



OPTIBAR PM 5060 C Technical Datasheet

Pressure transmitter for the measurement of process pressure and level with metallic measuring cell

- Fully universal up to 1000 bar
- Broad selection of process connections also for hygienic applications
- Modular converter platform for all applications

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1.1 OPTIBAR pressure transmitter

The OPTIBAR PM 5060 C features a fully welded metallic measuring diaphragm that comes in a variety of materials. Flush process connections allow for gap-free installation, particularly for hygienic applications. A piezoresistive sensor element with internal transmission fluid is used in measuring ranges up to 40 bar / 580 psi. Starting at a measuring range of 100 bar / 1450 psi, a thin-film sensor element is used. It can measure the process pressure up to a measuring range of 1000 bar / 14503 psi on the back of an Elgiloy[®] diaphragm without any additional filling liquid.

All process connections are approved up to a medium temperature of 105°C / 221°F and special versions allow for process temperatures up to 200°C / 392°F.

The OPTIBAR PM 5060 C is also used with diaphragm seals.

Highlights

- Measuring range up to 1000 bar
- Fully welded metallic process diaphragm
- Flush mounted, hygienic process connections for the food industry
- Process temperatures up to 200°C / 392°F
- Extremely quick step response times < 85 ms
- Universal modularity of the entire OPTIBAR process series
- Quick start-up for all applications
- Extensive diagnostic and parameterization functions on the display and adjustment module or the user-friendly and free DTM

Industries

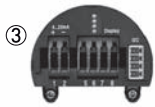
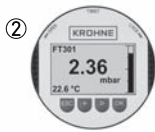
- General process technology
- Power generation
- Chemical
- Petrochemical
- Environmental technology
- Water and wastewater
- Food
- Pharmaceutical industry

Applications

- Level monitoring in the food production
- Monitoring of supply pressure in pipelines
- Dry-run protection of delivery pumps
- Pressure monitoring of compressors

1.2 Options

The OPTIBAR process pressure series allows free choice of pressure sensors, process connections, electronics and housings - so that each device is perfectly adapted to each measuring task.



① The optional display and adjustment module make it possible to start-up the converter entirely on site. With double chamber housings it can be installed on the side or on the top.

② The converter can be configured using the optional display and adjustment module as well as by way of PACTware™ via HART® or the optionally available USB module. Regardless of the selected option, user guidance and navigation are absolutely identical.

③ There are a variety of converters available and they can be used regardless of the housing or sensor selected. In addition to the standard configuration with 2-wire 4...20 mA and superimposed HART® (version 7) signal, Foundation Fieldbus and Profibus PA can be selected depending on the application.

④ Note that not all approvals are available with all housings.

⑤ The OPTIBAR process pressure series comprises relative and absolute pressure sensors with metallic and ceramic measuring cells as well as a differential pressure measuring cell with metallic diaphragm for any application in industrial process measuring technology.

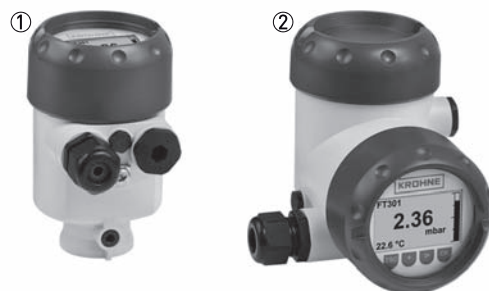


Figure 1-1: Plastic housing

- ① Single chamber
- ② Double chamber

The plastic housing is cost-effective and features a low net weight. Converters can only be used in hazardous areas in intrinsically safe operation.

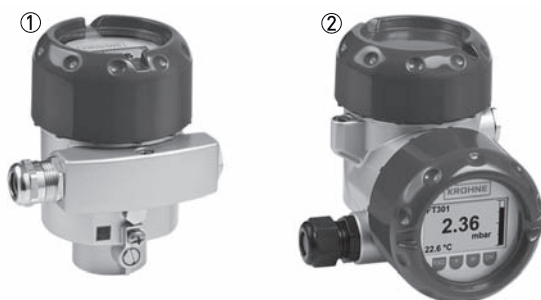


Figure 1-2: Aluminium housing

- ① Single chamber
- ② Double chamber

The standard housing for all pressure transmitters – it is perfectly equipped for industrial use and can be used in hazardous areas for all protection types.

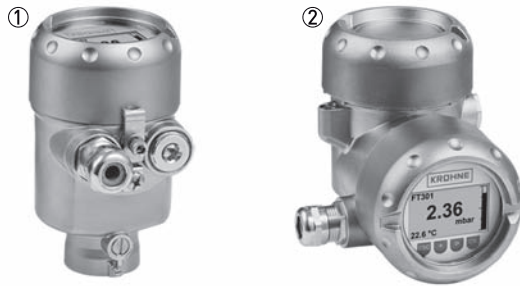


Figure 1-3: Stainless steel housing (precision casting)

- ① Single chamber
- ② Double chamber

For applications that place particular demands on the mechanical robustness of the converter. These housings can be used with all protection types for hazardous areas.



Figure 1-4: Stainless steel housing (electro-polished)

- ① Single chamber

Recommended for applications requiring the corrosion resistance of stainless steel but not the mechanical robustness of a stainless steel precision casting housing. Also suitable for hygienic applications that require an IP69K protection class for steam jet cleanings. Converters can only be used in hazardous areas in intrinsically safe operation.

1.3 Measuring principle

1.3.1 Piezoresistive or strain gauge measuring cell

The process pressure acts on the sensor element via the process diaphragm and an internal transfer fluid. The process pressure causes a resistance change, which is converted into an appropriate output signal and outputted as a measured value.

For measuring ranges up to and including 40 bar a piezoresistive sensor element is used. For pressure ranges from 40 bar a strain gauge sensor element is used.

Relative pressure: The measuring cell is open to the atmosphere. The ambient pressure is referenced in the measuring cell and compensated and thus has no influence on the measurement.

Absolute pressure: The measuring cell is evacuated and enclosed. The process pressure is measured in reference to vacuum. Any change in the ambient pressure changes the measured value.

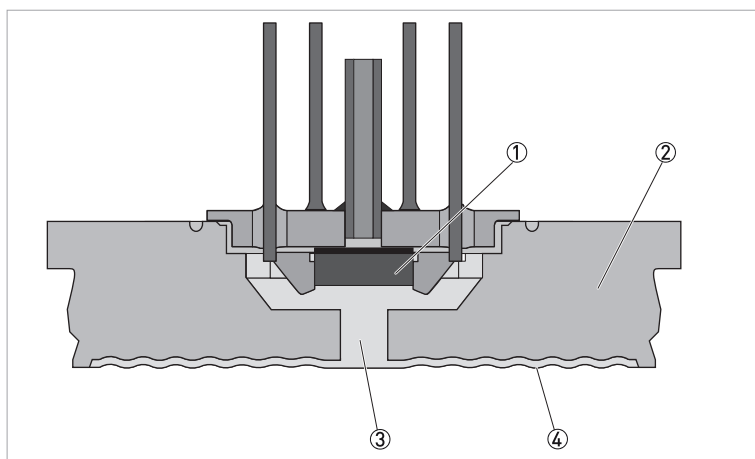


Figure 1-5: Setup of a piezoresistive measuring cell

- ① Sensor Element
- ② Base body
- ③ Transfer fluid
- ④ Process diaphragm

1.3.2 Metallic - ceramic measuring cell

For small measuring ranges or higher temperature ranges, the measurement unit is the ceramic capacitive measuring cell. This consists of a special temperature compensating isolating diaphragm system.

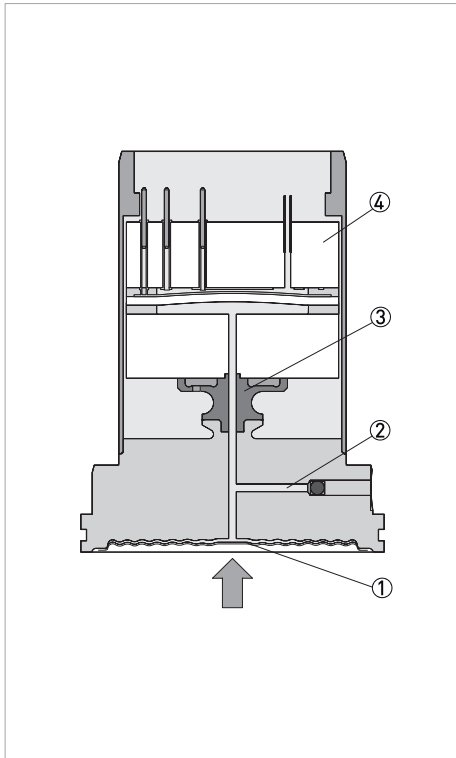


Figure 1-6: Setup of metallic-ceramic measuring cell

- ① Process diaphragm
- ② Isolating liquid
- ③ FeNi adapter
- ④ Metallic - ceramic measuring cell

2.1 Technical data

- *The following data is provided for general applications. If you require data that is more relevant to your specific application, please contact us or your local sales office.*
- *Additional information (certificates, special tools, software,...) and complete product documentation can be downloaded free of charge from the website (Downloadcenter).*

Measuring system

Measuring principle	<ul style="list-style-type: none"> • Piezoresistive measuring cell (up to and including 40 bar) • Strain gauge measuring cell (from 40 bar) • Metallic - ceramic measuring cell
Application range	<ul style="list-style-type: none"> • Process pressure measurement • Level measurement of liquids
Measuring range	100 mbar...1000 bar / 1.45...14500 psi
Display and User interface	
Display on signal converter	<ul style="list-style-type: none"> • Dot-matrix display 45x27 mm / 1.77x1.06", illuminated • Display turnable in 90° steps • Digit size 13x7 mm / 0.51x0.27" • Ambient temperatures below -20°C / -4°F may affect the readability of the display
Display function	<ul style="list-style-type: none"> • Display of measured value or derived measured value such as filling height • Warning and diagnostic information • All parameters are accessible via the operating menu
Operating and display languages	German, English, French, Spanish, Portuguese, Italian, Dutch, Russian, Turkish, Polish and Czech
Operation	Local operation via 4 push buttons on the display and adjustment module
Remote control	<ul style="list-style-type: none"> • PACTware™, incl. Device Type Manager (DTM) • HART® Hand Held Communicator from Emerson Process • AMS® from Emerson Process • PDM® from Siemens
Integrated clock	
Date format	Day / Month / Year
Time format	12 hours / 24 hours
Time zone	CET (Factory setting)
Rate deviation	Maximum 10.5 minutes / year

Measuring accuracy

Process pressure				
Reference conditions acc. to DIN 61298-1	<ul style="list-style-type: none"> Ambient temperature (constant): +18...+30°C / +64...+86°F Relative humidity (constant): 45...75% Ambient pressure (constant): 860...1060 mbar / 12.5...15.4 psi Measuring accuracy according to IEC 61298-2 (terminal based) Curve characteristic: linear Vertical mounting position, measuring diaphragm pointing down Effect of mounting position (piezoresistive or strain gauge measuring cell): dependent on process connection and diaphragm seals Effect of mounting position (metallic - ceramic measuring cell): < 5 mbar / 0.5 kPa / 0.07 psig Deviation at current output due to strong, high-frequency electromagnetic fields within the scope of EN 61326 (<± 150 µA) 			
Reference accuracy acc. to DIN EN 60770	Applies to the digital interfaces (HART®, Profibus PA, Foundation Fieldbus) as well as for the analogue 4...20 mA current output and refers to the set measuring span. Turn down (TD) is the relation of nominal range/set measuring span. [% of the set span]			
	Accuracy class	0.075%	0.10%	0.20%
	TD of 1:1 to 5:1	< ±0.075%	< ±0.10%	< ±0.20%
	TD > 5:1	< ±0.015% x TD	< ±0.02% x TD	< ±0.04% x TD
Effect of ambient or medium temperature	Ambient temperature effect on zero and span in relation to the set measuring span. Applies to the digital interfaces (HART®, Profibus PA, Foundation Fieldbus) as well as for the analogue 4...20 mA current output. [% of the set span]			
	Piezoresistive or strain gauge measuring cell			
	Turn Down	In the compensated temperature range 10...+70°C / +50...+158°F	Outside the compensated temperature range	
	TD 1:1	< ±0.05% per 10K	typ. < ±0.05% per 10K	
	TD to 5:1	< ±0.10% per 10K	-	
	TD to 10:1	< ±0.15% per 10K	-	
	Metallic - ceramic measuring cell			
	Ambient or medium temperature	Accuracy class 0.10%	Accuracy class 0.20%	
	-40...0°C / -40...+32°F	< ±0.375 + 0.375 x TD	< ±0.65 + 0.65 x TD	
	0...100°C / +32...+212°F	< ±0.075 + 0.075 x TD	< ±0.20 + 0.20 x TD	
	100...120°C / +212...+248°F	< ±0.125 + 0.125 x TD	< ±0.25 + 0.25 x TD	
Effect of mounting position	A position-dependent zero offset can be corrected.			
	≤0.1 mbar per 10° inclination			
Long-term stability acc. to DIN 16086 and IEC 60770-1	Applies to the digital interfaces (HART®, Profibus PA, Foundation Fieldbus) as well as for the analogue 4...20 mA current output. [% of URL]			
	Time period	Piezoresistive or strain gauge measuring cell	Metallic - ceramic measuring cell	
	1 year	<0.1% x TD	<0.05% x TD	
	5 years		<0.1% x TD	
	10 years		<0.2% x TD	
Dynamic output behaviour	These parameters depend on the fill fluid, temperature and, if applicable, the diaphragm seal.			

Damping	63% of the input variable 0...999 seconds, adjustable in 0.1 second steps.
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Operating conditions

Temperature		
Version	Ambient temperature	Storage and transport temperature
Standard version	-40...+80°C / -40...+176°F	-60...+80°C / -76...+176°F
IP66 / IP68 version (1 bar / 14.5 psi)	-20...+80°C / -4...+176°F	-20...+80°C / -4...+176°F
IP68 version (25 bar / 362 psi), connection cable PUR	-20...+80°C / -4...+176°F	-20...+80°C / -4...+176°F
IP68 version (25 bar / 362 psi), connection cable PE	-20...+60°C / -4...+14°F	-20...+60°C / -4...+140°F
Temperature derating metallic - ceramic measuring cell		
Version	Medium temperature	Maximum ambient temperature
+150°C / +302°F	+110°C / +230°F	+80°C / +176°F
	+150°C / +302°F	+60°C / +140°F
+180°C / +356°F	+150°C / +302°F	+80°C / +176°F
	+180°C / +356°F	+65°C / +149°F
+200°C / +392°F	+160°C / +320°F	+80°C / +176°F
	+200°C / +392°F	+65°C / +149°F

Further operating conditions

Ingress protection acc. to IEC 529 / EN 60529			
Plastic (PBT)	Single chamber	IP66 / IP67	NEMA 6P
	Double chamber	IP66 / IP67	NEMA 6P
Aluminium	Single chamber	IP66 / IP67	NEMA 6P
		IP68 (1 bar / 14.5 psi)	-
Double chamber		IP66 / IP67	NEMA 6P
Stainless steel (electro-polished)	Single chamber	IP69K	-
	Single chamber	IP66 / IP67	NEMA 6P
Stainless steel (precision casting)	Single chamber	IP66 / IP67	NEMA 6P
		IP68 (1 bar / 14.5 psi)	-
	Double chamber	IP66 / IP67	NEMA 6P
Stainless steel	Sensor for external housing	IP68 (25 bar / 362.6 psi)	-
Vibration			
Reference conditions	Single chamber housing, aluminium		
Vibration resistance acc. to EN 60068-2-6	4 g at 5...200 Hz		
Shock resistant according to EN 60068-2-27	100 g, 6 ms (mechanical shock)		

Materials

Gaskets			
Sealing	Standard version	Version with extended temperature range	Version for oxygen application
Without sealing (for process connection acc. to EN 837)	-40...+105°C / -40...+221°F	-	-40...+60°C / -40...+140°F
FKM (VP2/A)	-20...+105°C / -4...+221°F	-20...+150°C / -4...+302°F	-20...+60°C / -4...+140°F
EPDM (A+P 75, 5/KW75F)	-30...+105°C / -22...+221°F	-30...+150°C / -22...+302°F	-30...+60°C / -22...+140°F
FFKM (Perlast® G75S)	-15...+105°C / +5...+221°F	-15...+150°C / +5...+302°F	-15...+60°C / +5...+140°F
FEPM (Fluoraz® SD 890)	-5...+105°C / +23...+221°F	-	-5...+60°C / +23...+140°F
Wetted parts (piezoresistive or strain gauge measuring cell)			
Process connection	316 L / 1.4404		
Diaphragm	316 L / 1.4404		
Diaphragm for measuring range from 100 bar, non-flush version	Elgiloy® 2.4711		
Gasket process connection G1/2 (EN 837)	Thread G1/2 (EN 837)	Aramid fibres, bound with NBR	
	Thread G1 1/2 (DIN 3852-A)	Aramid fibres, bound with NBR	
	M44 x 1.25 (DIN 13), M30 x 1.5	FKM, FFKM and EPDM	
	FKM (VP2/A, A+P 70.16), EPDM (A+P 75.5/KW75F), FFKM (Perlast® G75S), FEPM (Fluoraz® SD890)		
Wetted parts (metal/ceramic measuring cell)			
Process connection	316 L / 1.4404		
Diaphragm	Alloy C-276, optional: gold coated 20 µ, gold/rhodium coated 5 µ/1 µ		
Gasket process connection G1 1/2 (DIN 3852-A)	Klingersil C-4400		
M44 x 1.25 (DIN 13)	FKM, FFKM, EPDM		

Materials for food applications	
Surface quality	
Aseptic connections	$R_a < 0.8 \mu\text{m}$
Non-wetted parts	
Electronics housing	Plastic PBT (Polyester), powder coated die-cast aluminium, 316 L / 1.4404
External housing	Plastic PBT (polyester) and 316 L / 1.4404
Base, wall mount external housing	Plastic PBT (polyester) and 316 L / 1.4404
Gasket between base and wall mount	EPDM (permanently attached)
Housing cover sealing ring	Silicone (aluminium or plastic housing), NBR (stainless steel housing)
Inspection window in housing cover (display, adjustment module)	Polycarbonate (UL746-C listed)
Ground terminal	316 Ti, 316 L / 1.4404
Connection cable, master and slave sensor	PE and PUR
Nameplate carrier on connecting cable	PE hard
Connection cable for IP68 (1 bar) version	PE

Process connection

Thread	from G1/2 and 1/2-14 NPT (female)
Flanges	from DN 25 (DIN) / 1" (ASME)
Flanges with extension	from DN 25 (DIN) / 1" (ASME)
Internal transfer fluid (piezoresistive or strain gauge measuring cell)	Pressure port with inner diaphragm <ul style="list-style-type: none"> • Silicone oil $\leq 40 \text{ bar} / 580 \text{ psi}$ • Halocarbon oil for oxygen applications $\leq 40 \text{ bar} / 580 \text{ psi}$ • Dry measuring cell (without fill fluid) for pressure ranges $\geq 60 \text{ bar} / 870 \text{ psi}$
	Pressure ports with flush diaphragm <ul style="list-style-type: none"> • Synthetic oil (Neobee) up to 250 bar (FDA-listed for the food industry) • Silicone oil for G1/2" and G1" process connections (LU, P6, C5)
Other connections	ISO 2852 / DIN 32676, DIN 11851, Neumo BioConnect / BioControl, Varivent, DRD, SMS and PMC

Tightening torques

Maximum tightening torques for NPT cable gland and conduit pipe	
Plastic housing	10 Nm / 7.4 ft lb
Aluminium housing	50 Nm / 37 ft lb
Stainless steel housing	50 Nm / 37 ft lb

Electrical connections

Mechanical - Standard	
Cable gland	M20 x 1.5 mm
cable diameter	5...9 mm / 0.20...0.35" 6...12 mm / 0.24...0.47" 10...14 mm / 0.39...0.55"
Cable entry	Blind plug: M20 x 1.5 mm, 1/2-14 NPT
	Closing cap: M20 x 1.5 mm, 1/2-14 NPT
	Connector option: M12 x 1, Harting HAN 7D,8D, 7/8" FF
Wire cross-section	Solid wire with cords: 0.2 mm...2.5 mm ² / AWG 24...14
	Cord with wire end sleeve: 0.2 mm...1.5 mm ² / AWG 4...16
Mechanical - IP66 / IP68 (1 bar)	
Connection cable	
Construction	Four wires, one pressure compensation capillary, one suspension cable, screen braiding, metal foil and cable jacket
Wire cross-section	0.5 mm ² / AWG 20
Wire resistance	< 0.036 Ω/m
Tensile strength	< 1200 N / 270 lbf
Standard length	5 m / 16.40 ft
Max. length	25 m / 82.02 ft
Min. bending radius	25 mm / 0.98" at 25°C / 77°F
Diameter	ca. 8 mm / 0.31"
Colour	Non-Ex version: black
	Ex version: blue (optional)
Mechanical - IP68 (25 bar)	
Connecting cable between IP68 device and external housing	
Construction	Four wires, one pressure compensation capillary, one suspension cable, screen braiding, metal foil and cable jacket
Wire cross-section	0.5 mm ² / AWG 20
Wire resistance	< 0.036 Ω/m / 0.011 Ω/ft
Standard length	5 m / 16.40 ft
Max. length	25 m / 82.02 ft
Min. bending radius	25 mm / 0.98" at 25°C / 77°F
Diameter	ca. 8 mm / 0.31"
Colour	Blue
Cable entry / Connector	
External housing	1 x cable gland M20 x 1.5 (cable Ø 5...9 mm), 1 x blind plug M20 x 1.5 or
	1 x connector (depending on version), 1 x blind plug M20 x 1.5
Spring load terminals for wire cross-section up to	2.5 mm ² / AWG 14

Electrical		
Supply voltage	Non-Ex device: 9.6...35 VDC	
	Ex ia device: 9.6...30 VDC	
	Ex d device: 9.6...35 VDC	
	Ex ia d device: 15...35 VDC	
Reverse polarity protection	Integrated	
Permissible residual ripple	Non-Ex devices	for U_n 12 VDC ($9.6 < U_B < 14$ VDC) $\leq 0.7 V_{eff}$ (16...400 Hz)
	Ex ia d devices and Ex ia devices	for U_n 24 VDC ($18 < U_B < 35$ VDC) $\leq 1.0 V_{eff}$ (16...400 Hz)
	Load	$R_{L, max} = (U_B - 9.6) / 22$ mA
Potential connection in device	Electronics: not electrically isolated	
	Ground terminal: galvanically connected with process connection	
Over voltage category	III	
Protection class	II	

Inputs and outputs

Output signal	
Output signal	4...20 mA / HART® version 7.3 3.8...20.5 mA / HART® version 7.3 (factory setting acc. to NAMUR recommendation)
Signal resolution	0.3 μ A
Error signal of current output (adjustable)	High alarm ≥ 21 mA Low alarm ≤ 3.6 mA, last valid measurement
Max. output current	21.5 mA
Boot-up current	≤ 10 mA for 5 ms after switching on, then ≤ 3.6 mA
Damping (63% of input variable), adjustable	0...999 seconds, adjustable

Approvals and certificates

CE	The device fulfils the statutory requirements of the EC directives. The manufacturer certifies that these requirements have been met by applying the CE marking.
Electromagnetic compatibility (EMC)	EMC conformity for EN 61326-1 (05/2006)
NAMUR	NE 21 - Electromagnetic compatibility of equipment NE 43 - Signal level for the failure information of digital transmitters NE 53 - Compatibility of field devices and display/adjustment components
Classification according to Pressure Equipment Directive (PED 97/23/EC)	For gases of fluid group 1 and liquids of fluid group 1, the requirements are fulfilled according to article 3, paragraph 3 (sound engineering practice).

2.2 Dimensions and weights

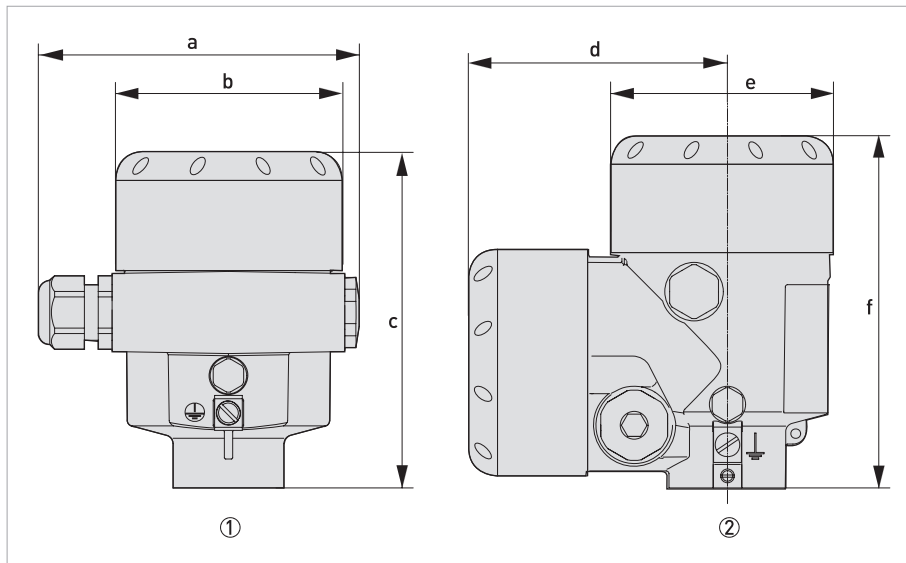


Figure 2-1: Aluminium housing

- ① Single chamber
- ② Double chamber

	Dimension [mm]	Dimension [inch]
a	116	4.57
b	86	3.39
c	116	4.57
d	87	3.43
e	86	3.39
f	120	4.72

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

Housing version	Weight [kg]	Weight [lb]
Single chamber, aluminium	0.83	1.84
Double chamber, aluminium	1.24	2.73

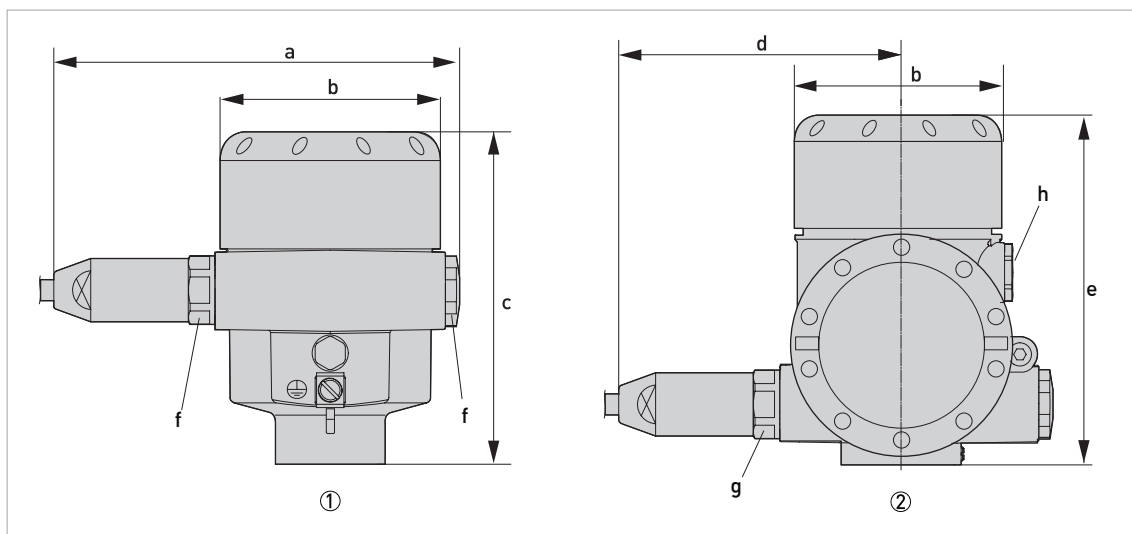


Figure 2-2: Aluminium housing in IP66 / IP68 version (1 bar)

- ① Single chamber
- ② Double chamber

	Dimension [mm]	Dimension [inch]
a	150	5.91
b	86	3.39
c	116	4.57
d	105	4.13
e	120	4.72
f		M20 x 1.5
g		M20 x 1,5 / 1/2-14 NPT
h		M16 x 1.5

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

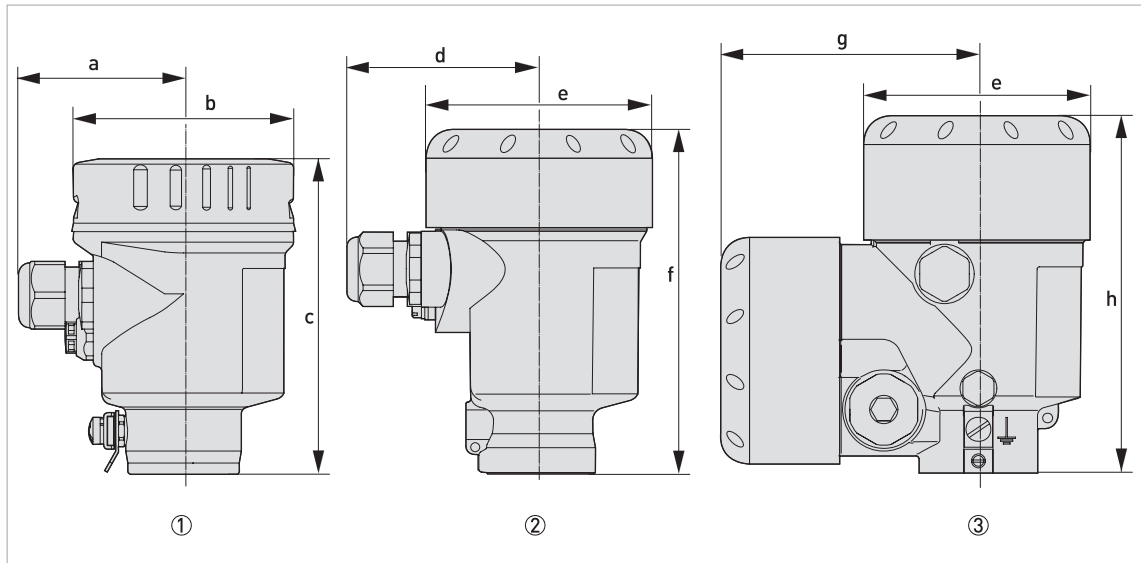


Figure 2-3: Stainless steel housing

- ① Single chamber, stainless steel (electro-polished)
- ② Single chamber, precision casting
- ③ Double chamber, precision casting

	Dimension [mm]	Dimension [inch]
a	59	2.32
b	80	3.15
c	112	4.41
d	69	2.72
e	79	3.11
f	117	4.61
g	87	3.42
h	120	4.72

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

Housing version	Weight [kg]	Weight [lb]
Single chamber, stainless steel (electro-polished)	0.73	1.61
Single chamber, precision casting	1.31	2.89
Double chamber, precision casting	2.86	6.31

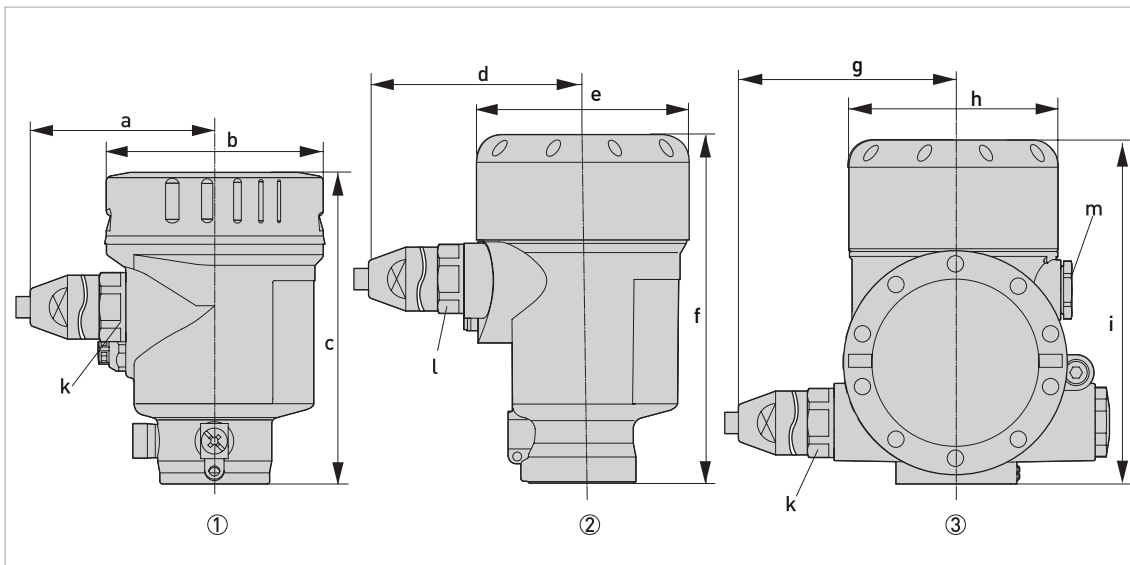


Figure 2-4: Stainless steel housing in IP66 / IP68 version (1 bar)

- ① Single chamber, stainless steel (electro-polished)
- ② Single chamber, precision casting
- ③ Double chamber, precision casting

	Dimension [mm]	Dimension [inch]
a	93	3.66
b	80	3.15
c	112	4.41
d	103	4.06
e	79	3.11
f	117	4.61
g	105	4.13
h	86	3.39
i	120	4.72
k	M20 x 1,5 / 1/2-14 NPT	
l	M20 x 1.5	
m	M16 x 1.5	

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

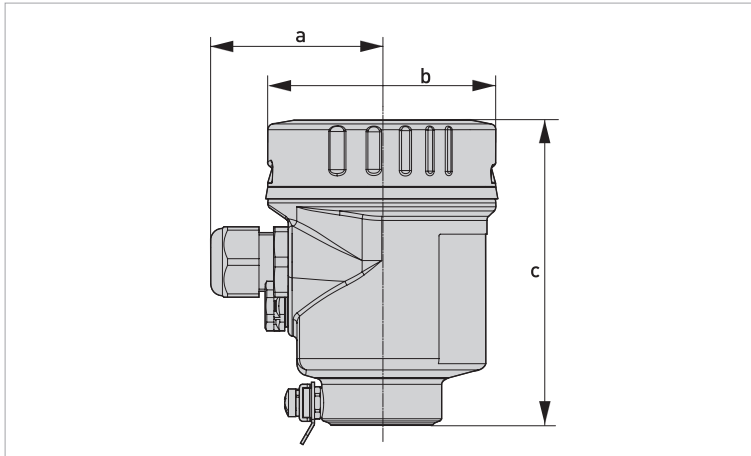


Figure 2-5: Stainless steel (electro-polished) in IP69K version

	Dimension [mm]	Dimension [inch]
a	59	2.32
b	80	3.15
c	104	4.10

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

Housing version	Weight [kg]	Weight [lb]
Single chamber, stainless steel (electro-polished)	0.73	1.61

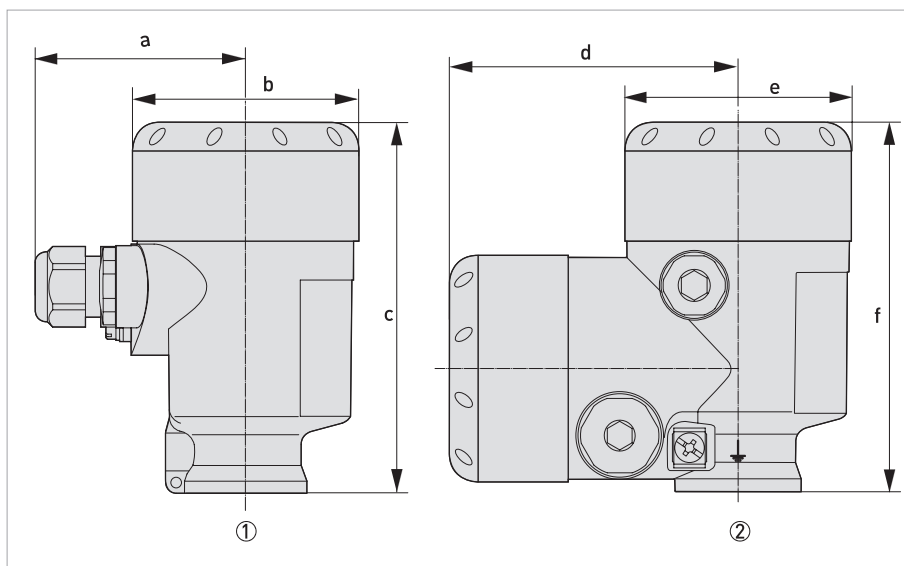


Figure 2-6: Plastic housing

- ① Single chamber
- ② Double chamber

	Dimension [mm]	Dimension [inch]
a	69	2.72
b	79	3.11
c	112	4.41
d	84	3.31
e	79	3.11
f	112	4.41

With integrated display and adjustment module the height of the housing increases by 9 mm / 0.35 inch.

Housing version	Weight [kg]	Weight [lb]
Single chamber, plastic	0.40	0.88
Double chamber, plastic	0.51	1.13

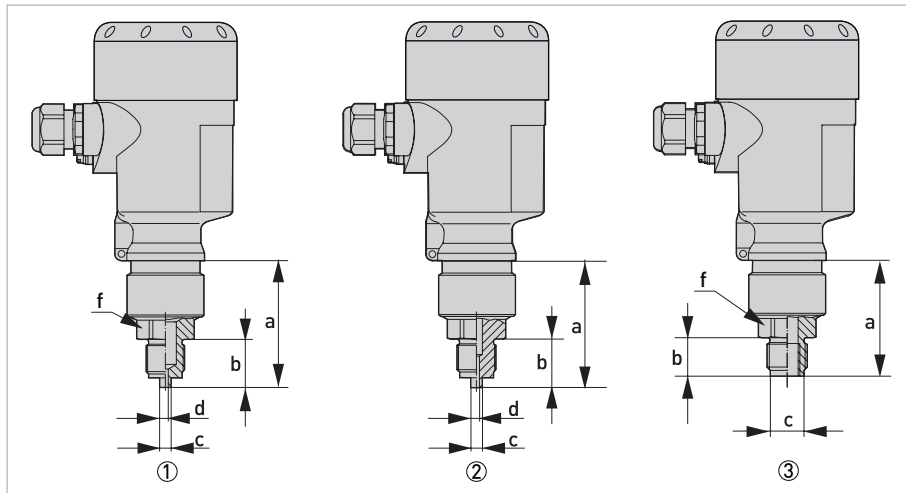


Figure 2-7: Thread non flush

- ① Thread ISO 228 G1/2 EN 837
- ② Thread DIN 13 M20 x 1.5 EN 837
- ③ Thread ISO 228 G1/2 - G1/4 female DIN 3852

Dimension [mm]	a	b	c	d	e	f	g
①	73	23	6	3	-	G1/2	-
②	75	25	6	3	-	M20 x 1.5	-
③	70	20	17.5	-	-	G1/2	-

Dimension [inch]	a	b	c	d	e	f	g
①	2.87	0.90	0.24	0.12	-	G1/2	-
②	2.95	0.98	0.24	0.12	-	M20 x 1.5	-
③	2.76	0.79	0.69	-	-	G1/2	-

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

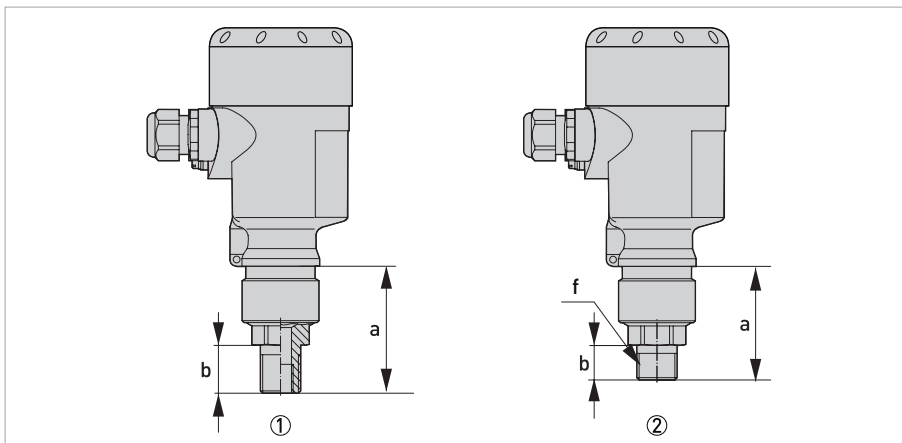


Figure 2-8: Thread non flush

- ① Thread ANSI 1/2-14 NPT - 1/4-18 NPT female thread ASME B1.20.1
- ② Thread ANSI 1/2-14 NPT, PN 1000

Dimension [mm]	a	b	c	d	e	f
①	65	25	-	-	-	-
②	65	19	-	-	-	1/2-14 NPT

Dimension [inch]	a	b	c	d	e	f
①	2.56	0.98	-	-	-	-
②	2.56	0.75	-	-	-	1/2-14 NPT

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

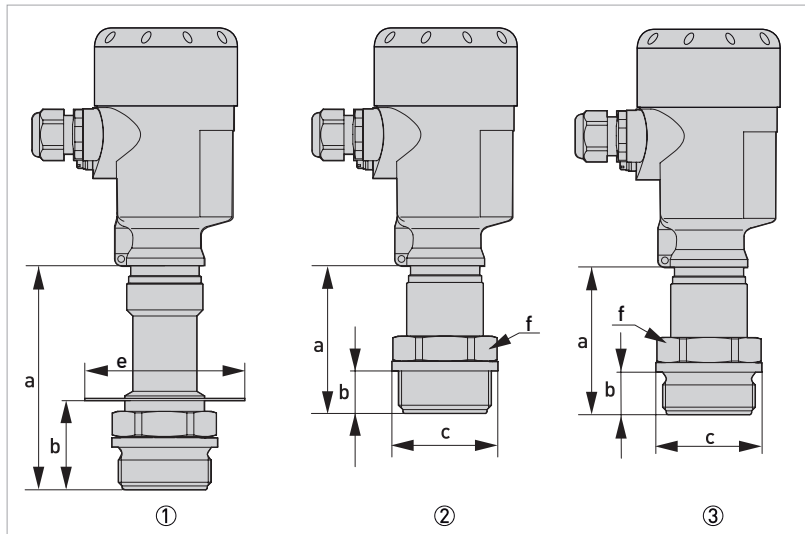


Figure 2-9: Thread flush (metallic - ceramic measuring cell)

- ① Thread ISO 228 G1/2 with temperature adapter for 180°C / 356°F and shielding plate for 200°C / 392°F, DIN 3852-A
- ② Thread ANSI 1 1/2-11.5 NPT
- ③ Thread ISO 228 G1/2, DIN 3852-A

Dimension [mm]	a	b	c	d	e	f
①	118	46	-	-	84	-
②	78	22	55	-	-	WS 46
③	78	22	55	-	-	WS 46

Dimension [inch]	a	b	c	d	e	f
①	4.65	1.81	-	-	3.31	-
②	3.07	0.87	2.17	-	-	1.81
③	1.73	0.87	2.17	-	-	1.81

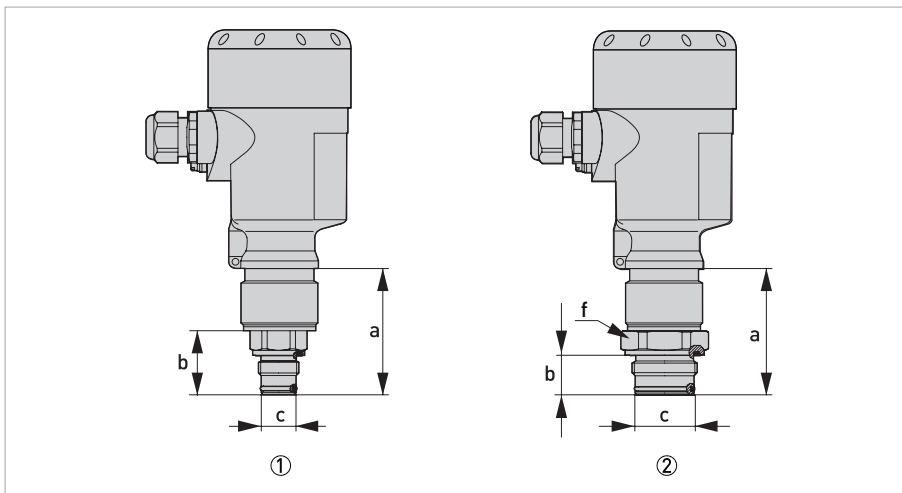


Figure 2-10: Thread flush

- ① Thread ISO 228 G1/2 with radial O-ring
- ② Thread ISO 228 G1 with radial O-ring

Dimension [mm]	a	b	c	d	e	f
①	65	20.5	18	-	-	-
②	65	20.5	30	-	-	WS 41

Dimension [inch]	a	b	c	d	e	f
①	2.56	0.81	0.71	-	-	-
②	2.56	0.81	1.18	-	-	1.61

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

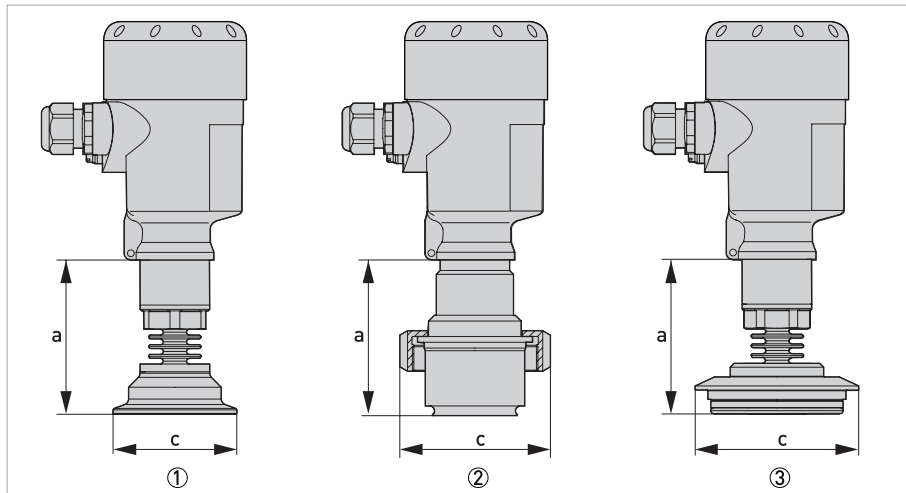


Figure 2-11: Hygienic connection 150°C / 302°F

- ① Clamp DN50 2" PN16, DIN 32676 / ISO 2852
- ② Hygienic connection with grooved union nut F40 PN25
- ③ Varivent N50-40 PN25, 316 L

Dimension [mm]	a	b	c	d	e	f
①	80	-	64	-	-	-
②	82	-	78	-	-	-
③	80	-	84	-	-	-

Dimension [inch]	a	b	c	d	e	f
①	3.15	-	2.52	-	-	-
②	3.23	-	3.07	-	-	-
③	3.15	-	3.31	-	-	-

For the version with a temperature range up to 150°C / 302°F the measure of length increases by 28 mm / 1.1".

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

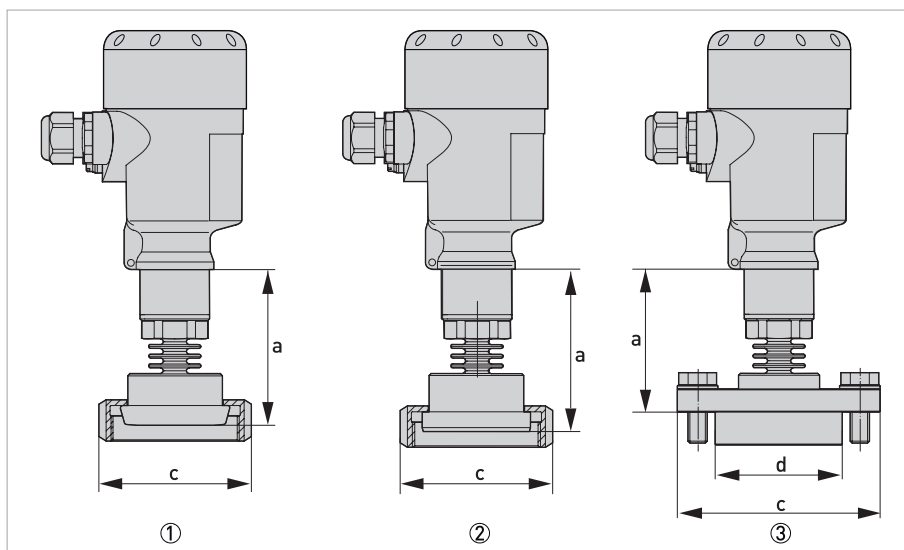


Figure 2-12: Hygienic connection 150°C / 302°F

- ① Compression fitting DIN 11851, DN40 PN40, 316 L
- ② Compression fitting DIN 11864-1 Form A, DN50 PN 40
- ③ Flange DRD PN40

Dimension [mm]	a	b	c	d	e	f
①	79	-	74	-	-	-
②	82	-	78	-	-	-
③	80	-	105	65	-	-

Dimension [inch]	a	b	c	d	e	f
①	3.11	-	2.91	-	-	-
②	3.23	-	3.07	-	-	-
③	3.15	-	4.13	2.56	-	-

For the version with a temperature range up to 150°C / 302°F the measure of length increases by 28 mm / 1.1".

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

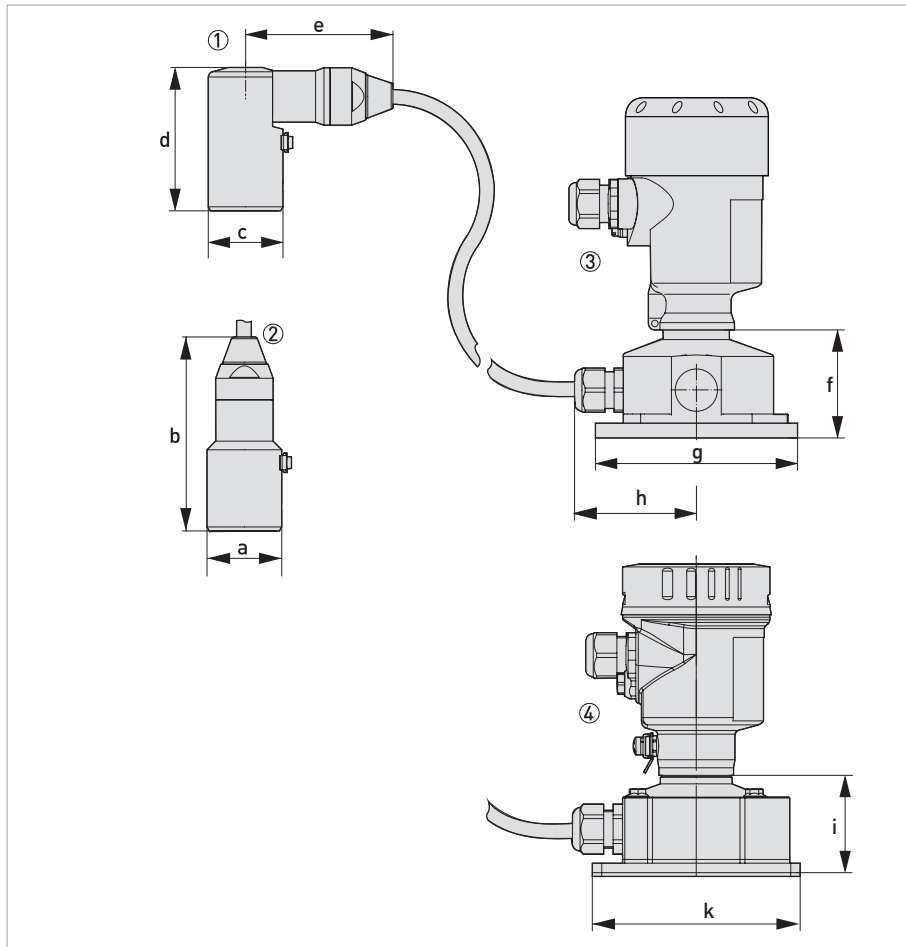


Figure 2-13: External housing

- ① Cable outlet, lateral
- ② Cable outlet, axial
- ③ Housing base in plastic
- ④ Housing base in stainless steel

	Dimension [mm]	Dimension [inch]
a	41.6	1.64
b	108	4.25
c	41.6	1.64
d	80	3.15
e	82	3.23
f	59	2.32
g	110 x 90	4.33 x 3.54
h	66	2.60
i	51	2.01
k	110 x 90	4.33 x 3.54

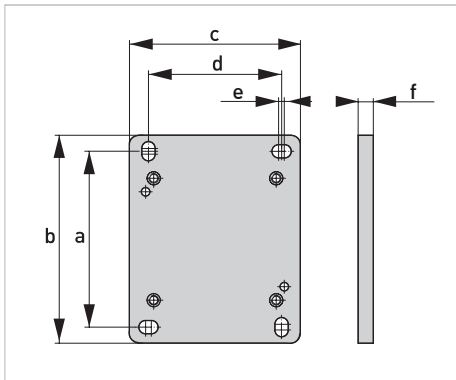


Figure 2-14: Mounting plate

	Dimension [mm]	Dimension [inch]
a	93	3.66
b	110	4.33
c	90	3.54
d	70	2.76
e	3	0.12
f	8	0.31

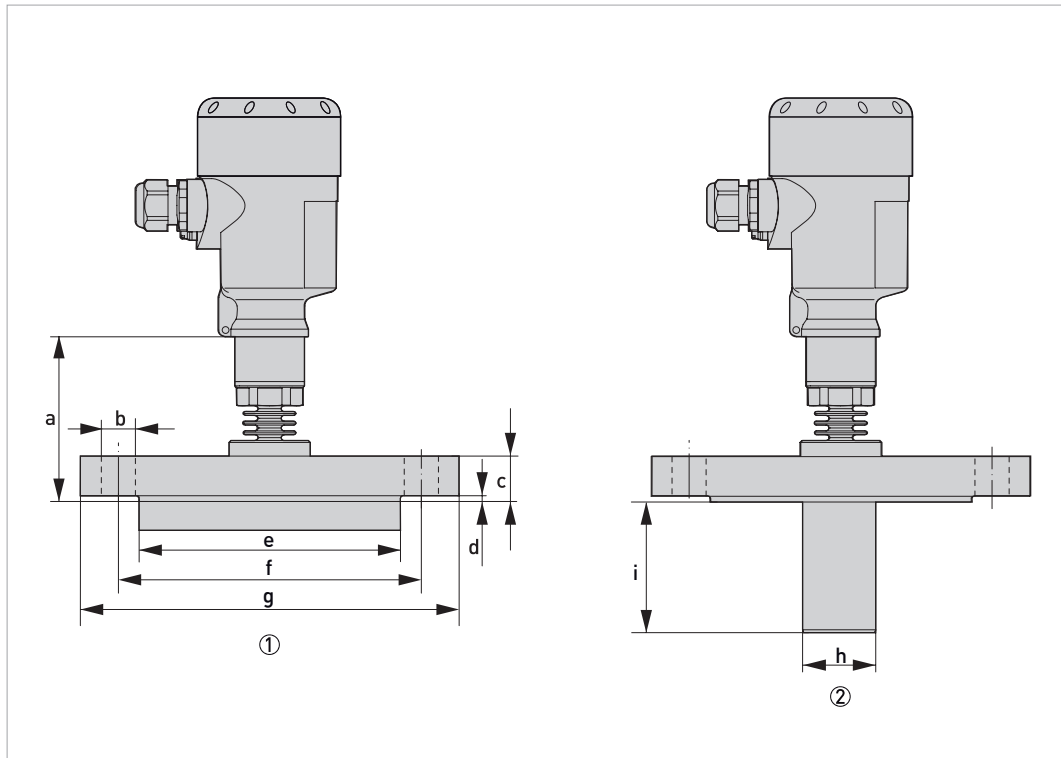


Figure 2-15: Dimensions - Flange

- ① Flange connection acc. to DIN 2501
 ② Flange connection acc. to ASME B16.5

Flange connection acc. to DIN 2501 or ASME B16.5

Dimension [mm]	a	b	c	d	e	f	g	h	i
DN40 PN40 Form C	80	4 x Ø 18	18	3	88	110	150	-	-
DN50 PN40 Form C	80	4 x Ø 18	20	3	102	125	165	-	-
DN50 PN40 Form C with extension	80	4 x Ø 18	20	3	102	125	165	38	10...200
DN80 PN40 Form C	80	8 x Ø 18	24	3	138	180	200	-	-
2" Class 150 lb RF	80	4 x Ø 19.1	19.1	3.2	91.9	120.7	152.4	-	-
3" Class 150 lb RF	80	8 x Ø 19.1	23.9	3.2	127	152.4	190.5	-	-

Dimension [inch]	a	b	c	d	e	f	g	h	i
DN40 PN40 Form C	3.15	4 x Ø 0.71	0.71	0.12	3.46	4.33	5.91	-	-
DN50 PN40 Form C	3.15	4 x Ø 0.71	0.79	0.12	4.02	4.92	6.50	-	-
DN50 PN40 Form C with extension	3.15	4 x Ø 0.71	0.79	0.12	4.02	4.92	6.50	1.5	0.39...7.87
DN80 PN40 Form C	3.15	8 x Ø 0.71	0.95	0.12	5.43	6.30	7.87	-	-
2" Class 150 lb RF	3.15	4 x Ø 0.75	0.75	0.13	3.62	4.75	6	-	-
3" Class 150 lb RF	3.15	8 x Ø 0.75	0.94	0.13	5	6	7.50	-	-

For the version with a temperature range up to 150°C / 302°F the measure of length increases by 28 mm / 1.1".

For the version with "secondary process barrier" the measure of length increases by 17 mm / 0.67".

Other versions are available on request.

2.3 Pressure ranges

2.3.1 Piezoresistive or strain gauge measuring cell

The process pressure acts on the sensor element via the process diaphragm and an internal transfer fluid. The process pressure causes a resistance change, which is converted into an appropriate output signal and outputted as a measured value.

For measuring ranges up to and including 40 bar a piezoresistive sensor element is used. For pressure ranges from 40 bar a strain gauge sensor element is used.

Relative pressure: The measuring cell is open to the atmosphere. The ambient pressure is referenced in the measuring cell and compensated and thus has no influence on the measurement.

Absolute pressure: The measuring cell is evacuated and enclosed. The process pressure is measured in reference to vacuum. Any change in the ambient pressure changes the measured value.

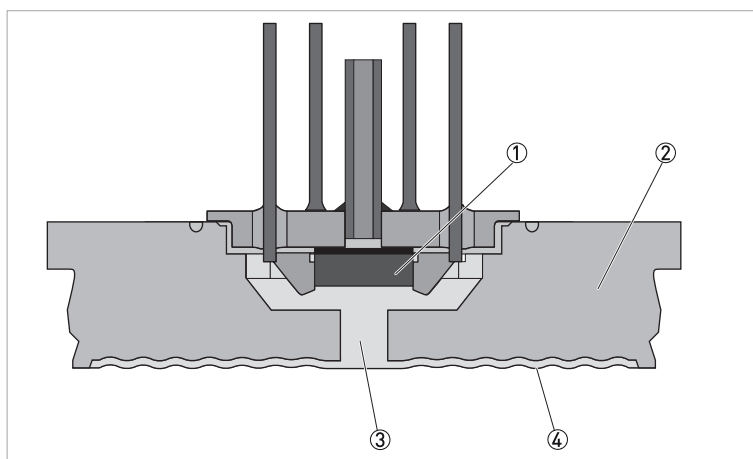


Figure 2-16: Setup of a piezoresistive measuring cell

- ① Sensor Element
- ② Base body
- ③ Transfer fluid
- ④ Process diaphragm

2.3.2 Metallic - ceramic measuring cell

For small measuring ranges or higher temperature ranges, the measurement unit is the ceramic capacitive measuring cell. This consists of a special temperature compensating isolating diaphragm system.

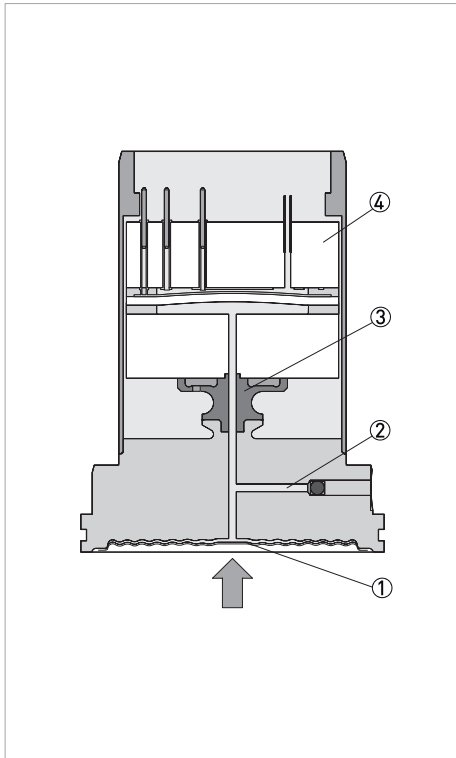


Figure 2-17: Setup of metallic-ceramic measuring cell

- ① Process diaphragm
- ② Isolating liquid
- ③ FeNi adapter
- ④ Metallic - ceramic measuring cell

3.1 Intended use

For devices used in hazardous areas, additional safety instructions apply.

Responsibility for the use of the measuring devices with regard to suitability, intended use and corrosion resistance of the used materials against the measured fluid lies solely with the operator.

The manufacturer is not liable for any damage resulting from improper use or use for other than the intended purpose.

The OPTIBAR PM 5060 C process pressure transmitter is suitable for measuring the process pressure and level of gases, vapours and liquids. The available measurement ranges and the respective permissible overloads are indicated on the nameplate. For details refer to *Technical data* on page 10. To observe the intended use, adhere to the following points:

- Observe the instructions in this document.
- Comply with the technical specifications (for further information refer to *Technical data* on page 10).
- Only suitably qualified personnel may install and operate the device.
- Observe the generally accepted standards of good practice.

3.2 Installation specifications

Observe the relevant directives, ordinances, standards and accident prevention regulations (e.g. VDE/VDI 3512, DIN 19210, VBG, Elex V, etc.).

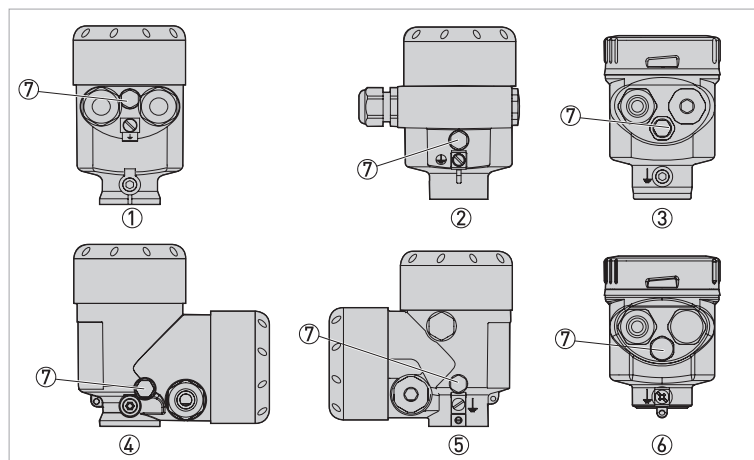
The accuracy of the measurement is only guaranteed if the transmitter and accompanying impulse line(s), if any, have been correctly installed. In addition, extreme ambient conditions including large fluctuations in temperature, vibrations and shocks should be kept as far away as possible from the measuring equipment.

3.3 Venting

The ventilation for the electronics housing is assured via a filter element in the vicinity of the cable glands, which is permeable to air but water-absorbent.

In order to ensure effective ventilation, the filter element must be always free of deposits.

Do not use a high-pressure cleaner to clean the housing. The filter element may become damaged and as a result moisture can penetrate into the housing. The exception to this is the IP69K single chamber housing.



- ① Single chamber housing, plastic, stainless steel precision casting
- ② Single chamber housing, aluminium
- ③ Single chamber housing, stainless steel electro-polished
- ④ Double chamber housing, plastic
- ⑤ Double chamber housing, aluminium
- ⑥ Single chamber housing IP69k
- ⑦ Filter element

3.4 Measurement setup for measuring the process pressure

The following points should be observed in this application:

- The pressure transmitter must be mounted above the measuring point.

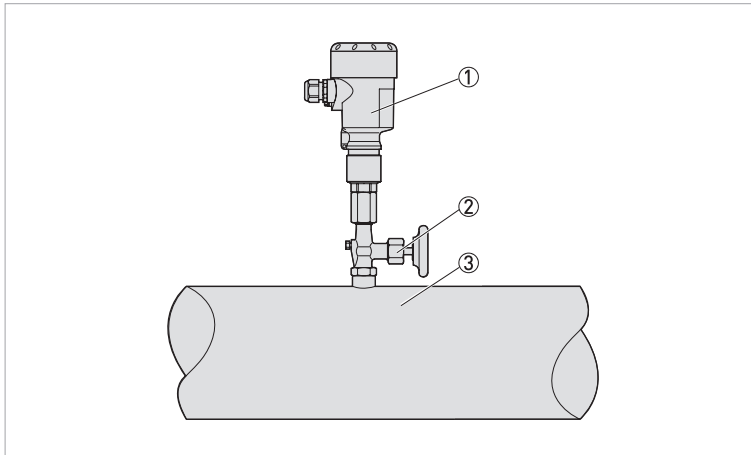


Figure 3-1: Measurement setup for measuring the process pressure of gases

- ① Pressure transmitter
- ② Shut-off valve
- ③ Tapping point

3.5 Measurement setup for measuring steam

The following points should be observed in this application:

- The pressure transmitter should be connected via a syphon to protect the measuring cell from non-permitted high temperatures.
- Siphon to be kept free of insulation.
- When using superheated steam, the siphon must be filled with water prior to start-up.

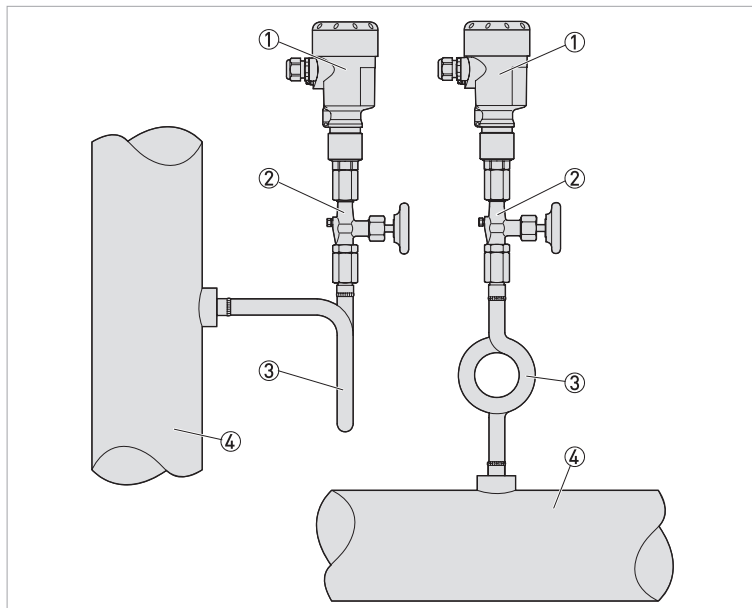


Figure 3-2: Measurement setup for measuring steam

- ① Pressure transmitter
- ② Shut-off valve
- ③ Syphon
- ④ Tapping point

3.6 Measurement setup for measuring fluids

The following points should be observed in this application:

- The pressure transmitter must be mounted below the measuring point.

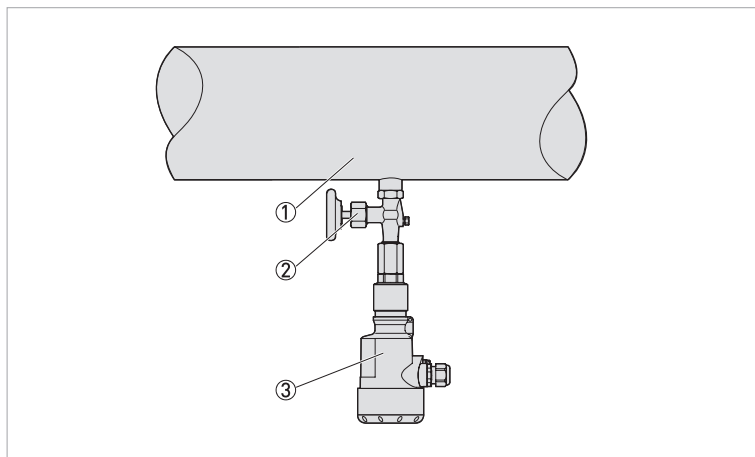


Figure 3-3: Measurement setup for measuring fluids

- ① Tapping point
- ② Shut-off valve
- ③ Pressure transmitter

3.7 Measurement setup for level measurement

The following points should be observed in this application:

- The pressure transmitter should be mounted below the lowest level.
- The pressure transmitter should be protected from filling/emptying current and agitator surges when mounted.

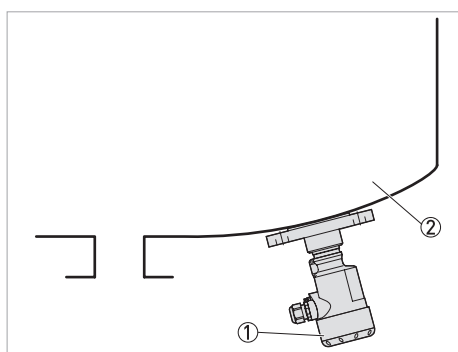


Figure 3-4: Measurement setup for level measurement

- ① Pressure transmitter
- ② Tank

3.8 External housing

A mounting plate is available as an option to facilitate the mounting of the external housing. For further information refer to *Technical data* on page 10.

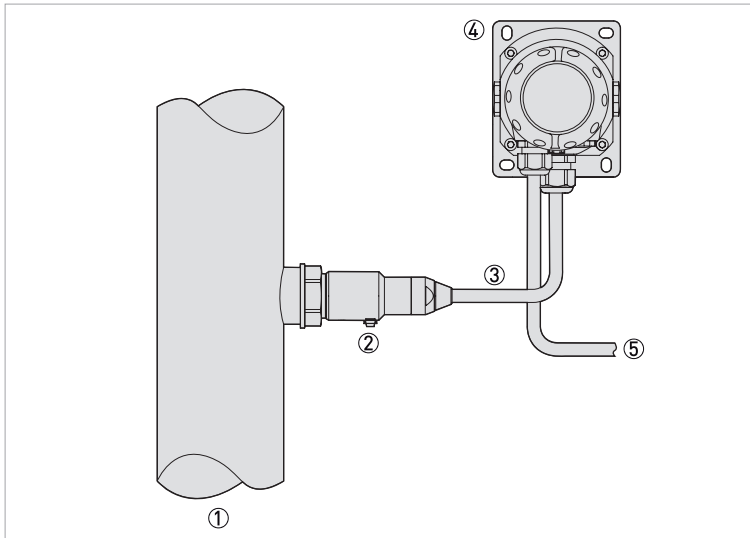


Figure 3-5: Measurement setup with an external housing

- ① Tapping point
- ② Sensor assembly
- ③ Connecting cable
- ④ External housing
- ⑤ Signal cable

IP68 version (25 bar)

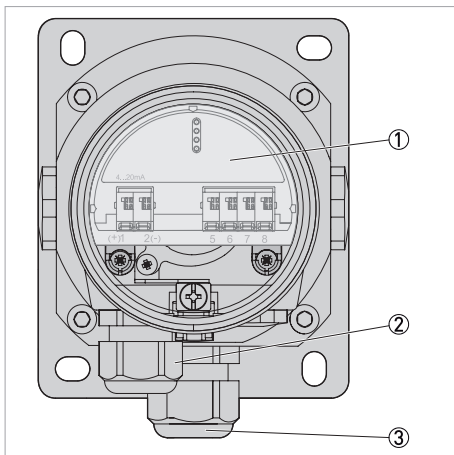


Figure 3-6: External housing (IP68)

- ① Electronic insert
- ② Cable gland for the power supply
- ③ Cable gland for the sensor connection cable

4.1 Safety instructions

All work on the electrical connections may only be carried out with the power disconnected. Take note of the voltage data on the nameplate!

Observe the national regulations for electrical installations!

Observe without fail the local occupational health and safety regulations. Any work done on the electrical components of the measuring device may only be carried out by properly trained specialists.

Look at the device nameplate to ensure that the device is delivered according to your order. Check for the correct supply voltage printed on the nameplate.

4.2 Notes for electrical cables

The device must be grounded to a spot in accordance with regulations in order to protect personnel against electric shocks.

Cables may only be connected when the power is switched off! Since the transmitter has no switch-off elements, overcurrent protection devices, lightning protection and/or energy isolating devices must be provided by the customer.

4.2.1 Requirements for signal cables supplied by the customer

If the signal cable was not ordered, it is to be provided by the customer. The following requirements regarding the electrical specifications of the signal cable must be observed:

Specifications for standard signal cables

- Test voltage: ≥ 500 VAC RMS (750 VDC)
- Temperature range: $-40\dots+105^{\circ}\text{C}$ / $-40\dots+221^{\circ}\text{F}$
- Capacity: ≤ 200 pF/m / 61 pF/ft
- Inductance: ≤ 0.7 $\mu\text{H}/\text{m}$ / 0.2 $\mu\text{H}/\text{ft}$
- Use cable with round cross section.
- A cable outer diameter of 5...9 mm / 0.2...0.35" ensures the seal effect of the cable gland. If you are using cable with a different diameter or cross-section, exchange the seal or use a suitable cable gland.
- We generally recommend the use of a shielded cable for HART[®] multidrop mode.

4.2.2 Laying electrical cables correctly

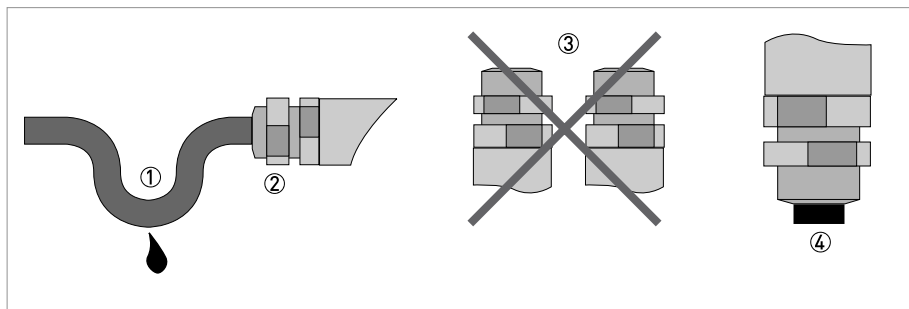


Figure 4-1: Protect housing from dust and water

- ① Lay the cable in a loop just before the housing.
- ② Tighten the screw connection of the cable entry securely.
- ③ Never mount the housing with the cable entries facing upwards.
- ④ Seal cable entries that are not needed with a plug.

4.2.3 Cable preparation

The device is connected with standard two-wire cable without shielding. If electromagnetic interference is expected which is above the test values of EN 61326-1 for industrial areas, a shielded cable should be used.

Check which outer diameter is suitable for the cable gland in order to ensure the sealing effect according to the specified IP protection class.

- 5...9 mm / 0.20...0.35" (standard)
- 6...12 mm / 0.24...0.47" (optional)
- 10...14 mm / 0.40...0.55" (optional)

The terminals in the terminal compartment are designed for wire cross-sections of up to 1.5 mm². To ensure a proper connection, you should strip the cable 40...50 mm / 1.6...2".

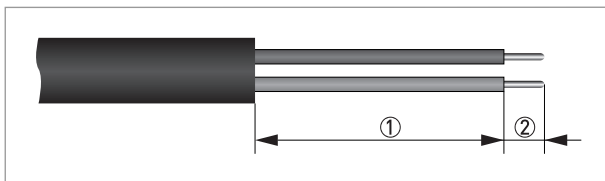


Figure 4-2: Stripping the cable

- ① 40...50 mm / 1.6...2"
- ② 5 mm / 0.2"

4.2.4 Cable entry 1/2-14 NPT (female)

With plastic housings, the NPT cable gland or the conduit steel tube must be screwed without grease into the thread. For further information about max. torque for all housings refer to *Technical data* on page 10.

4.2.5 Connector pin assignment

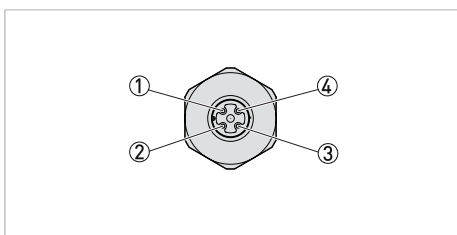


Figure 4-3: Connector M12 x 1, 4-pin

- ① VS+
- ② Not connected
- ③ Not connected
- ④ VS-

Contact pin	Colour of cable	Electronic insert for terminal
Pin ①	Brown	1
Pin ④	Blue	2

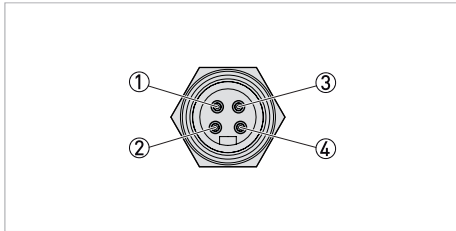


Figure 4-4: 7/8 connector, Foundation Fieldbus (FF)

- ① VS-
- ② VS+
- ③ Not connected
- ④ Cable shield

Contact pin	Colour of cable	Electronic insert for terminal
Pin ①	Blue	1
Pin ②	Brown	2
Pin ④	Green / yellow	Grounding

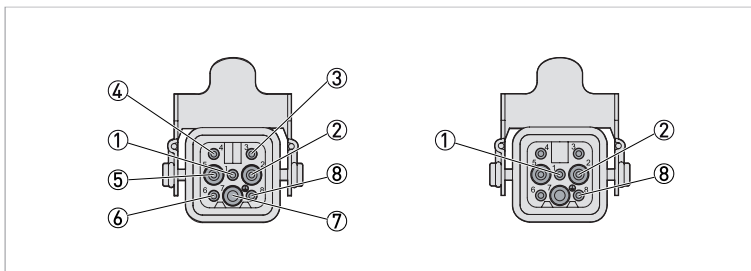


Figure 4-5: Connector, Harting HAN 8D (left) and Harting HAN 7D (right)

- ① VS-
- ② VS+

Contact pin	Colour of cable	Electronic insert for terminal
Pin ①	Black	1
Pin ②	Blue	2
Pin ⑧	Green / yellow	Grounding

4.2.6 Connection to the feed unit

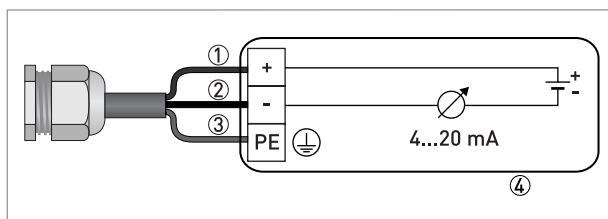


Figure 4-6: Connection to the feed unit

- ① Red
- ② Black
- ③ Green/yellow
- ④ Feed unit with load

4.2.7 Cable shield and grounding

If a shielded cable is necessary, connect the cable shield on both ends to the grounding potential.

In the device, the cable shield must be connected directly to the internal ground terminal.

The ground terminal outside on the housing must be connected to the grounding potential with low impedance.

In hazardous areas, the grounding is carried out according to the installation instructions.

Significant potential differences exist inside galvanization plants as well as on vessels with cathodic corrosion protection. A two-sided shield grounding can cause unacceptably high shield currents as a result.

The metallic and wetted parts (process connection, cap flange, measuring cell and separating diaphragm etc.) are conductive connected with the inner and outer ground terminal on the housing.

4.3 Electrical connection

The connection of the power supply and the signal output is carried out via spring-loaded terminals in the housing. The display and adjustment module is connected via contact pins with the interface adapter.

4.3.1 Connection in the terminal compartment

Procedure

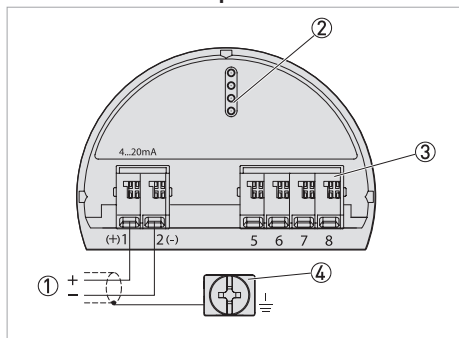
- Unscrew the housing cover.
- If present, remove the display and adjustment module by turning it to the left.
- Loosen union nut of the cable gland.
- For preparation of connection cable refer to *Cable preparation* on page 41.
- Push the cable through the cable gland into the terminal compartment.
- Insert the wire ends into the open terminals according to the wiring plan. Flexible cores with cable end sleeves as well as solid cores can be inserted directly into the terminal openings. In case of flexible cores, press the spring terminal with a small screwdriver to open the terminal opening.
- Check the proper hold of the wires in the terminals by lightly pulling on them.
- Connect the cable shield to the internal ground terminal, connect the outer ground terminal to the customer/plant equipotential bonding.
- Tighten the union nut of the cable gland. The sealing ring must completely enclose the cable.
- Screw the housing cover back on.

4.3.2 Single chamber housing

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

The following illustration applies to both the non-Ex as well as the Ex ia, the Ex d and the Ex d ia version.

Electronics compartment



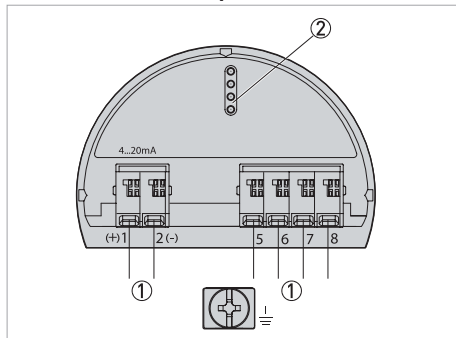
- ① Power supply / signal output
- ② Interface adapter for the display and adjustment module
- ③ Digital interface
- ④ Ground terminal for connection of the cable shield

4.3.3 Double chamber housing

For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

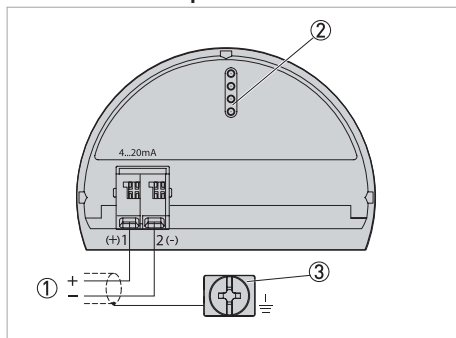
The following illustration applies to both the non-Ex as well as the the Ex ia, and the Ex d version.

Electronics compartment



- ① Internal connection to terminal compartment
- ② Interface adapter for the display and adjustment module

Terminal compartment

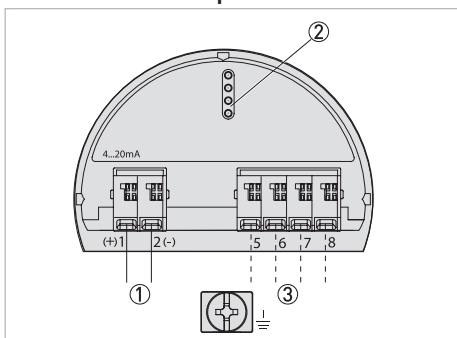


- ① Power supply / signal output
- ② Interface adapter for the display and adjustment module
- ③ Ground terminal for connection of the cable shield

4.3.4 Double chamber housing Ex d ia

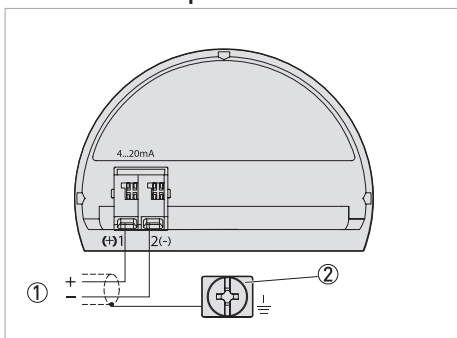
For devices used in hazardous areas, additional safety notes apply; please refer to the Ex documentation.

Electronics compartment



- ① Power supply / signal output
- ② Interface adapter for the display and adjustment module
- ③ Digital interface

Terminal compartment



- ① Power supply / signal output
- ② Ground terminal for connection of the cable shield

5.1 Order code

The characters of the order code highlighted in light grey describe the standard.

OPTIBAR PM 5060 C

VGK5	4	Approval			
	AX	Non-Ex zone Europe	WX	Non-Ex zone Europe	
	AC	ATEX II 1G, 1/2G, 2G Ex ia IIC T6	WC	IEC Ex ia IIC T6 Ga, Ga/Gb, Gb	
	AD	ATEX II 1/2G, 2G Ex d ia IIC T6	WD	IEC Ex d ia IIC T6, Ga/Gb, Gb	
	AE	ATEX II 1/2G, 2G Ex d IIC T6	WE	IEC Ex d IIC T6, Ga/Gb, Gb	
	AR	ATEX II 1D, 1/2D, 1/3D, 2D IP66	WR	IEC Ex t IIIC T... IP66	
	AH	ATEX II 1G, 1/2G 2G Ex ia IIC + II 1D, 1/2D, 1/3D, 2D IP66	WH	IEC Ex ia IIC T6 + IEC Ex t IIIC T... IP66	
	AT	ATEX II 1G, 1/2G, 2G Ex ia IIC + 1/2/-D Ex t IIIC IP67/66	W1	IEC Ex d ia IIC T6 + IEC Ex t IIIC T... IP66	
	A1	ATEX II 1/2G, 2G Ex d ia IIC + II 1D, 1/2D, 1/3D, 2D IP66	WL	IEC Ex d IIC T6 + IEC Ex t IIIC T... IP66	
	AL	ATEX II 1/2G, 2G Ex d IIC + II 1D, 1/2D, 1/3D, 2D IP66			
	AS	ATEX II 1/2/-D Ex t IIIC IP67/66 T.. Da/Db/-			
		Process connection / Material			
	DU	Thread ISO228 G1/2 EN837-1, 316 L			
	LS	Thread ISO228 G1/2, PN 1000, DIN 3852-E, 316 L			
	LF	Thread ANSI 1/2-14 NPT (female) - 1/4-18 NPT (female), 316 L			
	DL	Thread ANSI 1/2-14 NPT (female), 316 L			
	LY	Thread ANSI 1/2-14 NPT (female), PN1000, 316 Ti			
	C2	Thread DIN 13 M20x1.5, EN 837-1, 316 L			
	LU	Thread ISO228 G1/2 DIN 3852, with radial O-ring, flush, 316 L			
	P6	Thread ISO228 G1/2 DIN 3852, flush, Alloy C-276			
	C5	Thread ISO 228 G1, DIN 3852, 316 L			
	AT	Clamp DN40 (1 1/2") PN16, DIN 32676 / ISO 2852			
	AR	Clamp DN50 (2") PN16, DIN 32676 / ISO 2852, 316 L			
	ES	Hygienic connection with clamp F40, PN25, 316 L			
	AA	Flange DRD PN40, 316 L			
	FR	Varivent® N, N40 - 50 PN25, 316 L			
	E5	Compression fitting DIN 11851, DN25, PN40, 316 L			
	EZ	Compression fitting DIN 11851, DN40, PN40, 316 L			
	NB	Compression fitting DIN 11851, DN50, PN25, 316 L			
	FA	SMS, DN38, PN6, 316 L			
	FB	SMS, DN51, PN6, 316 L			
	E2	Compression fitting DIN 11864-1 Form A, DN40, PN40, 316 L			
	E3	Compression fitting DIN 11864-1 Form A, DN50, PN40, 316 L			
	FD	NEUMO Biocontrol, DN50 PN16, 316 L			
	FE	NEUMO Biocontrol, DN65 PN16, 316 L			
	FH	NEUMO BioConnect, DN80 PN25, 316 L			
	EV	DB40L - DB50L, PN40, 316 L			

N8	Flange DN25, PN40, Form B1, EN 1092-1, 316L
B3	Flange DN32, PN40, Form C, DIN 2501, 316 L
A8	Flange DN40, PN40, Form C, DIN 2501, 316 L
B2	Flange DN50, PN40, Form C, DIN 2501, 316 L
BP	Flange DN65, PN40, Form C, DIN 2501, 316 L
B5	Flange DN80, PN40, Form C, DIN 2501, 316 L
CD	Flange DN100, PN40, Form C, DIN 2501, 316 L
A6	Flange DN150, PN40, Form C, DIN 2501, 316 L
BW	Flange 1" 150lb RF, ASME B16.5, 316 L
CA	Flange 2" 150lb RF, ASME B16.5, 316 L
BG	Flange 2" 300lb RF, ASME B16.5, 316 L
CB	Flange 3" 150lb RF, ASME B16.5, 316 L
B4	Flange 3" 600lb RF, ASME B16.5, 316 L
BB	Flange 4" 150lb RF, ASME B16.5, 316 L
B9	Flange DN15 16K FF, JIS B2200, 316 L
B7	Flange DN25 20K FF, JIS B2200, 316 L
cF	Flange DN50 10K FF, JIS B2200, 316 L
BV	Flange DN50 16K FF, JIS B2200, 316 L
CG	Flange DN80 10K FF, JIS B2200, 316 L
CP	Flange DN100 16K FF, JIS B2200, 316 L
Diaphragm / Fill fluid	
S	316 L, (1.4404), Silicone oil
E	Elgiloy (2.4711), without
Gasket / Temperature	
S	without, -40...+105°C / -40...+221°F
E	without, -40...+150°C / -40...+302°F
1	FKM: -20...+105°C / -4...+221°F
3	EPDM: -30...+105°C / -22...+221°F
P	FFKM: -15...+105°C / +5...+221°F
A	FKM: -20...+150°C / -4...+302°F
C	EPDM: -30...+150°C / -22...+302°F
K	FFKM: -15...+150°C / +5...+302°F
Pressure type	
A	Absolute pressure
G	Gauge pressure
Measuring range	
C	0...400 mbar / 0...5.8 psi
D	0...1 bar / 0...14.5 psi
E	0...2.5 bar / 0...36 psi
G	0...10 bar / 0...145 psi
H	0...25 bar / 0...363 psi
K	0...40 bar / 0...580 psi
L	0...100 bar / 0...1450 psi
N	0...250 bar / 0...3630 psi

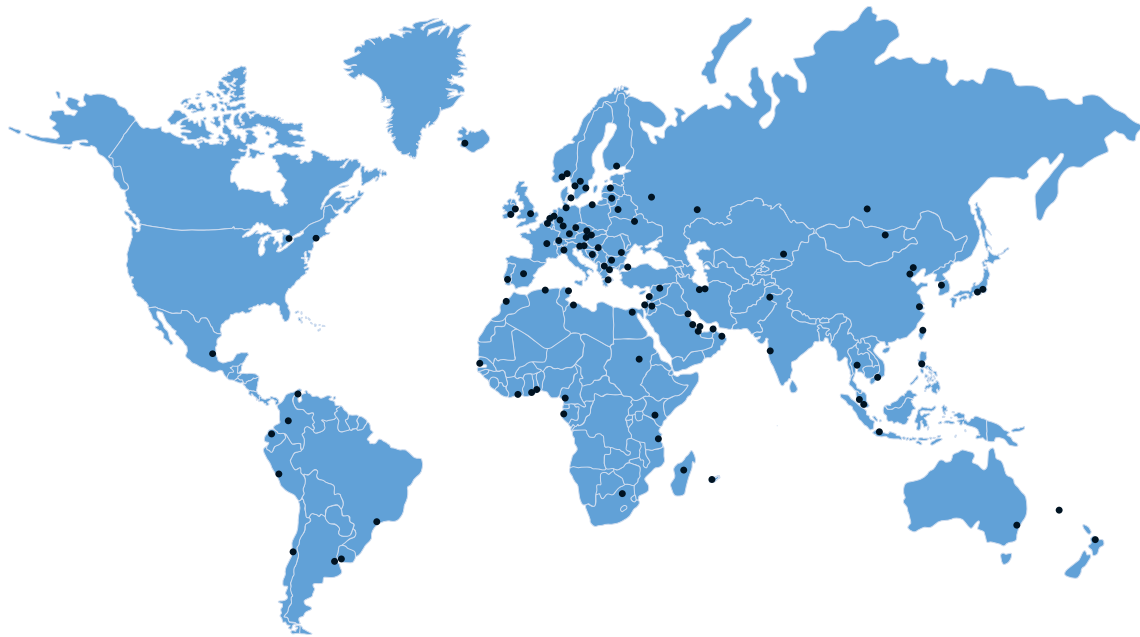
M	0...600 bar / 0...8700 psi
P	0...1000 bar / 0...14500 psi
T	-1...0 bar / -14.5...0 psi
U	-1...1.5 bar / -14.5...21.8 psi
W	-1...10 bar / -14.5...145 psi
X	-1...25 bar / -14.5...363 psi
1	-1...40 bar / -14.5...580 psi
2	-1...100 bar / -14...1450 psi
Y	Customer specific measuring range
Adjustment	
0	Nominal range %
1	Nominal range mbar
2	Nominal range bar
3	Nominal range psi
4	Nominal range Pa
5	Nominal range kPa
6	Nominal range Mpa
7	Nominal range mmH2O
8	Nominal range inH2O
A	Nominal range mmHG
B	Nominal range inHG
C	Nominal range mm (density 1)
D	Nominal range cm (density 1)
E	Nominal range m (density 1)
F	Nominal range in (density 1)
G	Nominal range ft (density 1)
Y	Customer specific adjustment for pressure
Accuracy class	
H	0.075%
E	0.1%
S	0.2%
Electronics	
H	2-wire 4...20 mA / HART®
A	2-wire 4...20 mA / HART® with SIL (in preparation)
F	Foundation Fieldbus
P	Profibus PA
Supplementary electronics	
X	Without
Housing	
K	Plastic (PBT), DIN single chamber
R	Plastic (PBT), DIN double chamber
A	Aluminium, DIN single chamber
D	Aluminium, DIN double chamber
8	316 L (electro-polished), DIN single chamber

V	316 L, DIN single chamber
W	316 L, DIN double chamber
Housing version / Ingress protection	
1	compact, IP 66 / 67, NEMA 6P
N	compact, IP 66 / 68 (1 bar), NEMA 6P
M	compact, IP 69K
K	remote, axial PE, IP 66 / 68 (25 bar)
A	remote, axial PUR, IP 66 / 68 (25 bar)
L	remote, lateral PE, IP 66 / 68 (25 bar)
S	remote, lateral PUR, IP 66 / 68 (25 bar)
Electrical connection / Material	
M	M20 x 1.5, plastic, black, Ø 5...9 mm / 0.20...0.35"
S	M20 x 1.5, plastic, black, Ø 6...12 mm / 0.23...0.47"
T	M20 x 1.5, plastic, black, Ø 10...14 mm / 0.39...0.55"
K	M20 x 1.5, plastic, blue, Ø 5...9 mm / 0.20...0.35"
U	M20 x 1.5, plastic, blue, Ø 6...12 mm / 0.23...0.47"
V	M20 x 1.5, plastic, blue, Ø 10...14 mm / 0.39...0.55"
0	M20 x 1.5, nickel-plated brass, Ø 4...8.5 mm / 0.16...0.33"
6	M20 x 1.5, nickel-plated brass, shielded cable
L	M20 x 1.5, 316 L, Ø 6...12 mm / 0.24...0.47"
D	M20 x 1.5, blind plug
1	M20 x 1.5, DIN43650 plug
C	M20 x 1.5, M12 x 1 A plug
B	M20 x 1.5, M12 x 1 B plug
F	M20 x 1.5, HAN7D plug, straight
G	M20 x 1.5, HAN7D plug, 90°
H	M20 x 1.5, HAN8D plug, straight
W	M20 x 1.5, HAN8D plug, 90°
N	1/2-14 NPT, blind plug
7	1/2-14 NPT, plastic, black, Ø 5...9 mm / 0.2...0.35"
P	1/2-14 NPT, nickel-plated brass, Ø 4...8.5 mm / 0.16...0.33"
8	1/2-14 NPT, nickel-plated brass, shielded cable
Z	1/2-14 NPT, 7/8-14 NPT plug

VGK5	4															Display / Adjustment module	
																X	without
																A	mounted (top)
																B	mounted (side)
																F	without, lid with sight window
																Language - Display	
																D	DE - German
																E	EN - English
																1	JP - Japanese
																C	CN - Chinese
																F	FR - French
																N	NL - Dutch
																D	PT - Portuguese
																R	RU - Russian
																S	ES - Spanish
																T	IT - Italian
																Language - Manual	
																D	DE - German
																E	EN - English
																F	FR - French
																Additional process barrier	
																0	Without
																S	Integrated
																cable material / length	
																0	Without
																B	PE, 5 m / 16.4 ft
																C	PE, 10 m / 32.8 ft
																D	PE, 25 m / 82 ft
																P	PUR, 5 m / 16.4 ft
																R	PUR, 10 m / 32.8 ft
																S	PUR, 25 m / 82 ft
														Reserve			
														0	Without		
														Identification tag			
														0	Without		
														F	Foil (40 x 20 mm)		
														S	Stainless steel (40 x 20 mm)		
														Certificates			
														X	Without		
														M	Observe VZPA / B code		







KROHNE product overview

- Electromagnetic flowmeters
- Variable area flowmeters
- Ultrasonic flowmeters
- Mass flowmeters
- Vortex flowmeters
- Flow controllers
- Level meters
- Temperature assemblies
- Pressure transmitters
- Analysis products
- Products and systems for the oil & gas industry
- Measuring systems for the marine industry

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