Flexim FLUXUS G731
Ultrasonic Flowmeter

Gas Ultrasonic Flowmeter for Permanent Installation

Features

- Exact and highly reliable bidirectional clamp-on flow measurement of operational and standard volume flow rates as well as mass flow rates
- High measurement accuracy even at very low as well as very high flow rates and independent of the flow direction (bidirectional)
- The measurement is zero point stable, drift free and independent of the pipe material as well as the process pressure (> 3 bar on steel pipes; no minimum pressure for plastic pipes) and the process fluid

Applications

- Chemical industry, petrochemical industry, oil and gas industry, manufacturing industries

Transmitter

Technical data

		FLUXUS G731**-NNN**-*AL G731**-NNN**-*ST	FLUXUS G731**-A2N**-*ST
		 	
design		standard field device	standard field device zone 2
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		all acoustically conductive gases, e.g. nitrogen, air, oxygen, hydrogen, argon, helium, ethylene, propane	
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		±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	
power consumption	W	< 15	
number of measuring channels		1, optional: 2	
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)	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	5.8
fixation		wall mounting, optional: 2" pipe mounting	
ambient temperature	°C	-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			
marking		-	II3G Ex ec IIC T4 Gc T_a -40...+59/60 °C
measuring functions			
physical quantities		operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity, optional: gas energy flow rate (DGM)	
totaliser		volume, mass, optional: gas energy (DGM)	
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[2] • LAN[2]	
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

[1] with aperture calibration of the transducers

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

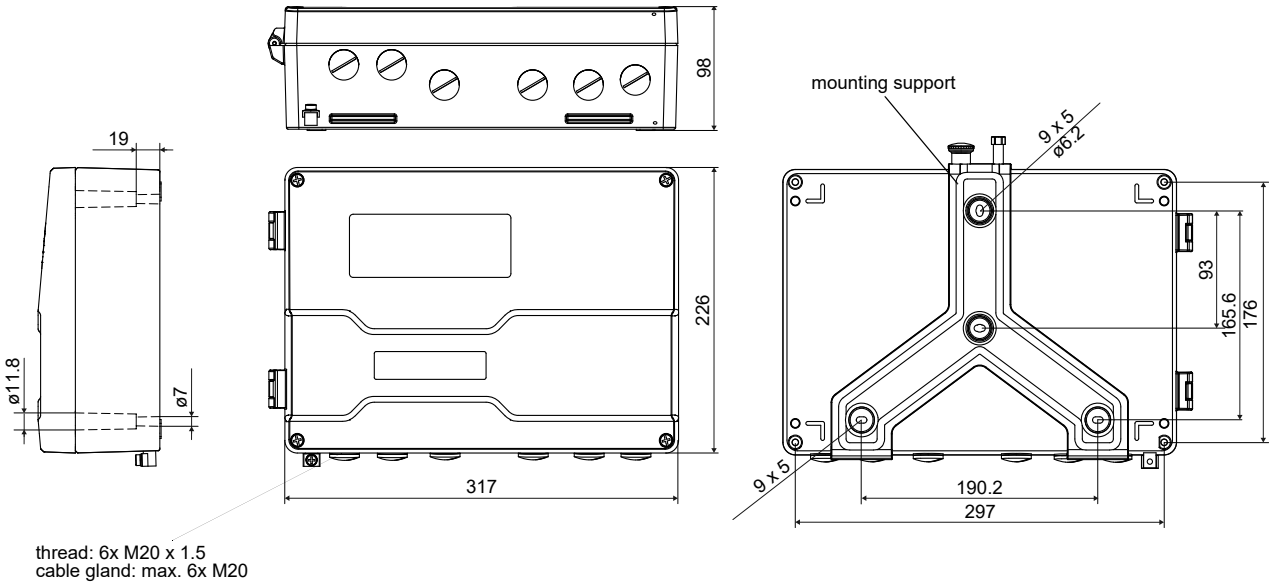
		FLUXUS G731**-NNN**-*AL G731**-NNN**-*ST	FLUXUS G731**-A2N**-*ST
accessories			
data transmission kit		USB cable	
software		• FluxDiagReader: reading of measured values and parameters, graphical representation • FluxDiag (optional): reading of measurement data, graphical representation, report generation, 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.	
number		on request, current inputs and outputs: max. 4	
• switchable current output			
		configurable according to NAMUR NE 43 All switchable current outputs are jointly switched to active or passive.	
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_{ext} = 250...530 Ω, $U_{opencircuit}$ = 28 V DC	
passive output		U_{ext} = 9...30 V DC, depending on R_{ext} (R_{ext} < 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_{ext} = 250...530 Ω, $U_{opencircuit}$ = 28 V DC	
• passive output		U_{ext} = 9...30 V DC, depending on R_{ext} (R_{ext} = 250...458 Ω at 20 V)	
• digital output			
functions		• frequency output • binary output • pulse output	
type		open collector (passive)	
operating parameters		**OC30V** (IEC 60947-5-6) 5...30 V, I_{max} = 20 mA, R_{int} = 1020 Ω Low: U < 2 V at I_{loop} = 2 mA (R_{ext} = 11 kΩ at U_{ext} = 24 V) High: U > 15 V (R_{ext} = 11 kΩ at U_{ext} = 24 V) or **OC30V/100mA** 5...30 V, I_{max} = 100 mA, R_{int} = 20 Ω Low: U < 2 V at I_{loop} = 2 mA (R_{ext} = 12 kΩ at U_{ext} = 24 V) High: U > 15 V (R_{ext} = 12 kΩ at U_{ext} = 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	
inputs			
		The inputs are galvanically isolated from the transmitter.	
number		on request, current inputs and outputs: max. 4	
• temperature input			
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.	
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_{int} = 75 Ω, I_{max} ≤ 30 mA $U_{opencircuit}$ = 28 V (open circuit) U_{min} = 21.4 V at 20 mA	
• range	mA	0...20	
passive input		U_{ext} = 24 V, R_{int} = 35 Ω, I_{max} ≤ 24 mA	
• range	mA	0...20	

[1] with aperture calibration of the transducers

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

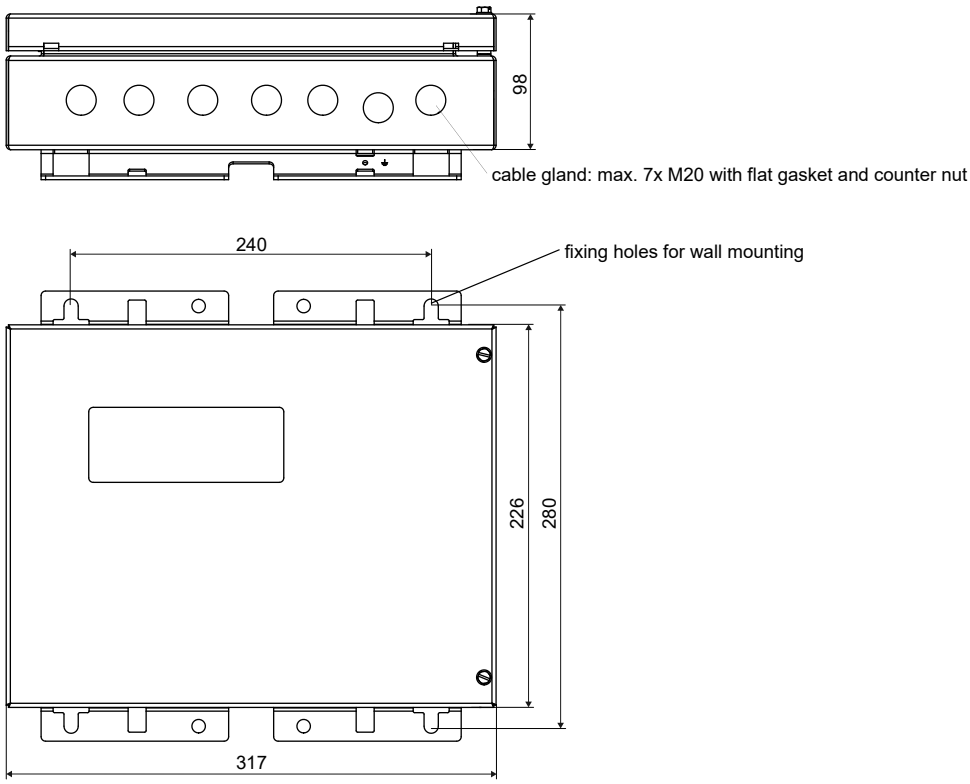
Dimensions

731**-**-*AL**



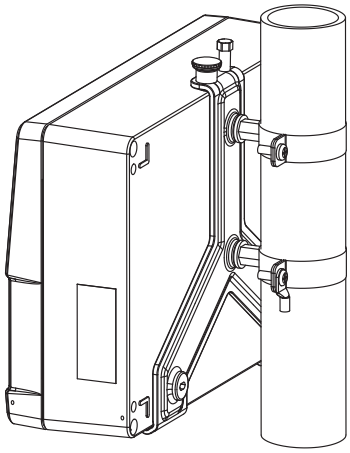
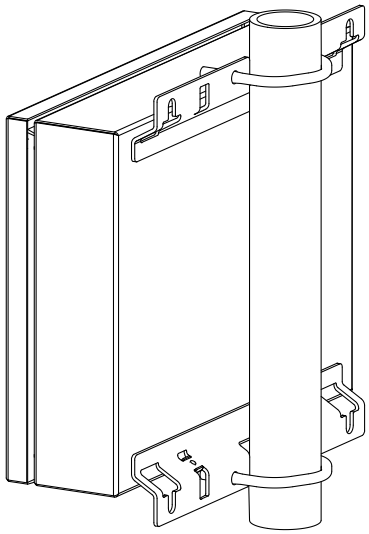
in mm

731**-**-*ST**



in mm

2" pipe mounting kit

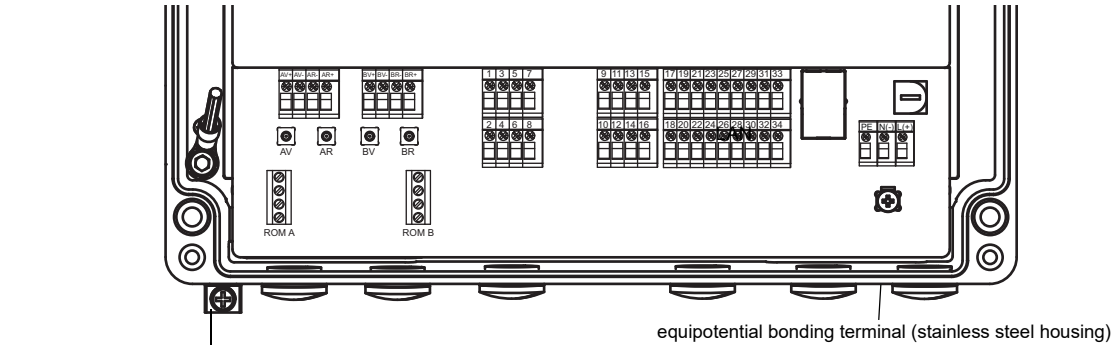
731**-**-*AL** 	item number: 731067-1
731**-**-*ST** 	item number: 721110-4

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

***731**



equipotential bonding terminal (aluminum housing)

equipotential bonding terminal (stainless steel housing)

power supply[1]							
AC				**DC**			
terminal		**connection**		**terminal**		**connection**	
L		line conductor		(+)		+	
N		neutral conductor		(-)		-	
PE		protective conductor		PE		protective conductor	
transducers							
transducer cable (transducers *****53, *****8*, ***\LI*), 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	signal		X_AV	X_BV	SMB connector
AVS or AV-	shield	BVS	shield				
ARS or AR-	shield	BRS	shield		X_AR	X_BR	SMB connector
AR or AR+	signal	BR	signal				

outputs, inputs[1, 2]	
terminal	**connection**
depending on configuration	current output, digital output, current input
1, 2, 3, 4 5, 6, 7, 8 9, 10, 11, 12 13, 14, 15, 16	temperature input
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, 9, 13	red	red
2, 6, 10, 14	white	white
3, 7, 11, 15	red/blue	grey
4, 8, 12, 16	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

[1] cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm^2

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

Transducers

Overview

Shear wave transducers

			technical type				
			G	**K**	**M**	**P**	**Q**
zone 2 - FM Class I Div. 2 - nonEx SMB connector normal temperature range			GDG1N52 GLG1N52	GDK1N52 GLK1N52	GDM2N52 GLM2N52	GDP2N52 GLP2N52	GDQ2N52 GLQ2N52
zone 2 - FM Class I Div. 2 - nonEx with stripped cable ends normal temperature range			GDG1N53 GLG1N53	GDK1N53 GLK1N53	GDM2N53 GLM2N53	GDP2N53 GLP2N53	GDQ2N53 GLQ2N53
zone 2 - nonEx IP68			GDG1LI8	GDK1LI8	GDM2LI8	GDP2LI8	
zone 2 - FM Class I Div. 2 - nonEx SMB connector extended temperature range			GDG1E52[1] GLG1E52[1]	GDK1E52[1] GLK1E52[1]	GDM2E52 GLM2E52	GDP2E52 GLP2E52	GDQ2E52 GLQ2E52
zone 2 - FM Class I Div. 2 - nonEx with stripped cable ends extended temperature range			GDG1E53[1] GLG1E53[1]	GDK1E53[1] GLK1E53[1]	GDM2E53 GLM2E53	GDP2E53 GLP2E53	GDQ2E53 GLQ2E53
zone 1 normal temperature range			GDG1N81 GLG1N81	GDK1N81 GLK1N81	GDM2N81 GLM2N81	GDP2N81 GLP2N81	GDQ2N81 GLQ2N81
zone 1 IP68			GDG1LI1	GDK1LI1	GDM2LI1	GDP2LI1	
zone 1 extended temperature range			GDG1E83 GLG1E83	GDK1E83 GLK1E83	GDM2E85 GLM2E85	GDP2E85 GLP2E85	GDQ2E85 GLQ2E85
inner pipe diameter d							
min. extended	mm		180	60	30	15	7
min. recommended	mm		220	80	40	20	10
max. recommended	mm		900	300	150	50	22
max. extended	mm		1100	360	180	60	30
pipe wall thickness							
min.	mm		11	5	2.5	1.2	0.6
fluid pressure							
min. extended	bar		metal pipe: 20				
min.	bar		metal pipe: 30, plastic pipe: 1				

[1] nonEx, FM

for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

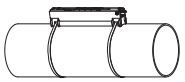
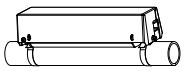
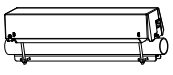
Lamb wave transducers

			technical type						
			F	**G**	**H**	**K**	**M**	**P**	**Q**
zone 2 - FM Class I Div. 2 - nonEx SMB connector normal temperature range			GRF1N52 GTF1N52	GRG1N52 GTG1N52	GRH1N52 GTH1N52	GRK1N52 GTK1N52	GRM1N52 GTM1N52	GRP1N52 GTP1N52	GRQ1N52 GTQ1N52
zone 2 - FM Class I Div. 2 - nonEx with stripped cable ends normal temperature range			GRF1N53 GTF1N53	GRG1N53 GTG1N53	GRH1N53 GTH1N53	GRK1N53 GTK1N53	GRM1N53 GTM1N53	GRP1N53 GTP1N53	GRQ1N53 GTQ1N53
zone 2 - nonEx IP68			GRF1LI8 GTF1LI8	GRG1LI8 GTG1LI8	GRH1LI8 GTH1LI8	GRK1LI8 GTK1LI8	GRM1LI8 GTM1LI8	GRP1LI8 GTP1LI8	
zone 2 - FM Class I Div. 2 - nonEx SMB connector higher temperatures				GRG1S52 GTG1S52	GRH1S52 GTH1S52	GRK1S52 GTK1S52	GRM1S52 GTM1S52	GRP1S52[1] GTP1S52[1]	
zone 2 - FM Class I Div. 2 - nonEx with stripped cable ends higher temperatures				GRG1S53 GTG1S53	GRH1S53 GTH1S53	GRK1S53 GTK1S53	GRM1S53 GTM1S53	GRP1S53[1] GTP1S53[1]	
zone 1 normal temperature range			GRF1N83 GTF1N83	GRG1N83 GTG1N83	GRH1N83 GTH1N83	GRK1N83 GTK1N83	GRM1N83 GTM1N83	GRP1N83 GTP1N83	GRQ1N83 GTQ1N83
zone 1 IP68			GRF1LI3	GRG1LI3	GRH1LI3	GRK1LI3	GRM1LI3	GRP1LI3	
zone 1 higher temperatures				GRG1S83 GTG1S83	GRH1S83 GTH1S83	GRK1S83 GTK1S83	GRM1S83 GTM1S83		
fluid pressure									
min. extended	bar		metal pipe: 10	metal pipe: 10	metal pipe: 10	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 plastic pipe: 1	metal pipe: 15 plastic pipe: 1	metal pipe: 15 plastic pipe: 1	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									
min. extended	mm		220	180	110	60	30	15	7
min. recommended	mm		270	220	140	80	40	20	10
max. recommended	mm		1200	900	600	300	150	50	22
max. extended	mm		1600	1400	1000	360	180	60	30
pipe wall thickness ****N, ****L****									
min.	mm		15	11	8	5	2.5	1.2	0.6
max.	mm		32	24	16	10	5	3	1.2
max. extended	mm		35						
pipe wall thickness ****S**									
min.	mm			10.6	7.1	4.2	2.1		
max.	mm			23.7	15.8	9.5	4.7		

[1] nonEx

for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Transducer mounting fixture

Variofix L	**Variofix C**
	
	Variofix C with bolt mounting plates
	 outer pipe diameter: **VCM**: max. 46 mm **VCQ**: max. 36 mm

for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Coupling materials for transducers

	normal temperature range		**extended temperature range**		
	< 100 °C	< 170 °C	< 150 °C	< 200 °C	200...240 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or H or coupling foil type VT	coupling foil type TF
long time measurement	coupling foil type VT	coupling foil type VT	coupling foil type VT	coupling foil type VT	

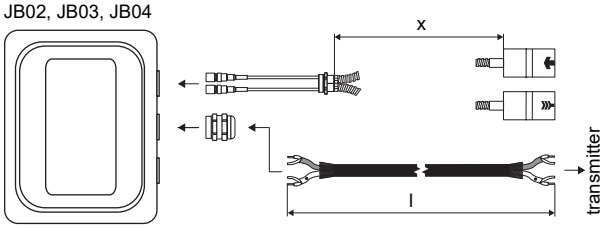
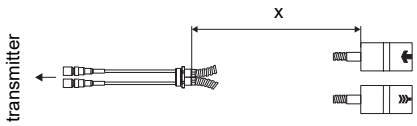
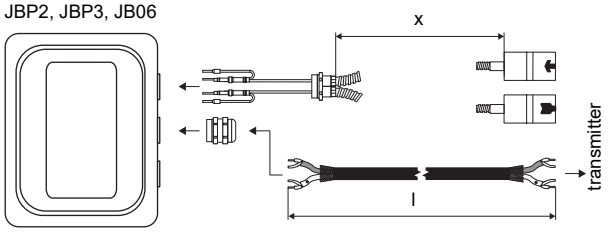
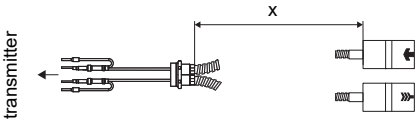
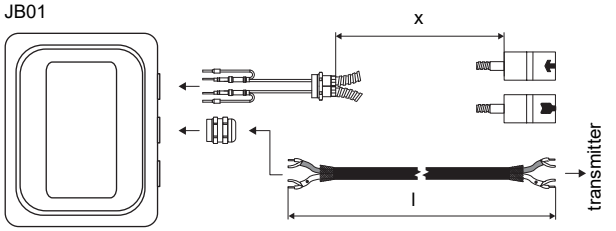
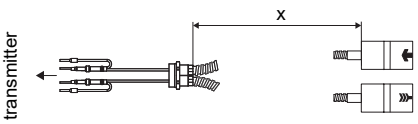
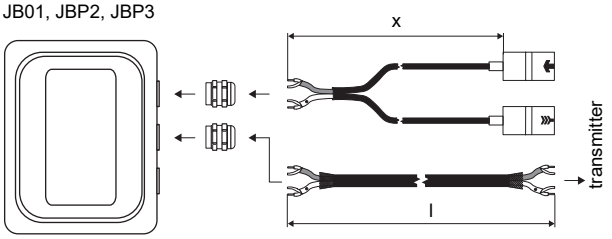
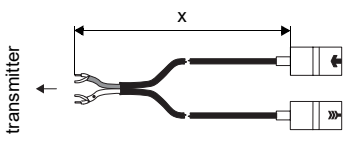
for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Damping material

		damping mat		**damping coat**
item number		992080-11	992080-10	992080-13
type		E30R4	E30R3	

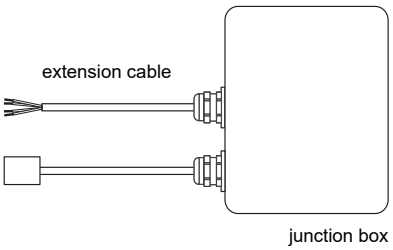
for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Connection systems

connection system TS		
connection with extension cable	direct connection	transducers technical type
JB02, JB03, JB04 		*****52
connection system T1		
connection with extension cable	direct connection	transducers technical type
JBP2, JBP3, JB06 		****N53 ****E53 ****S53
JB01 		*****8*
JB01, JBP2, JBP3 		****LI*

for further data see Technical specification TS_G7xx-transducersVx-xXX_Leu

Temperature Probes

PT12N		**PT12F**
item number: • 770415-1 • 770414-2 (matched)	item number: • 770415-1A2 • 770414-1A2 (matched)	item number: • 770415-2
• Pt100 • clamp-on • -30...+250 °C	• Pt100 • clamp-on • -30...+250 °C • ATEX/UKCA	• Pt100 • clamp-on • -45...+250 °C • response time: 8 s
direct connection 		
connection with extension cable  		

see Technical specification TS_PTVx-xXX_Leu

For more information: **Emerson.com**

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