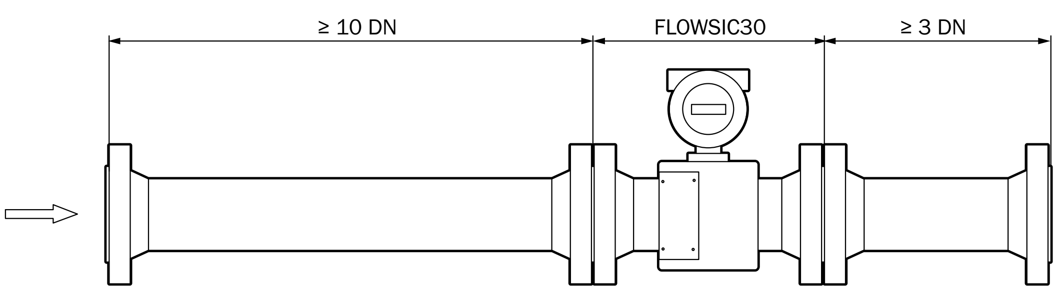
Dimensional drawings (dimensions in mm)



Nominal pipe size	Dimensions				
	A	**B**	**C**	**D**	**E**
3"	320	290	379	78	190
4”	300	293	407	102	229

Mounting instructions

FLOWSIC30 installation for unidirectional use



Device design

FLOWSIC30 is available in two different meter designs to provide the right wet gas capability. The two different meter designs are explained in the following:

Wet-gas tolerant meter design

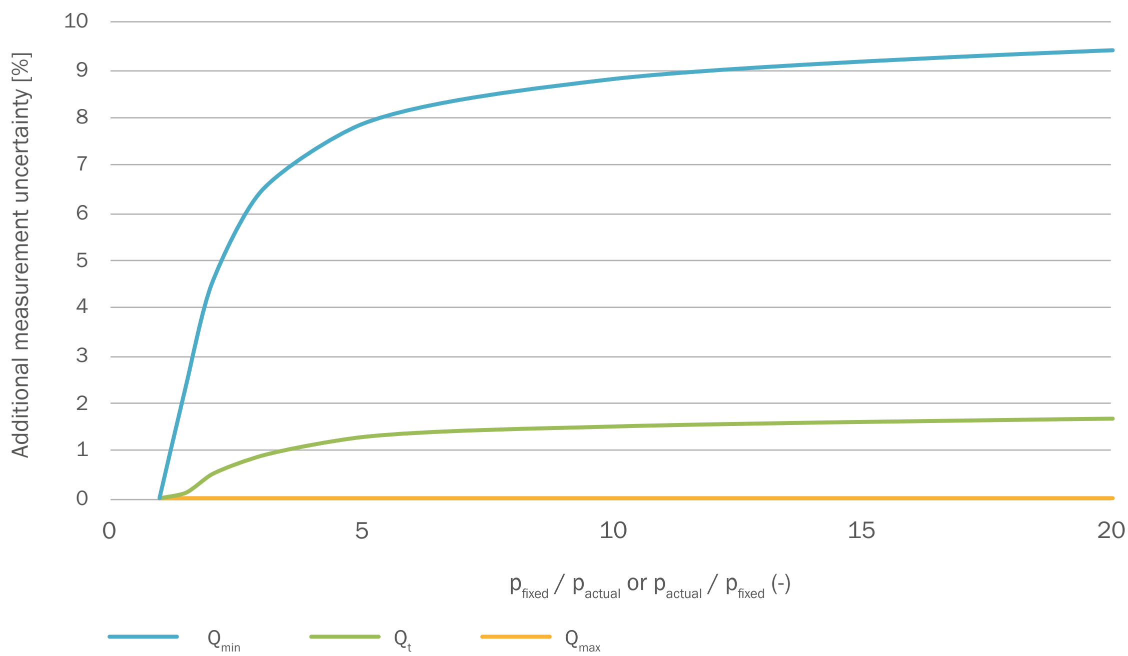
The wet-gas tolerant device design was developed specially for wet gas applications in natural gas production with installation in the flow direction behind separators. The device can measure in continuous wet gas operation with low moisture content. Higher moisture content for short periods can lead to limited measurement capability. When the moisture content recedes, the gas flow meter completely recovers, e.g. in the event of a brief reduction in separator performance. The lower wet-gas robustness enables improved measurement accuracy.

Wet-gas robust meter design

The wet-gas robust device design was developed specially for wet gas applications in natural gas production with installation in the flow direction in front of separators. The device can also measure in continuous wet gas operation with high moisture content.

Operational limits

Wet-gas robust devices without integrated pressure sensor or without externally fed live pressure value are parameterized with a constant pressure value (p_{fixed}) during commissioning. If there are fluctuations in operating pressure (p_{actual}) around the constant pressure value (p_{fixed}), these devices can show an additional uncertainty of the operational volume flow. The additional difference is shown in the diagram below using the ratio of the constant pressure value (p_{fixed}) to the operational pressure (p_{actual}).



Additional measurement uncertainty of the wet-gas robust device variants with deviation of the pressure value

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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."

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Detailed addresses and further locations → www.sick.com

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