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 mH2O to 600 mH2O
- Accuracy ±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 mH2O, 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 mH2O gauge, 3.5, 7, 10, 15, 20, 35, 50, 70, 100, 150, 200, 350, 600 mH2O gauge and absolute
  Other units may be specified

PTX 1800 (mA)

- Any zero based FS from 0.75 to 600 mH2O gauge and 3.5 to 600 mH2O absolute.
- Other units may be specified, such as ftH2O, inH2O, bar, mbar, kPa, kg/cm2, 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 mH2O
- 6 x for ranges above 1.5 to 3.5 mH2O
- 4 x for ranges above 3.5 mH2O (1400 mH2O max.)

Pressure containment

- 10 x for ranges up to 3.5 mH2O gauge
- 6 x for ranges above 3.5 mH2O gauge (1400 mH2O maximum)
- 200 bar for absolute ranges

Media compatibility

- Fluids compatible with titanium (body), acetyl (nose cone) and polyurethane or Hytrel® 6108 (cable assembly)
- Not suitable for media that has an oxygen concentration >21% or other strong oxidizing agents. This product contains materials or fluids that may degrade or combust in the presence of strong oxidizing agents

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 (VMIN) which must appear across the pressure transmitter terminals is 9 V and is given by the following equation:

VMIN = VSUP - (0.02 x RLOOP)

Where VSUP is supply voltage in Volts, and RLOOP 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

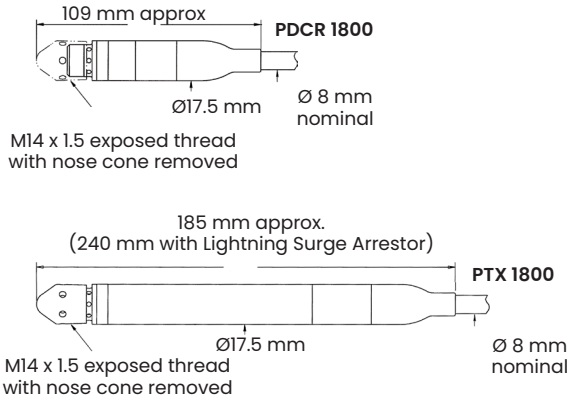
2 kΩ nominal

Performance specification

Accuracy

Combined effects of non-linearity, hysteresis and repeatability:

- Standard: ±0.1% FS BSL maximum
- Option D: ±0.06% FS BSL maximum
  (±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: ±1.5 mV
- Maximum: ±3 mV

PTX 1800

- Maximum: ±0.04 mA

Long-term stability

±0.1% FS per annum

Operating temperature range

-20 to 60°C (-4 to 140°F)

Compensated temperature range

-2 to 30°C (28 to 86°F)

Temperature effects

- ±0.3% FS Temperature Error Band (TEB) for 3.5 mH2O range and above
- ±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 MΩ at 500 Vdc
- Intrinsically Safe Version: <5 mA at 500 Vac

1800 series specifications

Intrinsic safety (Option B)

PDCR 1800: ATEX, IECEx and UKEX Certified

(BAS02ATEX1250X, IECEx BAS 15.0076X and BAS21UKEX0410X) for use with IS barrier systems to Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ 80°C) for cable lengths up to 100 metres

PTX 1800: ATEX, IECEx, and UKEX Certified:

(BAS01ATEX1018X, IECEx BAS10.0077X and BAS21UKEX0408X) for use with IS barrier systems to Ex ia I Ma (40°C ≤ Ta ≤ +80°C) and Ex ia IIC T4 Ga (-40°C ≤ Ta ≤ +80°C) for cable lengths up to 260 metres

Intrinsic safety (Option B1)

PDCR 1800: FM Certified

FM US Intrinsically safe.

Class I, II & III Division 1, groups A, B, C, D, E, F & G

Class I, zone 0, AEx ia Group IIC T4 (-40°C ≤ Ta ≤ +80°C)

Per certificate FM24US0231X

PTX 1800: FM Certified

FM US Intrinsically safe.

Class I, II & III Division 1, groups A, B, C, D, E, F & G

Class I, zone 0, AEx ia Group IIC T4 (-40°C ≤ Ta ≤ +80°C)

Per certificate FM24US0231X

Physical specification

Lightning Surge Arrestor (Option for PTX versions only):

Integral lightning protection assembly certified to Standard IEC 61000-4-5 (Level 4)

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 pressure connection

Available (PTX 1800 all ranges, and PDCR1800 for ranges ≥10 mH2O):
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 mH2O

1840: Vented Hytrel® 6108 cable (hydrocarbon resistant) with integral Kevlar® strain relief cord rated to 54 kg load. Water ingress protection IP68 to 700 mH2O

Cable lengths

To be specified as required in 1 meter increments up to 500 meters for PTX 1800 and up to 100 meters for PDCR 1800 (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

(B1) FM US 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

Code	Cable type
3	Polyurethane
4	Hytrel® 6108

Code	Lightning Surge Arrestor
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

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