

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
measurement				
• HPI				
standard volumetric flow rate				
• measurement uncertainty	%	±1 (crude oil, refined products, liquefied gases, heavy oils)		
• standard volumetric flow rate correction		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 - normalised density		
operating density, normalised 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 velocity	m/s	0.01...25		
repeatability		0.15 % MV ±0.005 m/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 ±0.005 m/s		
measurement uncertainty at the measuring point ²		±1 % MV ±0.005 m/s		
transmitter				
power supply		• 100...230 V/50...60 Hz or • 20...32 V DC or • 11...16 V DC		
power consumption	W	< 15		
number of measuring channels		1, optional: 2 (1 measuring point)		
damping	s	0...100 (adjustable)		
measuring cycle	Hz	100...1000 (1 channel)		
response time	s	1 (1 channel), option: 0.02		
housing material		aluminum, powder coated or stainless steel 316L (1.4404)		
degree of protection		IP66		aluminum housing: IP66/NEMA 4X stainless steel housing: IP65
dimensions	mm	see dimensional drawing		
weight	kg	aluminum housing: 5.4 stainless steel housing: 5.1		
fixation		wall mounting, optional: 2" pipe mounting		
ambient temperature	°C	-40...+60 (< -20 without operation of the display)		aluminum housing: -40...+55/60 (< -20 without operation of the display) stainless steel housing: -20...+55/60
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 transducers² for transit time difference principle and reference conditions³ 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, normalised density • interface detection: slope of the HPI physical quantities • fluid detection: according to fluid table		
totaliser		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, parametrisation 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, parametrisation of the transmitter		
data logger				
loggable values		all physical quantities, totalised 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...20 (3.2...22)		
accuracy		0.04 % MV ±3 µA		
active output		R _{ext} < 250 Ω		
passive output		U _{ext} = 8...30 V, depending on R _{ext} (R _{ext} < 1 kΩ at 30 V)		
• HART				
range	mA	4...20		
accuracy		0.1 % MV ±15 µA		
active output		U _{int} = 24 V, R _{ext} < 500 Ω		
passive output		U _{ext} = 10...24 V DC, depending on R _{ext} (R _{ext} < 1 kΩ at 24 V)		
• voltage output				
range	V	0...1 or 0...10		
accuracy		0...1 V: 0.1 % MV ±1 mV 0...10 V: 0.1 % MV ±10 mV		
internal resistance		R _{int} = 500 Ω		
• frequency output				
range	kHz	0...5		
optorelay		24 V/4 mA, R _{int} = 66.5 Ω		

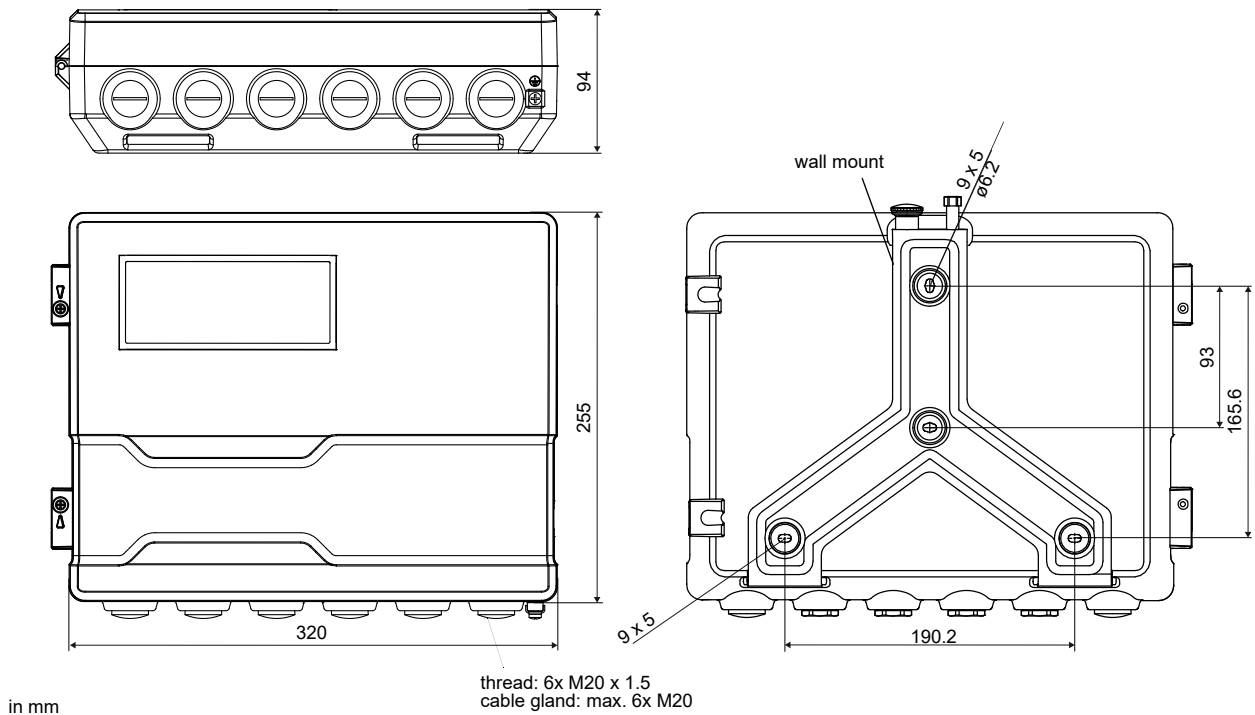
¹ with aperture calibration of the transducers² for transit time difference principle and reference conditions³ outside the explosive atmosphere (housing cover open)

		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...30 V/< 100 mA		
frequency output				
• range	kHz	0...5		
binary output				
• binary output as alarm output		limit, change of flow direction or error		
pulse output				
• functions		mainly for totalising		
• pulse value	units	0.01...1000		
• pulse width	ms	0.05...1000		
inputs				
		The inputs are galvanically isolated from the transmitter.		
number		max. 4, on request		
• temperature input				
type		Pt100/Pt1000		
connection		4-wire		
range	°C	-150...+560		
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...20		
passive input		R _{int} = 50 Ω, P _{int} < 0.3 W		
• range	mA	-20...+20		
• voltage input				
range	V	0...1		
accuracy		0.1 % MV ±1 mV		
internal resistance		R _{int} = 1 MΩ		
• binary input				
switching signal		5...30 V, 1 mA		5...26 V, 1 mA
functions		• reset of the measured values • reset of the totalisers • stop of the totalisers • activation of the measuring mode for highly dynamic flows		

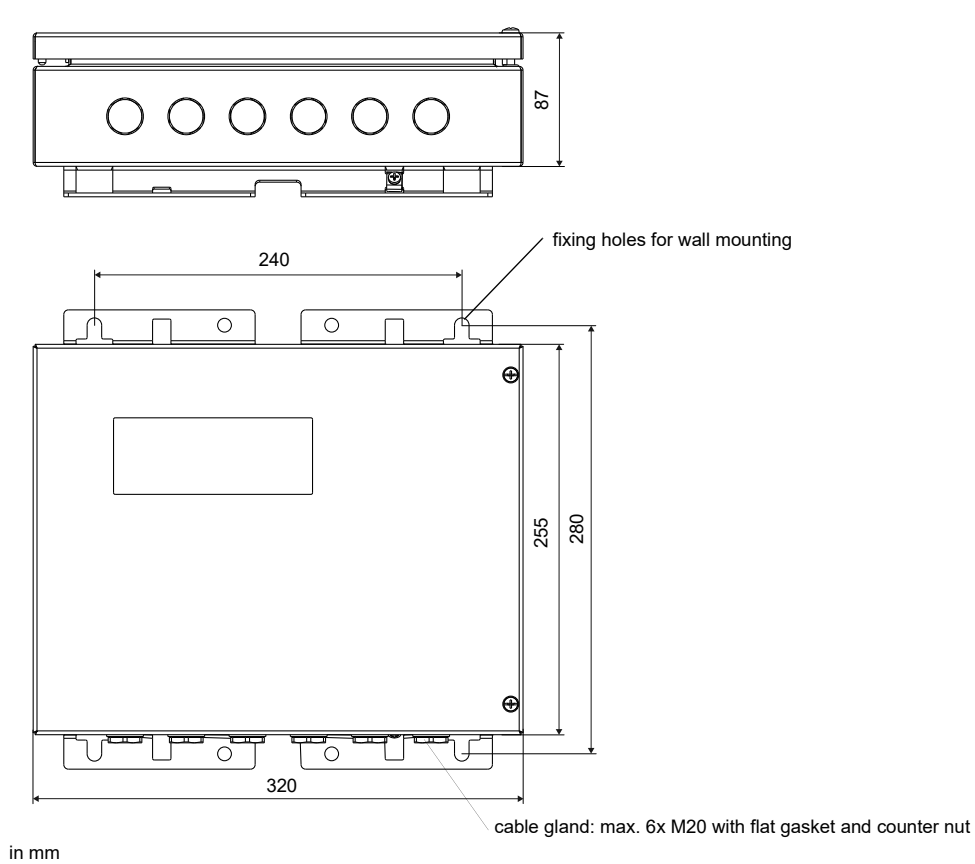
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Dimensions

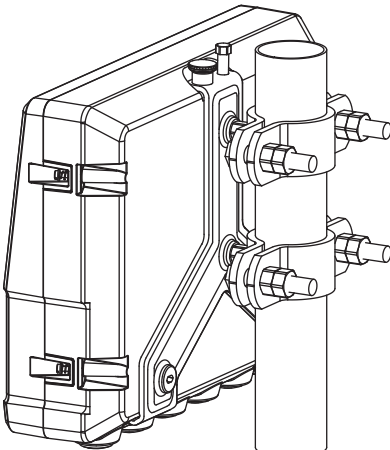
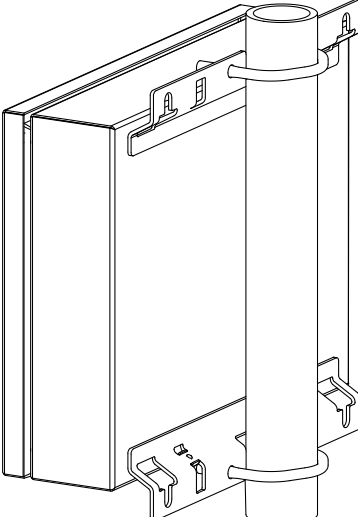
*72***-*****-A



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



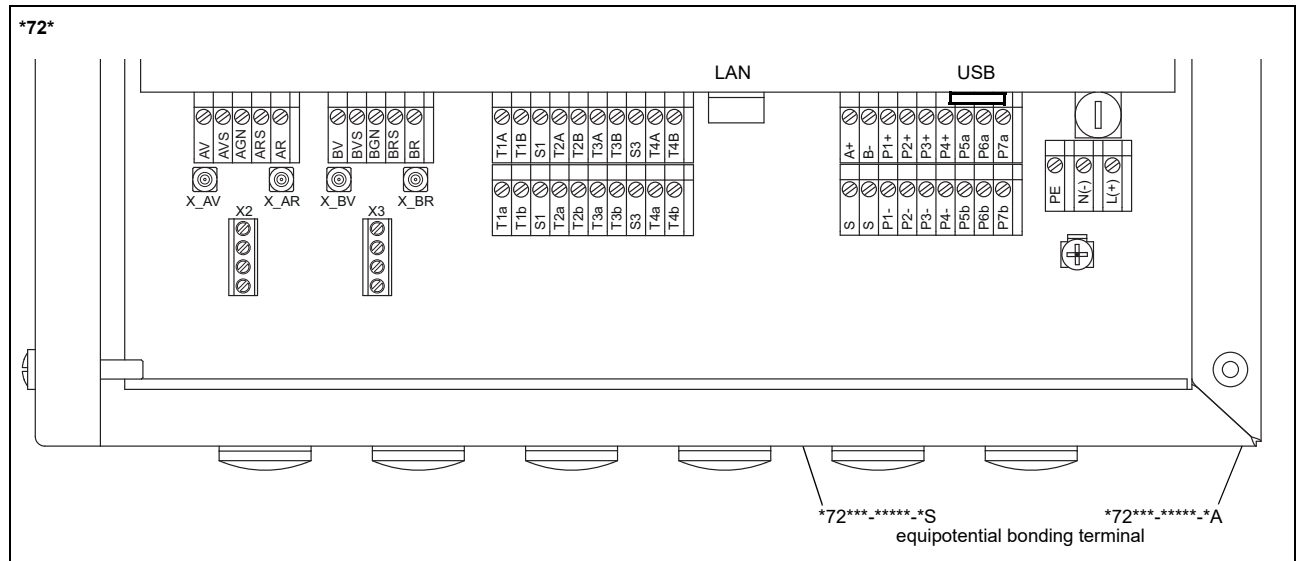
2" pipe mounting kit

*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: -20...+60 °C

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 *****8*, ****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+...P4+ P1-...P4-		current output, voltage output, frequency output, HART (P1)		A+	signal +		• RS485 ¹ • Modbus RTU ¹ • BACnet MS/TP ¹ • M-Bus ¹ • Profibus PA ¹ • FF H1 ¹
				B-	signal -		
P5a...P7a P5b...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...T4a		red	red	not connected		not connected	
T1A...T4A		red/blue	grey	-		+	
T1b...T4b		white/blue	blue	+		not connected	
T1B...T4B		white	white	not connected		-	
S1, S3		shield	shield	not connected		not connected	
binary inputs ^{1, 2}							
terminal							
P1+ P2+ P1- P2-							

¹ cable (by customer):
 - e.g. flexible wires, with insulated wire ferrules, wire cross-section: 0.25...2.5 mm²
 - outer diameter of the cable (*72***.*****S with ferrite nut): max. 7.6 mm

² The number, type and terminal assignment are customised.

Transducers

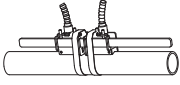
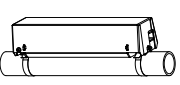
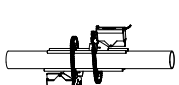
Overview

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	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

for further data see Technical specification TS_F7xx-transducersVx-xxx_Leu

Transducer mounting fixture

Variofix L		Variofix C	transducer box WI for WaveInjector with chains
	 transducer frequency S		
		Variofix C with bolt mounting plates	transducer box WI for WaveInjector with threaded rods
		 outer pipe diameter: VCN : max. 46 mm VCQ : max. 36 mm	 outer pipe diameter: 35...380 mm

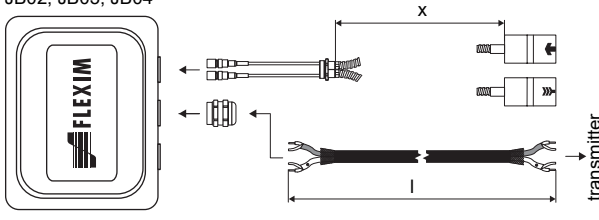
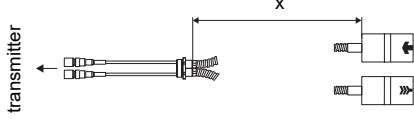
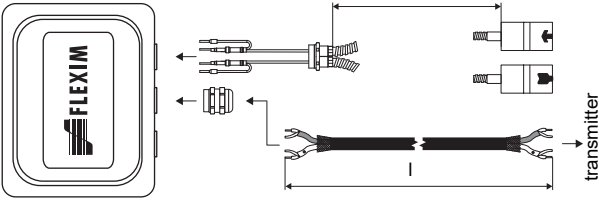
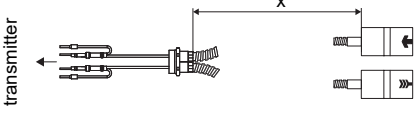
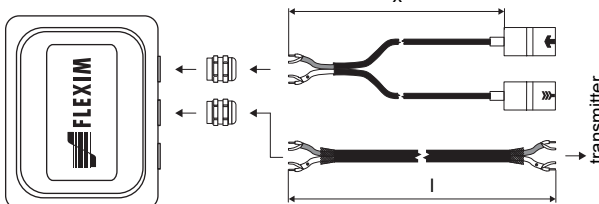
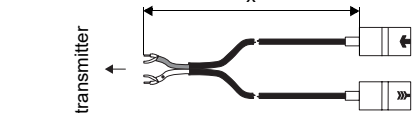
for further data see Technical specification TS_F7xx-transducersVx-xxx_Leu

Coupling materials for transducers

	normal temperature range		extended temperature range			WaveInjector	
	< 100 °C	< 170 °C	< 150 °C	< 200 °C	200...240 °C	< 280 °C	280...630 °C
< 24 h	coupling compound type N or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or coupling foil type VT	coupling compound type E or H or coupling foil type VT	coupling foil type TF	coupling foil type A and coupling foil type VT	coupling foil type B and coupling foil type VT
long time measure- ment	coupling foil type VT	coupling foil type VT	coupling foil type VT	coupling foil type VT			

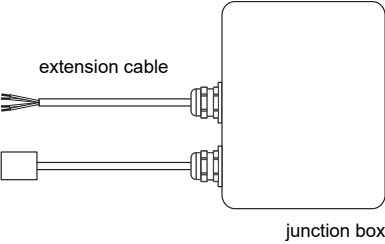
for further data see Technical specification TS_F7xx-transducersVx-xxx_Leu

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 		*****L1*

for further data see Technical specification TS_F7xx-transducersVx-xxx_Leu

Temperature probes

PT12N		PT12F
item number: • 770415-1 • 770414-2 (matched)	item number: • 770415-1A2 • 770414-1A2 (matched)	item number: • 770415-2
• Pt100 • clamp-on • -30...+250 °C	• Pt100 • clamp-on • -30...+250 °C • ATEX	• Pt100 • clamp-on • -45...+250 °C • response time: 8 s
direct connection		
		
connection with extension cable		
		

see Technical specification TS_PTVx-xxx_Leu

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