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PRODUCT INFORMATION

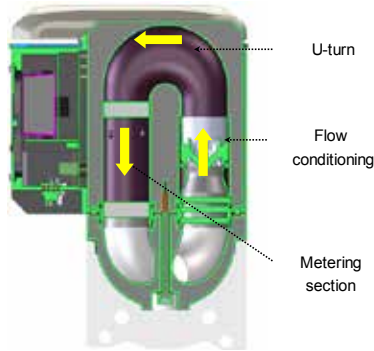
FLOWSIC500

Ultrasonic Gas Meter

Custody Transfer Measurement in
Natural Gas Distribution

SICK
Sensor Intelligence.

Custody transfer measurement
in natural gas distribution



Product description

The cutting-edge technology for ultimate measurement accuracy: the new ultrasonic compact gas meter FLOWSIC500 from SICK enables highly accurate measurement in natural gas distribution. Due to its lack of mechanical moving parts, the FLOWSIC500 is a rugged, dependable and low maintenance device – allowing for a significant reduction in operating costs. It is overload-proof, accurate and monitored by an intelligent diagnostics system. Recalibration is simple

and straightforward by replacing the cartridge. The FLOWSIC500 can easily be integrated into existing measuring stations. The FLOWSIC500 operates either on battery power or AC power 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.

At a glance

- Cutting edge ultrasonic technology
- Permanent diagnostics operational check
- Rugged and reliable without moving parts
- Replaceable 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 accuracy and assured continuous gas supply
- Reduction of installation costs due to integrated volume correction
- Simple installation, flange to flange dimensions compatible with conventional technology (turbine and rotary meters)
- Minimal operating costs due to being nearly maintenance-free
- Easy recalibration due to straightforward cartridge replacement
- Reliable under dynamic load changes

Application

- Natural gas distribution for the Local Distribution Companies (LDC) market
- Measuring stations in industrial and commercial applications.
- Applications where continuous gas supply must be ensured



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Local distribution companies purchase natural gas and sell it to users such as power stations and other industrial consumers. Because considerable volumes of gas are involved, the input and output measurement should be precise, but above all, reliable. Conventional mechanical gas meters can be difficult to monitor. On top of that, they may require costly maintenance and are not as easy to handle. The FLOWSIC500, the world's first ultrasonic gas meter for the natural gas distribution market, changes all that.

High level of measurement certainty

FLWSIC500 measures the gas flow with ultrasonic technology. It operates with no moving parts, and is not subject to wear. This provides stable measurement certainty over time. SICK developed ultrasonic transducers especially for the FLOWSIC500, which are not sensitive to typical USM interferences. FLOWSIC500: ideal for custody transfer in the LDC system.

Compact design

FLWSIC500 operates without straight inlet or outlet piping requirements. It can be equipped with an integrated volume corrector. Thus, the FLOWSIC500 requires considerably less space than conventional gas meters.

Insensitive to overload

FLWSIC500 is not harmed by overloading. It processes dynamic load changes without any loss in accuracy.

Increased measurement accuracy through self-diagnostics

The intelligent self-diagnostics immediately detects changes in measurement conditions that might prevent the gas meter from achieving the specified accuracy. FLOWSIC500 incorporates an early warning system that provides an unprecedented level of measurement accuracy and measurement certainty for natural gas distribution.

Suitable for demanding applications

With the FLOWSIC500, 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 sizing

FLWSIC500 is designed to mount easily where a conventional gas meter has been installed.

Easy handling

FLWSIC500 is more straightforward than conventional gas meters. Due to its design, the recalibration procedure on-site is much simpler and quicker. The measuring components are installed in a cartridge, easily replaced in only a few steps.

Power supply: No problem

The FLOWSIC500 can measure using an intrinsically safe AC power source with a battery backup. Alternatively, the meter can be operated by battery only for a period of more than five years.

Approved worldwide

FLWSIC500 complies with all relevant standards and regulations for natural gas distribution. This also includes the international requirements for hazardous locations.

FLWSIC500



Meter size 2" 5.5M285 (DN50)



Meter size 3" 14M285 (DN80)



Meter size 4" 23M285 (DN100)



Meter size 6" 35M285 (DN150)

- FLOWSIC500 is available in four meter sizes, all adhering to the common flange-to-flange dimensions used in natural gas distribution. The following meter sizes are available: 2", 3", 4" and 6" 5.5M285 (DN50), 14M285 (DN80), 23M285 (DN100) and 35M285 (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.
- 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 IrDA optical interface or RS-485 connection.

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.

Volume correction

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 TC or PTZ correction. 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 for easy commissioning or cartridge replacement during recalibration.

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 pulse output needs to be connected if required. There is no need for the usual process of connecting the gas meter to the volume corrector.

Everything from a single source

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. The entire system is monitored by the FLOWSIC500's integrated self-diagnostic system, which reports any deviations. SICK is your ideal partner for any application.

FLWSIC500 variant overview

Simply an outstanding gas meter

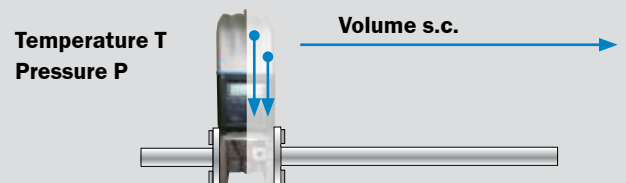
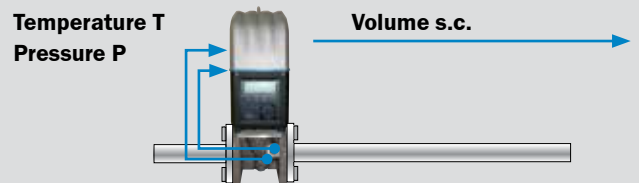
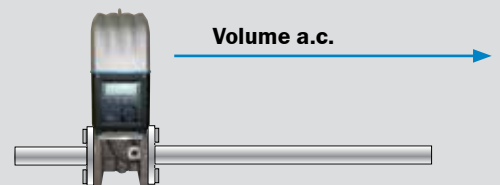
- Simple installation in the pipeline
- Connection to all standard volume correctors via LF, HF, encoder, or RS-485 output

Gas meter with volume corrector and external P/T sensor technology, the above benefits plus

- 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 calibration checks
- Option of using the P/T ports on the meter for connecting the sensors

Gas meter with volume corrector and internal P/T sensor technology, all the above benefits plus

- Maximum convenience during installation
- Integrated sensor technology for P/T fully pre-configured
- Just install and you're done





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

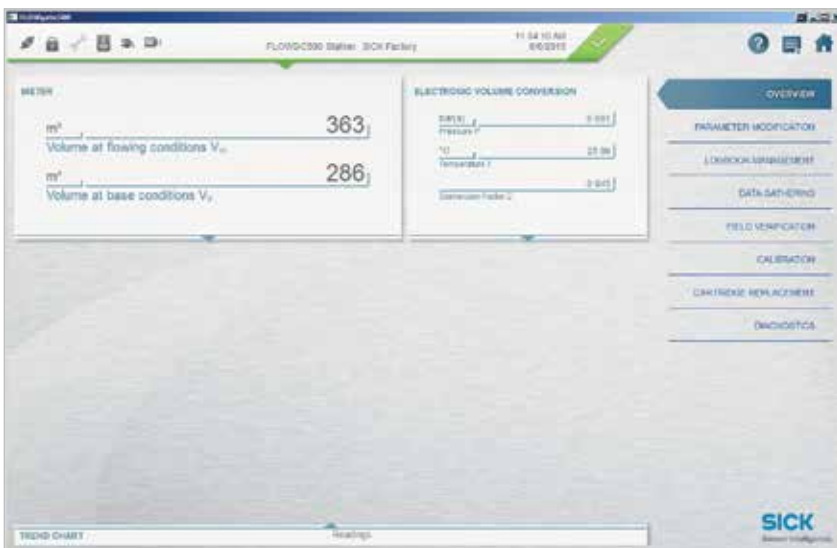
- All parameter changes are recorded
- Up to 250 entries



Metrology log book

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

Software application – FLOWgate500



Detailed technical data

System

Measured value	Volume actual conditions (a.c.), volume flow actual conditions (a.c.), gas velocity
Measuring principle	Ultrasonic transit time difference measurement
Measuring medium	Natural gas (dry, odorized)
Measuring ranges	
Volume flow a.c., 2" 5.5M285 (DN50)	35...5,650 ft ³ /h (1.3...160 m ³ /h)
Volume flow a.c., 3" 14M285 (DN80)	88...14,125 ft ³ /h (2.5...400 m ³ /h)
Volume flow a.c., 4" 23M285 (DN100)	141...23,000 ft ³ /h (4...650 m ³ /h)
Volume flow a.c., 6" 35M285 (DN150)	176...35,315 ft ³ /h (4...1,000 m ³ /h)
Repeatability	≤ 0.1 %
Accuracy	Accuracy class 1; typical error limits: Q_{\min} up to $0.1 Q_{\max}$: ≤ ± 1.0 % $0.1 Q_{\max}$ up to Q_{\max} : ≤ ± 0.5 % Accuracy class 1; maximum allowed error limits: Q_{\min} up to $0.1 Q_{\max}$: ≤ ± 2 % $0.1 Q_{\max}$ up to Q_{\max} : ≤ ± 1 %
Diagnostics function	Permanent monitoring of measured values
Gas temperature	-40 °F...+158 °F (-40 °C...+70 °C)
Operating pressure	Class 150 (ASME B16.5): 0 psig...285 psig (0 barg ... 20 barg)
Ambient temperature	-40 °F...+158 °F (-40 °C...+70 °C)
Storage temperature	-40 °F...+176 °F (-40 °C...+80 °C)
Conformities	2004/22/EC MI-002, OIML R137 1&2, 2012
Enclosure rating	IP 65
Digital outputs	3 open collector outputs: not electrically isolated, f_{\max} = 2 kHz
Interfaces	RS-485 alternative to 2 of the digital outputs (externally powered) Optical interface (according to IEC 62056-21)
Dimensions (W x H x D)	See dimensional drawings
Weight	See dimensional drawings
Material in contact with media	Aluminium AC-42100-S-T6
Mounting	Horizontal or vertical installation: straight inlet/outlet piping not required
Electrical connection	
Voltage	Intrinsically safe supply: 4.5 ... 16 V DC
Options	Battery powered (period of more than 5 years)
Items supplied	The scope of delivery depends on application and customer specifications.

Volume correction	
Accuracy	Accuracy class 0.5 Maximum allowed error limits of the correction factor C: $\pm 0.5\%$ (at reference conditions)
Correction method	PTZ or TC
Compressibility	Calculation according to: <ul style="list-style-type: none"> • SGERG88 • AGA 8 Gross method 1 • AGA 8 Gross method 2 • AGA NX-19 • AGA NX-19 mod. • Fixed value
Data archives	<ul style="list-style-type: none"> • Measurement period archive (6,000 entries) • Daily archive (600 entries) • Monthly archive (25 entries)
Pressure transmitter measuring ranges	Gauge pressure transmitters 0 ... 58 psig (0 ... 4 bar (g)) 0 ... 145 psig (0 ... 10 bar (g)) 0 ... 290 psig (0 ... 20 bar (g))
Temperature transmitter measuring ranges	-40 °F ... 158 °F (-40 °C ... +70 °C)
Log books	<ul style="list-style-type: none"> • Event log book (1,000 entries) • Parameter log book (250 entries) • Metrology log book (100 entries)

Sizing tables

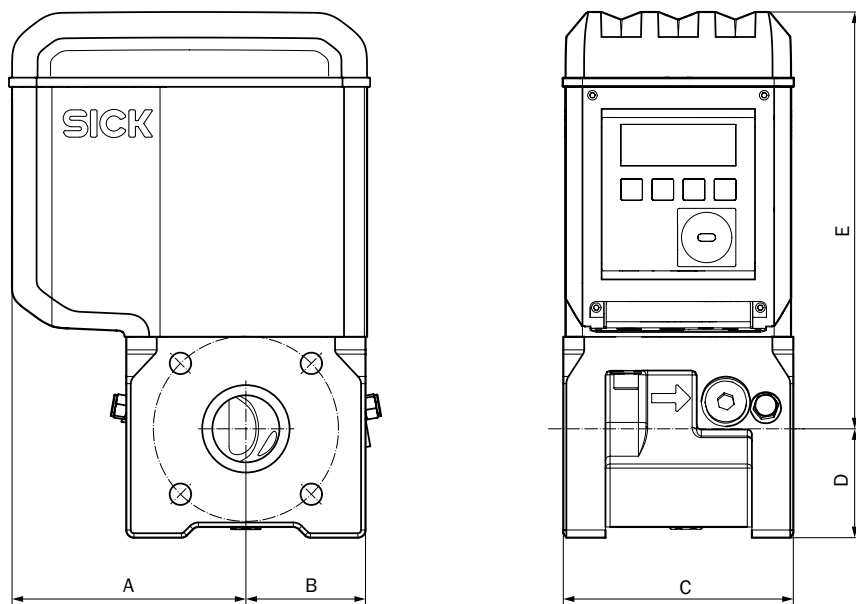
Corrected Capacity at Metering Pressure in MSCFH at Various Operating Pressures (psig)					
Meter Size	2"	3"	4"	6"	
Model	5.5M	14M	23M	35M	
Rating (ACFH)	5600	14,000	23,000	35,000	
Operating Pressure (psig)	1	5.85	14.64	24.05	36.59
	3	6.62	16.54	27.17	41.34
	5	7.38	18.44	30.29	46.10
	10	9.28	27.19	38.10	57.98
	15	11.18	27.94	45.91	69.86
	20	13.08	32.70	53.71	81.74
	25	14.98	37.45	61.52	93.62
	30	16.88	42.20	69.33	105.50
	40	20.68	51.70	84.94	129.26
	50	24.48	61.21	100.56	153.02
	60	28.29	70.71	116.17	176.78
	70	32.09	80.22	131.79	200.54
	80	35.89	89.72	147.40	224.30
	90	39.69	99.23	163.01	248.07
	100	43.49	108.73	178.63	271.83
	110	47.29	118.23	194.24	295.59
	120	51.10	127.74	209.86	319.35
	130	54.90	137.24	225.47	343.11
140	58.70	146.75	241.09	366.87	
150	62.50	156.25	256.70	390.63	
175	72.01	180.01	295.74	450.03	
200	81.51	203.77	334.77	509.44	
225	91.01	227.54	373.81	568.84	
250	100.52	251.30	412.84	628.24	
275	110.02	275.06	451.88	687.64	
285	113.82	284.56	467.49	711.41	

Corrected Capacity at Metering Pressure in MSCMH at Various Operating Pressures (kPag)							
Model			G100	G250	G400	G650	
Rating	kPa	Bar	0.16 160	0.4 400	0.65 650	1 1000	
Operating Pressure (kPag)	1	6.9	0.1	0.17	0.42	0.68	1.05
	3	20.7	0.2	0.19	0.47	0.77	1.18
	5	34.5	0.3	0.21	0.53	0.86	1.32
	10	69.0	0.7	0.27	0.66	1.08	1.66
	15	103.4	1.0	0.32	0.80	1.30	2.00
	20	137.9	1.4	0.37	0.93	1.52	2.34
	25	172.4	1.7	0.43	1.07	1.74	2.67
	30	206.9	2.0	0.48	1.21	1.96	3.01
	40	275.8	2.7	0.59	1.48	2.40	3.69
	50	344.8	3.4	0.70	1.75	2.84	4.37
	60	413.7	4.1	0.81	2.02	3.28	5.05
	70	482.7	4.8	0.92	2.29	3.72	5.73
	80	551.6	5.5	1.03	2.56	4.17	6.41
	90	620.6	6.2	1.13	2.84	4.61	7.09
	100	689.5	6.9	1.24	3.11	5.05	7.77
	110	758.5	7.6	1.35	3.38	5.49	8.45
	120	827.4	8.3	1.46	3.65	5.93	9.12
	130	896.4	9.0	1.57	3.92	6.37	9.80
140	965.3	9.6	1.68	4.19	6.81	10.48	
150	1034.3	10.3	1.79	4.46	7.25	11.16	
175	1206.6	12.1	2.06	5.14	8.36	12.86	
200	1379.0	13.8	2.33	5.82	9.46	14.56	
225	1551.4	15.5	2.60	6.50	10.56	16.25	
250	1723.8	17.2	2.87	7.18	11.67	17.95	
275	1896.1	18.9	3.14	7.86	12.77	19.65	
285	1965.1	19.6	3.25	8.13	13.21	20.33	

Measuring ranges (custody transfer)

Nominal pipe size	Meter rating	Measuring range				Rangeability
		min. [cfh] ±1%	max. [cfh]	min. [m³/h] ±1%	max. [m³/h]	
2" 5.5M285 (DN50)	5.6 M (G 100)	35	5,650	1.6	160	160:1
3" 14M285 (DN80)	14 M (G 250)	88	14,126	2.5	400	160:1
4" 23M285 (DN100)	23M (G 400)	141	22,956	4.0	650	160:1
6" 35M285 (DN150)	35 M (G 650)	176	35,315	5.0	1,000	200:1

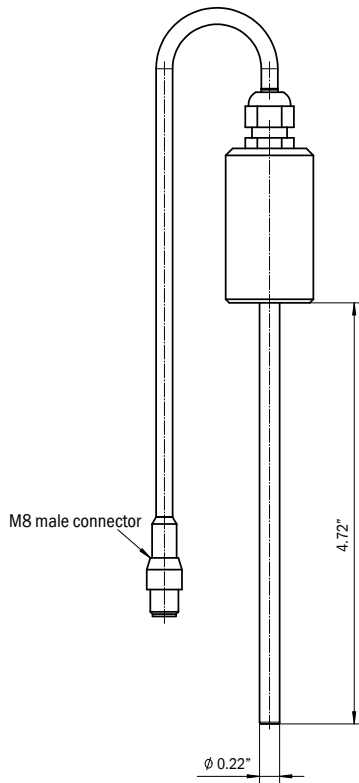
Dimensional drawing



Nominal size	Weight	Dimensions				
		A	B	C	D	E
2" 5.5M285 (DN50)	23.4 lb (10.6 kg)	6.02 in (153 mm)	3.07 in (78 mm)	6.75 in (171 mm)	2.80 in (71 mm)	10.71 in (272 mm)
	40.4 lb (18.3 kg)	7.64 in (194 mm)	4.76 in (121 mm)	6.75 in (171 mm)	3.70 in (94 mm)	16.42 in (417 mm)
3" 14M285 (DN80)	45.2 lb (20.5 kg)	9.09 in (231 mm)	6.26 in (159 mm)	9.50 in (241 mm)	4.25 in (108 mm)	18.74 in (476 mm)
	60 lb (27.2 kg)	9.09 in (231 mm)	6.26 in (159 mm)	11.81 in (300 mm)	5.63 in (143 mm)	18.74 in (476 mm)
4" 23M285 (DN100)	64.8 lb (29.4 kg)	9.13 in (232 mm)	6.22 in (158 mm)	17.75 in (450 mm)	5.63 in (143 mm)	18.74 in (476 mm)
6" 35M285 (DN150)	77.1 lb (35.0 kg)	9.13 in (232 mm)	6.22 in (158 mm)	17.75 in (450 mm)	5.63 in (143 mm)	18.74 in (476 mm)

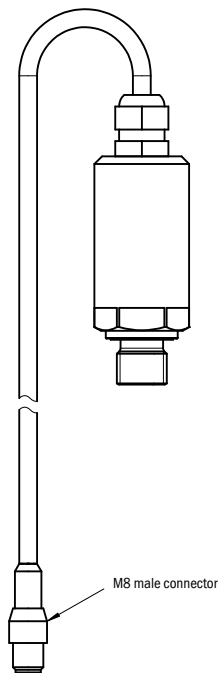
Digital temperature transmitter

Measuring ranges	-40 °F ... 158 °F (-40 °C ... +70 °C)
Sensor type	Platinum resistance sensor Pt1000 in stainless steel protective tube
Ambient temperature	-40 °F ... 185 °F (-40 °C ... +85 °C)
Accuracy	± 0.5 °F (0.3 °C) throughout the temperature range

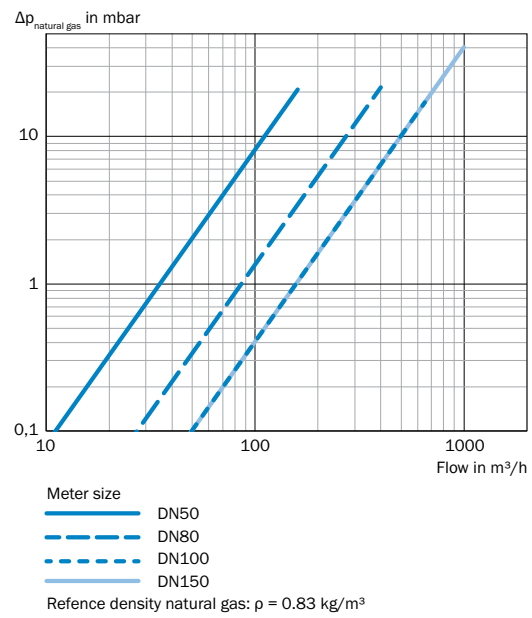
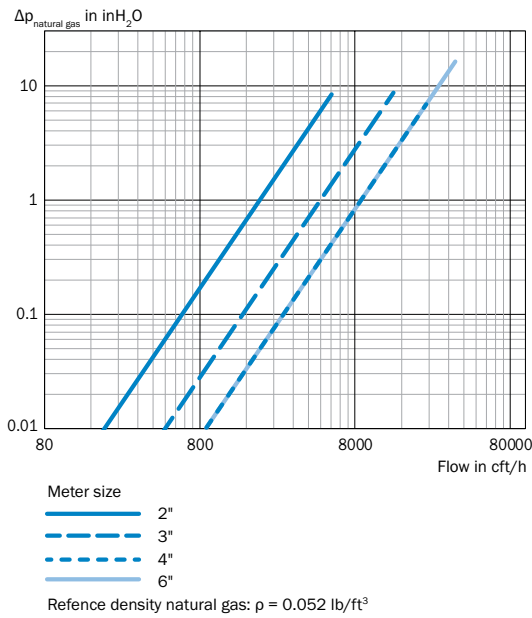


Digital pressure transmitter

Measuring ranges	Gauge
	0 ...58 psig (0 ... 4 bar (g))
	0 ... 145 psig (0 ... 10 bar (g))
	0 ... 20 psig (0 ... 20 bar (g))
	0 ... 20 psig (0 ... 20 bar (g))
Ambient temperature	-40 °F ... 185 °F (-40 °C ... +85 °C)
Accuracy	± 0.1% of the full scale reading (all ranges)



Characteristic pressure differential curve



FLWSIC500 meter, meter Body

Recalibration is simple and straightforward by replacing the cartridge.





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Our Competence in the Business Segments

Factory Automation

With its intelligent sensors, safety systems, and auto ident applications, SICK offers comprehensive solutions for factory automation.



- Non-contact detecting, counting, classifying, and positioning of any type of object
- Accident protection and personal safety using sensors, as well as safety software and services

Logistics Automation

Sensors made by SICK form the basis for automating material flows and the optimization of sorting and warehousing processes.



- Automated identification with bar code and RFID reading devices for the purpose of sorting and target control in industrial material flow
- Detecting volume, position, and contours of objects and surroundings with laser measurement systems

Process Automation

Optimized system solutions from SICK ensure efficient acquisition of process and environmental data in many industrial processes.



- Precise measurement of gases, liquids and dust concentrations for continuous emissions monitoring and the acquisition of process data in production processes
- Gas flow measurements with maximum accuracy thanks to compact gas meters

SICK
Sensor Intelligence.