FLEXIM

Technical specification

FLUXUS F721TE

Ultrasonic measurement of thermal energy and volume flow rate

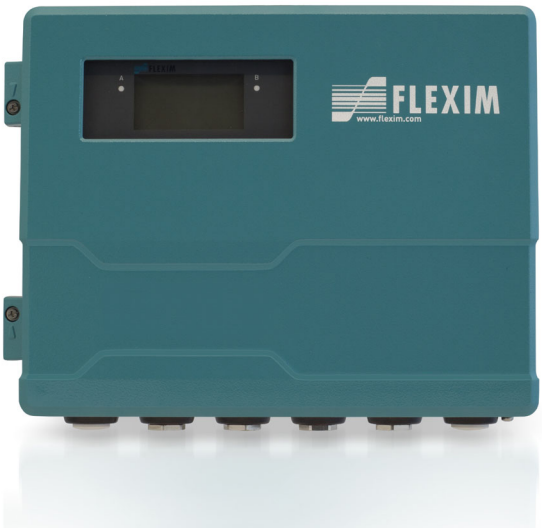
Precise and reliable clamp-on energy measuring system

Features

- Integrated heat, cold and volumetric flow rate measuring system
  - Non-invasive ultrasonic clamp-on principle
  - No shutdown for installation, no wear and tear
  - Perfect for retrofitting
- Suitable for all heat and cooling liquids within industrial or building applications
- Full two channel meter capability – two measuring points with one transmitter
- Smart meter ready with bi-directional communication and fieldbus systems
- The high precision paired temperature probes follow EN 1434 regulations
- Low flow ability down to 0.01 m/s to detect even minimum energy flows
- Extremely high measuring dynamic > 1000 : 1, no running out of flow range
- For pipe diameters of DN 25...DN 1000
- Rugged stainless steel transducer mounting – fit for industrial environments
- Maintenance free permanent acoustic coupling of the ultrasonic transducers – no re-greasing

Applications

- Monitoring and balancing of industrial heating and cooling systems
- Data acquisition for energy management and ISO 50001
- Sub metering in buildings and building complexes
- Heat flow balancing and leakage control in district heating systems



FLUXUS F721TE-****A

FLUXUS F721TE-****S

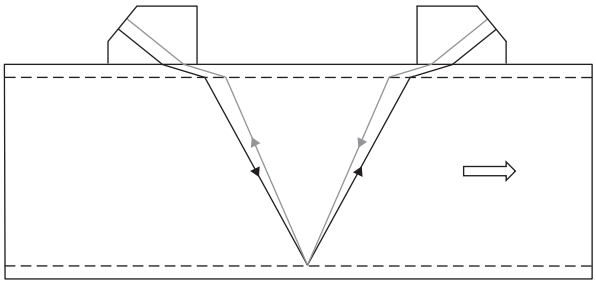
Variofix L

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

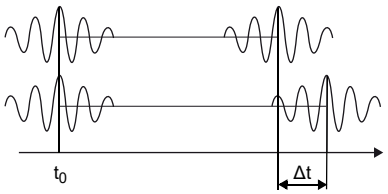


As the fluid where the ultrasound propagates is flowing, the transit time of the ultrasonic signal in flow direction is shorter than the one against the flow direction.

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

Calculation of thermal energy rate

The thermal energy rate is calculated with the following formula:

$\Phi = k_i \cdot \dot{V} \cdot (T_V - T_R)$ (heating application)

$\Phi = k_i \cdot \dot{V} \cdot (T_R - T_V)$ (cooling application)

where

Φ – thermal energy rate

k_i – thermal coefficient

$\dot{V}$ – volumetric flow rate

T_V – supply temperature

T_R – return temperature

The thermal coefficient k_i results from several thermal energy rate coefficients for the specific enthalpy and density of the fluid. The thermal energy rate coefficients of some fluids are stored in the internal database of the transmitter. Further customised fluids are possible.

Max. permissible error

The max. permissible error MPE of a complete heat meter is according to EN 1434 the arithmetic sum of the max. permissible errors of the subassemblies: calculator, temperature sensor pair and flow sensor.

$MPE = E_c + E_t + E_f$

where

MPE – total max. permissible error

E_c – max. permissible relative error of the calculator

E_t – max. permissible relative error of the temperature sensor pair

E_f – max. permissible relative error of the flow sensor

Number of sound paths

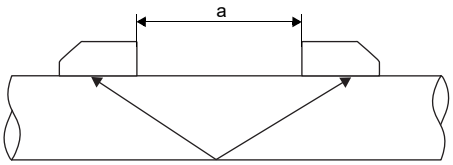
The number of sound paths is the number of transits of the ultrasonic signal through the fluid in the pipe. Depending on the number of sound paths, the following methods of installation exist:

- **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.

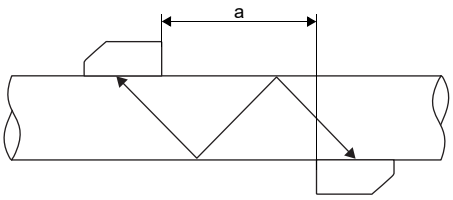
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the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

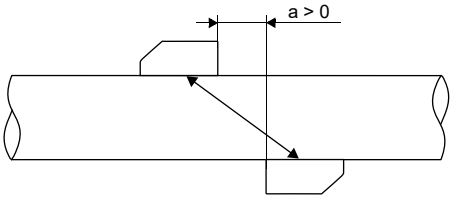
Reflection arrangement, number of sound paths: 2



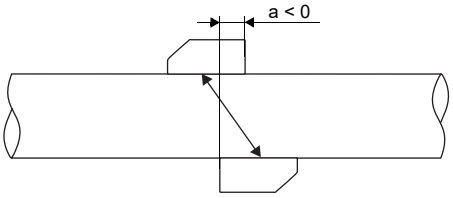
Diagonal arrangement, number of sound paths: 3



Diagonal arrangement, number of sound paths: 1



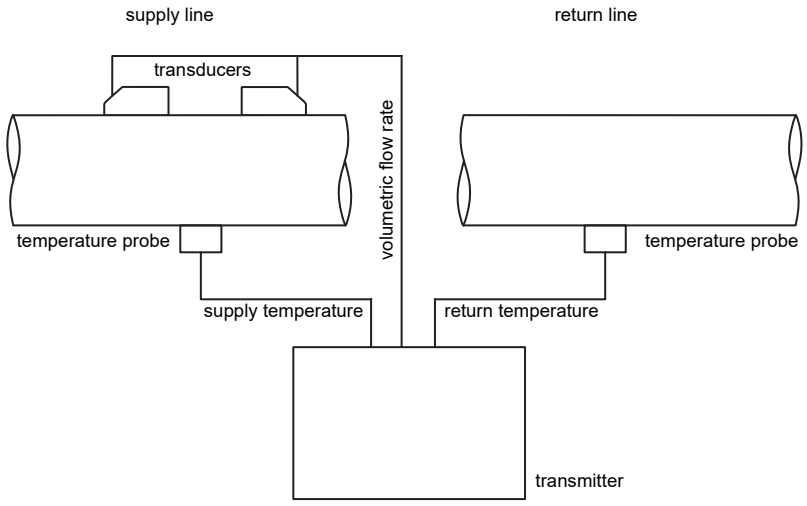
Diagonal arrangement, number of sound paths: 1, negative transducer distance



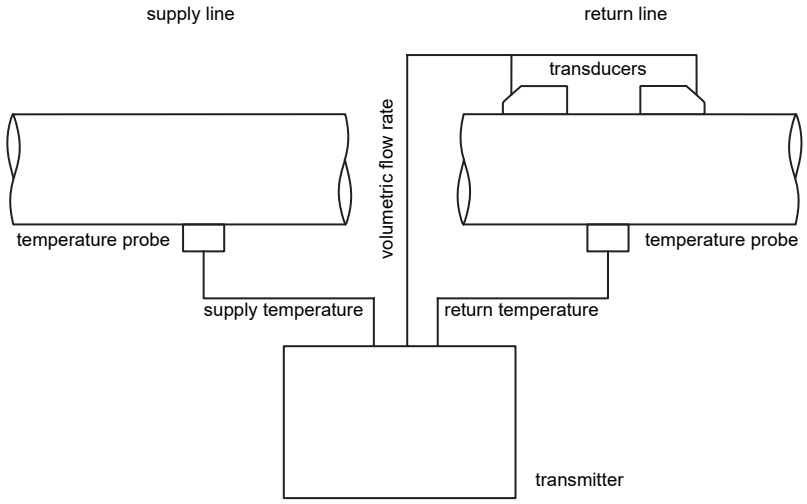
a - transducer distance

Typical measurement setup

Example of a thermal energy rate measurement measuring the volumetric flow rate in the supply line



Example of a thermal energy rate measurement measuring the volumetric flow rate in the return line



Transmitter

Technical data

		FLUXUS F721TE-NN0*A F721TE-NN0*S	FLUXUS F721TE-A20*A F721TE-A20*S	FLUXUS F721TE-F20*A F721TE-F20*S
		 		
design		standard field device	standard field device zone 2	standard field device FM Class I Div. 2
application		energy meter		
measurement				
• energy				
max. permissible relative error		calculator: E_c = ±(0.4 + 1 K/Δθ) %		
• temperature				
temperature difference		$\Delta\theta_{min}$ = 3 K, $\Delta\theta_{max}$ = 300 K		
max. permissible relative error		temperature sensor pair: E_t - depending on type, see Technical data of temperature probes		
• flow				
measurement principle		transit time difference correlation principle		
flow	m^3/h	Q_p = 17...20 000		
flow velocity	m/s	0.01...25		
repeatability		0.15 % MV ±0.005 m/s		
fluid		• water • glycol/H_2O: 20 %, 30 %, 40 %, 50 % • thermal fluids: BP Transcal LT, BP Transcal N, R22 Freon, R134 Freon, ammonia, Shell Termina B, Mobiltherm 594, Mobiltherm 603, R407C, R410A • others on request		
fluid pressure		without influence		
pressure loss		-		
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		• 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		
damping	s	0...100 (adjustable)		
measuring cycle	Hz	100...1000 (1 channel)		
response time	s	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
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
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	-

[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

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

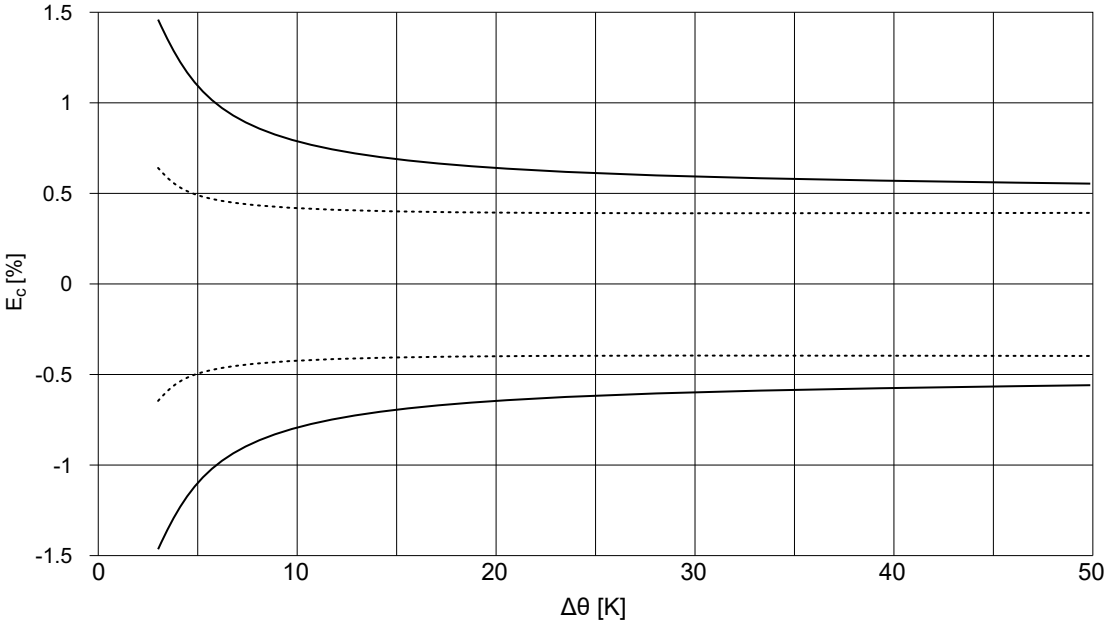
		FLUXUS F721TE-NN0*A F721TE-NN0*S	FLUXUS F721TE-A20*A F721TE-A20*S	FLUXUS F721TE-F20*A F721TE-F20*S
• FM				
marking		-	-	F721**-F20**2, F721**-F20**3:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C,D,E,F,G/ T5 F721**-F20**1:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C,D,E,F,G/ T4A
measuring functions				
physical quantities		thermal energy rate, volumetric flow rate, mass flow rate, flow velocity		
totaliser		thermal energy, volume, mass		
calculation functions		average, difference, sum (2 measuring channels necessary)		
diagnostic functions		sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times		
communication interfaces				
service interfaces		measured value transmission, parametrisation of the transmitter: • USB[3] • LAN[3]		
process interfaces		max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • M-Bus • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • RS485 (ASCII sender) • Modbus RTU • BACnet MS/TP • 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.		
• switchable current output				
		All switchable current outputs are jointly switched to active or passive.		
number		2 or 4		
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)		
• binary output				
number		3		
optorelay		26 V/100 mA		
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		
inputs				
		The inputs are galvanically isolated from the transmitter.		
• temperature input				
number		2 (1 measuring channel), 4 (2 measuring channels)		
type		Pt100/Pt1000		
connection		4-wire		
range	°C	-150...+560		
resolution	K	0.01		
accuracy		±0.01 % MV ±0.03 K		

[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

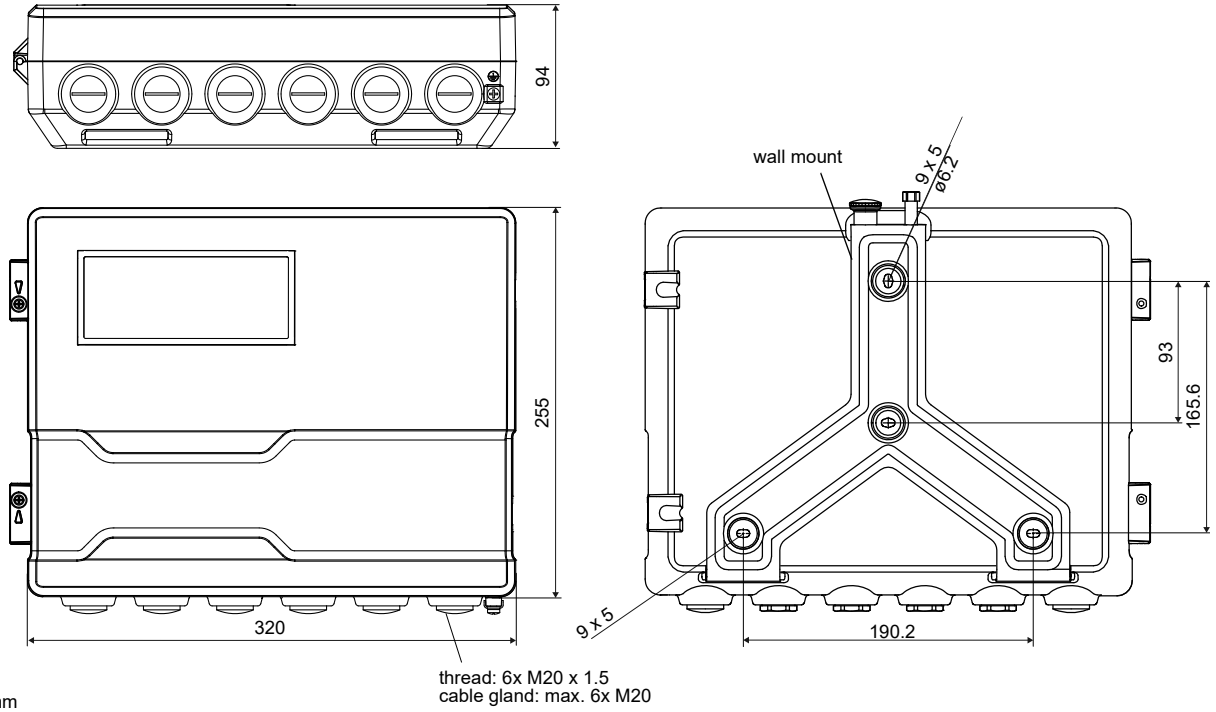
[3] outside the explosive atmosphere (housing cover open)

Max. permissible error of the calculator



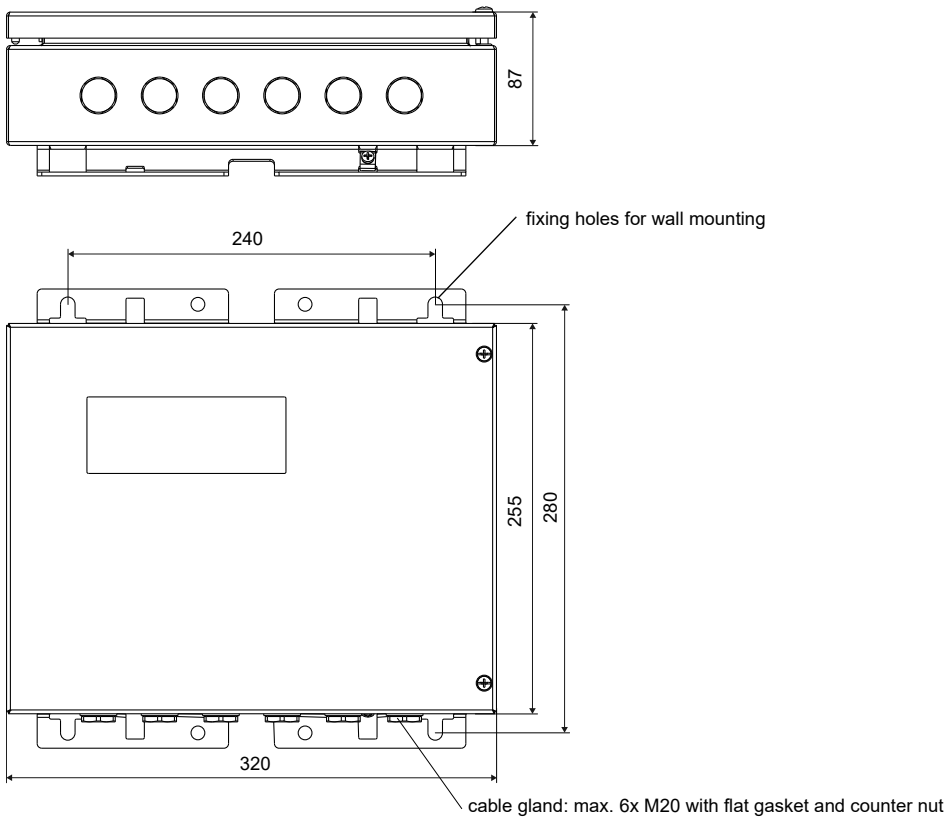
Dimensions

72-****A**



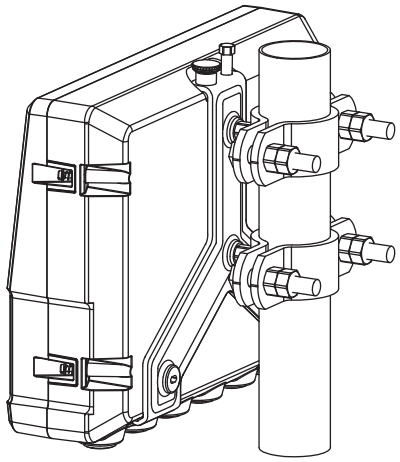
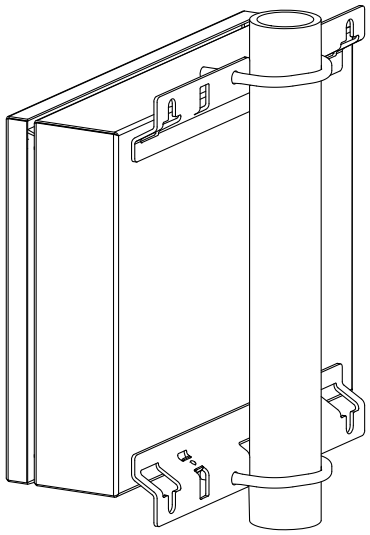
in mm

72-****S**

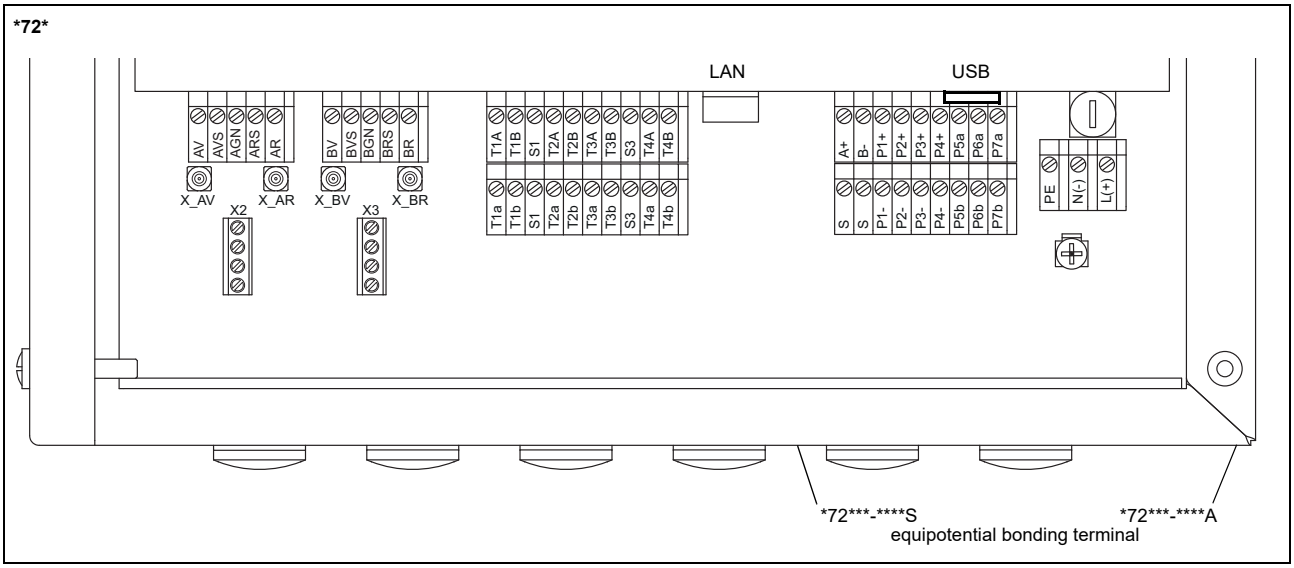


in mm

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

extension cable					transducer cable		
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]

terminal	**connection**
P1+...P4+ P1-...P4-	current output
P5a...P7a P5b...P7b	binary 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) • Modbus TCP • BACnet IP

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

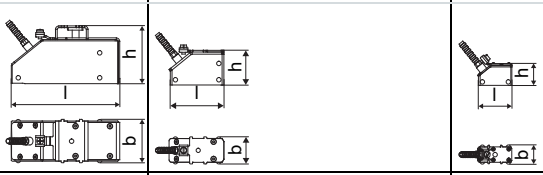
[1] cable (by customer):
- e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm^2
- outer diameter of the cable (*72***-****S with ferrite nut): max. 7.6 mm

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

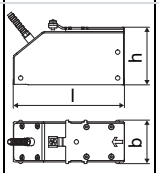
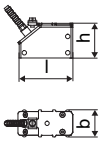
Transducers

Technical data

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

order code		FSK-N**TS/**	FSM-N**TS/**	FSP-N**TS/**	FSQ-N**TS/**
technical type		C(DL)K1N52	C(DL)M2N52	C(DL)P2N52	C(DL)Q2N52
transducer frequency	MHz	0.5	1	2	4
nominal size					
min.		DN 300	DN 200	DN 100	DN 25
max.		DN 1000	DN 600	DN 400	DN 150
material					
housing		PEEK with stainless steel cover 304 (1.4301)			
contact surface		PEEK			
degree of protection		IP67			
transducer cable					
type		1699			
length	m	5	4		3
length (***-*****/LC)	m	9			
dimensions					
length l	mm	126.5	64		40
width b	mm	51	32		22
height h	mm	67.5	40.5		25.5
dimensional drawing					
weight (without cable)	kg	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**					
pipe surface temperature (Ex)					
• min.	°C	-55			
• max.	°C	gas: +190, dust: +180			
marking		CE 0637 Ex 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**					
pipe surface temperature (Ex)					
• min.	°C	-40			
• max.	°C	+125	+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			

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

order code		FSK-ENNTS/**	FSM-E**TS/**	FSP-E**TS/**	FSQ-E**TS/**
technical type		C(DL)K1E52	C(DL)M2E52	C(DL)P2E52	C(DL)Q2E52
transducer frequency	MHz	0.5	1	2	4
inner pipe diameter d					
min.		DN 300	DN 200	DN 100	DN 25
max.		DN 1000	DN 600	DN 400	DN 150
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
material					
housing		PPSU with stainless steel cover 304 (1.4301)	PI with stainless steel cover 304 (1.4301)		
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			
explosion protection					
• ATEX/IECEx					
order code		-	FSM-EA2TS/**	FSP-EA2TS/**	FSQ-EA2TS/**
pipe surface temperature (Ex)					
• min.	°C	-	-45		
• max.	°C	-	gas: +235[1], dust: +225[1]		
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)					
• min.	°C	-	-40		
• max.	°C	-	+235[1]		
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		

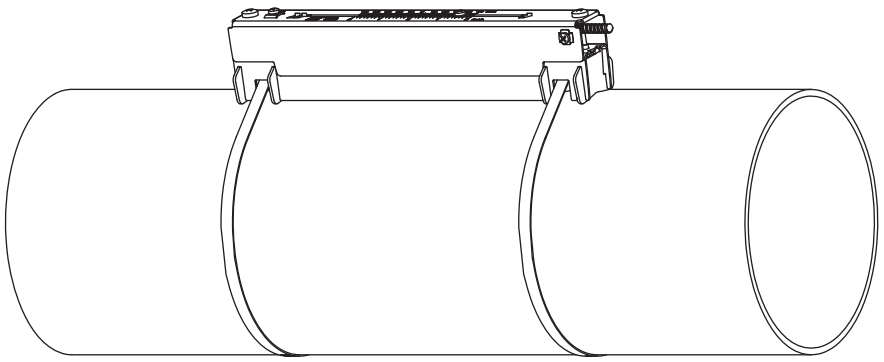
[1] > +200 °C:
Variofix C without cover or Variofix L
observe the insulation instruction
Ex: ambient temperature max. +40 °C

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

[3] pipe surface temperature max. +200 °C

Transducer mounting fixture

Variofix L (VLK, VLM, VLQ)



material: stainless steel 304 (1.4301), 301 (1.4310), 410 (1.4006)
inner length:
VLK: 348 mm
VLM: 234 mm
VLQ: 176 mm

dimensions:
VLK: 423 x 90 x 93 mm
VLM: 309 x 57 x 63 mm
VLQ: 247 x 43 x 47 mm

Coupling materials for transducers

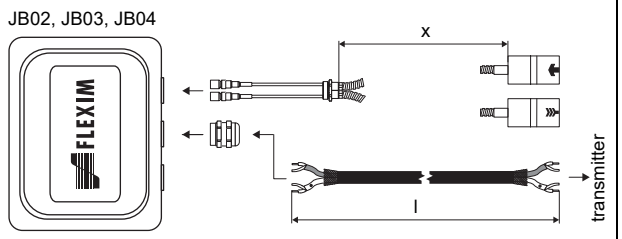
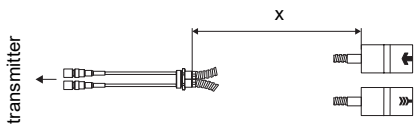
	< 100 °C	< 170 °C	200...240 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling foil type TF
long time measure-ment	coupling foil type VT	coupling foil type VT	coupling foil type TF

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 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
		*****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
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	l	x	l	x	l	x	l
*D***5*	m	5	≤ 300	4	≤ 300	3	≤ 90	2	≤ 40
option LC: *L***5*	m	9	≤ 300	9	≤ 300	9	≤ 90	-	≤ 40

x - transducer cable length

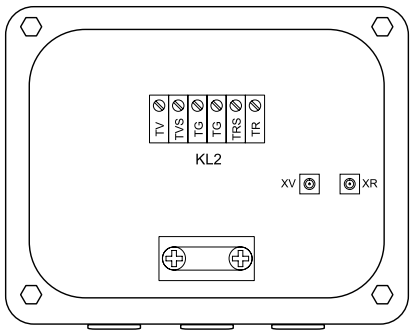
l - max. length of extension cable (depending on the application)

Junction box

Technical data

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

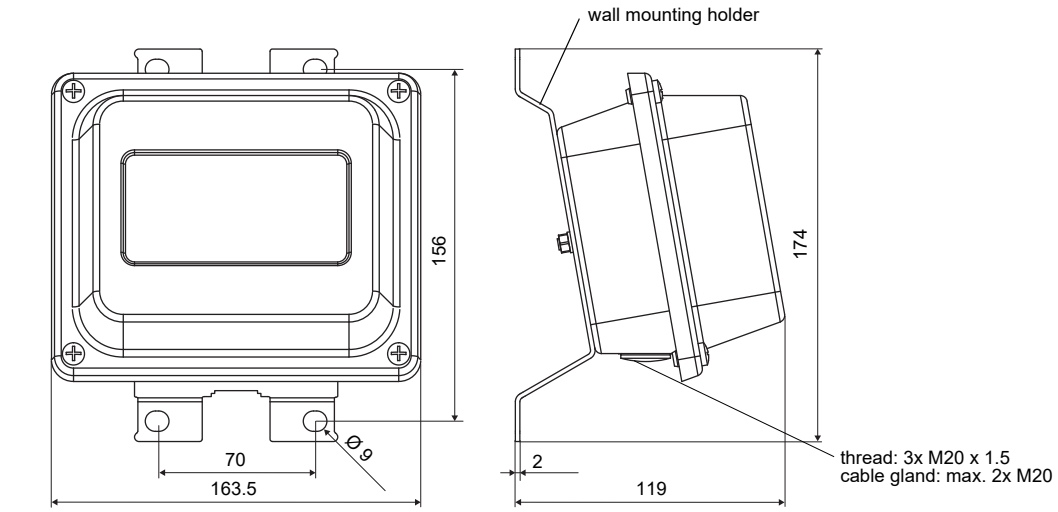
	terminal	connection	transducer
	XV	SMB connector	
	XR	SMB connector	

Extension cable

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

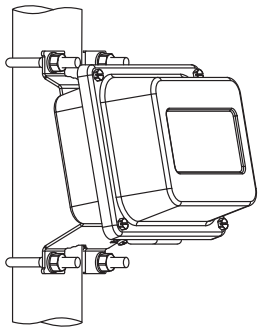
Dimensions

JB0*, JBP*



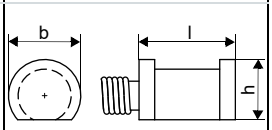
in mm

2" pipe mounting kit

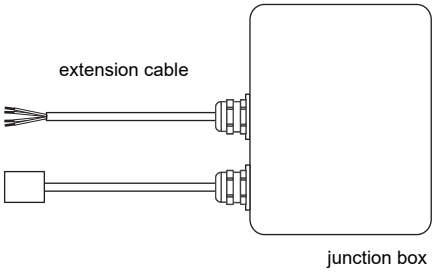
JB** 	order code: ACC-PE-GNNN-/JBPMK4

Clamp-on temperature probe (optional)

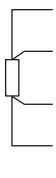
Technical data

PT12N		
order code		• ACC-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

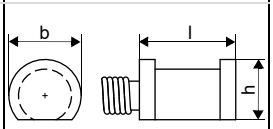
connection with extension cable	direct connection
	

Connection

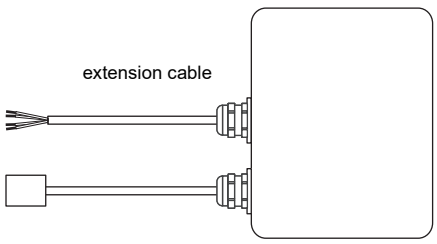
	temperature probe
	red
	red/blue
	white/blue
	white

Cable

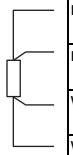
		temperature probe	extension cable
type		4 x 0.22 mm²	LIYCY 8 x 0.14 mm²
standard length	m	3	5/10/25
max. length	m	-	200
ambient temperature	°C	-30...+250	-25...+80
min. bend radius	mm	27	68
cable jacket			
material		PFA	PVC
outer diameter	mm	3.8 ±0.15	4.8 ±2
colour		black	grey

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

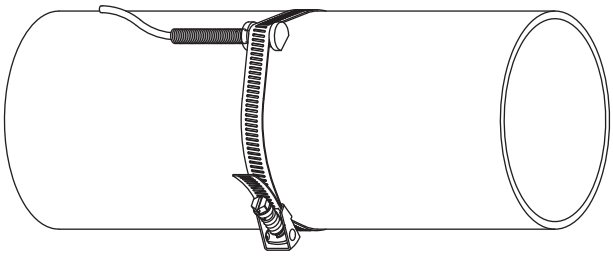
	temperature probe
	red
	red/blue
	white
	white/blue

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

Fixation

tension strap PT12N

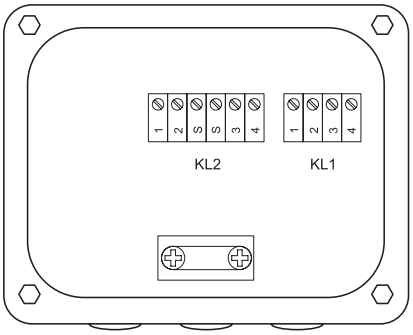


material: stainless steel 301 (1.4310), 410 (1.4006)
thermal insulation necessary

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

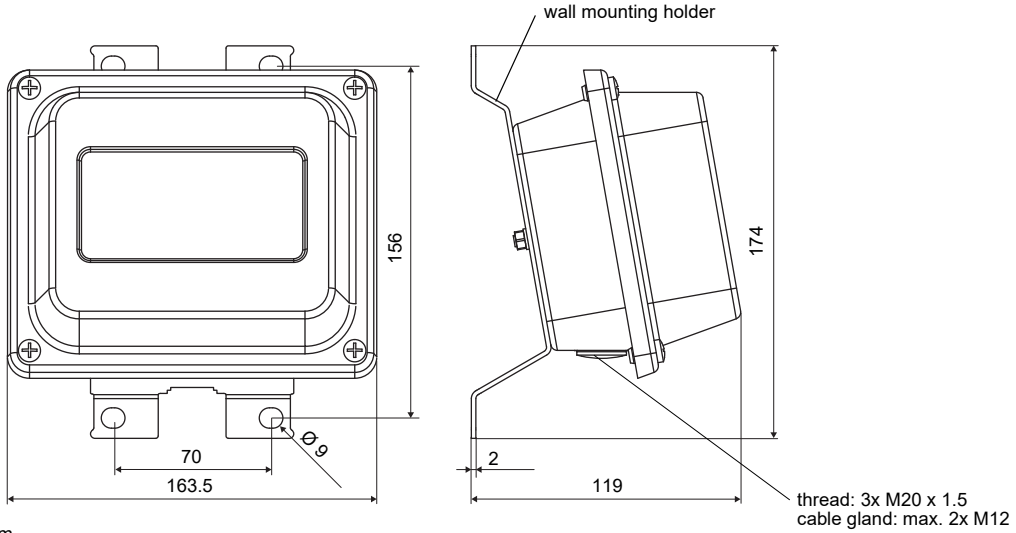
terminal strip	terminal	connection
KL1	1	red
	2	red/blue
	3	white
	4	white/blue

Extension cable

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

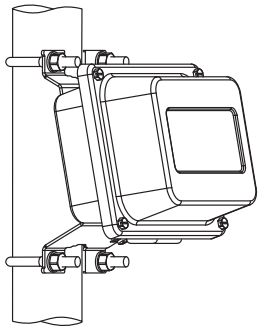
Dimensions

JBT*



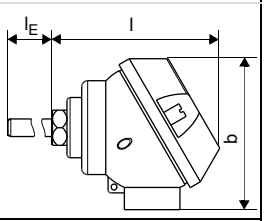
in mm

2" pipe mounting kit

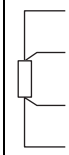
JB** 	order code: ACC-PE-GNNN-/JBPMK4

Inline temperature probe (optional)

Technical data

PT12N-IT-P **PT12N-IU-P**		
order code		**PT12N-IT-P**: • ACC-PE-GNNN-/T718 (matched, without cable) • ACC-PE-GNNN-/T716 (matched, 10 m) • ACC-PE-GNNN-/T717 (matched, 20 m) **PT12N-IU-P**: • ACC-PE-GNNN-/T818 (matched, without cable) • ACC-PE-GNNN-/T816 (matched, 10 m) • ACC-PE-GNNN-/T817 (matched, 20 m)
type		2x Pt100 matched according to EN 1434
connection		4-wire
measuring range	°C	-30...+200
accuracy θ		±(0.15 °C + 2 · 10^{-3} · |T [°C]|) class A
max. permissible relative error	%	E_t = ±0.9 · (0.5 + 3 · $\Delta\theta_{min}/\Delta\theta$)
response time	s	T50: 5, T90: 19
housing		316Ti (1.4571) connecting head J: aluminum
degree of protection		IP65
dimensions		
length l	mm	72 PT12N-IT-P: l_E = 140 PT12N-IU-P: l_E = 230
width b	mm	51
dimensional drawing		
weight	kg	PT12N-IT-P: 0.136 PT12N-IU-P: 0.142

connection

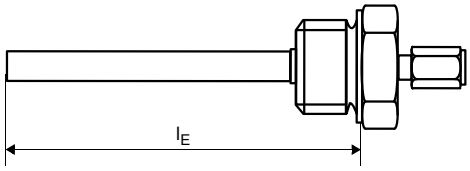
	temperature probe	cable
	red	red
	red	grey
	white	blue
	white	white

cable

		temperature probe
type		LIYCY 8 x 0.14 mm² grey
standard length	m	10/20
max. length	m	200
cable jacket		PVC

Fixation

threaded thermowell PT12N-I



		PT12N-IT-P	PT12N-IU-P
mounting length l_E	mm	120	210
material			
threaded thermowell		stainless steel 316L (1.4404)	
clamping nut		galvanised steel 1.0037, PTFE	
weight	kg	0.08	0.091
outer diameter	mm	8	
process connection		G 1/2“	
fluid pressure		PN25 (water)	
max. flow velocity[1]			
water, thermal oil	m/s	6.93	4.37
glycol/H_2O	m/s	8.4	3.78

[1] max. permissible values for laminar flows; further influences like motors, pumps, valves which provoke turbulences, water hammers, pulsations, oscillations, etc. have to be considered by the customer

FLEXIM GmbH
Boxberger Str. 4
12681 Berlin
Germany
Tel.: +49 (30) 93 66 76 60
Fax: +49 (30) 93 66 76 80

internet: www.flexim.com
e-mail: info@flexim.com

2021-07-01, TSFLUXUS_F721TEV2-7EN_Leu