

Issued by NMI Certin B.V.

In accordance with

- WELMEC 8.8, 2017: Guide on the General and Administrative Aspects of the Voluntary System of Modular Evaluation of Measuring instruments
- WELMEC 7.2, 2021: Software Guide
- OIML R 117, 2019: Dynamic measuring systems for liquids other than water
- EN 12405-1, 2018: Gas meters – Conversion devices – Part 1: Volume conversion
- OIML R 140, 2007: Measuring systems for gaseous fuel
- OIML R 81, 1998: Dynamic measuring devices and systems for cryogenic liquids
- OIML R 139, 2018: Compressed gaseous fuel measuring systems for vehicles

Producer Endress+Hauser SE+Co. KG  
Hauptstrasse 1  
79789 Maulburg  
Germany

Part A **pressure transducer** intended to be used as a part of a liquid dynamic measuring instrument/system, a type 2 gas electronic volume conversion devices or as an input for a depressurization correction device or other associated measuring instrument for compressed gaseous fuel measuring systems for vehicles.

Producer's mark or name : Endress+Hauser SE+Co. KG

Type designation : Cerabar PMP71B  
Cerabar PMC71B

Accuracy class : Refer § 1.2.3 of the description

Further properties and test results are described in the annexes:

- Description TC12262 revision 1;
- Documentation folder TC12262-2.

Initially issued 15 August 2022

Remarks

- This revision replaces the previous revision;
- The documentation folder replaces the previous documentation folder.

Issuing Authority **NMI Certin B.V., Notified Body number 0122**  
17 November 2023

Certification Board

## 1 General information about the pressure transducer

All properties of the pressure transducer, whether mentioned or not, shall not be in conflict with the legislation.

This Parts Certificate is the positive result of the applied voluntary, modular approach, for a component of a measuring instrument, as described in WELMEC 8.8, 2017.

The complete measuring instrument must be covered by relevant metrological certification that is valid in the country where the instrument is put into use.



Cerabar PMP71B with aluminum housing and integrated segment display, thread process connection



Cerabar PMP71B with aluminum housing and integrated graphic display, sensor remote version



Cerabar PMC71B with aluminum housing and integrated graphic display, flange process connection



Cerabar PMP71B with stainless steel housing and integrated segment display, thread process connection



Cerabar PMC71B with aluminum housing and integrated segment display, thread process connection



Cerabar PMC71B with stainless steel housing and integrated graphic display, flange process connection

Example of the pressure transducers

The overview of different types of pressure transducer is included in documentation numbers 12262/0-01; 12262/0-02 and 12262/0-03. The overview of different sensors is included in documentation numbers 12262/0-04; 12262/0-05; 12262/0-06; 12262/0-39; 12262/0-40; 12262/0-41 and 12262/0-42.

## 1.1 Essential parts

The pressure transducer can be composed of the following parts:

Description	Documentation	Remarks
Main Unit	12262/0-11; 12262/0-12; 12262/0-13; 12262/0-14; 12262/0-15	Main electronic module for analogue and digital communication
Segment display	12262/0-16; 12262/0-17; 12262/0-18; 12262/0-19	Segment display
Dot Matrix display	12262/0-20; 12262/0-21; 12262/0-22	Graphic display
Terminal Unit TA11	12262/0-28; 12262/0-29; 12262/0-30; 12262/0-31	Terminal blocks for dual compartment housing
Data Unit	12262/0-32; 12262/0-33; 12262/0-34; 12262/0-35	External non-volatile memory unit
Sensor Unit SP11B	12262/0-36; 12262/0-37; 12262/0-38	Sensor electronic of stainless steel 316L or stainless steel 316L coated with gold membrane versions
Sensor Unit SP13B-2	12262/0-39; 12262/0-40; 12262/0-41; 12262/0-42 12262/0-43	Sensor electronics of different ceramic membrane versions
Sensor Unit SP13B Hybrid	12262/0-45; 12262/0-46	
Sensor Unit SPE02B	12262/0-47; 12262/0-48; 12262/0-49	
Galvanic isolation board	12262/0-50; 12262/0-51; 12262/0-52; 12262/0-53	Electronic for sensor remote version

## 1.2 Essential characteristics

### 1.2.1 Measuring range for **liquid compressed gaseous fuels applications**

The pressure transducer has the following characteristics when used in liquid applications:

Type	Membrane Material	P <sub>min</sub> [bar]	P <sub>max</sub> [bar]	Measurement type
Cerabar PMP71B 10 bar	Stainless steel 316L	0,3	10	Absolute
Cerabar PMP71B 40 bar		1,3	40	Absolute
		0,3	40	Gauge
Cerabar PMP71B 100 bar		3	100	Absolute
		2	100	Gauge
Cerabar PMP71B 400 bar		11	400	Absolute
		10	400	Gauge
Cerabar PMP71B 700 bar		23	700	Absolute
	22	700	Gauge	
Cerabar PMP71B 10 bar	Stainless steel 316L coated with gold (AU)	0,3	10	Absolute
Cerabar PMP71B 40 bar		1,3	40	Absolute
		0,3	40	Gauge
Cerabar PMP71B 100 bar		3	100	Absolute
		2	100	Gauge
Cerabar PMP71B 400 bar		11	400	Absolute
		10	400	Gauge
Cerabar PMP71B 700 bar		23	700	Absolute
	22	700	Gauge	

Type	Membrane Material	P <sub>min</sub> [bar]	P <sub>max</sub> [bar]	Measurement type
Cerabar PMC71B 10 bar	Ceramic	0,3	10	Absolute/Gauge
Cerabar PMC71B 40 bar		1,3	40	Absolute/Gauge

Remarks:

Any measurement range between a user selected P<sub>min</sub> and P<sub>max</sub> is allowed if the following conditions are met:

- User selected P<sub>min</sub> is not below the P<sub>min</sub> value of the sensor as mentioned in the tables above.
- User selected P<sub>max</sub> is not above the P<sub>max</sub> value of the sensor as mentioned in the tables above.

- The ratio ( $P_{max}/P_{min}$ ) of the pressure transducer should fulfil the following equation:  
 $2 \leq (P_{max}/P_{min}) \leq 30$ .

## 1.2.2 Measuring range for **gas applications**

The pressure transducer has the following characteristics when used in gas applications:

Type	Membrane Material	$P_{min}$ [bar]	$P_{max}$ [bar]	$P_{max} / P_{min}$ ratio	Measurement type
Cerabar PMP71B 10 bar	Stainless steel 316L	0,5	10	$2 \leq P_{max} / P_{min} \leq 20$	Absolute
Cerabar PMP71B 40 bar		6	40	$2 \leq P_{max} / P_{min} \leq 6,7$	Absolute
Cerabar PMP71B 100 bar		6	100	$2 \leq P_{max} / P_{min} \leq 16,7$	Absolute
		35	100	$2 \leq P_{max} / P_{min} \leq 2,9$	Gauge
Cerabar PMP71B 400 bar		21	400	$2 \leq P_{max} / P_{min} \leq 19,05$	Absolute
		20	400	$2 \leq P_{max} / P_{min} \leq 20$	Gauge
Cerabar PMP71B 700 bar		22	700	$2 \leq P_{max} / P_{min} \leq 31,8$	Gauge
		23	700	$2 \leq P_{max} / P_{min} \leq 30,4$	Absolute
Cerabar PMP71B 10 bar	Stainless steel 316L coated with gold	0,5	10	$2 \leq P_{max} / P_{min} \leq 20$	Absolute
Cerabar PMP71B 40 bar		4	40	$2 \leq P_{max} / P_{min} \leq 10$	Absolute
Cerabar PMP71B 100 bar		6	100	$2 \leq P_{max} / P_{min} \leq 16,7$	Absolute
		35	100	$2 \leq P_{max} / P_{min} \leq 2,9$	Gauge
Cerabar PMP71B 400 bar		21	400	$2 \leq P_{max} / P_{min} \leq 19$	Absolute
		20	400	$2 \leq P_{max} / P_{min} \leq 20$	Gauge
Cerabar PMP71B 700 bar		22	700	$2 \leq P_{max} / P_{min} \leq 31,8$	Gauge
		23	700	$2 \leq P_{max} / P_{min} \leq 30,4$	Absolute

Type	Membrane Material	P <sub>min</sub> [bar]	P <sub>max</sub> [bar]	P <sub>max</sub> / P <sub>min</sub> ratio	Measurement type
Cerabar PMC71B 10 bar	Ceramic	2	10	$2 \leq P_{\max} / P_{\min} \leq 5$	Absolute
Cerabar PMC71B 40 bar		7	40	$2 \leq P_{\max} / P_{\min} \leq 5,71$	Absolute

**Remarks:**

Any measurement range between a user selected P<sub>min</sub> and P<sub>max</sub> is allowed if the following conditions are met:

- User selected P<sub>min</sub> is not below the P<sub>min</sub> value of the sensor as mentioned in the tables above.
- User selected P<sub>max</sub> is not above the P<sub>max</sub> value of the sensor as mentioned in the tables above.
- The ratio (P<sub>max</sub>/P<sub>min</sub>) of the pressure transducer should be within the values as stated in the tables above.

**1.2.3 Accuracy class**

- Approved for use in liquid measuring systems with accuracy class 0,3; 0,5; 1,0 and 1,5. The maximum permissible error (MPE) of the pressure transducer is in accordance with the table 5.3 of OIML R117-1:2019.
- Approved for use in Type 2 Electronic volume conversion devices with MPE of 0,5% at reference conditions and 1% at rated operating conditions. The MPE of the pressure transducer is in accordance with the table 3 of EN 12405-1 2018.
- Approved for use as an input for a depressurization correction device or other associated measuring instrument for Compressed gaseous fuel measuring systems for vehicles according to OIML R 139. The MPE of the pressure transducer is in accordance with the table 5.3 of OIML R 117-1:2019.

**1.2.4 Temperature range ambient**

- -40 °C / +70 °C ; condensing humidity

**1.2.5 Environment classes**

- M3 / E2 / H3 for liquid applications
- M2 / E2 / H3 for gas applications

**1.2.6 Power supply**

The Ex-version of the pressure transducer is powered in the range 10,5 – 30 VDC.  
The Non-Ex version of the pressure transducer is powered in the range 10,5 – 35 VDC.

## 1.2.7 Software specification (refer to WELMEC 7.2)

- Software type P;
- Risk Class C;
- Extension S, while extensions L, D and T are not applicable.

Software versions	CRC Checksum	Remarks
01.00.01	2074036626	-
01.00.02	1291645008	-
01.00.06	669966254	-

The validity of the program and the parameters are continuously checked. If these checks fail, an alarm is generated.

The metrological software is identified by the software version and/or checksum, which can be checked on the graphic display of the pressure transducer by navigating through the following menu:

**System → Information → Firmware version;**

**System → Information → Checksum.**

Or the software version and/or checksum can be verified:

- via a computer/tablet temporarily connected to the pressure transducer;
- via service programs e.g., DeviceCare, FieldCare;
- via a tablet/smartphone temporarily connected to the pressure transducer via service App SmartBlue (for Bluetooth connection only).

For pressure transducer with a segment display or no display, the software version and/or checksum can be verified as follows:

- imprinted on the nameplate;
- via a computer/tablet temporarily connected to the pressure transducer;
- via service programs e.g., DeviceCare, FieldCare;
- via a tablet/smartphone temporarily connected to the pressure transducer via service App SmartBlue (for Bluetooth connection only).

## 1.2.8 Data communication

The following outputs can be used for legally relevant data:

- 4...20 mA analog output;
- HART superimposed.

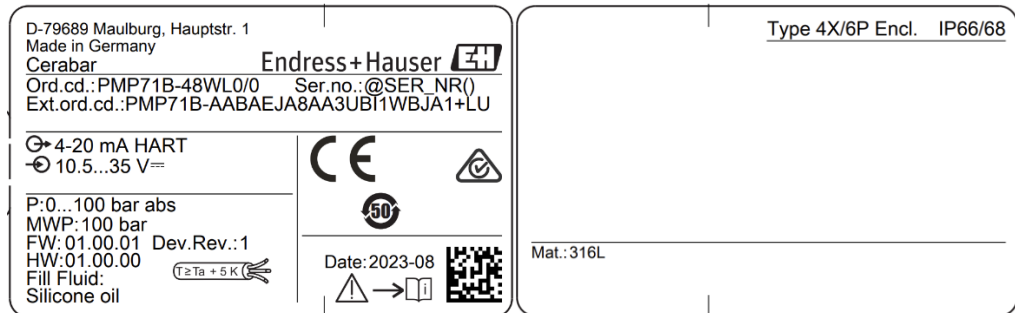
## 1.3 Essential shapes

### 1.3.1 Inscriptions

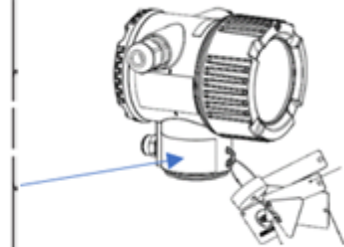
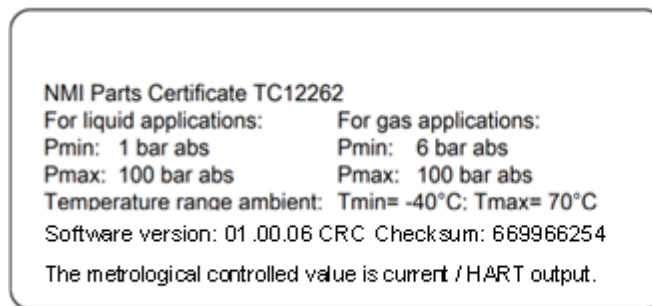
On the pressure transducer, clearly visible, at least the following is inscribed:

- Parts Certificate number TC12262;
- Name or trade mark of the producer;
- Type designation;
- Serial number and year of manufacture;
- Pressure minimum and maximum values  $p_{min}$  and  $p_{max}$ ;
- Ambient temperature range;
- Output range of 4-20 mA (if applicable).

See below for an example of the markings.



Example of main nameplate



Example of metrological nameplate

### 1.3.2 Indication

The pressure transducer is equipped either with an electronic segment display or an electronic graphic display. The electronic graphic display can be operated using the buttons on the display module.

The indicating device can either be on top of the pressure transducer (compact version) or separate of the pressure transducer by cable (sensor remote version).

The conversion device which is attached via the interface can display the measurement result for the pressure on request (e.g., for the versions of pressure transducer without display).

## 1.4 Conditional parts

### 1.4.1 Housings

The housing of the pressure transducer is made of steel or aluminium. See documentation numbers 12262/0-07, 12262/0-08 and 12262/0-10 for examples of the housings.

## 1.5 Conditional characteristics

### 1.5.1 Programming

On the Main Unit the dipswitch can be switched to the "locked" position. In this case no parameters or data can be altered (see chapter no. 2).

It is not possible to change the position of the dipswitch without breaking a seal.

### 1.5.2 Heartbeat verification

Can be used with devices locked for Custody Transfer, as it has no influence on the measurement accuracy. With Heartbeat enabled, the pressure transducer collects the data about the transducer's behaviour for evaluation.



## 1.5.3 Parameter settings

Below an overview is given of the legally relevant parameters along with their correct settings:

Parameter	Setting	Remarks
<b>Guidance → Commissioning</b>		
Pressure unit	MPa; kPa; Pa; bar; mbar; kgf/cm <sup>2</sup>	Used to select one of the preset settings.
Zero adjustment	Select	The pressure shift can be corrected with the zero adjustment.
<b>System → Display → Value 1 display</b>		
Value 1 display	Pressure	Select the measured value which is shown on the local display
<b>System → Information</b>		
Firmware version	See chapter 1.2.7	Shows the device firmware version installed
Checksum	See chapter 1.2.7	Shows the checksum of the firmware version
Serial number		Shows the serial number of the measuring device
Device name		Shows the name of the transmitter. It can also be found on the nameplate of the transmitter.
<b>Application → Sensor → Wet calibration</b>		
Zero	Select	Set applied zero reference pressure
Span	Select	Set applied span reference pressure

- All parameter settings may be read out and displayed:
  - by the electronic calculating/indicating device or electronic volume conversion device (EVCD) connected to the pressure transducer, or
  - for example, via a computer temporarily connected to the pressure transducer via service programs e.g. DeviceCare, FieldCare, SmartBlue.

## 1.5.4 Alarm handling and error messages

Under the following conditions the pressure transducer generates an accountable alarm:


- if sensor connection faulty;
- if sensor temperature is outside of specified limits;
- if firmware incompatible to transducer type;
- if electronic module is incompatible;
- if main electronic module is defective or faulty;
- if data storage is inconsistent;
- if memory content is inconsistent;
- if transducer configuration is incompatible;
- if failure mode simulation is active;

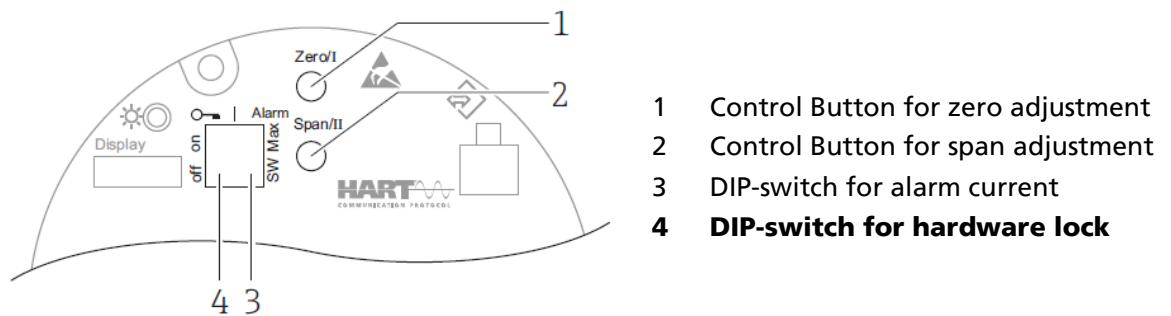
- if supply voltage deviates from programmed limits (for devices with Heartbeat Technology integrated);
- if loop current is faulty.

In case of an accountable alarm an error message is presented on the indication or transmitted to the connected electronic calculating and indicating device or electronic volume conversion device via digital interface.

## 2 Seals

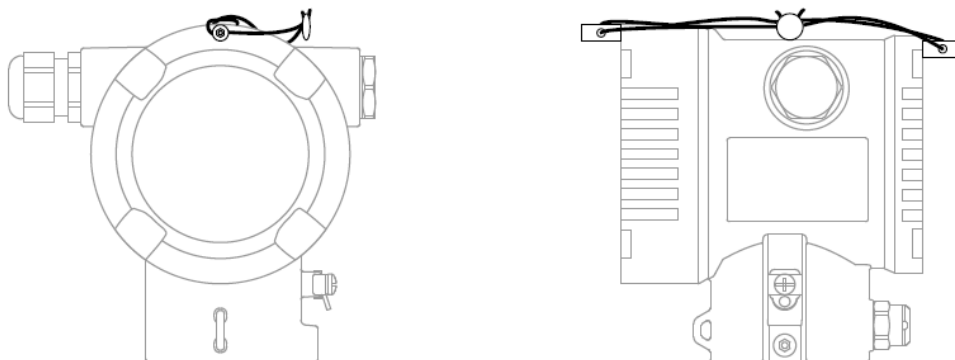
The following seals are applied:

- The inscriptions are fixed to the pressure transducer and secured against removal by seal or it will be destroyed when removed.
- The pressure transducer is locked for custody transfer by toggling the DIP-switch  (marked 4 in figure 1) of the electronic insert to 'ON' position.

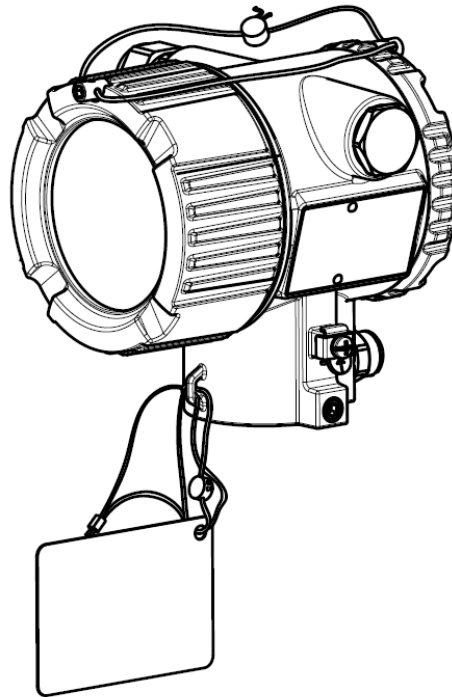


**Figure 1 Hardware sealing using dipswitch**

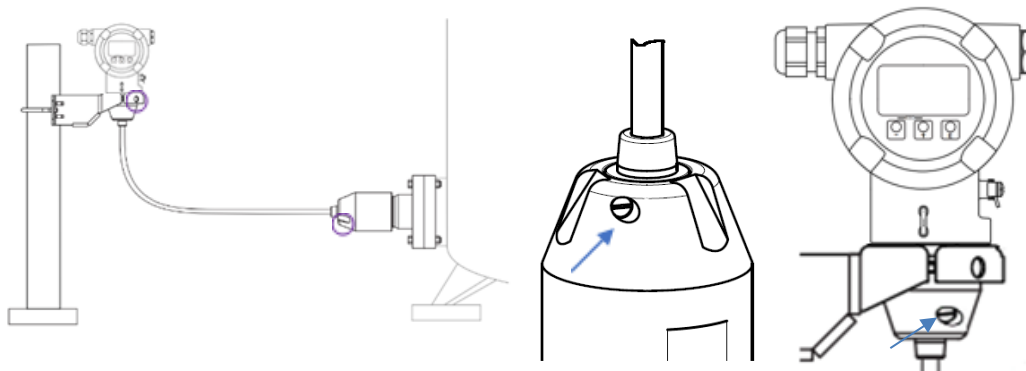
- The housing of the pressure transducer is sealed against opening after the pressure transducer is locked for custody transfer.



**Figure 2 Sealing example**



**Figure 3 Sealing of dual SS compartment housing with additional approval nameplate**



Example remote Sensor

Locking screw which must be secured with sticker seal

**Figure 4 Sealing example of sensor remote version**

### 3 Conditions for conformity assessment

- The pressure transducer must be constructed in accordance with this Parts Certificate and the appertaining documentation.
- Before taken into use, the pressure transducer shall be calibrated over the operational measuring range covering at least  $P_{\min}$  and  $P_{\max}$ .
- The calibration can be performed on site or at a test laboratory. In the latter case the relevant parameter settings have to be registered and checked at the initial verification on site.
- The pressure transducer shall be sealed as mentioned in chapter 2.

### 4 Reports

An overview of the performed tests is given in Evaluation Report ER12262 revision 1 issued together with this Parts Certificate.