PRODUKTINFORMATION

FLOWSIC600 Bio
Ultrasonic Gas Flow Meter for Biogas

Flow Metering for All Stages of Biogas Production

SICK
Sensor Intelligence.

FLOWSIC600 Bio and FLOWSIC600
Gas flow measurement for biogas production

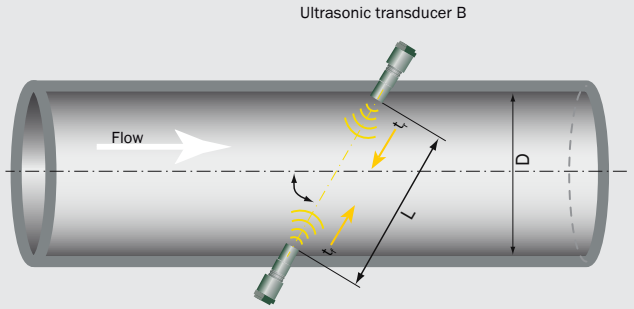
AREAS OF APPLICATION

- Biogas production from agricultural waste, sludge digestion or landfills
- All process stages from fermentation to (possible) injection into natural gas grid or storage
- Typical gas compositions ranging between raw biogas and bio methane as equivalent to natural gas
- Dry or wet gases with or without highly corrosive contents (H_2S or other corrosive components)
- Low flow, low pressure applications (FLOWSIC600 Bio) as well as high pressure applications (FLOWSIC600)
- Process measurement in the production (FLOWSIC600 Bio) or fiscal measurement at line injection (FLOWSIC600)

ULTRASOUND MEASURING PRINCIPLE

Two ultrasonic transducers, which are installed at a defined angle to the flow axis, operate alternately as transmitter and receiver. The signals transmitted through the gas accelerate in the direction of flow and decelerate against the direction of flow. The resulting difference in transit times is used, along with geometric variables, to determine the average gas velocity. Calculation with the cross-sectional area yields the volumetric flow during operation. Measuring results are not affected by pressure, temperature, or gas composition. To increase the accuracy, the gas velocity is measured using multiple paths.

Ultrasonic technology in biogas production
SICK ultrasound technology makes the measurement of biogas reliable and effective for your biogas plant. The sealed titanium transducers are build into a meter body made from low weight polyethylene (PE) or stainless steel – ideal materials for biogas environments.



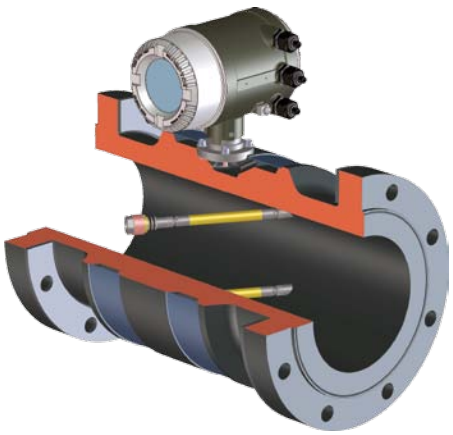
$$v = \frac{L}{2 \cdot \cos \alpha} \cdot \left(\frac{1}{t_f} - \frac{1}{t_r}\right)$$

$$Q = v \cdot \frac{D^2 \cdot \pi}{4}$$

v ... Gas velocity
L ... Path length
α ... Path angle
Q ... Flow rate
D ... Diameter
t_f ... Transit time in direction of flow
t_r ... Transit time against direction of flow

KEY FEATURES

- Highly efficient titanium transducers
- Reliable operation even at atmospheric pressure
- Suitable for installation according to ATEX/IECEx Zone 1 and Zone 2
- No pressure drop caused by installation
- Nearly maintenance free – no moving parts
- Bi-directional measurement for biogas storage
- Integrated real-time performance monitoring
- Data logs for hourly and daily historical data



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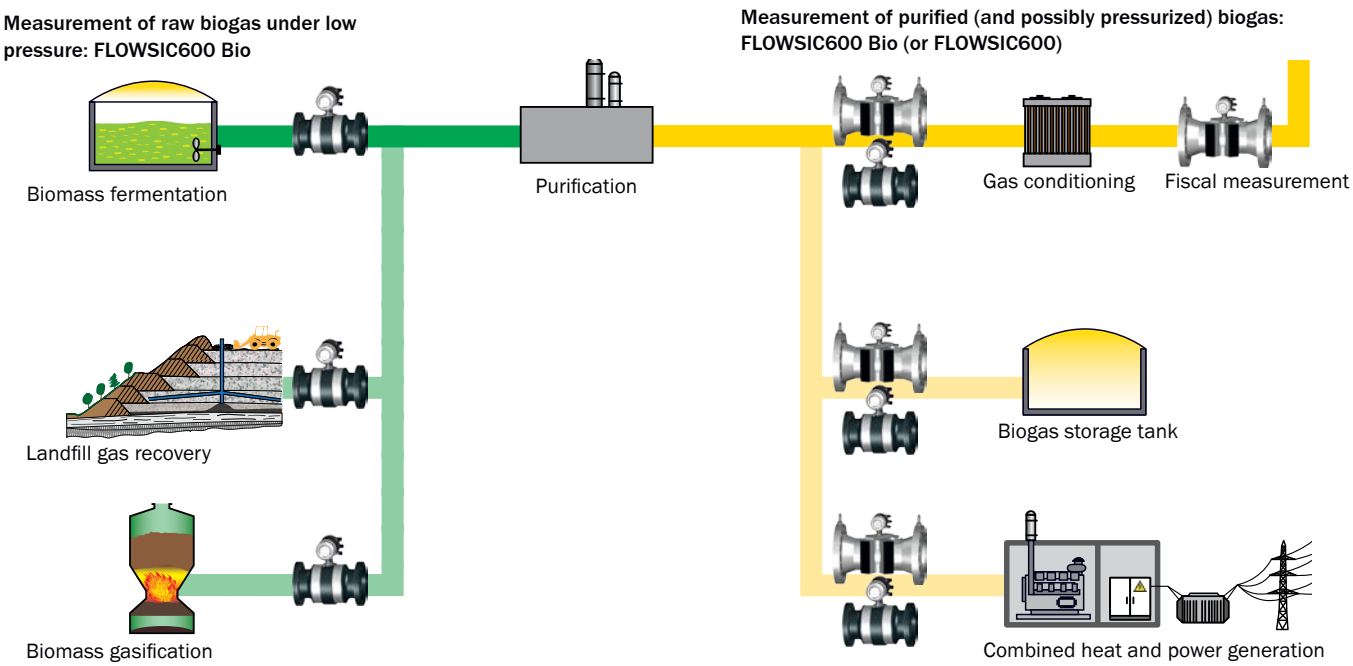
GAS FLOW MEASUREMENT FOR BIOGAS PRODUCTION

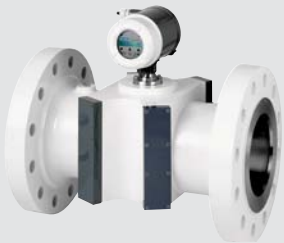


FLOWSIC600 BIO

- Uncertainty of ±1.5 % (depending on gas volume fraction and installation)
- Sealed titanium transducers
- Low weight PE meter body
- 2 ultrasonic measurement paths

RELIABLE PROCESS METER FOR RAW BIOGAS UNDER LOW PRESSURE

FLOWSIC600



- Uncertainty of ±0.2% for fiscal metering
- MID approval
- Steel or stainless steel meter body
- Sealed titanium transducers
- 4 ultrasonic measurement paths

FISCAL GAS FLOW METER FOR ALL PRESSURES AND ALL GASES

Technical Data		FLOWSIC600 Bio						
Meter characteristics								
Nominal size		Flow rate [m³/h]		Length [mm]	For Installation in PE piping (SDR 11)		For Installation in steel piping	
		Min.	Max.		Inner diameter [mm]	Weight [kg]	Inner diameter [mm]	Weight [kg]
DN 80	3"	12	1,000	440	73.6	16	83,7	15
DN 100	4"	20	1600	450	90.0	18	109,1	18
DN 150	6"	32	3,000	450	130.8	22	161,9	27
DN 200	8"	40	4,500	500	163.6	30	211,9	38
DN 250	10"	50	7,000	500	204.6	40	265,0	49
DN 300	12"	65	8,000	600	257.8	50	314,9	85
DN 400	16"	120	14,000	800	327.4	97	396,4	135
Meter body material		Polyethylene PE 100						
Flange connections		DIN EN 1092 Form B1 PN10						
Measuring parameters								
Gases		Biogases wet or dry (45 ... 70% CH_4, 25 ... 55% CO_2 + trace gases like H_2S)						
Measured value		Volume flow (actual + standard), volume (actual + standard), gas velocity, speed of sound						
Design temperature		–20 °C ... +60 °C						
Pressure range		0 barg ... 4 barg						
Repeatability		< 0.5 %						
Typical uncertainty		± 1.5 % [1]						

Technical Data		FLOWSIC600				
Meter characteristics						
Nominal size		Flow rate [m³/h]		Length [mm]	Inner diameter [mm]	Weight [kg]
		Min.	Max. [2]			
DN 50	2"	4	400	150	49	15
DN 80	3"	8	1,000	240	73	45
DN 100	4"	13	1,600	300	95	70
DN 150	6"	20	3,000	450	142	140
DN 200	8"	32	4,500	600	190	210
DN 250	10"	50	7,000	750	235	330
DN 300	12"	65	8,000	900	270	490
Meter body material		Stainless steel, low temperature carbon steel, duplex steel				
Measuring parameters						
Gases		Natural gas, process gases, biogas, air				
Measured value		Volume flow (actual and standard), volume (actual + standard), gas velocity, speed of sound				
Temperature		–40 °C ... +180 °C; –194 °C ... +280 °C on request				
Pressure range		0 barg ... 250 barg; up to 450 barg on request				
Repeatability		< 0.5 %				
Typical uncertainty		2 paths: ± 1.0 % [3] 4 paths: ±0.5 % [4] dry calibrated ±0.2 % [4] after flow calibration + adjustment with constant factor ±0.1 % [4] after flow calibration and with polynomial correction				

Approvals, interfaces	FLOWSIC600 Bio and FLOWSIC600	
Approval	**FLOWSIC600 Bio**	**FLOWSIC600**
Ex certification	ATEX II 2G Ex de ib [ia] IIa T4	ATEX II 1/2G Ex de ib [ia] IIA or IIC T4
Pattern approval	–	MID, PTB, NMi, Measurement Canada, GOST
Electrical safety	CE, Enclosure rating: IP 65	CE, Enclosure rating: IP 65/IP 67
Outputs and interfaces	1x analog, 1x RS-485, 1x pulse, 2x status	Pulse, Status, RS485, (analog optionally)

[1] In dry gas, for Q_t ... Q_{max} and installation with straight inlet/outlet section of 20D/3D.
[2] Q_{max} may be limited by working pressure and attenuation of the gas medium
[3] Within Q_t ... Q_{max} with straight inlet/outlet section of 20D/3D or with flow straightener 10D/3D
[4] Within Q_t ... Q_{max} with non disturbed inlet/outlet section of 10D/3D

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