

Safety Instructions

Cerabar PMC51B, PMP51B

4-20 mA HART

Control Drawing IS



Cerabar PMC51B, PMP51B

4-20 mA HART

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About this document

This document has been translated into several languages. Legally determined is solely the English source text.

Associated documentation

This document is an integral part of the following Operating Instructions:

PMC51B
BA02009P/00, TI01506P/00

PMP51B
BA02011P/00, TI01508P/00

Manufacturer's certificates**CSA C/US certificate**

Certificate number:
CSA21CA80066208

Manufacturer address

Endress+Hauser SE+Co. KG
Hauptstraße 1
79689 Maulburg, Germany
Address of the manufacturing plant: See nameplate.

Extended order code

The extended order code is indicated on the nameplate, which is affixed to the device in such a way that it is clearly visible. Additional information about the nameplate is provided in the associated Operating Instructions.

Structure of the extended order code

PMx51B - ***** + A*B*C*D*E*F*G*..
(Device type) *(Basic specifications)* *(Optional specifications)*

* = Placeholder

At this position, an option (number or letter) selected from the specification is displayed instead of the placeholders.

Basic specifications

The features that are absolutely essential for the device (mandatory features) are specified in the basic specifications. The number of positions depends on the number of features available. The selected option of a feature can consist of several positions.

Optional specifications

The optional specifications describe additional features for the device (optional features). The number of positions depends on the number of features available. The features have a 2-digit structure to aid identification (e.g. JA). The first digit (ID) stands for the feature group and consists of a number or a letter (e.g. J = Test, Certificate). The second digit constitutes the value that stands for the feature within the group (e.g. A = 3.1 material (wetted parts), inspection certificate).

More detailed information about the device is provided in the following tables. These tables describe the individual positions and IDs in the extended order code which are relevant to hazardous locations.

Extended order code: Cerabar



The following specifications reproduce an extract from the product structure and are used to assign:

- This documentation to the device (using the extended order code on the nameplate).
- The device options cited in the document.

Device type

PMC51B, PMP51B

Basic specifications

Position 1, 2 (Approval)		
Selected option		Description
PMC51B	CB	CSA C/US IS Cl. I, II, III, Div. 1, Gp. A-G; Cl. I, Zone 0, AEx/Ex ia IIC Ga
PMP51B		
	CC	CSA C/US IS Cl. I, Div. 1, Gp. A-D; Cl. I, Zone 0, AEx/Ex ia IIC Ga

Position 6 (Housing, Material)		
Selected option		Description
PMC51B	B	Single compartment; Alu, coated
PMP51B		

Position 10 (Diaphragm Seal Type)		
Selected option		Description
PMP51B	G	Temperature isolator
	M m capillary, 316L
	N m capillary, PVC>316L
	O m capillary, PTFE>316L
	R ft capillary, 316L
	S ft capillary, PVC>316L
	T ft capillary, PTFE>316L

Optional specifications

ID Nx, Ox (Accessory Mounted)		
Selected option		Description
PMC51B PMP51B	NA	Overvoltage protection

ID Px, Rx (Accessory Enclosed)		
Selected option		Description
PMC51B PMP51B	PB	Weather protection cover, plastic

Safety instructions: General

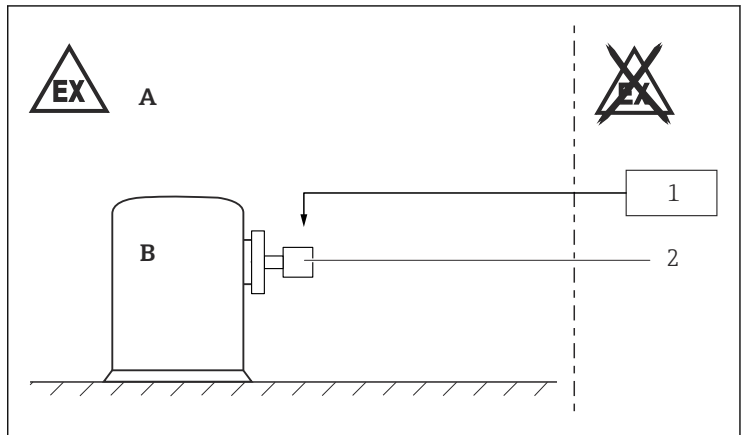
- Comply with the installation and safety instructions in the Operating Instructions.
- Staff must meet the following conditions for mounting, electrical installation, commissioning and maintenance of the device:
 - Be suitably qualified for their role and the tasks they perform
 - Be trained in explosion protection
 - Be familiar with national regulations
- Install the device according to the manufacturer's instructions and national regulations.
- Do not operate the device outside the specified electrical, thermal and mechanical parameters.

- Only use the device in media to which the wetted materials have sufficient durability.
- Avoid electrostatic charging:
 - Of plastic surfaces (e.g. housing, sensor element, special varnishing, attached additional plates, ..)
 - Of isolated capacities (e.g. isolated metallic plates)
- Modifications to the device can affect the explosion protection and must be carried out by staff authorized to perform such work by Endress+Hauser.

Safety instructions:
Special conditions

- To avoid electrostatic charging: Do not rub surfaces with a dry cloth.
- In the event of additional or alternative special varnishing on the housing or other metal parts or for adhesive plates:
 - Observe the danger of electrostatic charging and discharge.
 - Do not install in the vicinity of processes (≤ 0.5 m) generating strong electrostatic charges.
- Avoid sparks caused by impact and friction.

Safety instructions:
Installation



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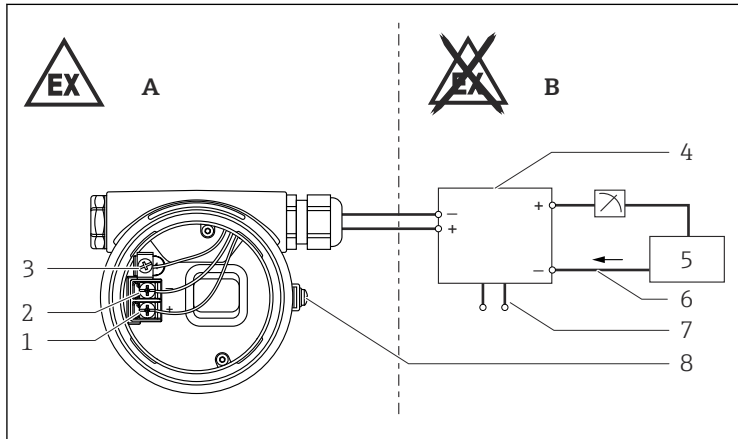
- A *Basic specification, Position 1, 2 = CB:*
Zone 0; Class I, II, III, Div. 1, Groups A-G
Basic specification, Position 1, 2 = CC:
Zone 0; Class I, Div. 1, Groups A-D
- B *Process;*
Basic specification, Position 1, 2 = CB:
Zone 0; Class I, II, III, Div. 1, Groups A-G
Basic specification, Position 1, 2 = CC:
Zone 0; Class I, Div. 1, Groups A-D
- 1 *Associated apparatus [Ex ia], intrinsically safe power supply units*
- 2 *PMC51B, PMP51B*

- After aligning (rotating) the housing, retighten the fixing screw.
- Continuous service temperature of the connecting cable: $\geq T_a + 20 \text{ K}$.
- Observe the pertinent guidelines when interconnecting intrinsically safe circuits.
- Observe the maximum process conditions according to the manufacturer's Operating Instructions.
- Install the device to exclude any mechanical damage or friction during the application. Pay particular attention to flow conditions and tank fittings.

Potential equalization

Integrate the device into the local potential equalization.

Intrinsic safety



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- A *Hazardous Location:*
Basic specification, Position 1, 2 = CB:
 Class I, Div. 1, Groups A, B, C, D; Class II, Div. 1, Groups E, F, G; Class III;
 Class I, Zone 0, AEx/Ex ia IIC Ga
Basic specification, Position 1, 2 = CC:
 Class I, Div. 1, Groups A, B, C, D; Class I, Zone 0, AEx/Ex ia IIC Ga
- B *Non-hazardous location*
- 1 *Positive terminal*
 - 2 *Negative terminal*
 - 3 *Internal ground terminal*
 - 4 *Barrier / Associated equipment*
 - 5 *External load*
 - 6 *4 to 20 mA loop*
 - 7 *Supply*
 - 8 *External ground terminal*

Entity installation

- Install per National Electrical Code (NFPA70) or Canadian Electrical Code, Part I (C22.1), as applicable.
- Use an intrinsic safety barrier or other associated equipment that is approved for the country in use and satisfies the following conditions:
 $U_o (V_{oc}) \leq U_i (V_{max}), I_o (I_{sc}) \leq I_i (I_{max}), C_o (C_a) \geq C_i + C_{cable},$
 $L_o (L_a) \geq L_i + L_{cable}$ and $P_o \leq P_i.$
- For transmitter parameters: See "Connection data" section.
- Associated devices with galvanic isolation between the intrinsically safe and non-intrinsically safe circuits are preferred.
- Control room equipment may not use or generate over 250 V_{rms}.
- Always follow the installation instructions provided by the intrinsic safety barrier manufacturer when installing this equipment.
- WARNINGS: Substitution of components may impair intrinsic safety.
- The transmitter housing is to be connected to ground via internal or external ground terminals.
- The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 500 V_{rms}.

Optional specification, ID Nx, Ox = NA

The intrinsically safe input power circuit of the device is isolated from ground. The dielectric strength is at least 290 V_{rms}.

Process seals

Device Type PMC51B

- The device is rated Single Seal in accordance with UL122701 and does not require the use of an external secondary process seal.
- The Single Seal rating is valid for a maximum pressure of up to 40 bar and a maximum process temperature (T_p) up to 125 °C.

Device Type PMP51B

- The device is rated Single Seal in accordance with UL122701 and does not require the use of an external secondary process seal.
- The Single Seal rating is valid for a maximum working pressure (MWP) of up to 400 bar and a maximum process temperature (T_p) up to 400 °C.



- Limitation of the maximum working pressure (MWP) for each device is marked on the nameplate and must not be exceeded! This value may be less than the Single Seal rating.
- Limitation of the maximum process temperature (T_p) with regards to the device options, temperature code rating and maximum ambient temperature as specified in the "Temperature tables" section of this document must be considered!
- Verify the chemical compatibility of the process fluid with the process seal material (see field "Mat." on the nameplate)!

Temperature tables



Optional specification, ID Px, Rx = PB

When using the weather protection cover: Reduce the admissible ambient temperature by 10 K.

Class I, Div. 1 / Zone 0



- The specified ambient and process temperature ranges exclusively refer to the explosion protection and must not be exceeded. Operationally permitted ambient temperature ranges can be restricted depending on the version: See Operating Instructions.
- Do not exceed the max. ambient temperature at the housing.
- The process temperatures refer to the temperature at the separation membrane.

Device Type PMC51B

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +60\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$

Device Type PMP51B

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +70\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$

Basic specification, Position 10 = G

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T3	$-40\text{ °C} \leq T_p \leq +190\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T2	$-40\text{ °C} \leq T_p \leq +285\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
T1	$-40\text{ °C} \leq T_p \leq +400\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

Basic specification, Position 10 = M, N, O, R, S, T

Temperature class	Process temperature range	Ambient temperature range
T6	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
T4	$-40\text{ °C} \leq T_p \leq +130\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T3	$-40\text{ °C} \leq T_p \leq +190\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T2	$-40\text{ °C} \leq T_p \leq +285\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$
T1	$-40\text{ °C} \leq T_p \leq +400\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Class II, III, Div. 1



- The specified surface temperature takes into account all direct heat influences from process heat and self-heating at the housing.
- The specified ambient and process temperature ranges exclusively refer to the explosion protection and must not be exceeded. Operationally permitted ambient temperature ranges can be restricted depending on the version: See Operating Instructions.
- Do not exceed the max. ambient temperature at the housing.
- The process temperatures refer to the temperature at the separation membrane.

Device Type PMC51B

Maximum surface temperature	Process temperature range	Ambient temperature range
T135 °C	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +50\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$

Device Type PMP51B

Maximum surface temperature	Process temperature range	Ambient temperature range
T125 °C	$-40\text{ °C} \leq T_p \leq +80\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +100\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +125\text{ °C}$	$-40\text{ °C} \leq T_a \leq +45\text{ °C}$

Basic specification, Position 10 = G

Maximum surface temperature	Process temperature range	Ambient temperature range
T125 °C	$-40\text{ °C} \leq T_p \leq +190\text{ °C}$	$-40\text{ °C} \leq T_a \leq +60\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +285\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$
	$-40\text{ °C} \leq T_p \leq +400\text{ °C}$	$-40\text{ °C} \leq T_a \leq +55\text{ °C}$

Basic specification, Position 10 = M, N, O, R, S, T

Maximum surface temperature	Process temperature range	Ambient temperature range
T125 °C	$-40\text{ °C} \leq T_p \leq +400\text{ °C}$	$-40\text{ °C} \leq T_a \leq +65\text{ °C}$

Connection data

Power supply
$U_i \text{ (or } V_{\text{max}}) \leq 30\text{ V}_{\text{DC}}$ $I_i \text{ (or } I_{\text{max}}) \leq 300\text{ mA}$ $P_i \leq 1\text{ W}$ $C_i \leq 10\text{ nF}$ $L_i = 0$



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