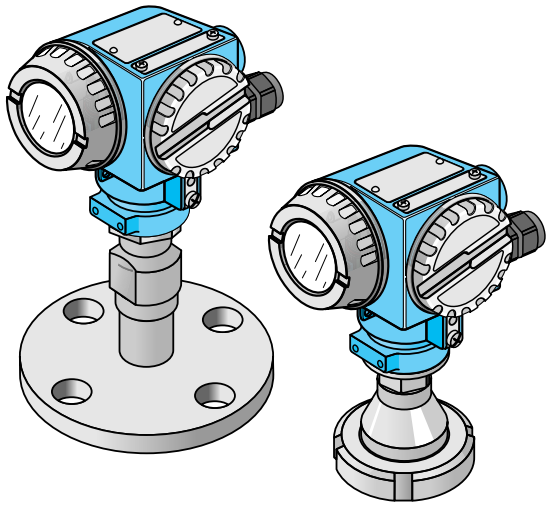
Technical
Information
TI 217P/00/en

Pressure Transmitter
cerabar S PMC 631, PMP 635

Cerabar S with diaphragm seal overload resistant with function monitoring Communication using PROFIBUS-PA, HART, INTENSOR protocols



Application

The Cerabar S transmitter accurately measures the pressure of gases, vapours and liquids and is used in all areas of chemical and process engineering.
Two criteria are to be considered when using diaphragm seals:
1. The technology or connection standard used for the particular plant.
Endress+Hauser offers:
- Diaphragm seals for hygienic applications
- Screw thread
- Flanges with or without extension

2. Special materials or connections to be used for the particular process, e.g.
- Mounting without a dead space for especially hygienic applications
- Flush-mounted installation for media which are solidifying or crystallising out
- Special materials for the diaphragm seal used with corrosive media
- Temperature spacers for product temperatures above +100°C (+212°F) (+350°C/+662°F possible with capillary tubes)

Features and Benefits

- High measurement accuracy
  – Linearity 0.2% of set measuring range
  – Long-term stability better than 0.1% per year
- Less stock with more modules
  – Freely adjustable measuring range (TD 20:1) without process pressure
  – Renewing wetted parts by simply replacing the sensor and diaphragm seal module, no recalibration required
  – Electronics can be replaced without recalibrating the pressure transmitter
- Simple and easy operation via 4…20 mA and intelligent data protocol (HART or INTENSOR) or connection to PROFIBUS-PA
- Self-monitoring from sensor to electronics

Endress+Hauser

Nothing beats know-how

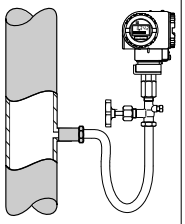
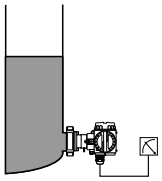
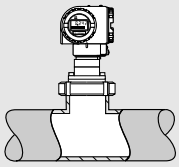
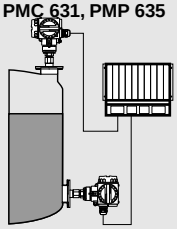
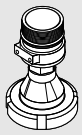
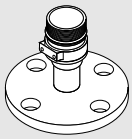
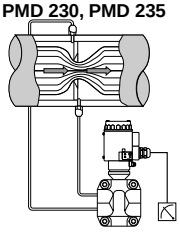
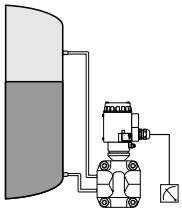
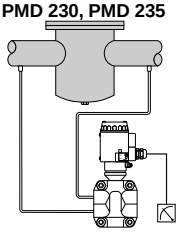
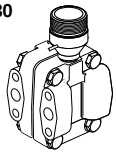
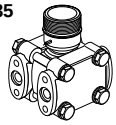
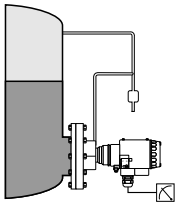
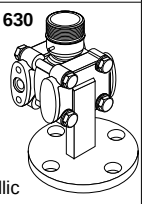
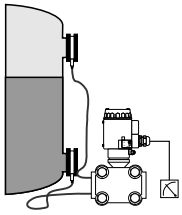
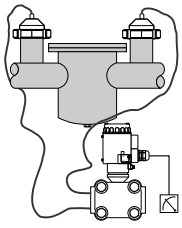
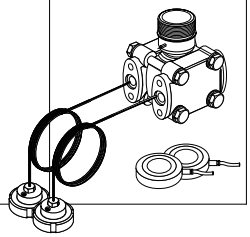
Selecting the Instrument

The Cerabar S is designed as replaceable modules and is based on the same construction principle as its »twin brother« the Deltabar S.
This has the following advantages:

- Better stock management and maintenance by stocking modules instead of instruments.
- Simple handling using a universal operating principle.

The table below provides a complete summary of the Cerabar S/ Deltabar S families. Further information on instruments:

- In the grey fields is found in this Technical Information.
- In the white fields is found in Technical Information TI 216P and TI 256P.

	Gauge and absolute pressure	Flow	Level	Differential pressure	**Ceramic sensor** Gauge pressure – 5 mbar to 40 bar Absolute pressure – from 20 mbar to 40 bar	**Metal sensor** Gauge and absolute pressure – from 2.5 bar to 400 bar
Cerabar S **threaded and flush-mounted process connections** **TI 216P**	**PMC 731, PMP 731** 		**PMC 731, PMP 731** 		**PMC 731**  including flush-mounted process connections	**PMP 731**  optional flush-mounted diaphragm or internal diaphragm with adapter
Diaphragm seal	**PMC 631, PMP 635** 		**PMC 631, PMP 635** 		**PMC 631**  **from page 15**	**PMP 635**  **from page 20**
					Differential pressure: – 25 mbar: PN 10 – to 3 bar: PN 100	Differential pressure: – from 10 mbar: PN 140/PN 420 – to 40 bar: PN 420
Deltabar S **oval flange** **TI 256P**		**PMD 230, PMD 235** 	**PMD 230, PMD 235** 	**PMD 230, PMD 235** 	**PMD 230**  metal-free connection also available	**PMD 235** 
Flange **TI 256P**			**FMD 230, FMD 630** 		**FMD 230**  flush-mounted ceramic sensor, metal-free connection also available	**FMD 630**  metallic diaphragm with optional extension
Diaphragm seal with capillary extension **TI 256P**			**FMD 633** 	**FMD 633** 		**FMD 633** including hygienic applications 

Mechanical Construction

Modularity

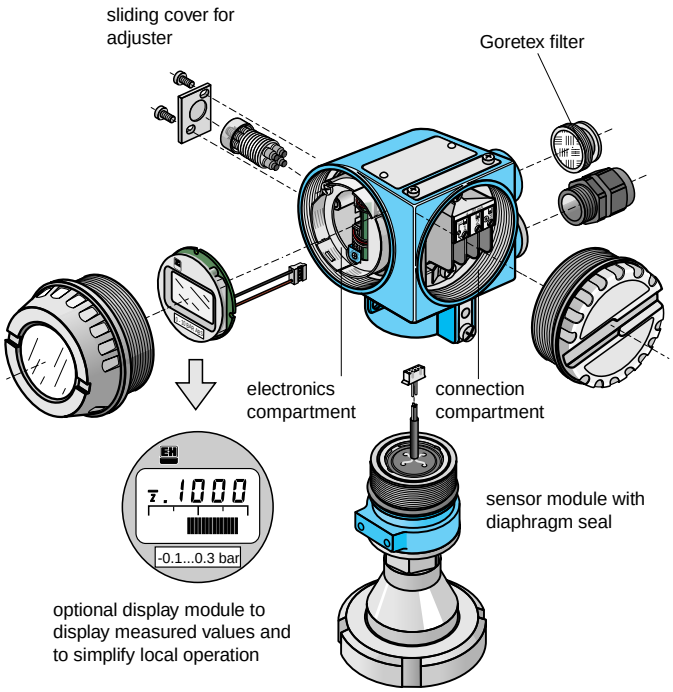
Both intelligent pressure transmitters from Endress+Hauser

- Cerabar S:
  gauge/absolute pressure measurement
- Deltabar S:
  differential pressure, level and flow measurement (see TI 256P)

offer optimum modularity for future product development.

Features include:

- Interchangeable sensor module and process connections
- Interchangeable housing versions
- Universal interchangeable electronics for gauge/absolute and differential pressure
- Simple and uniform operation



Interchangeable Sensor Modules

The sensor modules are fully calibrated for pressure and temperature in the factory. These data are permanently stored in the sensor module. After replacing the module, the electronics automatically calls up the data from the calibrated sensor module when it is switched on again. The transmitter is then again ready to measure without having to be recalibrated.

Display Module

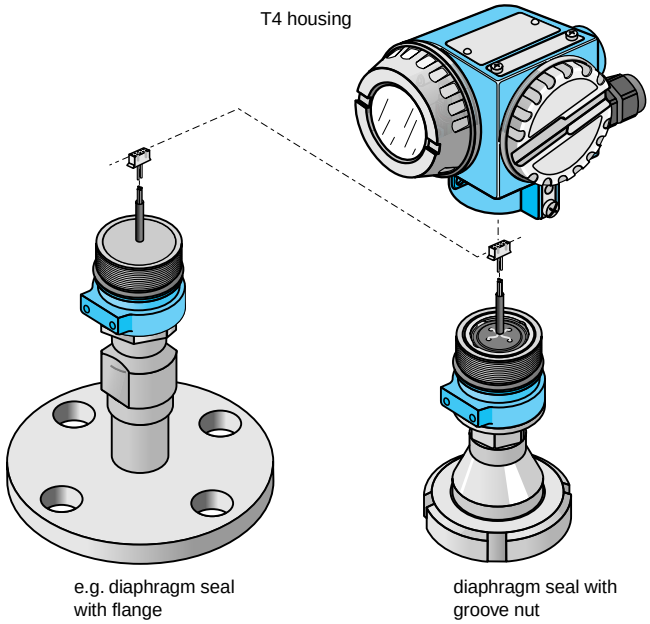
A display module with the following features can be used for showing measured values and for simplifying local operation:

- Large four-character pressure display with bargraph showing current.
- Separate electronics and connection compartments. The display is plugged into the electronics compartment so that the terminals are always accessible from the connection compartment.
- Certified for explosion hazardous areas.

Housings

Housing T4 is used for vertical mounting of the Cerabar S:

- IP 65 (NEMA 4X)
- Separate electronics and connection compartments
- Easily accessible operating elements on the outside of the instrument
- Optional Pg 13.5 cable gland with water-tight thread, M 20x1.5, ½ NPT or G ½
- Housing can be rotated through 270°



Replaceable Process Connections

- A wide variety of diaphragm seals to suit all common instrumentation concepts.
- Selecting a suitable material for the process connection ensures chemical resistance. This is especially important for the metallic diaphragm in contact with the medium.
- Specially resistant diaphragm seals, e.g. tantalum diaphragms, are available.
- The diaphragm is welded to every diaphragm seal without any dead space.

Measuring System

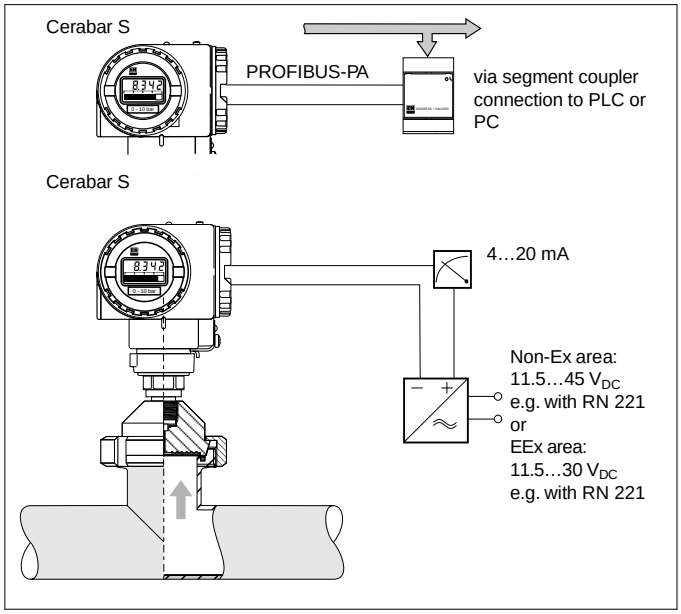
System Components

The complete measuring system consists of:

- Cerabar S pressure transmitters with
  – PROFIBUS-PA digital communications signal and
  – connection via segment coupler to a PLC or PC using e.g. the Endress+Hauser Commuwin II operating program

or

- Cerabar S pressure transmitter with
  – 4…20 mA signal output and HART or INTENSOR communication protocol and
  – power supply, e.g. with the RN 221 transmitter power supply unit from Endress+Hauser
  Non-EEx: 11.5…45 V_{DC} or
  EEx: 11.5…30 V_{DC}



System components for Cerabar S
- above: PROFIBUS-PA see also Operation page 8
- below: Current output 4…20 mA with HART or INTENSOR communications protocol and power supply

Operating Principle

Ceramic Sensor

The system pressure acts on the diaphragm of the diaphragm seal and is then transmitted by a filling fluid to the rugged ceramic diaphragm of the pressure sensor. This is deflected by max. 0.025 mm.
The pressure-proportional change in capacitance is then measured by the electrodes at the ceramic substrate and the diaphragm.
The measuring range is determined by the thickness of the ceramic diaphragm.

Advantages:

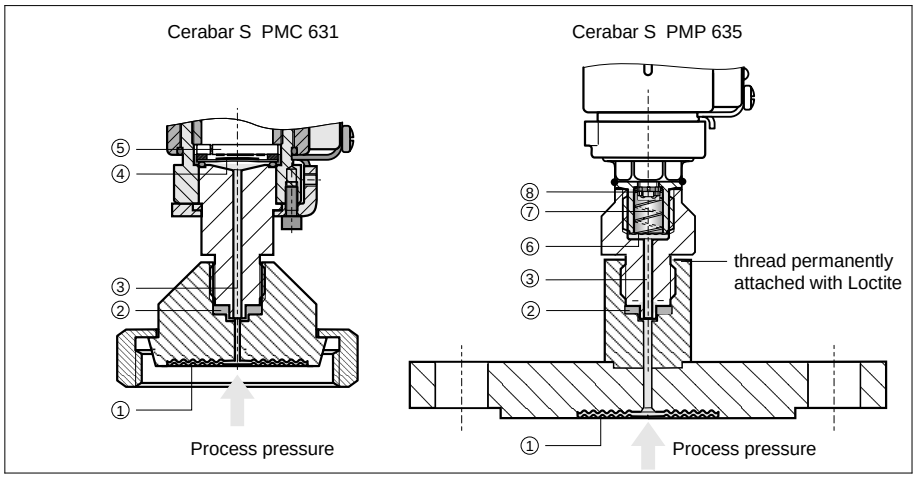
- suitable for process pressures from 40 mbar (0.6 psi) to 40 bar (600 psi)
- overload resistance guarantee to 25 times the nominal pressure rating
- good long-term stability

Metal Sensor

The process pressure to be measured acts on the diaphragm of the diaphragm seal and is transmitted by a filling fluids to the metallic separating diaphragm of the sensor. The separating diaphragm is deflected and the resulting pressure proportional change in the voltage across the resistance bridge is then measured.

Advantages:

- For process pressures from 100 mbar (1.45 psi) up to 400 bar (6000 psi)
- Excellent long-term stability
- Guaranteed resistance to overload up to 4-times nominal pressure (max. 600 bar/9000 psi)



Pressure sensors:
① diaphragm of the diaphragm seal
② copper seal
③ diaphragm seal filling fluid
④ ceramic diaphragm
⑤ ceramic substrate
⑥ metal separating diaphragm
⑦ channel with filling fluid
⑧ polysilicon measuring element

Design Planning for the Diaphragm Seal

Diaphragm Seal Fluid

The temperature and pressure of the process are of critical important when selecting the fluid for the diaphragm seal.
①, ②
The suitability of the fluid to meet the requirements of the medium must also be considered. For foodstuffs applications only physiologically safe fluids such as vegetable oil or silicone oil (AK 100) may be used in the diaphragm seal.
⑥

Guidelines for Mounting Capillary Tubes

The transmitter should generally be mounted below the pressure measuring point. The maximum height difference between the pressure measuring point and the transmitter should therefore not be exceeded. This will otherwise result in a break in the column of fluid in the capillary and damage the diaphragm seal.
③

- Minimum bending radius of capillary tubing: 100 mm (3.9 in)

The Smallest Recommended Measuring Span and Diaphragm Diameter

The effects of temperature cause the diaphragm seal to expand. This in turn gives rise to an additional temperature effect on the zero point. When selecting the diaphragm seal the following points are to be observed:

- The nominal diameter of the diaphragm seal determines the width of the diaphragm.
- Temperature effects vary inversely with the width of the diameter.

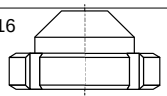
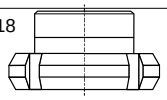
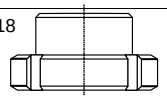
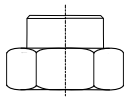
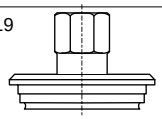
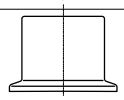
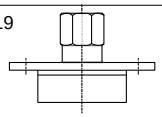
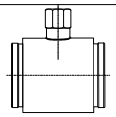
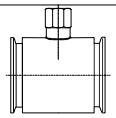
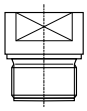
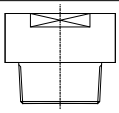
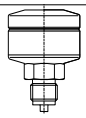
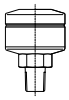
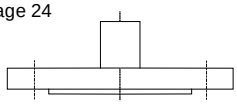
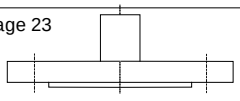
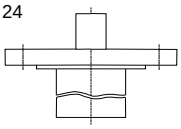
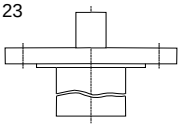
The largest possible width of diaphragm should be chosen for small measuring spans and/or capillaries so that the temperature effects remain within the nominal range of the application.

Temperature Effects

- The temperature coefficients of the diaphragm seals as stated in the technical data and dimensions (page 16 onwards) apply to silicone oil (calibrating temperature +20°C/+68°F) and are specified by the process temperature and ambient temperature. For other fluids used, the Tk value is to be multiplied by the Tk correction factor.
  ⑤
- The total temperature coefficient T_K is derived from adding the T_K of the Cerabar to that of the diaphragm seal together with the T_K of the capillary tubing.
  The T_K per metre for silicone oil: 0.5 mbar/10K (7.25 psiof the capillary tubing is determined by the ambient temperature.
  The T_K per metre for silicone oil: 0.5 mbar/10K
  ⑤

		①	②	③		④	⑤	⑥
Fill fluid of diaphragm seal	**Code**	**Permissible temperature of medium at 0.05 bar ≤ p_{abs} ≤ 1 bar (0.73 psi ≤ p_{abs} ≤ 14.5 psi)**	**Permissible temperature of medium at p_{abs} ≥ 1 bar (p_{abs} ≥ 14.5 psi)**	**Maximum height difference * at p_{abs} ≥ 1 bar (p_{abs} ≥ 14.5 psi)**	**Minimum permissible pressure at +20°C ** (+68°F) ****	**Density [g/cm³]**	**T_K correction factor**	**Notes**
Silicone oil (AK 100)	A, L	–40…+180°C (–40…+356°F)	–40…+250°C (–40…+482°F)	max. 7 m (max. 23 ft)	10 $mbar_{abs}$ (0.15 psi)	0.96	1	Standard, foodstuffs applications
High temperature oil (paraffin)	G, K	–10…+200°C (+14…+392°F)	–10…+350°C (+14…+662°F)	max. 7 m (max. 23 ft)	10 $mbar_{abs}$ (0.15 psi)	0.81	0.72	
Fluorolube	N	–40…+80°C (–40…+176°F)	–40…+175°C (–40…+347°F)	max. 7 m (max. 23 ft)	10 $mbar_{abs}$ (0.15 psi)	1.87	0.91	Inert oil for very pure gas applications
Glycerine	E	—	+15…+200°C (+59…+392°F)	max. 4 m (max. 13.1 ft)	10 $mbar_{abs}$ (0.15 psi)	1.26	0.64	Foodstuffs applications
Vegetable oil (Neobee M20)	D	–10…+120°C (+14…+392°F)	–10…+200°C (+14…+392°F)	max. 7 m (max. 23 ft)	10 $mbar_{abs}$ (0.15 psi)	0.94	1.05	Foodstuffs applications FDA No.: 21CFR172.856

* Max. height difference between the transmitter and the lower measurement point connection.
For applications in vacuum the transmitter should be mounted below the lower measurement point connection.
** For PMP 636 only, for PMC 631 at +20°C (+68°F): minimum permissible pressure 200 $mbar_{abs}$ (2.9 psi)

Construction	Diaphragm seal	Connection	Page/Version	Standard	Nominal width	Pressure range	Instrument
Hygienic applications	Diaphragm seal	Groove nut	Page 16 	DIN 11 851	DN 25, DN 32, DN 40, DN 50	to 40 bar	PMC 631
			Page 18 	SMS	1", 1½", 2"	to 40 bar	
			Page 18 	RJT	1", 1½", 2"	to 40 bar	
			Page 18 	ISS	1", 1½", 2"	to 40 bar	
		Clamp	Page 19 	Varivent	D = 68 mm	to 40 bar	
			Page 17 	Clamp	1½", 2"	to 40 bar	
		Flange	Page 19 	DRD	D = 65 mm	to 40 bar	
	Pipe diaphragm seal	Threaded nozzle	Page 16 	DIN 11 851	DN 40, DN 50	to 40 bar	
		Clamp	Page 17 	Clamp	¾", 1", 1½", 2"	to 40 bar	
Screw thread	Diaphragm seal	G	Page 22 	DIN ISO 228/1	G 1 G 1½ G 2	to 400 bar	PMP 635
		NPT	Page 22 	ANSI B1.20.1	1 NPT 1½ NPT 2 NPT		
Screw thread with separator	Diaphragm seal	G	Page 22 	DIN 16 288	G ½	to 400 bar	
		NPT	Page 22 	ANSI B1.20.1	½ NPT		
Flange	Diaphragm seal	DIN flange	Page 24 	DIN 2501	DN 25 DN 50 DN 80	to 400 bar	
		ANSI flange	Page 23 	ANSI B.16.5	1", 2", 3", 4"		
Flange with extended diaphragm	Diaphragm seal	DIN flange	Page 24 	DIN 2501	DN 50 DN 80	to 400 bar	
		ANSI flange	Page 23 	ANSI B.16.5	2", 3", 4"		

Operation

The Cerabar S can be operated in the following ways:

- Using the four keys on the instrument directly at the mounting point for calibrating zero point and span at the touch of a button.

or

- Operating remotely using intelligent HART or INTENSOR data protocols
  - e.g. via Commubox FXA 191 and a PC with the Endress+Hauser Commuwin II operating program or
  - using the Universal HART Communicator DXR 275 (HART) or Commulog VU 260 Z (INTENSOR) handheld terminals

or

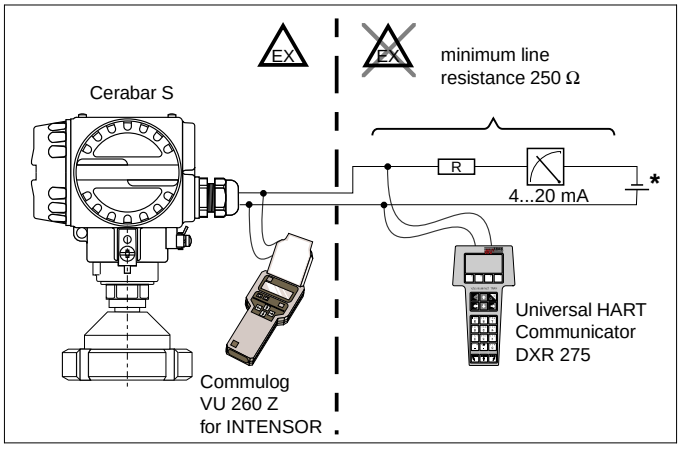
- Using segment couplers to connect to the intrinsically-safe PROFIBUS-PA fieldbus and operating the instrument via PC and Commuwin II operating program

Handheld Terminal

A handheld terminal can be connected at any point along the 4…20 mA line to check, configure and read additional information.

Two devices are available:

- Universal HART Communicator DXR 275: HART protocol
- Commulog VU 260 Z: INTENSOR protocol



The handhold terminal can be connected anywhere along the 4…20 mA line.

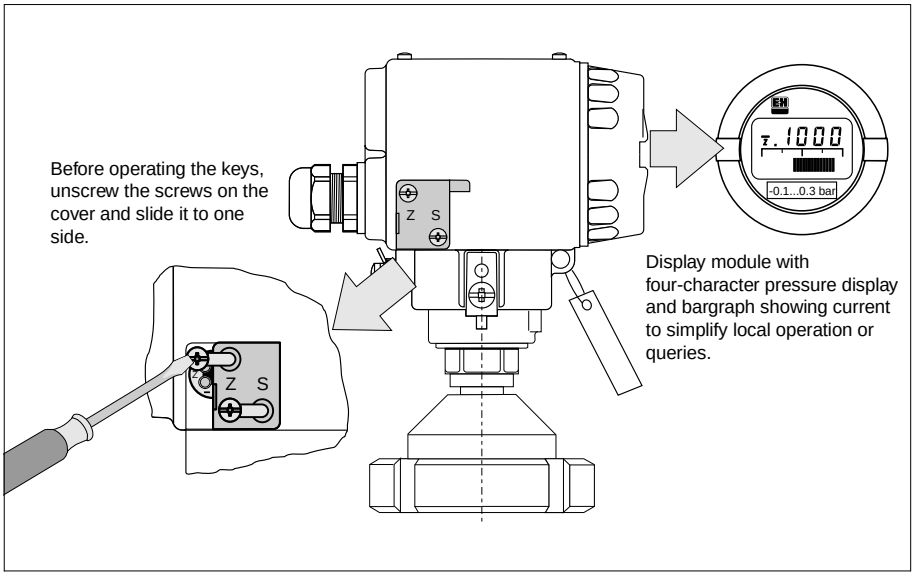
* Use an intrinsically safe power supply for Ex i (e.g. FXN 671, RN 221).

Operation Using Keys on the Instrument

There are two possibilities for scaling the 4…20 mA output: either by directly applying the appropriate line pressures or by entering the desived range-end values via the display module.

- ZERO: +Z and –Z
- SPAN: +S and –S

A zero point shift due to the orientation of the instrument can also be corrected using these keys.



When operating with keys

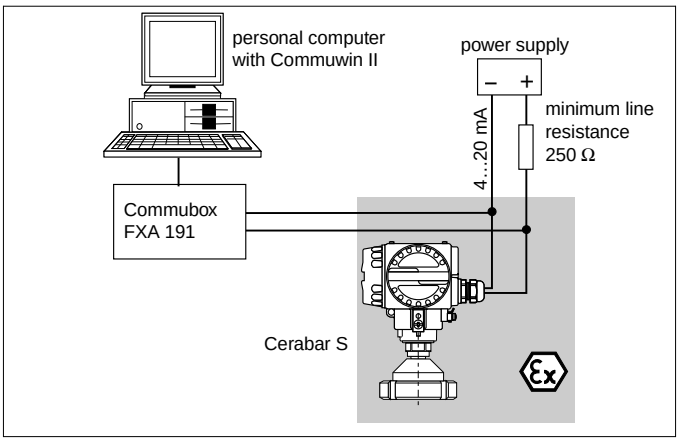
Screw the cover down securely with both screws after operation.

Operation Using the Matrix

All operations and functions are identical whether the Cerabar S is calibrated using a process bus and PC or a handheld terminal.

Examples:

Date to measuring point	– Measured value, measuring point, status information, instrument type – measuring range overrun – actual sensor temperature
Input functions	– Zero, span, output damping – bias pressure – signal response on fault – user text, technical units



The Commubox handheld terminal can be connected anywhere along the 4…20 mA line.

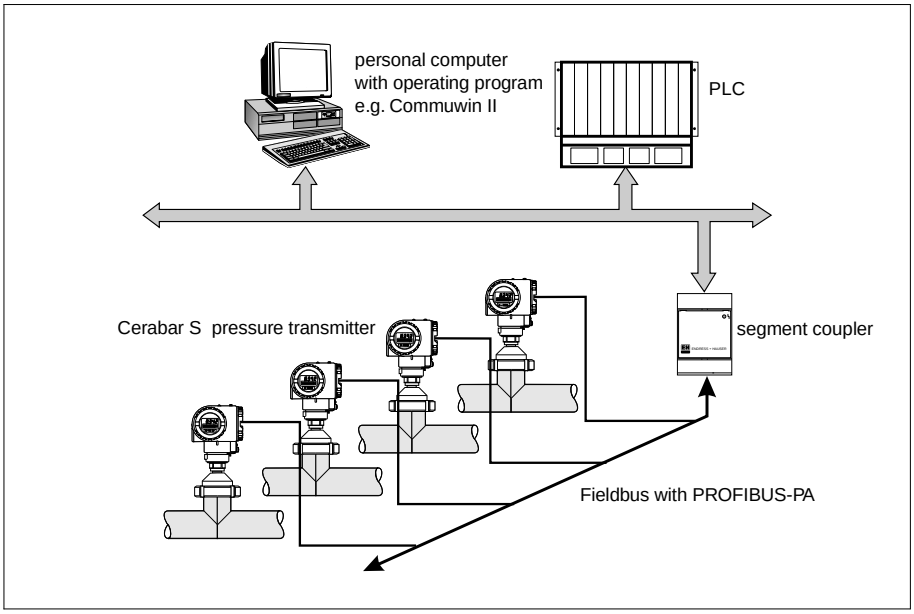
Operation Using the Commubox FXA 191

The Commubox FXA 191 connects 4…20 mA Smart transmitters that have a HART or INTENSOR protocol to the RS 232 C serial interface of a personal computer. This enables the transmitter to be remotely operated with the Endress+Hauser Commuwin II operating program.
The Commubox FXA 191 is used for intrinsically safe signal circuits.

Connecting to PROFIBUS-PA

PROFIBUS-PA is an open fieldbus standard to enable several sensors and actuators, including those in explosion-hazardous areas, to be connected to a bus line. With PROFIBUS-PA, two-wire looped instruments can be supplied by the sensor with power and digital process information.

The number of instruments operated by one bus segment is:
- up to 10 for EEx ia applications
- up to 32 for non-Ex applications



Cerabar S with PROFIBUS-PA

Installation Instructions

Mounting Instructions

- The protective cap should only be removed just before mounting in order to protect the diaphragm seal.
- The diaphragm seal and the pressure sensor together form a closed and calibrated system which is filled with filling fluid through a hole in the upper part. The following guidelines are to be observed:
  – This hole is sealed and is not to be opened.
  – When mounting, the Cerabar S is to be turned by the nut of the diaphragm seal and not by the hex nut.

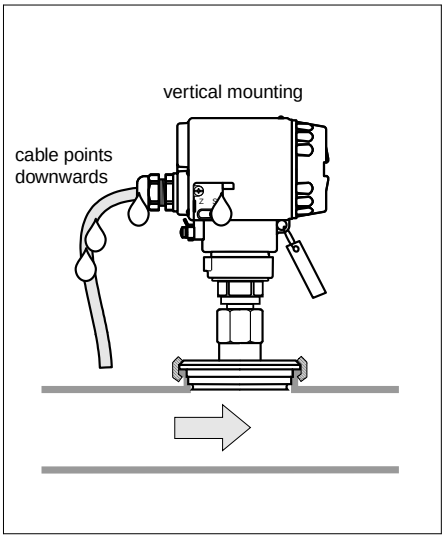
Cleaning

The metallic separating diaphragm of the diaphragm seal must not be pressed in or cleaned with pointed or hard objects.

Mounting

To protect against moisture:

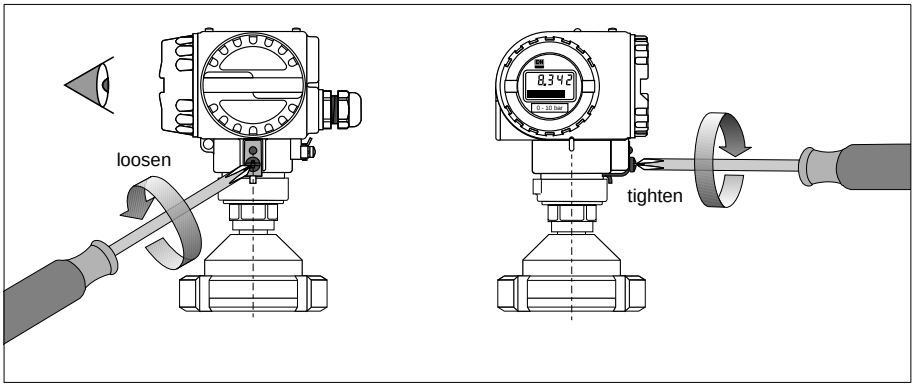
- The cable entry should preferably be pointing downwards.
- The cover for the Z/S keys is always on the side of the housing.



Position of the Cerabar S
- cable points downwards
- the cover of the Z/S keys is on the side of the housing

Rotating the Housing

By simply loosening the mounting screw, the housing over the process connection can be rotated through 270°. This can also be done when the instrument is mounted.



Loosen the screw underneath the connection compartment to rotate the housing.

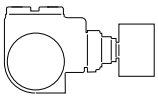
Shifting of the Zero Point due to Position

(see also diaphragm seal tables from page 16 onwards)

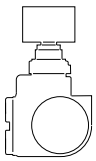
The Cerabar S is calibrated based on the limit point method according to DIN 16086.

Due to the hydrostatic column of fluid in the instrument, the zero point of the instrument depends on it being positioned between the vertical and horizontal planes. Diaphragm seals also shift the zero point depending on the orientation of the instrument:

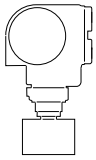
- Neutral calibration



- Max. positive zero point shift



- Max. negative zero point shift

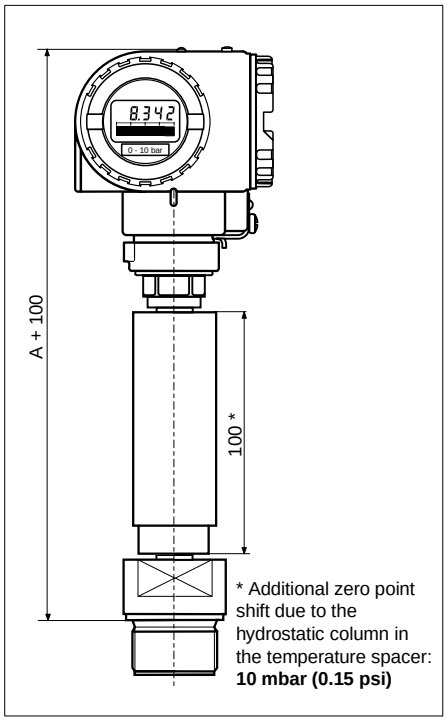


This shift of zero point caused by orientation can be fully compensated for once the instrument is mounted.

The max. effect of the orientation of all diaphragm seals are given in the tables on Page 16 onwards. These values apply to silicone oil. For the other fluids, the shift in zero point caused by orientation is dependent on the density of the particular fluid (see page 5).

Installation Instructions Continued

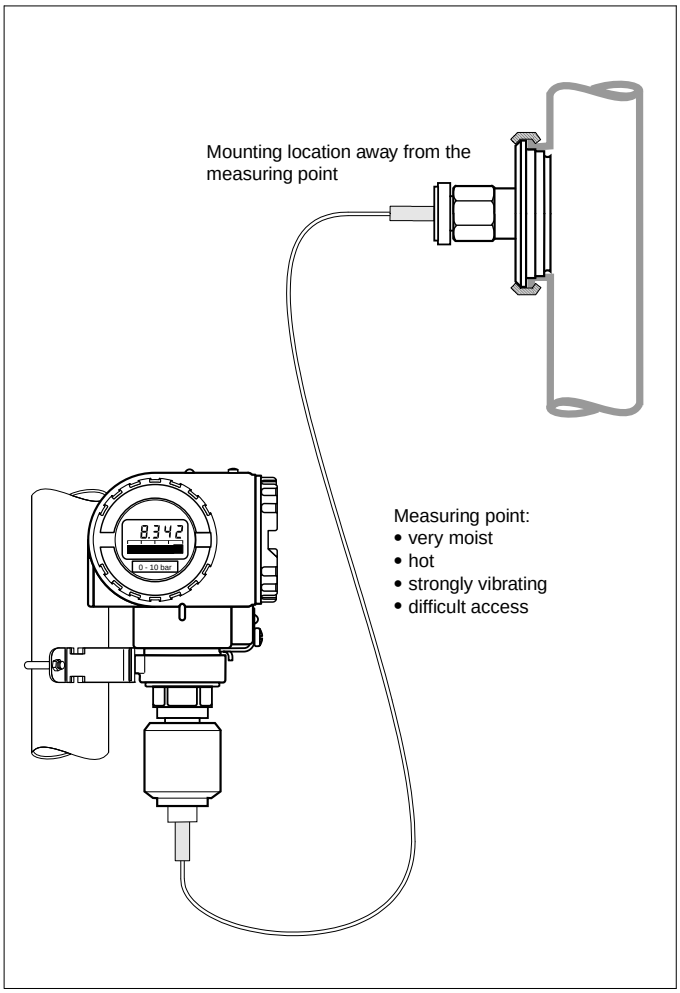
Mounting with Temperature Spacers
Temperature spacers are recommended when the continuous extreme temperature of the medium causes the maximum permissible ambient temperature to exceed +85°C (+185°F).

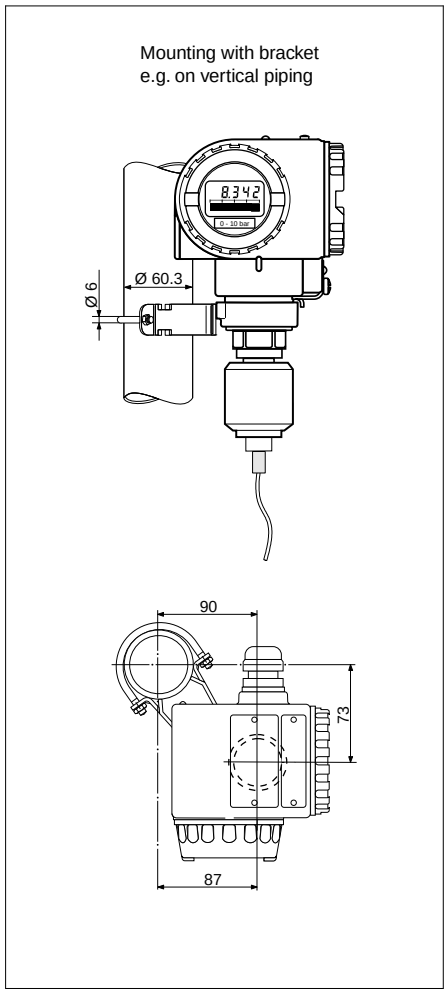


Mounting with Capillary Tubing
To protect against high temperatures, moisture or vibration or when the mounting point is not easily accessible, the housing of the Cerabar S can be mounted with capillary tubing away from the measuring point.
A mounting bracket for wall or pipe mounting is therefore available.
- Material: 1.4301 (SS 304)
- Order No.: 919706-0000

(Also as accessory in the product structure)

Dimensions
1 in = 25. 4 mm
1 mm = 0.039 in





Electrical Connection

Wiring 4…20 mA

The two-wire cable is connected to screw terminals (wire diameter 0.5…2.5 mm/ AWG 20…13) in the connecting compartment.

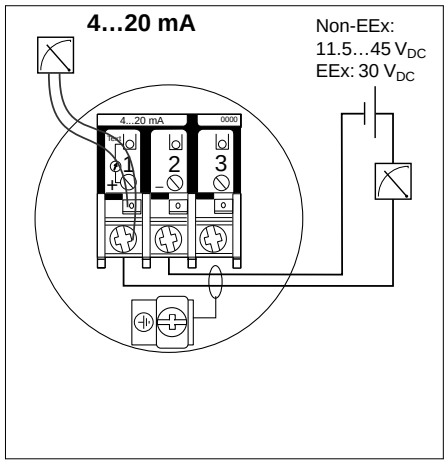
- Use screened transposed two-wire cabling.
- Supply voltage:
  – Non-EEx: 11.5…45 V_{DC}
  – EEx: 11.5…30 V_{DC}
- Internal protection circuits against reverse polarity, HF interference and overvoltage peaks (see TI 241F "EMC Guidelines")
- Test signal:
  The output current can be measured between terminal 1 and its terminal plug without interrupting the process measurement.

Wiring PROFIBUS-PA

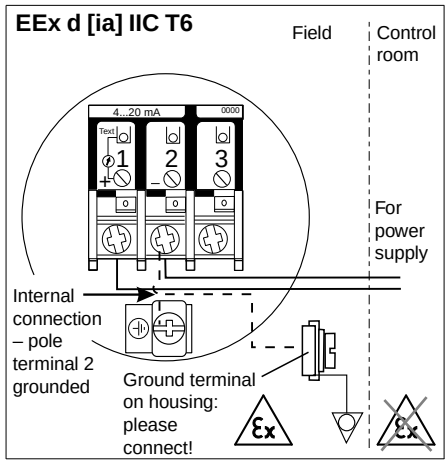
The digital communication signal is transmitted to the bus using a two-wire connecting cable. The bus cable also carries the power supply.

- Supply voltage:
  – Non-EEx: 9 V_{DC}…32 V_{DC}
  – EEx: 9 V_{DC}…24 V_{DC}
- Bus cable:
  Use screened twisted pairs. The following specifications must be observed when using the FISCO model (explosion protection):
  – Loop resistance (DC)
  15…150 Ω/km
  – Inductance 0.4…1 mH/km
  – Capacitance 80…200 nF/km

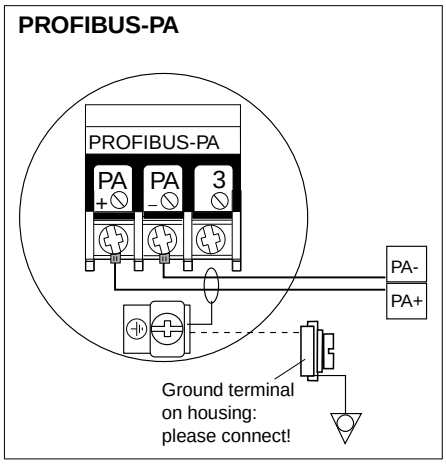
Instructions on connecting and grounding the network are given in TI 260F “Project Instructions for PROFIBUS-PA” as well as PROFIBUS-PA specifications.



Electrical connection:
Cerabar S for all versions with 4…20 mA



Electrical connection:
Cerabar S for version with flameproof enclosure
Structure PMC 631-I ❑ ❑ ❑ ❑ ❑ ❑ ❑ ❑ ❑



Electrical connection:
Cerabar S for versions with PROFIBUS-PA
(No effect on function with reversed polarity.)

Technical Data according to DIN 19 259

General Information

Manufacturer	Endress+Hauser
Designation	Cerabar S PMC 631, PMP 635

Application

Measurement of absolute and gauge pressure in gases, vapours and liquids

Operation and System Design

Measuring Principle

PMC 631	The pressure to be measured acts on the diaphragm of the diaphragm seal and is then transmitted by a filling fluid to the diaphragm of the pressure sensor. This causes a small displacement of the ceramic diaphragm of the sensor. The pressure-proportional change in capacitance is then measured by the electrodes at the ceramic sensor. Working volume: approx. 2 mm^3
PMP 635	The process pressure to be measured acts on the diaphragm of the diaphragm seal and is transmitted by a filling fluid to the metallic separating diaphragm of the sensor. The separating diaphragm is deflected and the resulting pressure proportional change in the voltage across the resistance bridge is then measured. Working volume: smaller than 1 mm^3

4…20 mA current output	Cerabar S and power supply, e.g. via the RN 221 transmitter power pack and operation via: – four keys on the instrument and a plug-in display module – Universal HART Communicator DXR 275 or Commulog VU 260 Z handheld terminals – PC with Commuwin II operating program via Commubox FXA 191
PROFIBUS-PA	Connection via segment coupler to PLC or PC, e.g. with Commuwin II operating program

Construction	All common diaphragm seal versions see page 6 and page 16 onwards
Signal transmission	– HART or INTENSOR: 4…20 mA analogue signal, 2-wire – PROFIBUS-PA: digital communication signal, 2-wire

Input

Measured variables	Absolute and gauge pressure

PMC 631					**PMP 635**				
Type of pressure	**Measure-ment limits**	**Nominal value**	**Min. span**	**Overload***	**Type of pressure**	**Measure-ment limits**	**Nominal value**	**Min. span**	**Overload**
	bar	**bar**	**bar**	**bar**		**bar**	**bar**	**bar**	**bar**
gauge	–0.4…0.4	0.4	0.02	10	**gauge**	–1…2.5	2.5	0.125	10
gauge	–1.0…2.0	2	0.1	20	**gauge**	–1…10	10	0.5	40
gauge	–1.0…10	10	0.5	40	**gauge**	–1…40	40**	2	160
gauge	–1.0…40	40	2	62	**gauge**	–1…100	100**	5	400
					gauge	–1…400	400**	20	600
absolute	0…0.4	0.4	0.02	10	**absolute**	0…2.5	2.5	0.125	10
absolute	0…2	2	0.1	20	**absolute**	0…10	10	0.5	40
absolute	0…10	10	0.5	40	**absolute**	0…40	40	2	160
absolute	0…40	40	2	62	**absolute**	0…100	100	5	400
					absolute	0…400	400	20	600

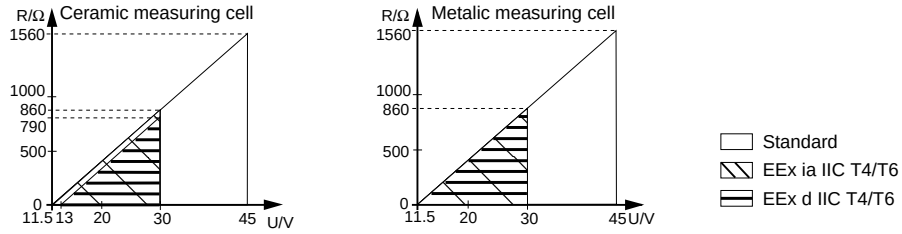
***** The overload limit applies to the cell only. The limit for diaphragm seals is given by their maximum permissible pressure.

****** Absolute pressure sensors

Adjusting the span (turndown)	20:1
Zero point increase and decrease	Within measurement limits

Output

4…20 mA with HART or INTENSOR protocol

Output signal	4…20 mA
Load 	
Signal on alarm For electronics E and H For electronics M and N	Optional 3.6 mA, 22 mA or HOLD (hold last current value) Optional 22 mA or HOLD (last current value will be held)
Integration time	0…16 s by switch on instrument, 0…40 s by handheld terminal

PROFIBUS-PA

Output signal	Digital communication signal PROFIBUS-PA
PA function	Slave
Transmission rate	31.25 kBit/s
Response time	Slave: approx. 20 ms PLC: 300…600 ms (depending on system coupler) for approx. 30 transmitters
Signal on alarm	optional –9999, +9999 or HOLD (last value will be held)
Communication resistance	PROFIBUS-PA termination resistor
Physical level	IEC 1158-2

Accuracy

Reference conditions	DIN IEC 770 T_U=25°C (77°F) Accuracy data adopted after entering »Low sensor calibration« and »High sensor calibration« for zero and nominal value
Linearity including hysteresis and reproducibility based on the limit point method to IEC 770	to TD 10:1: ± 0.2% of set span for TD 10:1 to 20:1: ±0.2% x [nominal value/(set span x 10)]
Linearity at low absolute pressure ranges (due to performance limits of currently available DKD calibration rigs)	Absolute: for > 30 mbar to <100 mbar: ±0.3% for ≤ 30 mbar: ±1% to the set span
Response time	Ceramic sensor: ±500 ms, metal sensor: ±400 ms
Rise time	150 ms (T_{90} time)
Long-term drift	Ceramic sensor: ±0.1% per year, Metal sensor: ±0.1% per year
Thermal effects (applies only to transmitters without diaphragm seals or capillary tubing)	For –10…+60°C (+14…+140°F): ± (0.1% x TD + 0.1%) For –40…–10°C (–40…+14°F), +60…+85°C (+140…+185°F): ± (0.2% x TD + 0.2%) TD = nominal value/set span
Temperature coefficient (maximum TK) (Set measuring span; for transmitters without diaphragm seals or capillary tubing only, for combined effects see diaphragm seal tables page 16 onwards)	For zero signal and span: ±0.02% of nominal value /10K for –10…+60°C (+14…+140°F) ±0.05% of nominal value / 10 K for –40…–10°C (–40…+14°F) and +60…+85°C (+140…+185°F)
Vibration effects	None (4 mm/0.16 in path peak-to-peak 5…15 Hz, 2 g: 15…150 Hz, 1 g: 150 Hz…2000 Hz)

Application conditions

Installation Conditions	Orientation as required, orientation-dependent zero shift up to 3 mbar can be adjusted.

Ambient conditions

Ambient temperature	–40…+85°C (–40…+185°F)
Ambient temperature range	–40…+100°C (–40…+212°F)
Storage temperature	–40…+100°C (–40…+212°F)
Climatic class	4K4H to DIN EN 60721-3
Protection	IP 65
Electromagnetic compatibility	Interference emission to EN 50081-1, Interference immunity to EN 50082-2 and NAMUR NE 21 Interference immunity to EN 61000-4-3: 30 V/m. Use twisted screened two-wire cabling for transmitters with INTENSOR, HART or PROFIBUS-PA protocol.

Process conditions

Material temperature	Depends on max. permissible temperature of the diaphragm seal fluid and the width of the diaphragm
Process pressure	Corresponds to permissible overload

Mechanical Construction

Design

Housing	Housing can be rotated, Separated electronics and connection compartments, Optional electrical connection via Pg 13.5 with cable gland or M 20 x 1.5, G ½, ½ NPT thread, Terminal connection for cable diameter 0.5…2.5 mm (AWG 20…13)
Process connections	All common diaphragm seal versions see page 6 and page 16 onwards

Materials

Housing	Cast aluminium housing with protective polyester-based powder coating RAL 5012 (blue), cover RAL 7035 (grey), seawater resistant, saltwater spray test DIN 50021 (504 h) passed
Nameplate	1.4301 (SS 304)
Process connections	1.4571 (SS 316Ti)
Process diaphragm PMC 631 PMP 635	1.4435 (SS 316L) optional 1.4435 (SS 316L), Hastelloy 2.4819, Tantal, PTFE film
O-ring for cover seal	NBR
Mounting accessories	with capillary bracket for pipe and wall mounting 1.4301 (SS 304)
Filling fluid in diaphragm seals	Silicone oil, vegetable oil, Glycerine, high temperature oil, Fluorolube oil-free for oxygen applications

Display and Operating Interface

Display and operating module

Display	Plug-in display module with four-character pressure display and analogue display (bargraph) of current with 28 segments
Operation	Four keys on the instrument

Communication interfaces

Handheld terminal	– HART: Universal HART Communicator DXR 275 – INTENSOR: Commulog VU 260 Z – for connecting anywhere along the 4…20 mA line – minimum line resistance: 250 Ω
PC for operating with the Commuwin II operating program	– via Commubox FXA 191 for connecting to serial interface of a PC – for connecting anywhere along the 4…20 mA line – minimum line resistance: 250 Ω
PROFIBUS-PA	Segment coupler for connecting to PLC or PC, e.g. with the Commuwin II operating program

Power Supply

Power voltage	Non-EEx area: 11.5…45 V_{DC} EEx area: 11.5…30 V_{DC}
Overvoltage category	III to DIN EN 61 010-1
Ripple Ripple with Smart transmitters	No effect for 4…20 mA signal up to ±5% residual ripple within permissible range INTENSOR max. ripple (measured at 500 Ω) 0…500 kHz: U_{PP}=30 mV HART max. ripple (measured at 500 Ω) 47…125 Hz: U_{PP}=200 mV max. noise (measured at 500 Ω) 500 Hz…10 kHz: U_{eff}=2.2 mV

Certificates and Approvals

Protection	see »Product Structure«
CE mark	By attaching the CE Mark, Endress+Hauser confirms that the instrument fulfils all the requirements of the relevant EC directives.

Order Code

see “Product Structure”

Supplementary Documentation

Cerabar S/ Deltabar S System Information: SI 020P/00/en
Cerabar S for all application ranges Technical Information: TI 216P/00/en
Project Planning PROFIBUS-PA Technical Information: TI 260F/00/en

Product Structure
Cerabar S PMC 631

Certificates, Approvals

R Standard
G Cenelec EEx ia IIC T4/T6 and ATEX II 1/2 G
I Cenelec EEx d [ia] IIC T6[1)] and ATEX II 2 G (with cable entry M 20x1.5, G ½, ½ NPT only)
O FM IS (non-incendive) Cl. I, II, III; Div. 1, Groups A…G[1)] (with cable entry ½ NPT only)
S CSA IS (non-incendive) Cl. I, II, III; Div. 1, Groups A…G[1)] (with cable entry ½ NPT only)
Y Others

1) Certificate not with electronics version PROFIBUS-PA

Housing: Type T4

with display module

1 Cable gland Pg 13.5
3 Cable entry M 20x1.5
5 Cable entry ½ NPT
7 Cable entry G ½
9 Others

without display module

2 Cable gland Pg 13.5
4 Cable entry M 20x1.5
6 Cable entry ½ NPT
8 Cable entry G ½

Ceramic Sensor: Nominal Value (Maximum Overload)

Gauge pressure: Limits –100 % rating –1 bar to +100 % value

1F	400 mbar	(10 bar)	40 kPa	(1.0 MPa)	6 psig	(150 psig)	150 inch H_2O	(150 psig)
1K	2 bar	(20 bar)	200 kPa	(2.0 MPa)	30 psig	(300 psig)	800 inch H_2O	(360 psig)
1P	10 bar	(40 bar)	1 MPa	(4.0 MPa)	150 psig	(600 psig)		
1S	40 bar	(62 bar)	4 MPa	(6.2 MPa)	600 psig	(850 psig)		

Absolute pressure: Limits 0…100 % rating

2F	400 mbar	(10 bar)	40 kPa	(1.0 MPa)	6 psia	(150 psig)
2K	2 bar	(20 bar)	200 kPa	(2.0 MPa)	30 psia	(300 psig)
2P	10 bar	(40 bar)	1 MPa	(4.0 MPa)	150 psia	(600 psig)
2S	40 bar	(62 bar)	4 MPa	(6.2 MPa)	600 psia	(850 psig)

9Y Others on request

Calibration and Technical Units

1 Calibrated from 0 to nominal value in mbar/bar
2 Calibrated from 0 to nominal value in kPa/MPa
3 Calibrated from 0 to nominal value in mm H_2O/m H_2O
4 Calibrated from 0 to nominal value in inch H_2O
5 Calibrated from 0 to nominal value in kgf/cm^2
6 Calibrated from 0 to nominal value in psi
9 Calibrated from… to … technical units

Electronics Version, Communication

E 4…20 mA passive, INTENSOR
N 4…20 mA passive, INTENSOR with linearisation and other functions
H 4…20 mA passive, HART
M 4…20 mA passive, HART with linearisation and other functions
P PROFIBUS-PA
Y Others

Accessories

1 None
2 Bracket for pipe and wall mounting
9 Others

Filling Fluid in Diaphragm Seal and Coupling to Cerabar S

A Silicone oil, direct
D Vegetable oil, direct
E Glycerine, direct
G High-temperature oil with spacer 100 mm (3.9 in)
K High-temperature oil with capillary 1 m (3.28 ft)
L Silicone oil with capillary 1 m (3.28 ft)
N Fluorolube, oil-free for oxygen
Y Others

Diaphragm and Pipe Diaphragm Seal for Hygienic Application, Standard, Diameter, Pressure Rating

Diaphragm seal

AB DIN 11 851, DN 25, PN 40
AG DIN 11 851, DN 32, PN 40
AH DIN 11 851, DN 40, PN 40
AL DIN 11 851, DN 50, PN 40

DG Clamp, DN 1,5", PN 40
DL Clamp, DN 2", PN 40

EB SMS, DN 1", PN 40
EG SMS, DN 1½", PN 40
EL SMS, DN 2", PN 40

FB RJT, DN 1", PN 40
FG RJT, DN 1½", PN 40
FL RJT, DN 2", PN 40

GB ISS, DN 1", PN 40
GG ISS, DN 1½", PN 40
GL ISS, DN 2", PN 40

KL DRD flange, D=65 mm, 1.4435

LL Varivent, D=68 mm, 1.4435

Pipe diaphragm seal

PH DIN 11 851, DN 40, PN 40
PL DIN 11 851, DN 50, PN 40

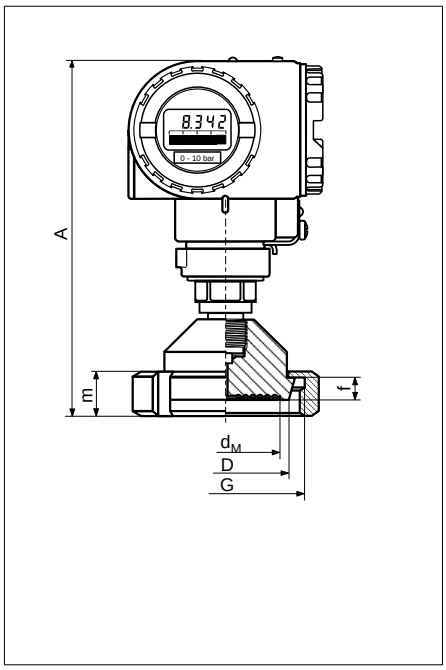
SA Clamp, DN ¾", PN 40
SB Clamp, DN 1", PN 40
SG Clamp, DN 1½", PN 40
SL Clamp, DN 2", PN 40

YY Special version

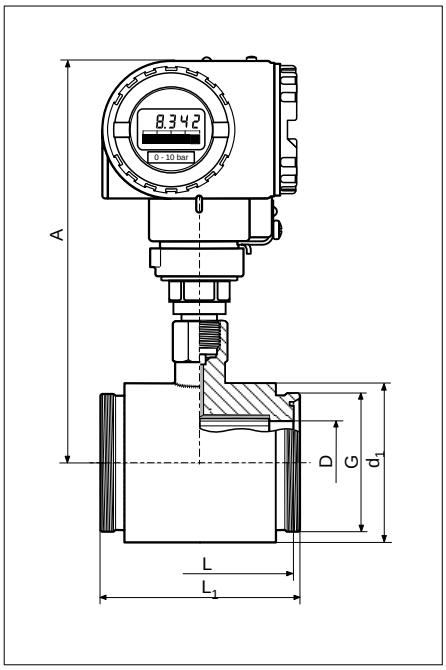
PMC 631									Product designation

Dimensions
Cerabar S PMC 631

Diaphragm Seal
Conical Sleeve with Groove Nut,
DIN 11 851 (Sanitary Connection)



Pipe Diaphragm Seal
Threaded Nozzle DIN 11 851
(Sanitary Connection)



Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

Materials of wetted parts for both versions
Diaphragm 1.4435/1.4571(SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)

Diaphragm seal
Conical sleeve with groove nut DIN 11 851 (sanitary connection)

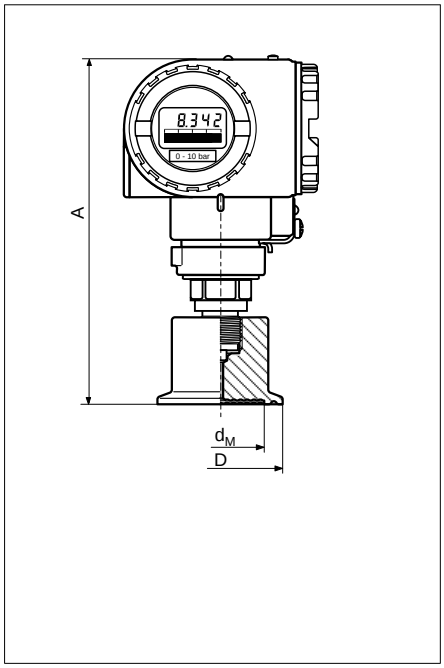
Instrument	Code	Pipe	Conical sleeve			Groove nut		Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Sleeve height	Thread	Height	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	f	G	m	d_M	Ambient	Process			max. A	
		mm	bar	mm	mm		mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	AB	25	40	44	10	Rd 52 x 1/6"	21	26	+6	+6	from 6	8	200	1.7
PMC 631	AG	32	40	50	10	Rd 58 x 1/6"	21	32	+3	+4	from 2	9	200	1.8
PMC 631	AH	40	40	56	10	Rd 65 x 1/6"	21	38	+2	+4	from 0.4	9	200	1.8
PMC 631	AL	50	40	68	11	Rd 78 x 1/6"	25	46	+1	+2	from 0.1	8	193	2.0

Pipe diaphragm seal
Threaded nozzle DIN 11 851 (sanitary connection)

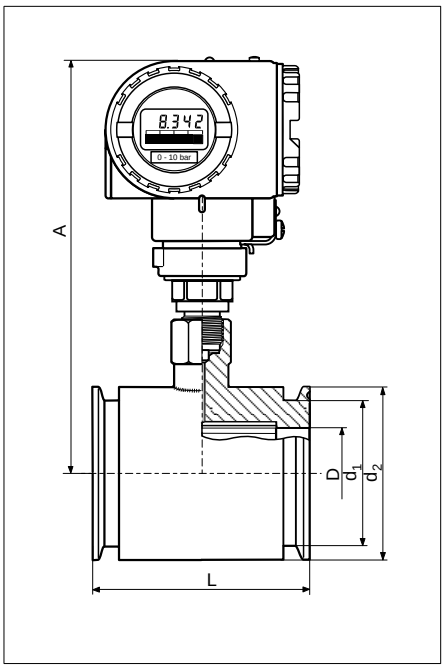
Instrument	Code	Pipe	Conical sleeve				Diaphragm seal							
		Nominal diameter	Nominal pressure	Diameter	Diameter	Thread	Installed length	Overall length	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	d_1	G	L	L_1	Ambient	Process			max. A	
		mm	bar	mm	mm		mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	PH	40	40	38.5	78	Rd 65 x 1/6"	100	114	+2	+4	from 0.4	10	200	3.8
PMC 631	PL	50	40	50.7	88	Rd 78 x 1/6"	100	114	+1	+2	from 0.1	11	205	4.2

Dimensions
Cerabar S PMC 631

Clamp



Clamp Pipe Diaphragm Seal



Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

Materials of wetted parts for both versions
Diaphragm 1.4435/1.4571 (SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)

Diaphragm seal Clamp

Instrument	Code	Pipe	Clamp		Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	d_M	Ambient	Process			max. A	
			bar	mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	DG	1½"	40	50.5	36	+3	+4	from 0.4	8	177	1.4
PMC 631	DL	2"	40	64	48	+1	+2	from 0.1	9	187	1.6

Pipe diaphragm seal Clamp

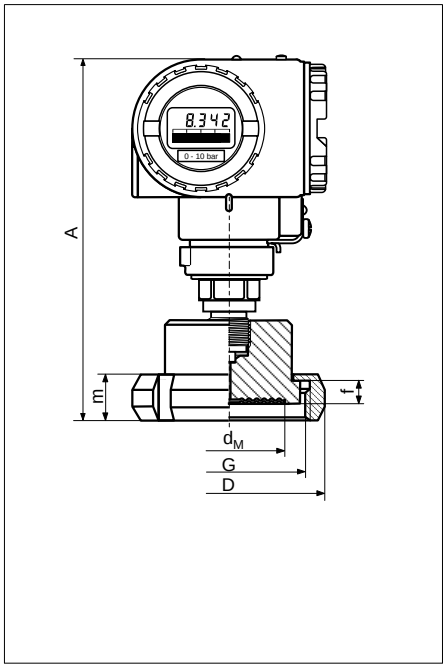
Instrument	Code	Pipe	Clamp				Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Diameter	Diameter	Installed length	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	d_1	d_2	L	Ambient	Process			max. A	
			bar	mm	mm	mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	SA	¾"	40	19.1	20.1	24.9	97.5	+7	+11	from 6	8	173	3
PMC 631	SB	1"	40	25.4	43.7	50	114	+4	+8	from 2	8	173	3.4
PMC 631	SG	1½"	40	35.5	40	50.5	146.1	+2	+4	from 0.4	9	210	3.8
PMC 631	SL	2"	40	48.6	55	64	156	+1	+2	from 0.1	11	217	4.2

Dimensions
Cerabar S PMC 631

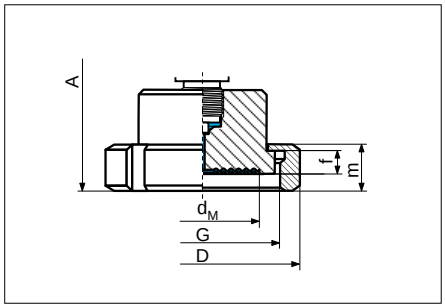
Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

Materials of wetted parts for both versions
Diaphragm 1.4435/1.4571 (SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)

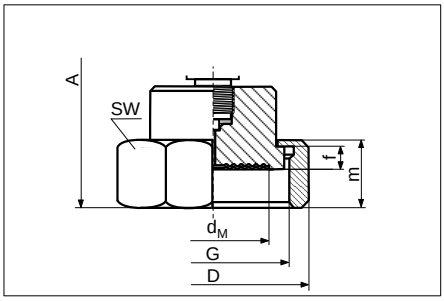
SMS Sleeve with Groove Nut



RJT Sleeve with Groove Nut



ISS Sleeve with Groove Nut



Diaphragm seal SMS sleeve with groove nut

Instrument	Code	Pipe	Conical sleeve			Groove nut		Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Sleeve height	Thread	Height	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	f	G	m	d_M	Ambient	Process			max. A	
			bar	mm	mm		mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	EB	1"	40	51	3.5	Rd 40 - 1/6"	20	24	+9	+9	from 6	9	204	1.4
PMC 631	EG	1½"	40	74	4	Rd 60 - 1/6"	25	34	+4	+4	from 0.4	8	204	1.8
PMC 631	EL	2"	40	84	4	Rd 70 - 1/6"	26	46	+2	+2	from 0.1	9	204	2.0

Diaphragm seal RJT sleeve with groove nut

Instrument	Code	Pipe	Conical sleeve			Groove nut		Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Sleeve height	Thread	Height	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	f	G	m	d_M	Ambient	Process			max. A	
			bar	mm	mm		mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	FB	1"	40	57	6.4	1 13/16" x 1/8"	20	20	+10	+10	from 6	9	202	1.6
PMC 631	FG	1½"	40	72	6.4	2 5/16" - 1/8"	21	28	+8	+8	from 0.4	8	202	2.0
PMC 631	FL	2"	40	86	6.4	2 7/8" - 1/8"	22	38	+3	+4	from 0.1	9	202	2.1

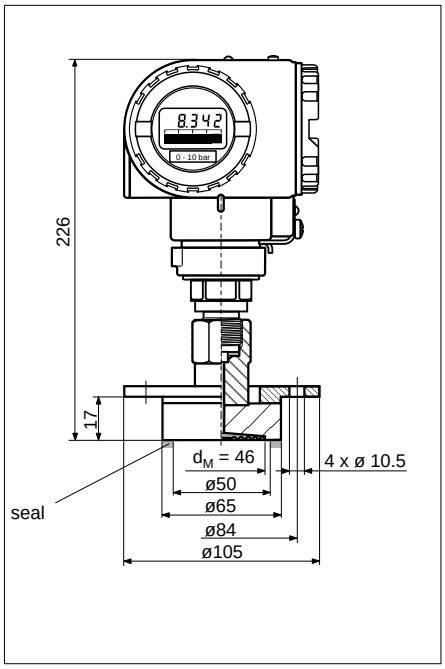
Diaphragm seal ISS sleeve with groove nut

Instrument	Code	Pipe	Conical sleeve			Groove nut			Diaphragm seal						
		Nominal diameter	Nominal pressure	Diameter	Sleeve height	Thread	Height	Across flats	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	D	f	G	m	SW	d_M	Ambient	Process			max. A	
			bar	mm	mm		mm	mm	mm	mbar/10K	mbar/10K	bar	mbar	mm	kg
PMC 631	GB	1"	40	SW 47	4	1 1/2" x 1/8"	30	47	24	+9	+9	from 6	9	210	1.6
PMC 631	GG	1½"	40	SW 62	4	2" - 1/8"	30	62	34	+4	+4	from 0,4	8	210	1.8
PMC 631	GL	2"	40	SW 77	4	2 1/2" - 1/8"	30	77	45	+2	+2	from 0.1	9	210	2.2

Dimensions
Cerabar S PMC 631

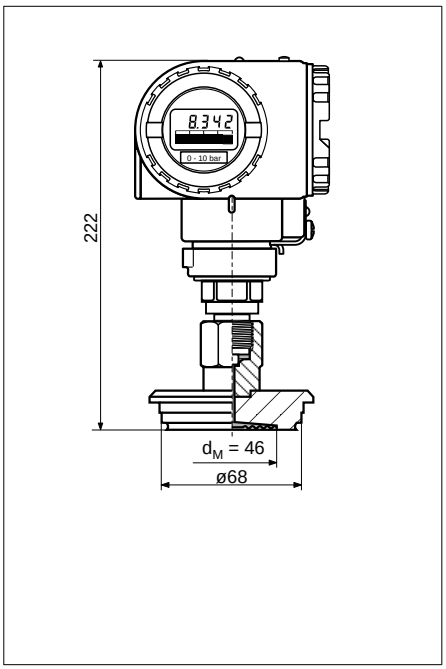
Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

DRD Flange (Code KL)



- Material of diaphragm: 1.4435/1.4571 (SS 316L/SS 316Ti)
- Material of body: 1.4571 (SS 316Ti)
- PN: 40
- T_K Ambient: +2 mbar/10 K
- T_K Process: +2 mbar/10 K
- Recommend min. measuring range: from 0.1 bar
- Max. effect of orientation: 11 mbar
- Weight: 2 kg

Varivent (Code LL)



- Material of diaphragm: 1.4435/1.4571 (SS 316L/SS 316Ti)
- Material of body: 1.4571 (SS 316Ti)
- PN: 40
- T_K Ambient: +2 mbar/10 K
- T_K Process: +2 mbar/10 K
- Recommend min. measuring range: from 0.1 bar
- Max. effect of orientation: 10 mbar
- Weight: 1.7 kg

Product Structure
Cerabar S PMP 635

Certificates, Approvals

R Standard
G Cenelec EEx ia IIC T4/T6 and ATEX II 1/2 G
I Cenelec EEx d IIC T5/T6 [1] and ATEX II 2 G (with cable entry M 20 x1,5, ½ NPT, G ½ only)
O FM IS (non-incendive) Cl. I, II, III; Div. 1, Groups A…G (with cable entry ½ NPT only)
Q FM Explosion proof Cl. I, II, III; Div. 1, Groups A…G (with cable entry ½ NPT only)
S CSA IS (non-incendive) Cl. I, II, III; Div. 1, Groups A…G ((with cable entry ½ NPT only)
U CSA Explosion proof Cl. I, II, III; Div. 1, Groups B…G (with cable entry ½ NPT only)
Y Others

[1] Certificate not with electronics version PROFIBUS-PA

Housing: Type T4

with display module

1 Cable gland Pg 13.5
3 Cable entry M 20x1.5
5 Cable entry ½ NPT
7 Cable entry G ½
9 Others

without display module

2 Cable gland Pg 13.5
4 Cable entry M 20x1.5
6 Cable entry ½ NPT
8 Cable entry G ½

Metal sensor: Nominal Value (Maximum Overload)

Gauge pressure: Limits –100 % rating –1 bar to +100 % value

3L	2.5bar	(10 bar)	250 kPa	(1.0 MPa)	38 psig	(152 psig)	1000 inch H_2O (4000 psig)
3P	10 bar	(40 bar)	1 MPa	(4 MPa)	150 psig	(600 psig)	
3S	40 bar	(160 bar)	4 MPa	(16 MPa)	600 psig	(2400 psig)	
3U	100 bar	(400 bar)	10 MPa	(40 MPa)	1500 psig	(6000 psig)	
3Z	400 bar	(600 bar)	40 MPa	(60 MPa)	6000 psig	(8500 psig)	

Absolute pressure: Limits 0…100 % rating

4L	2.5bar	(10 bar)	250 kPa	(1.0 MPa)	38 psia	(152 psia)	1000 inch H_2O (4000 psig)
4P	10 bar	(40 bar)	1 MPa	(4 MPa)	150 psia	(600 psia)	
4S	40 bar	(160 bar)	4 MPa	(16 MPa)	600 psia	(2400 psia)	
4U	100 bar	(400 bar)	10 MPa	(40 MPa)	1500 psia	(6000 psia)	
4Z	400 bar	(600 bar)	40 MPa	(60 MPa)	6000 psia	(8500 psia)	

Calibration and Technical Units

1 Calibrated from 0 to nominal value in mbar/bar
2 Calibrated from 0 to nominal value in kPa/MPa
3 Calibrated from 0 to nominal value in mm H_2O/m H_2O
4 Calibrated from 0 to nominal value in inch H_2O
5 Calibrated from 0 to nominal value in kgf/cm²
6 Calibrated from 0 to nominal value in psi
9 Calibrated from… to … technical units

Electronics Version, Communication

E 4…20 mA passive, INTENSOR
N 4…20 mA passive, INTENSOR with linearisation and other functions
H 4…20 mA passive, HART
M 4…20 mA passive, HART with linearisation and other functions
P PROFIBUS-PA
Y Others

Accessories

1 None
2 Bracket for pipe and wall mounting
9 Others

Filling Fluid in Diaphragm Seal and Coupling to Cerabar S

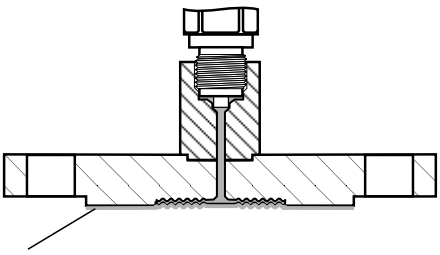
A Silicone oil, direct
D Vegetable oil, direct
E Glycerine, direct
G High-temperature oil with spacer 100 mm (3.9 in)
K High-temperature oil with capillary 1 m (3.28 ft)
L Silicone oil with capillary 1 m (3.28 ft)
N Fluorolube, oil-free for oxygen
Y Others

Code for Process Connection Version **see Page 21 ff.**

Material of Diaphragm

1 1.4435 (SS 316L)
2 Hastelloy 2.4819 (for flanges without extension only)
5 Tantalum (for flanges without extension only)
7 PTFE film 0.09 mm on 1.4435 (SS 316L)
(for flanges without extension only, not for use in vacuum)
8 PTFE film 0.25 mm (on 1.4435 (SS 316L)
(for flanges without extension only,
for Ex-free area only, not for use in vacuum)

PMP 635										Product designation



For diaphragms in Hastelloy, Tantalum and PTFE only: diaphragm covers the entire surface of the process connection exposed to the process.

Product Structure
Process Connections
Cerabar S PMP 635

Process Connection
Standard, Nominal Diameter, Nominal Pressure, Version
Screw thread

AF G 1 A, DIN ISO 228/1, from 10 bar span
AG G 1½ A, DIN ISO 228/1, from 0.4 bar span
AR G 2 A, DIN ISO 228/1, from 0.1 bar span
BF 1 NPT A, ANSI B 1.201, from 10 bar span
BG 1½ NPT A, ANSI B 1.201, from 0,4 bar span
BR 2 NPT A, ANSI B 1.201, from 0.1 bar span
CA Separator with G ½ A, DIN 16 288, Form B hexagonal
DA Separator with ½ NPT A, ANSI B 1.201

Flanges, dimensions to DIN 2501,
with raised face Form D to DIN 2526

EC DN 25, PN 64/160
ED DN 25, PN 250
EF DN 25, PN 400
EK DN 50, PN 10/40
EM DN 50, PN 64
EN DN 50, PN 100/160
EP DN 50, PN 250
ER DN 50, PN 400
EU DN 80, PN 10/40

Flanges with extension, dimensions to DIN 2501,
with raised face Form D to DIN 2526

FK DN 50, PN10/40, extended diaphragm 50 mm
GK DN 50, PN 10/40, extended diaphragm 100 mm
JK DN 50, PN 10/40, extended diaphragm 200 mm
FU DN 80, PN 10/40, extended diaphragm 50 mm
GU DN 80, PN 10/40, extended diaphragm 100 mm
JU DN 80, PN 10/40, extended diaphragm 200 mm

Flanges, dimensions to ANSI B 16.5, with raised face

KD 1", 400/600 lbs
KE 1", 900/1500 lbs
KF 1", 2500 lbs
KJ 2", 150 lbs
KK 2", 300 lbs
KL 2", 400/600 lbs
KM 2"; 900/1500 lbs
KN 2", 2500 lbs
KU 3", 150 lbs
KV 3", 300 lbs
KW 4", 150 lbs
KX 4", 300 lbs

Flanges with extension, dimensions to ANSI B 16.5, with raised face

LJ 2", 150 lbs, extended diaphragm 2"
MJ 2", 150 lbs, extended diaphragm 4"
NJ 2", 150 lbs, extended diaphragm 6"
LU 3", 150 lbs, extended diaphragm 2"
MU 3", 150 lbs, extended diaphragm 4"
NU 3", 150 lbs, extended diaphragm 6"
PU 3", 150 lbs, extended diaphragm 8"
MV 3", 300 lbs, extended diaphragm 4"
PV 3", 300 lbs, extended diaphragm 8"
LW 4", 150 lbs, extended diaphragm 2"
MW 4", 150 lbs, extended diaphragm 4"
NW 4", 150 lbs, extended diaphragm 6"

YY Special version

Code of process connection

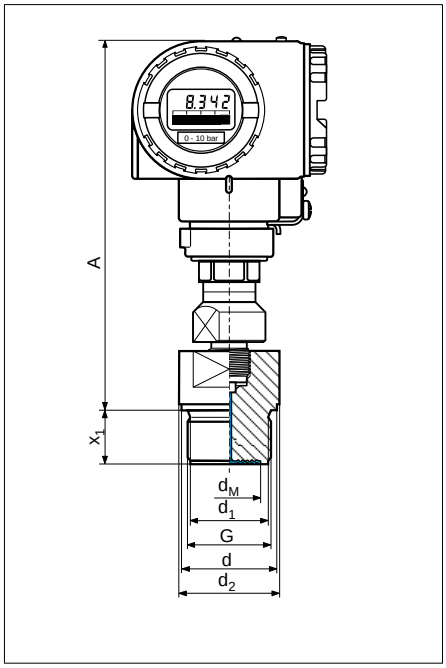
Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

Dimensions
Cerabar S PMP 635

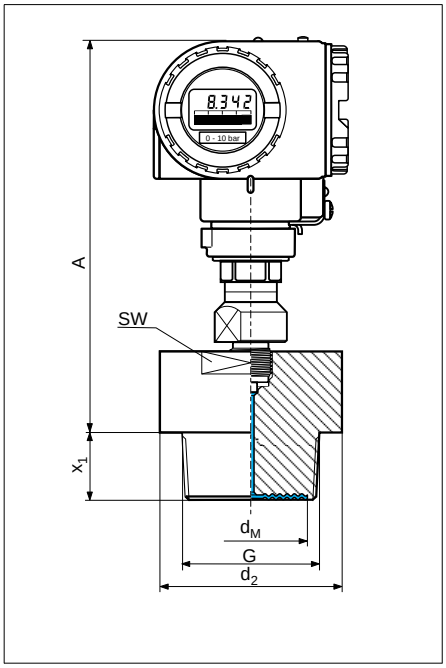
Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

Materials of wetted parts for both versions
Diaphragm 1.4435/1.4571 (SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)

G Screw Thread



NPT Screw Thread

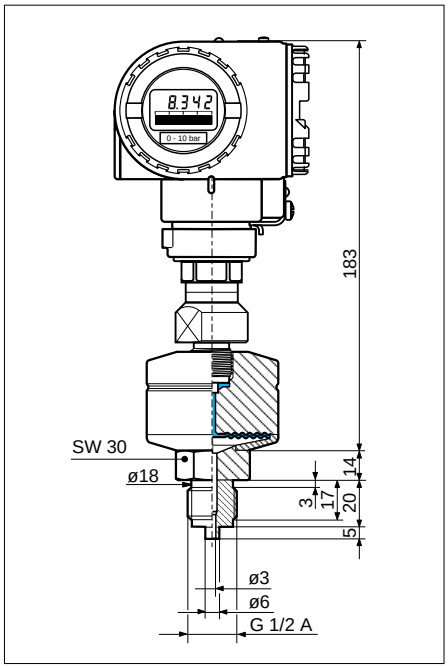


Screw thread G and NPT

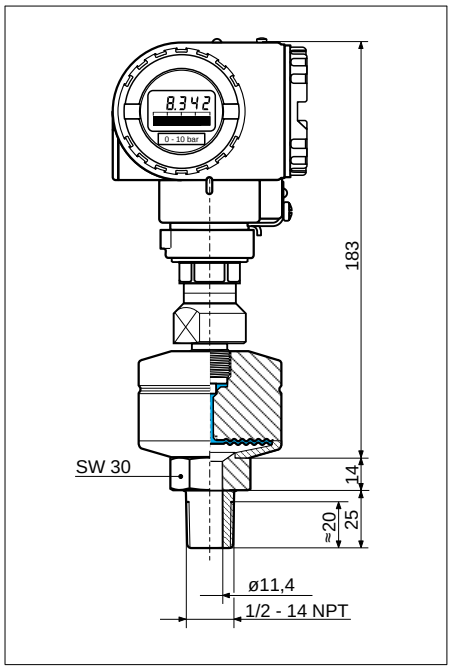
Instrument	Code	Screw thread	Nominal pressure	Diameter	Diameter	Diameter	Threaded length	Across flats	Diaphragm seal						
		Screw thread	Nominal pressure	Diameter	Diameter	Diameter	Threaded length	Across flats	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Recommend min. measuring range	Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
			PN	d_1	d	d_2	x_1	SW	d_M	Ambient	Process			max. A	
			bar	mm	mm	mm	mm	mm	mm	mbar/10K		bar	mbar	mm	kg
PMP 635	AF	G 1	400	29	39	SW 41	21	41	28	+6	+6	from 6	10	175	1.6
PMP 635	AG	G 1½	400	44	55	58	30	41	38	+2	+4	from 2	11	177	2.3
PMP 635	AR	G 2	400	56	68	78	30	60	46	+1	+2	from 0.4	11	182	3.3
PMP 635	BF	1 NPT	400	–	–	SW 41	23	41	23	+9	+9	from 10	11	180	1.9
PMP 635	BG	1½ NPT	400	–	–	52	30	46	32	+5	+5	from 0.4	11	178	2.3
PMP 635	BR	2 NPT	400	–	–	78	30	65	36	+3	+4	from 0.1	11	178	3.2

Separator with G ½ A; DIN 16 288 Form B hexagonal (Code CA)

left: separator with G ½ A:
- Material of diaphragm: 1.4435/1.4571 (SS 316L/SS 316Ti)
- Material of body: 1.4571 (SS 316Ti)
- PN: 40
- T_K ambient: +1 mbar/10 K
- T_K process: +2 mbar/10 K
- Recommend min. measuring range: from 0.1 bar
- Max. effect of orientation: 7 mbar
- Weight: 1.6 kg



Separator with ½ NPT, ANSI B 1.20.2 (Code DA)



right: separator with ½ NPT:
- Material of diaphragm: 1.4435/1.4571 (SS 316L/SS 316Ti)
- Material of body: 1.4571 (SS 316Ti)
- PN: 40
- T_K ambient: +1 mbar/10 K
- T_K process: +2 mbar/10 K
- Recommend min. measuring range: from 0.1 bar
- Max. effect of orientation: 7 mbar
- Weight: 1.6 kg

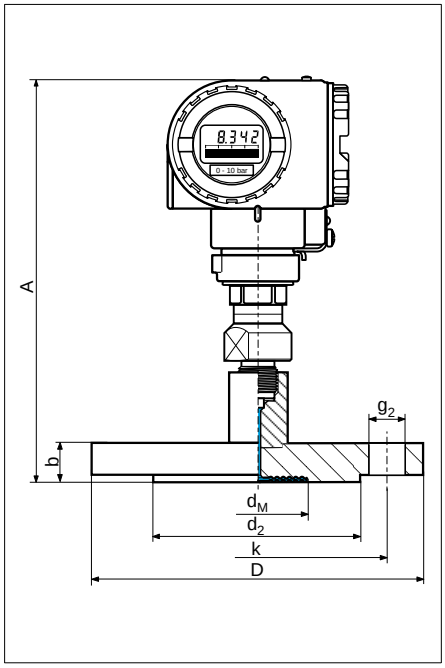
Dimensions
Cerabar S PMP 635

Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

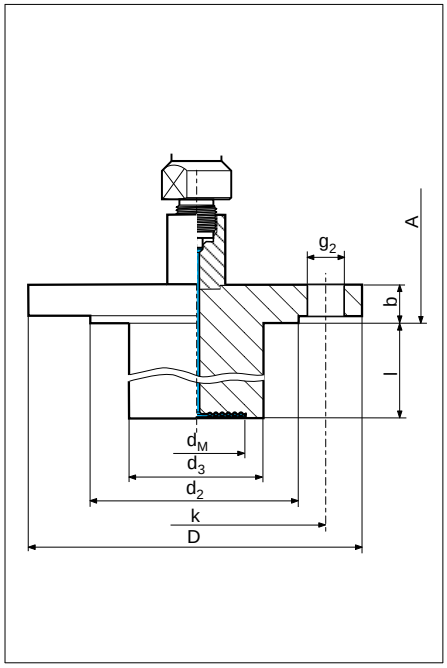
left:
Material of diaphragm
see Product Structure
Body 1.4571 (SS 316Ti)

right:
Diaphragm
1.4435/1.4571 (SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)
Other materials on request

ANSI Flange



ANSI Flange with Extended Diaphragm



Diaphragm seal: flanges, connection dimensions as ANSI 16.5, with raised face

Instrument	Code	Pipe	Flange						Bolt holes			Diaphragm seal					
		Nominal diameter	Nominal pressure	Extension length	Extension diameter	Diameter	Thickness	Raised face	Number	Diameter	Pitch diameter	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	l	d_3	D	b	d_2		g_2	k	d_M	Ambient	Process		max. A	
			lb/sq.in		inch	inch	inch	mm		inch	inch	inch	mbar/10K		mbar	mm	kg
PMP 635	KD	1"	400/600	–	–	4.88	0.69	2.0	4	0.75	3.50	1.10	+8	+8	10	200	2.9
PMP 635	KE	1"	900/1500	–	–	1.32	1.12	2.00	4	1.00	4.00	1.10	+8	+8	10	200	4.87
PMP 635	KF	1"	2500	–	–	6.25	1.38	2.00	4	1.00	4.25	1.10	+8	+8	10	200	6.26
PMP 635	KJ	2"	150	–	–	6.00	0.75	3.62	4	0.75	4.75	1.81	+3	+1	10	200	3.72
PMP 635	LJ	2"	150	2"	48.3	6.00	0.75	3.62	4	0.75	4.75	1.77	+1	+2	15	200	4.9
PMP 635	MJ	2"	150	4"	48.3	6.00	0.75	3.62	4	0.75	4.75	1.77	+1	+2	20	200	5.3
PMP 635	NJ	2"	150	6"	48.3	6.00	0.75	3.62	4	0.75	4.75	1.77	+1	+2	25	200	5.6
PMP 635	KK	2"	300	–	–	6.50	0.88	3.62	8	0.75	5.00	1.81	+1	+2	10	203	4.48
PMP 635	KL	2"	400/600	–	–	6.50	1.00	3.62	8	0.75	5.00	1.81	+1	+2	10	212	5.45
PMP 635	KM	2"	900/1500	–	–	8.50	1.50	3.62	8	1.00	6.50	1.81	+1	+2	10	225	11.4
PMP 635	KN	2"	2500	–	–	9.25	2.00	3.62	8	1.12	6.75	1.81	+1	+2	10	238	16.9
PMP 635	KU	3"	150	–	–	7.50	0.94	5.00	4	0.75	6.00	3.14	+1	+2	11	200	6.23
PMP 635	LU	3"	150	2"	76	7.50	0.94	5.00	4	0.75	6.00	2.83	+1	+2	16	200	7.3
PMP 635	MU	3"	150	4"	76	7.50	0.94	5.00	4	0.75	6.00	2.83	+1	+3	21	200	7.9
PMP 635	NU	3"	150	6"	76	7.50	0.94	5.00	4	0.75	6.00	2.83	+1	+3	23	200	8.2
PMP 635	PU	3"	150	8"	76	7.50	0.94	5.00	4	0.75	6.00	2.83	+1	+3	31	200	8.7
PMP 635	KV	3"	300	–	–	8.25	1.12	5.00	8	0.88	6.62	3.14	+1	+2	11	205	8.11
PMP 635	MV	3"	300	4"	76	8.25	1.12	5.00	8	0.88	6.62	2.83	+1	+2	16	205	7.9
PMP 635	PV	3"	300	8"	76	8.25	1.12	5.00	8	0.88	6.62	2.83	+1	+3	26	205	8.7
PMP 635	KW	4"	150	–	–	9.00	0.94	6.19	8	0.75	7.50	3.14	+1	+2	11	205	8.3
PMP 635	LW	4"	150	2"	94	9.00	0.94	6.19	8	0.75	7.50	3.50	+1	+2	16	200	9.4
PMP 635	MW	4"	150	4"	94	9.00	0.94	6.19	8	0.75	7.50	3.50	+1	+3	21	200	10.0
PMP 635	NW	4"	150	6"	94	9.00	0.94	6.19	8	0.75	7.50	3.50	+1	+3	26	200	10.3
PMP 635	KX	4"	300	–	–	10.00	1.25	6.19	8	0.88	7.88	3.14	+1	+2	12	208	12.8

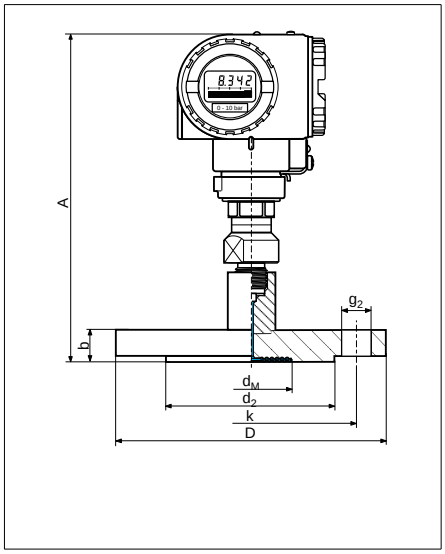
Dimensions
Cerabar S PMP 635

Conversion factors
- 1 mm = 0.039 in
  1 in = 25. 4 mm
- 1 kg = 2.2 lbs
  1 lbs = 0.45 kg
- 1 bar = 14.5 psi
  1 psi = 0.069 bar

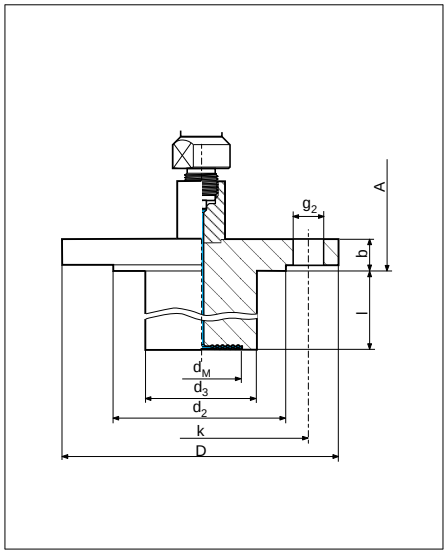
left:
Material of diaphragm
see Product Structure
Body 1.4571 (SS 316Ti)

right:
Diaphragm
1.4435/1.4571 (SS 316L/SS 316Ti)
Body 1.4571 (SS 316Ti)
Other materials on request

DIN Flange



DIN Flange with Extended Diaphragm



Diaphragm seal: flanges, connection dimensions as DIN 2501, with raised face form D to DIN 2526

Instrument	Code	Pipe	Flange						Bolt holes			Diaphragm seal					
		Nominal diameter	Nominal pressure	Extension length	Extension diameter	Diameter	Thickness	Raised face	Number	Diameter	Pitch diameter	Diaphragm diameter	Temperature coefficient T_K (for silicone oil, other oils, see page 5)		Max. effect of orientation (see page 9)	Height Cerabar S	Total weight
		DN	PN	l	d_3	D	b	d_2		g_2	k	d_M	Ambient	Process		max. A	
			bar	mm	mm	mm	mm	mm		mm	mm	mm	mbar/10K		mbar	mm	kg
PMP 635	EC	25	64/160	–	–	140	–	68	4	18	100	28	+8	+8	11	204	2.90
PMP 635	ED	25	250	–	–	150	–	68	4	22	105	28	+8	+8	11	204	5.45
PMP 635	EF	25	400	–	–	180	–	68	4	26	130	28	+8	+8	11	204	11.40
PMP 635	EK	50	10/40	–	–	165	20	102	4	18	125	46	+1	+2	10	204	3.72
PMP 635	EM	50	64	–	–	180	20	102	4	22	135	46	+1	+2	11	204	6.26
PMP 635	EN	50	100/160	–	–	195	20	102	4	26	145	46	+1	+2	11	204	16.90
PMP 635	EP	50	250	–	–	200	20	102	8	26	150	46	+1	+2	11	204	2.90
PMP 635	ER	50	400	–	–	235	52	102	8	30	180	52	+1	+2	11	204	9.9
PMP 635	FK	50	10/40	50	48.3	165	20	102	4	18	125	46	+1	+2	15	204	4.48
PMP 635	GK	50	10/40	100	48.3	165	20	102	4	18	125	46	+1	+2	20	204	8.11
PMP 635	JK	50	10/40	200	48.3	165	20	102	4	18	125	46	+1	+2	30	204	3.72
PMP 635	EU	80	10/40	–	–	200	24	138	8	18	160	70	+1	+2	11	204	6.23
PMP 635	FU	80	10/40	50	76.5	200	24	138	8	18	160	70	+1	+2	16	204	6.23
PMP 635	GU	80	10/40	100	76.5	200	24	138	8	18	160	70	+1	+3	21	204	4.48
PMP 635	JU	80	10/40	200	76.5	200	24	138	8	18	160	70	+1	+3	31	204	8.11

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