



FLAWSIC500

HIGH-PERFORMANCE FLOW MEASUREMENT
FOR A DIGITAL GAS DISTRIBUTION NETWORK

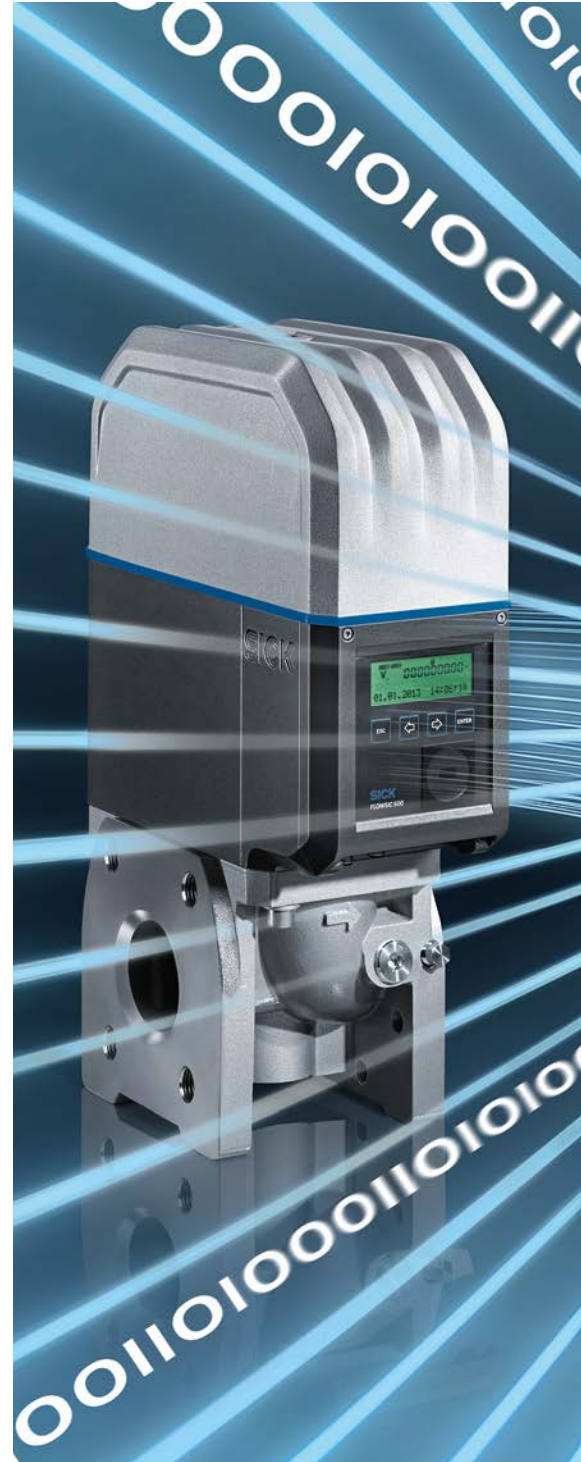
Gas flow meters

SICK
Sensor Intelligence.

INTO THE DIGITAL AGE WITH ULTRASOUND

The world is becoming ever more networked, and digitalization is opening up new opportunities - also for the energy industry. Managing the challenging energy transformation is a global concern in this area. On the other hand, there is a wide range of possibilities for modernizing company-internal processes.

The digital transformation is driving technological developments and therefore providing new measurement techniques and services even for even more efficient and intelligent processes. The gas flow meters from SICK make a digital transformation of the gas network possible. After releasing the FLOWSIC500, the world's first ultrasonic gas flow meter for natural gas distribution, SICK has taken the next innovative step with its second generation device, which is setting new standards in connectivity and transparency.





MORE VALUE

The advantages that characterized the previous version continue to be available: The FLOW SIC500 is a gas flow meter and volume corrector in one – and thanks to the absence of mechanically moving components, it is virtually wear and maintenance free.

Six powerful features support you on your path to the digital future of flow measurement.



+ Reduced costs thanks to absence of mechanically-moving components

The FLOW SIC500 measures the gas flow using ultrasound, which makes the device virtually wear and tear and maintenance-free in use.

+ Low operating costs due to high measurement certainty and measurement accuracy

Besides the low wear and tear characteristics, the insensitivity of the FLOW SIC500 for interferences ensures a long-term stable measurement certainty and therefore low operating costs.



+ Time and cost savings thanks to remote monitoring

Digital interfaces and wireless communication enable the FLOWSIC500 to be integrated perfectly into high-level control systems.

+ Full transparency through digital transformation of the gas network

FLOWSIC500 takes the gas distribution network into the digital age. The function i-diagnostics™ provides real-time monitoring of the gas quality, which increases the system performance by optimizing the network balance.

+ Compact design saves space

The FLOWSIC500 operates without straight inlet and outlet piping requirements. Equipped with an integrated volume corrector, it requires considerably less space than conventional solutions.

+ Perfect fit

The construction of the FLOWSIC500 enables it to be effortlessly mounted anywhere where a conventional gas flow meter was previously installed.

DIGITAL REMOTE CONTROL AND FLEET MONITORING IN REAL TIME

With its extensive and state-of-the-art communication options, the FLOW SIC500 is optimally equipped for the digital age. The modern digital interfaces and the option of wireless communication via the 4G/5G mobile telecommunication standard make it easy to integrate into higher-level control systems. Remote monitoring offers significant time and cost advantages.

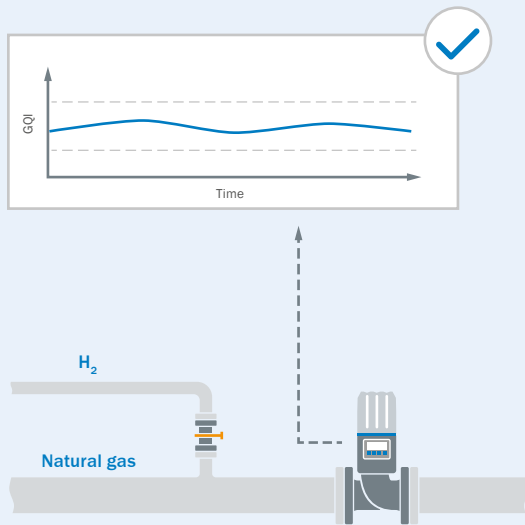
It enables all deployed devices to be monitored remotely from a control station using a real-time fleet control system. Continuous monitoring provides a transparent picture of the current device status thereby allowing condition-based maintenance. This eliminates any unnecessary on-site maintenance checks.



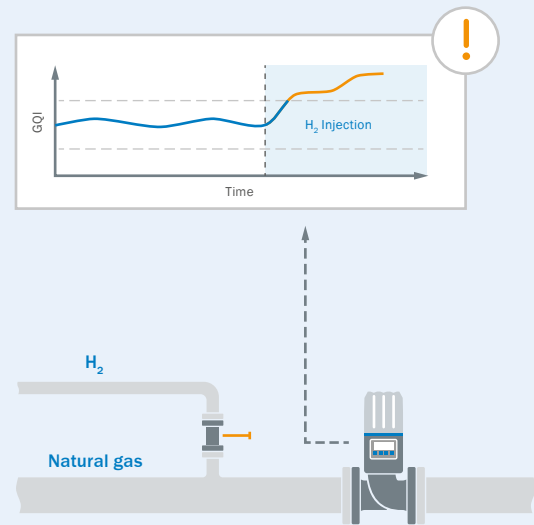
MAINTAINING A CONSTANT OVERVIEW OF THE DIGITAL GAS DISTRIBUTION NETWORK

The modern gas distribution market is characterized by the presence of a large number of different gas suppliers. Using different gas types (for example biogas, bio methane, hydrogen or synthetic gas) results in fluctuations in the supplied heating value. Using the FLOWSIC500, the gas network operator is well equipped to deal with this challenge because the i-diagnostics™ function offers an indication of the available gas qualities. If the set limit values are exceeded or not met due to fluctua-

tions in the gas qualities, the FLOWSIC500 reports this automatically to a remote higher-level control center. This enables significant changes in the heating value to be detected in real time and substantial savings in time and costs to be achieved. i-diagnostics™ assists with optimizing the network balance and provides the foundation for guaranteeing contractually agreed gas qualities.



During commissioning of the FLOWSIC500 the actual gas composition and a permissible deviation can be parameterized via the Gas Quality Indicator (GQI) in FLOWgate™. The gas quality is continuously monitored.

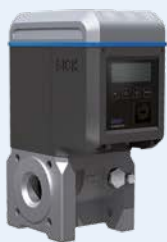


In case the gas composition is changed by injecting other gas types, e.g. hydrogen, the operator gets a status information as soon as the Gas Quality Indicator (GQI) of the FLOWSIC500 exceeds the parameterized allowed deviation. Changes of the gas quality can be detected.

Gas Quality Indicator using the example of H₂ injection

FOUR NOMINAL DIAMETERS – AND ALL EASY TO OPERATE

- All fitting to the common flange-to-flange dimensions used in natural gas distribution: DN50, DN80, DN100 and DN150.
- The electrical connections for the transfer of measurement data and power supply are easily accessible and can be installed in just a few steps. Removing the “cartridge” requires just loosening of a few screws.
- It is possible to install the gas meter horizontally or vertically. The display can be rotated for easier reading of metering data.
- The most important functions of the measurement device can be accessed directly from the display using the key pad. User-friendly software supports the FLOWSIC500 via an optical interface.



Meter size: 50 mm



Meter size: 80 mm



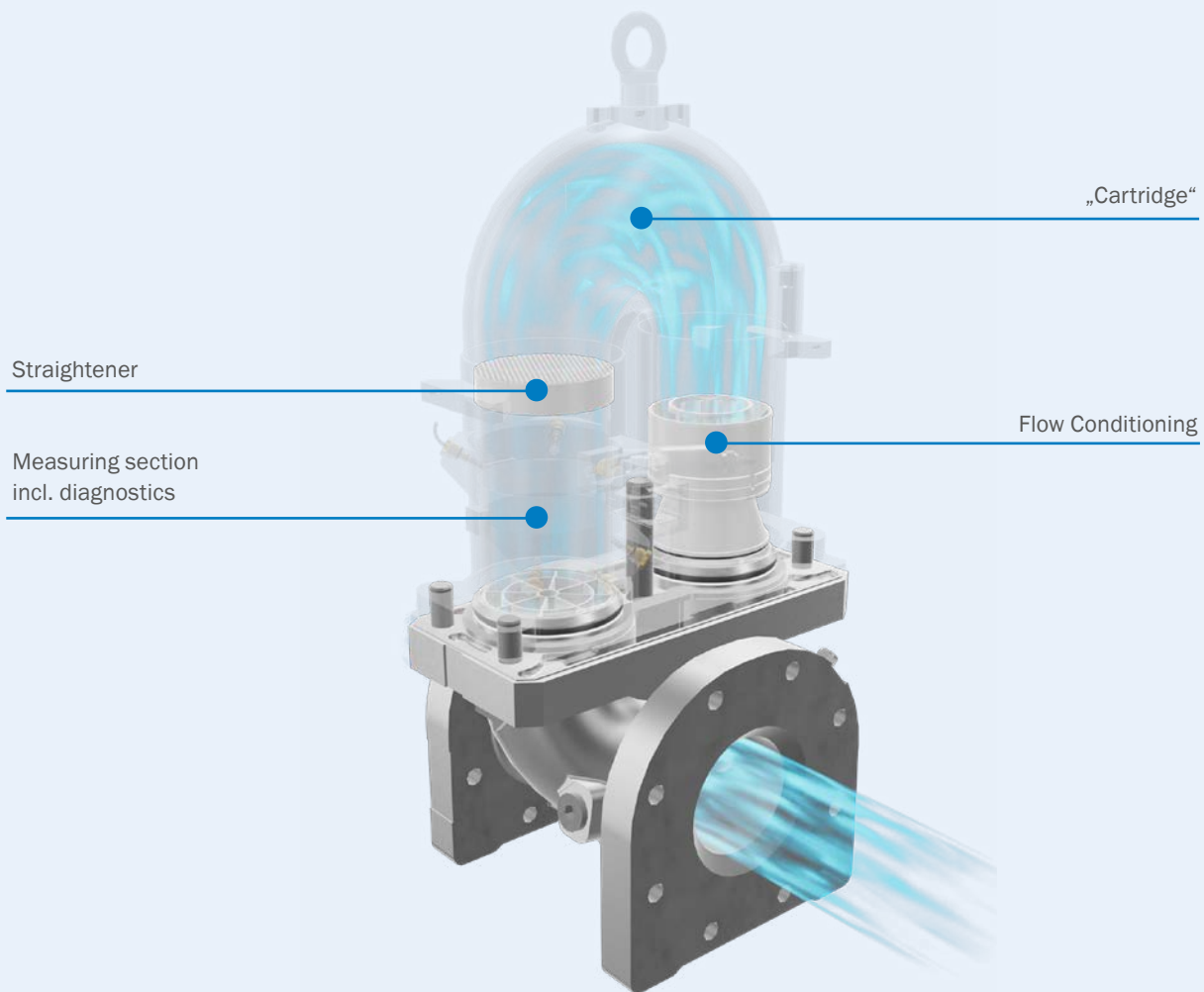
Meter size: 100 mm



Meter size: 150 mm

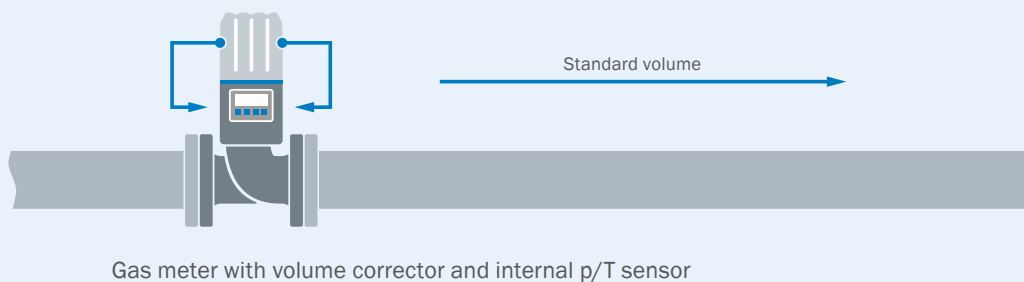
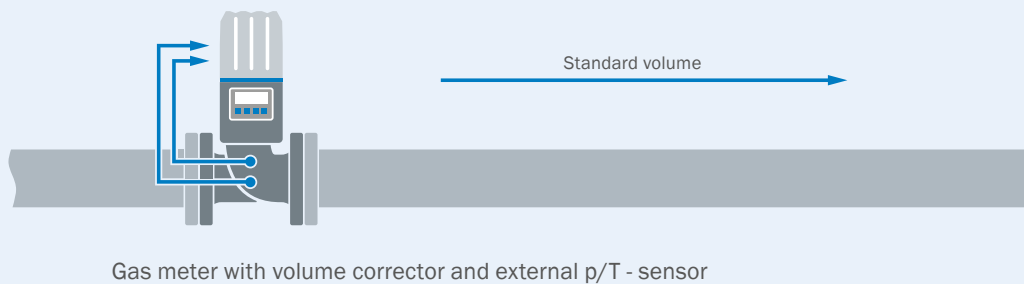
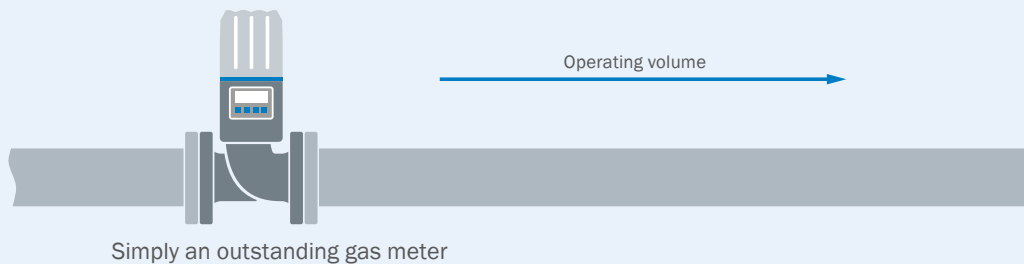
OPERATING PRINCIPLE

- Thanks to the use of ultrasound technology and the absence of mechanically moving components, the FLOW-SIC500 offers clear cost advantages over conventional turbine and rotary displacement meters.
- The gas flow meter works without any loss of performance during operation. No part of the measurement device interferes with the gas flow. The FLOW-SIC500 can therefore also be used in applications where a continuous gas supply is essential, for example in hospitals.
- Via self-monitoring the device triggers an alarm in case of a malfunction, e.g. changes in electronic performance or contamination. This eliminates the need for regular maintenance.
- Furthermore, being insensitive to excessive loads, the gas flow meter offers a broad measurement range and also processes dynamic load changes with no loss in accuracy. The FLOW-SIC500 is therefore ideal custody gas flow measurements.



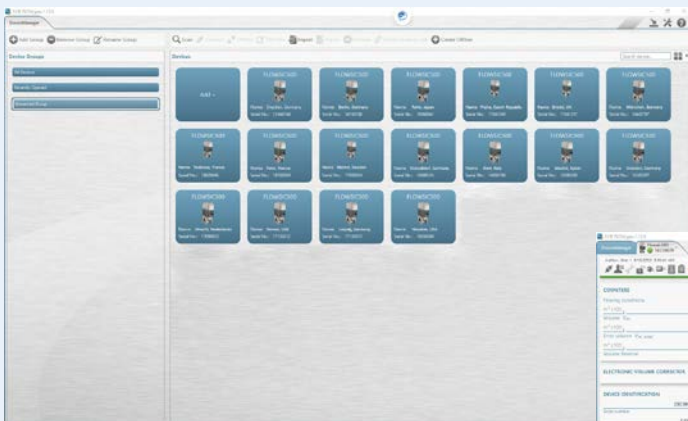
GAS FLOW METER AND VOLUME CORRECTOR IN ONE

- Gas flow measurement and volume correction have the same goal: providing a precise measurement of the quantity of gas supplied. The FLOWSIC500 combines both into one device thereby saving on installation costs and reducing the number of interfaces. Everything is conveniently available from a single source, with the same end result: precise and reliable measurement of the gas quantity in line with recognized, approved processes.
- The integratable volume corrector supports all typical correction algorithms, such as SGERG88, AGA 8, and AGA NX-19.
- There is the option of TZ or pTZ correction. The pTZ variant is approved in accordance with MID. The right temperature and pressure sensors always come with the meter. A wide range pressure sensor covers the range from 0.8 ... 20 bar(a)

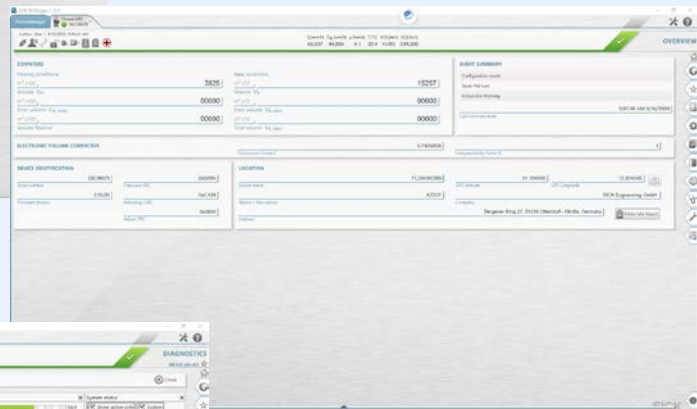


FLOWGATE™ OPERATING SOFTWARE

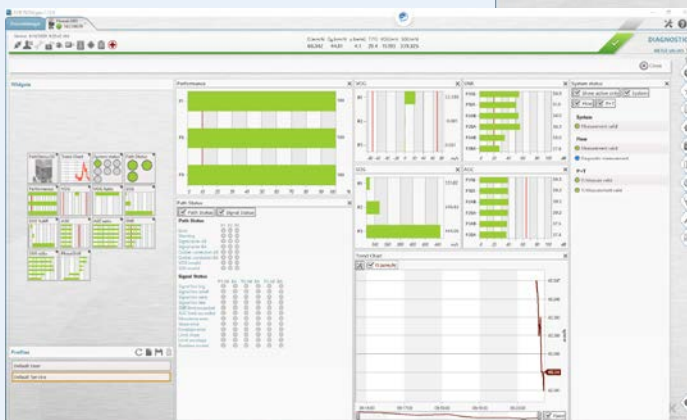
- The application software FLOWgate™ offers a user-friendly and result-oriented solution for all tasks in the Life Cycle Management of the FLOWSIC500.
- FLOWgate™ supports with its wizards for calibration, commissioning and device diagnosis the virtually maintenance-free operation of the gas meter and can also be used for remote monitoring of the gas meter.
- The device manager shows all registered devices, offers the grouping of devices and a comfortable data backup. With the integrated database you always have access to the stored data - offline and online.
- FLOWgate™'s intuitive operation and multi-language capability makes it easy to use the gas meter FLOWSIC500.



Device Manager



Overview



Meter values

CUSTODY TRANSFER MEASUREMENT IN NATURAL GAS DISTRIBUTION



Product description

The cutting-edge technology for natural gas measurement: The FLOWSIC500 ultrasonic compact gas meter ensures highly accurate metering in natural gas distribution. In absence of mechanical moving parts, the FLOWSIC500 is a robust, fail-safe and low-maintenance device – allowing for a significant reduction in operating costs. It is overload-proof, accurate and is monitored by an intelligent diagnostics system.

The modern interfaces and the option of wireless communication make it easy to integrate into remote data management systems. The continuous monitoring provides a transparent picture of the current device status and also changes in the gas quality. When utilized in transfer and measuring stations, FLOWSIC500 ensures a continuous and blockage free gas supply.

At a glance

- Rugged and time-proven ultrasound technology
- Diagnostics and permanent operational check
- Gas Quality Indicator based on i-diagnostics™
- Large turn down, no moving parts
- Straight inlet/outlet piping not required
- Integrated volume conversion
- State of the art interfaces and protocols
- Remote communication (DATCOM)

Your benefit

- Enabling digitalization of the gas grid
- Unique decentralized gas network monitoring based on i-diagnostics™
- Ultimate measurement certainty and safety of continuous gas supply
- Simple installation, compatible with conventional technologies (turbine and rotary meters)
- All-in-One solution: gas meter + volume correction + data registration + data communication (DATCOM)
- Self-sufficient operation or failsafe in network operation with battery backup
- Reduced maintenance effort thanks to remote service
- Simplified recalibration due to straightforward „cartridge“ exchange

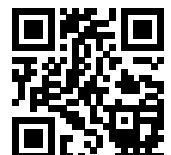


Additional information

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→ www.mysick.com/en/FLOWSIC500

For more information, just enter the link and get direct access to technical data, CAD design models, operating instructions, software, application examples and much more.



Fields of Application

- Natural gas distribution
- Metering stations in industrial and commercial industries
- Building and area metering for municipal and regional gas suppliers
- Critical applications where continuous gas supply must be ensured, e.g. in hospitals
- Natural gas measurement; compliant to the all relevant directives and guidelines

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 the FLOWSIC500 performance for your application.

System

Measured values	Volume a.c., volume flow a.c., gas velocity In addition, for integrated volume correction: volume s.c., volume flow s.c.								
Measurement principle	Ultrasonic transit time difference measurement								
Measuring medium	Natural gas (dry, odorized)								
Measuring ranges	<table> <tr> <td>Volume flow, a. c., DN 50</td> <td>1.0 ... 160 m³/h</td> </tr> <tr> <td>Volume flow, a. c., DN 80</td> <td>2.5 ... 400 m³/h</td> </tr> <tr> <td>Volume flow, a. c., DN 100</td> <td>4.0 ... 650 m³/h</td> </tr> <tr> <td>Volume flow, a. c., DN 150</td> <td>4.0 ... 1000 m³/h</td> </tr> </table>	Volume flow, a. c., DN 50	1.0 ... 160 m ³ /h	Volume flow, a. c., DN 80	2.5 ... 400 m ³ /h	Volume flow, a. c., DN 100	4.0 ... 650 m ³ /h	Volume flow, a. c., DN 150	4.0 ... 1000 m ³ /h
Volume flow, a. c., DN 50	1.0 ... 160 m ³ /h								
Volume flow, a. c., DN 80	2.5 ... 400 m ³ /h								
Volume flow, a. c., DN 100	4.0 ... 650 m ³ /h								
Volume flow, a. c., DN 150	4.0 ... 1000 m ³ /h								
Reproducibility	≤ 0.1 %								
Accuracy	<p>Accuracy class 1, typical error limits:</p> <table> <tr> <td>Q_{\min} up to $0.1 Q_{\max}$</td> <td>≤ ±1 %</td> </tr> <tr> <td>$0.1 Q_{\max}$ up to Q_{\max}</td> <td>≤ ±0.5 %</td> </tr> </table> <p>Accuracy class 1, maximum allowed error limits:</p> <table> <tr> <td>Q_{\min} up to $0.1 Q_{\max}$</td> <td>≤ ±2 %</td> </tr> <tr> <td>$0.1 Q_{\max}$ up to Q_{\max}</td> <td>≤ ±1 %</td> </tr> </table> <p>After high pressure flow calibration: ±0.2 % at test pressure; otherwise ±0.5 %</p>	Q_{\min} up to $0.1 Q_{\max}$	≤ ±1 %	$0.1 Q_{\max}$ up to Q_{\max}	≤ ±0.5 %	Q_{\min} up to $0.1 Q_{\max}$	≤ ±2 %	$0.1 Q_{\max}$ up to Q_{\max}	≤ ±1 %
Q_{\min} up to $0.1 Q_{\max}$	≤ ±1 %								
$0.1 Q_{\max}$ up to Q_{\max}	≤ ±0.5 %								
Q_{\min} up to $0.1 Q_{\max}$	≤ ±2 %								
$0.1 Q_{\max}$ up to Q_{\max}	≤ ±1 %								
Diagnostics functions	Permanent monitoring of measured values, Gas Quality Indicator								
Gas temperature	-25 °C ... +60 °C -40 °C ... +70 °C (Optional)								
Operating pressure	PN16 (EN 1092-1): 0 bar (g) ... 16 bar (g) Class 150 (ASME B16.5): 0 bar (g) ... 20 bar (g)								
Ambient temperature	-25 °C ... +60 °C -40 °C ... +70 °C (Optional)								
Storage temperature	-40 °C ... +80 °C								
Conformities	MID: 2014/32/EU OIML R 137-1&2:2012 EN 12405:2010 (with integrated volume correction)								
Ex-approvals	<table> <tr> <td>IECEX</td> <td>Ex ia [ia] IIC T4 Gb, Ex op is IIC T4 Gb</td> </tr> <tr> <td>ATEX</td> <td>II 2G Ex ia [ia] IIC T4 Gb, II 2G Ex op is IIC T4 Gb</td> </tr> <tr> <td>NEC/CEC (US/CA)</td> <td>I.S. for Class I Division 1 Groups C and D T4; Ex/AEx ia IIB T4 Ga Class I, Division 2, Groups A, B, C, and/or D, T4</td> </tr> </table>	IECEX	Ex ia [ia] IIC T4 Gb, Ex op is IIC T4 Gb	ATEX	II 2G Ex ia [ia] IIC T4 Gb, II 2G Ex op is IIC T4 Gb	NEC/CEC (US/CA)	I.S. for Class I Division 1 Groups C and D T4; Ex/AEx ia IIB T4 Ga Class I, Division 2, Groups A, B, C, and/or D, T4		
IECEX	Ex ia [ia] IIC T4 Gb, Ex op is IIC T4 Gb								
ATEX	II 2G Ex ia [ia] IIC T4 Gb, II 2G Ex op is IIC T4 Gb								
NEC/CEC (US/CA)	I.S. for Class I Division 1 Groups C and D T4; Ex/AEx ia IIB T4 Ga Class I, Division 2, Groups A, B, C, and/or D, T4								
Enclosure rating	IP66								

Digital outputs	Configurations: LF-Impulse + malfunction, electrically isolated (fmax = 100 Hz) HF-Impulse + malfunction, electrically isolated (fmax = 2 kHz) Encoder + LF-Impulse, electrically isolated (fmax = 100 Hz) Encoder + HF-Impulse, not electrically isolated (fmax = 2 kHz) 2x LF-Impulse, electrically isolated (fmax = 2 kHz / 100 Hz) LF-Impulse + RS485 (externally powered) HF-Impulse + RS485 (externally powered) RTU RS-485 (externally powered)
RS485 protocol	Modbus RTU, Modbus Enron, ISO-17089.1 (DSfG)
Optical interface	According to EN 62056-21, section 4.3
Dimensions (W x H x D)	See dimensional drawings
Material in contact with media	Aluminum AC-42100-S-T6
Mounting	Horizontal or vertical installation with 0 D straight inlet/outlet piping
Electrical connection	Voltage Intrinsically safe supply: 4.5 ... 16 V DC Inclusive 3-months back-up battery
Options	
	Self-sufficient meter configuration (more than 5 years battery runtime) Autarkic meter configuration with internal supply RS485 (2.5 years battery life)

Volume correction

Accuracy	Accuracy class 0.5; Maximum allowed error limits: Correction factor C: $\leq \pm 0.5\%$ (at reference conditions)
Correction method	pTZ or TZ
Compressibility	SGERG88 AGA 8 Gross method 1 AGA 8 Gross method 2 AGA 8 DC92 AGA NX-19 AGA NX-19 mod. GERG91 Fixed value
Data archives	Measurement period archive (6000 entries) Daily archive (600 entries) Monthly archive (25 entries)
Log books	Event log book (1,000 entries) Parameter log book (250 entries) Metrology log book (100 entries) Gas parameters logbook (150 entries)

Pressure sensor

Measuring ranges	Absolute pressure Relative pressure	0.8 ... 5.2 bar (a) / 2.0 ... 10 bar (a) / 4.0 ... 20 bar (a) / 0.8 ... 20 bar (a) 0 ... 4 bar (g) / 0 ... 10 bar (g) / 0 ... 20 bar (g)
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Temperature sensor

Measuring ranges	Temperature	-25 ... +60 °C -40 ... +70 °C
Sensor type		Platinum resistance sensor, Pt1000 in stainless steel protective tube
Ambient temperature		-40 ... +85 °C

Custody transfer measuring ranges

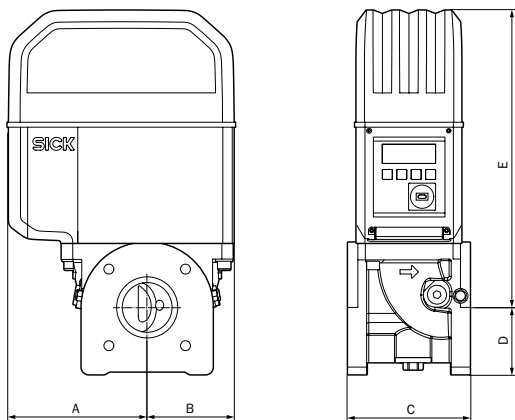
Nominal size	Meter size	Measuring range [m ³ /h]		Measuring span
		Min	Max	
DN 50 (2")	G 40	1.3	65	1 : 50
	G 65	2.0	100	1 : 50
	G 100	3.2	160	1 : 50
	G 100	1.6	160	1 : 100
	G 100	1.0	160	1 : 160
DN 80 (3")	G 100	3.2	160	1 : 50
	G 160	5.0	250	1 : 50
	G 160	2.5	250	1 : 100
	G 250	8.0	400	1 : 50
	G 250	4.0	400	1 : 100
DN 100 (4")	G 250	2.5	400	1 : 160
	G 160	5.0	250	1 : 50
	G 250	8.0	400	1 : 50
	G 250	4.0	400	1 : 100
	G 400	13.0	650	1 : 50
DN 150 (6")	G 400	6.5	650	1 : 100
	G 400	4.0	650	1 : 160
	G 250	8.0	400	1 : 50
	G 250	4.0	400	1 : 100
	G 400	13.0	650	1 : 50
	G 400	6.5	650	1 : 100
	G 400	4.0	650	1 : 160
	G 650	20.0	1000	1 : 50
	G 650	10.0	1000	1 : 100
DN 150 (6")	G 650	6.2	1000	1 : 160
	G 650	5.0	1000	1 : 200
	G 650	4.0	1000	1 : 250

Ordering information

Our regional sales organization will help you to select the optimum device configuration.

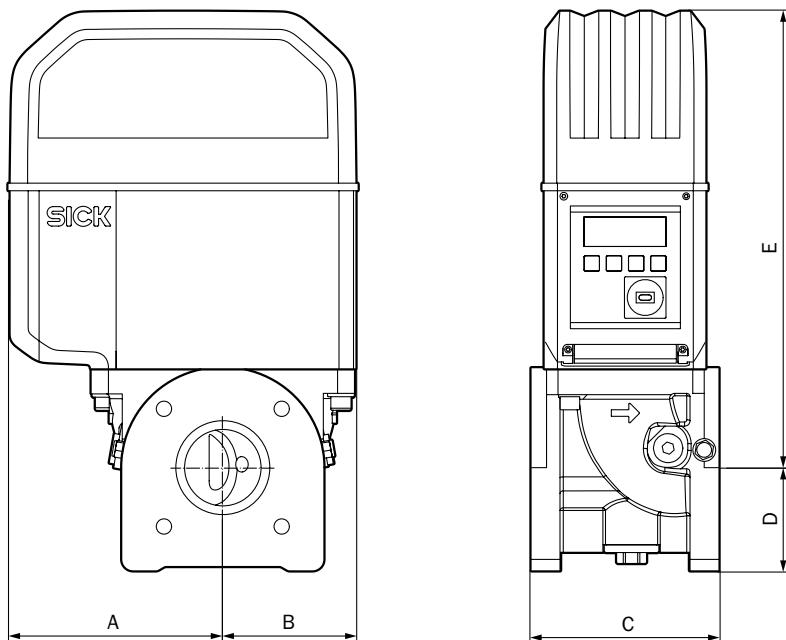
Dimensional drawings (Dimensions in mm)

FLWSIC500, nominal size DN50



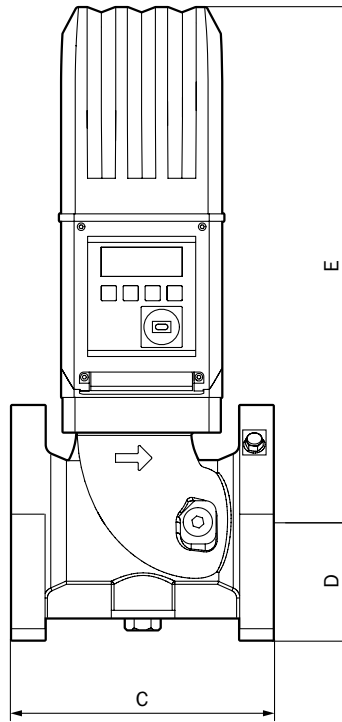
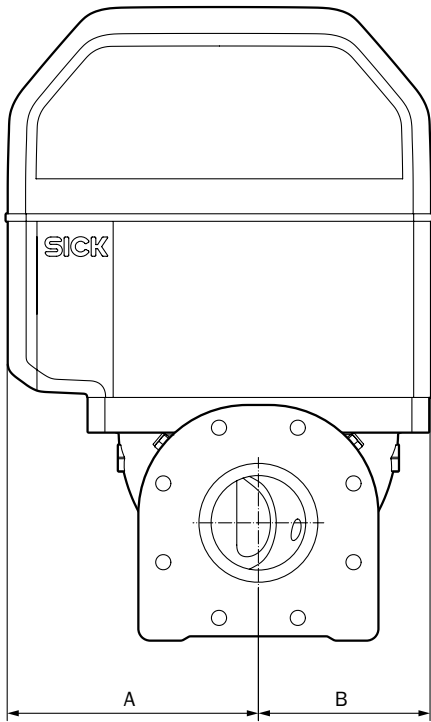
Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 50	10.6	153	78	150	71	272
				171		
All dimensions in mm. All weights in kg.						

FLWSIC500, nominal size DN80



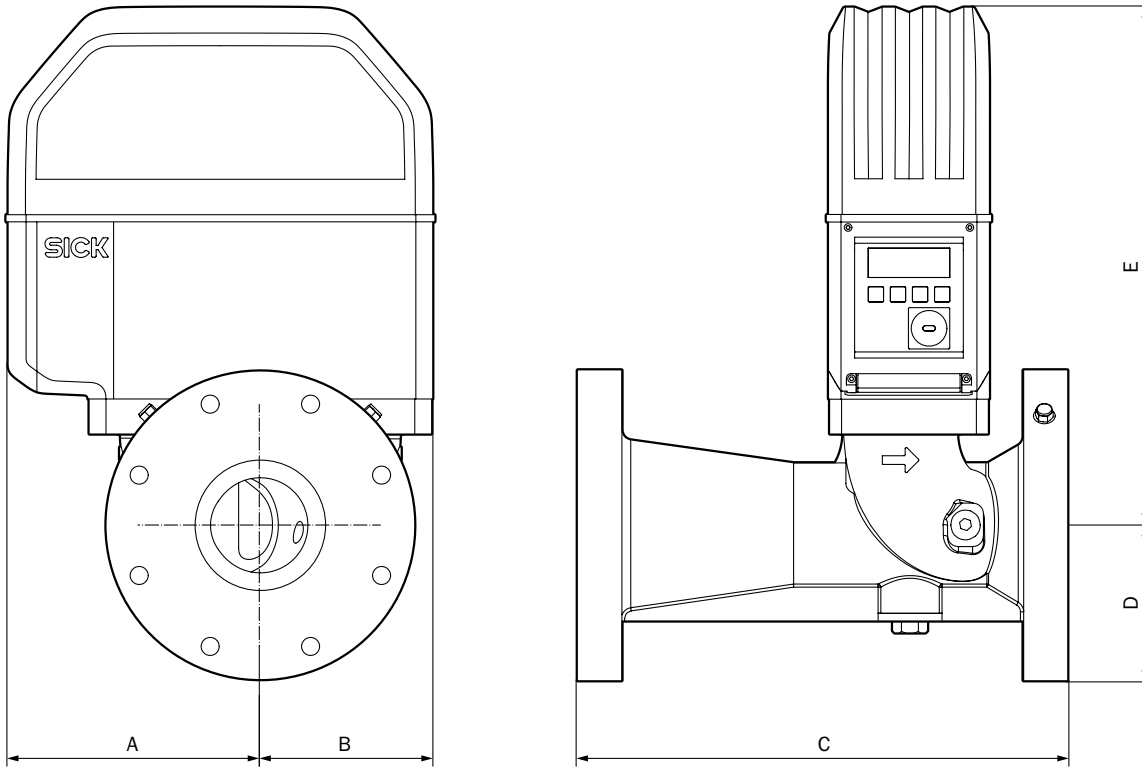
Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 80	18.3	194	121	171	94	417
	20.5			241		
All dimensions in mm. All weights in kg.						

FLAWSIC500, nominal size DN100



Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 100	27.2	231	159	241	108	476
	29.4			300		
All dimensions in mm. All weights in kg.						

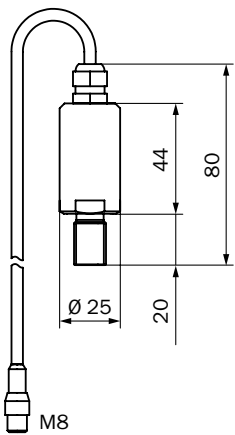
FLOWSIC500, nominal size DN150



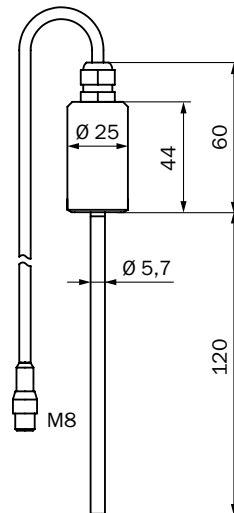
Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 150	35.0	232	158	450	143	476

All dimensions in mm. All weights in kg.

Pressure sensor



Temperature sensor

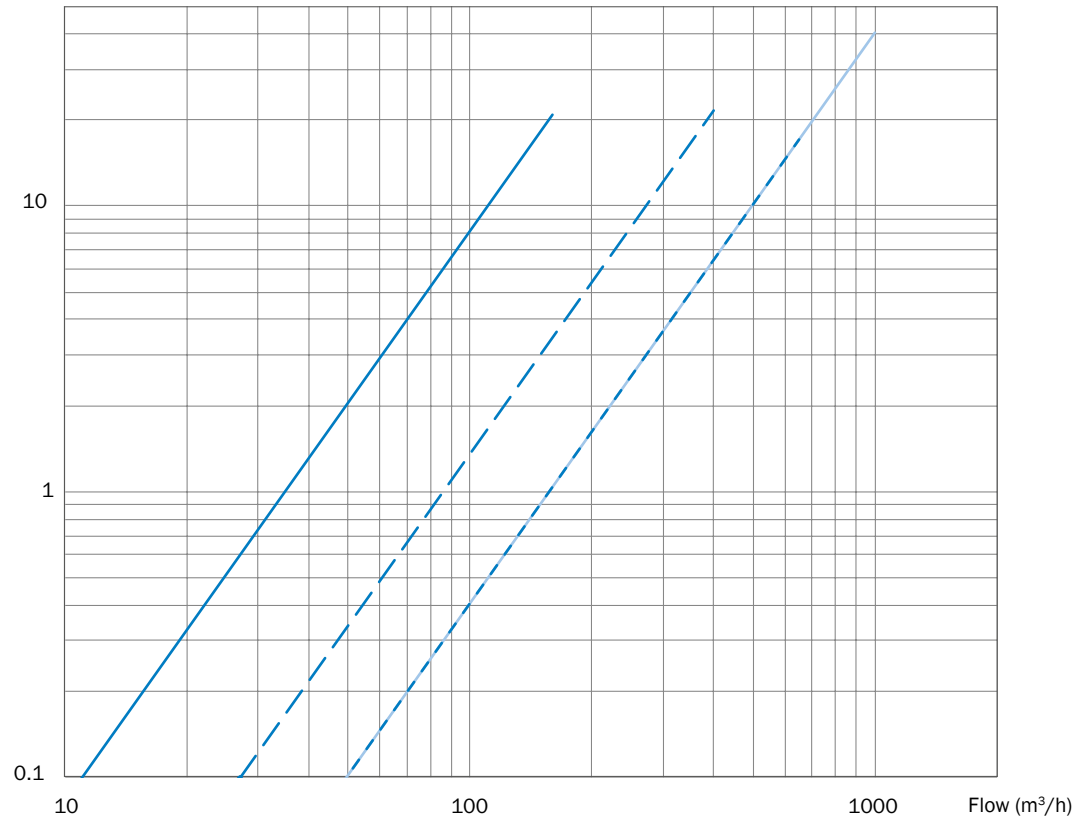


Application ranges

Pressure loss

The FLOWSIC500 causes a typical pressure loss of:

$\Delta p_{\text{natural gas}}$ [mBar]



Nominal size

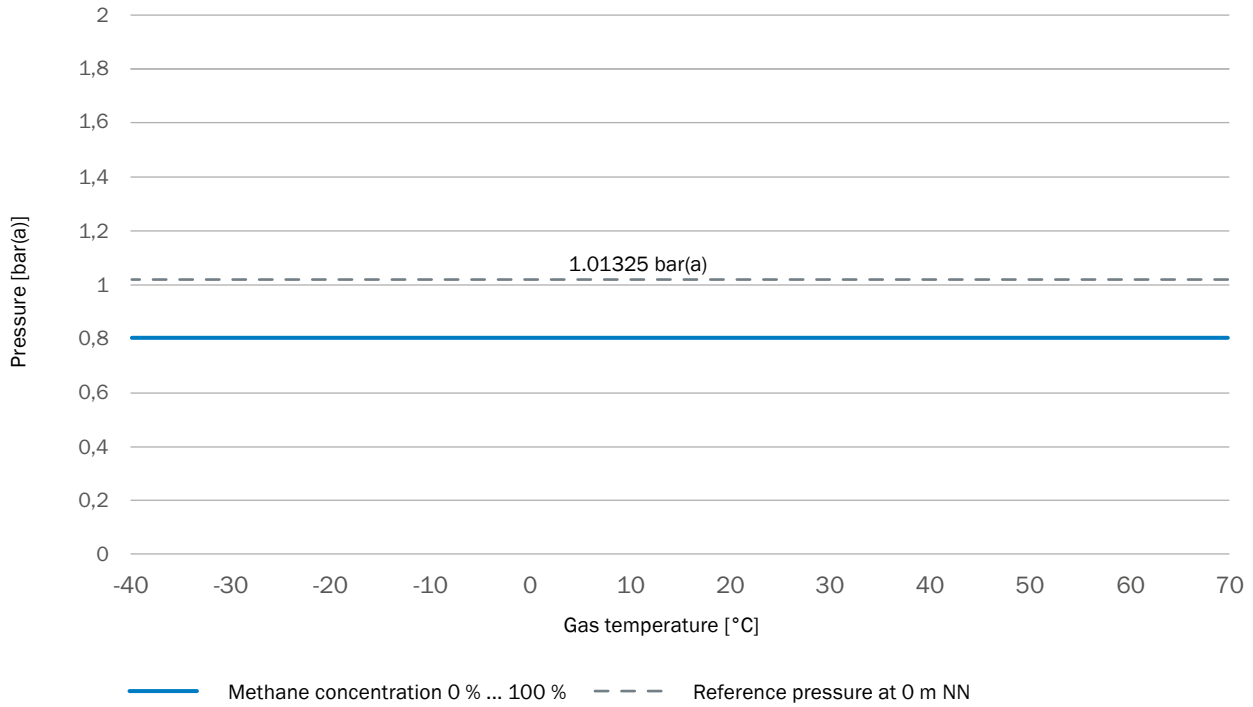
— DN50 - - - DN100
- - - DN80 — DN150

Reference density natural gas: $\rho = 0.83 \text{ kg/m}^3$

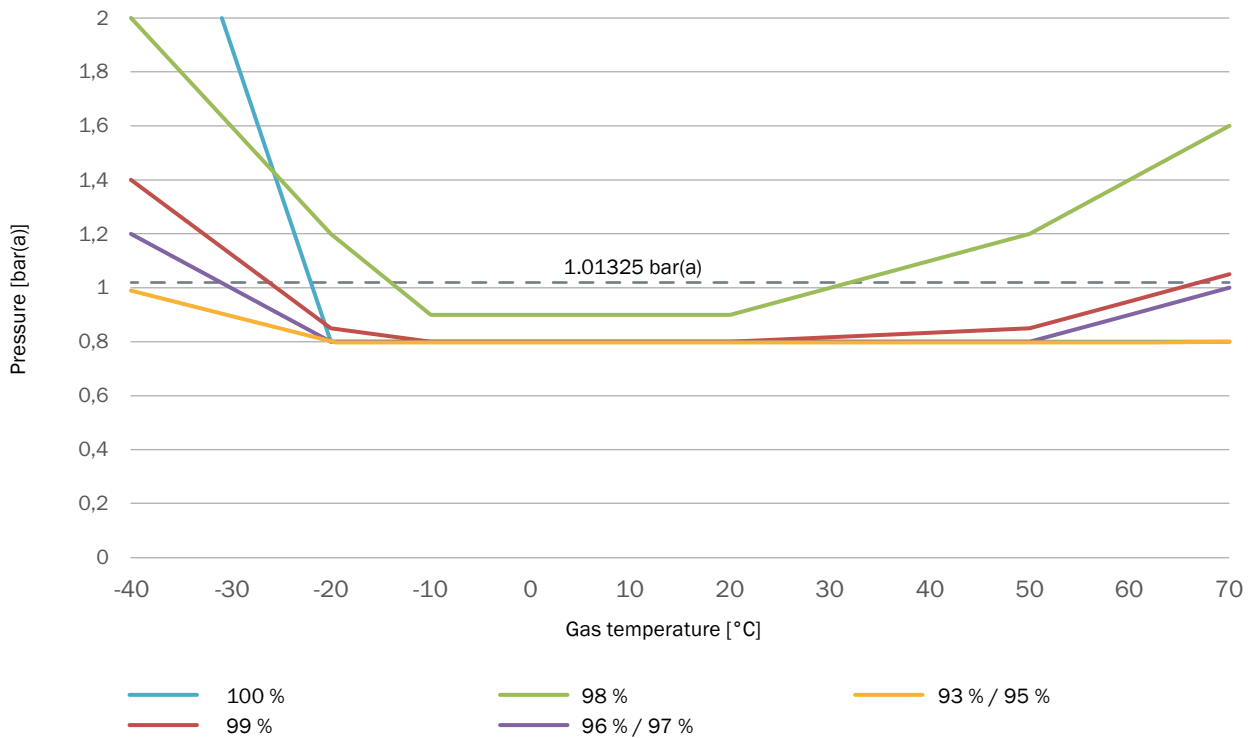
Methane concentration (CH₄) in natural gas

At very high methane concentrations, the FLOWSIC500 requires a minimum operating pressure for meter size DN80 up to DN150. Methane has a damping effect on the signal transmission.

Meter size DN50



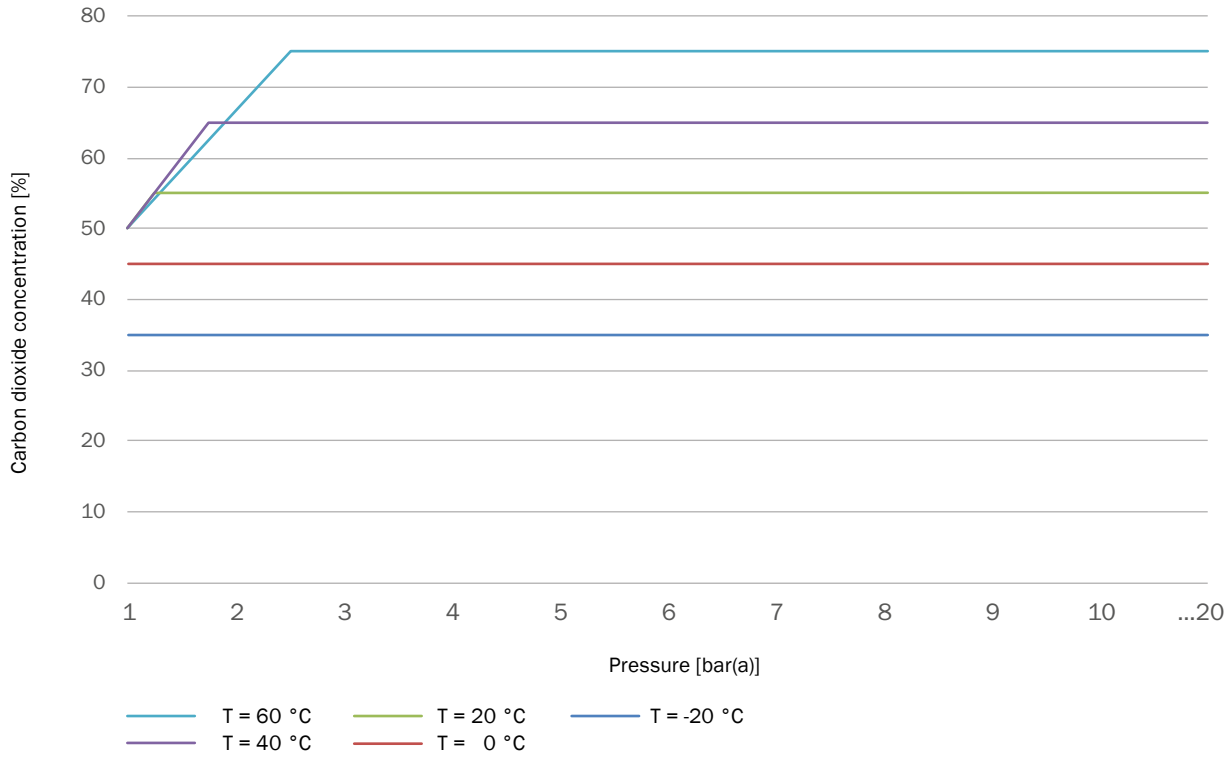
Meter size DN80 / DN100 / DN150



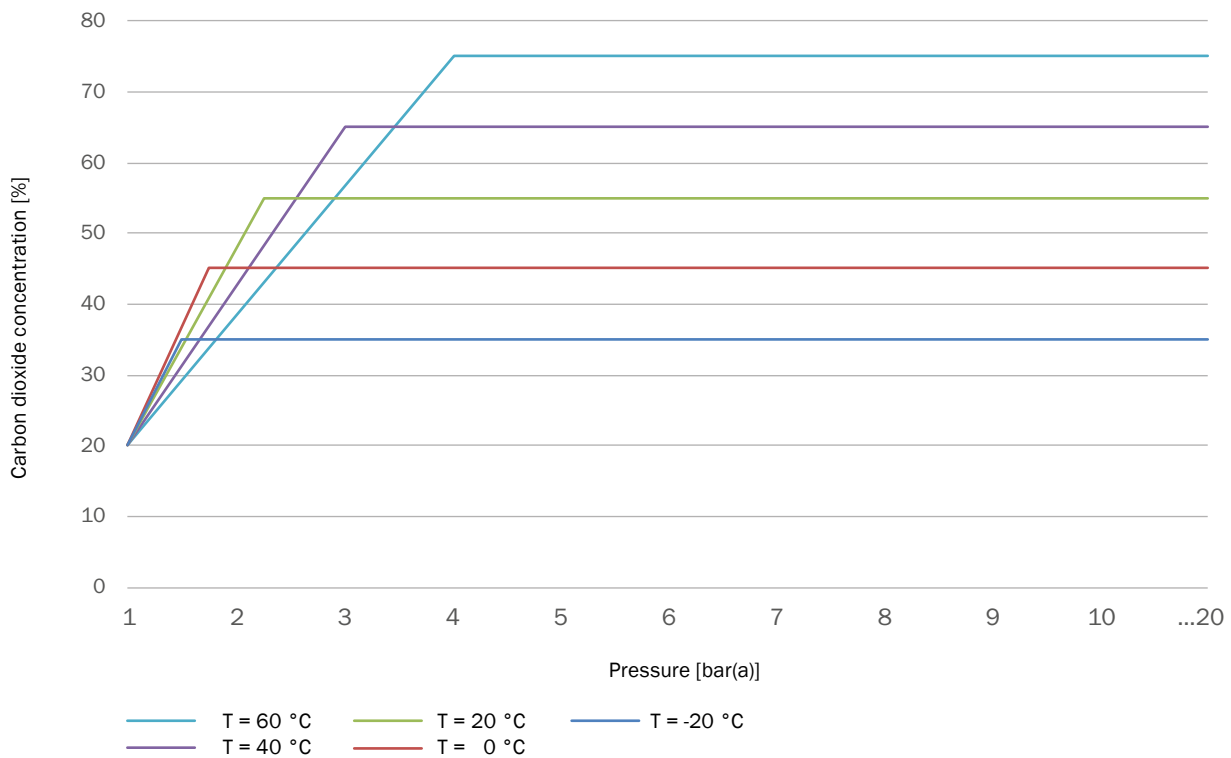
Carbon dioxide concentration (CO₂) in natural gas

The measuring capability of the FLOWSIC500 is limited by a maximum carbon dioxide concentration.

Meter size DN50

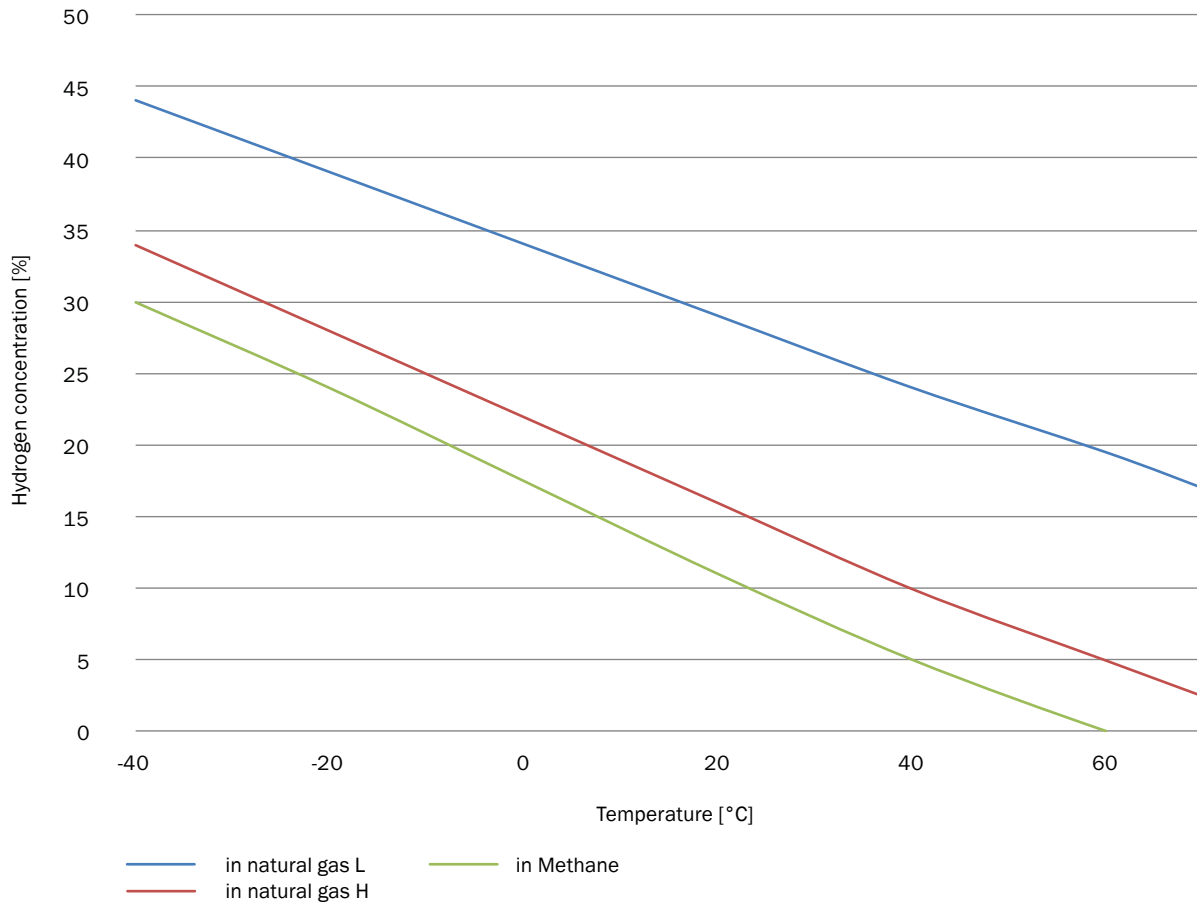


Meter size DN80 / DN100 / DN150



Hydrogen concentration (H2) in natural gas

Depending on the type of natural gas, the measuring capability is limited to a maximum hydrogen concentration. This diagram applies to all meter sizes.



Speed of sound

The speed of sound of the measured gas needs to be in a range of **300 m/s to 480 m/s**.

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- ✔ Use the direct order to quickly order a big amount of products.
- ✔ Check the status of your orders and quotes and get information on status changes by e-mail.
- ✔ Save time by using past orders.
- ✔ Easily export orders and quotes, suited to your systems.



SERVICES FOR MACHINES AND PLANTS: SICK LifeTime Services

Our comprehensive and versatile LifeTime Services are the perfect addition to the comprehensive range of products from SICK. The services range from product-independent consulting to traditional product services.



- 
Consulting and design
 Safe and professional
- 
Product and system support
 Reliable, fast, and on-site
- 
Verification and optimization
 Safe and regularly inspected
- 
Upgrade and retrofits
 Easy, safe, and economical
- 
Training and education
 Practical, focused, and professional

SICK AT A GLANCE

SICK is a leading manufacturer of intelligent sensors and sensor solutions for industrial applications. With more than 10,000 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