

Special Documentation

Cerabar PMC71B, PMP71B

Custody transfer

4 to 20 mA, HART



1 About this document

1.1 Document function

This manual is Special Documentation that describes the use of the device for custody transfer.

NOTICE

When installing:

- Observe the Operating Instructions for the device.

1.2 Using this document

1.2.1 Information on the document structure



Additional information regarding:

- The arrangement of the parameters, along with a short description, according to the **Operation** menu, **Setup** menu, **Diagnostics** menu: see the Operating Instructions
- Operating concept: see the Operating Instructions

1.3 Symbols

1.3.1 Symbols for certain types of information

Symbol	Meaning
	Tip Indicates additional information.
	Notice or individual step to be observed
	Series of steps
	Result of a step

1.3.2 Symbols in graphics

Symbol	Meaning
	Item numbers
	Series of steps within an image

1.4 Documentation

This manual is Special Documentation. It does not replace the Operating Instructions supplied with the device.

Detailed information can be found in the Operating Instructions and in the other documentation available at "[www.endress.com/ deviceviewer](http://www.endress.com/deviceviewer)".

The Special Documentation is an integral part of the following Operating Instructions:

Device	Documentation code
Cerabar PMC71B	BA02010P
Cerabar PMP71B	BA02012P

2 Basic safety instructions

2.1 Requirements for the personnel

The personnel performing installation, commissioning, diagnostics and maintenance must satisfy the following requirements:

- ▶ Trained, qualified specialists must have a relevant qualification for this specific function and task.
- ▶ Personnel must be authorized by the plant owner/operator.
- ▶ Personnel must be familiar with federal/national regulations.
- ▶ Before starting work: personnel must read and understand the instructions in the manual and supplementary documentation as well as the certificates (depending on the application).
- ▶ Personnel must follow instructions and comply with general policies.

The operating personnel must satisfy the following requirements:

- ▶ Personnel are instructed and authorized according to the requirements of the task by the facility's owner-operator.
- ▶ Personnel follow the instructions in this manual.

3 Product description

The devices are optionally certified in accordance with OIML R117, OIML R 140, OIML R139, OIML R81 (<http://www.oiml.org/>) and EN 12405-1 and have a Parts Certificate in accordance with WELMEC 8.8 "Guide on the General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring Instruments".

Measuring instruments subject to legal metrology controls are protected against tampering by means of an electronic lock with password and optional sealing of the transmitter or sensor. This electronic lock and optional seal may be unlocked or broken only by an authorized

representative of the responsible authority for weights and measures services. Operator seals are not subject to legal controls.



Outside Europe

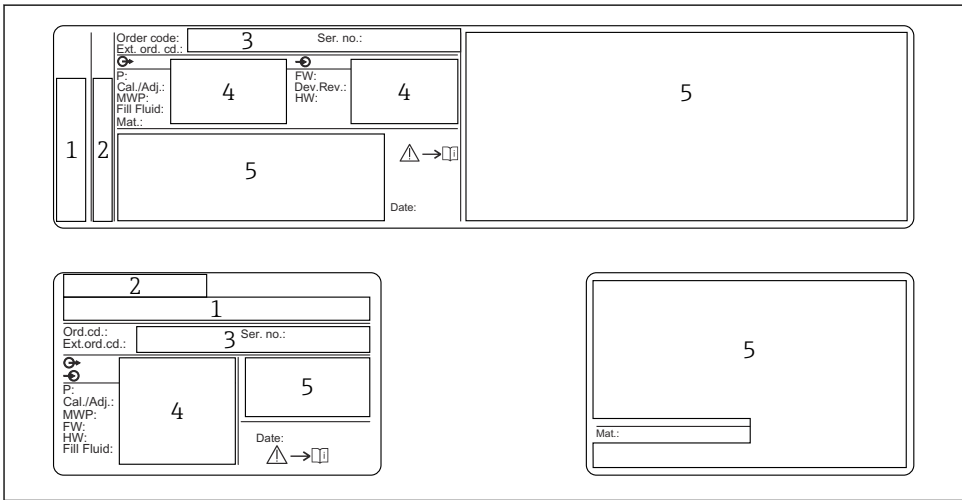
For national approvals based on OIML R117, OIML R 140, OIML R139, OIML R81 or EN 12405-1, detailed ordering information is available from your local Endress+Hauser sales organization.

4 Product identification

Devices for use subject to legal metrology controls are supplied with the relevant marking.

4.1 Nameplates

Different nameplates are used depending on the device version.

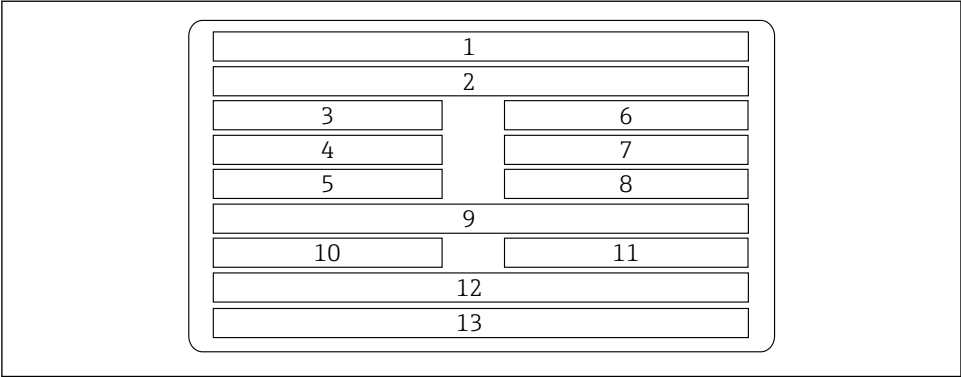


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- 1 Manufacturer name and device name
- 2 Address of the certificate holder and country of manufacture
- 3 Order code and serial number
- 4 Technical data
- 5 Approval-relevant information including custody transfer approval-relevant information (NMI Certin. and approval number)

4.1.1 Metrology nameplate - calibration obligation

The metrology nameplate contains additional device information in accordance with the requirements of the standards for which the device is certified.



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- 1 *Number of the assembly certificate*
- 2 *As per EN 12405-1; OIML R: 81, 117, 139, 140*
- 3 *For liquid applications*
- 4 *Minimum medium pressure (for liquids)*
- 5 *Maximum medium pressure (for liquids)*
- 6 *For gas applications*
- 7 *Minimum medium pressure (for gas)*
- 8 *Maximum medium pressure (for gas)*
- 9 *Ambient temperature range*
- 10 *Software version*
- 11 *CRC checksum*
- 12 *The metrologically controlled value is the current/HART output.*
- 13 *Suitable for H₂ (only valid for PMP71B with gold-coated membrane)*

4.2 **Software version**

For custody transfer measurement, the software version is indicated in the certificate.

5 **Operation and commissioning**

5.1 **Operating conditions**

For operating conditions, see

- the relevant national regulations.
- Parts Certificate TC12262 (issued by NMI Certin B.V.)

	Cerabar PMC71B	Cerabar PMP71B
Ambient temperature range	-40 to +70 °C (-40 to 158 °F)	
Maximum working pressure	40 bar	700 bar

5.1.1 Measuring ranges

Liquid measurements

Measurement range	Membrane	P _{min}	P _{max}	Type of measurement
10 bar	Ceramic	0.3 bar	10 bar	Absolute pressure/ gauge pressure
40 bar	Ceramic	1.3 bar	40 bar	Absolute pressure/ gauge pressure
10 bar	316L	0.3 bar	10 bar	Absolute pressure
40 bar	316L	1.3 bar	40 bar	Absolute pressure
40 bar	316L	0.3 bar	40 bar	Gauge pressure
100 bar	316L	3 bar	100 bar	Absolute pressure
100 bar	316L	2 bar	100 bar	Gauge pressure
400 bar	316L	11 bar	400 bar	Absolute pressure
400 bar	316L	10 bar	400 bar	Gauge pressure
700 bar	316L	23 bar	700 bar	Absolute pressure
700 bar	316L	22 bar	700 bar	Gauge pressure
10 bar	316 L, gold-coated	0.3 bar	10 bar	Absolute pressure
40 bar	316 L, gold-coated	1.3 bar	40 bar	Absolute pressure
40 bar	316 L, gold-coated	0.3 bar	40 bar	Gauge pressure
100 bar	316 L, gold-coated	3 bar	100 bar	Absolute pressure
100 bar	316 L, gold-coated	2 bar	100 bar	Gauge pressure
400 bar	316 L, gold-coated	11 bar	400 bar	Absolute pressure
400 bar	316 L, gold-coated	10 bar	400 bar	Gauge pressure
700 bar	316 L, gold-coated	23 bar	700 bar	Absolute pressure
700 bar	316 L, gold-coated	22 bar	700 bar	Gauge pressure

Any measuring range between a P_{min} and P_{max} selected by the user is permitted, provided the following conditions are met:

- The P_{min} value selected by the user is not less than the P_{min} value of the sensor, as indicated in the table above.
- The P_{max} value selected by the user is not greater than the P_{max} value of the sensor, as indicated in the table above.
- The (P_{max}/P_{min}) ratio of the pressure sensor should fulfill the following equation : $2 \leq (P_{max}/P_{min}) \leq 30$.

Gas measurements

Measurement range	Membrane	P _{min}	P _{max}	Ratio P _{max} /P _{min}	Type of measurement
10 bar	Ceramic	2 bar	10 bar	$2 \leq (P_{\max}/P_{\min}) \leq 5$	Absolute pressure
40 bar	Ceramic	7 bar	40 bar	$2 \leq (P_{\max}/P_{\min}) \leq 5.71$	Absolute pressure
10 bar	316L	0.5 bar	10 bar	$2 \leq (P_{\max}/P_{\min}) \leq 20$	Absolute pressure
40 bar	316L	6 bar	40 bar	$2 \leq (P_{\max}/P_{\min}) \leq 6.7$	Absolute pressure
100 bar	316L	6 bar	100 bar	$2 \leq (P_{\max}/P_{\min}) \leq 16.7$	Absolute pressure
100 bar	316L	35 bar	100 bar	$2 \leq (P_{\max}/P_{\min}) \leq 2.9$	Gauge pressure
400 bar	316L	21 bar	400 bar	$2 \leq (P_{\max}/P_{\min}) \leq 19.05$	Absolute pressure
400 bar	316L	20 bar	400 bar	$2 \leq (P_{\max}/P_{\min}) \leq 20$	Gauge pressure
700 bar	316L	22 bar	700 bar	$2 \leq (P_{\max}/P_{\min}) \leq 31.8$	Gauge pressure
700 bar	316L	23 bar	700 bar	$2 \leq (P_{\max}/P_{\min}) \leq 30.4$	Absolute pressure
10 bar	316 L, gold-coated	0.5 bar	10 bar	$2 \leq (P_{\max}/P_{\min}) \leq 20$	Absolute pressure
40 bar	316 L, gold-coated	4 bar	40 bar	$2 \leq (P_{\max}/P_{\min}) \leq 10$	Absolute pressure
100 bar	316 L, gold-coated	6 bar	100 bar	$2 \leq (P_{\max}/P_{\min}) \leq 16.7$	Absolute pressure
100 bar	316 L, gold-coated	35 bar	100 bar	$2 \leq (P_{\max}/P_{\min}) \leq 2.9$	Gauge pressure
400 bar	316 L, gold-coated	21 bar	400 bar	$2 \leq (P_{\max}/P_{\min}) \leq 19$	Absolute pressure
400 bar	316 L, gold-coated	20 bar	400 bar	$2 \leq (P_{\max}/P_{\min}) \leq 20$	Gauge pressure
700 bar	316 L, gold-coated	22 bar	700 bar	$2 \leq (P_{\max}/P_{\min}) \leq 31.8$	Gauge pressure
700 bar	316 L, gold-coated	23 bar	700 bar	$2 \leq (P_{\max}/P_{\min}) \leq 30.4$	Absolute pressure

Any measuring range between a P_{min} and P_{max} selected by the user is permitted, provided the following conditions are met:

- The P_{min} value selected by the user is not less than the P_{min} value of the sensor, as indicated in the table above.
- The P_{max} value selected by the user is not greater than the P_{max} value of the sensor, as indicated in the table above.
- The (P_{max}/P_{min}) ratio of the pressure sensor should be within the values indicated in the above table.

5.2 As-delivered state



The devices are not locked when delivered. The devices must be locked for custody transfer.

5.3 Installation

After installing the device, perform a position adjustment if necessary and adjust the zero point and the span.

5.3.1 Configuring the device

Commissioning with keys on the electronic insert

The following functions are possible via the keys on the electronic insert:

- Position adjustment (zero point correction)
The orientation of the device may cause a pressure shift
This pressure shift can be corrected by a position adjustment
- Setting the lower range value and upper range value
The pressure applied must be within the nominal pressure limits of the sensor (see the specifications on the nameplate)
- Resetting the device

Carrying out position adjustment

1. Device installed in desired position and no pressure applied.
2. Press the "Zero" and "Span" keys simultaneously for at least 3 s.
3. When the LED lights up briefly, the pressure present has been accepted for position adjustment.

Setting the lower range value (pressure or scaled variable)

1. The desired pressure for the lower range value is present at the device.
2. Press the "Zero" key for at least 3 s.
3. When the LED lights up briefly, the pressure present has been accepted for the lower range value.

Setting the upper range value (pressure or scaled variable)

1. The desired pressure for the upper range value is present at the device.
2. Press the "Span" key for at least 3 s.
3. When the LED lights up briefly, the pressure present has been accepted for the upper range value.
4. Does the LED on the electronic insert not light up?
 - ↳ Applied pressure for upper range value has not been accepted.
Wet calibration is not possible if the **Scaled variable** option has been selected in the **Assign PV** parameter and the **Table** option has been selected in the **Scaled variable transfer function** parameter.

Checking the settings (pressure or scaled variable)

1. Press the "Zero" key briefly (approx. 1 second) in order to display the lower range value.
2. Press the "Span" key briefly (approx. 1 second) in order to display the upper range value.

3. Briefly press the "Zero" and "Span" keys simultaneously (approx. 1 second) in order to display the position offset.

Resetting the device

- Press and hold the "Zero" and "Span" keys simultaneously for at least 12 seconds.

Commissioning with the commissioning wizard

In FieldCare, DeviceCare¹⁾, SmartBlue and on the display, the **Commissioning** wizard for guiding the user through the initial commissioning steps is available. Commissioning can also be carried out via the Asset Management Solution (AMS) and Process Device Manager (PDM).

1. Connect the device with FieldCare or DeviceCare.
2. Open the device in FieldCare or DeviceCare.
 - ↳ The dashboard (homepage) of the device is displayed:
3. In the **Guidance** menu, click the **Commissioning** wizard to open the wizard.
4. Enter the appropriate value in each parameter or select the appropriate option. These values are written directly to the device.
5. Click "Next" to go to the next page.
6. Once all the pages are completed, click "End" to close the **Commissioning** wizard.

 If the **Commissioning** wizard is canceled before all necessary parameters have been configured, the device may be in an undefined state. In such situations, it is advisable to reset the device to the factory default settings.

Example: Outputting of the pressure value at the current output

 Pressure and temperature units are converted automatically. Other units are not converted.

In the following example, the pressure value should be measured in a pipe and output on the current output. The maximum pressure of 450 mbar corresponds to the 20 mA current. The 4 mA current corresponds to a pressure of 50 mbar.

Prerequisites:

- Measured variable in direct proportion to the pressure
- Due to the orientation of the device, there may be pressure shifts in the measured value (when the vessel is empty or partly filled, the measured value is not zero)
Perform a position adjustment if necessary
- In the **Assign PV** parameter, the **Pressure** option must be selected (factory setting).
Display: In the **Guidance** menu **Commissioning** wizard, keep pressing the  key until you reach the **Assign PV** parameter. Press the  key to confirm, select the **Pressure** option and press  to confirm.

Adjustment:

1. Using the **Lower range value output** parameter, enter the pressure value for the 4 mA current (50 mbar).
2. Using the **Upper range value output** parameter, enter the pressure value for the 20 mA current (450 mbar)

Result: The measuring range is set to 4 to 20 mA.

1) DeviceCare is available for download at www.software-products.endress.com. You must register in the Endress +Hauser software portal to download the product.

5.4 Custody transfer

i National rules or regulations must be observed when carrying out legal metrological control.

5.4.1 Outputs relevant for custody transfer

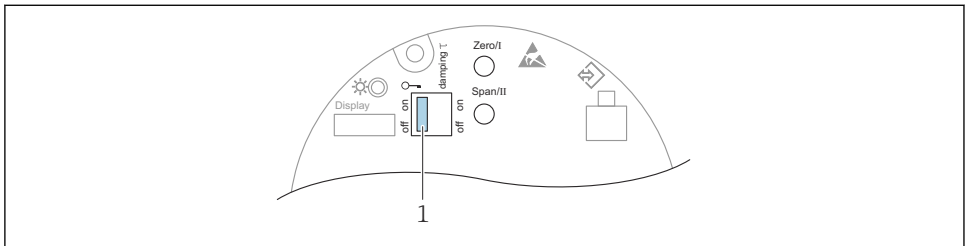
The output relevant for custody transfer is the 4 to 20 mA current signal or the HART output.

5.4.2 Setting up Custody transfer mode

The device is not locked when delivered. It is the responsibility of the system operator to ensure that the device is put into operation in accordance with national regulations governing locking and sealing.

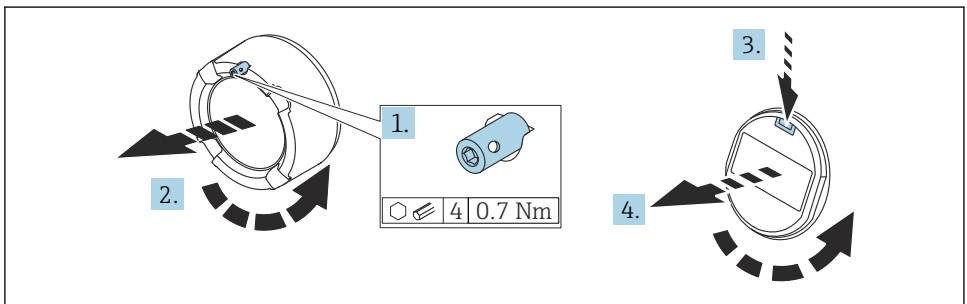
i The device can only be locked with the **DIP switch 1**.

i Use a suitable tool - preferably one with a non-metal tip - to switch the DIP switch.



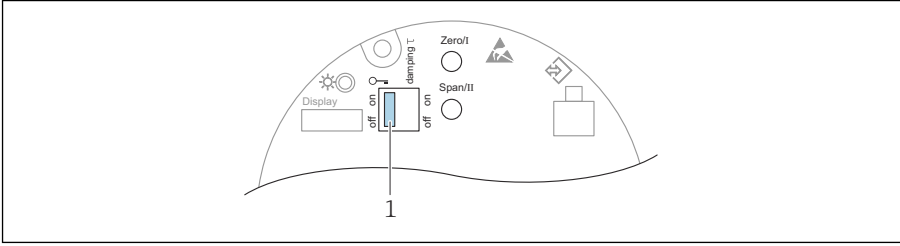
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1. Disconnect the power supply to the device. Loosen the securing screw.
2. Unscrew the connection compartment cover.
3. Press down the tab of the display module holder.
4. Tilt the display module forwards and remove it.



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1.



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Set **DIP switch 1** to the **On** position.

- ↳ If the device has been correctly locked with the **DIP switch**, the lock symbol appears on the display.

2. Follow the reverse sequence to close the device, and seal if desired.
3. Reestablish the power supply.
4. A padlock symbol (🔒) appears in the header of the display.

5.5 Repeated calibration due to legal metrology controls

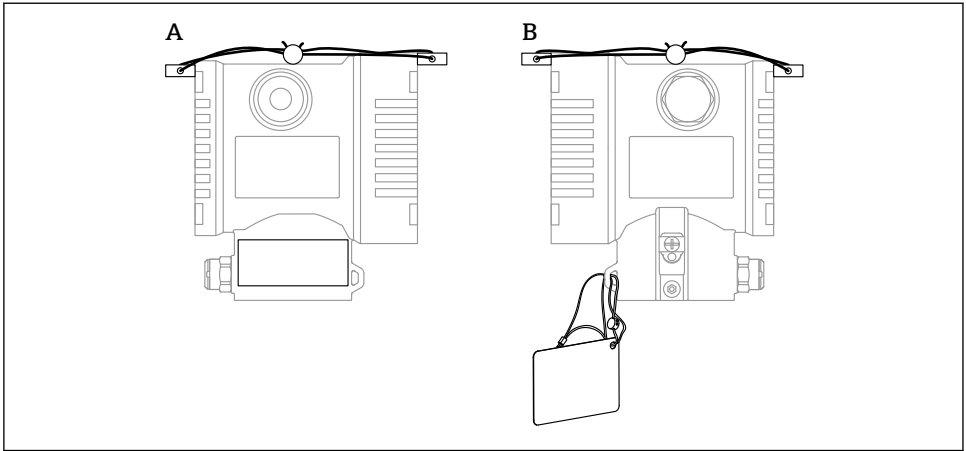
The system operator is obliged to perform a recalibration in accordance with the relevant applicable national regulations.

5.6 Sealing



The device can be sealed. The system operator or the competent weights and measures services is responsible for applying the optional seal. This can be carried out with sealing screws.

5.6.1 Housing



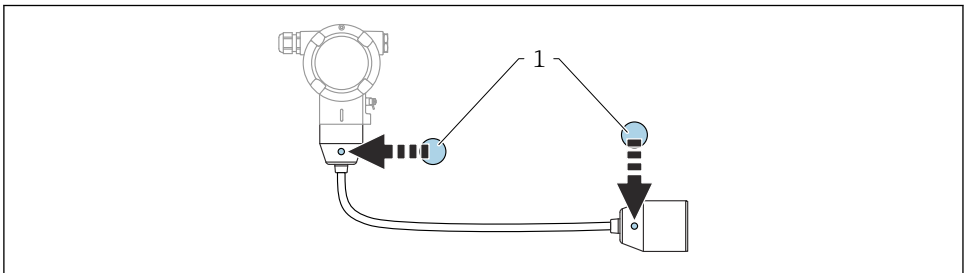
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A Dual compartment housing, aluminum

B Dual compartment housing, 316L

1. Pull the wire through the screw holes. In doing so, ensure that the wire is taut and there is no leeway for the screw to loosen.
2. Twist the wire.
3. Seal the wire ends together.

5.6.2 Sensor, remote



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1 Calibration mark



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