Your Global Automation Partner

# TURCK

# PS+ Programmable
# Pressure Sensors

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**50+**
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60 representations worldwide

# PS+ Programmable Pressure Sensor

The PS+ series pressure sensor is a fully programmable pressure sensor that offers a local display as well as electrical outputs to provide critical feedback to a control system.
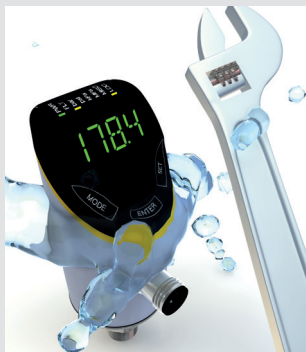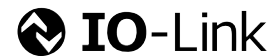
## Features

- Stainless steel measuring cell for pressure ranges >10bar
- Up to 600 bar relative pressure
- Accuracy up to 0.25%
- IO-Link 1.1
- Automatic signal detection
- Up to seven-fold overpressure resistance
- High protection class (IP6K6K, IP6K7, IP6K9K)
- 180° invertible multi-color display
- Rotatable sensor body

## Award-winning industrial design

The sensors of the PS+ series won the iF DESIGN AWARD in the Industry/Tools category. The prize has been awarded every year since 1954 for outstanding achievements in product design. The innovative cross-platform operating concept particularly impressed the jury.

**Maximum robustness**
The IP protection classes 6K6K, 6K7 and 6K9K, excellent resistance to shock and vibration, as well as a high pressure resistance ensure increased system availability. The design without mechanical pushbuttons also minimizes the number of sealing surfaces required.

**Variable data mapping**
IO-Link process data profiles enable the flexible connection of the sensor with a large degree of freedom. This allows convenient adaption to existing systems with a 1:1 replacement of existing devices – even from third party manufacturers. This eliminates the need for complex adaptions to the controller environment.

# PS+ Industrial Pressure Sensors with IO-Link

**Switch point LEDs**
Two LEDs visible from all sides indicate the state of the two switching outputs

**Process value display**
The 4-digit 14-segment display can show process values clearly in red or green

**Inscription**
The laser inscription of the translucent front cap and the stainless steel housing is abrasion resistant and offers a high contrast

**Adjustability**
The sensor head is freely rotatable around 340° and the display can be inverted 180°, thus simplifying the positioning of the electrical connection and user interface after mounting

**Sloped display**
The 45° display angle of the user interface offers greater convenience for operation and reading

**Status LEDs**
Additional LEDs indicate the status of the power supply, errors, the locking state as well as IO-Link communication

**Translucent front cap**
The front cap consists of a scratch-proof, temperature and impact resistant plastic

**MODE, ENTER and SET**
Touch-sensitive touchpads with a large surface area ensure straightforward menu navigation, even with gloves

**Capacitive touchpads**
The sensor is operated using capacitive touchpads. These do not require any moving parts and are therefore abrasion and wear-free. An additional seal, as required with conventional mechanical operating elements, is unnecessary.

**NPN/PNP auto output**
The sensor output is automatically set according to the connected electrical input. A massive reduction in variants and an intelligent concept save time and costs because of the reduced effort required for configuration and error prevention.

## Conventional applications

The pressure sensors of the PS+ series enable the reliable and reproducible measurement of process pressures in industrial applications. The large number of different pressure ranges and process connections results in a wide range of variants, ensuring simple application. Pressure sensors are very frequently used in the following application fields:

- Hydraulic applications
- Cooling circuits
- Lubricant applications

## Higher system availability

The stainless steel housing in conjunction with the single-piece cover is an extremely robust design. The absence of mechanical operating elements ensures a high wear resistance. The reduced number of sealing surfaces offers maximum protection from humidity and dust penetrating inside the device – even outdoors thanks to the materials resistant to UV radiation and salt spray. The new sealing concepts enable protection classes IP6K7K, IP6K7 and IP6K9K. The PS+ series also offers exceptional resistance to vibration and shock. The measuring cells of the PS310 series have a burst pressure of at least four times the maximum nominal pressure,

while the PS510 series features up to 7 times maximum nominal pressure. The minimum/maximum pressure memory forms a digital "drag pointer", making an even better analysis of processes possible.

## Simple operation

The pressure switch points can be set in a few steps in the usual way, either according to the Turck or VDMA standard. The 14-segment display offers users optimum support in navigating the menus.
The display can show process values in red or green giving operators a quick and easy way of determining whether the pressure bis within the normal operating range.
The color change can be linked here to the switching outputs in order to indicate the actual switching status via the switch point LEDs.

## Advanced functions

The advanced functions enable the sensor to be reset to its previous settings (Undo function) as well as to the factory settings. The switching behavior of the outputs can be set to "Normally Open" (NO) and "Normally Closed" (NC). Additional hysteresis and filter functions enable the optimum adaptation of the sensor for complex applications.

## Simple mounting and commissioning

The PS+ Series offers a variety of useful features to make mounting, connection and commissioning of the sensors as effective and straightforward as possible.

- The large selection of different process connections ensures a simple connection to the process environment.
- The freely rotatable sensor housing allows the display and plug connector to be aligned after mounting.
- The automatic detection of output signals simplifies the connection to the controller environment.
- The option of either Turck standard or VDMA menu guidance ensures intuitive operation of the sensor.
- The different IO-Link process data profiles enable the sensor to be adapted to existing systems and thus reduce the programming effort required.



**Multicolor display**
The display can show all indicated information in green or red. This makes it possible to optimally adapt the device to the particular lighting conditions of the application. Several setting options also allow the display color to be linked to the status of the sensor switching outputs.



**Automatic signal detection**
Devices with an analog output automatically detect whether the connected interface expects a current or voltage signal. This automatic setting of the analog output reduces configuration time and helps to prevent errors.

# PS+ Programmable Pressure Sensors

## Performance Data

| | |
|---|---|
| Programmable Output Type 2UPN8 | 2X PNP/NPN N.O./N.C |
| Programmable Output Type LI2UPN8 | **4 -20 mA, 0 - 20 mA, 0 - 10 V, 1 - 6 V, 0 - 5 V and 1X PNP/NPN N.O./N.C or 2X PNP/NPN N.O./N.C. |
| Analog Accuracy (including LHR) | (1) +/- 0.5% Full Scale, (2) ± 0.25% full scale |
| Set Point Accuracy | (1) +/- 0.5% Full Scale, (2) ± 0.25% full scale |
| Set Point Range | (min + 0.005 x range) up to 100% of full scale |
| Reset Point Range | Min up to (SP - 0.005 x Range) |
| Set Point Hysteresis | ≥ 0.5% |
| Temperature Coefficient Zero Point | (1) +/-0.15% of full scale/10K    (2)  +/-0.1% of full scale/10K |
| Temperature Coefficient Span | (1) +/-0.15% of full scale/10K    (2)  +/-0.1% of full scale/10K |

## Electrical Data

| | |
|---|---|
| Operating Voltage | 18 - 30 VDC |
| Switching Current | ≤ 250 mA |
| Voltage Drop | ≤ 2 V |
| Switching Frequency | ≤ 300 Hz |
| Response Time | ≤ 500 ms |
| Short Circuit/Reverse Polarity Protection | Yes/Yes |
| IO-Link | Version 1.1 |

## Environmental Data

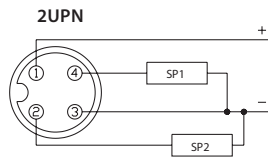| | |
|---|---|
| Ambient Temperature | −40 to 80 °C |
| Storage Temperature | −40 to 100 °C |
| Medium Temperature | −30 to 80 °C |
| Housing Materials | 316L Stainless Steel/Polyarylamide 50%GF  UL 94-V-0 |
| Wetted Materials | (1) 316L Stainless Steel/AL2O3/FKM    (2) 316L / 17-4 Stainless Steel |
| Protection Type | ***IP6K6K/ 6K7/6K9K |
| LED Measuring Value | 4 digit rotatable, red or green |

(1)    PS310
(2)    PS510
**      Inverse analog outputs are programmable: example, 4-20mA or 20-4mA
***    Per ISO 20653 for electrical equipment mounted on road vehicles which offers more stringent wash-down requirements
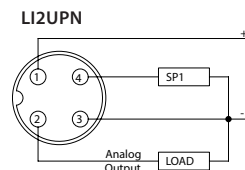        than the typical IEC 60529; IP66, IP67, and IP69K

# Part Number Key

| PS | 510 | - | 10V | - | 01 | - | LI2UPN8 | - | H1141 | /X |
|----|-----|---|-----|---|----|----|---------|---|-------|-----|

**Pressure Sensor**

**310** = Programmable sensor with Ceramic Measuring Cell

**510** = Programmable sensor with Stainless Steel Measuring Cell

**Option Codes**

**X** = Orifice Snubber

**Electrical Connection**

**H1141** = M12

**Pressure Range and Scale**

**PS310**

**0V** = −1 to 0 Bar
**1V** = −1 to 1 Bar
**1** = 0 to 1 Bar
**2.5V** = −1 to 2.5 Bar
**1A** = 0 to 1 Bar Absolute
**1.6A** = 0 to 1.6 Bar Absolute
**2.5A** = 0 to 2.5 Bar Absolute

**PS510**

**10V** = −1 to 10 Bar
**16V** = −1 to 16 Bar
**25V** = −1 to 25 Bar
**40V** = −1 to 40 Bar
**100** = 0 to 100 Bar
**250** = 0 to 250 Bar
**400** = 0 to 400 Bar
**600** = 0 to 600 Bar
**10A** = 0 to 10 Bar Absolute

**Electrical Output**

**2UPN8** = Dual switch point
**LI2UPN8** = Analog voltage/current+switch point or dual switch point

**Process Connection**

**01** = Female G 1/4
**02** = Female NPT 1/4
**03** = Male NPT 1/4
**04** = Male G 1/4
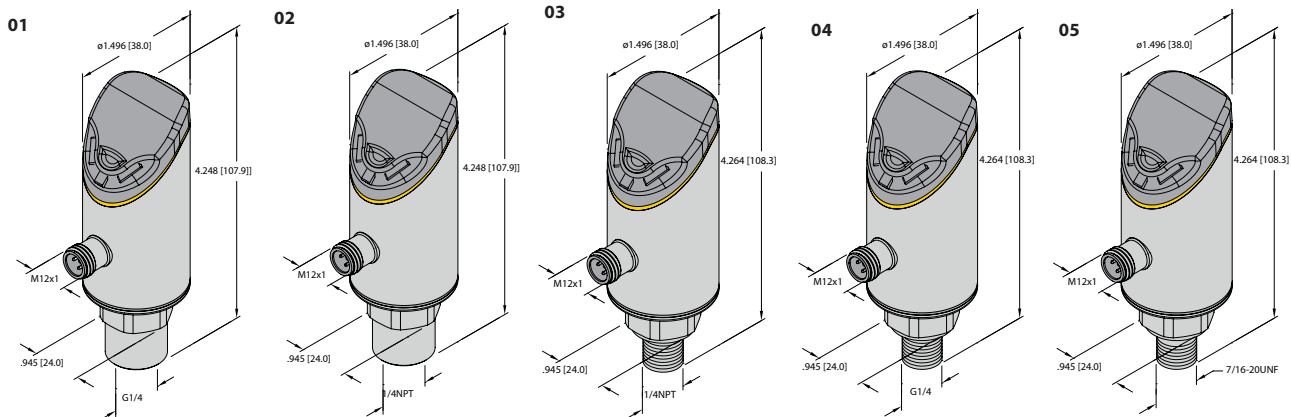**05 =** Male 7/16-20 UNF (SAE-ORB)

**Consult factory for additional pressure ranges and process connections; note that above pressure ranges can be programmed and displayed in PSI, Kpa, Mpa, and additional user defined ranges**
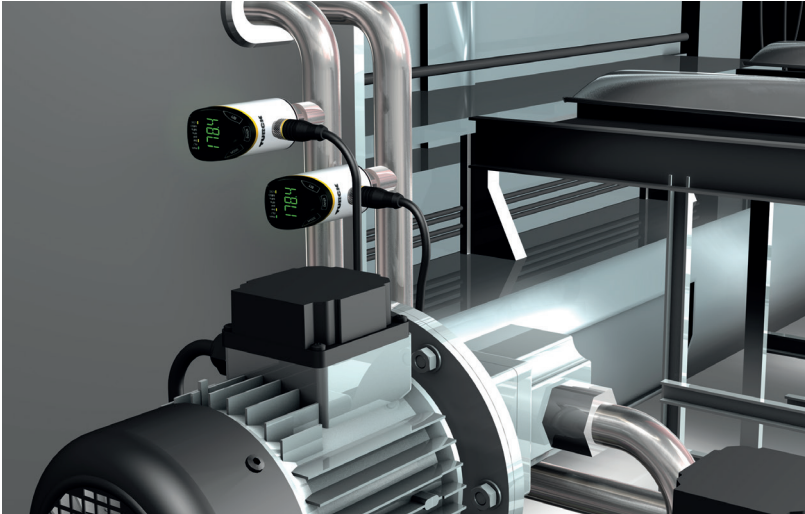
**2UPN**



Mating Cordset: RK  4 . 4T-*

**LI2UPN**



Mating Cordset: RK  4 . 4T-*/S618

**01**



ø1.496 [38.0]
4.248 [107.9]]
M12x1
.945 [24.0]
G1/4

**02**

ø1.496 [38.0]
4.248 [107.9]]
M12x1
.945 [24.0]
1/4NPT

**03**

ø1.496 [38.0]
4.264 [108.3]
M12x1
.945 [24.0]
1/4NPT

**04**

ø1.496 [38.0]
4.264 [108.3]
M12x1
.945 [24.0]
G1/4

**05**

ø1.496 [38.0]
4.264 [108.3]
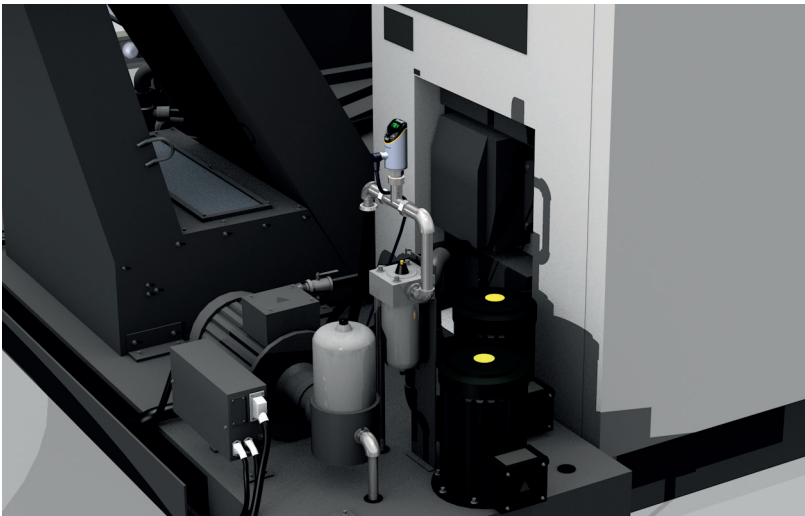M12x1
.945 [24.0]
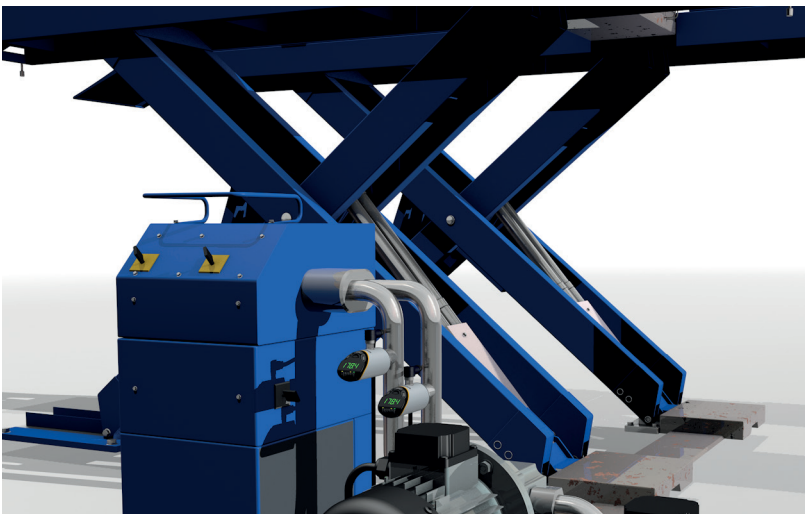7/16-20UNF

# Typical Applications



## Controlling hydraulic pressure

Pressure sensors monitor the hydraulic pressure in presses. If an overpressure occurs due to a forming defect, this is detected immediately and reported to the controller. The PS+ series of intuitively operable sensors not only features high overpressure resistance but can also withstand the vibrations in pressing plants. Eliminating the need for a fully potted design means that the pressure sensors are light and therefore have a low resonance mass. Another feature also helps to prevent failures: Users can read out minimum and maximum pressures via IO-Link.



## Monitoring the supply of cooling lubricant

To ensure minimum wear on machine tool equipment, the cooling lubricant supply pressure must be properly monitored. One of the challenges in this application is the heavy shock and vibrations potential that can impact the reliability of the pressure sensor. Turck has taken these kinds of stresses into account in the development of the PS+ series and offers the pressure sensors of the PS510 series with a fully welded metal measuring cell as well as an optional pressure peak aperture. The multi-color display provides optimum indication of any deviations from the set pressure value.



## Measuring process pressure on scissor lifts

Hydraulic scissor lifts for lifting and positioning heavy workpieces place demanding requirements on the pressure sensors of the hydraulic cylinders: Pressures of up to 400 bar can occur at the beginning of the lift. Turck's robust pressure sensors of the PS+ series come with a metal measuring cell (PS510), offering an overpressure resistance of up to seven times the nominal pressure. The sensors also offer protection from accidental operating errors. This is implemented with the locking mechanism and password function.

# Notes

# Notes

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