

PP20R

Competitive pressure sensor for railway applications

PP20R-1.####R.####.####00.050

Overview

- Tested according EN 50155
- High dielectric strength of 1 kV AC exceeding the standard according EN 50155
- High accuracy over a wide temperature range (-40 ... 125 °C) due to active compensated temperature compensation
- Extended EMC immunity compared to EN 50121-3-2
- Traceability according GS1 standard
- Designed for a wide range of railway applications as e.g. pantograph pressure control, coolant recirculating pumps and pneumatic and hydraulic brake systems
- Frontflush pressure connection available for requirements of water applications as e.g. fluid management, water pumps, level monitoring, lavatory equipment and high viscosity media



Picture similar



Technical data

Performance characteristics

Pressure type	Relative (gauged)
Compensated temperature range	-10 ... 60 °C
Long term stability	≤ 0.2 % FSR/a
Max. measuring error	± 0.3 % FSR ± 0.5 % FSR ± 1.0 % FSR ± 3.0 % FSR Including zero-point and span error, non-linearity (by terminal base line), hysteresis and non-repeatability (EN 61298-2)
Max. measuring span	400 bar
Measuring range	-1 ... 400 bar
Step response time	< 3 ms
Standard error of measurement (BFSL)	± 0.12 % FSR ± 0.2 % FSR ± 0.4 % FSR ± 1.2 % FSR Including non-linearity, hysteresis and non-repeatability according BFSL
Min. measuring span	0.25 bar
Power-up time	< 50 ms
Temperature coefficient	≤ 0.05 % FSR/10 K, measuring span ≤ 0.05 % FSR/10 K, zero point

Process conditions

Process temperature	Refer to section "Operating conditions"
Process pressure	Refer to section "Operating conditions"

Process connection

Connection variants	Refer to section "Dimensional drawings"
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Process connection

Wetted parts material	AISI 304 (1.4301) AISI 316L (1.4404) Ceramic, 96% AL2O3 NBR, optional EPDM, optional FKM, optional, gaskets require a minimum ambient temperature of -20 °C and a minimum medium temperature of -25 °C FVMQ, optional
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Ambient conditions

Operating temperature range	Connector M12-A, 4-pin: -40 ... 105 °C, with voltage output -40 ... 115 °C, with current output @ voltage supply range 26.4 ... 35 V DC -40 ... 125 °C, with current output @ voltage supply range 11 ... 26.3 V DC Class OT6 (EN 50155) Connector DIN EN 175301-803 A (DIN 43650 A), 4-pin: -40 ... 90 °C
Storage temperature range	-40 ... 125 °C
Degree of protection (EN 60529)	IP65, with connector DIN EN 175301-803 A (DIN 43650 A), 4-pin IP67, with connector M12-A, 4-pin IP69K, with connector M12-A, 4-pin
Insulation resistance	> 100 MΩ, 500 V DC
Insulation voltage	1 kV AC, EN 50155
Shock and vibration tests (EN 61373:1999, 2010)	Category 2 The respective most demanding severity levels of the issues 1999 and 2010 are applied in each Category 2

Output signal

Current output	4 ... 20 mA, 2-wire
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Output signal

Voltage output	0 ... 10 V , 3-wire 1 ... 5 V , 3-wire 0 ... 2 V , 3-wire
Load resistance	> 5 kΩ, with voltage output $R \leq (V_{DC} - 11 V)/0.023 A$, with current output
Short circuit protection	Yes

Housing

Style	Compact transmitter
Overall size	Refer to section "Dimensional drawings"
Material	AISI 304 (1.4301)

Electrical connection

Connector	M12-A, 4-pin DIN EN 175301-803 A (DIN 43650 A), 4-pin
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Power supply

Voltage supply range	11 ... 35 V DC , with current output 14 ... 35 V DC , with 0 ... 10 V output signal 9 ... 35 V DC , with 1 ... 5 V output signal 9 ... 35 V DC , with 0 ... 2 V output signal 24 V DC , according EN 50155, Class S1
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Power supply

Current consumption (no load)	23 mA , max.
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Factory settings

Output lower limit	3.8 mA
Output upper limit	22 mA
Damping	0 s
Output at sensor fault	23 mA

Compliance and approvals

EMC	EN 61326-1 EN 50121-3-2:2016 EN 55011:2009 (Class A)
Railway applications	EN 50155
Fire protection	EN 45545 HL 3

Operating conditions

Measuring range (bar)				Proof pressure (bar)	Burst pressure (bar)
0 ... 0,25				1	2
0 ... 0,25 strengthened	-1 ... 1	0 ... 2,5		4	6
0 ... 4	0...6			10	15
0 ... 10	0 ... 2,5 strengthened	0 ... 4 strengthened	0 ... 6 strengthened	15	25
0 ... 16	0 ... 12 strengthened			35	65
0 ... 40	0 ... 60			100	120
0 ... 100				150	200
0 ... 160				350	500
0 ... 250	0 ... 400			500	650

Material	Process temperature	
	Air	Liquids (water or more viscous)
	Full scale range FSR refers to upper limit of pressure measuring range of the sensor	
FKM	-5 ... 125 °C @ FSR ≤ 400 bar	-10 ... 125 °C @ FSR ≤ 400 bar
FVMQ	-40 ... 125 °C @ FSR ≤ 160 bar	-40 ... 125 °C @ FSR ≤ 160 bar
EPDM	-40 ... 125 °C @ FSR ≤ 100 bar	-40 ... 125 °C @ FSR ≤ 100 bar
	-30 ... 100 °C @ 100 bar < FSR ≤ 400 bar	-30 ... 100 °C @ 100 bar < FSR ≤ 400 bar
NBR standard	-20 ... 100 °C @ FSR ≤ 100 bar	-20 ... 100 °C @ FSR ≤ 400 bar
	-10 ... 100 °C @ 100 bar < FSR ≤ 400 bar	
NBR low temperature	-30 ... 100 °C @ FSR ≤ 160 bar	-30 ... 100 °C @ FSR ≤ 160 bar

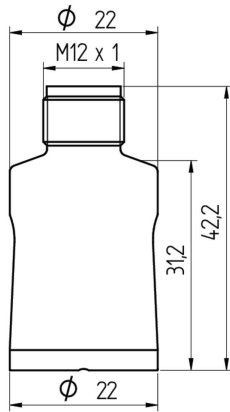
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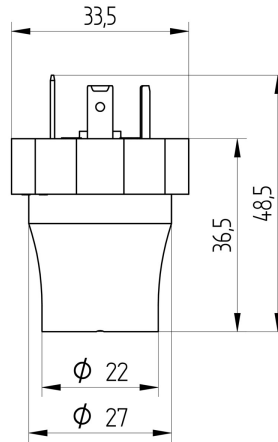
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Dimensional drawings (mm)

Housing



M12-A, 4-pin



DIN EN 175301-803 A (DIN 43650 A), 4-pin

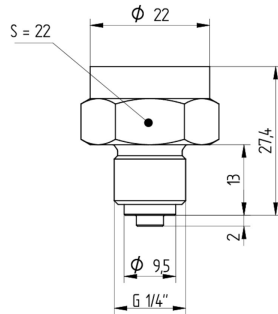
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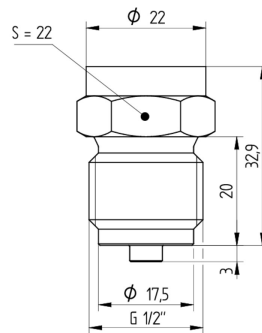
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Dimensional drawings (mm)

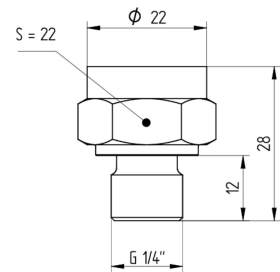
Process connection



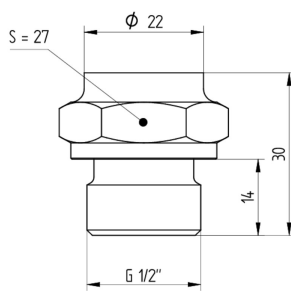
G 1/4 B EN 837-1 (G30)



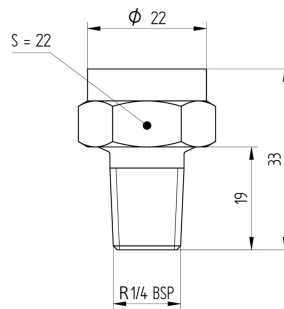
G 1/2 B EN 837-1 (G31)



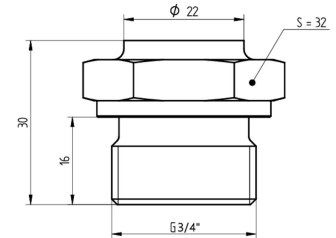
G 1/4 A DIN EN ISO 1179-2 (3852-E) (G50)



G 1/2 A DIN EN ISO 1179-2 (3852-E) (G51)



R 1/4 BSP (R03)



G 3/4 A DIN EN ISO 1179-2 (3852-E) (G57)

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Electrical connection

Output signal	Equivalent circuit	Electrical connection	Function	Pin assignment
4 ... 20 mA (2-wire)			+Vs	1
			lout	3
			Frame Ground	Plug thread
			n.c.	2, 4
			+Vs	1
			lout	2
0 ... 10 V (3-wire)			+Vs	1
			Uout	2, 4
			GND (0 V)	3
			Frame Ground	Plug thread
			+Vs	1
			Uout	3
			GND (0 V)	2
			Frame Ground	Grounding lug

Ordering information

Ordering key - Configuration possibilities see website

Product	PP20R	-	1	.	#	###	R	.	##	##	.	##	#	#	0	0	.	0	5	0
Housing material	SS 1.4301 AISI 304																			
Accuracy																				
±1.0 % FS																				
±0.5 % FS																				
±0.3 % FS																				
±3.0 % FS																				
Measuring range																				
0 ... 0.25 bar (EN)																				
0 ... 0.25 bar (EN), strengthened																				
0 ... 2.5 bar (EN)																				
0 ... 2.5 bar (EN), strengthened																				
0 ... 4 bar (EN)																				
0 ... 4 bar (EN), strengthened																				
0 ... 12 bar (EN), strengthened																				
0 ... 6 bar (EN)																				
0 ... 6 bar (EN), strengthened																				
0 ... 10 bar (EN)																				
0 ... 16 bar (EN)																				
0 ... 40 bar (EN)																				
0 ... 60 bar (EN)																				
0 ... 100 bar (EN)																				
0 ... 160 bar (EN)																				
0 ... 250 bar (EN)																				
0 ... 400 bar (EN)																				
-1 ... 1 bar (EN)																				

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Ordering information

Ordering key - Configuration possibilities see website

	PP20R	-	1	.	#	###	R	.	##	##	.	##	#	#	0	0	.	0	5	0
Kind of pressure																				
Relative (gauged)							R													
Output signal																				
4...20 mA									A1											
0...10 V									A2											
1...5 V									A3											
0...2 V									A9											
Output Connection																				
M12-A, 4-pin										14										
DIN EN 175301-803 A (DIN 43650 A), 4-pin ⁽¹⁾										44										
Process connection																				
G 1/4 B EN 837-1 (G30)															02					
G 1/2 B EN 837-1 (G31)															03					
G 1/4 A DIN EN ISO 1179-2(G50)															06					
G 1/2 A DIN EN ISO 1179-2(G51)															09					
R 1/4 ISO 7-1 (R03)															17					
G 3/4 A DIN EN ISO 1179-2 (3852-E)															47					
Front flush membrane (G57)																				
Process connection material																				
Stainless steel 1.4404 AISI 316L																2				
Stainless steel 1.4301 AISI 304																4				
Seal																				
NBR standard																			1	
EPDM																			2	
FKM																			3	
FVMQ																			6	
NBR low temperature																			N	
Oil filling																				
Without																			0	
Display																				
Without																			0	
ATEX																				
Without																			0	
Approvals																				
Railway (EN 50155)																			5	
Configuration																				
No configuration																			0	

(1) Including female power connector with crimped terminals