



# FLOWSIC900

CUSTODY TRANSFER ULTRASONIC LNG METER

Flow meter

**SICK**  
Sensor Intelligence.

# ULTRASONIC TECHNOLOGY FOR THE CUSTODY TRANSFER MEASUREMENT OF LIQUEFIED NATURAL GAS

LNG has been driving global energy diversification for decades and is becoming increasingly important as a bridge fuel for reducing emissions in the mobility and energy sectors. Although the basic process of liquefaction, transportation, distribution, and regasification have long been established, operators still face technical, operational, and commercial challenges in LNG transactions. FLOWSIC900 is the result of many years of experience in the natural gas industry: a flow meter specially tailored to the requirements of the LNG industry that solves these challenges. FLOWSIC900 thus offers the necessary custody transfer measurement accuracy for volume flow measurement, which is approved according to metrological standards for the storage and loading of large quantities of LNG. FLOWSIC900 is also the right choice for LNG process measurement and keeps your process under control at all times.

**Everything from a single source:** Together with the proven FLOWSIC600-XT, FLOWSIC100 Flare-XT and Analyzer solutions, the FLOWSIC900 significantly increases measurement performance and reliability in LNG plants - a complete solution portfolio from a single source.





## WHY ULTRASONIC TECHNOLOGY?

Flow meters with ultrasonic technology are ideal for custody transfer flow measurement - both for gases and cryogenic liquids such as LNG:

- Highly accurate measurement in accordance with current metrological standards (OIML R117 / API MPMS Ch. 5.8)
- Real-time measurement of fluid quality fluctuations directly at the billing point
- Real-time measurement of the transferred LNG quantity (volume) directly at the billing point in the pipeline
- Large nominal diameter range (DN200 to DN900)
- High measuring span of  $\geq 1:25$
- Blockage-free, no pressure loss
- No mechanically moving parts, no pulsation



## FLAWSIC900: COMPREHENSIVE EXPERTISE INCLUDED

### Over 30 years of experience in ultrasonic flow measurement

Our ultrasonic gas meters have been used successfully at over 20,000 measuring points worldwide for more than 30 years. This also includes applications for gases with different hydrogen contents. This knowledge was incorporated into the development of the FLAWSIC900.

### Designed and tested to the highest metrological standards

State-of-the-art development methods such as CFD flow simulations are used in the development of the device design. This enables the design and measurement performance to be fine-tuned in the shortest possible development time, even before the first laboratory test. The result: conformity with the highest metrological standards - such as OIML R117 Cl. 0.3 and API MPMS Chapter 5.8.

### Easy access and maximum flexibility thanks to remote SPU

An advantage during commissioning or regular tests: Thanks to the remote SPU, the meter body can be installed exactly where the process and safety guidelines require. Depending on requirements, the SPU is mounted up to 15 ft away at an easily accessible point on the wall using a 2" pipe. The meter body can therefore be installed flexibly and independently of the SPU – even in hard-to-reach pipe sections.

Remote Signal Processing Unit

Real time and in-situ measurement and diagnostics

Compact meter design without junction boxes

Factory thermal pre-insulation



### No pressure loss by full-bore design and no need for flow conditioner

The constriction-free full-bore design of the FLOWSIC900 and the absence of flow conditioners virtually eliminate the pressure loss in the metering line. This means: less boil-off gas, higher flow velocities, less pump energy and ultimately a more efficient LNG transfer.

### Compact design without separate connection units

Flexible system design, simple installation, low space requirement: the intrinsically safe transducer design means that the cabling between the ultrasonic transducer and the SPU is free and without separate connection units. This means that no additional installation space needs to be planned above or below the meter and the meter fits almost seamlessly into the pipework.

### Factory thermal pre-insulation

In order to achieve low measurement uncertainty and minimize boil-off gas losses, thermal insulation of the LNG pipelines is essential. The FLOWSIC900 is thermally pre-insulated ex works, and can also be ordered with optional metal jacketing: This reduces the effort required for insulation in the field to a minimum.



FLAWSIC900 with 4 paths as standard version



FLAWSIC900 Forte with 8 paths for compact installations

### No active electronic components within the insulation

In order to reduce the probability of failure and therefore maintenance and service to a minimum, only passive, intrinsically safe components are used in the ultrasonic transducers of the FLOWSIC900. In addition, the cables are pre-routed within the insulation, robustly connected to each other and protected against mechanical influences.

## FLAWSIC900: SIMPLE INTEGRATION, INTELLIGENT DIAGNOSTICS

### Bluetooth® or wired: always well connected

In addition to the standardized interfaces for data communication, FLAWSIC900 is equipped with a dedicated commissioning and service interface: Equipped with the Bluetooth®-compatible adapter, wireless connections of up to 100 ft are possible with Bluetooth®-enabled end devices. Additional device-specific adapters are not required. Alternatively, a wired adapter with USB-C interface is also available.

### Guided commissioning and inspection via FLOWgate™

FLOWgate™ enables on-line or off-line access to the FLAWSIC900 and therefore to all measured value and diagnostic data at any time via computer or mobile devices. Various assistance functions, such as the guided commissioning wizard, make operating the device much easier. This minimizes the time, complexity, and therefore the effort involved in commissioning the device. The quick status provides immediate information on the current status of the meter and the system.

### Everything in view

Depending on the variant, the FLAWSIC900 comes with a fully integrated display for clear indication of the relevant measurement and diagnostic data as well as metrological data for regular maintenance and inspection. If necessary, the display can be easily replaced as it is a separate module.



## PROCESS AND ASSET MONITORING

### Real-time monitoring of process and measurement conditions

With modern diagnostics features like:

- monitoring fluid quality via speed of sound,
- plausibility check of individual path values,

the indication of process changes as e.g. sudden fluid quality changes or partially closed valves gets possible. That allows switching from time- to event-triggered process interactions like gas sampling or piping inspections. These features help operators to keep their processes under control at all times.

### High measurement availability by path compensation

In the unlikely event that process conditions cause malfunction of a single measurement path – FLOWsic900 keeps running inside uncertainty limits. With the path compensation feature, the measurement availability and therefore process stability are ensured. Inspection of the metering section can wait until the next regular plant maintenance.

### Easy Asset Monitoring by FLOWgate™ and Monitoring Box

All relevant measurement data, meter diagnostics, settings, and live sessions can be visualized and stored in standardized Flowgate™ reports and files. SICK Monitoring Box offers cloud based Dashboards, which visualize health status and process data from all your measurement tags and assets. This eases monitoring, trend diagnosis and troubleshooting of your asset – from the control room or from any standard web-browser, anywhere and anytime without need for field visit of the meter.



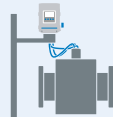
i-diagnostic



Easy meter value pages



FLOWsic600-XT



FLOWsic900



FLOWsic100 Flare-XT



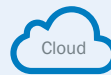
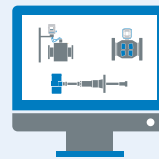
Real time monitoring in the cloud



Data analysis and trend prediction



All assets on one dashboard



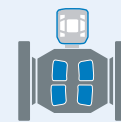
Cloud



Smart Service Gateway



FLOWsic900



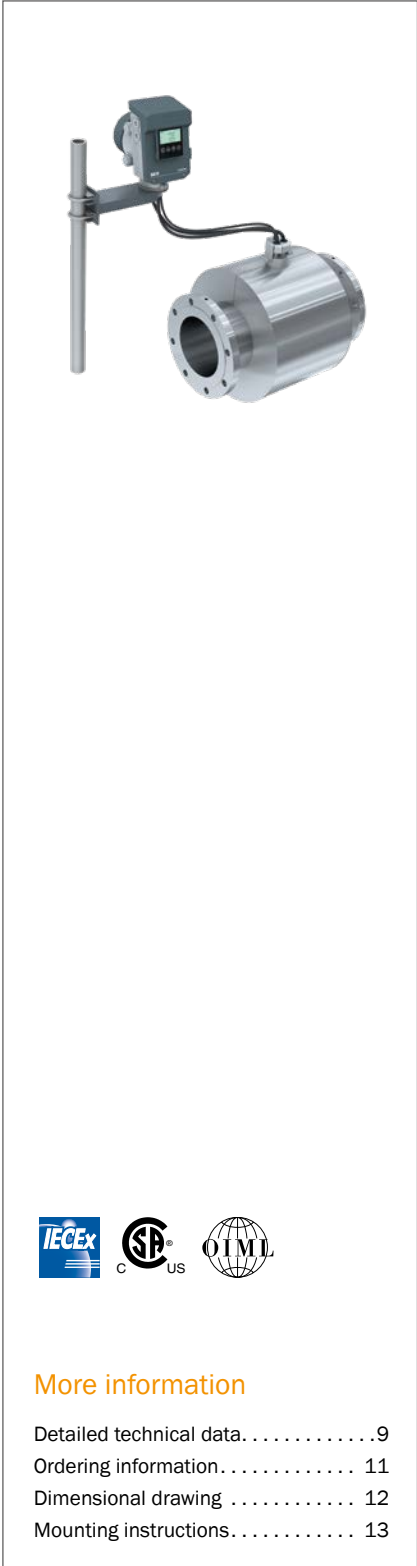
FLOWsic600-XT



FLOWsic100 Flare-XT



# CUSTODY TRANSFER ULTRASONIC LNG METER



## Product description

LNG drives energy diversification and reduces emissions in the mobility and energy sector. Plant operators however still face technical, operational, and commercial challenges during LNG transfer. FLOWSIC900 solves these challenges. It is the result of our many years of experience in natural gas measurement: A flow meter specially tailored to the needs of the LNG-industry.

FLOWSIC900 offers the required custody transfer accuracy for volume flow measurement and meets highest standards. FLOWSIC900 and the proven products FLOWSIC600-XT and FLOWSIC100 Flare-XT significantly increase measurement performance and reliability in LNG plants - a complete solution portfolio from a single source.

## At a glance

- Custody transfer ultrasonic liquid flow meter
- Conform to OIML R117 Cl. 0.3 and API MPMS Ch. 5.8
- Real time measurement and diagnostics
- Intrinsically safe and reliable ultrasonic transducers
- Full bore design without pressure drop or need for flow conditioner
- Compact meter design without junction boxes
- Factory thermal pre-insulation
- Remote Signal Processing Unit

## Your benefits

- Low measurement uncertainty directly at custody transfer point reducing financial risks during LNG-transaction
- Increased transparency during LNG-transaction by dynamic & real-time measurement & diagnostics
- Nearly maintenance-free due to intrinsically safe transducers from SICK with over 30 years ultrasonic expertise
- Operational expenditure savings by reduced boil-off gas losses and efficient LNG transfer due to minimized pressure drop
- Capital expenditure savings by simplified meter integration and installation due to compact design and factory pre-insulation
- Easy and fast access during commissioning and regular checks with remote SPU

## Fields of application

- Custody transfer measurement of LNG
- On- and offshore applications
- Liquefaction, transport, and storage of LNG
- Process measurement of LNG



## More information

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 Dimensional drawing . . . . . 12  
 Mounting instructions . . . . . 13

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

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.



## 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 for information about the performance of FLOWsic900 for your application.

### System

<b>Measured values</b>	Volume a.c., volumetric flow a.c., velocity of fluid, speed of sound
<b>Measuring principle</b>	Ultrasonic transit time difference measurement
<b>Measuring medium</b>	LNG (Liquified Natural Gas)
<b>Measuring ranges</b>	1.5 ft/s ... 43 ft/s
<b>Accuracy</b> <sup>1</sup> 4 path and 8 path design	Typical error limits $Q_{min} \dots Q_{max}$ ≤ ±0.2 % of reading After flow calibration with adjustment
<b>Repeatability</b>	≤ ±0.05 % of reading <sup>2</sup>
<b>Nominal pipe diameter</b>	8" ... 36" / DN200 ... DN900 Schedule 40S/STD acc. ASME B36.19 / B36.10 Others on request
<b>Design pressure</b>	0 psi(g) ... 275 psi(g) Others on request
<b>Design temperature</b>	-321 °F ... +140 °F
<b>Operating pressure</b>	0 psi(g) ... 275 psi(g) Others on request
<b>Operating temperature</b>	-321 °F ... +140 °F
<b>Ambient temperature</b>	-40 °F ... +140 °F For cCSAus: -22 °F ... +140 °F, -40 °F pending
<b>Storage temperature</b>	-40 °F ... +140 °F
<b>Flange type</b>	Class 150/300 acc. ASME B16.5/B16.47 PN16/40 acc. EN 1092-1 Raised Face Stock Finish Others on request
<b>Material</b>	
Meter body (wetted)	Stainless steel (316/316L / 1.4401/1.4404) Others on request
Ultrasonic transducers (wetted)	Titanium Grade 5
SPU housing	Aluminum (copper-free) <sup>3</sup>
<b>Ambient humidity</b>	≤ 100% relative humidity
<b>Direction of flow</b>	Unidirectional Bidirectional
<b>Electrical connection</b>	
Voltage	24 V DC +30% / -20%
Power consumption	≤5 W
Cable entries	4x M25x1,5 or 4x NPT 3/4" <sup>4</sup>
<b>Number of measurement paths</b>	4 / 8 (Forte)
<b>SPU mounting</b>	Mounted remotely from the meter body (5 m cable length)
<b>Coating</b>	
SPU housing	Coating system: C3, option: C5-M-H <sup>5</sup> acc. ISO 12944 Color: SICK standard Others on request
Meter body	Uncoated Coating on request
<b>Operation</b>	Commissioning and regular checks via FLOWgate™ Visualization of measured values via integrated Display <sup>6</sup> on SPU front cover

<b>I/O</b>	Process interfaces	2x RS485 Modbus RTU/ASCII 2x Digital Output 2x Frequency Output Others on request
	Commissioning and service	1x BLE (Bluetooth® Low Energy) or 1x USB via accessory adapter to SPU
<b>Ex approvals<sup>8</sup></b>	IECEX NEC/CEC (US/CA)	Ex db ia [ia Ga] IIA T4 Gb Class I, Division 2, Group D T4 Ex db ia [ia Ga] IIA T4 Gb Class I, Zone 1, AEx db ia [ia Ga] IIA T4 Gb
	NEC (US)	Class I, Division 1, Group D T4
<b>Protection class</b>		IP66/IP67 acc. to EN 60529 Nema Type 4X
<b>Compliance</b>	Metrological OIML <sup>8</sup>	R117 Class 0.3
	Explosion protection IECEX cCSA CSAus	IEC 60079 CSA C22.2 No. 60079, CSA C22.2 No. 61010-1 UL60079, UL 61010-1, FM3600, FM3610, FM3615
	Pressure safety ASME	B16.5/B16.47, B36.19/36.10
	Others API	MPMS Ch. 5.8
<b>Installation in the pipeline</b>		horizontal, vertical <sup>6</sup>
		<sup>1</sup> 1,0 % of measured value for process measurement without need for flow calibration <sup>2</sup> At reference conditions, fulfilling requirements of API MPMS Ch. 5.8, Table B.1 and OIML R 117-1 Cl. 0.3 <sup>3</sup> Aluminum EN AW-6082 or Aluminum EN AC-44300 with ≤ 0.1 % copper content, copper-free acc. API definition (API Recommended Practice 14FZ) <sup>4</sup> Depending on the device variant selected <sup>5</sup> CX pending <sup>6</sup> Depending on the device variant selected, this feature is available as an option. <sup>7</sup> See installation instructions in the operating instructions <sup>8</sup> Approvals pending

## Flowrates LNG-Meter FL900

Nominal diameter	$Q_{\min}$	$Q_{\max}$
	<b>m<sup>3</sup>/h</b>	<b>m<sup>3</sup>/h</b>
<b>8" / DN200</b>	2100	53000
<b>10" / DN250</b>	3200	81000
<b>12" / DN300</b>	4600	117000
<b>14" / DN350</b>	5700	145000
<b>16" / DN400</b>	7700	195000
<b>18" / DN450</b>	9900	247000
<b>20" / DN500</b>	12000	310000
<b>24" / DN600</b>	14800	452000
<b>26" / DN650</b>	15200	536000
<b>28" / DN700</b>	17600	621000
<b>30" / DN750</b>	20200	713000
<b>32" / DN800</b>	23000	812000
<b>36" / DN900</b>	29000	1020000

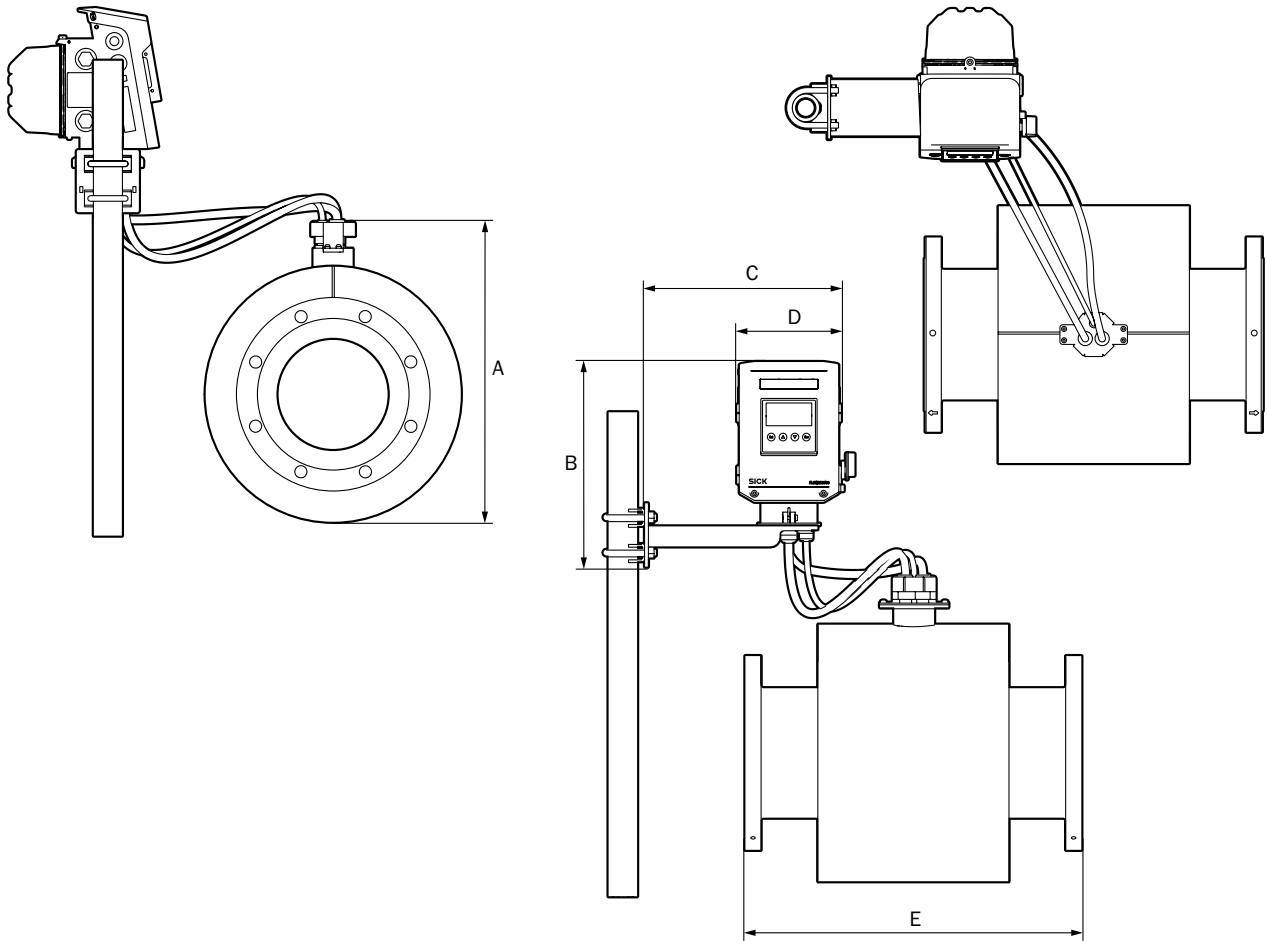
**Ordering Information**

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

Product features subject to change. Product availability upon request.

Dimensional drawings

FLAWSIC900 - Remote version



Nominal diameter	Weight	Dimensions				
		A	B	C	D	E
8" / DN200	320	21.7	14.1	14.5	9.0	23.6
10" / DN250	450	24.5				29.5
12" / DN300	870	24.5				35.4
14" / DN350	1100	25.6				41.3
16" / DN400	1210	28.3				29.9
18" / DN450	1290	29.5				32.2
20" / DN500	1550	31.5				35.4
24" / DN600	2200	35.8				38.9
26" / DN650	2500	37.8				41.3
28" / DN700	2760	39.8				43.3
30" / DN750	2980	41.7				45.2
32" / DN800	3220	43.3				47.2
36" / DN900	4140	46.5				49.2

**All dimensions in inch. All weights in lbs.**



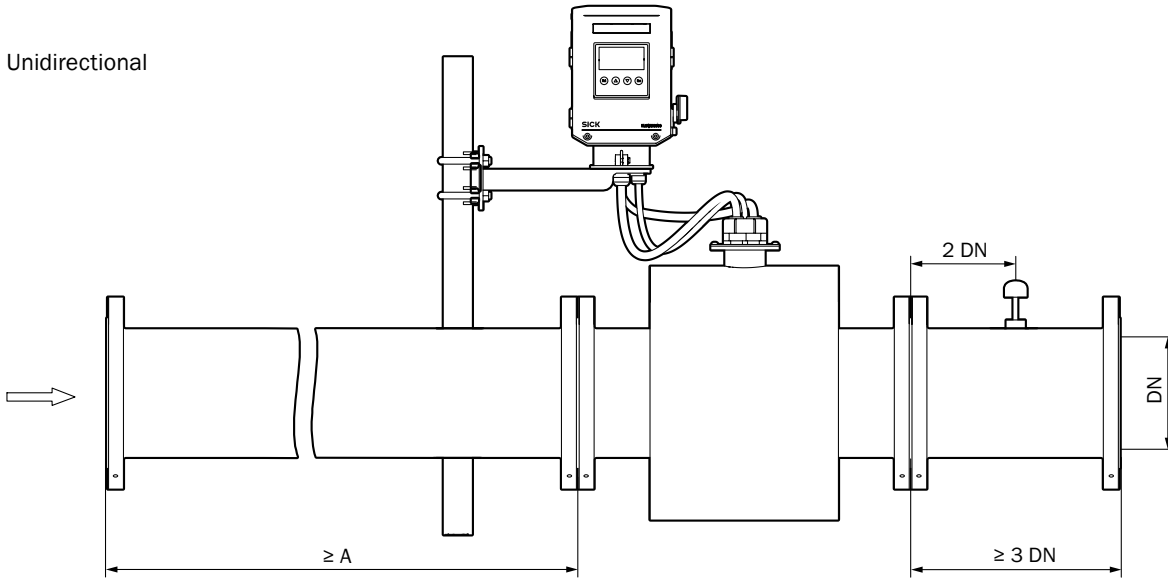
**Mounting instructions**

Installation of the FLOWIC900 in the pipeline for unidirectional and bidirectional use (minimum requirements)

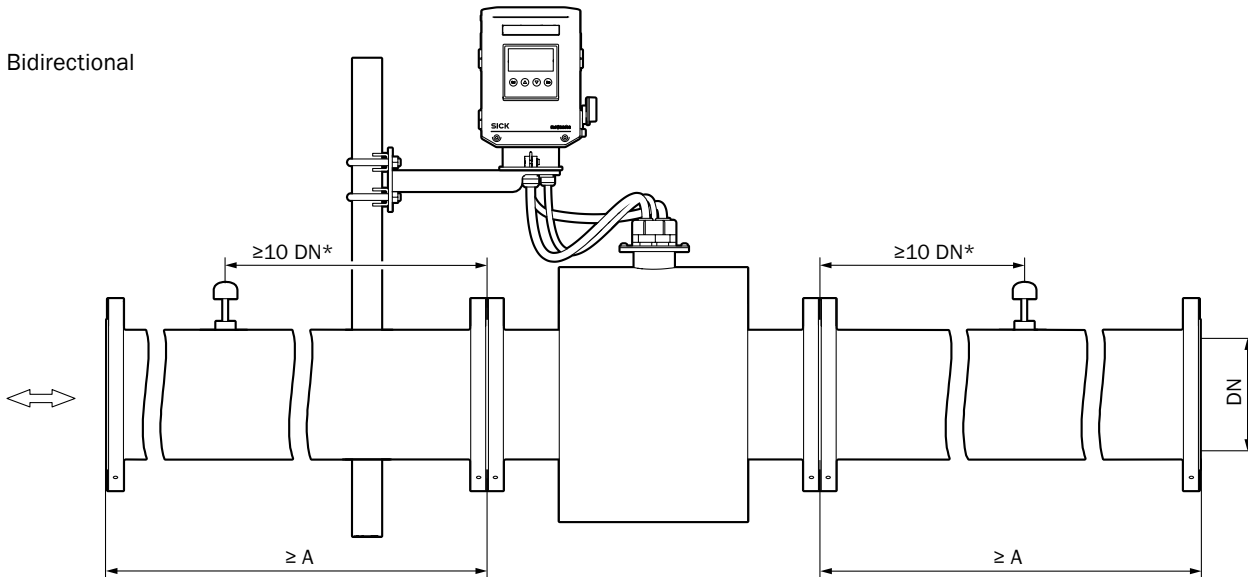
Number of measuring paths	OIML R117	A
4	Class 0.3	20 DN
8	Class 0.3	5 DN

FLAWSIC900 – Remote Version

Unidirectional



Bidirectional



\* Thermowell recommended to position downstream of mainly used flow direction



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# 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.



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Safe and professional



**Product and system support**  
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**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 11,900 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:

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