FLEXIM

Technical specification

FLUXUS F721LF

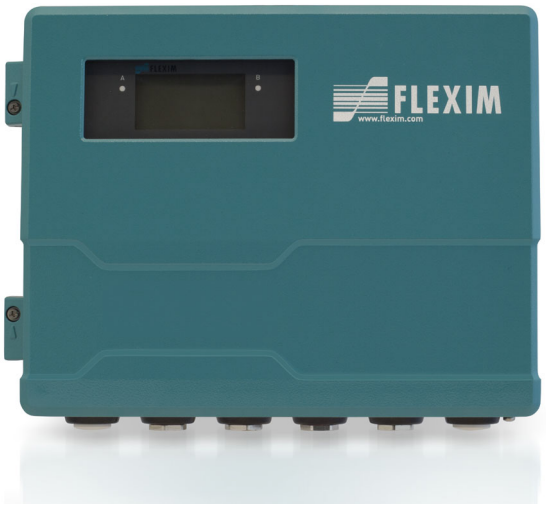
Permanently installed clamp-on ultrasonic measuring system for extremely low flows

Features

- Installation and start-up do not require any pipe work nor any process interruptions
- Extra low flow measurement system optimised for pipe diameters of 10...50 mm and above
- Achieved accuracy of 1 % MV ± 0.0006 m/s on extreme low flows – 3 l/h and below – independent of wall thickness
- Matched transducers, advanced digital signal processing (DSP) and efficient algorithms ensure stable measurements at very low flows
- System calibration: transmitter and transducers calibrated together for improved low flow accuracy
- Automatic loading of calibration data and transducer recognition
- Bidirectional communication and support of common bus technologies (Profibus PA, Foundation Fieldbus, HART, Modbus, BACnet, M-Bus)
- Advanced self-diagnosis and possibilities for event-based triggering of data recording for the supervision and control of critical processes
- Rugged and hazardous area approved transducers and transmitters: ATEX/IECEx zone 1/2, FM Class I Div. 1/2 (see also Technical specification F80xLF)
- Available in aluminum and stainless steel housing

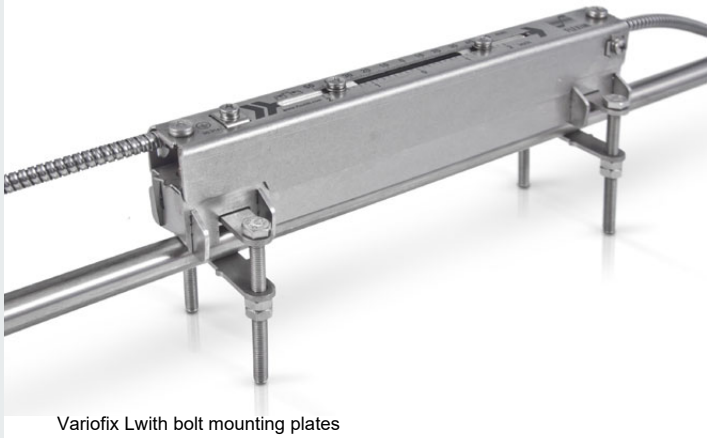
Applications

- Chemical injection for oil and gas
- Oil and gas exploration and production
- Chemical dosing in water and wastewater treatment
- Paint spray lines
- Pulp and paper industry
- Chemical and petrochemical industry
- Semiconductor industry



FLUXUS F721LF-****A

FLUXUS F721LF-****S



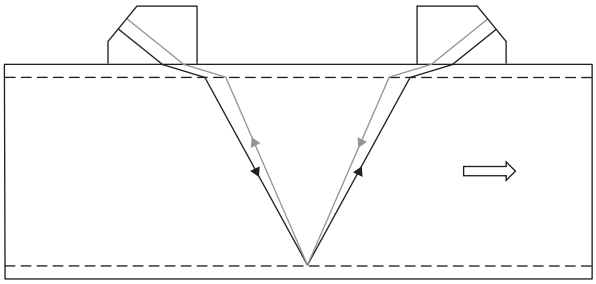
Variofix Lwith bolt mounting plates

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.

Path of the ultrasonic signal in the flowing fluid



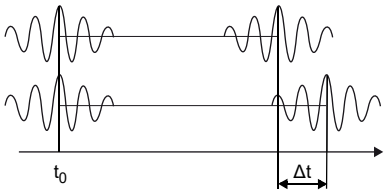
Transit time difference principle

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.

Transit time difference Δt



Calculation of volumetric flow rate

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

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_γ - average of transit times in the fluid

Number of sound paths

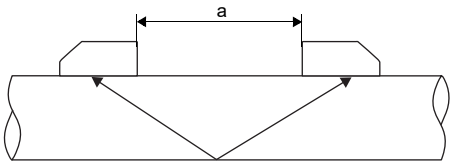
The number of sound paths is the number of transits of the ultrasonic signal through the fluid in the pipe. Depending on the number of sound paths, the following methods of installation exist:

- **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.

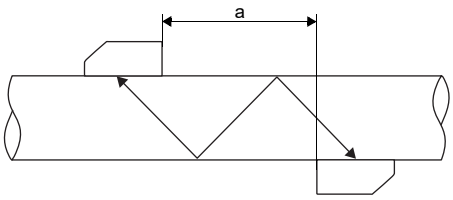
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the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

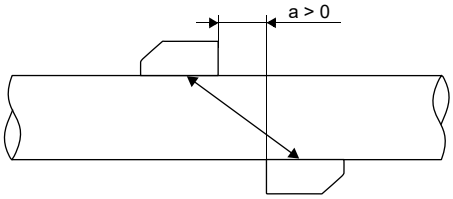
Reflection arrangement, number of sound paths: 2



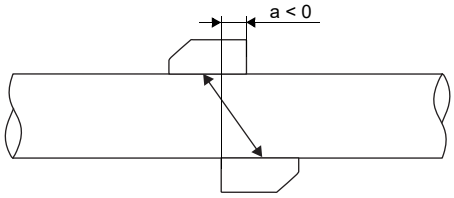
Diagonal arrangement, number of sound paths: 3



Diagonal arrangement, number of sound paths: 1



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



a - transducer distance

Transmitter

Technical data

		FLUXUS F721LF-NN0*A F721LF-NN0*S	FLUXUS F721LF-A20*A F721LF-A20*S	FLUXUS F721LF-F20*A F721LF-F20*S
		 		
design		standard field device	field device with stainless steel housing zone 2	field device with stainless steel housing FM Class I Div. 2
application		extreme low flow measurement for liquids		
measurement				
measurement principle		transit time difference correlation principle		
flow		depending on pipe diameter, see diagrams		
flow velocity		depending on pipe diameter, see diagrams		
repeatability		0.15 % MV ±0.0006 m/s		
Reynolds number		< 1 000		
fluid		all acoustically conductive liquids with < 2 % gaseous or solid content in volume		
temperature compensation		corresponding to the recommendations in ANSI/ASME MFC-5.1-2011		
measurement uncertainty (volumetric flow rate)				
measurement uncertainty of the measuring system		±0.3 % MV ±0.0006 m/s		
measurement uncertainty at the measuring point[1]		±1 % MV ±0.0006 m/s		
transmitter				
power supply		• 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		
damping	s	0...100 (adjustable)		
measuring cycle	Hz	100...1000		
response time	s	1		
housing material		aluminum, powder coated or stainless steel 316L (1.4404)		
degree of protection		IP66		aluminum housing: IP66/NEMA 4X stainless steel housing: IP65
dimensions	mm	see dimensional drawing		
weight	kg	aluminum housing: 5.4 stainless steel housing: 5.1		
fixation		wall mounting, optional: 2" pipe mounting		
ambient temperature	°C	-40...+60 (< -20 without operation of the display)		aluminum housing: -40...+55/60 (< -20 without operation of the display) stainless steel housing: -20...+55/60
display		128 x 64 pixels, backlight		
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian		
explosion protection				
• ATEX/IECEx				
marking		-	CE 0637 Ex II3G II2D Ex nA nC ic IIC T4 Gc Ex tb IIIC T120 °C Db T_a -40...+60 °C	-
certification ATEX		-	IBExU11ATEX1015	-
certification IECEx		-	IECEx IBE 11.0008	-
• FM				
marking		-	-	F721**-F20**2, F721**-F20**3: FM APPROVED NI/Cl. I,II,III/Div. 2/ GP. A,B,C,D,E,F,G/ T5 F721**-F20**1: FM APPROVED 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		
totaliser		volume, mass		
diagnostic functions		sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times		

[1] with LowFlow reference conditions (water: 20 °C, number of sound paths: 8, inner pipe diameter: 13.1 mm)

[2] outside the explosive atmosphere (housing cover open)

		FLUXUS F721LF-NN0*A F721LF-NN0*S	FLUXUS F721LF-A20*A F721LF-A20*S	FLUXUS F721LF-F20*A F721LF-F20*S
communication interfaces				
service interfaces		measured value transmission, parametrisation of the transmitter: • USB[2] • LAN[2]		
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
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 Ω		
passive output		U_{ext} = 8...30 V, depending on R_{ext} (R_{ext} < 1 kΩ at 30 V)		
• HART				
range	mA	4...20		
accuracy		0.1 % MV ±15 µA		
active output		U_{int} = 24 V, R_{ext} < 500 Ω		
passive output		U_{ext} = 10...24 V DC, depending on R_{ext} (R_{ext} < 1 kΩ 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 Ω		
• frequency output				
range	kHz	-	0...5	-
optorelay		-	24 V/4 mA, R_{int} = 66.5 Ω	-
• 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		• frequency output • binary output • pulse output	-	• frequency output • binary output • pulse output
number		3	-	3
operating parameters		5...30 V/< 100 mA	-	5...30 V/< 100 mA
frequency output				
• range	kHz	0...5	-	0...5
binary output				
• binary output as alarm output		limit, change of flow direction or error	-	limit, change of flow direction or error
pulse output				
• functions		mainly for totalising	-	mainly for totalising
• pulse value	units	0.01...1000	-	0.01...1000
• pulse width	ms	0.05...1000	-	0.05...1000

[1] with LowFlow reference conditions (water: 20 °C, number of sound paths: 8, inner pipe diameter: 13.1 mm)

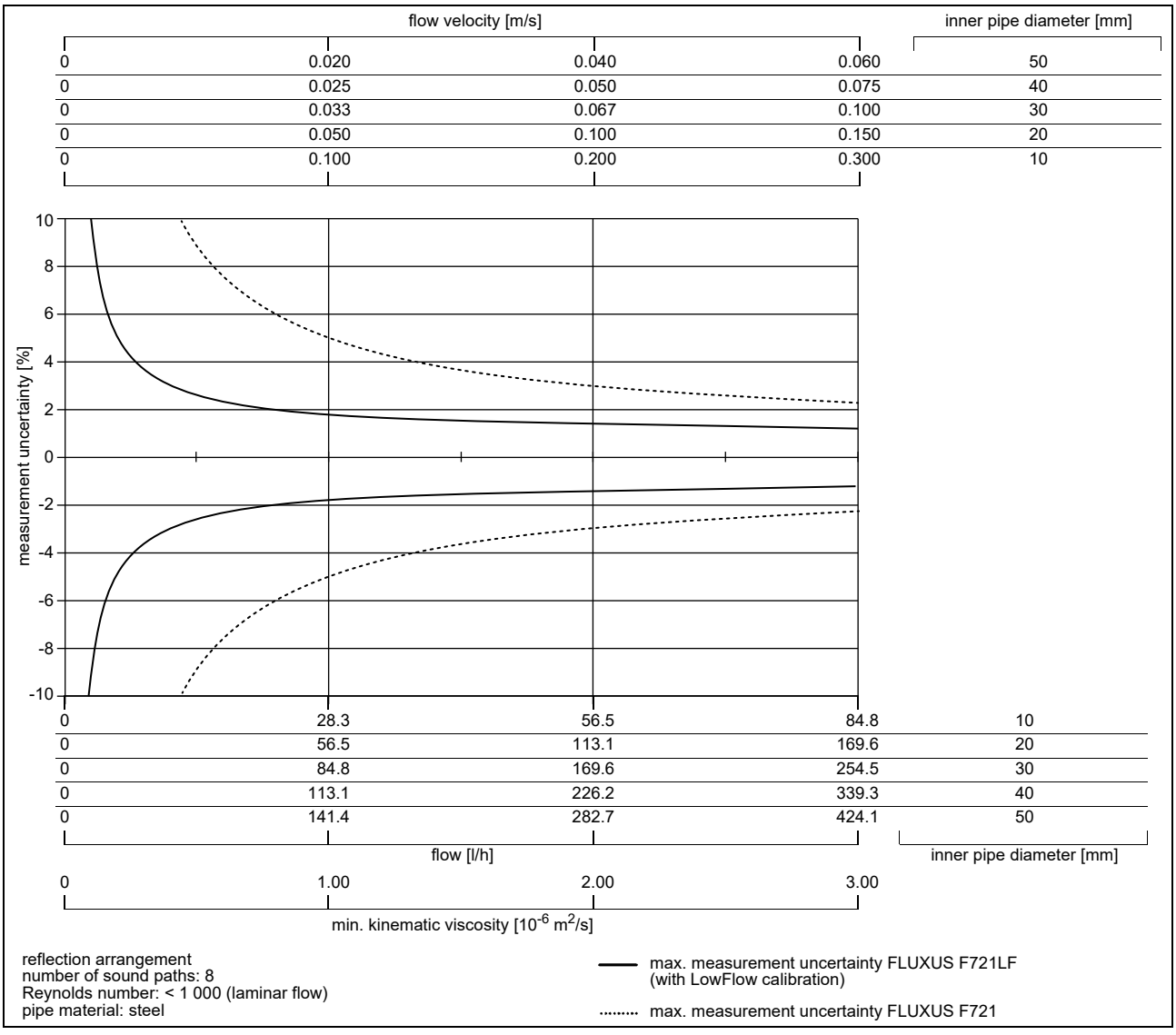
[2] outside the explosive atmosphere (housing cover open)

		FLUXUS F721LF-NN0*A F721LF-NN0*S	FLUXUS F721LF-A20*A F721LF-A20*S	FLUXUS F721LF-F20*A F721LF-F20*S
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
functions		• reset of the measured values • reset of the totalisers • stop of the totalisers • activation of the measuring mode for highly dynamic flows		

[1] with LowFlow reference conditions (water: 20 °C, number of sound paths: 8, inner pipe diameter: 13.1 mm)

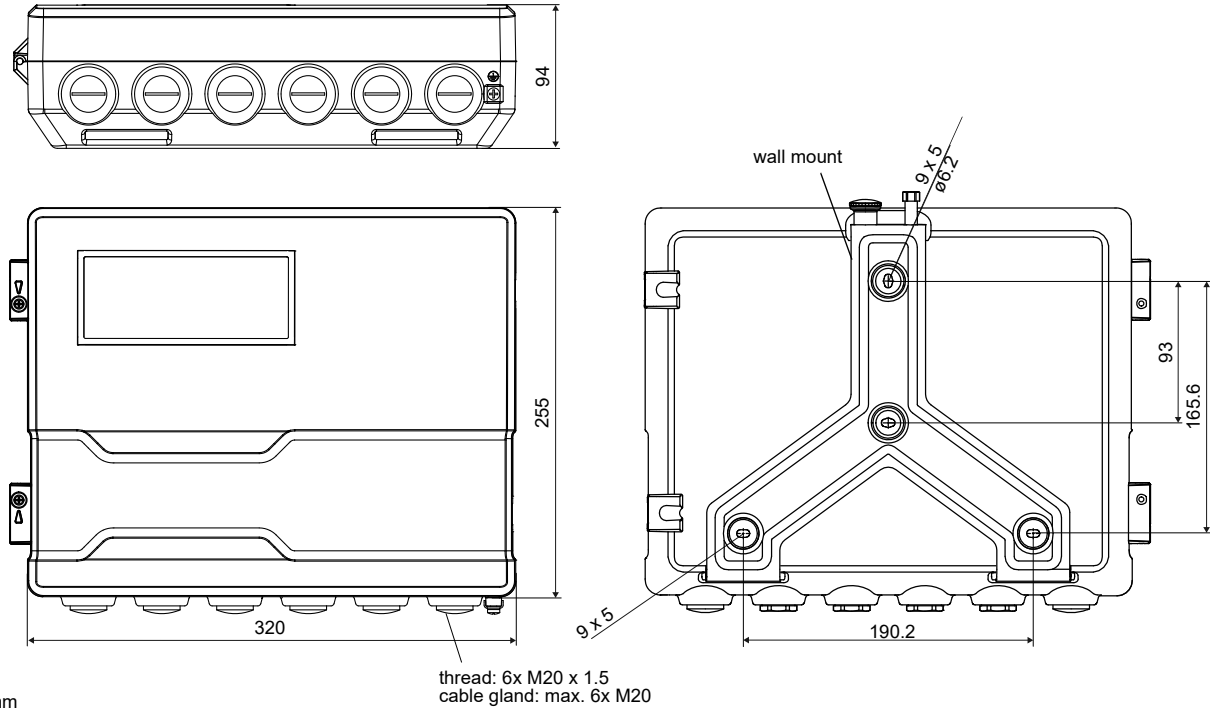
[2] outside the explosive atmosphere (housing cover open)

Diagrams



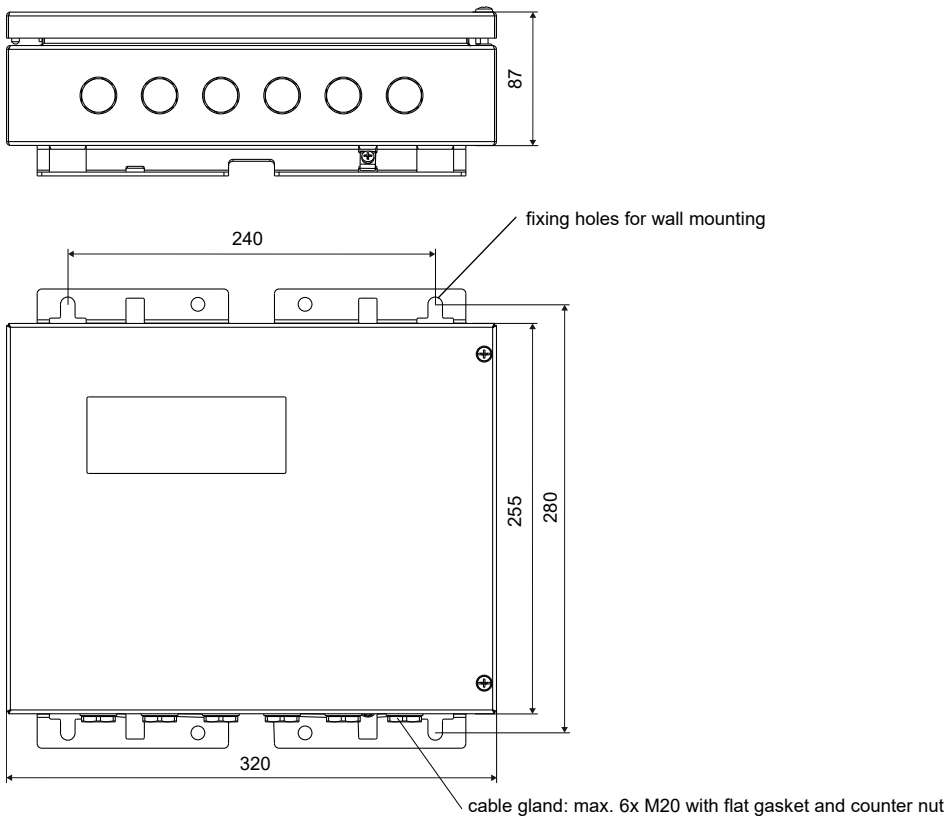
Dimensions

72-****A**



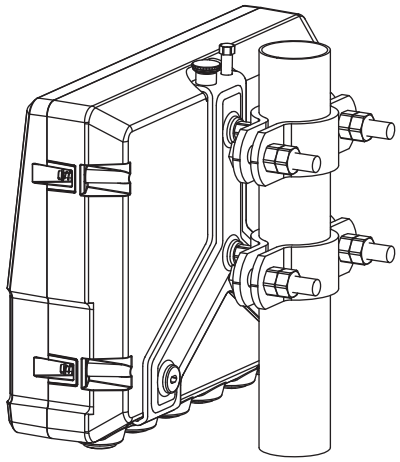
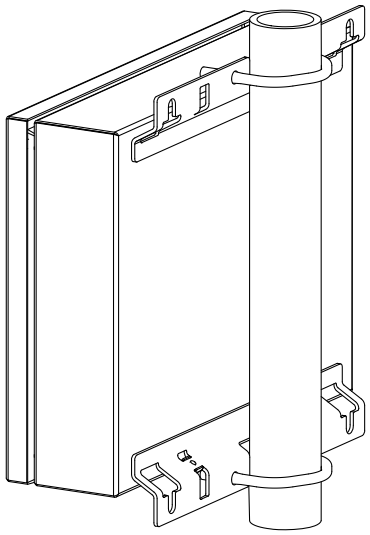
in mm

72-****S**

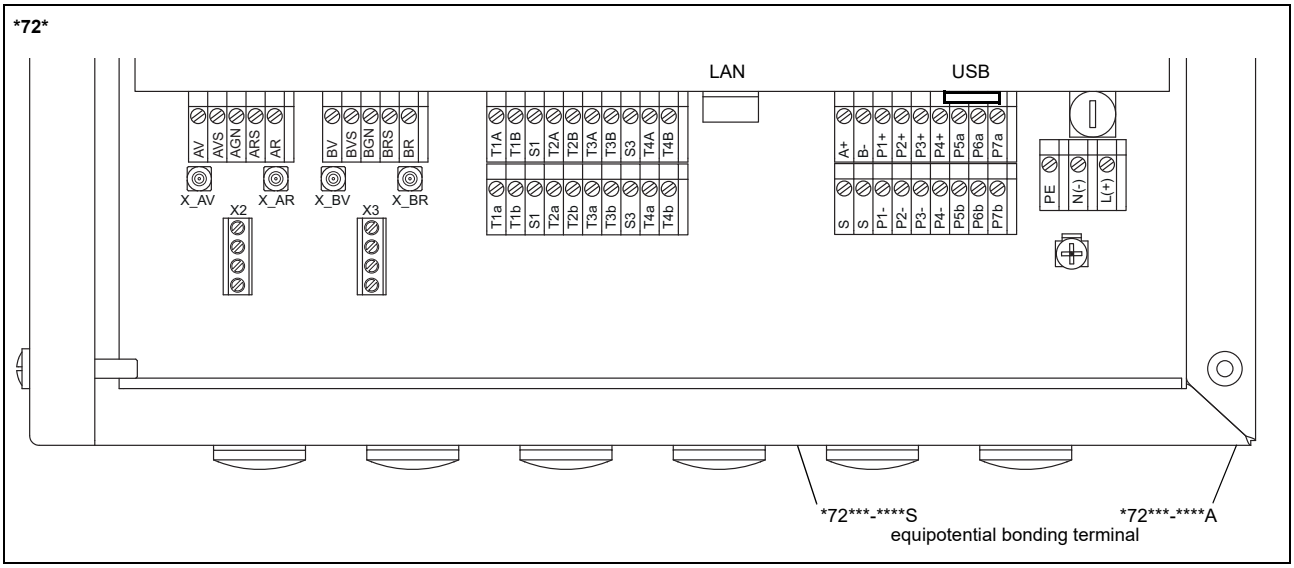


in mm

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*), 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	SMB connector
AVS	shield	BVS	shield				
ARS	shield	BRS	shield		X_AR	X_BR	SMB connector
AR	signal	BR	signal				

outputs[1, 2]

terminal	**connection**
P1+...P4+ P1-...P4-	current output, voltage output, frequency output, binary output (Reed relay), HART (P1)
P5a...P7a P5b...P7b	binary output (optorelay), digital output

terminal	**connection**	**communication interface**
A+	signal +	• RS485[1] • Modbus RTU[1] • BACnet MS/TP[1] • M-Bus[1] • Profibus PA[1] • FF H1[1]
B-	signal -	
S	shield	
USB	type B Hi-Speed USB 2.0 Device	• service (FluxDiag/ FluxDiagReader)
LAN	RJ45 10/100 Mbps Ethernet	• service (FluxDiag/ FluxDiagReader) • BACnet IP • Modbus TCP

analog inputs[1, 2]

	temperature probe		**passive sensor**	**active sensor**
terminal	**direct connection**	**connection with extension cable**	**connection**	**connection**
T1a...T4a	red	red	not connected	not connected
T1A...T4A	red/blue	grey	-	+
T1b...T4b	white/blue	blue	+	not connected
T1B...T4B	white	white	not connected	-
S1, S3	shield	shield	not connected	not connected

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 mm^2
- outer diameter of the cable (*72***-****S with ferrite nut): max. 7.6 mm

[2] The number, type and terminal assignment are customised.

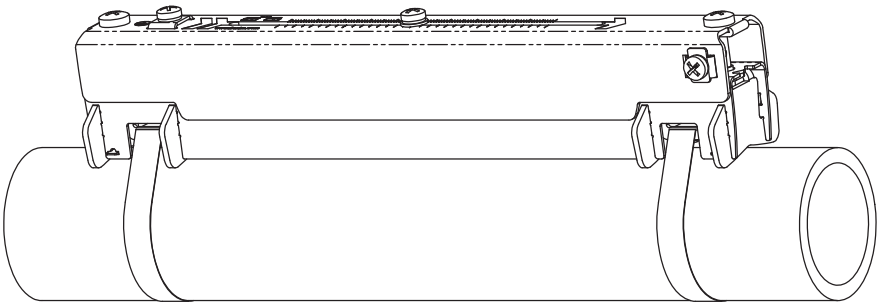
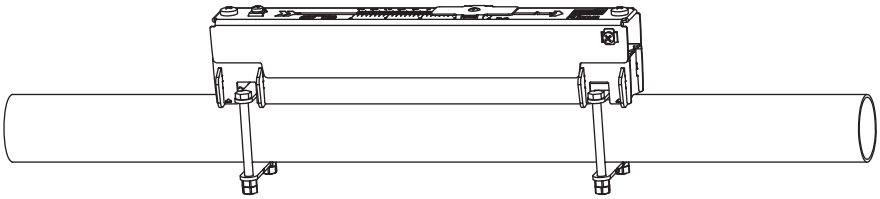
Transducers

Technical data

order code		FSQ-N**TS/**	FSQ-N*1T1/**
technical type		C(DL)Q2N52	C(DL)Q2N81
transducer frequency	MHz	4	4
inner pipe diameter d[1]			
min. extended	mm	10	10
min. recommended	mm	25	25
max. recommended	mm	150	150
max. extended	mm	240	240
pipe wall thickness			
min.	mm	0.6	0.6
material			
housing		PEEK with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)	PEEK with stainless steel cover 304 (1.4301), ***-*****/OS: 316L (1.4404)
contact surface		PEEK	PEEK
degree of protection		IP67	IP65
transducer cable			
type		1699	1699
length	m	3	3
length (***-*****/LC)	m	9	9
dimensions			
length l	mm	40	40
width b	mm	22	22
height h	mm	25.5	25.5
dimensional drawing			
weight (without cable)	kg	0.016	0.016
pipe surface temperature			
min.	°C	-40	-40
max.	°C	+130	+130
ambient temperature			
min.	°C	-40	-40
max.	°C	+130	+130
temperature compensation		x	x
explosion protection			
• **ATEX/IECEx**			
order code		FSQ-NA2TS/**	FSQ-NA1T1/**
pipe surface temperature (Ex)			
• min.	°C	-55	-55
• max.	°C	gas: +190, dust: +180	+180
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db	CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db
certification ATEX		IBExU10ATEX1163 X	IBExU07ATEX1168 X
certification IECEx		IECEx IBE 12.0005X	IECEx IBE 08.0007X
• **FM**			
order code		FSQ-NF2TS/**	-
pipe surface temperature (Ex)			
• min.	°C	-40	-
• max.	°C	+190	-
degree of protection		IP66	-
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860	-

[1] inner pipe diameter > 50 mm:
If necessary, a smaller number of sound paths has to be used. This may result in an increase of the measurement uncertainty.

Transducer mounting fixture

Variofix L (VLQ-DS-S) 	material: stainless steel 304 (1.4301), 301 (1.4310), 410 (1.4006) inner length: 176 mm dimensions: 247 x 43 x 47 mm
Variofix L with bolt mounting plates (VLQ-DS-B) 	material: stainless steel 304 (1.4301), 301 (1.4310), 410 (1.4006) inner length: 176 mm dimensions: 247 x 43 x 47 mm outer pipe diameter: max. 48 mm

Coupling materials for transducers

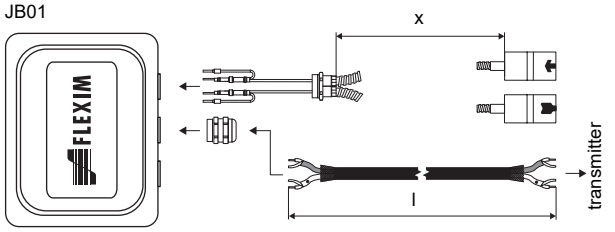
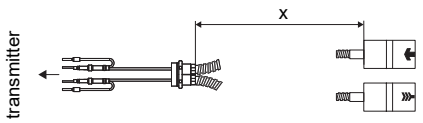
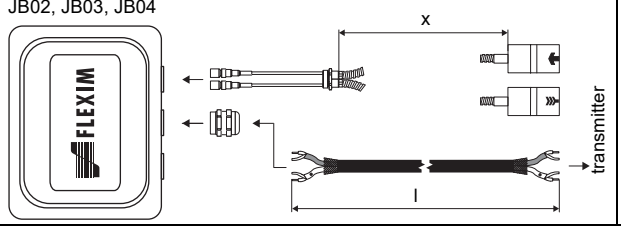
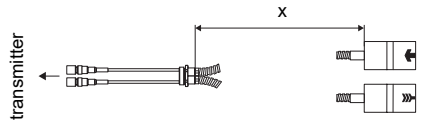
	< 100 °C	< 170 °C	< 150 °C	< 200 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or H or coupling foil type VT
long time measurement	coupling foil type VT	coupling foil type VT	coupling foil type VT	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 VT	-10...+200

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
JB01 		*****8*
connection system TS		
connection with extension cable	direct connection	transducers technical type
JB02, JB03, JB04 		*****52

Cable

transducer cable			
type		**1699**	**6111**
weight	kg/m	0.094	0.092
ambient temperature	°C	-55...+200	-100...+225
cable jacket			
material		PTFE	PFA
outer diameter	mm	2.9	2.7
thickness	mm	0.3	0.5
colour		brown	white
shield		x	x
sheath			
material		stainless steel 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-/EXEXXXX	ACC-PE- GNNN-/EXA1XXX
max. length	m	90	90
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

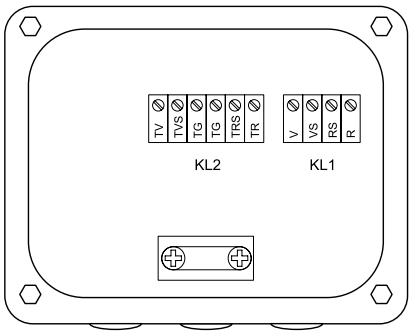
XXX - cable length in m

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

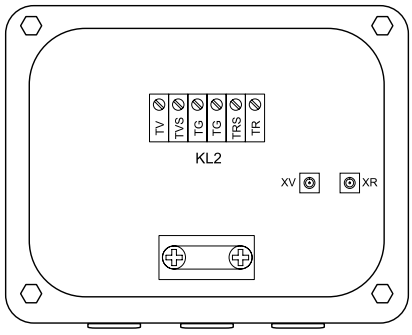
terminal strip	terminal	connection	transducer
KL1	V	signal	↑
	VS	internal shield	
	RS	internal shield	⅄
	R	signal	

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		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C

Connection



Transducers

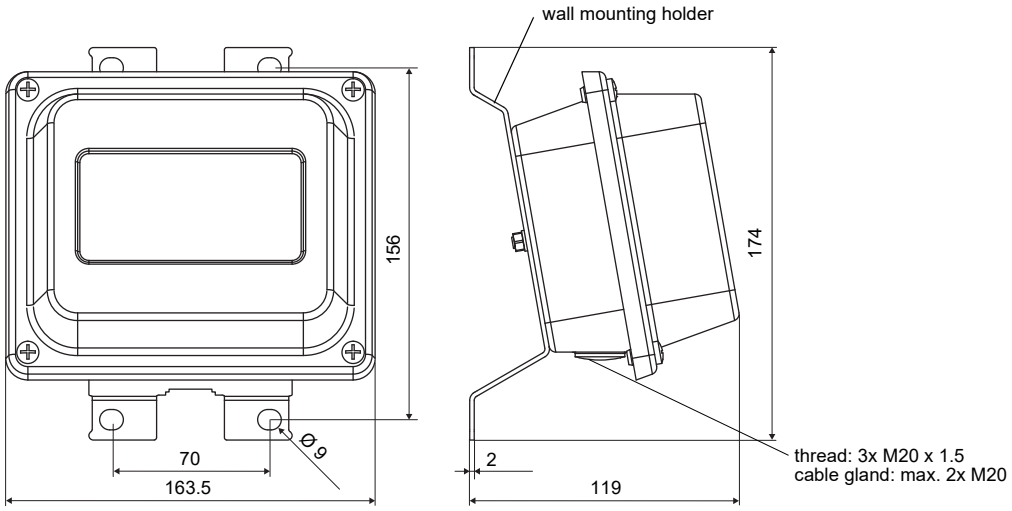
	terminal	connection	transducer
	XV	SMB connector	↑
	XR	SMB connector	⅄

Extension cable

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

Dimensions

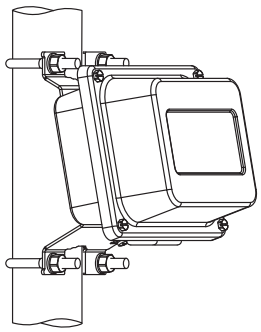
JB0*, JBP*



in mm

2" pipe mounting kit

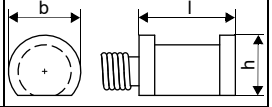
JB**



order code:
ACC-PE-GNNN-/JBPMK4

Clamp-on temperature probe (optional)

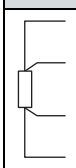
Technical data

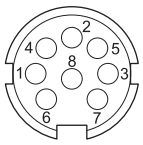
PT12N		
order code		• ACC-PO-#601-/T311 • ACC-PO-#601-/T511 (matched)
design		clamp-on with connector
type		Pt100
connection		4-wire
measuring range	°C	-30...+250
accuracy T		±(0.15 °C + 2 · 10^{-3} · |T [°C]|) class A
accuracy ΔT (2x Pt matched according to EN 1434-1)		≤ 0.1 K (3 K < ΔT < 6 K), more 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 (without connector)
accessories		
thermal conductivity paste 200 °C		x
thermal conductivity foil 250 °C		x

Connection system

direct connection/connection with extension cable

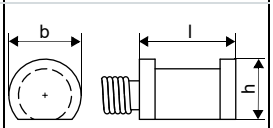

Connection

	temperature probe	extension cable	connector
			pin
	red	grey	2
	red/blue	red	6
	white/blue	blue	1
	white	white	7

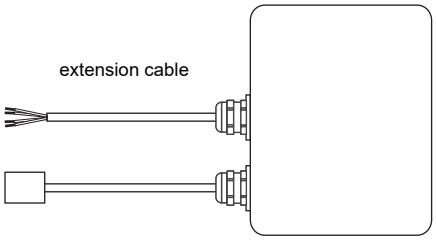


Cable

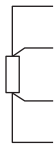
		temperature probe	extension cable
type		4 x 0.22 mm²	LIYCY 8 x 0.14 mm²
standard length	m	3	5/10/25
max. length	m	-	200
ambient temperature	°C	-30...+250	-25...+80
min. bend radius	mm	27	68
cable jacket			
material		PFA	PVC
outer diameter	mm	3.8 ±0.15	4.8 ±2
colour		black	grey

PT12N		
order code		• 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

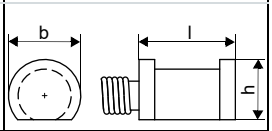
connection with extension cable	direct connection
	

Connection

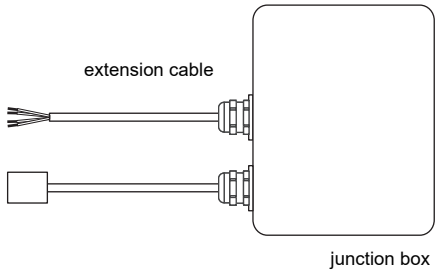
	temperature probe
	red
	red/blue
	white/blue
	white

Cable

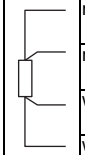
		temperature probe	extension cable
type		4 x 0.22 mm²	LIYCY 8 x 0.14 mm²
standard length	m	3	5/10/25
max. length	m	-	200
ambient temperature	°C	-30...+250	-25...+80
min. bend radius	mm	27	68
cable jacket			
material		PFA	PVC
outer diameter	mm	3.8 ±0.15	4.8 ±2
colour		black	grey

PT12N		
order code		• 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		±(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
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		CE Ex II3G Ex nA IIC T6...T2 Gc Ta -30...+250 °C

Connection system

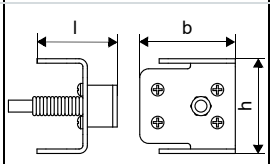
connection with extension cable	**direct connection**
	

Connection

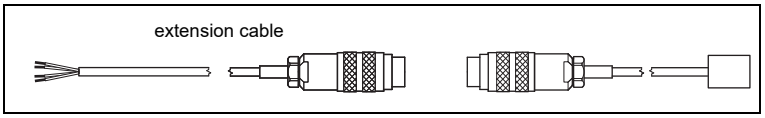
	temperature probe
	red
	red/blue
	white
	white/blue

Cable

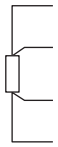
		temperature probe	**extension cable**
type		4 x 0.25 mm²	LIYCY 8 x 0.14 mm²
standard length	m	3	5/10/25
max. length	m	-	200
ambient temperature	°C	-30...+250	-25...+80
min. bend radius	mm	19	68
cable jacket			
material		PTFE	PVC
outer diameter	mm	3.8	4.8 ±2
colour		black	grey

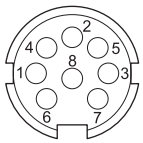
PT12F		
order code		• ACC-PO-#601-/T111 • ACC-PO-#601-/T211 (matched)
design		clamp-on short response time, with connector
type		Pt100
connection		4-wire
measuring range	°C	-50...+250
accuracy T		±(0.15 °C + 2 · 10^{-3} · |T [°C]|) class A
accuracy ΔT (2x Pt matched according to EN 1434-1)		≤ 0.1 K (3 K < ΔT < 6 K), more corresponding to EN 1434-1
response time	s	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



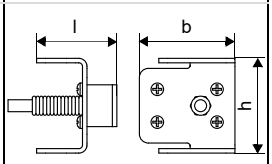
Connection

	temperature probe	extension cable	connector
			pin
	red	grey	2
	red/blue	red	6
	white/blue	blue	1
	white	white	7

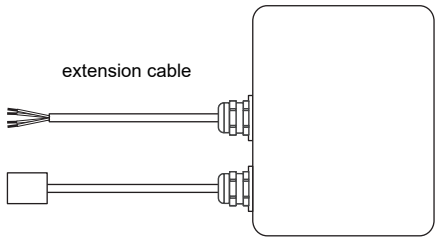
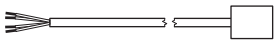


Cable

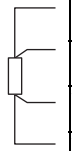
		temperature probe	extension cable
type		4 x 0.22 mm²	LIYCY 8 x 0.14 mm²
standard length	m	3	5/10/25
max. length	m	-	200
ambient temperature	°C	-50...+250	-25...+80
min. bend radius	mm	27	68
cable jacket			
material		PFA	PVC
outer diameter	mm	3.8 ±0.15	4.8 ±2
colour		black	grey

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		±(0.15 °C + 2 · 10^{-3} · |T [°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

connection with extension cable	direct connection
	

Connection

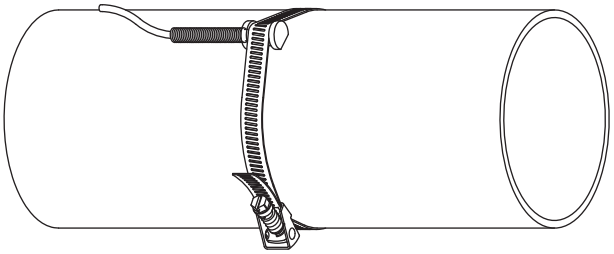
	temperature probe
	red
	red/blue
	white/blue
	white

Cable

		temperature probe	extension cable
type		4 x 0.22 mm²	LIYCY 8 x 0.14 mm²
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

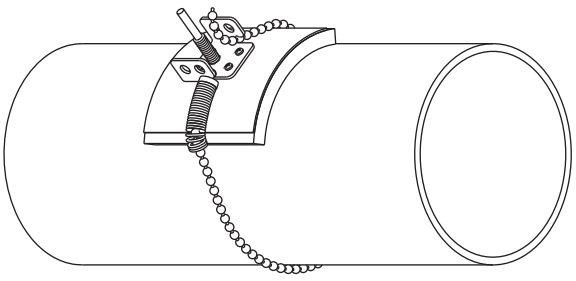
Fixation

tension strap PT12N



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

ball chain PT12F

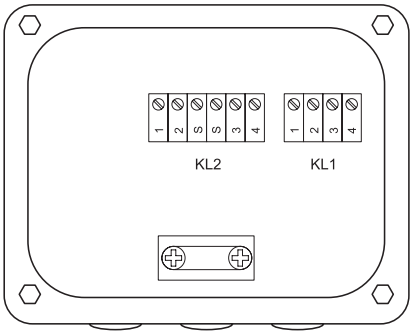


material: stainless steel 316L (1.4404)
length: 1 m

Junction box

JBT2, JBT3		
order code		• 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		JBT2
marking		CE Ex II3G Ex nA IIC (T6)...T4 Gc II3D Ex tc IIIC T 100 °C Dc Ta -40...+(70)80 °C

Connection



Temperature probe

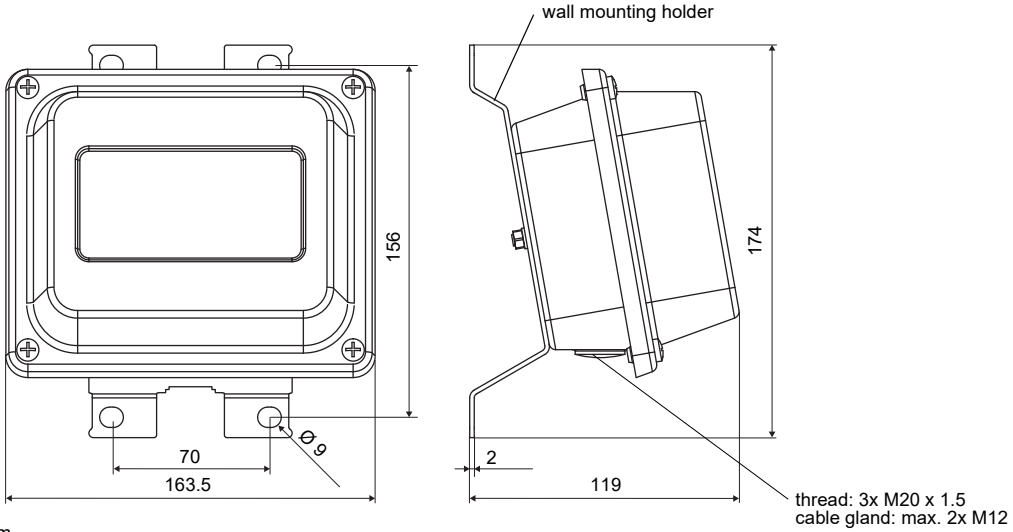
terminal strip	terminal	connection
KL1	1	red
	2	red/blue
	3	white
	4	white/blue

Extension cable

terminal strip	terminal	connection
KL2	1	red
	2	grey
	3	white
	4	blue

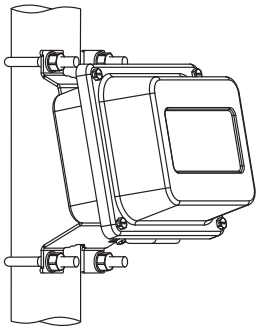
Dimensions

JBT*



in mm

2" pipe mounting kit

JB** 	order code: ACC-PE-GNNN-/JBPMK4

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