FLEXIM

Technical specification
Chemistry design
PIOX R721/R500

Transmitted light process refractometer

For a wide range of applications in the field of chemistry

Features

- Unique transmitted light refractometer for process analysis
- High accuracy and drift-free due to difference measurement
- No minimum flow velocity required for reliable measurement
- Immune to pressure and temperature fluctuations
- Integrated fluid temperature measurement
- Sapphire optics with high chemical resistance and mechanical durability
- Optical system insensitive to deposits
- Internal self-diagnosis and detection of errors
- Stainless steel and carbon-fiber reinforced PTFE sensors available
- Use in explosive atmospheres feasible
- Sensor calibration microcontroller-controlled and independent of the transmitter
- Digital data transmission between transmitter and sensor
- Configurable data logger
- Remote parameterizing via USB/LAN
- Support of numerous fieldbus systems
- Process connections for a wide range of pipe and vessel dimensions
- Library for approx. 50 typical analysis applications available, customized fluid data sets can also be provided
- Typical analysis outputs like M%, Vol%, g/l, operating density, laboratory density selectable
- Analysis of multi-component mixtures possible using additional measurement parameter, e.g., density, conductance, sound speed

Sensor PIOX R500-*C

PIOX R721**-*****-*A

PIOX R721**-*****-*S

Measurement principle

Refractive index

The refractive index n of a solution is determined using transmitted light refractometry. A light beam propagates through the solution and is refracted at the interface of a prism. The angle of refraction is measured by a detector. The refractive index n of the solution is calculated from the angle of refraction using Snell's law of refraction:

$n_i \cdot \sin\theta_i = n_t \cdot \sin\theta_t$

where

n_i = refractive index of fluid

θ_i = angle of incidence

n_t = refractive index of prism

θ_t = angle of refraction

Measurement with refractometer PIOX R

Sensor

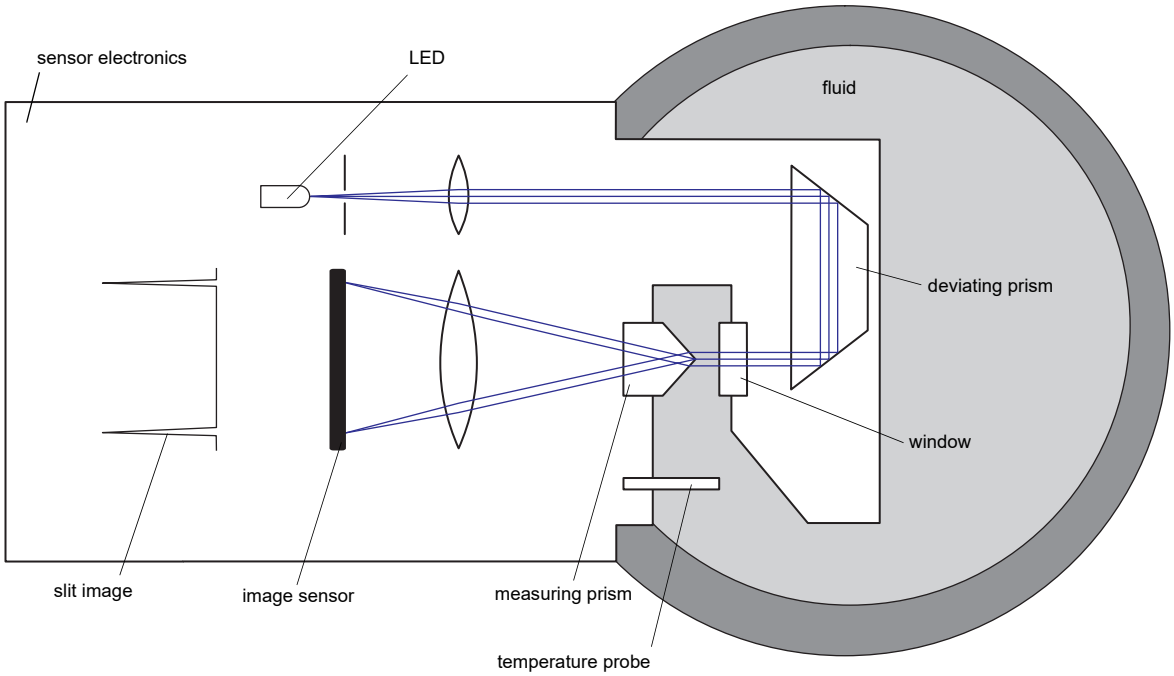
A special LED with a wave length λ = 590 nm (sodium D line) is used as the light source. The light passes through a slit, is parallelized by a lens and reversed by a deviating prism. Then it enters the fluid through a window in the sensor head. When the light beam re-enters the sensor, it is split at the apex of a measuring prism and refracted at its lateral surfaces.

The two resulting measuring beams are focused by a lens, generating sharp slit images on the image sensor.

The angle of refraction is determined from the difference between the two images of the slit. The zero point is calculated continuously in order to compensate for the influences of the process pressure and temperature.

The refractive index nD is calculated from the angle of refraction between the measuring prism and the fluid. Furthermore, the following values can be measured:

- fluid temperature measured by the integrated temperature probe Pt1000
- diagnostic values (e.g., gain, amplitude, quality, symmetry) resulting from extended signal processing
- sensor humidity and temperature



Processing in the transmitter

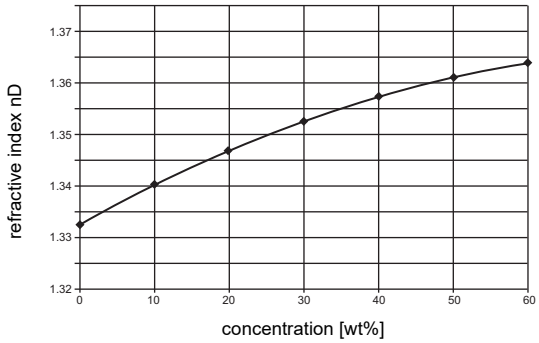
The transmitter calculates application-specific analysis quantity such as M%, Vol%, g/l, nDT (temperature-compensated refractive index), operating density, laboratory density, Brix value either with standardized fluid data sets from the library or with customized ones.

The transmitter can be equipped with electrical inputs, allowing for the input of additional available fluid quantities, e.g., sound speed, density or conductance, and using them for the measurement of three-component mixtures.

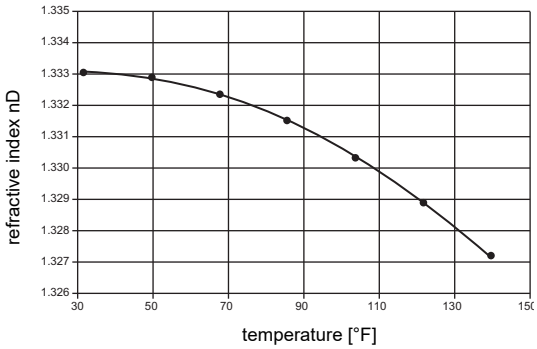
Dependence on temperature and concentration

As well as the density, the refractive index of a fluid depends on the temperature and concentration. In the majority of aqueous solutions, the refractive index increases with rising concentration (temperature = constant) and decreases with rising temperature (concentration = constant).

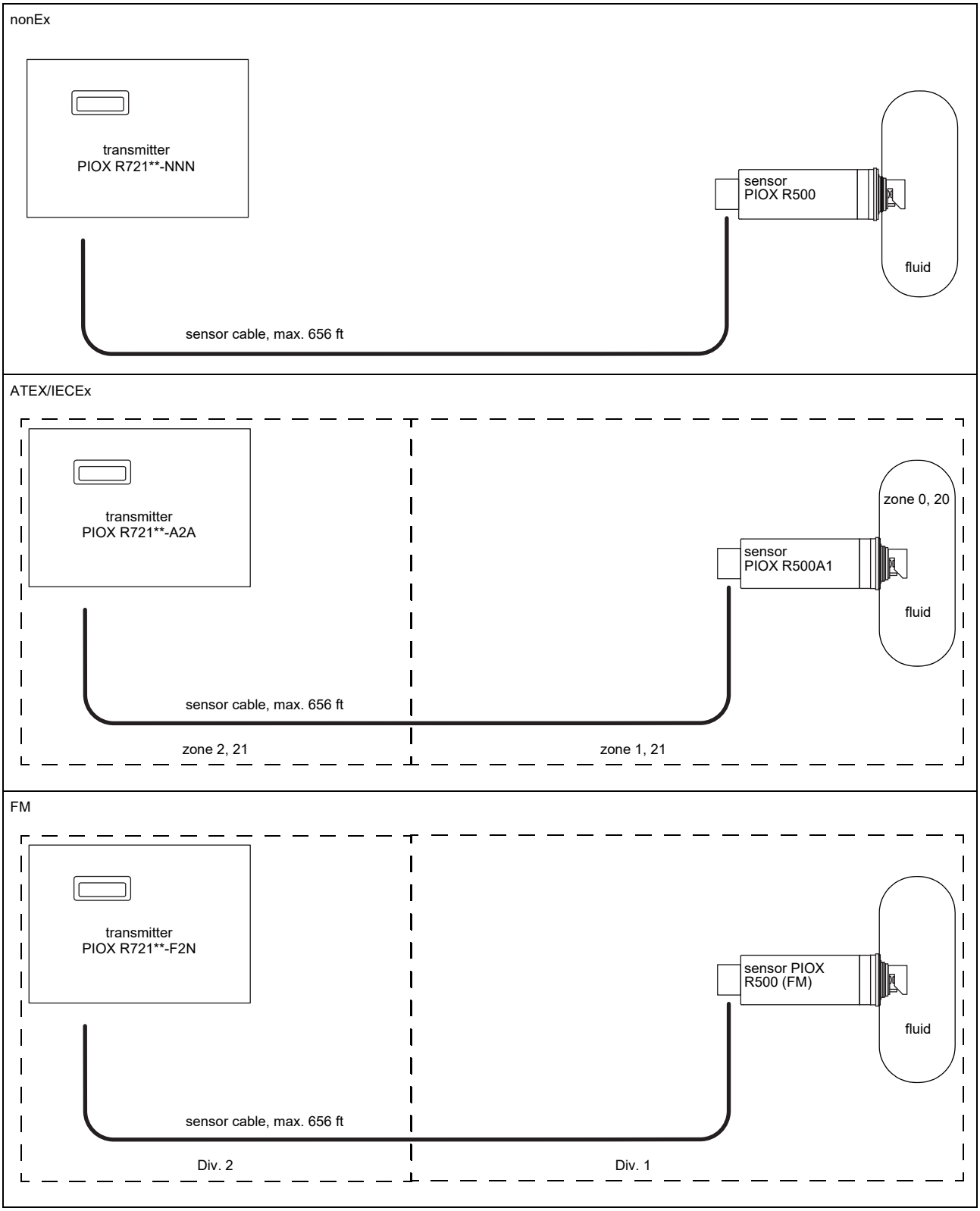
Dependence of the refractive index on the concentration (temperature = constant)



Dependence of the refractive index on the temperature (concentration = constant)



Measuring setup



Transmitter

Technical data

		PIOX R721**-NNN**-1A	PIOX R721**-NNN**-1S	PIOX R721**-A2A**-1S	PIOX R721**-F2N**-1S
					
design		standard field device	field device with stainless steel housing	field device with stainless steel housing zone 2	field device with stainless steel housing FM Class I Div. 2
transmitter					
power supply		• 100 to 230 V/50 to 60 Hz or • 20 to 32 V DC		• 20 to 32 V DC	• 20 to 32 V DC
power consumption	W	< 15			
number of measuring channels		1			
damping	s	0 to 100 (adjustable)			
response time	s	1			
housing material		aluminum, powder coated	stainless steel 316L		
degree of protection		IP65	IP65	IP66	IP65
dimensions	inch	see dimensional drawing			
weight	lb	11.9	11.2		
fixation		wall mounting, optional: 2" pipe mounting			
ambient temperature	°F	-4 to +131/140	-4 to +131/140	-40 to +140 (< -4 without operation of the display)	-4 to +140
display		128 x 64 dots, backlight			
menu language		English, German, French, Spanish, Dutch, Russian, Polish			
explosion protection					
• ATEX/IECEx					
marking		-	-	R721RI-A2A1S: II(1)3G CE 0637 Ex I(M1) II(1)2D Ex ec nC ic [ia Ga] IIC T4 Gc [Ex ia Ma] I Ex tb [ia Da] IIIC T120 °C Db T_a -40...+60 °C	-
certification		-	-	IBExU06ATEX1075 X, IECEx IBE 10.0003X	-
intrinsic safety parameters		-	-	U_m = 120 V	-
• FM					
marking		-	-	-	R721RI-F201S: FM APPROVED Cl. I,II,III/Div. 2/ GP. A,B,C,D,F,G T5 -20 °C to +60 °C
measuring functions					
physical quantities		see table below			
diagnostic functions		signal amplitude, sensor humidity, sensor temperature			
communication interfaces					
service interfaces		measured value transmission, parametrization of the transmitter: • USB[1] • LAN[1]			
process interfaces		max. 1 option: • Modbus RTU • HART • 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			

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

		PIOX R721**-NNN**-1A	PIOX R721**-NNN**-1S	PIOX R721**-A2A**-1S	PIOX R721**-F2N**-1S
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)			
• 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			
• digital output					
functions		• frequency output • binary output • pulse output			
number		3			
		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 • pulse value • pulse width	 units ms	 0.01 to 1000 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 • range	 mA	U_{int} = 24 V, R_{int} = 50 Ω, P_{int} < 0.5 W, not short-circuit proof 0 to 20			
passive input • range	 mA	R_{int} = 50 Ω, P_{int} < 0.3 W -20 to +20			
• voltage input					
range	V	0 to 1			
accuracy		0.1 % MV ±1 mV			
internal resistance		R_{int} = 1 MΩ			

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

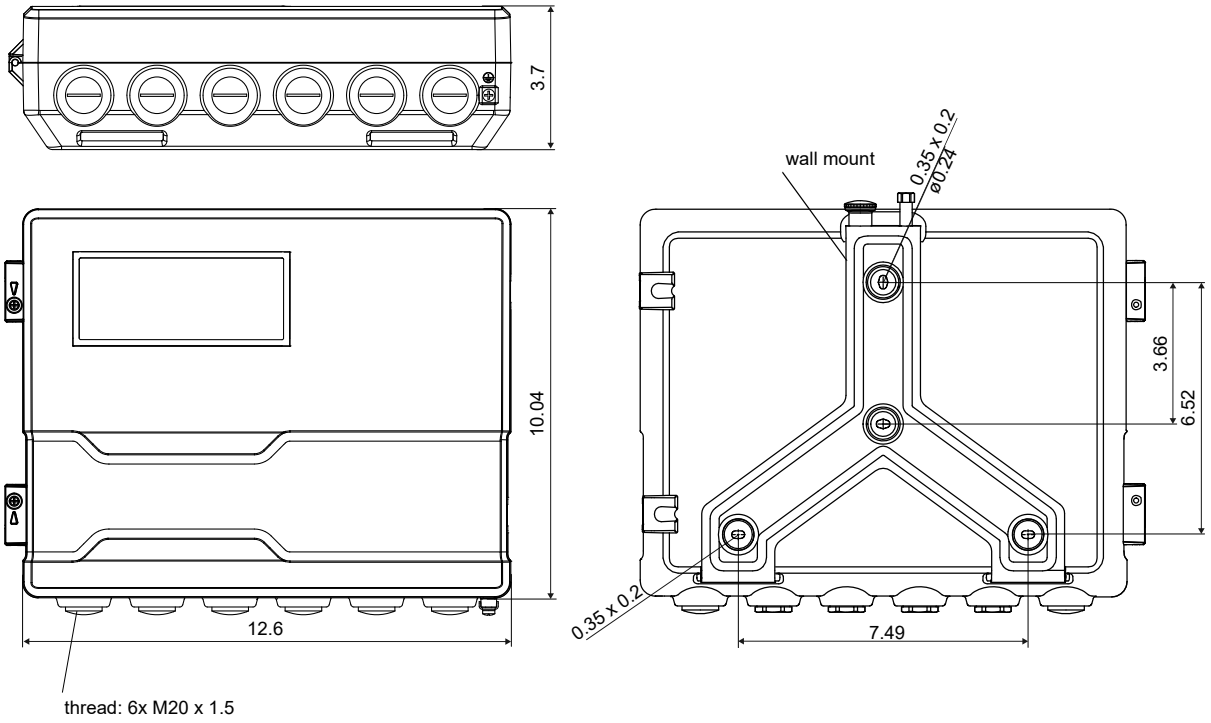
Physical quantities

The available physical quantities depend on the fluid data set in the transmitter.

fluid data set		physical quantities	remark
	no fluid data set	refractive index, fluid temperature, °Brix	
SSF	standard fluid data set	refractive index, fluid temperature, °Brix, concentration	application-specific fluid data set from FLEXIM database
SCF	customized fluid data set	refractive index, fluid temperature, °Brix, further customized physical quantities	data set developed by FLEXIM in cooperation with the customer

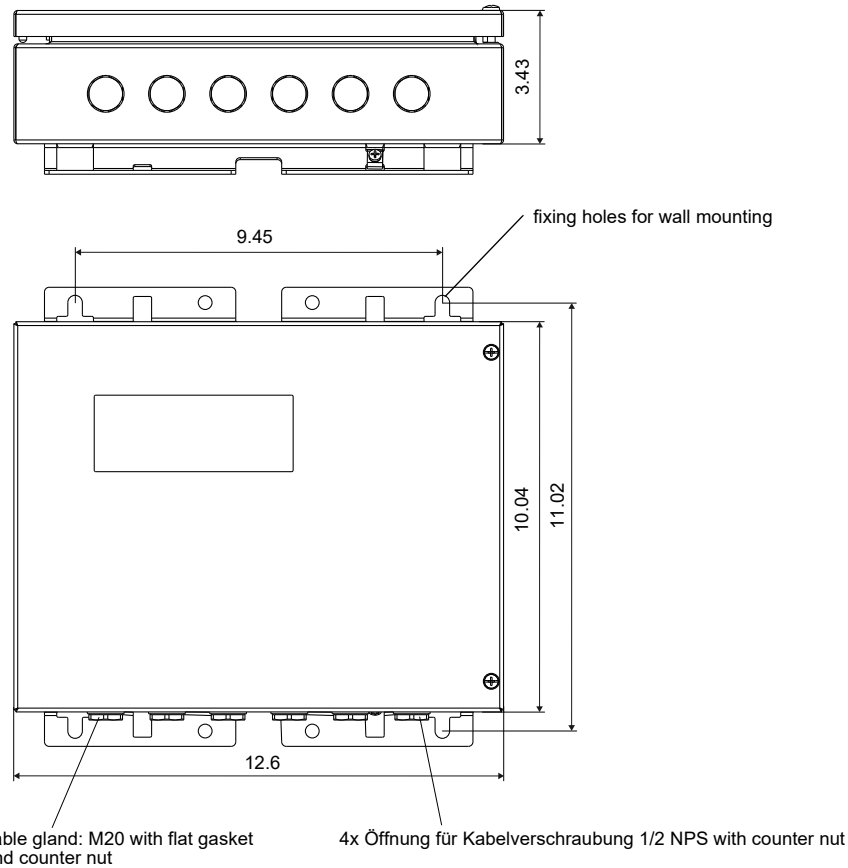
Dimensions

R721-*****-*A**



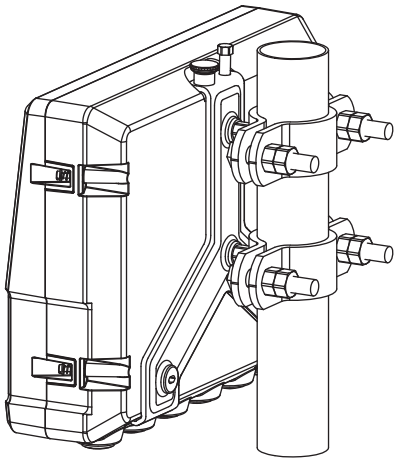
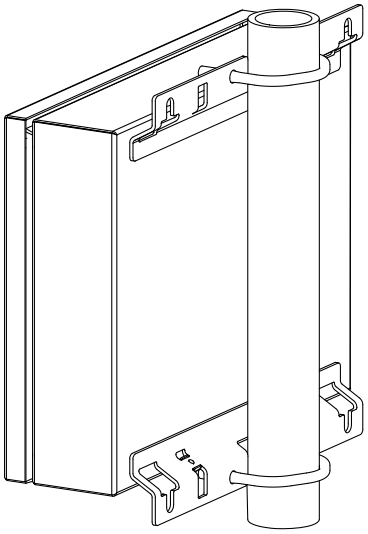
in inch

R721-*****-*S**



in inch

2" pipe mounting kit

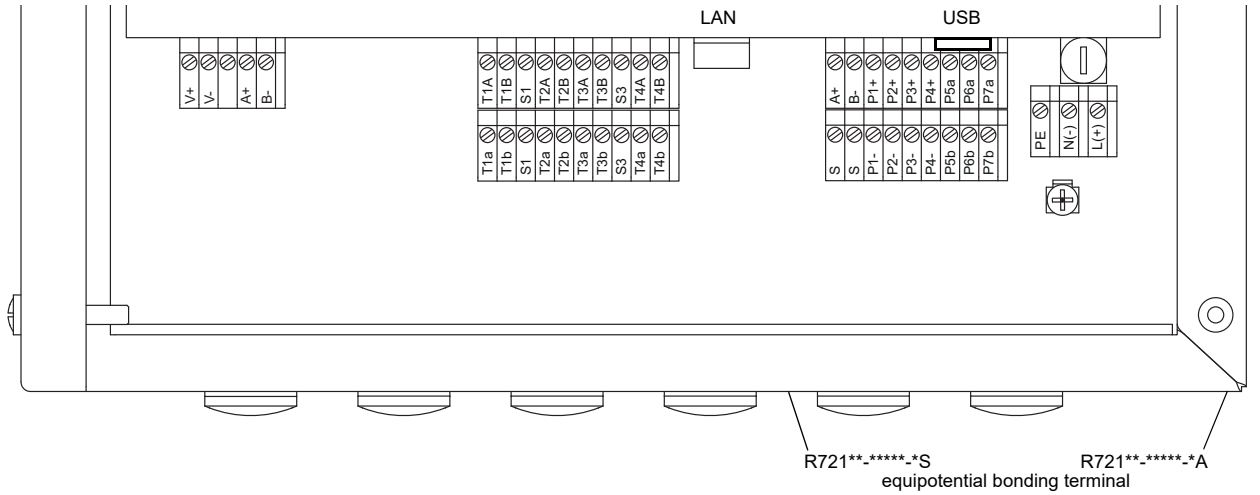
72-*****-*A** 	item number: 721037-4
72-*****-*S** 	item number: 721110-4

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

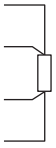
R721



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

transducers	
terminal	**transducer cable**
V+	yellow
V-	green
A+	brown
B-	white

outputs[1, 2]				
terminal	**connection**	**terminal**	**connection**	**communication interface**
P1+ to P4+ P1- to P4-	current output, voltage output	A+	signal +	• Modbus RTU[1] • HART[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) • Modbus TCP

analog inputs[1, 2]			
terminal	**temperature probe**	**passive sensor**	**active sensor**
T1a to T4a		not connected	not connected
T1A to T4A		-	+
T1b to T4b		+	not connected
T1B to T4B‘		not connected	-
S1, S3		not connected	not connected

[1] cable (by customer): e.g., flexible wires, with insulated wire ferrules, wire cross-section: AWG14 to 24

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

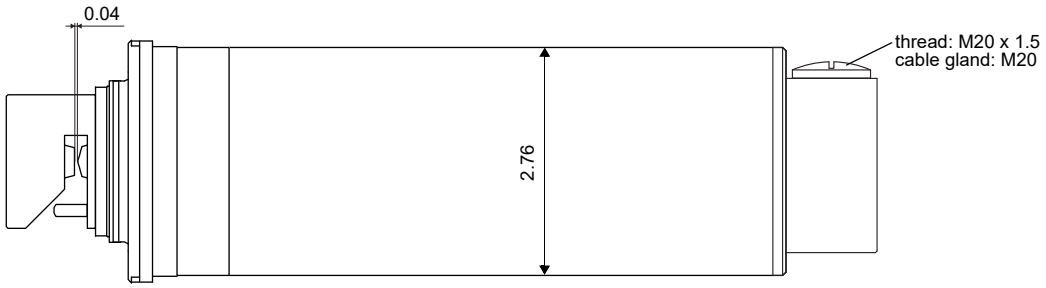
Sensor

Technical data

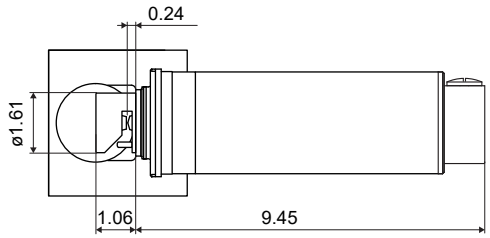
		R500	R500A1	R500 (FM)	R500	R500A1	R500 (FM)
order code		RS1-R500-*CS4KR-NN	RS1-R500-*CS4KR-A1	RS1-R500-*CS4KR-F1	RS1-R500-*CTFKR-NN	RS1-R500-*CTFKR-A1	RS1-R500-*CTFKR-F1
process parameters							
fluid		all liquids with a turbidity < 10 000 FAU			all liquids with a turbidity < 10 000 FAU		
fluid temperature (depending on ambient temperature)	°F	-4 to +302 (302 °F at an ambient temperature of 68 °F)	-4 to +266		-4 to +248		
fluid pressure		PN 10, PN 16, PN 40 (on request, depending on process connection)		150 psi, 300 psi	PN 10		150 psi
measurement							
measurement principle		transmitted light refractometry			transmitted light refractometry		
measuring range		nD: 1.3 to 1.7			nD: 1.3 to 1.7		
accuracy (absolute)		nD: 0.000 2 (typically 0.1 wt%)			nD: 0.000 2 (typically 0.1 wt%)[1]		
repeatability		nD: 0.000 02 (typically 0.01 wt%)			nD: 0.000 02 (typically 0.01 wt%)		
resolution (display)		nD: 0.000 001			nD: 0.000 001		
material							
housing		stainless steel 304			stainless steel 304, epoxy-powder coated		
wetted parts		stainless steel 316Ti (others on request)			PTFE/carbon 25 %		
gaskets		FFKM			FFKM		
prism		sapphire, nD ≈ 1.76			sapphire, nD ≈ 1.76		
degree of protection		IP54, wetted parts: IP67			IP54, wetted parts: IP67		
flange		depending on type of construction (see sensor order code)			depending on type of construction (see sensor order code)		
dimensions		see dimensional drawing			see dimensional drawing		
weight	lb	min. 4.4			see dimensional drawing		
ambient temperature	°F	-40 to +158			-40 to +158		
explosion protection							
• ATEX/IECEx							
marking		-	II1G CE 0637 Ex I M1 II1D Ex ia op is IIC T4 Ga Ex ia op is I Ma Ex ia IIIC T120 °C Da Ta -40...+70 °C Tm -20...+130 °C	-	-	II1G CE 0637 Ex I M1 II1D Ex ia op is IIC T4 Ga Ex ia op is I Ma Ex ia IIIC T120 °C Da Ta -40...+70 °C Tm -20...+130 °C	-
certification		-	IBExU06ATEX1075 X, IECEx IBE 10.0003X	-	-	IBExU06ATEX1075 X, IECEx IBE 10.0003X	-
• FM							
marking		-	-	FM APPROVED IS, Cl. I,II,III/ Div. 1/GP. A,B,C,D, E,F,G / T4 Ta = -40°C to 70°C	-	-	FM APPROVED IS, Cl. I,II,III/ Div. 1/GP. A,B,C,D, E,F,G / T4 Ta = -40°C to 70°C
temperature probe							
type		Pt1000			Pt1000		
resolution	K	0.01			0.01		
accuracy at 68 °F	K	0.15			0.15		
response time	s	5			20		

[1] R500-LCTF: depending on temperature and flow velocity:
max. 8 ft/s at 68 °F
max. 3 ft/s at 176 °F

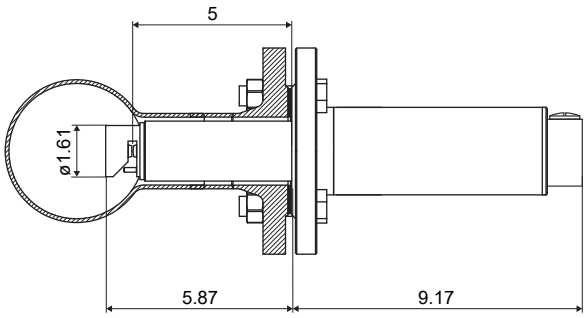
Dimensions



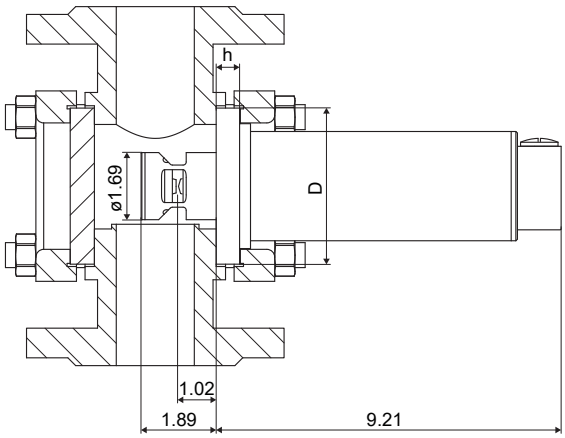
R500-MCS4, FLEXIM flange



R500-LCS4, direct flange

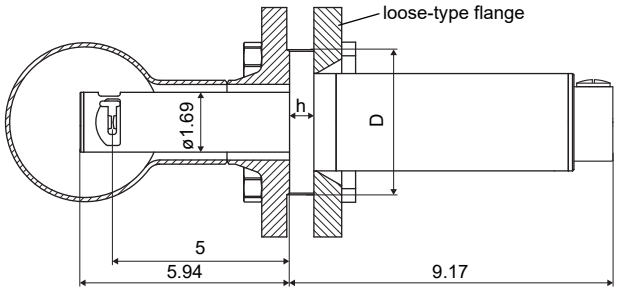


R500-MCTF



pipe diameter	D inch	h inch	weight lb
DN 50, 2"	Ø3.94	0.59	4.1
DN 80, 3"	Ø4.8	0.79	4.5

R500-LCTF



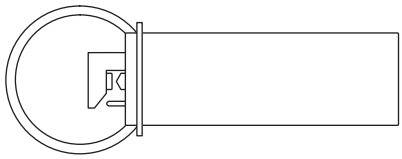
pipe diameter	D inch	h inch	weight lb	connecting dimensions according to
DN 50	Ø4.02	0.67	4.8	ISO 7005 EN 1092 BS 4504 DIN 2501
DN 80	Ø4.88	0.67	5.5	
2"	Ø4.02	0.67	4.8	ANSI/ASME B 16.5 class 150 ASTM D 4024 BS 1560 BS EN 1759
3"	Ø4.88	0.67	5.5	

in inch

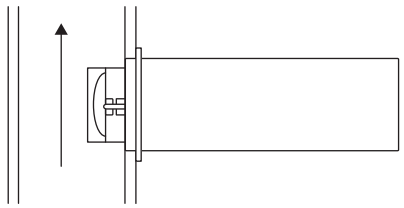
Sensor mounting positions

R500-M

horizontal pipe

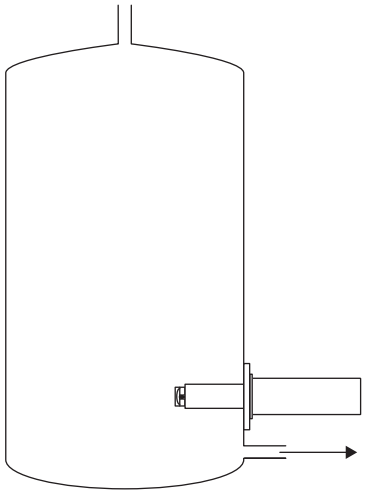


vertical pipe[1]



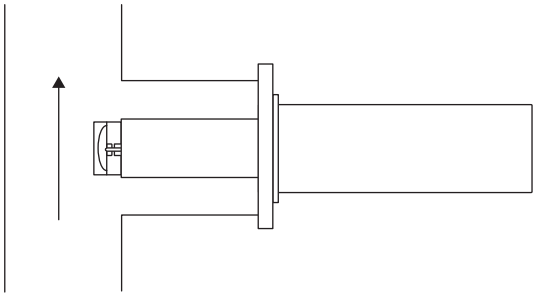
R500-L

vessel



installation close to the outlet

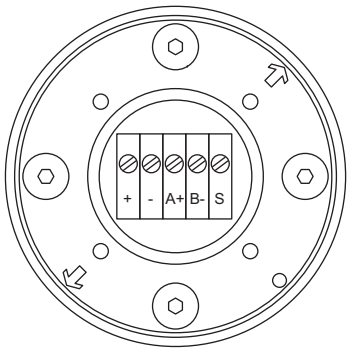
T-piece[1]



[1] The pipe always has to be completely filled. The preferred flow direction is upward, in exceptional cases downward.

Connection

Terminal assignment



terminal	connection
+	yellow
-	green
A+	brown
B-	white
S	shield

equipotential bonding terminal on housing cover

Sensor cable

		R500	R500A1
item number		TR10126	TR10125
type		LIYCY 2 x 2 x 0.75 gray	EB CY 2x2x0.75
length	ft	max. 656	max. 656
weight	lb/ft	approx. 0.07	approx. 0.07
ambient temperature	°F	-40 to +176	-40 to +176
properties		flame retardant according to IEC 60332-1-2	flame retardant according to IEC 60332-1-2
cable jacket			
material		PVC	PVC
outer diameter	inch	0.33	0.34
color		gray	blue
shield		x	x

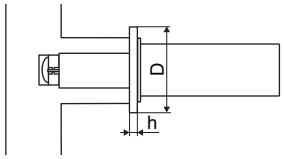
Sensor order code

1, 2	3 to 5		6	7	8, 9	10, 11		12, 13	14, 15		16 to 18	19	20 to 22	no. of character
measurement principle	**type**	**-**	**type of construction**	**design**	**material (wetted parts)**	**gaskets**	**-**	**explosion protection**	**certification**	**-**	**process pressure**	**flange**	**flange size (flange = D)**	**description**
R														transmitted light refractometer
	500													
			M											standard sensor
			L											long sensor
				C										chemistry design
					S4									stainless steel 316Ti (1.4571)
					TF									PTFE
						KR								FFKM (Kalrez)
								A1						zone 0/1
								F1						FM Class I Div. 1
								NN						not explosion-proof
									NN					-
											P10			PN 10
											P15			150 psi
											P16			PN 16
											P30			300 psi
											P40			PN 40 (on request)
												F		FLEXIM flange (R500-MC)
												D		direct flange (R500-LCS4, R500-*CTF)
													050	DN 50 (R500-LCS4)
													080	DN 80 (R500-LCS4)
													002	2" (R500-LCS4)
													003	3" (R500-LCS4)
													H50	DN 50 (loose-type flange (R500-LCTF) or sight glass fitting (R500-MCTF))
													H80	DN 80 (loose-type flange (R500-LCTF) or sight glass fitting (R500-MCTF))
													H02	2" (loose-type flange (R500-LCTF) or sight glass fitting (R500-MCTF))
													H03	3" (loose-type flange (R500-LCTF) or sight glass fitting (R500-MCTF))

Process connection

Direct flange for PIOX R500-LCS4KR-****-P**D

The sensor is welded to the direct flange (EN 1092-1 type 05 or ASME B16.5 150/300 psi).

description		sensor order code	pressure rating (flange)	pipe diameter	dimensions [inch]		dimensional drawing
					D	h	
direct flange	D050	R500-LCS4KR-****-P**D050	PN 16 optional: PN 40	DN 50	ø6.5	0.71	
	D080	R500-LCS4KR-****-P16D080	PN 16	DN 80	ø7.87	0.79	
	D002	R500-LCS4KR-****-P15D002 R500-LCS4KR-****-P30D002	150 psi 300 psi	2"	ø6	0.75	
	D003	R500-LCS4KR-****-P15D003 R500-LCS4KR-****-P30D003		3"	ø7.5	0.94	

special materials on request

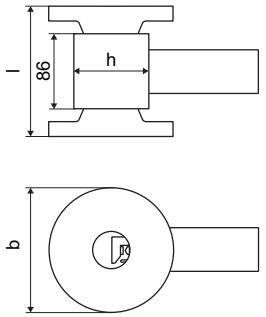
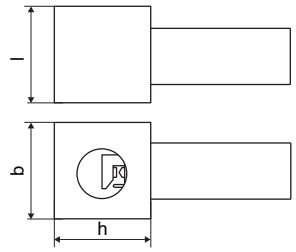
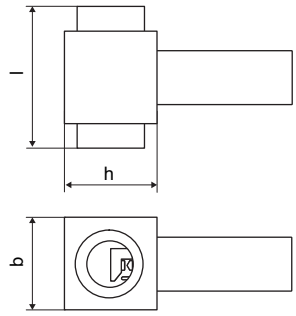
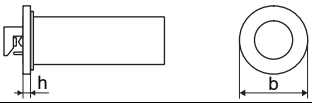
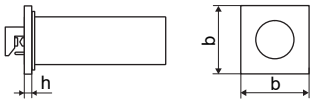
Process connection for PIOX R500-MCS4KR-****-P**F

Order code

process connection	-	connection type	pipe diameter	-	explosion protection	-	material[1]	gaskets	-	pressure rating (flange)[1]	/	option	description
PCR													process connection
		FD											flow chamber with flanges according to EN 1092-1 type 11
		FA											flow chamber with flanges according to ASME B 16.5 150/ 300 psi
		FT											flow chamber with screwed connection
		FW											flow chamber with welded connection to the process pipe
		WR											round welding plate for vessel installation
		WS											square welding plate for vessel installation
			xxx										DN xxx (xxx = 015, 025, 050, 080) 1" (xxx = 001), 2" (xxx = 002), 3" (xxx = 003), 3/8" (xxx = G38), 1/2" (xxx = G12), 3/4" (xxx = G34) welding plate (xxx = T00)
					F1								FM Class I Div. 1
					NN								not explosion-proof, zone 0/1
							S4						stainless steel 316Ti
								FE					FPM with FEP coating
										Pyy			pressure rating PN yy in bar (yy = 10, 16, on request: 40) 150 psi (yy = 15), 300 psi (yy = 30)
												HCL	cleaning line (PCR-F*)

[1] possible pipe diameters/materials/pressure ratings to be selected from table on page 17. Observe national regulations when selecting the flange size depending on the pressure rating.

Technical data

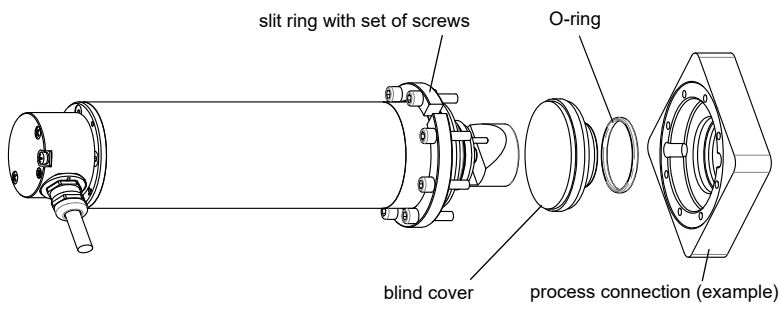
description	order code	pressure rating (flange) Pyy	pipe diameter xxx	dimensions [inch]			weight [lb]	dimensional drawing
				l	b	h		
flow chamber with flanges accessories: blind cover, sensor mounting kit optional: cleaning line[1]	PCR-FDxxx-**-S4FE-P16	PN 16	DN 15	6.69	ø3.74	2.28	9.5	
			DN 25	6.93	ø4.53	2.28	11	
			DN 50	7.48	ø6.5	3.15	18.3	
			DN 80	7.87	ø7.87	4.21	26.2	
	PCR-FAxxx-**-S4FE-Pyy	150 psi 300 psi	ANSI 1"	8.32	ø4.25	2.3	11.2	
			ANSI 2"	8.94	ø6	3.15	19.4	
			ANSI 3"	9.69	ø7.48	4.21	29.5	
flow chamber with screwed connection accessories: blind cover, sensor mounting kit optional: cleaning line[1]	PCR-FTxxx-**-S4FE-Pyy		G 3/8"	3.94	3.94	3.94	7.3	
			G 1/2"				7.1	
			G 3/4"				7.1	
flow chamber with welded connection to the process pipe accessories: blind cover, sensor mounting kit optional: cleaning line[1]	PCR-FWxxx-**-S4FE-Pyy		DN 15	3.94	3.94	2.28	6.2	
			DN 25	3.94	3.94	2.28	6	
			DN 50	3.94	3.94	3.15	9.3	
			DN 80	3.94	3.94	4.21	6.8	
			1"	3.94	3.94	2.3	6	
			2"	3.94	3.94	3.15	9.3	
			3"	3.94	3.94	4.21	6.8	
round welding plate for vessel installation accessories: blind cover, sensor mounting kit	PCR-WRT00-**-S4FE-Pyy				ø3.94	0.79		
square welding plate for vessel installation accessories: blind cover, sensor mounting kit	PCR-WST00-**-S4FE-Pyy			3.94	3.94	0.79		

xxx, yy - see order code
PN 40 on request

[1] cleaning connection:
- thread: G1/4"
- cable gland
- stainless steel pipe 0.24 x 0.04 inch, length: 5.91 inch

Accessories

sensor mounting kit

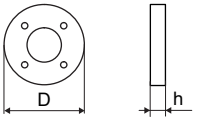


sensor mounting kit	item number
slit ring	TR4492-SP
set of screws	8x TR4214-SP
O-ring	TR2661-SP
blind cover	TR4494-SP

included in supply

Direct flange for PIOX R500-LCTFKR-****-P**D

The sensor is connected to the direct flange. It is fixed with a loose-type flange.

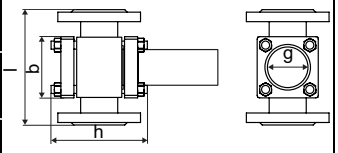
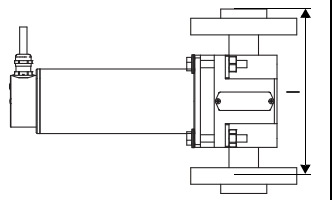
description		sensor order code	pressure rating (flange)	pipe diameter	dimensions [inch]		dimensional drawing
					D	h	
loose-type flange	DH50	R500-LCTFKR-****-P10DH50	PN 10	DN 50	6.5	0.79	
	DH80	R500-LCTFKR-****-P10DH80		DN 80	7.87	0.79	
	DH02	R500-LCTFKR-****-P15DH02	150 psi	2"	6.5	0.94	
	DH03	R500-LCTFKR-****-P15DH03		3"	7.87	1.06	

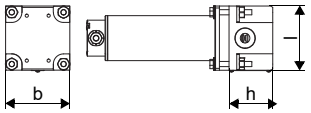
included in supply

Process connection for PIOX R500-MCTFKR-****-P**D

Order code

process connection	-	connection type	pipe diameter	-	explosion protection	-	material (wetted parts)	gaskets	-	pressure rating (flange)	description
PCR											process connection
		FH									sight glass fitting
		PH									flow chamber PVDF
			xxx								DN xxx (xxx = 025, 050, 080) 1" (xxx = 001), 2" (xxx = 002), 3" (xxx = 003), 4" (xxx = 004) 3/8" (xxx = G38), 1/2" (xxx = G12), 3/4" (xxx = G34)
					F1						FM Class I Div. 1
					NN						not explosion-proof, zone 0/1
							PF				sight glass fitting with PFA liner
							PV				PVDF
								FE			FPM with FEP coating
								NN			without gasket (self-sealing)
										yy	pressure rating PN yy in bar (yy = 10) 150 psi (yy = 15)

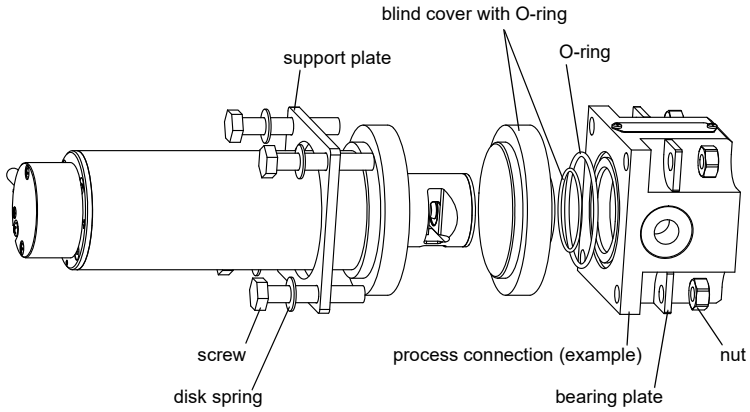
description	order code	pressure rating (flange)	pipe diameter	dimensions [inch]				dimensional drawing
				l	b	g	h	
sight glass fitting with PFA liner (self-sealing) • sensor: PIOX R500-MCTFKR-****-P10DH** (Rohrdurchmesser der Schauglasarmatur und Flanschgröße des Sensors müssen zueinander passen)	PCR-FH050-**-PFNN-P10	PN 10	DN 50	9.06	4.72	ø3.15	7.28	
	PCR-FH080-**-PFNN-P10		DN 80	12.2	ø7.48	ø3.94	9.69	
	PCR-FH002-**-PFNN-P15	150 psi	2"	9.06	4.72	ø3.15	7.28	
	PCR-FH003-**-PFNN-P15		3"	12.2	ø7.48	ø3.94	9.69	
flow chamber with flanges (PVDF) • sensor: PIOX R500-MCTFKR-****-P10DH50 • gasket: TR2644-SP[1]	PCR-PH025-**-PVFE-P10	PN 10	DN 25	7.87				
	PCR-PH001-**-PVFE-P15	150 psi	1 "	7.87				

description	order code	pressure rating (flange)	pipe diameter	dimensions [inch]				dimensional drawing
				l	b	g	h	
flow chamber with screwed connection (PVDF) • sensor: PIOX R500-MCTFKR-****-P10DH50 • gasket: TR2644-SP[1]	PCR-PHG38-**-PVFE-P15	150 psi	NPT 3/8"	3.94	3.94		2.68	
	PCR-PHG12-**-PVFE-P15		NPT 1/2"					
	PCR-PHG34-**-PVFE-P15		NPT 3/4"					

[1] gasket TR2644-SP: 63.17 x 2.62 FEP (FPM), included in supply

Accessories

sensor mounting kit



sensor mounting kit	item number
support plate	TR2013-SP
bearing plate	4x TR2014-SP
screw	4x TR9180-SP
nut	4x TR4294-SP
disk spring	4x TR4209-SP
O-ring	TR2644-SP
blind cover O-ring	TR3922-SP TR2646-SP

included in supply

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