



# FLOWSIC500

CUSTODY TRANSFER MEASUREMENT IN NATURAL GAS DISTRIBUTION

Gas flow meters

**SICK**  
Sensor Intelligence.



## ULTIMATE MEASUREMENT CERTAINTY. FOR MUNICIPAL GAS SUPPLIERS AND INDUSTRIAL CONSUMERS

Local authorities purchase natural gas and sell it to users such as power stations, primary industries, and other industrial consumers. Because considerable volumes of gas are involved, the input and output measurement should be precise, but above all, reliable in the long term. Conventional mechanical gas meters are very difficult to monitor. On top of that, they require costly maintenance and are not as easy to handle. Now, the FLOWSIC500, the world's first ultrasonic gas meter for the natural gas distribution market, changes all that. FLOWSIC500 comes from SICK, one of the leading German sensor specialists.

### High level of measurement certainty

FLAWSIC500 measures the gas flow with ultrasonic technology. It operates with no mechanical moving parts, and is not liable to wear. This provides stable measurement certainty in the long term. SICK developed ultrasonic transducers especially for the FLOW5IC500, which are not sensitive to interferences. FLOW5IC500: ideal for fiscal metering.

### Compact design

FLAWSIC500 operates without straight inlet or outlet piping requirements. It can be equipped with an integrated volume corrector. Thus, the FLOW5IC500 requires considerably less space than conventional gas meters.

### Insensitive to overload

FLAWSIC500 does not get harmed by overloading. It processes dynamic load changes without any loss in accuracy.

### Increased measurement reliability

FLAWSIC500 is self-monitoring, in the event of an issue, such as change in electronics performance or contamination, the meter will generate an alarm. This means that there is no need for maintenance on a timed basis – resulting in a reduced cost of ownership.

### Suitable for demanding applications

With the FLOW5IC500, no part of the measurement device interferes with the gas flow. Therefore, it can be used in applications where a continuous gas supply is vital, for example in hospitals.

### Exact replacement fitting

FLAWSIC500 is designed to mount easily where a conventional gas meter has been in place.

### Easy handling

FLAWSIC500 is more straightforward than conventional gas meters. Due to its exceptional design, the recalibration procedure on-site is much easier and quicker. The measuring components are installed in a cartridge, which is replaced in only a few steps.

### Power supply: No problem

FLAWSIC500 measures fail-safe in intrinsically safe line powered operation with battery back-up. Alternatively, the meter operates by battery as an energy self-sufficient configuration for a period of at least five years.

### Approved worldwide

FLAWSIC500 complies with all relevant standards and regulations for natural gas distribution. This also includes the international requirements for explosion-proof areas.

## FLAWSIC500



Meter size: 50 mm (2")



Meter size: 80 mm (3")



Meter size: 100 mm (4")



Meter size: 150 mm (6")

- FLOW5IC500 is available in four meter sizes, all fitting to the common flange-to-flange dimensions used in natural gas distribution: DN50, DN80, DN100 and DN150 (2", 3", 4" and 6").
- 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 FLOW5IC500 via an optical interface.

# A GAS METER AND VOLUME CORRECTOR IN ONE – SIMPLE, CONVENIENT, RELIABLE. MORE THAN JUST ONE OPTION.

Why use two devices for one task? Gas flow measurement and volume correction have the same goal: providing a precise measurement of the quantity of gas supplied. It makes sense to combine both into one device 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.

## Volume correction in line with MID

The volume corrector can be integrated into the FLOWSIC500 on request and supports all typical correction algorithms, such as SGERG88, AGA 8, and AGA NX-19. There is the option of TZ or pTZ correction, with the pTZ version approved in accordance with MID. The right temperature and pressure sensors always come with the meter.

## Redefining user-friendliness

The FLOWSIC500 operating display offers full access to all settings and measured values of the FLOWSIC500. However, it is the FLOWgate500 software that makes this device really stand out. Using simple step-by-step instructions, it guides the operator through the key functions, so commissioning or cartridge replacement during recalibration couldn't be easier.

## Simple installation

Just attach and connect. That's how easy it is to install the FLOWSIC500. With the integrated volume corrector and the internal pressure and temperature sensors, only the signal for the standard flow needs to be led through the system. There is no need for the usual process of connecting the gas meter to the volume corrector.

## Everything from a single source

Featuring a gas meter, volume correction, and pressure and temperature sensors all in one, the FLOWSIC500 offers everything you need, making integration simple and keeping installation costs low. SICK is your ideal partner for any application.

### FLAWSIC500 variant overview

#### Simply an outstanding gas meter

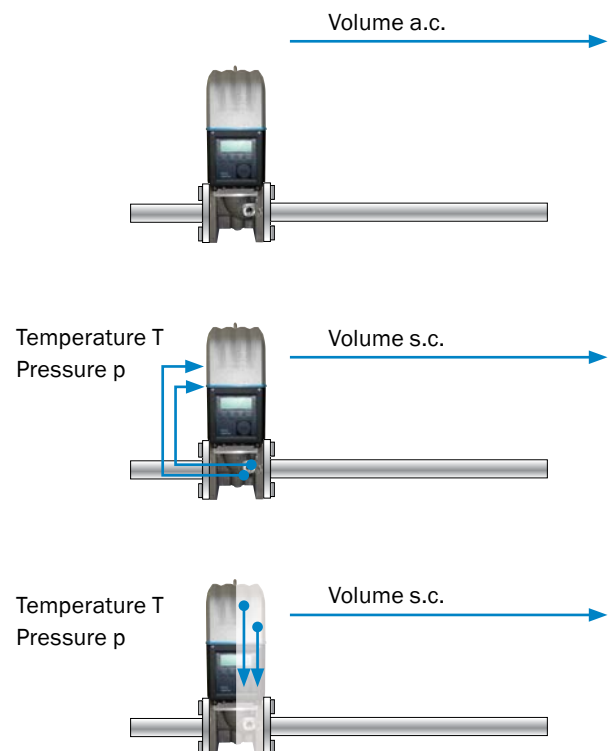
- Simple installation in the pipeline
- Connection to all standard volume correctors via LF, HF, encoder, or RS-485 output

#### Gas meter with volume corrector and external p/T sensor technology

- Minimal installation costs
- The meter is preconfigured in line with the p/T sensor technology supplied with it
- Easy access to the p/T sensors for operating point tests
- Option of using the p/T tappings on the meter for connecting the sensors

#### Gas meter with volume corrector and internal p/T sensor technology

- Maximum convenience during installation
- Integrated sensor technology for p/T fully pre-configured
- Just install, connect the signal output, and you're done





FLOWgate500 installation

## Never lose anything – comprehensive data archive and log books



### Monthly archive

- Monthly actual, minimum, maximum, and  $\emptyset$  values
- Up to 25 entries



### Daily archive

- Daily actual values
- Up to 600 entries



### Measurement period archive

- Adjustable measuring period between 5 and 60 min
- Up to 6,000 entries



### Event log book

- All events have time stamps
- Up to 1,000 entries



### Parameter log book

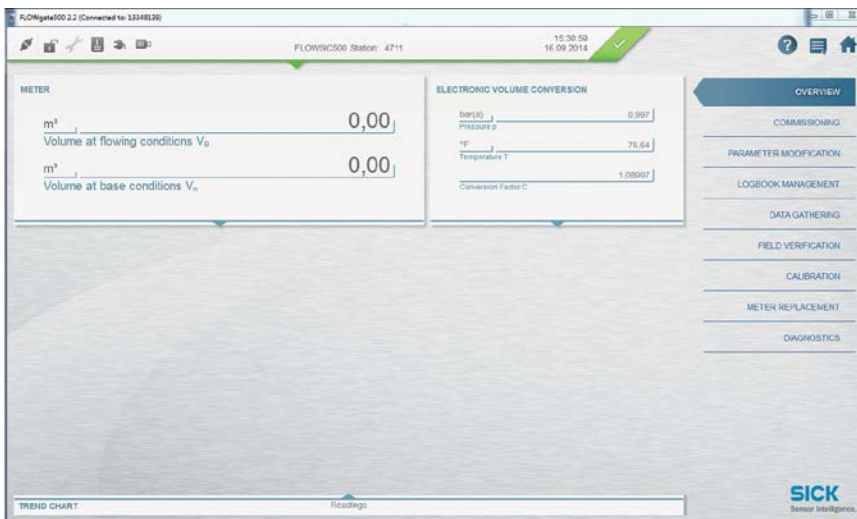
- All parameter changes are recorded
- Up to 250 entries



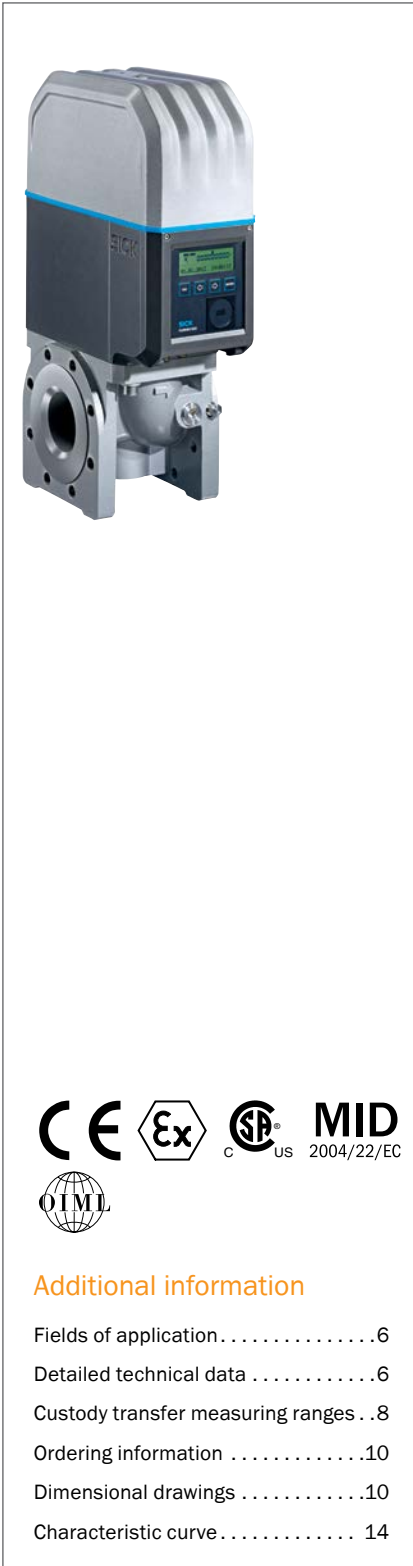
### Metrology log book

- Recording of all calibration-related changes
- Up to 100 entries

## A software application worthy of the name – FLOWgate500



# CUSTODY TRANSFER MEASUREMENT IN NATURAL GAS DISTRIBUTION



### Additional information

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### Product description

The cutting-edge technology for natural gas measurement:  
 The new FLOWSIC500 ultrasonic compact gas meter from SICK 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.

### At a glance

- Cutting-edge technology: ultrasound
- Diagnostics and permanent operational check
- Durable and reliable without moving parts
- Replacable cartridge
- Straight inlet/outlet piping not required
- Overload-proof
- Optional integrated volume correction/data registration
- Battery or intrinsically safe power supply

### Your benefits

- Ultimate measurement certainty and safety of continuous gas supply
- Reduction of installation costs due to integrated volume correction
- Simple installation, compatible with conventional technologies (turbine and rotary displacement meters)
- Minimal operating costs due to being nearly maintenance-free
- Easy recalibration due to straightforward cartridge replacement
- Reliable under dynamic load changes
- Self-sufficient operation

Recalibration is simple and straightforward by replacing the cartridge. FLOWSIC500 can easily be integrated into existing measuring stations. The FLOWSIC500 operates either in an energy self-sufficient configuration or failsafe in network operation with battery backup. It complies with all relevant standards and regulations. When utilized in transfer and measuring stations, FLOWSIC500 ensures a continuous and blockage free gas supply.

→ [www.mysick.com/en/FLAWSIC500](http://www.mysick.com/en/FLAWSIC500)

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 in transfer and measuring stations for municipal and regional gas suppliers
- Applications where continuous gas supply must be ensured
- Measuring stations in industrial and commercial applications

## 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.

### System

<b>Measured values</b>	Volume a.c., volume flow a.c., gas velocity In addition, for integrated volume correction: volume s.c., volume flow s.c.								
<b>Measurement principle</b>	Ultrasonic transit time difference measurement								
<b>Measuring medium</b>	Natural gas (dry, odorized)								
<b>Measuring ranges</b>	<table> <tr> <td>Volume flow, a. c., DN 50 (2")</td> <td>1.0 ... 160 m<sup>3</sup>/h</td> </tr> <tr> <td>Volume flow, a. c., DN 80 (3")</td> <td>2.5 ... 400 m<sup>3</sup>/h</td> </tr> <tr> <td>Volume flow, a. c., DN 100 (4")</td> <td>4.0 ... 650 m<sup>3</sup>/h</td> </tr> <tr> <td>Volume flow, a. c., DN 150 (6")</td> <td>4.0 ... 1,000 m<sup>3</sup>/h</td> </tr> </table>	Volume flow, a. c., DN 50 (2")	1.0 ... 160 m <sup>3</sup> /h	Volume flow, a. c., DN 80 (3")	2.5 ... 400 m <sup>3</sup> /h	Volume flow, a. c., DN 100 (4")	4.0 ... 650 m <sup>3</sup> /h	Volume flow, a. c., DN 150 (6")	4.0 ... 1,000 m <sup>3</sup> /h
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Volume flow, a. c., DN 150 (6")	4.0 ... 1,000 m <sup>3</sup> /h								
<b>Reproducibility</b>	≤ 0.1 %								
<b>Accuracy</b>	<p>Accuracy class 1, typical error limits:</p> <table> <tr> <td><math>Q_{min}</math> up to <math>0.1 Q_{max}</math></td> <td>≤ ± 1 %</td> </tr> <tr> <td><math>0.1 Q_{max}</math> up to <math>Q_{max}</math></td> <td>≤ ± 0.5 %</td> </tr> </table> <p>Accuracy class 1, maximum allowed error limits:</p> <table> <tr> <td><math>Q_{min}</math> up to <math>0.1 Q_{max}</math></td> <td>≤ ± 2 %</td> </tr> <tr> <td><math>0.1 Q_{max}</math> up to <math>Q_{max}</math></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 %
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$Q_{min}$ up to $0.1 Q_{max}$	≤ ± 2 %								
$0.1 Q_{max}$ up to $Q_{max}$	≤ ± 1 %								
<b>Diagnostics functions</b>	Permanent monitoring of measured values								
<b>Gas temperature</b>	<table> <tr> <td></td> <td>-25 °C ... +60 °C</td> </tr> <tr> <td>Optional:</td> <td>-40 °C ... +70 °C</td> </tr> </table>		-25 °C ... +60 °C	Optional:	-40 °C ... +70 °C				
	-25 °C ... +60 °C								
Optional:	-40 °C ... +70 °C								
<b>Operating pressure</b>	<table> <tr> <td>PN16 (EN 1092-1):</td> <td>0 bar (g) ... 16 bar (g)</td> </tr> <tr> <td>Class 150 (ASME B16.5):</td> <td>0 bar (g) ... 20 bar (g)</td> </tr> </table>	PN16 (EN 1092-1):	0 bar (g) ... 16 bar (g)	Class 150 (ASME B16.5):	0 bar (g) ... 20 bar (g)				
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Class 150 (ASME B16.5):	0 bar (g) ... 20 bar (g)								
<b>Ambient temperature</b>	<table> <tr> <td></td> <td>-25 °C ... +60 °C</td> </tr> <tr> <td>Optional:</td> <td>-40 °C ... +70 °C</td> </tr> </table>		-25 °C ... +60 °C	Optional:	-40 °C ... +70 °C				
	-25 °C ... +60 °C								
Optional:	-40 °C ... +70 °C								
<b>Storage temperature</b>	-40 °C ... +80 °C								
<b>Conformities</b>	<p>2004/22/EC MI-002 OIML R137 1&amp;2, 2012 EN 12405 : 2010 (with integrated volume correction)</p>								
<b>Ex-approvals</b>	<table> <tr> <td>IECEX</td> <td>Ex ia [ia] IIB T4 Gb</td> </tr> <tr> <td>ATEX</td> <td>II 2G Ex ia [ia] IIB T4 Gb</td> </tr> <tr> <td>NEC/CEC (US/CA)</td> <td>CSA: I.S. for Class 1 Division 1 Groups C &amp; D T4; Ex/AEx ia IIB T4 Ga</td> </tr> </table>	IECEX	Ex ia [ia] IIB T4 Gb	ATEX	II 2G Ex ia [ia] IIB T4 Gb	NEC/CEC (US/CA)	CSA: I.S. for Class 1 Division 1 Groups C & D T4; Ex/AEx ia IIB T4 Ga		
IECEX	Ex ia [ia] IIB T4 Gb								
ATEX	II 2G Ex ia [ia] IIB T4 Gb								
NEC/CEC (US/CA)	CSA: I.S. for Class 1 Division 1 Groups C & D T4; Ex/AEx ia IIB T4 Ga								
<b>Enclosure rating</b>	IP 66								

<b>Digital outputs</b>	3 Open collector outputs: not electrically isolated, $f_{max} = 10$ Hz or 1 output: in accordance with EN 60947-5-6 (NAMUR), $f_{max} = 2$ kHz, optically isolated
<b>Interfaces</b>	RS-485, alternative to the digital output (externally powered) Optical interface (according to IEC 62056-21)
<b>Dimensions (W x H x D)</b>	See dimensional drawings
<b>Weight</b>	See dimensional drawings
<b>Material in contact with media</b>	Aluminum AC-42100-S-T6
<b>Mounting</b>	Horizontal or vertical installation with 0 D straight inlet/outlet piping
<b>Electrical connection</b>	Voltage Intrinsically safe supply: 4.5 ... 16 V DC Inclusive 3-months back-up battery
<b>Options</b>	

### Volume correction

<b>Accuracy</b>	Accuracy class 0.5; Maximum allowed error limits: Correction factor C: $\leq \pm 0.5$ % (at reference conditions)
<b>Correction method</b>	pTZ or TZ
<b>Compressibility</b>	SGERG88 AGA 8 Gross method 1 AGA 8 Gross method 2 AGA NX-19 AGA NX-19 mod. Fixed value
<b>Data archives</b>	Measurement period archive (6,000 entries) Daily archive (600 entries) Monthly archive (25 entries)
<b>Log books</b>	<ul style="list-style-type: none"> <li>• Event log book (1,000 entries)</li> <li>• Parameter log book (250 entries)</li> <li>• Metrology log book (100 entries)</li> </ul>

### Pressure sensor

<b>Measuring ranges</b>	Absolute pressure 0.8 ... 5.2 bar (a) / 2 ... 10 bar (a) / 4 ... 20 bar (a) Relative pressure 0 ... 4 bar (g) / 0 ... 10 bar (g) / 0 ... 20 bar (g)

### Temperature sensor

<b>Measuring ranges</b>	Temperature -25 ... 60 bar (a) / -40 ... 70 bar (a)
<b>Sensor type</b>	Platinum resistance sensor Pt1000 in stainless steel protective tube
<b>Ambient temperature</b>	-40 °C ... +85°C

## Custody transfer measuring ranges

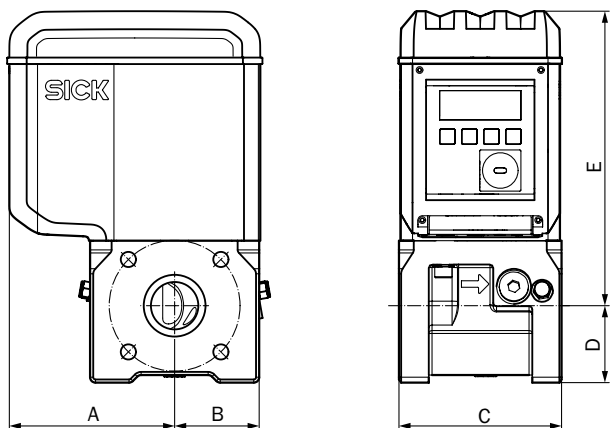
Nominal size	Meter size	Measuring range [m <sup>3</sup> /h]		Measuring span
		Min.	Max	
DN 50 (2")	G 40	1.3	65	1 : 50
	G 65	2.0	100	1 : 50
	G 100	3.2	160	1 : 50
	G 100	1.6	160	1 : 100
	G 100	1.0	160	1 : 160
DN 80 (3")	G 100	3.2	160	1 : 50
	G 160	5.0	250	1 : 50
	G 160	2.5	250	1 : 100
	G 250	8.0	400	1 : 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	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	650	1 : 50
	G 400	6.5	650	1 : 100
	G 400	4.0	650	1 : 160
	G 650	20	1,000	1 : 50
G 650	10	1,000	1 : 100	
G 650	6.2	1,000	1 : 160	
G 650	5.0	1,000	1 : 200	

**Ordering information**

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

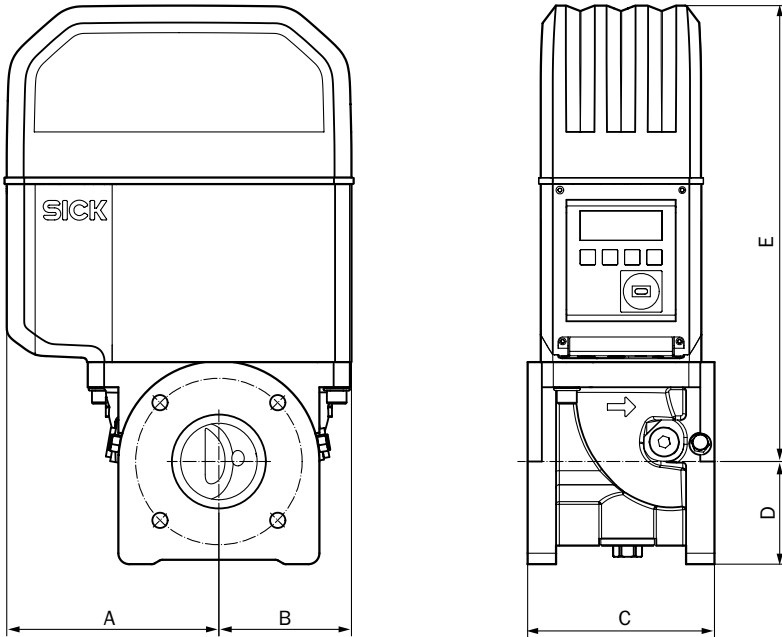
**Dimensional drawings** (Dimensions in mm (inch))

FLWSIC500, nominal size DN50



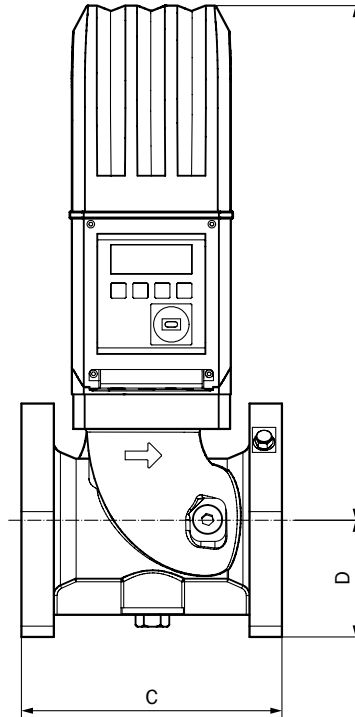
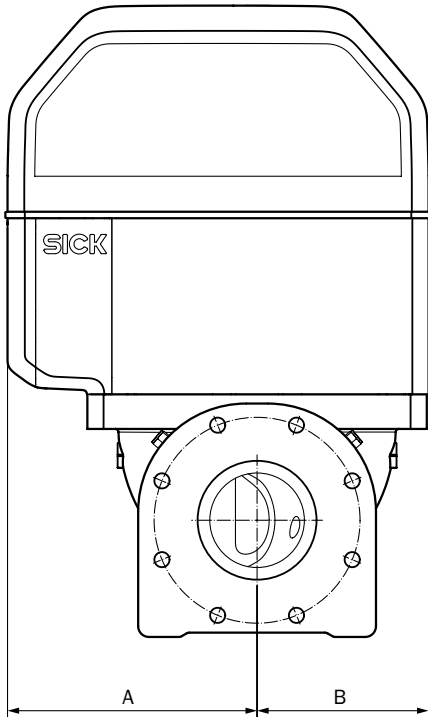
Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 50 (2")	10.6	153 (6.02)	78 (3.07)	150 (5.91)	71 (2.80)	272 (10.71)
				171 (6.73)		
<b>All dimensions in mm (inch). All weights in kg.</b>						

FLAWSIC500, nominal size DN80



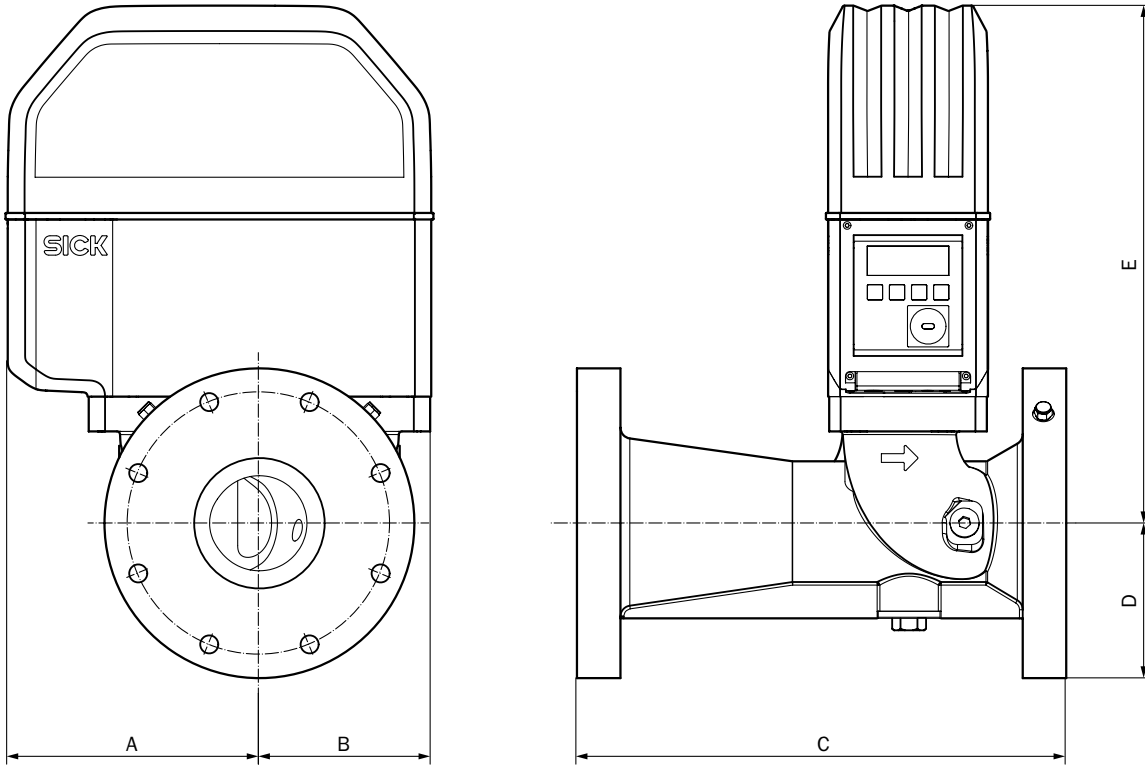
Nominal size	Weight	Dimensions				
		A	B	C	D	E
DN 80 (3")	18.3	194 (7.64)	121 (4.76)	171 (6.73)	94 (3.70)	417 (16.42)
	20.5			241 (9.49)		
<b>All dimensions in mm (inch). All weights in kg.</b>						

FLWSIC500, nominal size DN100



Nominal size	Weights	Dimensions				
		A	B	C	D	E
DN 100 (4")	27.2	231	159	241	108	476
	29.4	(9.09)	(6.26)	(9.49)		
All dimensions in mm (inch). All weights in kg. (300 (11.81))						

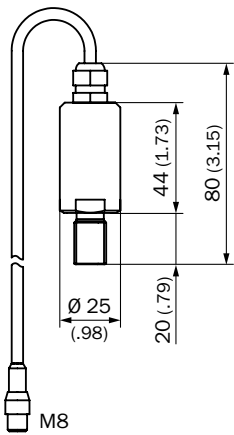
FLOWSIC500, nominal size DN150



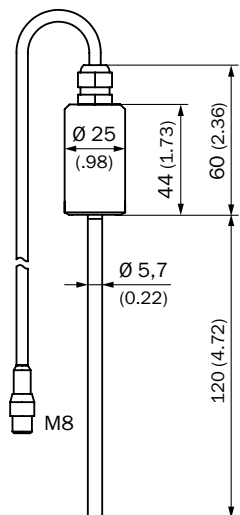
Nominal size	Weight	Dimensions				
		A	B	C	D	E
<b>DN 150 (6")</b>	35.0	232 (9.13)	158 (6.22)	450 (17.72)	143 (5.63)	476 (18.74)

**All dimensions in mm (inch). All weights in kg.**

Pressure sensor



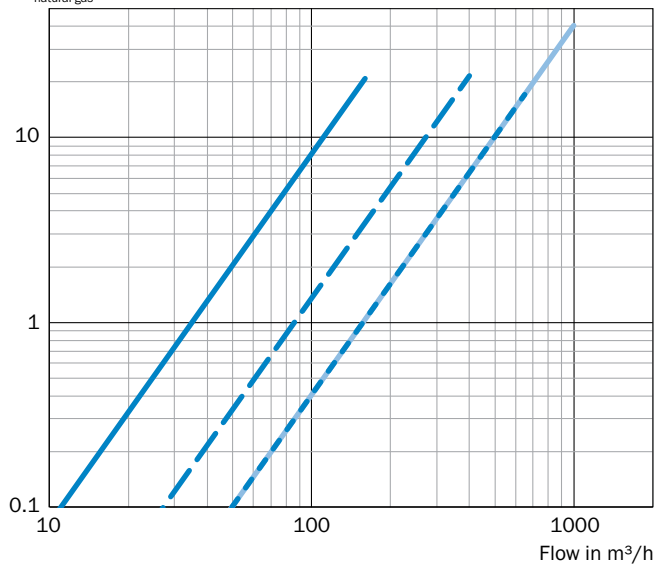
Temperature sensor



Characteristic curve

Pressure loss

$\Delta p_{\text{natural gas}}$  in mbar



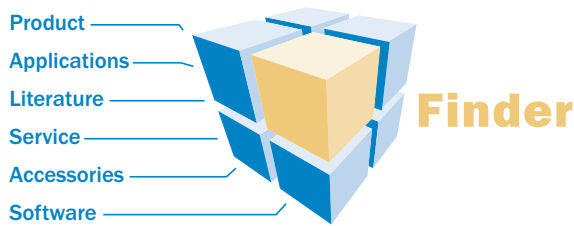
Nominal size

- DN50
- - - DN80
- · - · - DN100
- DN150

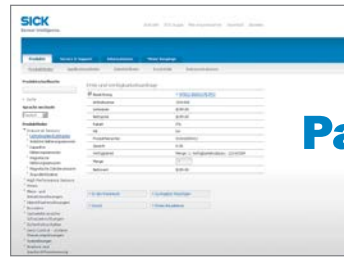
Reference density natural gas:  $\rho = 0.83 \text{ kg/m}^3$

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Efficiency – with the e-commerce tools from SICK



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**Applications Finder:** Select the application description on the basis of the challenge posed, industrial sector, or product group.

**Literature Finder:** Go directly to the operating instructions, technical information, and other literature on all aspects of products from SICK.

**Find out prices and availability:** Determine the price and possible delivery date of your desired product simply and quickly at any time.

**Request or view a quote:** You can have a quote generated online here. Every quote is confirmed to you via e-mail.

**Order online:** You can go through the ordering process in just a few steps.

These and other “Finders” at → [www.mysick.com](http://www.mysick.com)

## SERVICES FOR MACHINES AND SYSTEMS: 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 & Design**

Safe and professional



**Product & System Support**

Reliable, fast and on-site



**Verification & Optimization**

Safe and regularly inspected



**Upgrade & Retrofits**

Easy, safe, economical



**Training & 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 6,500 employees and over 50 subsidiaries and equity investments as well as numerous representative offices worldwide, we are always close to our 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.

We have extensive experience in various industries and understand their processes and requirements. With intelligent sensors, we can deliver exactly what our 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 us a reliable supplier and development partner.

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

**For us, that is “Sensor Intelligence.”**

### **Worldwide presence:**

Australia, Austria, Belgium/Luxembourg, Brazil, Czech Republic, Canada, China, Denmark, Finland, France, Germany, Great Britain, Hungary, India, Israel, Italy, Japan, Mexico, Netherlands, Norway, Poland, Romania, Russia, Singapore, Slovenia, South Africa, South Korea, Spain, Sweden, Switzerland, Taiwan, Turkey, United Arab Emirates, USA

Detailed addresses and additional representatives → [www.sick.com](http://www.sick.com)