

# Flexim FLUXUS G731CA Ultrasonic Flowmeter



## Stationary Ultrasonic Clamp-on System for Flow Measurement of Compressed Air and Other Industrial Gases

### Features

- Accurate and reliable flow measurement
- Bidirectional measurement for flow direction detection in compressed-air networks
- Installation and start-up do not require any pipe work nor any process interruptions
- Measurement unaffected by gas density, viscosity, dust content and humidity
- Measurement at extremely low pressure:
  - min. 3 bar(a) in metal pipes
  - 1 bar(a) in plastic pipes
- Extremely high turndown ratio > 1000:1
- High measuring accuracy, even at low flow velocities down to 0.01 m/s
  - Monitoring of small flows (e.g. during the night)
  - Leakage detection





### Applications

- Industrial manufacturing facilities:
  - Air compressors and compressed-air distribution networks
  - Pressure generators and distribution networks for inert or purge gases
  - Pressure generators and distribution networks for oxygen, e.g. for steel production
- Measurement of atmospheric gases consumption: compressed air, nitrogen, oxygen, argon, helium

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## Transmitter

### Technical data

		FLUXUS G731CA nonEx	FLUXUS G731CA ATEX/IECEX	FLUXUS G731CA FM Class I Div. 2
design		DE7-G731CA-NNN**-*AL... (aluminum housing) DE7-G731CA-NNN**-*ST... (stainless steel housing)	DE7-G731CA-A2N**-*AL... (aluminum housing) DE7-G731CA-A2N**-*ST... (stainless steel housing)	DE7-G731CA-F2N**-*AL... (aluminum housing) DE7-G731CA-F2N**-*ST... (stainless steel housing)
				
certification type			aluminum housing: 731-ADN (100...240 V) 731-ANN (11...32 V DC) stainless steel housing: 731-SNN	F731**-F2N...
application		flow measurement of compressed air and industrial gases		
measurement				
measurement principle		transit time difference correlation principle		
flow direction		bidirectional		
synchronised channel averaging		x (2 measuring channels necessary)		
flow velocity	m/s	0.01...35, depending on pipe diameter		
repeatability		0.15 % MV ±0.005 m/s		
fluid		compressed air, oxygen, nitrogen, argon, helium		
temperature compensation		corresponding to the recommendations in ANSI/ASME MFC-5.1-2011		
measurement uncertainty (volumetric flow rate)				
measurement uncertainty of the measuring system <sup>1</sup>		±0.3 % MV ±0.005 m/s		
measurement uncertainty at the measuring point		±1...2 % MV ±0.005 m/s, depending on the application		
transmitter				
power supply		• 100...240 V ±10 %/50...60 Hz or • 11...32 V DC	• 731-ADN, 731-SNN: 100...240 V ±10 %/ 50...60 Hz or • 731-ANN, 731-SNN: 11...32 V DC	• 100...240 V ±10 %/50...60 Hz or • 11...32 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		
dimensions	mm	see dimensional drawing		
weight	kg	aluminum housing: 4.5 stainless steel housing: 5.8		
fixation		wall mounting, optional: 2" pipe mounting		
ambient temperature	°C	-40*...+60 aluminum housing and 240 V: -40*...+65 * < -20 without operation of the display	731-ADN: -40*...+65 731-ANN, 731-SNN: -40*...+60 * < -20 without operation of the display	-40...+60 (< -20 without operation of the display)
display		240 x 128 pixels, backlight		
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese		
explosion protection				
• ATEX/IECEX				
marking		-	 0637  II3G Ex ec IIC T4 Gc II2D Ex tb IIIC T135 °C Db T <sub>a</sub> -40...+65 °C (731-ADN) T <sub>a</sub> -40...+60 °C (731-ANN) T <sub>a</sub> -40...+59/60 °C (731-SNN)	-
certification		-	IBExU24ATEX1014 X, IECEx IBE 23.0024X	-
• FM				
marking		-	-	 Cl. I,II,III/Div. 2 / GP. A, B, C, D, F, G / T5 -40 °C ≤ Ta ≤ +60 °C
certification		-	-	FM23US0036, FM23CA0026

<sup>1</sup> with aperture calibration of the transducers<sup>2</sup> outside the explosive atmosphere (housing cover open)

		FLUXUS G731CA nonEx	FLUXUS G731CA ATEX/IECEX	FLUXUS G731CA FM Class I Div. 2
measuring functions				
physical quantities		operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity		
totaliser		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 <sup>2</sup> • LAN <sup>2</sup>		
process interfaces		max. 1 option: • Modbus RTU • BACnet MS/TP • M-Bus • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP	max. 1 option: • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1	max. 1 option: • Modbus RTU • BACnet MS/TP • HART • Profibus PA • FF H1 • Modbus TCP • BACnet IP
accessories				
data transmission kit		USB cable		
software		• FluxDiag Reader: reading of measured values and parameters, graphical representation • FluxDiag (optional): reading of measurement data, graphical representation, 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				
		configurable according to NAMUR NE 43 All switchable current outputs are jointly switched to active or passive.		
number		0 or 2		
range	mA	4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)		
uncertainty		0.04 % of output value ±3 µA		
active output		R <sub>ext</sub> = 250...530 Ω, U <sub>opencircuit</sub> = 28 V DC		
passive output		U <sub>ext</sub> = 9...30 V DC, depending on R <sub>ext</sub> (R <sub>ext</sub> < 458 Ω at 20 V)		
current output in HART mode		option		
• range	mA	4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2)		
• active output		R <sub>ext</sub> = 250...530 Ω, U <sub>opencircuit</sub> = 28 V DC		
• passive output		U <sub>ext</sub> = 9...30 V DC, depending on R <sub>ext</sub> (R <sub>ext</sub> = 250...458 Ω at 20 V)		
• digital output				
number		0 or 4		
functions		• frequency output • binary output • pulse output		
type		open collector (passive)		
operating parameters		OC30V/100mA 5...30 V, I <sub>max</sub> = 100 mA, R <sub>int</sub> = 20 Ω Low: U < 2 V at I <sub>loop</sub> = 2 mA (R <sub>ext</sub> = 12 kΩ at U <sub>ext</sub> = 24 V) High: U > 15 V (R <sub>ext</sub> = 12 kΩ at U <sub>ext</sub> = 24 V)		OC30V (IEC 60947-5-6) 5...30 V, I <sub>max</sub> = 20 mA, R <sub>int</sub> = 1020 Ω Low: U < 2 V at I <sub>loop</sub> = 2 mA (R <sub>ext</sub> = 11 kΩ at U <sub>ext</sub> = 24 V) High: U > 15 V (R <sub>ext</sub> = 11 kΩ at U <sub>ext</sub> = 24 V)
frequency output				
• range	kHz	0.002...10		
• damping	s	0...999.9 (adjustable)		
• pulse-to-pause ratio		1:1		
binary output				
• binary output as alarm output		limit, change of flow direction or error		
pulse output				
• pulse value	units	0.01...1000		
• pulse width	ms	0.05...1000		
• pulse rate		max. 10 000 pulses		

<sup>1</sup> with aperture calibration of the transducers<sup>2</sup> outside the explosive atmosphere (housing cover open)

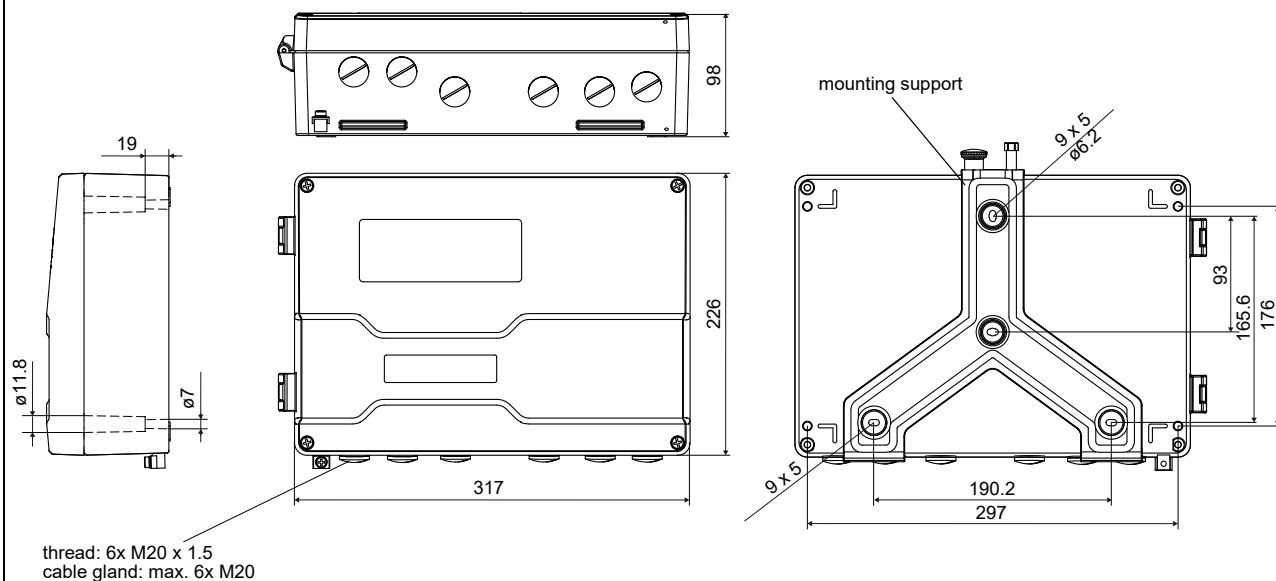
		FLUXUS G731CA nonEx	FLUXUS G731CA ATEX/IECEx	FLUXUS G731CA FM Class I Div. 2
inputs				
		The inputs are galvanically isolated from the transmitter.		
• temperature input				
number		1 or 2		
type		Pt100/Pt1000		
connection		4-wire		
range	°C	-150...+560		
resolution	K	0.01		
accuracy		±0.01 % MV ±0.03 K at 18...28 °C ±0.01 % MV ±0.03 K ±0.0005 %/K at <18 °C/>28 °C		
cable resistance	Ω	max. 1000		
• switchable current input				
		All switchable current inputs are jointly switched to active or passive.		
number		1 or 2		
accuracy		±0.1 % MV ±0.01 mA at 18...28 °C ±0.1 % MV ±0.01 mA ±0.005 %/K at <18 °C/>28 °C		
resolution	μA	0.1		
active input		R <sub>int</sub> = 75 Ω, I <sub>max</sub> ≤ 30 mA U <sub>opencircuit</sub> = 28 V (open circuit) U <sub>min</sub> = 21.4 V at 20 mA		
• range	mA	0...20		
passive input		U <sub>ext</sub> = 24 V, R <sub>int</sub> = 35 Ω, I <sub>max</sub> ≤ 24 mA		
• range	mA	0...20		

<sup>1</sup> with aperture calibration of the transducers

<sup>2</sup> outside the explosive atmosphere (housing cover open)

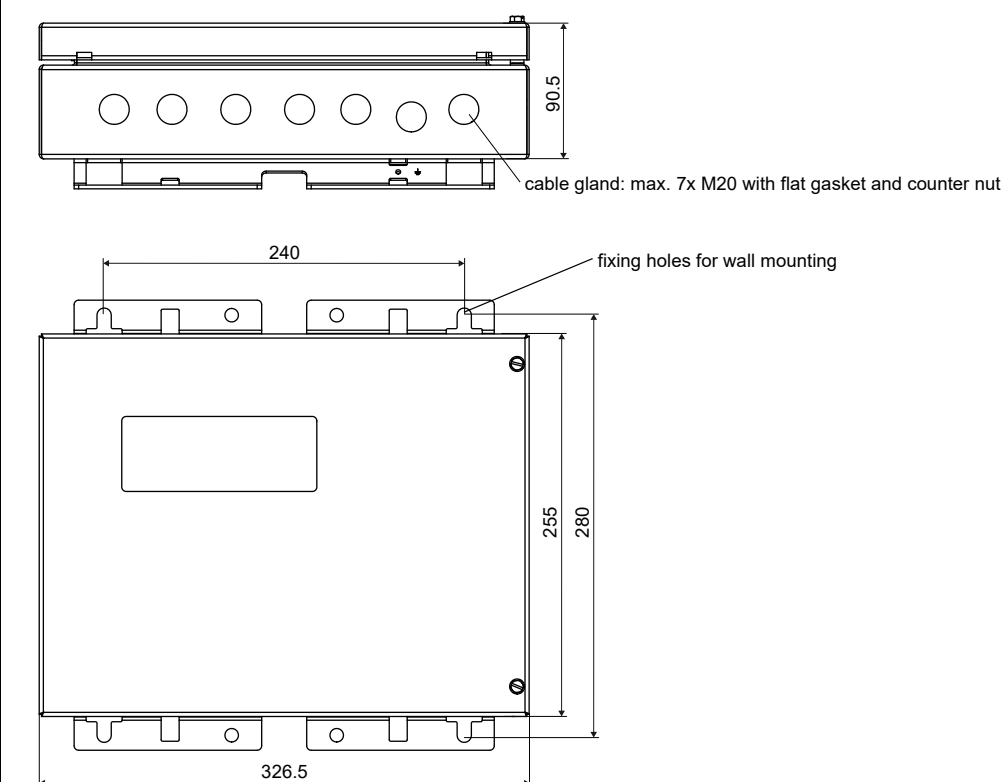
## Dimensions

### \*731 (aluminum housing)



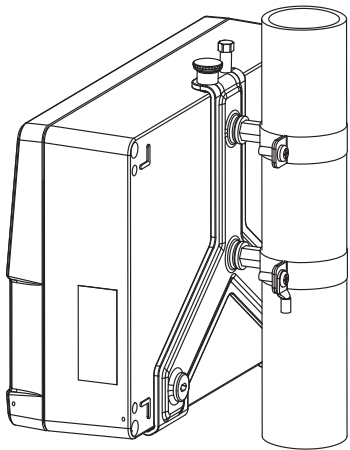
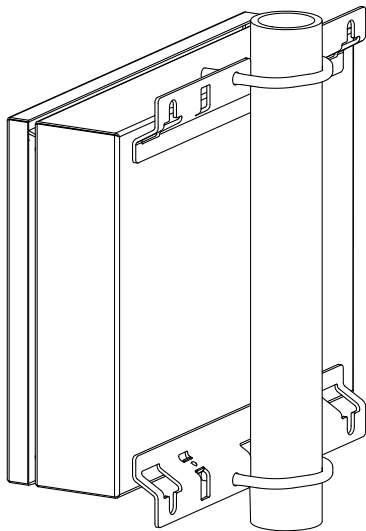
in mm

### \*731 (stainless steel housing)



in mm

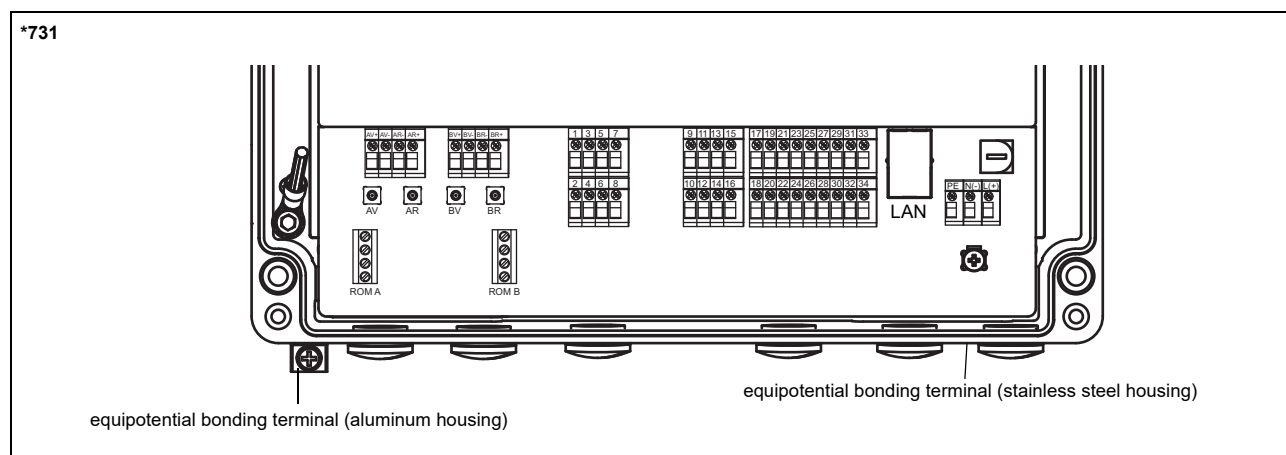
## 2" pipe mounting kit

<p><b>*731 (aluminum housing)</b></p> 	<p>item number: 731037-1</p>
<p><b>*731 (stainless steel housing)</b></p> 	<p>item number: 721110-4</p>

### 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: -40...+60 °C

## Terminal assignment



power supply <sup>1</sup>							
terminal		connection (AC)			connection (DC)		
PE		protective conductor			protective conductor		
N(-)		neutral conductor			-		
L(+)		line conductor			+		
transducers							
transducer cable (transducers *****53), extension cable					transducer cable (transducers *****52)		
measuring channel A		measuring channel B			measuring channel A	measuring channel B	
terminal	connection	terminal	connection	transducer	terminal		connection
AV or AV+	signal	BV or BV+	signal	↑	X_AV	X_BV	SMB connector
AVS or AV-	shield	BVS or BV-	shield				
ARS or AR-	shield	BRS or BR-	shield	⬇	X_AR	X_BR	SMB connector
AR or AR+	signal	BR or BR+	signal				
outputs, inputs <sup>1, 2</sup>							
terminal		connection					
depending on configuration		current output, digital output, current input					
1, 2, 3, 4		temperature input					
5, 6, 7, 8							
29+, 30-		passive current output/HART					
29-, 30+		active current output/HART					
29, 30		Modbus RTU, BACnet MS/TP, M-Bus, Profibus PA, FF H1					
temperature probe							
terminal		direct connection			connection with extension cable		
1, 5		red			red		
2, 6		white			white		
3, 7		red/blue			grey		
4, 8		white/blue			blue		
USB		type C Hi-Speed USB 2.0 Device			service (FluxDiag/FluxDiagReader)		
LAN		RJ45 10/100 Mbps Ethernet			• service (FluxDiag/FluxDiagReader) • Modbus TCP • BACnet IP		

<sup>1</sup> cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm<sup>2</sup>

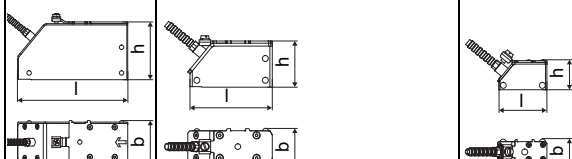

<sup>2</sup> The number, type and terminal assignment are customised.



## Transducers

### Technical data

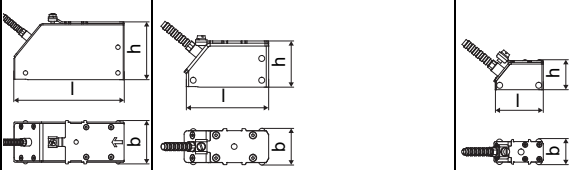

#### Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)

order code		GLK-N***-**TS	GLM-N***-**TS	GLP-N***-**TS	GLQ-N***-**TS
technical type		G(RT)K1N52	G(RT)M1N52	G(RT)P1N52	G(RT)Q1N52
transducer frequency	MHz	0.5	1	2	4
fluid pressure <sup>1</sup>					
min. extended	bar	metal pipe: 10 (d > 120 mm) 3 (d < 120 mm)	metal pipe: 3 (d < 60 mm)	metal pipe: 3 (d < 35 mm)	metal pipe: 3 (d < 15 mm)
min.	bar	metal pipe: 15 (d > 120 mm) 10 (d < 120 mm) plastic pipe: 1	metal pipe: 10 (d > 60 mm) 5 (d < 60 mm) plastic pipe: 1	metal pipe: 10 (d > 35 mm) 5 (d < 35 mm) plastic pipe: 1	metal pipe: 10 (d > 15 mm) 5 (d < 15 mm) plastic pipe: 1
inner pipe diameter d <sup>2</sup>					
min. extended	mm	60	30	15	7
min. recommended	mm	80	40	20	10
max. recommended	mm	300	150	50	22
max. extended	mm	360	180	60	30
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
max.	mm	10	5	3	1.2
material					
housing		PPSU with stainless steel cover 316L (1.4404)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5	4		3
dimensions					
length l	mm	128.5	74		42
width b	mm	51	32		22
height h	mm	67.5	40.5		25.5
dimensional drawing					
weight (without cable)	kg	0.471	0.077		0.019
pipe surface temperature	°C	-40...+130			
ambient temperature	°C	-40...+130			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		GLK-NA2N-**TS	GLM-NA2N-**TS	GLP-NA2N-**TS	GLQ-NA2N-**TS
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155			
marking		CE0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• FM					
order code		GLK-NF2N-**TS	GLM-NF2N-**TS	GLP-NF2N-**TS	GLQ-NF2N-**TS
pipe surface temperature (Ex)	°C	-40...+165			
degree of protection		IP66			
marking		 NI/CI. I,II,III/Div. 2 / GP A,B,C,D,F,G/ Temp. Codes dwg 3860			

<sup>1</sup> depending on the application, typical absolute value for natural gas, nitrogen, compressed air

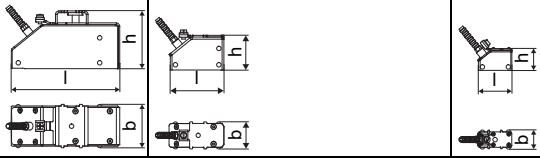

<sup>2</sup> Lamb wave transducer:  
 typical values for natural gas, nitrogen, oxygen; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 15 m/s (30 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 12 m/s (25 m/s)

**Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, T1)**

order code		GLK-N***-**T1	GLM-N***-**T1	GLP-N***-**T1	GLQ-N***-**T1
technical type		G(RT)K1N53	G(RT)M1N53	G(RT)P1N53	G(RT)Q1N53
transducer frequency	MHz	0.5	1	2	4
fluid pressure <sup>1</sup>					
min. extended	bar	metal pipe: 10 (d > 120 mm) 3 (d < 120 mm)	metal pipe: 3 (d < 60 mm)	metal pipe: 3 (d < 35 mm)	metal pipe: 3 (d < 15 mm)
min.	bar	metal pipe: 15 (d > 120 mm) 10 (d < 120 mm) plastic pipe: 1	metal pipe: 10 (d > 60 mm) 5 (d < 60 mm) plastic pipe: 1	metal pipe: 10 (d > 35 mm) 5 (d < 35 mm) plastic pipe: 1	metal pipe: 10 (d > 15 mm) 5 (d < 15 mm) plastic pipe: 1
inner pipe diameter d <sup>2</sup>					
min. extended	mm	60	30	15	7
min. recommended	mm	80	40	20	10
max. recommended	mm	300	150	50	22
max. extended	mm	360	180	60	30
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
max.	mm	10	5	3	1.2
material					
housing		PPSU with stainless steel cover 316L (1.4404)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5	4		3
dimensions					
length l	mm	128.5	74		42
width b	mm	51	32		22
height h	mm	67.5	40.5		25.5
dimensional drawing					
weight (without cable)	kg	0.471	0.077		0.019
pipe surface temperature	°C	-40...+130			
ambient temperature	°C	-40...+130			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		GLK-NA2N-**T1	GLM-NA2N-**T1	GLP-NA2N-**T1	GLQ-NA2N-**T1
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155			
marking		CE 0637 Ex II 3G II 2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• FM					
order code		GLK-NF2N-**T1	GLM-NF2N-**T1	GLP-NF2N-**T1	GLQ-NF2N-**T1
pipe surface temperature (Ex)	°C	-40...+165			
degree of protection		IP66			
marking		 NI/CI. I,II,III/Div. 2 / GP A,B,C,D,F,G/ Temp. Codes dwg 3860			

<sup>1</sup> depending on the application, typical absolute value for natural gas, nitrogen, compressed air
<sup>2</sup> Lamb wave transducer:  
 typical values for natural gas, nitrogen, oxygen; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 15 m/s (30 m/s)  
 inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 12 m/s (25 m/s)

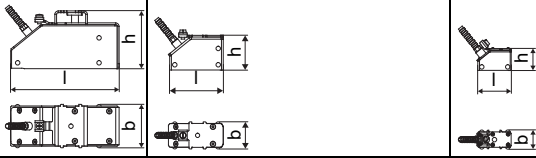

**Shear wave transducers (optional, zone 2 - FM Class I Div. 2 - nonEx, TS)**

order code		GSK-N***-**TS	GSM-N***-**TS	GSP-N***-**TS	GSQ-N***-**TS
technical type		G(DL)K1N52	G(DL)M2N52	G(DL)P2N52	G(DL)Q2N52
transducer frequency	MHz	0.5	1	2	4
fluid pressure <sup>1</sup>					
min. extended	bar	metal pipe: 20			
min.	bar	metal pipe: 30, plastic pipe: 1			
inner pipe diameter d <sup>2</sup>					
min. extended	mm	60	30	15	7
min. recommended	mm	80	40	20	10
max. recommended	mm	300	150	50	22
max. extended	mm	360	180	60	30
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
material					
housing		PEEK with stainless steel cover 316L (1.4404)			
contact surface		PEEK			
degree of protection		IP66		IP66/IP67	
transducer cable					
type		1699			
length	m	5	4		3
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	°C	-40...+130			
ambient temperature	°C	-40...+130			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		GSK-NA2N-**TS	GSM-NA2N-**TS	GSP-NA2N-**TS	GSQ-NA2N-**TS
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180			
marking		CE 0637 Ex II 3G II 2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• FM					
order code		GSK-NF2N-**TS	GSM-NF2N-**TS	GSP-NF2N-**TS	GSQ-NF2N-**TS
pipe surface temperature (Ex)	°C	-40...+125	-40...+190		
degree of protection		IP66			
marking		 NI/CI. I,II,III/Div. 2 / GP A,B,C,D,F,G/ Temp. Codes dwg 3860			

<sup>1</sup> depending on the application, typical absolute value for natural gas, nitrogen, compressed air

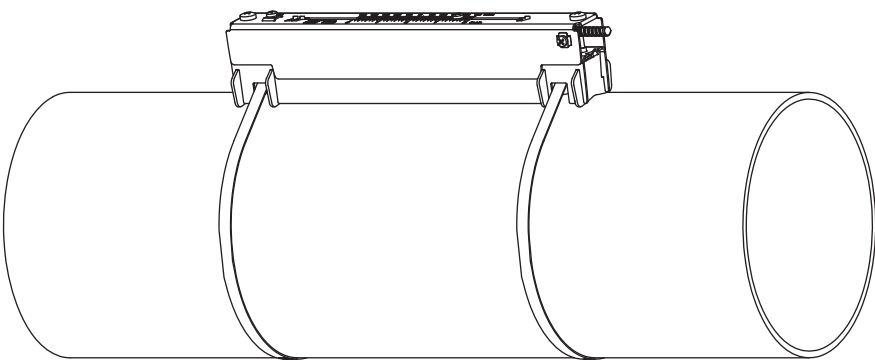
<sup>2</sup> shear wave transducer:  
 typical values for natural gas, nitrogen, oxygen; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended/max. extended: in reflection arrangement and for a flow velocity of 15 m/s

**Shear wave transducers (optional, zone 2 - FM Class I Div. 2 - nonEx, T1)**

order code		GSK-N***-**T1	GSM-N***-**T1	GSP-N***-**T1	GSQ-N***-**T1
technical type		G(DL)K1N53	G(DL)M2N53	G(DL)P2N53	G(DL)Q2N53
transducer frequency	MHz	0.5	1	2	4
fluid pressure <sup>1</sup>					
min. extended	bar	metal pipe: 20			
min.	bar	metal pipe: 30, plastic pipe: 1			
inner pipe diameter d <sup>2</sup>					
min. extended	mm	60	30	15	7
min. recommended	mm	80	40	20	10
max. recommended	mm	300	150	50	22
max. extended	mm	360	180	60	30
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
material					
housing		PEEK with stainless steel cover 316L (1.4404)			
contact surface		PEEK			
degree of protection		IP66	IP66/IP67		
transducer cable					
type		1699			
length	m	5	4		3
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	°C	-40...+130			
ambient temperature	°C	-40...+130			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		GSK-NA2N-**T1	GSM-NA2N-**T1	GSP-NA2N-**T1	GSQ-NA2N-**T1
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180			
marking		CE 0637 Ex II 3G II 2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• FM					
order code		GSK-NF2N-**T1	GSM-NF2N-**T1	GSP-NF2N-**TS	GSQ-NF2N-**T1
pipe surface temperature (Ex)	°C	-40...+125	-40...+190		
degree of protection		IP66			
marking		 NI/CI. I,II,III/Div. 2 / GP A,B,C,D,F,G/ Temp. Codes dwg 3860			

<sup>1</sup> depending on the application, typical absolute value for natural gas, nitrogen, compressed air
<sup>2</sup> shear wave transducer:  
 typical values for natural gas, nitrogen, oxygen; pipe diameters for other fluids on request  
 inner pipe diameter max. recommended/max. extended: in reflection arrangement and for a flow velocity of 15 m/s

Transducer mounting fixture

<p>Variofix L (VL)</p> 	<p>material: stainless steel 316Ti (1.4571), 316L (1.4404), 17-7PH (1.4568) inner length: <b>VLK:</b> 348 mm <b>VL(MP):</b> 234 mm <b>VLQ:</b> 176 mm dimensions: <b>VLK:</b> 423 x 90 x 93 mm <b>VL(MP):</b> 309 x 57 x 63 mm <b>VLQ:</b> 247 x 43 x 47 mm</p>
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## Coupling materials for transducers

type	ambient temperature °C	remark
coupling compound type N	-30...+130	< 24 h
coupling foil type VT	-10...+200	

## Damping mats

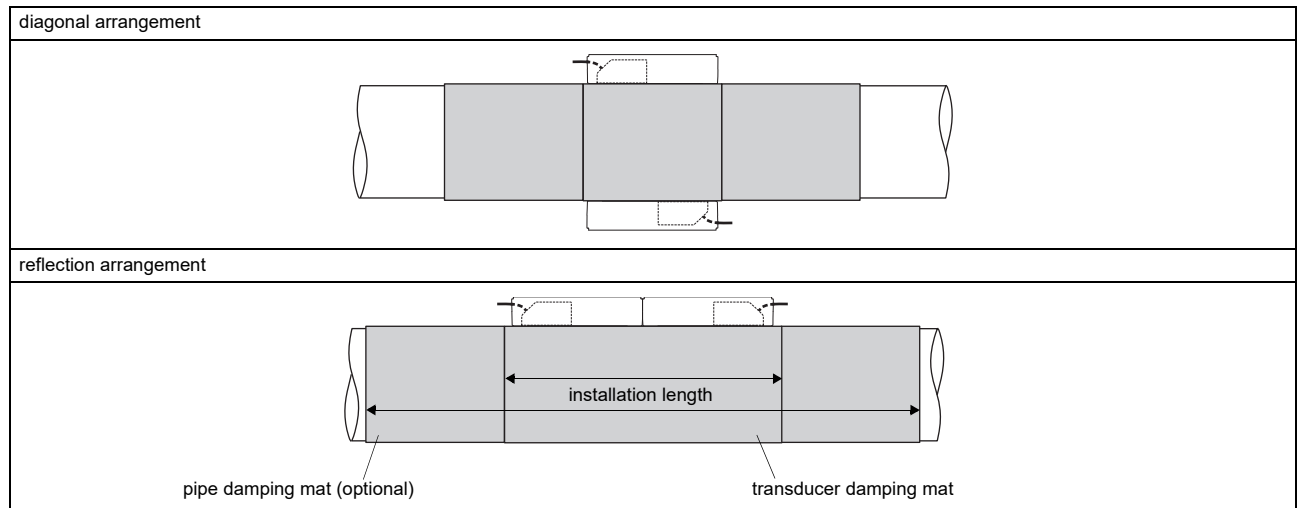
Damping mats will be used for the gas measurement to reduce acoustic noise influences on the measurement.

### transducer damping mat

Transducer damping mats will be installed below the transducers.

### pipe damping mat

Pipe damping mats will be installed if the sound propagation is disturbed at reflection points (e.g. flange, weld). Depending on the noise, the pipe damping mats will be installed at one or both sides of the transducer damping mat. If the local conditions are unknown, pipe damping mats should be installed.



## Technical data

type		E30R4	E30R3
item number		992080-11	992080-10
width	mm	225	50
thickness	mm	0.7	
length (per roll)	m	10	
weight	kg/m <sup>2</sup>	1.015	
ambient temperature	°C	-30...+80	
properties		self-adhesive	

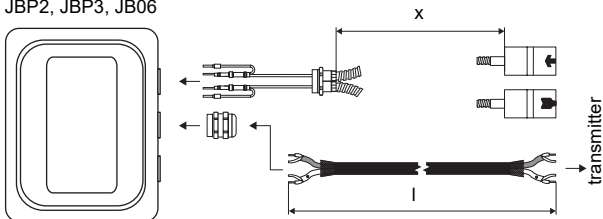
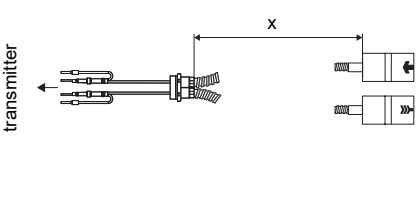
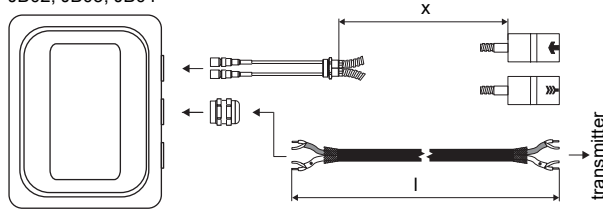
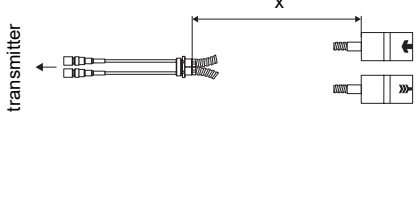
## Dimensioning

transducer		damping mat							
transducer mounting fixture	order code	type	number of layers	transducer damping mat			transducer damping mat + 2x pipe damping mat		
				max. installation length [mm]	number of rolls <sup>1</sup>		max. installation length [mm]	number of rolls <sup>1</sup>	
					standard <sup>2</sup>	extended <sup>2</sup>		standard	extended
<b>VarioFix L</b>									
VLK	GLK	E30R4	1	890	1	1	1830	2	2
	GSK		1		1	1		2	2
VLM	GLM	E30R3	1	660	1	1	1360	2	2
	GSM		1		1	1		2	2
VLP	GLP	E30R3	1	540	1	1	1120	1	1
	GSP		1		1	1		1	1
VLQ	GLQ	E30R3	1	540	1	1	1120	1	1
	GSQ		1		1	1		1	1

<sup>1</sup> calculation on the base of:  
max. installation length (installation of one transducer mounting fixture per transducer in reflection arrangement) and  
max. recommended pipe diameter (standard) or max. extended pipe diameter (extended)

<sup>2</sup> calculation of the number of rolls when both transducers are mounted in one transducer mounting fixture (reflection arrangement) or in diagonal arrangement: number of rolls/2 and round up to the nearest integer

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
<div>JBP2, JBP3, JB06</div> 		*****53
connection system TS		
connection with extension cable	direct connection	transducers technical type
<div>JB02, JB03, JB04</div> 		*****52

Cable

transducer cable		
type		1699
weight	kg/ m	0.094
ambient temperature	°C	-55...+200
cable jacket		
material		PTFE
outer diameter	mm	2.9
thickness	mm	0.3
colour		brown
shield		x
sheath		
material		stainless steel 316Ti (1.4571)
outer diameter	mm	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	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



**Cable length**

transducer frequency		K		M, P		Q	
transducers technical type		x	l	x	l	x	l
*(DR)***5*	m	5	≤ 300	4	≤ 300	3	≤ 90
*(LT)***5*	m	9	≤ 300	9	≤ 300	9	≤ 90

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		JB02, JB03: IP66/IP67 JB04: Type 4X, IP66
ambient temperature °C		-40...+80
explosion protection		
• ATEX, UKEX		
junction box		JB02
marking		<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>CE</div><div>UK</div><div>CA</div></div><div><div>Ex</div><div></div></div></div><div>II3G Ex nA IIC T6...T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C</div></div>
• FM		
junction box		JB04
certification type		JBC24
marking		<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>FIM</div><div>APPROVED</div></div><div>IS</div></div><div>NI/CI. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C</div></div>

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

JBP2, JBP3, JB06		
weight	kg	1.2 kg
fixation		wall mounting optional: 2" pipe mounting
material		
housing		stainless steel 316L (1.4404)
gasket		silicone
degree of protection		JBP2, JBP3: IP66/IP67 JB06: Type 4X, IP66
ambient temperature °C		-40...+80
explosion protection		
• ATEX/UKEX		
junction box		JBP2
marking		<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>CE</div><div>UK</div><div>CA</div></div><div><div>Ex</div><div></div></div></div><div>II3G Ex nA IIC T6...T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C</div></div>
• FM		
junction box		JB06
certification type		JBC23
marking		<div><div><div><div><div></div><div></div></div><div><div></div><div></div></div></div><div><div>FIM</div><div>APPROVED</div></div><div>IS</div></div><div>NI/CI. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ T6 Ta = -40...+60 °C</div></div>

Connection

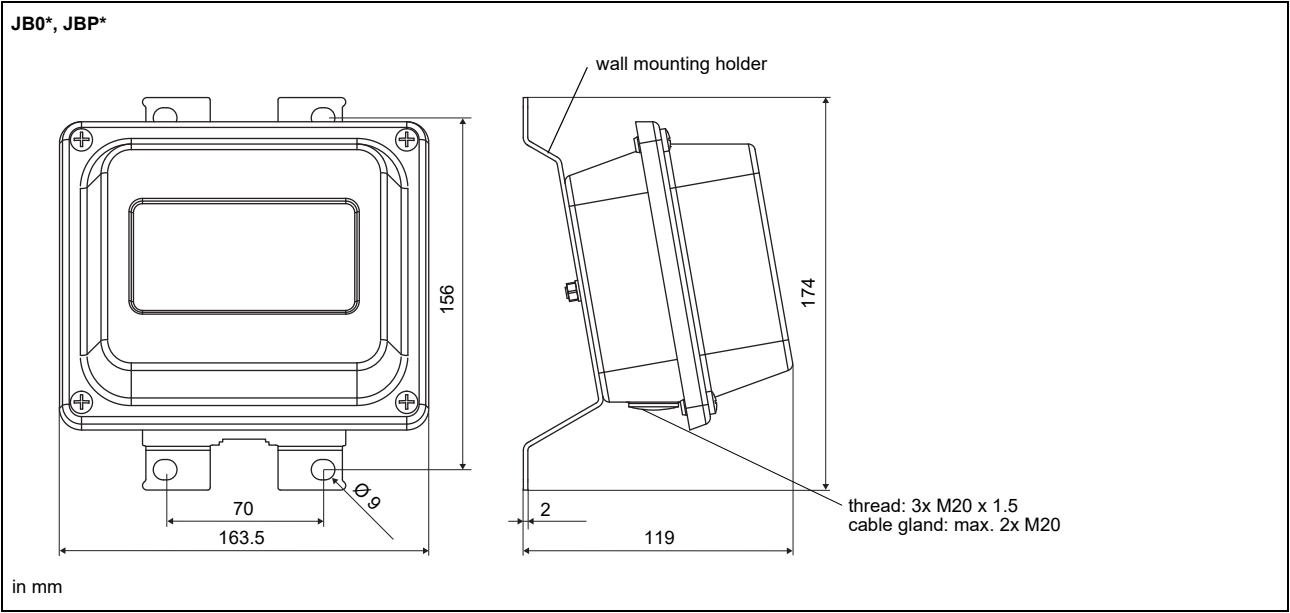
Transducers

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

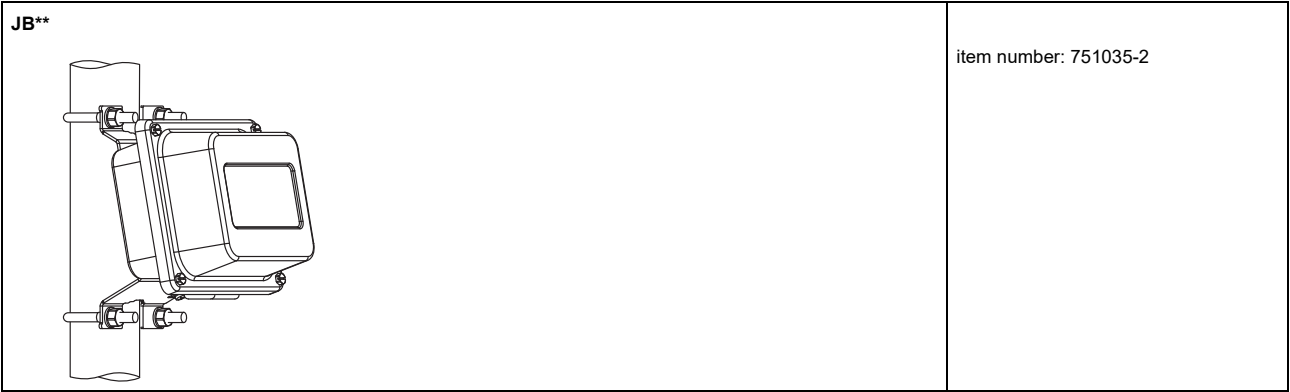
Extension cable

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

Dimensions

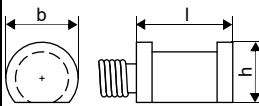


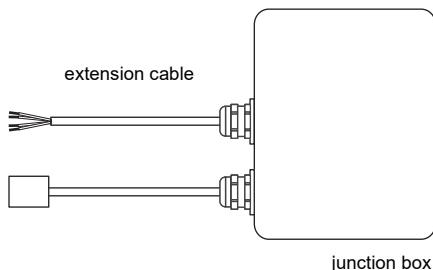

2" pipe mounting kit

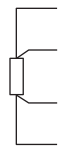


## Clamp-on temperature probe (optional)

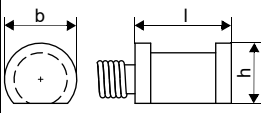

### Technical data

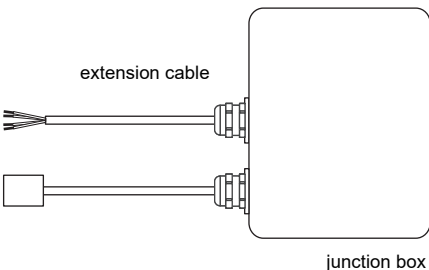

PT12N, PT12N-LC			
item number		<b>PT12N:</b> <ul style="list-style-type: none"><li>• 770415-1</li><li>• 770414-2 (matched)</li></ul> <b>PT12N-LC:</b> <ul style="list-style-type: none"><li>• 770415-4</li><li>• 770414-4 (matched)</li></ul>	
design		clamp-on option: with long cable	
type		Pt100	
connection		4-wire	
measuring range	°C	-30...+250	
accuracy T		±(0.15 °C + 2 · 10 <sup>-3</sup> ·  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 material		aluminum	
degree of protection		IP54	
<b>dimensions</b>			
length l	mm	20	
width b	mm	15	
height h	mm	13	
dimensional drawing			
weight	kg	0.25	
<b>accessories</b>			
thermal conductivity foil 250 °C		x	

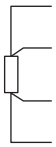
Connection system			
connection with extension cable		direct connection	
			

	temperature probe
	red
	red/blue
	white/blue
	white

Cable				
		PT12N	PT12N-LC	extension cable
type		4 x 0.22 mm <sup>2</sup>		LIYCY 8 x 0.14 mm <sup>2</sup> grey
standard length	m	3	15	5/10/25
max. length	m	-		200
ambient temperature	°C	-30...+250		-25...+80
min. bend radius	mm	27		68
<b>cable jacket</b>				
material		PFA		PVC
outer diameter	mm	3.8 ±0.15		4.8 ±0.2
colour		black		grey

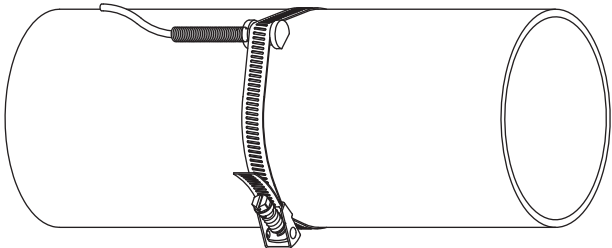
PT12N			
item number		• 770415-1A2 • 770414-1A2 (matched)	
design		clamp-on ATEX, UKEX	
type		Pt100	
connection		4-wire	
measuring range	°C	-30...+250	
accuracy T		±(0.15 °C + 2 · 10 <sup>-3</sup> ·  T [°C] ) class A	
accuracy ΔT (2x Pt matched according to EN 1434-1)		≤ 0.1 K (3 K < ΔT < 6 K), more corresponding to EN 1434-1	
response time	s	50	
housing material		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, UKEX			
marking		 II3G Ex nA IIC T6...T2 Gc Ta -30...+250 °C	

Connection system	
connection with extension cable	direct connection
	

Connection	
	temperature probe
	red
	red/blue
	white
	white/blue

Cable			
		temperature probe	extension cable
type		4 x 0.25 mm <sup>2</sup>	LIYCY 8 x 0.14 mm <sup>2</sup>
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 ±0.2
colour		black	grey

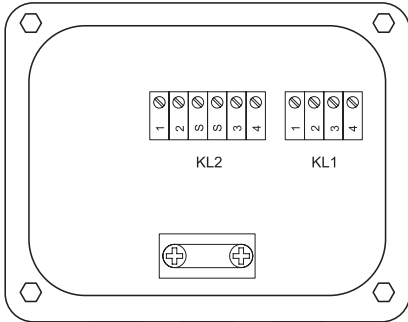
Fixation

<div><div>tension strap PT12N</div></div>	<div>material: stainless steel 301 (1.4310), 410 (1.4006) thermal insulation necessary</div>
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Junction box

JBT2, JBT3		
weight	kg	1.2 kg
fixation		wall mounting optional: 2" pipe mounting
material		
housing		stainless steel 316L (1.4404)
gasket		silicone
degree of protection		IP66/IP67
ambient temperature		
min.	°C	-40
max.	°C	+80
explosion protection		
• ATEX		
junction box marking		JBT2
marking		<div>CE UK CA</div> <div>II3G Ex nA IIC T6...T4 Gc II3D Ex tc IIIC T 100 °C Dc -40 ≤ Ta ≤ +70 °C/+80 °C</div>

Connection



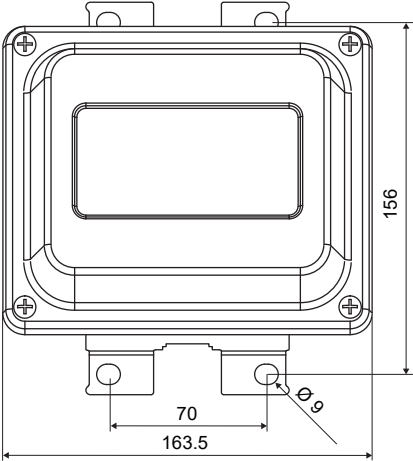
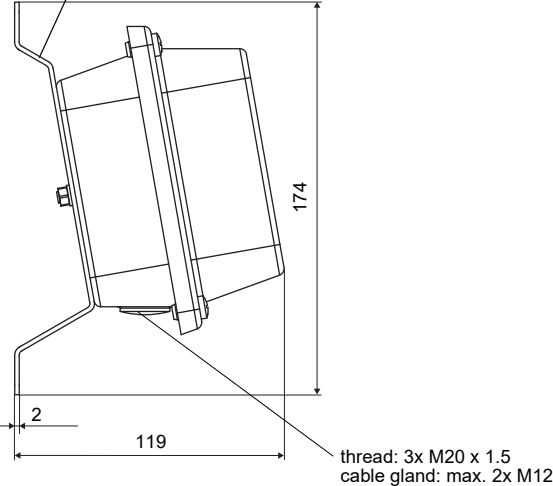
Temperature probe

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

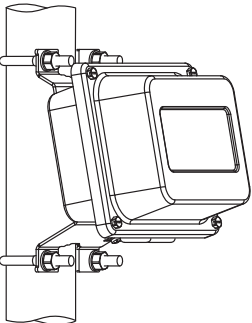
Extension cable

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

Dimensions

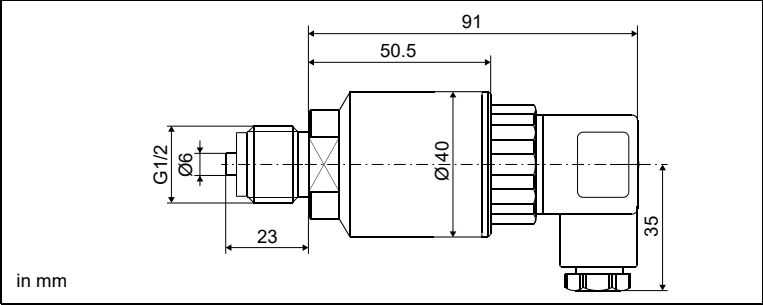
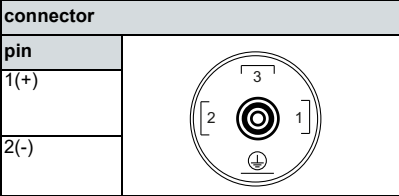
JBT*	
	
in mm	

2" pipe mounting kit

<p>JB**</p> 	<p>item number: 751035-2</p>
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Pressure transmitter (optional)

Technical data

Nöding P 121			Dimensions	
connection		2-wire		
measuring range	bar (a)	0...16		
fluid pressure	bar (a)	-1...40		
accuracy		≤ ±0.2 % FS ≥ 0.1 bar at 25 °C		
temperature coefficient		≤ ±0.015 % FS/K (zero)		
long term stability		≤ ±0.15 % per year		
response time	ms	200 (T <sub>90</sub> )		
power supply	V DC	9...30		
ambient temperature	°C	-25...+80		
fluid temperature	°C	-40...+100 max. 125 (< 0.5 h)		
material			Connection	
housing		stainless steel 316L (1.4404)		
measuring cell		Al <sub>2</sub> O <sub>3</sub>		
process connection		stainless steel 316L (1.4404)		
process gasket		FPM		
degree of protection		IP65		
weight (without connector)	kg	0.236		
current output	mA	4...20		
			Cable	
			8038	
			type	2 x 0.5 mm <sup>2</sup>
			standard length	m 5 15
			weight	kg/m 0.045
			ambient temperature	°C -40...+80
			bend radius	mm min. 29
			properties	self-extinguishing, flame retardant according to IEC 60332-1
			cable jacket	
			material	PVC
			outer diameter	mm 5.7
			colour	grey
			shield	x



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