

Permanently installed ultrasonic flowmeter for liquids

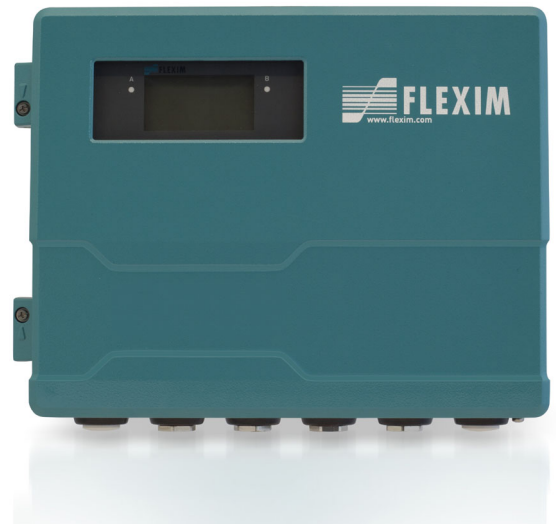
Transmitter for permanent outdoor wall or pipe mounting

Features

- Exact and highly reliable clamp-on volume and mass flow measurement
- High measurement accuracy even at very low as well as very high flow rates and independent of the flow direction (bidirectional)
- The measurement is zero point stable, drift free and independent of pipe material, process pressure, process temperature and process fluid
- Advanced self-diagnosis and possibilities for event-based triggering of data recording for the supervision and control of critical processes
- F722 with advanced functionality:
 - Synchronized channel averaging to reduce turbulence-related fluctuations of the measured value
 - Multifunctional digital outputs
- Bidirectional communication and support of common bus technologies (Profibus PA, Foundation Fieldbus, HART, Modbus, BACnet, M-Bus)
- Installation and start-up do not require any pipe work nor any process interruptions
- Transmitter and transducers are separately calibrated (traceable to national standards)
- Automatic loading of calibration data and transducer recognition
- Transducers available for a wide range of inner pipe diameters and fluid temperatures $-200\dots+600\text{ }^{\circ}\text{C}$
- Transmitter and transducers for use in hazardous areas are available
- Possibility to measure thermal energy quantities when using clamp-on or inline temperature probes

Applications

- Chemical industry
- Petrochemical industry
- Oil and gas industry
- Pharmaceutical industry
- Semiconductor industry
- Manufacturing industries
- Building technology/energy management
- Water and wastewater industry
- Mining industries



FLUXUS F72***-****A



FLUXUS F72***-****S



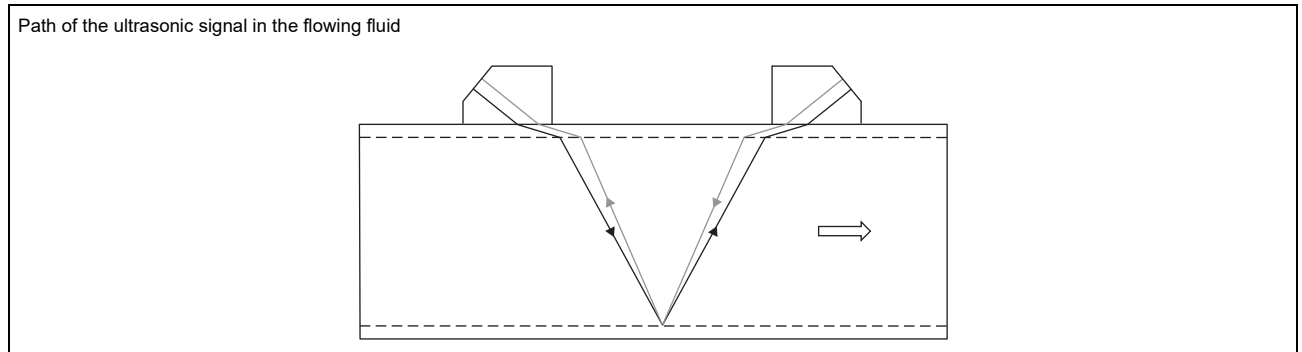
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Function

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.

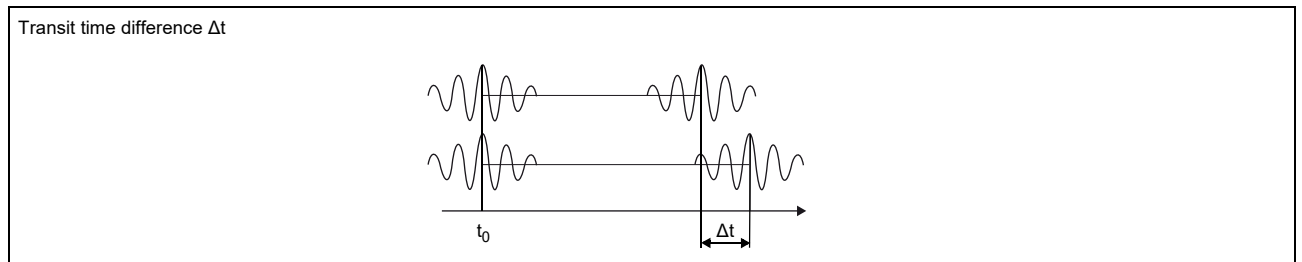


Transit time difference principle

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.



HybridTrek

If the gaseous or solid content in the fluid increases occasionally during measurement, a measurement with the transit time difference principle is no longer possible. NoiseTrek mode will then be selected by the flowmeter. This measurement method allows the flowmeter to achieve a stable measurement even with high gaseous or solid content.

The transmitter automatically toggles between the TransitTime and the NoiseTrek mode without having to change the measuring setup.

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 mechanics calibration factor
- A - cross-sectional pipe area
- k_a - acoustical calibration factor
- Δt - transit time difference
- t_y - average of transit times in the fluid

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**

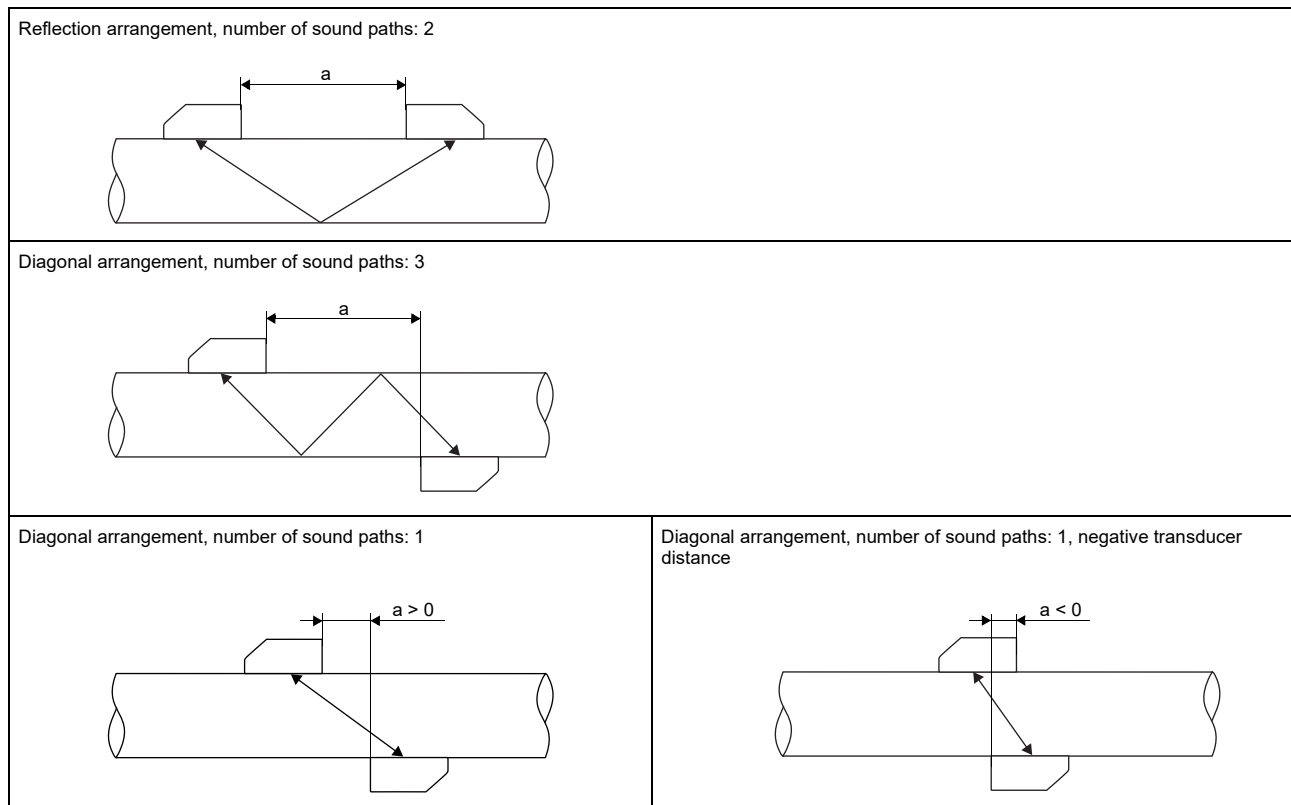
The number of sound paths is even. The transducers are mounted on the same side of the pipe. Correct positioning of the transducers is easy.

- **diagonal arrangement**

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

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


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



a - transducer distance

Transmitter





Technical data

	FLUXUS F721**-NN0*A F721**-NN0*S	FLUXUS F721**-A20*A F721**-A20*S	FLUXUS F721**-F20*A F721**-F20*S	FLUXUS F722**-NN0*A F722**-NN0*S	FLUXUS F722**-A20*A F722**-A20*S	FLUXUS F722**-F20*A F722**-F20*S
						
design	standard field device	standard field device zone 2	standard field device FM Class I Div. 2	standard field device	standard field device zone 2	standard field device FM Class I Div. 2
measurement						
measurement principle	transit time difference correlation principle, automatic NoiseTrek selection for measurements with high gaseous or solid content					
synchronised channel averaging	-			x (2 measuring channels necessary)		
flow velocity	m/s	0.01...25				
repeatability	0.15 % MV ±0.005 m/s					
fluid	all acoustically conductive liquids with < 10 % gaseous or solid content in volume (transit time difference principle)					
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 ²	±1 % MV ±0.005 m/s					
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				
number of measuring channels	1, optional: 2			1, optional: 2 (1 measuring point)		
damping	s	0...100 (adjustable)				
measuring cycle	Hz	100...1000 (1 channel)				
response time	s	1 (1 channel), option: 0.02			1 (1 channel), option: 0.02	
housing material	aluminum, powder coated or stainless steel 316L (1.4404)					
degree of protection	IP66		aluminum housing: IP66/NEMA 4X stainless steel housing: IP65	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 °C without operation of the display)	aluminum housing: 40...+55/60 (< -20 °C without operation of the display) stainless steel housing: -20...+55/60	-40...+60 (< -20 °C without operation of the display)	aluminum housing: 40...+55/60 (< -20 °C 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	-	CE 0637 Ex IIC T4 Gc Ex tb IIC T120 °C Db T _a -40...+60 °C	-	-	CE 0637 Ex IIC T4 Gc Ex tb IIC T120 °C Db T _a -40...+60 °C	-
certification ATEX	-	IBExU11ATEX1015	-	-	IBExU11ATEX1015	-
certification IECEX	-	IECEX IBE 11.0008	-	-	IECEX IBE 11.0008	-

¹ with aperture calibration of the transducers

² for transit time difference principle and reference conditions

³ outside the explosive atmosphere (housing cover open)

	FLUXUS F721**-NN0*A F721**-NN0*S	FLUXUS F721**-A20*A F721**-A20*S	FLUXUS F721**-F20*A F721**-F20*S	FLUXUS F722**-NN0*A F722**-NN0*S	FLUXUS F722**-A20*A F722**-A20*S	FLUXUS F722**-F20*A F722**-F20*S
• FM						
marking	-	-	F721**-F20**2, F721**-F20**3:  NI/Cl. I,II,III/ Div. 2/GP. A,B,C,D,E, F,G/ T5 F721**-F20**1:  NI/Cl. I,II,III/ Div. 2/GP. A,B,C,D,E, F,G/ T4A	-	-	F722**-F20**2, F722**-F20**3:  NI/Cl. I,II,III/ Div. 2/GP. A,B,C,D,E, F,G/ T5 F722**-F20**1:  NI/Cl. I,II,III/ Div. 2/GP. A,B,C,D,E, F,G/ T4A
measuring functions						
physical quantities	volumetric flow rate, mass flow rate, flow velocity, thermal energy rate (if temperature inputs are installed)					
totaliser	volume, mass, optional: thermal energy					
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 ³ • LAN ³					
process interfaces	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • M-Bus • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP
accessories						
data transmission kit	USB cable					
software	• FluxDiagReader: reading of measured values and parameters, graphical presentation • FluxDiag (optional): reading of measurement data, graphical presentation, 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		$R_{ext} < 350 \Omega$				
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		$R_{int} = 500 \Omega$				
• frequency output						
range	kHz	0...5				
optorelay		24 V/4 mA, $R_{int} = 66.5 \Omega$				

¹ with aperture calibration of the transducers

² for transit time difference principle and reference conditions

³ outside the explosive atmosphere (housing cover open)

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• binary output						
optorelay	26 V/100 mA			-		
Reed relay	48 V/100 mA, R _{int} = 22 Ω			-		
binary output as alarm output						
• functions	limit, change of flow direction or error			-		
binary output as pulse output						
• functions	mainly for totalising			-		
• pulse value	units	0.01...1000		-		
• pulse width	ms	optorelay: 1...1000 Reed relay: 80...1000		-		
• 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		
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					
• binary input						
switching signal	5...30 V, 1 mA		5...26 V, 1 mA	5...30 V, 1 mA		5...26 V, 1 mA
functions	<ul style="list-style-type: none"> • reset of the measured values • reset of the totalisers • stop of the totalisers • activation of the measuring mode for highly dynamic flows 					

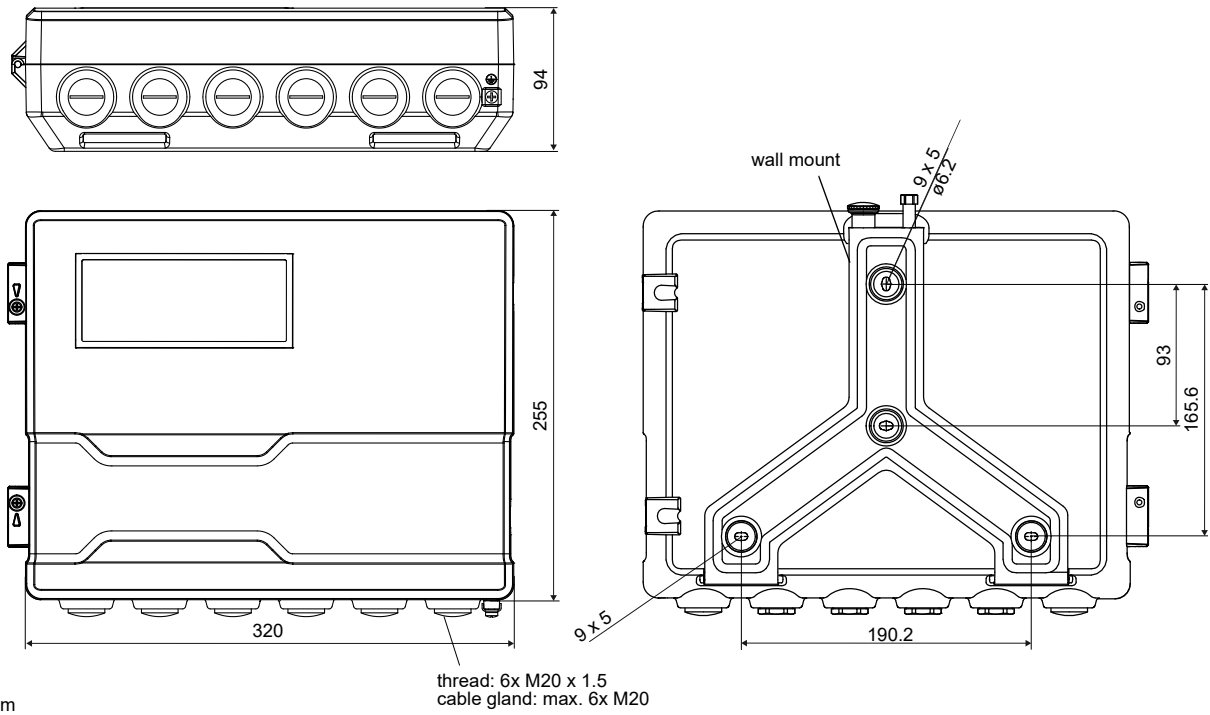
¹ with aperture calibration of the transducers

² for transit time difference principle and reference conditions

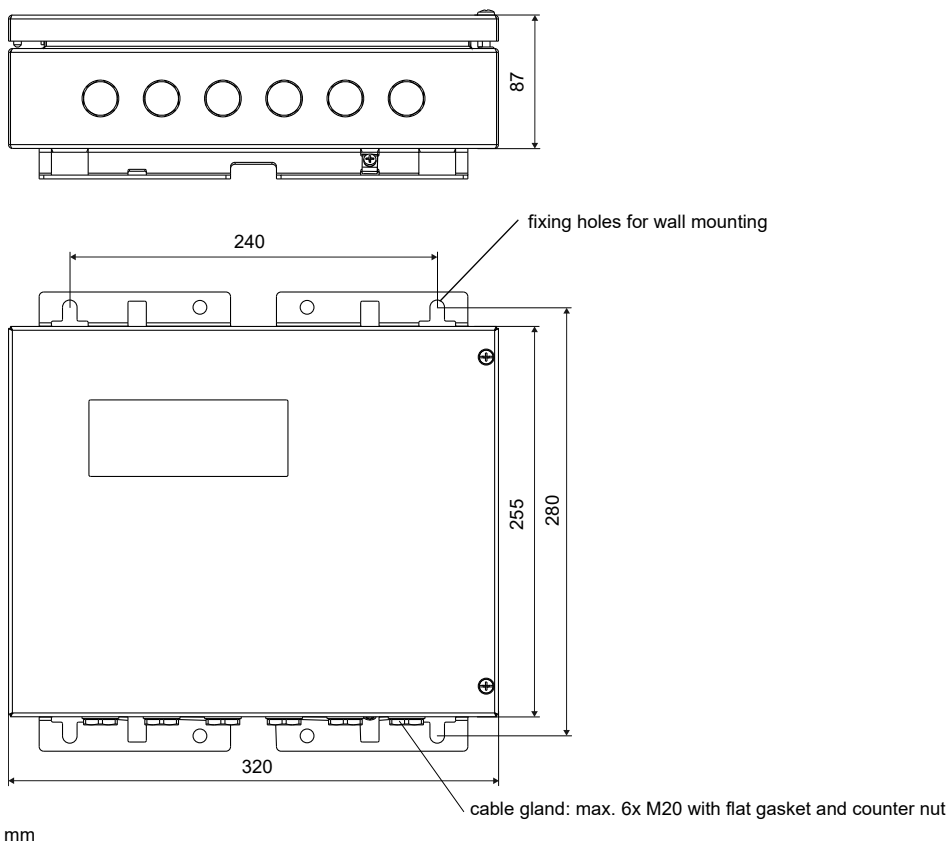
³ outside the explosive atmosphere (housing cover open)

Dimensions

*72***_****A

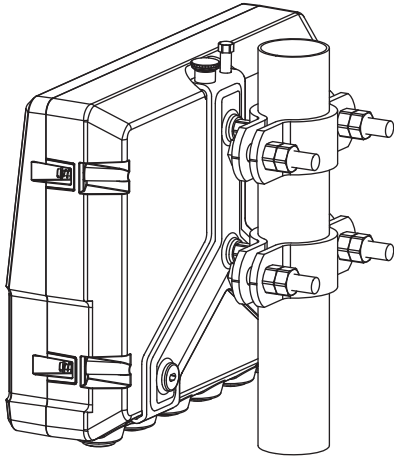


*72***_****S



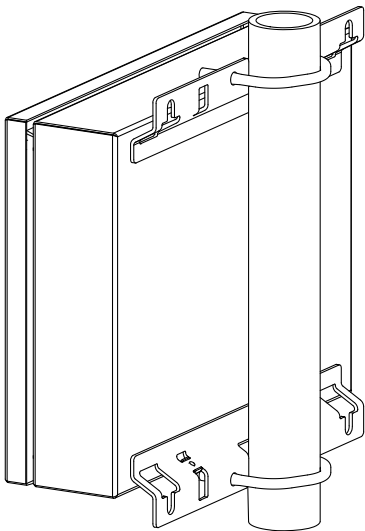
2" pipe mounting kit

*72***-****A



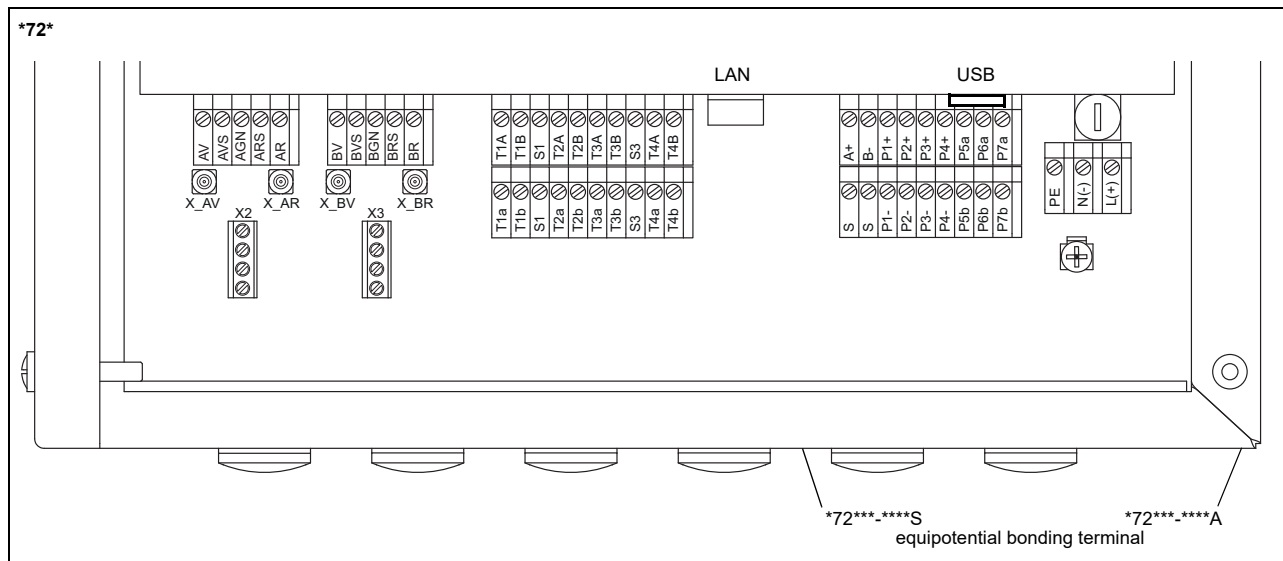
order code:
ACC-PE-*721-/PMK4

*72***-****S



order code:
ACC-PE-*721-/PMK6

Terminal assignment



power supply ¹		
terminal	connection (AC)	connection (DC)
PE	earth	earth
N(-)	neutral	-
L(+)	phase	+

transducers						
transducer cable (transducers ****8*, ****L*), extension cable				transducer cable (transducers ****52)		
measuring channel A		measuring channel B			measuring channel A	measuring channel B
terminal	connection	terminal	connection	transducer	terminal	connection
AV	signal	BV	signal	↑	X_AV	X_BV
AVS	shield	BVS	shield			
ARS	shield	BRS	shield	⌞	X_AR	X_BR
AR	signal	BR	signal			

outputs ^{1, 2}				
terminal	connection	terminal	connection	communication interface
P1+...P4+ P1-...P4-	current output, voltage output, frequency output, binary output (Reed relay), HART (P1)	A+	signal +	<ul style="list-style-type: none"> RS485¹ Modbus RTU¹ BACnet MS/TP¹ M-Bus¹ Profibus PA¹ FF H1¹
		B-	signal -	
P5a...P7a P5b...P7b	binary output (optorelay), digital output	S	shield	
		USB	type B Hi-Speed USB 2.0 Device	<ul style="list-style-type: none"> service (FluxDiag/FluxDiagReader)
		LAN	RJ45 10/100 Mbps Ethernet	<ul style="list-style-type: none"> service (FluxDiag/FluxDiagReader) BACnet IP Modbus TCP

analog inputs ^{1, 2}				
terminal	temperature probe		passive sensor connection	active sensor connection
	direct connection	connection with extension cable		
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

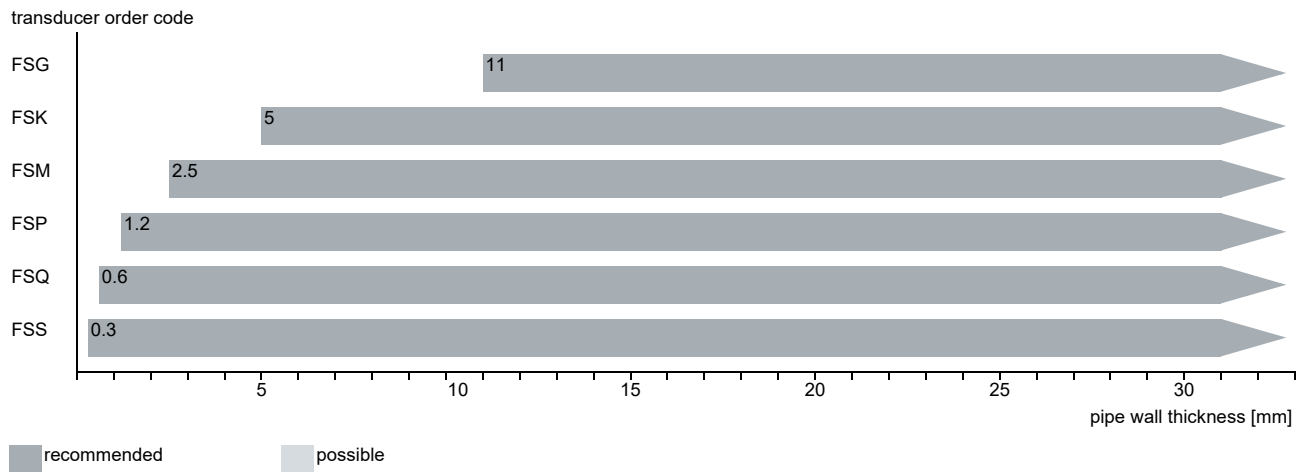
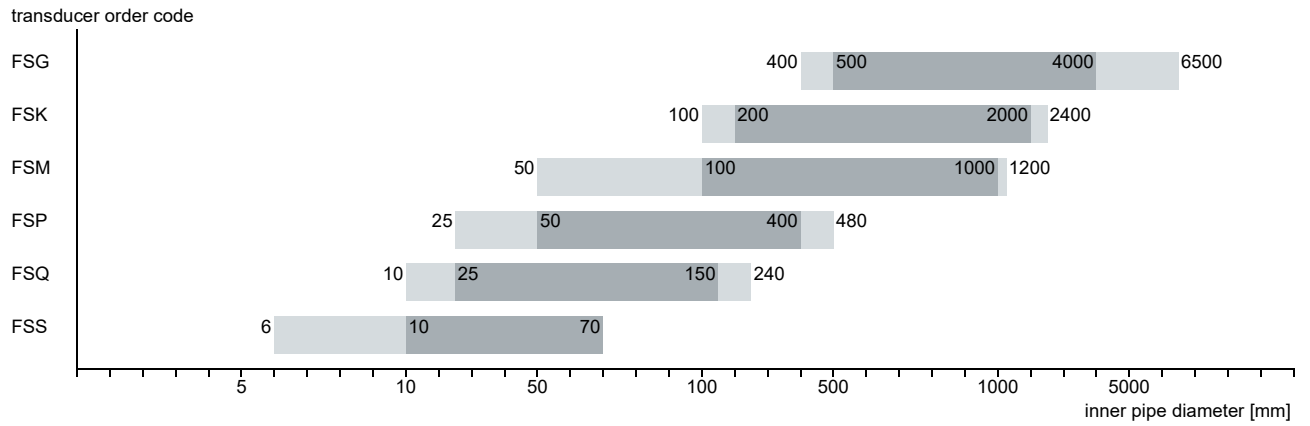
binary inputs ^{1, 2}	
terminal	
P1+...P2+, P1-...P2-	

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



Transducer order code

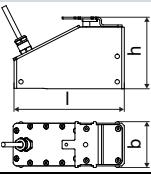
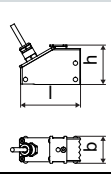
1, 2	3	4	5, 6	7, 8	9...11	no. of character				
transducer	transducer frequency	-	ambient temperature	explosion protection	connection system	-	extension cable	/	option	description
FS										set of ultrasonic flow transducers for liquids measurement, shear wave
	G									0.2 MHz
	K									0.5 MHz
	M									1 MHz
	P									2 MHz
	Q									4 MHz
	S									8 MHz
		N								normal temperature range
		E								extended temperature range
			NN							not explosion-proof
			A2							ATEX zone 2/IECEX zone 2
			A1							ATEX zone 1/IECEX zone 1
			F2							FM Class I Div. 2
				TS						direct connection or connection via junction box
							XXX			0 m: without extension cable > 0 m: with extension cable
								LC		long transducer cable
								IP68		degree of protection IP68
								OS		housing with stainless steel 316

Technical data

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

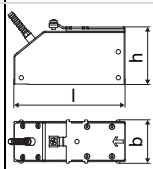
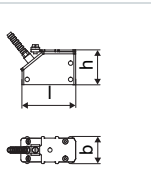
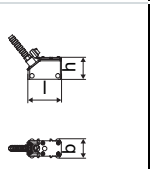

order code		FSG-N**TS/**	FSK-N**TS/**	FSM-N**TS/**	FSP-N**TS/**	FSQ-N**TS/**	FSS-N**TS/**	
technical type		C(DL)G1N52	C(DL)K1N52	C(DL)M2N52	C(DL)P2N52	C(DL)Q2N52	CDS1N52	
transducer frequency	MHz	0.2	0.5	1	2	4	8	
inner pipe diameter d								
min. extended	mm	400	100	50	25	10	6	
min. recommended	mm	500	200	100	50	25	10	
max. recommended	mm	4000	2000	1000	400	150	70	
max. extended	mm	6500	2400	1200	480	240	70	
pipe wall thickness								
min.	mm	11	5	2.5	1.2	0.6	0.3	
material								
housing		PEEK with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)					stainless steel 304 (1.4301)	
contact surface		PEEK					PEI	
degree of protection		IP67					IP65	
transducer cable								
type		1699						
length	m	5		4	3		2	
length (**-*****/LC)	m	9						-
dimensions								
length l	mm	129.5	126.5	64	40		25	
width b	mm	51	51	32	22		13	
height h	mm	67	67.5	40.5	25.5		17	
dimensional drawing								
weight (without cable)	kg	0.47	0.36	0.066	0.016		0.004	
pipe surface temperature								
min.	°C	-40					-30	
max.	°C	+130					+130	
ambient temperature								
min.	°C	-40					-30	
max.	°C	+130					+130	
temperature compensation		x					-	
explosion protection								
• ATEX/IECEx								
order code		FSG-NA2TS/**	FSK-NA2TS/**	FSM-NA2TS/**	FSP-NA2TS/**	FSQ-NA2TS/**	-	
pipe surface temperature (Ex)								
• min.	°C	-55					-	
• max.	°C	gas: +190, dust: +180					-	
marking		CE 0637 II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db					-	
certification ATEX		IBExU10ATEX1163 X					-	
certification IECEx		IECEx IBE 12.0005X					-	
• FM								
order code		FSG-NF2TS/**	FSK-NF2TS/**	FSM-NF2TS/**	FSP-NF2TS/**	FSQ-NF2TS/**	FSS-NF2TS/**	
pipe surface temperature (Ex)								
• min.	°C	-40					-	
• max.	°C	+125		+190		+125		
degree of protection		IP66						
marking		NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860						

Shear wave transducers (zone 2 - nonEx, TS, IP68)

order code		FSG-N**TS/IP68	FSK-N**TS/IP68	FSM-N**TS/IP68	FSP-N**TS/IP68
technical type		CDG1LI8	CDK1LI8	CDM2LI8	CDP2LI8
transducer frequency	MHz	0.2	0.5	1	2
inner pipe diameter d					
min. extended	mm	400	100	50	25
min. recommended	mm	500	200	100	50
max. recommended	mm	4000	2000	1000	400
max. extended	mm	6500	2400	1200	480
pipe wall thickness					
min.	mm	11	5	2.5	1.2
material					
housing		PEEK with stainless steel cover 316Ti (1.4571)			
contact surface		PEEK			
degree of protection		IP68 ¹			
transducer cable					
type		2550			
length	m	12			
dimensions					
length l	mm	130		72	
width b	mm	54		32	
height h	mm	83.5		46	
dimensional drawing					
weight (without cable)	kg	0.43		0.085	
pipe surface temperature					
min.	°C	-40			
max.	°C	+100			
ambient temperature					
min.	°C	-40			
max.	°C	+100			
temperature compensation		x			
explosion protection					
• ATEX/IECEX					
order code		FSG-NA2TS/IP68	FSK-NA2TS/IP68	FSM-NA2TS/IP68	FSP-NA2TS/IP68
pipe surface temperature (Ex)					
• min.	°C	-40			
• max.	°C	gas: +90, dust: +80			
marking		CE 0637 Ex II 3G II 2D Ex nA IIC T6...T5 Gc Ex tb IIIC T80 °C...T85 °C Db			
certification ATEX		IBExU10ATEX1163 X			
certification IECEx		IECEX IBE 12.0005X			

¹ test conditions: 3 months/2 bar (20 m)/20 °C

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

order code		FSG-ENNTS/**	FSK-ENNTS/**	FSM-E**TS/**	FSP-E**TS/**	FSQ-E**TS/**
technical type		C(DL)G1E52	C(DL)K1E52	C(DL)M2E52	C(DL)P2E52	C(DL)Q2E52
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PPSU with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)		PI with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)		
contact surface		PPSU		PI		
degree of protection		IP65		IP56		
transducer cable						
type		1699		6111		
length	m	5		4		3
length (***-*****/LC)	m	9		9		
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						
min.	°C	-40		-30		-30
max.	°C	+180		+240 ¹		+200
ambient temperature						
min.	°C	-40		-30		-30
max.	°C	+180		+40 +60 ² +200 ³		+200
temperature compensation		x		x		
explosion protection						
• ATEX/IECEx						
order code		-	-	FSM-EA2TS/**	FSP-EA2TS/**	FSQ-EA2TS/**
pipe surface temperature (Ex)				-45		
• min.	°C	-		gas: +235 ¹ , dust: +225 ¹		
• max.	°C	-				
marking		-		CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...230 °C Db		
certification ATEX		-		IBExU10ATEX1163 X		
certification IECEx		-		IECEx IBE 12.0005X		
• FM						
order code		-	-	FSM-EF2TS/**	FSP-EF2TS/**	FSQ-EF2TS/**
pipe surface temperature (Ex)				-40		
• min.	°C	-		+235 ¹		
• max.	°C	-				
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 or Variofix L
observe the insulation instruction
Ex: ambient temperature max. +40 °C

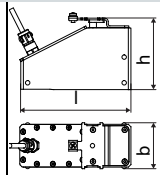
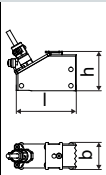
² pipe surface temperature +200...+240 °C: Variofix C without cover

³ pipe surface temperature max. +200 °C

Shear wave transducers (zone 1, TS)

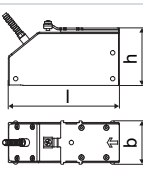
order code		FSG-N*1TS/**	FSK-N*1TS/**	FSM-N*1TS/**	FSP-N*1TS/**	FSQ-N*1TS/**
technical type		C(DL)G1N81	C(DL)K1N81	C(DL)M2N81	C(DL)P2N81	C(DL)Q2N81
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PEEK with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)				
contact surface		PEEK				
degree of protection		IP65	IP66			IP65
transducer cable						
type		1699				
length	m	5		4		3
length (**-*****/LC)	m	9				
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						
min.	°C	-40				
max.	°C	+130				
ambient temperature						
min.	°C	-40				
max.	°C	+130				
temperature compensation		x				
explosion protection						
• ATEX/IECEX						
order code		FSG-NA1TS/**	FSK-NA1TS/**	FSM-NA1TS/**	FSP-NA1TS/**	FSQ-NA1TS/**
pipe surface temperature (Ex)						
• min.	°C	-55				
• max.	°C	+180				
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification ATEX		IBExU07ATEX1168 X				
certification IECEX		IECEX IBE 08.0007X				

Shear wave transducers (zone 1, TS, IP68)

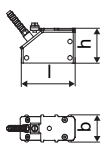
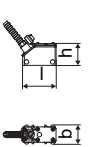

order code	FSG-N*1TS/IP68	FSK-N*1TS/IP68	FSM-N*1TS/IP68	FSP-N*1TS/IP68
technical type	CDG1LI1	CDK1LI1	CDM2LI1	CDP2LI1
transducer frequency	MHz 0.2	0.5	1	2
inner pipe diameter d				
min. extended	mm 400	100	50	25
min. recommended	mm 500	200	100	50
max. recommended	mm 4000	2000	1000	400
max. extended	mm 6500	2400	1200	480
pipe wall thickness				
min.	mm 11	5	2.5	1.2
material				
housing	PEEK with stainless steel cover 316Ti (1.4571)			
contact surface	PEEK			
degree of protection	IP68 ¹			
transducer cable				
type	2550			
length	m 12			
dimensions				
length l	mm 130			72
width b	mm 54			32
height h	mm 83.5			46
dimensional drawing				
weight (without cable)	kg 0.43			0.085
pipe surface temperature				
min.	°C -40			
max.	°C +100			
ambient temperature				
min.	°C -40			
max.	°C +100			
temperature compensation	x			
explosion protection				
• ATEX/IECEX				
order code	FSG-NA1TS/IP68	FSK-NA1TS/IP68	FSM-NA1TS/IP68	FSP-NA1TS/IP68
pipe surface temperature (Ex)				
• min.	°C -40			
• max.	°C +80			
marking	CE 0637 Ex II2G II2D Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db			
certification ATEX	IBExU07ATEX1168 X			
certification IECEX	IECEX IBE 08.0007X			

¹ test conditions: 3 months/2 bar (20 m)/20 °C

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

order code		FSG-E*1TS/**	FSK-E*1TS/**
technical type		C(DL)G1E83	C(DL)K1E83
transducer frequency	MHz	0.2	0.5
inner pipe diameter d			
min. extended	mm	400	100
min. recommended	mm	500	200
max. recommended	mm	4000	2000
max. extended	mm	6500	2400
pipe wall thickness			
min.	mm	11	5
material			
housing		PPSU with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)	
contact surface		PPSU	
degree of protection		IP65	
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			
min.	°C	-40	
max.	°C	+180	
ambient temperature			
min.	°C	-40	
max.	°C	+180	
temperature compensation		x	
explosion protection			
• ATEX/IECEX			
order code		FSG-EA1TS/**	FSK-EA1TS/**
pipe surface temperature (Ex)			
• min.	°C	-50	
• max.	°C	+155	
marking		CE 0637 Ex II 2G II 2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification ATEX		IBExU07ATEX1168 X	
certification IECEX		IECEX IBE 08.0007X	

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

order code		FSM-E*1TS/**	FSP-E*1TS/**	FSQ-E*1TS/**
technical type		C(DL)M2E85	C(DL)P2E85	C(DL)Q2E85
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	1200	480	240
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover 304 (1.4301), ***_*****/OS: 316L (1.4404)		
contact surface		PI		
degree of protection		IP66		IP56
transducer cable				
type		6111		
length	m	4		3
length (***_*****/LC)	m	9		
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature				
min.	°C	-30		-30
max.	°C	+240 ¹		+200
ambient temperature				
min.	°C	-30		-30
max.	°C	+40 +200 ²		+200
temperature compensation		x		
explosion protection				
• ATEX/IECEx				
order code		FSM-EA1TS/**	FSP-EA1TS/**	FSQ-EA1TS/**
pipe surface temperature (Ex)				
• min.	°C	-45		
• max.	°C	+225 ¹		
marking		CE 0637  II2G II2D Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification ATEX		IBExU07ATEX1168 X		
certification IECEx		IECEx IBE 08.0007X		

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

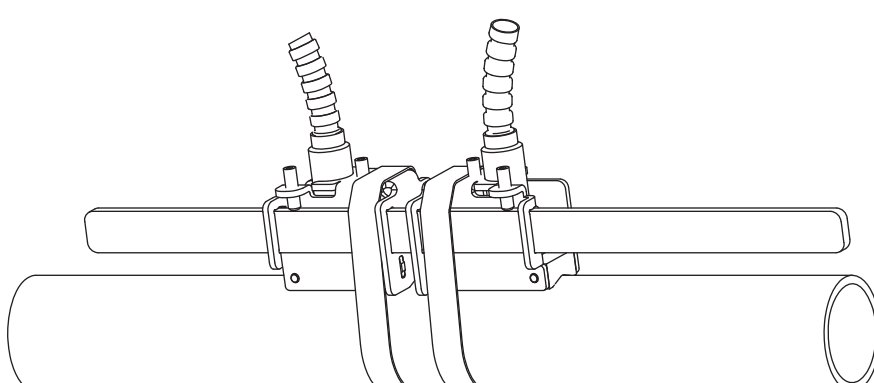
² pipe surface temperature max. +200 °C

Transducer mounting fixture

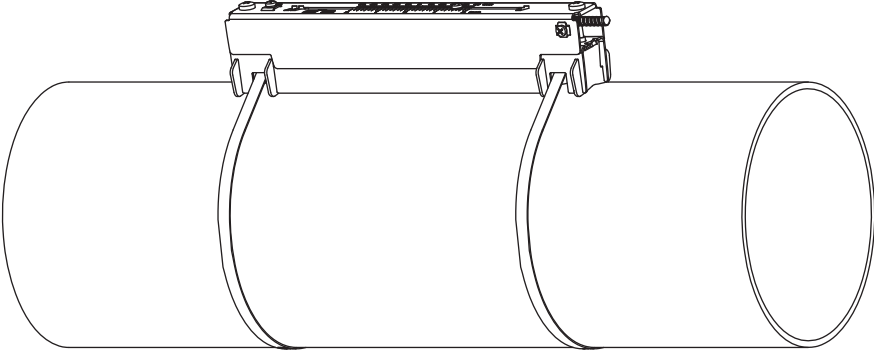
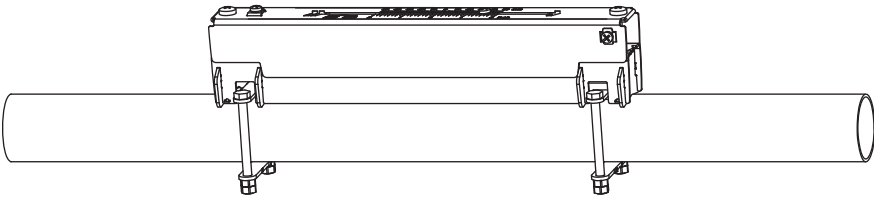
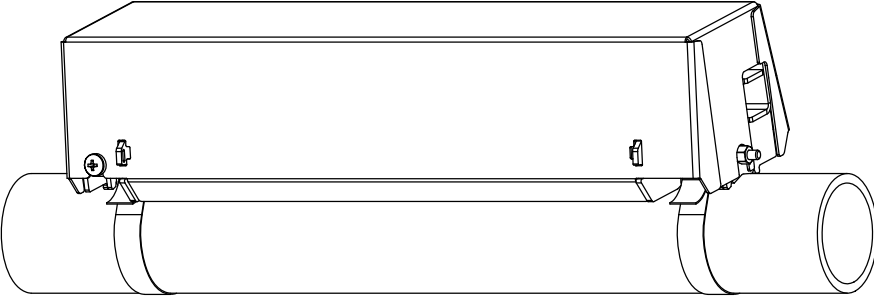
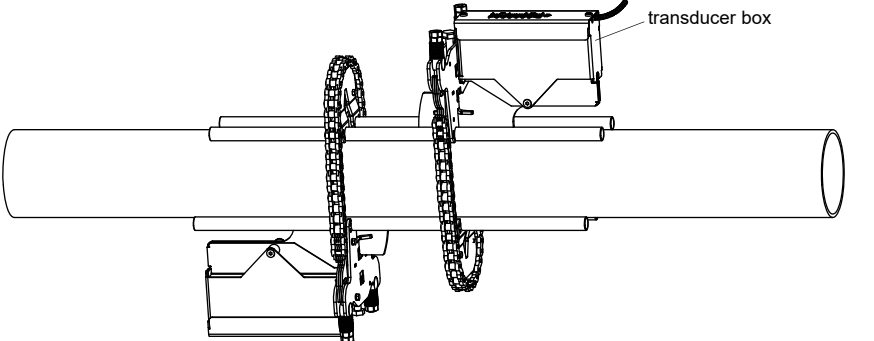
Order code

1, 2	3	4	5	6	7...9	no. of character
transducer mounting fixture	transducer	measurement arrangement	size	fixation	outer pipe diameter	option
						description
VL						Variofix L
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
	S					transducers with transducer frequency S
		D				reflection arrangement or diagonal arrangement
		R				reflection arrangement
			S			small
			M			medium
			L			large
				B		bolts
				S		tension straps
				W		welding
				N		without fixation
					002	10...20 mm
					004	20...40 mm
					T36	40...360 mm
					013	10...130 mm
					036	130...360 mm
					092	360...920 mm
					200	920...2000 mm
					450	2000...4500 mm
					940	4500...9400 mm
					NDR	any
						IP68 for transducers with degree of protection IP68
						OS housing with stainless steel 316
						Z special design

Variofix L (VLS)



transducer frequency: S
 material: stainless steel 304 (1.4301),
 303 (1.4305)

<p>Variofix L (VLK, VLM, VLQ)</p> 	<p>material: stainless steel 304 (1.4301), 301 (1.4310), 410 (1.4006) option OS: 316Ti (1.4571), 316L (1.4404), 17-7PH (1.4568) inner length: VLK: 348 mm, option IP68: 368 mm VLM: 234 mm VLQ: 176 mm dimensions: VLK: 423 x 90 x 93 mm option IP68: 443 x 94 x 105 mm VLM: 309 x 57 x 63 mm VLQ: 247 x 43 x 47 mm</p>
<p>Variofix L with bolt mounting plates (VL**-B)</p> 	<p>material: stainless steel 304 (1.4301), 301 (1.4310), 410 (1.4006) option OS: 316Ti (1.4571), 316L (1.4404), 17-7PH (1.4568) inner length: VLM: 234 mm VLQ: 176 mm dimensions: VLM: 309 x 57 x 63 mm VLQ: 247 x 43 x 47 mm outer pipe diameter: max. 48 mm</p>
<p>Variofix C (VC)</p> 	<p>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</p>
<p>transducer box WI for WaveInjector</p>  <p style="text-align: right; margin-right: 50px;">transducer box</p>	<p>see Technical specification TSWaveInjectorVx-x</p>

Coupling materials for transducers

	normal temperature range (4th character of transducer order code = N)		extended temperature range (4th character of transducer order code = E)			WaveInjector WI-400	
	< 100 °C	< 170 °C	< 150 °C	< 200 °C	200...240 °C	< 280 °C	280...400 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or H or coupling foil type VT	coupling foil type TF	coupling foil type A and coupling foil type VT	coupling foil type B and coupling foil type VT
long time measurement	coupling foil type VT	coupling foil type VT	coupling foil type VT	coupling foil type VT	coupling foil type TF	coupling foil type A and coupling foil type VT	coupling foil type B and coupling foil type VT

type VT: fluid temperature 200 °C: min. 2 years

Technical data

type	ambient temperature °C
coupling compound type N	-30...+130
coupling compound type E	-30...+200
coupling compound type H	-30...+250
coupling foil type A	max. 280
coupling foil type B	280...400
coupling foil type VT	-10...+200
coupling foil type TF	200...240

Connection systems

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

Cable

transducer cable				
type		1699	2550	6111
weight	kg/m	0.094	0.035	0.092
ambient temperature	°C	-55...+200	-40...+100	-100...+225
properties			longitudinal watertight	
cable jacket				
material		PTFE	PUR	PFA
outer diameter	mm	2.9	5.2 ±0.2	2.7
thickness	mm	0.3	0.9	0.5
colour		brown	grey	white
shield		x	x	x
sheath				
material		stainless steel 304 (1.4301) option OS: 316Ti (1.4571)	-	stainless steel 304 (1.4301) option OS: 316Ti (1.4571)
outer diameter	mm	8	-	8

extension cable				
type		2615	5245	
order code		ACC-PE- GNNN-/EXEXXX	ACC-PE- GNNN-/EXA1XXX	
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	

XXX - cable length in m

Cable length

transducer frequency		F, G, H, K		M, P		Q		S	
connection system TS									
transducers technical type		x		x		x		x	
*(DR)**8*	m	5	≤ 300	4	≤ 300	3	≤ 90	-	-
option LC: *(LT)**8*	m	9	≤ 300	9	≤ 300	9	≤ 90	-	-
*(DR)**5*	m	5	≤ 300	4	≤ 300	3	≤ 90	2	≤ 40
option LC: *(LT)**5*	m	9	≤ 300	9	≤ 300	9	≤ 90	-	-
option IP68: ****L*	m	12	≤ 300	12	≤ 300	-	-	-	-

x - transducer cable length

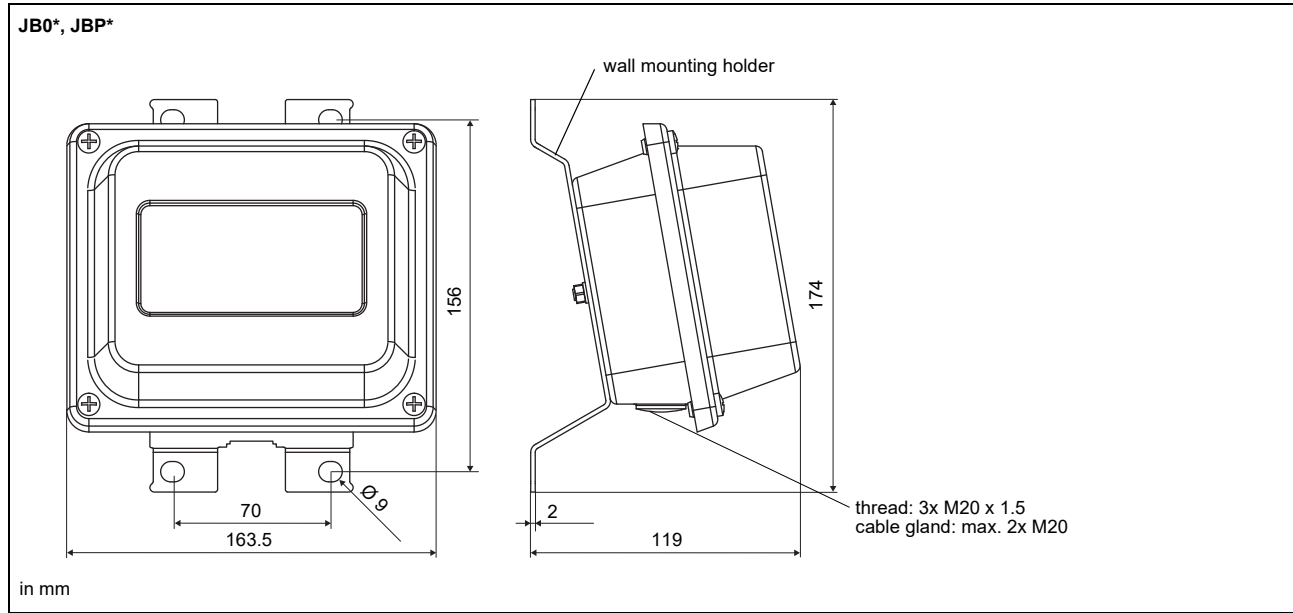
l - max. length of extension cable (depending on the application)

Junction box

Technical data

JB01S4E3M, JBP2, JBP3			
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 (zone 1)			
junction box	JB01S4E3M		
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 decoupled network: encapsulation dust: protection by enclosure		
• ATEX (zone 2)			
junction box	JBP2		
marking	CE Ex II3G Ex nA IIC (T6)...T4 Gc II3D Ex tc IIIC T 100 °C Dc Ta -40...+(70)80 °C		
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 strip	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

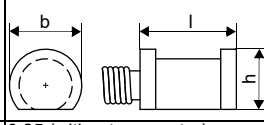
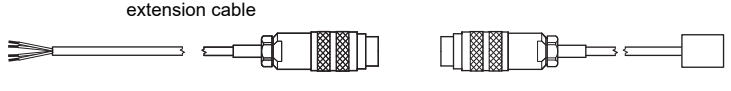
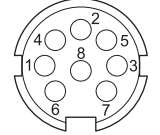


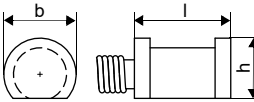
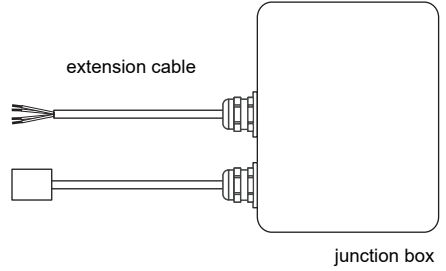
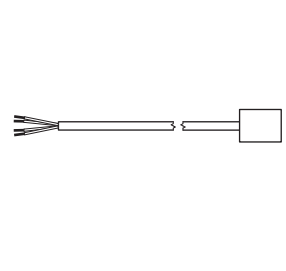
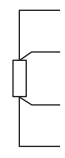
2" pipe mounting kit

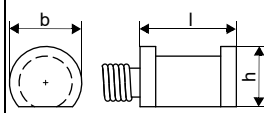

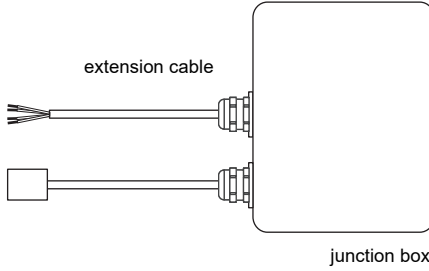

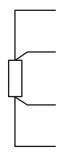


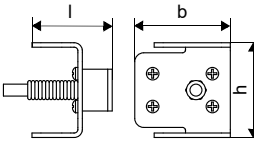
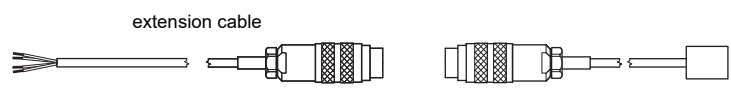
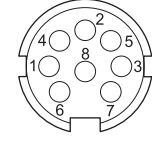
Clamp-on temperature probe (optional)

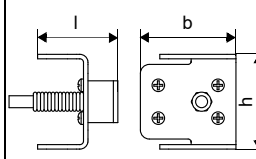
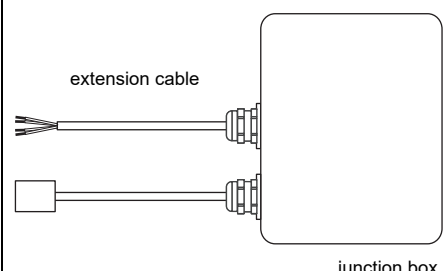
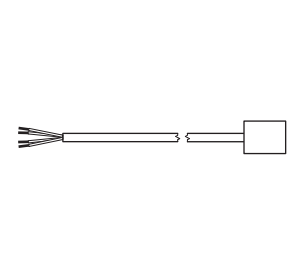
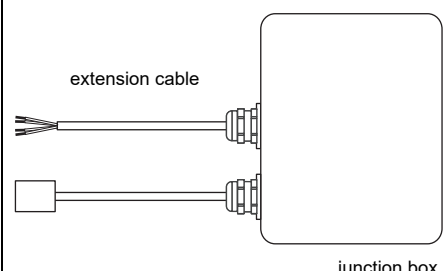
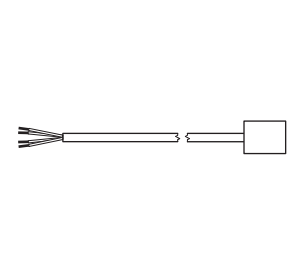
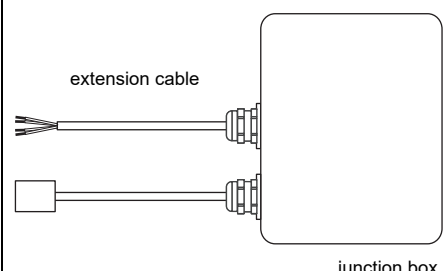
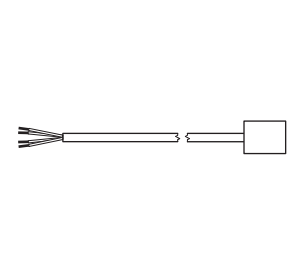
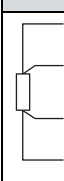
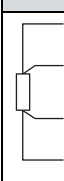
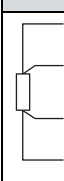
Technical data

PT12N			
order code		<ul style="list-style-type: none"> ACC-PO-#601-/T311 ACC-PO-#601-/T511 (matched) 	
design		clamp-on with connector	
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	
accuracy ΔT (2x Pt matched according to EN 1434-1)		$\leq 0.1 \text{ K}$ ($3 \text{ K} < \Delta T < 6 \text{ K}$), more corresponding to EN 1434-1	
response time	s	50 (t_{50} , $T_1 = 25 \text{ °C}$, $T_2 = 60 \text{ °C}$)	
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 (without connector)	
accessories			
thermal conductivity paste 200 °C		x	
thermal conductivity foil 250 °C		x	
Connection system			
direct connection/connection with extension cable			
			
Connection			
	temperature probe	extension cable	connector
			pin
	red	grey	2
	red/blue	red	6
	white/blue	blue	1
	white	white	7
			
Cable			
		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

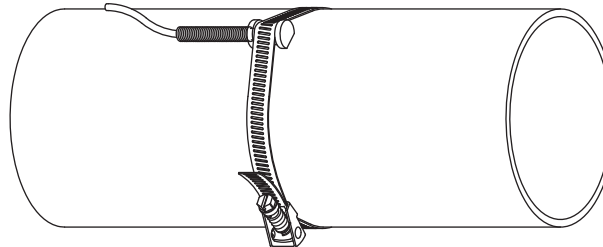
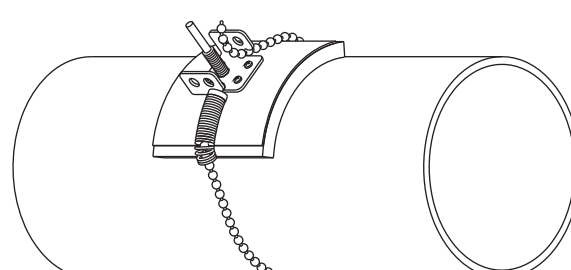
PT12N		
order code	<ul style="list-style-type: none"> • ACC-PE-GNNN-/T312 • ACC-PE-GNNN-/T512 (matched) 	
design	clamp-on	
type	Pt100	
connection	4-wire	
measuring range	°C -30...+250	
accuracy T	±(0.15 °C + 2 · 10 ⁻³ · T [°C]) class A	
accuracy ΔT (2x Pt matched according to EN 1434-1)	≤ 0.1 K (3 K < ΔT < 6 K), more corresponding to EN 1434-1	
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		
connection with extension cable		direct connection
		
Connection		
temperature probe		
	red	
	red/blue	
	white/blue	
	white	
Cable		
	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

PT12N	
order code	<ul style="list-style-type: none"> ACC-PE-GNNN-/T322 ACC-PE-GNNN-/T522 (matched)
design	clamp-on ATEX
type	Pt100
connection	4-wire
measuring range	°C -30...+250
accuracy T	$\pm(0.15 \text{ }^\circ\text{C} + 2 \cdot 10^{-3} \cdot T \text{ [}^\circ\text{C]})$ class A
accuracy ΔT (2x Pt matched according to EN 1434-1)	$\leq 0.1 \text{ K}$ ($3 \text{ K} < \Delta T < 6 \text{ K}$), more corresponding to EN 1434-1
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	
type	4 x 0.25 mm ²
standard length	m 3
max. length	m -
ambient temperature	°C -30...+250
min. bend radius	mm 19
extension cable	
type	LIYCY 8 x 0.14 mm ²
standard length	m 5/10/25
max. length	m 200
ambient temperature	°C -25...+80
min. bend radius	mm 68
cable jacket	
material	PTFE
outer diameter	mm 3.8
colour	black
material	PVC
outer diameter	mm 4.8 ±2
colour	grey


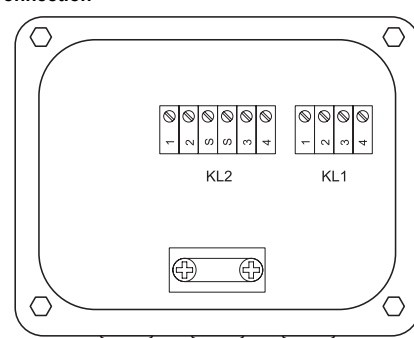
PT12F			
order code	<ul style="list-style-type: none"> • ACC-PO-#601-/T111 • ACC-PO-#601-/T211 (matched) 		
design	clamp-on short response time, with connector		
type	Pt100		
connection	4-wire		
measuring range	°C -50...+250		
accuracy T	$\pm(0.15 \text{ °C} + 2 \cdot 10^{-3} \cdot T \text{ [°C]})$ class A		
accuracy ΔT (2x Pt matched according to EN 1434-1)	$\leq 0.1 \text{ K}$ ($3 \text{ K} < \Delta T < 6 \text{ K}$), more corresponding to EN 1434-1		
response time	s 8 (t50, T1 = 25 °C, T2 = 60 °C)		
housing	PEEK, stainless steel 304 (1.4301), copper		
degree of protection	IP54		
dimensions			
length l	mm	14	
width b	mm	30	
height h	mm	27	
dimensional drawing			
weight	kg	0.32 (without connector)	
accessories			
thermal conductivity paste 200 °C	x		
thermal conductivity foil 250 °C	x		
plastic protection plate, insulation foam	x		
Connection system			
			
Connection			
	temperature probe	extension cable	connector
			pin
	red	grey	2
	red/blue	red	6
	white/blue	blue	1
	white	white	7
Cable			
	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 -50...+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	

PT12F																															
order code	• ACC-PE-GNNN-/T112																														
design	clamp-on short response time																														
type	Pt100																														
connection	4-wire																														
measuring range	°C -50...+250																														
accuracy T	$\pm(0.15 \text{ °C} + 2 \cdot 10^{-3} \cdot T \text{ [°C]})$ class A																														
response time	s 8 (t50, T1 = 25 °C, T2 = 60 °C)																														
housing	PEEK, stainless steel 304 (1.4301), copper																														
degree of protection	IP54																														
dimensions																															
length l	mm 14																														
width b	mm 30																														
height h	mm 27																														
dimensional drawing																															
weight	kg 0.32																														
accessories																															
thermal conductivity paste 200 °C	x																														
thermal conductivity foil 250 °C	x																														
plastic protection plate, insulation foam	x																														
Connection system																															
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Connection																															
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Cable																															
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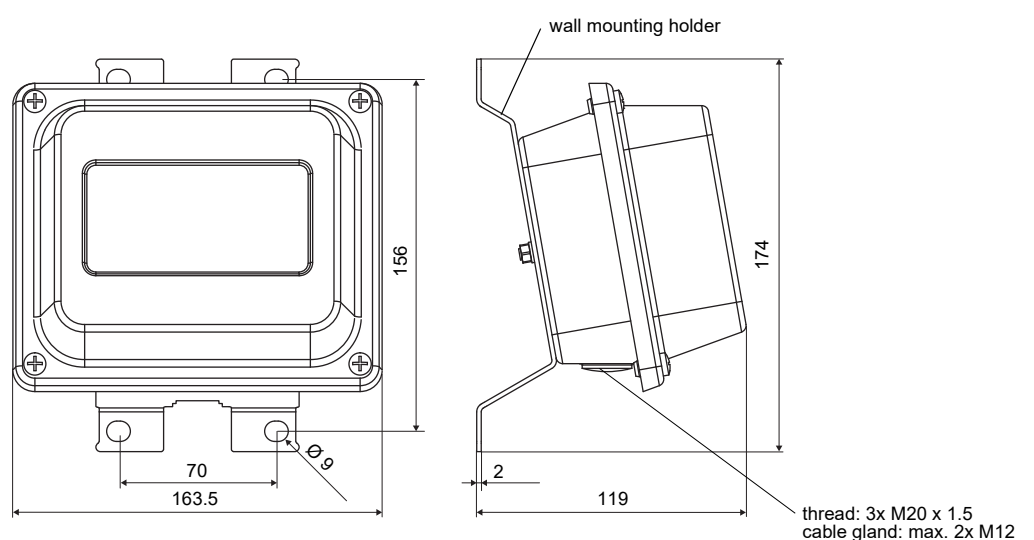
Fixation

<p>tension strap PT12N</p> 	<p>material: stainless steel 301 (1.4310), 410 (1.4006) thermal insulation necessary</p>
<p>ball chain PT12F</p> 	<p>material: stainless steel 316L (1.4404) length: 1 m</p>

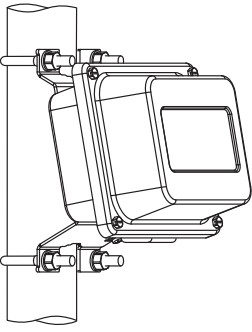
Junction box

JBT2, JBT3																									
order code	<ul style="list-style-type: none"> • JBT2: ACC-PE-GNNN-/JB4 • JBT3: ACC-PE-GNNN-/JB6 																								
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 marking	JBT2																								
marking	 II3G Ex nA IIC (T6)...T4 Gc II3D Ex tc IIIC T 100 °C Dc Ta -40...+(70)80 °C																								
<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

JBT*
 <p>in mm</p> <p>thread: 3x M20 x 1.5 cable gland: max. 2x M12</p>

2" pipe mounting kit

<p>JB**</p> 	<p>order code: ACC-PE-GNNN-JBPMK4</p>
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