

Ultrasonic flowmeters for liquids for permanent installation in hazardous areas

Especially designed for the stationary use in explosive atmosphere

Features

- Precise bidirectional and highly dynamic flow measurement with the non-invasive clamp-on technology
- High precision at fast and slow flow rates, high temperature and zero point stability
- All stainless steel and seawater resistant FLUXUS F801 is ATEX/IECEX certified and thus suited for offshore applications
- Automatic loading of calibration data and transducer detection for a fast and easy set-up (less than 5 min), providing precise and long-term stable results
- User-friendly design
- Transducers available for a wide range of inner pipe diameters and fluid temperatures (-200...+600 °C)
- ATEX, IECEx approved transducers for hazardous areas available
- HybridTrek automatically switches between transit time and NoiseTrek mode of measurement when high particulate flows are encountered
- Measurement is unaffected by fluid density, viscosity and solid content (max. 10 % of volume)

Applications

- Chemical industry
- Petrochemical industry
- Oil extraction and exploration
- Natural gas extraction and processing
- Refineries



FLUXUS F801



Variofix C

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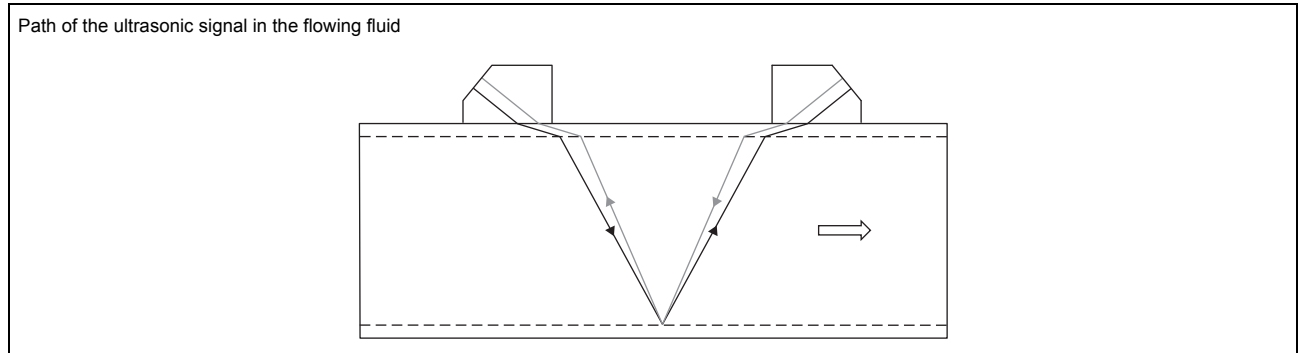
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Function

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.

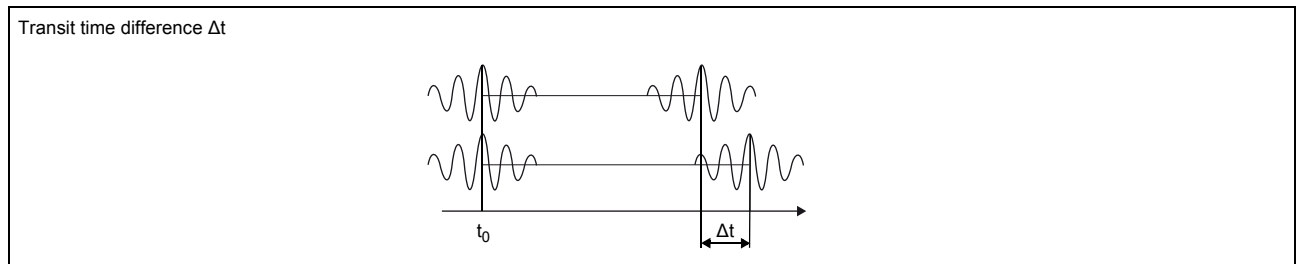


Transit time difference principle

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 can switch automatically between transit time and NoiseTrek mode without any changes to the measurement 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**

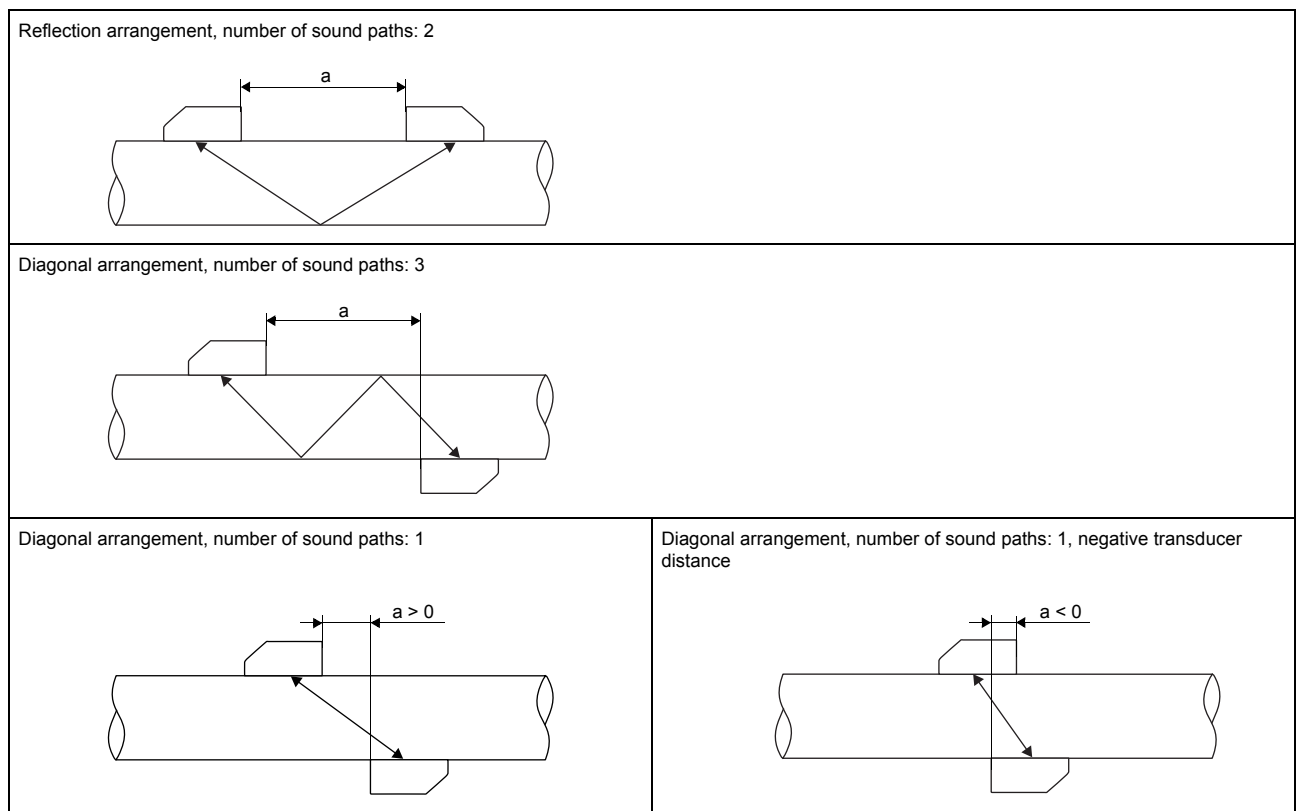
The number of sound paths is even. The transducers are mounted on the same side of the pipe. Correct positioning of the transducers is easier.

- **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.

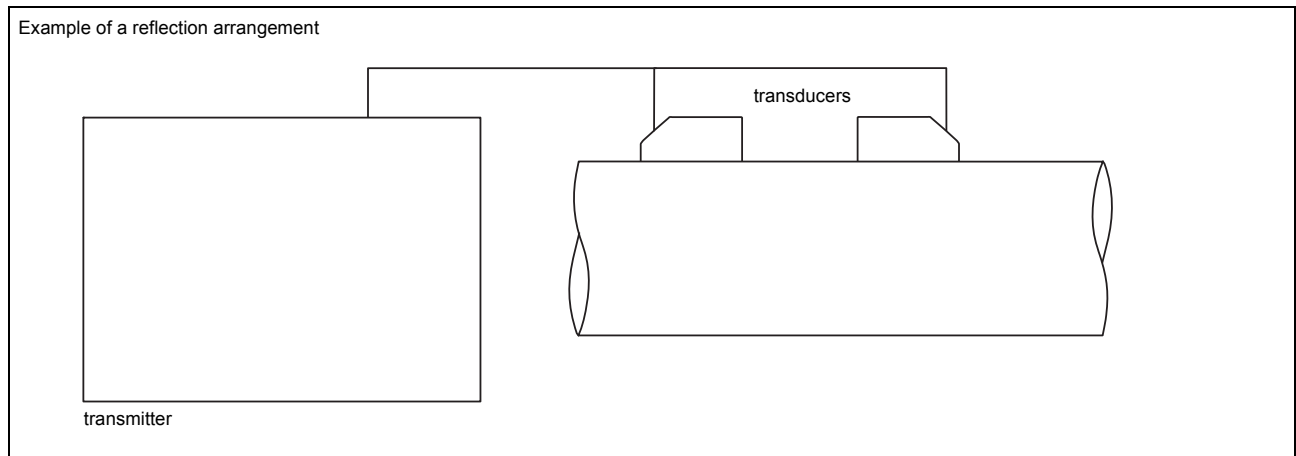
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the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

Typical measurement setup



Transmitter

Technical data

		FLUXUS F801**-A1	FLUXUS F801C24
order code		F801**-A10****-A F801**-A10****-P	F801**-A10****-FF F801**-A1B
			
design		explosion proof offshore device	
supported transducer frequencies		K, M, P, Q on request: G	
measurement			
measurement principle		transit time difference correlation principle, automatic NoiseTrek selection for measurements with high gaseous or solid content	
flow velocity	m/s	0.01...25	
repeatability		0.15 % of reading ±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 measuring system ¹		±0.3 % of reading ±0.005 m/s	
measurement uncertainty at the measuring point ²		±1 % of reading ±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 • on request: 11...16 V DC 	• 24 V DC ±10 %
power consumption	W	< 8	< 4
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: 0.07	
housing material		stainless steel 316/316L (1.4401, 1.4404, 1.4432)	
degree of protection		IP66	
dimensions	mm	see dimensional drawing	
weight	kg	6.6	
fixation		wall mounting, 2" pipe mounting	
ambient temperature	°C	-20...+60	-20...+50
display		2 x 16 characters, dot matrix, backlight	
menu language		English, German, French, Dutch, Spanish	
explosion protection			
• ATEX/IECEX			
marking		CE 0637  II2G II2D Ex db eb IIC T6 Gb Ex tb IIIC T100 °C Db T _a -20...+60 °C	CE 0637  II2G Ex db eb [ib] IIC T4 Gb T _a -20...+50 °C
certification ATEX		IBExU05ATEX1078	
certification IECEX		IECEX IBE 12.0020	
intrinsic safety parameters		-	U _m = 250 V AC intrinsically safe outputs: U _i = 28.2 V P _i = 0.76 W L _i , C _i negligible

¹ with aperture calibration of the transducers

² for transit time difference principle and reference conditions

³ connection of the interface RS232 outside of explosive atmosphere (housing cover open)

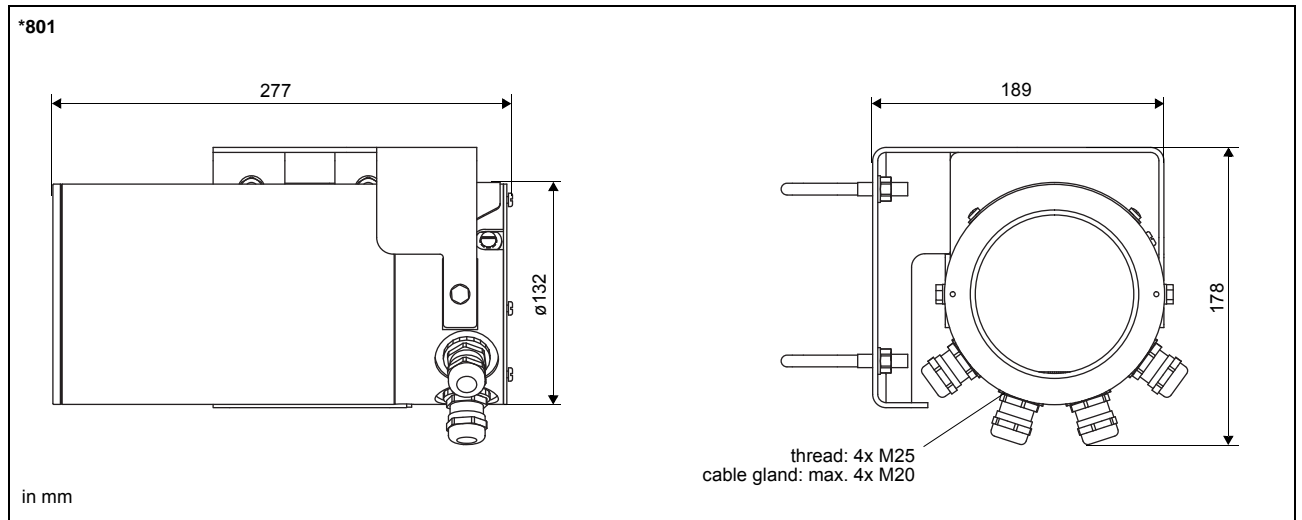
		FLUXUS F801**-A1	FLUXUS F801C24
measuring functions			
physical quantities		volumetric flow rate, mass flow rate, flow velocity	
totalizer		volume, mass	
calculation functions		average, difference, sum (2 measuring channels necessary)	
diagnostic functions		sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times	
communication interfaces			
service interfaces		<ul style="list-style-type: none"> • RS232³ • USB (with adapter)³ 	
process interfaces		max. 1 option: <ul style="list-style-type: none"> • RS485 (ASCII sender) • Modbus RTU • HART 	-
accessories			
serial data kit		RS232 RS232 - USB	
<ul style="list-style-type: none"> • cable • adapter 			
software		<ul style="list-style-type: none"> • FluxDiagReader: download of measured values and parameters, graphical presentation • FluxDiag (optional): download of measurement data, graphical presentation, report generation • FluxSubstanceLoader: upload of fluid data sets 	
data logger			
loggable values		all physical quantities, totaled values and diagnostic values	
capacity		> 100 000 measured values	
outputs			
		The outputs are galvanically isolated from the transmitter.	
number		<ul style="list-style-type: none"> • current output: 1...2 • binary output (open collector): 1...2 or <ul style="list-style-type: none"> • current output: 1...2 • binary output (open collector): 1 • binary output (Reed relay): 1 	<ul style="list-style-type: none"> • frequency output: 1 • binary output (open collector): 1
			<ul style="list-style-type: none"> • current output: 1 • binary output (open collector): 1
• current output			
range	mA	0/4...20	4...20
accuracy		0.1 % of reading ±15 µA	0.1 % of reading ±15 µA
active output		$R_{ext} < 500 \Omega$	-
passive output		$U_{ext} = 4...26.4 \text{ V}$, depending on R_{ext} ($R_{ext} < 1 \text{ k}\Omega$ at 26.4 V)	$U_{ext} = 4...28.2 \text{ V}$, depending on R_{ext} ($R_{ext} < 1 \text{ k}\Omega$ at 28.2 V) intrinsic safety
current output in HART mode		I1	-
• range	mA	4...20	-
• active output		$U_{int} = 24 \text{ V}$	-
• passive output		$U_{ext} = 10...24 \text{ V}$	-
• frequency output			
range	kHz	-	0...5
open collector		-	30 V/100 mA $I_{off} = 0.8 \text{ mA}$ optional: 8.2 V DIN EN 60947-5-6 (NAMUR)
• binary output			
open collector		24 V/4 mA	30 V/100 mA $I_{off} = 0.8 \text{ mA}$ intrinsic safety
Reed relay		48 V/100 mA	-
binary output as alarm output			
• functions		limit, change of flow direction or error	
binary output as pulse output			
• functions		mainly for totalizing	
• pulse value	units	0.01...1000	
• pulse width	ms	1...1000	

¹ with aperture calibration of the transducers

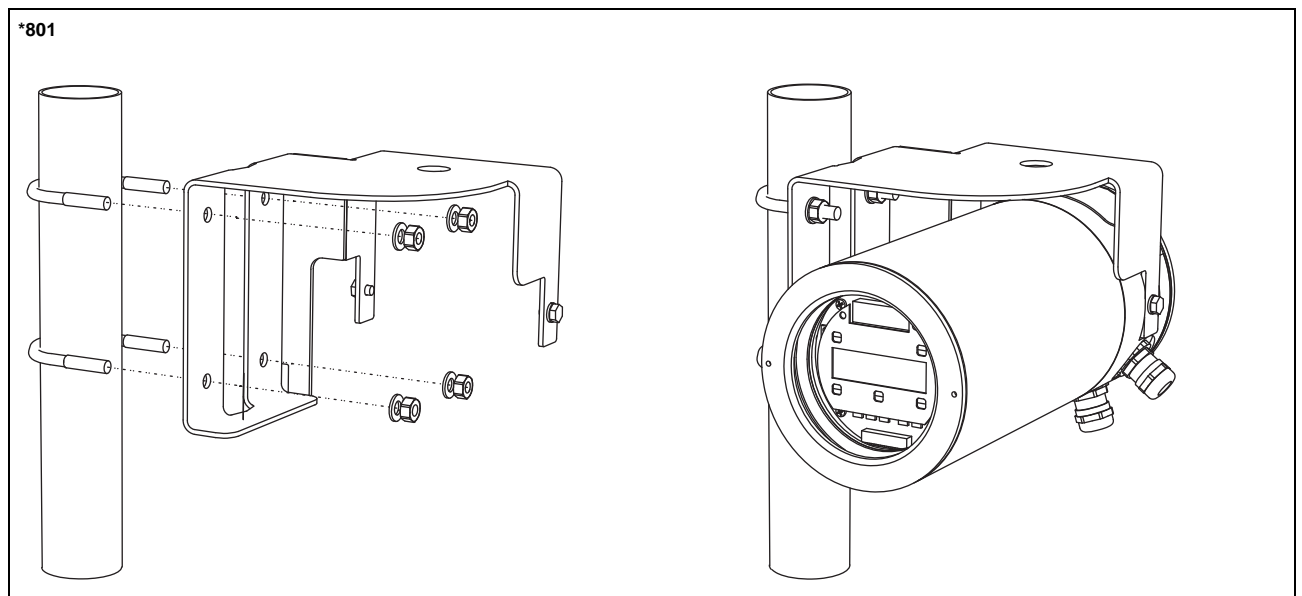
² for transit time difference principle and reference conditions

³ connection of the interface RS232 outside of explosive atmosphere (housing cover open)

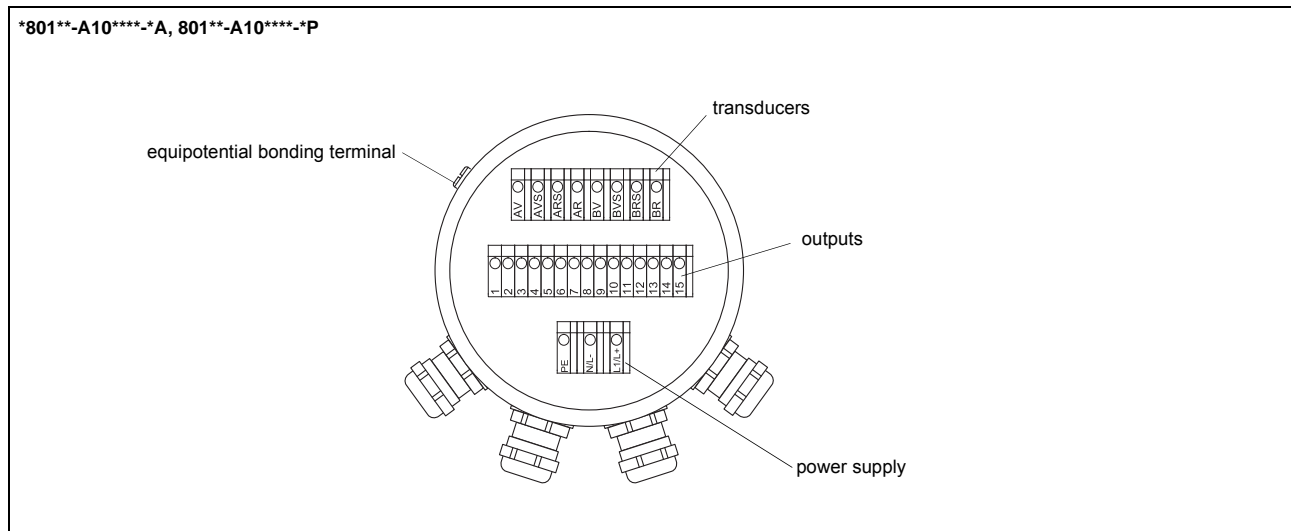
Dimensions



Wall and 2" pipe mounting kit

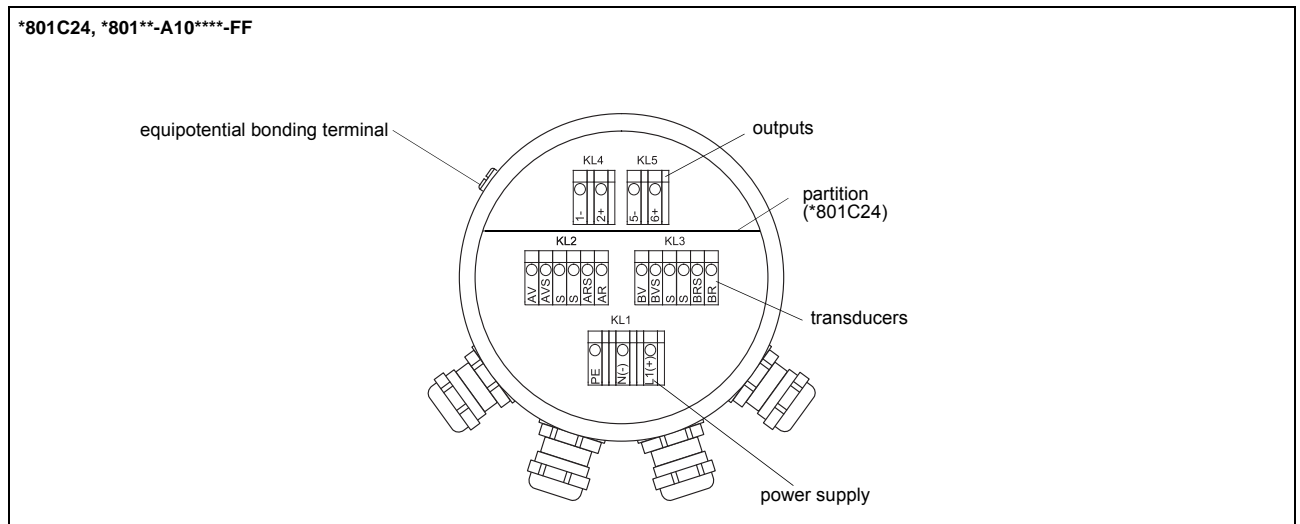


Terminal assignment



power supply ¹				
AC		DC		
terminal	connection	terminal	connection	
L1	phase	L+	+	
N	neutral	L-	-	
PE	earth	PE	earth	
transducers, extension cable				
measuring channel A		measuring channel B		transducer
terminal	connection	terminal	connection	
AV	signal	BV	signal	↑
AVS	internal shield	BVS	internal shield	
ARS	internal shield	BRS	internal shield	⌋
AR	signal	BR	signal	
cable gland	external shield	cable gland	external shield	↑ ⌋
outputs ¹				
*801**-A10****-A		*801**-A10****-P		
terminal	connection	terminal	connection	
1(-), 2(+)	active current output I1	1(+), 2(-)	passive current output I1	
3(-), 4(+)	active current output I2 (optional)	3(+), 4(-)	passive current output I2 (optional)	
5(-), 6(+)	binary output B1 (open collector)			
7(-), 8(+)	binary output B2 (open collector, optional)			
9(a), 10(b)	binary output B1 (open collector, Reed relay, optional)			
11(a), 12(b)	binary output B2 (open collector, Reed relay, optional)			
13(B-), 14(A+), 15 (shield)	communication interface			

¹ cable (by customer): e.g. flexible leads, with insulated wire end ferrules, lead cross sectional area: 0.25...2.5 mm²

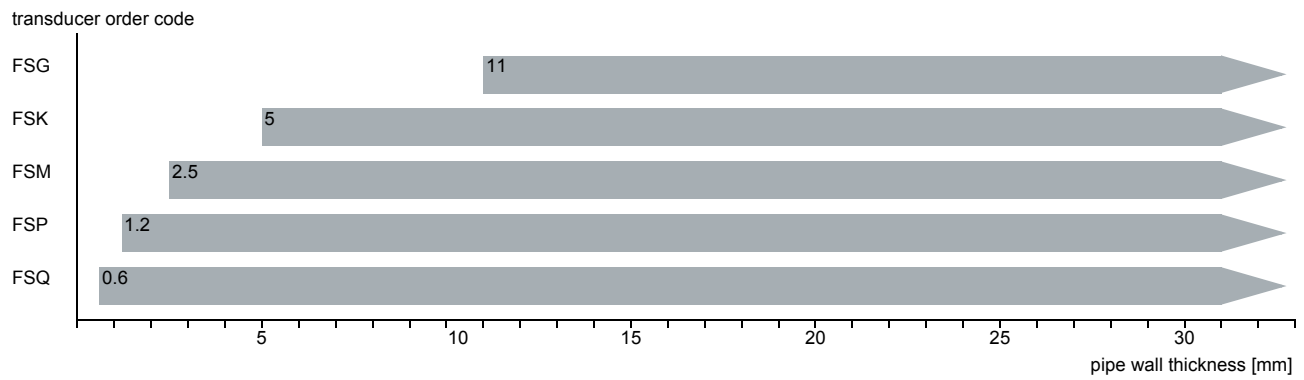
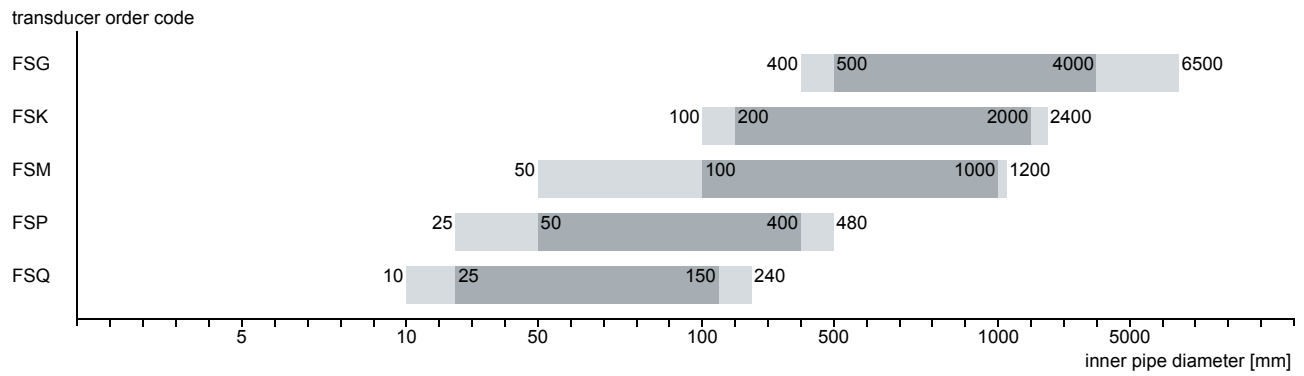


power supply ¹				
AC		DC		
*801**-A10****-FF		*801C24, *801**-A10****-FF		
terminal	connection	terminal	connection	
L1	phase	L+	+	
N	neutral	L-	-	
PE	earth	PE	earth	
transducers, extension cable				
measuring channel A		measuring channel B		transducer
terminal	connection	terminal	connection	
AV	signal	BV	signal	↑
AVS	internal shield	BVS	internal shield	
ARS	internal shield	BRS	internal shield	⤴
AR	signal	BR	signal	
S	not connected	S	not connected	
cable gland	external shield	cable gland	external shield	↑ ⤴
outputs ¹				
	*801C24		*801**-A10****-FF	
colour of terminals	blue (intrinsic safety)		green	
terminal	connection			
1(-), 2(+)	current output I1		frequency output F1	
5(-), 6(+)	binary output B1		binary output B1	

¹ cable (by customer): e.g. flexible leads, with insulated wire end ferrules, lead cross sectional area: 0.25...2.5 mm²

Transducers

Transducer selection



recommended
 possible

Transducer order code

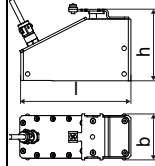
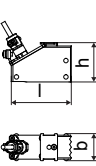
1, 2	3	4	5, 6	7, 8	9...11	no. of character				
transducer	transducer frequency	-	ambient temperature	explosion protection	connection system	-	extension cable	/	option	description
FS										set of ultrasonic flow transducers for liquids measurement, shear wave
	G									0.2 MHz (on request)
	K									0.5 MHz
	M									1 MHz
	P									2 MHz
	Q									4 MHz
		N								normal temperature range
		E								extended temperature range
			A1							ATEX zone 1/IECEx zone 1
				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 1, TS)

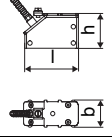
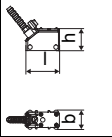

order code	FSG-N*1TS/**	FSK-N*1TS/**	FSM-N*1TS/**	FSP-N*1TS/**	FSQ-N*1TS/**
technical type	C(DL)G1N81	C(DL)K1N81	C(DL)M2N81	C(DL)P2N81	C(DL)Q2N81
transducer frequency /MHz	0.2	0.5	1	2	4
inner pipe diameter d					
min. extended	mm 400	100	50	25	10
min. recommended	mm 500	200	100	50	25
max. recommended	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 cap 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 TX Db				
certification ATEX	IBExU07ATEX1168 X				
certification IECEX	IECEX IBE 08.0007X				
remark	on request				

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		CDG1L11	CDK1L11	CDM2L11	CDP2L11
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 cap 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 -55 • max. °C +80			
marking		CE 0637 Ex II 2G II 2D Ex q IIC T6...T3 Gb Ex tb IIIC TX Db			
certification ATEX		IBExU07ATEX1168 X			
certification IECEX		IECEX IBE 08.0007X			
remark		on request			

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

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 cap 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		25.5
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 TX Db		
certification ATEX		IBExU07ATEX1168 X		
certification IECEx		IECEx IBE 08.0007X		

¹ > +200 °C:

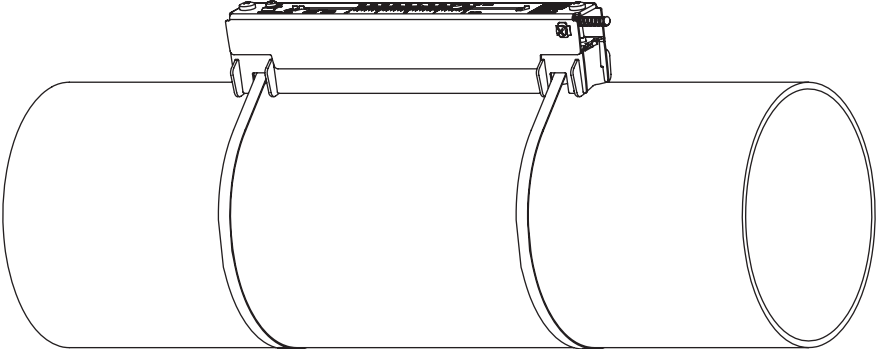
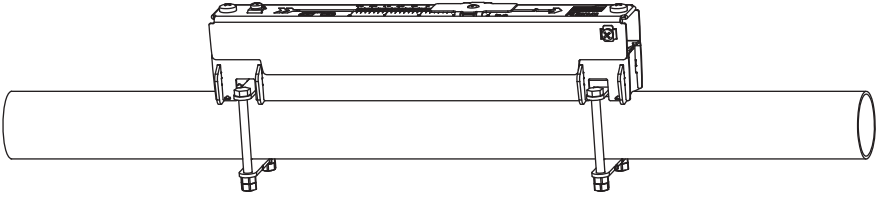
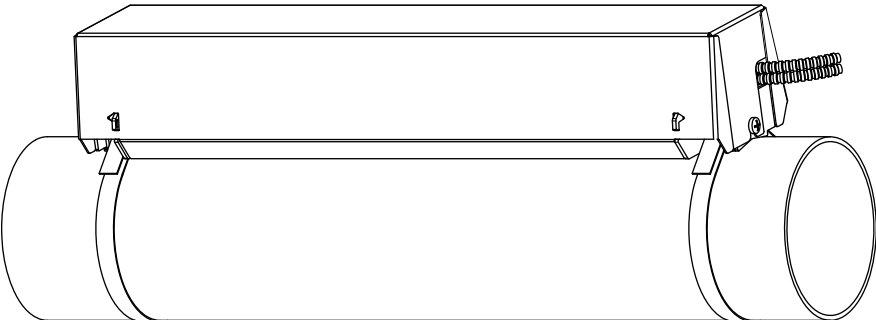
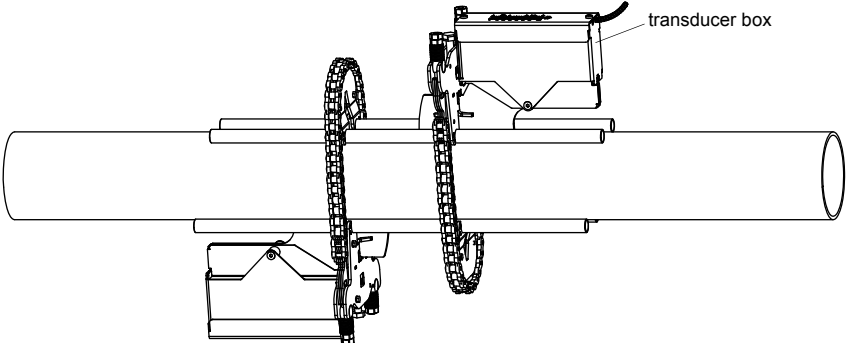
Variofix L or Variofix C
 observe the insulation instruction
 ambient temperature max. +40 °C

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
		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

<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 304 (1.4301), 301 (1.4310) option OS: 316Ti (1.4571) inner length: VCK-*L: 500 mm VCK-*S: 350 mm VCM: 400 mm VCC: 250 mm dimensions: VCK-*L: 560 x 122 x 102 mm, option IP68: 560 x 126 x 120 mm VCK-*S: 410 x 122 x 102 mm, option IP68: 410 x 126 x 120 mm VCM: 460 x 96 x 80 mm VCC: 310 x 85 x 62 mm</p>
<p>transducer box WI for Wavelnjector</p>  <p style="text-align: right;">transducer box</p>	<p>see Technical specification TSWavelnjectorVx-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 ¹	coupling foil type VT ²	coupling foil type VT ¹	coupling foil type VT ²	coupling foil type TF	coupling foil type A and coupling foil type VT	coupling foil type B and coupling foil type VT

¹ < 5 years

² < 6 months

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
		****G*
		****LI*

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	
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	12	12	
thickness	mm	2	2	
colour		black	black	
shield		x	x	
sheath				
material		-	steel wire braid with copolymer sheath	
outer diameter	mm	-	15.1	

Cable length


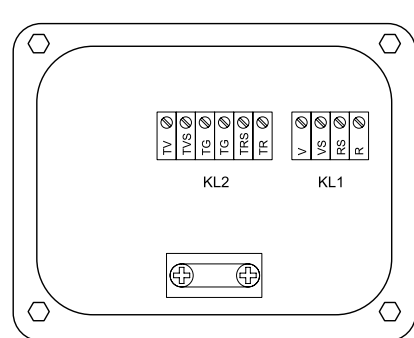
transducer frequency		F, G, H, K		M, P		Q		S	
connection system TS									
transducers									
technical type		x	l	x	l	x	l	x	l
*(DR)***8*	m	5	≤ 300	4	≤ 300	3	≤ 90	-	-
option LC: *(LT)***8*	m	9	≤ 300	9	≤ 300	9	≤ 90	-	-
option IP68: ****LI*	m	12	≤ 300	12	≤ 300	-	-	-	-

x - transducer cable length

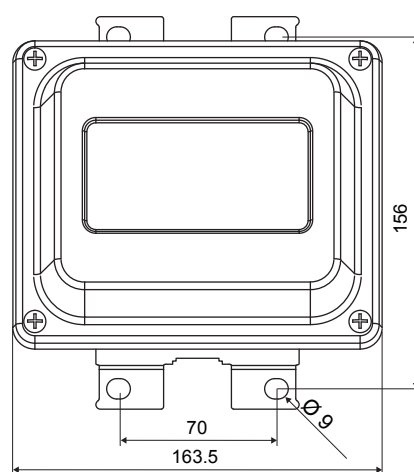
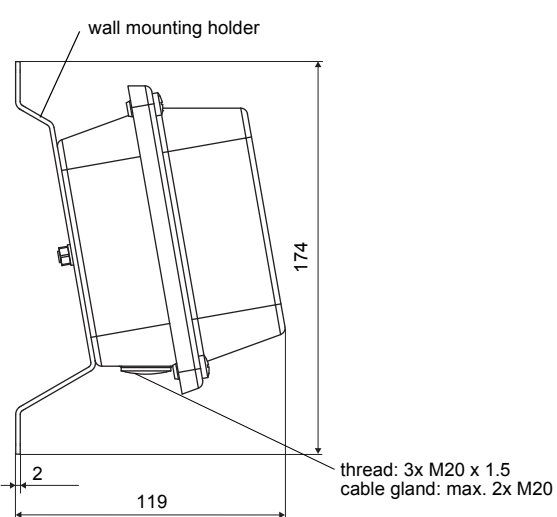
l - max. length of extension cable (depending on application)

Junction box

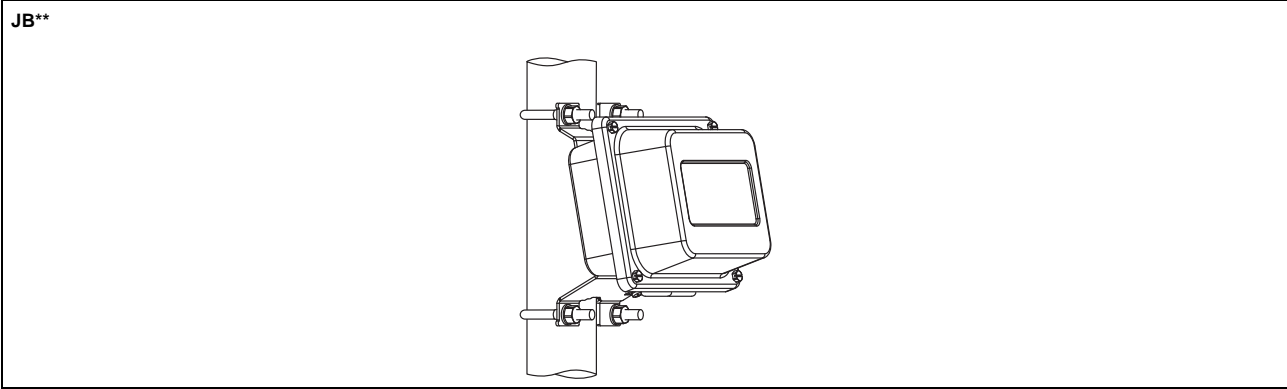
Technical data

JB01S4E3M																												
weight	kg 1.2 kg																											
fixation	wall mounting optional: 2" pipe mounting																											
material																												
housing	stainless steel 316L (1.4404)																											
gasket	silicone																											
degree of protection	IP67																											
ambient temperature																												
min.	°C -40																											
max.	°C +80																											
explosion protection																												
• ATEX/IECEX																												
marking	CE 0637  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																											
<div style="display: flex; justify-content: space-between;"> <div style="width: 30%;"> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> <th>transducer</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL1</td> <td>V</td> <td>signal</td> <td rowspan="2">↑</td> </tr> <tr> <td>VS</td> <td>internal shield</td> </tr> <tr> <td>RS</td> <td>internal shield</td> <td rowspan="2">↓</td> </tr> <tr> <td>R</td> <td>signal</td> </tr> </tbody> </table> </div> <div style="width: 30%;"> <p>Transducers</p> <table border="1"> <thead> <tr> <th>terminal strip</th> <th>terminal</th> <th>connection</th> </tr> </thead> <tbody> <tr> <td rowspan="4">KL2</td> <td>TV</td> <td>signal</td> </tr> <tr> <td>TVS</td> <td>internal shield</td> </tr> <tr> <td>TRS</td> <td>internal shield</td> </tr> <tr> <td>TR</td> <td>signal</td> </tr> </tbody> </table> </div> <div style="width: 30%;"> <p>Connection</p>  </div> </div>		terminal strip	terminal	connection	transducer	KL1	V	signal	↑	VS	internal shield	RS	internal shield	↓	R	signal	terminal strip	terminal	connection	KL2	TV	signal	TVS	internal shield	TRS	internal shield	TR	signal
terminal strip	terminal	connection	transducer																									
KL1	V	signal	↑																									
	VS	internal shield																										
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KL2	TV	signal																										
	TVS	internal shield																										
	TRS	internal shield																										
	TR	signal																										

Dimensions

JB0*, JBP*	
	
in mm	

2" pipe mounting kit



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Subject to change without notification.
Errors excepted.
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