

Your Global Automation Partner

**TURCK**

PS.../3GD

# Pressure sensors with Ex approval

Operating instructions



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# 1 About these instructions

These operating instructions describe the structure, functions and the use of the product, and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damages to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions too.

## 1.1 Target groups

These instructions are aimed at qualified personnel with knowledge in the field of explosion hazard protection (EN 60079-14, etc.) and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device.

## 1.2 Explanation of symbols

The following symbols are used in these instructions:



**DANGER**

DANGER indicates an imminently hazardous situation with a high risk of death or serious injury if it is not prevented.



**WARNING**

WARNING indicates a potentially hazardous situation with a medium risk of death or serious injury if it is not prevented.



**CAUTION**

CAUTION indicates a situation that may result in damage to property if it is not prevented.



**NOTE**

NOTE indicates tips, recommendations and important information. The notes will make work easier, contain information on specific action steps and help prevent more work due to incorrect processes.



**CALL TO ACTION**

This symbol identifies action steps that the user has to perform.



**ACTION RESULT**

This symbol identifies relevant results of actions and action sequences.

### 1.3 Additional documents

You will find the following supplementary documents online at [www.turck.com](http://www.turck.com):

- Data sheet
- Quick Start Guide
- IO-Link parameters manual
- EU declaration of conformity
- IO-Link devices commissioning manual
- Device approvals

The most important data from the EC-type examination certificate are listed on pp. 32. All valid national and international approvals are available via the Internet.

The IECEx Certificate of Conformity (IECEx CoC) can be found at [www.iecex.com](http://www.iecex.com). Further information on explosion protection is available on request.

### 1.4 Feedback on these instructions

We are committed to always keeping these instructions as informative and as clear as possible. Should you have any suggestions for a better design or any information is missing from the instructions, please send your suggestions to [techdoc@turck.com](mailto:techdoc@turck.com).

## 2 Notes on the product

### 2.1 Product identification

**PS 010V - 3 01 - LI2UPN 8 X - H1 1 4 1 / 3GD**

**PS 010V** Pressure sensor - **3 01** Design/pressure connection - **LI2UPN 8 X** Electrical version -

**Measuring range**

- 01VR -1 to 0 bar g <sup>1)</sup>
- 001R 0 - 1 bar g <sup>1)</sup>
- 0.25VR -0.25 to 0.25 bar g
- 001A 0 - 1 bar a
- 003A 0 - 2.5 bar a
- 010A 0 - 10 bar a
- 016A 0 to 16 bar a
- 001V -1 to 1 bar g <sup>1)</sup>
- 003V -1 to 2.5 bar g <sup>1)</sup>
- 010V -1 to 10 bar g
- 016V -1 to 16 bar g
- 025V -1 to 25 bar g
- 040V -1 to 40 bar g
- 100R 1 to 100 bar g
- 250R 1 to 250 bar g
- 400R 1 to 400 bar g
- 600R 1 to 600 bar g <sup>2)</sup>

**Functional principle**

PS Pressure sensor

**Pressure connection**

- 01 G1/4" female thread
- 02 1/4" 18NPT female thread
- 03 1/4" 18NPT male thread
- 04 G3/4" male thread
- 05 7/16" UNF male thread (for design 5 only)
- 06 G3/4" front-flush male thread (for design 6 only)
- 07 1 1/2" Tri-Clamp (for design 6 only)
- 08 G1/2" male thread for pressure gauge connection (for design 5 only)
- 09 G1/2" front-flush male thread (for design 6 only)
- 10 R1/4" male thread
- 11 R1/4" female thread

**Construction**

- 3 adjustable, with display, non-rotatable sensor body
- 5 adjustable, with display, rotatable sensor body
- 6 adjustable, with display, rotatable sensor body, with front-flush diaphragm

**with LED indicator**

**Operating voltage**

8 15 (18) to 30 VDC

**Output type**

- 2UPN 2 switching outputs/IO-Link
- LI2UPN Current or voltage and switching output/IO-Link

<sup>1)</sup> not for PS...609

<sup>2)</sup> not for design 6

**H1 1 4 1** Electrical connection / **3GD** Special design

**Assignment (point 5)**

1 Standard assignment

**Number of contacts (point 4)**

4 4-pin

**Connector type (point 3)**

1 Straight

**Connector type (points 1 and 2)**

H1 M12 x 1 connector

**Special design**

3GD EX zone



**NOTE**

The devices PS...R... do not have the password function. The analog output can be set solely as a current output.

## 2.2 Scope of delivery

Included in the scope of delivery:

- Pressure sensor
- Safety clip SC-M12/3GD
- Quick Start Guide

## 2.3 Legal requirements

The device falls under the following EU directives:

- 2014/30/EU (electromagnetic compatibility)
- 2014/34/EU (ATEX Directive)

## 2.4 Manufacturer and service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats. You can access the product database at the following address: [www.turck.de/products/](http://www.turck.de/products/)

Should you have any further questions, please contact the sales and service team in Germany under the following telephone numbers:

Sales: +49 208 4952-380

Technology: +49 208 4952-390

Outside Germany, please contact your Turck representative.

Hans Turck GmbH & Co. KG  
Witzlebenstraße 7  
45472 Mülheim an der Ruhr  
Germany



## 3 For your safety

The product is designed according to the state of the art technology. However, residual risks still exist. Observe the following warnings and safety regulations to prevent danger to persons and property. Turck accepts no liability for damage caused by failure to observe these warning and safety instructions.

### 3.1 Intended use

The devices are only designed for use in industrial applications.  
The pressure sensors of the PS series monitor media in fluid group 2 and indicate the measured values in a display. The sensors are vacuum-tight and are suitable for operation in zone 2.  
The devices must only be used as described in this manual. Any other usage shall be considered improper and Turck shall not be held liable for any resulting damage.

### 3.2 Obvious misuse

- The sensors are not safety devices. Do not use the devices to ensure human or machine safety.

### 3.3 General safety instructions

- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.
- The device must only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- Do not paint or coat the housing surface.
- The permissible burst pressure must not be exceeded.

### 3.4 Explosion protection notes

- When using the device in explosion-protection circuits, the user must have a working knowledge of explosion protection (EN 60079-14, etc.).
- Adhere to national and international regulations on explosion protection.
- Use the device only within the permitted operating and environmental conditions (see registration data and conditions from the Ex approval).

### 3.5 Conditions from the Ex approval

- Use power supplies with safe separations according to IEC 60364/UL508.
- In the case of devices with M12 connectors: Use safety clip SC-M12/3GD (incl. in delivery).
- Do not connect or disconnect the connection cable or connectors when energized.
- Attach a "Nicht unter Spannung trennen/Do not separate when energized" warning label in close proximity to the connector.
- Protect the device against UV radiation.
- The connectors are fully IP rated only in combination with suitable O-rings.

## 4 Product description

The pressure sensors of the PS series are incorporated in metal housing with a display and are available with various process connections. The housing for the PS...-5... variants can also be aligned (360°) and secured after installation. All devices have a metal M12 connector to connect the sensor cable.

The devices can be adjusted via buttons or FDT/DTM. The measured pressure can be displayed in bar, psi, kPa, MPa and ten other pressure units (Ud1-Ud10). Devices with the following output functions are available:

- PS...2UPN8X: 2 switching outputs (PNP/NPN)
- PS...R...LI2UPN8X: 1 switching output (PNP/NPN) and 1 switching output (PNP/NPN) or analog output (current)
- PS...A...LI2UPN8X: 1 switching output (PNP/NPN) and 1 switching output (PNP/NPN) or analog output (current or voltage)

### 4.1 Device overview

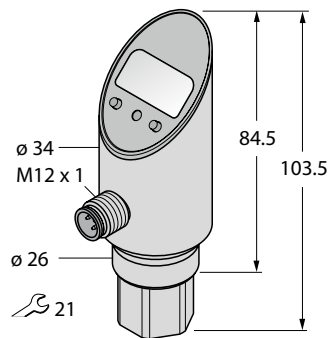


Fig. 1: Dimensions – PS...301/302/311

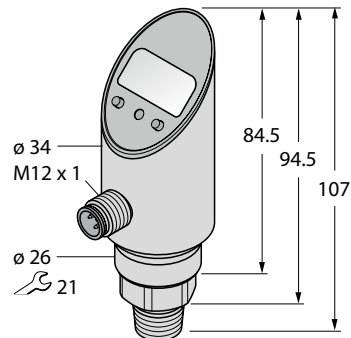


Fig. 2: Dimensions – PS...303/304/310

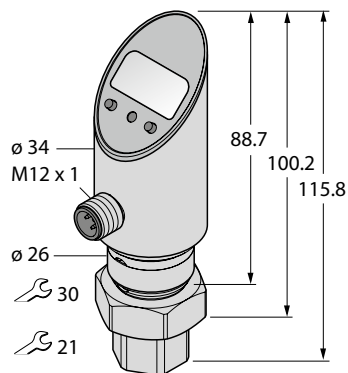


Fig. 3: Dimensions – PS...501/502/511

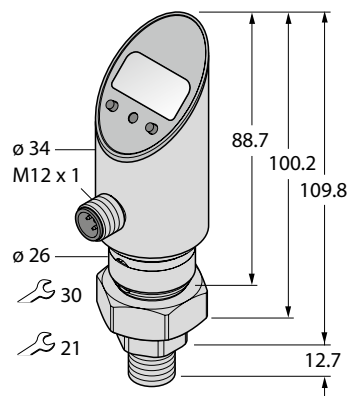


Fig. 4: Dimensions – PS...503/504/510

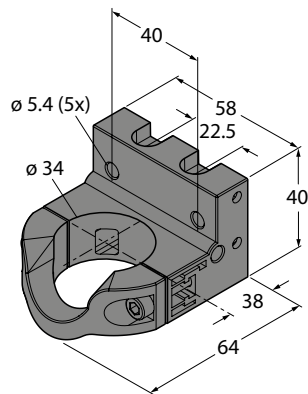


Fig. 5: Mounting bracket  
PTS-MB-1

4.1.1 Operating elements

The devices have three buttons for adjusting the device functions.

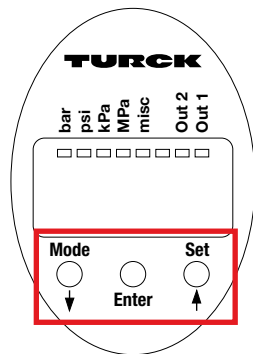


Fig. 6: Push button

4.1.2 Display elements

The devices have a 4-digit 7-segment display.

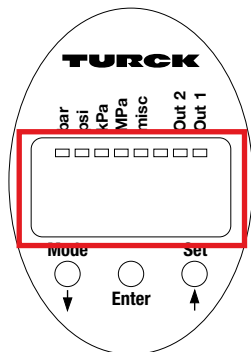


Fig. 7: Display

The following units can be shown on the display:

Display	LED	unit
bar	bar	bar
psi	psi	psi
kPa	kPa	kPa
MPa	MPa	MPa
Ud1	misc	millibar/hectopascal
Ud2	misc	mmHg (0 °)/Torr
Ud3	misc	inH <sub>2</sub> O (68 °F)
Ud4	misc	inH <sub>2</sub> O (39 °F)
Ud5	misc	ftH <sub>2</sub> O (39 °F)
Ud6	misc	inHg (60 °F)
Ud7	misc	inHg (32 °F)
Ud8	misc	mH <sub>2</sub> O (16 °C)
Ud9	misc	mH <sub>2</sub> O (4 °C)
Ud10	misc	kg/cm <sup>2</sup>

The units can be displayed as follows for the various measuring ranges:

Measuring range (bar)	bar	psi	kPa	MPa	Ud1	Ud2	Ud3	Ud4	Ud5	Ud6	Ud7	Ud8	Ud9	Ud10
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
10	✓	✓	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓	✓
16	✓	✓	✓	✓	-	-	✓	✓	✓	✓	✓	✓	✓	✓
25	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
40	✓	✓	✓	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
100	✓	✓	-	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
250	✓	✓	-	✓	-	-	-	-	✓	✓	✓	✓	✓	✓
400	✓	✓	-	✓	-	-	-	-	-	-	-	✓	✓	✓
600	✓	✓	-	✓	-	-	-	-	-	-	-	✓	✓	✓

## 4.2 Properties and characteristics

- Process connection available with a non-rotatable or rotatable sensor body
- Reading of adjusted values without tools
- Recessed pushbutton and keylock for secure programming
- Permanent indication of pressure (bar, psi, kPa, MPa, misc)
- Peak pressure memory
- Devices available for various pressure ranges

## 4.3 Functional principle

The pressure sensors of the PS series operate with piezo-resistive ceramic measuring cells. The ceramic diaphragm is unbalanced in proportion to the pressure applied. Depending on the sensor type, the voltage produced is made available either as switching or analog output signal.

## 4.4 Functions and operating modes

The pressure sensors are available with two different output variants:

Type	Output
PS...2UPN8X...	2 switching outputs (PNP/NPN)
PS...A...LI2UPN8X...	1 switching output (PNP/NPN) and 1 switching output (PNP/NPN) or analog output (adjustable as a current or voltage output)
PS...R...LI2UPN8X...	1 switching output (PNP/NPN) and 1 switching output (PNP/NPN) or analog output (adjustable as a current output)

A window function and a hysteresis function can be set for the switching outputs. The measuring ranges of the analog outputs can be freely selected. The measured pressure can be displayed in bar, psi, kPa, MPa and ten other pressure units (Ud1 - Ud10). The devices can be parametrized via IO-Link and via buttons.

### 4.4.1 Setting options

The devices have two setting options:

- Settings via IO-Link
- Settings via buttons

### 4.4.2 Normal operation – run mode

The sensor detects the system pressures and displays the recorded process values in accordance with the preset switching or analog behavior. The applied system pressure, the selected unit and the state of the available switching outputs appear in the display.

### 4.4.3 Menu mode

The display changes to Menu mode when the Mode button is pressed. In Menu mode, all parameters and their corresponding values can be read out. The values for a parameter are displayed by briefly pressing the Set button.

### 4.4.4 Programming mode

In Programming mode, all adjustable parameter values can be changed. The values for a parameter are displayed by briefly pressing the Set button.

4.4.5 Output functions – switching output

A window function and a hysteresis function can be set for the switching outputs.

Window function

The window function is used to teach a switching range in which the switching output takes on a defined switching state. The switching range is defined by means of an upper and lower limit value. The minimum distance between the limit values is 0.5 % of the nominal pressure range. The lower limit value is automatically adjusted if the upper limit value is changed.

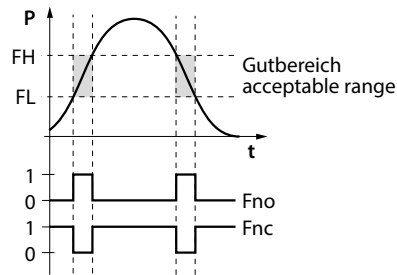


Fig. 8: Behavior of the switching output (window function)

Hysteresis function

The hysteresis function is used to teach a stable switching state that is independent of the system-related pressure fluctuations and the configured setpoint. The switching range is defined by means of a switchpoint and a reset point. The minimum hysteresis is 0.5 % of the nominal pressure range. The reset point is automatically adjusted if the switchpoint is changed.

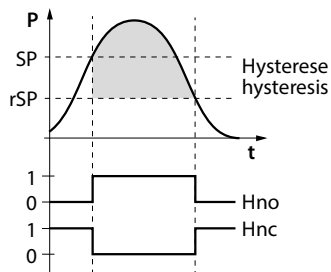


Fig. 9: Behavior of the switching output – hysteresis function

4.4.6 Output functions – analog output

The analog output of PS...LI2UPN8X sensors can either be set as a current or voltage output. The measuring range can be freely set.

### Current output

In the defined measuring range between ASP (analog switchpoint) and AEP (analog end point), the output signal lies between 4 and 20 mA or between 0 and 20 mA. The minimum distance between the start and end point is 10 % of the configured measuring range.

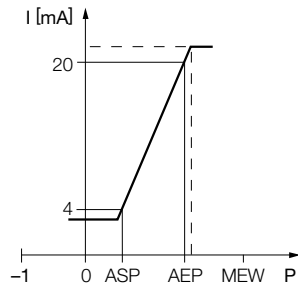


Fig. 10: Behavior of the current output (4 - 20 mA)

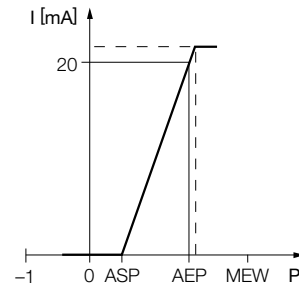


Fig. 11: Behavior of the current output (0 - 20 mA)

### Voltage output

In the defined measuring range between ASP (analog switchpoint) and AEP (analog end point), the output signal lies between 0 and 10 V, between 0 and 5 V or between 1 and 6 V.

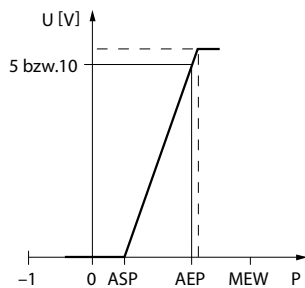


Fig. 12: Behavior of the voltage output (0 - 10 V or 0 - 5 V)

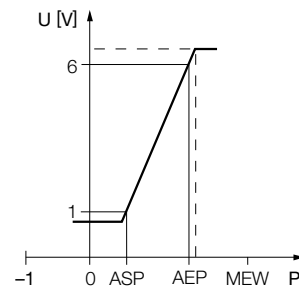


Fig. 13: Behavior of the voltage output (1 - 6 V)

#### 4.4.7 IO-Link mode

In IO-Link mode, the device can be parameterized from a PC via IO-Link. In addition to the manually adjustable functions, additional operating modes can be set via IO-Link. Refer to the IO-Link parameters manual for the IO-Link parameters. The sensor operates in COM2 mode at 38.4 kBaud.

## 4.5 Technical accessories

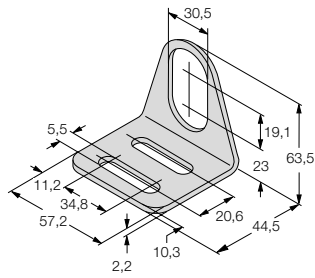
The following accessories are not included in the delivery:

Article name	Description	Figure
USB 2-IOL-0002	IO-Link adapter V1.1 with integrated USB interface	
RKC4.5T-2-RSC4.5T/TEL	Connection cable between the sensor and USB-2-IOL-002, length 2 m	
RKC4.5-5T-2/TEL	Female connector, straight, with 2 m PVC cable, open end	
RKC4.5-5T-5/TEL	Female connector, straight, with 5 m PVC cable, open end	
RKC4.5-5T-10/TEL	Female connector, straight, with 10 m PVC cable, open end	
WKC4.5-5T-2/TEL	Female connector, angled, with 2 m PVC cable, open end	
WKC4.5-5T-5/TEL	Female connector, angled, with 5 m PVC cable, open end	
WKC4.5-5T-10/TEL	Female connector, angled, with 10 m PVC cable, open end	



Article name	Description	Figure
--------------	-------------	--------

MW-30  
 Stainless steel mounting bracket  
 for M30



In addition to the listed connection cables, Turck also offers additional versions for special applications with suitable connections for the device. Further information can be found in the Connectivity section of the Turck product database at <http://www.turck.de/products>

## 5 Mounting



### **DANGER**

Explosive atmospheres

#### **Explosion due to ignitable sparks**

Use of devices in Zone 2 and Zone 22

- Only mount the device if there is no potentially explosive atmosphere present.
- Protect the device's connector against accidental removal during operation using safety clip SC-M12/3GD (included in delivery).

Strong thermal changes in the environment of the sensor can result in a zero offset. In this case, in a pressure-free state, the measured value displayed is not null. If a zero point offset is present, an offset value can be set via the CoF parameter (see parameterization instructions).

The sensors may be mounted in any orientation. The maximum torque when mounting the sensors is 20 Nm.

- Depressurize prior to assembly.
- Do not mount the device in a location that is subject to high pressure pulses.
- Mount the device on the pressure connection with the appropriate counterpart.

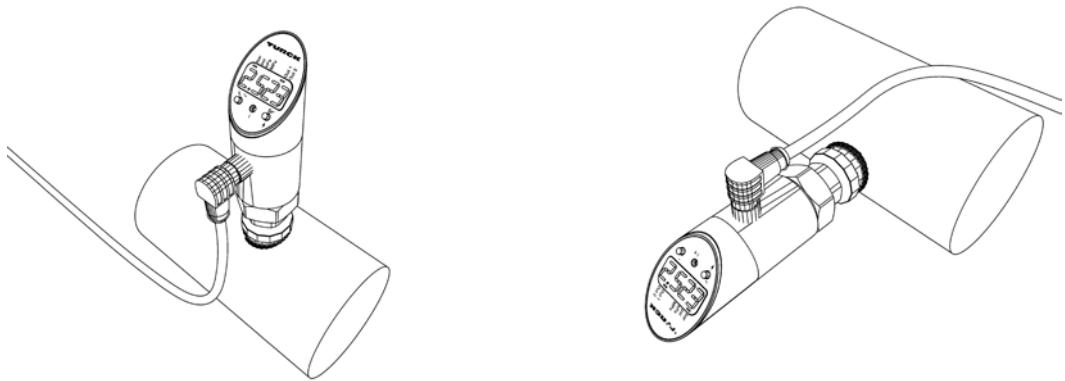


Fig. 14: Mounting the device on the pressure connection

## 6 Connection



### **DANGER**

Explosive atmospheres

#### **Explosion due to ignitable sparks!**

Use of devices in Zone 2 and Zone 22

- Only connect the device during use in zone 2 if there is no potentially explosive atmosphere present.
- Protect the device's connector against accidental removal during operation using safety clip SC-M12/3GD (included in delivery).

- Connect the connection cable coupling to the sensor connector.
- Connect the open end of the connection cable to the power source and/or evaluation device.

## 6.1 Connection and wiring diagrams

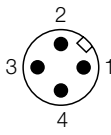
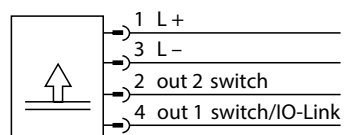
Pin	Pin assignment	Connection image
Pin 1	+24 VDC	 
Pin 2	Out 2	
Pin 3	GND	
Pin 4	Out 1/IO-Link	

Fig. 15: Connection image PS...2UPN...

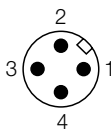
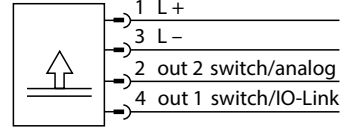
Pin	Pin assignment	Connection image
Pin 1	+24 VDC	 
Pin 2	Out 2/I <sub>A</sub> /V <sub>A</sub>	
Pin 3	GND	
Pin 4	Out 1/IO-Link	

Fig. 16: Connection image PS...A...LIUPN...

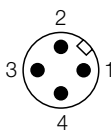
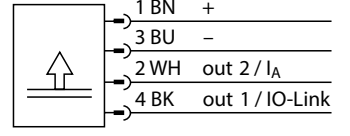
Pin	Pin assignment	Connection image
Pin 1	+24 VDC	 
Pin 2	Out 2/I <sub>A</sub>	
Pin 3	GND	
Pin 4	Out 1/IO-Link	

Fig. 17: Connection image PS.....R...LIUPN...

## 7 Commissioning

Once the cables and the supply voltage have been connected, the device will automatically go into operation.

## 8 Operation

### 8.1 Display functions

Display	Meaning
Flashing	Value within the configured measuring range, pressure more than 2 % below or above the configured limits
OL	Value beyond the configured measuring range, pressure more than 5 % f.s. above the configured limit
UL	Value beyond the configured measuring range, pressure more than 5 % f.s. below the configured limit
SC1	Short-circuit at output 1
SC2	Short-circuit at output 2
SC12	Short-circuit at both outputs
Boot	EEPROM error

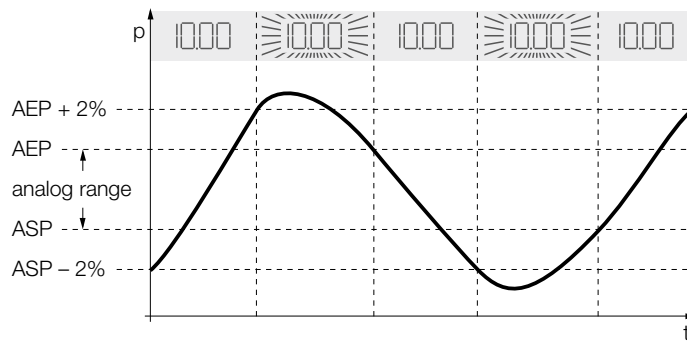


Fig. 18: Display – value within the configured measuring range

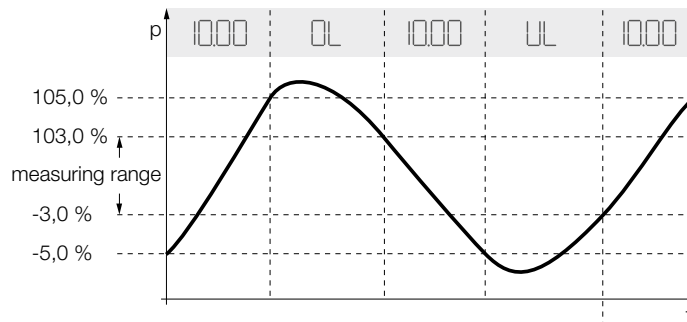


Fig. 19: Display – value outside the configured measuring range

## 9 Setting



**DANGER**

Explosive atmospheres

**Explosion due to ignitable sparks**

► Only adjust the device if there is no potentially explosive atmosphere present.

The device can be parameterized as follows:

- Setting via buttons
- Setting via IO-Link

The flow charts below illustrate the action steps to be performed during the teach-in process.

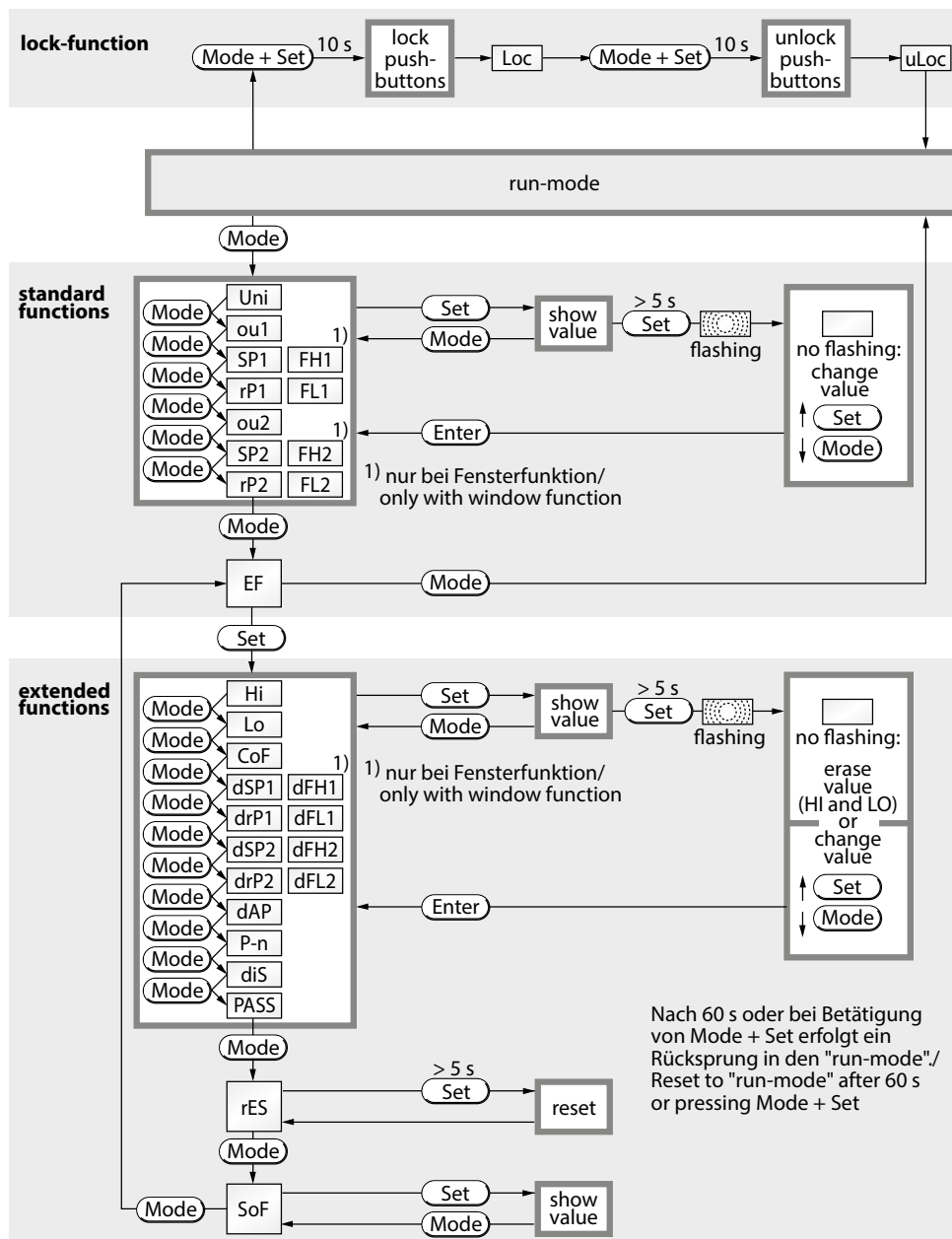


Fig. 20: PS...-2UPN8X2... – Overview of the teach-in process

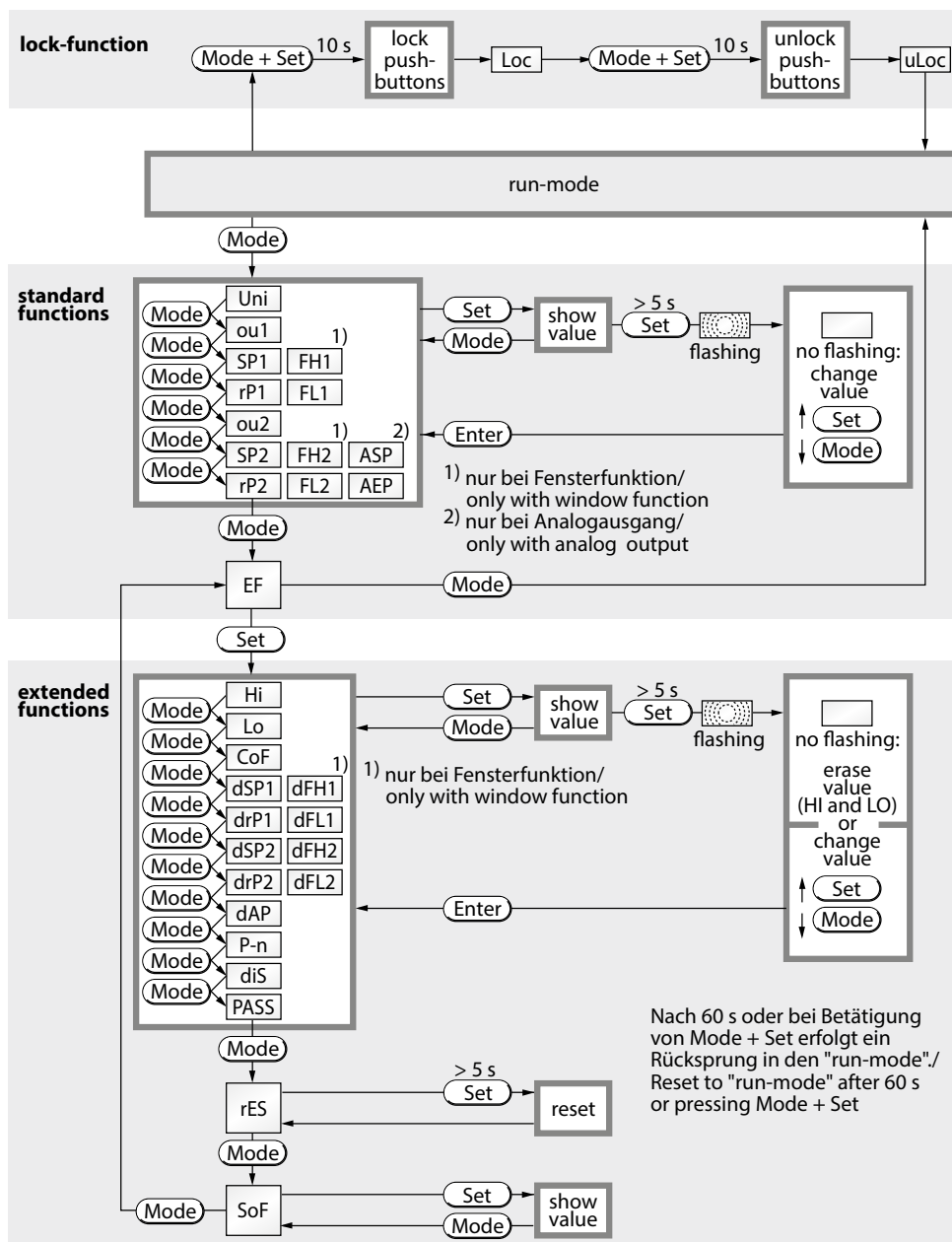


Fig. 21: PS...-LI2UPN8X2... – Overview of the teach-in process



**NOTE**

The devices PS...R... do not have the password function. The analog output can be set solely as a current output.

## 9.1 Setting via buttons

The device has 3 buttons for setting parameters.

- Mode/↓
- Enter
- Set/↑

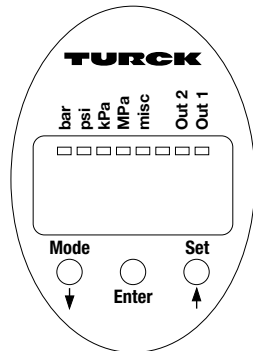


Fig. 22: Buttons on device

### 9.1.1 Setting parameter values via buttons

- Press the Mode button until the desired parameter is shown in the display. An explanation of the parameters can be found in the table below.
- If **Loc** is shown in the display, unlock the device.
- Display parameter value: Briefly press the Set button.
- Change the displayed value: Press the Set button for at least 5 s until the display stops flashing.
- Increase or decrease the value using the ↑ or ↓ button.
- Press the Enter button to save the changed value.

#### Parameters in the main menu

Default values are shown in **bold**.

	Explanation	Options	Function
<b>Loc</b>	Lock the programming menu		Programming menu is locked
<b>uLoc</b>	Unlock the programming menu		Programming menu is enabled (default)
<b>Uni</b>	Display unit	<b>bar</b> psi kPa MPa Ud1-Ud10	bar psi kPa MPa Customized units
<b>ou1</b>	Function of output 1	<b>Hno1</b>	Hysteresis function (NO contact)
		Hnc1	Hysteresis function (NC contact)
		Fno1	Window function (NO contact)
		Fnc1	Window function (NC contact)
<b>SP1</b>	Switchpoint 1 for hysteresis function		Upper limit value, at which output 1 changes its switching state with rising pressure, <b>Default: 50 % f.s.</b>

	Explanation	Options	Function
rP1	Reset point 1 for hysteresis function		Lower limit value, at which output 1 changes its switching state with falling pressure <b>Default: 25 % f.s.</b>
FH1	Upper switchpoint for window function		Upper switchpoint, at which output 1 changes its switching state <b>Default: 50 % f.s.</b>
FL1	Lower switchpoint for window function		Lower switchpoint, at which output 1 changes its switching state <b>Default: 25 % f.s.</b>
ou2	Function of output 2 (switching output)	Hno2	Hysteresis function (NO = normally open)
		Hnc2	Hysteresis function (NC = normally closed)
		Fno2	Window function (NO = normally open)
		Fnc2	Window function (NC = normally closed)
ou2	Current output	4-20 0-20	Increasing straight line
		20-4 20-0	Decreasing straight line
ou2	Voltage output Only for type: PS...A...	0-10 0-5 1-6	Increasing straight line
		10-0 5-0 6-1	Decreasing straight line
SP2	Switchpoint 2		Upper limit value, at which output 2 changes its switching state with rising pressure <b>Default: 50 % f.s.</b>
rP2	Reset point 2		Lower limit value, at which output 2 changes its switching state with falling pressure <b>Default: 25 % f.s.</b>
FH2	Upper switchpoint for window function		Upper switchpoint, at which output 2 changes its switching state <b>Default: 50 % f.s.</b>
FL2	Lower switchpoint for window function		Lower switchpoint, at which output 2 changes its switching state <b>Default: 25 % f.s.</b>
ASP	Switchpoint of the analog signal Only for type: ...-LI2UPN8X		Pressure level where the analog signal has its switchpoint <b>Default: -1 (for measuring range 0 to -1)</b> <b>Default: 0 (for all other measuring ranges)</b>
AEP	End point of the analog signal Only for type: ...-LI2UPN8X		Pressure level where the analog signal has its end point <b>Default: End of the measuring range</b>
EF	Sub-menu for additional setting options		By pressing the Set button, you can adjust various additional settings in a sub-menu



## Parameters in the EF sub-menu

	Explanation	Options	Function
Hi	Maximum value memory		The highest pressure is saved and can be displayed/deleted here. <b>Default: Peak value (max.)</b>
Lo	Minimum value memory		The lowest pressure is saved and can be displayed/deleted here. <b>Default: Peak value (min.)</b>
CoF	Offset calibration		Strong thermal changes in the environment of the sensor can result in a zero point offset. This results in the displayed measured value not being zero in an unpressurized state. This drift can be corrected. Adjustment range: -5 to +5 % of the measuring range <b>Default: 0</b>
dSP1	Switching delay of SP1		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive). <b>Default: 0.0</b>
drP1	Switching delay of rP1		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive) <b>Default: 0.0</b>
dFH1	Switching delay of FH1		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive), only available in window mode Fno or Fnc <b>Default: 0.0</b>
dFL1	Switching delay of FL1		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive), only available in window mode Fno or Fnc <b>Default: 0.0</b>
dSP2	Switching delay of SP2		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive). <b>Default: 0.0</b>
drP2	Switching delay of rP2		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive). <b>Default: 0.0</b>
dFH2	Switching delay of FH2		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive), only available in window mode Fno or Fnc <b>Default: 0.0</b>
dFL2	Switching delay of FL2		Adjustment range: 0 to 50 s in increments of 0.1 s (0 = delay time is inactive), only available in window mode Fno or Fnc <b>Default: 0.0</b>
dAP	Damping the switching output (filter)		Pressure peaks of short duration or high frequency can be filtered. 0 to 4 s in increments of 0.01 s <b>(0 = filter is disabled)</b>

	Explanation	Options	Function
<b>dAA</b>	Damping the analog output Only for type: ...LI2UPN8X		Pressure peaks of short duration or high frequency can be filtered. 0 to 4 s in increments of 0.01 s (0 = delay time is disabled)
<b>P-n</b>	Behavior of the switching output	NPN PNP	n-switching p-switching
<b>diS</b>	Measurement value display	50	50 ms update time
		200	200 ms update time
		600	600 ms update time
		r50	50 ms update time/display rotated by 180°
		r200	200 ms update time/display rotated by 180°
		r600	600 ms update time/display rotated by 180°
		OFF	Measurement value display disabled. Pressing the Set button causes the measured value to be displayed temporarily.
<b>PASS</b>	Password protection Only for type: PS...A...		Hexadecimal, 4-digit (default value "0000"). Once a new password is defined, enter new password to unlock.
<b>rES</b>	Reset the parameters to the default values		
<b>SOF</b>	Software version		

## 9.1.2 Locking and unlocking buttons

- ▶ Locking buttons: Press and hold the Mode button and Set button simultaneously until **Loc** appears in the display.
- ▶ Unlocking buttons: Press and hold the Mode button and Set button simultaneously until **uLoc** appears in the display.
- ▶ If password protection is enabled, enter the password to unlock.

## 9.2 Setting via IO-Link

The devices can be configured via a PC with an FDT frame application (e.g. PACTware™) or via a control system.

Refer to the IO-Link parameters manual and the IO-Link commissioning manual (D900063) for further information about configuring the devices via IO-Link.

## 10 Eliminate interference

If the device does not work as expected, first check whether ambient interference is present. If there is no ambient interference, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case decommission the device and replace it with a new device of the same type.

## 11 Maintenance

Ensure that the plug connections and cables are always in good condition.  
The devices are maintenance-free; if necessary clean dry.

## 12 Repairs

The device is not intended for repair by the user. If the device is faulty, please take it out of operation. If you are returning the device to Turck, please note our return terms and conditions.

### 12.1 Returning devices

If a device has to be returned, bear in mind that only devices with a decontamination declaration will be accepted. This is available for download at <https://www.turck.de/en/retoure-service-6079.php> and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

## 13 Disposal



Devices must be properly disposed of, not in general household waste.


## 14 Specifications

Type code	PS 300	PS 500	PS 600
Pressure range	-1 to 600 bar	-1 to 600 bar	-1 to 400 bar
Pressure type	Relative/absolute		
Outputs	Transistor switching output, analog outputs and IO-Link (freely configurable)		
IO-Link COM2	38.4 kBaud frame type 2.2		
Current output	(0) 4 to 20 mA		
Voltage output	0 to 10 V, 0 to 5 V, 1 to 6 V		
Analog output accuracy (NLHR), non-linearity, hysteresis and repeatability	± 0.5 % full scale		
Switching output	2 PNP/NPN, N.C./N.O., progr.		
Accuracy/switchpoint.	± 0.5 % full scale		
Switching point distance	≥ 0.5 % full scale		
Switch points	(min. + 0.005 x range) up to 100 % full scale		
Release points	min. up to (SP -0.005 x range)		
Switching frequency	≤ 180 Hz		
Operating voltage	15 to 30 VDC with 2 switching outputs 18 to 30 VDC with analog output SELV, PELV according to EN 50178		
No-load current $I_0$	≤ 50 mA		
Medium temperature	-40...75 °C		
Ambient temperature	-40...70 °C		
Storage temperature	-40...70 °C		
$T_K$ :			
– Zero point/10K	± 0.15 %		
– Range/10K	± 0.15 %		
Voltage drop at $I_e$	≤ 2 V (150 mA) or ≤ 2,5 V (200 mA)		
Burst protection	–	Pat. medium-stop	–
Short-circuit protection	yes	yes	yes
Reverse polarity protection	yes	yes	yes
Rated operational current	200 mA		
IP Rating	IP69K	IP67	IP67
Protection class	III		
EMC			
EN 61000-4-2	ESD: 4 KV CD/8 KV AD		
EN 61000-4-3	HF radiated: 15 V/m		
EN 61000-4-4	Burst: 2 KV		
EN 61000-4-5	Surge: 1 kV, 42 Ω		
EN 61000-4-6	HF conducted: 10 V		
Housing material	Stainless steel 1.4305 (AISI 303)		
Pressure module	Ceramics Al <sub>2</sub> O <sub>3</sub>		
Medium contacting materials	FPM, 1.4305 (AISI 303) ceramics Al <sub>2</sub> O <sub>3</sub>	on request	
Pressure connection with tightening torque	SW21, max. 50 Nm		

Type code	PS 300	PS 500	PS 600
Coupling nut with tightening torque	–	SW30, max. 35 Nm	–
Diaphragm seal mounting	no	no	yes
Rotatable display		180°	
Rotatable sensor body	no	360°	no
Vibration resistance	20 g (10 to 2000 Hz), according to IEC 60068-2-6		
Shock resistance	50 x g (11 ms) according to IEC 60068-2-27		
Connector	M12 x 1 connector		
Display type	4-digit 7-segment display		
Number of programming buttons	3		

## 15 Appendix: Declarations of conformity and approvals

### 15.1 Approvals and labels

Approvals	Marking parts in accordance with	
	ATEX directive	EN 60079-0/-15/-31
ATEX	Ⓔ II 3G	Ex nA IIC T5...T4 Gc
Certificate number: TURCK Ex-14001H X	Ⓔ II 3D	Ex tc IIIC T90°C...T100°C Dc
		

#### Electrical data

Electrical data	
Supply Voltage	15(18)... 30 VDC

#### Thermal data

Thermal data	
Ambient temperature range	-40°C to +70°C
Medium temperature	-40...+75 °C

Max. ambient temperature ( $t_{amb.}$ )	Medium temperature ( $t_{med.}$ )	Temperature class	Surface temperature
70 °C	75 °C	T4	T100 °C
70 °C	$T_{med.} \leq T_{amb.}$	T4	T100 °C
65 °C	$T_{med.} \leq T_{amb.}$	T5	T95 °C
60 °C	$T_{med.} \leq T_{amb.}$	T5	T90 °C
$T_{amb.} \leq T_{med.}$	75 °C	T4	T100 °C
$T_{amb.} \leq T_{med.}$	70 °C	T5	T100 °C
$T_{amb.} \leq T_{med.}$	60 °C	T5	T90 °C

### 15.2 Special conditions for use in zone 2 (requirements of the test body)



#### **DANGER**

Explosive atmospheres

#### **Explosion due to ignitable sparks!**

- ▶ Use power supplies with safe separations according to IEC 60364/UL508.
- ▶ In the case of devices with M12 connectors: Use safety clip SC-M12/3GD (incl. in delivery).
- ▶ Do not connect or disconnect the connection cable or connectors when energized.
- ▶ Attach a "Nicht unter Spannung trennen/Do not separate when energized" warning label in close proximity to the connector.
- ▶ Protect the device against UV radiation.
- ▶ The connectors are fully IP rated only in combination with suitable O-rings.

15.3 Certificates of conformity

**EU-Konformitätserklärung Nr.: 5132-1M**

EU Declaration of Conformity No.:



Wir/ We: **HANS TURCK GMBH & CO KG**  
**WITZLEBENSTR. 7, 45472 MÜLHEIM A.D. RUHR**

erklären in alleiniger Verantwortung, dass die Produkte  
 declare under our sole responsibility that the products

Drucksensoren: PSxxxx - 3(5)xx - xxxUPN8X - H1141/3GD  
 pressure sensors:

auf die sich die Erklärung bezieht, den Anforderungen der folgenden EU-Richtlinien durch Einhaltung der  
 folgenden Normen genügen:  
 to which this declaration relates are in conformity with the requirements of the following EU-directives by compliance with the following  
 standards:

EMV - Richtlinie /EMC Directive EN 61326-2-3:2013	2014 / 30 / EU	26.02.2014
ATEX - Richtlinie /Directive ATEX EN 60079-0:2012+A11:2013 EN 60079-15:2010 EN 60079-31:2014	2014 / 34 / EU	26.02.2014
RoHS – Richtlinie /RoHS Directive EN 50581:2012	2011 / 65 / EU	08.06.2011

Weitere Normen, Bemerkungen:  
 additional standards, remarks:

Zusätzliche Informationen:  
 Supplementary information:

Angewandtes ATEX-Konformitätsbewertungsverfahren: Modul A /module A  
 ATEX - conformity assessment procedure applied:

Baumusterprüfbescheinigung: TURCK Ex-14001H X  
 examination certificate:

ausgestellt: Hersteller:  
 issued by: Hans Turck GmbH & Co. KG

Mülheim, den 28.05.2018

Ort und Datum der Ausstellung /  
 Place and date of issue

i.V. Dr. M. Linde, Leiter Zulassungen /Manager Approvals  
 Name, Funktion und Unterschrift des Befugten /  
 Name, function and signature of authorized person

## 15.4 Approvals

### 15.4.1 EX type-examination certificate

Your Global Automation Partner

**TURCK**

*Translation:*

(1) **Type Examination Certificate**

(2) Equipment or Protective systems intended for use in potentially explosive atmosphere **Directive 2014 / 34 / EU**

(3) **Number:** **TURCK Ex-14001HX** **issue No.: 0**

(4) Product: Sensors: PSxxxx - 3(5)xx - xxxUPN8X - H1141/3GD

(5) Manufacturer: Hans Turck GmbH & Co KG

(6) Address: Witzlebenstr. 7  
45472 Mülheim an der Ruhr, Germany

(7) The design of this product and any acceptable variation thereto is specified in the appendix to this Type Examination Certificate.

(8) The Hans Turck GmbH & Co. KG certifies that this product has been found to comply with the Essential Health and Safety Requirements relating to the design and construction of equipment and protective systems intended for use in potentially explosive atmospheres given in Annex II to the Directive. The examination and test are recorded in the confidential Assessment Report TURCK Ex-14001HX.

(9) Compliance with the Essential Health and Safety Requirements has assured by compliance with:

**EN 60079-0:2012/A11:2013** **EN 60079-7:2015** **EN 60079-31:2014**

(10) If the sign "X" is placed after the certificate number, it indicates that the product or protective system is subject to special conditions for safe use specified in the schedule to this certificate.

(11) This Type Examination Certificate relates only to the design, examination and tests of the specified equipment in accordance to the Directive 2014 / 34 / EU. Further requirements of the Directive apply to the manufacturing process and supply of this equipment. These are not covered by this certificate.

(12) The marking of the equipment protective system must include the following:

 **II 3 G Ex nA IIC T5...T4 Gc**  
**II 3 D Ex tc IIIC T90°C...T100°C Dc**

Hans Turck GmbH & Co. KG

**TURCK**

Hans Turck GmbH & Co. KG  
Witzlebenstr. 7 | 45472 Mülheim an der Ruhr  
T +49 208 4952-0 | more@turck.com

Mülheim an der Ruhr, Date 20.04.2016



(i.A. W. Dick)  
Certification Representative



Your Global Automation Partner

**TURCK**

Translation:

(13) **Appendix**

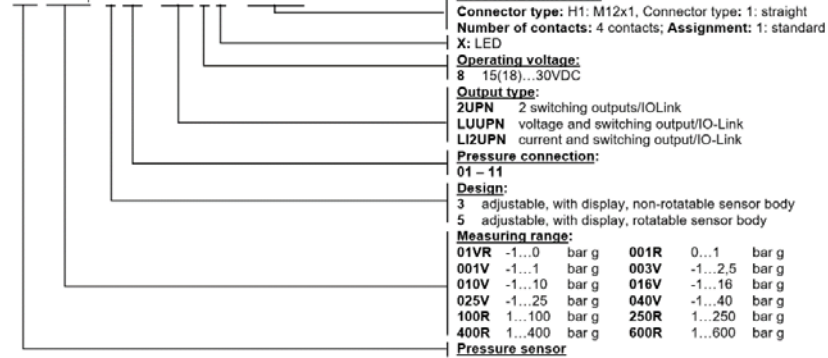
(14) **Statement of Conformity TURCK Ex-14001HX**

(15) Product description

The Pressure sensors are allowed to be used in zone 2 resp. zone 22 depending on the marking. They are used for measuring the pressures in a range between -1 and 600 bar. The connection will be done by an M12x1 screw connector and and pressure connection in different versions.

Type code:

PS xxxx - x xx - xxx 8 x - H1141



Ambient temperature range: -40°C...+70°C  
 Media temperature range: -40°C...+75°C

Temperature class and the surface temperature of the pressure sensors depend on the ambient temperature and the media temperature and can be determined from Table 1.

Table 1:

Ambient temperature [T <sub>amb.</sub> ]	Media temperature [T <sub>med.</sub> ]	Temperature class	surface temperature
70°C	75°C	T4	T100°C
70°C	T <sub>med.</sub> ≤ T <sub>amb.</sub>	T4	T100°C
65°C	T <sub>med.</sub> ≤ T <sub>amb.</sub>	T5	T95°C
60°C	T <sub>med.</sub> ≤ T <sub>amb.</sub>	T5	T90°C
T <sub>amb.</sub> ≤ T <sub>med.</sub>	75°C	T4	T100°C
T <sub>amb.</sub> ≤ T <sub>med.</sub>	70°C	T5	T100°C
T <sub>amb.</sub> ≤ T <sub>med.</sub>	60°C	T5	T90°C

Electrical Data:

Operating voltage / voltage range: 15(18) – 30VDC

Your Global Automation Partner

**TURCK**

(16) Report Number:

Turck Ex-14001H  
Turck Ex-14001H\_3G  
Turck Ex-14001H\_3D  
Zone2+22\_A0\_D\_NGW\_~\_Turck Ex-14001HX

(17) Special conditions for safe use:

- Use class II power supply according to IEC 60 364 / UL 508.
- The temperature class or the maximum surface temperature depends on the application (Table 1)
- Connectors shall only be connected or disconnected in a de-energized state.
- Devices with connector have to be ensured against accidentally disconnecting; use the included safety clip SC-M12 / 3GD.
- Fixed permanently in suitable form a warning near of the connector with following text: DO NOT SEPARATE WHEN ENERGIZED.
- The sensors shall be protected against ultraviolet radiation.
- The IP degree of protection of the connectors is given only in conjunction with matching O-rings.

(18) Essential health and safety requirements:

- no additional ones

Seite 3/3



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60 representations worldwide!

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