MP SENSOR

Operating Manual
P.Touch

CONTENTS

1. About this manual

These instructions will inform you about the structure, functions and possible applications of our sensor. The instructions will help you to use the sensor safely and in accordance to its intended use. Please read the instructions carefully before using the sensor. This will help you to avoid possible personal injuries, property damages and equipment damages. Keep these instructions handy as long as you use the product. If you pass on the product, please hand over these instructions as well.

1.1. User

These instructions are intended for professionally trained personnel. It must be read carefully by every person who mounts, commissions, operates, maintains, disassembles, or disposes the sensor. Further information on the required personnel qualification can be found in Chap. 3.3.

1.2. Symbols used

The following symbols are used in this manual:

	DANGER DANGER indicates a hazardous situation with high risk that will result in death or serious injury if not avoided.
	WARNING WARNING indicates a dangerous situation with medium risk, which can lead to death or serious injury if not avoided.
	CAUTION CAUTION indicates a hazardous situation with medium risk, which may result in moderate or minor injury if not avoided.
	ATTENTION ATTENTION indicates a hazardous situation, which may result in property damage if not avoided.
	NOTE Under NOTE you will find tips, recommendations and useful information on special action steps and facts. The notes make your work easier and help you to avoid extra work.

1.3. Further information

In addition to these instructions, you will find the following documents on the Internet at www.mp-sensor.de/en:

- Data sheet
- Quickstart
- IO-Link IODD
- IO-Link Interface Description
- 3D model (STEP format)

2. Explanations on the product

2.1. Article number key

5 - 10 - X 1 3 X - XXX 0 XX

Fluid Connection		*Variant*	
G1/4“M *(external)*	1	Standard	00
G1/4“F *(internal)*	5	Customer specific	>00

Sealings		*Pressure range**	
NBR *(= standard)*	1	0…10 bar	010
FKM	2	0…16 bar	016
EPDM	3	0…25 bar	025
		0…40 bar	040
		0…100 bar	100
		0…250 bar	250
		0…400 bar	400
		0…600 bar	600

**other pressure ranges available on request*

2.2. Scope of delivery

The scope of delivery includes:
→ Pressure sensor
→ Quickstart

2.3. Guidelines / Legal

The device falls under the following EU directives:
→ 2014/30/EU (Electromagnetic compatibility)
→ 2011/65/EU und 2015/863/EU (RoHS Guideline)

2.4. Manufacturer

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Albstraße 13
D-73765 Neuhausen a.d.F.

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+49 (0)7158 987 8490

3. Safety instructions

The product has been designed and developed according to state-of-the-art technology and good engineering practice. Nevertheless, residual dangers cannot be excluded. To avoid personal injury and damage to property, the safety and warning instructions must be observed.
MP-Sensor GmbH does not accept any liability for damage caused by non-observance of safety and warning instructions.

3.1. Intended use / field of application

The devices are intended exclusively for use in the industrial sector.
The P.Touch pressure sensors detect the pressure of media of fluid group 2 and show the measured values on a TFT touch display. Optionally, they also output either a switching signal and / or an analog signal. The sensors are vacuum proof.
The device may only be used as described in these instructions. Any other use is considered improper.
MP-Sensor GmbH accepts no liability for any resulting damage.

The P.Touch sensors are not safety components.

3.2. General safety instructions

- Only use the P.Touch sensors in applications that are within their technical performance limits (e.g. max. ambient temperature, material compatibility, ...).
- The overload pressure must not be exceeded at any time, not even when errors occur in the end application.
- The device complies exclusively with the EMC requirements for the industrial sector.
- Only professionally trained personnel may assemble, install, operate, parameterize and maintain the device.
- Only use the device in accordance with the applicable national and international regulations, directives, standards and laws.

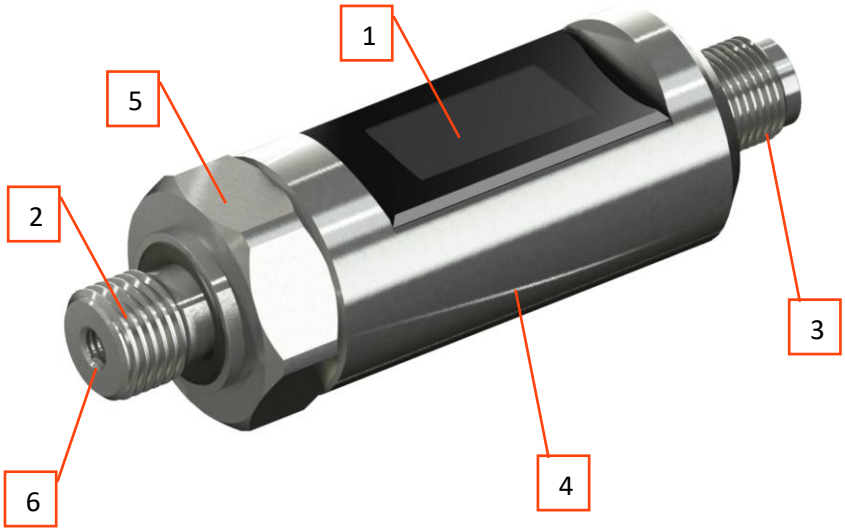
3.3. Personnel qualification

Due to their technical training, their knowledge of measurement and control technology and their experience as well as knowledge of the country-specific regulations, applicable standards and guidelines, the specialist personnel authorized by the operator is able to determine the suitable product for the respective application and to carry out the relevant points described in these operating instructions as well as to recognize possible dangers independently. Certain operating conditions require further appropriate knowledge, e.g. about aggressive media.

4. Product description

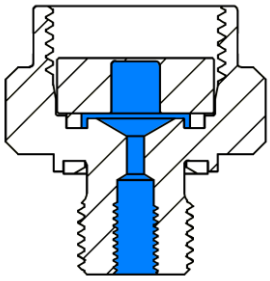
The P.Touch pressure sensor is an Industry 4.0-capable IO-Link sensor with TFT touch screen and a new, innovative operating concept in which no push-buttons are required. It is operated exclusively via swipe gestures. The ultra-compact design predestines the sensor for use in the tightest of spaces.
The IP67/IP68 housing is made entirely of stainless steel and shatterproof glass. Further key features are fully configurable outputs (switching output / analog output / IO-Link), extended display and diagnostic options through the 160x80px display and a virtual, two-part scroll wheel.

4.1. Overview



1. TFT Touch-Display 160x80px
2. Process connection
3. Electr. connection
4. 350° rotatable housing
5. Wrench flat process connection
6. M5 female thread for pressure peak choke

4.2. Operating principle



The P.Touch pressure sensor detects pressures by means of a ceramic measuring cell. The effect of a pressure on the resistance bridge of the ceramic measuring cell results in a proportional change of the resistance, which is conditioned and processed internally in the sensor and finally provided to the user via the display or via the electrical output signal by means of a standardized industrial signal.

4.3. Features

The most important features at a glance:

→ Detecting the pressure of fluid group 2 media
→ IO-Link 1.1 communication
→ 0.96" TFT touch display, unbreakable
→ Virtual, two-part scroll wheel
→ Extended display and diagnostic options through 160x80px display
→ 2 configurable outputs (switching output / analog / IO-Link)
→ Protection class IP65 / IP67 / IP68
→ 350° rotatable housing incl. display after installation
→ Stainless steel housing 1.4404 / 1.4305 / 1.4301
→ Ultra compact design

4.4. Tightness

Assignment of tightness to leakage rate:

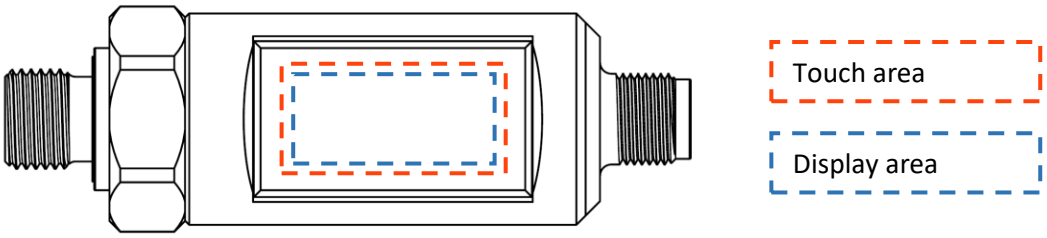
- Waterproof: $Q < 10^{-2}\ mbar\frac{l}{s}$ (Surface tension prevents seepage)
- Vapor tight: $Q < 10^{-3}\ mbar\frac{l}{s}$ (Vapor tight, tight against sweating)
- Bacteria tight: $Q < 10^{-4}\ mbar\frac{l}{s}$ (Bacteria diameter approx. 0.5µm)
- Gasoline / oil tight $Q < 10^{-5}\ mbar\frac{l}{s}$
- „Gas-tight“: $Q < 10^{-6}\ mbar\frac{l}{s}$ (~ 1cm³ gas loss in 12 days)
- Viral tight: $Q < 10^{-8}\ mbar\frac{l}{s}$ (Diameter of small viruses approx. 10nm)
- Techn. absolutely tight: $Q < 10^{-10}\ mbar\frac{l}{s}$
- Atomic tight $Q < 10^{-12}\ mbar\frac{l}{s}$ (Hole diameter = atomic radius)

All P.Touch pressure sensors are leak tested at the end-of-line test with a helium vacuum leak test system and exceed at least the tightness group "gas-tight" at nominal pressure = $Q < 10^{-6}\ mbar\frac{l}{s}$.

4.5. User Interface

The user interface has been completely redesigned for this sensor. Instead of using (capacitive or mechanical) buttons to navigate through a menu of mostly 3 or 4 digits, the user interface of the P.Touch pressure sensor consists of a 160x80px TFT touch display.

The menu items are thus displayed in plain text, often also with helpful additional information or color highlights. Navigation through the menu is intuitive and considerably simplified by swiping left/right and up/down.



4.6. Controls

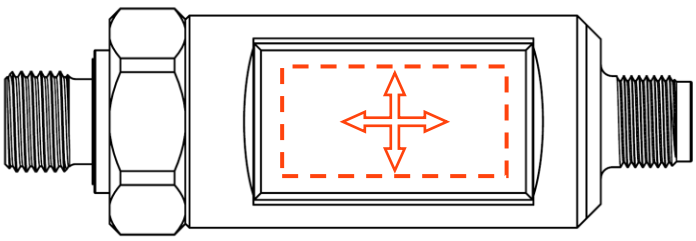
4.6.1. Navigating the menu

Available swipe gestures are:

- UP / DOWN
  Switch between vertically arranged screens and scroll up or down menu items or numerical values.

- LEFT / RIGHT
  Switching between horizontally arranged screens and changing the menu depth, i.e. entering or leaving a submenu item.

NOTE: When you exit a submenu item, the set or adjusted value of the relevant menu item is automatically saved.



4.6.2. Confirmation of changed menu items

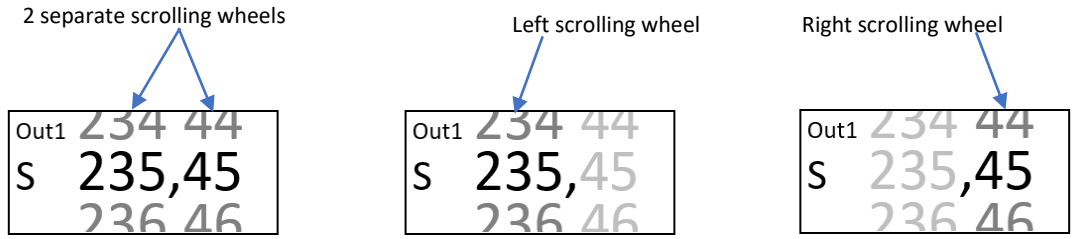
Confirmation of changed menu items is not necessary, the changes are automatically saved the moment the respective submenu is exited again with a swipe gesture to the left or right.

While you are still in the menu item and you have accidentally changed values that should not be saved, you must disconnect the sensor from the power supply before leaving the menu item. In this case, the change will not be saved.

NOTE: To reset the settings to the delivery state, a factory reset can be performed via the settings menu. → see under Chapter 8 (Settings)

4.6.3. The virtual scrolling wheel

In order to adjust numerical values such as the switching point in a comfortable and fast way, a 2-part virtual scrolling wheel has been implemented.



Regardless of the displayed unit of the number or the number of digits and decimal places of the displayed number, the scrolling wheel is always divided after the first two digits from the right. In the default setting with the pressure value bar, the division matches the decimal place, but is not necessarily the case with other units or display settings.

Scrolling behaviour:

The scrolling wheel can be operated in multiple steps, ensuring maximum comfort and speed when adjusting numerical values.

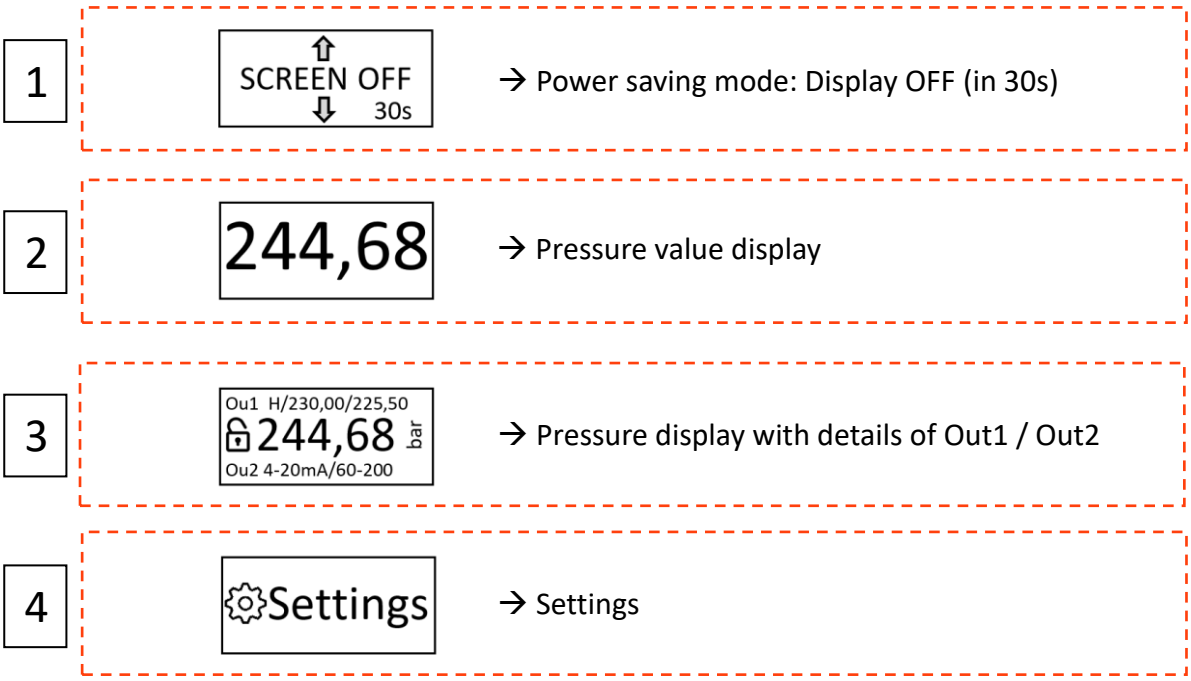
- Swiping up or down once adjusts the scrolling wheel by exactly one place.
- When swiping up or down twice within approx. 0.5s, the scrolling wheel starts to move slowly on its own.
- Another swipe in the scrolling direction accelerates the wheel. There are a total of 3 speed levels.
- Tapping the touch display or the running wheel stops the wheel.

Both scrolling wheels can be operated independently of each other. Depending on where the swipe gesture is made, the corresponding scrolling wheel starts moving.

4.7. Functional description

4.7.1. Main screens (normal operation)

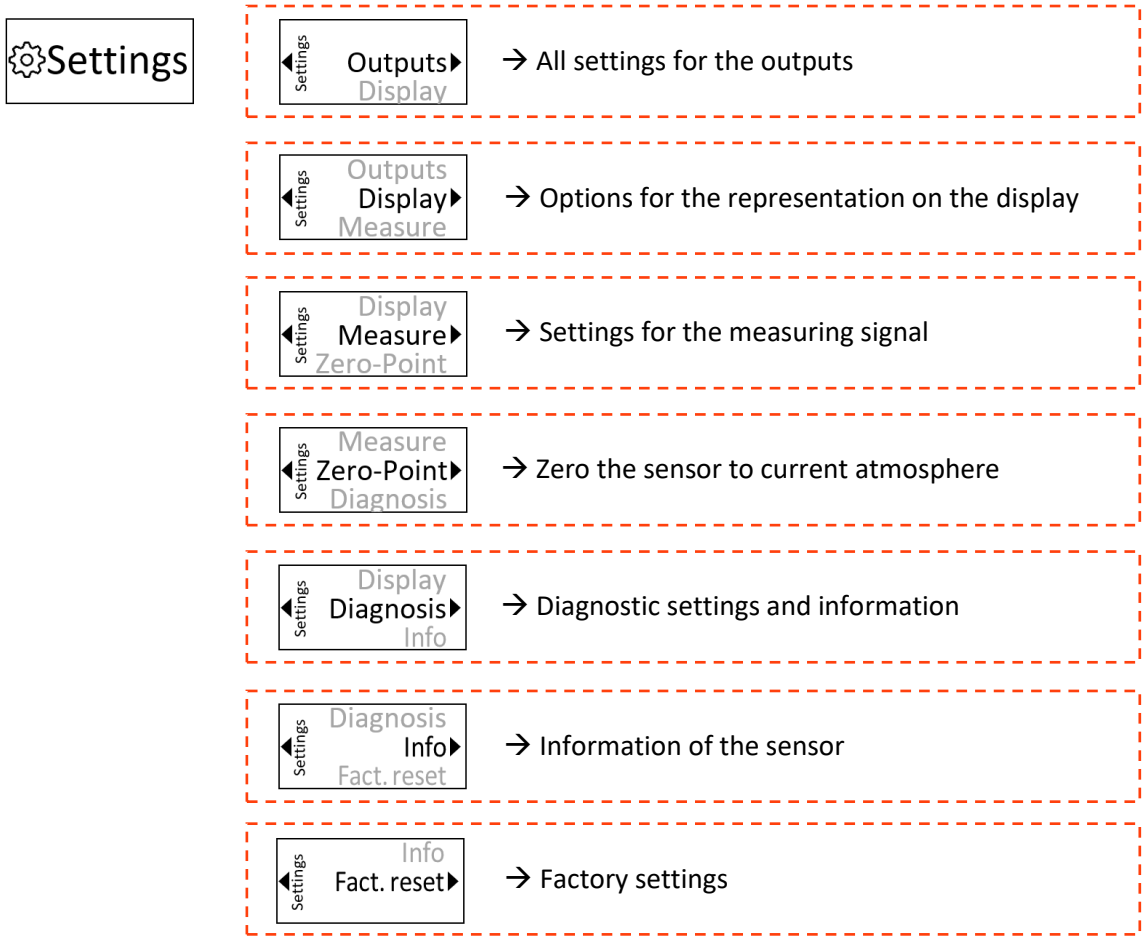
After switching on the supply voltage, the main screen that was last used appears. By default, this is the 3rd main screen, i.e. the pressure display with details of Out1 / Out2. After unlocking the screen lock (see chapter 8), you can switch between the 4 main screens by swiping up or down.



While one of the main screens 1-3 is displayed, the sensor is in normal operation. The main screen 4 is intended to enter the settings menu.

4.7.2. Settings menu

If you are on the 4th main screen "Settings", you can access the settings menu by swiping to the left. This contains the following main menu items, which can be selected by scrolling up or down with a swipe gesture. The selected main menu item can then be entered by swiping to the left and exited again by swiping to the right.



NOTE: If you reach the end of the menu depth by swiping to the left, you can either get back by swiping to the right several times, or you are taken directly back to the main menu item by swiping to the left again.

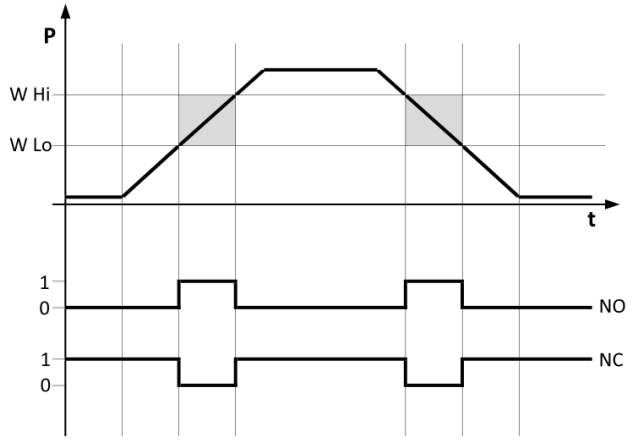
4.7.3. Behavior of the digital switching outputs

Window-Mode

If the window function is set in the settings for an output, the output behaves as shown below depending on the measured pressure.

The output then changes the switching state within the set window, e. g. between the lower limit value "Window Lo" and the upper limit value "Window Hi".

Windows Lo is therefore always at least one increment below the value of Windows Hi.

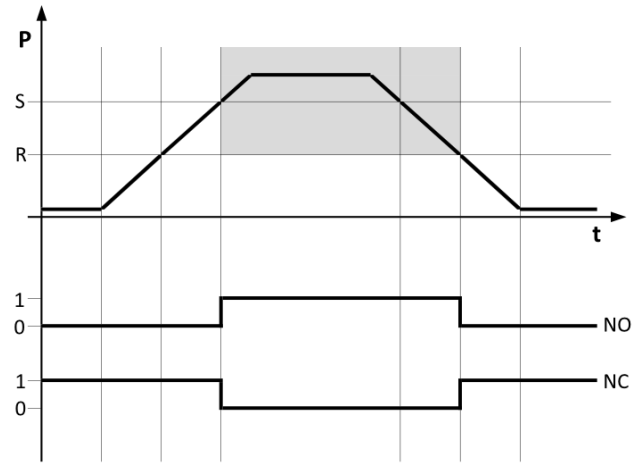


Hysteresis-Mode

If the hysteresis function is set in the settings for an output, the output behaves as shown below depending on the measured pressure.

The output then changes the switching state when the pressure rises at the set switching point S and maintains this state until the pressure falls below the reset switching point R again. Only then does the output switch back to its original switching state.

Therefore, the reset point R is always at least one increment below the value of switch point S.



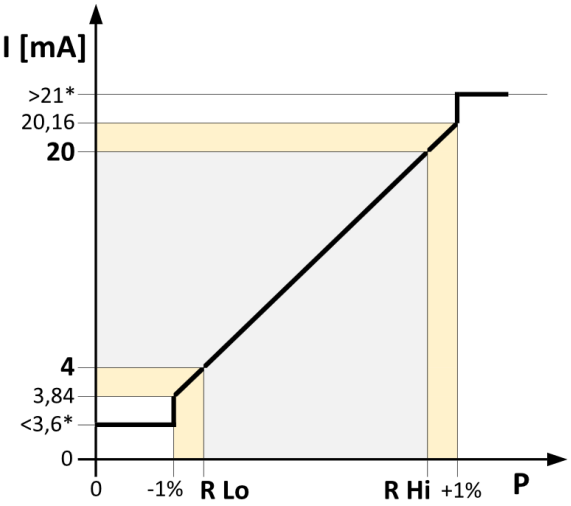
4.7.4. Behaviour of the analog output

The analog output of the P.Touch pressure sensor can be set either as a current or voltage output. The measuring range is freely adjustable. An inverted output signal with identical behavior can also be selected.

In the defined measuring range between Range Lo (analog starting point) and Range Hi (analog end point), the set output signal (e. g. between 4 and 20 mA or 0 to 10 V) will be issued. The minimum distance between starting and end point is 20 % of the available measuring range. This allows a maximum turn down of 5:1.

As set at the factory, Range Lo corresponds to the lower and Range Hi to the upper nominal value of the sensor.

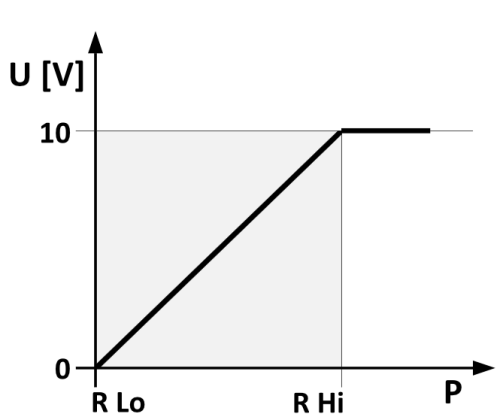
Current output

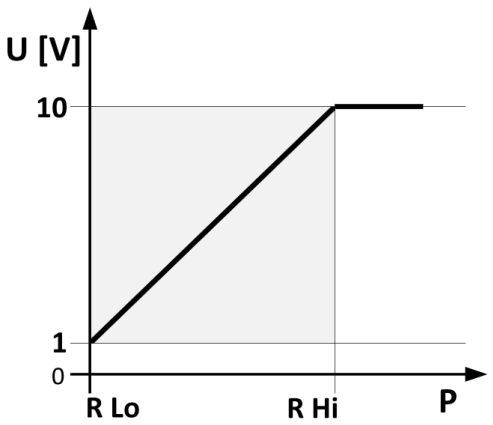


Behaviour of the current output 4…20mA

*<3,6mA or >21mA corresponds to failure information according to NAMUR NE43.

Voltage output





Behavior of voltage output 0…10V Behavior of voltage output1…10V

4.7.5. IO-Link mode

This device has an IO-Link communication interface, which requires an IO-Link-capable module (IO-Link master) for operation.
If the sensor is connected to an IO-Link master, a wake-up call automatically activates the IO-Link mode.
The IO-Link interface enables direct access to process and diagnostic data and offers the option of parameterizing the device during operation.
Furthermore, communication is possible via a point-to-point connection with a USB adapter cable.
The IODDs required for configuring the device as well as detailed information about process data structure and parameter addresses can be found on the homepage of MP-Sensor in the download area of the product.

4.8. Accessories

1. 2m cable straight, without LED
2. 2m cable straight, with LED
3. 2m cable angled, without LED
4. 2m cable angled, with LED
5. Pressure peak choke

5. Mounting

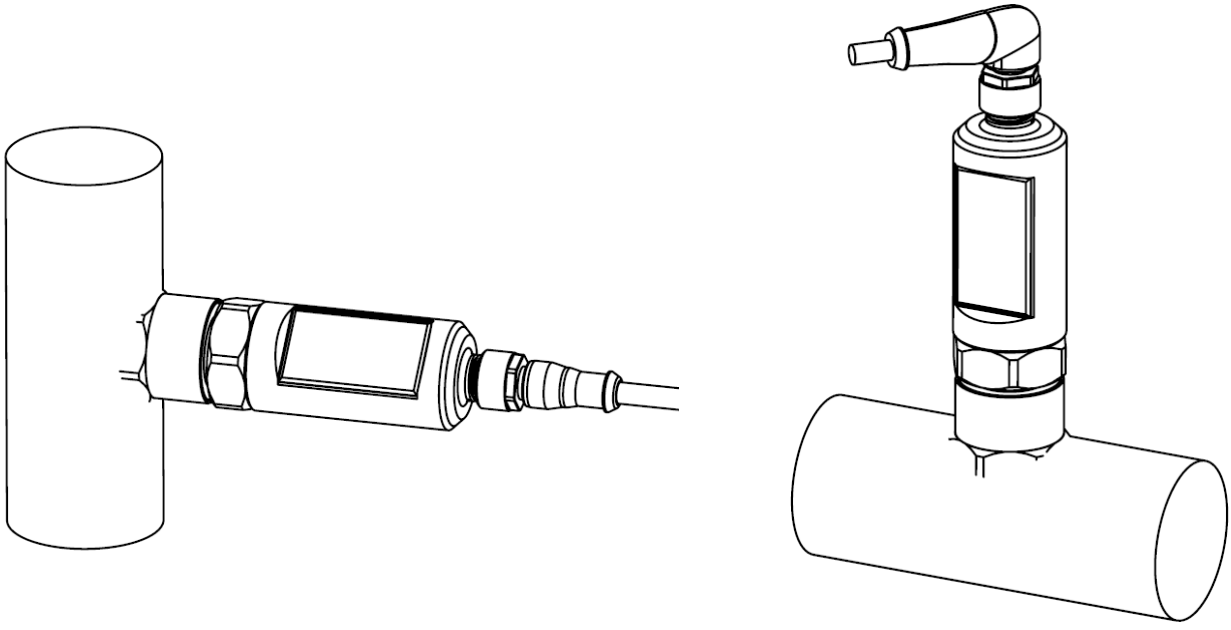
DANGER: Before installing and removing the device: Make sure that the system is pressure-free.

The assembly site must meet the following conditions:

- Protected from the effects of weather.
- In case of high ambient temperature and high UV irradiation, install the pressure switch with additional shading.
- Do not expose sensor housing to direct exposure of aggressive media.
- Sealing surfaces are clean and undamaged.
- Permissible ambient and medium temperatures remain within the performance limits. Observe possible limitations of the ambient temperature range due to derating.

5.1. Process connection

- First screw the pressure sensor hand-tight into the mounting location in any installation direction (make sure that the mating piece is suitable).
- Then tighten firmly with a maximum recommended tightening torque of 35 Nm via the wrench flat using a suitable tool. (Torque depends on lubrication, seal and pressure load!)
- The display can be rotated 180° in the settings menu (see chap. 8).
- The housing can be rotated 350° after mounting.



A well thought out housing design maximized for compactness allows mounting even in confined spaces.

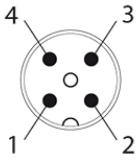
When using a straight connector, the installation diameter is limited to 30mm, whereas a low installation height can be achieved by using an angled connector. Mounting directly in front of a wall is possible without any problems, as the sensor has no components protruding from the side and even an angled connector always protrudes to the front left when viewed from the display.

5.2. Electrical Connection

ATTENTION: The device may only be installed by a qualified electrician. Observe the national and international regulations for the installation of electrotechnical installations.

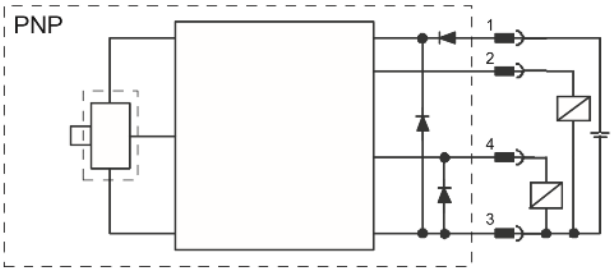
The pressure sensor must be supplied by a power supply according to EN 50178, SELV, PELV. For applications with application of UL approval, the supply must be provided by an energy-limited circuit according to Class 2 of the UL1310/UL1585 standard (NEC or CEC).

- Disconnect the system from the power supply.
- Plug on the socket of the 4-pin M12 (A-coded) connection cable and tighten with approx. 0.6Nm.
- Connect the open end of the connecting cable as follows.



Pin	*Assignment*	*Colours*
1	Ub+	BN / brown
3	0 V	BU / blue
4	Out 1 / IO-L	BK / black
2	Out 2	WH / white

Sample circuit:



6. Sart-up

After switching on the supply voltage, the device automatically goes into operation.

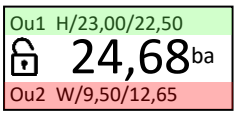
NOTE: During commissioning, check the zero point displayed on the digital display. If a zero offset is displayed due to installation or thermal changes in the environment of the sensor, it can be adjusted to the current atmosphere in the menu (see chapter 8).

ATTENTION: The display may only be calibrated to zero in the depressurized state.

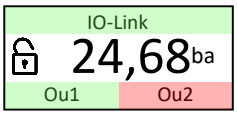
7. Operation

7.1. Status display

In the delivery state, the 3rd main screen with details on the settings of the outputs and the setting "only detail" for the switching status display are displayed by default after initial commissioning. This display will now be explained in the following.

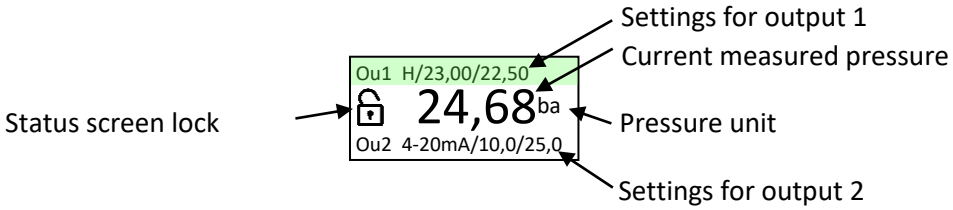
Display	*Object*	*Colours*	*Meaning*
	Upper colour bar	green	OUT 1 switched
		red	OUT 1 not switched
	Lower colour bar	green	OUT 2 switched
		red	OUT 2 not switched
		Without colour	OUT 2 = analog output

While the sensor is in IO-Link operation, the display looks as follows:

Display	*Object*	*Colours*	*Meaning*
	Upper colour bar	Green flashing	IO-Link communication
	Lower colour bar, left half	green	OUT 1 switched
		red	OUT 1 not switched
	Lower colour bar, right half	green	OUT 2 switched
		red	OUT 2 not switched
		Without colour	OUT 2 = analog output

7.2. Structure oft he main screen

The 3rd main screen with details about the settings of the outputs is structured in this way:



Explanations of the settings shown in the example:

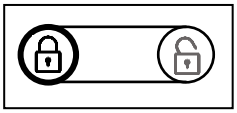
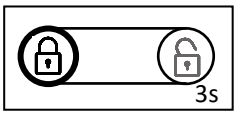
Upper bar:

Ou1 = Output 1
H = Hysteresis-mode
23,00 = Switching point S at 23.00 bar
22,5 = Reset point R at 22.50 bar

Lower bar:

Ou2 = Output 2
4-20mA = Analog output 4…20mA
10,0 = Range Lo at 10.0 bar (analog starting point)
25,0 = Range Hi at 25.0 bar (analog end point)

7.3. Display messages

Display	*Displayed*	*Meaning*	*Recommendation for action*
	Unlocking bar	Screen locked, "simple" mode	Swipe right to unlock the screen.
	Unlocking bar with "3s" addition	Screen locked, "safe" mode	Press and hold screen for 3 seconds, then swipe right to unlock screen.

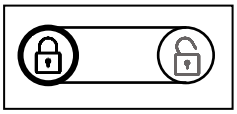
Access locked by admin	Input lock message	The input on the touch screen was blocked by the admin	Contact your local administrator, he has actively locked the input via IO-L. See also Chap. 8.5.1
Zero-Point could not be adjusted	Error message zero adjustment	The zero adjustment was not successful	Depressurize the system. The zero adjustment only works between -1 and +1 bar and +3% of the pressure span.
Over current / short circuit detected	OC message	Overcurrent (>250mA) or short circuit at Out 1 and/or Out 2	Reduce the load on Out 1 / 2 or, if necessary, find and eliminate the short circuit.
Over temperature detected	OT message	Overheating detected at Out 2 analog output.	Reduce the load on the Out 2 analog output, observe technical data and temperature derating.
Parameter error detected	Parameter error message	An invalid parameter was written via IO-Link	Observe the validity table / value range of the P.Touch IO-Link description file.
Pressure over measuring range	Overpressure message	The measured pressure is >1% above the max. nominal pressure range	Operate sensor within the nominal pressure range. CAUTION: Overpressure can cause severe damage.
Pressure below measuring range	Negative pressure message	The measured pressure is >1% below the min. Nominal pressure range	Operate the sensor within the nominal pressure range.
Hardware defect detected	Hardware defect message	A defect was detected in the electronics of the sensor	The sensor is no longer functional and must not be operated any longer. It must be repaired or replaced.
Critical error detected	critical defect - message	An unspecified critical defect has been detected on the sensor	The sensor is no longer functional and must not be operated any longer. It must be repaired or replaced.
	No display	Sensor is in power saving mode (main screen 1)	Tap, unlock and select another main screen by swiping up / down.

8. Parameterization

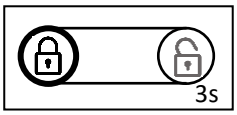
8.1. Setting via touch screen

8.1.1. Unlocking the touch screen

There are two screen lock modes that can be selected in the settings menu. The "simple" mode is set at factory.



In "simple" mode, the screen is unlocked with a simple swipe gesture to the right as long as the unlock bar is displayed.



In "safe" mode, the screen is protected against accidental unlocking. To unlock it, the screen must be held down for 3 seconds before the screen can then be unlocked with a swipe gesture to the right.

8.1.2. Locking the touch screen

The screen is automatically locked when any of the following conditions occur:

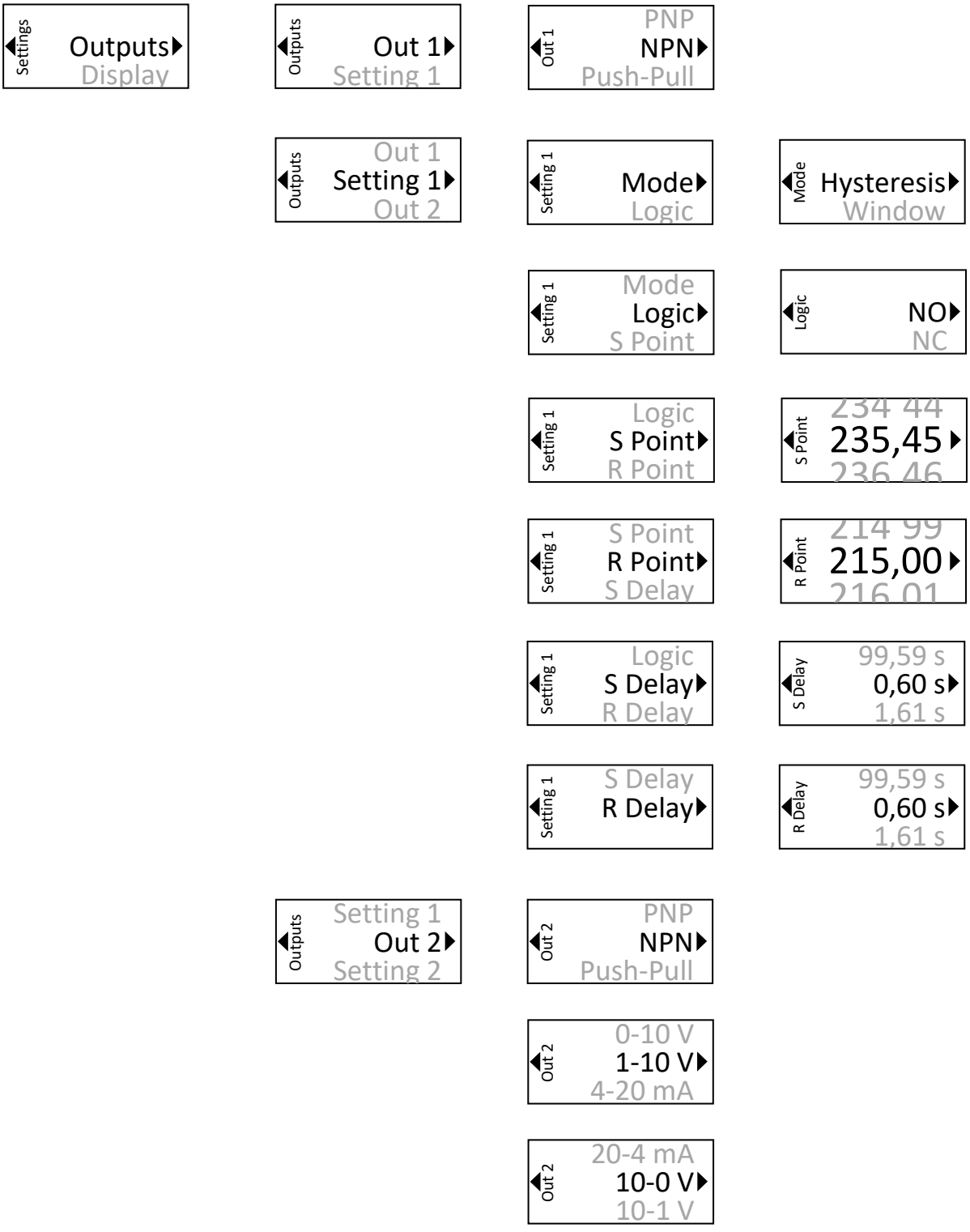
- If you are on a main screen, the screen is locked after 60 seconds without being touched. The time can be set in the menu between 0...3600s.
- If you are in the settings menu, the screen is locked after 2 minutes without being touched and the display returns to the last main screen used. In this case, any menu item that has been adjusted without being actively exited is not saved.

The last used main screen is always the one from which the sensor last changed to screen lock.

8.2. Menu tree „Settings“

The menu tree is displayed in the same way as the individual screens are arranged in the menu. This means that it is possible to switch screens or to scroll the scrolling list by swiping in the corresponding direction.

If you swipe to the left on the 4th main screen "Settings", this menu structure appears:



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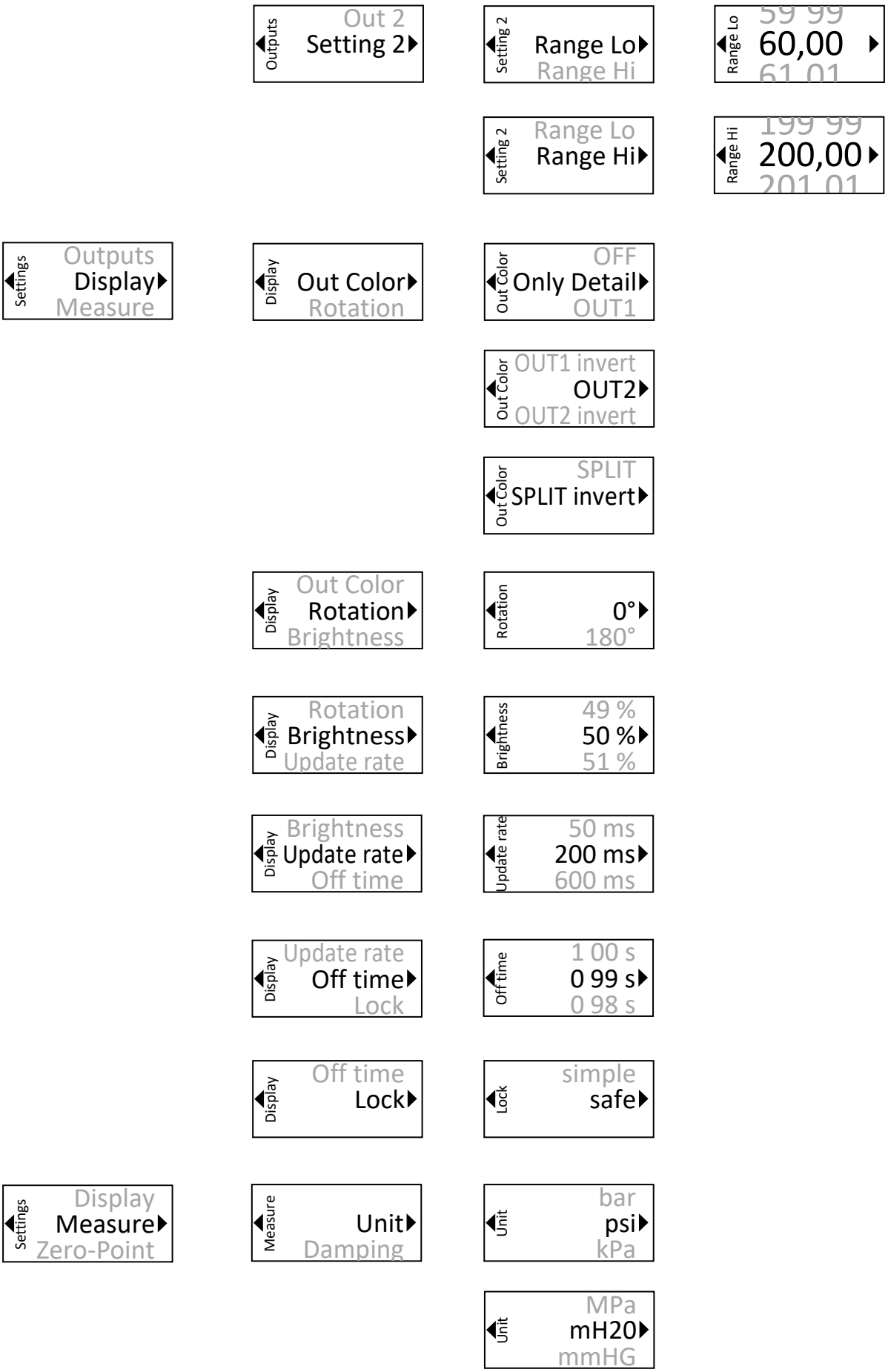
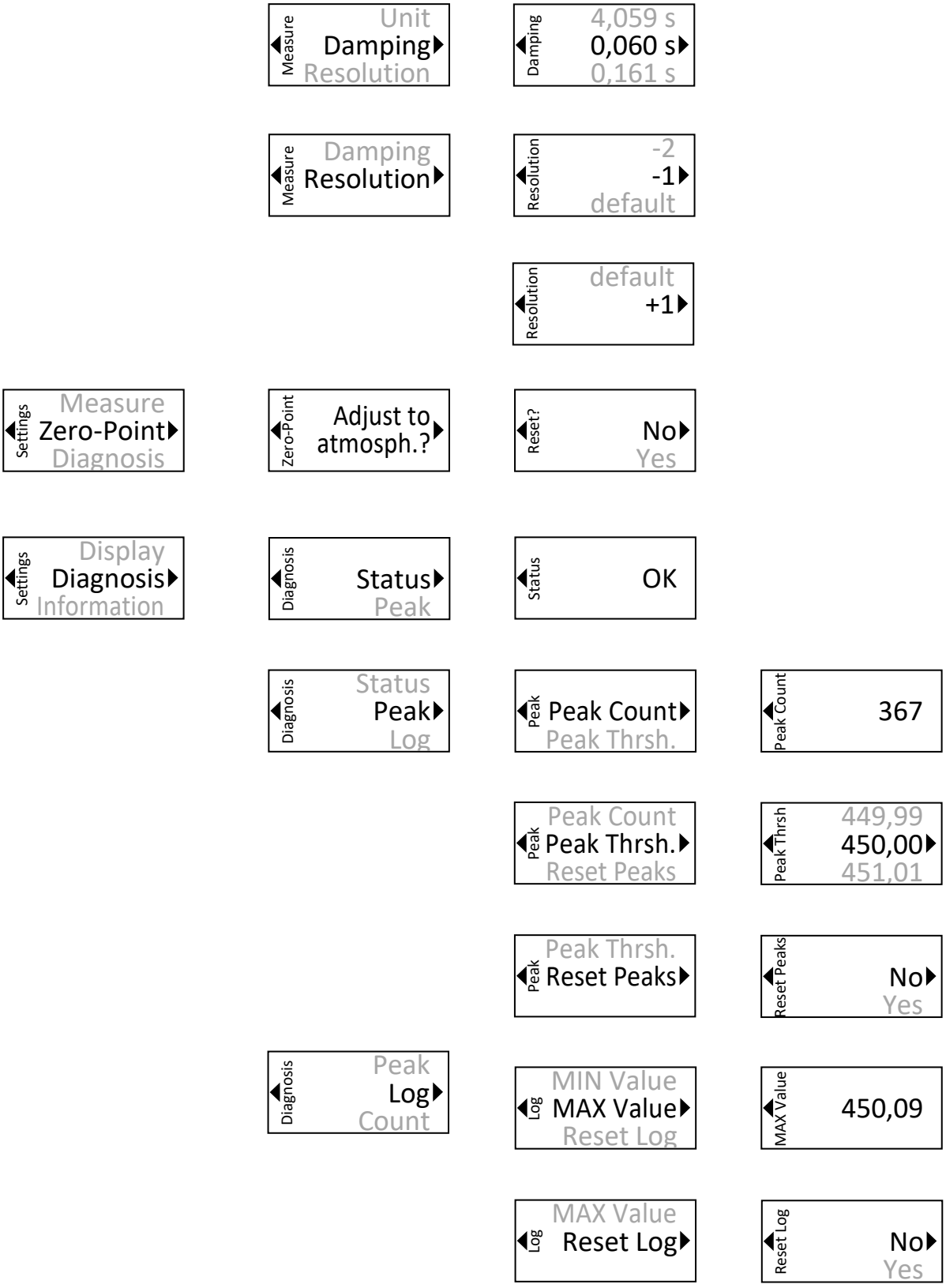

Settings
Outputs
Display
Measure
Outputs
Out 2
Setting 2
Display
Out Color
Rotation
Display
Out Color
Rotation
Brightness
Display
Rotation
Brightness
Update rate
Display
Brightness
Update rate
Off time
Display
Update rate
Off time
Lock
Display
Off time
Lock
Setting 2
Range Lo
Range Hi
Setting 2
Range Lo
Range Hi
Range Lo
59 99
60,00
61 01
Range Hi
199 99
200,00
201 01
Out Color
OFF
Only Detail
OUT1
Out Color
OUT1 invert
OUT2
OUT2 invert
Out Color
SPLIT
SPLIT invert
Rotation
0°
180°
Brightness
49 %
50 %
51 %
Update rate
50 ms
200 ms
600 ms
Off time
1 00 s
0 99 s
0 98 s
Lock
simple
safe
Settings
Display
Measure
Zero-Point
Measure
Unit
Damping
Unit
bar
psi
kPa
Unit
MPa
mH20
mmHG



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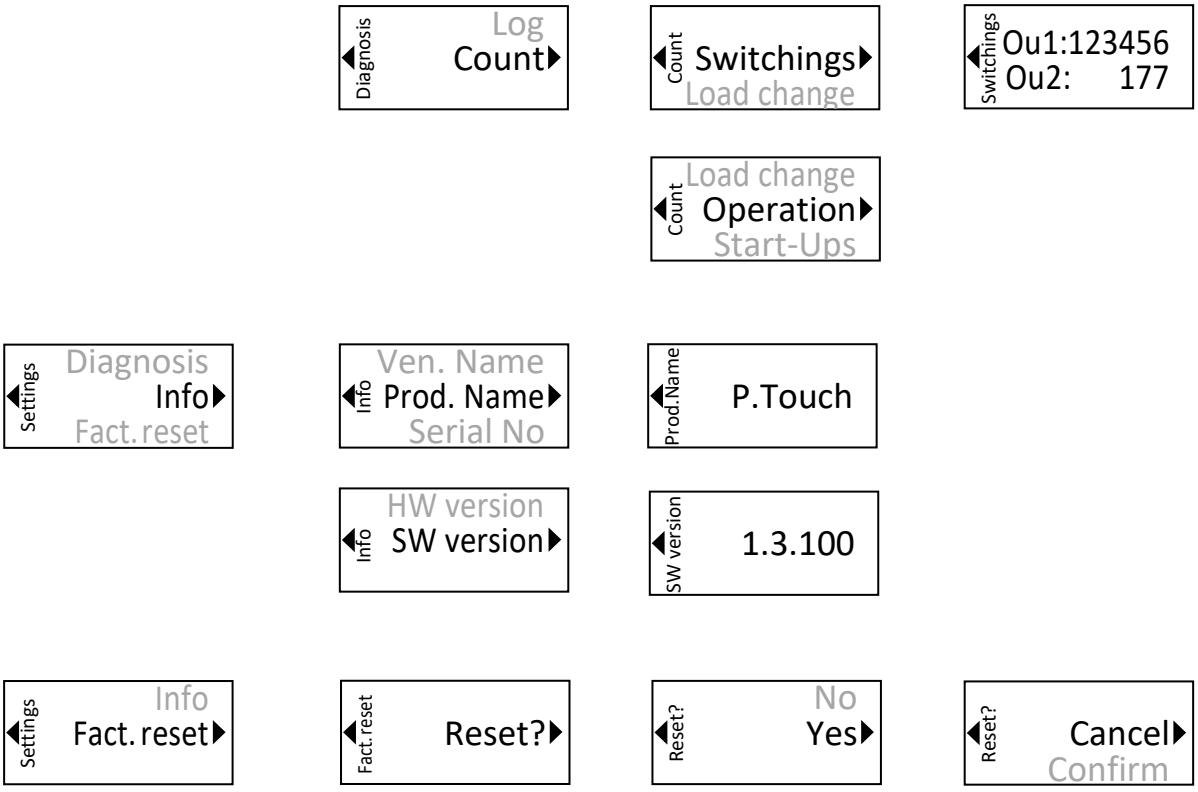
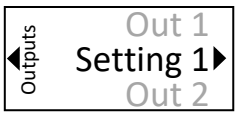
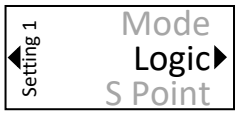

Diagnosis
Log
Count
Count
Switchings
Load change
Switchings
Ou1:123456
Ou2: 177
Count
Load change
Operation
Start-Ups
Settings
Diagnosis
Info
Fact. reset
Info
Ven. Name
Prod. Name
Serial No
Prod.Name
P.Touch
Info
HW version
SW version
SW version
1.3.100
Settings
Info
Fact. reset
Fact. reset
Reset?
Reset?
No
Yes
Reset?
Cancel
Confirm

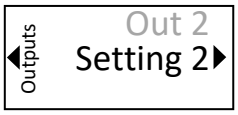
8.3. Description of the settings under "Settings

8.3.1. Main menu item „Outputs“

The main menu item "Outputs" contains all settings for the two outputs. Here they can be configured or switching points can be changed.

Parameter	*Value range / options*	*Explanation*
	PNP	digital, p-switching
	NPN	digital, n-switching
	Push-Pull	digital, p- and n-switching (antivalent)
	The submenu shown below appears when setting a digital output (for Out 1 only digital options available).	
	Hysteresis	Hysteresis mode
	Window	Window mode
	NO	Normally Open
	NC	Normally Closed
	Nominal pressure range of the sensor	Switching point in hysteresis mode, at which the output changes the switching state when the pressure increases. Forced min. one increment above the reset point "R Point".
	Nominal pressure range of the sensor	Reset point in hysteresis mode, at which the output changes back to the original switching state when the pressure falls. Forced min. one increment below the switching point "S Point".
	Nominal pressure range of the sensor	Lower switching point in window mode at which the output changes the switching state. Forced min. one increment below the upper switching point "W High".
	Nominal pressure range of the sensor	Upper switching point in window mode at which the output changes the switching state. Forced min. one increment above the lower switching point "W Low".

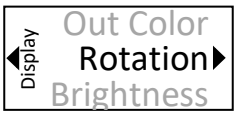
	0…600 seconds / 0.01s steps	Switching delay of the switching state from 0 to 1 (NO) resp. 1 to 0 (NC)
	0…600 seconds / 0.01s steps	Switch-back delay of the switching state from 1 to 0 (NO) resp. 0 to 1 (NC)

	PNP	digital, p-switching
	NPN	digital, n-switching
	Push-Pull	digital, p- and n-switching (antivalent)
	0…10V	analog, voltage signal 0…10 V
	1…10V	analog, voltage signal 1…10 V
	4…20mA	analog, voltage signal 4…20 mA
	20…4mA	analog, current signal 4…20mA, inverted
	10…0V	analog, voltage signal 0…10V, inverted
	10…1V	analog, voltage signal 1…10V, inverted
	The submenu shown below appears when setting an analog output. (for the digital options menu - see description "Setting 1").	

	0…80% of the nominal pressure range	Analog starting point at which the lower limit point of the analog signal is output. Forced min. 20% below "Range Hi".
	20…100% of the nominal pressure range	Analog end point at which the upper limit point of the analog signal is output. Forced min. 20% above "Range Lo".

8.3.2. Main menu item „Display“

The main menu item "Display" contains all settings for the touch screen and the display itself, such as color behavior, brightness or the screen lock.

Parameter	*Value range / options*	*Explanation*
	OFF	no color display of the switching states of Out 1 or Out 2
	only detail	Color bars above (for Out 1) and below (for Out 2), only active on main screen 3. Green = output switched Red = output not switched
	OUT 1	The whole display lights up depending on Out 1 Green = Output 1 switched Red = Output 1 not switched
	OUT 1 invert	The whole display lights up depending on Out 1 Green = Output 1 not switched Red = Output 1 switched
	OUT 2	The whole display lights up depending on Out 2 Green = Output 2 switched Red = Output 2 not switched
	OUT 2 invert	The whole display lights up depending on Out 2 Green = Output 2 not switched Red = Output 2 switched
	SPLIT	The display lights up in two parts. The left half lights up depending on Out 1, the right half depending on Out 2. Green = output switched Red = Output not switched
	SPLIT invert	The display lights up in two parts. The left half lights up depending on Out 1, the right half depending on Out 2. Green = Output not switched Red = output switched
	0°	Standard orientation of the display
	180°	180° rotated display
	0…125% / 1% Steps	Brightness of the display. A max. setting of 100% is recommended, above this the service life of the LED illumination is reduced.
	50ms	The update rate of the display is 50ms
	200ms	The update rate of the display is 200ms
	600ms	The update rate of the display is 600ms
	0…3600 seconds / 1s steps	Time until the screen is automatically locked on main screen 2 and 3 or until the screen is switched off on main screen 1.

	simple	Unlock the screen with a simple swipe gesture to the right.
	safe	Unlocking the screen with a swipe gesture to the right after pressing the touchscreen for 3s beforehand.

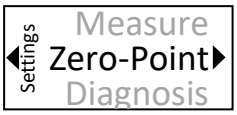
8.3.3. Main menu item „Measure“

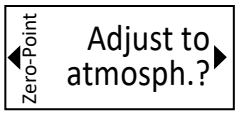
The main menu item "Measure" contains all settings for the measuring signal, such as pressure unit, damping or the resolution.

Parameter	*Value range / options*	*Explanation*
	bar	Pressure unit: bar
	psi	Pressure unit: psi
	kPa	Pressure unit: Kilo Pascal
	MPa	Pressure unit: Mega Pascal
	mH2O	Pressure unit: Meters water column
	mmHG	Pressure unit: Millimeter mercury column
	%	Percent of the nominal pressure range
	0…4 seconds / 0.001s steps	Damping of the measured signal: Time for averaging the measured pressure.
	-2	Measured value reduced by two decimal places.
	-1	Measured value reduced by one decimal place.
	default	Standard setting. 2 decimal places for pressure unit "bar".
	+1	Measured value increased by one decimal place.

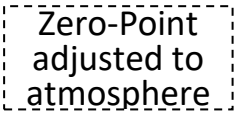
8.3.4. Main menu item „Zero-Point“

Via the main menu item "Zero-Point" the sensor can be adjusted to the current atmosphere. This may be necessary if a zero point offset (i.e. not exactly 0.00) is displayed due to installation or thermal changes in the environment of the sensor.

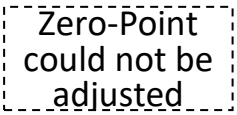




If „Yes“ is selected at the prompt, the sensor will adjust to the current atmosphere by swiping to the left and will read exactly 0.00 thereafter.



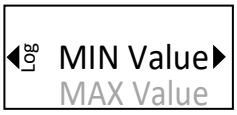
A Confirmation message appears for a few seconds that the zero point has been recalibrated.

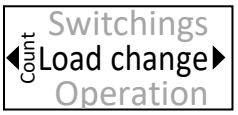


This Error message appears with zero point deviations greater than 3%. For safety reasons, the sensor can only be calibrated up to a deviation of max. 3% of the nominal pressure range (but in any case in the range -1...+1 bar).

8.3.5. Main menu item „Diagnosis“

All diagnostic functions of this sensor can be accessed via the main menu item "Diagnosis".

Parameter	*Value range / options*	*Explanation*
	Device is OK	The sensor works properly
	Maintenance required	Sensor maintenance required
	Out of specification	Parameters outside the validity range
	Functional check	Measured value or load outside validity range
	Failure	Hardware defect, replacement required
	The "Peak" submenu item contains settings and information on pressure peaks.	
	1 … 2 147 483 647	Peak Count = Counter, how often the pressure has exceeded the value, which is set under "Peak Thrsh”.
	Nominal pressure range of the sensor	Peak Threshold = Threshold at which the "Peak Count" counter is to be triggered.
	Reset function	When executed, the "Peak Count" counter is set to zero.
	The "Peak" submenu item contains settings and information on pressure peaks.	
	technically measurable range	Log function, which stores the highest pressure value ever measured.
	technically measurable range	Log function, which stores the lowest pressure value ever measured.
	Reset function	When executed, the two loggers "MIN Value" and "MAX Value" are deleted.

	The submenu item "Count" contains all available counters of the sensor.	
	1 … 2 147 483 647 (Out1) 1 … 2 147 483 647 (Out2)	Counter, which records the number of switching state changes at Out1 and Out2 separately.
	1 … 2 147 483 647	Counter, which records the number of pressure load changes. Only when the direction is reversed by >20% the algorithm does count upwards.
	1 … 2 147 483 647	Operating hours counter. If necessary, short start-up times in the minute range are not added.
	1 … 2 147 483 647	Counter, which records the number of start operations.

8.3.6. Main menu item „Info“

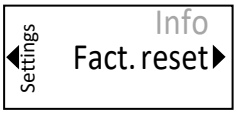
All available information about this sensor can be accessed via the main menu item "Info".

Parameter	*Value range / options*	*Explanation*
	Ven. Name	Vendor Name
	Prod. Name	Product Name
	Serial No	Serial Number
	HW version	Hardware version
	SW version	Software version

8.3.7. Factory setting / main menu item "Fact. reset"

Via the main menu item "Fact. reset" a factory reset can be performed, which means that the sensor can be reset to factory settings.

ATTENTION: In this case, all previously set values are irrevocably lost. However, it is still possible to save and reload the values via IO-Link.



The reset is performed when both the query with "YES" and the security query with "Confirm" are confirmed with a swipe gesture to the left.

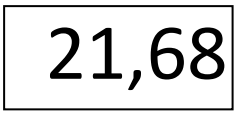
A Confirmation message appears for a few seconds that the factory reset was performed successfully.

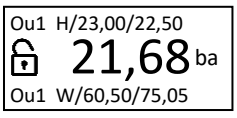
8.4. Easy-Mode

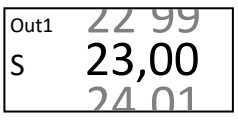
The Easy-Mode is an additional, very simple and fast way to set the switching points (or analog points) to both outputs.

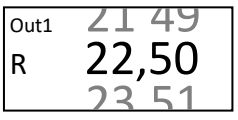
To do this, simply swipe to the left when you are on main screens 2 or 3 as shown below. By swiping to the left, you can adjust the 2 points to an exit on each of the following 4 screens.

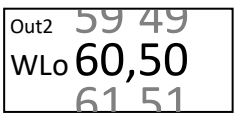
These settings can also be parameterized via the menu as described above, so the Easy mode can be used optionally, e. g. for frequently recurring changes or for commissioning tests.

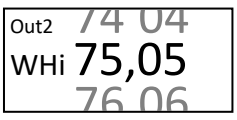












Swiping to the left on the last easy-mode screen takes you back to the original main screen.

8.5. Setting via IO-Link

General Device Information

IO-Link revision	V1.1
SIO mode	yes
Process data	4 bytes: 16-bit pressure value, 4-bit device status, 2-bit switching status Out1 / Out2
Baudrate	COM2 (38.4 kBaud)
Minimal cycle time	3,5 ms
ISDU	yes

The device can be parameterized via the IO-Link communication interface within the technical specification - both offline, e. g. via a PC with configuration tool, and online via the controller. An overview of the various functions and parameters that can be set and used for the IO-Link or SIO mode can be found in the document "IO-Link Interface Description", which can be downloaded from the product download area on our homepage.

In IO-Link mode, all parameters can be changed via the controller both during commissioning and during operation. In SIO mode, the device acts as it was last set in IO-Link mode.

Via IO-Link, it is possible to save a configuration and transfer it to another sensor of the same design. More information about these and many other advantages of IO-Link can also be found on the official IO-Link homepage https://io-link.com/en/.

8.5.1. Locking the input via IO-Link

Using the IO-Link parameter Write protection (index 12, subindex 0), it is possible to lock the input at the sensor both on the touchscreen and via IO-Link (except for index 12).

Index 12, subindex 0 → Value 0 = unlocked, normal operation
Index 12, subindex 0 → Value 1 = locked, the input lock is active

In case of an active input lock, the error message appears on the display:

Access locked
by admin

9. Eliminate malfunctions

If the device does not operate as expected first check for environmental disturbances. Environmental disturbances can represent all those factors that exceed or fall below the performance limits defined in the data sheet.

If there are no environmental disturbances, check the connections of the device for errors. In particular the power supply and the load of the outputs should be checked. If no error is present, there is a device malfunction.

If necessary, the device malfunction can be identified and eliminated by means of the instructions in Chap. 7.3. If this is not the case, take the sensor out of operation and replace it with a new sensor of the same type.

10. Maintenance / decomissioning

DANGER!
Danger to life
Danger to life due to flying parts, escaping medium and electric shock.
→ Always disassemble pressure sensors when they are depressurized and deenergized!
→ Before disassembly, check whether it is necessary to drain the medium.

CAUTION!
Residues
Residues of the medium on the device can pose a danger to the operator and the environment.
→ Wear suitable protective clothing, e. g. gloves or safety goggles.

ATTENTION!
Damage to the measuring cell
Incorrect cleaning can lead to irreparable damage to the measuring cell.
→ Do not use compressed air or pointed objects for cleaning!

The device is basically maintenance-free. If necessary, the housing of the device can be cleaned with a dry or damp cloth and a non-aggressive cleaning solution when it is switched off.

Depending on the measured medium, however, deposits or fouling may occur on the diaphragm. If this is known, the operator must define appropriate cleaning intervals. After the device has been properly decommissioned, the membrane can be cleaned carefully with a non-aggressive cleaning solution and a soft brush or sponge.

11. Repair / return

The device is not intended for repair by the user. If the device is defective, take it out of operation. When returning the P.Touch pressure sensor, clean it carefully and pack it so that it is unbreakable.

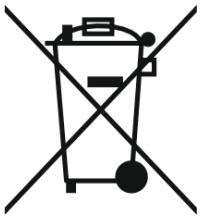
If your device has come into contact with contaminants, a decontamination declaration is also required. Devices without a decontamination declaration will only be examined in case of doubt regarding the medium used after receipt of a corresponding declaration.

The decontamination declaration can be downloaded from the product download area on our homepage.

If necessary, address the return shipment incl. decontamination declaration to the following address:

MP-Sensor GmbH
Qualitätssicherung
Albstraße 13
D-73765 Neuhausen
Germany

12. Proper disposal



Dispose of device components and packaging materials in accordance with the relevant country-specific waste treatment and disposal regulations of the delivery area.

The devices must be disposed properly and do not belong in normal household waste.

13. Technical Data

Extract from data sheet, can be downloaded in the download area of the product on our homepage.

General Data	
Display	0.96" TFT touch display, unbreakable
Switching status display	1x color display per output
IO-Link status display	Color indicator
Protection type	IP65 / IP67 / IP68
Protection class	III
Life span	100 million load cycles
Pressure type	Relative pressure
Measuring cell type	Ceramics
MTTF (40°C)	478 Years
Electrical data	
Electrical connection	Plug connector M12x1, 4-pole
Operating voltage	9…30 VDC
Internal power consumption	< 30 mA
Short circuit / reverse polarity protection	yes / yes
Outputs	
Output 1 (Pin 4)	PNP/NPN/PP or IO-Link (max. 30µF capac., 500mJ induct.)
Output 2 (Pin 2)	PNP/NPN/PP or analog (0…10V / 1…10V / 4…20mA)
Max. Output current	max. 200 mA per output
Response time	< 3 ms
Accuracy	
Overall accuracy (23°C)max.	± 0,5% FSO
Temperature error (-25...+80°C)	± 1,5% (<100bar); ± 2,5% (≥100bar)
Long-term drift	≤ 0,1% / a
Programming options	
Outputs	Switching/reverse switching points; start/end value for analog output; hysteresis/window mode; normally closed/ normally open contact; switch-on/switch-off delay
Display	Display mode (simple / detail. / off) Color behavior; rotation; brightness; update rate; screen lock
Measured value	Units; Attenuation; Resolution
Diagnosis	
Pressure peaks	Counter, adjustable threshold, reset
Counter	Switching operations; load changes; operating hours; start operations

Materials (wetted parts)

Material fluid connection	Stainless steel 1.4404
Material measuring cell	Ceramic Al2O3 96%
Material gaskets	see order number key

Materials (not in contact with the medium)

Material housing	Stainless steel 1.4301 / 1.4305
Material display	Glass (shatterproof installed)
Gasket display	PE

Mechanical data

Width across flats pressure connection	27
Weight	191g *(G1/4“M);* 244g *(G1/4“F)*

Pressure ranges

Measuring range [bar]	**10**	**16**	**25**	**40**	**100**	**250**	**400**	**600**
Overload pressure** [bar]	20	40	40	100	150	375	500	750
Bursting pressure** [bar]	35	60	60	140	300	500	650	900

*** increased overload resistance available on request*

Environmental conditions

Ambient temperature	Operation: -25°...+80°C*** Medium: -25°...+100°C*** Storage: -30°...+85°C
Application area	Media of fluid group 2
EMC / Interference immunity	EN61000-6-2
EMC / Emitted interference	EN61000-6-4
Vibration resistance	DIN EN 60068-2-6: 20G, 10-2000 Hz, XYZ
Shock resistance	DIN EN 60068-2-27: 50G, 11ms, XYZ

*** Display switches off from 80°C Display temperature*

MP SENSOR

Adress

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www.mp-sensor.de/en