

Superheated steam flow measurement

Permanently installed non-invasive ultrasonic measuring system

Features

- Exact and highly reliable measurement of superheated steam up to 630 °C
- Installation and start-up do not require any pipe work nor any process interruptions
- Volumetric and mass flow rate available without additional steam calculator
- Non-invasive and wear-free measurement without pressure loss
- Maintenance-free acoustic coupling using permanent coupling foil
- Bidirectional measurement over a wide turndown ratio - up to 10:1
- Advanced self-diagnosis and possibilities for event-based triggering of data recording
- Bidirectional communication and support of common bus technologies
- Transmitter and transducers are separately calibrated (traceable to national standards)
- The measurement is drift free

Applications

- Process control
- Consumption metering
- Check metering



FLUXUS G722ST-HT (aluminum housing)



FLUXUS G722ST-HT (stainless steel housing)



WaveInjector

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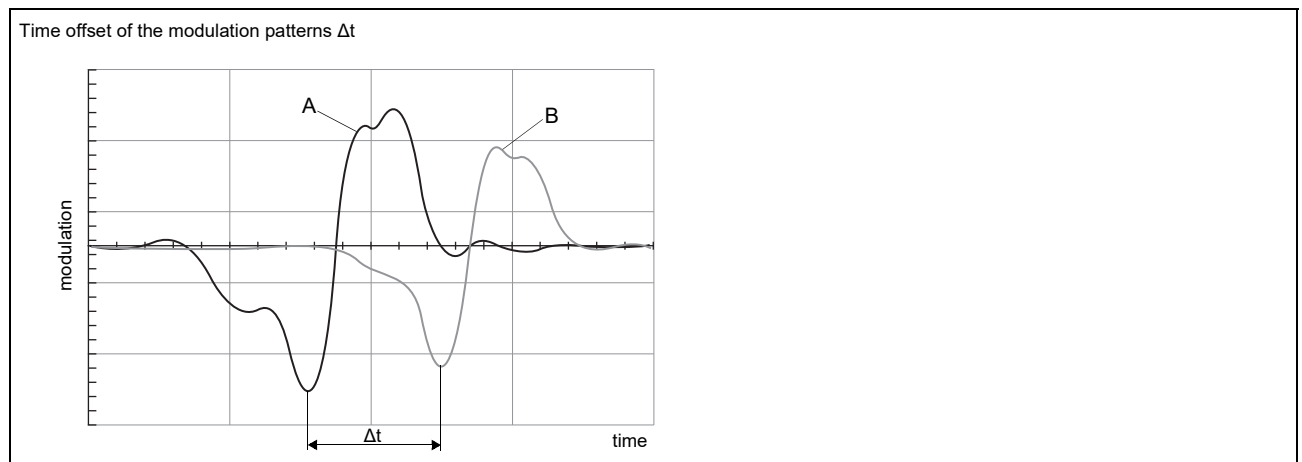
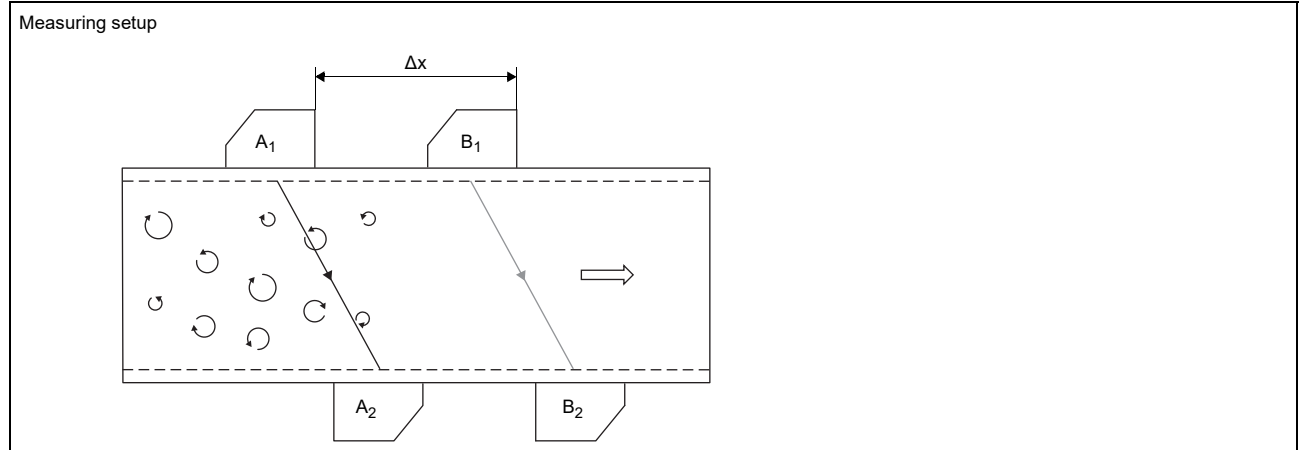
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Function

Measurement principle

The flow velocity of the fluid is measured using the correlation principle. 2 pairs of ultrasonic transducers are mounted one after the other at a distance Δx on the pipe. The transducer pairs form the measuring barriers A and B. Ultrasonic signals are alternately emitted by the emitters A_1 and B_1 and received by the respective receivers A_2 and B_2 . The ultrasonic signals are modulated regarding amplitude and phase by the swirls of the turbulent flowing fluid. Since the swirls move with the flow, they pass the measuring barriers A and B with a time offset Δt , so that the modulation patterns of the ultrasonic signals of measuring barrier A and B are also offset by Δt . This time offset Δt is measured by means of cross correlation of the modulation signals.



Calculation of volumetric flow rate

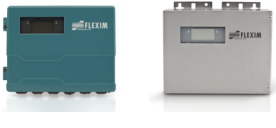



$$\dot{V} = A \cdot v = A \cdot k_{Re} \cdot \frac{\Delta x}{\Delta t}$$

where

- \dot{V} - operating volumetric flow rate
- A - cross-sectional pipe area
- v - flow velocity
- k_{Re} - fluid mechanics calibration factor
- Δx - distance between measuring barriers
- Δt - time offset of the modulation patterns

Transmitter

Technical data

	FLUXUS G722ST-NNN**-2A G722ST-NNN**-2S	FLUXUS G722ST-A2N**-2A G722ST-A2N**-2S	FLUXUS G722ST-F2N**-2A G722ST-F2N**-2S
			
design	standard field device	standard field device zone 2	standard field device FM Class I Div. 2
application	high-temperature steam measurement ¹		
measurement			
measurement principle	cross correlation principle		
Flussrichtung	bidirektional		
flow velocity	m/s depending on the application		
repeatability	±1 % MV (Re > 60 000) ±3 % MV (Re 10 000...60 000)		
Reynolds number	Re > 10 000		
fluid	saturated steam, superheated steam		
fluid pressure	bar (a)	1...110	
fluid temperature	°C	100...630	
measurement uncertainty (volumetric flow rate)			
measurement uncertainty at the measuring point	±3 % MV (Re > 60 000) ±4 % MV (Re 10 000...60 000)		
transmitter			
power supply	<ul style="list-style-type: none"> • 100...230 V/50...60 Hz or • 20...32 V DC or • 11...16 V DC 		
power consumption	W	< 15	
measuring setup	2 transducer pairs of the same type required (see measuring setup in section Measurement principle)		
damping	s	0...100 (adjustable)	
measuring cycle	Hz	0.5...1 (depending on the application)	
response time	s	20...50 (depending on the application)	
housing material	aluminum, powder coated or stainless steel 316L (1.4404)		
degree of protection	IP66		aluminum housing: IP66/NEMA 4X stainless steel housing: IP65
dimensions	mm	see dimensional drawing	
weight	kg	aluminum housing: 5.4 stainless steel housing: 5.1	
fixation	wall mounting, optional: 2" pipe mounting		
ambient temperature	°C	-40...+60 (< -20 without operation of the display)	aluminum housing: -40...+55/60 (< -20 without operation of the display) stainless steel housing: -20...+55/60
display	128 x 64 pixels, backlight		
menu language	English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian		
explosion protection			
• ATEX/IECEx			
marking	-	G722**-A20*A, G722**-A20*S: CE 0637  II3G II2D Ex nA nC ic IIC T4 Gc Ex tb IIIC T120 °C Db T _a -40...+60 °C	-
certification	-	IBExU11ATEX1015, IECEx IBE 11.0008	-
• FM			
marking	-	-	G722**-F20*S2, G722**-F20*S3:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C, D,E,F,G/ T5 G722**-F20*S1:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C, D,E,F,G/ T4A
measuring functions			
physical quantities	operating volumetric flow rate, mass flow rate, flow velocity		
totaliser	volume, mass		
diagnostic functions	crest factor, peak width, symmetry of amplification		

¹ test measurement to validate the application required in advance

² outside the explosive atmosphere (housing cover open)

	FLUXUS G722ST-NNN**-2A G722ST-NNN**-2S	FLUXUS G722ST-A2N**-2A G722ST-A2N**-2S	FLUXUS G722ST-F2N**-2A G722ST-F2N**-2S
communication interfaces			
service interfaces	measured value transmission, parametrisation of the transmitter: <ul style="list-style-type: none"> • USB² • LAN² 		
process interfaces	max. 1 option: <ul style="list-style-type: none"> • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP 		
accessories			
data transmission kit	USB cable		
software	<ul style="list-style-type: none"> • 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		
outputs			
	The outputs are galvanically isolated from the transmitter.		
number	on request		
• switchable current output			
	All switchable current outputs are jointly switched to active or passive.		
range	mA	4...20 (3.2...22)	
accuracy		0.04 % MV ±3 µA	
active output		$R_{ext} < 250 \Omega$	
passive output		$U_{ext} = 8...30 \text{ V}$, depending on R_{ext} ($R_{ext} < 1 \text{ k}\Omega$ at 30 V)	
• HART			
range	mA	4...20	
accuracy		0.1 % MV ±15 µA	
active output		$U_{int} = 24 \text{ V}$, $R_{ext} < 500 \Omega$	
passive output		$U_{ext} = 10...24 \text{ V DC}$, depending on R_{ext} ($R_{ext} < 1 \text{ k}\Omega$ at 24 V)	
• voltage output			
range	V	0...1 or 0...10	
accuracy		0...1 V: 0.1 % MV ±1 mV 0...10 V: 0.1 % MV ±10 mV	
internal resistance		$R_{int} = 500 \Omega$	
• digital output			
functions		<ul style="list-style-type: none"> • frequency output • binary output • pulse output 	
number		3	
operating parameters		5...30 V / < 100 mA	
frequency output			
• range	kHz	0...5	
binary output			
• binary output as alarm output		limit, change of flow direction or error	
pulse output			
• functions		mainly for totalising	
• pulse value	units	0.01...1000	
• pulse width	ms	0.05...1000	

¹ test measurement to validate the application required in advance

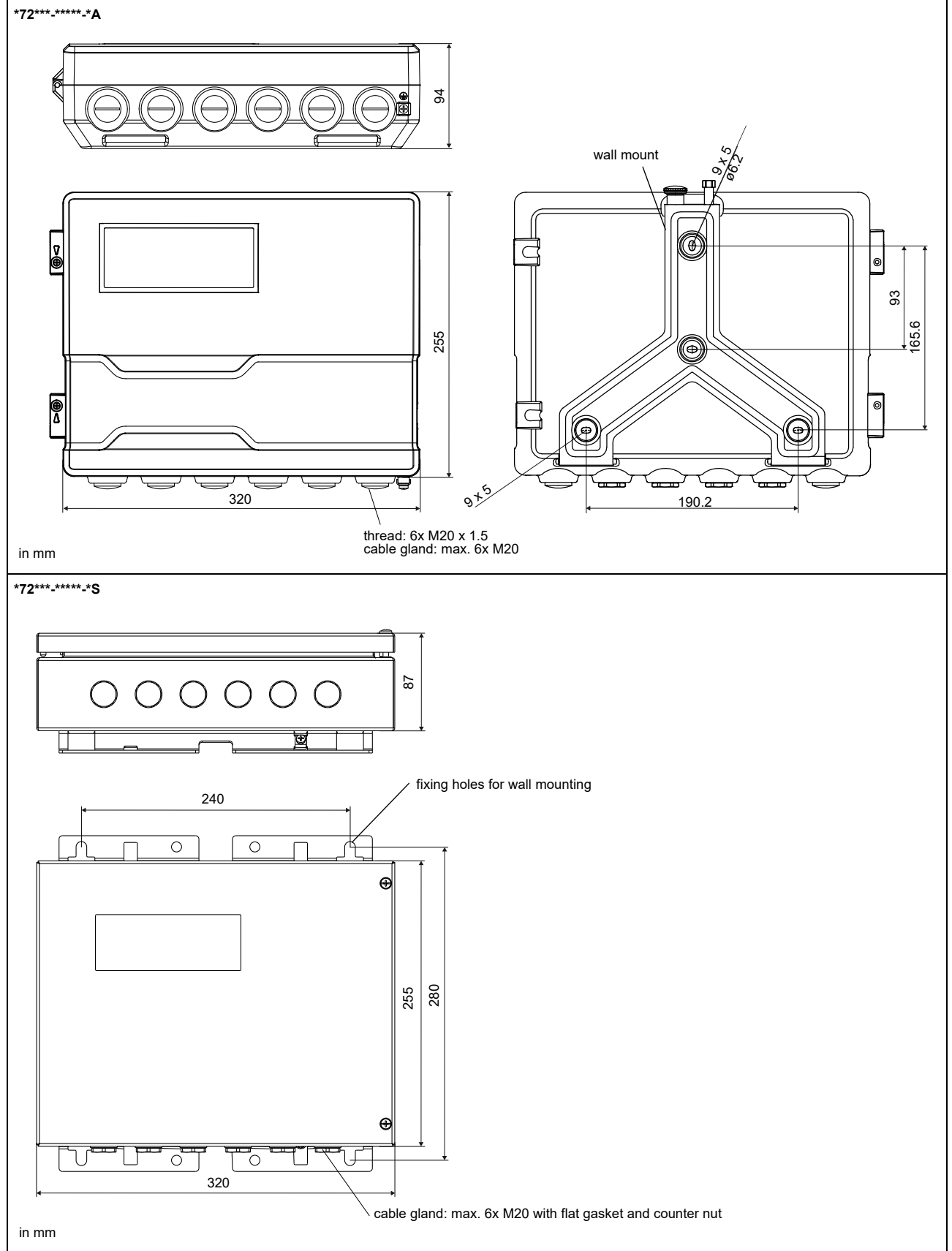
² outside the explosive atmosphere (housing cover open)

	FLUXUS G722ST-NNN**-2A G722ST-NNN**-2S	FLUXUS G722ST-A2N**-2A G722ST-A2N**-2S	FLUXUS G722ST-F2N**-2A G722ST-F2N**-2S
inputs			
	The inputs are galvanically isolated from the transmitter.		
number	max. 4, on request		
• temperature input			
type	Pt100/Pt1000		
connection	4-wire		
range	°C	-150...+560	
resolution	K	0.01	
accuracy	±0.01 % MV ±0.03 K		
• current input			
accuracy	0.1 % MV ±10 µA		
active input	U _{int} = 24 V, R _{int} = 50 Ω, P _{int} < 0.5 W, not short-circuit proof		
• range	mA	0...20	
passive input	R _{int} = 50 Ω, P _{int} < 0.3 W		
• range	mA	-20...+20	
• voltage input			
range	V	0...1	
accuracy	0.1 % MV ±1 mV		
internal resistance	R _{int} = 1 MΩ		

¹ test measurement to validate the application required in advance

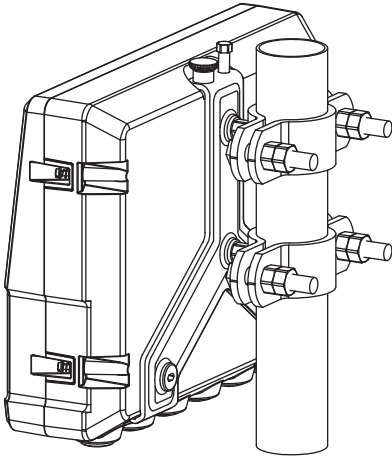
² outside the explosive atmosphere (housing cover open)

Dimensions



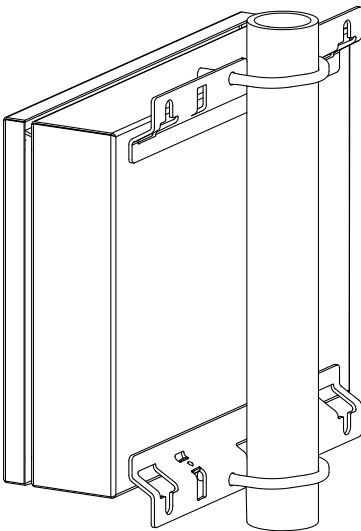
2" pipe mounting kit

*72***.****.*A



item number: 721037-4

*72***.****.*S

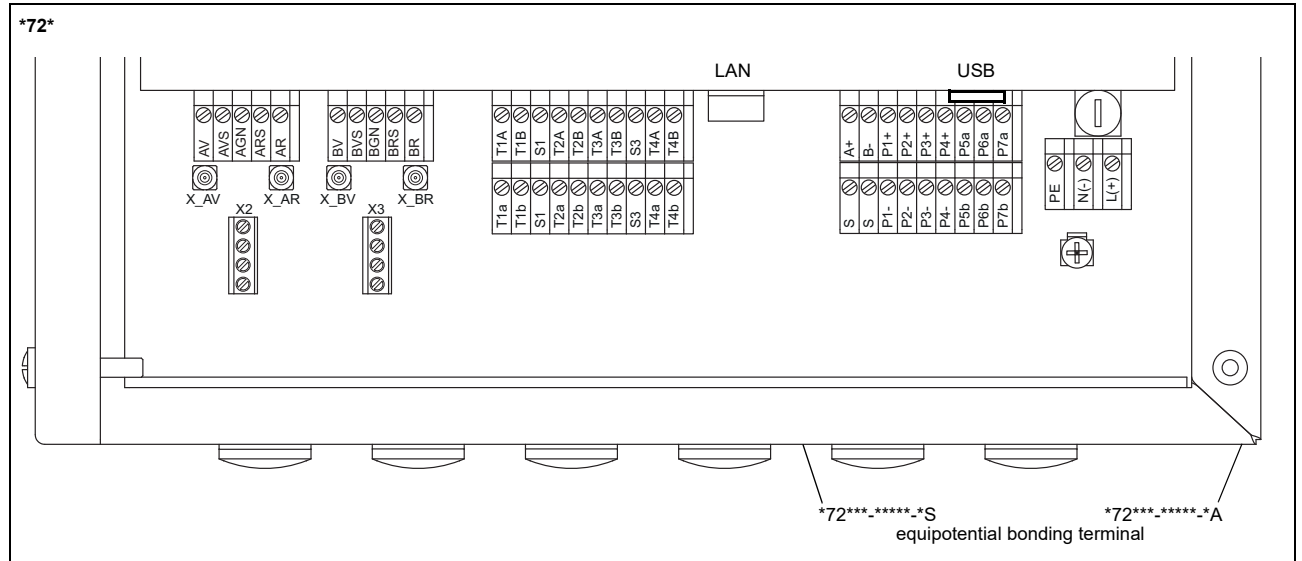


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Storage

- 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: -40...+60 °C

Terminal assignment



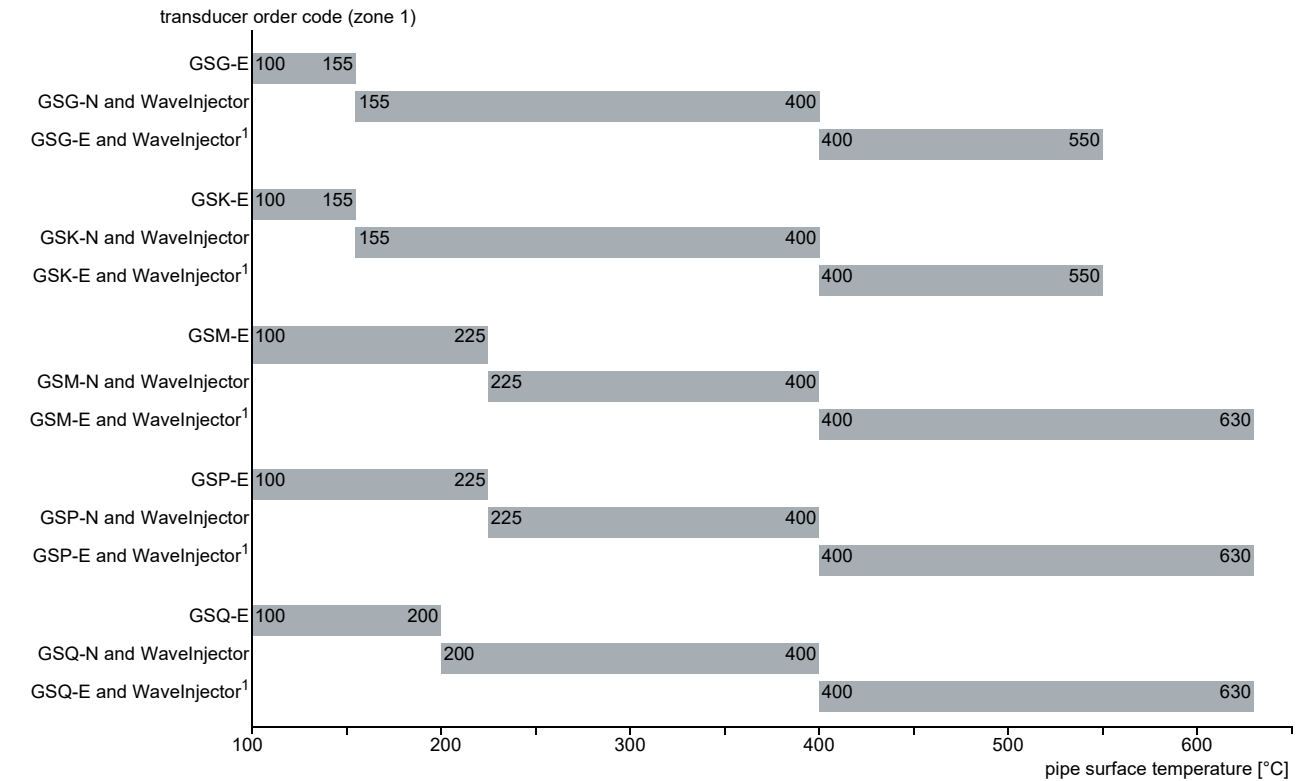
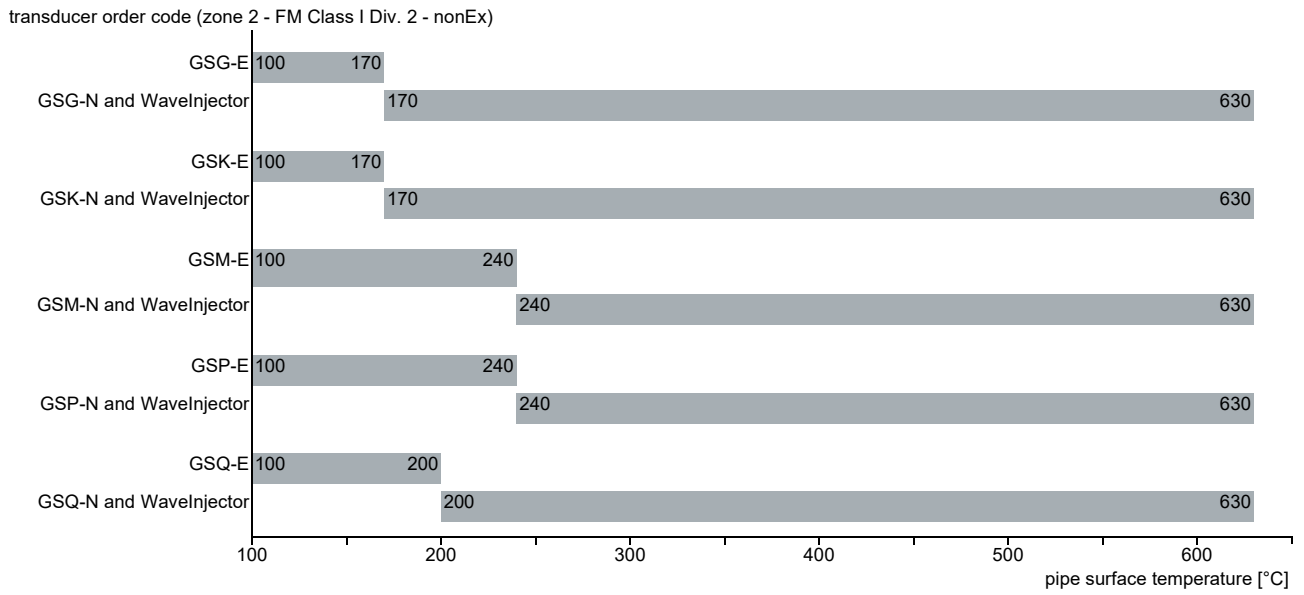
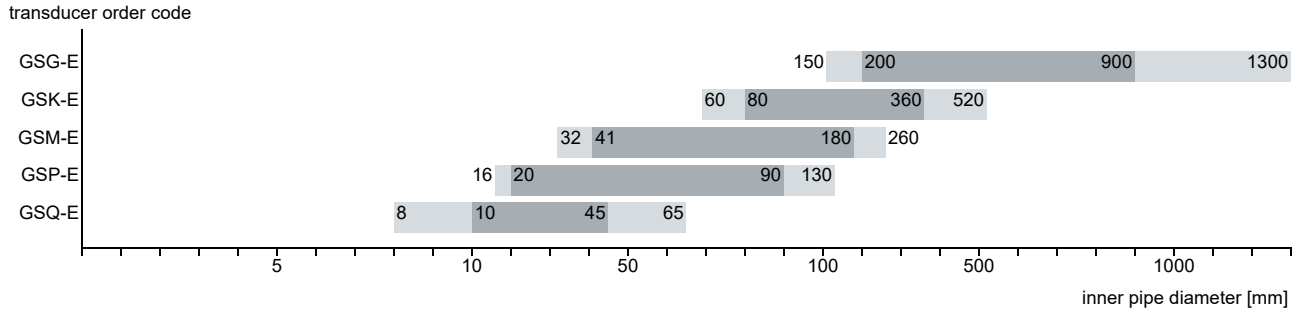
power supply ¹				
terminal		connection (AC)		connection (DC)
PE		protective earth		protective earth
N(-)		xxx		-
L(+)		outer conductor		+
transducers				
transducer cable (transducers *****8*), extension cable				transducer cable (transducers *****52)
measuring channel A		measuring channel B		
terminal	connection	terminal	connection	transducer
AV	signal	BV	signal	↑
AVS	shield	BVS	shield	
ARS	shield	BRS	shield	≡
AR	signal	BR	signal	
				X_AV
				X_BV
				X_AR
				X_BR
				SMB connector
				SMB connector
outputs ^{1, 2}				
terminal	connection	terminal	connection	communication interface
P1+...P4+ P1-...P4-	current output, voltage output, HART (P1)	A+	signal +	• RS485 ¹ • Modbus RTU ¹ • BACnet MS/TP ¹ • Profibus PA ¹ • FF H1 ¹
P5a...P7a P5b...P7b	digital output	B-	signal -	
		S	shield	
		USB	type B Hi-Speed USB 2.0 Device	• service (FluxDiag/ FluxDiagReader)
		LAN	RJ45 10/100 Mbps Ethernet	• service (FluxDiag/ FluxDiagReader) • BACnet IP • Modbus TCP
analog inputs ^{1, 2}				
terminal	temperature probe		passive sensor	active sensor
	direct connection	connection with extension cable	connection	connection
T1a...T4a	red	red	not connected	not connected
T1A...T4A	red/blue	grey	-	+
T1b...T4b	white/blue	blue	+	not connected
T1B...T4B	white	white	not connected	-
S1, S3	shield	shield	not connected	not connected

¹ cable (by customer):
 - e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²
 - outer diameter of the cable (*72***.*****S with ferrite nut): max. 7.6 mm

² The number, type and terminal assignment are customised.

Transducers

Transducer selection



¹ technical verification to validate the application required in advance

■ recommended ■ possible

Transducer order code

1, 2 3 4 5...7 8, 9 10, 11 12...14 no. of character

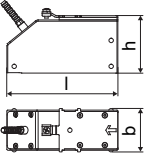
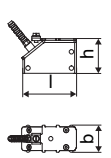
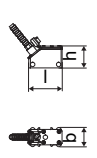

transducer	transducer frequency	-	ambient temperature	explosion protection	-	certification	connection system	-	cable length	description		
GS										set of ultrasonic flow transducers, shear wave		
	G										0.2 MHz	
	K										0.5 MHz	
	M										1 MHz	
	P										2 MHz	
	Q										4 MHz	
		N										normal temperature range
		E										extended temperature range
			NNN								not explosion-proof	
			A2N								ATEX zone 2/IECEX zone 2	
			A1N								ATEX zone 1/IECEX zone 1	
			F2N								FM Class I Div. 2	
				**								
					TS						with SMB connector	
					T1						with stripped cable ends	
								***		in m		

Technical data

Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)

order code		GSG-N***-**TS	GSK-N***-**TS	GSM-N***-**TS	GSP-N***-**TS	GSQ-N***-**TS
technical type		G(DL)G1N52	G(DL)K1N52	G(DL)M2N52	G(DL)P2N52	G(DL)Q2N52
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	180	70	37	18	9
min. recommended	mm	240	100	48	24	12
max. recommended	mm	920	370	180	90	46
max. extended	mm	1300	520	260	130	66
pipe wall thickness						
min.	mm	11.1	4.4	2.2	1.1	0.6
material						
housing		PEEK with stainless steel cover 316L (1.4404)				
contact surface		PEEK				
degree of protection		IP66				
transducer cable						
type		1699				
length	m	5			4	3
dimensions						
length l	mm	129.5	126.5	64	40	
width b	mm	51	51	32	22	
height h	mm	67	67.5	40.5	25.5	
dimensional drawing						
weight (without cable)	kg	0.47	0.36	0.066	0.016	
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		GSG-NA2*-**TS	GSK-NA2*-**TS	GSM-NA2*-**TS	GSP-NA2*-**TS	GSQ-NA2*-**TS
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180				
marking		CE 0637 Ex II 3G II 2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X				
• FM						
order code		GSG-NF2*-**TS	GSK-NF2*-**TS	GSM-NF2*-**TS	GSP-NF2*-**TS	GSQ-NF2*-**TS
pipe surface temperature (Ex)	°C	-40...+125			-40...+190	
degree of protection		IP66				
marking		NI/CI. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				

Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS, extended temperature range)

order code		GSG-ENNN-***TS	GSK-ENNN-***TS	GSM-E***-***TS	GSP-E***-***TS	GSQ-E***-***TS
technical type		G(DL)G1E52	G(DL)K1E52	G(DL)M2E52	G(DL)P2E52	G(DL)Q2E52
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	150	60	32	16	8
min. recommended	mm	200	80	41	20	10
max. recommended	mm	900	360	180	90	45
max. extended	mm	1300	520	260	130	65
pipe wall thickness						
min.	mm	11.1	4.4	2.2	1.1	0.6
material						
housing		PPSU with stainless steel cover 316L (1.4404)		PI with stainless steel cover 316L (1.4404)		
contact surface		PPSU		PI		
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699		6111		
length	m	5		4		3
dimensions						
length l	mm	129.5		64		40
width b	mm	51		32		22
height h	mm	67		40.5		25.5
dimensional drawing						
weight (without cable)	kg	0.82		0.066		0.017
pipe surface temperature	°C	100...180		100...240 ¹		100...200
ambient temperature	°C	-40...+180		-30...+40 -30...+60 ² -30...+200 ³		-30...+200
temperature compensation		x		x		
explosion protection						
• ATEX/IECEx						
order code		-	-	GSM-EA2*-***TS	GSP-EA2*-***TS	GSQ-EA2*-***TS
pipe surface temperature (Ex)	°C	-	-	gas: -45...+235 ¹ dust: -45...+225 ¹		
marking		-	-	CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db IBExU10ATEX1163 X, IECEx IBE 12.0005X		
certification		-	-	IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• FM						
order code		-	-	GSM-EF2*-***TS	GSP-EF2*-***TS	GSQ-EF2*-***TS
pipe surface temperature (Ex)	°C	-	-	-40...+235 ¹		
degree of protection		-	-	IP66		
marking		-	-	 NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860		

¹ > +200 °C:

Variofix C without cover
observe the insulation instruction
Ex: ambient temperature max. +40 °C

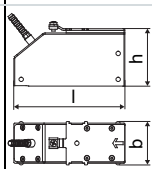
² pipe surface temperature +200...+240 °C: Variofix C without cover

³ pipe surface temperature max. +200 °C

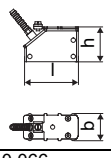
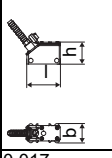

Shear wave transducers (zone 1, T1)

order code		GSG-N*1*-**T1	GSK-N*1*-**T1	GSM-N*1*-**T1	GSP-N*1*-**T1	GSQ-N*1*-**T1
technical type		G(DL)G1N81	G(DL)K1N81	G(DL)M2N81	G(DL)P2N81	G(DL)Q2N81
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	180	70	37	18	9
min. recommended	mm	240	100	48	24	12
max. recommended	mm	920	370	180	90	46
max. extended	mm	1300	520	260	130	66
pipe wall thickness						
min.	mm	11.1	4.4	2.2	1.1	0.6
material						
housing		PEEK with stainless steel cover 316L (1.4404)				
contact surface		PEEK				
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699				
length	m	5		4	3	
dimensions						
length l	mm	129.5	126.5	64	40	
width b	mm	51	51	32	22	
height h	mm	67	67.5	40.5	25.5	
dimensional drawing						
weight (without cable)	kg	0.47	0.36	0.066	0.016	
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		GSG-NA1*-**T1	GSK-NA1*-**T1	GSM-NA1*-**T1	GSP-NA1*-**T1	GSQ-NA1*-**T1
pipe surface temperature (Ex)	°C	-55...+180				
marking		CE 0637 (Ex) II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X				

Shear wave transducers (zone 1, T1, extended temperature range)

order code		GSG-E*1*-**T1	GSK-E*1*-**T1
technical type		G(DL)G1E83	G(DL)K1E83
transducer frequency	MHz	0.2	0.5
inner pipe diameter d			
min. extended	mm	150	60
min. recommended	mm	200	80
max. recommended	mm	900	360
max. extended	mm	1300	520
pipe wall thickness			
min.	mm	11.1	4.4
material			
housing		PPSU with stainless steel cover 316L (1.4404)	
contact surface		PPSU	
degree of protection		IP66	
transducer cable			
type		1699	
length	m	5	
length (***_***/LC)	m	9	
dimensions			
length l	mm	129.5	
width b	mm	51	
height h	mm	67	
dimensional drawing			
weight (without cable)	kg	0.82	
pipe surface temperature	°C	100...180	
ambient temperature	°C	-40...+180	
temperature compensation		x	
explosion protection			
• ATEX/IECEX			
order code		GSG-EA1*-**T1	GSK-EA1*-**T1
pipe surface temperature (Ex)	°C	-50...+155	
marking		CE 0637 Ex II 2G II 2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification		IIBExU07ATEX1168 X, IIECEX IBE 08.0007X	

Shear wave transducers (zone 1, T1, extended temperature range)

order code		GSM-E*1*-**T1	GSP-E*1*-**T1	GSQ-E*1*-**T1
technical type		G(DL)M2E85	G(DL)P2E85	G(DL)Q2E85
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	32	16	8
min. recommended	mm	41	20	10
max. recommended	mm	180	90	45
max. extended	mm	260	130	65
pipe wall thickness				
min.	mm	2.2	1.1	0.6
material				
housing		PI with stainless steel cover 316L (1.4404)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		25.5
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature	°C	100...240 ¹		100...200
ambient temperature	°C	-30...+40 -30...+200 ²		-30...+200
temperature compensation		x		
explosion protection				
• ATEX/IECEx				
order code		GSM-EA1*-**T1	GSP-EA1*-**T1	GSQ-EA1*-**T1
pipe surface temperature (Ex)	°C	-45...+225 ¹		
marking		CE 0637  II2G II2D Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X		

¹ > +200 °C :
 Variofix C
 observe the insulation instruction
 ambient temperature max. +40 °C

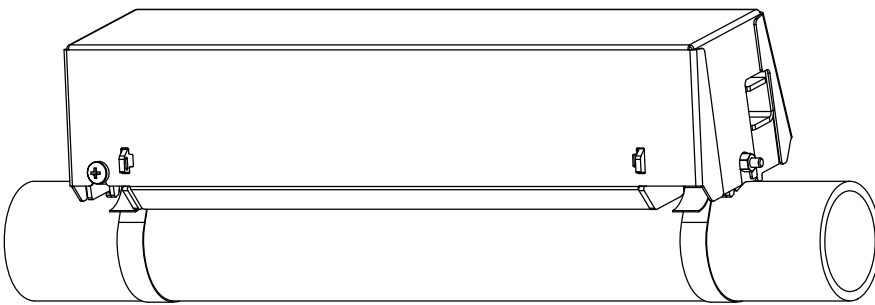
² pipe surface temperature max. +200 °C

Transducer mounting fixture

Order code

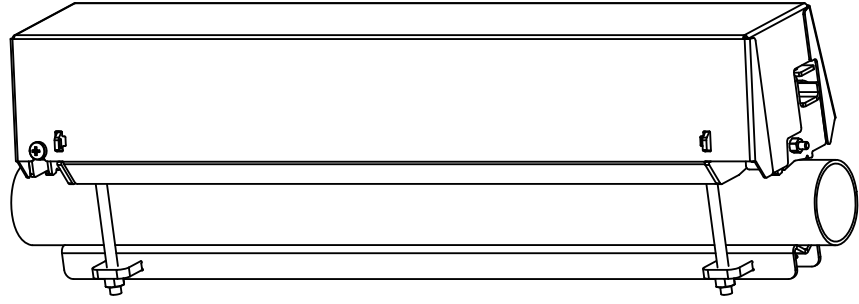
1, 2	3	4	5	6	7...10	no. of character
transducer mounting fixture	transducer	measurement arrangement	size	fixation	outer pipe diameter	option
						description
VC						Variofix C
WI						transducer box for WaveInjector
	K					transducers with transducer frequency G, K
	M					transducers with transducer frequency M, P
	Q					transducers with transducer frequency Q
		D				diagonal arrangement
			S			small
			L			large
				B		bolts
				S		tension straps
					0020	10...20 mm
					0040	20...40 mm
					T360	40...360 mm
					0130	10...130 mm
					0360	130...360 mm
					0920	360...920 mm
					2000	920...2000 mm

Variofix C (VC)



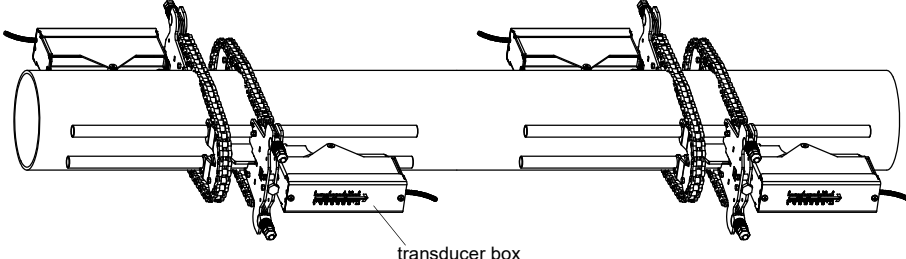
material: stainless steel 316Ti (1.4571)
 inner length:
VCK-*L: 500 mm
VCK-*S: 350 mm
VCM: 400 mm
VCQ: 250 mm
 dimensions:
VCK-*L:
 560 x 126 x 125 mm
VCK-*S:
 410 x 126 x 125 mm
VCM: 460 x 96 x 82 mm
VCQ: 310 x 85 x 71 mm

Variofix C (VC) with bolt mounting plates (VCM--B, VCQ-**-B)**



material: stainless steel 316Ti (1.4571)
 inner length:
VCM: 400 mm
VCQ: 250 mm
 dimensions:
VCM: 460 x 96 x 82 mm
VCQ: 310 x 85 x 71 mm
 outer pipe diameter:
VCM: max. 46 mm
VCQ: max. 36 mm

transducer box WI for WaveInjector



see Technical specification
 TSWaveInjectorVx-x

Coupling materials for transducers

type	ambient temperature °C	remark
coupling foil type VT	-10...+200	fluid temperature 200 °C: min. 2 years
coupling foil type TF	200...240	
coupling compound type E	-30...+200	in combination with type VT only
coupling compound type H	-30...+250	in combination with type TF only
coupling foil type A	max. 280	WaveInjector
coupling foil type B	280...630	WaveInjector

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
		****8*
connection system TS		
		****52

Cable

transducer cable			
type		1699	6111
weight	kg/m	0.094	0.092
ambient temperature	°C	-55...+200	-100...+225
cable jacket			
material		PTFE	PFA
outer diameter	mm	2.9	2.7
thickness	mm	0.3	0.5
colour		brown	white
shield		x	x
sheath			
material		stainless steel 316Ti (1.4571)	stainless steel 316Ti (1.4571)
outer diameter	mm	8	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, K		M, P		Q	
connection system TS							
transducers technical type		x	l	x	l	x	l
*D***8*	m	5	≤ 300	4	≤ 300	3	≤ 90
*L***8*	m	9	≤ 300	9	≤ 300	9	≤ 90
*D***5*	m	5	≤ 300	4	≤ 300	3	≤ 90
*L***5*	m	9	≤ 300	9	≤ 300	9	≤ 90

x - transducer cable length

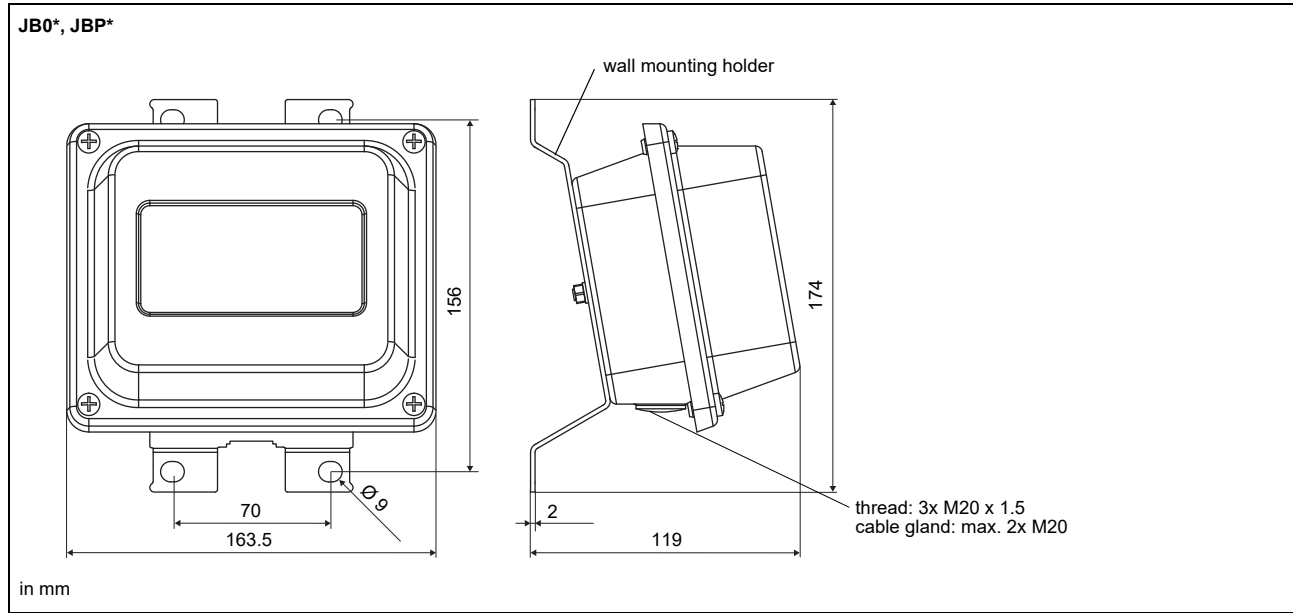
l - max. length of extension cable (depending on the application)

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		IP67	
ambient temperature			
min.	°C	-40	
max.	°C	+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 ATEX		IBExU06ATEX1161	
certification IECEX		IECEX IBE 08.0006	
type of protection		gas: increased safety decoupling network: encapsulation dust: protection by enclosure	
Connection			
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	
JB02, JB03, JB04			
weight	kg	1.2 kg	
fixation		wall mounting optional: 2" pipe mounting	
material			
housing		stainless steel 316L (1.4404)	
gasket		silicone	
degree of protection		IP67	
ambient temperature			
min.	°C	-40	
max.	°C	+80	
explosion protection			
• ATEX			
junction box		JB02	
marking		CE Ex II3G Ex nA IIC (T6)...T4 Gc II3D Ex tc IIIC T 100 °C Dc Ta -40...+(70)80 °C	
• FM			
junction box		JB04	
marking		NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C	
Connection			
Transducers			
terminal	connection	transducer	
XV	SMB connector	↑	
XR	SMB connector	⌋	
Extension cable			
terminal strip	terminal	connection	
KL2	TV	signal	
	TVS	internal shield	
	TRS	internal shield	
	TR	signal	

Dimensions

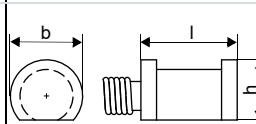
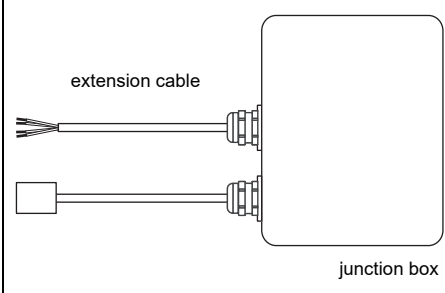
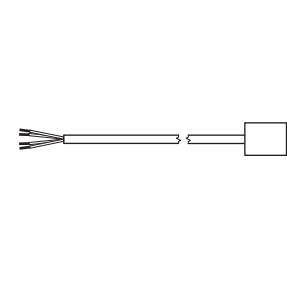
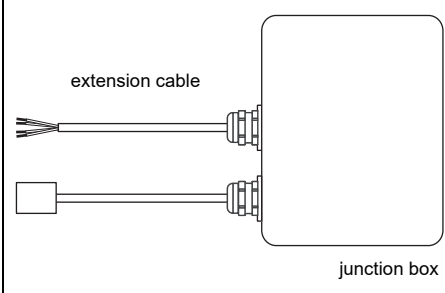
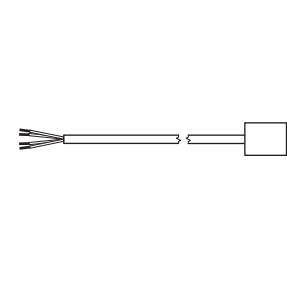
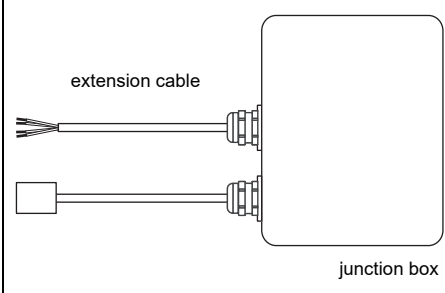
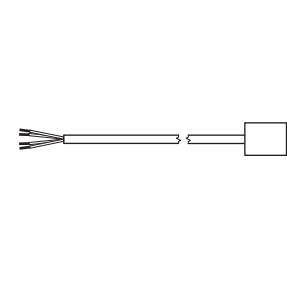
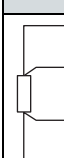
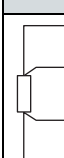
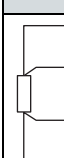
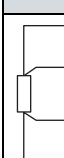
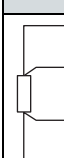
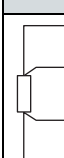
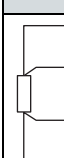
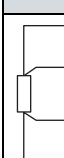
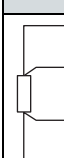
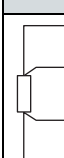
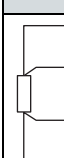
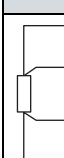


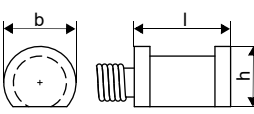

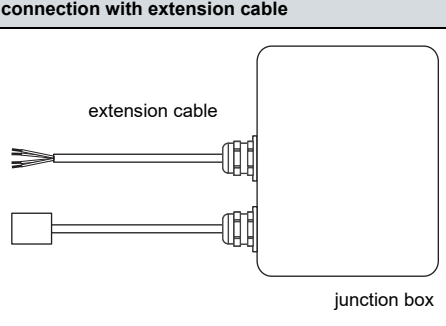
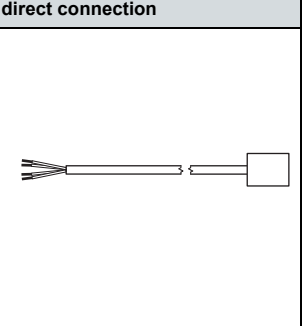
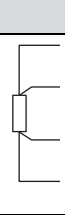
2" pipe mounting kit



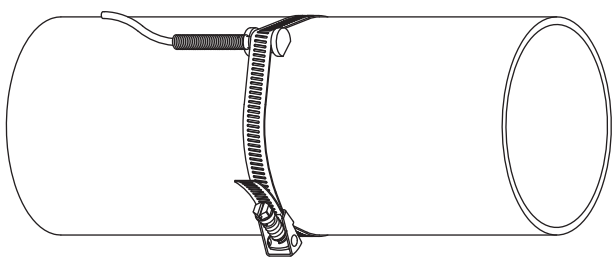
Clamp-on temperature probe (optional)

Technical data

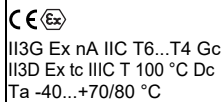
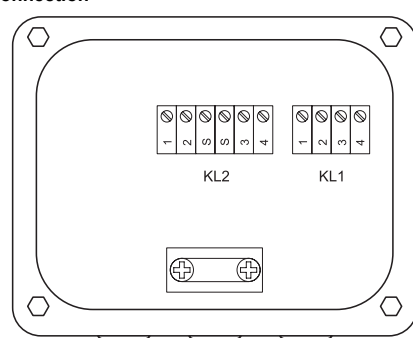
PT12N																															
item number	770415-1																														
design	clamp-on																														
type	Pt100																														
connection	4-wire																														
measuring range	°C -30...+250																														
accuracy T	$\pm(0.15 \text{ °C} + 2 \cdot 10^{-3} \cdot T \text{ [°C] })$ class A																														
response time	s 50 (t50, T1 = 25 °C, T2 = 60 °C)																														
housing	aluminum																														
degree of protection	IP54																														
dimensions																															
length l	mm 20																														
width b	mm 15																														
height h	mm 13																														
dimensional drawing																															
weight	kg 0.25																														
accessories																															
thermal conductivity foil 250 °C	x																														
Connection system																															
<table border="1"> <thead> <tr> <th>connection with extension cable</th> <th>direct connection</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>		connection with extension cable	direct connection																												
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Connection																															
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	temperature probe																														
	red																														
	red/blue																														
	white/blue																														
	white																														
Cable																															
<table border="1"> <thead> <tr> <th></th> <th>temperature probe</th> <th>extension cable</th> </tr> </thead> <tbody> <tr> <td>type</td> <td>4 x 0.22 mm²</td> <td>LIYCY 8 x 0.14 mm²</td> </tr> <tr> <td>standard length</td> <td>m 3</td> <td>5/10/25</td> </tr> <tr> <td>max. length</td> <td>m -</td> <td>200</td> </tr> <tr> <td>ambient temperature</td> <td>°C -30...+250</td> <td>-25...+80</td> </tr> <tr> <td>min. bend radius</td> <td>mm 27</td> <td>68</td> </tr> <tr> <td colspan="3">cable jacket</td> </tr> <tr> <td>material</td> <td>PFA</td> <td>PVC</td> </tr> <tr> <td>outer diameter</td> <td>mm 3.8 ±0.15</td> <td>4.8 ±2</td> </tr> <tr> <td>colour</td> <td>black</td> <td>grey</td> </tr> </tbody> </table>			temperature probe	extension cable	type	4 x 0.22 mm ²	LIYCY 8 x 0.14 mm ²	standard length	m 3	5/10/25	max. length	m -	200	ambient temperature	°C -30...+250	-25...+80	min. bend radius	mm 27	68	cable jacket			material	PFA	PVC	outer diameter	mm 3.8 ±0.15	4.8 ±2	colour	black	grey
	temperature probe	extension cable																													
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standard length	m 3	5/10/25																													
max. length	m -	200																													
ambient temperature	°C -30...+250	-25...+80																													
min. bend radius	mm 27	68																													
cable jacket																															
material	PFA	PVC																													
outer diameter	mm 3.8 ±0.15	4.8 ±2																													
colour	black	grey																													

PT12N		
item number	770415-1A2	
design	clamp-on ATEX	
type	Pt100	
connection	4-wire	
measuring range	°C -30...+250	
accuracy T	$\pm(0.15\text{ °C} + 2 \cdot 10^{-3} \cdot T\text{ [°C] })$ class A	
response time	s 50	
housing	aluminum	
degree of protection	IP67	
dimensions		
length l	mm 20	
width b	mm 15	
height h	mm 13	
dimensional drawing		
weight	kg 0.25	
accessories		
thermal conductivity foil 250 °C	x	
explosion protection		
• ATEX		
marking	 II3G Ex nA IIC T6...T2 Gc Ta -30...+250 °C	
Connection system		
connection with extension cable	direct connection	
		
Connection		
	temperature probe	
	red	
	red/blue	
	white	
	white/blue	
Cable		
	temperature probe	extension cable
type	4 x 0.25 mm ²	LIYCY 8 x 0.14 mm ²
standard length	m 3	5/10/25
max. length	m -	200
ambient temperature	°C -30...+250	-25...+80
min. bend radius	mm 19	68
cable jacket		
material	PTFE	PVC
outer diameter	mm 3.8	4.8 ±2
colour	black	grey

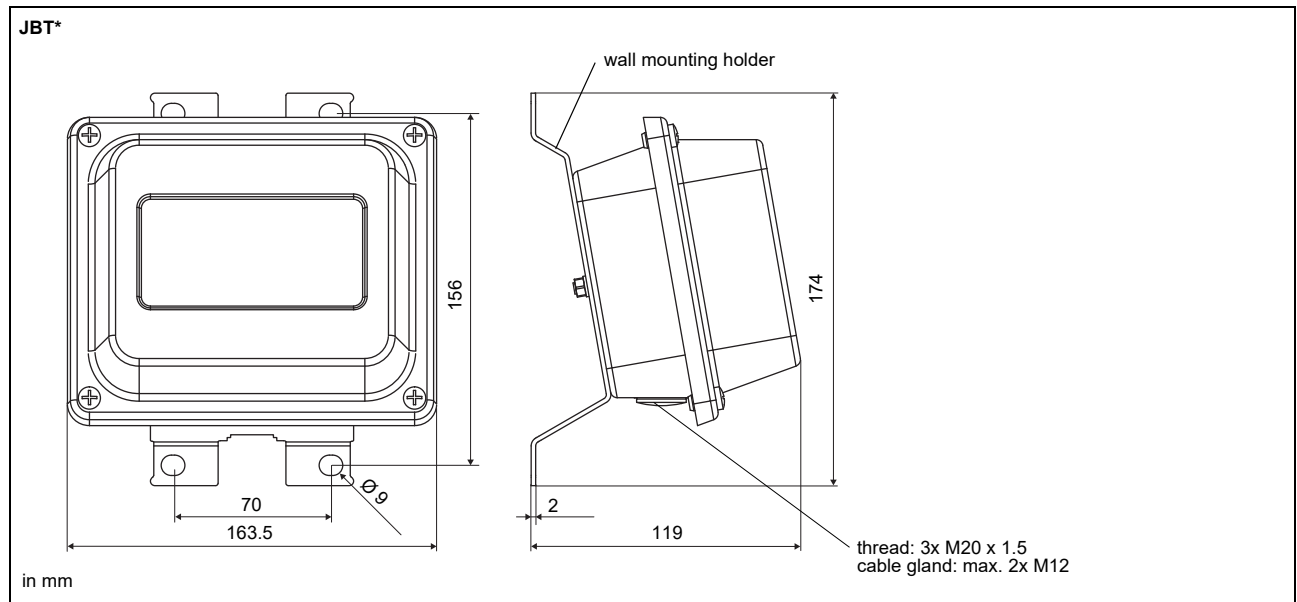
Fixation

tension strap PT12N	
	material: stainless steel 301 (1.4310), 410 (1.4006) thermal insulation necessary

Junction box

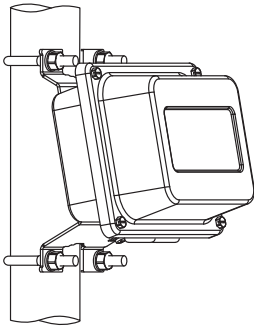
JBT2, JBT3																									
item number	<ul style="list-style-type: none"> JBT2: 770428-5A2 JBT3: 751040-36 																								
weight	kg 1.2 kg																								
fixation	wall mounting optional: 2" pipe mounting																								
material																									
housing	stainless steel 316L (1.4404)																								
gasket	silicone																								
degree of protection	IP67																								
ambient temperature																									
min.	°C -40																								
max.	°C +80																								
explosion protection																									
• ATEX																									
junction box	JBT2																								
marking																									
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Connection</p>  </div> <div style="width: 45%;"> <p>Temperature probe</p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL1</td> <td>1</td> <td>red</td> </tr> <tr> <td>2</td> <td>red/blue</td> </tr> <tr> <td>3</td> <td>white</td> </tr> <tr> <td>4</td> <td>white/blue</td> </tr> </tbody> </table> <p>Extension cable</p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL2</td> <td>1</td> <td>red</td> </tr> <tr> <td>2</td> <td>grey</td> </tr> <tr> <td>3</td> <td>white</td> </tr> <tr> <td>4</td> <td>blue</td> </tr> </tbody> </table> </div> </div>		terminal strip	terminal	connection	KL1	1	red	2	red/blue	3	white	4	white/blue	terminal strip	terminal	connection	KL2	1	red	2	grey	3	white	4	blue
terminal strip	terminal	connection																							
KL1	1	red																							
	2	red/blue																							
	3	white																							
	4	white/blue																							
terminal strip	terminal	connection																							
KL2	1	red																							
	2	grey																							
	3	white																							
	4	blue																							

Dimensions



2" pipe mounting kit

JB**



item number:
751035-2

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Germany
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Fax: +49 (30) 93 66 76 80
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