

Flexim FLUXUS G731ST-HT Ultrasonic Flowmeter



Superheated Steam Flow Measurement

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

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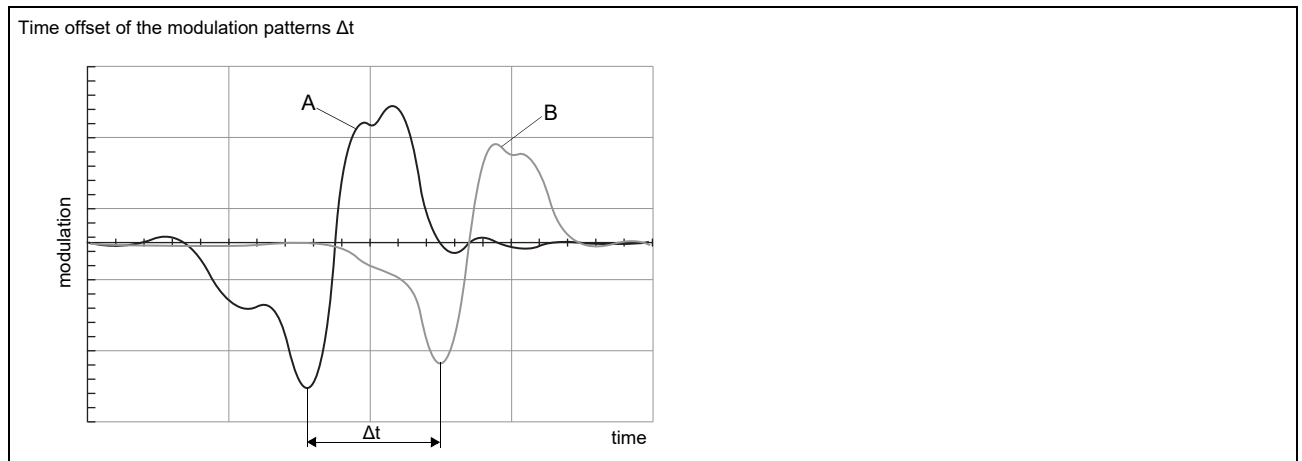
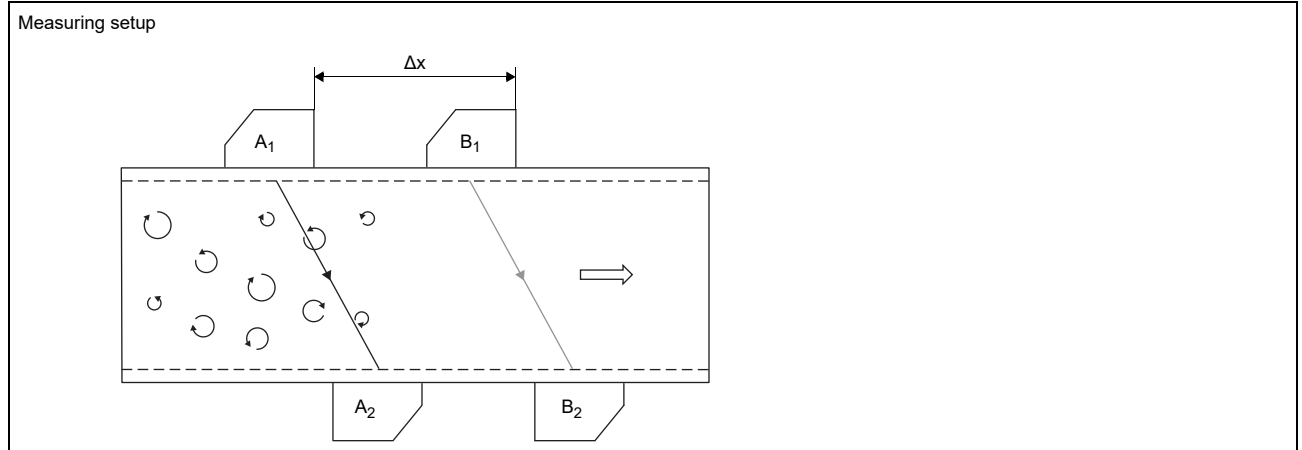
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Function

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



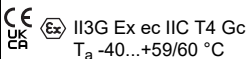
$$\dot{V} = A \cdot v = A \cdot k_{Re} \cdot \frac{\Delta x}{\Delta t}$$

where

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

Transmitter

Technical data

	FLUXUS G731ST-NNN**.*AL G731ST-NNN**.*ST	FLUXUS G731ST-A2N**.*ST
		
design	standard field device	standard field device zone 2
application	high-temperature steam measurement ¹	
measurement		
measurement principle	cross correlation principle	
flow direction	bidirectional	
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...240 V ±10 %/50...60 Hz or • 11...32 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)	stainless steel 316L (1.4404)
degree of protection	IP66	
dimensions	mm	see dimensional drawing
weight	kg	aluminum housing: 4.5 stainless steel housing: 5.8
fixation	wall mounting, optional: 2" pipe mounting	
ambient temperature	°C	-40...+60 (< -20 without operation of the display)
display	240 x 128 pixels, backlight	
menu language	English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese	
explosion protection		
• ATEX		
marking	-	
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	
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"> • Modbus RTU • BACnet MS/TP • M-Bus • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP 	max. 1 option: <ul style="list-style-type: none"> • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1
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 	

¹ test measurement to validate the application required in advance

² outside the explosive atmosphere (housing cover open)

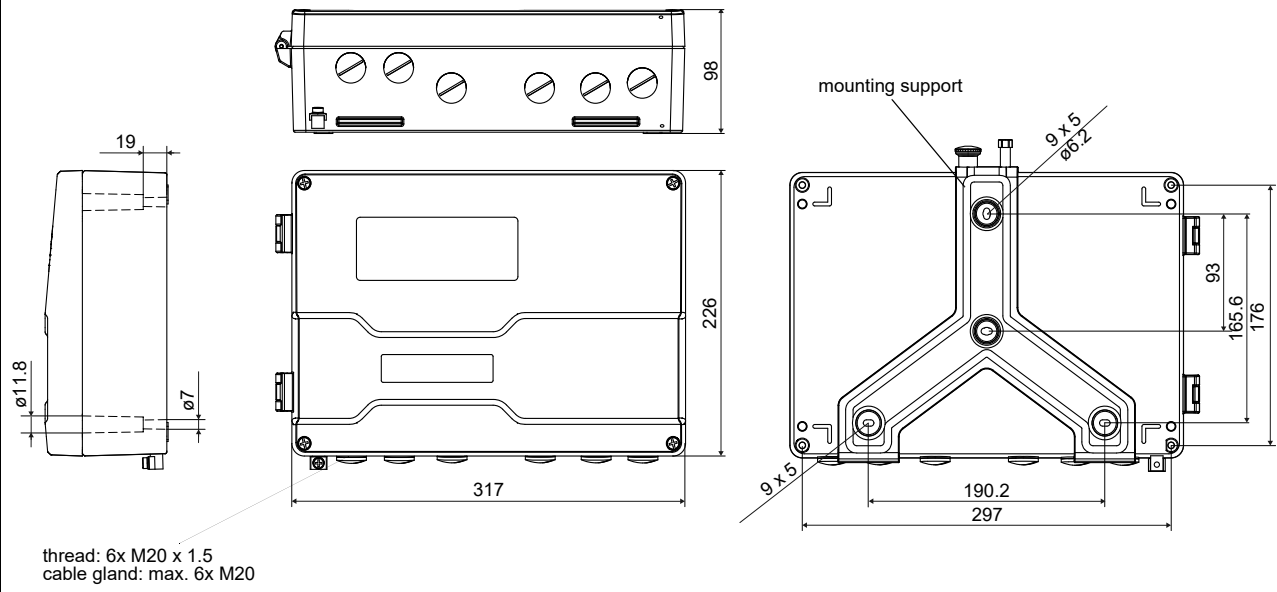
		FLUXUS G731ST-NNN**-*AL G731ST-NNN**-*ST	FLUXUS G731ST-A2N**-*ST
data logger			
loggable values		all physical quantities, totalised physical quantities and diagnostic values	
capacity		max. 800 000 measured values	
outputs			
		The outputs are galvanically isolated from the transmitter.	
number		on request, current inputs and outputs: max. 4	
• switchable current output			
		configurable according to NAMUR NE 43 All switchable current outputs are jointly switched to active or passive.	
range	mA	4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)	
uncertainty		0.04 % of output value $\pm 3 \mu\text{A}$	
active output		$R_{\text{ext}} = 250...530 \Omega$, $U_{\text{opencircuit}} = 28 \text{ V DC}$	
passive output		$U_{\text{ext}} = 9...30 \text{ V DC}$, depending on R_{ext} ($R_{\text{ext}} < 458 \Omega$ 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		$R_{\text{ext}} = 250...530 \Omega$, $U_{\text{opencircuit}} = 28 \text{ V DC}$	
• passive output		$U_{\text{ext}} = 9...30 \text{ V DC}$, depending on R_{ext} ($R_{\text{ext}} = 250...458 \Omega$ at 20 V)	
• digital output			
functions		<ul style="list-style-type: none"> • frequency output • binary output • pulse output 	
type		open collector (passive)	
operating parameters		OC30V (IEC 60947-5-6) 5...30 V, $I_{\text{max}} = 20 \text{ mA}$, $R_{\text{int}} = 1020 \Omega$ Low: $U < 2 \text{ V}$ at $I_{\text{loop}} = 2 \text{ mA}$ ($R_{\text{ext}} = 11 \text{ k}\Omega$ at $U_{\text{ext}} = 24 \text{ V}$) High: $U > 15 \text{ V}$ ($R_{\text{ext}} = 11 \text{ k}\Omega$ at $U_{\text{ext}} = 24 \text{ V}$) or OC30V/100mA 5...30 V, $I_{\text{max}} = 100 \text{ mA}$, $R_{\text{int}} = 20 \Omega$ Low: $U < 2 \text{ V}$ at $I_{\text{loop}} = 2 \text{ mA}$ ($R_{\text{ext}} = 12 \text{ k}\Omega$ at $U_{\text{ext}} = 24 \text{ V}$) High: $U > 15 \text{ V}$ ($R_{\text{ext}} = 12 \text{ k}\Omega$ at $U_{\text{ext}} = 24 \text{ V}$)	
frequency output		<ul style="list-style-type: none"> • range • damping • pulse-to-pause ratio 	
	kHz	0.002...10	
	s	0...999.9 (adjustable)	
		1:1	
binary output		<ul style="list-style-type: none"> • binary output as alarm output limit, change of flow direction or error	
pulse output		<ul style="list-style-type: none"> • pulse value • pulse width • pulse rate 	
	units	0.01...1000	
	ms	0.05...1000	
		max. 10 000 pulses	
inputs			
		The inputs are galvanically isolated from the transmitter.	
number		on request, current inputs and outputs: max. 4	
• temperature input			
type		Pt100/Pt1000	
connection		4-wire	
range	$^{\circ}\text{C}$	-150...+560	
resolution	K	0.01	
accuracy		$\pm 0.01 \text{ \% MV} \pm 0.03 \text{ K}$ at 18...28 $^{\circ}\text{C}$ $\pm 0.01 \text{ \% MV} \pm 0.03 \text{ K} \pm 0.0005 \text{ \% / K}$ at $< 18 \text{ }^{\circ}\text{C} / > 28 \text{ }^{\circ}\text{C}$	
cable resistance	Ω	max. 1000	
• switchable current input			
		All switchable current inputs are jointly switched to active or passive.	
accuracy		$\pm 0.1 \text{ \% MV} \pm 0.01 \text{ mA}$ at 18...28 $^{\circ}\text{C}$ $\pm 0.1 \text{ \% MV} \pm 0.01 \text{ mA} \pm 0.005 \text{ \% / K}$ at $< 18 \text{ }^{\circ}\text{C} / > 28 \text{ }^{\circ}\text{C}$	
resolution	μA	0.1	
active input		$R_{\text{int}} = 75 \Omega$, $I_{\text{max}} \leq 30 \text{ mA}$ $U_{\text{opencircuit}} = 28 \text{ V}$ (open circuit) $U_{\text{min}} = 21.4 \text{ V}$ at 20 mA	
• range	mA	0...20	
passive input		$U_{\text{ext}} = 24 \text{ V}$, $R_{\text{int}} = 35 \Omega$, $I_{\text{max}} \leq 24 \text{ mA}$	
• range	mA	0...20	

¹ test measurement to validate the application required in advance

² outside the explosive atmosphere (housing cover open)

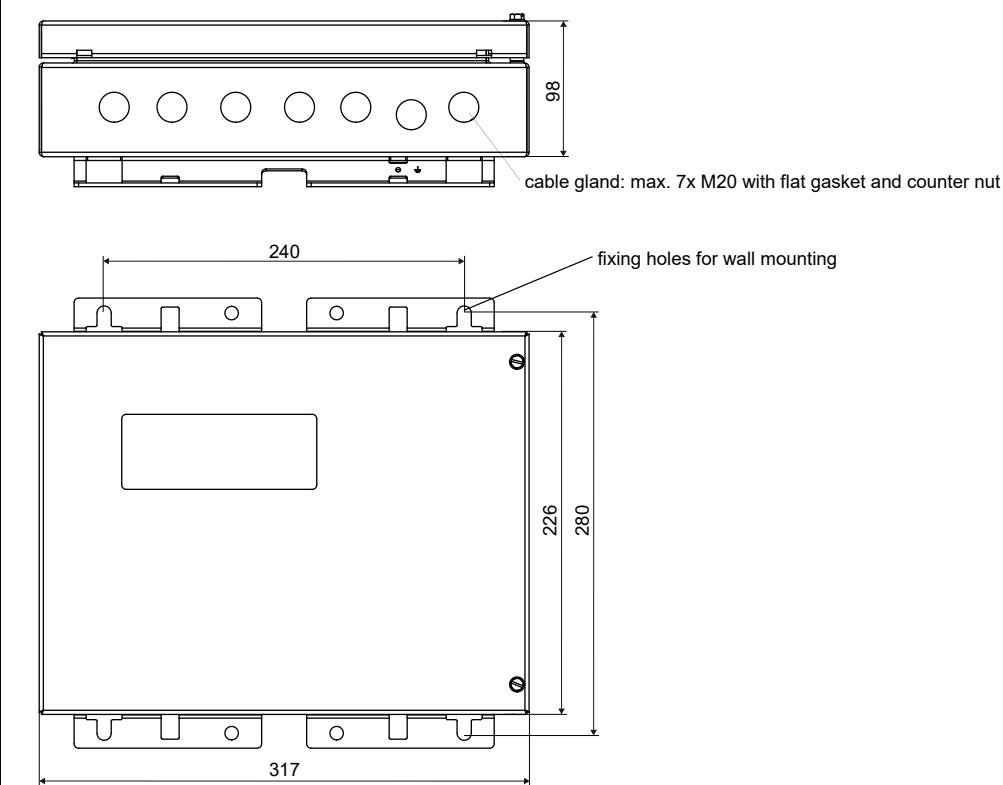
Dimensions

*731**_****_**AL



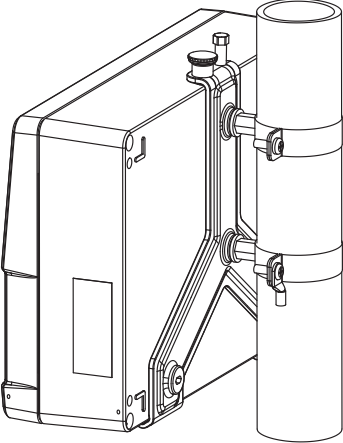
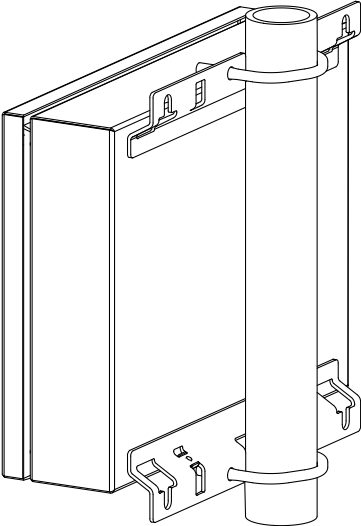
in mm

*731**_****_**ST



in mm

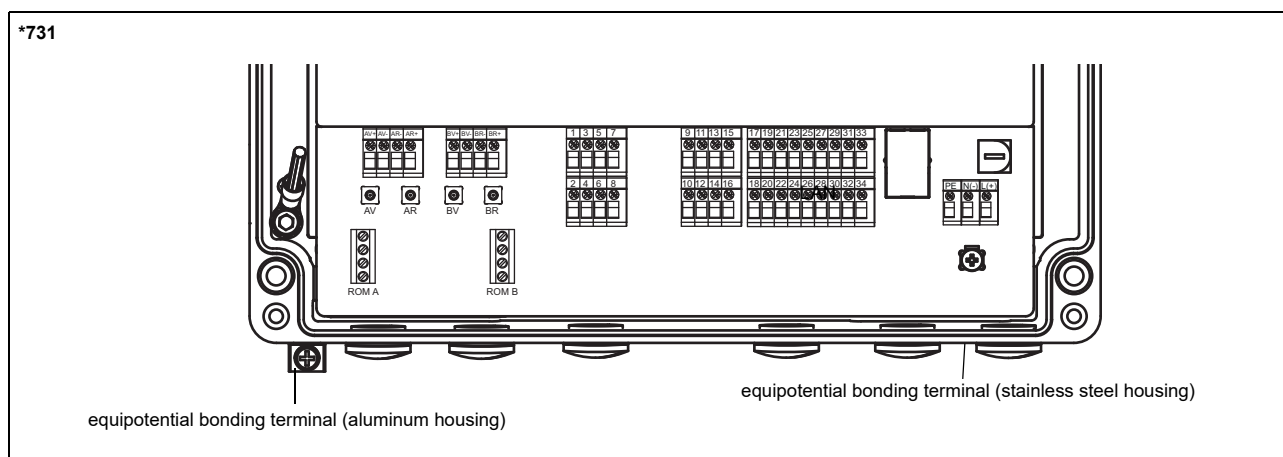
2" pipe mounting kit

<p>*731**_****_*AL</p> 	<p>item number: 731067-1</p>
<p>*731**_****_*ST</p> 	<p>item number: 721110-4</p>

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							
AC				DC			
terminal	connection			terminal	connection		
L	line conductor			(+)	+		
N	neutral conductor			(-)	-		
PE	protective conductor			PE	protective conductor		
transducers							
transducer cable (transducers ****53, ****8*), extension cable				transducer cable (transducers ****52)			
measuring channel A		measuring channel B		transducer	measuring channel A		measuring channel B
terminal	connection	terminal	connection		terminal	terminal	connection
AV or AV+	signal	BV	signal	↑	X_AV	X_BV	SMB connector
AVS or AV-	shield	BVS	shield	↕	X_AR	X_BR	SMB connector
ARS or AR-	shield	BRS	shield				
AR or AR+	signal	BR	signal				
outputs, inputs ^{1, 2}							
terminal	connection						
depending on configuration	current output, digital output, current input						
1, 2, 3, 4 5, 6, 7, 8 9, 10, 11, 12 13, 14, 15, 16	temperature input						
29+, 30-	passive current output/HART						
29-, 30+	active current output/HART						
29, 30	Modbus RTU, BACnet MS/TP, M-Bus, Profibus PA, FF H1						
temperature probe							
terminal	direct connection			connection with extension cable			
1, 5, 9, 13	red			red			
2, 6, 10, 14	white			white			
3, 7, 11, 15	red/blue			grey			
4, 8, 12, 16	white/blue			blue			
USB	type C Hi-Speed USB 2.0 Device			service (FluxDiag/FluxDiagReader)			
LAN	RJ45 10/100 Mbps Ethernet			<ul style="list-style-type: none"> • service (FluxDiag/FluxDiagReader) • Modbus TCP • BACnet IP 			

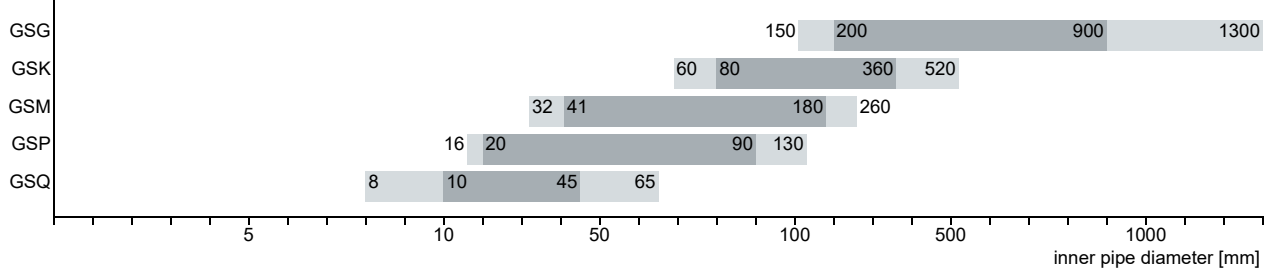
¹ cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

² The number, type and terminal assignment are customised.

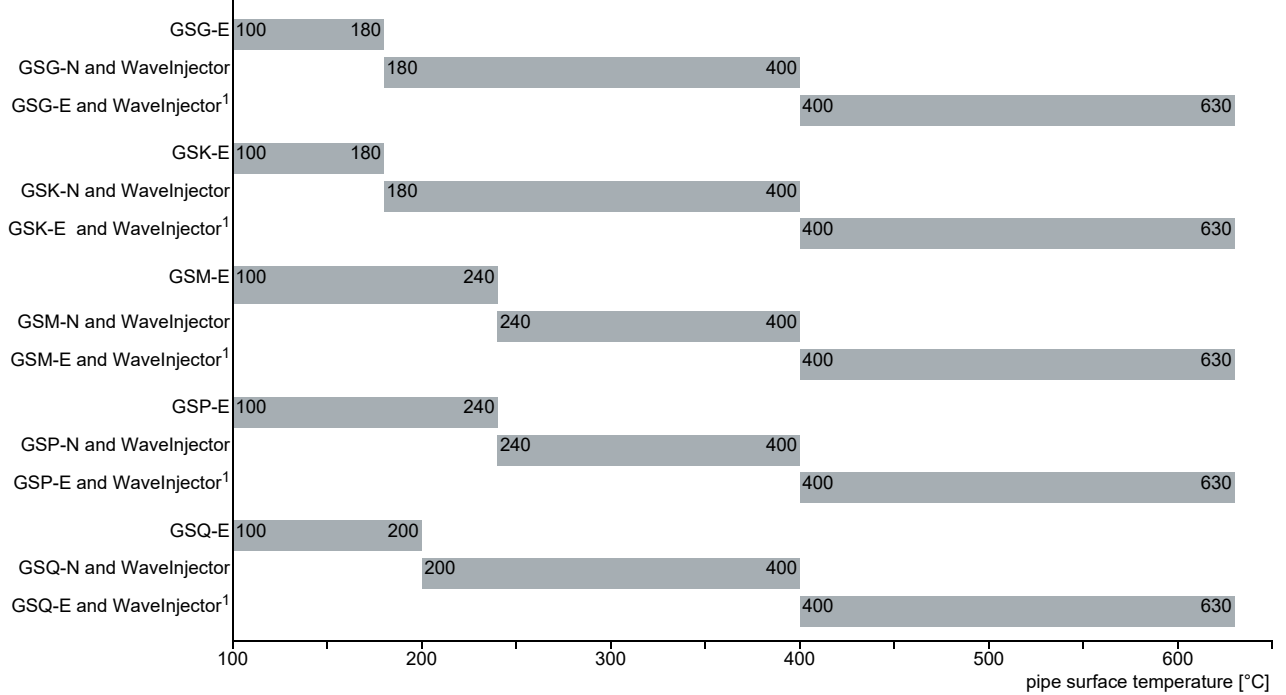
Transducers

Transducer selection

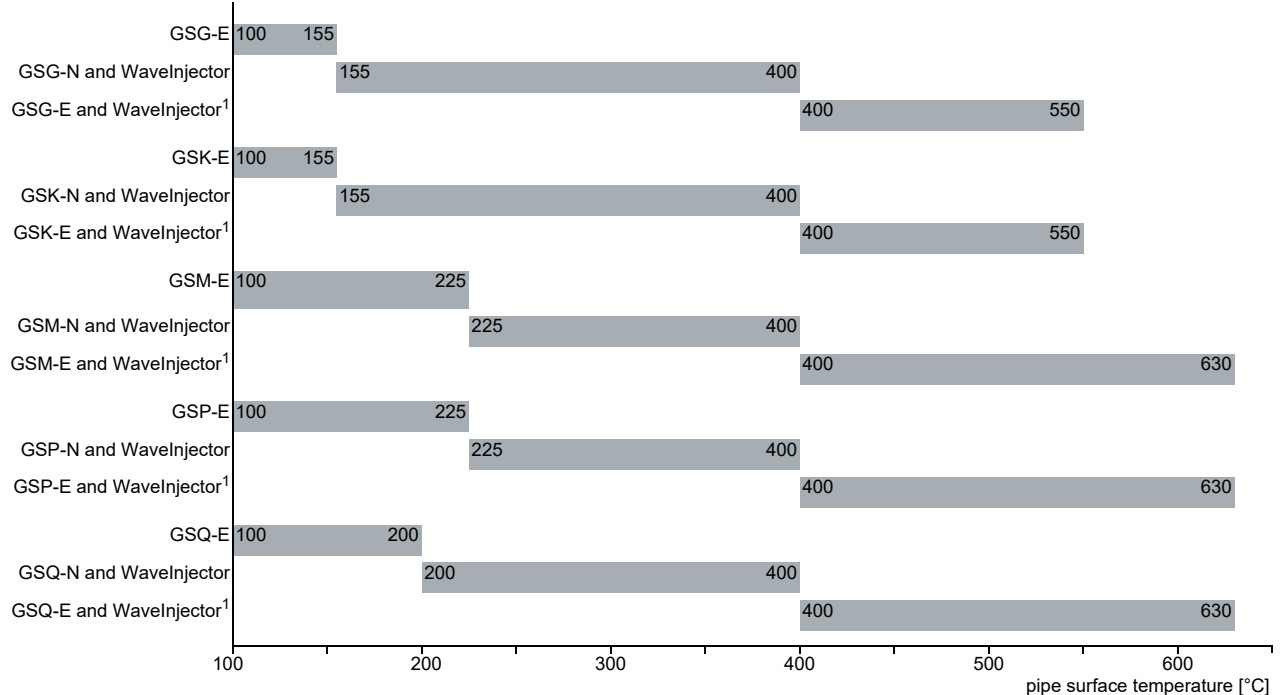
transducer order code



transducer order code (zone 2 - FM Class I Div. 2 - nonEx)



transducer order code (zone 1)



¹ technical verification to validate the application required in advance

■ recommended ■ possible

Technical data

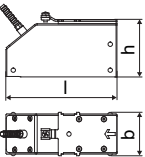
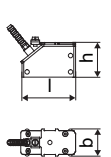
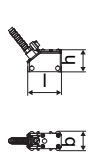

Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)

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		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-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 II3G II2D 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, T1)

order code		GSG-N*2N-**T1	GSK-N*2N-**T1	GSM-N*2N-**T1	GSP-N*2N-**T1	GSQ-N*2N-**T1
technical type		G(DL)G1N53	G(DL)K1N53	G(DL)M2N53	G(DL)P2N53	G(DL)Q2N53
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*-**T1	GSK-NA2*-**T1	GSM-NA2*-**T1	GSP-NA2*-**T1	GSQ-NA2*-**T1
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*-**T1	GSK-NF2*-**T1	GSM-NF2*-**T1	GSP-NF2*-**T1	GSQ-NF2*-**T1
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-E***-**TS	GSK-E***-**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 dust: -45...+225		
marking		-	-	CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db		
certification		-	-	IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• FM						
order code		GSG-EF2*-**TS	GSK-EF2*-**TS	GSM-EF2*-**TS	GSP-EF2*-**TS	GSQ-EF2*-**TS
pipe surface temperature (Ex)	°C	-40...+235		-40...+235		
degree of protection		IP66				
marking		 NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				

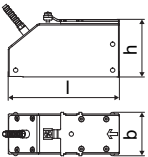
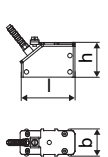
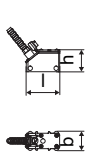

¹ > +200 °C:

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 2 - FM Class I Div. 2 - nonEx, T1)

order code		GSG-E***-**T1	GSK-E***-**T1	GSM-EF2N-**T1	GSP-EF2N-**T1	GSQ-EF2N-**T1
technical type		G(DL)G1E53	G(DL)K1E53	G(DL)M2E53	G(DL)P2E53	G(DL)Q2E53
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...+200 ²		-30...+200
temperature compensation		x		x		
explosion protection						
• ATEX/IECEx						
order code		-	-	GSM-EA2*-**T1	GSP-EA2*-**TS	GSQ-EA2*-**T1
pipe surface temperature (Ex)	°C	-	-	gas: -45...+235 dust: -45...+225		
marking		-	-	CE 0637 Ex II 3G II 2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db		
certification		-	-	IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• FM						
order code		GSG-EF2*-**T1	GSK-EF2*-**T1	GSM-EF2*-**T1	GSP-EF2*-**T1	GSQ-EF2*-**T1
pipe surface temperature (Ex)	°C	-40...+235		-40...+235		
degree of protection		IP66				
marking		 NI/CI, I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				

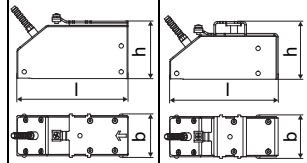
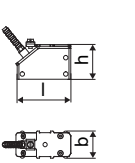
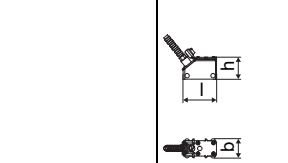
¹ > +200 °C:

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

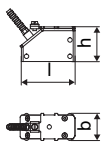
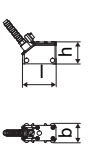

Shear wave transducers (zone 1, T1)

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 (E) 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 II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification		IBExU07ATEX1168 X, IECEX 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		

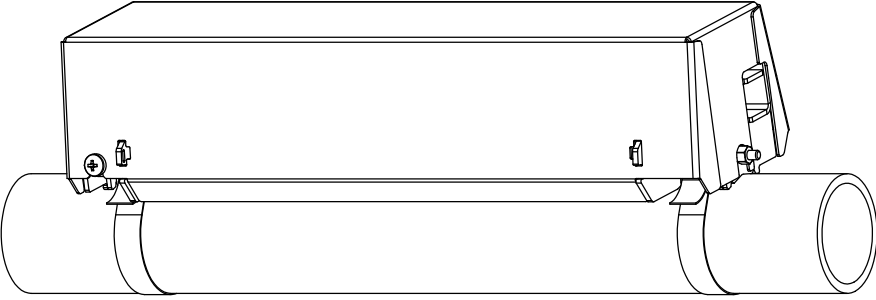
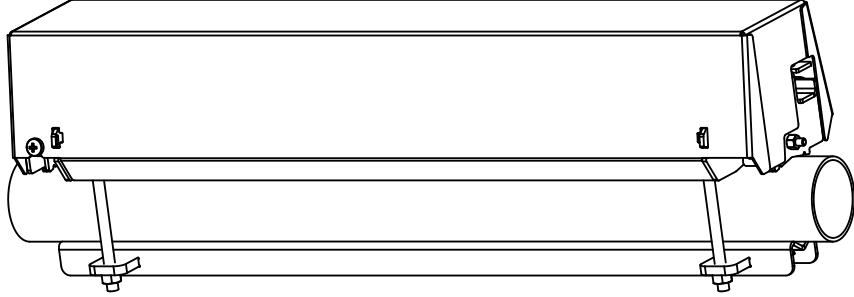
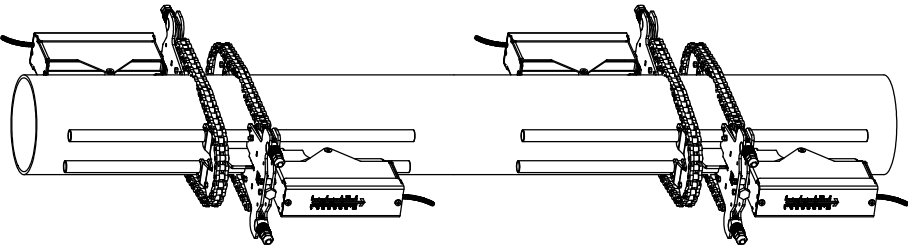
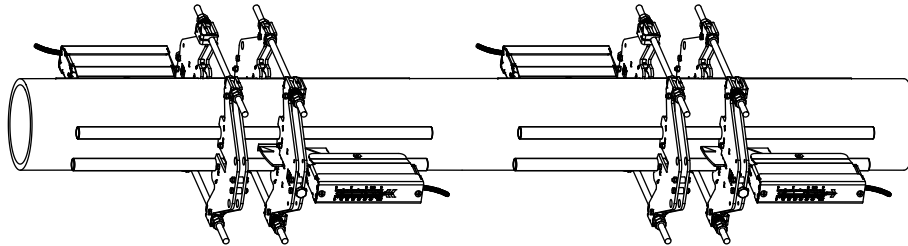
¹ > +200 °C :
 Variofix C
 observe the insulation instruction
 ambient temperature max. +40 °C

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
WN						WaveInjector WI-550
WH						WaveInjector WI-630
	G					transducers with transducer frequency G
	K					transducers with transducer frequency K
	M					transducers with transducer frequency M
	P					transducers with transducer frequency 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

<p>Variofix C (VC)</p> 	<p>material: stainless steel 316Ti (1.4571) inner length: VC(GHK)-*L: 500 mm VC(GHK)-*S: 350 mm VC(MP): 400 mm VCQ: 250 mm dimensions: VC(GHK)-*L: 560 x 126 x 125 mm VC(GHK)-*S: 410 x 126 x 125 mm VC(MP): 460 x 96 x 82 mm VCQ: 310 x 85 x 71 mm</p>
<p>Variofix C (VC) with bolt mounting plates (VC**-*B)</p> 	<p>material: stainless steel 316Ti (1.4571) inner length: VC(MP): 400 mm VCQ: 250 mm dimensions: VC(MP): 460 x 96 x 82 mm VCQ: 310 x 85 x 71 mm outer pipe diameter: VC(MP): max. 46 mm VCQ: max. 36 mm</p>
<p>Wavelinjector with chains</p> 	<p>see Technical specification TSWaveInjectorVx-x</p>
<p>Wavelinjector with threaded rods</p> 	<p>outer pipe diameter: 35...380 mm see Technical specification TSWaveInjectorVx-x</p>

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
<p>JBP2, JBP3, JB06</p>		<p>*****53</p>
<p>JB01</p>		<p>*****8*</p>
connection system TS		
connection with extension cable	direct connection	transducers technical type
<p>JB02, JB03, JB04</p>		<p>*****52</p>

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

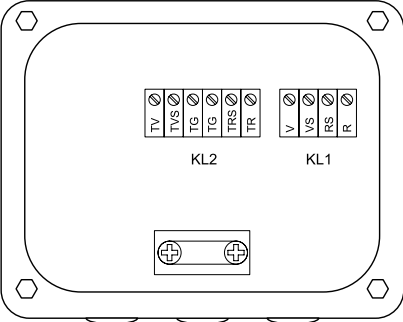
x - transducer cable length

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

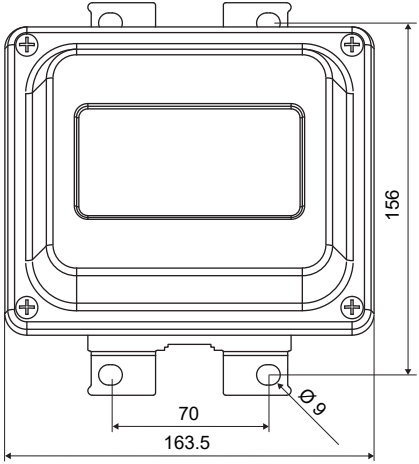
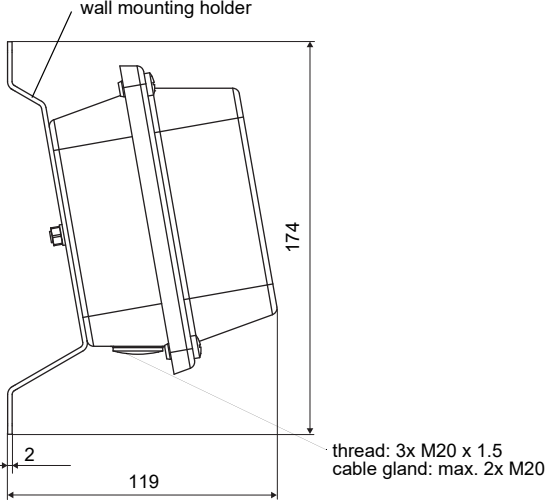
Junction box

Technical data

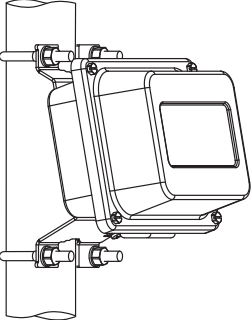
JB01S4E3M			
weight	kg	1.2 kg	
fixation		wall mounting optional: 2" pipe mounting	
material			
housing		stainless steel 316L (1.4404)	
gasket		silicone	
degree of protection		IP66/IP67	
ambient temperature °C		-40...+80	
explosion protection			
• ATEX/IECEX			
marking		CE 0637 Ex II2G II2D Ex eb mb IIC 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			
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		JB02, JB03: IP66/IP67 JB04: Type 4X, IP66	
ambient temperature °C		-40...+80	
explosion protection			
• ATEX			
junction box		JB02	
marking		CE UK CA Ex II3G Ex nA IIC T6...T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C	
• FM			
junction box		JB04	
certification type		JBC24	
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	

JBP2, JBP3, JB06																														
weight	kg 1.2 kg																													
fixation	wall mounting optional: 2" pipe mounting																													
material																														
housing	stainless steel 316L (1.4404)																													
gasket	silicone																													
degree of protection	JBP2, JBP3: IP66/IP67 JB06: Type 4X, IP66																													
ambient temperature °C	-40...+80																													
explosion protection																														
• ATEX																														
junction box marking	JBP2 CE UK CA II3G Ex nA IIC T6...T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C																													
• FM																														
junction box marking	JB06 JBC23 FM APPROVED NI/CI. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C																													
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>Connection</p>  </div> <div style="width: 45%;"> <p>Transducers</p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> <th>transducer</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL1</td> <td>V</td> <td>signal</td> <td>↑</td> </tr> <tr> <td>VS</td> <td>internal shield</td> <td></td> </tr> <tr> <td>RS</td> <td>internal shield</td> <td>↕</td> </tr> <tr> <td>R</td> <td>signal</td> <td></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>TV</td> <td>signal</td> </tr> <tr> <td>TVS</td> <td>internal shield</td> </tr> <tr> <td>TRS</td> <td>internal shield</td> </tr> <tr> <td>TR</td> <td>signal</td> </tr> </tbody> </table> </div> </div>		terminal strip	terminal	connection	transducer	KL1	V	signal	↑	VS	internal shield		RS	internal shield	↕	R	signal		terminal strip	terminal	connection	KL2	TV	signal	TVS	internal shield	TRS	internal shield	TR	signal
terminal strip	terminal	connection	transducer																											
KL1	V	signal	↑																											
	VS	internal shield																												
	RS	internal shield	↕																											
	R	signal																												
terminal strip	terminal	connection																												
KL2	TV	signal																												
	TVS	internal shield																												
	TRS	internal shield																												
	TR	signal																												

Dimensions

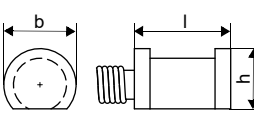
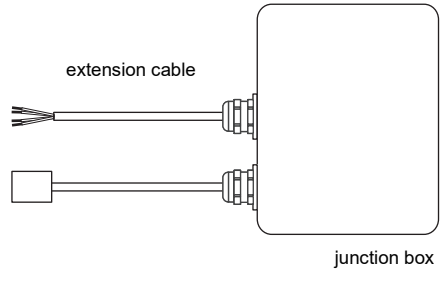
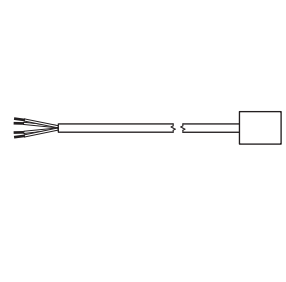
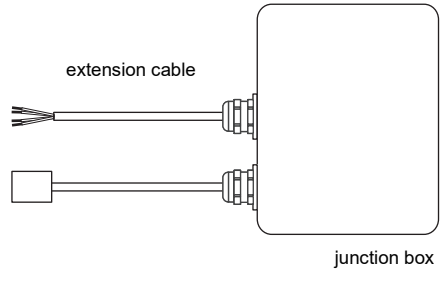
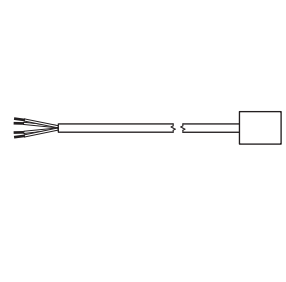
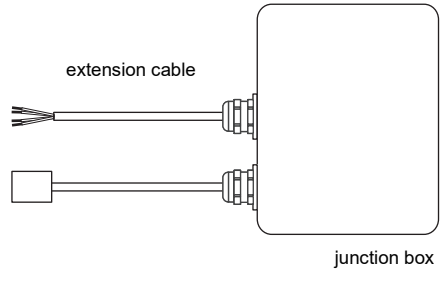
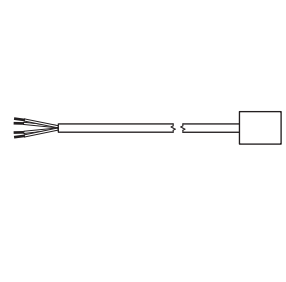
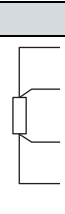
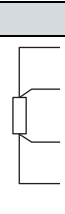
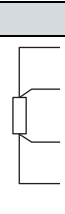
JB0*, JBP*	
	
in mm	

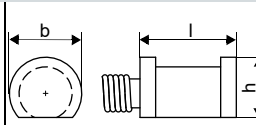

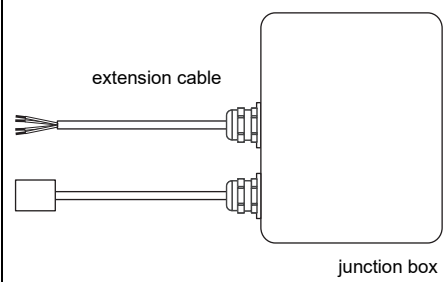
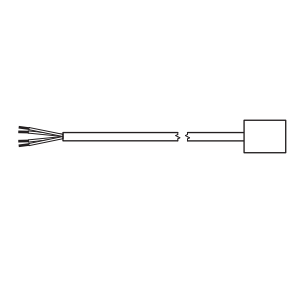
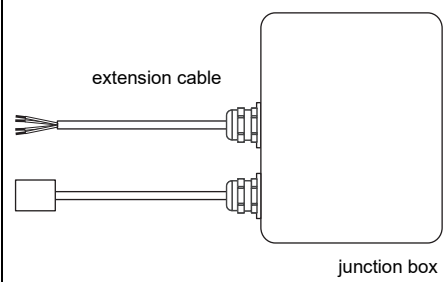
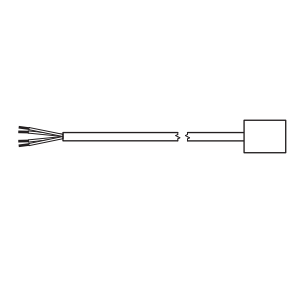
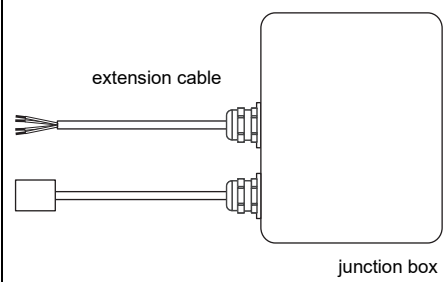
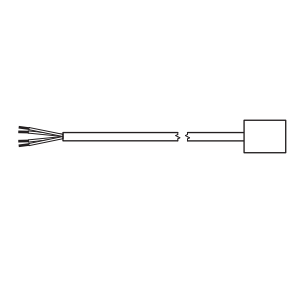
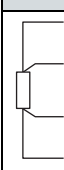
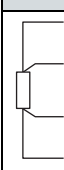
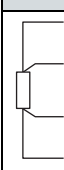
2" pipe mounting kit

<p>JB**</p> 	<p>item number: 751035-2</p>
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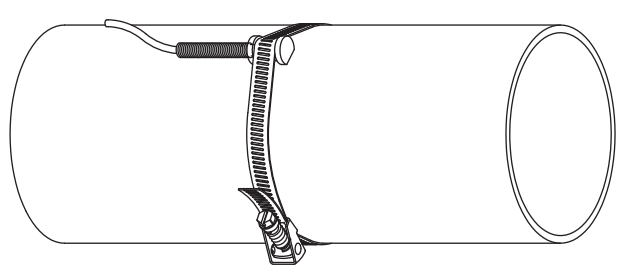
Clamp-on temperature probe (optional)

Technical data


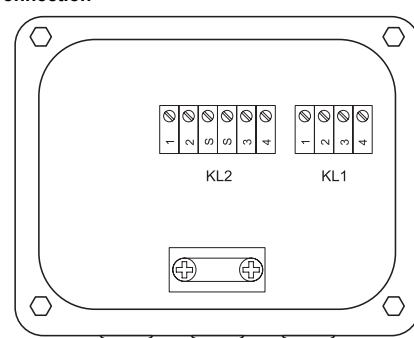
PT12N																															
item number	770415-1																														
design	clamp-on																														
type	Pt100																														
connection	4-wire																														
measuring range	°C -30...+250																														
accuracy T	$\pm(0.15 \text{ °C} + 2 \cdot 10^{-3} \cdot T \text{ [°C]})$ 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																															
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PT12N																															
order code	770415-1A2																														
design	clamp-on ATEX/UKCA																														
type	Pt100																														
connection	4-wire																														
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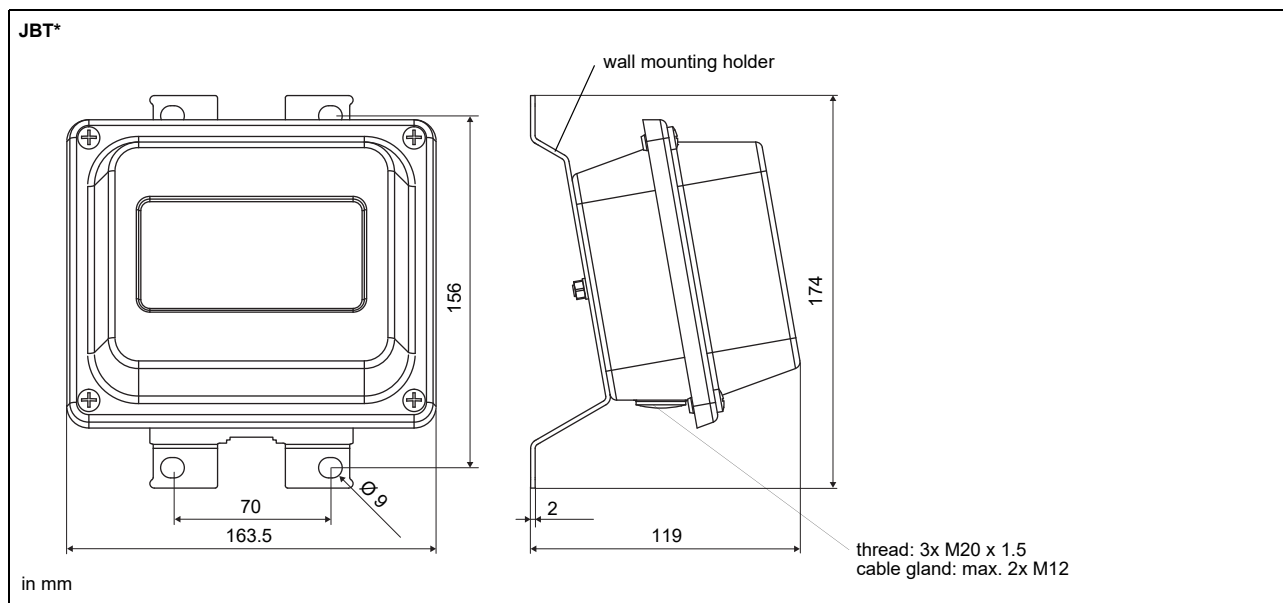
Fixation

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

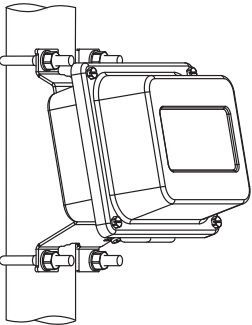
Junction box

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	IP66/IP67																								
ambient temperature																									
min.	°C -40																								
max.	°C +80																								
explosion protection																									
• ATEX																									
junction box marking	JBT2  II3G Ex nA IIC T6..T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C																								
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Dimensions



2" pipe mounting kit

<p>JB**</p> 	<p>item number: 751035-2</p>
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