

# Flexim FLUXUS H721 Ultrasonic Flowmeter



## Ultrasonic Process Monitoring and Flow Measurement of Hydrocarbons

### Features

- Measurement of standard volumetric flow rate according to ASTM and API determination
- Fluid data sets for all classes of hydrocarbons integrated in the transmitter
- Guided application adaptation


### Applications

Applications in single and multiproduct pipelines:

- Leakage detection
- Check metering
- Fluid detection, batch/interface detection
- Fluid quality monitoring

# Transmitter

## Technical data

	FLUXUS H721**-NNN**-*A H721**-NNN**-*S	FLUXUS H721**-A2N**-*A H721**-A2N**-*S	FLUXUS H721**-F2N**-*A H721**-F2N**-*S
			
design	standard field device	standard field device zone 2	standard field device FM Class I Div. 2
<b>measurement</b>			
<b>• HPI</b>			
standard volumetric flow rate			
• measurement uncertainty	%	±1 (crude oil, refined products, liquefied gases, heavy oils)	
• standard volumetric flow rate correction		$VCF = CTL \cdot CPL = \rho / \rho_N$ VCF - volume correction factor CTL - correction for the effect of temperature on liquid CPL - correction for the effect of pressure on liquid ρ - operating density ρ <sub>N</sub> - normalized density	
operating density, normalized density			
• repeatability	%	±1 (with field calibration of sound speed)	
<b>• flow</b>			
measurement principle		transit time difference correlation principle, automatic NoiseTrek selection for measurements with high gaseous or solid content	
flow direction		bidirectional	
flow velocity	ft/s	0.03 to 82	
repeatability		0.15 % MV ±0.02 ft/s	
fluid		all acoustically conductive liquids with < 10 % gaseous or solid content in volume (transit time difference principle)	
temperature compensation		corresponding to the recommendations in ANSI/ASME MFC-5.1-2011	
<b>measurement uncertainty (volumetric flow rate)</b>			
measurement uncertainty of the measuring system <sup>1</sup>		±0.3 % MV ±0.02 ft/s includes calibration certificate traceable to NIST	
measurement uncertainty at the measuring point <sup>2</sup>		±1 % MV ±0.02 ft/s	
<b>transmitter</b>			
power supply		• 100 to 230 V/50 to 60 Hz or • 20 to 32 V DC or • 11 to 16 V DC	
power consumption	W	< 15	
number of measuring channels		1, optional: 2 (1 measuring point)	
damping	s	0 to 100 (adjustable)	
measuring cycle	Hz	100 to 1000 (1 channel)	
response time	s	1 (1 channel), option: 0.02	
housing material		aluminum, powder coated or stainless steel 316L	
degree of protection		IP66	aluminum housing: IP66/NEMA 4X stainless steel housing: IP65
dimensions	inch	see dimensional drawing	
weight	lb	aluminum housing: 11.9 stainless steel housing: 11.2	
fixation		wall mounting, optional: 2" pipe mounting	
ambient temperature	°F	-40 to +140 (< -4 without operation of the display)	aluminum housing: -40 to +131/140 (< -4 without operation of the display) stainless steel housing: -4 to +131/140
display		128 x 64 pixels, backlight	
menu language		English, German, French, Spanish, Dutch, Russian, Polish, Turkish, Italian	
<b>explosion protection</b>			
<b>• ATEX/IECEx</b>			
marking		H721**-A20*A, H721**-A20*S:  CE 0637 Ex II 3G II 2D Ex nA nC ic IIC T4 Gc Ex tb IIIC T120 °C Db T <sub>a</sub> -40...+60 °C	
certification		IBExU11ATEX1015, IECEx IBE 11.0008	

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

<sup>2</sup> for transit time difference principle and reference conditions

<sup>3</sup> outside the explosive atmosphere (housing cover open)

	FLUXUS H721**-NNN**.*A H721**-NNN**.*S	FLUXUS H721**-A2N**.*A H721**-A2N**.*S	FLUXUS H721**-F2N**.*A H721**-F2N**.*S
<b>• FM</b>			
marking	-	-	H721**-F20*S2, H721**-F20*S3:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C,D,E,F,G/ T5  H721**-F20*S1:  NI/Cl. I,II,III/Div. 2/ GP. A,B,C,D,E,F,G/ T4A
<b>measuring functions</b>			
physical quantities	<ul style="list-style-type: none"> <li>operating volumetric flow rate, standard volumetric flow rate according to ASTM 1250/TP25/4311, flow velocity, mass flow rate</li> </ul> <b>additional output quantities</b> <ul style="list-style-type: none"> <li>HPI: API gravity, density, normalized density</li> <li>interface detection: slope of the HPI physical quantities</li> <li>fluid detection: according to fluid table</li> </ul>		
totalizer	volume, mass		
calculation functions	average, difference, sum (2 measuring channels necessary)		
diagnostic functions	sound speed, signal amplitude, SNR, SCNR, standard deviation of amplitudes and transit times		
<b>communication interfaces</b>			
service interfaces	measured value transmission, parametrization of the transmitter: <ul style="list-style-type: none"> <li>USB<sup>3</sup></li> <li>LAN<sup>3</sup></li> </ul>		
process interfaces	max. 1 option: <ul style="list-style-type: none"> <li>Modbus RTU</li> <li>HART</li> <li>Profibus PA</li> <li>FF H1</li> <li>Modbus TCP</li> </ul>		
<b>accessories</b>			
data transmission kit	USB cable		
software	<ul style="list-style-type: none"> <li>FluxDiagReader: reading of measured values and parameters, graphical representation</li> <li>FluxDiag (optional): reading of measurement data, graphical representation, report generation, parametrization of the transmitter</li> </ul>		
<b>data logger</b>			
loggable values	all physical quantities, totaled physical quantities and diagnostic values		
capacity	max. 800 000 measured values		
<b>outputs</b>			
	The outputs are galvanically isolated from the transmitter.		
number	on request		
<b>• switchable current output</b>			
	All switchable current outputs are jointly switched to active or passive.		
range	mA	4 to 20 (3.2 to 22)	
accuracy		0.04 % MV ±3 µA	
active output		$R_{ext} < 250 \Omega$	
passive output		$U_{ext} = 8 \text{ to } 30 \text{ V}$ , depending on $R_{ext}$ ( $R_{ext} < 1 \text{ k}\Omega$ at 30 V)	
<b>• HART</b>			
range	mA	4 to 20	
accuracy		0.1 % MV ±15 µA	
active output		$U_{int} = 24 \text{ V}$ , $R_{ext} < 500 \Omega$	
passive output		$U_{ext} = 10 \text{ to } 24 \text{ V DC}$ , depending on $R_{ext}$ ( $R_{ext} < 1 \text{ k}\Omega$ at 24 V)	
<b>• voltage output</b>			
range	V	0 to 1 or 0 to 10	
accuracy		0 to 1 V: 0.1 % MV ±1 mV 0 to 10 V: 0.1 % MV ±10 mV	
internal resistance		$R_{int} = 500 \Omega$	
<b>• frequency output</b>			
range	kHz	0 to 5	
optorelay		24 V/4 mA, $R_{int} = 66.5 \Omega$	

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

<sup>2</sup> for transit time difference principle and reference conditions

<sup>3</sup> outside the explosive atmosphere (housing cover open)

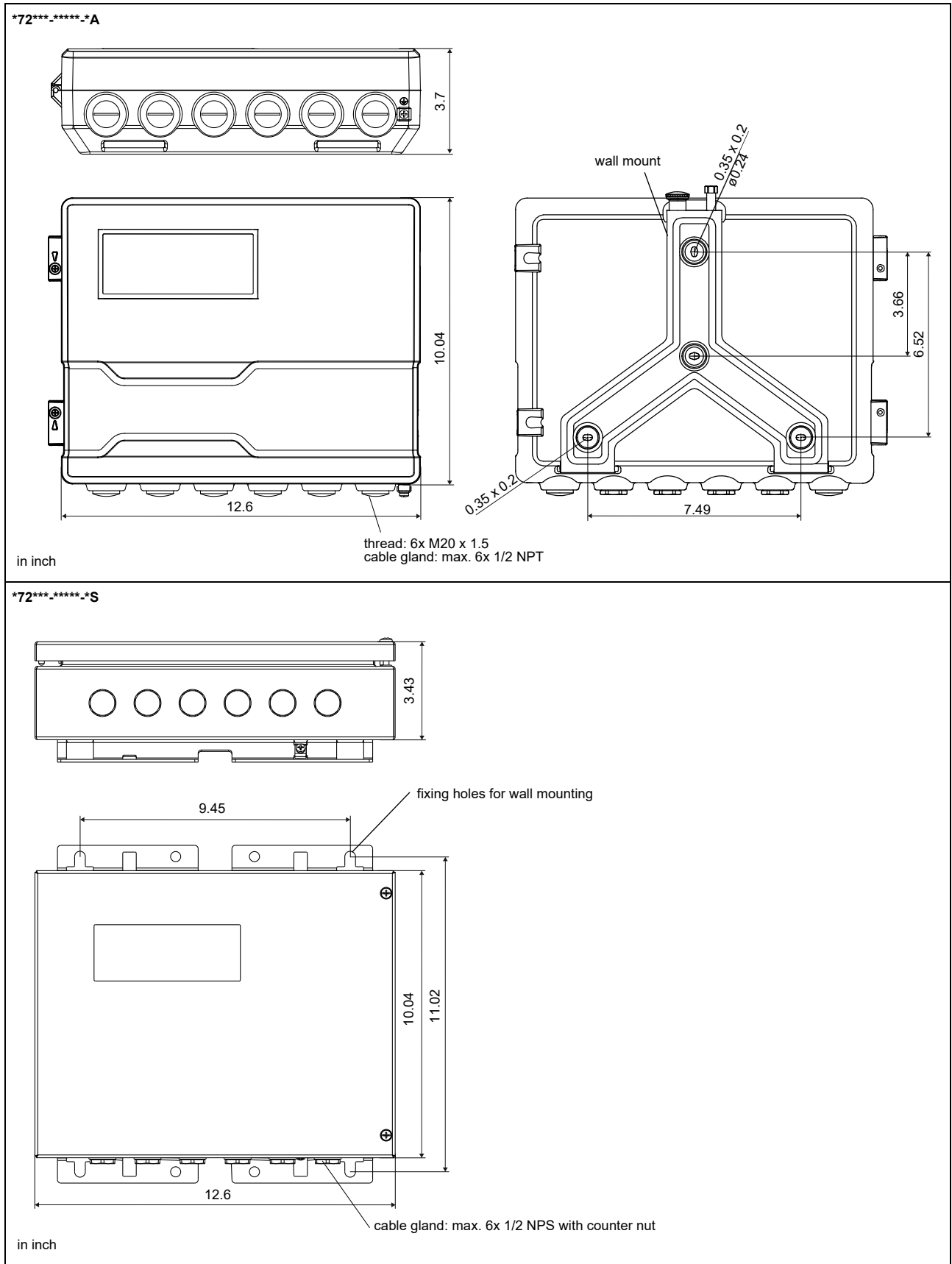
	FLUXUS H721**-NNN**.*A H721**-NNN**.*S	FLUXUS H721**-A2N**.*A H721**-A2N**.*S	FLUXUS H721**-F2N**.*A H721**-F2N**.*S
<b>• digital output</b>			
functions	<ul style="list-style-type: none"> <li>• frequency output</li> <li>• binary output</li> <li>• pulse output</li> </ul>		
number	3		
operating parameters	5 to 30 V/< 100 mA		
<b>frequency output</b>			
• range	kHz	0 to 5	
<b>binary output</b>			
• binary output as alarm output	limit, change of flow direction or error		
<b>pulse output</b>			
• functions	mainly for totalizing		
• pulse value	units	0.01 to 1000	
• pulse width	ms	0.05 to 1000	
<b>inputs</b>			
The inputs are galvanically isolated from the transmitter.			
number	max. 4, on request		
<b>• temperature input</b>			
type	Pt100/Pt1000		
connection	4-wire		
range	°F	-238 to +1040	
resolution	K	0.01	
accuracy	±0.01 % MV ±0.03 K		
<b>• current input</b>			
accuracy	0.1 % MV ±10 µA		
active input	U <sub>int</sub> = 24 V, R <sub>int</sub> = 50 Ω, P <sub>int</sub> < 0.5 W, not short-circuit proof		
• range	mA	0 to 20	
passive input	R <sub>int</sub> = 50 Ω, P <sub>int</sub> < 0.3 W		
• range	mA	-20 to +20	
<b>• voltage input</b>			
range	V	0 to 1	
accuracy	0.1 % MV ±1 mV		
internal resistance	R <sub>int</sub> = 1 MΩ		
<b>• binary input</b>			
switching signal	5 to 30 V, 1 mA		5 to 26 V, 1 mA
functions	<ul style="list-style-type: none"> <li>• reset of the measured values</li> <li>• reset of the totalizers</li> <li>• stop of the totalizers</li> <li>• activation of the measuring mode for highly dynamic flows</li> </ul>		

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

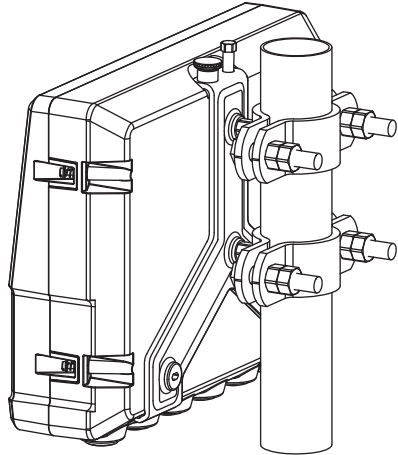
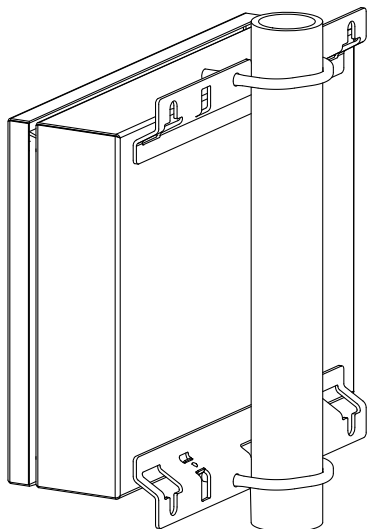
<sup>2</sup> for transit time difference principle and reference conditions

<sup>3</sup> outside the explosive atmosphere (housing cover open)

## Dimensions



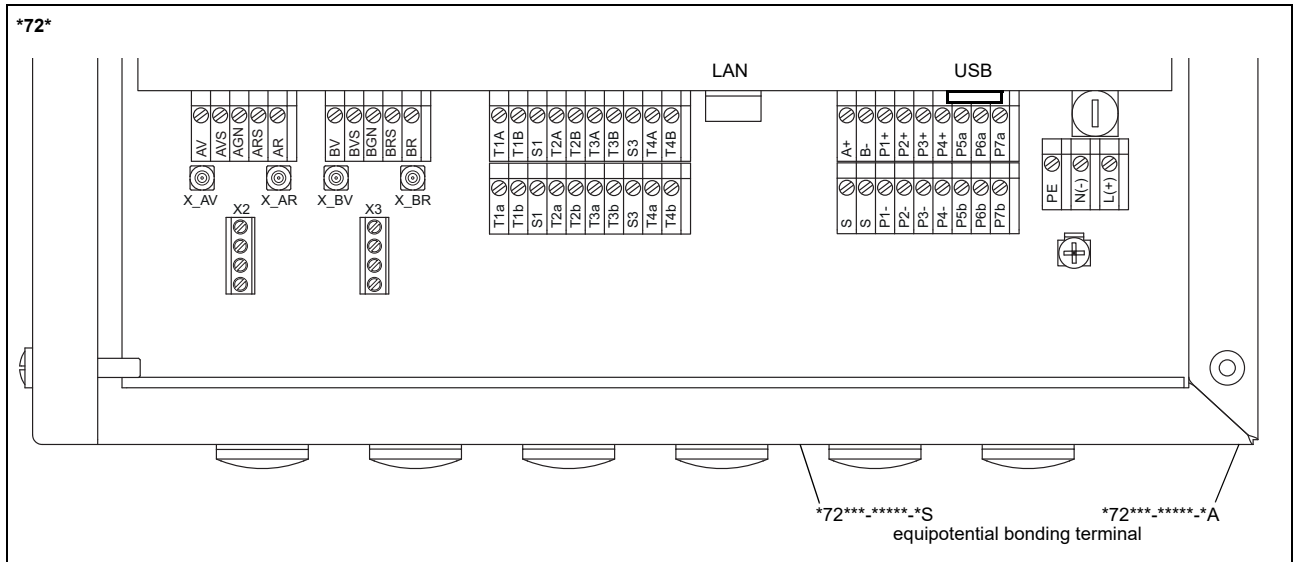
## 2" pipe mounting kit

<p>*72***_*****_A</p> 	<p>item number: 721037-4</p>
<p>*72***_*****_S</p> 	<p>item number: 721110-4</p>

### Storage

- do not store outdoors
- store within the original package
- store in a dry and dust-free place
- protect against sunlight
- keep all openings closed
- storing temperature: -4...+140 °F

## Terminal assignment



power supply <sup>1</sup>						
terminal		connection (AC)		connection (DC)		
PE		protective conductor		protective conductor		
N(-)		neutral conductor		-		
L(+)		outer conductor		+		
transducers						
transducer cable (transducers ****LI*), extension cable				transducer cable (transducers *****52)		
measuring channel A		measuring channel B			measuring channel A	measuring channel B
terminal	connection	terminal	connection	transducer	terminal	connection
AV	signal	BV	signal	↑	X_AV	X_BV
AVS	shield	BVS	shield			
ARS	shield	BRS	shield	↗	X_AR	X_BR
AR	signal	BR	signal			
						SMB connector
						SMB connector
outputs <sup>1, 2</sup>						
terminal	connection	terminal	connection	communication interface		
P1+ to P4+ P1- to P4-	current output, voltage output, frequency output, HART (P1)	A+	signal +	<ul style="list-style-type: none"> <li>RS485<sup>1</sup></li> <li>Modbus RTU<sup>1</sup></li> <li>BACnet MS/TP<sup>1</sup></li> <li>Profibus PA<sup>1</sup></li> <li>FF H1<sup>1</sup></li> </ul>		
		B-	signal -			
		S	shield			
P5a to P7a P5b to P7b	digital output	USB	type B Hi-Speed USB 2.0 Device	<ul style="list-style-type: none"> <li>service (FluxDiag/FluxDiagReader)</li> </ul>		
		LAN	RJ45 10/100 Mbps Ethernet			
analog inputs <sup>1, 2</sup>						
terminal	temperature probe		passive sensor		active sensor	
	direct connection	connection with extension cable	connection	connection	connection	connection
T1a to T4a	red	red/white	not connected	not connected	not connected	not connected
T1A to T4A	red/blue	gray/black	-	+	+	+
T1b to T4b	white/blue	blue/red	+	-	-	-
T1B to T4B	white	white/green	not connected	not connected	not connected	not connected
S1, S3	shield	shield	not connected	not connected	not connected	not connected
binary inputs <sup>1, 2</sup>						
terminal						
P1+ to P2+, P1- to P2-						

<sup>1</sup> cable (by customer):  
 - e.g., flexible wires, with insulated wire ferrules, wire cross-section: AWG14 to 24  
 - outer diameter of the cable (\*72\*\*\*-\*\*\*\*\*-S with ferrite nut): max. 0.3 inch

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

# Transducers

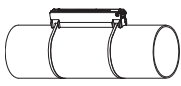
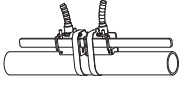
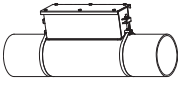
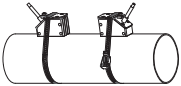
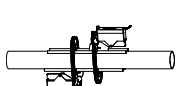
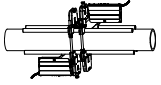
## Overview

### Shear wave transducers

	technical type						
	G	K	M	P	Q	S	
zone 2 - FM Class I Div. 2 - nonEx normal temperature range	CDG1N52 CLG1N52	CDK1N52 CLK1N52	CDM2N52 CLM2N52	CDP2N52 CLP2N52	CDQ2N52 CLQ2N52	CDS2N52	
zone 2 - nonEx IP68	CDG1L18	CDK1L18	CDM2L18	CDP2L18			
zone 2 - FM Class I Div. 2 - nonEx extended temperature range	CDG1E52 CLG1E52	CDK1E52 CLK1E52	CDM2E52 CLM2E52	CDP2E52 CLP2E52	CDQ2E52 CLQ2E52		
zone 1 normal temperature range	CDG1N81 CLG1N81	CDK1N81 CLK1N81	CDM2N81 CLM2N81	CDP2N81 CLP2N81	CDQ2N81 CLQ2N81		
zone 1 IP68	CDG1L11	CDK1L11	CDM2L11	CDP2L11			
zone 1 extended temperature range	CDG1E83 CLG1E83	CDK1E83 CLK1E83	CDM2E85 CLM2E85	CDP2E85 CLP2E85	CDQ2E85 CLQ2E85		
<b>inner pipe diameter d</b>							
min. extended	inch	15.7	3.9	2	0.98	0.39	0.24
min. recommended	inch	19.7	7.9	3.9	2	0.98	0.39
max. recommended	inch	157.5	78.7	39.4	15.7	5.9	2.8
max. extended	inch	255.9	94.5	47.2	18.9	9.4	2.8
<b>pipe wall thickness</b>							
min.	inch	0.43	0.2	0.1	0.05	0.02	0.01

for further data see Technical specification TS\_F7xx-transducersVx-xxx\_Lus

### Transducer mounting fixture

PermaRail		PermaLok PL		quick release clasps and tension straps	transducer box WI for Wavelnjector with chains
					
	transducer frequency S	transducer frequency M, P	transducer frequency M, P, Q		
					transducer box WI for Wavelnjector with threaded rods
					 outer pipe diameter: 1.4 to 15 inch

for further data see Technical specification TS\_F7xx-transducersVx-xxx\_Lus

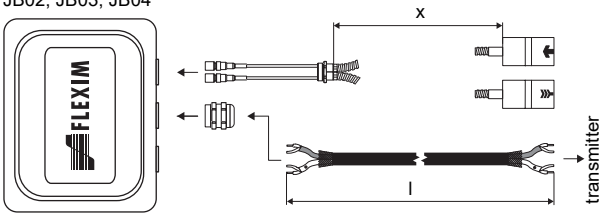
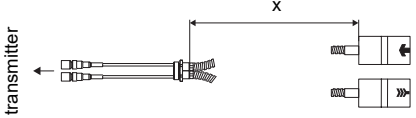
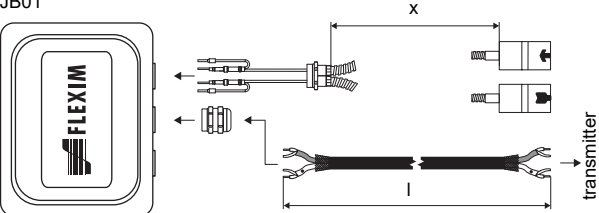
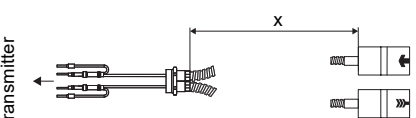
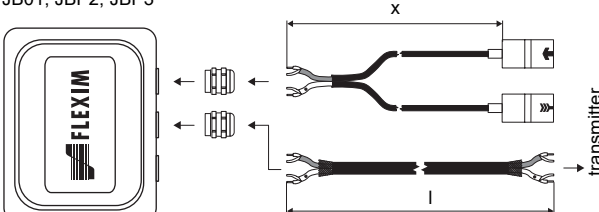
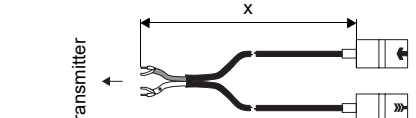
### Coupling materials for transducers

	normal temperature range		extended temperature range			Wavelnjector	
	< 212 °F	< 338 °F	< 302 °F	< 392 °F	392 to 464 °F	< 536 °F	536 to 1166 °F
< 24 h	coupling compound type N or coupling pad type VT	coupling compound type E or coupling pad type VT	coupling compound type E or coupling pad type VT	coupling compound type E or H or coupling pad type VT	coupling pad type TF	coupling pad type A and coupling pad type VT	coupling pad type B and coupling pad type VT
long time measurement	coupling pad type VT	coupling pad type VT	coupling pad type VT	coupling pad type VT			

for further data see Technical specification TS\_F7xx-transducersVx-xxx\_Lus

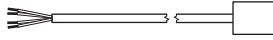
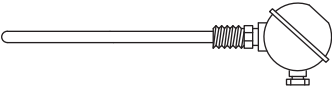
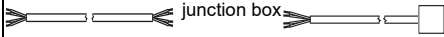


### Connection systems

connection system TS		
connection with extension cable	direct connection	transducers technical type
<p>JB02, JB03, JB04</p> 		****52
connection system T1		
connection with extension cable	direct connection	transducers technical type
<p>JB01</p> 		****8*
<p>JB01, JBP2, JBP3</p> 		****L*

for further data see Technical specification TS\_F7xx-transducersVx-xxx\_Lus

## Temperature probes

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

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