OPTISONIC 7300 BIOGAS

Technical Datasheet

Ultrasonic gas flowmeter for biogas

- Measurement of dry and wet biogas with variable composition
- Integrated methane content measurement
- No moving parts and no pressure

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CONTENTS

1.1 Ultrasonic process gas flow measurement

The **OPTISONIC 7300 Biogas** offers an ultrasonic measurement solution for biogas and landfill gas. Biogas, generated from bio feed stocks by fermentation, mainly contains methane and CO_2 in a variable composition. It contains also small amounts of other gasses like H_2S, Nitrogen and hydrocarbons or can be saturated with water.

The OPTISONIC 7300 is specially designed to measure biogas and landfill gas and can measure this with high CO_2 content, saturated with water or with free condensation water present.

The flowmeter provides additional functions like calculation of standard volume, methane content measurement and diagnostics features.

The OPTISONIC 7300 Biogas does not have the limitations that are usually associated with traditional gas flow meters like periodical recalibrations, maintenance, pressure loss and a limited flow range. The OPTISONIC 7300 combines the advantages of ultrasonic measurement in a way that it is efficient, reliable and easy to use.

① Current input option for calculation to standard conditions
② Process connections
③ Temperature sensor for methane content measurement

Highlights

- Wide flow range
- Independent of gas density and composition to a large extend
- No maintenance
- No recalibration
- No moving parts, no pressure loss

Industries

- Water and wastewater, waste treatment
- Agricultural sector
- Biogas plants

Applications

- Measurement of raw/wet biogas directly from fermentation
- Measurement of dry biogas
- Measurement of landfill gas
- Measurement of methane content
- Conversion to standard volume

1.2 Variants

Version and some general examples

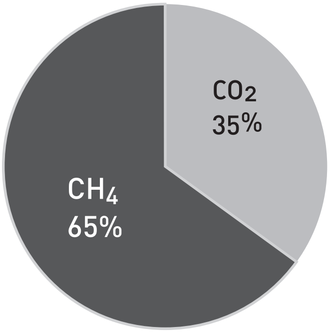
Correction to standard conditions (optional)
- Gas flow volume correction to standard conditions
- Using temperature and pressure inputs

Connection options
- PN 10 lap joint ISO flange acc. to DIN 2642 F
- ASME 150 lbs lap joint flange

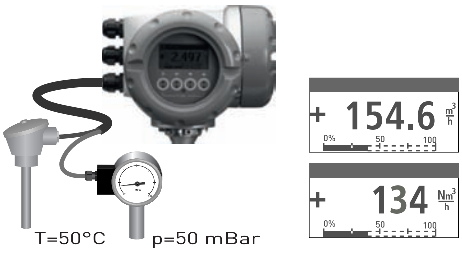
Converter mounting
- Available as compact or remote version

1.3 Features

Transducer design
With the innovative patented design of the transducers, the OPTISONIC 7300 offers a superior measurement of biogas with CO2 content up to 50% even at low pressure. Also if the measured media is saturated with water, when liquid water may appear in the tube. The transducers are made from corrosion resistant titanium and will not be affected by H2S if present in the biogas. The OPTISONIC 7300 will provide continuous operation.



Integrated measurement of methane content
By using the velocity of sound which is a standard available measurement in the OPTISONIC 7300 and the input of the gas temperature, the methane content of biogas can be calculated. From this also the energy output can be derived.
This will enable you to monitor online the performance of the biogas installation



Calculation to standard conditions
Gas flow is often specified in standard conditions (for example flow at 20 °C and 1 bar a). The build in flowcomputer can provide calculation of gasvolume to standard conditions. For this the flowconverter GFC300 has inputs for measurement of pressure and temperature.

Diagnostics
Important information about both the process and sensor can be provided by diagnostic values. Examples are gain for information about pollution in the sensor, velocity of sound for changes in the gas composition and signal to noise ratio for changes in the process.

1.4 Measuring principle

- Like canoes crossing a river, acoustic signals are transmitted and received along a diagonal measuring path.
- A sound wave going downstream with the flow travels faster than a sound wave going upstream against the flow.
- The difference in transit time is directly proportional to the mean flow velocity of the medium.

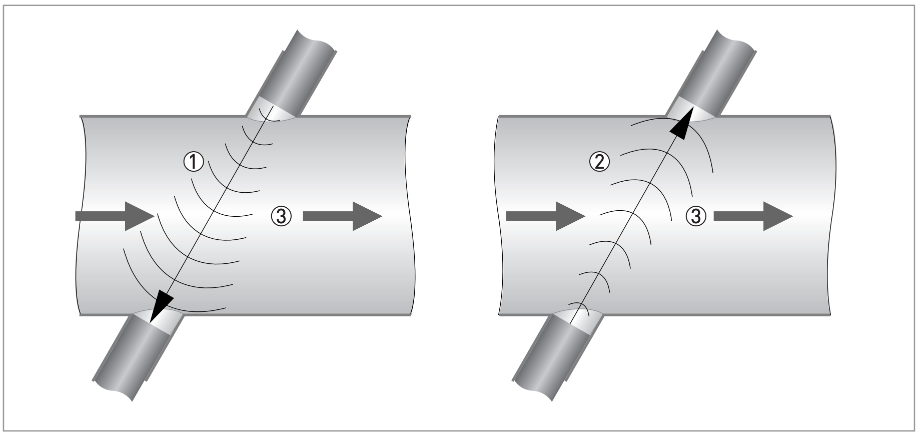


Figure 1-1: Measuring principle

① Sound wave against flow direction
② Sound wave with flow direction
③ Flow direction

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Download Center).*

Measuring system

Measuring principle	Ultrasonic transit time
Application range	Flow measurement of dry gases
Measured value	
Primary measured value	Transit time
Secondary measured values	Volume flow, corrected volume flow, mass flow, molar mass, flow speed, flow direction, speed of sound, gain, signal to noise ratio, reliability of flow measurement, quality of acoustic signal, methane content

Design

Features	1 or 2 path all welded flow sensor with o-ring fitted titanium transducers.
Modular construction	The measurement system consists of a measuring sensor and a signal converter.
Compact version	OPTISONIC 7300 C
Remote version	OPTISONIC 7000 F with GFC 300 F signal converter
Nominal diameter	1 path: DN50, DN80 / 2", 3"
	2 path: DN100, DN150, DN200 / 4", 6", 8"
	Larger diameters on request.
Measurement range	0.3... 30 m/s / 0.98... 98.4 ft/s (bi-directional)
Signal converter	
Inputs / outputs	Current (incl. HART®), pulse, frequency and/or status output, limit switch and/or control input (depending on the I/O version)
Counters	2 internal counters with a max. of 8 counter places (e.g. for counting volume and/or mass units).
Self diagnostics	Integrated verification, diagnosis functions: flowmeter, process, measured value, bargraph
Communication interfaces	HART®, Modbus
Temperature sensor	
Type	PT100 (4-20 mA output, ATEX-ExD)
Measurement range	0...100 °C / 32...212 °F

Display and user interface	
Graphic display	LC display, backlit white
	Size: 128x64 pixels, corresponds to 59x31 mm = 2.32"x1.22"
	Display turnable in 90° steps.
	The readability of the display could be reduced at ambient temperatures below -25°C / -13°F.
Operator input elements	4 optical keys for operator control of the signal converter without opening the housing.
	Option: Infrared interface (GDC)
Remote control	PACTware® including Device Type Manager (DTM)
	All DTM's and drivers will be available at the internet homepage of the manufacturer.
Display functions	
Menu	Programming of parameters at 2 measured value pages, 1 status page, 1 graphic page (measured values and descriptions adjustable as required)
Language of display texts	English, French, German
Units	Metric, British and US units selectable from list / free unit.

Measuring accuracy

Gas flow (uncorrected)	
Reference conditions (for gas calibration)	Medium: Air
	Temperature: 20°C / 68°F
	Pressure: 1 bara / 14.5 psia
Gas calibration	DN50, 80 / 2, 3": < ± 1.5% of actual measured flow rate, for 1...30 m/s ; < ± 1.5 cm/s for 0.3...1 m/s
	DN100, 150, 200 / 4, 6, 8": < ± 1% of actual measured flow rate, for 1...30 m/s ; < ± 1 cm/s for 0.3...1 m/s
Repeatability	< ± 0.2%

Operating conditions

Temperature	
Process temperature	**Compact version**
	-40...+100°C / -40...+212°F
	Remote version
	-40...+100°C / -40...+212°F
Ambient temperature	Standard (die-cast aluminum converter housing): -40…+65°C / -40…+149°F
	Option (die-cast stainless steel converter housing): -40...+55°C / -40...+131°F
Storage temperature	-50…+70°C / -58…+158°F

Pressure	
	Design pressure: 10 Bar
EN 1092-2 / DIN 2642F	DN50...200: PN10, lap joint flange, pressed plate
ASME	2…8": 150 lb RF, lap joint flange, pressed plate
Properties of medium (Other properties on request)	
Physical condition	Dry gas
Density	10…45 g/mol / 1...150 kg/m^3 / 0.062...9.36 lb/ft^3

Installation conditions

Installation	For detailed information refer to *Installation* on page 19.
Inlet run	≤DN80: ≥ 20 DN
	≥DN100: ≥ 10 DN
Outlet run	≥ 3 DN
Dimensions and weights	For detailed information refer to *Dimensions and weights* on page 15.

Materials

Sensor	
Flanges (wetted)	Standard: Stainless steel 316 L (1.4404)
Tube (wetted)	Standard: Stainless steel 316 L (1.4404)
Nozzles transducer + temperature sensor (wetted)	Stainless steel 316 Ti (1.4571)
Transducer holders (wetted)	Stainless steel 316 L (1.4404)
Transducers (wetted)	Titanium grade 29
Transducer o-rings (wetted)	Standard: FKM / FPM
Tube transducer cabling, caps transducer holder	Stainless steel 316 L
Connection box (remote version only)	Standard: die-cast aluminium, polyurethane coated
Converter/ connection-box support:	Stainless steel
Converter	
Converter housing	Standard: die-cast aluminium, polyurethane coated
Field version	Standard: die-cast aluminium, polyurethane coated

Electrical connections

Power supply	Standard: 100…230 VAC (-15% / +10%), 50/60 Hz
	Option: 24 VAC/DC (AC: -15% / +10%; DC: -25% / +30%)
Power consumption	AC: 22 VA
	DC: 12 W
Signal cable (remote version only)	MR02 (shielded cable with 2 triax cores): Ø 10.6 mm, 1 per acoustic path
	5 m / 16 ft
	Option: 10...30 m / 33...98 ft
Cable entries	Standard: M20 x 1.5
	Option: ½" NPT, PF ½

Inputs and outputs

General	All in-and outputs are galvanically isolated from each other and from all other circuits.	
Description of used abbreviations	U_{ext} = external voltage U_{nom} = nominal voltage U_{int} = internal voltage U_o = terminal voltage R_L = resistance of load I_{nom} = nominal current	
Current output		
Output data	Measurement of volume flow, corr. volume flow, mass flow, molar mass, flow speed, velocity of sound, gain, diagnostics 1, 2, 3, HART® communication.	
Settings	**Without HART®**	
	Q = 0%: 0…15 mA	
	Q = 100%: 10…20 mA	
	Error identification: 3…22 mA	
	With HART®	
	Q = 0%: 4…15 mA	
	Q = 100%: 10…20 mA	
	Error identification: 3…22 mA	
Operating data	**Basic I/Os**	**Ex-i**
Active	U_{int} = 24 VDC I ≤ 22 mA R_L ≤ 1 kΩ	U_{int} = 20 VDC I ≤ 22 mA R_L ≤ 450 Ω
		U_0 = 21 V I_0 = 90 mA P_0 = 0.5 W C_0 = 90 nF / L_0 = 2 mH C_0 = 110 nF / L_0 = 0.5 mH
Passive	U_{ext} ≤ 32 VDC I ≤ 22 mA U_0 ≥ 1.8 V $R_L \leq (U_{ext} - U_o) / I_{max}$	U_{ext} ≤ 32 VDC I ≤ 22 mA U_0 ≥ 4 V $R_L \leq (U_{ext} - U_o) / I_{max}$
		U_I = 30 V I_I = 100 mA P_I = 1 W C_I = 10 nF L_I = 0 mH

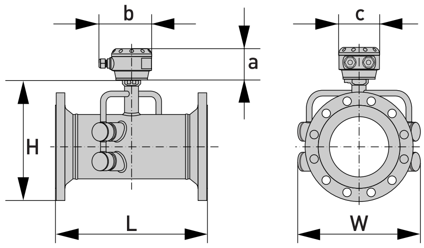
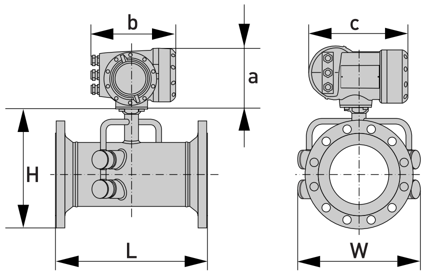
HART®			
Description	HART® protocol via active and passive current output		
	HART® version: V5		
	Universal HART® parameter: completely integrated		
Load	≥ 250 Ω t HART® test point: Note maximum load for current output!		
Multidrop	Yes, current output = 4 mA		
	Multidrop addresses adjustable in operation menu 1...15		
Device drivers	DD for FC 375/475, AMS, PDM, FDM, DTM for FDT		
Pulse or frequency output			
Output data	Volume flow, corr. volume flow, mass flow, molar mass, flow speed, velocity of sound, gain, diagnostics 1,2,3.		
Function	Adjustable as pulse of frequency output		
Settings	For Q = 100%: 0.01... 10000 pulses per second or pulses per unit volume.		
	Pulse width: adjustable as automatic, symmetric or fixed (0.05...2000 ms)		
Operating data	Basic I/Os	Modular I/Os	Ex-i
Active	-	U_{nom} = 24 VDC	-
		f_{max} in operating menu set to: **$f_{max} \leq$ 100 Hz:** $I \leq$ 20 mA $R_{L, max}$ = 47 kΩ open: $I \leq$ 0.05 mA closed: $U_{0,nom}$ = 24 V at I = 20 mA	
		F_{max} in operating menu set to: **100 Hz < $f_{max} \leq$ 10 kHz:** $I \leq$ 20 mA $R_L \leq$ 10 kΩ for $f \leq$ 1 kHz $R_L \leq$ 1 kΩ for $f \leq$ 10 kHz open: $I \leq$ 0.05 mA closed: $U_{0,nom}$ = 22.5 V at I = 1 mA $U_{0,nom}$ = 21.5 V at I = 10 mA $U_{0,nom}$ = 19 V at I = 20 mA	

Passive	$U_{ext} \le 32$ VDC		-
	f_{max} in operating menu set to: **$f_{max} \le 100$ Hz:** $I \le 100$ mA $R_{L, max} = 47$ kΩ $R_{L, max} = (U_{ext} - U_0) / I_{max}$ open: $I \le 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 0.2$ V at $I \le 10$ mA $U_{0, max} = 2$ V at $I \le 100$ mA		
	f_{max} in operating menu set to: **100 Hz < $f_{max} \le 10$ kHz:** $I \le 20$ mA $R_L \le 10$ kΩ for $f \le 1$ kHz $R_L \le 1$ kΩ for $f \le 10$ kHz $R_{L, max} = (U_{ext} - U_0) / I_{max}$ open: $I \le 0.05$ mA at $U_{ext} = 32$ VDC closed: $U_{0, max} = 1.5$ V at $I \le 1$mA $U_{0, max} = 2.5$ V at $I \le 10$ mA $U_{0, max} = 5.0$ V at $I \le 20$ mA		
NAMUR	-	Passive to EN 60947-5-6 open: $I_{nom} = 0.6$ mA closed: $I_{nom} = 3.8$ mA	Passive to EN 60947-5-6 open: $I_{nom} = 0.43$ mA closed: $I_{nom} = 4.5$ mA
			$U_I = 30$ V $I_I = 100$ mA $P_I = 1$ W $C_I = 10$ nF $L_I = 0$ mH
Current input			
Function	For conversion to standard conditions, input from external temperature and pressure transmitters is required.		
Operating data	Basic I/Os	Modular I/Os	Ex i
Active	-	$U_{int} = 24$ VDC $I \le 22$ mA $I_{max} \le 26$ mA (electronically limited) $U_{0, min} = 19$ V at $I \le 22$ mA	$U_{int} = 20$ VDC $I \le 22$ mA $U_{0, min} = 14$ V at $I \le 22$ mA
			No HART®
		No HART®	$U_0 = 24.1$ V $I_0 = 99$ mA $P_0 = 0.6$ W $C_0 = 75$ nF / $L_0 = 0.5$ mH
			No HART®

Approvals and certificates

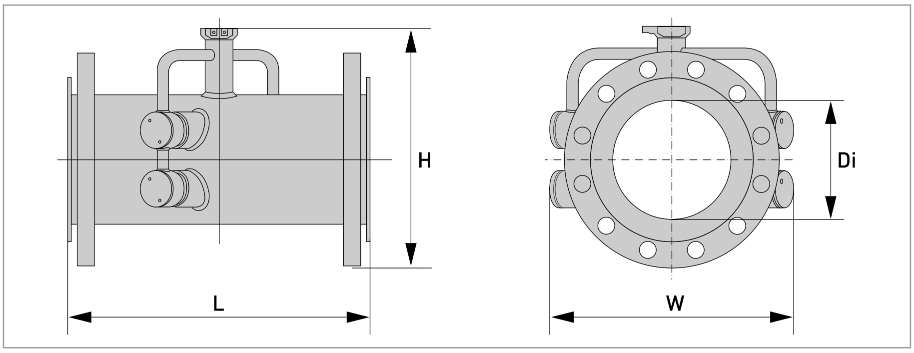
CE	
	This device fulfills the statutory requirements of the EC directives. The manufacturer certifies successful testing of the product by applying the CE mark.
Electromagnetic compatibility	Directive: 2004/108/EC, NAMUR NE21/04
	Harmonized standard: EN 61326-1 : 2006
Low Voltage Directive	Directive: 2006/95/EC
	Harmonized standard: EN 61010 : 2001
Pressure Equipment Directive	Directive: 97/23/EC
	Category I, II, III or SEP
	Fluid group 1
	Production module H
Other approvals and standards	
Hazardous areas	
	For detailed information, please refer to the relevant Ex documentation.
ATEX	DEKRA 12ATEX0063 X
Protection category acc. to IEC 529 / EN 60529	**Signal converter**
	Compact (C): IP66/67 (NEMA 4X/6)
	Field (F): IP66/67 (NEMA 4X/6)
	All flow sensors
	IP67 (NEMA 6)
Shock resistance	IEC 68-2-27
Vibration resistance	IEC 68-2-64

2.2 Dimensions and weights

Remote version		a = 77 mm / 3.1"
		b = 139 mm / 5.5" ①
		c = 106 mm / 4.2"
		Total height = H + a
Compact version		a = 155 mm / 6.1"
		b = 230 mm / 9.1" ①
		c = 260 mm / 10.2"
		Total height = H + a

① The value may vary depending on the used cable glands.

2.2.1 Gas flow sensor, stainless steel



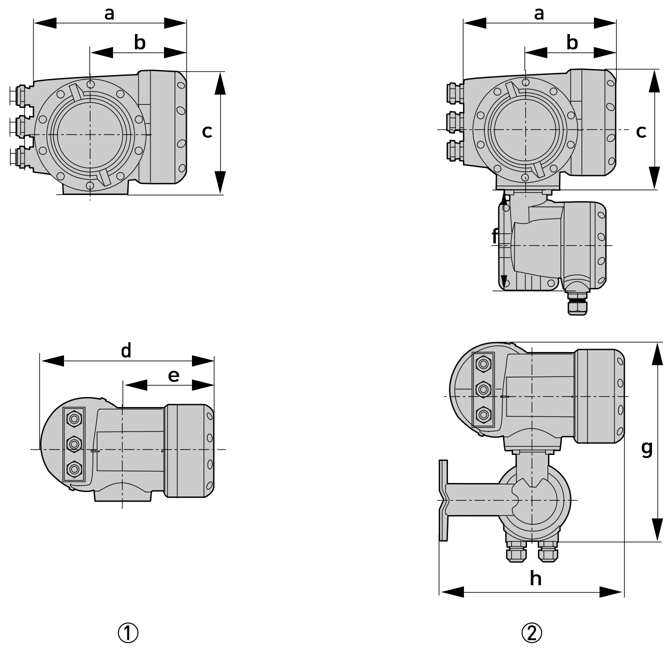
EN 1092-2 / DIN 2642 F; lap joint flange, pressed plate

Nominal size		Dimensions [mm]				Approx weight [kg]
DN	PN [Bar]	L	H	W	Di	
50	10	420	196	304	53	6.5
80	10	480	230	331	81	10
100	10	490	254	345	106	14
150	10	540	315	392	160	21
200	10	460	368	436	211	25

ASME 150 lb; lap joint flange, pressed plate

Nominal size	Dimensions								Approx weight	
	L		H		W		Di			
	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[inch]	[mm]	[lb]	[kg]
2"	16.5	420	7.5	190	12	304	2.1	53	21	9.5
3"	20.5	520	8.9	226	13	331	3.2	81	34	15.5
4"	21.7	550	10.2	258	13.6	345	4.2	106	50	22.5
6"	24.4	620	12.3	312	15.4	392	6.3	160	70	32
8"	21.3	540	14.5	369	17.2	436	8.3	211	95	43

2.2.2 Converter housing



① Compact housing (C)
② Field housing (F)

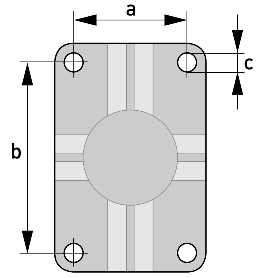
Dimensions and weights in mm and kg

Version	Dimensions [mm]							Weight [kg]
	a	b	c	d	e	g	h	
C	202	120	155	260	137	-	-	4.2
F	202	120	155	-	-	295.8	277	5.7

Dimensions and weights in inches and lb

Version	Dimensions [inches]							Weight [lb]
	a	b	c	d	e	g	h	
C	7.75	4.75	6.10	10.20	5.40	-	-	9.30
F	7.75	4.75	6.10	-	-	11.60	10.90	12.60

2.2.3 Mounting plate, field housing



Dimensions in mm and inches

	[mm]	[inches]
a	60	2.4
b	100	3.9
c	Ø 9	Ø 0.4

3.1 General notes on installation

Inspect the packaging carefully for damages or signs of rough handling. Report damage to the carrier and to the local office of the manufacturer.

Do a check of the packing list to make sure that you have all the elements given in the order.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

3.2 Intended use

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The overall functionality of the **OPTISONIC 7300** gas flowmeter is the continuous measurement of actual volume flow, mass flow, molar mass, flow speed, velocity of sound, gain, SNR and diagnosis value.

3.3 Installation requirements signal converter

- Allow 10…20 cm / 3.9…7.9" of space at the sides and rear of the signal converter to permit free air circulation.
- Protect signal converter against direct solar radiation, install a sunshield if necessary.
- Signal converters installed in switchgear cabinets require adequate cooling, e.g. by fan or heat exchanger.
- Do not expose the signal converter to intense vibration.

3.3.1 Vibration

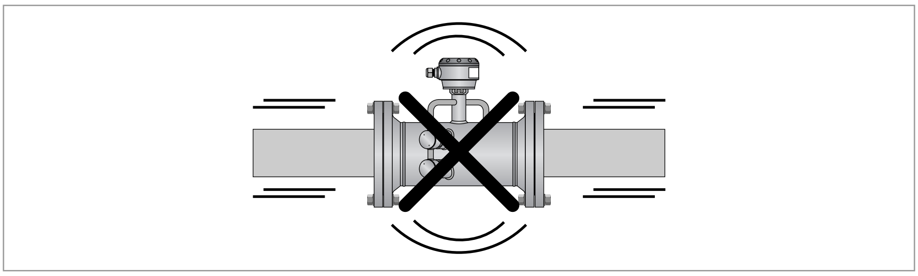


Figure 3-1: Avoid vibrations

3.4 Installation requirements sensor

To secure the optimum functioning of the flowmeter, please note the following observations.

The OPTISONIC 7300 is designed for the measurement dry gasflow. Excess of liquids may disturb the acoustic signals and should thus be avoided.
The following guidelines should be observed in case occasional small amounts of liquids are to be expected:

- Install the flow sensor in a horizontal position in a slightly descending line.
- Orientate the flow sensor such that the path of the acoustic signal is in the horizontal plane.

For exchanging the transducers, please keep a free space of 1 m / 39" around the transducer.

3.4.1 Inlet and outlet

1 path flowmeter

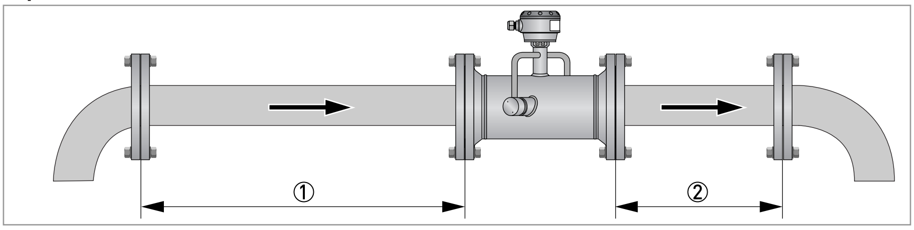


Figure 3-2: Recommended inlet and oulet for ≤ DN80/3"

① ≥ 20 DN
② ≥ 3 DN

2 path flowmeter

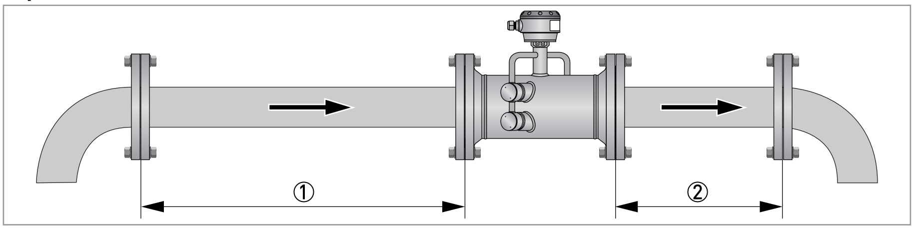


Figure 3-3: Recommended inlet and oulet for ≥ DN100/4"

① ≥ 10 DN
② ≥ 3 DN

3.4.2 Mounting position

- Horizontally with the acoustic path in horizontal plane +15° < α < -15°
- Vertically

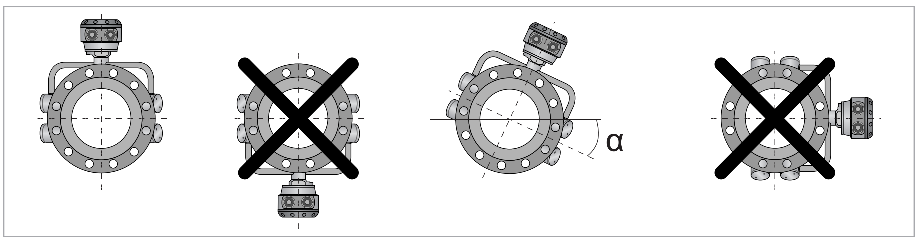


Figure 3-4: Mounting position

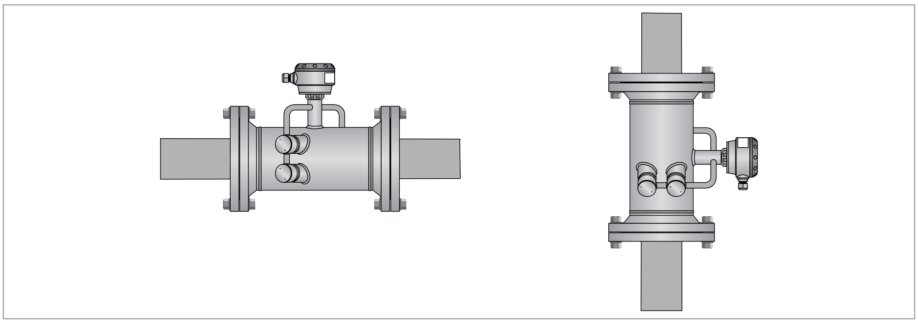


Figure 3-5: Horizontal and vertical mounting

3.4.3 Flange deviation

Max. permissible deviation of pipe flange faces:
$L_{max} - L_{min} \leq 0.5\ mm / 0.02"$

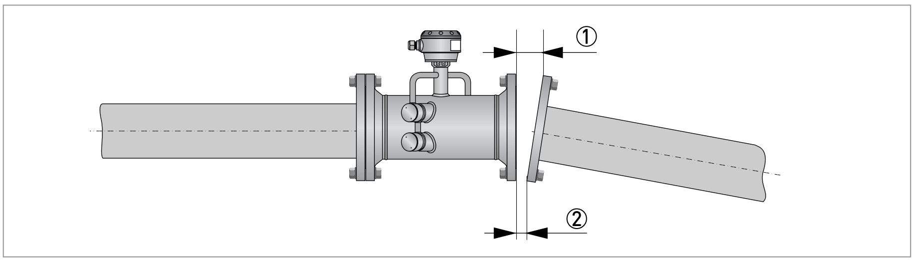


Figure 3-6: Flange deviation

① L_{max}
② L_{min}

3.4.4 T-section

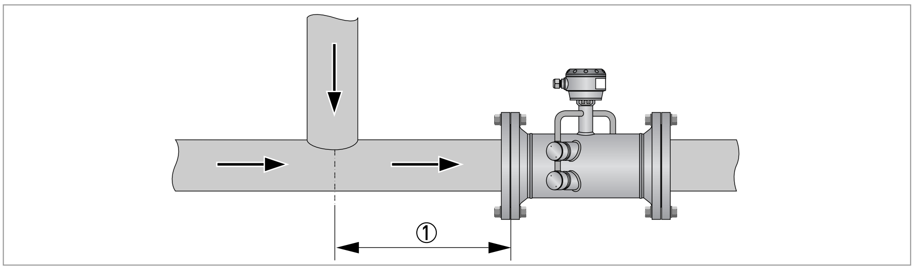


Figure 3-7: Distance behind a T-section

① ≥ 10 DN

3.4.5 Control valve

To avoid distorted flow profiles and interference caused by valve noise in the sensor, control valves or pressure reducers should not be installed in the same pipeline as the flowmeter. In case this is required, please contact the manufacturer.

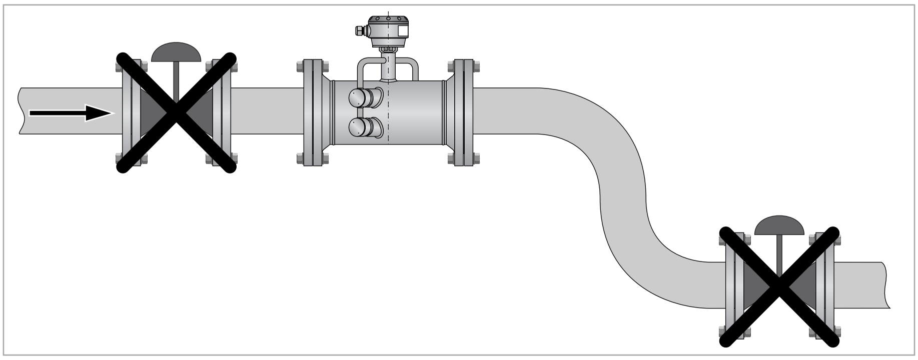


Figure 3-8: Control valve

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

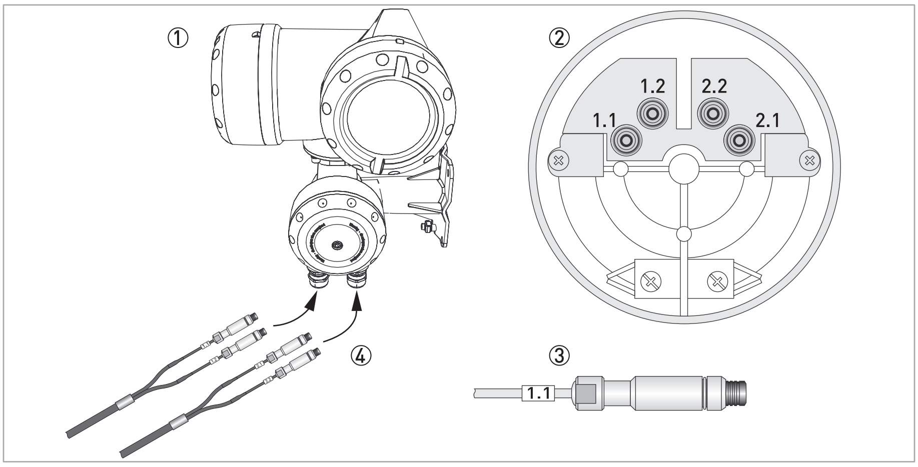
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Signal cable converter

The flow sensor is connected to the signal converter via the signal cable(s). A flow sensor with one acoustic path has one cable. A flow sensor with two acoustic paths has two cables.



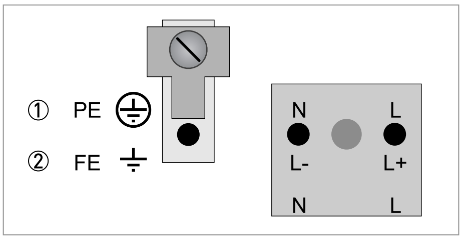
① Converter housing.
② Open connection box.
③ Marking on cable.
④ Insert cables through cable glands.

Connect the cable on connector with similar numeric marking

4.3 Power supply

When this device is intended for permanent connection to the mains.
It is required (for example for service) to mount an external switch or circuit breaker near the device for disconnection from the mains. It shall be easily reachable by the operator and marked as the disconnecting the device for this equipment.
The switch or circuit breaker and wiring has to be suitable for the application and shall also be in accordance with the local (safety) requirements of the (building) installation (e.g. IEC 60947-1 / -3)

The power terminals in the terminal compartments are equipped with additional hinged lids to prevent accidental contact.



① 100...230 VAC (-15% / +10%), 22 VA
② 24 VAC/DC (AC: -15% / +10%; DC: -25% / +30%), 22 VA or 12 W

The device must be grounded in accordance with regulations in order to protect personnel against electric shocks.

100…230 VAC

- Connect the protective ground conductor PE of the mains power supply to the separate terminal in the terminal compartment of the signal converter.
- Connect the live conductor to the L terminal and the neutral conductor to the N terminal.

24 VAC/DC

- Connect a functional ground FE to the separate U-clamp terminal in the terminal compartment of the signal converter.
- When connecting to functional extra-low voltages, provide a facility for protective separation (PELV) (VDE 0100 / VDE 0106 and/or IEC 364 / IEC 536 or relevant national regulations).

4.4 Inputs and outputs, overview

4.4.1 Combinations of the inputs/outputs (I/Os)

This signal converter is available with various input/output combinations.

Ex i version

- Current outputs can be active or passive.

Modular version

- Depending on the task, the device can be configured with various output modules.

Bus systems

Ex

- For hazardous areas, all of the input/output variants for the housing designs with terminal compartment in the Ex d (pressure-resistant casing) or Ex e (increased safety) versions can be delivered.
- Please refer to the separate instructions for connection and operation of the Ex-devices.

4.4.2 Description of the CG number

CG 3_ _ _ _ _ _ _
① ② ③ ④ ⑤ ⑥ ⑦

Figure 4-1: Marking (CG number) of the electronics module and input/output variants

① ID number: 6
② ID number: 0 = standard
③ Power supply option
④ Display (language versions)
⑤ Input/output version (I/O)
⑥ 1st optional module for connection terminal A
⑦ 2nd optional module for connection terminal B

The last 3 digits of the CG number (⑤, ⑥ and ⑦) indicate the assignment of the terminal connections. Please see the following examples.

Examples for CG number

CG 360 11 100	100...230 VAC & standard display; basic I/O: I_a or I_p & S_p/C_p & S_p & P_p/S_p
CG 360 11 7FK	100...230 VAC & standard display; modular I/O: I_a & P_N/S_N and optional module P_N/S_N & C_N
CG 360 81 4EB	24 VDC & standard display; modular I/O: I_a & P_a/S_a and optional module P_p/S_p & I_p

Description of abbreviations and CG identifier for possible optional modules on terminals A and B

Abbreviation	Identifier for CG No.	Description
I_a	A	Active current output
I_p	B	Passive current output
P_a / S_a	C	Active pulse output, frequency output, status output or limit switch (changeable)
P_p / S_p	E	Passive pulse output, frequency output, status output or limit switch (changeable)
P_N / S_N	F	Passive pulse output, frequency output, status output or limit switch acc. to NAMUR (changeable)
C_a	G	Active control input
C_p	K	Passive control input
C_N	H	Active control input to NAMUR Signal converter monitors cable breaks and short circuits acc. to EN 60947-5-6. Errors indicated on LC display. Error messages possible via status output.
IIn_a	P	Active current input
IIn_p	R	Passive current input
-	8	No additional module installed
-	0	No further module possible

4.4.3 Alterable input/output versions

This signal converter is available with various input/output combinations.

- The grey boxes in the tables denote unassigned or unused connection terminals.
- In the table, only the final digits of the CG no. are depicted.
- Term. = (connection) terminal

CG no.	Connection terminals								
	A+	A	A-	B	B-	C	C-	D	D-

Modular IOs (option)

CG no.	A+	A	A-	B	B-	C	C-	D	D-
4 _ _		max. 2 optional modules for term. A + B				I_a + HART® active		P_a / S_a active ①	
8 _ _		max. 2 optional modules for term. A + B				I_p + HART® passive		P_a / S_a active ①	
6 _ _		max. 2 optional modules for term. A + B				I_a + HART® active		P_p / S_p passive ①	
B _ _		max. 2 optional modules for term. A + B				I_p + HART® passive		P_p / S_p passive ①	
7 _ _		max. 2 optional modules for term. A + B				I_a + HART® active		P_N / S_N NAMUR ①	
C _ _		max. 2 optional modules for term. A + B				I_p + HART® passive		P_N / S_N NAMUR ①	

Modbus (Option)

CG no.	A+	A	A-	B	B-	C	C-	D	D-
G _ _ ②		max. 2 optional modules for term. A + B					Common	Sign. B (D1)	Sign. A (D0)
H _ _ ③		max. 2 optional modules for term. A + B					Common	Sign. B (D1)	Sign. A (D0)

① Changeable
② Not activated bus terminator
③ Activated bus terminator

Please fill in this form and fax or email it to your local representive. Please include a sketch of the pipe layout as well, including the X, Y, Z dimensions.

Customer information:

Date:	
Submitted by:	
Company:	
Address:	
Telephone:	
Fax:	
E-mail:	

Flow application data:

Reference information (name, tag etc):	
New application Existing application, currently using:	
Measurement objective:	
Medium	
Gas composition:	
CO_2 content:	
H_2 content:	
Density:	
Velocity of sound:	
Flowrate	
Normal:	
Minimum:	
Maximum:	
Temperature	
Normal:	
Minimum:	
Maximum:	
Pressure	
Normal:	
Minimum:	
Maximum:	

Piping details

Nominal pipe size:	
Outer diameter:	
Wall thickness / schedule:	
Pipe material:	
Pipe condition (old / new / painted / internal scaling / exterior rust):	
Liner material:	
Liner thickness:	
Straight inlet / outlet section (DN):	
Upstream situation (elbows, valves, pumps):	
Flow orientation (vertical up / horizontal / vertical down / other):	

Environment details

Corrosive atmosphere:	
Sea water:	
High humidity (% R.H.)	
Nuclear (radiation):	
Hazardous area:	
Additional details:	

Hardware requirements:

Accuracy requested (percentage of rate):	
Power supply (voltage, AC / DC):	
Analog output (4-20 mA)	
Pulse (specify minimum pulse width, pulse value):	
Digital protocol:	
Options:	
Remote mounted signal converter:	
Specify cable length:	
Accessories:	

KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature assemblies
- Pressure transmitters
- Analysis products
- Products and systems for the oil & gas industry
- Measuring systems for the marine industry

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