Technical specification

FLUXUS G831

Ultrasonic gas flowmeters for permanent installation in hazardous areas

Features

- Two measuring channels
- Flameproof/explosion proof housing for hazardous areas
- Intrinsic safe process inputs for the integration of external pressure and temperature sensors
- More precise measurement at unfavorable measuring points through integrated disturbance correction
- Bidirectional communication and support of common bus technologies (Profibus PA, Foundation Fieldbus, HART, Modbus, BACnet)
- Certification: ATEX/IECEx zone 1, FM Class I Div. 1+2

Applications

- Chemical industry
- Petrochemical industry
- Oil and gas industry

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TSFLUXUS_G831V1-4EN_Leu, 2023-06-12

Transmitter

Technical data

		FLUXUS G831 (831-AA*, 831-SA*)	FLUXUS G831 (831-AB*, 831-SB*)	FLUXUS G831 (831-ANN, 831-SNN)	FLUXUS G831**-F1N
					
design		**831-AA*** (aluminum housing): explosion-proof field device or **831-SA*** (stainless steel housing): explosion-proof offshore device zone 1 (intrinsic safety: outputs, process interfaces)	**831-AB*** (aluminum housing): explosion-proof field device or **831-SB*** (stainless steel housing): explosion-proof offshore device zone 1 (intrinsic safety: outputs, inputs, process interfaces)	**831-ANN** (aluminum housing): explosion-proof field device or **831-SNN** (stainless steel housing): explosion-proof offshore device zone 1	aluminum housing: explosion-proof field device FM
measurement					
measurement principle		transit time difference correlation principle			
flow direction		bidirectional			
synchronised channel averaging		x (2 measuring channels necessary)			
flow velocity	m/s	measuring range: 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		20...32 V DC, U_m = 120 V		• 100...230 V/50...60 Hz or • 20...32 V DC	
power consumption	W	< 4		< 8	
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 housing: cast aluminum EN AC 44200 mod, special heavy-duty coating (C5 according to EN ISO 12944) stainless steel housing: stainless steel 316/316L (1.4401, 1.4404, 1.4432)			cast aluminum EN AC 44200 mod, special heavy-duty coating (C5 according to EN ISO 12944)
degree of protection		IP66			TYPE 4X/IP66
dimensions	mm	see dimensional drawing			
mounting position		**831-A*F** (Profibus PA, FF H1)**, 831-S****: nameplate faces upwards		-	
weight	kg	aluminum housing: 6.5, stainless steel housing: 15.6			
fixation		wall mounting, 2" pipe mounting			
ambient temperature	°C	aluminum housing: • -40…+60 • **831-A*F** (Profibus PA, FF H1): -40…+50 (< -20 without operation of the display) stainless steel housing: • -20...+60 • **831-S*F** (Profibus PA, FF H1): -20...+50		aluminum housing: -40…+60 (< -20 without operation of the display) stainless steel housing: -20…+60	-40…+60 (< -20 without operation of the display)
display		128 x 64 pixels, backlight			
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian, Chinese			

[1] with aperture calibration of the transducers

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

		FLUXUS G831 (831-AA*, 831-SA*)	FLUXUS G831 (831-AB*, 831-SB*)	FLUXUS G831 (831-ANN, 831-SNN)	FLUXUS G831**-F1N
explosion protection					
• ATEX/IECEx					
marking		CE 0637 Ex II2G II2D Ex db eb ia IIC T6 Gb Ex tb ia IIIC T100 °C Db **831-AAN:** T_a -40...+60 °C **831-SAN:** T_a -20...+60 °C **831-AAF:** T_a -40...+50 °C **831-SAF:** T_a -20...+50 °C	CE 0637 Ex II(1)2G II(1)2D Ex db eb ia [ia Ga] IIC T6 Gb Ex tb ia [ia Da] IIIC T100 °C Db **831-ABN:** T_a -40...+60 °C **831-SBN:** T_a -20...+60 °C **831-ABF:** T_a -40...+50 °C **831-SBF:** T_a -20...+50 °C	CE 0637 Ex II2G II2D Ex db eb IIC T6 Gb Ex tb IIIC T100 °C Db **831-ANN:** T_a -40...+60 °C **831-SNN:** T_a -20...+60 °C	-
certification		IBExU20ATEX1103 X, IECEx IBE 20.0015X	IBExU20ATEX1103 X, IECEx IBE 20.0015X	IBExU20ATEX1103 X, IECEx IBE 20.0015X	-
• FM					
marking		-	-	-	FM APPROVED NI, Cl. I, II, III, Div. 2, GP A, B, C, D, F, G / T4A Cl. I Div. 1, GP. A, B, C, D / T6 For Group A, conduit seal of connection compartment is required within 18 inches. Cl. II, Div. 1, GP. E, F, G / T6 Cl. III, Div. 1 / T6 Ta = -40°C to +60°C FM c APPROVED NI, Cl. I, II, III, Div. 2, GP A, B, C, D, F, G / T4A Cl. I Div. 1, GP. B, C, D / T6 Cl. II, Div. 1, GP. E, F, G / T6 Cl. III, Div. 1 / T6 Ta = -40°C to +60°C
measuring functions					
physical quantities		operating volumetric flow rate, standard volumetric flow rate, mass flow rate, flow velocity, gas energy flow rate (NGE)			
totaliser		volume, mass, gas energy (NGE)			
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]			
process interfaces		intrinsic safety, max. 1 option: • HART • Profibus PA • FF H1		max. 1 option: • Modbus RTU/RS485 • HART • Profibus PA • FF H1 • BACnet MS/TP	
intrinsic safety parameters		Profibus PA, FF H1: U_i = 24 V I_i = 174 mA P_i = 1044 mW L_i = 10 µH C_i negligible		-	
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			

[1] with aperture calibration of the transducers

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

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outputs					
		The outputs are galvanically isolated from the transmitter.			
• switchable current output					
				configurable according to NAMUR NE43 All switchable current outputs are jointly switched to active or passive.	
number		-		max. 3	
range	mA	-		4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)	
Unsicherheit		-		0.04 % v. AW ±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 • range • active output • passive output	 mA	- - - -		option 4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2) R_{ext} = 250...530 Ω, $U_{opencircuit}$ = 28 V DC U_{ext} = 9...30 V DC, depending on R_{ext} (R_{ext} = 250...458 Ω at 20 V)	
• current output					
		configurable according to NAMUR NE43			
range	mA	4...20 (alarm current: 3.2...3.99, 20.01...24, hardware fault current: 3.2)		-	
Unsicherheit		0.04 % v. AW ±3 µA		-	
passive output		U_{ext} ≤ 29 V DC, depending on R_{ext} (R_{ext} < 458 Ω at 20 V)		-	
current output in HART mode • range • passive output	 mA	option 4...20 (alarm current: 3.5...3.99, 20.01...22, hardware fault current: 3.2) U_{ext} = 9...29 V DC, depending on R_{ext} (R_{ext} = 250...458 Ω at 20 V)		 - -	
intrinsic safety parameters		U_i = 29 V I_i = 100 mA P_i = 0.725 W C_i = 1 nF L_i = 50 nH		-	
• digital output					
functions		• frequency output • binary output • pulse output		• frequency output • binary output • pulse output	
type		open collector (passive)		open collector (passive)	
operating parameters		8.2 V/30 mA (NAMUR)		8.2 V/30 mA (NAMUR)	
max. values		8 mA at 29 V DC		8 mA at 29 V DC	
frequency output					
• range	kHz	2...10		2...10	
• damping	s	0...999.9		0...999.9	
• pulse-to-pause ratio		1:1		1:1	
binary output					
• binary output as alarm output		limit, change of flow direction or error		limit, change of flow direction or error	
pulse output					
• pulse value	units	0.01...1000		0.01...1000	
• pulse width	ms	0.05...1000		0.05...1000	
• pulse rate		max. 10 000 pulses		max. 10 000 pulses	
intrinsic safety parameters		U_i = 29 V I_i = 100 mA P_i = 0.725 W C_i = 1 nF L_i = 50 nH		-	

[1] with aperture calibration of the transducers

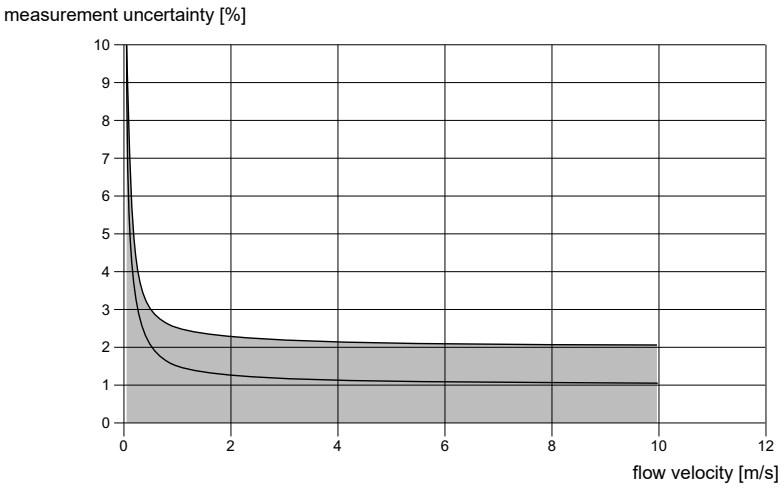
[2] outside the explosive atmosphere (housing cover open)

		FLUXUS G831 (831-AA*, 831-SA*)	FLUXUS G831 (831-AB*, 831-SB*)	FLUXUS G831 (831-ANN, 831-SNN)	FLUXUS G831**-F1N
inputs					
		not short-circuit proof The inputs are not galvanically isolated from the transmitter.		The inputs are galvanically isolated from the transmitter.	
• temperature input					
number		-	max. 1	max. 1	
type		-	Pt100/Pt1000	Pt100/Pt1000	
connection		-	4-wire	4-wire	
range	°C	-	-150...+560	-150...+560	
resolution	K	-	0.01	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	±0.01 % MV ±0.03 K at 18...28 °C ±0.01 % MV ±0.03 K ±0.0005 %/K at <18 °C/>28 °C	
Kabelwiderstand	Ω		max. 1000	max. 1000	
intrinsic safety parameters		-	U_o = 9.2 V I_o = 25 mA P_o = 0.057 W C_o = 4283 nF L_o = 57 mH	-	
• switchable current input					
		All switchable current inputs are jointly switched to active or passive.			
number		-		max. 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 • range	 mA	- -		R_{int} = 75 Ω, I_{max} ≤ 30 mA $U_{opencircuit}$ = 28 V (Leerlauf) U_{min} = 21.4 V at 20 mA 0...20	
passive input • range	 mA	- -		U_{ext} = 24 V, R_{int} = 35 Ω, I_{max} ≤ 24 mA 0...20	
• current input					
number		-	max. 1	-	
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 • range	 mA	- -	U_{int} < 20 V, R_{int} ≤ 385 Ω, I_{max} ≤ 40 mA U_{min} = 19.6 V - R_{int} · I 0...20	- -	
intrinsic safety parameters		-	U_o = 29.2 V I_o = 88 mA P_o = 0.64 W C_o = 73 nF L_o = 4.1 mH	-	

[1] with aperture calibration of the transducers

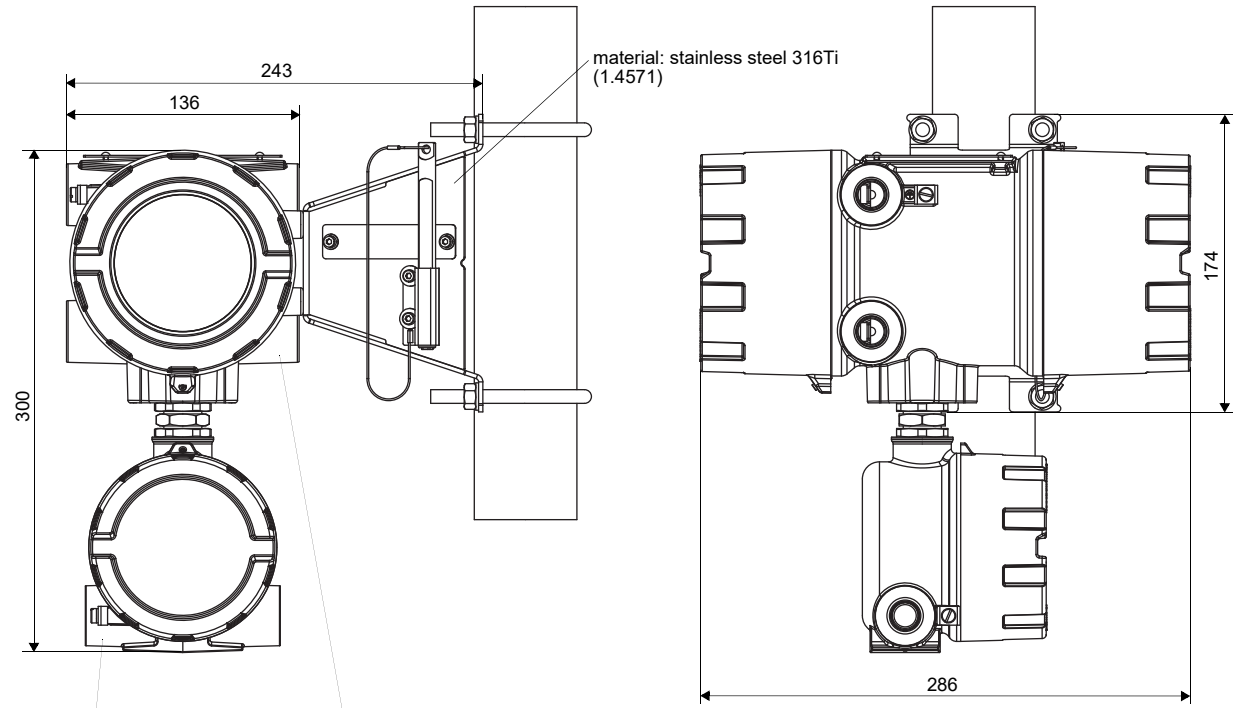
[2] outside the explosive atmosphere (housing cover open)

Measurement uncertainty



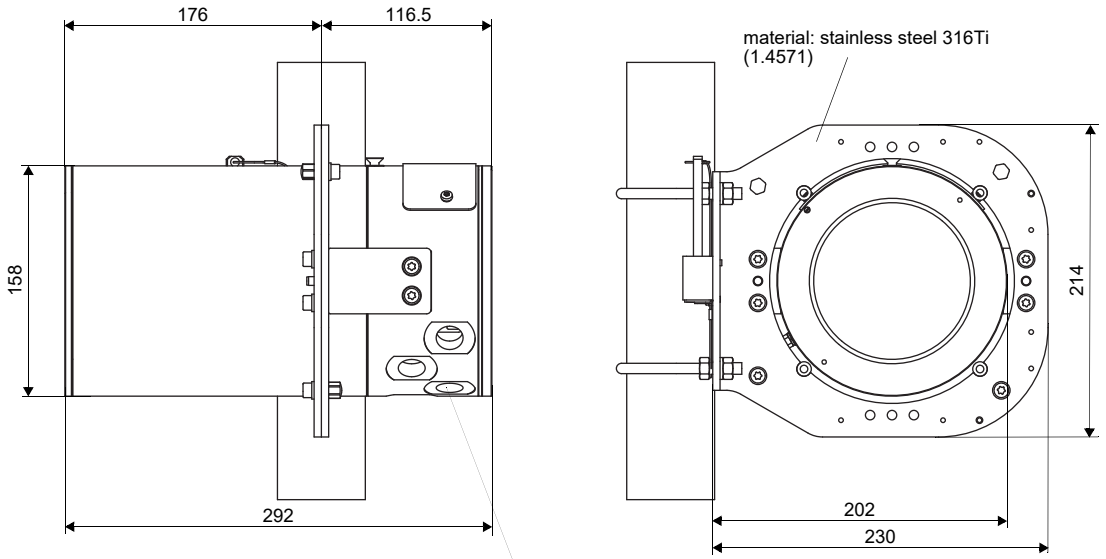
Dimensions

***831 (aluminum housing)**



in mm

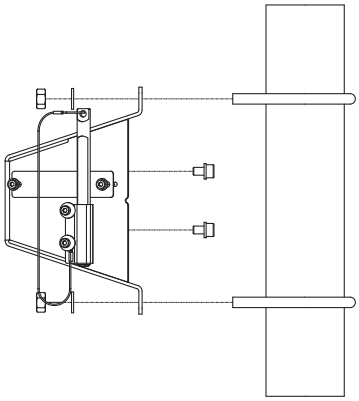
***831 (stainless steel housing)**



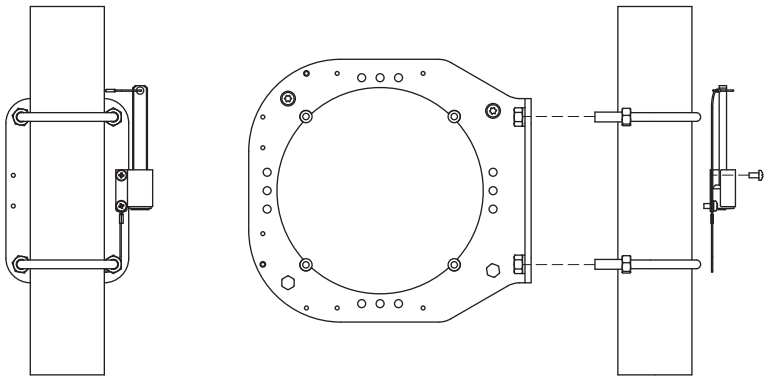
in mm

Wall and 2" pipe mounting kit

***831 (aluminum housing)**



***831 (stainless steel housing)**

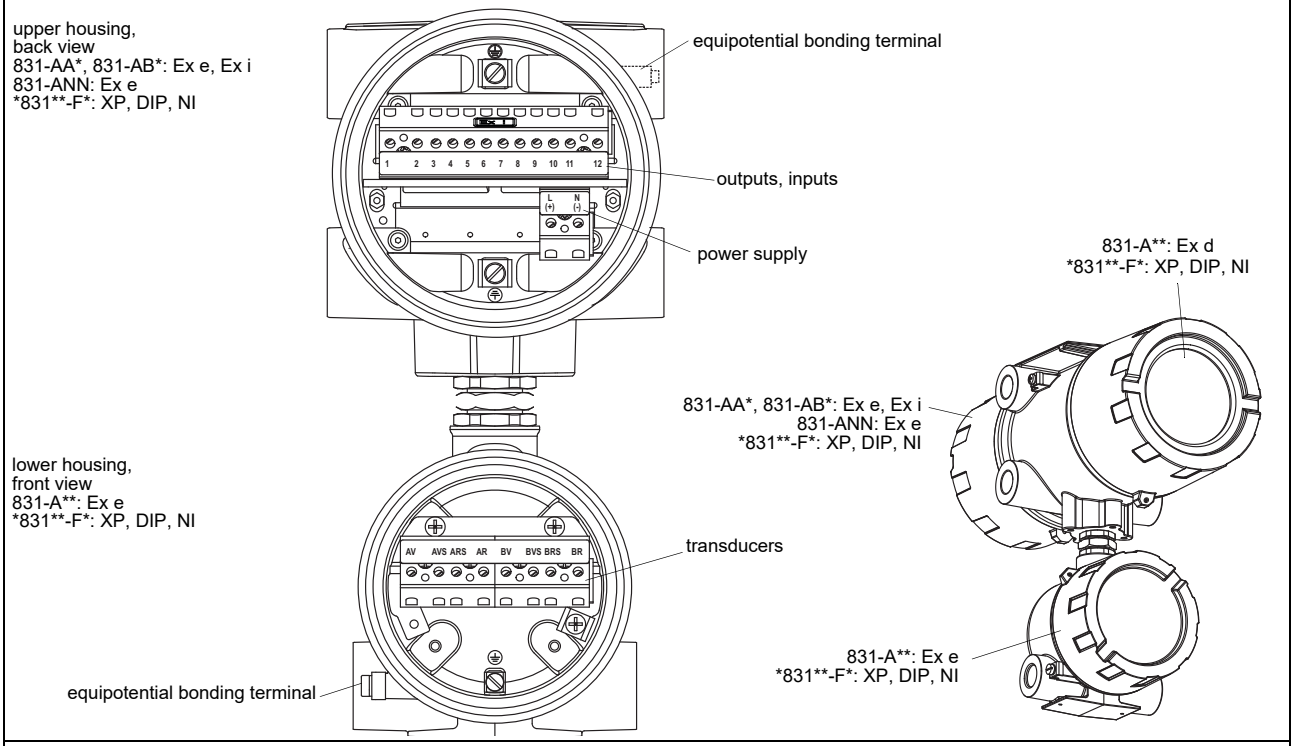


Storage

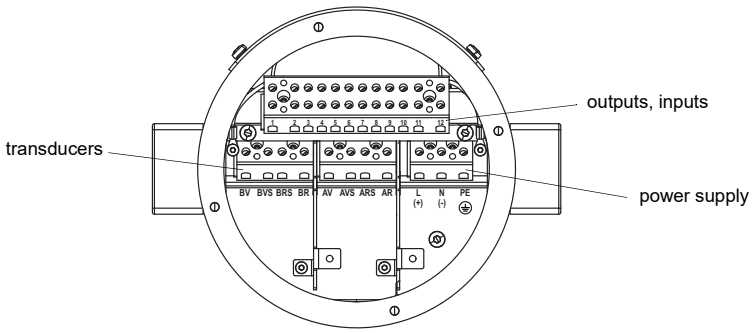
- do not store outdoors
- store within the original package
- store in a dry and dust-free place
- protect against sunlight
- keep all openings closed
- storing temperature:
  - aluminum housing: -40...+60 °C
  - stainless steel housing: -20...+60 °C

Terminal assignment

***831 (aluminum housing)**



***831 (stainless steel housing)**



power supply[1]			
AC		**DC**	
terminal	**connection**	**terminal**	**connection**
L	outer conductor	(+)	+
N	neutral conductor	(-)	-
⏚	protective conductor		

[1] cable (by customer): e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²

transducers, extension cable				
measuring channel A		**measuring channel B**		**transducer**
terminal	**connection**	**terminal**	**connection**	
AV	signal	BV	signal	↑
AVS	internal shield	BVS	internal shield	
ARS	internal shield	BRS	internal shield	⩔
AR	signal	BR	signal	
cable gland	external shield	cable gland	external shield	↑ ⩔

outputs, inputs[1, 2]		
terminal	**connection**	
depending on configuration	current output, digital output, current input	
3, 4, 5, 6	temperature input	
11+, 12-	passive current output/HART	
11-, 12+	active current output/HART	
11, 12	Modbus RTU, FF H1, Profibus PA, BACnet MS/TP	
temperature probe		
terminal	**direct connection**	**connection with extension cable**
3	red	blue
4	red	grey
5	white	white
6	white	red
USB	type C Hi-Speed USB 2.0 Device	service (FluxDiag/FluxDiagReader)

[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 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
FM Class I Div. 1 normal temperature range			GDG1N62 GLG1N62	GDK1N62 GLK1N62	GDM1N62 GLM1N62	GDP1N62 GLP1N62	GDQ1N62 GLQ1N62
FM Class I Div. 2 normal temperature range			CDG1N53 CLG1N53	CDK1N53 CLK1N53	CDM2N53 CLM2N53	CDP2N53 CLP2N53	CDQ2N53 CLQ2N53
FM Class I Div. 2 extended temperature range					CDM2E53 CLM2E53	CDP2E53 CLP2E53	CDQ2E53 CLQ2E53
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				

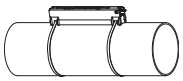
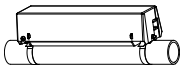
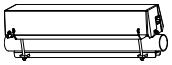
for further data see Technical specification TS_G8xx-transducersVx-xXX_Leu

Lamb wave transducers

			technical type						
			F	**G**	**H**	**K**	**M**	**P**	**Q**
zone 1 normal temperature range			GRF1N83 GTF1N83	GRG1N83 GTG1N83	GRH1N83 GTH1N83	GRK1N83 GTK1N83	GRM1N83 GTM1N83	GRP1N83 GTP1N83	GRQ1N83 GTQ1N83
zone 1 higher temperatures				GRG1S83 GTG1S83	GRH1S83 GTH1S83	GRK1S83 GTK1S83	GRM1S83 GTM1S83		
zone 1 IP68			GRF1LI3	GRG1LI3	GRH1LI3	GRK1LI3	GRM1LI3	GRP1LI3	
FM Class I Div. 1				GRG1N62 GTG1N62	GRH1N62 GTH1N62	GRK1N62 GTK1N62	GRM1N62 GTM1N62	GRP1N62 GTP1N62	GRQ1N62 GTQ1N62
FM Class I Div. 2			GRF1N53 GTF1N53	GRG1N53 GTG1N53	GRH1N53 GTH1N53	GRK1N53 GTK1N53	GRM1N53 GTM1N53		
FM Class I Div. 2 higher temperatures				GRG1S53 GTG1S53	GRH1S53 GTH1S53	GRK1S53 GTK1S53	GRM1S53 GTM1S53		
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		

for further data see Technical specification TS_G8xx-transducersVx-xXX_Leu

Transducer mounting fixture

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

for further data see Technical specification TS_G8xx-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 measure-ment	coupling foil type VT	coupling foil type VT	coupling foil type VT	coupling foil type VT	

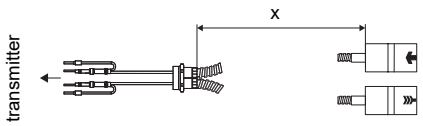
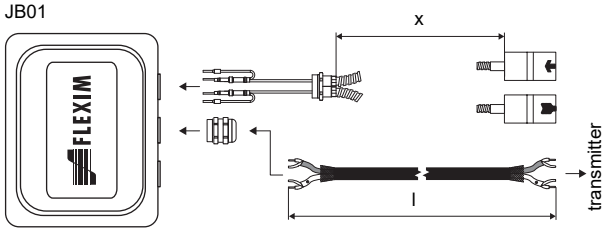
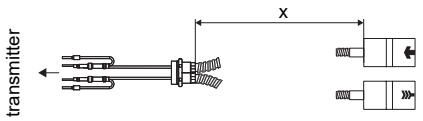
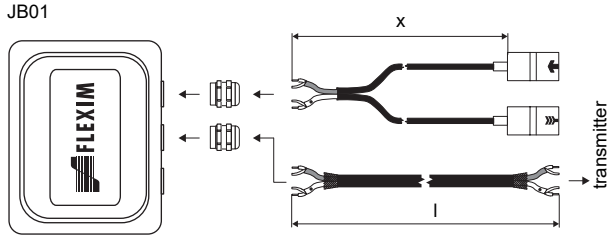
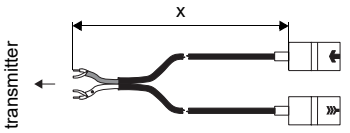
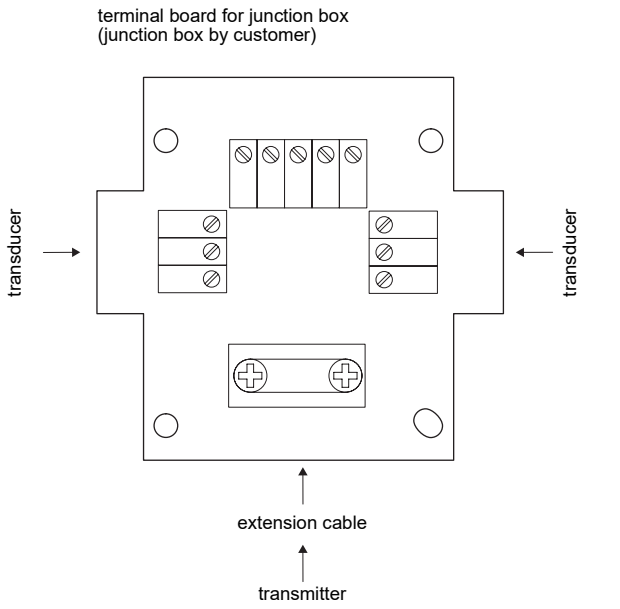
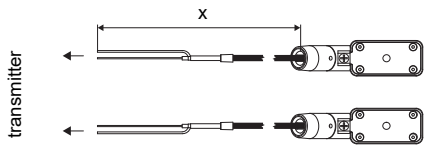
for further data see Technical specification TS_G8xx-transducersVx-xXX_Leu

Damping material

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

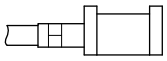
for further data see Technical specification TS_G8xx-transducersVx-xXX_Leu

Connection systems

connection system T1		
connection with extension cable	direct connection	transducers technical type
		*****53
JB01 		*****8*
JB01 		****LI*
terminal board for junction box (junction box by customer) 		*****62

for further data see Technical specification TS_G8xx-transducersVx-xXX_Leu

Temperature probes

PT12N (item number: 770415-6)	PT12N (item number: 770415-7)
• Pt100 • clamp-on • -45...+230 °C • ATEX zone 0/1 (intrinsic safety) • for 831-*B*	• Pt100 • clamp-on • -45...+250 °C • ATEX zone 1 • for 831-*NN
	

see Technical specification TS_PTVx-xXX