

# 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



## EN 50155

### 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 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 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	With NBR seal: -25 ... 100 °C @ -1 ... 400 bar With EPDM seal: -40 ... 125 °C @ -1 ... 160 bar -30 ... 100 °C @ 160 ... 400 bar With FKM (Viton®) seal: -10 ... 125 °C @ -1 ... 400 bar With FVMQ seal: -40 ... 125 °C @ -1 ... 160 bar
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 (Viton®), optional 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
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 ≤ (V DC - 11 V)/0.023 A, with current output

# PP20R

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## Technical data

### Output signal

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

### Power supply

Voltage supply range 11 ... 35 V DC , with current output  
14 ... 35 V DC , with voltage output  
24 V DC , according EN 50155, Class S1

### 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

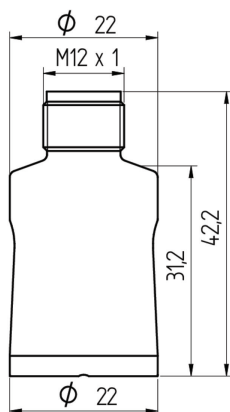
Fire protection EN 45545 HL 3

## Operating conditions

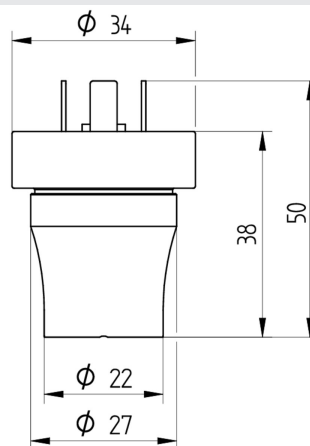
Measuring range (bar)			Proof pressure (bar)	Burst pressure (bar)
0 ... 0.25	0 ... 2.5	-1 ... 1	4	6
0 ... 4	0 ... 6		10	12
0 ... 10	0 ... 2.5 strengthened	0 ... 4 strengthened	15	20
0 ... 12 strengthened	0 ... 16		35	50
0 ... 40	0 ... 60		100	120
0 ... 100			150	200
0 ... 160			350	500
0 ... 250	0 ... 400		500	650

## Dimensional drawings (mm)

### Housing



M12-A, 4-pin



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

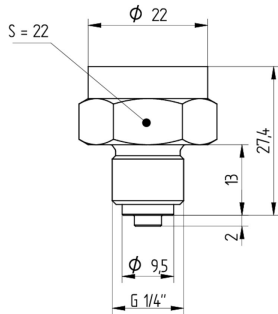
# PP20R

Competitive pressure sensor for railway applications

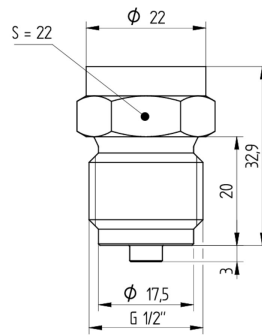
PP20R-1.####R.####.####00.050

## Dimensional drawings (mm)

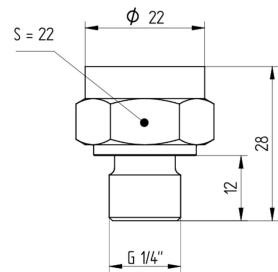
### Process connection



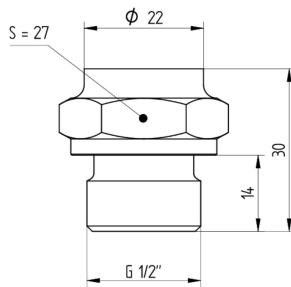
G 1/4 B EN 837-1 (G30)



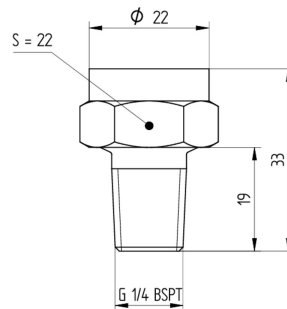
G 1/2 B EN 837-1 (G31)



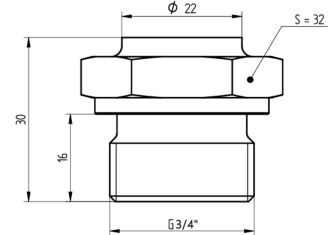
G 1/4 A DIN 3852-E (G50)



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



R 1/4 BSP - Tr (R03)



G 3/4 A DIN 3852-E (G57)

# PP20R

Competitive pressure sensor for railway applications

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

## Electrical connection

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

## Ordering information

Ordering key - Configuration possibilities see website

	PP20R	-	1	.	#	###	R	.	##	##	.	##	#	#	#	0	0	.	0	5	0
<b>Product</b>	PP20R																				
<b>Housing material</b>	SS 1.4301 AISI 304																				
<b>Accuracy</b>																					
±1.0 % FS																					1
±0.5 % FS																					3
±0.3 % FS																					B
<b>Measuring range</b>																					
0 ... 0.25 bar (EN)																					B10
0 ... 2.5 bar (EN)																					B18
0 ... 2.5 bar (EN), strengthened																					BA8
0 ... 4 bar (EN)																					B19
0 ... 4 bar (EN), strengthened																					BA9
0...12 bar (EN), strengthened																					BAK
0 ... 6 bar (EN)																					B20
0 ... 6 bar (EN), strengthened																					BA0
0 ... 10 bar (EN)																					B22
0 ... 16 bar (EN)																					B24
0 ... 40 bar (EN)																					B27
0 ... 60 bar (EN)																					B29
0 ... 100 bar (EN)																					B31
0 ... 160 bar (EN)																					B33
0 ... 250 bar (EN)																					B35
0 ... 400 bar (EN)																					B38
-1...1 bar (EN)																					B73
<b>Kind of pressure</b>																					
Relative (gauged)																					R

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## Ordering information

Ordering key - Configuration possibilities see website

	PP20R	-	1	.	#	###	R	.	##	##	.	##	#	#	0	0	.	0	5	0	
<b>Output signal</b>																					
4...20 mA																					A1
0...10 V																					A2
1...5 V																					A3
0...2 V																					A9
<b>Output Connection</b>																					
M12-A, 4-pin																					14
DIN EN 175301-803 A (DIN 43650 A), 4-pin																					44
<b>Process connection</b>																					
G 1/4 B EN 837-1 (G30)																					02
G 1/2 B EN 837-1 (G31)																					03
G 1/4 A DIN 3852-E (G50)																					06
G 1/2 A DIN 3852-E (G51)																					09
R 1/4 ISO 7-1 (R03)																					17
G3/4 DIN3852-E front flush (G57)																					47
<b>Process connection material</b>																					
Stainless steel 1.4404 AISI 316L																					2
Stainless steel 1.4301 AISI 304																					4
<b>Seal</b>																					
NBR standard																					1
EPDM																					2
FKM (Viton®)																					3
FVMQ																					6
<b>Oil filling</b>																					
Without																					0
<b>Display</b>																					
Without																					0
<b>ATEX</b>																					
Without																					0
<b>Approvals</b>																					
Railway (EN 50155)																					5
<b>Configuration</b>																					
No configuration																					0

(1) Including female power connector with crimped terminals