

### Ultrasonic Gas Flowmeters for Permanent Installation in Hazardous Areas

Especially designed for the stationary use in explosive atmosphere

#### Features

- Precise bi-directional and highly dynamic flow measurement with the non-intrusive clamp-on technology
- High precision at fast and slow flow rates, high temperature and zero point stability
- ATEX certified FLUXUS G800 is presented in a flame-proof housing (IP66) and can be operated by a magnet pen without opening the housing
- All stainless steel and seawater resistant FLUXUS G801 is ATEX certified and thus suited for offshore applications
- Automatic loading of calibration data and transducer detection for a fast and easy set-up (less than 5 min), providing precise and long-term stable results
- User-friendly design
- Transducers available for a wide range of inner pipe diameters (7...1600 mm) and fluid temperatures (-40...+200 °C)
- ATEX, IECEx approved transducers for hazardous areas available
- Measurement is unaffected by gas density, viscosity, composition, dust, humidity, temperature or pressure

#### Applications

Designed for industrial use in harsh environments, in gas processing and natural gas extraction, chemical industry and in the petroleum industry. Practical applications:

- Measurement on natural gas pipelines and in natural gas storage installations
- Measurement of synthesized gas and injection gas
- Measurement for the gas supply industry



FLUXUS G800



FLUXUS G801



Measurement with transducers mounted by Variofix L

# Table of Contents

<b>Function</b> .....	3
Measurement Principle .....	3
Calculation of Volumetric Flow Rate .....	3
Number of Sound Paths .....	4
Typical Measurement Setup .....	5
Standard Volumetric Flow Rate .....	5
<b>Flow Transmitter</b> .....	6
Technical Data .....	6
Dimensions .....	9
Wall and 2 " Pipe Mounting Kit.....	10
Terminal Assignment .....	11
<b>Transducers</b> .....	13
Transducer Selection .....	13
Transducer Order Code .....	16
Technical Data .....	17
<b>Transducer Mounting Fixture</b> .....	23
<b>Coupling Materials for Transducers</b> .....	25
<b>Damping Mats (optional)</b> .....	26
<b>Connection Systems</b> .....	28
Transducer Cable.....	28
<b>Junction Box</b> .....	29
Technical Data .....	29
Dimensions .....	29
2 " Pipe Mounting Kit (optional).....	30
Terminal Assignment .....	30

## Function

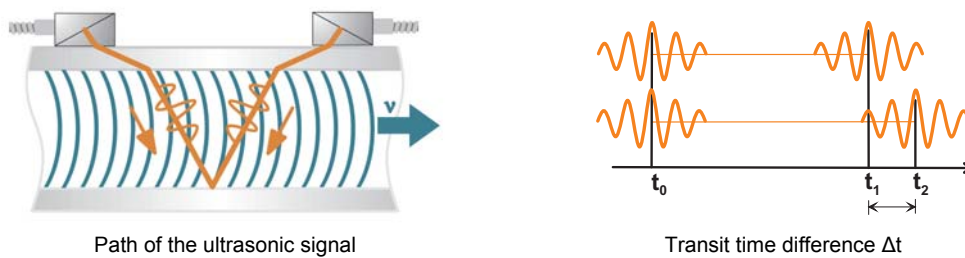
### Measurement Principle

In order to measure the flow of a medium in a pipe, ultrasonic signals are used, employing the transit time difference principle. Ultrasonic signals are emitted by a transducer installed on the pipe and received by a second transducer. These signals are emitted alternately in the flow direction and against it.

As the medium in which the signals propagate is flowing, the transit time of the ultrasonic signals in the flow direction is shorter than against the flow direction.

The transit time difference,  $\Delta t$ , is measured and allows the flowmeter to determine the average flow velocity along the propagation path of the ultrasonic signals. A flow profile correction is then performed in order to obtain the area averaged flow velocity, which is proportional to the volumetric flow rate.

Two integrated microprocessors control the entire measuring process. This allows the flowmeter to remove disturbance signals, and to check each received ultrasonic wave for its validity which reduces noise.



### Calculation of Volumetric Flow Rate

$$\dot{V} = k_{Re} \cdot A \cdot k_a \cdot \Delta t / (2 \cdot t_{fl})$$

where

- $\dot{V}$  - volumetric flow rate
- $k_{Re}$  - fluid mechanics calibration factor
- $A$  - cross-sectional pipe area
- $k_a$  - acoustical calibration factor
- $\Delta t$  - transit time difference
- $t_{fl}$  - transit time in the medium

### Number of Sound Paths

The number of sound paths is the number of transits of the ultrasonic signal through the medium in the pipe. Depending on the number of sound paths, the following methods of installation exist:

- **reflection arrangement**

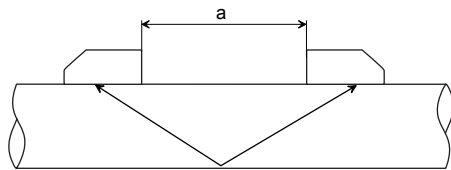
The number of sound paths is even. Both of the transducers are mounted on the same side of the pipe. Correct positioning of the transducers is easier.

- **diagonal arrangement**

The number of sound paths is odd. Both of the transducers are mounted on opposite sides of the pipe. In the case of a high signal attenuation by the medium, pipe and coatings, diagonal arrangement with 1 sound path will be used.

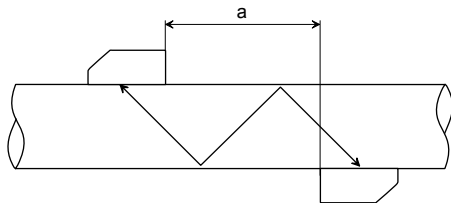
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the transmitter.

As the transducers can be mounted with the transducer mounting fixture in reflection arrangement or diagonal arrangement, the number of sound paths can be adjusted optimally for the application.

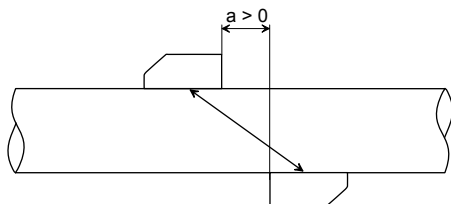


a - transducer distance

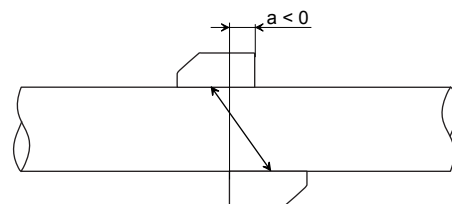
Reflection arrangement, number of sound paths: 2



Diagonal arrangement, number of sound paths: 3

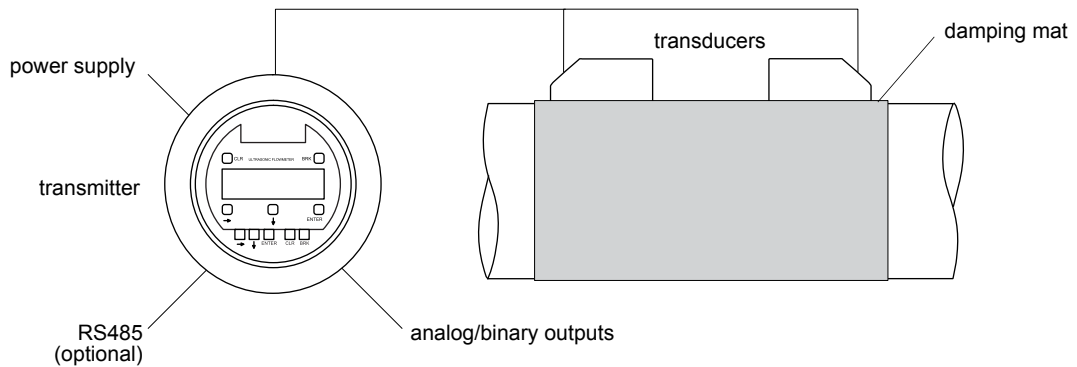


Diagonal arrangement, number of sound paths: 1



Diagonal arrangement, number of sound paths: 1, negative transducer distance

## Typical Measurement Setup



Example of a gas flow measurement in reflection arrangement with standard volumetric flow rate output

## Standard Volumetric Flow Rate

The standard volumetric flow rate can be selected as physical quantity to be measured. It will be calculated internally by:

$$\dot{V}_N = \dot{V} \cdot p/p_N \cdot T_N/T \cdot 1/K$$

where

- $\dot{V}_N$  - standard volumetric flow rate
- $\dot{V}$  - operating volumetric flow rate
- $p_N$  - standard pressure (absolute value)
- $p$  - operating pressure (absolute value)
- $T_N$  - standard temperature in K
- $T$  - operating temperature in K
- $K$  - compressibility coefficient of the gas: ratio of the compressibility factors of the gas at operating conditions and at standard conditions  $Z/Z_N$



The operational pressure  $p$  and the operational temperature  $T$  of the medium will be entered directly as fixed values into the transmitter.










The gas compressibility coefficient  $K$  of the gas is entered in the transmitter:

- as fixed value or
- as approximation according to e.g. AGA8 or GERG

## Flow Transmitter

### Technical Data

FLUXUS	G800 G800L G800P G800LP	G800C24 G800LC24	G801 G801P	G801C24
design	explosion proof field device		explosion proof offshore device	
				
<b>measurement</b>				
measurement principle	transit time difference correlation principle			
flow velocity	0.01...35 m/s, depending on pipe diameter			
repeatability	0.15 % of reading ±0.01 m/s			
medium	all acoustically conductive gases, e.g. nitrogen, air, oxygen, hydrogen, argon, helium, ethylene, propane			
temperature compensation	corresponding to the recommendations in ANSI/ASME MFC-5.1-2011			
<b>accuracy</b>				
volumetric flow rate	± 1...3 % of reading ±0.01 m/s depending on application ± 0.5 % of reading ±0.01 m/s with field calibration			
<b>flow transmitter</b>				
power supply	100...240 V/50...60 Hz or 20...32 V DC or on request: 11...16 V DC	24 V DC ±10 %	100...240 V/50...60 Hz or 20...32 V DC or on request: 11...16 V DC	24 V DC ±10 %
power consumption	< 10 W	< 4 W	< 10 W	< 4 W
number of flow measuring channels	1, optional: 2	1, optional: 2	1, optional: 2	1, optional: 2
signal attenuation	0...100 s, adjustable			
measuring cycle (1 channel)	100...1000 Hz			
response time	1 s (1 channel), option: 70 ms			
housing material	cast aluminum G800, G800P, G800C24: powder coated G800L, G800LP, G800LC24: special offshore coating		stainless steel 316/316L (1.4401, 1.4404, 1.4432)	
degree of protection according to IEC/EN 60529	IP66		IP66	
dimensions	see dimensional drawing			
weight	6 kg		8.5 kg	
fixation	wall mounting, 2" pipe mounting			
ambient temperature	-20...+60 °C	-20...+50 °C	-20...+50 °C	-20...+50 °C
display	2 x 16 characters, dot matrix, backlight			
menu language	English, German, French, Dutch, Spanish			

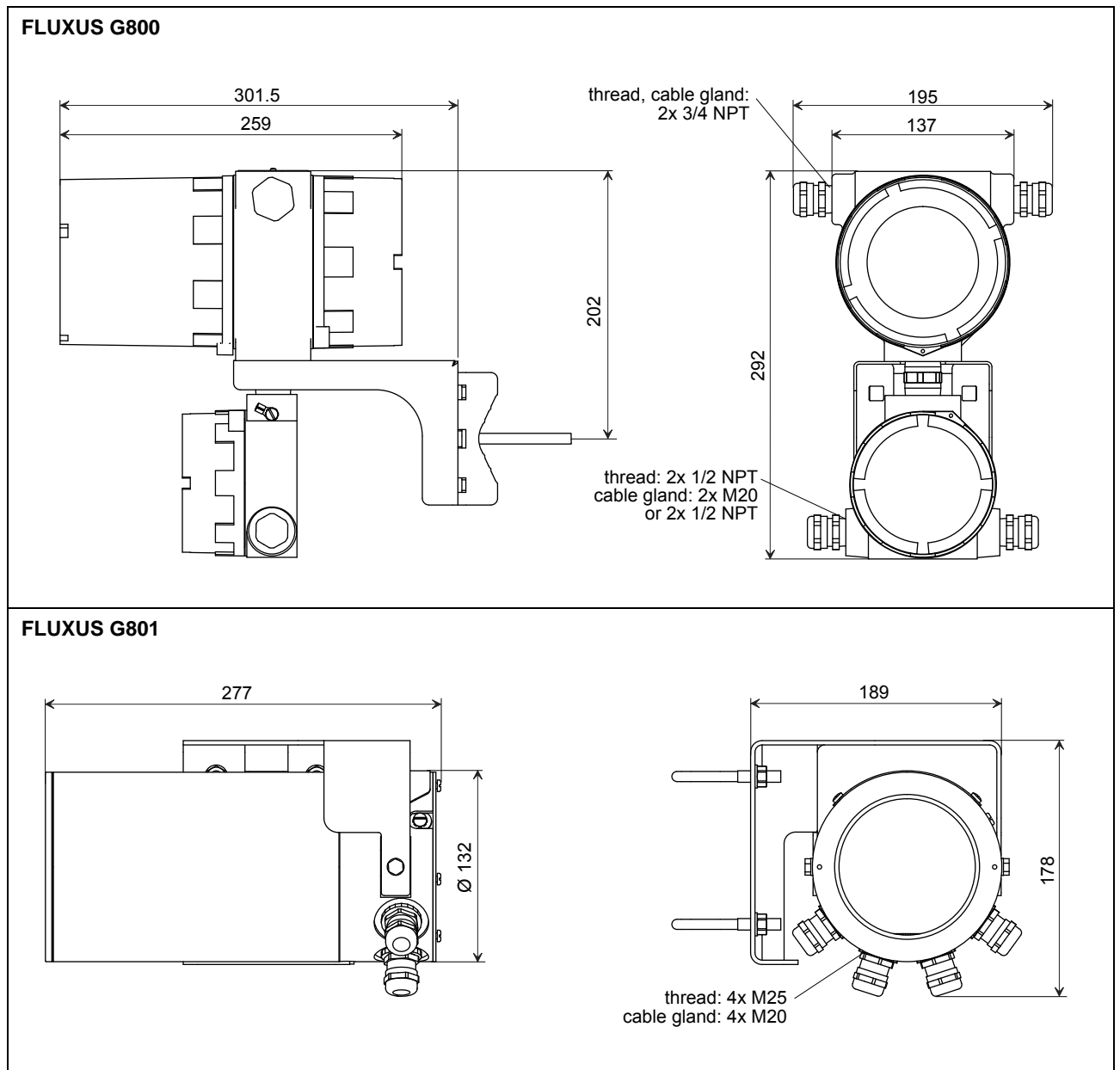
FLUXUS	G800 G800L G800P G800LP	G800C24 G800LC24	G801 G801P	G801C24	
<b>explosion protection</b>					
ATEX	zone	1	1	1	1
	marking	<b>G800:</b> CE 0637  II2G Ex d e IIC T6 T <sub>a</sub> -20...+60 °C  <b>G800L:</b> CE 0637  II2G Ex d e IIB T6 T <sub>a</sub> -20...+60 °C  <b>G800P:</b> CE 0637  II2G Ex d e IIC T4 T <sub>a</sub> -20...+60 °C  <b>G800LP:</b> CE 0637  II2G Ex d e IIB T4 T <sub>a</sub> -20...+60 °C	<b>G800C24:</b> CE 0637  II2G Ex d e [ib] IIC T4 T <sub>a</sub> -20...+50 °C  <b>G800LC24:</b> CE 0637  II2G Ex d e [ib] IIB T4 T <sub>a</sub> -20...+50 °C	<b>G801:</b> CE 0637  II2G Ex d e IIC T6 T <sub>a</sub> -20...+50 °C  <b>G801P:</b> CE 0637  II2G Ex d e IIC T4 T <sub>a</sub> -20...+50 °C	CE 0637  II2G Ex d e [ib] IIC T4 T <sub>a</sub> -20...+50 °C
	certification	IBExU01ATEX1064	IBExU01ATEX1064	IBExU05ATEX1078	IBExU05ATEX1078
	type of protection	electronics compartment: flameproof enclosure  connection compartment: increased safety	electronics compartment: flameproof enclosure  connection compartment: increased safety  output circuits: intrinsic safety	electronics compartment: flameproof enclosure  connection compartment: increased safety	electronics compartment: flameproof enclosure  connection compartment: increased safety  output circuits: intrinsic safety
intrinsic safety parameters	-	U <sub>m</sub> = 250 V AC  intrinsically safe outputs: U <sub>i</sub> = 28.2 V P <sub>i</sub> = 0.76 W L <sub>i</sub> , C <sub>i</sub> negligible	-	U <sub>m</sub> = 250 V AC  intrinsically safe outputs: U <sub>i</sub> = 28.2 V P <sub>i</sub> = 0.76 W L <sub>i</sub> , C <sub>i</sub> negligible	
<b>measuring functions</b>					
physical quantities	operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity				
totalizer	volume, mass				
calculation functions	average, difference, sum (2 measuring channels necessary)				
diagnostic functions	sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times				
<b>data logger</b>					
loggable values	all physical quantities, totaled values and diagnostic values				
capacity	> 100 000 measured values				
<b>communication</b>					
interface	- process integration (optional): RS485 (emitter) or Modbus/RS485 (emitter) or HART  - diagnosis: RS232 <sup>1</sup>	- diagnosis: RS232 <sup>1</sup>	- process integration (optional): RS485 (emitter) or Modbus/RS485 (emitter) or HART  - diagnosis: RS232 <sup>1</sup>	- diagnosis: RS232 <sup>1</sup>	
<b>serial data kit (optional)</b>					
software (all Windows™ versions)	- FluxData: download of measurement data, graphical presentation, conversion to other formats (e.g. for Excel™) - FluxKoeff: creating medium data sets				
cable	RS232 <sup>1</sup>				
adapter	RS232 - USB <sup>1</sup>				

<sup>1</sup> connection of the interface RS232 outside of explosive atmosphere (housing cover open)

FLUXUS	G800 G800L G800P G800LP	G800C24 G800LC24	G801 G801P	G801C24
<b>outputs (optional)</b>				
The outputs are galvanically isolated from the transmitter.				
number	current output: 1...2 and binary output (open collector (A)): 1...4  <b>or</b> current output: 1...2 and binary output (open collector (A)): 1...2 and binary output (Reed relays): 0...2  <b>or</b> frequency output: 1 and binary output (open collector (B)): 1	current output: 1 and binary output (open collector (A)): 1	current output: 1...2 and binary output (open collector (A)): 1...4  <b>or</b> current output: 1...2 and binary output (open collector (A)): 1...2 and binary output (Reed relays): 0...2  <b>or</b> frequency output: 1 and binary output (open collector (B)): 1	current output: 1 and binary output (open collector (A)): 1
<b>current output</b>				
current output I1, I2 - range - accuracy - active output  - passive output	0/4...20 mA 0.1 % of reading ±15 µA  <b>G800, G800L:</b> R <sub>ext</sub> < 500 Ω <b>G800P, G800LP:</b> U <sub>ext</sub> = 4...26.4 V, depending on R <sub>ext</sub> R <sub>ext</sub> < 1 kΩ	4...20 mA 0.1 % of reading ±15 µA  -  U <sub>ext</sub> = 4...28.2 V, depending on R <sub>ext</sub> R <sub>ext</sub> < 1 kΩ intrinsic safety	0/4...20 mA 0.1 % of reading ±15 µA  <b>G801:</b> R <sub>ext</sub> < 500 Ω  <b>G801P:</b> U <sub>ext</sub> = 4...26.4 V, depending on R <sub>ext</sub> R <sub>ext</sub> < 1 kΩ	4...20 mA 0.1 % of reading ±15 µA  -  U <sub>ext</sub> = 4...28.2 V, depending on R <sub>ext</sub> R <sub>ext</sub> < 1 kΩ intrinsic safety
current output I1 in HART mode - range - passive output	4...20 mA U <sub>ext</sub> = 10...24 V	- -	4...20 mA U <sub>ext</sub> = 10...24 V	- -
<b>frequency output (optional) (G800P, G801P)</b>				
range open collector	0...5 kHz 30 V/100 mA optional: 8.2 V DIN EN 60947-5-6 (NAMUR)	- -	0...5 kHz 30 V/100 mA optional: 8.2 V DIN EN 60947-5-6 (NAMUR)	- -
<b>binary output</b>				
Reed relay open collector (A)	48 V/0.25 A 24 V/4 mA	- 24 V/4 mA intrinsic safety	48 V/0.25 A 24 V/4 mA	- 24 V/4 mA intrinsic safety
open collector (B), optional	30 V/100 mA	-	30 V/100 mA	-
binary output as alarm output - functions	limit, change of flow direction or error	limit, change of flow direction or error	limit, change of flow direction or error	limit, change of flow direction or error
binary output as pulse output - pulse value - pulse width	0.01...1000 units 1...1000 ms	0.01...1000 units 1...1000 ms	0.01...1000 units 1...1000 ms	0.01...1000 units 1...1000 ms



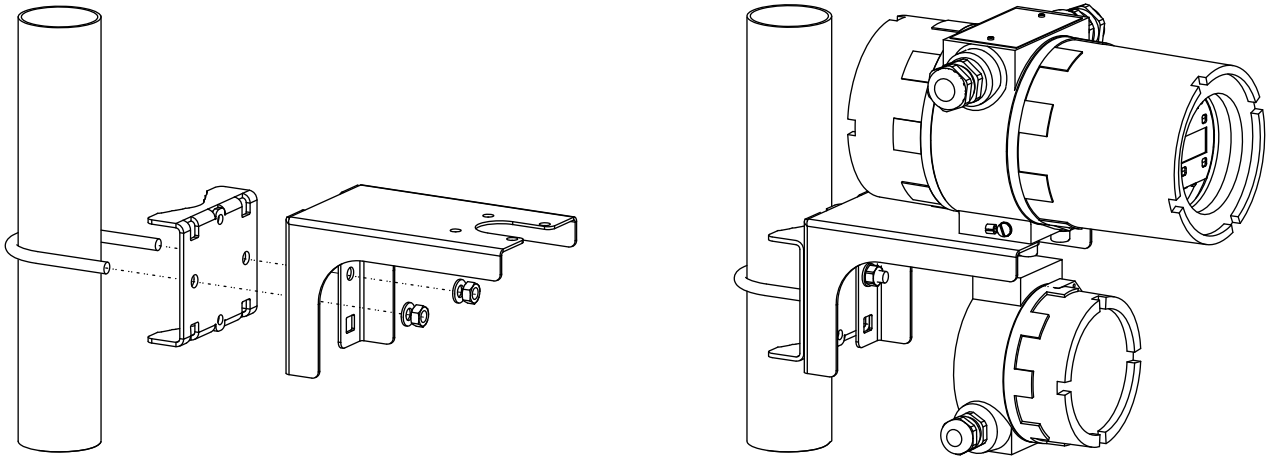
**Dimensions**



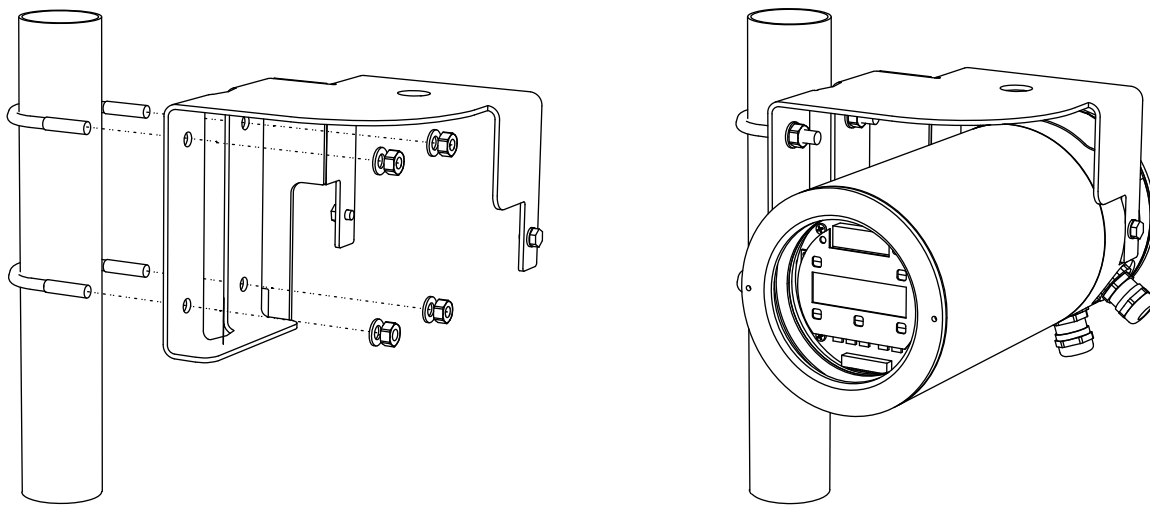
in mm

### Wall and 2 " Pipe Mounting Kit

#### FLUXUS G800



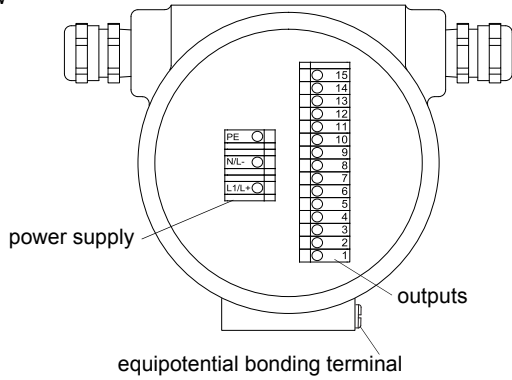
#### FLUXUS G801



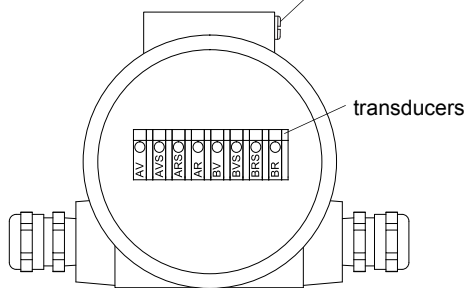
## Terminal Assignment

**FLUXUS G800, G800L, G800P (transmitter without frequency output), G800LP**

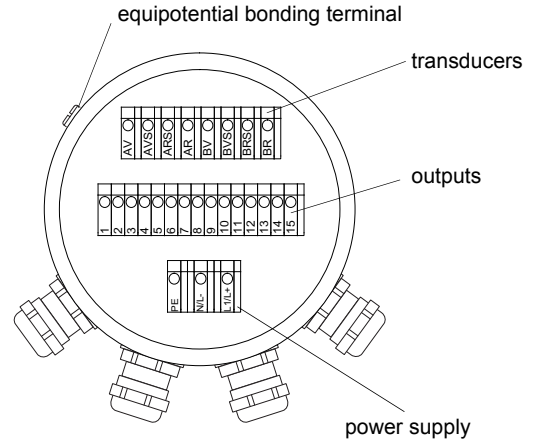
upper housing, back view



lower housing, front view



**FLUXUS G801, G801P (transmitter without frequency output)**



### power supply

AC		DC	
terminal	connection	terminal	connection
PE	earth	PE	earth
N	neutral	L-	-
L1	phase	L+	+

### transducers

measuring channel A		measuring channel B	
terminal	connection	terminal	connection
AV	transducer  signal	BV	transducer  signal
AVS	transducer  internal shield	BVS	transducer  internal shield
ARS	transducer  internal shield	BRS	transducer  internal shield
AR	transducer  signal	BR	transducer  signal
cable gland	external shield	cable gland	external shield

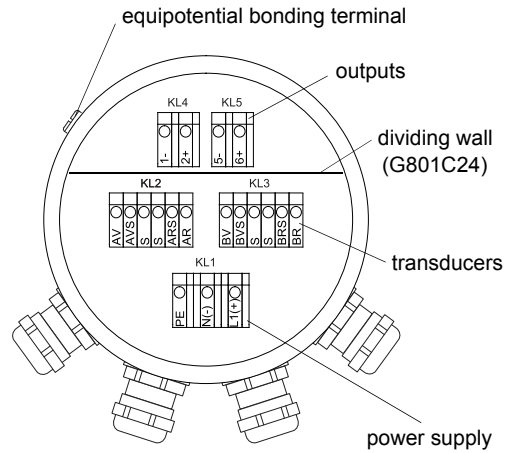
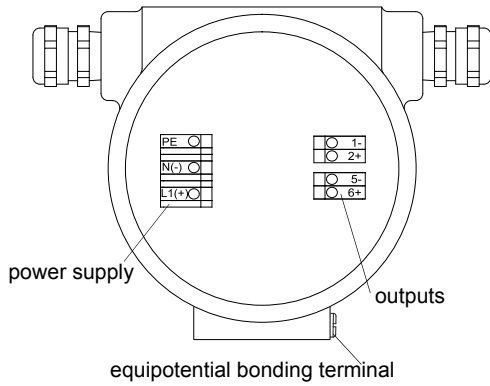
### outputs

terminal	connection
1(-), 2(+)	current output I1
3(-), 4(+)	current output I2 (optional)
5(-), 6(+)	binary output B1 (open collector)
7(-), 8(+)	binary output B2 (open collector, optional)
9(a), 10(b)	binary output B3 (open collector or Reed relay, optional)
11(a), 12(b)	binary output B4 (open collector or Reed relay, optional)
13(B-), 14(A+)	RS485 (optional)

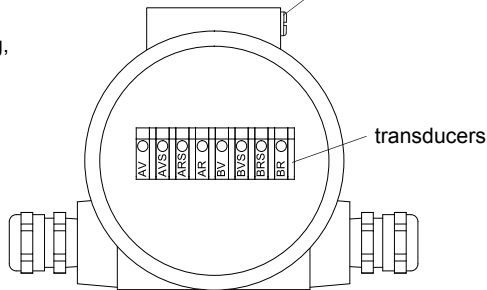
**FLUXUS G800C24, G800LC24, G800P (transmitter with frequency output)**

**FLUXUS G801C24, G801P (transmitter with frequency output)**

upper housing, back view



lower housing, front view



**power supply**

AC (G800P, G801P)		DC	
terminal	connection	terminal	connection
PE	earth	PE	earth
N	neutral	L-	-
L1	phase	L+	+

**transducers**

measuring channel A		measuring channel B	
terminal	connection	terminal	connection
AV	transducer ↑, signal	BV	transducer ↑, signal
AVS	transducer ↑, internal shield	BVS	transducer ↑, internal shield
ARS	transducer ↗, internal shield	BRS	transducer ↗, internal shield
AR	transducer ↗, signal	BR	transducer ↗, signal
S	not connected	S	not connected
cable gland	external shield	cable gland	external shield

**outputs**

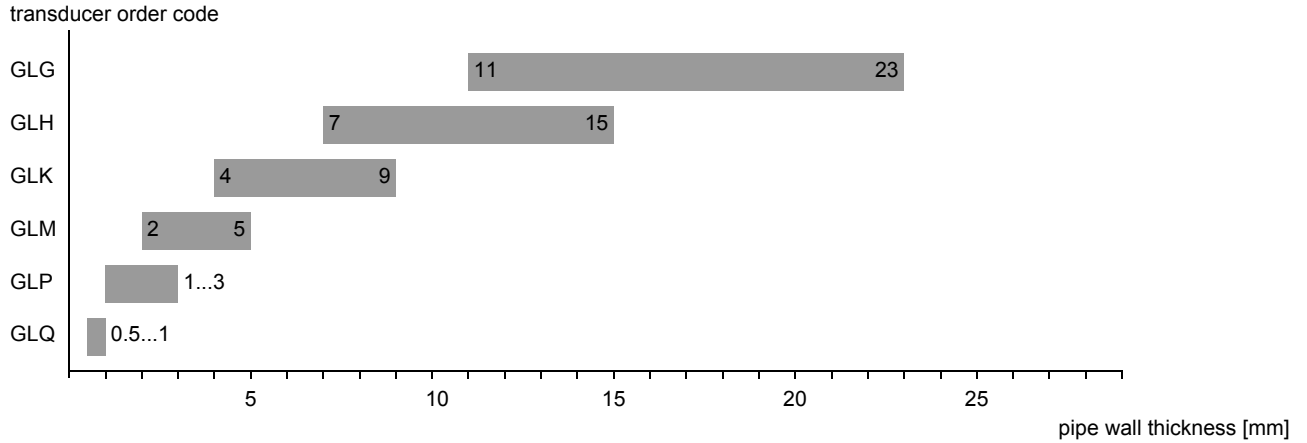
	G800C24, G800LC24, G801C24	G800P, G801P
color of terminals	blue (intrinsic safety)	green
<b>terminal</b>	<b>connection</b>	
1(-), 2(+)	current output I1	frequency output F1
5(-), 6(+)	binary output B1 (open collector)	binary output B1 (open collector)

## Transducers

### Transducer Selection

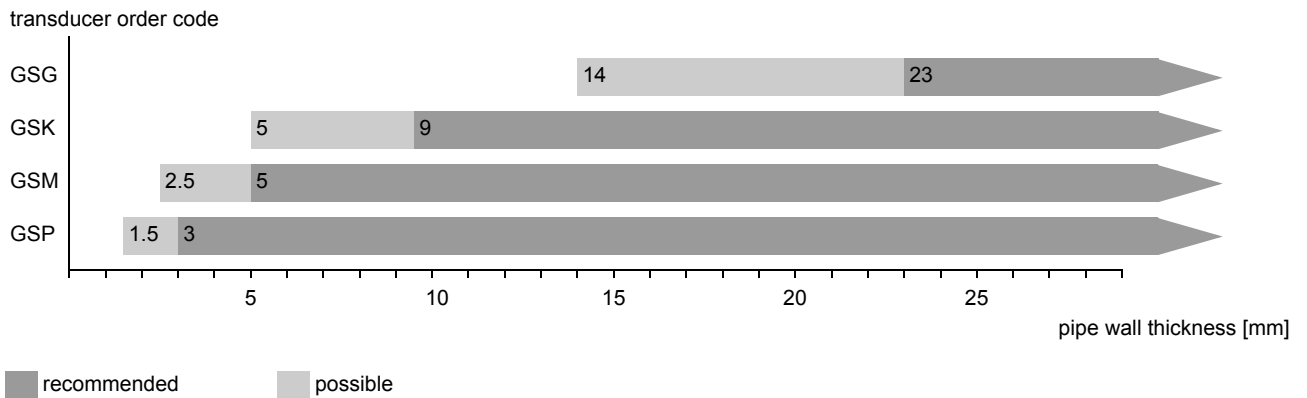
#### Step 1a

Select a Lamb wave transducer:



#### Step 1b

If the pipe wall thickness is not in the range of the Lamb wave transducers, select a shear wave transducer:

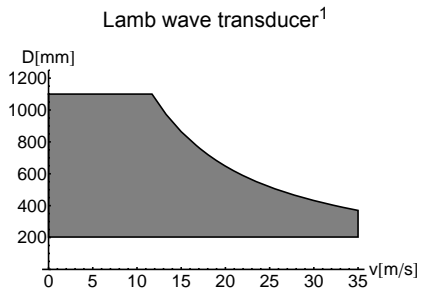


#### Step 2

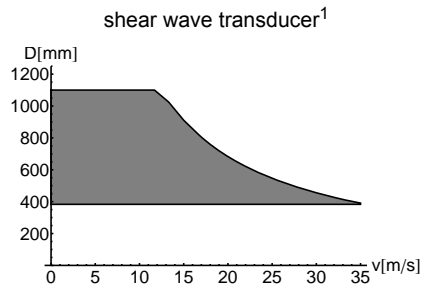
inner pipe diameter  $d$  dependent on the flow velocity  $v$  of the medium in the pipe

The transducers are selected from the characteristics (see next page). Lamb wave transducers are selected from the left column, shear wave transducers from the right column.

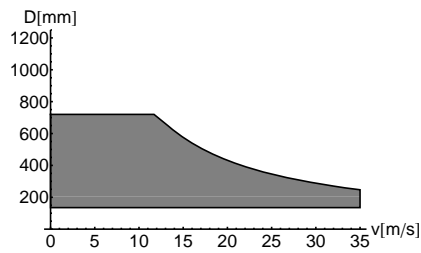
Lamb wave transducers: If the values  $d$  and  $v$  are not in the range, the diagonal arrangement with 1 sound path may be used, i.e. the same characteristics can be used with doubling the inner pipe diameter. If the values are still not in the range, shear waves transducers regarding the pipe wall thickness have to be selected in step 1b.



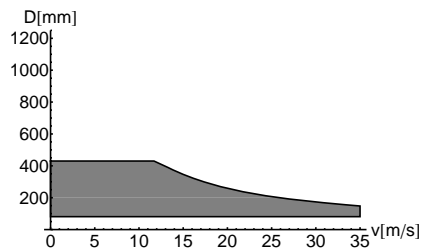
GLG



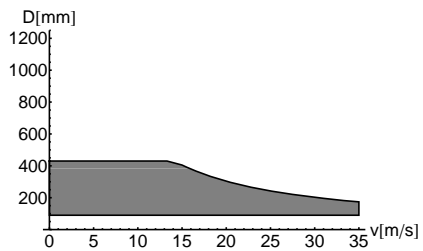
GSG



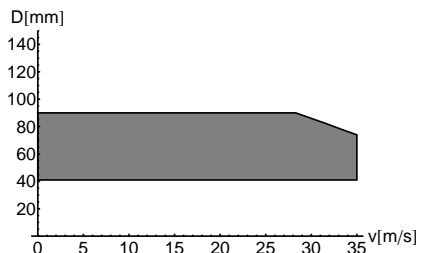
GLH



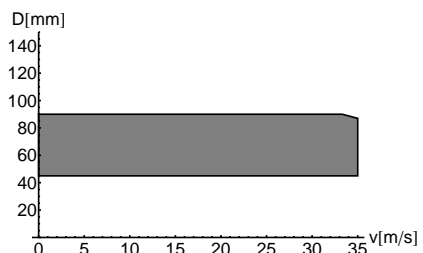
GLK



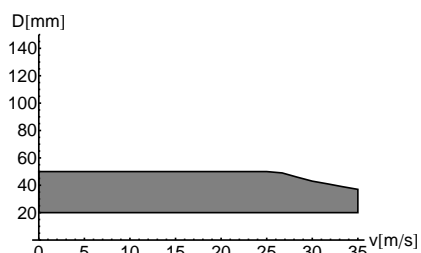
GSK



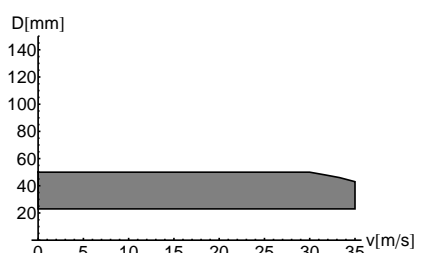
GLM



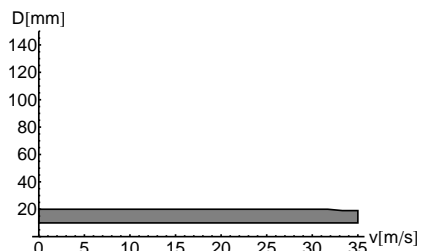
GSM



GLP



GSP



GLQ

<sup>1</sup> inner pipe diameter and max. flow velocity for a typical application with natural gas, nitrogen, oxygen in reflection arrangement with 2 sound paths (Lamb wave transducers)/1 sound path (shear wave transducers)

**Step 3**

min. medium pressure

Lamb wave transducer			
transducer order code	medium pressure <sup>1</sup> [bar]		
	metal pipe		plastic pipe
	min.	min. extended	min.
GLG	15	10	1
GLH	15	10	1
GLK	15 (d > 120 mm) 10 (d < 120 mm)	10 (d > 120 mm) 5 (d < 120 mm)	1
GLM	10 (d > 60 mm) 5 (d < 60 mm)	-	1
GLP	10 (d > 35 mm) 5 (d < 35 mm)	-	1
GLQ	10 (d > 15 mm) 5 (d < 15 mm)	-	1

shear wave transducer			
transducer order code	medium pressure <sup>1</sup> [bar]		
	metal pipe		plastic pipe
	min.	min. extended	min.
GSG	30	20	1
GSK	30	20	1
GSM	30	20	1
GSP	30	20	1

<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

d - inner pipe diameter

**Example**

step						
1	pipe wall thickness selected transducer	mm	12 GLG or GLH	12 GLG or GLH	12 GLG or GLH	30 GS
2	inner pipe diameter max. flow velocity selected transducer	mm m/s	800 15 GLG	600 15 GLG or GLH	800 30 values not in the range of the characteristics, but by using diagonal arrangement with 1 sound path, the inner pipe diameter in the characteristics is doubled: GLG	300 15 GSK
3	min. medium pressure selected transducer	bar	17 GLG	17 GLG or GLH influence of acoustic noise is reduced with increased transducer frequency, thus recommended: GLH	17 GLG	35 GSK

**Step 4**

for the characters 4...11 of the transducer order code (ambient temperature, explosion protection, connection system, extension cable) see page 16

**Step 5**

for the technical data of the selected transducer see page 17 et seqq.

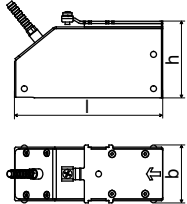
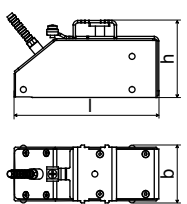
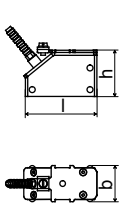
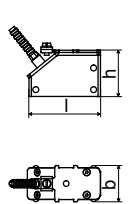
### Transducer Order Code

1, 2	3	4	5, 6	7, 8	9...11	12, 13	no. of character		
transducer	transducer frequency	-	ambient temperature	explosion protection	connection system	-	extension cable	/	option
GL	set of ultrasonic flow transducers for gas measurement, Lamb wave								
GS	set of ultrasonic flow transducers for gas measurement, shear wave								
G	0.2 MHz								
H	0.3 MHz (Lamb wave only)								
K	0.5 MHz								
M	1 MHz								
P	2 MHz								
Q	4 MHz (Lamb wave only)								
		N	normal temperature range						
		E	extended temperature range (shear wave transducers with transducer frequency M, P)						
			A1	ATEX zone 1/IECEx zone 1					
				TS	direct connection or connection via junction box				
						XXX	cable length in m, for max. length of extension cable see page 28		
						connection system TS: 0 m: without junction box > 0 m: with junction box JB01			
							IP68	degree of protection IP68	
							OS	housing with stainless steel 316	
example									
GL	K	-	N	A1	TS	-	030		Lamb wave transducer 0.5 MHz, normal temperature range, ATEX zone 1/IECEx zone 1, connection system TS with junction box JB01 and extension cable 30 m
		-				-		/	



## Technical Data

### Shear Wave Transducers (zone 1)

technical type		GDG1N81	GDK1N81	GDM2N81	GDP2N81
order code		<b>GSG-NA1TS</b> <b>GSG-NA1TS/OS</b>	<b>GSK-NA1TS</b> <b>GSK-NA1TS/OS</b>	<b>GSM-NA1TS</b> <b>GSM-NA1TS/OS</b>	<b>GSP-NA1TS</b> <b>GSP-NA1TS/OS</b>
transducer frequency	MHz	0.2	0.5	1	2
<b>medium pressure<sup>1</sup></b>					
min. extended min.	bar bar	metal pipe: 20 metal pipe: 30 plastic pipe: 1	metal pipe: 20 metal pipe: 30 plastic pipe: 1	metal pipe: 20 metal pipe: 30 plastic pipe: 1	metal pipe: 20 metal pipe: 30 plastic pipe: 1
<b>inner pipe diameter d<sup>2</sup></b>					
min. extended	mm	250	70	30	15
min. recommended	mm	380	80	40	20
max. recommended	mm	810	500	80	40
max. extended	mm	1100	720	120	60
<b>pipe wall thickness</b>					
min.	mm	14	5	2.5	1.5
max.	mm	-	-	-	-
<b>material</b>					
housing		PEEK with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	PEEK with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	PEEK with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	PEEK with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)
contact surface		PEEK	PEEK	PEEK	PEEK
degree of protection according to IEC/EN 60529		IP65	IP65	IP65	IP65
<b>transducer cable</b>					
type		1699	1699	1699	1699
length	m	5	5	4	4
<b>dimensions</b>					
length l	mm	129.5	126.5	64	64
width b	mm	51	51	32	32
height h	mm	67	67.5	40.5	40.5
dimensional drawing					
<b>ambient temperature</b>					
min.	°C	-40	-40	-40	-40
max.	°C	+130	+130	+130	+130
temperature compensation		x	x	x	x
<b>explosion protection</b>					
category zone		gas: 2G 1	dust: 2D 21	gas: 2G 1	dust: 2D 21
<b>explosion protection temperature (pipe surface)</b>					
min.	°C	-55	-55	-55	-55
max.	°C	+180	+180	+180	+180
marking		CE 0637 Ex II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db
certification ATEX		IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X
certification IECEx		IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X
type of protection		gas: increased safety, powder filling dust: protection by enclosure	gas: increased safety, powder filling dust: protection by enclosure	gas: increased safety, powder filling dust: protection by enclosure	gas: increased safety, powder filling dust: protection by enclosure
transducer mounting fixture necessary		x	x	x	x

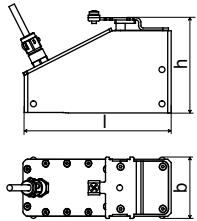
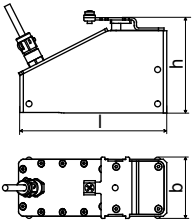
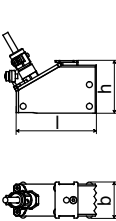
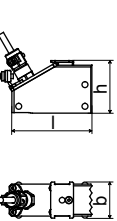
<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

<sup>2</sup> shear wave transducer:

typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request

pipe diameter min. recommended/max. recommended/max. extended: in diagonal arrangement and for a flow velocity of 15 m/s

**Shear Wave Transducers (zone 1, IP68)**

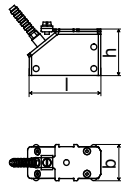
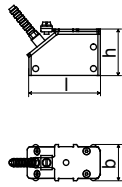
technical type		GDG1L11	GDK1L11	GDM2L11	GDP2L11
order code		<b>GSG-NA1TS/IP68</b>	<b>GSK-NA1TS/IP68</b>	<b>GSM-NA1TS/IP68</b>	<b>GSP-NA1TS/IP68</b>
transducer frequency		MHz 0.2	0.5	1	2
<b>medium pressure<sup>1</sup></b>					
min. extended	bar	metal pipe: 20	metal pipe: 20	metal pipe: 20	metal pipe: 20
min.	bar	metal pipe: 30 plastic pipe: 1	metal pipe: 30 plastic pipe: 1	metal pipe: 30 plastic pipe: 1	metal pipe: 30 plastic pipe: 1
<b>inner pipe diameter d<sup>2</sup></b>					
min. extended	mm	250	70	30	15
min. recommended	mm	380	80	40	20
max. recommended	mm	810	500	80	40
max. extended	mm	1100	720	120	60
<b>pipe wall thickness</b>					
min.	mm	14	5	2.5	1.5
max.	mm	-	-	-	-
<b>material</b>					
housing		PEEK with stainless steel cap 316Ti (1.4571)	PEEK with stainless steel cap 316Ti (1.4571)	PEEK with stainless steel cap 316Ti (1.4571)	PEEK with stainless steel cap 316Ti (1.4571)
contact surface		PEEK	PEEK	PEEK	PEEK
degree of protection according to IEC/EN 60529		IP68 <sup>3</sup>	IP68 <sup>3</sup>	IP68 <sup>3</sup>	IP68 <sup>3</sup>
<b>transducer cable</b>					
type		2550	2550	2550	2550
length	m	12	12	12	12
<b>dimensions</b>					
length l	mm	130	130	72	72
width b	mm	54	54	32	32
height h	mm	83.5	83.5	46	46
dimensional drawing					
<b>ambient temperature</b>					
min.	°C	-40	-40	-40	-40
max.	°C	+100	+100	+100	+100
temperature compensation		x	x	x	x
<b>explosion protection</b>					
category zone		gas: 2G dust: 2D 1 21	gas: 2G dust: 2D 1 21	gas: 2G dust: 2D 1 21	gas: 2G dust: 2D 1 21
<b>explosion protection temperature (pipe surface)</b>					
min.	°C	-55	-55	-55	-55
max.	°C	+180	+180	+180	+180
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC TX Db
certification ATEX		IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X
certification IECEx		IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X
type of protection		gas: powder filling dust: protection by enclosure	gas: powder filling dust: protection by enclosure	gas: powder filling dust: protection by enclosure	gas: powder filling dust: protection by enclosure
transducer mounting fixture necessary		x	x	x	x

<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

<sup>2</sup> shear wave transducer:  
typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request  
pipe diameter min. recommended/max. recommended/max. extended: in diagonal arrangement and for a flow velocity of 15 m/s

<sup>3</sup> test conditions: 3 months/2 bar (20 m)/20 °C

**Shear Wave Transducers (zone 1, extended temperature range)**

technical type		GDM2E85		GDP2E85	
order code		<b>GSM-EA1TS</b> <b>GSM-EA1TS/OS</b>		<b>GSP-EA1TS</b> <b>GSP-EA1TS/OS</b>	
transducer frequency		MHz	1		2
<b>medium pressure<sup>1</sup></b>					
min. extended min.		bar	metal pipe: 20 metal pipe: 30 plastic pipe: 1		metal pipe: 20 metal pipe: 30 plastic pipe: 1
<b>inner pipe diameter d<sup>2</sup></b>					
min. extended		mm	30		15
min. recommended		mm	40		20
max. recommended		mm	80		40
max. extended		mm	120		60
<b>pipe wall thickness</b>					
min.		mm	2.5		1.5
max.		mm	-		-
<b>material</b>					
housing			PI with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)		PI with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)
contact surface			PI		PI
degree of protection according to IEC/EN 60529			IP56		IP56
<b>transducer cable</b>					
type		m	6111		6111
length		m	4		4
<b>dimensions</b>					
length l		mm	64		64
width b		mm	32		32
height h		mm	40.5		40.5
dimensional drawing					
<b>ambient temperature</b>					
min.		°C	-30		-30
max.		°C	+200		+200
temperature compensation			x		x
<b>explosion protection</b>					
category zone			gas: 2G    dust: 3D 1            22		gas: 2G    dust: 3D 1            22
<b>explosion protection temperature (pipe surface)</b>					
min.		°C	-45		-45
max.		°C	+225		+225
marking			CE 0637 Ex e q IIC T6...T2 Gb Ex tb IIIA TX Db II2G II2D		CE 0637 Ex e q IIC T6...T2 Gb Ex tb IIIA TX Db II2G II2D
certification ATEX			IBExU07ATEX1168 X		IBExU07ATEX1168 X
certification IECEx			IECEx IBE 08.0007X		IECEx IBE 08.0007X
type of protection			gas: increased safety, powder filling dust: protection by enclosure		gas: increased safety, powder filling dust: protection by enclosure
transducer mounting fixture necessary			x		x

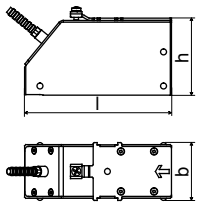
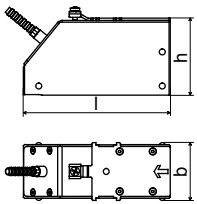
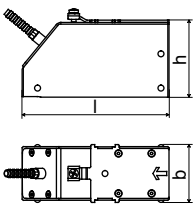
<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

<sup>2</sup> shear wave transducer:

typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request

pipe diameter min. recommended/max. recommended/max. extended: in diagonal arrangement and for a flow velocity of 15 m/s

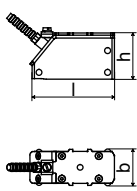
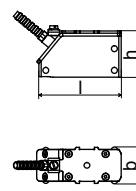
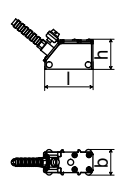
**Lamb Wave Transducers (zone 1)**

technical type		GRG1N83	GRH1N83	GRK1N83
order code		<b>GLG-NA1TS</b> <b>GLG-NA1TS/OS</b>	<b>GLH-NA1TS</b> <b>GLH-NA1TS/OS</b>	<b>GLK-NA1TS</b> <b>GLK-NA1TS/OS</b>
transducer frequency		MHz 0.2	0.3	0.5
<b>medium pressure<sup>1</sup></b>				
min. extended		bar metal pipe: 10	metal pipe: 10	metal pipe: 10 (d > 120 mm) 5 (d < 120 mm)
min.		bar metal pipe: 15 plastic pipe: 1	metal pipe: 15 plastic pipe: 1	metal pipe: 15 (d > 120 mm) 10 (d < 120 mm) plastic pipe: 1
<b>inner pipe diameter d<sup>2</sup></b>				
min. extended		mm 190	120	60
min. recommended		mm 220	140	80
max. recommended		mm 900	600	300
max. extended		mm 1600	1000	500
<b>pipe wall thickness</b>				
min.		mm 11	7	4
max.		mm 23	15	9
<b>material</b>				
housing		PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)
contact surface		PPSU	PPSU	PPSU
degree of protection according to IEC/EN 60529		IP65	IP65	IP65
<b>transducer cable</b>				
type		1699	1699	1699
length		m 5	5	5
<b>dimensions</b>				
length l		mm 128.5	128.5	128.5
width b		mm 51	51	51
height h		mm 67.5	67.5	67.5
dimensional drawing				
<b>ambient temperature</b>				
min.		°C -40	-40	-40
max.		°C +170	+170	+170
temperature compensation		x	x	x
<b>explosion protection</b>				
category		gas: 2G dust: 2D	gas: 2G dust: 2D	gas: 2G dust: 2D
zone		1 21	1 21	1 21
<b>explosion protection temperature (pipe surface)</b>				
min.		°C -55	-55	-55
max.		°C +140	+140	+140
marking		CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db
certification ATEX		IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X
certification IECEx		IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X
type of protection		gas: increased safety, powder filling dust: protection by enclosure	gas: increased safety, powder filling dust: protection by enclosure	gas: increased safety, powder filling dust: protection by enclosure
transducer mounting fixture necessary		x	x	x

<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

<sup>2</sup> Lamb wave transducer:  
typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request  
pipe diameter min. recommended/max. recommended: in reflection arrangement and for a flow velocity of 15 m/s  
pipe diameter max. extended: in diagonal arrangement and for a flow velocity of 25 m/s

### Lamb Wave Transducers (zone 1)

technical type		GRM1N83		GRP1N83		GRQ1N83	
order code		<b>GLM-NA1TS</b> <b>GLM-NA1TS/OS</b>		<b>GLP-NA1TS</b> <b>GLP-NA1TS/OS</b>		<b>GLQ-NA1TS</b> <b>GLQ-NA1TS/OS</b>	
transducer frequency		MHz 1		2		4	
<b>medium pressure<sup>1</sup></b>							
min. extended min.		bar	-	-	-	bar	-
		bar	metal pipe: 10 (d > 60 mm) 5 (d < 60 mm) plastic pipe: 1	metal pipe: 10 (d > 35 mm) 5 (d < 35 mm) plastic pipe: 1	metal pipe: 10 (d > 15 mm) 5 (d < 15 mm) plastic pipe: 1		
<b>inner pipe diameter d<sup>2</sup></b>							
min. extended		mm	30	15	7		
min. recommended		mm	40	20	10		
max. recommended		mm	90	50	22		
max. extended		mm	150	70	35		
<b>pipe wall thickness</b>							
min.		mm	2	1	0.5		
max.		mm	5	3	1		
<b>material</b>							
housing		PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)		PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)		PPSU with stainless steel cap 304 (1.4301), option OS: 316L (1.4404)	
contact surface		PPSU		PPSU		PPSU	
degree of protection according to IEC/ EN 60529		IP65		IP65		IP65	
<b>transducer cable</b>							
type		1699		1699		1699	
length		m	4	4	3		
<b>dimensions</b>							
length l		mm	74	74	42		
width b		mm	32	32	22		
height h		mm	40.5	40.5	25.5		
dimensional drawing							
<b>ambient temperature</b>							
min.		°C	-40	-40	-40		
max.		°C	+170	+170	+170		
temperature compensation		x		x		x	
<b>explosion protection</b>							
category zone		gas: 2G dust: 2D 1 21		gas: 2G dust: 2D 1 21		gas: 2G dust: 2D 1 21	
<b>explosion protection temperature (pipe surface)</b>							
min.		°C	-55	-55	-55		
max.		°C	+140	+140	+140		
marking		CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db		CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db		CE 0637 II2G II2D Ex e q IIC T6...T3 Gb Ex tb IIIC TX Db	
certification ATEX		IBExU07ATEX1168 X		IBExU07ATEX1168 X		IBExU07ATEX1168 X	
certification IECEx		IECEx IBE 08.0007X		IECEx IBE 08.0007X		IECEx IBE 08.0007X	
type of protection		gas: increased safety, powder filling dust: protection by enclosure		gas: increased safety, powder filling dust: protection by enclosure		gas: increased safety, powder filling dust: protection by enclosure	
transducer mounting fixture necessary		x		x		x	
remark						on request	

<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

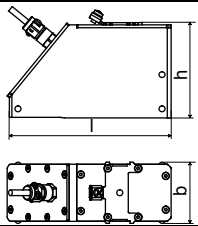
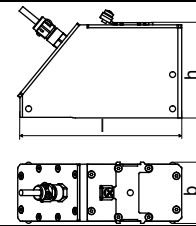
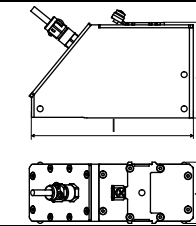
<sup>2</sup> Lamb wave transducer:

typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request

pipe diameter min. recommended/max. recommended: in reflection arrangement and for a flow velocity of 15 m/s

pipe diameter max. extended: in diagonal arrangement and for a flow velocity of 25 m/s

**Lamb Wave Transducers (zone 1, IP68)**

technical type		GRG1LI3	GRH1LI3	GRK1LI3
order code		<b>GLG-NA1TS/IP68</b>	<b>GLH-NA1TS/IP68</b>	<b>GLK-NA1TS/IP68</b>
transducer frequency		MHz 0.2	0.3	0.5
<b>medium pressure<sup>1</sup></b>				
min. extended	bar	metal pipe: 10	metal pipe: 10	metal pipe: 10 (d > 120 mm) 5 (d < 120 mm)
min.	bar	metal pipe: 15 plastic pipe: 1	metal pipe: 15 plastic pipe: 1	metal pipe: 15 (d > 120 mm) 10 (d < 120 mm) plastic pipe: 1
<b>inner pipe diameter d<sup>2</sup></b>				
min. extended	mm	190	120	60
min. recommended	mm	220	140	80
max. recommended	mm	900	600	300
max. extended	mm	1600	1000	500
<b>pipe wall thickness</b>				
min.	mm	11	7	4
max.	mm	23	15	9
<b>material</b>				
housing		PPSU with stainless steel cap 316Ti (1.4571)	PPSU with stainless steel cap 316Ti (1.4571)	PPSU with stainless steel cap 316Ti (1.4571)
contact surface		PPSU	PPSU	PPSU
degree of protection according to IEC/EN 60529		IP68 <sup>3</sup>	IP68 <sup>3</sup>	IP68 <sup>3</sup>
<b>transducer cable</b>				
type		2550	2550	2550
length	m	12	12	12
<b>dimensions</b>				
length l	mm	143.5	143.5	143.5
width b	mm	54	54	54
height h	mm	83.5	83.5	83.5
dimensional drawing				
<b>ambient temperature</b>				
min.	°C	-40	-40	-40
max.	°C	+100	+100	+100
temperature compensation		x	x	x
<b>explosion protection</b>				
category		gas: 2G dust: 2D	gas: 2G dust: 2D	gas: 2G dust: 2D
zone		1 21	1 21	1 21
<b>explosion protection temperature (pipe surface)</b>				
min.	°C	-55	-55	-55
max.	°C	+140	+140	+140
ATEX / IECEx	marking	CE 0637 Ex q IIC T6...T3 Gb Ex tb IIIC TX Db II2G II2D	CE 0637 Ex q IIC T6...T3 Gb Ex tb IIIC TX Db II2G II2D	CE 0637 Ex q IIC T6...T3 Gb Ex tb IIIC TX Db II2G II2D
	certification ATEX	IBExU07ATEX1168 X	IBExU07ATEX1168 X	IBExU07ATEX1168 X
	certification IECEx	IECEX IBE 08.0007X	IECEX IBE 08.0007X	IECEX IBE 08.0007X
	type of protection	gas: powder filling dust: protection by enclosure	gas: powder filling dust: protection by enclosure	gas: powder filling dust: protection by enclosure
	transducer mounting fixture necessary	x	x	x

<sup>1</sup> depending on application, typical absolute value for natural gas, nitrogen, compressed air

<sup>2</sup> Lamb wave transducer:  
typical values for natural gas, nitrogen, oxygen, pipe diameters for other gases on request  
pipe diameter min. recommended/max. recommended: in reflection arrangement and for a flow velocity of 15 m/s  
pipe diameter max. extended: in diagonal arrangement and for a flow velocity of 25 m/s

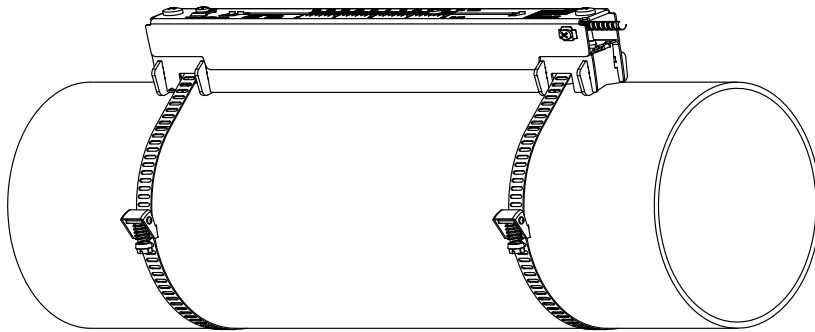
<sup>3</sup> test conditions: 3 months/2 bar (20 m)/20 °C

## Transducer Mounting Fixture

### Order Code

1, 2	3	4	5	6	7...9	10, 11	no. of character			
transducer mounting fixture	transducer	-	measuring mode	size	-	fixation	outer pipe diameter	/	option	description
VL										Variofix L
VC										Variofix C
	K									transducers with transducer frequency G, H, K
	M									transducers with transducer frequency M, P
	Q									transducers with transducer frequency Q
			D							reflection arrangement or diagonal arrangement
			R							reflection arrangement
				S						small
				M						medium
				L						large
						S				tension straps
						W				welding
						N				without fixation
							002			10...20 mm
							004			20...40 mm
							T36			40...360 mm
							013			10...130 mm
							036			130...360 mm
							092			360...920 mm
							200			920...2000 mm
									IP68	degree of protection IP68
									OS	housing with stainless steel 316
									Z	special design
example										
VL	K	-	D	S	-	S	200			Variofix L and tension straps for transducers with transducer frequency G, H, K
		-			-			/		

**Variofix L (VLK, VLM, VLQ)**

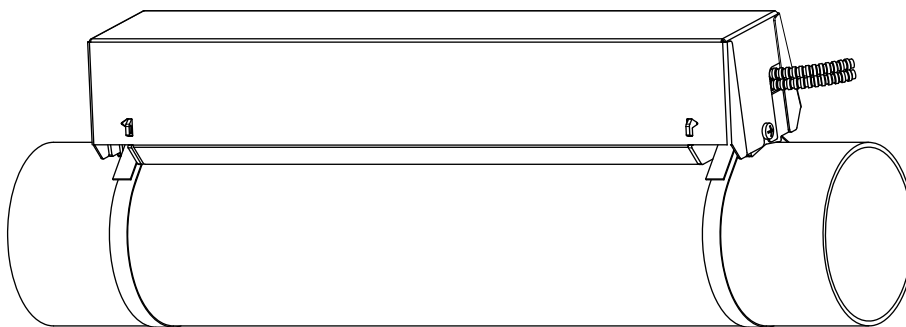


material: stainless steel 304  
 (1.4301), 301 (1.4310), 410  
 (1.4006), 410 (1.4006)  
 option OS: 316 (1.4571), 316L  
 (1.4404), 17-7PH (1.4568)

inner length:  
**VLK:** 348 mm,  
 option IP68: 368 mm  
**VLM:** 234 mm  
**VLQ:** 176 mm

dimensions:  
**VLK:** 423 x 90 x 93 mm,  
 option IP68: 443 x 94 x 105 mm  
**VLM:** 309 x 57 x 63 mm  
**VLQ:** 247 x 43 x 47 mm

**Variofix C (VC)**



material: stainless steel 304  
 (1.4301), 301 (1.4310)  
 option OS: 316 (1.4571)

inner length:  
**VCK-\*L:** 500 mm  
**VCK-\*S:** 350 mm  
**VCN:** 400 mm  
**VCQ:** 250 mm

dimensions:  
**VCK-\*L:** 560 x 122 x 102 mm,  
 option IP68: 560 x 126 x 120 mm  
**VCK-\*S:** 410 x 122 x 102 mm,  
 option IP68: 410 x 126 x 120 mm  
**VCN:** 460 x 96 x 80 mm  
**VCQ:** 310 x 85 x 62 mm



### Coupling Materials for Transducers

	normal temperature range (4th character of transducer order code = N)		extended temperature range (4th character of transducer order code = E)	
	< 100 °C	< 170 °C	< 150 °C	< 200 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or H or coupling foil type VT
long time measurement	coupling foil type VT <sup>1</sup>	coupling foil type VT <sup>2</sup>	coupling foil type VT <sup>1</sup>	coupling foil type VT <sup>2</sup>

<sup>1</sup> < 5 years

<sup>2</sup> < 6 months

### Technical Data

type	order code	ambient temperature °C	material	remark
coupling compound type N	990739-1	-30...+130	mineral grease paste	
coupling compound type E	990739-2	-30...+200	silicone paste	
coupling compound type H	990739-3	-30...+250	fluoropolymer paste	
coupling foil type VT	990739-0	-10...+200	fluoroelastomer	for transducers with transducer frequency G, H, K
	990739-6			for shear wave transducers with transducer frequency M, P
	990739-14			for shear wave transducers IP68 and Lambwave transducers with transducer frequency M, P
	990739-5			for transducers with transducer frequency Q

## Damping Mats (optional)

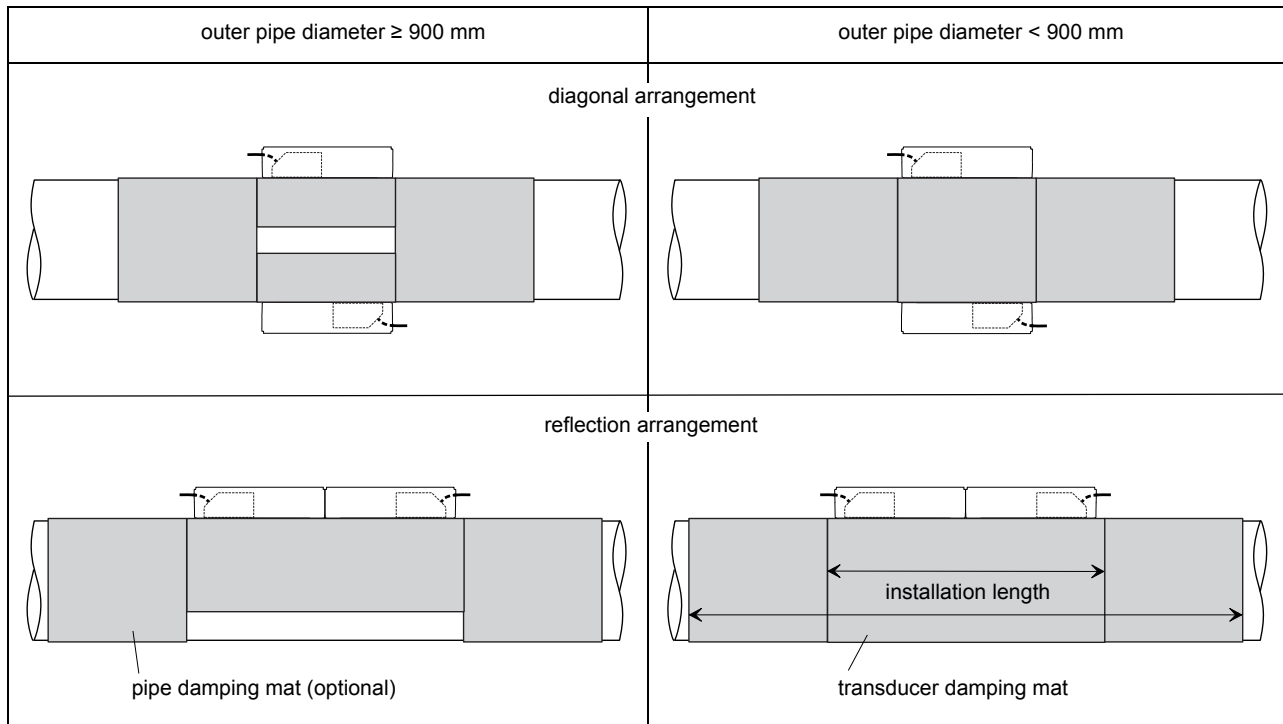
Damping mats will be used for the gas measurement to reduce acoustic noise influences on the measurement.

### transducer damping mat

Transducer damping mats will be installed below the transducers.

### pipe damping mat

Pipe damping mats will be installed if the sound propagation is disturbed at reflection points (e.g. flange, weld). Depending on the noise, the pipe damping mats will be installed at one or both sides of the transducer damping mat. If the local conditions are unknown, pipe damping mats should be installed.



## Technical Data

type		E30R4	E30R3
width	mm	225	50
thickness	mm	0.7	
length (per roll)	m	10	
weight	kg/m <sup>2</sup>	1.015	
ambient temperature	°C	-30...+80	
properties		self-adhesive	

## Dimensioning

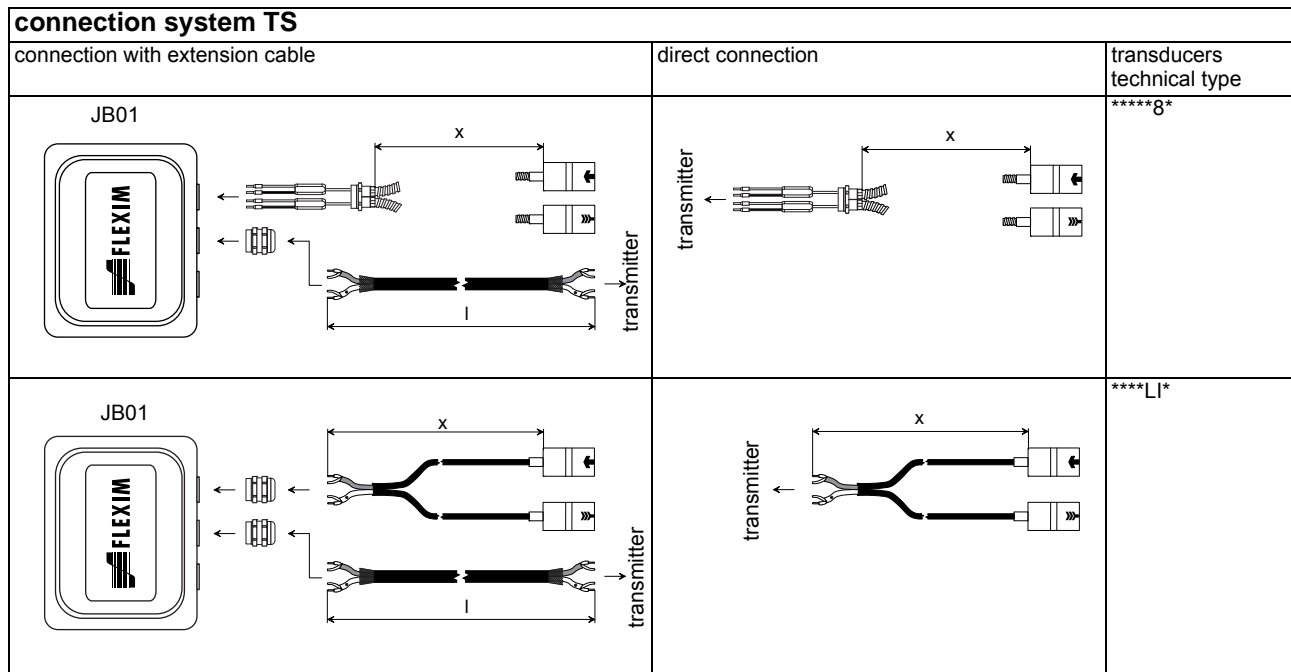
transducer		damping mat							
transducer mounting fixture	order code	type	number of layers	transducer damping mat			transducer damping mat + 2x pipe damping mat		
				max. installation length [mm]	number of rolls <sup>1</sup> standard <sup>2</sup>   extended <sup>2</sup>		max. installation length [mm]	number of rolls <sup>1</sup> standard   extended	
<b>VarioFix L</b>									
VLK	GLG	E30R4	3	890	4	4	1830	9	13
	GSG		3		4	4		9	11
	GLH		2		2	3		4	7
	GLK		1		1	1		1	2
	GSK		1		1	1		2	3
VLK-**-****/IP68	GLG	E30R4	3	930	5	5	1910	10	14
	GSG		3		5	5		10	11
	GLH		2		2	3		5	7
	GLK		1		1	1		2	2
	GSK		1		1	2		2	3
VLM	GLM	E30R3	1	660	1	1	1360	1	2
	GSM		1		1	1		2	
	GLP		1		1	1		1	
	GSP		1		1	1		1	
VLQ	GLQ	E30R3	1	540	1	1	1120	1	1
<b>Variofix C</b>									
VCK-*L VCK-*L-****/IP68	GLG	E30R4	3	1160	6	6	2360	11	15
	GSG		3		6	6		11	12
	GLH		2		3	4		5	8
	GLK		1		1	1		2	2
	GSK		1		2	2		3	3
VCK-*S VCK-*S-****/IP68	GLG	E30R4	3	860	4	4	1760	7	10
	GSG		3		4	4		7	8
	GLH		2		2	3		4	5
	GLK		1		1	1		1	2
	GSK		1		1	1		2	2
VCM	GLM	E30R3	1	960	1	2	1960	2	3
	GSM		1		1	1		2	2
	GLP		1		1	1		1	1
	GSP		1		1	1		1	1
VCQ	GLQ	E30R3	1	660	1	1	1360	1	1

<sup>1</sup> calculation on the base of:

- max. installation length (installation of one transducer mounting fixture per transducer in reflection arrangement) and
- max. recommended pipe diameter (standard) or max. extended pipe diameter (extended)  
(for inner pipe diameter max. recommended and max. extended see Technical Data of the Transducers from page 17)

<sup>2</sup> calculation for the number of rolls when both transducers are mounted in one transducer mounting fixture (reflection arrangement) or in diagonal arrangement: number of rolls/2 and round up to the nearest integer

### Connection Systems



transducer frequency (3d character of transducer order code)		G, H, K		M, P		Q		S		
T S	cable length	m	x	l	x	l	x	l	x	
	cable length (option IP68)	m	5	≤ 300	4	≤ 300	3	≤ 90	2	≤ 40
			12	≤ 300	12	≤ 300	-	-	-	-

x - transducer cable length

l - max. length of extension cable


### Transducer Cable

#### Technical Data

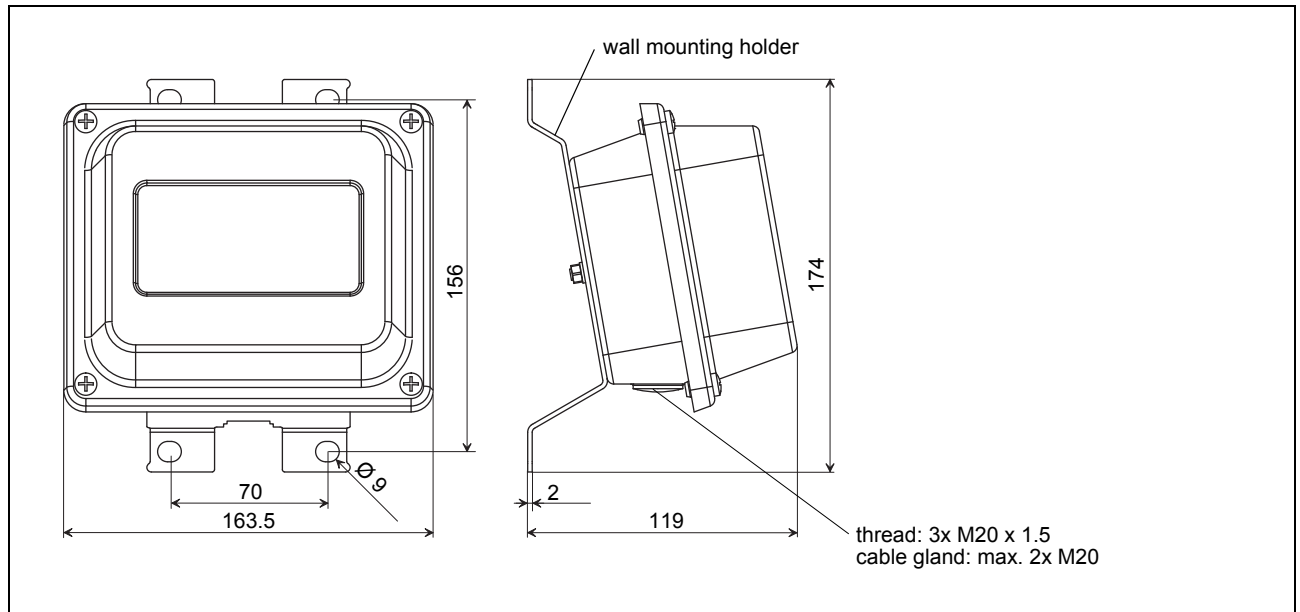
		transducer cable			extension cable	
type		1699	2550 (option IP68)	6111	2615	
standard length	m	see table above				
max. length	m	-				
ambient temperature	°C	-55...+200	-40...+100	-100...+225	-40...+70	
properties			longitudinal water tight		halogen free fire propagation test according to IEC 60332-1 combustion test according to IEC 60754-2	
<b>sheath</b>						
material		stainless steel 304 (1.4301) option OS: 316L (1.4404)	-	stainless steel 304 (1.4301) option OS: 316L (1.4404)	-	
outer diameter	mm	8	-	8	-	
<b>cable jacket</b>						
material		PTFE	PUR	PFA	PUR	
outer diameter	mm	2.9	5.2 ±0.2	2.7	12	
thickness	mm	0.3	0.9	0.5	2	
color		brown	gray	white	black	
shield		x	x	x	x	

## Junction Box

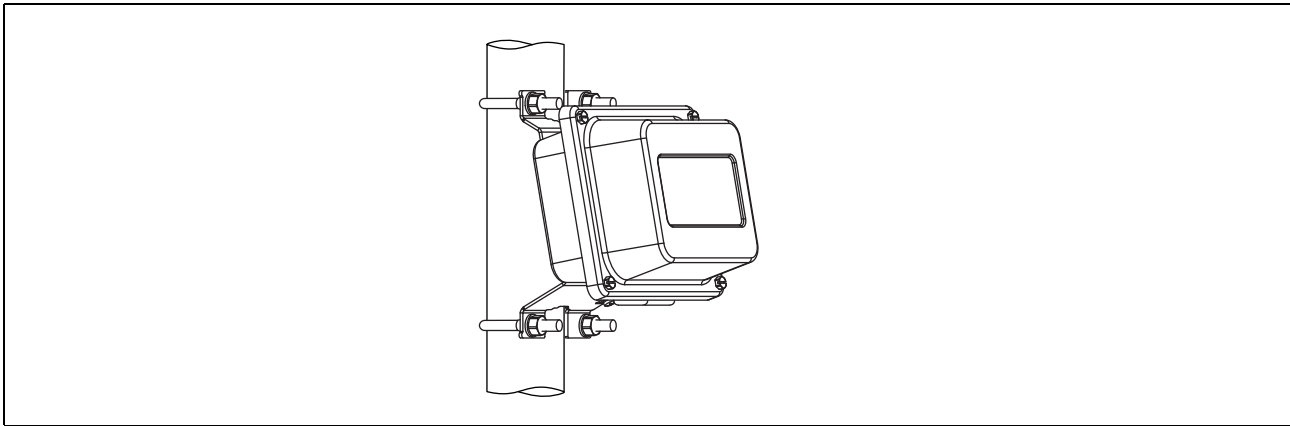
### Technical Data

technical type	<b>JB01S4E3M</b>	
dimensions	see dimensional drawing	
fixation	wall mounting, optional: 2" pipe mounting	
<b>material</b>		
housing	stainless steel 316L (1.4404)	
gasket	silicone	
degree of protection according to IEC/EN 60529	IP67	
<b>ambient temperature</b>		
min.	°C	-40
max.	°C	+80
<b>explosion protection</b>		
ATEX / IECEx	zone	1
	marking	CE 0637  II2G II2D Ex e mb II (T6)...T4 Ta -40...+(70)80 °C Ex tD A21 IP67 T 100 °C
	certification ATEX	IBExU06ATEX1161
	certification IECEx	IECEX IBE 08.0006
	type of protection	gas: • increased safety • decoupled network: encapsulation dust: protection by enclosure

### Dimensions

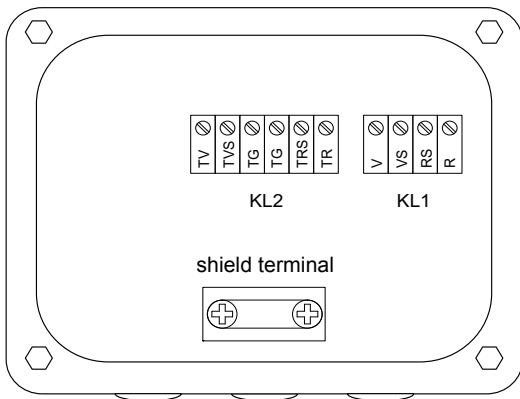


### 2 " Pipe Mounting Kit (optional)



### Terminal Assignment

#### JB01



#### transducers

terminal strip KL1

terminal	connection
V	transducer ↑, signal
VS	transducer ↑, internal shield
RS	transducer ↗, internal shield
R	transducer ↘, signal
cable gland	external shield

#### extension cable

terminal strip KL2

terminal	connection
TV	signal
TVS	internal shield
TRS	internal shield
TR	signal
shield terminal	external shield



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