FLEXIM

Technical specification

FLUXUS H721

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

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TSFLUXUS_H721V3-0US_Lus, 2023-07-01

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
measurement				
• HPI				
standard volumetric flow rate • measurement uncertainty • standard volumetric flow rate correction	% 	±1 (crude oil, refined products, liquefied gases, heavy oils) VCF = CTL · CPL = ρ/ρ_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_N - normalized density		
operating density, normalized density • repeatability	 %	 ±1 (with field calibration of sound speed)		
• flow				
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		
measurement uncertainty (volumetric flow rate)				
measurement uncertainty of the measuring system[1]		±0.3 % MV ±0.02 ft/s includes calibration certificate traceable to NIST		
measurement uncertainty at the measuring point[2]		±1 % MV ±0.02 ft/s		
transmitter				
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		
explosion protection				
• ATEX/IECEx				
marking		-	H721**-A20*A, H721**-A20*S: CE 0637 Ex II3G II2D Ex nA nC ic IIC T4 Gc Ex tb IIIC T120 °C Db T_a -40...+60 °C	-
certification		-	IBExU11ATEX1015, IECEx IBE 11.0008	-

[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

[3] 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
• FM				
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
measuring functions				
physical quantities		• operating volumetric flow rate, standard volumetric flow rate according to ASTM 1250/TP25/4311, flow velocity, mass flow rate **additional output quantities** • HPI: API gravity, density, normalized density • interface detection: slope of the HPI physical quantities • fluid detection: according to fluid table		
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		
communication interfaces				
service interfaces		measured value transmission, parametrization of the transmitter: • USB[3] • LAN[3]		
process interfaces		max. 1 option: • Modbus RTU • HART • Profibus PA • FF H1 • Modbus TCP		
accessories				
data transmission kit		USB cable		
software		• FluxDiagReader: reading of measured values and parameters, graphical representation • FluxDiag (optional): reading of measurement data, graphical representation, report generation, parametrization of the transmitter		
data logger				
loggable values		all physical quantities, totalized physical quantities and diagnostic values		
capacity		max. 800 000 measured values		
outputs				
		The outputs are galvanically isolated from the transmitter.		
number		on request		
• switchable current output				
		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 Ω		
passive output		U_{ext} = 8 to 30 V, depending on R_{ext} (R_{ext} < 1 kΩ at 30 V)		
• HART				
range	mA	4 to 20		
accuracy		0.1 % MV ±15 µA		
active output		U_{int} = 24 V, R_{ext} < 500 Ω		
passive output		U_{ext} = 10 to 24 V DC, depending on R_{ext} (R_{ext} < 1 kΩ at 24 V)		
• voltage output				
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 Ω		
• frequency output				
range	kHz	0 to 5		
optorelay		24 V/4 mA, R_{int} = 66.5 Ω		

[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

[3] 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
• digital output				
functions		• frequency output • binary output • pulse output		
number		3		
operating parameters		5 to 30 V/< 100 mA		
frequency output				
• range	kHz	0 to 5		
binary output				
• binary output as alarm output		limit, change of flow direction or error		
pulse output				
• functions		mainly for totalizing		
• pulse value	units	0.01 to 1000		
• pulse width	ms	0.05 to 1000		
inputs				
		The inputs are galvanically isolated from the transmitter.		
number		max. 4, on request		
• temperature input				
type		Pt100/Pt1000		
connection		4-wire		
range	°F	-238 to +1040		
resolution	K	0.01		
accuracy		±0.01 % MV ±0.03 K		
• current input				
accuracy		0.1 % MV ±10 µA		
active input		U_{int} = 24 V, R_{int} = 50 Ω, P_{int} < 0.5 W, not short-circuit proof		
• range	mA	0 to 20		
passive input		R_{int} = 50 Ω, P_{int} < 0.3 W		
• range	mA	-20 to +20		
• voltage input				
range	V	0 to 1		
accuracy		0.1 % MV ±1 mV		
internal resistance		R_{int} = 1 MΩ		
• binary input				
switching signal		5 to 30 V, 1 mA		5 to 26 V, 1 mA
functions		• reset of the measured values • reset of the totalizers • stop of the totalizers • activation of the measuring mode for highly dynamic flows		

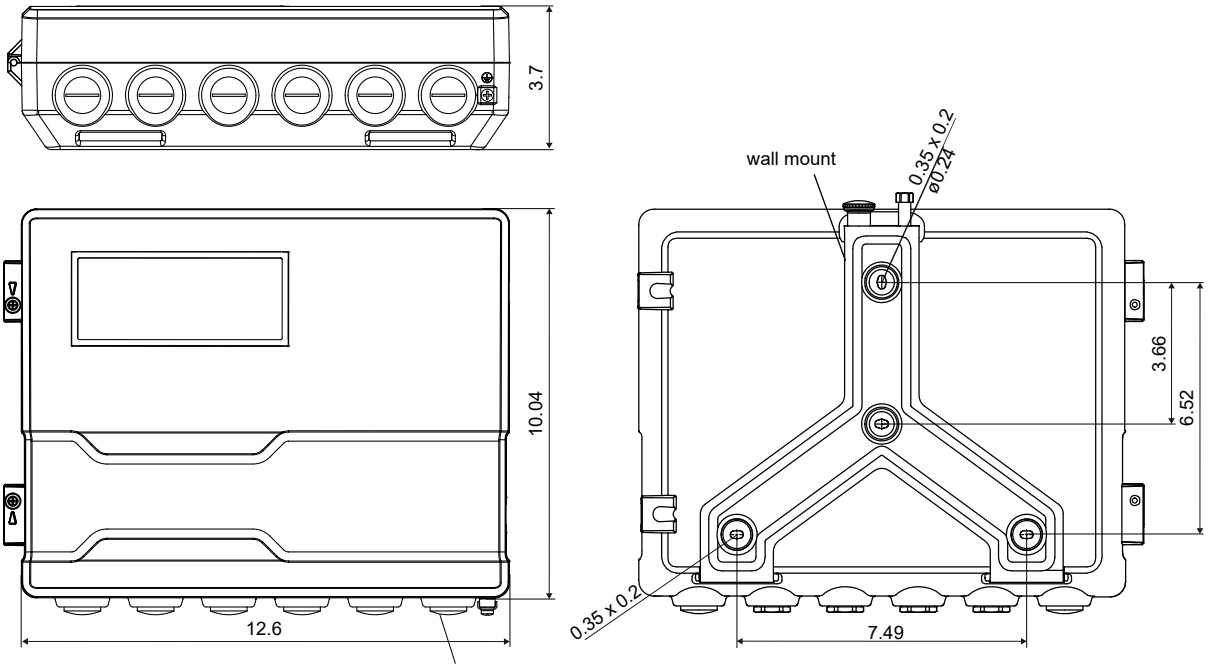
[1] with aperture calibration of the transducers

[2] for transit time difference principle and reference conditions

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

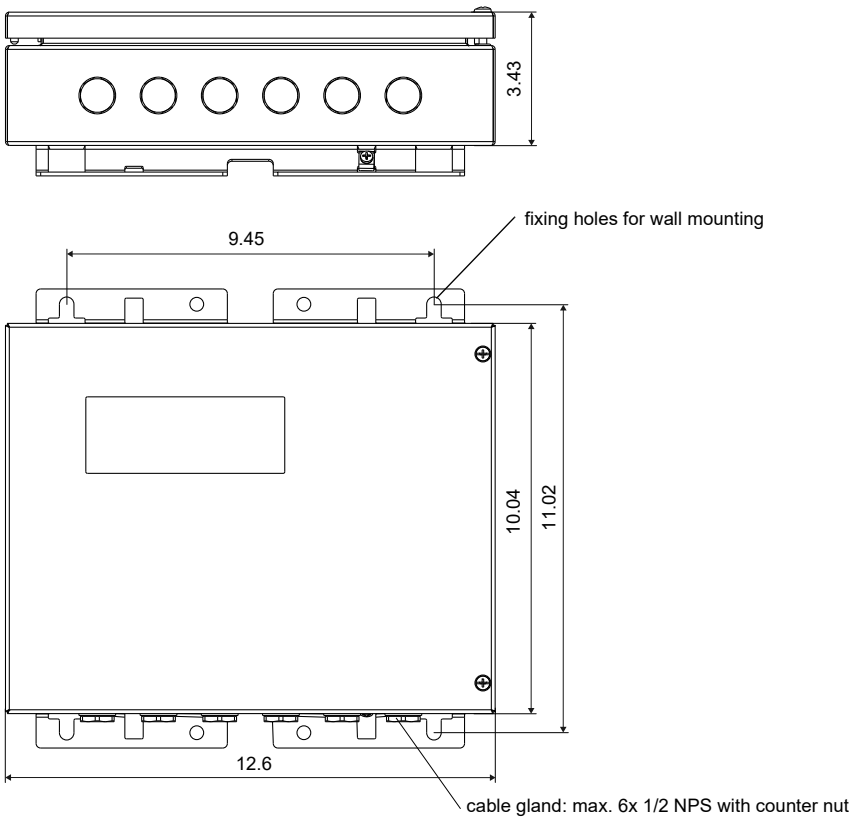
Dimensions

72-*****-*A**



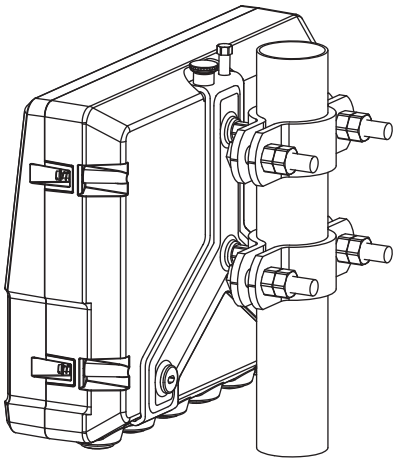
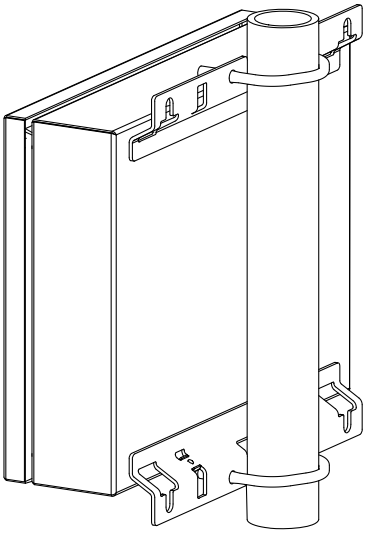
in inch

72-*****-*S**



in inch

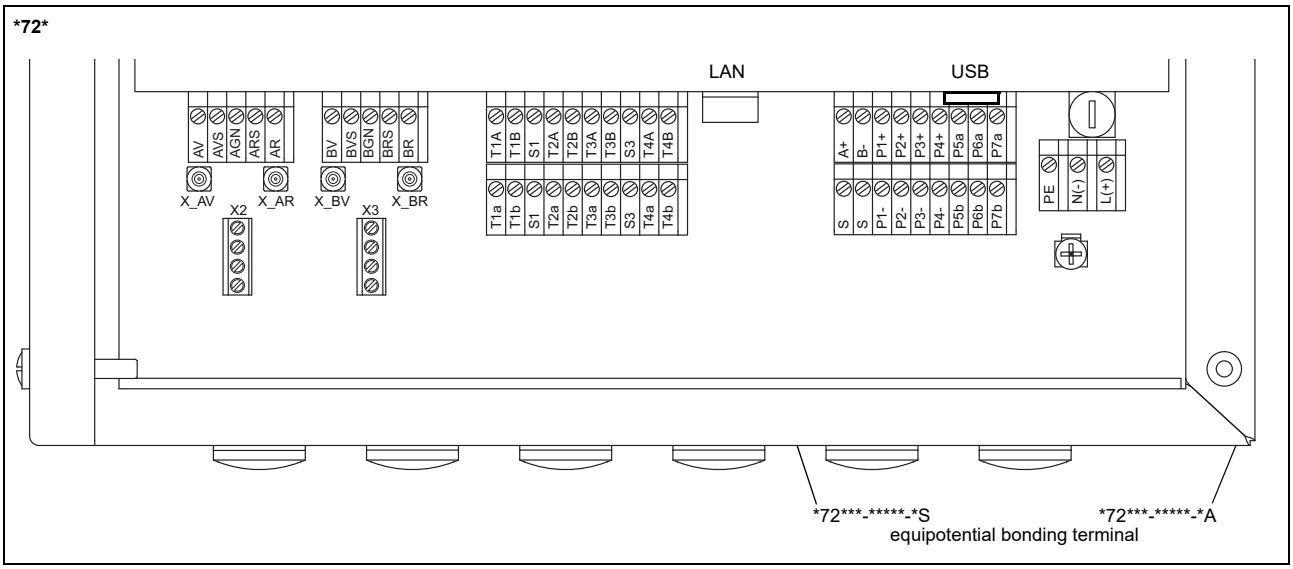
2" pipe mounting kit

72-*****-*A** 	item number: 721037-4
72-*****-*S** 	item number: 721110-4

Storage

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

Terminal assignment



power supply[1]		
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	SMB connector
AVS	shield	BVS	shield				
ARS	shield	BRS	shield		X_AR	X_BR	SMB connector
AR	signal	BR	signal				

outputs[1, 2]				
terminal	**connection**	**terminal**	**connection**	**communication interface**
P1+ to P4+ P1- to P4-	current output, voltage output, frequency output, HART (P1)	A+	signal +	• RS485[1] • Modbus RTU[1] • BACnet MS/TP[1] • Profibus PA[1] • FF H1[1]
		B-	signal -	
P5a to P7a P5b to P7b	digital output	S	shield	
		USB	type B Hi-Speed USB 2.0 Device	• service (FluxDiag/ FluxDiagReader)
		LAN	RJ45 10/100 Mbps Ethernet	• service (FluxDiag/ FluxDiagReader) • BACnet IP • Modbus TCP

analog inputs[1, 2]				
	temperature probe		**passive sensor**	**active sensor**
terminal	**direct connection**	**connection with extension cable**	**connection**	**connection**
T1a to T4a	red	red/white	not connected	not connected
T1A to T4A	red/blue	gray/black	-	+
T1b to T4b	white/blue	blue/red	+	not connected
T1B to T4B	white	white/green	not connected	-
S1, S3	shield	shield	not connected	not connected

binary inputs[1, 2]
terminal
P1+ to P2+, P1- to P2-

[1] 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

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

Transducers

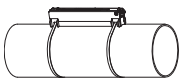
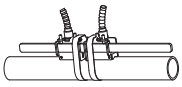
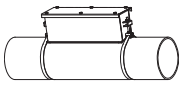
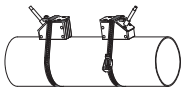
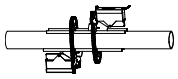
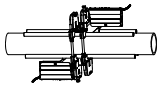
Overview

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	CDG1LI8	CDK1LI8	CDM2LI8	CDP2LI8		
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	CDG1LI1	CDK1LI1	CDM2LI1	CDP2LI1		
zone 1 extended temperature range	CDG1E83 CLG1E83	CDK1E83 CLK1E83	CDM2E85 CLM2E85	CDP2E85 CLP2E85	CDQ2E85 CLQ2E85	
inner pipe diameter d						
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
pipe wall thickness						
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 WaveInjector with chains**
  transducer frequency S	 transducer frequency M, P	 transducer frequency M, P, Q	
			transducer box WI for WaveInjector with threaded rods
			 outer pipe diameter: 1.4 to 15 inch

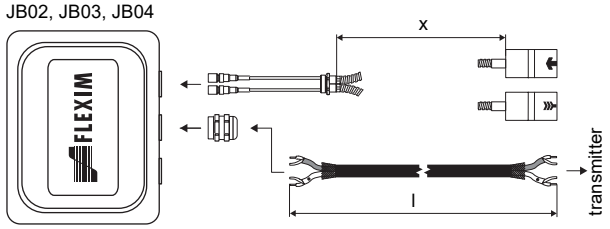
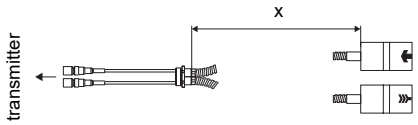
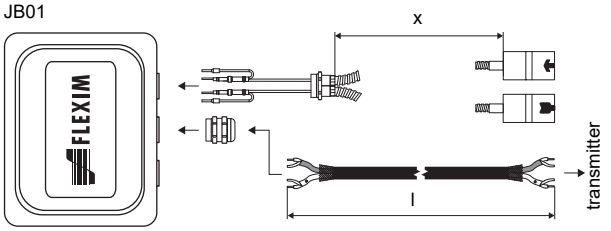
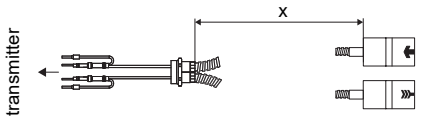
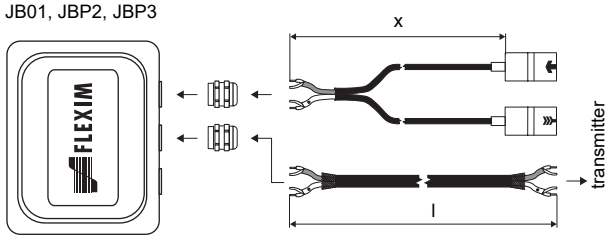
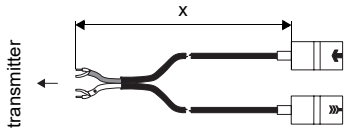
for further data see Technical specification TS_F7xx-transducersVx-xXX_Lus

Coupling materials for transducers

	normal temperature range		**extended temperature range**			**WaveInjector**	
	< 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			

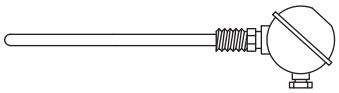
for further data see Technical specification TS_F7xx-transducersVx-xXX_Lus

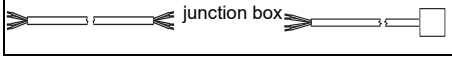
Connection systems

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

for further data see Technical specification TS_F7xx-transducersVx-xXX_Lus

Temperature probes

<table>
<tr><th>PT13N</th><th>PT13F</th><th>A2179</th></tr>
<tr><td>• Pt1000
• clamp-on
• -40 to +392 °F</td><td>• Pt1000
• clamp-on
• response time: 8 s
-49 to +482 °F</td><td>• Pt1000
• inline
• -58 to +500 °F</td></tr>
<tr><td colspan="2">direct connection
  </td><td rowspan="2">  </td></tr>
<tr><td colspan="2">connection with extension cable

extension cable
 
junction box</td></tr>
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