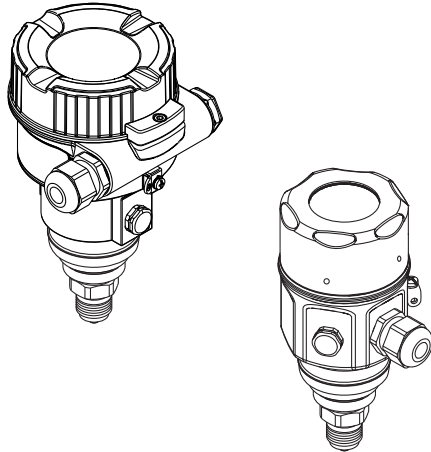


# ***Pressure Transmitter LHC-M51, PPC-M51***

## **Process Pressure**

### **With Analog Electronics**



These are Brief Operating Instructions.

For more detailed information, please refer to the Operating Instructions and the additional documentation on the CD-ROM provided.

These Brief Operating Instructions are not intended to replace the Operating Instructions provided in the scope of supply.

The complete device documentation consists of:

- these Brief Operating Instructions
- a CD-ROM with:
  - the Operating Instructions
  - Technical Information

With regard to the supply of products, the current issue of the following document is applicable:

The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship".

<b>1</b>	<b>Safety Instructions</b> . . . . .	<b>4</b>
1.1	Intended use . . . . .	4
1.2	Installation, commissioning and operation. . . . .	4
1.3	Operational safety and process safety. . . . .	4
1.4	Return. . . . .	4
1.5	Safety symbols . . . . .	5
<b>2</b>	<b>Mounting</b> . . . . .	<b>6</b>
2.1	Installation position . . . . .	6
2.2	Installation instructions for devices without diaphragm seals. . . . .	6
2.3	Assembling and mounting the "separate housing" version . . . . .	8
2.4	Closing the cover. . . . .	9
2.5	Post-installation check . . . . .	9
<b>3</b>	<b>Wiring</b> . . . . .	<b>10</b>
3.1	Connecting the device. . . . .	10
3.2	Connecting the measuring unit. . . . .	11
3.3	Potential equalization . . . . .	11
3.4	Overvoltage protection (optional). . . . .	11
3.5	Post-connection check . . . . .	11
<b>4</b>	<b>Operation</b> . . . . .	<b>12</b>
4.1	Position of operating elements . . . . .	12
4.2	Using the device display (optional) . . . . .	13
<b>5</b>	<b>Commissioning</b> . . . . .	<b>15</b>
5.1	Function check. . . . .	15
5.2	The procedure . . . . .	16

# 1 Safety Instructions

## 1.1 Intended use

The pressure transmitter is used for measuring pressure and level.

The manufacturer accepts no liability for damages resulting from incorrect use or use other than that designated.

## 1.2 Installation, commissioning and operation

- The device must only be installed, connected, commissioned and maintained by qualified and authorized specialists (e. g. electrical technicians) in full compliance with the instructions in this manual, the applicable norms, legal regulations and certificates (depending on the application).
- The specialist must have read and understood this manual and must follow the instructions it contains. If you are unclear on anything in these Brief Operating Instructions, you must read the Operating Instructions (on the CD-ROM). The Operating Instructions provide detailed information on the device/measuring system.
- The device may only be modified or repaired if such work is expressly permitted in the Operating Instructions (→ see CD-ROM).
- If faults cannot be rectified, the device must be taken out of service and secured against unintentional commissioning.
- Do not operate damaged devices. Mark them as defective.

## 1.3 Operational safety and process safety

- Alternative monitoring measures must be taken to ensure operational safety and process safety during configuration, testing and maintenance work on the device.
- The device is safely built and tested according to state-of-the-art technology and has left the factory in perfect condition as regards technical safety. The applicable regulations and European standards have been taken into account.
- Pay particular attention to the technical data on the nameplate.
- If using devices for applications with safety integrity level, the separate manual on functional safety must be observed thoroughly (→ see CD-ROM).







**WARNING**

Only disassemble the device in pressureless condition!

## 1.4 Return

Follow the instructions on returning the device as outlined in the Operating Instructions on the CD-ROM provided.

## 1.5 Safety symbols

Symbol	Meaning
 P0011189-EN	<b>DANGER!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation will result in serious or fatal injury.
 P0011190-EN	<b>WARNING!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in serious or fatal injury.
 P0011191-EN	<b>CAUTION!</b> This symbol alerts you to a dangerous situation. Failure to avoid this situation can result in minor or medium injury.
 P0011192-EN	<b>NOTE!</b> This symbol contains information on procedures and other facts which do not result in personal injury.

## 2 Mounting

- WARNING** The seal is not allowed to press against the process isolating diaphragm as this could affect the measurement result.

### 2.1 Installation position

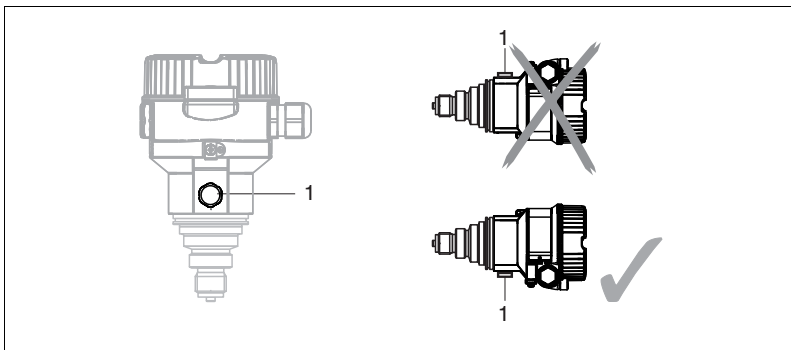
**NOTICE**

- Due to the orientation of the pressure transmitter, there may be a shift in the measured value, i. e. when the container is empty, the measured value does not display zero. You may correct this zero point shift → 13, "Function of the Operating Elements".
- Pepperl+Fuchs offers a mounting bracket for installing on pipes or walls (see Operating Instructions BA00385O).

### 2.2 Installation instructions for devices without diaphragm seals

**NOTICE**

- ▶ Keep the pressure compensation and GORE-TEX® filter (1) free from contamination.
- ▶ Pressure transmitters without diaphragm seals are mounted as per the norms for a manometer (DIN EN 837-2). We recommend the use of shutoff devices and siphons. The orientation depends on the measuring application.
- ▶ Do not clean or touch process isolating diaphragms with hard or pointed objects.
- ▶ If a heated pressure transmitter is cooled during the cleaning process (e.g. by cold water), a vacuum develops for a short time, whereby moisture can penetrate the sensor through the pressure compensation (1). If this is the case, mount the pressure transmitter with the pressure compensation (1) pointing downwards.



#### 2.2.1 Pressure measurement in gases

- ▶ Mount the pressure transmitter with shutoff device above the tapping point so that condensate which may be present, can flow into the process.

### 2.2.2 Pressure measurement in steams

- ▶ Mount the pressure transmitter with siphon above the tapping point.
- ▶ Fill the siphon with liquid before commissioning.  
The siphon reduces the temperature to almost the ambient temperature.

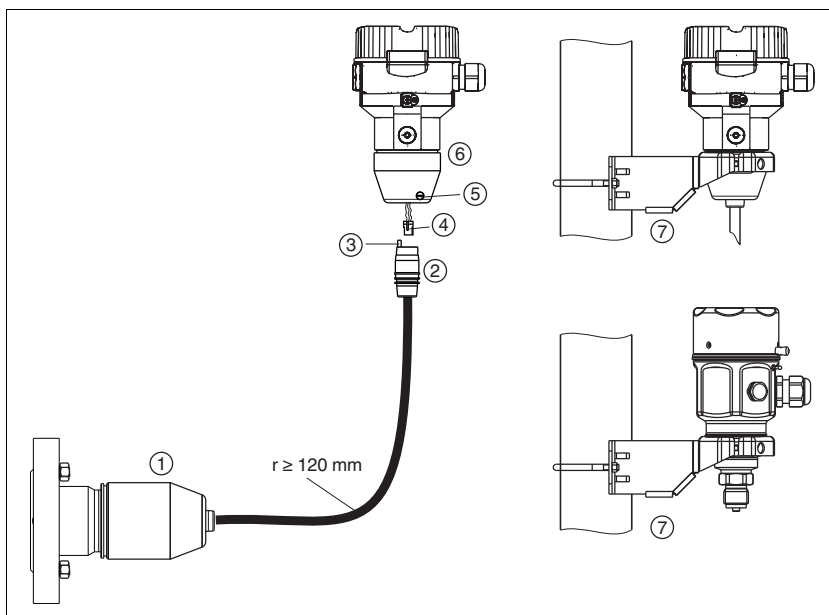
### 2.2.3 Pressure measurement in liquids


- ▶ Mount the pressure transmitter with shutoff device below or at the same level as the tapping point.

### 2.2.4 Level measurement

- ▶ Always install the pressure transmitter below the lowest measuring point.
- ▶ Do not mount the device in the filling curtain or at a point in the tank which could be affected by pressure pulses from an agitator.
- ▶ Do not mount the device in the suction area of a pump.
- ▶ The calibration and functional test can be carried out more easily if you mount the device downstream of a shutoff device.

## 2.3 Assembling and mounting the "separate housing" version



1  "Separate housing" version

- 1 In the case of the "separate housing" version, the sensor is delivered with the process connection and cable ready mounted.
- 2 Cable with connection jack
- 3 Pressure compensation
- 4 Connector
- 5 Locking screw
- 6 Housing mounted with housing adapter, included
- 7 Mounting bracket provided, suitable for pipe and wall mounting (for pipes from 1-1/4 in up to 2 in diameter)

### 2.3.1 Assembly and mounting

1. Insert the connector (4) into the corresponding connection jack of the cable (2).
2. Plug the cable into the housing adapter (6).
3. Tighten the locking screw (5).
4. Mount the housing on a wall or pipe using the mounting bracket (7).

When mounting on a pipe, tighten the nuts on the bracket uniformly with a torque of at least 5 Nm (3.69 lbs ft).

Mount the cable with a bending radius ( $r \geq 120$  mm (4.72 in)).



## 2.4 Closing the cover

The cover for the electronics compartment is tightened by hand at the housing until the stop.

## 2.5 Post-installation check

After installing the device, carry out the following checks:

- ▶ Are all screws firmly tightened?
- ▶ Are the housing covers screwed down tight?

## 3 Wiring

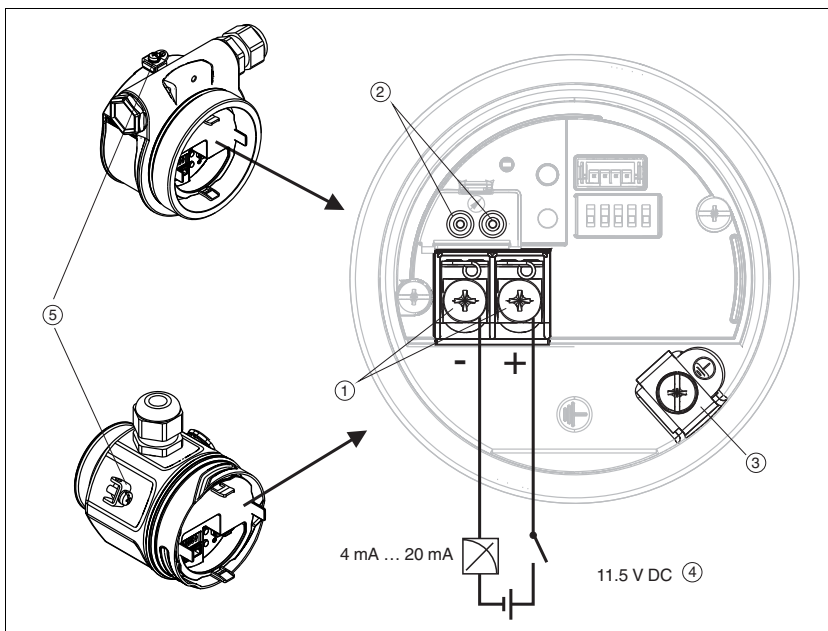
### 3.1 Connecting the device


#### NOTICE

- A suitable circuit breaker has to be provided for the device in accordance with IEC/EN 61010.
- Devices with integrated overvoltage protection must be earthed.
- Protective circuits against reverse polarity, HF influences and overvoltage peaks are integrated.

#### The procedure

1. Check if the supply voltage matches the specified supply voltage on the nameplate.
2. Switch off the supply voltage before connecting the device.
3. Remove housing cover.
4. Guide cable through the gland. Preferably use twisted, screened two-wire cable.
5. Connect device in accordance with the following diagram.
6. Screw down housing cover.
7. Switch on supply voltage.



2  Electrical connection 4 mA to 20 mA

- 1 Terminals for supply voltage and signal
- 2 Test terminals
- 3 Grounding terminal
- 4 Supply voltage: 11.5 V DC to 45 V DC (versions with plug connectors: 35 V DC)
- 5 External ground terminal

## 3.2 Connecting the measuring unit

### 3.2.1 Supply voltage

Electronic version	
4 mA to 20 mA	11.5 V DC to 45 V DC (versions with plug-in connector 35 V DC)

#### Taking 4 to 20 mA test signal

A 4 to 20 mA test signal may be measured via the test terminals without interrupting the measurement. To keep the corresponding measured error below 0.1 %, the current measuring device should exhibit an internal resistance of  $< 0.7 \Omega$ .

### 3.2.2 Cable specification

- Pepperl+Fuchs recommends using twisted, shielded two-wire cables.
- Terminals for wire cross-sections: 0.5 mm<sup>2</sup> to 2.5 mm<sup>2</sup> (20 AWG to 14 AWG)
- Cable outer diameter: 5 mm to 9 mm (0.2 in to 0.35 in) depends on the used cable gland (see technical information)

### 3.2.3 Shielding/potential equalization

You achieve optimum shielding against disturbances if the shielding is connected on both sides (in the cabinet and on the device). If potential equalization currents are expected in the plant, only ground shielding on one side, preferably at the transmitter.

## 3.3 Potential equalization

Observe the applicable regulations.

### 3.4 Overvoltage protection (optional)

The device can be fitted with overvoltage protection. The overvoltage protection is mounted at the factory on the housing thread (M20x1.5) for the cable gland (take additional length into account when installing).

## 3.5 Post-connection check

Perform the following checks after completing electrical installation of the device:

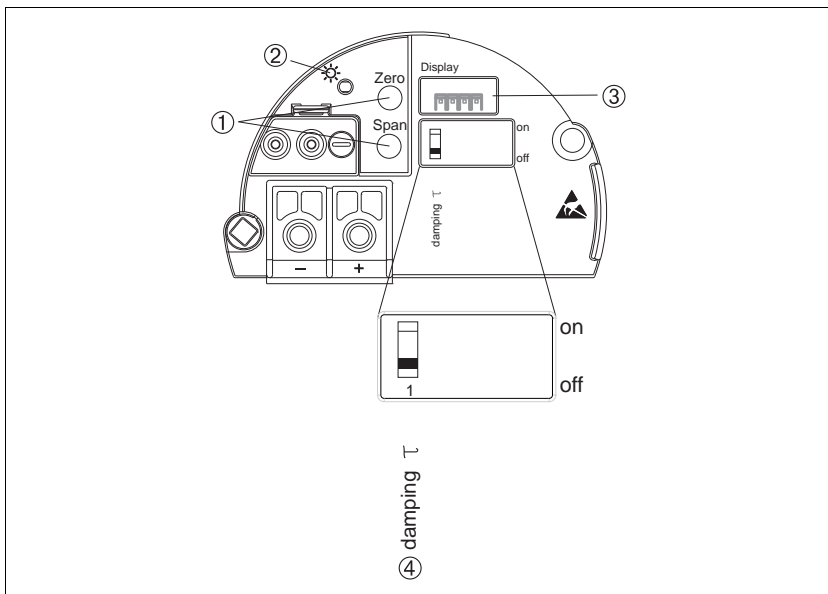
- ▶ Does the supply voltage match the specifications on the nameplate?
- ▶ Is the device connected as per section 3.1?
- ▶ Are all screws firmly tightened?
- ▶ Are the housing covers screwed down tight?

As soon as voltage is applied to the device, the green LED on the electronic insert lights up for a few seconds or the connected local display lights up.

## 4 Operation

### 4.1 Position of operating elements

The operating keys and DIP switch are located on the electronic insert in the device.



3  Electronic insert Analog

- 1 Operating keys for lower range value (zero) and upper range value (span)
- 2 Green LED to indicate successful operation
- 3 Slot for optional local display
- 4 DIP switch for switching damping on/off

#### 4.1.1 Function of the DIP switch

Switch position	
"off"	"on"
Damping is switched off. The output signal follows measured value changes without any delay.	Damping is switched on. The output signal follows measured value changes with the delay time $\tau$ (Factory setting: $\tau = 2$ s or as per order specifications).

04/2013

TDOCT-2989\_ENG 255435

#### 4.1.2 Function of the Operating Elements

Operating key(s)	Meaning
"Zero" pressed briefly	<b>Display lower range value</b>
"Zero" pressed for at least 3 seconds	<b>Get lower range value</b> The pressure present is accepted as the lower range value (LRV).
"Span" pressed briefly	<b>Display upper range value</b>
"Span" <b>pressed for at least 3 seconds</b>	<b>Get upper range value</b> The pressure present is accepted as the upper range value (LRV).
"Zero" and "Span" pressed together briefly	<b>Display position adjustment</b>
"Zero" and "Span" pressed simultaneously for at least 3 seconds	<b>Position adjustment</b> The sensor characteristic curve is shifted parallel to itself, so that the pressure present becomes the zero value.
"Zero" and "Span" pressed simultaneously for at least 12 seconds	<b>Reset</b> All parameters are reset to the order configuration.

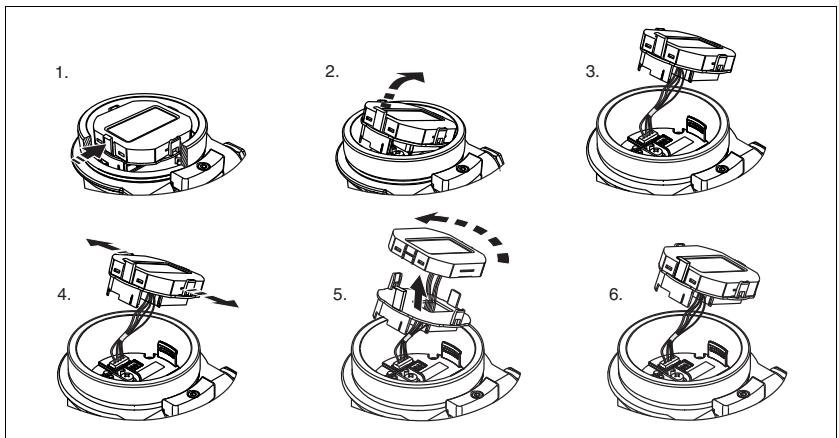
#### 4.2 Using the device display (optional)

A 4-line liquid crystal display (LCD) is used. The local display shows measured values, fault messages and notice messages.

The display can be removed for easy operation (see diagram, steps 1 to 3). It is connected to the device via a 90 mm (3.54 in) long cable.

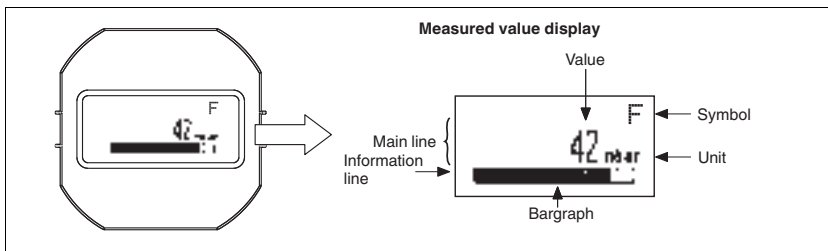
The device display can be rotated in 90 ° stages (see diagram, steps 4 to 6).

Depending on the orientation of the device, this makes it easy to read the measured values.



Functions:

- 8-digit measured value display including sign and decimal point, bar graph for 4 to 20 mA as current display.
- Diagnostic functions (fault and warning message etc.)



The following table illustrates the symbols that can appear on the local display. Four symbols can occur at one time.

Symbol	Meaning
<b>S</b> P0012088	<b>Error message "Out of specification"</b> The device is being operated outside its technical specifications (e.g. during warm-up or cleaning processes).
<b>C</b> P0012100	<b>Error message "Service mode"</b> The device is in the service mode (during a simulation, for example).
<b>M</b> P0012101	<b>Error message "Maintenance required"</b> Maintenance is required. The measured value remains valid.
<b>F</b> P0012086	<b>Error message "Failure detected"</b> An operating error has occurred. The measured value is no longer valid.



## 5 Commissioning

**WARNING** If the pressure present at the device is less than the permitted minimum pressure or greater than the permitted maximum pressure, the message "S" and "Warning" are output alternately.

**NOTICE** The measuring range and the unit in which the measured value is displayed correspond to the specifications on the nameplate.

### 5.1 Function check

Carry out a post-installation and a post-connection check as per the checklist before commissioning the device.

- ▶ "Post-installation check" →  9
- ▶ "Post-connection check" →  11

## 5.2 The procedure

**NOTICE** The pressure applied must be within the nominal pressure limits of the sensor.  
See information on the nameplate.

1. Carrying out position adjustment		2. Setting lower range value	
Pressure is present at device.		Desired pressure for lower range value is present at device.	
↓		↓	
Press the "Zero" and "Span" keys simultaneously for at least 3 s.		Press the "Zero" key for at least 3 s.	
↓		↓	
Does the LED on the electronic insert light up briefly?		Does the LED on the electronic insert light up briefly?	
Yes	No	Yes	No
↓	↓	↓	↓
Applied pressure for position adjustment has been accepted.	Applied pressure for position adjustment has not been accepted. Observe the input limits.	Applied pressure for lower range value has been accepted.	Applied pressure for lower range value has not been accepted. Observe the input limits.

3. Setting upper range value		4. Check configuration	
Desired pressure for upper range value is present at device.		Press "Zero" key briefly to display the lower range value.	
↓		↓	
Press the "Span" key for at least 3 s.		Press "Span" key briefly to display the upper range value.	
↓		↓	
Does the LED on the electronic insert light up briefly?		Press "Zero" and "Span" keys together briefly to display the calibration offset.	
Yes	No		
↓	↓		
Applied pressure for upper range value has been accepted.	Applied pressure for upper range value has not been accepted. Observe the input limits.		





TDOCT-2989\_ENG 255435 04/2013





TDOCT-2989\_ENG 255435 04/2013

# PROCESS AUTOMATION – PROTECTING YOUR PROCESS



## Worldwide Headquarters

Pepperl+Fuchs GmbH  
68307 Mannheim · Germany  
Tel. +49 621 776-0  
E-mail: [info@de.pepperl-fuchs.com](mailto:info@de.pepperl-fuchs.com)

For the Pepperl+Fuchs representative  
closest to you check [www.pepperl-fuchs.com/contact](http://www.pepperl-fuchs.com/contact)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

Subject to modifications  
Copyright PEPPERL+FUCHS • Printed in Germany



71210677

KA010360/98/EN/14.12  
71210677  
FM7.2

 **PEPPERL+FUCHS**  
*PROTECTING YOUR PROCESS*

TDOCT-2989\_ENG 255435  
02/2013