

Modular Pharma Pressure Transmitter MPP

Range of applications

- Pressure measurement in pipes and vessels
- High temperature applications up to 177 °C (350 °F) permanent

Application examples

- Bio-reactor head space pressure monitoring
- Chromatography column pressure measurement
- SIP monitoring
- Pressure measurement of sterile gas lines
- Pressure measurement within sterile transfer lines
- Pressure measurement within filtration processes

Hygienic design/Process connection

- Front-flush, hygienic and easy sterilizable installation, CPM-process connection
- 3-A compliant version with Tri-Clamp
- Additional hygienic process connections: CLEANadapt, Varivent, BioControl
- CIP / SIP cleaning up to 177 °C / 350 °F
- Product contacting materials compliant with FDA regulations

Features

- Unique design and fully modular components
- Components may be economically purchased and individually integrated
- Lower inventory cost for critical sensors
- Modules may be stocked and interchanged to meet any need
- Extremely durable at continuous temperatures up to 177 °C / 350 °F
- Easy to operate; adjustments require no additional tools
- Self-diagnostics ensure that sensor is performing optimally
- Available with absolute and relative measuring cell (vacuum proof)
- Developed to excel in the harshest environments
- Airtight sealing eliminates internal condensation (patent pending)
- Intuitive menu-driven setup simplifies commissioning

Options/Accessories

- Wide offering of standard pressure ranges
- Customer-specified ranges available
- Waterproof prefabricated cable for M12 connector

Measuring principle of the pressure sensor

This unit utilizes an internal piezoelectric transducer to convert the process measurement into a corresponding mV signal. The mV signal then passes through custom linearization and conditioning circuitry. The resulting signal is an industry standard 4...20 mA output. This mA signal is factory set over the specified range of the unit.

With relative pressure sensors, the back of the diaphragm is vented, i.e. this sensor measures the gauge pressure and/or vacuum relative to the atmospheric pressure. With an absolute pressure sensor the measurement is relative to a perfect theoretical vacuum. As a result, the signal will vary with the ambient atmospheric air pressure.

Authorizations



ASME BPE
2014



Pressure sensor MPP

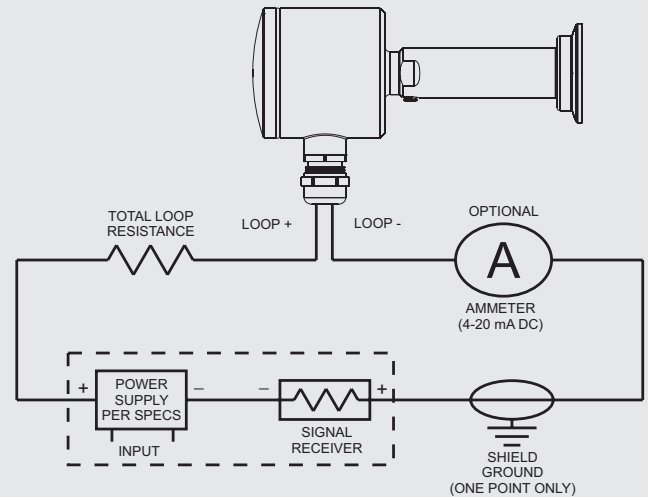
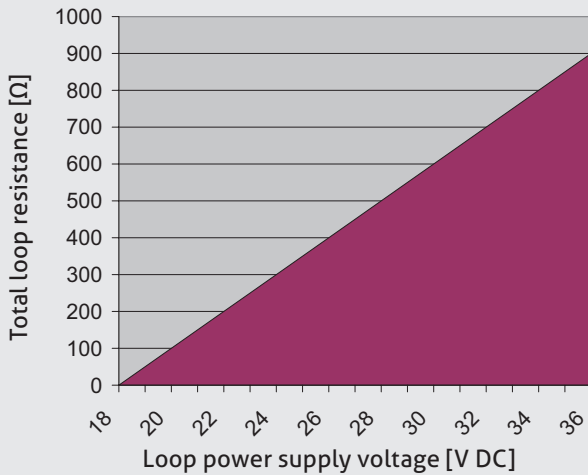


Pressure sensor MPP with CPM



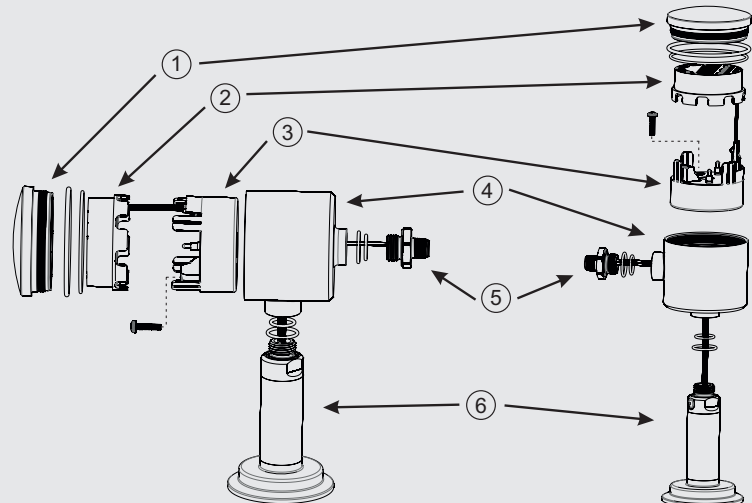
Specification		
Measuring range URL [bar]	Relative	0...2 / 3 / 4 / 6 / 7 / 10 / 20 / 35 / 70 -1...1 / 2.5 / 3 / 4 / 7
Measuring range URL [psi]	Absolute	0...2 / 3 / 4 / 6 / 7 / 10 / 20 / 35
	Relative	0...30 / 50 / 60 / 100 / 150 / 160 / 200 / 500 / 1000 30 mmHg/0, 30 mmHg/0...15 / 30 / 60 / 100 / 200
	Absolute	0...30 / 50 / 60 / 100 / 150 / 160 / 200 / 300 / 500
Turndown	Max. 10:1	of upper range value (see also measurement accuracy)
Overpressure strength	Factor	1.5 x nominal pressure of measuring element up to 35 bar / 500 psi 1.1 x nominal pressure of measuring element up to 70 bar / 1000 psi
Measurement accuracy	Turndown to 5:1	≤ 0.07 % in calibrated measuring range
	Turndown over 5:1	≤ 0.1 % in calibrated measuring range
	Repeatability	0.05 %
	Long-term stability	0.2 % URL every 2 years
Temperature effect	Process	< 12.5 mbar / 10 °C (0.1 psi / 10 °F) typical
	Ambient	< 12.5 mbar / 10 °C (0.1 psi / 10 °F) typical
Temperature range	Process	-18...177 °C (0...350 °F) at ambient temp. up to 60 °C (140 °F)
	Ambient	-18...165 °C (0...330 °F) at ambient temp. up to 71 °C (160 °F) 0...71 °C (32...160 °F)
Response time		< 0.1 seconds
Sample rate		< 0.05 seconds
Materials	Connection head	Stainless steel, AISI 304 (1.4301), $R_a \leq 0.2 \mu\text{m}$ (8 microinch)
	Metal cap	Stainless steel, AISI 304 (1.4301), $R_a \leq 0.2 \mu\text{m}$ (8 microinch)
	Plastic cap	Polycarbonate
	Threaded connector	Stainless steel, AISI 304 (1.4301), $R_a \leq 0.2 \mu\text{m}$ (8 microinch)
	Wetted parts	Stainless steel, AISI 316L, $R_a \leq 0.2 \mu\text{m}$ (8 microinch)
	Diaphragm	Stainless steel, AISI 316L, $R_a \leq 0.2 \mu\text{m}$ (8 microinch)
	Diaphragm seal/oil filling	Medical white oil / mineral oil / paraffin oil FDA approval number 21CFR172.878, 21CFR178.3620, 21CFR573.680 Neobee M20 (optional)
Process connection		G1" hygienic, CPM fitting, Tri-Clamp 3/4" ...2"
Electric connection	Cable gland	M16x1.5
	Plug-in connection	M12 connector, 5-pin, 1.4305 (option)
Protection class		IP 67 (with cable fitting) / NEMA 4X IP 69 K (with plug-in connection)
Auxiliary voltage		18...36 V DC
Output	Current loop	4...20 mA DC / Hart 7.0 / 2-wire
		20...4 mA DC / Hart 7.0 / 2-wire
		Foundation Fieldbus
Burden		See separate graph on page 3, typical 0...300 ohm at 24 VDC
Tightening torque	For assembly of all MPP components	27 Nm (20 ft-lbs)
Compliance		HART 7.0 compatible Article 3.3 PED 97/23/EC CSA-B51-03 CRN number CSAOF9754.5R1
Weight		Approx. 780 g

Burden



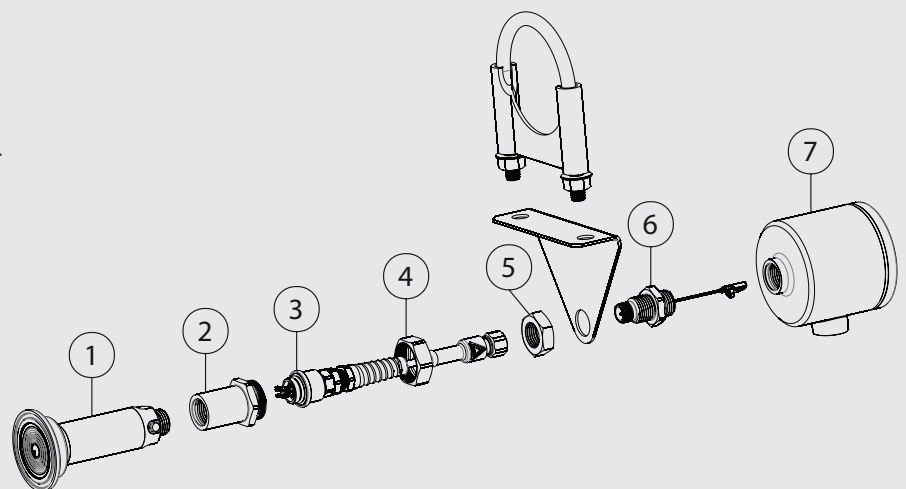
Exploded view of functional components

- 1: Cap (including two O-rings)
- 2: Display interface
- 3: Puck
- 4: Enclosure
- 5: M12 quick disconnect (including two O-rings)
- 6: Stem (including two O-rings)

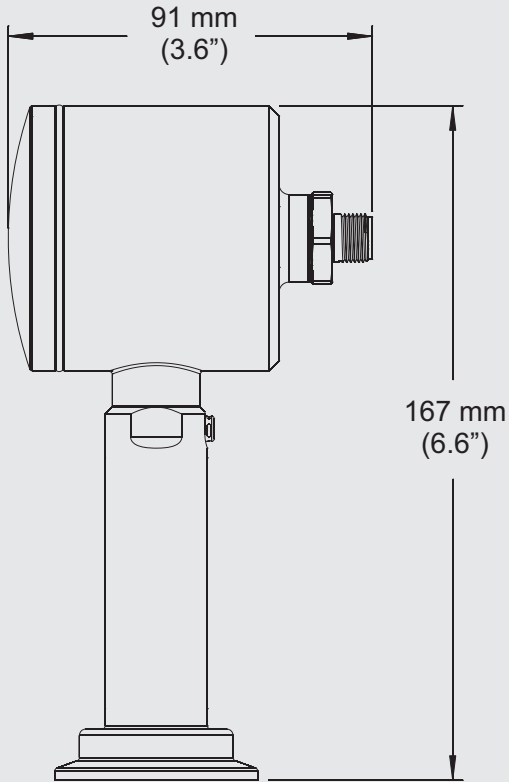


Exploded view of functional components

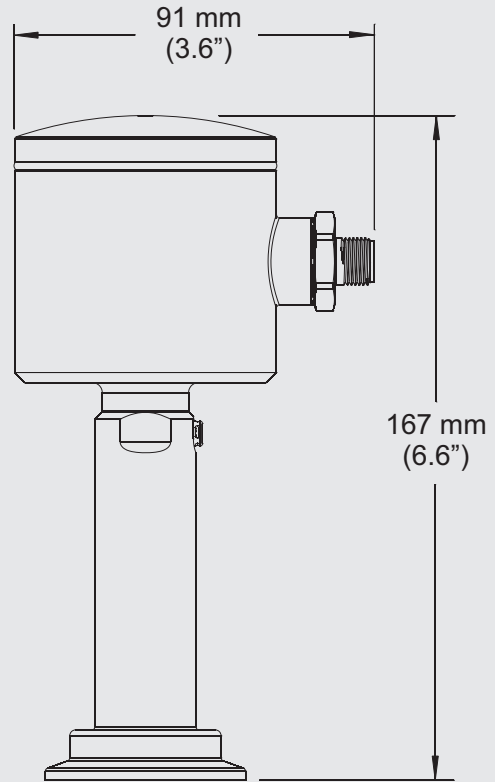
- 1: Measurement cell (stem)
- 2: Stem adaptor kit
- 3: Cable kit receptacle
- 4: Union nut
- 5: Nut
- 6: Remote M12 connector/QDR adaptor
- 7: Enclosure



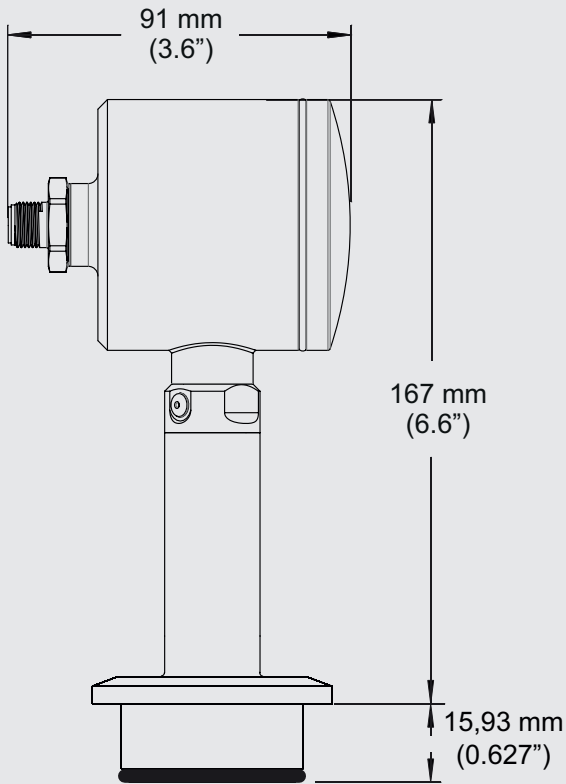
Dimensional drawing: horizontal orientation



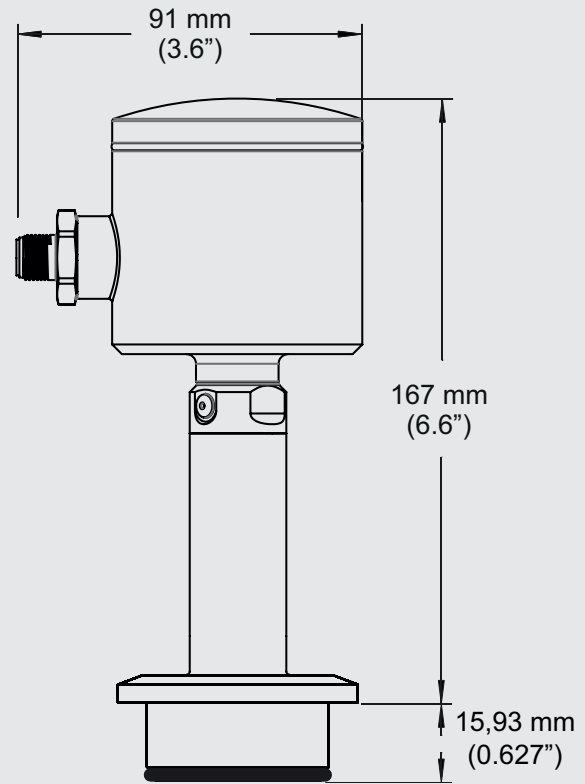
Dimensional drawing: vertical orientation



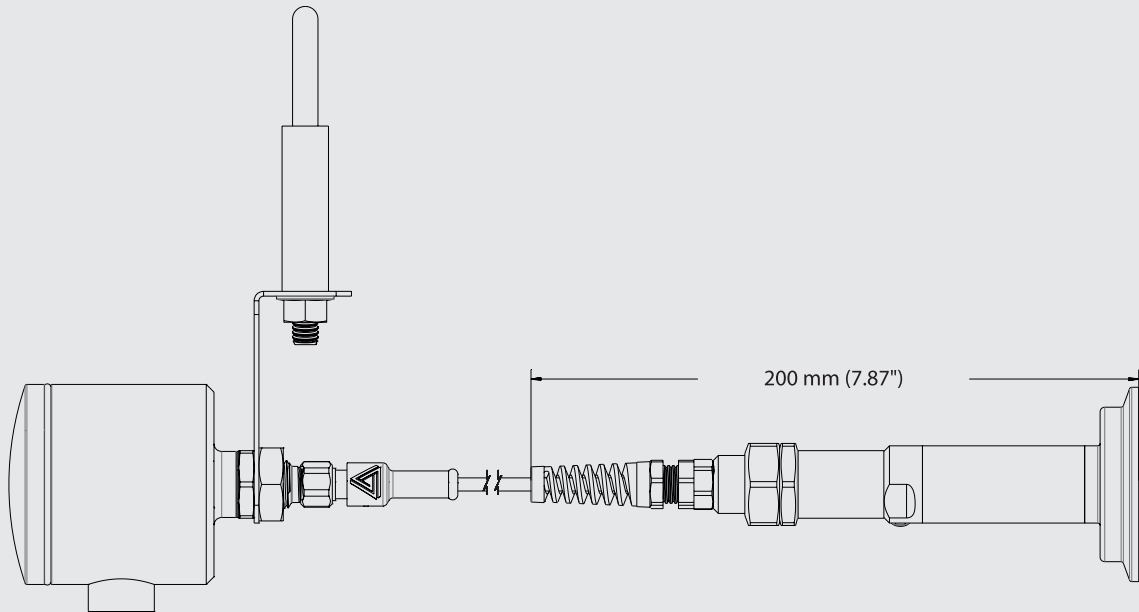
Dimensional drawing: horizontal orientation with CPM



Dimensional drawing: vertical orientation with CPM



Dimensional drawing for remote version



Conditions for a measuring point according to 3-A Sanitary Standard 74-06



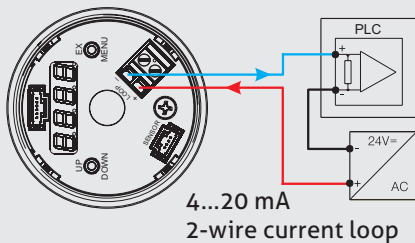
- The MPP sensors with Tri-Clamp fitting conforming to the 3-A Sanitary Standard.
- The sensors are designed for CIP-/ SIP-cleaning. Maximum 177 °C / 120 minutes.
- Only with 3-A conforming Tri-Clamp connection.
- Mounting position, self draining and the position of the leakage hole must be in accordance to current 3-A Sanitary Standard.

Intended use

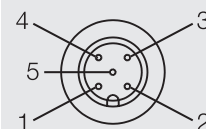


- Not suitable for applications in explosive areas.
- Not suitable for applications in safety-relevant equipment (SIL).

Electrical connection with cable gland



Electrical connection with M12 connector



M12 connector configuration

- 1: + supply +24 V DC
- 2: - output 4...20 mA
- 3: not connected
- 4: not connected
- 5: not connected



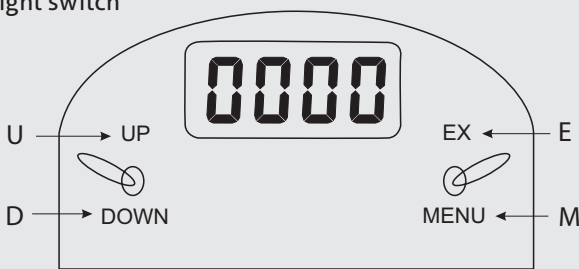
Modular sensor principle

The "MPP" pressure sensor has a modular design. It can be purchased in separate components and assembled as required by the customer. It is also available as a fully assembled sensor. In both cases, the user can check or change the following settings.

The components and sensors are delivered according to the specifications (ranges and units) stated on the type label. These values can be checked and changed by the user in the following menu. This is accomplished using two operating buttons (with a total of 4 actuation possibilities) and a 4-digit segment display.

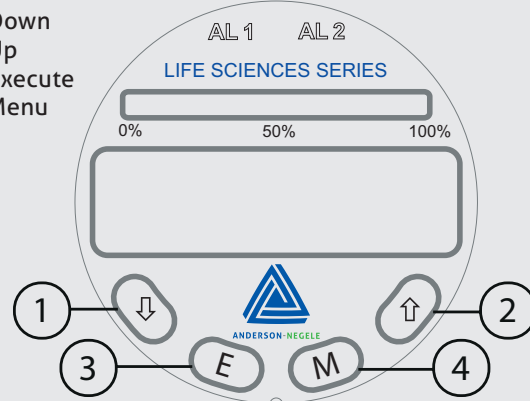
Configuration without display interface

- "U" (up) and "D" (down) are toggle pressed on the left switch
- "E" (execute) and "M" (menu) are toggle pressed on the right switch



Configuration with display interface

- 1: Down
- 2: Up
- 3: Execute
- 4: Menu



Modes

RUN mode	Zero
SENSOR CONFIG mode	4-20mA / Process Variable PSIG / BAR 4-20mA / 20-4mA LRV URV Damping Factory Restore
CALIBRATION mode	2 Point Cal 4 Point Cal

Modes

RUN mode	Zero Adjust Display Decimal Momentarily Display mA Output Descriptive Error Message
SENSOR CONFIG mode	PSIG/BAR (native units) 4-20mA / 20-4mA LRV URV Damping Alarm1 Alarm2 Display Units Unit Description Scroll Factory Restore
CALIBRATION mode	2 Point Cal 4 Point Cal

Note

The exact adjustment procedure will be described in the MPP instruction manual.



Cleaning/Maintenance

- If using pressure washers, do not point nozzle directly at electrical connections!

Reshipment

- Sensors shall be clean and must not be contaminated with dangerous media! Note the cleaning instructions!
- To avoid damage to the equipment, use suitable transport packaging only!

Advice to conformity

- Applicable guidelines:
Electromagnetic compatibility 2004/108/EC
- The accordance with applicable EC-guidelines is confirmed with CE-labeling of the device.
- You have to guarantee the compliance of all guidelines applicable for the entire equipment.

Transport/Storage

- No outdoor storage
- Dry and dust free
- Do not expose to corrosive media
- Protect against solar radiation
- Avoid mechanical shock and vibration
- Storage temperature -55...+90 °C
- Relative humidity max. 95 %

Standards and guidelines

- Comply with the applicable regulations and directives.

Disposal

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Pass the instrument directly on to a specialized recycling company and do not use the municipal collecting points.

Possible presettings of the measurement range

Order number PSI		Suitable for sensor type (see order number)		Order number BAR		Suitable for sensor type (see order number)	
		A (absolute)	C (relative)			A (absolute)	C (relative)
25	30Hg/0		x	AA	-1...1		x
28	30Hg/0/15		x	AB	-1...2.5		x
29	30Hg/0/30		x	AC	-1...3		x
31	30Hg/0/60		x	AD	-1...4		x
32	30Hg/0/100		x	AE	-1...7		x
34	30Hg/0/200		x	AF	0...2	x	x
66	0...30	x	x	AG	0...3	x	x
68	0...50	x	x	AH	0...4	x	x
69	0...60	x	x	AI	0...6	x	x
71	0...100	x	x	AJ	0...7	x	x
73	0...150	x	x	AK	0...10	x	x
74	0...160	x	x	AL	0...20	x	x
75	0...200	x	x	AM	0...35	x	x
81	0...500	x	x	AN	0...70		x
84	0...1000	x	x				

Order code of fully assembled sensor

MPP (Modular pressure sensor, pharma)

SA (Standard stem, pharma)

Maximum upper range value

- 1** (0...30 psi / 2 bar, type C - relative)
- 2** (0...100 psi / 7 bar, type C - relative)
- 3** (0...500 psi / 35 bar, type C - relative)
- 4** (0...1000 psi / 70 bar, type C - relative)
- A** (0...30 psi / 2 bar, type A - absolute)
- B** (0...100 psi / 7 bar, type A - absolute)
- C** (0...500 psi / 35 bar, type A - absolute)

Process connection

- | | |
|--|--|
| 2 (3/4" Tri-Clamp) | B (Varivent B; DN10...DN15) |
| 3 (1" Tri-Clamp) | F (Varivent F; DN25) |
| 4 (1.5" Tri-Clamp) | N (Varivent N; DN40) |
| 5 (2" Tri-Clamp) | C (CPM fitting) |
| A (Thread 1.5" NPT) | M (Mini CPM fitting) |
| D (Thread G1", standard) | E (Fermenter connection length 46 mm) |
| G (Thread G1", hygienic CLEANadapt) | H (Fermenter connection length 52 mm) |

Capillary fill

- 1** (Medical-grade white oil/FDA-approved)
- 5** (Neobee M20)

Wettable material

- A** (Stainless steel 316L)
- D** (Stainless steel 1.4435)
- B** (Hastelloy diaphragm)

Sensor type

- O** (Compact version)
- A** (Remote with 1.5 m (= 5') cable)
- B** (Remote with 3 m (= 10') cable)
- C** (Remote with 4.5 m (= 15') cable)
- D** (Remote with 6 m (= 20') cable)
- E** (Remote with 7.65 m (= 25') cable)

Enclosure

- EB** (Stainless steel enclosure with puck, display and plastic cap)
- EC** (Stainless steel enclosure with puck, display and stainless steel cap (without sight glass))

Output

- H** (4...20 mA Hart)
- F** (Foundation Fieldbus)

Ranges

- XX** (See measuring range table, page 7)
- 99** (Custom calibration)

Electrical connection

- A** (M12 connector/QDR)
- C** (Cable gland / cord grip M16x1.5)
- N** (Adaptor 1/2" NPTF)
- M** (7/8" Minifast)

Enclosure orientation

- 1** (Vertical)
- 2** (Horizontal)
- A** (Fixed character)



MPP SA 1 2 1 A O EB H XX A 1 A