



Pressure Transmitters

100 V2 series

PZM 100/101

VRM 100/101

PZT 100/101

TPF 100/101

TCF 100/101

KS 100/101



Operating Instructions

English

PN-TI113V2

Version 2.1



Notes / comments:



Please use this space for your own notes or comments. For example, you can enter the TAG numbers of the devices, to which these operating instructions belong. Furthermore, you can specify details such as set values for the installation of the devices or record the reminders of service intervals.



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1 Important notes

1.1 *Intended use*

The pressure transmitters of the 100 series are designed for measuring the process pressure of aggressive and non-aggressive gases, vapours and fluids. Depending on the construction of the device, the transmitter can be used for measuring both absolute and relative pressures.

Please read these operating instructions carefully before commissioning the devices. If you have questions, please contact the manufacturer's technical department.

The manufacturer cannot assume any liability for damage due to any other kind of use or the incorrect use of the devices. If in doubt, please contact the manufacturer with regard to the suitability of the device for your specific application before its installation.

The transmitter is not approved for use in explosion-proof areas.

The manufacturer can be contacted under the following address:

**Hengesbach Prozessmesstechnik GmbH & Co. KG
Schimmelbuschstr. 17
40699 Erkrath-Hochdahl**

DEUTSCHLAND

**Tel.: +49 (0)2104 3032 – 0
Fax: +49 (0)2104 3032 – 22**

**info@hengeschbach.com
www.hengesbach.com**

1.2 *Assembly, commissioning and operation of the device*

The transmitter has been manufactured according to state-of-the-art technical knowledge and complies with all relevant guidelines for it to be safely operated.

The assembly, connection, commissioning, operation and service of the device should always be carried out by qualified personnel. Personnel who are carrying out the above tasks must have been authorised by the plant operator.

This document must be kept in a location where it is easily accessible for the relevant personnel. Please contact us for another copy if required or download another copy from the manufacturer's homepage.



2 Unpacking the transmitter

In order to avoid damage to the device, please observe the following notes before unpacking the device.

	Carefully cut the packaging open as sharp objects may destroy parts of the device inside the packaging.
	Depending on the measuring cell, the membrane of the measuring device is covered with a protective cover. Please only remove this cover immediately before assembling / installing the device. The measuring cell must under no circumstances be touched. Any damage to the membrane will result in the malfunction of the transmitter.
	Please protect the contents of the shipment until its final installation and when all connections are checked for moisture-proof installation.

Please check that the goods are correct, undamaged and complete. For this purpose, please compare the details on the delivery note with the contents of the received shipment. Pay special attention to the correspondence between the order data and the details on the transmitter's type plate. If you detect any discrepancies, please contact the manufacturer immediately.

3 Transmitter identification

The following illustration shows the type plate of a transmitter and the meaning of the symbols and details:










PZM101_10bar_MT1
range: 0...10 bar, P_{max}: 30 bar
adjusted range: 0...10 bar, TD 10:1
output: 4...20 mA, 2-wire
supply: 12...36 V DC
serial-no.: 12345.10.12345678.112V2
 T_{amb}: -40...+85 °C
 made in Germany
 Hengesbach GmbH & Co. KG D-40699 Erkrath Te. +49 (0) 21 04 / 30 32-0

- 1: Device designation
- 2: Max. measuring range
- 3: Overload protection
- 4: Set measuring range
- 5: Turn down ratio
- 6: Output signal
- 7: Connection type
- 8: Supply voltage
- 9: Serial number
- 10: Ambient temperature
- 11: Electrical connection
- 12: Manufacturing location



4 Assembly information

Please observe the following assembly notes. These notes are intended to ensure your own safety as well as ensuring the smooth, low-maintenance and reliable operation of the device.

	<p>You must make sure that the plant is depressurised before assembling / installing the device. If there is any residual medium in the facility, this residual medium must be drained beforehand or the plant parts upstream of the transmitter must be blocked accordingly.</p>
	<p>You must make sure that personnel can safely work at the plant while the transmitter is installed. Be aware of the danger of burns due to heat or cold and protect yourself against any contact with aggressive media.</p>
	<p>Make sure that the potential equalisation between the transmitter and plant is facilitated. In this respect, please also read the section regarding the electrical connections of the device.</p>
	<p>Do not remove the protective cover from the measuring cell during the assembly preparations. Only remove the cover shortly before installing the transmitter. Make sure that you don't touch the membrane during the installation.</p>
	<p>The device manufacturer recommends that device openings such as ventilation openings should point downwards during the installation if possible. This way, in the event that process media make the device wet, its blockage by highly viscose or drying substances is avoided.</p>
	<p>The device should be installed in a low-vibration location and with some distance to larger plants and strong electrical fields if possible.</p>
	<p>Make sure that the process connection with the plant has a tight fit and no medium leaks from the connection point. For this purpose, use a seal, which is suited for your specific process, and pay special attention to its suitability for the process temperature.</p>
	<p>Tighten the transmitter with the torque that is suitable for your process connection. If in doubt, please contact the manufacturer. It may be that metal screw connections, which have been damaged by an incorrect installation, cannot be loosened without causing problems.</p>
	<p>If the provided reference cable is used, please observe a minimum bending radius of the cable of 120 mm. Protect the cable against the ingress of moisture by making sure that it ends inside a dry room.</p>



5 Servicing and cleaning

The transmitter does not contain any parts that can be serviced by the user. In the event of problems with the device, please contact the manufacturer in order to discuss any further action.



Any changes that are made to the inside of the device will automatically result in the loss of warranty. Furthermore, the manufacturer reserves the right to reject any repair request for devices, which have been opened by the customer. (The above does not apply to the opening of the device lid for the purpose of wiring.)

You should only check the electrical connections, seals and pressure compensation openings (only for relative pressure devices) as part of your regular service activities.

Make sure that the connection wires are tightly secured in the screw terminals and the cable screw connections are tightly connected to the connection wire (if applicable). For devices with an M12 plug, the screw connection must be checked for a tight fit. Also check the tight fit of the lid in order to ensure the best possible sealing.

The ventilation opening must be free from highly viscose media or other adhesive media. A blocked ventilation opening prevents the pressure compensation of relative pressure devices and will result in the distortion of the measuring value. If the reference cable is used, the ventilation tube must also be free from foreign objects.

The transmitters are fully encapsulated and therefore have no dead spaces. However, especially during the cleaning process, major heating-up with subsequent cooling-down processes can result in an underpressure inside the device. This effect will be reduced to a minimum due to the small dead space volume. However, the transmitter head should be visually inspected at regular intervals in order to make sure that no foreign media have ingressed. Such foreign media can result in the build-up of conductive deposits (salts, etc.), which cause leakage currents, which will distort the measuring result.

You should also check the seals, both in the lid and at the process connection, for corrosion.



Observe the maximum permitted temperatures when cleaning. Sustained overtemperature can destroy both the electronics and attachments at the housing.



The membrane of the measuring cell must not be directly radiated by localised pressure sources, such as high-pressure cleaning equipment. This may result in the destruction of the membrane. Please continue to avoid any mechanical contact with the measuring cell.

The housing of the transmitter can be cleaned with all common cleaning agents and methods. But please contact the manufacturer if you consider using special types of cleaning agents and processes.

When using high-pressure equipment for cleaning, please make sure that you don't directly aim at the openings of the device, such as the pressure compensation element.



6 Electrical connection

6.1 A note regarding the electrical connection

This transmitter is a loop-fed, 2-wire, low-voltage DC device. Like all devices with a 2-wire design, the transmitter is supplied straight from the current loop, which also provides the analogue output signal between 4 and 20 mA.

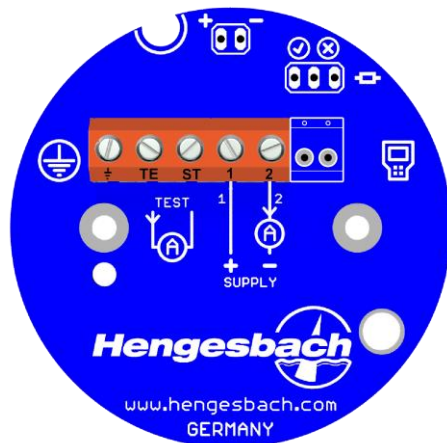


The operating voltage of the device is 12 to 36 VDC. The transmitter must under NO circumstances be operated with ANY other supply voltage.

6.2 The connection terminals in the transmitter head

The following illustration shows the connection terminals in the transmitter head. Depending on the device version, these terminals can be accessed as follows:

- **Pressure transmitter type 101** (without an integrated display module):
Unscrew the device lid in anti-clockwise direction.
- **Pressure transmitter type 100** (with an integrated display module):
Unscrew the device lid in anti-clockwise direction. The operating module is hard-wired to the electronics with a cable. When taking the module out of the device, make sure that the connection cable is not unnecessarily twisted or subjected to excessive tensile stress. Carefully pull the module out straight to the front.



Circuit board with connection terminals in the head of the transmitter housing

Please proceed in the reverse order in order to close the device lid. Screw the lid hand-tight without applying excessive force, but enough to ensure that it is sufficiently tight.

Permissible cable cross sections:

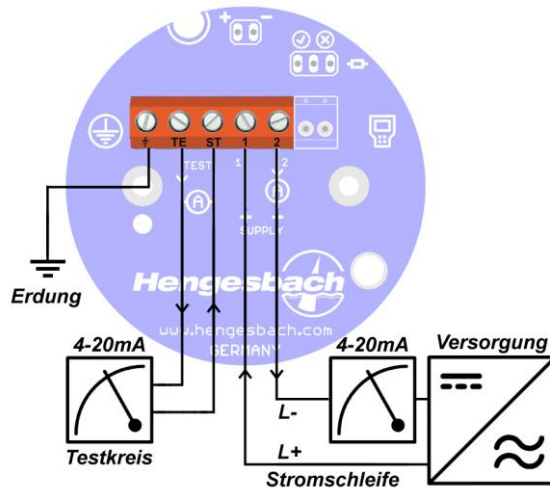
Without wire-end sleeve	(only for rigid wires)	0.2 to 1.5 mm ² (AWG 24 to AWG 16)
With wire-end sleeve	(for flexible and rigid wires)	0.25 to 0.75 mm ²



6.3 The terminal connection diagram

The connection circuit board in the transmitter head is equipped with a 5 pole screw terminal. They are described in the following.

- 5 occupied connection terminals: **EARTH, TE, ST, 1, 2**
- 2 free terminal positions
- 1 free switch position



Connection diagram

	The manufacturer recommends that you earth yourself and the device before installing the connections in order to minimise unnecessary loads due to static electricity.
	The screw connections must ensure that the connection lines are reliably fixed. The manufacturer recommends the use of wire-end sleeves.
	Use shielded and twisted wires for connecting the transmitter in order to suppress any interference due to electromagnetic fields to the best possible extent.



6.4 Functions of the connection terminals

Terminal	Function	Description
ERDE	Housing earth	<p><u>Connection with the transmitter housing</u></p> <p>Connect this connection for potential equalisation between the transmitter and supply source.</p>
TE ST	Test tap + Test tap –	<p><u>Test tap for the continuous measuring of the actual loop current</u></p> <p>Connect a low-resistance measuring instrument for detecting the actual loop current to this tap. This may be a hand-held multimeter or equivalent. This connection is only used for service purposes and should remain free during the normal operation of the device. The current flows from the TE terminal (multimeter connection +) to the ST terminal (multimeter connection –). The power supply to the device does not have to be disconnected for the test tapping.</p>
1 2	Supply + Supply –	<p><u>Transmitter supply connections</u></p> <p>The transmitter supply voltage is connected to terminals 1 and 2. Connect terminal 1 with the positive supply terminal and terminal 2 with the negative supply terminal. The current in this loop also represents the analogue output signal of 4 to 20 mA. This connection is protected against voltage reversal.</p>



6.5 Electrical connection variants at the point of delivery

Depending on the connection variant, which you have ordered, the transmitter can come in one of four possible configurations. The electrical connection of the device is contained in the device designation. The four possible variants are listed in the following:

- Cable screw connection

PZM101_10bar_KT1

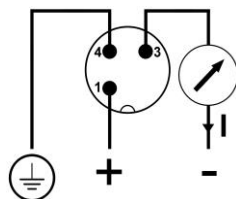
(example for the designation of a device with a cable screw connection)

Cable connection acc. to connection terminal designation

- M12 device plug

PZM101_10bar_MT1

(example for the designation of a device with an M12 device plug)

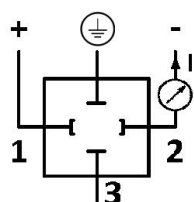


Assignment of the M12 device plug
 (as viewed from the plug side of the housing)

- Angle plug

PZM101_10bar_WT1

(example for the designation of a device with an angle plug)



Assignment of the angle plug
 (as viewed from the plug side of the housing)

- Reference cable is connected

PZM101_10bar_R(10m)T1

(example for the designation of a device with a connected 10 metre reference cable)

brown	supply +
black	supply -
white	earth
shield	earth

Assignment of the reference cable

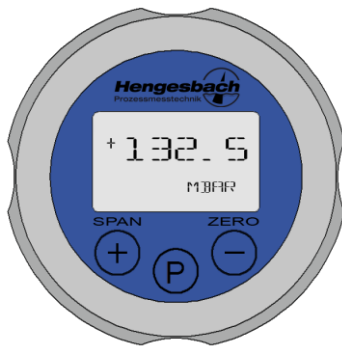


7 The on-site display / external OPUS^M

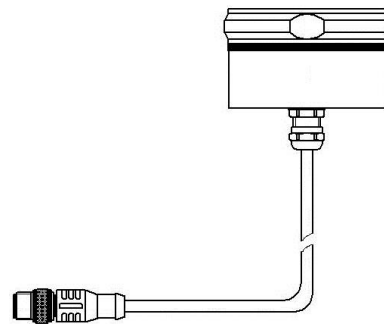
Depending on the device version, the on-site display has either already been integrated in your transmitter (device type 100) or it can be connected to the transmitter as an external OPUS^M display and operating module (device type 101).

The module can display the measuring values directly on site. Furthermore, the device can be fully parametrised via the keys that are integrated in the display.

The display and operating module consist of the two-row LCD display part and three keys, which are located below the display and are used for navigating the menu.



The external OPUS^M display and operating module in a separate stainless steel housing is connected via an integrated M12 device plug, which for the 101 device type is integrated in the side of the transmitter.



The integrated display and operating module is protected against environmental impact by an acrylic glass pane in the lid, which also makes the display easy to read. The external OPUS^M variant has its own stainless steel housing.

If the external operating module is used, please make sure that the locking screw of the device's M12 plug is screwed tight after the parametrisation has been completed. It protects the internal contacts from environmental influences.

The display of the 100 device types can be rotated by 360 degrees in the housing. This way, optimum readability is ensured depending on the position, in which the device is installed. In order to adjust its position, carefully pull the display out of the device, adjust its position and press it back in.



8 Repairs, returns and warranty

8.1 Repairs

If the transmitter shows any sign of malfunction, please always contact the manufacturer first. The manufacturer will help you over the telephone with all further actions that are necessary and may be able to suggest a solution for the problem. Often, the devices are merely incorrectly set and seem to be malfunctioning because of such incorrect settings.

However, if a device has a definite fault, please return it to the manufacturer. The transmitter does not contain any parts, which can be repaired by the user. The manufacturer's QA department will ensure that your device is repaired as quickly as possible or, if the device is still under warranty, will provide you with a free replacement device.



Please do not attempt to repair the transmitter on your own accord. You may lose your warranty entitlement and possibly make the fault worse.

8.2 Returns

If you return a device to us, please observe the following notes:

- Please secure the measuring cell against all forms of contact.
- Pack the device in transport-proof outer packaging.
- Pack the electronic components in ESD-compliant outer packaging.
- Please include a precise description of the transmitter fault with the returned device.
- Please tell us what you would like us to do with the returned item if applicable.
- Please use the enclosed *Returns Form* for your product return.

The manufacturer's returns address is:

Hengesbach Prozessmesstechnik GmbH & Co. KG

**Schimmelbuschstr. 17
40699 Erkrath-Hochdahl**

DEUTSCHLAND

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www.hengesbach.com
Tel.: +49 (0)2104 3032-0
Fax.: +49 (0)2104 3032-22



8.3 Warranty

The manufacturer warrants all manufactured products for a period of 1 year from delivery. Devices, which develop a fault or fail entirely during this period, will be repaired or replaced by the manufacturer. Please contact the manufacturer before you make your complaint in order to discuss further actions, as this will ensure the quick and smooth processing of your request.



Faults, which are due to incorrect handling, incorrect installation or other improper handling of the product, will not be regarded as warranty cases. In such instances, the manufacturer will prepare a report for each individual case.

Please also observe the return notes in the event of warranty processing. The manufacturer may not be able to tell who should be responsible for a device, which has become damaged during its return transport to the manufacturer because it was incorrectly packed. Therefore, in the worst case scenario, you may have to bear the damage yourself. For this reason we ask you to always make sure that you choose a safe means of transport packaging and pay special attention to the membrane of the measuring cell, as this is the one item, which gets damaged most often.

9 Storage

Always choose a clean, dry and cool location for devices that are stored. Furthermore, the devices should be protected against vibration and must under no circumstances be stored while standing on their measuring cell. Always protect the measuring cell against any form of contact.

10 Disposal

10.1 Packaging material

A certain packaging effort is required to protect the device against damage during transport. Please recycle the packaging materials correctly or reuse them for packing other items.

10.2 Obsolete devices

The devices consist of a number of different materials, all of which need to be specifically disposed of. Therefore, please dispose of the devices via a suitable recycling specialist or return them to the manufacturer for the purpose of disposal.



The device is not subject to the WEEE directive 2002/96/EC and its associated laws and regulations. Therefore, obsolete devices are not designed for disposal in communal recycling centres.



11 Operation via the on-site display

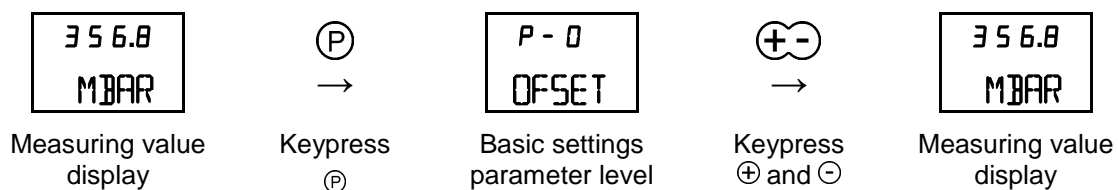
11.1 Operating notes

The transmitter is operated via the OPUSM display and operating module. All settings can be made with the three keys. The symbols, which are used in this documentation, and their meanings are listed in the following:

Symbol	Meaning	Function
	A single press on the ⊕ key	The ⊕ key is used for incrementing values and for the ascending navigation within the menu.
	A single press on the ⊖ key	The ⊖ key is used for decrementing values and for the descending navigation within the menu.
	A single press on the ⊕ key	The ⊕ key is used for opening parameters in the menu as well as for incrementing cursor positions and ack. the entering of values.
	A single press on the ⊕ and ⊖ keys at the same time	If the ⊕ and ⊖ keys are pressed at the same time, the menu returns to the previous level. Any data that have not been stored will be lost.
	A single press on the ⊕ or ⊖ key	You can press either the ⊕ or ⊖ key in order to increment or decrement a value or navigate the menu.
	A long press on the ⊕ key	A long press on the ⊕ key accepts the settings, which are selected on the display module, and saves them in the transmitter.
	A long press on the ⊕ key	A long press on the ⊕ key is equivalent to the repeated pressing of the key with ascending order. (if supported by the parameter)
	A long press on the ⊖ key	A long press on the ⊖ key is equivalent to the repeated pressing of the key with ascending order. (if supported by the parameter)

Press the ⊕ key to change from the display of the measuring values to the configuration menu. The measurements of the process parameters are continued in the background. By pressing the ⊕ and ⊖ keys at the same time you will leave the respective level and exit the parameter, which you have just selected, or go back by one item in the parameter menu.

If no key is pressed in the configuration menu over a period of three minutes, the menu is closed and the transmitter returns to the display of the measuring values. Any settings, which have not been saved, will be lost.





11.2 The parameter level

The fundamental settings of the transmitter can be made on the basic parameter level. After the Ⓢ key has been pressed, the transmitter changes from the measuring mode to this level. The starting point is the 0 parameter for setting the beginning of the measuring range. Press the ⊕ or ⊖ key to toggle between the various parameters. Press the Ⓢ key to open the respective parameter. Press the ⊕ and ⊖ keys at the same time to revert the device to the display of the measuring values.

Display	Description
P - 0 OFFSET	OFFSET: This parameter is used for setting the beginning of the measuring range. The value, which is set here, is assigned the output current of 4 mA. The adjustable range is within 0 to 90 % of the nominal measuring range.
P - 1 SPAN	SPAN: The span sets the end value for the measuring range. The value, which is set here, represents an output current of 20 mA. The adjustable range varies within 10 to 100 % of the nominal measuring range.
P - 2 I OUT	OUTPUT CURRENT: The current range of 4 to 20 mA can be inverted if required. The beginning of the measuring range, in its inverted state, corresponds to a current of 20 mA, and the end of the measuring range to 4 mA accordingly.
P - 3 DAMP	DAMPING: If the pressure conditions vary heavily, the measuring value can be settled by activating the damping function. However, because this will slow down the reaction time of the device, this setting should only be activated if required.
P - 4 MAINS	MAINS FREQUENCY: The setting of the mains frequency, which is used at the respective operating location, serves to suppress any interference inside the device. This way, the mains noise of the power supply unit can be cut out to a large extent.
P - 5 UNIT	MEASURING UNIT: This setting is used for selecting between different measuring units depending on the measuring value (pressure, temperature, volume, mass), which is currently displayed.
P - 6 DISPL	DISPLAY VALUE: This parameter allows the selection of the displayed measuring value. Depending on the device configuration, you can choose between the pressure, temperature, current, percentage, volume or mass.
P - 7 BIAS	INLET PRESSURE: A possible offset pressure, which should not be included in the measuring result, can be hidden by entering an inlet pressure / bias. This is particularly useful for volume measurements in pressurised tanks.
P - 8 LIMIT	TRAILING POINTER: The device continuously writes the minimum and maximum values of the recorded measuring data, and these trailing pointers are provided both as a continuous and non-deletable version as well as a resettable version.
P - 9 LOCK	INSTRUMENT LOCK: It is possible to set a lock for parameters which are used for special adjustments of the instrument. This is to avoid unsolicited changes of the instrument.
P - 10 I ERR	CURRENT IN AN ERROR CASE: If the transmitter is faulty, the output current can either assume the lower limit (3.8 mA), upper limit (22 mA) or the last valid value (hold).
P - 11 VERSN	VERSION: Both the version of the installed hardware (electronics) and the software (firmware) in the device can be viewed under this parameter. In the event of a fault it is possible to draw conclusions regarding the revision of the device.



12 The device parameters in greater detail

12.1 Parameter 0 – Setting the beginning of the measuring range

P - 0
OFFSET

You will need to specify the beginning of the measuring range for the transmitter. The value, which you set here, corresponds to the output current of 4 mA (or 20 mA for the inverted current signal).

Press the P key to go to the level where you enter the beginning of the measuring range. The currently set value is displayed.

P - 0 P 0
OFFSET → MBAR



Independent of the set measuring unit, the values are entered in the transmitter's basic unit of *millibar*.

If you want to change the value, you need to press the P key to change to the editing mode. Repeated pressing of the P key moves the cursor to the right by one digit at a time, and the selected digit will flash. If the cursor has reached the last digit, the process starts again from the first digit. Leading zeros are automatically hidden by the transmitter.

0 MBAR → 0000 MBAR → 000 MBAR → 00 MBAR → 0 MBAR

Press the \oplus or \ominus key to change the respective digit.

0 MBAR → 0000 MBAR → 000 MBAR → + 100 MBAR → + 200 MBAR

If the set value is above or below the maximum display range, the transmitter automatically adapts the unit to the required range.

+9000 MBAR → +10.00 BAR → +20.00 BAR → +10.00 BAR → +9000 MBAR



Please note the minimum measuring span of 10% of the nominal measuring range. If your entry is below the minimum span, the transmitter automatically adapts the value to the maximum value.

Example: Nominal measuring range 0 to 10 bar → minimum span 1000 mbar

If the entry is below the minimum value, the transmitter automatically sets the value to the applicable lower limit. When this end value has been reached, a flashing *MIN* is displayed.



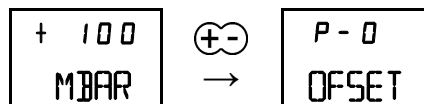
If the entry is above the maximum value, the transmitter automatically sets the value to the applicable upper limit. When this end value has been reached, a flashing *MAX* is displayed.



To save the value you have to leave the editing mode. This is the case, if no digit of the display flashes. By repeated short pressing of the [P] key the cursor is moved from one digit to the next, until after the fourth digit the flashing vanishes. By long pressing of the [P] key the value is saved and the parameter left. The transmitter now works with the new set limit.



Press the [+] and [-] key at the same time to exit the parameter. Any settings, which have not been saved, will be lost.



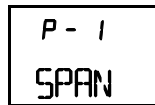
Fast set up of the beginning of the measuring range

To define the actual pressure as new beginning of the measuring range it can be saved directly. For that the [P] key is pressed short once to get in the editing mode. This is shown by a flashing cursor. Then a long press on key [P] fetches the actual value and immediately saves it as the new beginning of the measuring range. The parameter is automatically left. The transmitter now operates with the new setting.

Note: If the actual measured value is outside the possible range, the MIN/MAX-notification will appear and the value will be set to the nearest possible. In this case, the device does not immediately save the new setting to ensure you have seen the value you are about to operate with. To save it anyway, press key [P] long while none of the digits is flashing. Refer to the manual saving of values described in the upper text.

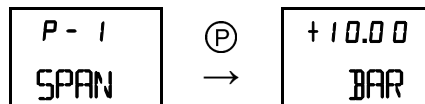


12.2 Parameter 1 – Setting the end of the measuring range



You will need to specify the end of the measuring range for the transmitter. The value, which you set here, corresponds to the output current of 20mA (or 4mA for the inverted current signal).

Press the P key to go to the level where you enter the beginning of the measuring range. The currently set value is displayed.

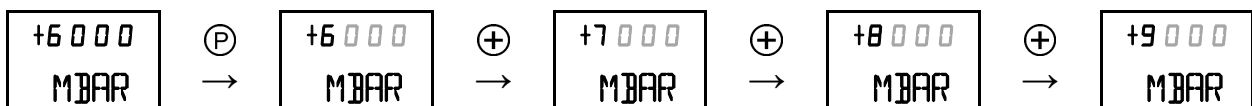


Independent of the set measuring unit, the values are entered in the transmitter's basic unit of *millibar*.

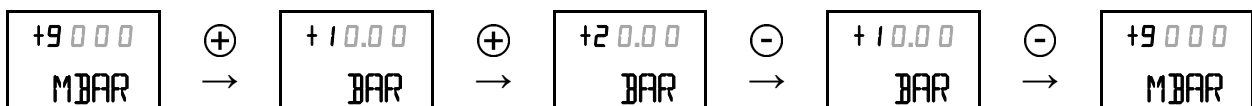
If you want to change the value, you need to press the P key to change to the editing mode. Repeated pressing of the P key moves the cursor to the right by one digit at a time, and the selected digit will flash. If the cursor has reached the last digit, the process starts again from the first digit. Leading zeros are automatically hidden by the transmitter.



Press the \oplus or \ominus key to change the respective digit.



If the set value is above or below the maximum display range, the transmitter automatically adapts the unit to the required range.





Please note the minimum measuring span of 10% of the nominal measuring range. If your entry is below the minimum span, the transmitter automatically adapts the value to the minimum value.

Example: Nominal measuring range 0 to 10 bar → minimum span 1000 mbar

If the entry is below the minimum value, the transmitter automatically sets the value to the applicable lower limit. When this end value has been reached, a flashing *MIN* is displayed.



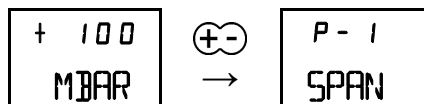
If the entry is above the maximum value, the transmitter automatically sets the value to the applicable upper limit. When this end value has been reached, a flashing *MAX* is displayed.



To save the value you have to leave the editing mode. This is the case, if no digit of the display flashes. By repeated short pressing of the P key the cursor is moved from one digit to the next, until after the fourth digit the flashing vanishes. By long pressing of the P key the value is saved and the parameter left. The transmitter now works with the new set limit.



Press the ⊕ and ⊖ key at the same time to exit the parameter. Any settings, which have not been saved, will be lost.



Fast set up of the ending of the measuring range

To define the actual pressure as new ending of the measuring range it can be saved directly. For that the P key is pressed short once to get in the editing mode. This is shown by a flashing cursor. Then a long press on key P fetches the actual value and immediately saves it as the new beginning of the measuring range. The parameter is automatically left. The transmitter now operates with the new setting.

Note: If the actual measured value is outside the possible range, the MIN/MAX-notification will appear and the value will be set to the nearest possible. In this case, the device does not immediately save the new setting to ensure you have seen the value you are about to operate with. To save it anyway, press key P long while none of the digits is flashing. Refer to the manual saving of values described in the upper text.



12.3 Parameter 2 – Setting the output current

P - 2
I OUT

During normal operation, the measuring value is represented by an output current between 4 and 20 mA. If this range is to be inverted to 20 to 4 mA, you can make this setting here. The beginning of the measuring range is represented by 20 mA and the end of the measuring range by 4 mA.

Press the \textcircled{P} key to go to the level where you select the output current. The currently set output current is displayed.

P - 2 \textcircled{P} 4 - 20
I OUT → I MA

Press the \oplus or \ominus key to toggle between both variants. If the display flashes, the currently displayed value is not saved.

4 - 20 $\oplus \ominus$ 20 - 4
I MA ↔ I MA

Press the \textcircled{P} key for a long time to stop the flashing and save the value in the transmitter.

20 - 4 \textcircled{P} 20 - 4
I MA → I MA

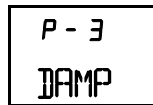
Press the \oplus and \ominus keys at the same time to exit the actual parameter and return to the basic parameter menu. Any settings, which have not been saved, will be lost.

20 - 4 $\oplus \ominus$ P - 2
I MA → I OUT

Settings between 4 and 20 mA (normal operation) or inverted settings between 20 and 4 mA are possible.



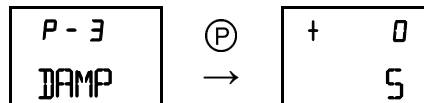
12.4 Parameter 3 – Setting the damping



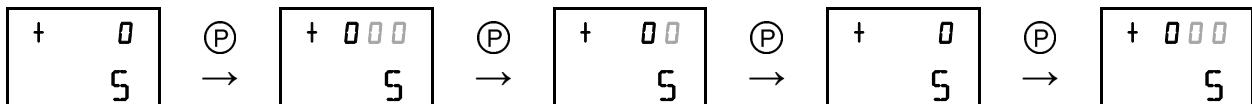
The damping is used for flattening a heavily varying input signal at the output side. Therefore, the transmitter will not react immediately to pressure changes. Both the display and the current output will appear more constant (depending on the set damping time).

	The damping value should only ever be adapted to the degree that the process requires. A value, which has been set too high, can give the appearance that the output signal no longer reacts to process changes.
	If the damping time is changed the transmitter has to integrate and to average the measured values. In consequence the transmitter cannot react on the pressure during the first damping cycle.

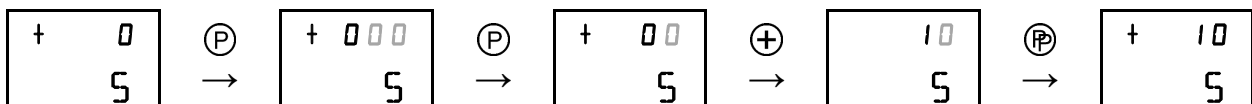
Press the $\text{\textcircled{P}}$ key to go to the level where you set the damping. The currently set value is displayed. A + in the top left corner of the display indicates that the currently displayed value is saved in the transmitter.



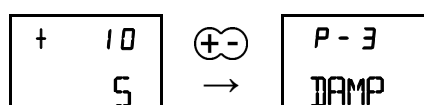
If you want to change the value, you need to press the $\text{\textcircled{P}}$ key to change to the editing mode. Repeated pressing of the $\text{\textcircled{P}}$ key moves the cursor to the right by one digit at a time, and the selected digit will flash. If the cursor has reached the last digit, the process starts again from the first digit. Leading zeros are automatically hidden by the transmitter.



Press the \oplus or \ominus key to change the respective digit. If the displayed value no longer equals the currently saved value, the + in the left corner of the display goes off. You will need to press the $\text{\textcircled{P}}$ key for a long time to accept the new damping value. This is confirmed by the + on the display, and the flashing cursor goes off.



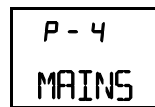
Press the \oplus and \ominus key at the same time to exit the parameter. Any settings, which have not been saved, will be lost.



The adjustable damping time is between 0 and 300 seconds.



12.5 Parameter 4 – Setting the mains frequency

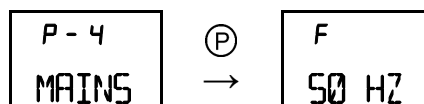


You can optimise the measurements of the transmitter by setting the correct mains frequency for the respective location. This way the mains noise of 50/60 Hz can be suppressed to the best possible extent for the internal digitalisation of the measuring values, which will have a positive effect on the measuring result.

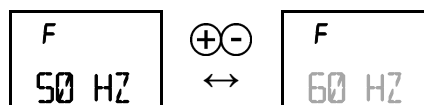


The transmitter should always be adapted to the mains frequency of the respective location. As a result, the interference, which is caused by the mains noise, is eliminated to the best possible extent.

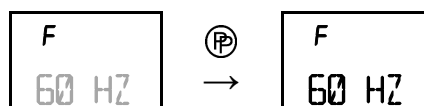
Press the P key to go to the level where you select the mains frequency. The currently set frequency is displayed.



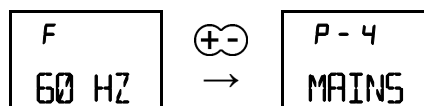
Press the \oplus or \ominus key to toggle between both variants. If the display flashes, the currently displayed value is not saved.



Press the P key for a long time to stop the flashing and save the frequency in the transmitter.



Press the \oplus and \ominus keys at the same time to exit the actual parameter and return to the basic parameter menu. Any settings, which have not been saved, will be lost.



You can choose between the settings of 50 Hz and 60 Hz.



12.6 Parameter 5 – Setting the measuring unit

P - 5
UNIT

The setting option for the measuring unit varies depending on the measuring value that is currently displayed (see the setting in parameter 6). If the transmitter, for example, is set to display the pressure, a selection of the possible units for displaying the process pressure is shown. The same applies to the temperature, volume and mass. The units for the output current (mA) and percentage (%) cannot be changed.

Press the $\text{\textcircled{P}}$ key to go to the level where you select the measuring unit. The currently selected unit for the currently displayed measuring value is shown.

P - 5 $\text{\textcircled{P}}$ Unit
UNIT → MBAR

Press the $\text{\textcircled{+}}$ or $\text{\textcircled{-}}$ key to toggle between the various units. If the display flashes, the currently displayed value is not saved.

Units for the pressure:

Unit MBAR	$\text{\textcircled{+}}$ ↔	Unit BAR	$\text{\textcircled{+}}$ ↔	Unit PSI	$\text{\textcircled{+}}$ ↔	Unit PA	$\text{\textcircled{+}}$ ↔	Unit MH2O
				↔				
Unit MMHG	$\text{\textcircled{+}}$ ↔	Unit TORR	$\text{\textcircled{+}}$ ↔	Unit ATM	$\text{\textcircled{+}}$ ↔	Unit AT	$\text{\textcircled{+}}$ ↔	Unit KG2CM

Units for the temperature:

Unit °C	$\text{\textcircled{+}}$ ↔	Unit °F	$\text{\textcircled{+}}$ ↔	Unit K	$\text{\textcircled{+}}$ ↔	Unit °R	$\text{\textcircled{+}}$ ↔	Unit °RE'
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Press the $\text{\textcircled{P}}$ key for a long time to stop the flashing and save the measuring unit in the transmitter.

Unit $\text{\textcircled{P}}$ Unit
PSI → PSI

Press the $\text{\textcircled{+}}$ and $\text{\textcircled{-}}$ keys at the same time to exit the actual parameter and return to the basic parameter menu. Any settings, which have not been saved, will be lost.

Unit $\text{\textcircled{+}}$ P - 5
PSI → UNIT



If the transmitter is set to display the current or percentage, you can open the measuring units but you won't be able to change them.

If you open the measuring unit for the current, the following will be displayed:

Unit
mA

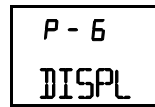
If you open the measuring unit for the percentage, the following will be displayed:

Unit
%

In this case you can to press any key to exit the parameter and return the transmitter to the basic parameter menu.

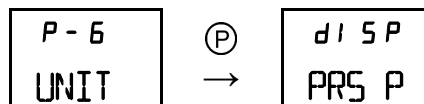


12.7 Parameter 6 – Setting the displayed measuring value

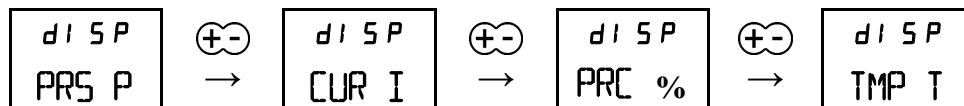


You need to set the measuring value, which is to be shown by the transmitter on the display.

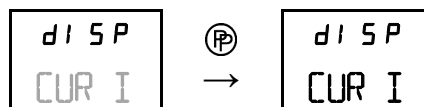
Press the $\text{\textcircled{P}}$ key to go to the level where you select the displayed measuring value. The currently set value is displayed.



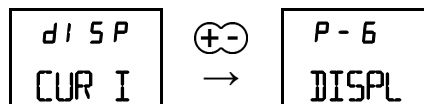
Press the $\text{\textcircled{+}}$ or $\text{\textcircled{-}}$ key to change between the various measuring values. If the display flashes, the currently displayed value is not saved.



Press the $\text{\textcircled{P}}$ key for a long time to stop the flashing and save the measuring value in the transmitter.



Press the $\text{\textcircled{+}}$ and $\text{\textcircled{-}}$ keys at the same time to exit the actual parameter and return to the basic parameter menu. Any settings, which have not been saved, will be lost.





12.8 Parameter 7 – Setting an inlet pressure

P - 7
BIAS

If a pressure is to be measured, which - in addition - is to be differentiated from a constant pressure over time, the inlet pressure can be entered under this parameter. The transmitter does not reflect this inlet pressure in its output signal. This entry is equally helpful for the hydrostatic measuring of the filling level in pressurised tanks.

	The device is not a differential pressure transmitter. Therefore, any inlet pressure, which is entered, must be constant over time. A fluctuation of the inlet pressure cannot be detected by the device and will therefore not be incorporated in the output signal.
	Please observe the maximum permitted values for your transmitter. Pressure values above its specification may cause irreversible damage to the device.
	Independent of the set measuring unit, the values are entered in the transmitter's basic unit of <i>millibar</i>.

Press the $\text{\textcircled{P}}$ key to go to the level where you enter an inlet pressure. The currently set value is displayed.

P - 7 $\text{\textcircled{P}}$ 0000
BIAS → MBAR

If you want to change the value, you need to press the $\text{\textcircled{P}}$ key to change to the editing mode. Repeated pressing of the $\text{\textcircled{P}}$ key moves the cursor to the right by one digit at a time, and the selected digit will flash. If the cursor has reached the last digit, the process starts again from the first digit. Leading zeros are automatically hidden by the transmitter.

0 MBAR $\text{\textcircled{P}}$ → 0000 MBAR $\text{\textcircled{P}}$ → 000 MBAR $\text{\textcircled{P}}$ → 00 MBAR $\text{\textcircled{P}}$ → 0 MBAR

Press the $\text{\textcircled{+}}$ or $\text{\textcircled{-}}$ key to change the respective digit.

0 MBAR $\text{\textcircled{P}}$ → 0000 MBAR $\text{\textcircled{P}}$ → 000 MBAR $\text{\textcircled{+}}$ → + 100 MBAR $\text{\textcircled{P}}$ → + 100 MBAR

If the set value is above or below the maximum display range, the transmitter automatically adapts the unit to the required range.

+9000 MBAR $\text{\textcircled{+}}$ → +10.00 BAR $\text{\textcircled{+}}$ → +20.00 BAR $\text{\textcircled{-}}$ → +10.00 BAR $\text{\textcircled{-}}$ → +9000 MBAR



The minimum and maximum values for the adjustable inlet pressure are determined by both the nominal measuring range of the transmitter and the minimum measuring span.

If the entry is below the minimum value, the transmitter automatically sets the value to the applicable lower limit. When this end value has been reached, a flashing *MIN* is displayed.



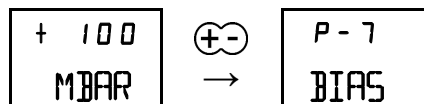
If the entry is above the maximum value, the transmitter automatically sets the value to the applicable upper limit. When this end value has been reached, a flashing *MAX* is displayed.



To save the value you have to leave the editing mode. This is the case, if no digit of the display flashes. By (repeated) pressing of the Ⓟ key the cursor is moved from one digit to the next, until after the fourth digit the flashing vanishes. By long pressing of the Ⓟ key the value is saved and the parameter left. The transmitter now works with the new set limit.



Press the Ⓢ and Ⓜ key at the same time to exit the parameter. Any settings, which have not been saved, will be lost.



Fast set up of the beginning of the measuring range

To delete the actual pressure from the output signal, it can be saved directly. For that the Ⓟ key is pressed short once to get in the editing mode. This is shown by a flashing cursor. Then a long press on key Ⓟ fetches the actual value and immediately saves it as the new inlet pressure. The parameter is automatically left. The transmitter now operates with the new setting.

Note: If the actual measured value is outside the possible range, the MIN/MAX-notification will appear and the value will be set to the nearest possible. In this case, the device does not immediately save the new setting to ensure you have seen the value you are about to operate with. To save it anyway, press key Ⓟ long while none of the digits is flashing. Refer to the manual saving of values described in the upper text.

Hint: Use this function to delete any offset pressure caused by the mounting of the device.



12.9 Parameter 8 – Displaying the trailing pointers

P - B
LIMIT

The trailing pointers continuously record the minimum and maximum values for the pressure.

Press the \textcircled{P} key to go to the parameter for displaying the trailing pointers.

P - B
LIMIT \textcircled{P} → P MIN

Press the \oplus or \ominus key to toggle between minimum value and maximum value.

P MIN $\oplus\ominus$ ↔ P MAX

Press the \textcircled{P} key to select the respective trailing pointer.

P MIN \textcircled{P} → - 12
MBAR

Press the \oplus and \ominus keys at the same time to exit the actual parameter and return to the device information menu level.

- 12
MBAR $\oplus\ominus$ → P - B
LIMIT



12.10 Parameter 9 – Instrument lock

P - 9
LOCK

The instrument can be locked for setting new parameter values. If the lock is set, it is impossible, to display parameters which are used to change adjustments at the transmitter. Before changing those parameters the lock must be opened. Parameters just showing information are not affected.



Should new settings be impossible in the instrument, it should be checked if the lock is set. Release the lock first to make new parameter adjustments.

Press the \textcircled{P} key to go to the parameter for setting the lock. It displays the actually set state of the lock.

P - 9 \textcircled{P} n o
LOCK → LOCK

Press the \oplus or \ominus key to toggle between the two different settings of the lock.

n o $\oplus \ominus$ y e s
LOCK ↔ LOCK

Press the \textcircled{P} key for a long time to stop the flashing and to save the setting.

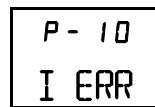
y e s \textcircled{P} y e s
LOCK → LOCK

Press the \oplus and \ominus keys at the same time to exit the actual parameter and return to the device information menu level. Not saved settings are lost.

y e s $\oplus \ominus$ P - 9
LOCK → LOCK

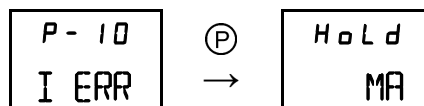


12.11 Parameter 10 – Setting the current in the event of an error



You will need to specify how the transmitter should behave in the event of a device error. Device errors include, for example, faulty memory contents in the EEPROM or faulty data with regard to the measuring electronics. In such an event the behaviour of the device can no longer be predicted. In order to avoid an uncontrolled output current, the output current can be set to a fixed value, which will indicate that an error has occurred. The output can adopt an error current of 3.8 mA or 22 mA. Alternatively, the last valid value can be maintained (hold).

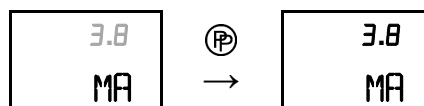
Press the Ⓢ key to go to the parameter for setting the current limits. The value that is currently stored in the device is displayed.



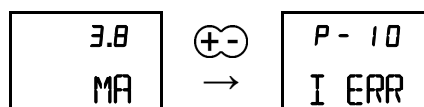
Press the ⊕ or ⊖ key to toggle between the variants. If the display flashes, the currently displayed value is not saved.



Press the Ⓢ key for a long time to stop the flashing and save the value in the transmitter.



Press the ⊕ and ⊖ keys at the same time to exit the actual parameter and return to the system parameter menu level. Any settings, which have not been saved, will be lost.



You can select between 3.8mA, 22mA and hold of the last valid output current.



12.12 Parameter 11 – Displaying the hard- and software version

P - 1 1
V E R S N

This parameter allows you to display information about the revision of the transmitter. It shows both the hardware and software version of the device. This information can be useful in the event of a malfunction of the transmitter. Furthermore, over time, changes to the functional scope or handling of the transmitter may occur. In order to be able to support the operation of the device in such an event, the device version must be known.

Press the \textcircled{P} key to go to the parameter for displaying the version information.

P - 1 1 \textcircled{P} S O F T
V E R S N → V E R S N

Press the $\textcircled{+}$ or $\textcircled{-}$ key to toggle between the software version and hardware version.

S O F T $\textcircled{+/-}$ H A R D
V E R S N ↔ V E R S N

Press the \textcircled{P} key to choose between the two trailing pointers. The selected version number is displayed.

H A R D \textcircled{P} 2.0 0
V E R S N → V E R S N

Press the $\textcircled{+}$ and $\textcircled{-}$ keys at the same time to exit the actual parameter and return to the device information menu level.

2.0 0 $\textcircled{+/-}$ P - 1 1
V E R S N → V E R S N



13 Faults and troubleshooting

13.1 Transmitter malfunction

In the event of a fault or malfunction, please check the following items first in order to exclude possible error sources before beginning with the actual troubleshooting. However, if you cannot find a solution for the problem, please contact the manufacturer to discuss further actions.

Fault	Possible causes	Check / correction
The device does not start or no current is flowing in the loop	The voltage of the power supply is reversed or incorrectly connected	Make sure that the power supply is connected correctly
	The power supply is not switched on	Use a voltmeter to check whether voltage is applied to the transmitter
	The supply line has a broken cable	
The output current does not react to pressure.	The damping value is set to a very high integration time	Set the damping value down to the minimum required time
The current value is outside the range of 4 to 20 mA	The transmitter has been applied with a pressure, which is outside the set measuring range	Return the transmitter to its set measuring range
The display is difficult to read or its display is sluggish	The temperature is very low	Check the display in a warmer environment (this behaviour in severe cold is normal)



13.2 Error messages

The transmitter messages, which might be shown on the display during the device operation, are listed in the following. These messages can be general notes, warnings or device errors.

Err EPROM	ERROR An error has occurred while reading or writing to the EEPROM.	Please restart the device. Check whether the maximum permitted value for electromagnetic radiation has been exceeded.
Err CRC	ERROR A checksum read from the internal memory is faulty	Please restart the device. Check whether the maximum permitted value for electromagnetic radiation has been exceeded. If the error persists, please load the default settings from the device.
Err ADC	ERROR Error during the A/D conversion	Check whether the transmitter is overloaded and bring it into a depressurised state. If the problem persists, please contact the manufacturer.
FULL SCALE	NOTE The maximum display range of the display has been exceeded.	Please select another measuring unit.
LO ALARM	WARNING The measurement is below the limits. The output current is fixed.	Return the transmitter to its set measuring range.
HI ALARM	WARNING The measurement is over the limits. The output current is fixed.	Return the transmitter to its set measuring range.