FLEXIM

Technical specification

FLUXUS F608**-A2

Portable ultrasonic flow measurement of liquids in hazardous areas

Portable instrument for non-invasive, quick ultrasonic flow measurement with clamp-on technology for all types of piping

Features

- Precise bidirectional and highly dynamic flow measurement with the non-invasive clamp-on technology
- 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
- High precision at fast and slow flow rates, high temperature and zero point stability
- Portable, easy-to-use flow transmitter with 2 flow channels, multiple inputs/outputs, an integrated data logger with a serial interface
- Water tight; resistant against oil, many liquids and dirt
- Extremely resistant carbon fiber housing
- Robust, water-tight (IP67) transport case with comprehensive accessories
- Compact and very lightweight, allowing the measuring system to be easily carried as personal luggage, e.g. for offshore visits
- Covered by ATEX/IECEx zone 2 certification
- Li-Ion battery provides up to 25 hours of measurement operation
- User-friendly design
- QuickFix for a simple and fast transmitter fixation, e.g. on pipes
- Transducers available for a wide range of inner pipe diameters and fluid temperatures
- Rugged transducers (ATEX/IECEx zone 1 and 2, resistant to rough environments, dust and humidity)
- 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)

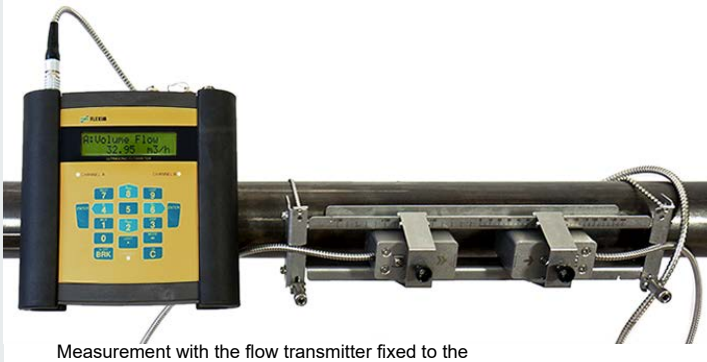
Applications

Designed for the following industries:

- Upstream (on- and offshore)
- Midstream and downstream (pipelines and refineries)
- Chemical industry
- Energy sector (e.g. HVAC, geothermal, power plants)

FLUXUS F608

Measurement with transducers mounted with the portable Variofix VP



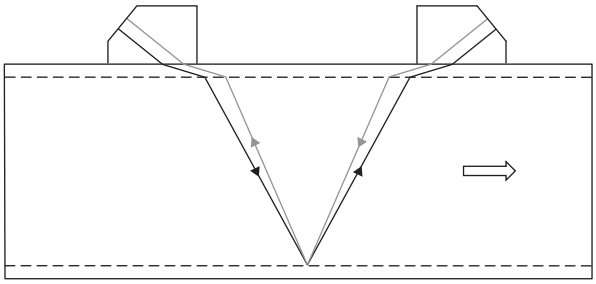
Measurement with the flow transmitter fixed to the pipe with the QuickFix pipe mounting fixture

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



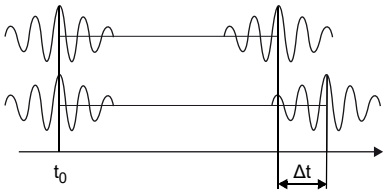
Transit time difference principle

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



HybridTrek

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

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

Calculation of volumetric flow rate

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

where

- $\dot{V}$ - volumetric flow rate
- k_{Re} - fluid mechanic calibration factor
- A - cross-sectional pipe area
- k_a - acoustic calibration factor
- Δt - transit time difference
- t_γ - average of transit times in the fluid

Number of sound paths

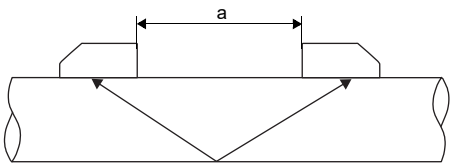
The number of sound paths is the number of transits of the ultrasonic signal through the fluid in the pipe. Depending on the number of sound paths, the following methods of installation exist:

- **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 case of high signal attenuation by the fluid or pipe, diagonal arrangement with 1 sound path is used.

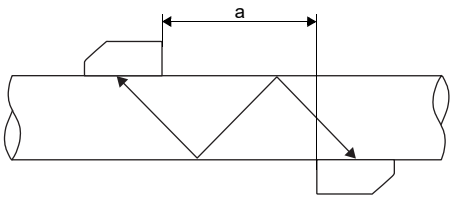
The preferred method of installation depends on the application. While increasing the number of sound paths increases the accuracy of the measurement, signal attenuation increases as well. The optimum number of sound paths for the parameters of the application will be determined automatically by the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

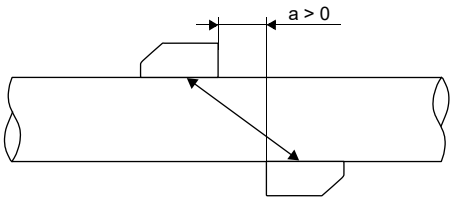
Reflection arrangement, number of sound paths: 2



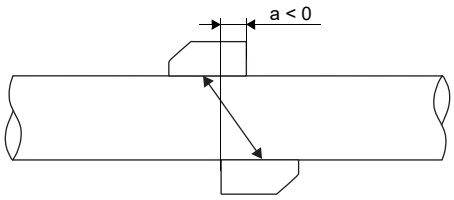
Diagonal arrangement, number of sound paths: 3



Diagonal arrangement, number of sound paths: 1



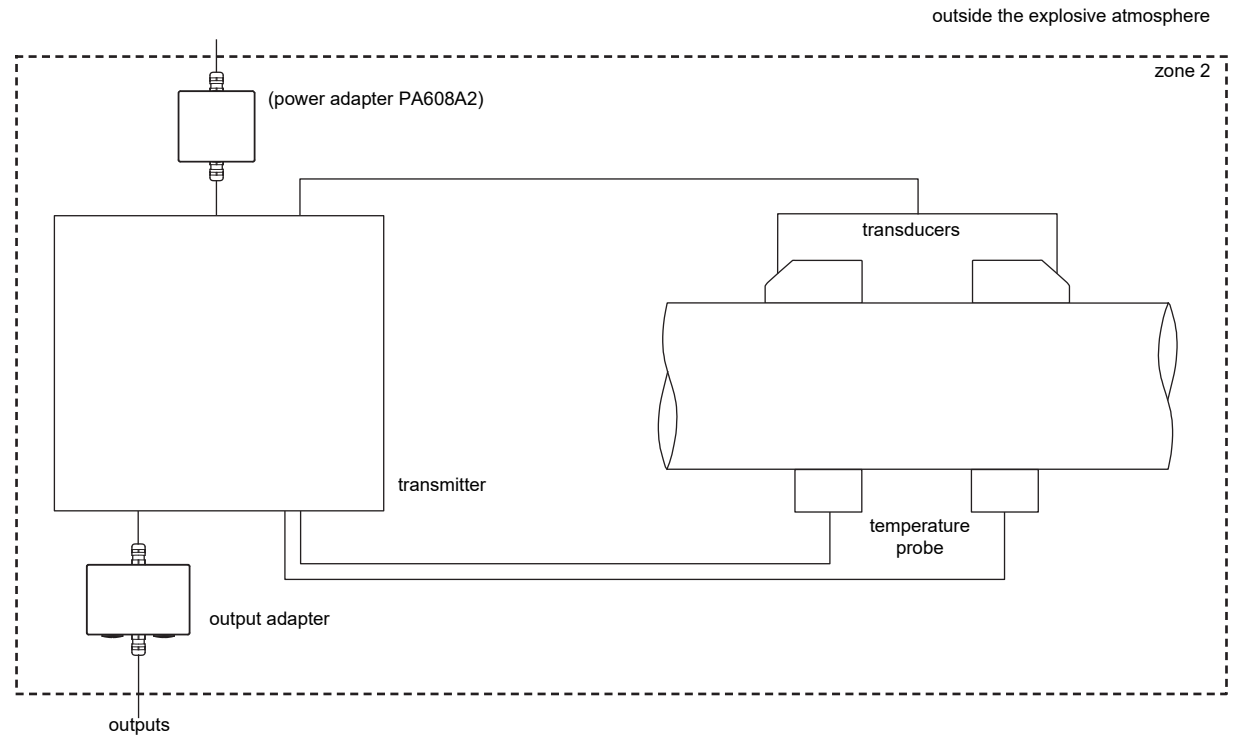
Diagonal arrangement, number of sound paths: 1, negative transducer distance



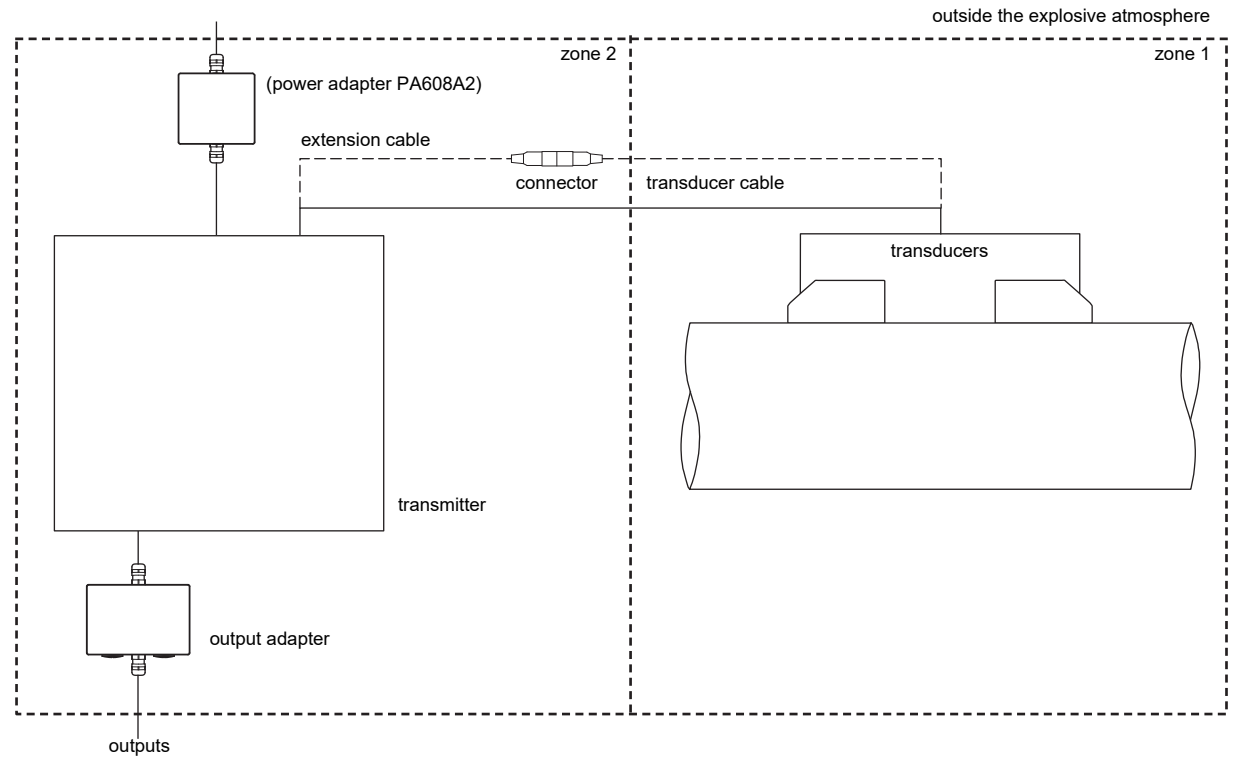
a - transducer distance

Typical measurement setup

zone 2



zone 2/1



Transmitter

Technical data

		FLUXUS F608**-A2
		
design		portable, zone 2
measurement		
measurement principle		transit time difference correlation principle, automatic NoiseTrek selection for measurements with high gaseous or solid content
flow direction		bidirectional
flow velocity	m/s	0.01...25
repeatability		0.15 % MV ±0.005 m/s
fluid		all acoustically conductive liquids with < 10 % gaseous or solid content in volume (transit time difference principle)
temperature compensation		corresponding to the recommendations in ANSI/ASME MFC-5.1-2011
measurement uncertainty (volumetric flow rate)		
measurement uncertainty of the measuring system[1]		±0.3 % MV ±0.005 m/s
measurement uncertainty at the measuring point[2]		±1 % MV ±0.005 m/s
transmitter		
power supply		• 100...230 V/50...60 Hz (power supply unit, outside the explosive atmosphere) • 10.5...15 V DC (socket at transmitter, with power adapter PA608A2 (optional) and power connection adapter PA608NN (optional)) • integrated battery
integrated battery • operating time	 h	Li-Ion, 7.2 V/6.2 Ah, max. 47 Wh > 14 (without outputs, inputs and backlight) > 25 (1 measuring channel, ambient temperature > 10 °C, without outputs, inputs and backlight)
power consumption	W	< 6 (with outputs, inputs and backlight), charging: 18
number of measuring channels		2
damping	s	0...100 (adjustable)
measuring cycle	Hz	100...1000 (1 channel)
response time	s	1 (1 channel), option: 0.07
housing material		PA, TPS, PC, Polyester, stainless steel
degree of protection		IP65
dimensions	mm	see dimensional drawing
weight	kg	2.2
fixation		QuickFix pipe mounting fixture
ambient temperature	°C	-10...+60
display		2 x 16 characters, dot matrix, backlight
menu language		English, German, French, Dutch, Spanish
explosion protection		
• ATEX/IECEx		
marking		without inputs (608-A): CE 0637 Ex II3G II2D Ex nA nC ic IIC (T6)T4 Gc Ex tb IIIC T100 °C Db T_a -10...+(50)60 °C with inputs (608-B): CE 0637 Ex II3G II2D Ex nA nC ic [ic] IIC (T6)T4 Gc Ex tb IIIC T100 °C Db T_a -10...+(50)60 °C
certification		IBExU10ATEX1067, IECEx IBE 12.0006
intrinsic safety parameters		U_m = 16 V DC intrinsically safe inputs: U_o = 22 V, I_o = 6 mA, P_o = 33 mW, C_o = 450 nF, L_o = 10 mH C_i = 1.8 nF, L_i = 10 µH
measuring functions		
physical quantities		volumetric flow rate, mass flow rate, flow velocity, thermal energy rate (if temperature inputs are installed)
totaliser		volume, mass, optional: thermal energy
calculation functions		average, difference, sum
diagnostic functions		sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times

[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

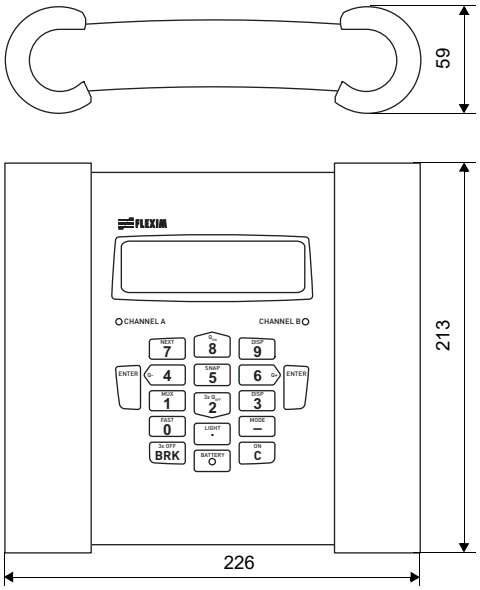
		FLUXUS F608**-A2
communication interfaces		
service interfaces		• RS232 • USB (with adapter)
accessories		
data transmission kit • cable • adapter		 RS232 RS232 - USB
software		• FluxDiagReader: reading of measured values and parameters, graphical representation • FluxDiag (optional): reading of measurement data, graphical representation, report generation
adapter		• output adapter (necessary, option) • input adapter (if number of inputs > 2)
transport case		dimensions: 500 x 400 x 190 mm
data logger		
loggable values		all physical quantities, totalised physical quantities and diagnostic values
capacity		> 100 000 measured values
outputs		
		The outputs are galvanically isolated from the transmitter.
number		analog outputs: max. 4 • 0, 2 or 4 active current outputs or passive current outputs or frequency outputs or • 2 active current outputs and 2 passive current outputs or • 2 active current outputs and 2 frequency outputs or • 2 passive current outputs and 2 frequency outputs binary outputs: max. 4
• **current output**		
range	mA	0/4...20
accuracy		0.1 % MV ±15 µA
active output		R_{ext} < 200 Ω
passive output		U_{ext} = 4...9 V, depending on R_{ext} (R_{ext} < 200 Ω at 9 V)
• **frequency output**		
range	kHz	0...5
open collector		24 V/4 mA
• **binary output**		
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	1...1000
inputs		
		The inputs are galvanically isolated from the transmitter.
number		max. 4
• **temperature input**		
		intrinsic safety
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

Dimensions

60



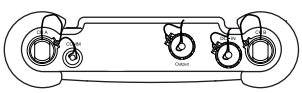
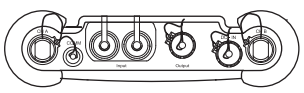
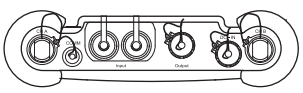
in mm

Storage

do not store outdoors

- store within the original package
- store in a dry and dust-free place
- protect against sunlight
- keep all openings closed
- storing temperature: -10...+60 °C

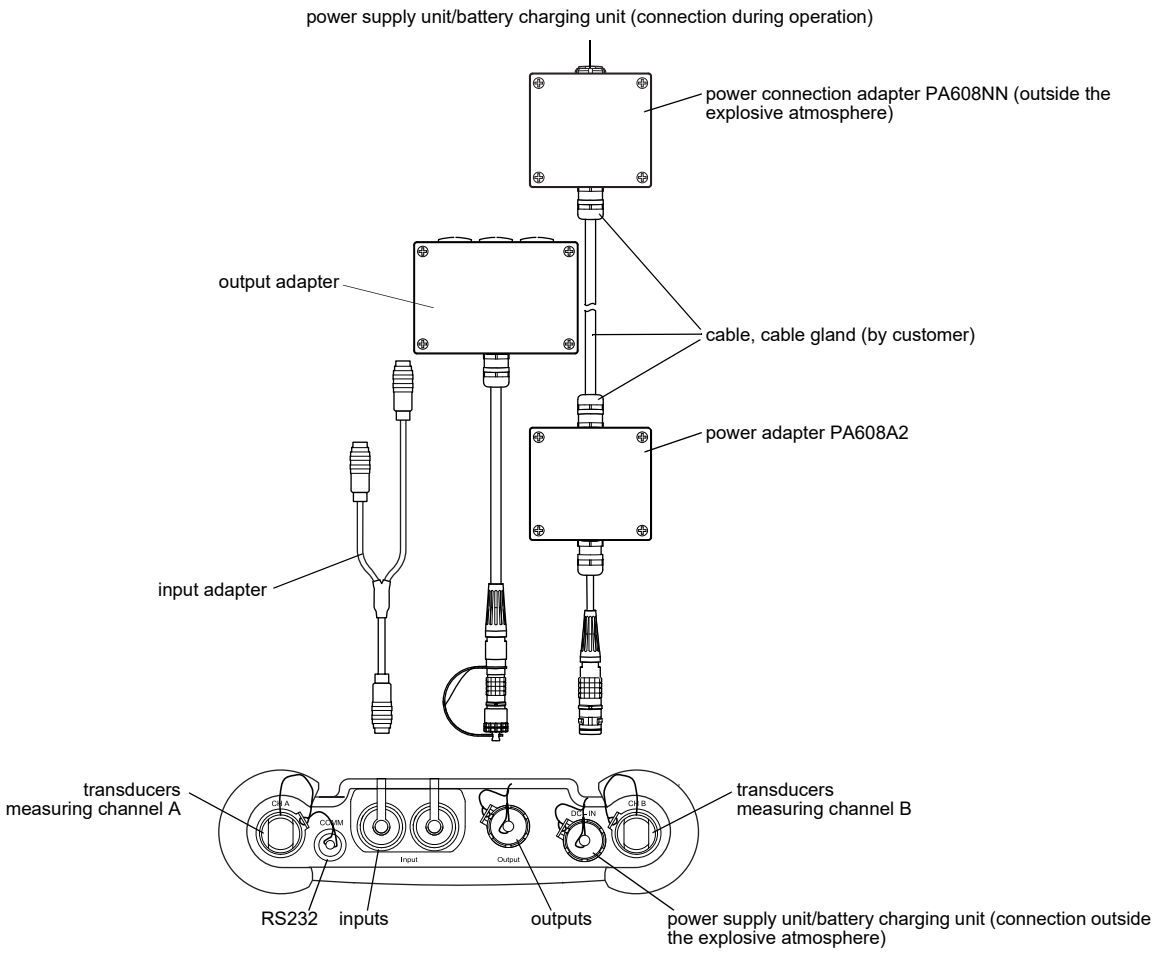
Standard scope of supply

	F608 Standard	F608 Energy	F608 Double Energy
application	flow measurement of liquids		
	2 independent measuring channels		
		temperature-compensated calculation of mass flow rate	
		integrated thermal energy computer for monitoring of energy flows	
		simultaneous monitoring of flow and energy flow	simultaneous monitoring of 2 energy flows, e.g. heating systems, heat exchangers
outputs			
passive current output	2	2	2
inputs			
temperature input	-	2	4
accessories			
transport case	x	x	x
power supply unit, mains cable	x	x	x
battery	x	x	x
power adapter PA608A2[1]	-	-	-
power connection adapter PA608NN[1]	-	-	-
output adapter[1]	-	-	-
input adapter	-	-	2
QuickFix pipe mounting fixture for transmitter	x	x	x
data transmission kit	x	x	x
measuring tape	x	x	x
operating instruction, safety instructions, Quick start guide	x	x	x
connector board at the upper side of the transmitter			

[1] to be ordered separately, if required

Adapters

***608**-A2**

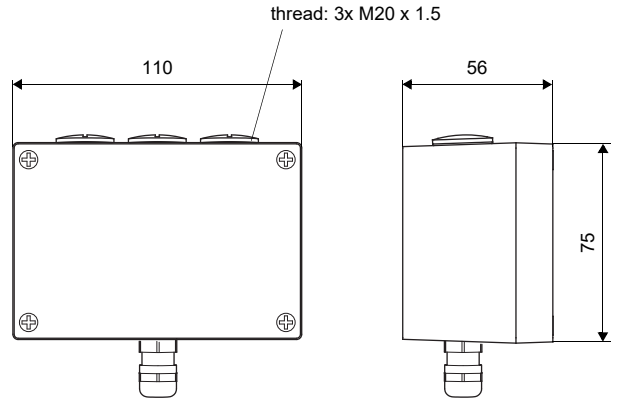


Technical data

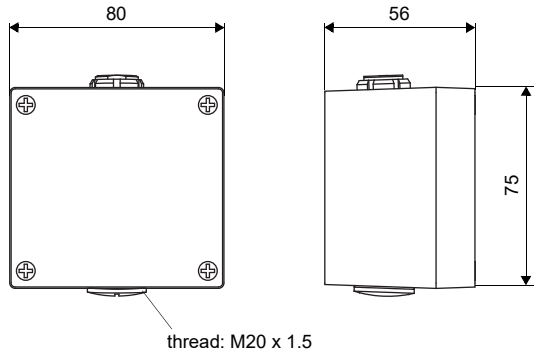
		output adapter	power adapter	power connection adapter
technical type		OA608A2	PA608A2	PA608NN
connection voltage			10.5...15 V DC	
weight	kg	0.26	0.26	0.32
material				
housing		polyester		polyester
gasket		silicone		chloroprene
degree of protection		IP66		IP65
ambient temperature				
min.	°C	-20		-10
max.	°C	+90		+60
explosion protection				
• ATEX/UKCA				
marking		CE UKCA Ex II3G Ex nA IIC T6 Gc Ta -10...+60 °C		-

Dimensions

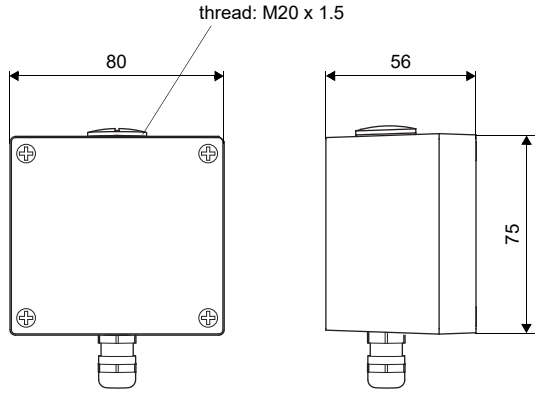
output adapter OA608A2



power connection adapter PA608NN



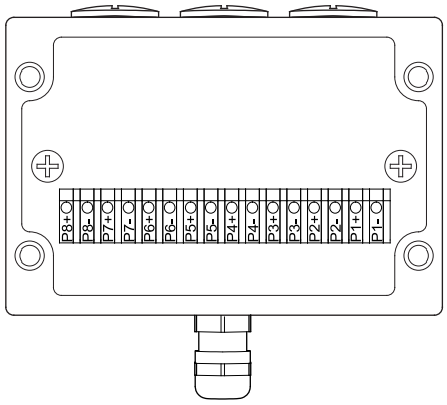
power adapter PA608A2



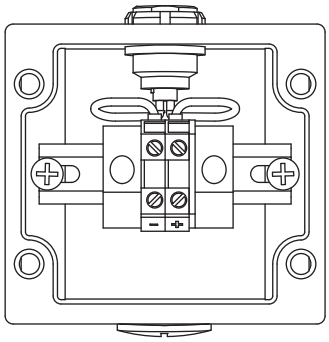
in mm

Terminal assignment

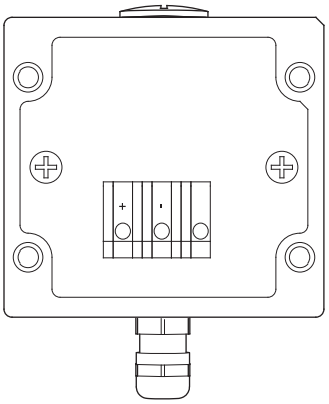
output adapter OA608A2



power connection adapter PA608NN[1]



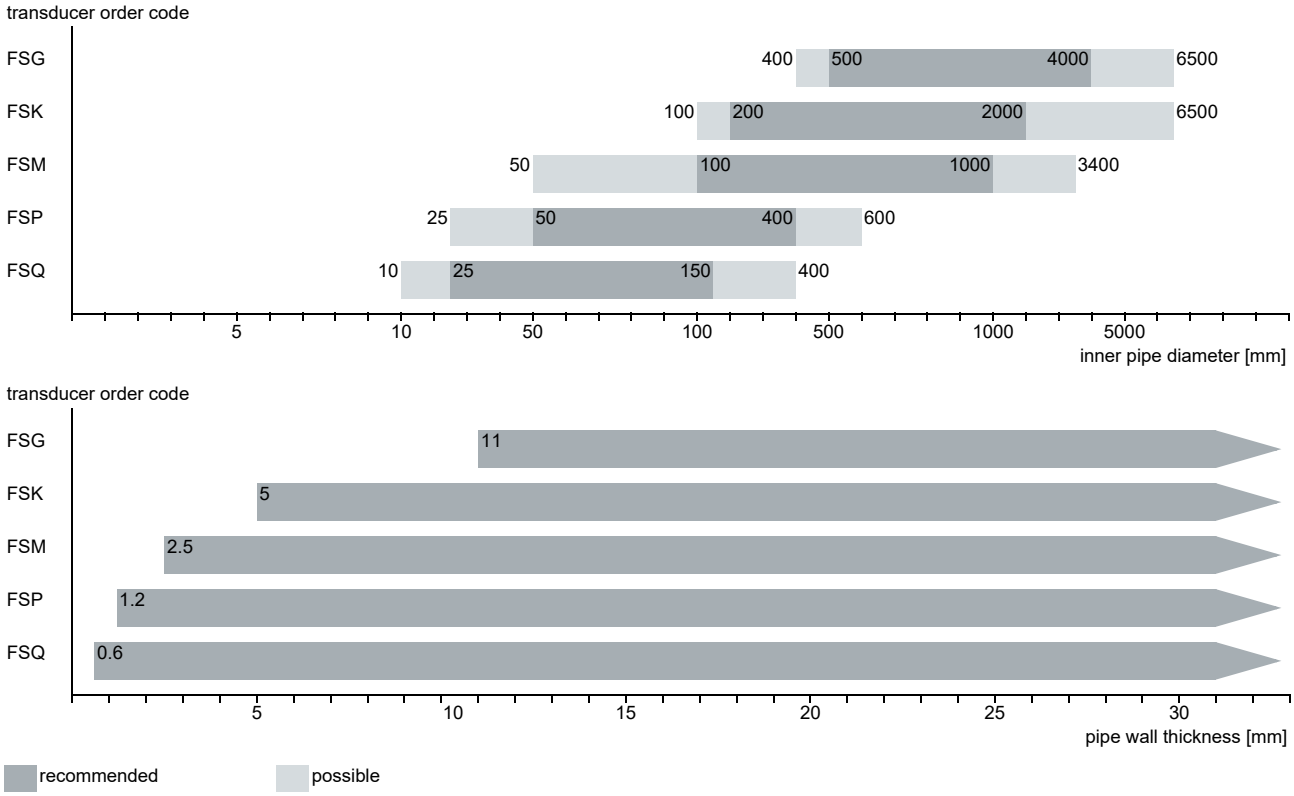
power adapter PA608A2[1]



[1] cable PA608A2 - PA608NN (by customer):
length: max. 30 m
wire cross-section: 1.5...2.5 mm^2

Transducers

Transducer selection

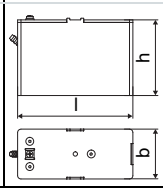
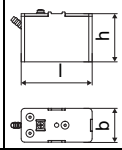
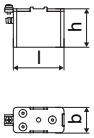


Transducer order code

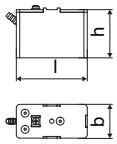
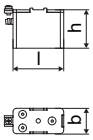
1, 2	3		4	5...7		8, 9	10, 11		12...14	no. of character
transducer	**transducer frequency**	**-**	**ambient temperature**	**explosion protection**	**-**	**certification**	**connection system**	**-**	**cable length**	**description**
FS										set of ultrasonic flow transducers for measurement of liquids, shear wave
	G									0.2 MHz
	K									0.5 MHz
	M									1 MHz
	P									2 MHz
	Q									4 MHz
			N							normal temperature range
			E							extended temperature range
				A2N						ATEX zone 2/IECEx zone 2
				A1N						ATEX zone 1/IECEx zone 1
						**				
							NL			with LEMO connector
									***	in m (connector outside of ATEX zone 1/IECEx zone 1)

Technical data

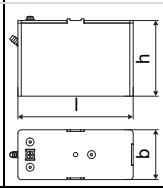
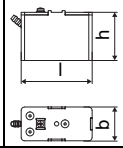
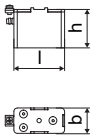
Shear wave transducers (zone 2, NL)

order code		FSG-N*2*-**NL	FSK-N*2*-**NL	FSM-N*2*-**NL	FSP-N*2*-**NL	FSQ-N*2*-**NL
technical type		C(DL)G1NH1	C(DL)K1NH1	C(DL)M2NH1	C(DL)P2NH1	C(DL)Q2NH1
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	6500	3400	600	400
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PEEK with stainless steel cover and transducer shoe 304 (1.4301)				
contact surface		PEEK				
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699				
length	m	5		4		3
dimensions						
length l	mm	136.5		84		70
width b	mm	59		40		30
height h	mm	90.5		59		47.5
dimensional drawing						
weight (without cable)	kg	1.674		0.504		0.251
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• **ATEX/IECEx**						
order code		FSG-NA2*-**NL	FSK-NA2*-**NL	FSM-NA2*-**NL	FSP-NA2*-**NL	FSQ-NA2*-**NL
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180				
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X				

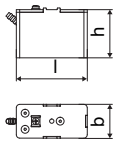
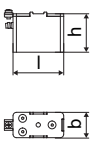
Shear wave transducers (zone 2, NL, extended temperature range)

order code		FSM-E*2*-**NL	FSP-E*2*-**NL	FSQ-E*2*-**NL
technical type		C(DL)M2EH5	C(DL)P2EH5	C(DL)Q2EH5
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	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover and transducer shoe 304 (1.4301)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	84		70
width b	mm	40		30
height h	mm	59		47.5
dimensional drawing				
weight (without cable)	kg	0.505		0.252
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
explosion protection				
• **ATEX/IECEx**				
order code		FSM-EA2*-**NL	FSP-EA2*-**NL	FSQ-EA2*-**NL
pipe surface temperature (Ex)	°C	gas: -45...+235 dust: -45...+225		
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...230 °C Db		
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X		

Shear wave transducers (zone 1, NL)

order code		FSG-N*1*-**NL	FSK-N*1*-**NL	FSM-N*1*-**NL	FSP-N*1*-**NL	FSQ-N*1*-**NL
technical type		C(DL)G1NW1	C(DL)K1NW1	C(DL)M2NW1	C(DL)P2NW1	C(DL)Q2NW1
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	6500	3400	600	400
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PEEK with stainless steel cover and transducer shoe 304 (1.4301)				
contact surface		PEEK				
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699				
length	m	5		4		3
dimensions						
length l	mm	136.5		84		70
width b	mm	59		40		30
height h	mm	90.5		59		47.5
dimensional drawing						
weight (without cable)	kg	1.674		0.504		0.251
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• **ATEX/IECEx**						
order code		FSG-NA1*-**NL	FSK-NA1*-**NL	FSM-NA1*-**NL	FSP-NA1*-**NL	FSQ-NA1*-**NL
pipe surface temperature (Ex)	°C	-55...+180				
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X				

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

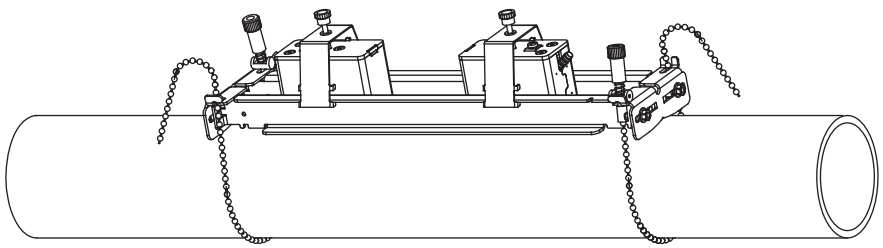
order code		FSM-E*1*-**NL	FSP-E*1*-**NL	FSQ-E*1*-**NL
technical type		C(DL)M2EW5	C(DL)P2EW5	C(DL)Q2EW5
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover and transducer shoe 304 (1.4301)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	84		70
width b	mm	40		30
height h	mm	59		47.5
dimensional drawing				
weight (without cable)	kg	0.505		0.252
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
explosion protection				
• **ATEX/IECEx**				
order code		FSM-EA1*-**NL	FSP-EA1*-**NL	FSQ-EA1*-**NL
pipe surface temperature (Ex)	°C	-45...+225		
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X		

Transducer mounting fixture

Order code

1, 2	3		4	5		6	7...10	no. of character
transducer mounting fixture	**transducer**	**-**	**measurement arrangement**	**size**	**-**	**fixation**	**outer pipe diameter**	**description**
VP								portable Variofix
	A							all transducers
			D					reflection arrangement or diagonal arrangement
			R					reflection arrangement
				M				medium
						C		chains
						N		without fixation
							0550	10...550 mm

portable Variofix VP and chains



material: stainless steel 304 (1.4301), 301 (1.4310), 303 (1.4305)
dimensions: 414 x 94 x 76 mm
chain length: 2 m

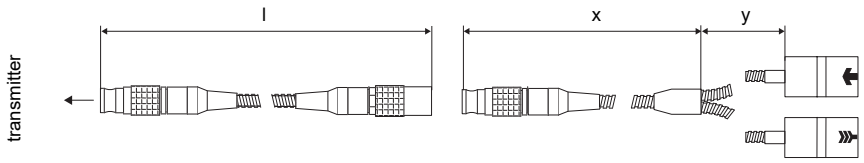
Coupling materials for transducers

normal temperature range (4th character of transducer order code = N)		**extended temperature range (4th character of transducer order code = E)**	
< 100 °C	< 170 °C	< 150 °C	< 200 °C
coupling compound type N	coupling compound type E	coupling compound type E	coupling compound type E or H

Technical data

type	**ambient temperature** °C
coupling compound type N	-30...+130
coupling compound type E	-30...+200
coupling compound type H	-30...+250

Connection systems

connection system NL	
direct connection/connection with extension cable	transducers technical type
	*****W* *****H*

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)	stainless steel 304 (1.4301)
outer diameter	mm	8	8

extension cable		
type		**1750**
standard length	m	5 10
weight	kg/m	0.12
ambient temperature	°C	< 80
cable jacket		
material		PE
outer diameter	mm	6
thickness	mm	0.5
colour		black
shield		x
sheath		
material		stainless steel 304 (1.4301)
outer diameter	mm	9

Cable length

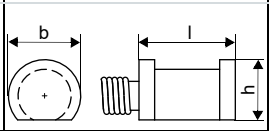
transducer frequency		**F, G, H, K**			**M, P**			**Q**			**S**		
connection system NL													
transducers technical type		x	y	l	x	y	l	x	y	l	x	y	l
*(DR)***W* *(DR)***H*	m	2	3	≤ 10	2	2	≤ 10	2	1	≤ 10	-	-	-
*(LT)***W* *(LT)***H*	m	2	7	≤ 10	7	2	≤ 10	8	1	≤ 10	-	-	-

x, y - transducer cable length

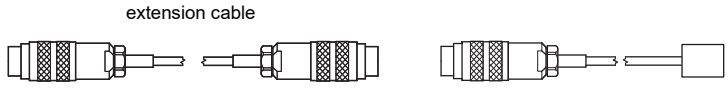
l - max. length of extension cable

Clamp-on temperature probe (optional)

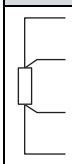
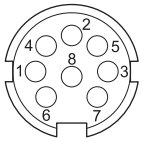
Technical data

PT12N		
item number		• 670415-1 • 670414-1 (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 material		aluminum
degree of protection		IP54
dimensions		
length l	mm	20
width b	mm	15
height h	mm	13
dimensional drawing		
weight	kg	0.25 (without connector)
accessories		
thermal conductivity paste 200 °C		x
thermal conductivity foil 250 °C		x

Connection system

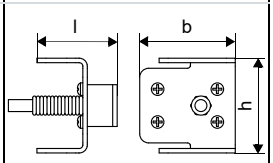
direct connection/connection with extension cable


Connection

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

Cable

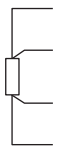
		temperature probe	extension cable
type		4 x 0.22 mm^2	LIYCY 8 x 0.14 mm^2
standard length	m	3	5/10/25
max. length	m	-	100
ambient temperature	°C	-30...+250	-25...+80
min. bend radius	mm	27	68
cable jacket			
material		PFA	PVC
outer diameter	mm	3.8 ±0.15	4.8 ±2
colour		black	grey

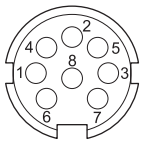
PT12F		
item number		• 670415-2 • 670414-2 (matched)
design		clamp-on short response time, with connector
type		Pt100
connection		4-wire
measuring range	°C	-50...+250
accuracy T		±(0.15 °C + 2 · 10^{-3} · |T [°C]|) class A
accuracy ΔT (2x Pt matched according to EN 1434-1)		≤ 0.1 K (3 K < ΔT < 6 K), more corresponding to EN 1434-1
response time	s	8 (t50, T1 = 25 °C, T2 = 60 °C)
housing material		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

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

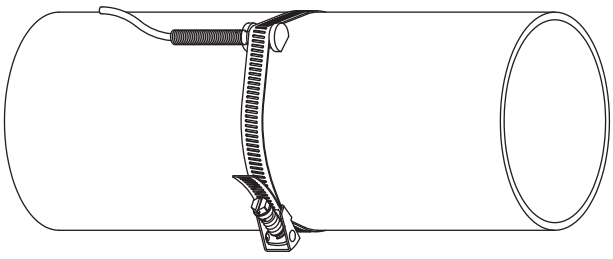


Cable

		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	-	100
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

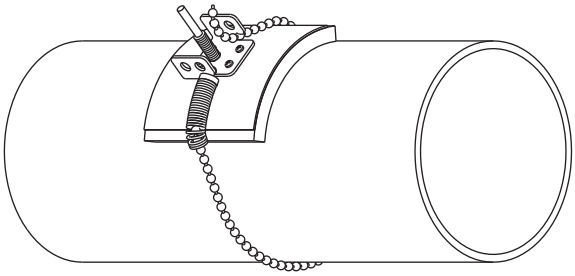
Fixation

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

Wall thickness measurement (optional)

The pipe wall thickness is an important pipe parameter which has to be determined exactly for a good measurement. However, the pipe wall thickness often is unknown.

The wall thickness probe can be connected to the transmitter instead of the flow transducers and the wall thickness measurement mode is activated automatically.

Acoustic coupling compound is applied to the wall thickness probe which then is placed firmly on the pipe. The wall thickness is displayed and can be stored directly in the transmitter.

Technical data

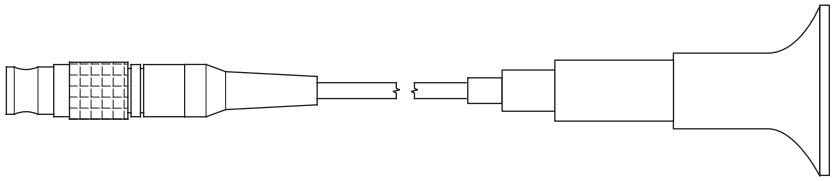
		DWR1NZ7
item number		600522-0
measuring range[1]	mm	1...250
resolution	mm	0.01
accuracy		1 % ±0.1 mm
fluid temperature	°C	-20...+200, short-time peak max. 500
explosion protection		-
cable		
type		2616
length	m	1.5

[1] The measuring range depends on the attenuation of the ultrasonic signal in the pipe. For strongly attenuating plastics (e.g. PFA, PTFE, PP) the measuring range is smaller.

Cable

		2616
ambient temperature	°C	<200
cable jacket		
material		FEP
outer diameter	mm	5.1
colour		black
shield		x

DWR1NZ7



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