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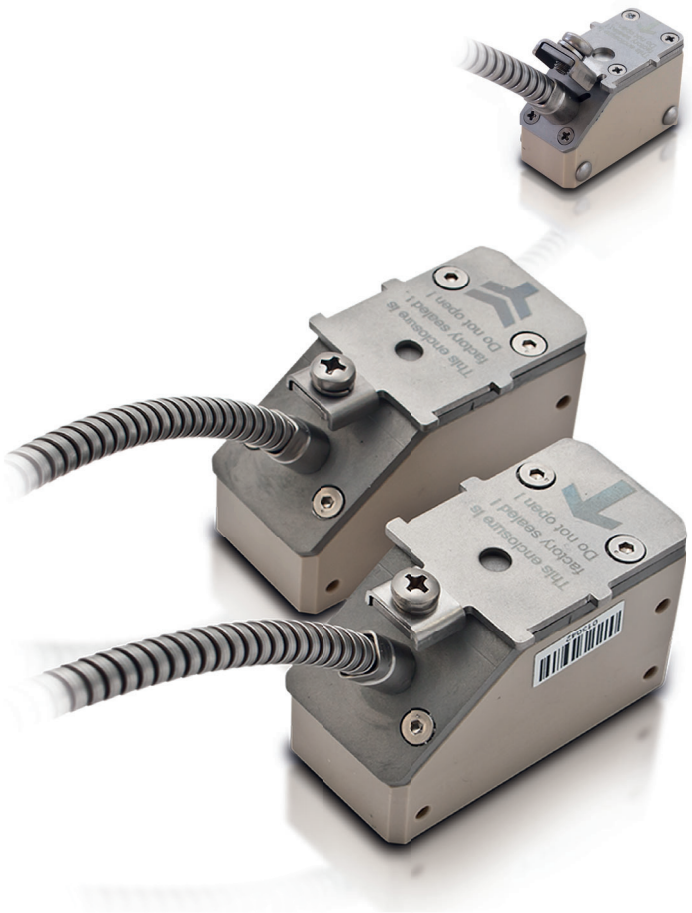
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Technical Specification
TS_CxxxxxxV6-1EN_Leu

2024-11-01

Flexim Clamp-on Ultrasonic Transducers for Measurement of Liquids



FLEXIM

EMERSON

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Transducers for Measurement of Liquids

Overview

					shear wave transducers			Lamb wave transducers		
explosion protection	ambient temperature	connection system	IP68	radiation-hardened	order code	page	technical type	order code	page	technical type
nonEx	N	TS			FS*-NNNN-**TS	15	C(DL)**N52	FL*-NNNN-**TS	33	C(RT)*1N52
		T1			FS*-NNNN-**T1	16	C(DL)**N53	FL*-NNNN-**T1	34	C(RT)*1N53
				x	FS*-NNNN-**T1/HRH	12	CD*2R53			
		AS			FS*-NNNN-**AS	7	C(DL)**NZ7	FL*-NNNN-**AS	31	C(RT)*1NC3
		NL			FS*-NNNN-**NL	9	C(DL)*1NZ7	FL*-NNNN-**NL	31	C(RT)*1NC3
	L	T1	x		FS*-LNNN-**T1/H68	17	CD**LI8	FL*-LNNN-**T1/H68	36	CR*1LI8
					FS*-LNNN-**T1	6	CDK1LZ7, CD*2LZ1			
					FSQ-LNNN-**T1/HSC	14	CDQ2LK1			
		KL	x		FS*-LNNN-**KL/H68	11	CD**LI7			
	E	TS			FS*-ENNN-**TS	18	C(DL)**E52			
		T1			FS*-ENNN-**T1	19	C(DL)**E53			
				x	FS*-ENNN-**T1/HRH	13	CD*2W53			
		AS			FS*-ENNN-**AS	8	C(DL)*2EZ7			
		NL			FS*-ENNN-**NL	10	C(DL)*1EZ7			
	S	TS						FL*-SNNN-**TS	37	C(RT)*1S52
		T1						FL*-SNNN-**T1	38	C(RT)*1S53
		NL						FL*-SNNN-**NL	32	C(RT)*1SC3
ATEX/IECEx zone 2	N	TS			FS*-NA2N-**TS	15	C(DL)**N52	FL*-NA2N-**TS	33	C(RT)*1N52
		T1			FS*-NA2N-**T1	16	C(DL)**N53	FL*-NA2N-**T1	34	C(RT)*1N53
		NL			FS*-NA2N-**NL	20	C(DL)**NH1	FL*-NA2N-**NL	39	C(RT)*1NH3
	L	T1	x		FS*-LA2N-**T1/H68	17	CD**LI8	FL*-LA2N-**T1/H68	36	CR*1LI8
	E	TS			FS*-EA2N-**TS	18	C(DL)**E52			
		T1			FS*-EA2N-**T1	19	C(DL)**E53			
		NL			FS*-EA2N-**NL	21	C(DL)*2EH5			
	S	TS						FL*-SA2N-**TS	37	C(RT)*1S52
		T1						FL*-SA2N-**T1	38	C(RT)*1S53
		NL						FL*-SA2N-**NL	40	C(RT)*1SH3
ATEX/IECEx zone 1	N	T1			FS*-NA1N-**T1	24	C(DL)**N81	FL*-NA1N-**T1	42	C(RT)*1N83
		NL			FS*-NA1N-**NL	26	C(DL)**NW1	FL*-NA1N-**NL	46	C(RT)*1NW3
	L	T1	x		FS*-LA1N-**T1/H68	25	CD**LI1	FL*-LA1N-**T1/H68	44	CR*1LI3
	E	T1			FS*-EA1N-**T1	27	C(DL)*1E83			
						28	C(DL)*2E85			
		NL			FS*-EA1N-**NL	29	C(DL)*2EW5			
	S	T1						FL*-SA1N-**T1	45	C(RT)*1S83
		NL						FL*-SA1N-**NL	47	C(RT)*1SW3
inmetro	N	T1			FS*-NS1N-**T1	24	C(DL)**N81	FL*-NS1N-**T1	42	C(RT)*1N83
	L		x		FS*-LS1N-**T1/H68	25	CD**LI1	FL*-LS1N-**T1/H68	44	CR*1LI3
	E	T1			FS*-EA1N-**T1	27	C(DL)*1E83			
						28	C(DL)*2E85			
	S	T1						FL*-SA1N-**T1	45	C(RT)*1S83
KOSHA	N	T1			FS*-NK1N-**T1	24	C(DL)**N81	FL*-NK1N-**T1	42	C(RT)*1N83
	E				FS*-EK1N-**T1	28	C(DL)*2E85			
EAC zone 2	N	TS			FS*-NE2N-**TS	15	C(DL)**N52	FL*-NE2N-**TS	33	C(RT)*1N52
		T1			FS*-NE2N-**T1	16	C(DL)**N53	FL*-NE2N-**T1	34	C(RT)*1N53
		NL			FS*-NE2N-**NL	20	C(DL)**NH1	FL*-NE2N-**NL	39	C(RT)*1NH3
	L	T1	x		FS*-LE2N-**T1/H68	17	CD**LI8	FL*-LE2N-**T1/H68	36	CR*1LI8
	E	TS			FS*-EE2N-**TS	18	C(DL)**E52			
		T1			FS*-EE2N-**T1	19	C(DL)**E53			
		NL			FS*-EE2N-**NL	21	C(DL)*2EH5			
	S	TS						FL*-SE2N-**TS	37	C(RT)*1S52
		T1						FL*-SE2N-**T1	38	C(RT)*1S53
		NL						FL*-SE2N-**NL	40	C(RT)*1SH3
EAC zone 1	N	T1			FS*-NE1N-**T1	24	C(DL)**N81	FL*-NE1N-**T1	42	C(RT)*1N83
		NL			FS*-NE1N-**NL	26	C(DL)**NW1	FL*-NE1N-**NL	46	C(RT)*1NW3
	L	T1	x		FS*-LE1N-**T1/H68	25	CD**LI1	FL*-LE1N-**T1/H68	44	CR*1LI3
	E	T1			FS*-EE1N-**T1	27	C(DL)*1E83			
						28	C(DL)*2E85			
		NL			FS*-EE1N-**NL	29	C(DL)*2EW5			
	S	T1						FL*-SE1N-**T1	45	C(RT)*1S83
		NL						FL*-SE1N-**NL	47	C(RT)*1SW3

technical type *D*****, *R*****: standard transducer
technical type *L*****, *T*****: transducer with long cable

continued on next page

					shear wave transducers			Lamb wave transducers		
explosion protection	ambient temperature	connection system	IP68	radiation-hardened	order code	page	technical type	order code	page	technical type
JPEx zone 1	N	T1			FS*-NJ1N-**T1	24	C(DL)**N81	FL*-NJ1N-**T1	42	C(RT)*1N83
	L		x		FS*-LJ1N-**T1/H68	25	CD**LI1	FL*-LJ1N-**T1/H68	44	CR*1LI3
	E				FS*-EJ1N-**T1	27	C(DL)*1E83			
						28	C(DL)*2E85			
FM Class I Div. 2	N	TS			FS*-NF2N-**TS	15	C(DL)**N52	FL*-NF2N-**TS	33	C(RT)*1N52
		T1			FS*-NF2N-**T1	16	C(DL)**N53	FL*-NF2N-**T1	34	C(RT)*1N53
		NL			FS*-NF2N-**NL	22	C(DL)*1N51	FL*-NF2N-**NL	41	C(RT)*1N51
	E	TS			FS*-EF2N-**TS	18	C(DL)**E52			
		T1			FS*-EF2N-**T1	19	C(DL)**E53			
		NL			FS*-EF2N-**NL	23	C(DL)*1E51			
	S	TS						FL*-SF2N-**TS	37	C(RT)*1S52
		T1						FL*-SF2N-**T1	38	C(RT)*1S53
FM Class I Div. 1	N	T1			FS*-NF1N-**T1	30	C(DL)*1N62	FL*-NF1N-**T1	48	C(RT)*1N62

technical type *D*****, *R*****: standard transducer
technical type *L*****, *T*****: transducer with long cable

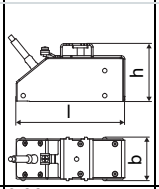
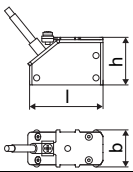
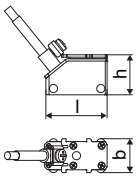
Transducer order code

1, 2	3		4	5...7		8, 9	10, 11		12...14			no. of character
transducer	**transducer frequency**	**-**	**ambient temperature**	**explosion protection**	**-**	**certification**	**connection system**	**-**	**cable length**	**/**	**option**	**description**
FS												set of ultrasonic flow transducers for measurement of liquids, shear wave
FL												set of ultrasonic flow transducers for measurement of liquids, Lamb wave
	F											0.15 MHz
	G											0.2 MHz
	H											0.3 MHz
	K											0.5 MHz
	M											1 MHz
	P											2 MHz
	Q											4 MHz
	S											8 MHz
			L									low temperature range
			N									normal temperature range
			E									extended temperature range
			S									higher temperatures
				NNN								not explosion-proof
				A2N								ATEX zone 2/IECEx zone 2
				A1N								ATEX zone 1/IECEx zone 1
				S1N								inmetro zone 1
				K1N								KOSHA zone 1
				E2N								EAC zone 2
				E1N								EAC zone 1
				J1N								Japanese Ex certification zone 1
				F1N								FM Class I Div. 1
				F2N								FM Class I Div. 2
						**						
							AS					with Amphenol connector
							NL					with LEMO connector
							KL					with LEMO connector
							TS					with SMB connector
							T1					with stripped cable ends
									***			in m
											H68	degree of protection IP68
											HRH	radiation-hardened
											HSC	metal-free

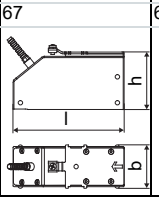
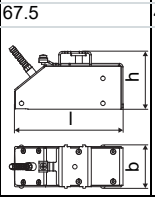
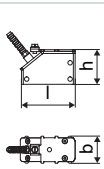
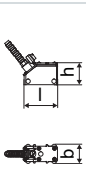
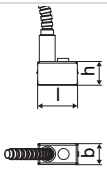
Technical data

Shear wave transducers

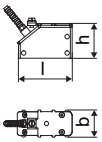
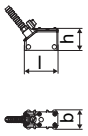
Shear wave transducers (nonEx, T1, low temperature range)

order code		FSK-LNNN-**T1	FSM-LNNN-**T1	FSP-LNNN-**T1	FSQ-LNNN-**T1
technical type		CDK1LZ7	CDM2LZ1	CDP2LZ1	CDQ2LZ1
transducer frequency	MHz	0.5	1	2	4
inner pipe diameter d					
min. extended	mm	100	50	25	10
min. recommended	mm	200	100	50	25
max. recommended	mm	2000	1000	400	150
max. extended	mm	2400	1200	480	240
pipe wall thickness					
min.	mm	5	2.5	1.2	0.6
material					
housing		PEEK with stainless steel cover 316Ti (1.4571)			
contact surface		PEEK			
degree of protection		IP66			
transducer cable					
type		2606			
length	m	10			
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...+100			
ambient temperature	°C	-40...+100			

Shear wave transducers (nonEx, AS)

order code		FSG-NNNN-**AS	FSK-NNNN-**AS	FSM-NNNN-**AS	FSP-NNNN-**AS	FSQ-NNNN-**AS	FSS-NNNN-**AS
technical type		C(DL)G1NZ7	C(DL)K1NZ7	C(DL)M2NZ7	C(DL)P2NZ7	C(DL)Q2NZ7	CDS1NZ7
transducer frequency	MHz	0.2	0.5	1	2	4	8
inner pipe diameter d							
min. extended	mm	400	100	50	25	10	6
min. recommended	mm	500	200	100	50	25	10
max. recommended	mm	4000	2000	1000	400	150	70
max. extended	mm	6500	2400	1200	480	240	70
pipe wall thickness							
min.	mm	11	5	2.5	1.2	0.6	0.3
material							
housing		PEEK with stainless steel cover 304 (1.4301)		PEEK with stainless steel cover 304 (1.4301)			stainless steel 304 (1.4301)
contact surface		PEEK		PEEK			PEI
degree of protection		IP66		IP66/IP67			IP66
transducer cable							
type		1699					
length	m	5		4		3	2
dimensions							
length l	mm	129.5	126.5	64		40	25
width b	mm	51	51	32		22	13
height h	mm	67	67.5	40.5		25.5	17
dimensional drawing							
weight (without cable)	kg	0.47	0.36	0.066		0.016	0.004
pipe surface temperature	°C	-40...+130					-30...+130
ambient temperature	°C	-40...+130					-30...+130
temperature compensation		x					

Shear wave transducers (nonEx, AS, extended temperature range)

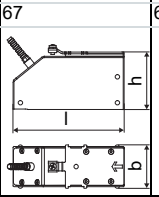
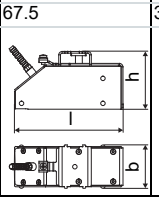
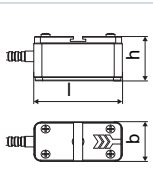
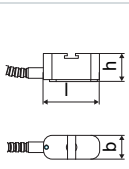
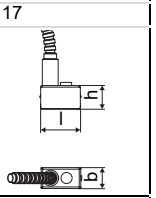
order code		FSM-ENNN-**AS	FSP-ENNN-**AS	FSQ-ENNN-**AS
technical type		C(DL)M2EZ7	C(DL)P2EZ7	C(DL)Q2EZ7
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	1200	480	240
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover 304 (1.4301)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		25.5
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature	°C	-30...+240[1]		-30...+200
ambient temperature	°C	-30...+40 -30...+60[2] -30...+200[3]		-30...+200
temperature compensation		x		

[1] > +200 °C:
Variofix C without cover or Variofix L
observe the insulation instruction

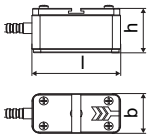
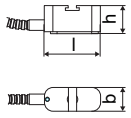
[2] pipe surface temperature +200...+240 °C: Variofix C without cover

[3] pipe surface temperature max. +200 °C

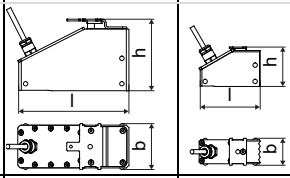
Shear wave transducers (nonEx, NL)

order code		FSG-NNNN-**NL	FSK-NNNN-**NL	FSM-NNNN-**NL	FSP-NNNN-**NL	FSQ-NNNN-**NL	FSS-NNNN-**NL
technical type		C(DL)G1NZ7	C(DL)K1NZ7	C(DL)M1NZ7	C(DL)P1NZ7	C(DL)Q1NZ7	CDS1NZ7
transducer frequency	MHz	0.2	0.5	1	2	4	8
inner pipe diameter d							
min. extended	mm	400	100	50	25	10	6
min. recommended	mm	500	200	100	50	25	10
max. recommended	mm	4000	2000	1000	400	150	70
max. extended	mm	6500	6500	3400	600	400	70
pipe wall thickness							
min.	mm	11	5	2.5	1.2	0.6	0.3
material							
housing		PEEK with stainless steel cover 304 (1.4301)		stainless steel 304 (1.4301)			stainless steel 304 (1.4301)
contact surface		PEEK		PEEK			PEI
degree of protection		IP66		IP66			IP66
transducer cable							
type		1699					
length	m	5		4		3	2
dimensions							
length l	mm	129.5	126.5	60		42.5	25
width b	mm	51	51	30		18	13
height h	mm	67	67.5	33.5		21.5	17
dimensional drawing							
weight (without cable)	kg	0.47	0.36	0.035		0.011	0.004
pipe surface temperature	°C	-40...+130					-30...+130
ambient temperature	°C	-40...+130					-30...+130
temperature compensation		x					

Shear wave transducers (nonEx, NL, extended temperature range)

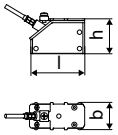
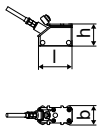
order code		FSM-ENNN-**NL	FSP-ENNN-**NL	FSQ-ENNN-**NL
technical type		C(DL)M1EZ7	C(DL)P1EZ7	C(DL)Q1EZ7
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		stainless steel 304 (1.4301)		
contact surface		Sintimid		
degree of protection		IP66		
transducer cable				
type		1699		
length	m	4		3
dimensions				
length l	mm	60		42.5
width b	mm	30		18
height h	mm	33.5		21.5
dimensional drawing				
weight (without cable)	kg	0.042		0.011
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		

Shear wave transducers (nonEx, KL)

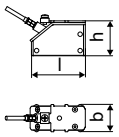
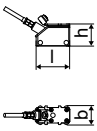
order code		FSK-LNNN-**KL/ H68	FSM-LNNN-**KL/ H68	FSP-LNNN-**KL/ H68
technical type		CDK1LI7	CDM2LI7	CDP2LI7
transducer frequency	MHz	0.5	1	2
inner pipe diameter		see transducer recommendation		
pipe wall thickness				
min.	mm	5	2.5	1.2
material				
housing		PEEK with stainless steel cover 316Ti (1.4571)		
contact surface		PEEK		
degree of protection		IP68[1]		
transducer cable				
type		7819		
length	m	6		
dimensions				
length l	mm	130	72	
width b	mm	54	32	
height h	mm	83.5	46	
dimensional drawing				
weight (without cable)	kg	0.43	0.085	
pipe surface temperature	°C	-40...+100		
ambient temperature	°C	-40...+100		

[1] test conditions: 3 months/2 bar (20 m)/20 °C

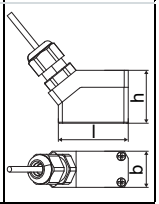
Shear wave transducers (nonEx, T1, radiation-hardened)

order code		FSM-NNNN-**T1/HRH	FSP-NNNN-**T1/HRH	FSQ-NNNN-**T1/HRH
technical type		CDM2R53	CDP2R53	CDQ2R53
transmitter		F721		
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	1200	480	240
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PEEK with stainless steel cover		
contact surface		PEEK		
degree of protection		IP66/IP67		
transducer cable				
type		2619		
length	m	4		3
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		25.5
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature	°C	-40...+130		
ambient temperature	°C	-40...+130		
temperature compensation		x		
absorbed dose	Gy	max. 500 000		

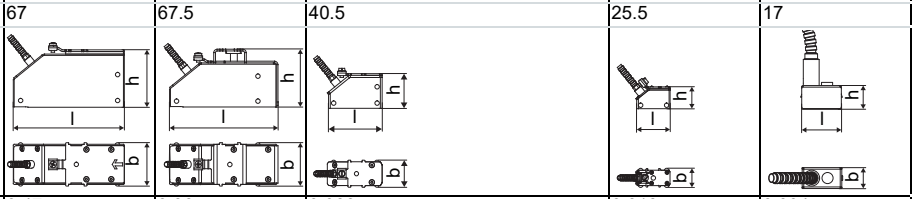
Shear wave transducers (nonEx, T1, radiation-hardened, extended temperature range)

order code		FSM-ENNN-**T1/HRH	FSP-ENNN-**T1/HRH	FSQ-ENNN-**T1/HRH
technical type		CDM2W53	CDP2W53	CDQ2W53
transmitter		F721		
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	1200	480	240
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		2619		
length	m	4		3
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		25.5
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
absorbed dose	Gy	max. 500 000		

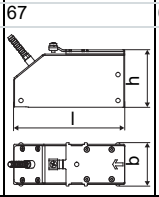
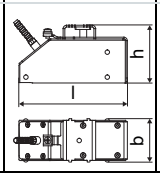
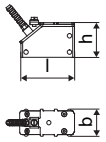
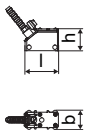
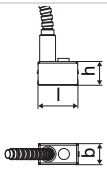
Shear wave transducers (nonEx, T1, metal-free)

order code		FSQ-LNNN-**T1/ HSC
technical type		CDQ2LK1
transducer frequency	MHz	4
inner pipe diameter d		
min. extended	mm	8
min. recommended	mm	12
max. recommended	mm	51
pipe wall thickness		
min.	mm	0.6
material		PEEK
degree of protection		IP67
transducer cable		
type		1699
length	m	10
dimensions		
length l	mm	40
width b	mm	18
height h	mm	26.5
dimensional drawing		
pipe surface temperature	°C	-20...+100
ambient temperature	°C	-20...+100

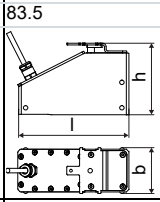
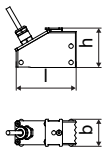
Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS)

order code		FSG-N***-**TS	FSK-N***-**TS	FSM-N***-**TS	FSP-N***-**TS	FSQ-N***-**TS	FSS-N***-**TS
technical type		C(DL)G1N52	C(DL)K1N52	C(DL)M2N52	C(DL)P2N52	C(DL)Q2N52	CDS1N52
transducer frequency	MHz	0.2	0.5	1	2	4	8
inner pipe diameter d							
min. extended	mm	400	100	50	25	10	6
min. recommended	mm	500	200	100	50	25	10
max. recommended	mm	4000	2000	1000	400	150	70
max. extended	mm	6500	2400	1200	480	240	70
pipe wall thickness							
min.	mm	11	5	2.5	1.2	0.6	0.3
material							
housing		PEEK with stainless steel cover 316L (1.4404)					stainless steel 304 (1.4301)
contact surface		PEEK					PEI
degree of protection		IP66		IP66/IP67			IP66
transducer cable							
type		1699					
length	m	5		4		3	2
dimensions							
length l	mm	129.5	126.5	64		40	25
width b	mm	51	51	32		22	13
height h	mm	67	67.5	40.5		25.5	17
dimensional drawing							
weight (without cable)	kg	0.47	0.36	0.066		0.016	0.004
pipe surface temperature							
min.	°C	-40					-30
max.	°C	+130					+130
ambient temperature							
min.	°C	-40					-30
max.	°C	+130					+130
temperature compensation		x					
explosion protection							
• ATEX/IECEx							
order code		FSG-NA2N-**TS	FSK-NA2N-**TS	FSM-NA2N-**TS	FSP-NA2N-**TS	FSQ-NA2N-**TS	-
pipe surface temperature (Ex)							
• min.	°C	-55					-
• max.	°C	gas: +190, dust: +180					-
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db					-
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X					-
• EAC							
order code		FSG-NE2N-**TS	FSK-NE2N-**TS	FSM-NE2N-**TS	FSP-NE2N-**TS	FSQ-NE2N-**TS	-
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db от -55 °C до +190 °C Пыль: до +180 °C					-
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					-
• FM							
order code		FSG-NF2N-**TS	FSK-NF2N-**TS	FSM-NF2N-**TS	FSP-NF2N-**TS	FSQ-NF2N-**TS	FSS-NF2N-**TS
pipe surface temperature (Ex)							
• min.	°C	-40					
• max.	°C	+125		+190			+125
degree of protection		IP66					
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860					

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

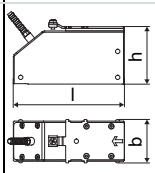
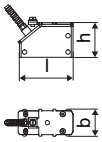
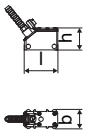
order code		FSG-N***-**T1	FSK-N***-**T1	FSM-N***-**T1	FSP-N***-**T1	FSQ-N***-**T1	FSS-N***-**T1
technical type		C(DL)G1N53	C(DL)K1N53	C(DL)M2N53	C(DL)P2N53	C(DL)Q2N53	CDS1N53
transducer frequency	MHz	0.2	0.5	1	2	4	8
inner pipe diameter d							
min. extended	mm	400	100	50	25	10	6
min. recommended	mm	500	200	100	50	25	10
max. recommended	mm	4000	2000	1000	400	150	70
max. extended	mm	6500	2400	1200	480	240	70
pipe wall thickness							
min.	mm	11	5	2.5	1.2	0.6	0.3
material							
housing		PEEK with stainless steel cover 316L (1.4404)					stainless steel 304 (1.4301)
contact surface		PEEK					PEI
degree of protection		IP66		IP66/IP67			IP66
transducer cable							
type		1699					
length	m	5		4		3	2
dimensions							
length l	mm	129.5	126.5	64		40	25
width b	mm	51	51	32		22	13
height h	mm	67	67.5	40.5		25.5	17
dimensional drawing							
weight (without cable)	kg	0.47	0.36	0.066		0.016	0.004
pipe surface temperature	°C	-40...+130					-30...+130
ambient temperature	°C	-40...+130					-30...+130
temperature compensation		x					-
explosion protection							
• ATEX/IECEx							
order code		FSG-NA2*-**T1	FSK-NA2*-**T1	FSM-NA2*-**T1	FSP-NA2*-**T1	FSQ-NA2*-**T1	-
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180					-
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db					-
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X					-
• EAC							
order code		FSG-NE2*-**T1	FSK-NE2*-**T1	FSM-NE2*-**T1	FSP-NE2*-**T1	FSQ-NE2*-**T1	-
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db от -55 °C до +190 °C Пыль: до +180 °C					-
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					-
• FM							
order code		FSG-NF2*-**T1	FSK-NF2*-**T1	FSM-NF2*-**T1	FSP-NF2*-**T1	FSQ-NF2*-**T1	FSS-NF2*-**T1
pipe surface temperature (Ex)	°C	-40...+125		-40...+190			-40...+125
degree of protection		IP66					
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860					

Shear wave transducers (zone 2 - nonEx, T1, IP68)

order code		FSG-L***-**T1/H68	FSK-L***-**T1/H68	FSM-L***-**T1/H68	FSP-L***-**T1/H68
technical type		CDG1LI8	CDK1LI8	CDM2LI8	CDP2LI8
transducer frequency	MHz	0.2	0.5	1	2
inner pipe diameter d					
min. extended	mm	400	100	50	25
min. recommended	mm	500	200	100	50
max. recommended	mm	4000	2000	1000	400
max. extended	mm	6500	2400	1200	480
pipe wall thickness					
min.	mm	11	5	2.5	1.2
material					
housing		PEEK with stainless steel cover 316Ti (1.4571)			
contact surface		PEEK			
degree of protection		IP68[1]			
transducer cable					
type		2550			
length	m	12			
dimensions					
length l	mm	130		72	
width b	mm	54		32	
height h	mm	83.5		46	
dimensional drawing					
weight (without cable)	kg	0.43		0.085	
pipe surface temperature	°C	-40...+100 (*S*-LNN*-**T1/H68) -40...+90 (*S*-L*2*-**T1/H68)			
ambient temperature	°C	-40...+100 (*S*-LNN*-**T1/H68) -40...+90 (*S*-L*2*-**T1/H68)			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		FSG-LA2N-**T1/H68	FSK-LA2N-**T1/H68	FSM-LA2N-**T1/H68	FSP-LA2N-**T1/H68
pipe surface temperature (Ex)	°C	gas: -40...+90 dust: -40...+80			
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T5 Gc Ex tb IIIC T80 °C...T85 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• EAC					
order code		FSG-LE2N-**T1/H68	FSK-LE2N-**T1/H68	FSM-LE2N-**T1/H68	FSP-LE2N-**T1/H68
marking		2Ex nA IIC T6...T5 Gc Ex tb IIIC T80 °C...T85 °C Db от -40 °C до +90 °C Пыль: до +80 °C			
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830			

[1] test conditions: 3 months/2 bar (20 m)/20 °C

Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS, extended temperature range)

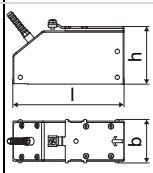
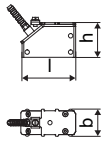
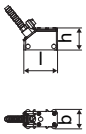
order code		FSG-E***-**TS	FSK-E***-**TS	FSM-E***-**TS	FSP-E***-**TS	FSQ-E***-**TS
technical type		C(DL)G1E52	C(DL)K1E52	C(DL)M2E52	C(DL)P2E52	C(DL)Q2E52
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PPSU with stainless steel cover 316L (1.4404)		PI with stainless steel cover 316L (1.4404)		
contact surface		PPSU		PI		
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699		6111		
length	m	5		4		3
dimensions						
length l	mm	129.5		64		40
width b	mm	51		32		22
height h	mm	67		40.5		25.5
dimensional drawing						
weight (without cable)	kg	0.82		0.066		0.017
pipe surface temperature	°C	-40...+180		-30...+240[1]		-30...+200
ambient temperature	°C	-40...+180		-30...+40 -30...+60[2] -30...+200[3]		-30...+200
temperature compensation		x		x		
explosion protection						
• ATEX/IECEx						
order code		-	-	FSM-EA2*-**TS	FSP-EA2*-**TS	FSQ-EA2*-**TS
pipe surface temperature (Ex)	°C	-	-	gas: -45...+235 dust: -45...+225		
marking		-	-	CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db		
certification		-	-	IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• EAC						
order code		-	-	FSM-EE2*-**TS	FSP-EE2*-**TS	FSQ-EE2*-**TS
marking		-	-	2Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db от -45 °C до +235 °C Пыль: до +225 °C		
certification		-	-	EAC Ex EAЭС KZ 7500525.01.01.01830		
• FM						
order code		FSG-EF2*-**TS	FSK-EF2*-**TS	FSM-EF2*-**TS	FSP-EF2*-**TS	FSQ-EF2*-**TS
pipe surface temperature (Ex)	°C	-40...+165		-40...+235		
degree of protection		IP66				
marking		FM APPROVED c us NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				

[1] > +200 °C:
nonEx: Variofix C without cover or Variofix L
Ex: Variofix C or Variofix L, ambient temperature max. +40 °C
observe the insulation instruction

[2] nonEx: pipe surface temperature +200...+240 °C: Variofix C without cover

[3] nonEx: pipe surface temperature max. +200 °C

Shear wave transducers (zone 2 - FM Class I Div. 2 - nonEx, T1, extended temperature range)

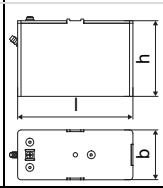
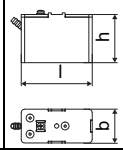
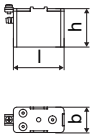
order code		FSG-E***-**T1	FSK-E***-**T1	FSM-E***-**T1	FSP-E***-**T1	FSQ-E***-**T1
technical type		C(DL)G1E53	C(DL)K1E53	C(DL)M2E53	C(DL)P2E53	C(DL)Q2E53
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PPSU with stainless steel cover 316L (1.4404)		PI with stainless steel cover 316L (1.4404)		
contact surface		PPSU		PI		
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699		6111		
length	m	5		4		3
dimensions						
length l	mm	129.5		64		40
width b	mm	51		32		22
height h	mm	67		40.5		25.5
dimensional drawing						
weight (without cable)	kg	0.82		0.066		0.017
pipe surface temperature	°C	-40...+180		-30...+240[1]		-30...+200
ambient temperature	°C	-40...+180		-30...+40 -30...+60[2] -30...+200[3]		-30...+200
temperature compensation		x		x		
explosion protection						
• ATEX/IECEx						
order code		-	-	FSM-EA2*-**T1	FSP-EA2*-**T1	FSQ-EA2*-**T1
pipe surface temperature (Ex)	°C	-	-	gas: -45...+235 dust: -45...+225		
marking		-	-	CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db		
certification		-	-	IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• EAC						
order code		-	-	FSM-EE2*-**T1	FSP-EE2*-**T1	FSQ-EE2*-**T1
marking		-	-	2Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db от -45 °C до +235 °C Пыль: до +225 °C		
certification		-	-	EAC Ex ЕАЭС KZ 7500525.01.01.01830		
• FM						
order code		FSG-EF2*-**T1	FSK-EF2*-**T1	FSM-EF2*-**T1	FSP-EF2*-**T1	FSQ-EF2*-**T1
pipe surface temperature (Ex)	°C	-40...+165		-40...+235		
degree of protection		IP66				
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				

[1] > +200 °C:
nonEx: Variofix C without cover or Variofix L
Ex: Variofix C or Variofix L, ambient temperature max. +40 °C
observe the insulation instruction

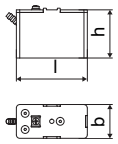
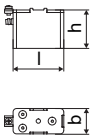
[2] nonEx: pipe surface temperature +200...+240 °C: Variofix C without cover

[3] nonEx: pipe surface temperature max. +200 °C

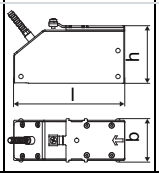
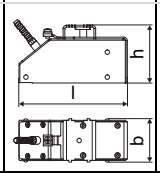
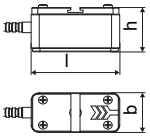
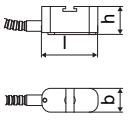
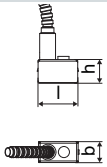
Shear wave transducers (zone 2, NL)

order code		FSG-N*2*-**NL	FSK-N*2*-**NL	FSM-N*2*-**NL	FSP-N*2*-**NL	FSQ-N*2*-**NL
technical type		C(DL)G1NH1	C(DL)K1NH1	C(DL)M2NH1	C(DL)P2NH1	C(DL)Q2NH1
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	6500	3400	600	400
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PEEK with stainless steel cover and transducer shoe 304 (1.4301)				
contact surface		PEEK				
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699				
length	m	5		4		3
dimensions						
length l	mm	136.5		84		70
width b	mm	59		40		30
height h	mm	90.5		59		47.5
dimensional drawing						
weight (without cable)	kg	1.674		0.504		0.251
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		FSG-NA2*-**NL	FSK-NA2*-**NL	FSM-NA2*-**NL	FSP-NA2*-**NL	FSQ-NA2*-**NL
pipe surface temperature (Ex)	°C	gas: -55...+190 dust: -55...+180				
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X				
• EAC						
order code		FSG-NE2*-**NL	FSK-NE2*-**NL	FSM-NE2*-**NL	FSP-NE2*-**NL	FSQ-NE2*-**NL
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T185 °C Db от -55 °C до +190 °C Пыль: до +180 °C				
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830				

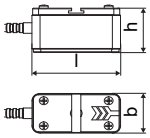
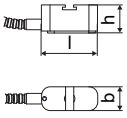
Shear wave transducers (zone 2, NL, extended temperature range)

order code		FSM-E*2*-**NL	FSP-E*2*-**NL	FSQ-E*2*-**NL
technical type		C(DL)M2EH5	C(DL)P2EH5	C(DL)Q2EH5
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover and transducer shoe 304 (1.4301)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	84		70
width b	mm	40		30
height h	mm	59		47.5
dimensional drawing				
weight (without cable)	kg	0.505		0.252
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
explosion protection				
• ATEX/IECEx				
order code		FSM-EA2*-**NL	FSP-EA2*-**NL	FSQ-EA2*-**NL
pipe surface temperature (Ex)	°C	gas: -45...+235 dust: -45...+225		
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...230 °C Db		
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X		
• EAC				
order code		FSM-EE2*-**NL	FSP-EE2*-**NL	FSQ-EE2*-**NL
marking		2Ex nA IIC T6...T2 Gc Ex tb IIIA T80 °C...T230 °C Db от -45 °C до +235 °C Пыль: до +225 °C		
certification		EAC Ex EAЭС KZ 7500525.01.01.01830		

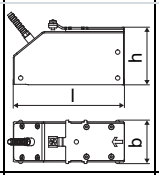
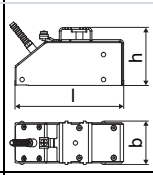
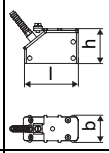
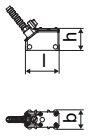
Shear wave transducers (FM Class I Div. 2, NL)

order code		FSG-NF2N-**NL	FSK-NF2N-**NL	FSM-NF2N-**NL	FSP-NF2N-**NL	FSQ-NF2N-**NL	FSS-NF2N-**NL
technical type		C(DL)G1N51	C(DL)K1N51	C(DL)M1N51	C(DL)P1N51	C(DL)Q1N51	CDS1N51
transducer frequency	MHz	0.2	0.5	1	2	4	8
inner pipe diameter d							
min. extended	mm	400	100	50	25	10	6
min. recommended	mm	500	200	100	50	25	10
max. recommended	mm	4000	2000	1000	400	150	70
max. extended	mm	6500	6500	3400	600	400	70
pipe wall thickness							
min.	mm	11	5	2.5	1.2	0.6	0.3
material							
housing		PEEK with stainless steel cover 304		stainless steel 304			stainless steel 304
contact surface		PEEK		PEEK			PEI
degree of protection		IP66					
transducer cable							
type		1699					
length	m	5		4		3	2
dimensions							
length l	mm	129.5	126.5	60		42.5	25
width b	mm	51	51	30		18	13
height h	mm	67	67.5	33.5		21.5	17
dimensional drawing							
weight (without cable)	kg	0.47	0.36	0.035		0.011	0.004
pipe surface temperature	°C	-40...+130					-30...+130
ambient temperature	°C	-40...+130					-30...+130
temperature compensation		x					
explosion protection							
• **FM**							
pipe surface temperature (Ex)	°C	-40...+125					
degree of protection		IP66					
marking		NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860					

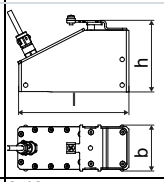
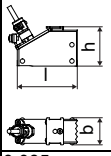
Shear wave transducers (FM Class I Div. 2, NL, extended temperature range)

order code		FSM-EF2N-**NL	FSP-EF2N-**NL	FSQ-EF2N-**NL
technical type		C(DL)M1E51	C(DL)P1E51	C(DL)Q1E51
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		stainless steel 304		
contact surface		Sintimid		
degree of protection		IP66		
transducer cable				
type		1699		
length	m	4		3
dimensions				
length l	mm	60		42.5
width b	mm	30		18
height h	mm	33.5		21.5
dimensional drawing				
weight (without cable)	kg	0.042		0.011
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
explosion protection				
• **FM**				
pipe surface temperature (Ex)	°C	-40...+190		
degree of protection		IP66		
marking		NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860		

Shear wave transducers (zone 1, T1)

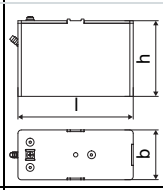
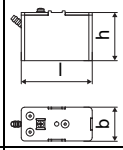
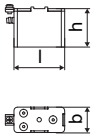
order code		FSG-N*1*-**T1	FSK-N*1*-**T1	FSM-N*1*-**T1	FSP-N*1*-**T1	FSQ-N*1*-**T1
technical type		C(DL)G1N81	C(DL)K1N81	C(DL)M2N81	C(DL)P2N81	C(DL)Q2N81
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	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	129.5	126.5	64		40
width b	mm	51	51	32		22
height h	mm	67	67.5	40.5		25.5
dimensional drawing						
weight (without cable)	kg	0.47	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		FSG-NA1*-**T1	FSK-NA1*-**T1	FSM-NA1*-**T1	FSP-NA1*-**T1	FSQ-NA1*-**T1
pipe surface temperature (Ex)	°C	-55...+180				
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X				
• EAC						
order code		FSG-NE1*-**T1	FSK-NE1*-**T1	FSM-NE1*-**T1	FSP-NE1*-**T1	FSQ-NE1*-**T1
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db от -55 °C до +180 °C				
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830				
• inmetro						
order code		FSG-NS1*-**T1	FSK-NS1*-**T1	FSM-NS1*-**T1	FSP-NS1*-**T1	FSQ-NS1*-**T1
pipe surface temperature (Ex)	°C	-55...+180				
marking		Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		Segurança INMETRO TÜV 15.0616 X				
• KOSHA						
order code		FSG-NK1*-**T1	FSK-NK1*-**T1	FSM-NK1*-**T1	FSP-NK1*-**T1	FSQ-NK1*-**T1
marking		Ex eq IIC T3...T6 Tamb = -55 °C - +180 °C				
certification		• 14-AV4BO-0510		• 14-AV4BO-0509		
• Japanese Ex certification						
order code		FSG-NJ1*-**T1	FSK-NJ1*-**T1	FSM-NJ1*-**T1	FSP-NJ1*-**T1	FSQ-NJ1*-**T1
marking		Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		CML 21JPN5217X				

Shear wave transducers (zone 1, T1, IP68)

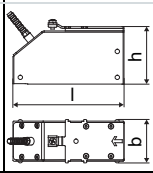
order code		FSG-L*1*-**T1/ H68	FSK-L*1*-**T1/H68	FSM-L*1*-**T1/ H68	FSP-L*1*-**T1/H68
technical type		CDG1LI1	CDK1LI1	CDM2LI1	CDP2LI1
transducer frequency	MHz	0.2	0.5	1	2
inner pipe diameter d					
min. extended	mm	400	100	50	25
min. recommended	mm	500	200	100	50
max. recommended	mm	4000	2000	1000	400
max. extended	mm	6500	2400	1200	480
pipe wall thickness					
min.	mm	11	5	2.5	1.2
material					
housing		PEEK with stainless steel cover 316Ti (1.4571)			
contact surface		PEEK			
degree of protection		IP68[1]			
transducer cable					
type		2550			
length	m	12			
dimensions					
length l	mm	130		72	
width b	mm	54		32	
height h	mm	83.5		46	
dimensional drawing					
weight (without cable)	kg	0.43		0.085	
pipe surface temperature	°C	-40...+80			
ambient temperature	°C	-40...+80			
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		FSG-LA1*-**T1/ H68	FSK-LA1*-**T1/ H68	FSM-LA1*-**T1/ H68	FSP-LA1*-**T1/ H68
pipe surface temperature (Ex)	°C	-40...+80			
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db			
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X			
• EAC					
order code		FSG-LE1*-**T1/ H68	FSK-LE1*-**T1/ H68	FSM-LE1*-**T1/ H68	FSP-LE1*-**T1/ H68
marking		1Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db от -40 °C до +80 °C			
certification		EAC Ex EAЭС KZ 7500525.01.01.01830			
• inmetro					
order code		FSG-LS1*-**T1/ H68	FSK-LS1*-**T1/ H68	FSM-LS1*-**T1/ H68	FSP-LS1*-**T1/ H68
pipe surface temperature (Ex)	°C	-40...+80			
marking		Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db			
certification		Segurança INMETRO TÜV 15.0616 X			
• Japanese Ex certification					
order code		FSG-LJ1*-**T1/ H68	FSK-LJ1*-**T1/ H68	FSM-LJ1*-**T1/ H68	FSP-LJ1*-**T1/ H68
marking		Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db			
certification		CML 21JPN5217X			

[1] test conditions: 3 months/2 bar (20 m)/20 °C

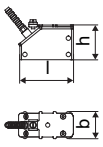
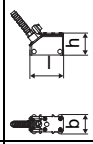
Shear wave transducers (zone 1, NL)

order code		FSG-N*1*-**NL	FSK-N*1*-**NL	FSM-N*1*-**NL	FSP-N*1*-**NL	FSQ-N*1*-**NL
technical type		C(DL)G1NW1	C(DL)K1NW1	C(DL)M2NW1	C(DL)P2NW1	C(DL)Q2NW1
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	6500	3400	600	400
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		PEEK with stainless steel cover and transducer shoe 304 (1.4301)				
contact surface		PEEK				
degree of protection		IP66		IP66/IP67		
transducer cable						
type		1699				
length	m	5		4		3
dimensions						
length l	mm	136.5		84		70
width b	mm	59		40		30
height h	mm	90.5		59		47.5
dimensional drawing						
weight (without cable)	kg	1.674		0.504		0.251
pipe surface temperature	°C	-40...+130				
ambient temperature	°C	-40...+130				
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		FSG-NA1*-**NL	FSK-NA1*-**NL	FSM-NA1*-**NL	FSP-NA1*-**NL	FSQ-NA1*-**NL
pipe surface temperature (Ex)	°C	-55...+180				
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db				
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X				
• EAC						
order code		FSG-NE1*-**NL	FSK-NE1*-**NL	FSM-NE1*-**NL	FSP-NE1*-**NL	FSQ-NE1*-**NL
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T185 °C Db от -55 °C до +180 °C				
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830				

Shear wave transducers (zone 1, T1, extended temperature range)

order code		FSG-E*1*-**T1	FSK-E*1*-**T1
technical type		C(DL)G1E83	C(DL)K1E83
transducer frequency	MHz	0.2	0.5
inner pipe diameter d			
min. extended	mm	400	100
min. recommended	mm	500	200
max. recommended	mm	4000	2000
max. extended	mm	6500	2400
pipe wall thickness			
min.	mm	11	5
material			
housing		PPSU with stainless steel cover 316L (1.4404)	
contact surface		PPSU	
degree of protection		IP66	
transducer cable			
type		1699	
length	m	5	
dimensions			
length l	mm	129.5	
width b	mm	51	
height h	mm	67	
dimensional drawing			
weight (without cable)	kg	0.82	
pipe surface temperature	°C	-40...+155	
ambient temperature	°C	-40...+155	
temperature compensation		x	
explosion protection			
• ATEX/IECEx			
order code		FSG-EA1*-**T1	FSK-EA1*-**T1
pipe surface temperature (Ex)	°C	-50...+155	
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X	
• EAC			
order code		FSG-EE1*-**T1	FSK-EE1*-**T1
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +155 °C	
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830	
• inmetro			
order code		FSG-ES1*-**T1	FSK-ES1*-**T1
pipe surface temperature (Ex)	°C	-50...+155	
marking		Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification		TÜV 15.0616 X	
• Japanese Ex certification			
order code		FSG-EJ1*-**T1	FSK-EJ1*-**T1
marking		Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db	
certification		CML 21JPN5217X	

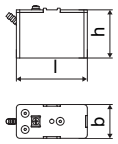
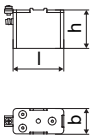
Shear wave transducers (zone 1, T1, extended temperature range)

order code		FSM-E*1*-**T1	FSP-E*1*-**T1	FSQ-E*1*-**T1
technical type		C(DL)M2E85	C(DL)P2E85	C(DL)Q2E85
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	1200	480	240
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover 316L (1.4404)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	64		40
width b	mm	32		22
height h	mm	40.5		25.5
dimensional drawing				
weight (without cable)	kg	0.066		0.017
pipe surface temperature	°C	-30...+240[1]		-30...+200
ambient temperature	°C	-30...+40 -30...+200[2]		-30...+200
temperature compensation		x		
explosion protection				
• ATEX/IECEx				
order code		FSM-EA1*-**T1	FSP-EA1*-**T1	FSQ-EA1*-**T1
pipe surface temperature (Ex)	°C	-45...+225		
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X		
• EAC				
order code		FSM-EE1*-**T1	FSP-EE1*-**T1	FSQ-EE1*-**T1
marking		1Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db от -40 °C до +225 °C		
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830		
• inmetro				
order code		FSM-ES1*-**T1	FSP-ES1*-**T1	FSQ-ES1*-**T1
pipe surface temperature (Ex)	°C	-45...+225		
marking		Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		TÜV 15.0616 X		
• KOSHA				
order code		FSM-EK1*-**T1	FSP-EK1*-**T1	FSQ-EK1*-**T1
marking		Ex eq IIC T2...T6 Tamb = -45 °C - +225 °C		
certification		14-AV4BO-0511		
• Japanese Ex certification				
order code		FSM-EJ1*-**T1	FSP-EJ1*-**T1	FSQ-EJ1*-**T1
marking		Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		CML 21JPN5217X		

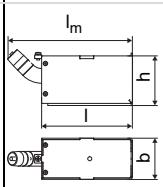
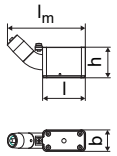
[1] > +200 °C :
Variofix L or Variofix C
observe the insulation instruction
ambient temperature max. +40 °C

[2] pipe surface temperature max. +200 °C

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

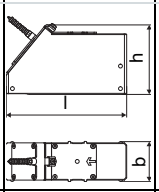
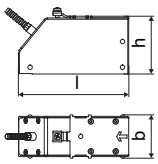
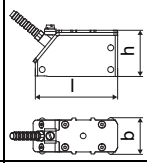
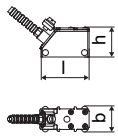
order code		FSM-E*1*-**NL	FSP-E*1*-**NL	FSQ-E*1*-**NL
technical type		C(DL)M2EW5	C(DL)P2EW5	C(DL)Q2EW5
transducer frequency	MHz	1	2	4
inner pipe diameter d				
min. extended	mm	50	25	10
min. recommended	mm	100	50	25
max. recommended	mm	1000	400	150
max. extended	mm	3400	600	400
pipe wall thickness				
min.	mm	2.5	1.2	0.6
material				
housing		PI with stainless steel cover and transducer shoe 304 (1.4301)		
contact surface		PI		
degree of protection		IP66/IP67		
transducer cable				
type		6111		
length	m	4		3
dimensions				
length l	mm	84		70
width b	mm	40		30
height h	mm	59		47.5
dimensional drawing				
weight (without cable)	kg	0.505		0.252
pipe surface temperature	°C	-30...+200		
ambient temperature	°C	-30...+200		
temperature compensation		x		
explosion protection				
• ATEX/IECEx				
order code		FSM-EA1*-**NL	FSP-EA1*-**NL	FSQ-EA1*-**NL
pipe surface temperature (Ex)	°C	-45...+225		
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db		
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X		
• EAC				
order code		FSM-EE1*-**NL	FSP-EE1*-**NL	FSQ-EE1*-**NL
marking		1Ex q IIC T6...T2 Gb Ex tb IIIA T80 °C...T230 °C Db от -40 °C до +225 °C		
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830		

Shear wave transducers (FM Class I Div. 1, T1)

order code		FSG-NF1N-**T1	FSK-NF1N-**T1	FSM-NF1N-**T1	FSP-NF1N-**T1	FSQ-NF1N-**T1
technical type		C(DL)G1N62	C(DL)K1N62	C(DL)M1N62	C(DL)P1N62	C(DL)Q1N62
transducer frequency	MHz	0.2	0.5	1	2	4
inner pipe diameter d						
min. extended	mm	400	100	50	25	10
min. recommended	mm	500	200	100	50	25
max. recommended	mm	4000	2000	1000	400	150
max. extended	mm	6500	2400	1200	480	240
pipe wall thickness						
min.	mm	11	5	2.5	1.2	0.6
material						
housing		stainless steel 316L (1.4404)				
contact surface		PEEK				
degree of protection		IP66				
transducer cable						
type		2549				
length	m	10				
dimensions						
length l	mm	132		60		
width b	mm	60		30		
height h	mm	72		43		
mounting length l_m	mm	185		110		
thread		1/2 NPT		1/2 NPT		
dimensional drawing						
weight (without cable)	kg	1.09		0.285		
pipe surface temperature	°C	-40...+110				
ambient temperature	°C	-40...+110				
temperature compensation		x				
explosion protection						
• FM						
pipe surface temperature (Ex)	°C	-40...+125				
marking		S/Cl. I, II, III / Div. 1 / GP A, B, C, D, E, F, G / Temperature Codes dwg 3831				

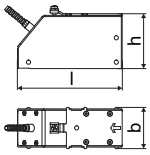
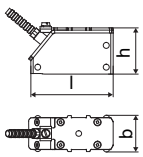
Lamb wave transducers

Lamb wave transducers (nonEx, NL, AS)

order code		FLF-NNNN-**NL FLF-NNNN-**AS	FLG-NNNN**NL FLG-NNNN-**AS	FLH-NNNN-**NL FLH-NNNN-**AS	FLK-NNNN-**NL FLK-NNNN-**AS	FLM-NNNN-**NL FLM-NNNN-**AS	FLP-NNNN-**NL FLP-NNNN-**AS	FLQ-NNNN-**NL FLQ-NNNN-**AS
technical type		C(RT)F1NC3	C(RT)G1NC3	C(RT)H1NC3	C(RT)K1NC3	C(RT)M1NC3	C(RT)P1NC3	C(RT)Q1NC3
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2	4
inner pipe diameter d[1]								
min. extended	mm	640	400	350	100	50	25	10
min. recommended	mm	800	500	450	200	100	50	25
max. recommended	mm	5500	4000	3000	2000	1000	400	150
max. extended	mm	6600	4800	3600	2400	1200	480	240
pipe wall thickness								
min.	mm	15	11	8	5	2.5	1.2	0.6
max.	mm	32	24	16	10	5	3	1.2
material								
housing		PPSU with stainless steel cover 316Ti (1.4571)	PPSU with stainless steel cover 304 (1.4301)					
contact surface		PPSU						
degree of protection		IP66/IP67	IP66					
transducer cable								
type		1699						
length	m	5				4		3
dimensions								
length l	mm	163	128.5			74		42
width b	mm	54	51			32		22
height h	mm	91.3	67.5			40.5		25.5
dimensional drawing								
weight (without cable)	kg	0.935	0.471			0.077		0.019
pipe surface temperature	°C	-40...+130						
ambient temperature	°C	-40...+130						
temperature compensation		x						

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

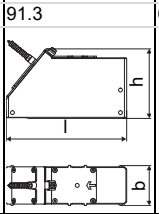
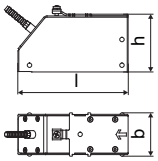
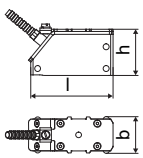
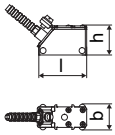
Lamb wave transducers (nonEx, higher temperatures, NL)

order code		FLG-SNNN-**NL	FLH-SNNN-**NL	FLK-SNNN-**NL	FLM-SNNN-**NL	FLP-SNNN-**NL
technical type		C(RT)G1SC3	C(RT)H1SC3	C(RT)K1SC3	C(RT)M1SC3	C(RT)P1SC3
transducer frequency	MHz	0.2	0.3	0.5	1	2
inner pipe diameter d[1]						
min. extended	mm	400	350	100	50	25
min. recommended	mm	500	450	200	100	50
max. recommended	mm	4000	3000	2000	1000	400
max. extended	mm	4800	3600	2400	1200	480
pipe wall thickness						
min.	mm	10.6	7.1	4.2	2.1	1.1
max.	mm	23.7	15.8	9.5	4.7	2.4
material						
housing		PPSU with stainless steel cover 316Ti (1.4571)				
contact surface		PPSU				
degree of protection		IP66				
transducer cable						
type		1699				
length	m	5			4	
dimensions						
length l	mm	128.5			74	
width b	mm	51			32	
height h	mm	67.5			40.5	
dimensional drawing						
weight (without cable)	kg	0.8			0.16	
storing temperature	°C	-40...+180				
operating temperature	°C	100…180				
warm-up time	h	3			1	
temperature compensation		x				

completely thermically insulated transducer installation necessary

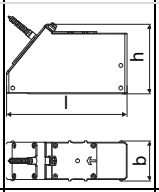
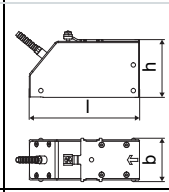
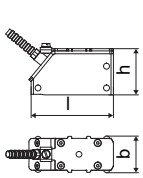
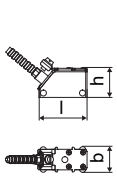
[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

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

order code		FLF-N***-**TS	FLG-N***-**TS	FLH-N***-**TS	FLK-N***-**TS	FLM-N***-**TS	FLP-N***-**TS	FLQ-N***-**TS
technical type		C(RT)F1N52	C(RT)G1N52	C(RT)H1N52	C(RT)K1N52	C(RT)M1N52	C(RT)P1N52	C(RT)Q1N52
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2	4
inner pipe diameter d[1]								
min. extended	mm	640	400	350	100	50	25	10
min. recommended	mm	800	500	450	200	100	50	25
max. recommended	mm	5500	4000	3000	2000	1000	400	150
max. extended	mm	6600	4800	3600	2400	1200	480	240
pipe wall thickness								
min.	mm	15	11	8	5	2.5	1.2	0.6
max.	mm	32	24	16	10	5	3	1.2
material								
housing		PPSU with stainless steel cover 316Ti (1.4571)	PPSU with stainless steel cover 316L (1.4404)					
contact surface		PPSU						
degree of protection		IP66/IP67	IP66					
transducer cable								
type		1699						
length	m	5				4		3
dimensions								
length l	mm	163	128.5			74		42
width b	mm	54	51			32		22
height h	mm	91.3	67.5			40.5		25.5
dimensional drawing								
weight (without cable)	kg	0.935	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		FLF-NA2N-**TS	FLG-NA2N-**TS	FLH-NA2N-**TS	FLK-NA2N-**TS	FLM-NA2N-**TS	FLP-NA2N-**TS	FLQ-NA2N-**TS
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155						
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIA T80 °C...T160 °C Db	CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db					
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X						
• EAC								
order code		FLF-NE2N-**TS	FLG-NE2N-**TS	FLH-NE2N-**TS	FLK-NE2N-**TS	FLM-NE2N-**TS	FLP-NE2N-**TS	FLQ-NE2N-**TS
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIA T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C	2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830						
• FM								
order code		FLF-NF2N-**TS	FLG-NF2N-**TS	FLH-NF2N-**TS	FLK-NF2N-**TS	FLM-NF2N-**TS	FLP-NF2N-**TS	FLQ-NF2N-**TS
pipe surface temperature (Ex)	°C	-40...+165						
degree of protection		IP66						
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860						

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

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

order code		FGLF-N***-**T1	FGLG-N***-**T1	FGLH-N***-**T1	FGLK-N***-**T1	FGLM-N***-**T1	FGLP-N***-**T1	FGLQ-N***-**T1
technical type		CG(RT)F1N53	CG(RT)G1N53	CG(RT)H1N53	CG(RT)K1N53	CG(RT)M1N53	CG(RT)P1N53	CG(RT)Q1N53
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2	4
fluid pressure[1]								
min. extended	bar	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 (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[1][2]								
min. extended	mm	640	400	350	100	50	25	10
min. recommended	mm	800	500	450	200	100	50	25
max. recommended	mm	5500	4000	3000	2000	1000	400	150
max. extended	mm	6600	4800	3600	2400	1200	480	240
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								
min.	mm	15	11	8	5	2.5	1.2	0.6
max.	mm	32	24	16	10	5	3	1.2
material								
housing		PPSU with stainless steel cover 316Ti (1.4571)	PPSU with stainless steel cover 316L (1.4404)					
contact surface		PPSU						
degree of protection		IP66/IP67	IP66					
transducer cable								
type		1699						
length	m	5				4		3
dimensions								
length l	mm	163	128.5			74		42
width b	mm	54	51			32		22
height h	mm	91.3	67.5			40.5		25.5
dimensional drawing								
weight (without cable)	kg	0.935	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		FLF-NA2*-**T1	FLG-NA2*-**T1	FLH-NA2*-**T1	FLK-NA2*-**T1	FLM-NA2*-**T1	FLP-NA2*-**T1	FLQ-NA2*-**T1
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155						
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIA T80 °C...T160 °C Db	CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db					
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X						

[1] depending on the application, typical absolute value for natural gas, nitrogen, compressed air

[2] 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)

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

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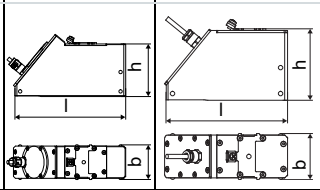
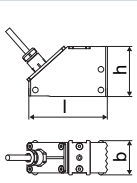
order code		FGLF-N***-**T1	FGLG-N***-**T1	FGLH-N***-**T1	FGLK-N***-**T1	FGLM-N***-**T1	FGLP-N***-**T1	FGLQ-N***-**T1
technical type		CG(RT)F1N53	CG(RT)G1N53	CG(RT)H1N53	CG(RT)K1N53	CG(RT)M1N53	CG(RT)P1N53	CG(RT)Q1N53
• **EAC**								
order code		FLF-NE2*-**T1	FLG-NE2*-**T1	FLH-NE2*-**T1	FLK-NE2*-**T1	FLM-NE2*-**T1	FLP-NE2*-**T1	FLQ-NE2*-**T1
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIA T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C	2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830						
• **FM**								
order code		FLF-NF2*-**T1	FLG-NF2*-**T1	FLH-NF2*-**T1	FLK-NF2*-**T1	FLM-NF2*-**T1	FLP-NF2*-**T1	FLQ-NF2*-**T1
pipe surface temperature (Ex)	°C	-40...+165						
degree of protection		IP66						
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860						

[1] depending on the application, typical absolute value for natural gas, nitrogen, compressed air

[2] 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)

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

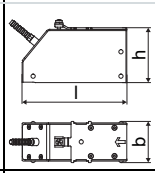
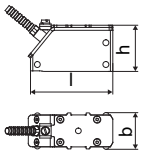
Lamb wave transducers (zone 2 - nonEx, T1, IP68)

order code		FLF-L***-**T1/ H68	FLG-L***-**T1/ H68	FLH-L***-**T1/ H68	FLK-L***-**T1/ H68	FLM-L***-**T1/ H68	FLP-L***-**T1/ H68
technical type		CRF1LI8	CRG1LI8	CRH1LI8	CRK1LI8	CRM1LI8	CRP1LI8
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2
inner pipe diameter d [1]							
min. extended	mm	640	400	350	100	50	25
min. recommended	mm	800	500	450	200	100	50
max. recommended	mm	5500	4000	3000	2000	1000	400
max. extended	mm	6600	4800	3600	2400	1200	480
pipe wall thickness							
min.	mm	15	11	8	5	2.5	1.2
max.	mm	32	24	16	10	5	3
material							
housing		PPSU with stainless steel cover 316Ti (1.4571)					
contact surface		PPSU					
degree of protection		IP68 [2]					
transducer cable							
type		2550					
length	m	12					
dimensions							
length l	mm	173	143.5			73	
width b	mm	54	54			31.6	
height h	mm	91.5	83.5			46	
dimensional drawing							
weight (without cable)	kg	1.36	0.639			0.093	
pipe surface temperature	°C	-40...+100 (*L*-LNN*-**T1/H68) -40...+90 (*L*-L*2*-**T1/H68)					
ambient temperature	°C	-40...+100 (*L*-LNN*-**T1/H68) -40...+90 (*L*-L*2*-**T1/H68)					
temperature compensation		x					
explosion protection							
• ATEX/IECEx							
order code		FLF-LA2N-**T1/ H68	FLG-LA2N-**T1/ H68	FLH-LA2N-**T1/ H68	FLK-LA2N-**T1/ H68	FLM-LA2N-**T1/ H68	FLP-LA2N-**T1/ H68
pipe surface temperature (Ex)	°C	gas: -40...+90 dust: -40...+80					
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T5 Gc Ex tb IIIC T80 °C...T85 °C Db					
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X					
• EAC							
order code		FLF-LE2N-**T1/ H68	FLG-LE2N-**T1/ H68	FLH-LE2N-**T1/ H68	FLK-LE2N-**T1/ H68	FLM-LE2N-**T1/ H68	FLP-LE2N-**T1/ H68
marking		2Ex nA IIC T6...T5 Gc Ex tb IIIC T80 °C...T85 °C Db от -40 °C до +90 °C Пыль: до +80 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

[2] test conditions: 3 months/2 bar (20 m)/20 °C

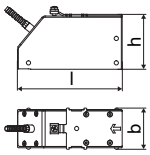
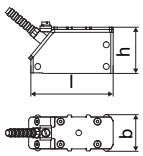
Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, TS, higher temperatures)

order code		FLG-S***-**TS	FLH-S***-**TS	FLK-S***-**TS	FLM-S***-**TS	FLP-SNNN-**TS
technical type		C(RT)G1S52	C(RT)H1S52	C(RT)K1S52	C(RT)M1S52	C(RT)P1S52
transducer frequency	MHz	0.2	0.3	0.5	1	2
inner pipe diameter d[1]						
min. extended	mm	400	350	100	50	25
min. recommended	mm	500	450	200	100	50
max. recommended	mm	4000	3000	2000	1000	400
max. extended	mm	4800	3600	2400	1200	480
pipe wall thickness						
min.	mm	10.6	7.1	4.2	2.1	1.1
max.	mm	23.7	15.8	9.5	4.7	2.4
material						
housing		PPSU with stainless steel cover 316Ti (1.4571)				
contact surface		PPSU				
degree of protection		IP66				
transducer cable						
type		1699				
length	m	5			4	
dimensions						
length l	mm	128.5			74	
width b	mm	51			32	
height h	mm	67.5			40.5	
dimensional drawing						
weight (without cable)	kg	0.8			0.16	
storing temperature	°C	-40...+165				
operating temperature	°C	100…180 (*L*-SNN*-**TS) 100…165 (*L*-S*2*-**TS)				
warm-up time	h	3			1	
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		FLG-SA2N-**TS	FLH-SA2N-**TS	FLK-SA2N-**TS	FLM-SA2N-**TS	-
pipe surface temperature (Ex)	°C	gas: -50…+165 dust: -50…+155				
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db				-
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X				-
• EAC						
order code		FLG-SE2N-**TS	FLH-SE2N-**TS	FLK-SE2N-**TS	FLM-SE2N-**TS	-
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C				-
certification		EAC Ex EAЭС KZ 7500525.01.01.01830				-
• FM						
order code		FLG-SF2N-**TS	FLH-SF2N-**TS	FLK-SF2N-**TS	FLM-SF2N-**TS	-
pipe surface temperature (Ex)	°C	-40…+165				
degree of protection		IP66				-
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				-

completely thermically insulated transducer installation necessary

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

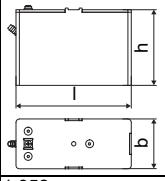
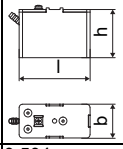
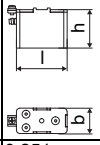
Lamb wave transducers (zone 2 - FM Class I Div. 2 - nonEx, T1, higher temperatures)

order code		FLG-S***-**T1	FLH-S***-**T1	FLK-S***-**T1	FLM-S***-**T1	FLP-S***-**T1
technical type		C(RT)G1S53	C(RT)H1S53	C(RT)K1S53	C(RT)M1S53	C(RT)P1S53
transducer frequency	MHz	0.2	0.3	0.5	1	2
inner pipe diameter d [1]						
min. extended	mm	400	350	100	50	25
min. recommended	mm	500	450	200	100	50
max. recommended	mm	4000	3000	2000	1000	400
max. extended	mm	4800	3600	2400	1200	480
pipe wall thickness						
min.	mm	10.6	7.1	4.2	2.1	1.1
max.	mm	23.7	15.8	9.5	4.7	2.4
material						
housing		PPSU with stainless steel cover 316Ti (1.4571)				
contact surface		PPSU				
degree of protection		IP66				
transducer cable						
type		1699				
length	m	5			4	
dimensions						
length l	mm	128.5			74	
width b	mm	51			32	
height h	mm	67.5			40.5	
dimensional drawing						
weight (without cable)	kg	0.8			0.16	
storing temperature	°C	-40...+165				
operating temperature	°C	100…180 (*L*-SNN*-**T1) 100…165 (*L*-S*2*-**T1)				
warm-up time	h	3			1	
temperature compensation		x				
explosion protection						
• ATEX/IECEx						
order code		FLG-SA2*-**T1	FLH-SA2*-**T1	FLK-SA2*-**T1	FLM-SA2*-**T1	-
pipe surface temperature (Ex)	°C	gas: -50…+165 dust: -50…+155				
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db				-
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X				-
• EAC						
order code		FLG-SE2*-**T1	FLH-SE2*-**T1	FLK-SE2*-**T1	FLM-SE2*-**T1	-
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C				-
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830				-
• FM						
order code		FLG-SF2*-**T1	FLH-SF2*-**T1	FLK-SF2*-**T1	FLM-SF2*-**T1	-
pipe surface temperature (Ex)	°C	-40…+165				
degree of protection		IP66				-
marking		FM APPROVED NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860				-

completely thermically insulated transducer installation necessary

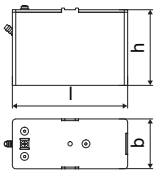
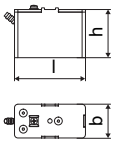
[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

Lamb wave transducers (zone 2, NL)

order code		FLG-N*2*-**NL	FLH-N*2*-**NL	FLK-N*2*-**NL	FLM-N*2*-**NL	FLP-N*2*-**NL	FLQ-N*2*-**NL
technical type		C(RT)G1NH3	C(RT)H1NH3	C(RT)K1NH3	C(RT)M1NH3	C(RT)P1NH3	C(RT)Q1NH3
transducer frequency	MHz	0.2	0.3	0.5	1	2	4
inner pipe diameter d[1]							
min. extended	mm	400	350	100	50	25	10
min. recommended	mm	500	450	200	100	50	25
max. recommended	mm	4000	3000	2000	1000	400	150
max. extended	mm	4800	3600	2400	1200	480	240
pipe wall thickness							
min.	mm	11	8	5	2.5	1.2	0.6
max.	mm	24	16	10	5	3	1.2
material							
housing		PPSU with stainless steel cover and transducer shoe 304 (1.4301)					
contact surface		PPSU					
degree of protection		IP66					
transducer cable							
type		1699					
length	m	5			4		3
dimensions							
length l	mm	136.5			84		70
width b	mm	59			40		30
height h	mm	90.5			59		47.5
dimensional drawing							
weight (without cable)	kg	1.652			0.504		0.251
pipe surface temperature	°C	-40...+130					
ambient temperature	°C	-40...+130					
temperature compensation		x					
explosion protection							
• **ATEX/IECEx**							
order code		FLG-NA2*-**NL	FLH-NA2*-**NL	FLK-NA2*-**NL	FLM-NA2*-**NL	FLP-NA2*-**NL	FLQ-NA2*-**NL
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155					
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db					
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X					
• **EAC**							
order code		FLG-NE2*-**NL	FLH-NE2*-**NL	FLK-NE2*-**NL	FLM-NE2*-**NL	FLP-NE2*-**NL	FLQ-NE2*-**NL
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +160 °C Пыль: до +155 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

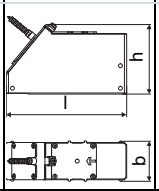
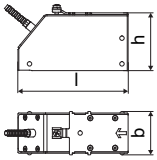
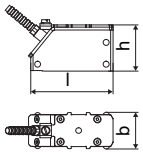
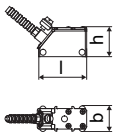
Lamb wave transducers (zone 2, higher temperatures, NL)

order code		FLG-S*2N-**NL	FLH-S*2N-**NL	FLK-S*2N-**NL	FLM-S*2N-**NL
technical type		C(RT)G1SH3	C(RT)H1SH3	C(RT)K1SH3	C(RT)M1SH3
transducer frequency	MHz	0.2	0.3	0.5	1
inner pipe diameter d [1]					
min. extended	mm	400	350	100	50
min. recommended	mm	500	450	200	100
max. recommended	mm	4000	3000	2000	1000
max. extended	mm	4800	3600	2400	1200
pipe wall thickness					
min.	mm	10.6	7.1	4.2	2.1
max.	mm	23.7	15.8	9.5	4.7
material					
housing		PPSU with stainless steel cover and transducer shoe 304 (1.4301)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5			4
dimensions					
length l	mm	136.5			84
width b	mm	59			40
height h	mm	90.5			59
dimensional drawing					
weight (without cable)	kg	1.652			0.504
storing temperature	°C	-40...+130			
operating temperature	°C	100...165			
warm-up time	h	3			1
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		FLG-SA2N-**NL	FLH-SA2N-**NL	FLK-SA2N-**NL	FLM-SA2N-**NL
pipe surface temperature (Ex)	°C	gas: -50...+165 dust: -50...+155			
marking		CE 0637 Ex II3G II2D Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU10ATEX1163 X, IECEx IBE 12.0005X			
• EAC					
order code		FLG-SE2N-**NL	FLH-SE2N-**NL	FLK-SE2N-**NL	FLM-SE2N-**NL
marking		2Ex nA IIC T6...T3 Gc Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +165 °C Пыль: до +155 °C			
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830			

completely thermically insulated transducer installation necessary

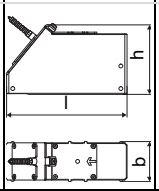
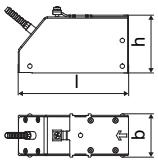
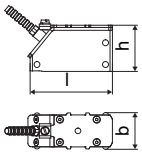
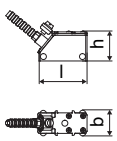
[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

Lamb wave transducers (FM Class I Div. 2, NL)

order code		FLF-NF2N-**NL	FLG-NF2N-**NL	FLH-NF2N-**NL	FLK-NF2N-**NL	FLM-NF2N-**NL	FLP-NF2N-**NL	FLQ-NF2N-**NL
technical type		C(RT)F1N51	C(RT)G1N51	C(RT)H1N51	C(RT)K1N51	C(RT)M1N51	C(RT)P1N51	C(RT)Q1N51
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2	4
inner pipe diameter d[1]								
min. extended	mm	640	400	350	100	50	25	10
min. recommended	mm	800	500	450	200	100	50	25
max. recommended	mm	5500	4000	3000	2000	1000	400	150
max. extended	mm	6600	4800	3600	2400	1200	480	240
pipe wall thickness								
min.	mm	15	11	8	5	2.5	1.2	0.6
max.	mm	32	24	16	10	5	3	1.2
material								
housing		PPSU with stainless steel cover 316Ti	PPSU with stainless steel cover 304					
contact surface		PPSU						
degree of protection		IP66/IP67	IP66					
transducer cable								
type		1699						
length	m	5				4		3
dimensions								
length l	mm	163	128.5			74		42
width b	mm	54	51			32		22
height h	mm	91.3	67.5			40.5		25.5
dimensional drawing								
weight (without cable)	kg	0.935	0.471			0.077		0.019
pipe surface temperature	°C	-40...+130						
ambient temperature	°C	-40...+130						
temperature compensation		x						
explosion protection								
• **FM**								
pipe surface temperature (Ex)	°C	-40...+165						
degree of protection		IP66						
marking		NI/Cl. I,II,III/Div. 2 / GP A,B,C,D,E,F,G/ Temp. Codes dwg 3860						

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

Lamb wave transducers (zone 1, T1)

order code		FLF-N*1*-**T1	FLG-N*1*-**T1	FLH-N*1*-**T1	FLK-N*1*-**T1	FLM-N*1*-**T1	FLP-N*1*-**T1	FLQ-N*1*-**T1
technical type		C(RT)F1N83	C(RT)G1N83	C(RT)H1N83	C(RT)K1N83	C(RT)M1N83	C(RT)P1N83	C(RT)Q1N83
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2	4
inner pipe diameter d [1]								
min. extended	mm	640	400	350	100	50	25	10
min. recommended	mm	800	500	450	200	100	50	25
max. recommended	mm	5500	4000	3000	2000	1000	400	150
max. extended	mm	6600	4800	3600	2400	1200	480	240
pipe wall thickness								
min.	mm	15	11	8	5	2.5	1.2	0.6
max.	mm	32	24	16	10	5	3	1.2
material								
housing		PPSU with stainless steel cover 316L, 316Ti (1.4404, 1.4571)				PPSU with stainless steel cover 316L (1.4404)		
contact surface		PPSU						
degree of protection		IP66/IP67	IP66					
transducer cable								
type		1699						
length	m	5				4		3
dimensions								
length l	mm	163	128.5			74		42
width b	mm	54	51			32		22
height h	mm	91.3	67.5			40.5		25.5
dimensional drawing								
weight (without cable)	kg	0.935	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		FLF-NA1N-**T1	FLG-NA1N-**T1	FLH-NA1N-**T1	FLK-NA1N-**T1	FLM-NA1N-**T1	FLP-NA1N-**T1	FLQ-NA1N-**T1
pipe surface temperature (Ex)	°C	-50...+155						
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIA T80 °C...T160 °C Db	CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db					
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X						
• EAC								
order code		FLF-NE1N-**T1	FLG-NE1N-**T1	FLH-NE1N-**T1	FLK-NE1N-**T1	FLM-NE1N-**T1	FLP-NE1N-**T1	FLQ-NE1N-**T1
marking		1Ex q IIC T6...T3 Gb Ex tb IIIA T80 °C...T160 °C Db от -50 °C до +155 °C	1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +155 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830						
• inmetro								
order code		FLF-NS1N-**T1	FLG-NS1N-**T1	FLH-NS1N-**T1	FLK-NS1N-**T1	FLM-NS1N-**T1	FLP-NS1N-**T1	FLQ-NS1N-**T1
pipe surface temperature (Ex)	°C	-50...+155						
marking		Ex q IIC T6...T3 Gb Ex tb IIIA T80 °C... T160 °C Db	Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db					
certification		TÜV 15.0616 X						
• KOSHA								
order code		-	FLG-NK1N-**T1	FLH-NK1N-**T1	FLK-NK1N-**T1	FLM-NK1N-**T1	FLP-NK1N-**T1	FLQ-NK1N-**T1
marking		-	Ex eq IIC T3...T6 Tamb = -50 °C - +155 °C					
certification		-	14-AV4BO-0510					

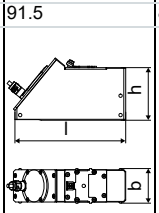
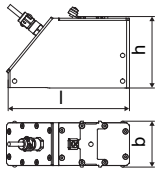
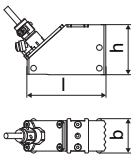
[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

continued on next page

order code		FLF-N*1*-**T1	FLG-N*1*-**T1	FLH-N*1*-**T1	FLK-N*1*-**T1	FLM-N*1*-**T1	FLP-N*1*-**T1	FLQ-N*1*-**T1
technical type		C(RT)F1N83	C(RT)G1N83	C(RT)H1N83	C(RT)K1N83	C(RT)M1N83	C(RT)P1N83	C(RT)Q1N83
• **Japanese Ex certification**								
order code		FLF-NJ1N-**T1	FLG-NJ1N-**T1	FLH-NJ1N-**T1	FLK-NJ1N-**T1	FLM-NJ1N-**T1	FLP-NJ1N-**T1	FLQ-NJ1N-**T1
marking		Ex q IIC T6...T3 Gb Ex tb IIIA T80 °C...T160 °C Db	Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db					
certification		CML 21JPN5217X						

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

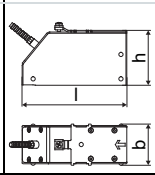
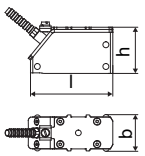
Lamb wave transducers (zone 1, T1, IP68)

order code		FLF-L*1*-**T1/ H68	FLG-L*1*-**T1/ H68	FLH-L*1*-**T1/ H68	FLK-L*1*-**T1/ H68	FLM-L*1*-**T1/ H68	FLP-L*1*-**T1/ H68
technical type		CRF1LI3	CRG1LI3	CRH1LI3	CRK1LI3	CRM1LI3	CRP1LI3
transducer frequency	MHz	0.15	0.2	0.3	0.5	1	2
inner pipe diameter d [1]							
min. extended	mm	640	400	350	100	50	25
min. recommended	mm	800	500	450	200	100	50
max. recommended	mm	5500	4000	3000	2000	1000	400
max. extended	mm	6600	4800	3600	2400	1200	480
pipe wall thickness							
min.	mm	15	11	8	5	2.5	1.2
max.	mm	32	24	16	10	5	3
material							
housing		PPSU with stainless steel cover 316Ti (1.4571)	PPSU with stainless steel cover 316Ti (1.4571)				
contact surface		PPSU	PPSU				
degree of protection		IP68[2]	IP68[2]				
transducer cable							
type		2550	2550				
length	m	12	12				
dimensions							
length l	mm	173	143.5			73	
width b	mm	54	54			31.6	
height h	mm	91.5	83.5			46	
dimensional drawing							
weight (without cable)	kg	1.36	0.639			0.093	
pipe surface temperature	°C	-40...+80	-40...+80				
ambient temperature	°C	-40...+80	-40...+80				
temperature compensation		x	x				
explosion protection							
• ATEX/IECEx							
order code		FLF-LA1N-**T1/ H68	FLG-LA1N-**T1/ H68	FLH-LA1N-**T1/ H68	FLK-LA1N-**T1/ H68	FLM-LA1N-**T1/ H68	FLP-LA1N-**T1/ H68
pipe surface temperature (Ex)	°C	-40...+80					
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db					
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X					
• EAC							
order code		FLF-LE1N-**T1/ H68	FLG-LE1N-**T1/ H68	FLH-LE1N-**T1/ H68	FLK-LE1N-**T1/ H68	FLM-LE1N-**T1/ H68	FLP-LE1N-**T1/ H68
marking		1Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db от -40 °C до +80 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					
• inmetro							
order code		FLF-LS1N-**T1/ H68	FLG-LS1N-**T1/ H68	FLH-LS1N-**T1/ H68	FLK-LS1N-**T1/ H68	FLM-LS1N-**T1/ H68	FLP-LS1N-**T1/ H68
pipe surface temperature (Ex)	°C	-40...+80					
marking		Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db					
certification		TÜV 15.0616 X					
Japanese Ex certification							
order code		FLF-LJ1N-**T1/ H68	FLG-LJ1N-**T1/ H68	FLH-LJ1N-**T1/ H68	FLK-LJ1N-**T1/ H68	FLM-LJ1N-**T1/ H68	FLP-LJ1N-**T1/ H68
marking		Ex q IIC T6...T5 Gb Ex tb IIIC T80 °C...T85 °C Db					
certification		CML 21JPN5217X					

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

[2] test conditions: 3 months/2 bar (20 m)/20 °C

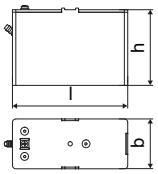
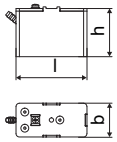
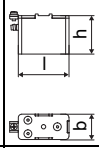
Lamb wave transducers (zone 1, higher temperatures, T1)

order code		FLG-S*1N-**T1	FLH-S*1N-**T1	FLK-S*1N-**T1	FLM-S*1N-**T1
technical type		C(RT)G1S83	C(RT)H1S83	C(RT)K1S83	C(RT)M1S83
transducer frequency	MHz	0.2	0.3	0.5	1
inner pipe diameter d[1]					
min. extended	mm	400	350	100	50
min. recommended	mm	500	450	200	100
max. recommended	mm	4000	3000	2000	1000
max. extended	mm	4800	3600	2400	1200
pipe wall thickness					
min.	mm	10.6	7.1	4.2	2.1
max.	mm	23.7	15.8	9.5	4.7
material					
housing		PPSU with stainless steel cover 316Ti (1.4571)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5			4
dimensions					
length l	mm	128.5			74
width b	mm	51			32
height h	mm	67.5			40.5
dimensional drawing					
weight (without cable)	kg	0.8			0.16
storing temperature	°C	-40...+155			
operating temperature	°C	100...155			
warm-up time	h	3			1
temperature compensation		x			
explosion protection					
• ATEX/IECEx					
order code		FLG-SA1N-**T1	FLH-SA1N-**T1	FLK-SA1N-**T1	FLM-SA1N-**T1
pipe surface temperature (Ex)	°C	-50...+155			
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X			
• EAC					
order code		FLG-SE1N-**T1	FLH-SE1N-**T1	FLK-SE1N-**T1	FLM-SE1N-**T1
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +155 °C			
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830			
• inmetro					
order code		FLG-SS1N-**T1	FLH-SS1N-**T1	FLK-SS1N-**T1	FLM-SS1N-**T1
pipe surface temperature (Ex)	°C	-50...+155			
marking		Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db			
certification		Segurança INMETRO TÜV 15.0616 X			

completely thermically insulated transducer installation necessary

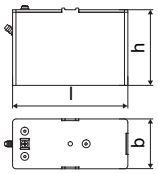
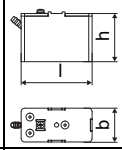
[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

Lamb wave transducers (zone 1, NL)

order code		FLG-N*1*-**NL	FLH-N*1*-**NL	FLK-N*1*-**NL	FLM-N*1*-**NL	FLP-N*1*-**NL	FLQ-N*1*-**NL
technical type		C(RT)G1NW3	C(RT)H1NW3	C(RT)K1NW3	C(RT)M1NW3	C(RT)P1NW3	C(RT)Q1NW3
transducer frequency	MHz	0.2	0.3	0.5	1	2	4
inner pipe diameter d [1]							
min. extended	mm	400	350	100	50	25	10
min. recommended	mm	500	450	200	100	50	25
max. recommended	mm	4000	3000	2000	1000	400	150
max. extended	mm	4800	3600	2400	1200	480	240
pipe wall thickness							
min.	mm	11	8	5	2.5	1.2	0.6
max.	mm	24	16	10	5	3	1.2
material							
housing		PPSU with stainless steel cover and transducer shoe 304 (1.4301)					
contact surface		PPSU					
degree of protection		IP66					
transducer cable							
type		1699					
length	m	5			4		3
dimensions							
length l	mm	136.5			84		70
width b	mm	59			40		30
height h	mm	90.5			59		47.5
dimensional drawing							
weight (without cable)	kg	1.652			0.504		0.251
pipe surface temperature	°C	-40...+130					
ambient temperature	°C	-40...+130					
temperature compensation		x					
explosion protection							
• ATEX/IECEx							
order code		FLG-NA1*-**NL	FLH-NA1*-**NL	FLK-NA1*-**NL	FLM-NA1*-**NL	FLP-NA1*-**NL	FLQ-NA1*-**NL
pipe surface temperature (Ex)	°C	-50...+155					
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db					
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X					
• EAC							
order code		FLG-NE1*-**NL	FLH-NE1*-**NL	FLK-NE1*-**NL	FLM-NE1*-**NL	FLP-NE1*-**NL	FLQ-NE1*-**NL
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +155 °C					
certification		EAC Ex ЕАЭС KZ 7500525.01.01.01830					

[1] Lamb wave transducer:
typical values for water; pipe diameters for other fluids on request
inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
inner pipe diameter max. extended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 5 m/s (10 m/s)

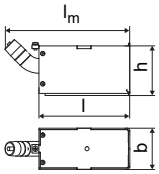
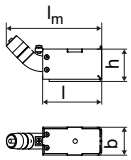
Lamb wave transducers (zone 1, higher temperatures, NL)

order code		FLG-S*1N-**NL	FLH-S*1N-**NL	FLK-S*1N-**NL	FLM-S*1N-**NL
technical type		C(RT)G1SW3	C(RT)H1SW3	C(RT)K1SW3	C(RT)M1SW3
transducer frequency	MHz	0.2	0.3	0.5	1
inner pipe diameter d[1]					
min. extended	mm	400	350	100	50
min. recommended	mm	500	450	200	100
max. recommended	mm	4000	3000	2000	1000
max. extended	mm	4800	3600	2400	1200
pipe wall thickness					
min.	mm	10.6	7.1	4.2	2.1
max.	mm	23.7	15.8	9.5	4.7
material					
housing		PPSU with stainless steel cover and transducer shoe 304 (1.4301)			
contact surface		PPSU			
degree of protection		IP66			
transducer cable					
type		1699			
length	m	5			4
dimensions					
length l	mm	136.5			84
width b	mm	59			40
height h	mm	90.5			59
dimensional drawing					
weight (without cable)	kg	1.652			0.504
storing temperature	°C	-40...+130			
operating temperature	°C	100...155			
warm-up time	h	3			1
temperature compensation		x			
explosion protection					
• **ATEX/IECEx**					
order code		FLG-SA1N-**NL	FLH-SA1N-**NL	FLK-SA1N-**NL	FLM-SA1N-**NL
pipe surface temperature (Ex)	°C	-50...+155			
marking		CE 0637 Ex II2G II2D Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db			
certification		IBExU07ATEX1168 X, IECEx IBE 08.0007X			
• **EAC**					
order code		FLG-SE1N-**NL	FLH-SE1N-**NL	FLK-SE1N-**NL	FLM-SE1N-**NL
marking		1Ex q IIC T6...T3 Gb Ex tb IIIC T80 °C...T160 °C Db от -50 °C до +155 °C			
certification		EAC Ex EAЭС KZ 7500525.01.01.01830			

completely thermically insulated transducer installation necessary

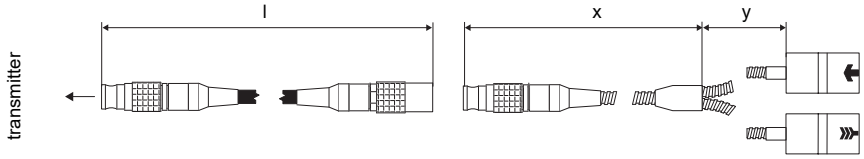
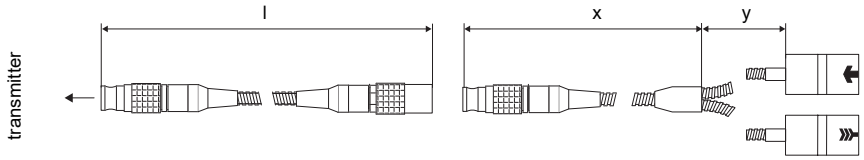
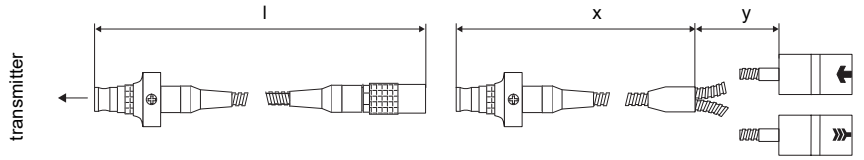
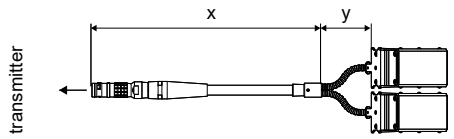
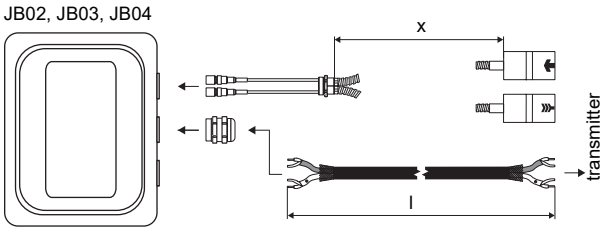
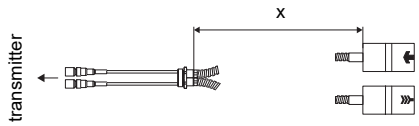
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inner pipe diameter max. recommended: in reflection arrangement (diagonal arrangement) and for a flow velocity of 7 m/s (14 m/s)
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Lamb wave transducers (FM Class I Div. 1, T1)

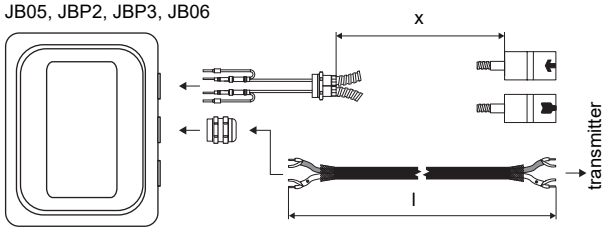
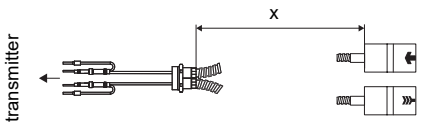
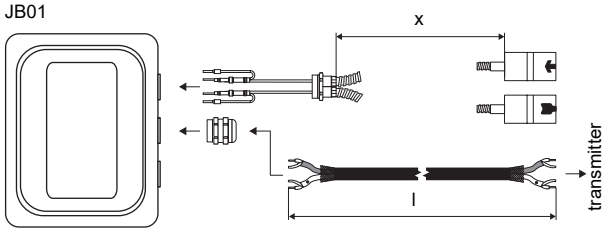
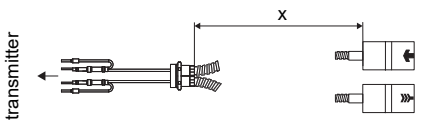
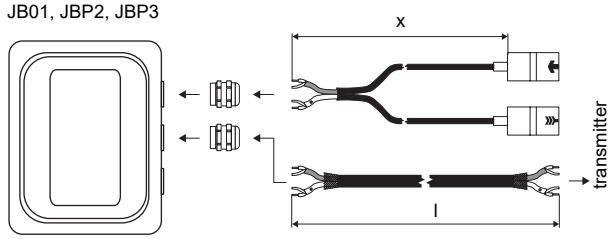
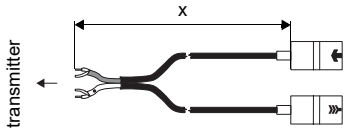
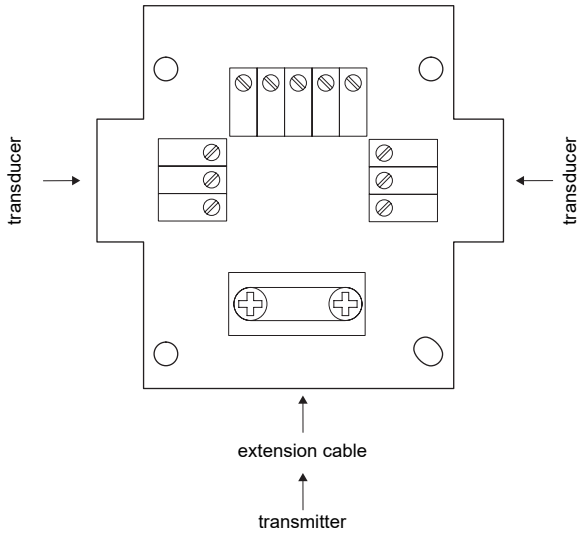
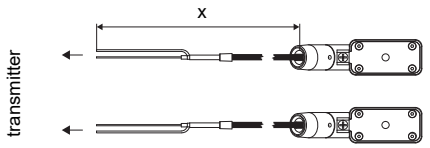
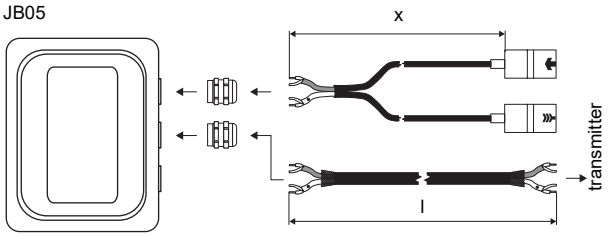
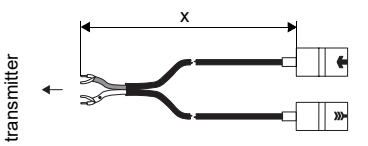
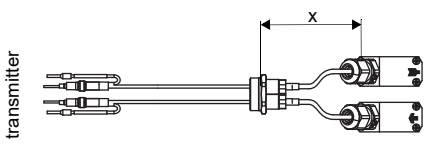
order code		FLG-NF1N-**T1	FLH-NF1N-**T1	FLK-NF1N-**T1	FLM-NF1N-**T1	FLP-NF1N-**T1	FLQ-NF1N-**T1
technical type		C(RT)G1N62	C(RT)H1N62	C(RT)K1N62	C(RT)M1N62	C(RT)P1N62	C(RT)Q1N62
transducer frequency	MHz	0.2	0.3	0.5	1	2	4
inner pipe diameter d [1]							
min. extended	mm	400	350	100	50	25	10
min. recommended	mm	500	450	200	100	50	25
max. recommended	mm	4000	3000	2000	1000	400	150
max. extended	mm	4800	3600	2400	1200	480	240
pipe wall thickness							
min.	mm	11	8	5	2.5	1.2	0.6
max.	mm	24	16	10	5	3	1.2
material							
housing		stainless steel 316L (1.4404)					
contact surface		PPSU					
degree of protection		IP66					
transducer cable							
type		2549					
length	m	10					
dimensions							
length l	mm	132			80		
width b	mm	60			38		
height h	mm	72			44		
mounting length l_m	mm	185			135		
thread		1/2 NPT			1/2 NPT		
dimensional drawing							
weight (without cable)	kg	0.305			0.470	0.475	0.479
pipe surface temperature	°C	-40...+110					
ambient temperature	°C	-40...+110					
temperature compensation		x					
explosion protection							
• **FM**							
pipe surface temperature (Ex)	°C	-40...+125					
marking		FM APPROVED S/Cl. I, II, III / Div. 1 / GP A, B, C, D, E, F, G / Temperature Codes dwg 3831					

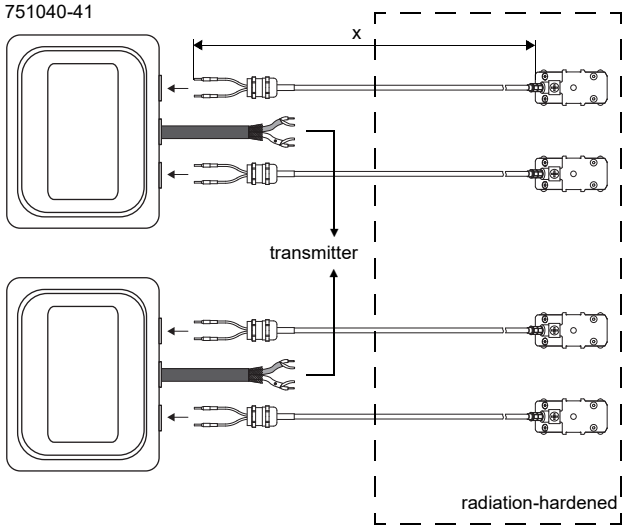
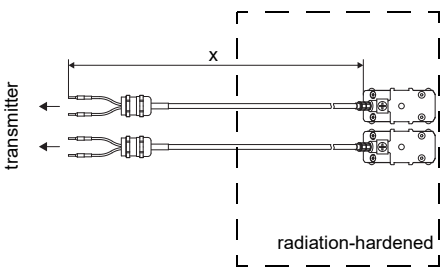
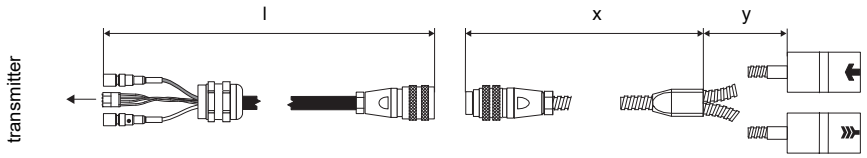
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Connection systems

<table>
<tr><td colspan="2">connection system NL</td></tr>
<tr><td>direct connection/connection with extension cable</td><td>transducers
technical type</td></tr>
<tr><td>
</td><td>*****Z7
*****C3</td></tr>
<tr><td>
</td><td>*****W*
*****H*</td></tr>
<tr><td>
</td><td>*****51</td></tr>
<tr><td>direct connection</td><td>transducers
technical type</td></tr>
<tr><td>
</td><td>****LI7</td></tr>
<tr><td colspan="2">connection system TS</td></tr>
<tr><td>connection with extension cable</td><td>direct connection</td><td>transducers
technical type</td></tr>
<tr><td>
</td><td>
</td><td>*****52</td></tr>
</table>

connection system T1

connection with extension cable	direct connection	transducers technical type
JB05, JBP2, JBP3, JB06 		****N53 ****E53 ****S53
JB01 		*****8*
JB01, JBP2, JBP3 		****LI*
terminal board for junction box KFM1 (junction box by customer) 		*****62
JB05 		****LZ*
		CDQ2LK1

connection system T1		
connection via junction box • 2 measuring channels (inputs possible)	direct connection • 1 measuring channel (inputs possible) or • 2 measuring channels (without inputs)	transducers technical type
751040-41 		****R53 ****W53
connection system AS		
connection with extension cable		transducers technical type
		*****Z7 *****C3

Cable

transducer cable								
type		**7819**	**2606**	**1699**	**2550**	**6111**	**2549**	**2619**
transducers technical type		****LI7	****LZ*	****N** ***1E** ****S** CDQ2LK1 (without sheath)	****LI*	***2E**	*****62	****R** ****W**
weight	kg/m		0.033	0.094	0.035	0.092	0.065	0.03
ambient temperature	°C	-40...+100	-40...+100	-55...+200	-40...+100	-100...+225	-100...+200	-55...+200
min. bend radius								7.5x outer diameter recommended: 12x outer diameter
properties					longitudinal watertight			teflon free, radiation-hardened fire propagation test according to IEC 60332-1 NF-C32-070 C1/2
cable jacket								
material		PUR	PUR	PTFE	PUR	PFA	PTFE	PEEK
outer diameter	mm	5.2 ±0.2	5	2.9	5.2 ±0.2	2.7	5.3	4.2
thickness	mm	0.9		0.3	0.9	0.5	0.5	0.5
colour		grey	grey	brown	grey	white	black	grey
shield		x	x	x	x	x	x	x
sheath 1								
material		PUR	-	stainless steel 316Ti (1.4571)	-	stainless steel 316Ti (1.4571)	-	-
outer diameter	mm	13 ±0.4	-	8	-	8	-	-
colour		grey	-	-	-	-	-	-
sheath 2								
material		stainless steel 316Ti (1.4571)	-	-	-	-	-	-
outer diameter	mm	8	-	-	-	-	-	-
connector								
type		Lemo 3K	-	-	-	-	-	-

extension cable					
type		**1750**	**2551**	**2615**	**5245**
connection system		NL	AS	TS, T1	TS, T1
standard length	m	5 10	1 10	-	-
weight	kg/m	0.12	0.083	0.18	0.38
ambient temperature	°C	< 80	-25...+80	-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		PE	TPE-O	PUR	PUR
outer diameter	mm	6	8	max. 12	max. 12
thickness	mm	0.5		2	2
colour		black	black	black	black
shield		x	x	x	x
sheath					
material		stainless steel 304 (1.4301)	-	-	steel wire braid with copolymer sheath
outer diameter	mm	9	-	-	max. 15.5
remark		optional			

Cable length

transducer frequency		F, G, H, K			M, P			Q			S		
connection system NL													
transducers technical type		x	y	l	x	y	l	x	y	l	x	y	l
*D***Z7[1] *R***C3[1]	m	2	3	≤ 25	2	2	≤ 25	2	1	≤ 25	1	1	≤ 20
*L***Z7[1] *T***C3[1]	m	2	7	≤ 25	7	2	≤ 25	8	1	≤ 25	-	-	-
*(DR)***W* *(DR)***H*	m	2	3	≤ 10	2	2	≤ 10	2	1	≤ 10	-	-	-
*(LT)***W* *(LT)***H*	m	2	7	≤ 10	7	2	≤ 10	8	1	≤ 10	-	-	-
*(DR)***51	m	2	3	≤ 10	2	2	≤ 10	2	1	≤ 10	1	1	≤ 10
*(LT)***51	m	2	7	≤ 10	7	2	≤ 10	8	1	≤ 10	-	-	-
****LI7	m	3	3	-	3	3	-	-	-	-	-	-	-
connection system TS													
transducers technical type		x		l	x		l	x		l	x		l
*(DR)***52 *(DR)***53	m	5		≤ 300	4		≤ 300	3		≤ 90	2		≤ 40
*(LT)***52 *(LT)***53	m	9		≤ 300	9		≤ 300	9		≤ 90	-		-
connection system T1													
transducers technical type		x		l	x		l	x		l	x		l
*(DR)***8*	m	5		≤ 300	4		≤ 300	3		≤ 90	-		-
*(LT)***8*	m	9		≤ 300	9		≤ 300	9		≤ 90	-		-
*(DR)***62	m	10		≤ 300	10		≤ 300	10		≤ 90	-		-
*(LT)***62	m	46		≤ 300	46		≤ 300	46		≤ 90	-		-
option H68: ****LI*	m	12		≤ 300	12		≤ 300	-		-	-		-
CDK1LZ7	m	10		≤ 300	-		-	-		-	-		-
***2LZ1	m	-		-	10		≤ 300	10		≤ 90	-		-
CDQ2LK1	m	-		-	-		-	10		-	-		-
****R** ****W**	m	-		-	≤ 300		-	≤ 90		-	-		-
connection system AS													
transducers technical type		x	y	l	x	y	l	x	y	l	x	y	l
*D***Z7 *R***C3	m	2	3	≤ 100	2	2	≤ 100	2	1	≤ 50	1	1	≤ 20
*L***Z7 *T***C3	m	2	7	≤ 100	2	7	≤ 100	2	7	≤ 50	-	-	-

[1] l > 25...100 m on request

x, y - transducer cable length

l - max. length of extension cable (depending on the application)

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