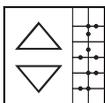
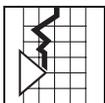
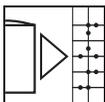
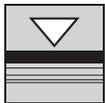


Pressure Transmitter *cerabar T PMP 135*

**Pressure transmitter for hygienic processes
For absolute and gauge pressures up to 500 psi
Flush-mounted process connections with
metal diaphragm**



Application

The Cerabar T PMP 135 is a pressure transmitter for hygienic applications, e.g. in the food processing and pharmaceutical industries. It is designed for measuring absolute and gauge pressures in gases, vapors, liquids and dust.

- Finely graduated measuring ranges up to 500 psi
- Electronic versions include:
 - 4 to 20 mA analog output
 - Switch output (PNP)

Features and benefits

The PMP 135 is a compact, low cost pressure transmitter, engineered for hygienic processes.

- Flush-mounted process connections with metal diaphragm
- Hygienic design as per 3-A guidelines
- Analog output accuracy $\leq 0.5\%$, PNP switch point deviation $\leq 1\%$
- Up to 5 times overload resistant and excellent longterm stability (0.15% per year)
- Process temperature, -13° to $+212^\circ\text{F}$; maximum temperature 275°F (1 hour)
- Optional 3.1.B inspection certificate
- Wetted materials made of 316L SS with a surface quality of $R_a \leq 0.8 \mu\text{m}$ (better than 150 grit)

Endress + Hauser

The Power of Know How



Function and system design

Measuring principle

PMP 135 with analog output

The process pressure acting on the metallic separating diaphragm of the sensor is transmitted to a resistance bridge via a fill fluid. The change in the output voltage of the bridge is proportional to the pressure and can be measured directly.

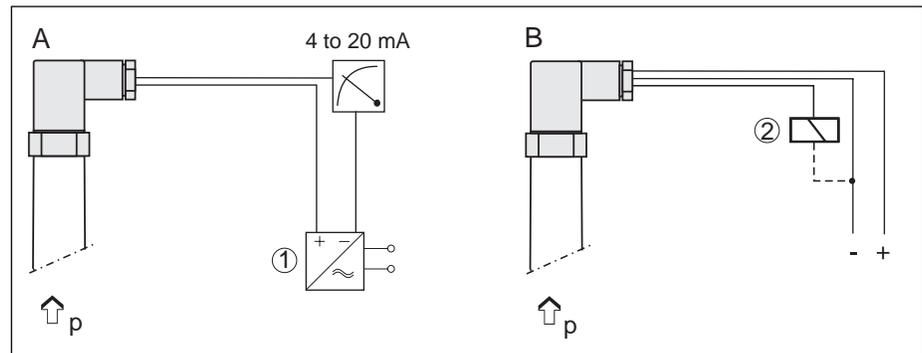
PMP 135 with PNP switch output

The process pressure acting on the metallic separating diaphragm of the sensor is transmitted to a resistance bridge via a fill fluid. A differential amplifier creates a standard signal from the pressure-proportional change in the output voltage of the bridge. A comparator with an adjustable hysteresis compares this signal with the pre-set switch point and then activates the transistor output and LED display.

Measuring system

Cerabar T PMP 135 pressure transmitter with:

- 4 to 20 mA analog output
Power supply, e.g. RN 221N transmitter power supply unit from Endress+Hauser
- Switch output
Preferably in connection with a programmable logic controller (PLC). Positive signal at electronics switch (PNP).



A = analog output with transmitter power supply unit ①

B = PNP output with load ②, e.g. PLC, DCS, relay

Input

Measured variable

The measured variable for the Cerabar T PMP 135 pressure transmitter can be selected as either gauge or absolute pressure.

Measuring range

Measuring ranges up to 500 psi (40 bar) can be selected (refer to Ordering Information).

Output

Output signal

Analog output

4 to 20 mA

Load

$R_B \leq (U_s - 12 \text{ V}) / 0.02 \text{ A}$ (U_s = power supply)

Switch (PNP) output

Output signal

Positive voltage signal (rate depends on power supply voltage) at electronics switch output (PNP)

Output current

Switch status ON: $I_a \leq 500 \text{ mA}$
 Switch status OFF: $I_a \leq 1 \text{ mA}$

Power

Maximum 6 W

Switch frequency

Maximum 10 Hz

Input PLC

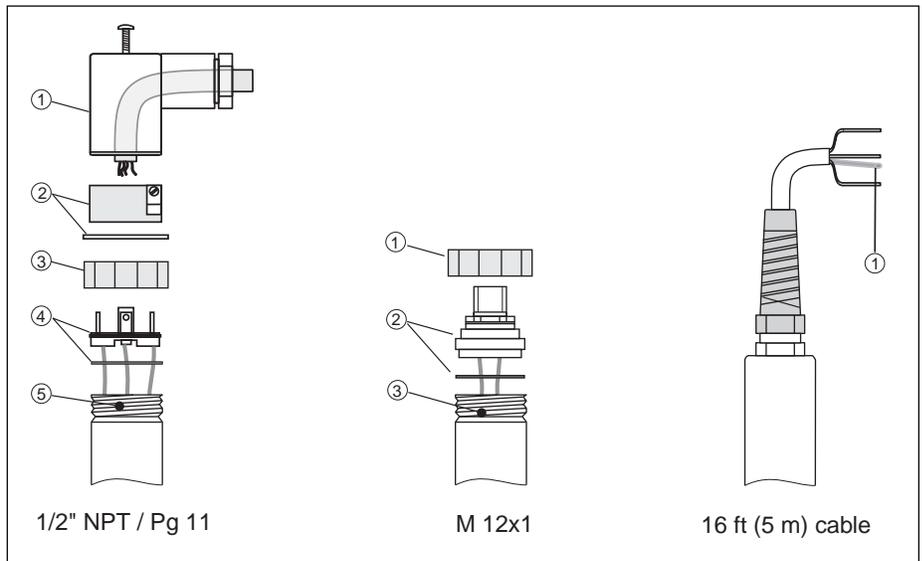
Input resistance $R_i \leq 2 \text{ k}\Omega$
 Input current $I_i \geq 10 \text{ mA}$

Inductive loads

To prevent electrical interference, only operate an inductive load (relays, contactors, solenoid valves) when directly connected to a protective circuit (diode or capacitor).

Power supply

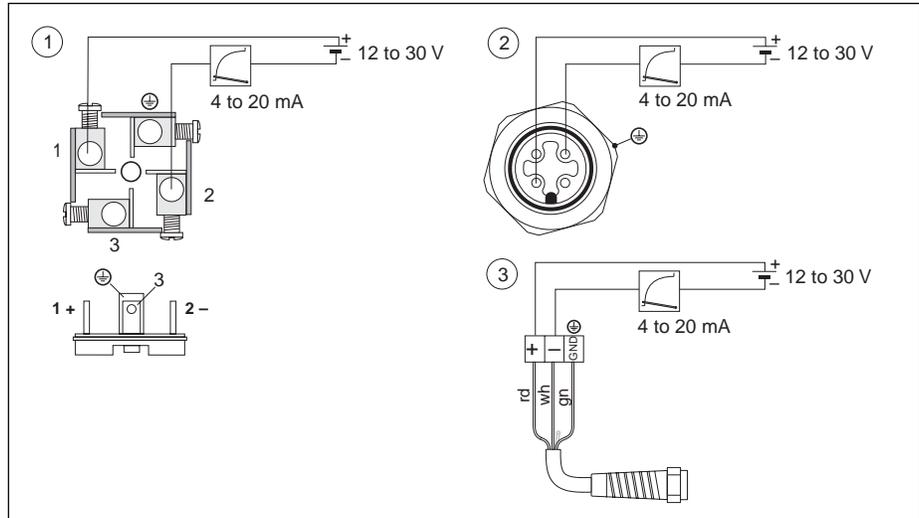
Cable entry



1/2" NPT or PG 11	M 12 x 1 plug	15 ft cable, analog output only
① Plug-in housing	① Coupling nut	① Reference pressure line
② Plug-in jack with gasket	② Connector with gasket	
③ Coupling nut	③ Operating potentiometer (inner)	
④ Plug with o-ring		
⑤ Operating potentiometer (inner)		

Electrical connection

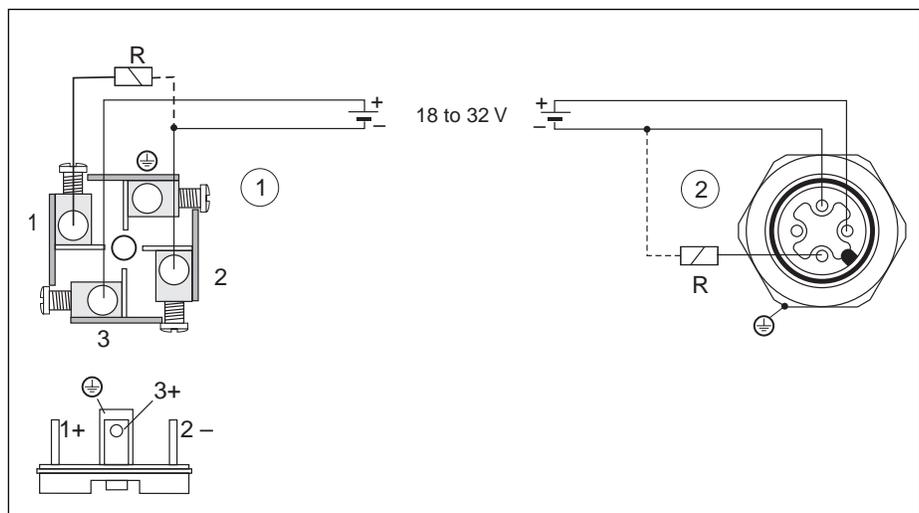
Analog output connection



- ① Plug with 1/2" NPT or Pg 11
 ② M 12 x 1 ;lug
 ③ Cable (rd = red, wh = white, gn = green)

Supply voltage	12 to 30 VDC
Residual ripple	Maximum 5%
Cable entry	Plug with 1/2" NPT, Pg 11, M 12 x 1 or cable

PNP switch connection



- ① Plug with 1/2" NPT or Pg 11
 ② M 12 x 1 ;lug
 R: External load, e.g. relay, programmable logic controller, distributed control system

Supply voltage	12 to 32 VDC
Current consumption	Without load, < 20 mA, with reverse polarity protection
Residual ripple	Maximum 10%
Cable entry	Plug with 1/2" NPT, PG 11 or M 12 X 1

Performance characteristics

Note: Percentages listed below refer to the measuring range

Reference operating conditions	As per DIN IEC 60770, T = 77°F (25°C)
Analog output non-linearity	≤ 0.5% including hysteresis and non-reproducibility (limit point method as per DIN IEC 60770)
Switch point deviation	≤ 1%
Switch point non-reproducibility	≤ 0.5%
Settling time	2 to 4 ms
Long-term drift	≤ 0.15% per year
Influence of temperature	<ul style="list-style-type: none"> • Zero: typical 0.2% / 10K, maximum 0.5% / 10K. Values are 0.1% / 10K higher for measuring spans ≤ 87 psi (6 bar) • Span: typical 0.2% / 10K, maximum 0.5% / 10K • Switch point: typical 0.2% / 10K, maximum 0.5% / 10K

Operating conditions, installation

Mounting position	Any orientation. Orientation dependent zero shift can be corrected using potentiometer adjustments
--------------------------	--

Operating conditions, environment

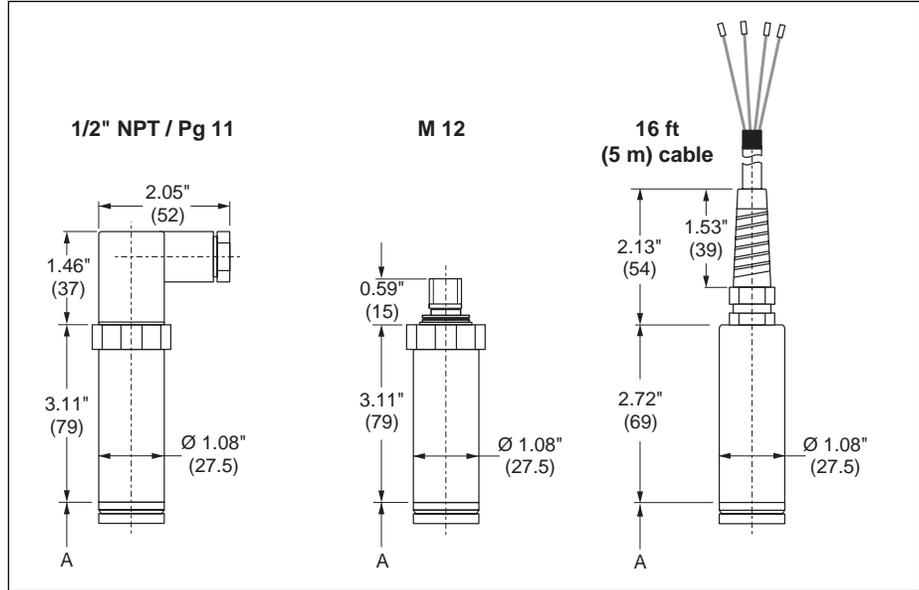
Ambient temperature	-13° to +158°F (-25° to +70°C)
Storage temperature	-40° to +185°F (-40° to +85°C)
Climate class	4 Z: with Z = 158°F (70°C) as per VDI/VDE 3540
Degree of protection	<ul style="list-style-type: none"> • NEMA 4X (IP 65) with 1/2" NPT or Pg 11 cable entry • NEMA 4X (IP 65) with M 12 x 1 plug, when using gauge pressure sensors • NEMA 6P (IP 68), 1 m water column, with 12 x 1 plug, when using absolute pressure sensors • NEMA 6P (IP 68), 1 m water column, with cable
Vibration resistance	4M5 as per DIN EN 60721-3
Electromagnetic compatibility	Interference emission as per EN 61326 electrical device B Interference immunity as per EN 61326 appendix A (industrial use) and NAMUR recommendation NE 21

Operating conditions, process

Medium temperature	-13° to +212°F (-25° to +100°C), maximum 275°F (135°C) for maximum 1 hour
Limiting medium pressure range	Maximum overload resistance, refer to "Ordering information" Vacuum resistance up to 0.14 psia (10 mbar _{abs})

Mechanical construction

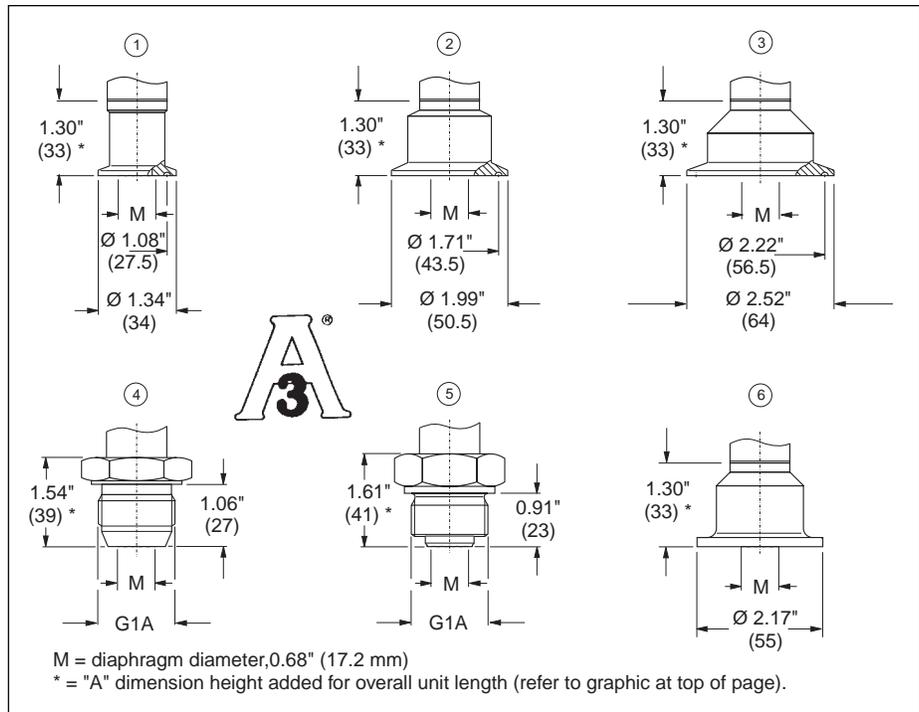
PMP 135 dimensions



A = height dimension of process connector (see process connection drawings below)

- Plug version with 1/2" NPT or Pg 11 cable connection per DIN 43650A/ISO 4400
- M 12 x 1 plug version
- Cable version , with 16 ft. (5 m) fixed cable including pressure compensation tube.

Process connections



- ① Tri-clamp, 1/2" or 3/4" (ISO 2852)
- ② Tri-clamp, 1" or 1-1/2" (ISO 2852)
- ③ Tri-clamp, 2" (ISO 2852)
- ④ G 1A (ISO 228), with tapered metallic seal
- ⑤ G 1A (ISO 228), with sealing surface for flush-mounted installation
- ⑥ SMS 1-1/2"

Materials

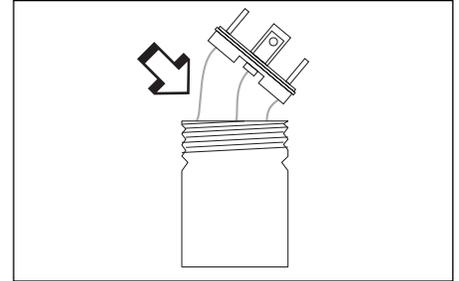
- Process connections and diaphragm: 316L SS
Wetted surface smoothness: $R_a \leq 0.8 \mu\text{m}$ (≥ 150 grit)
- Transmitter housing: 304 SS
- Plug: polyamide (PA)
- Cable outer covering: polyurethane (PUR)
- Fill fluid: Neobee M20 (FDA-no. 21CFR172.856)

Human interface

Operating elements

Operating elements location

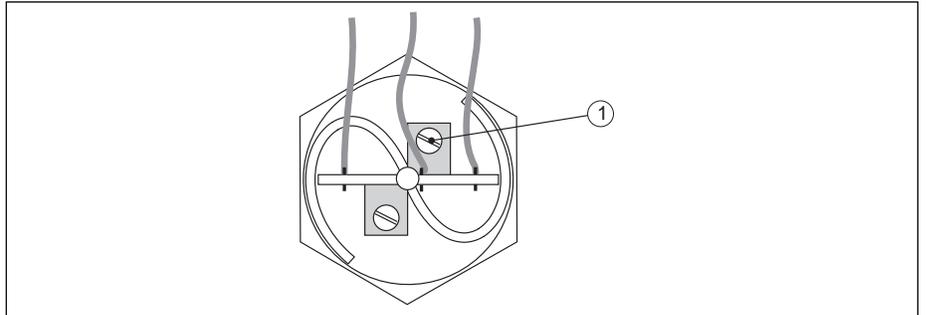
The potentiometer for operating the Cerabar T with analog or PNP switch output is located beneath the plug base.



Adjustments

Analog output: zero point adjustment

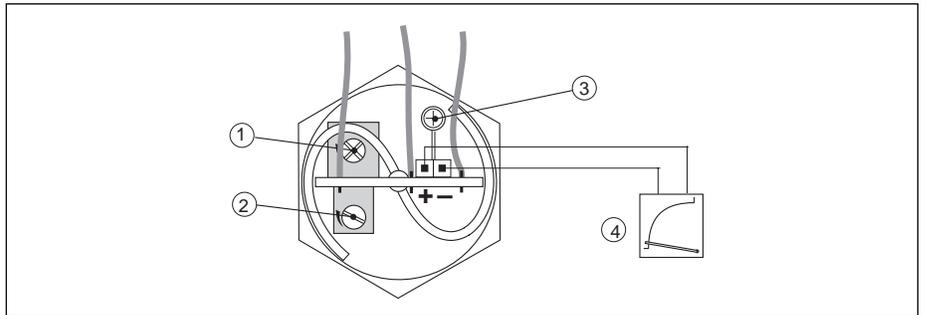
The zero point can be adjusted for the Cerabar T with analog output and plug version.



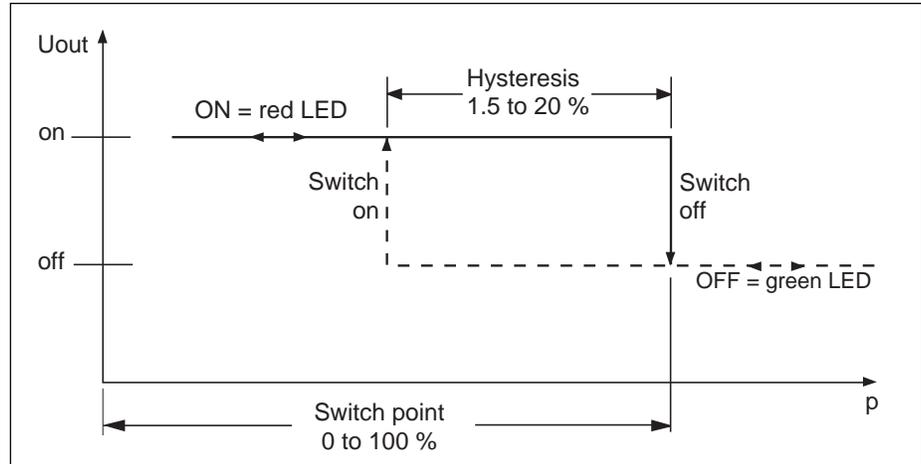
① Potentiometer for zero point correction by $\pm 5\%$ of the measuring range

PNP switch output: switch point and hysteresis adjustment

The Cerabar T with PNP switch output allows adjustment of both the switch point and hysteresis. Adjustment can be made at atmospheric pressure using the enclosed test cables and voltmeter.



- ① Hysteresis adjustment, 1.5 to 20%; factory setting 10%
- ② Switch point adjustment, 0 to 100%; factory setting 50%
- ③ LED color code for checking switch status: green = OFF; red = ON
- ④ Connect voltmeter to test points: 0 to 1 V corresponds to 0 to 100%
Percentages refer to the measuring range.



Instructions for switch point and hysteresis

U_{out} = output voltage

p = acting pressure

The percentages refer to the measuring range

Certificates and approvals

CE mark

By attaching the CE mark, Endress+Hauser confirms that the instrument fulfills all the requirements of the relevant EC directives.

Pressure equipment directive

This device conforms to Article 3 (3) of EC Directive 97/23/EC (pressure equipment directive) and is developed and produced in sound engineering practice.

Ordering information

Cerabar T PMP 135

PMP 135 -

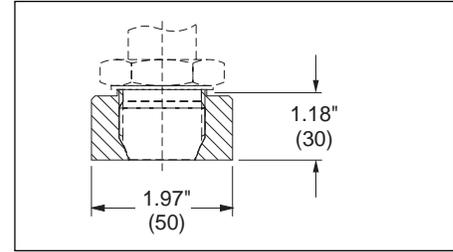
1	2	3	4	5
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- 1 Electrical connection
 A1 Plug with Pg 11 cable gland, NEMA 4X (IP 65)
 A2 Plug with 1/2" NPT conduit entry, NEMA 4X (IP 65)
 A3 Cable, 16 ft. (5 m), NEMA 6P (IP 68)
 A4 M 12 x 1 plug, NEMA 4X (gauge) / NEMA 6P (absolute) (IP 65 / 68)
- 2 Process connection
 F Tri-clamp, 1/2" to 3/4"
 G Tri-clamp, 1" to 1-1/2"
 H Tri-clamp, 2"
 M G 1A, with metallic sealing, tapered
 N G 1A with sealing surface for flush-mounted installation
 S SMS 1-1/2"
- 3 Output signal, certificate
 0 4 to 20 mA analog, 2-wire
 2 PNP switch output, 3-wire
- 4 Additional equipment
 1 Without additional equipment
 C 3.1.B inspection certificate per EN 10204
 2 Linearity protocol
- 5 Measuring range (permitted overload)
- Gauge pressure*
- | | | |
|-----|---------------------------------|------------|
| Q4H | 0 to 15 psi | (60 psi) |
| Q4K | 0 to 30 psi | (150 psi) |
| Q4N | 0 to 50 psi | (240 psi) |
| Q4R | 0 to 150 psi | (600 psi) |
| Q4S | 0 to 300 psi | (1500 psi) |
| Q4T | 0 to 500 psi * | (2400 psi) |
| A1G | 0 to 1 bar / 0 to 100 kPa | (4 bar) |
| A1H | 0 to 1.6 bar / 0 to 160 kPa | (6.4 bar) |
| A1N | 0 to 2.5 bar / 0 to 25 kPa | (10 bar) |
| A1Q | 0 to 4 bar / 0 to 400 kPa | (16 bar) |
| A1R | 0 to 6 bar / 0 to 600 kPa | (24 bar) |
| A1S | 0 to 10 bar / 0 to 1000 kPa | (40 bar) |
| A1T | 0 to 16 bar / 0 to 1600 kPa | (64 bar) |
| A1W | 0 to 25 bar / 0 to 2500 kPa | (100 bar) |
| A1X | 0 to 40 bar * / 0 to 4000 kPa * | (160 bar) |
- * absolute pressure transmitter
- Absolute pressure*
- | | | |
|-----|-----------------------------|------------|
| R4H | 0 to 15 psi | (60 psi) |
| R4K | 0 to 30 psi | (150 psi) |
| R4N | 0 to 50 psi | (240 psi) |
| R4R | 0 to 150 psi | (600 psi) |
| R4S | 0 to 300 psi | (1500 psi) |
| R4T | 0 to 500 psi | (2400 psi) |
| A2G | 0 to 1 bar / 0 to 100 kPa | (4 bar) |
| A2H | 0 to 1.6 bar / 0 to 160 kPa | (6.4 bar) |
| A2N | 0 to 2.5 bar / 0 to 25 kPa | (10 bar) |
| A2Q | 0 to 4 bar / 0 to 400 kPa | (16 bar) |
| A2R | 0 to 6 bar / 0 to 600 kPa | (24 bar) |
| A2S | 0 to 10 bar / 0 to 1000 kPa | (40 bar) |
| A2T | 0 to 16 bar / 0 to 1600 kPa | (64 bar) |
| A2W | 0 to 25 bar / 0 to 2500 kPa | (100 bar) |
| A2X | 0 to 40 bar / 0 to 4000 kPa | (160 bar) |

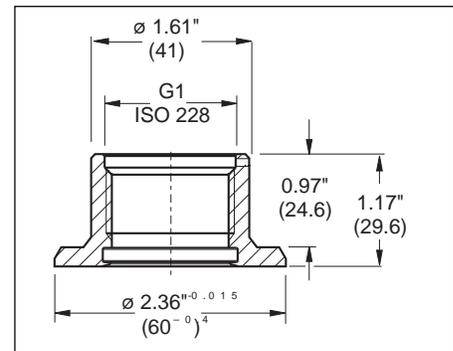
Accessories

Welding bosses

- Welding boss for flush-mounted installation of G1 A process connection with metallic sealing taper (used with process connection M selection, order code).
Material: 316L SS
Order number: 52005087
- Optional with 3.1.B inspection certificate
Order number: 52010171



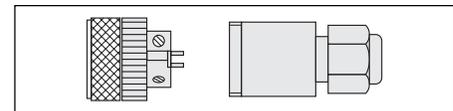
- Welding boss for flush-mounted installation of G1 A process connection with sealing surface (used with process connection N selection, order code).
Material: 316L SS
Gasket (enclosed): silicon o-ring
Order number: 52001051
- Optional with 3.1.B inspection certificate
Order number: 52011196



- Welding aid (dummy plug) for welding the boss (order numbers 52005087 and 52001051), prevents warping of boss during welding.
Material: brass
Order number: 52005272

Plug-in jack

- M 12 x 1 plug-in jack, connection to M 12 x 1 housing
Order number: 52006263



Power supply / display units

- RN 221 N transmitter power supply unit. For safe galvanic isolation of the 4 to 20 mA analog signal and for supplying power to the Cerabar T. Refer to TI 073R/09/en



- RIA 251 process display unit, digital display unit for indicating the analog signal through the 4 to 20 mA current loop.
Refer to TI 063R/24/ae



Supplemental documentation

Cerabar T PMP 131, pressure transmitter with polysilicon sensor:

TI 291P/24/ae

Cerabar T PMC 131, pressure transmitter with capacitive ceramic sensor:

TI 279P/24/ae

PMP 135 operation/installation manual:

KA 198P/00/a6

For application and selection assistance,
in the U.S. call 888-ENDRESS

For total support of your installed base, 24 hours
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