

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 (min. 45 to 100 psi 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 nonEx	FLUXUS G731 ATEX/IECEx	FLUXUS G731 FM Class I Div. 2
design		DE7-G731GP-NNN**-*AL... (aluminum housing) DE7-G731GP-NNN**-*ST... (stainless steel housing)	DE7-G731GP-A2N**-*AL... (aluminum housing) DE7-G731GP-A2N**-*ST... (stainless steel housing)	DE7-G731GP-F2N**-*AL... (aluminum housing) DE7-G731GP-F2N**-*ST... (stainless steel housing)
				
certification type			aluminum housing: 731-ADN (100 to 240 V) 731-ANN (11 to 32 V DC) stainless steel housing: 731-SNN	F731**-F2N...
measurement				
measurement principle		transit time difference correlation principle		
flow direction		bidirectional		
synchronized channel averaging		x (2 measuring channels necessary)		
flow velocity	ft/s	0.03 to 115, depending on pipe diameter		
repeatability		0.15 % MV ±0.02 ft/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 ±0.02 ft/s includes calibration certificate traceable to NIST		
measurement uncertainty at the measuring point		±1 to 2 % MV ±0.02 ft/s, contact FLEXIM for an application specific uncertainty evaluation		
transmitter				
power supply		• 100 to 240 V ±10 %/50 to 60 Hz or • 11 to 32 V DC	• 731-ADN, 731-SNN: 100 to 240 V ±10 %/50 to 60 Hz or • 731-ANN, 731-SNN: 11 to 32 V DC	• 100 to 240 V ±10 %/50 to 60 Hz or • 11 to 32 V DC
power consumption	W	< 15		
number of measuring channels		1, optional: 2		
damping	s	0 to 100 (adjustable)		
measuring cycle	Hz	100 to 1000 (1 channel)		
response time	s	1 (1 channel), option: 0.02		
housing material		aluminum, powder coated or stainless steel 316L		
degree of protection		IP66		
dimensions	inch	see dimensional drawing		
weight	lb	aluminum housing: 9.9 stainless steel housing: 12.8		
fixation		wall mounting, optional: 2" pipe mounting		
ambient temperature	°F	-40* to +140 aluminum housing and 240 V: -40* to +149 * < -4 without operation of the display	731-ADN: -40* to +149 731-ANN, 731-SNN: -40* to +140 * < -4 without operation of the display	-40 to +140 (< -4 without operation of the display)
display		240 x 128 pixels, backlight		
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese		
certificates				
use in unclassified (ordinary) locations		optional:  FM25US0185 FM25CA0073 ambient temperature: -40* to +140 °F	-	-
explosion protection				
• ATEX/IECEx				
marking		-	 0637  II3G Ex ec IIC T4 Gc II2D Ex tb IIIC T135 °C Db T _a -40...+65 °C (731-ADN) T _a -40...+60 °C (731-ANN) T _a -40...+59/60 °C (731-SNN)	-
certification		-	IBExU24ATEX1014 X, IECEx IBE 23.0024X	-

¹ with aperture calibration of the transducers

² outside the explosive atmosphere (housing cover open)

		FLUXUS G731 nonEx	FLUXUS G731 ATEX/IECEX	FLUXUS G731 FM Class I Div. 2
• FM				
marking		-	-	 Cl. I,II,III/Div. 2 / GP. A, B, C, D, F, G / T5 -40 °C ≤ Ta ≤ +60 °C
certification		-	-	FM23US0036, FM23CA0026
measuring functions				
physical quantities		operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity, optional: gas energy flow rate (DGM)		
totalizer		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, parametrization of the transmitter: • USB ² • LAN ²		
process interfaces		max. 1 option: • Modbus RTU • BACnet MS/TP • 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, parametrization of the transmitter		
data logger				
loggable values		all physical quantities, totaled 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 to 20 (alarm current: 3.2 to 3.99, 20.01 to 24, hardware fault current: 3.2)		
uncertainty		0.04 % of output value ±3 µA		
active output		R _{ext} = 250 to 530 Ω, U _{opencircuit} = 28 V DC		
passive output		U _{ext} = 9 to 30 V DC, depending on R _{ext} (R _{ext} < 458 Ω at 20 V)		
current output in HART mode		option		
• range	mA	4 to 20 (alarm current: 3.5 to 3.99, 20.01 to 22, hardware fault current: 3.2)		
• active output		R _{ext} = 250 to 530 Ω, U _{opencircuit} = 28 V DC		
• passive output		U _{ext} = 9 to 30 V DC, depending on R _{ext} (R _{ext} = 250 to 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 to 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 to 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)		OC30V (IEC 60947-5-6) 5 to 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)
frequency output				
• range	kHz	0.002 to 10		
• damping	s	0 to 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 to 1000		
• pulse width	ms	0.05 to 1000		
• pulse rate		max. 10 000 pulses		

¹ with aperture calibration of the transducers² outside the explosive atmosphere (housing cover open)

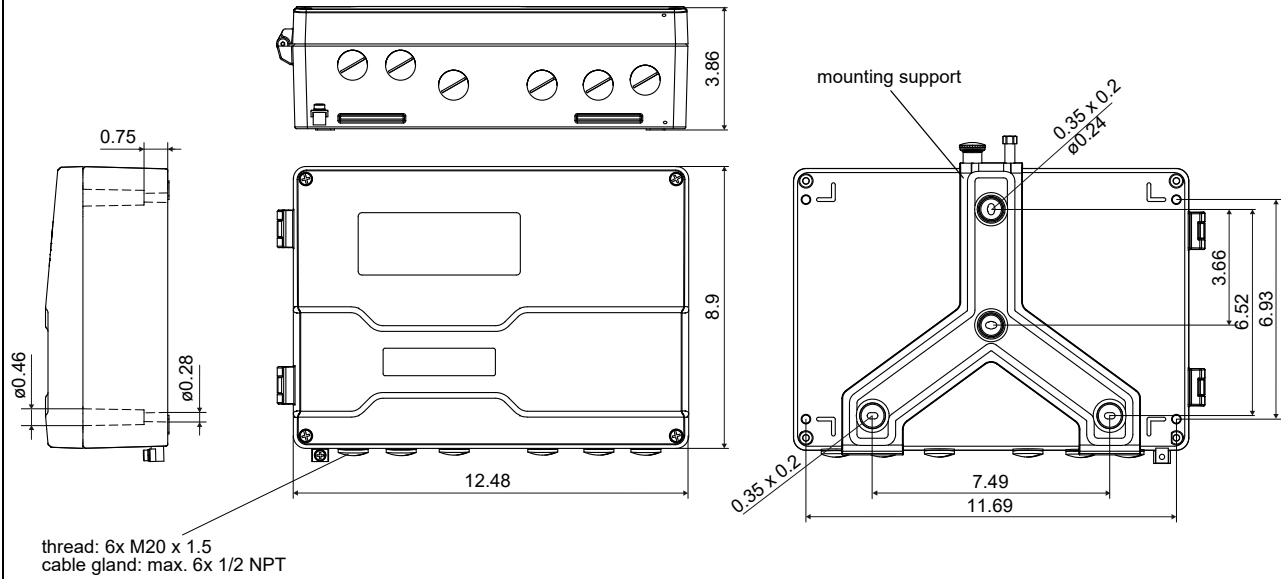
		FLUXUS G731 nonEx	FLUXUS G731 ATEX/IECEx	FLUXUS G731 FM Class I Div. 2
inputs				
		The inputs are galvanically isolated from the transmitter.		
number		on request, current inputs and outputs: max. 4		
• temperature input				
type		Pt100/Pt1000		
connection		4-wire		
range	°F	-238 to +1040		
resolution	K	0.01		
accuracy		±0.01 % MV ±0.03 K at 64 to 82 °F ±0.01 % MV ±0.03 K ±0.0005 %/K at <64 °F/>82 °F		
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 64 to 82 °F ±0.1 % MV ±0.01 mA ±0.005 %/K at <64 °F/>82 °F		
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 to 20		
passive input		U _{ext} = 24 V, R _{int} = 35 Ω, I _{max} ≤ 24 mA		
• range	mA	0 to 20		

¹ with aperture calibration of the transducers

² outside the explosive atmosphere (housing cover open)

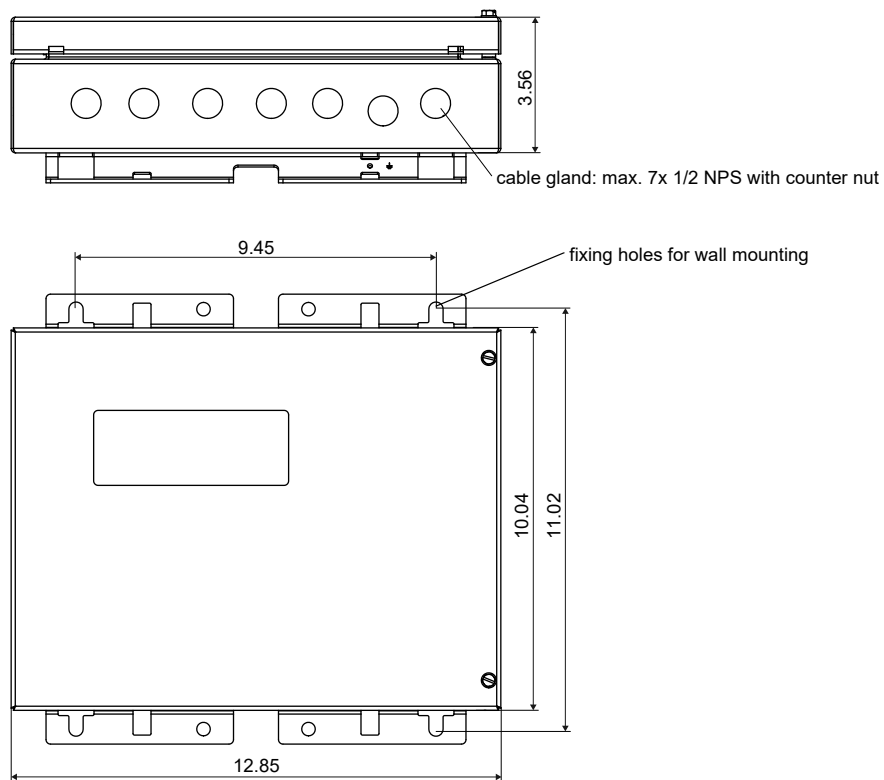
Dimensions

*731 (aluminum housing)



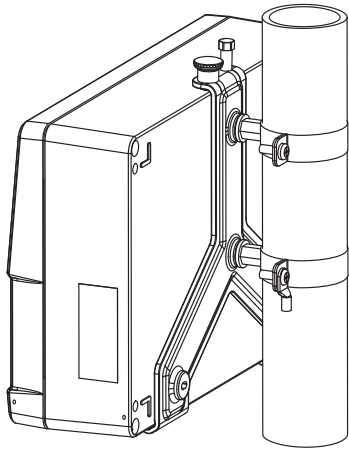
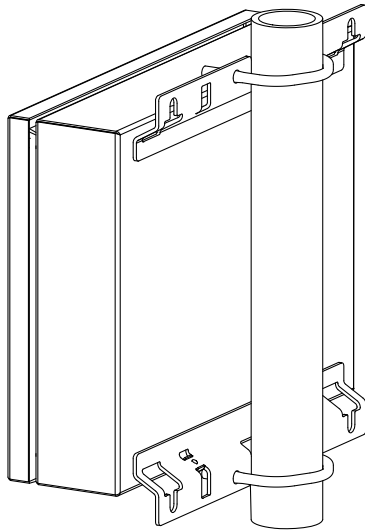
in inch

*731 (stainless steel housing)



in inch

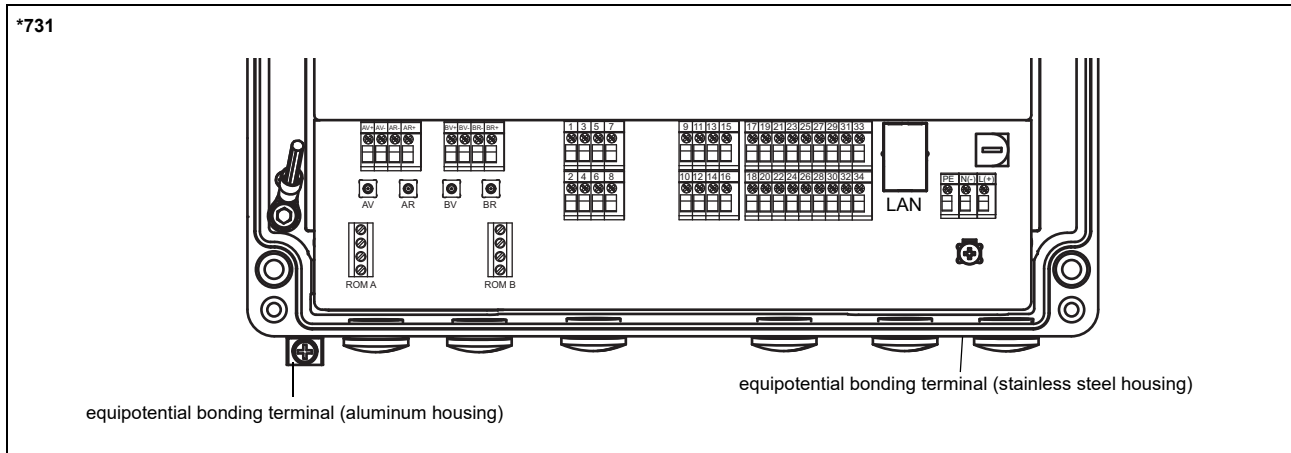
2" pipe mounting kit

<p>*731 (aluminum housing)</p> 	<p>item number: 731037-1</p>
<p>*731 (stainless steel housing)</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...+140 °F

Terminal assignment



power supply ¹				
AC		DC		
terminal	connection	terminal	connection	
L	line conductor	(+)	+	
N	neutral conductor	(-)	-	
PE	protective conductor	PE	protective conductor	
transducers				
measuring channel A		measuring channel B		transducer
terminal	connection	terminal	connection	
AV or AV+	signal	BV or BV+	signal	
AVS or AV-	shield	BVS or BV-	shield	
ARS or AR-	shield	BRS or BR-	shield	
AR or AR+	signal	BR or 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, Profibus PA, FF H1			
temperature probe				
terminal	direct connection		connection with extension cable, inline temperature probe	
1, 5, 9, 13	red		white	
2, 6, 10, 14	white		red	
3, 7, 11, 15	red		black	
4, 8, 12, 16	white		green	
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: AWG14 to 24

² The number, type and terminal assignment are customized.

Transducers

Overview

Shear wave transducers

			technical type				
			G	K	M	P	Q
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 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	inch		7.1	2.4	1.2	0.59	0.28
min. recommended	inch		8.7	3.1	1.6	0.79	0.39
max. recommended	inch		35.4	11.8	5.9	2	0.87
max. extended	inch		43.3	14.2	7.1	2.4	1.2
pipe wall thickness							
min.	inch		0.43	0.2	0.1	0.05	0.02
fluid pressure							
min. extended	psi		metal pipe: 290				
min.	psi		metal pipe: 435, plastic pipe: 15				

¹ nonEx, FM

for further data see Technical specification TS_G7xx-transducersVx-xxx_Lus

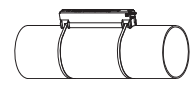
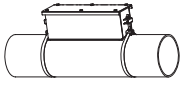
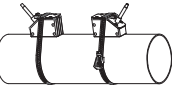
Lamb wave transducers

			technical type						
			F	G	H	K	M	P	Q
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 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	psi		metal pipe: 145	metal pipe: 145	metal pipe: 145	metal pipe: 145 (d > 4.7 inch) 44 (d < 4.7 inch)	metal pipe: 44 (d < 2.4 inch)	metal pipe: 44 (d < 1.4 inch)	metal pipe: 44 (d < 0.59 inch)
min.	psi		metal pipe: 218 plastic pipe: 15	metal pipe: 218 plastic pipe: 15	metal pipe: 218 plastic pipe: 15	metal pipe: 218 (d > 4.7 inch) 145 (d < 4.7 inch) plastic pipe: 15	metal pipe: 145 (d > 2.4 inch) 73 (d < 2.4 inch) plastic pipe: 15	metal pipe: 145 (d > 1.4 inch) 73 (d < 1.4 inch) plastic pipe: 15	metal pipe: 145 (d > 0.59 inch) 73 (d < 0.59 inch) plastic pipe: 15
inner pipe diameter d									
min. extended	inch		8.7	7.1	4.3	2.4	1.2	0.59	0.28
min. recommended	inch		10.6	8.7	5.5	3.1	1.6	0.79	0.39
max. recommended	inch		47.2	35.4	23.6	11.8	5.9	2	0.87
max. extended	inch		63	55.1	39.4	14.2	7.1	2.4	1.2
pipe wall thickness ****N**, ****L**									
min.	inch		0.59	0.43	0.31	0.2	0.1	0.05	0.02
max.	inch		1.3	0.94	0.63	0.39	0.2	0.12	0.05
max. extended	inch		1.4						
pipe wall thickness ****S**									
min.	inch			0.42	0.28	0.17	0.08		
max.	inch			0.93	0.62	0.37	0.19		

¹ nonEx

for further data see Technical specification TS_G7xx-transducersVx-xxx_Lus

Transducer mounting fixture

Variofix L	PermaLok	quick release clasps and tension straps
		
		transducer frequency M, P, Q

for further data see Technical specification TS_G7xx-transducersVx-xxx_Lus

Coupling materials for transducers

	normal temperature range (4th character of transducer order code = N)		extended temperature range higher temperatures (4th character of transducer order code = E, S)		
	< 212 °F	< 266 °F	< 356 °F	< 392 °F	392 to 464 °F
< 24 h	coupling compound type N or coupling pad type VT	coupling compound type N or type E or coupling pad type VT	coupling compound type E or coupling pad type VT	coupling compound type E or coupling pad type VT	coupling compound type H or coupling pad type TF
long time measurement	coupling pad type VT	coupling pad type VT	coupling pad type VT	coupling pad type VT	coupling pad type TF

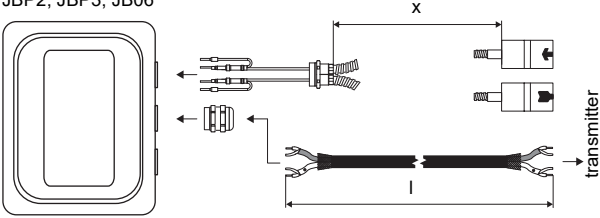
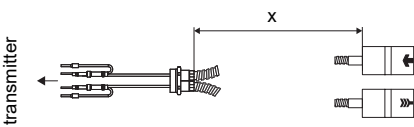
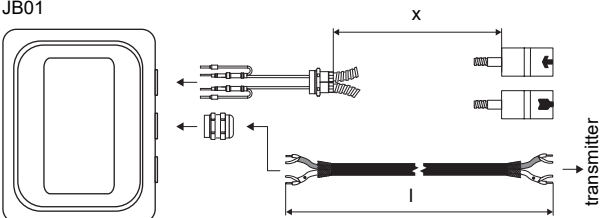
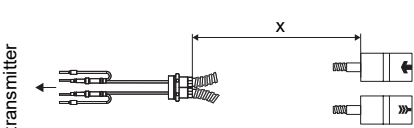
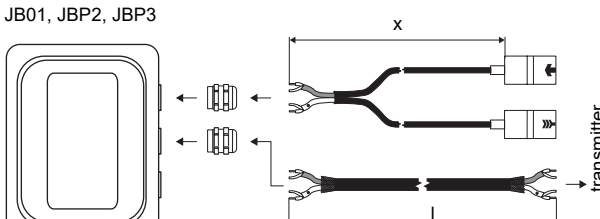
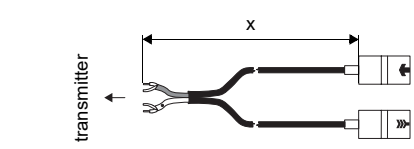
for further data see Technical specification TS_G7xx-transducersVx-xxx_Lus

Damping material

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

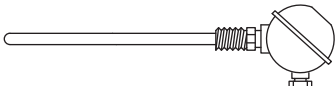
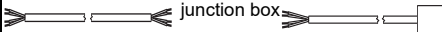
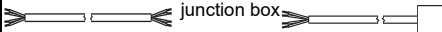
for further data see Technical specification TS_G7xx-transducersVx-xXX_Lus

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
<div>JBP2, JBP3, JBP6</div> 		****N53 ****E53 ****S53
<div>JB01</div> 		****g*
<div>JB01, JBP2, JBP3</div> 		****L *

for further data see Technical specification TS_G7xx-transducersVx-xXX_Lus

Temperature Probes

PT13N	PT13F	A2179
<ul style="list-style-type: none">• Pt1000• clamp-on• -40 to +392 °F	<ul style="list-style-type: none">• Pt1000• clamp-on• response time: 8 s• -49 to +482 °F	<ul style="list-style-type: none">• Pt1000• inline• -58 to +500 °F
direct connection		
		
connection with extension cable		
extension cable		
		

For more information: **Emerson.com**

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