



# 1800 series

## Druck high performance level pressure sensors

The PDCR 1800 transducer (mV output) and the PTX 1800 transmitter (4 to 20 mA output) are the latest generation of fully submersible titanium high performance sensors for measurement of hydrostatic liquid levels.

### Features

- Ranges from 0.75 mH<sub>2</sub>O to 600 mH<sub>2</sub>O
- Accuracy  $\pm 0.10\%$  full scale (FS) best straight line (BSL)
- Fully welded 17.5 mm diameter titanium construction
- Polyurethane and hydrocarbon resistant cables
- Full range of installation accessories

### Applications

The 1800 Series incorporates many enhanced features gained from experience in supplying thousands of sensors for small and large scale installations worldwide. Example applications include:

- **Potable water**  
From ground water borehole to surface water level measurements in rivers, canals and reservoirs.
- **Waste water and remediation**  
Monitoring of secondary and outflow sewage levels and contaminated ground water levels in land fill sites.
- **Tank level**  
From land based liquid storage vessels to on-board ship ballast tank monitoring.
- **Sea water**  
Marine environmental applications, including tide gauging, coastal flood protection and wave profiling, amongst others.

## Reliability and data quality

The combination of a high technology sensor, together with advanced signal conditioning and packaging techniques, provides an ideal long term solution for reliable, accurate and economical level measurements. The micromachined silicon element is sealed within an all-titanium pressure module assembly, fully isolated from the pressure media. This is contained in a slimline, welded titanium body, terminated in an injection moulded cable assembly. The cable features a Kevlar® strain cord and is IP68 rated for indefinite immersion in 700 mH<sub>2</sub>O, with a selection of cable materials to meet the application.

## Ease of use

A simple datum marked cable system is provided for ease of installation. 1 m datum points are clearly marked for quick and accurate cable alignment below ground level. In addition, a full range of related accessories simplifies installation, operation and maintenance, including:

- Quick-release cable clamp assembly
- Slimline and short profile sink weights
- Moistureproof Sensor Termination Enclosure
- In-situ pressure test/calibration adapters

## 1800 series specifications

### Pressure measurement

#### Operating pressure ranges

##### PDCR 1800 (mV)

0.75, 1.5 mH<sub>2</sub>O gauge, 3.5, 7, 10, 15, 20, 35, 50, 70, 100, 150, 200, 350, 600 mH<sub>2</sub>O gauge and absolute  
Other units may be specified

##### PTX 1800 (mA)

Any zero based FS from 0.75 to 600 mH<sub>2</sub>O gauge and 3.5 to 600 mH<sub>2</sub>O absolute.

Other units may be specified, such as ftH<sub>2</sub>O, inH<sub>2</sub>O, bar, mbar, kPa, kg/cm<sup>2</sup>, psi

#### Overpressure

The operating FS pressure range may be exceeded by the following multiples with negligible effect on calibration:

- 8 x for ranges up to 1.5 mH<sub>2</sub>O
- 6 x for ranges above 1.5 to 3.5 mH<sub>2</sub>O
- 4 x for ranges above 3.5 mH<sub>2</sub>O (1400 mH<sub>2</sub>O max.)



### Pressure containment

- 10 x for ranges up to 3.5 mH<sub>2</sub>O gauge
- 6 x for ranges above 3.5 mH<sub>2</sub>O gauge (1400 mH<sub>2</sub>O maximum)
- 200 bar for absolute ranges

### Media compatibility

Fluids compatible with titanium (body), acetyl (nose cone) and polyurethane or Hytrel® 6108 (cable assembly)

# 1800 series specifications

## Excitation voltage

### PDCR 1800 (mV)

10 V at 5 mA nominal

Output is ratiometric to supply within 2.5 V to 12 V limits.

### PTX 1800 (mA)

9 to 30 V

The minimum supply voltage ( $V_{MIN}$ ) which must appear across the pressure transmitter terminals is 9 V and is given by the following equation:

$$V_{MIN} = V_{SUP} - (0.02 \times R_{LOOP})$$

Where  $V_{SUP}$  is supply voltage in Volts, and  $R_{LOOP}$  is total loop resistance in Ohms

## Pulse power excitation

Recommended power-on time before output sample:

- PDCR 1800: 10 ms
- PTX 1800: 30 ms

## Output signal

### PDCR 1800

- 25 mV for 0.75 mH2O range
- 50 mV for 1.5 and 3.5 mH2O ranges
- 100 mV for ranges 7 mH2O and above

### PTX 1800

4 to 20 mA, proportional for zero to FS pressure

## Common mode voltage

### PDCR 1800

Typically +3.5 V to +9 V with respect to the negative supply

## Output impedance

### PDCR 1800

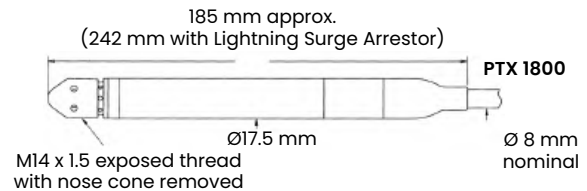
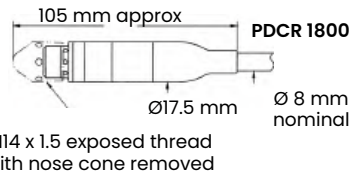
2 k $\Omega$  nominal

# Performance specification

## Accuracy

Combined effects of non-linearity, hysteresis and repeatability:

- **Standard:**  $\pm 0.1\%$  FS BSL maximum
- **Option D:**  $\pm 0.06\%$  FS BSL maximum ( $\pm 0.08\%$  FS BSL max. for 1 mH2O and below)



Installation Drawing

## Electrical connections

### PDCR 1800 – Polyurethane cable

### PDCR 1800 – Hytrel® 6108 cable

Red: Supply positive  
White: Supply negative  
Yellow: Output positive  
Blue: Output negative  
Screen wire connected to case  
(IS version: screen not connected)  
Remaining cores not connected

### PTX 1800 – Polyurethane cable

### PTX 1800 – Hytrel 6108 cable

Red: Supply positive  
Blue: Supply negative  
Screen wire connected to case  
(IS version: screen not connected)  
Remaining cores not connected

## Zero offset and span setting

### PDCR 1800

- **Typical:**  $\pm 1.5$  mV
- **Maximum:**  $\pm 3$  mV

### PTX 1800

- **Maximum:**  $\pm 0.04$  mA

## Long-term stability

$\pm 0.1\%$  FS per annum

## Operating temperature range

$-20$  to  $60^{\circ}\text{C}$  ( $-4$  to  $140^{\circ}\text{F}$ )

## Compensated temperature range

$-2$  to  $30^{\circ}\text{C}$  ( $28$  to  $86^{\circ}\text{F}$ )

## Temperature effects

- $\pm 0.3\%$  FS Temperature Error Band (TEB) for 3.5 mH2O range and above
- $\pm 0.6\%$  FS TEB for ranges below 3.5 mH2O

## Shock and vibration

MIL-STD-810E, method 514.4

Category 10 min. Figure 514.4-16

Product will withstand 20 g peak shock half sine wave  
9 ms duration in all axes, also 2000 g peak shock  
0.5 ms duration in all axes

## Insulation

Standard:  $>100$  M $\Omega$  at 500 Vdc

Intrinsically Safe Version:  $<5$  mA at 500 Vac

# 1800 series specifications

## Intrinsic safety (Option B)

**PDCR 1800: ATEX Certified** (BAS02ATEX1250X) for use with IS barrier systems to EEx ia IIC T4 ( $-40^{\circ}\text{C} \leq T_a \leq 80^{\circ}\text{C}$ ) for cable lengths up to 29 metres

**PTX 1800: ATEX and IECEx Certified** (BAS01ATEX1018X and IECEx BAS10.0077X) for use with IS barrier systems to Ex ia I Ma ( $40^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$ ) and Ex ia IIC T4 Ga ( $-40^{\circ}\text{C} \leq T_a \leq +80^{\circ}\text{C}$ ) for cable lengths up to 300 metres

**Lightning Surge Arrestor** (PTX versions only):  
Integral lightning protection assembly certified to Standard IEC 61000-4-5 (Level 4)

## Physical specification

### Pressure connection (Option C)

**Standard:** Radial holed M14 x 1.5 mm male thread fitted with protective acetyl nose cone

**Option C:** Screw on welded male pressure connection

Available (PTX 1800 only):  
G1/4 Male flat end  
G1/4B (flat end) 6mm hole  
1/4 NPT Male  
M12 x 1 Male  
1/8-27 NPT Female  
M14 x 1.5 60° Int Cone

### Electrical connection

1830: Vented polyurethane cable with integral Kevlar® strain relief cord rated to 54 kg load. Water ingress protection IP68 to 700 mH<sub>2</sub>O

1840: Vented Hytrel® 6108 cable (hydrocarbon resistant) with integral Kevlar® strain relief cord rated to 54 kg load. Water ingress protection IP68 to 700 mH<sub>2</sub>O

### Cable lengths

To be specified as required in 1 meter increments up to 500 meters (for IS restrictions see Intrinsic Safety above). For longer lengths refer to Druck.

### CE marking

CE marked for electromagnetic compatibility and, for ATEX version only, use in potentially explosive atmospheres

### Documentation

Detailed user instructions are provided with specific calibration data. They are supplied in English, French, German, Italian, Spanish or Portuguese.

**Language selected on order**

## Accessories

A full range of accessories is available to enhance installation, operation and maintenance of the 1800 Series as listed below:

- STE moisture proof sensor termination enclosure (202-034-05)
- Slimline sink weight Ø17.5 mm (DA2608-1-01)
- Short sink weight Ø25 mm (DA4068-1-01)
- Cable clamp system (192-373-01)
- 360° Rotatable calibration adapter to:  
G1/8 (DA4112-1-01) or 1/8 NPT (DA4112-2-01)
- Economical direct calibration adapter to:  
G1/8 (DA2537-1-01)
- Accessory pack contains (S01830E) STE box, Slimline sink weight, cable clamp, direct calibration adapter

## Options

### (B) Intrinsically Safe Version

**(C) Alternative Pressure Connection (PTX 1800 only)** In place of the standard acetyl nose cone, a welded male pressure connection can be supplied

### (D) Improved Accuracy

## Ordering information

Please state the following:

(1) Select model number

| Code    | Model       |                   |                                 |
|---------|-------------|-------------------|---------------------------------|
| PDCR 18 | mV output   |                   |                                 |
| PTX 18  | mA output   |                   |                                 |
|         | <b>Code</b> | <b>Cable type</b> |                                 |
|         | 3           | Polyurethane      |                                 |
|         | 4           | Hytrel® 6108      |                                 |
|         |             | <b>Code</b>       | <b>Lightning Surge Arrestor</b> |
|         |             | 0                 | Not Required                    |
|         |             | 5                 | Fitted                          |
|         |             |                   |                                 |

- (2) Pressure range and scale units  
(3) Options (if required)  
(4) Cable length required  
(5) Accessories (order as separate items)  
(6) Supporting Services (order as separate items)

## Supporting services

Our highly trained staff can support you, no matter where you are in the world. We can provide training, nationally accredited calibration – both initially and at periodic intervals – extended warranty terms and even rental of portable or laboratory calibrators. Further details can be found at [druck.com](http://druck.com)