

Steam ultrasonic flowmeter for permanent installation

Transmitter for permanent outdoor wall or pipe mounting

Features

- Exact and highly reliable measurement of saturated and superheated steam for temperatures up to max. 155 °C by means of the clamp-on principle
- Synchronized channel averaging to reduce turbulence-related fluctuations of the measured value
- Physical quantities volumetric flow rate and mass flow rate available in a transmitter without additional steam calculator
- Installation and start-up do not require any pipe work and are carried out without any process interruptions and cooling down of the steam system
- Non-invasive, wear-free and pressure constant measurement
- Maintenance-free acoustic coupling using permanent coupling foil
- High measurement accuracy even at very low as well and high flow rates and independent of the flow direction (bidirectional)
- Automatic loading of calibration data and transducer recognition
- Advanced self-diagnosis and possibilities for event-based triggering of data recording for the supervision and control of critical processes
- Transmitter and transducers for use in hazardous areas
- Transmitter and transducers are separately calibrated (traceable to national standards)
- The measurement is zero point stable and drift free

Applications

- Food and beverage industry
- Pharmaceutical industry
- Chemical industry
- Manufacturing industries



FLUXUS G831ST-LT



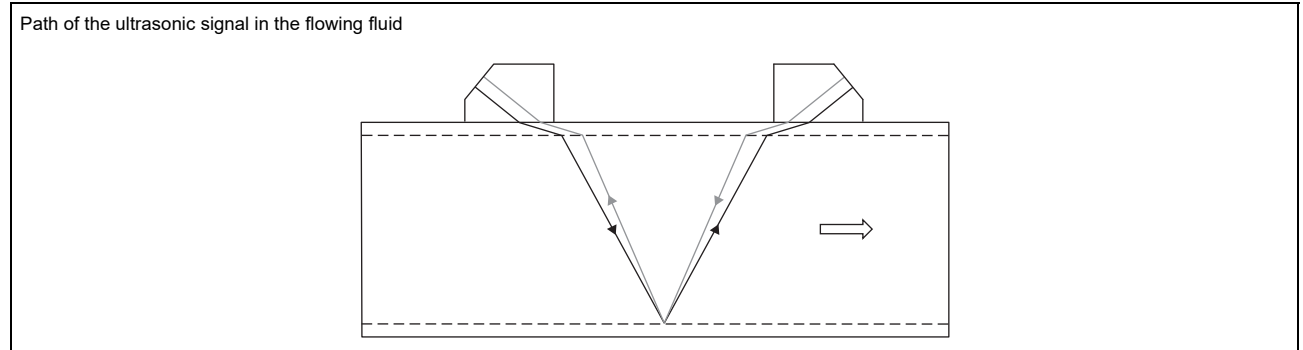
Variofix L

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Function

Measurement principle

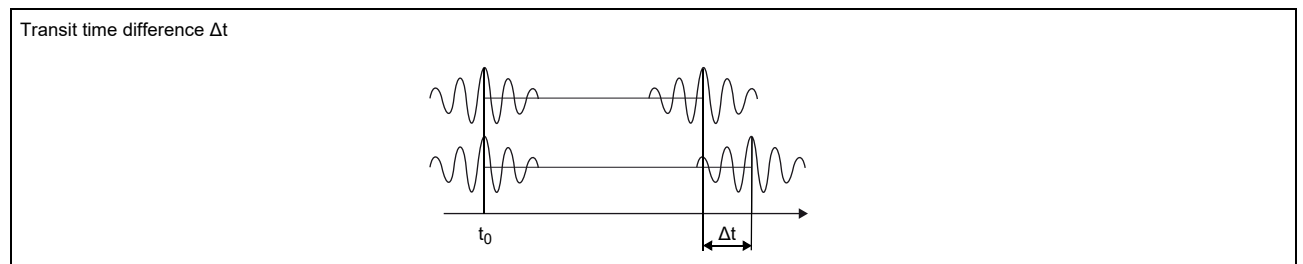
The transducers are mounted on the pipe which is completely filled with the fluid. The ultrasonic signals are emitted alternately by a transducer and received by the other. The physical quantities are determined from the transit times of the ultrasonic signals.



As the fluid where the ultrasound propagates is flowing, the transit time of the ultrasonic signal in flow direction is shorter than the one against the flow direction.

The transit time difference Δt 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.

The integrated microprocessors control the entire measuring cycle. The received ultrasonic signals are checked for measurement usability and evaluated for their reliability. Noise signals are eliminated.



Calculation of volumetric flow rate

$$\dot{V} = k_{Re} \cdot A \cdot k_a \cdot \frac{\Delta t}{2 \cdot t_y}$$

where

- \dot{V} - volumetric flow rate
- k_{Re} - fluid mechanic calibration factor
- A - cross-sectional pipe area
- k_a - acoustic calibration factor
- Δt - transit time difference
- t_y - average of transit times in the fluid

Calculation of mass flow rate

The mass flow rate is calculated from the operating density and the volumetric flow rate:

$$\dot{m} = \rho \cdot \dot{V}$$

The operating density of the fluid is calculated as the function of pressure and temperature of the fluid:

$$\rho = f(p, T)$$

where

- ρ - operating density
- p - fluid pressure
- T - fluid temperature
- \dot{m} - mass flow rate
- \dot{V} - volumetric flow rate

Number of sound paths

The number of sound paths is the number of transits of the ultrasonic signal through the fluid 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. The transducers are mounted on the same side of the pipe. Correct positioning of the transducers is easy.

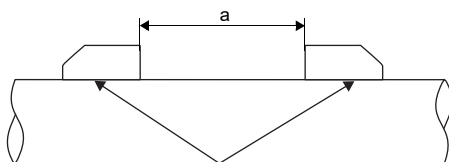
• diagonal arrangement

The number of sound paths is odd. The transducers are mounted on opposite sides of the pipe. In case of high signal attenuation by the fluid or pipe, diagonal arrangement with 1 sound path is used.

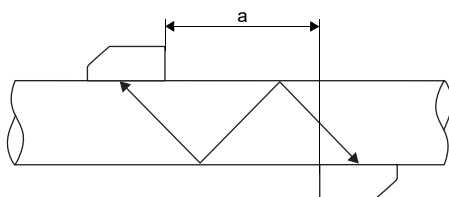
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the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

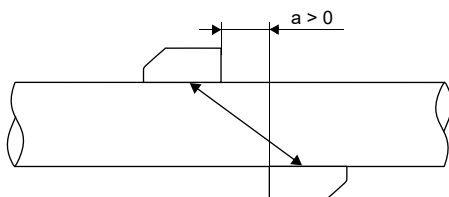
Reflection arrangement, number of sound paths: 2



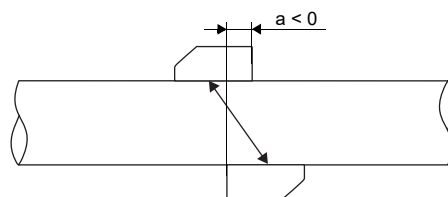
Diagonal arrangement, number of sound paths: 3



Diagonal arrangement, number of sound paths: 1



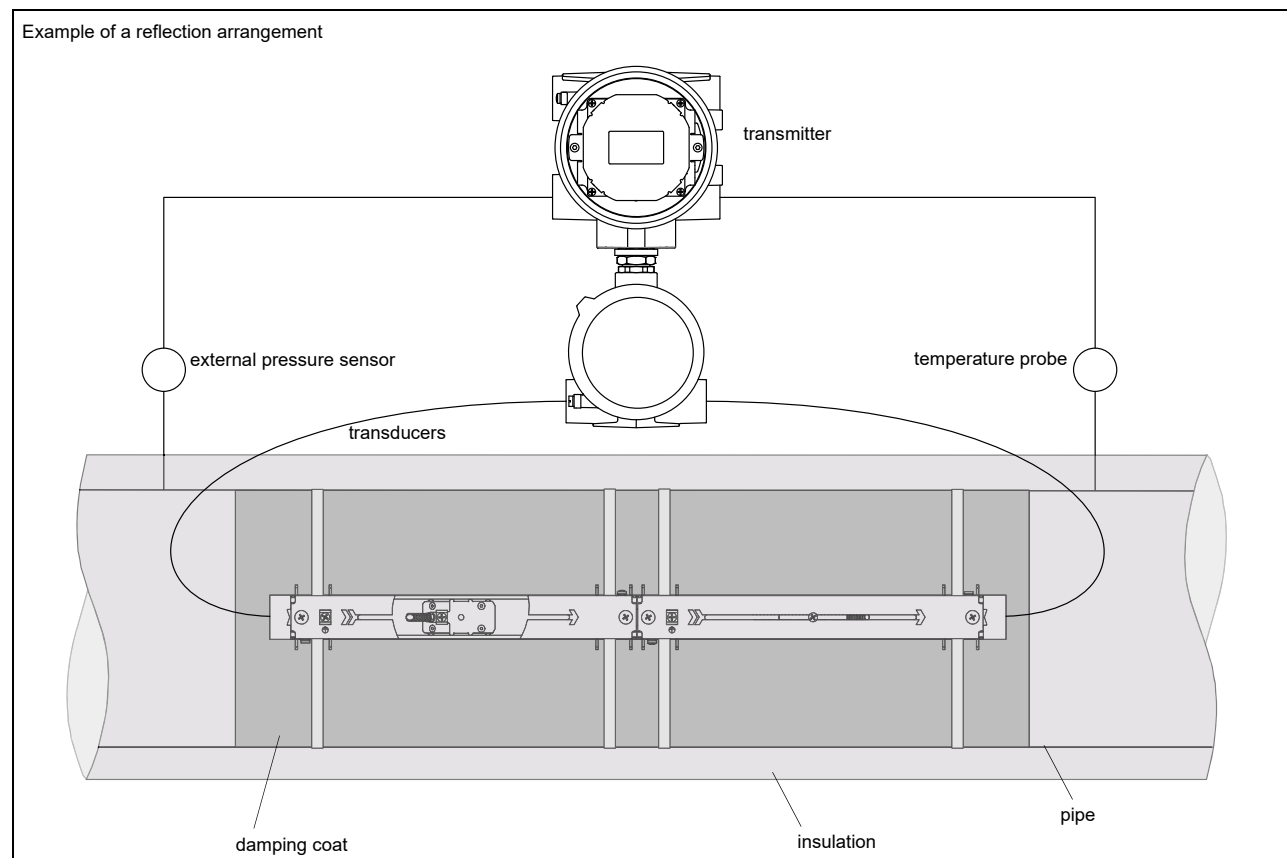
Diagonal arrangement, number of sound paths: 1, negative transducer distance



a - transducer distance


Typical measurement setup

Example of a reflection arrangement



Transmitter




Technical data

		FLUXUS G831ST-LT (831-AA*, 831-SA*)	FLUXUS G831ST-LT (831-AB*, 831-SB*)	FLUXUS G831ST-LT (831-ANN, 831-SNN)
				
design		831-AA* (aluminum housing): explosion-proof field device or 831-SA* (stainless steel housing): explosion-proof offshore device zone 1 (intrinsic safety: outputs, process interfaces)	831-AB* (aluminum housing): explosion-proof field device or 831-SB* (stainless steel housing): explosion-proof offshore device zone 1 (intrinsic safety: outputs, inputs, process interfaces)	831-ANN (aluminum housing): explosion-proof field device or 831-SNN (stainless steel housing): explosion-proof offshore device zone 1
application		steam measurement ²		
measurement				
measurement principle		transit time difference correlation principle		
flow direction		bidirectional		
synchronised channel averaging		x (2 measuring channels necessary)		
flow velocity	m/s	depending on pipe diameter and transducer, see diagrams		
repeatability		0.15 % MV ±0.005 m/s		
fluid		saturated steam, superheated steam		
fluid pressure	bar (a)	3...5.4		
fluid temperature	°C	135...155		
temperature compensation		corresponding to the recommendations in ANSI/ASME MFC-5.1-2011		
measurement uncertainty (volumetric flow rate)				
measurement uncertainty of the measuring system ¹		±0.3 % MV ±0.005 m/s		
measurement uncertainty at the measuring point		±1...3 % MV ±0.005 m/s, depending on the application		
transmitter				
power supply		20...32 V DC, U _m = 120 V		• 100...230 V/50...60 Hz or • 20...32 V DC
power consumption	W	< 4		< 8
number of measuring channels		1, optional: 2		
damping	s	0...100 (adjustable)		
measuring cycle	Hz	100...1000 (1 channel)		
response time	s	1 (1 channel), option: 0.02		
housing material		aluminum housing: cast aluminum EN AC 44200 mod, special heavy-duty coating (C5 according to EN ISO 12944) stainless steel housing: stainless steel 316/316L (1.4401, 1.4404, 1.4432)		
degree of protection		IP66		
dimensions	mm	see dimensional drawing		
mounting position		831-A*F (Profibus PA, FF H1), 831-S** : nameplate faces upwards		-
weight	kg	aluminum housing: 6.5, stainless steel housing: 15.6		
fixation		wall mounting, 2" pipe mounting		
ambient temperature	°C	aluminum housing: • -40...+60 • 831-A*F (Profibus PA, FF H1): -40...+50 (< -20 without operation of the display) • stainless steel housing: • -20...+60 • 831-S*F (Profibus PA, FF H1): -20...+50		aluminum housing: -40...+60 (< -20 without operation of the display) stainless steel housing: -20...+60
display		128 x 64 pixels, backlight		
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese		

¹ with aperture calibration of the transducers

² test measurement to validate the application required in advance

³ outside the explosive atmosphere (housing cover open)

		FLUXUS G831ST-LT (831-AA*, 831-SA*)	FLUXUS G831ST-LT (831-AB*, 831-SB*)	FLUXUS G831ST-LT (831-ANN, 831-SNN)
explosion protection				
• ATEX/IECEx				
marking		CE 0637  II2G II2D Ex db eb ia IIC T6 Gb Ex tb ia IIIC T100 °C Db 831-AAN: T _a -40...+60 °C 831-SAN: T _a -20...+60 °C 831-AAF: T _a -40...+50 °C 831-SAF: T _a -20...+50 °C	CE 0637  II(1)2G II(1)2D Ex db eb ia [ia Ga] IIC T6 Gb Ex tb ia [ia Da] IIIC T100 °C Db 831-ABN: T _a -40...+60 °C 831-SBN: T _a -20...+60 °C 831-ABF: T _a -40...+50 °C 831-SBF: T _a -20...+50 °C	CE 0637  II2G II2D Ex db eb IIC T6 Gb Ex tb IIIC T100 °C Db 831-ANN: T _a -40...+60 °C 831-SNN: T _a -20...+60 °C
certification		IBExU20ATEX1103 X, IECEx IBE 20.0015X	IBExU20ATEX1103 X, IECEx IBE 20.0015X	IBExU20ATEX1103 X, IECEx IBE 20.0015X
measuring functions				
physical quantities		operating volumetric flow rate, mass flow rate, flow velocity		
totaliser		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		
communication interfaces				
service interfaces		measured value transmission, parametrisation of the transmitter: USB		
process interfaces		intrinsic safety, max. 1 option: • HART • Profibus PA • FF H1		max. 1 option: • Modbus RTU/RS485 • HART • Profibus PA • FF H1 • BACnet MS/TP
intrinsic safety parameters		Profibus PA, FF H1: U _i = 24 V I _i = 174 mA P _i = 1044 mW L _i = 10 µH C _i negligible		-
accessories				
data transmission kit		USB cable		
software		• FluxDiagReader: reading of measured values and parameters, graphical representation • FluxDiag (optional): reading of measurement data, graphical representation, report generation, parametrisation of the transmitter		
data logger				
loggable values		all physical quantities, totalised physical quantities and diagnostic values		
capacity		max. 800 000 measured values		

¹ with aperture calibration of the transducers

² test measurement to validate the application required in advance

³ outside the explosive atmosphere (housing cover open)

		FLUXUS G831ST-LT (831-AA*, 831-SA*)	FLUXUS G831ST-LT (831-AB*, 831-SB*)	FLUXUS G831ST-LT (831-ANN, 831-SNN)
outputs				
		The outputs are galvanically isolated from the transmitter.		
• switchable current output				
				configurable according to NAMUR NE43 All switchable current outputs are jointly switched to active or passive.
number		-		max. 3
range	mA	-		4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)
Unsicherheit		-		0.04 % v. AW ±3 µA
active output		-		R _{ext} = 250...530 Ω, U _{opencircuit} = 28 V DC
passive output		-		U _{ext} = 9...30 V DC, depending on R _{ext} (R _{ext} < 458 Ω at 20 V)
current output in HART mode		-		option
• range	mA	-		4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2)
• active output		-		R _{ext} = 250...530 Ω, U _{opencircuit} = 28 V DC
• passive output		-		U _{ext} = 9...30 V DC, depending on R _{ext} (R _{ext} = 250...458 Ω at 20 V)
• current output				
		configurable according to NAMUR NE43		
range	mA	4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)		-
Unsicherheit		0.04 % v. AW ±3 µA		-
passive output		U _{ext} ≤ 29 V DC, depending on R _{ext} (R _{ext} < 458 Ω at 20 V)		-
current output in HART mode		option		
• range	mA	4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2)		-
• passive output		U _{ext} = 9...29 V DC, depending on R _{ext} (R _{ext} = 250...458 Ω at 20 V)		-
intrinsic safety parameters		U _i = 29 V I _i = 100 mA P _i = 0.725 W C _i = 1 nF L _i = 50 nH		-
• digital output				
functions		• frequency output • binary output • pulse output		• frequency output • binary output • pulse output
type		open collector (passive)		open collector (passive)
operating parameters		8.2 V/30 mA (NAMUR)		8.2 V/30 mA (NAMUR)
max. values		8 mA at 29 V DC		8 mA at 29 V DC
frequency output				
• range	kHz	2...10		2...10
• damping	s	0...999.9		0...999.9
• pulse-to-pause ratio		1:1		1:1
binary output				
• binary output as alarm output		limit, change of flow direction or error		limit, change of flow direction or error
pulse output				
• pulse value	units	0.01...1000		0.01...1000
• pulse width	ms	0.05...1000		0.05...1000
• pulse rate		max. 10 000 pulses		max. 10 000 pulses
intrinsic safety parameters		U _i = 29 V I _i = 100 mA P _i = 0.725 W C _i = 1 nF L _i = 50 nH		-
inputs				
		not short-circuit proof The inputs are not galvanically isolated from the transmitter.		The inputs are galvanically isolated from the transmitter.
• temperature input				
number		-	max. 1	max. 1
type		-	Pt100/Pt1000	Pt100/Pt1000
connection		-	4-wire	4-wire
range	°C	-	-150...+560	-150...+560
resolution	K	-	0.01	0.01
accuracy			±0.01 % MV ±0.03 K at 18...28 °C ±0.01 % MV ±0.03 K ±0.0005 %/K at <18 °C/>28 °C	±0.01 % MV ±0.03 K at 18...28 °C ±0.01 % MV ±0.03 K ±0.0005 %/K at <18 °C/>28 °C
Kabelwiderstand	Ω		max. 1000	max. 1000
intrinsic safety parameters		-	U _o = 9.2 V I _o = 25 mA P _o = 0.057 W C _o = 4283 nF L _o = 57 mH	-

¹ with aperture calibration of the transducers² test measurement to validate the application required in advance³ outside the explosive atmosphere (housing cover open)

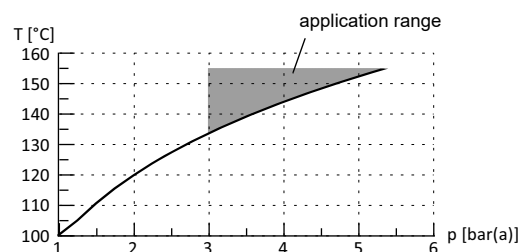
		FLUXUS G831ST-LT (831-AA*, 831-SA*)	FLUXUS G831ST-LT (831-AB*, 831-SB*)	FLUXUS G831ST-LT (831-ANN, 831-SNN)
• switchable current input				
		All switchable current inputs are jointly switched to active or passive.		
number		-	-	max. 2
accuracy		-	-	$\pm 0.1\%$ MV ± 0.01 mA at 18...28 °C $\pm 0.1\%$ MV ± 0.01 mA $\pm 0.005\%$ /K at <18 °C/>28 °C
resolution	μ A	-	-	0.1
active input		-	-	$R_{int} = 75\ \Omega$, $I_{max} \leq 30$ mA $U_{opencircuit} = 28$ V (Leerlauf) $U_{min} = 21.4$ V at 20 mA
• range	mA	-	-	0...20
passive input		-	-	$U_{ext} = 24$ V, $R_{int} = 35\ \Omega$, $I_{max} \leq 24$ mA
• range	mA	-	-	0...20
• current input				
number		-	max. 1	-
accuracy		-	$\pm 0.1\%$ MV ± 0.01 mA at 18...28 °C $\pm 0.1\%$ MV ± 0.01 mA $\pm 0.005\%$ /K at <18 °C/>28 °C	-
resolution	μ A	-	0.1	-
active input		-	$U_{int} < 20$ V, $R_{int} \leq 385\ \Omega$, $I_{max} \leq 40$ mA $U_{min} = 19.6$ V - $R_{int} \cdot I$	-
• range	mA	-	0...20	-
intrinsic safety parameters		-	$U_o = 29.2$ V $I_o = 88$ mA $P_o = 0.64$ W $C_o = 73$ nF $L_o = 4.1$ mH	-

¹ with aperture calibration of the transducers

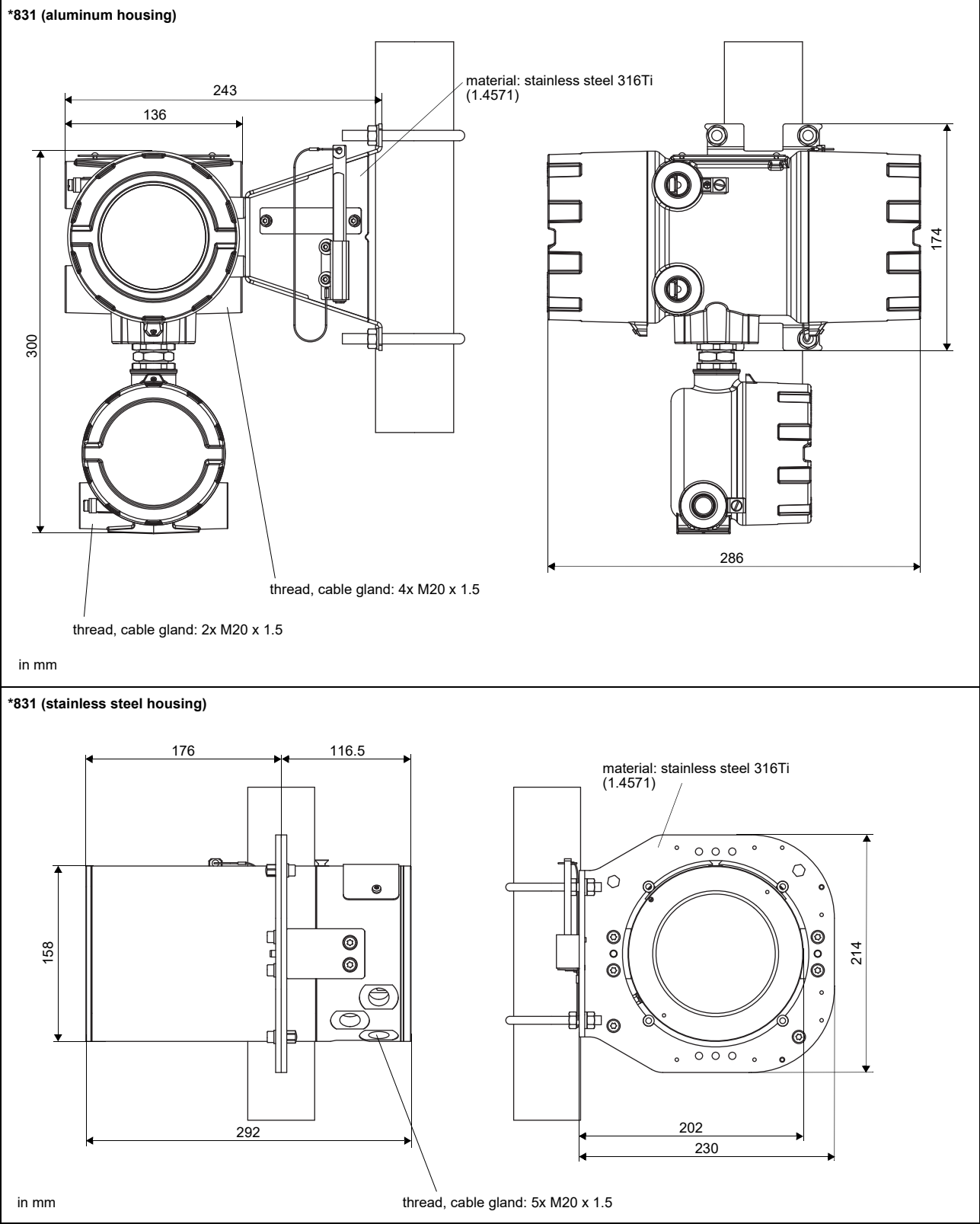
² test measurement to validate the application required in advance

³ outside the explosive atmosphere (housing cover open)

Saturated steam pressure curve

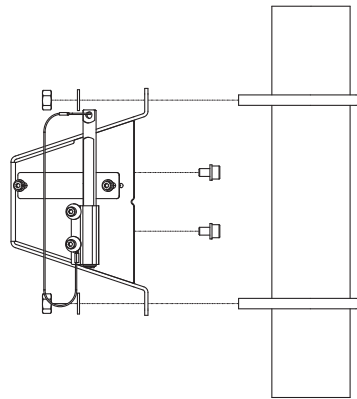


Dimensions

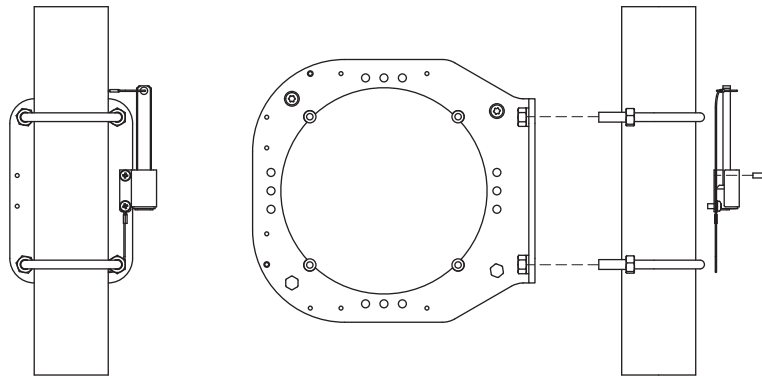


Wall and 2" pipe mounting kit

*831 (aluminum housing)



*831 (stainless steel housing)



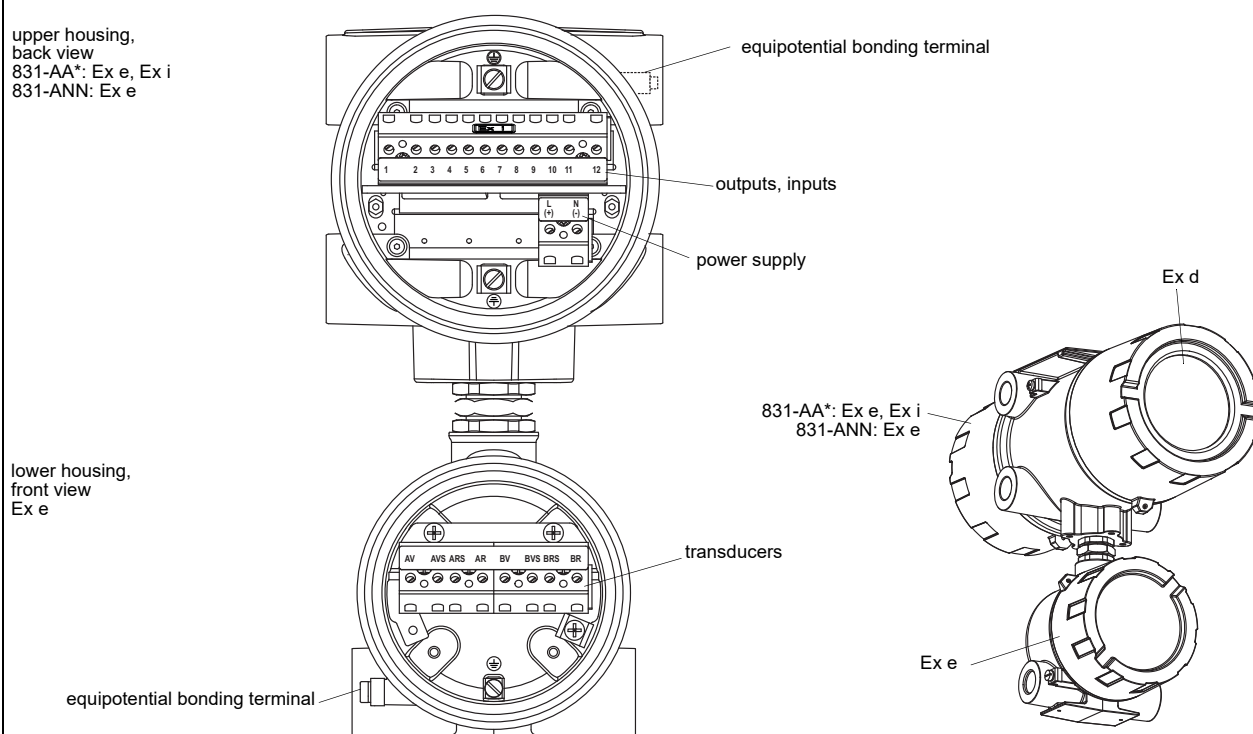
Storage

- do not store outdoors
- store within the original package
- store in a dry and dust-free place
- protect against sunlight
- keep all openings closed
- storing temperature:
 - aluminum housing: -40...+60 °C
 - stainless steel housing: -20...+60 °C

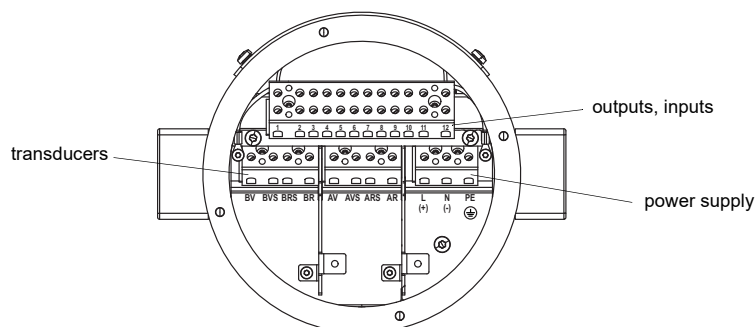
Terminal assignment


***831 (aluminum housing)**

upper housing,
back view
831-AA*: Ex e, Ex i
831-ANN: Ex e



***831 (stainless steel housing)**

power supply¹

AC		DC	
terminal	connection	terminal	connection
L	outer conductor	(+)	+
N	neutral conductor	(-)	-
	protective conductor		

¹ cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

transducers, extension cable

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

outputs, inputs ^{1, 2}		
terminal	connection	
depending on configuration	current output, digital output, current input	
3, 4, 5, 6	temperature input	
11+, 12-	passive current output/HART	
11-, 12+	active current output/HART	
11, 12	Modbus RTU, FF H1, Profibus PA, BACnet MS/TP	
temperature probe		
terminal	direct connection	connection with extension cable
3	red	blue
4	red	grey
5	white	white
6	white	red
USB	type C Hi-Speed USB 2.0 Device	service (FluxDiag/FluxDiagReader)

¹ cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

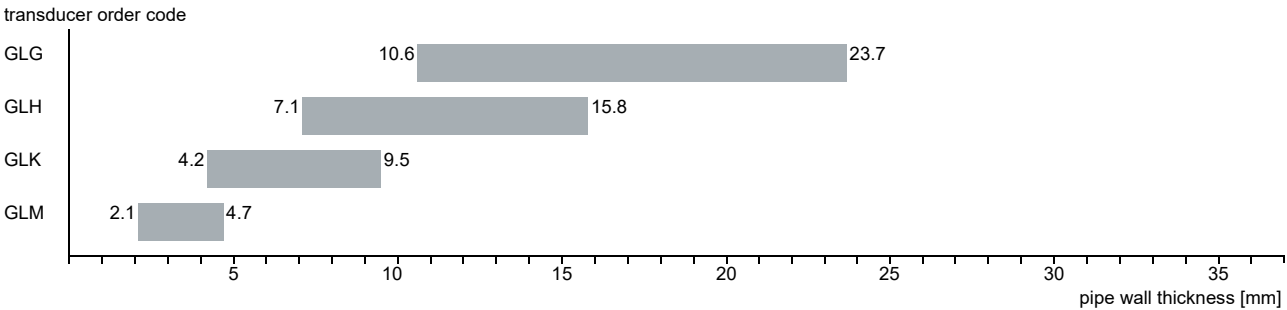
² The number, type and terminal assignment are customised.

Transducers

Transducer selection

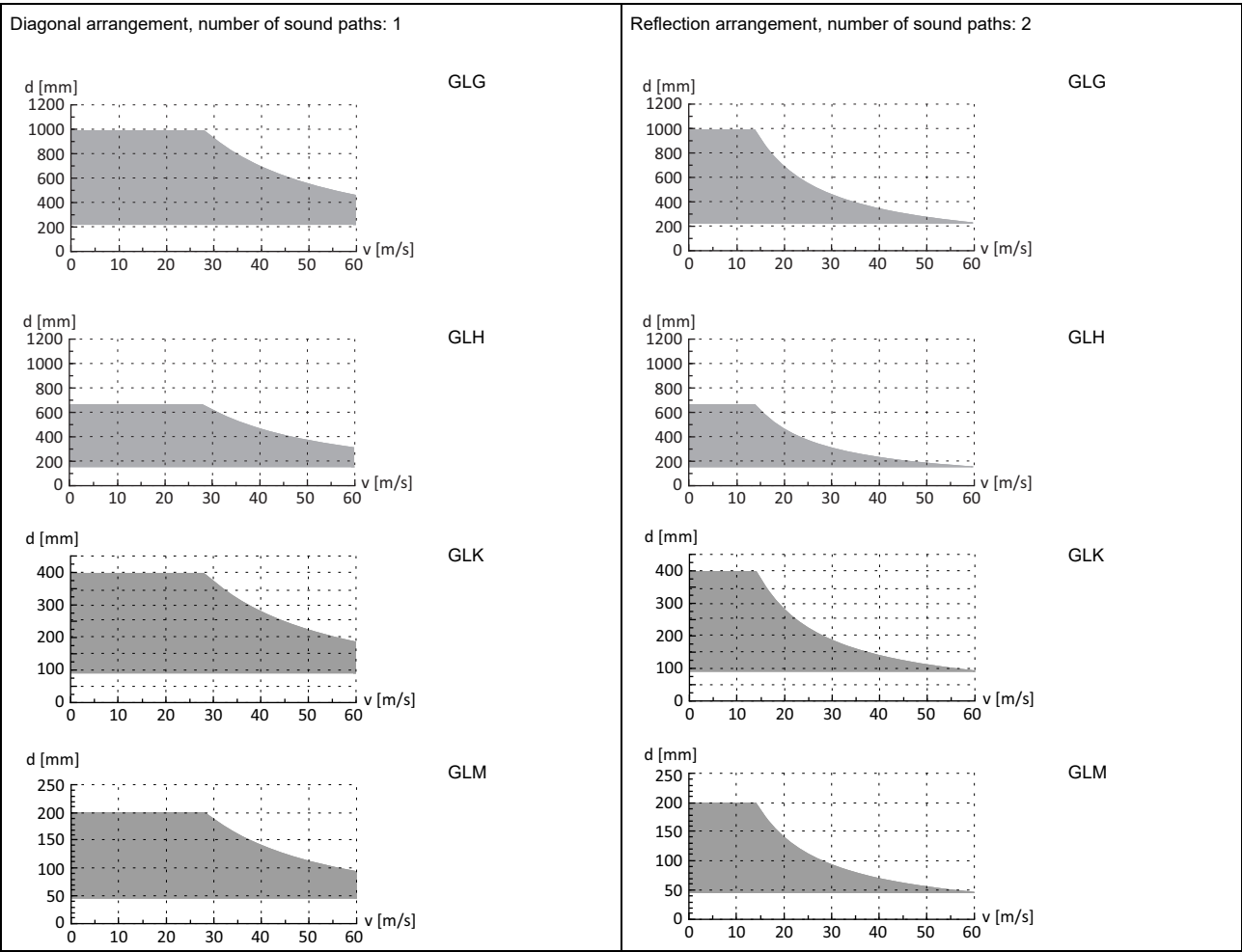
Step 1

pipe wall thickness



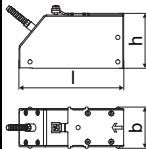
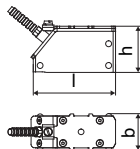
Step 2

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



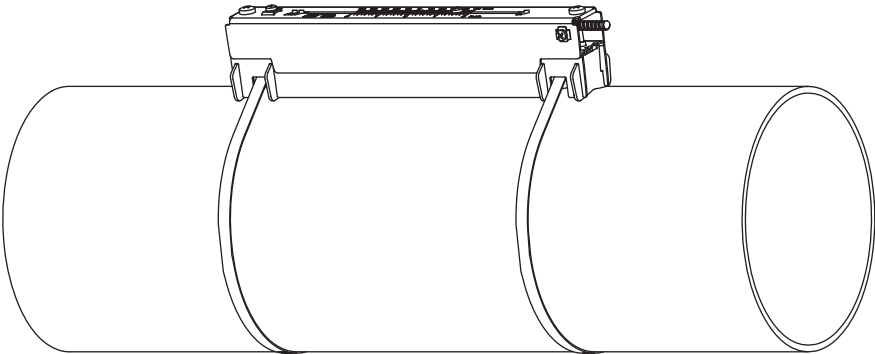
inner pipe diameter and max. flow velocity for a steam application

Lamb wave transducers (zone 1, steam measurement, T1)

order code		GLG-SA1*-**T1	GLH-SA1*-**T1	GLK-SA1*-**T1	GLM-SA1*-**T1
technical type		G(RT)G1S83	G(RT)H1S83	G(RT)K1S83	G(RT)M1S83
transducer frequency	MHz	0.2	0.3	0.5	1
fluid pressure		see saturated steam pressure curve			
inner pipe diameter d					
min.	mm	225	150	90	45
max.	mm	1000	667	400	200
pipe wall thickness					
min.	mm	10.6	7.1	4.2	2.1
max.	mm	23.7	15.8	9.5	4.7
material					
housing		PPSU with stainless steel cover 316Ti (1.4571)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5			4
dimensions					
length l	mm	128.5			74
width b	mm	51			32
height h	mm	67.5			40.5
dimensional drawing					
weight (without cable)	kg	0.8			0.16
storing temperature	°C	-40...+155			
operating temperature	°C	100...155			
warm-up time	h	3			1
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
pipe surface temperature (Ex)	°C	-50...+155			
marking		CE0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X			

completely thermally insulated transducer installation necessary

Transducer mounting fixture

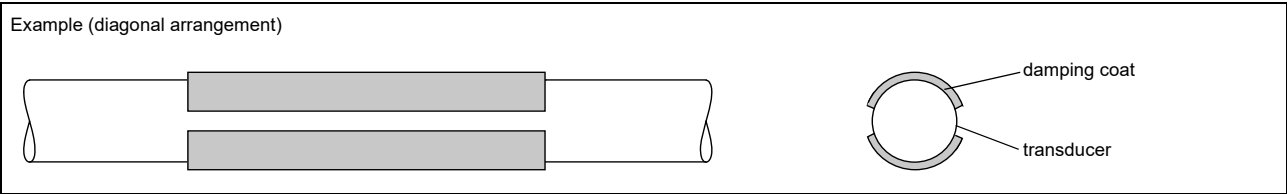
<div><div>Variofix L (VLK, VLM)</div><div></div></div>	<div><div>material: stainless steel 316Ti (1.4571), 316L (1.4404), 17-7PH (1.4568)</div><div>inner length: VLK: 348 mm, VLM: 234 mm</div><div>dimensions: VLK: 423 x 90 x 93 mm VLM: 309 x 57 x 63 mm</div></div>
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Coupling materials for transducers

type	ambient temperature °C
coupling foil type VT	-10...+200

Damping coat

The damping coat will be used to reduce acoustic noise influences on the measurement.



Technical data

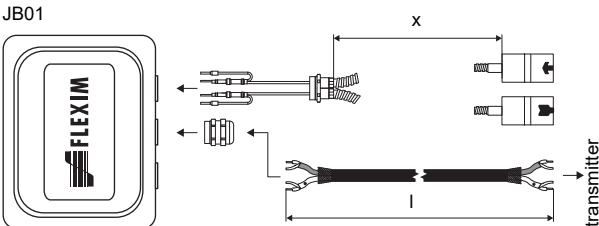
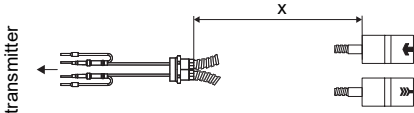
item number		992080-13
material		multipolymeric matrix/inorganic ceramic coating
packing drum	I	1
properties		heat-resistant, inert
fluid temperature when applying	°C	10...200
drying time (example)		approx. 3 h at 20 °C approx. 15 min at 150 °C
temperature resistance in dry state	°C	max. 650
durability of the packing drum (unopened)		2 years

Observe installation instructions (TI_DampingCoat).

Dimensioning

transducer frequency	number of packing drums		
	outer pipe diameter		
	≤300	≤500	≤700
	mm		
G	2	3	4
H	2	2	3
K	2	2	-
M	2	-	-

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
		*****8*

Cable

transducer cable		
type		1699
weight	kg/m	0.094
ambient temperature	°C	-55...+200
cable jacket		
material		PTFE
outer diameter	mm	2.9
thickness	mm	0.3
colour		brown
shield		x
material		stainless steel 316Ti (1.4571)
outer diameter	mm	8

extension cable			
type		2615	5245
weight	kg/m	0.18	0.38
ambient temperature	°C	-30...+70	-30...+70
properties		halogen-free fire propagation test according to IEC 60332-1 combustion test according to IEC 60754-2	halogen-free fire propagation test according to IEC 60332-1 combustion test according to IEC 60754-2
cable jacket			
material		PUR	PUR
outer diameter	mm	max. 12	max. 12
thickness	mm	2	2
colour		black	black
shield		x	x
sheath			
material		-	steel wire braid with copolymer sheath
outer diameter	mm	-	max. 15.5

Cable length

transducer frequency	G, H, K		M	
transducers technical type	x	l	x	l
*R***8*	5	≤ 300	4	≤ 300
*T***8*	9	≤ 300	9	≤ 300

x - transducer cable length

l - max. length of extension cable (depending on the application)

Junction box

Technical data

JB01S4E3M		
weight	kg	1.2 kg
fixation		wall mounting optional: 2" pipe mounting
material		
housing		stainless steel 316L (1.4404)
gasket		silicone
degree of protection		IP66/IP67
ambient temperature °C		-40...+80
explosion protection		
• ATEX/IECEX		
marking		CE 0637 Ex II2G II2D Ex eb mb IIC T6...T4 Gb Ex tb IIIC T100 °C Db Ta -40...+70/80 °C
certification		IBExU06ATEX1161 IECEX IBE 08.0006
type of protection		gas: increased safety decoupling network: encapsulation dust: protection by enclosure

Connection

The diagram shows the rear panel of the enclosure with two terminal blocks, KL1 and KL2, and a ground terminal. KL1 has four terminals: V, VS, RS, and R. KL2 has five terminals: TV, TVS, TG, TRS, and TR. The ground terminal is located below KL2 and consists of two screw terminals connected by a bar.

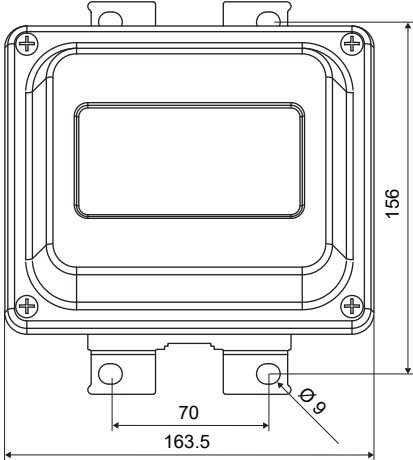
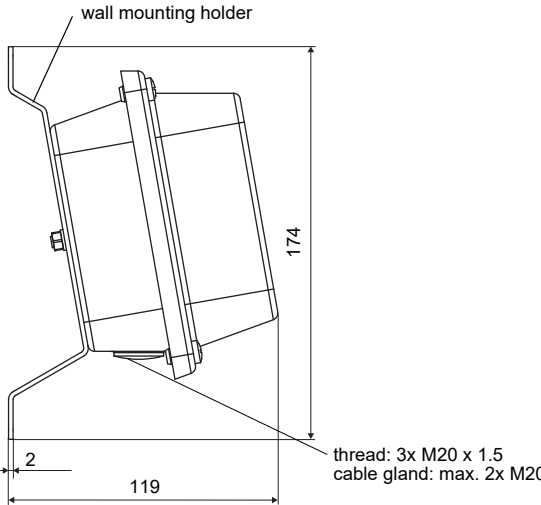
Transducers

terminal strip	terminal	connection	transducer
KL1	V	signal	↑
	VS	internal shield	
	RS	internal shield	⌋
	R	signal	

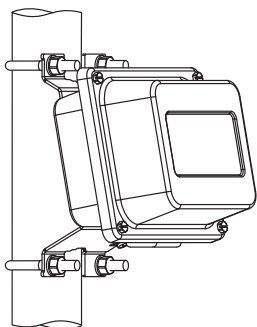
Extension cable

terminal strip	terminal	connection
KL2	TV	signal
	TVS	internal shield
	TRS	internal shield
	TR	signal

Dimensions

JB0*, JBP*	
	
in mm	

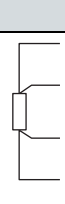
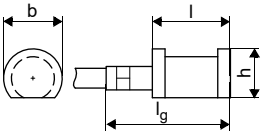
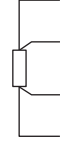
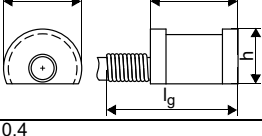
2" pipe mounting kit

JB**

item number: 751035-2

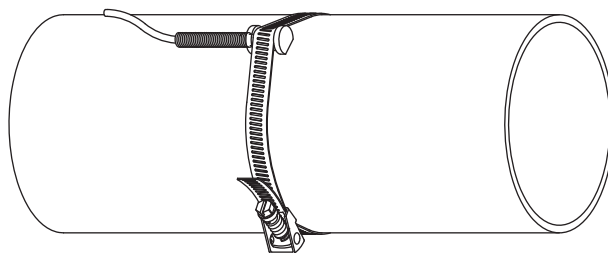
Clamp-on temperature probe (optional)

Technical data

PT12N			Connection	
item number		770415-6		temperature probe
design		clamp-on zone 0/1 (intrinsic safety)		red
type		Pt100		red
connection		4-wire		white
measuring range	°C	-45...+230		white
accuracy T		$\pm(0.15\text{ °C} + 2 \cdot 10^{-3} \cdot T\text{ [°C]})$ class A		
housing material		stainless steel 316		
degree of protection		IP65/IP68		
dimensions			Cable	
length l	mm	20 ($l_q = 45$)		temperature probe
width b	mm	16	type	4 x 0.22 mm ²
height h	mm	11	standard length	m 4
dimensional drawing			ambient temperature	°C -45...+80
			cable jacket	
weight	kg	0.15	material	FEP
explosion protection			outer diameter	mm 3.6
• ATEX/IECEx			colour	black
technical type		LEX25		
marking		CE 0344 Ex ia IIC T6...T1 Ga		
certification		DEKRA17ATEX0123 X IECExDEK 17.0046X		
intrinsic safety parameters		$U_i = 30\text{ V DC}$ $I_i = 75\text{ mA}$ $P_i = 500\text{ mW}$ $C_i = 0$ $L_i = 0$		
PT12N			Connection	
item number		770415-7		temperature probe
design		clamp-on zone 1		red
type		Pt100		red
connection		4-wire		white
measuring range	°C	-45...+250		white
accuracy T		$\pm(0.15\text{ °C} + 2 \cdot 10^{-3} \cdot T\text{ [°C]})$ class A		
housing material		stainless steel 316		
degree of protection		IP68		
dimensions			Cable	
length l	mm	20 ($l_q = 80$)		temperature probe
width b	mm	16	type	4 x 0.22 mm ²
height h	mm	11	standard length	m 4
dimensional drawing			ambient temperature	°C -45...+80
			min. bend radius	mm 22
weight	kg	0.4	cable jacket	
explosion protection			material	PTFE
• ATEX/IECEx			outer diameter	mm 3.6
technical type		LEX15	colour	black
marking		CE 0344 Ex eb IIC T6...T1 Gb		
certification		DEKRA17ATEX0123 X IECExDEK 17.0046X		

Fixation

tension strap PT12N



material: stainless steel 301 (1.4310),
410 (1.4006)
thermal insulation necessary

FLEXIM GmbH
Boxberger Str. 4
12681 Berlin
Germany
Tel.: +49 (30) 93 66 76 60
Fax: +49 (30) 93 66 76 80
internet: www.flexim.com
e-mail: info@flexim.com

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