

Part 1 - General

1.1 Section includes:

Pressure probe with a ceramic, capacitive, relative pressure measuring cell and shielded pressure probe cable with pressure compensation capillary and Kevlar core for length stabilization. Pre-fabricated cable end with transport protection against moisture.

1.2 Measurement Procedures

The pressure probe uses the hydrostatic pressure of the water column above a relative pressure measuring cell to do so. A pressure compensation capillary in the pressure probe cable gives the measuring cell the current ambient air pressure as a reference. Erroneous measurement results due to atmospheric air pressure fluctuations are thus eliminated.

1.3 Alternates

- Staff Level Gauges (manual read)
- Contact Gauges (manual read)
- Float-operated shaft encoder level sensor
- Non-contact radar level sensor
- Bubbler sensor

1.4 System Description

Performance Requirements

Water Level

Measurement ranges:

- 0 ... 4 m water column (0 ... 0.4 bar)
- 0 ... 10 m water column (0 ... 1 bar)
- 0 ... 20 m water column (0 ... 2 bar)
- 0 ... 40 m water column (0 ... 4 bar)
- 0 ... 100 m water column (0 ... 10 bar)

Resolution (SDI-12 interface)

0.001 m; 0.1 cm; 0.01 ft; 0.1 mbar; 0.001 psi

Accuracy (linearity + hysteresis)

- SDI-12: $\leq \pm 0.05\%$ of full scale
- 4... 20 mA: $\leq \pm 0.1\%$ of full scale

Long-term stability (linearity + hysteresis)

$\pm 0.1\%$ FS/a

Zero-point drift

$\leq \pm 0.1\%$ of full scale

Units

m, cm, ft, mbar, psi

Overload protection for the measuring cell (without permanent mechanical damage)

0 ... 0.4 bar 4 bar

0 ... 1 bar 10 bar

0 ... 2 bar 15 bar

0 ... 4 bar 25 bar

0 ... 10 bar 40 bar

Pressure sensor

ceramic, capacitive; temperature compensated

Temperature-compensated operating range

-5 °C ... +45 °C

Temperature

Measuring range

-25 °C ... +70 °C

Resolution

0.1 °C

Accuracy

± 0.5 °C

Units

°C, °F

Temperature sensor

NTC

Supply voltage

+9,6 ... +28 V DC, typically 12/24 V DC

Current consumption

SDI-12 sleep mode < 600 µA

SDI-12 active mode < 3.6 mA

Interfaces

SDI-12 version 1.3

RS-485 (SDI-12 protocol)

4 ... 20 mA; 2-wire (scaleable)

Reaction times

Boot time 5,000 ms

Measuring time <2,000 ms

1.5 Certifications

Performance classification in accordance with DIN EN ISO 4373

Measurement reliability Performance class 1

Temperature range Temperature class 1

Relative humidity Class 1

EMC limits

complies with EN 61326-1:2013

CE compliant

1.6 Environmental Requirements

Operational Criteria

Storage temperature

-40 °C ... +85 °C

Type of protection

IP 68

Pressure probe housing

POM, stainless steel 1.4539 (904 L), resistant to sea water

1.7 Warranty

The product includes a one-year warranty from the date of shipment (EU: 2 years)

1.8 Maintenance Service

Carrying out maintenance work

- Even a thin build-up of deposits on the measuring cell will not appreciably affect the measurement results.
- If very heavy contamination occurs at the station due to algae, mud, vegetation or sediment, the pressure probe should be checked from time to time.
- Replacement of desiccant if saturated

Scheduled Maintenance

Depending on site conditions semi-annually to annually

Replacement of desiccant if saturated

Part 2 - Products

2.1 Manufacturer

OTT Hydromet GmbH

2.2 Manufactured Unit

OTT PLS Pressure probe with a ceramic, capacitive, relative pressure measuring cell and shielded pressure probe cable with pressure compensation capillary and Kevlar core for length stabilization. Pre-fabricated cable end with transport protection against moisture.

2.3 Equipment

Pressure probe

- Pressure probe with a ceramic, capacitive, relative pressure measuring cell and shielded pressure probe cable with pressure compensation capillary and Kevlar core for length stabilization. Pre-fabricated cable end with transport protection against

moisture.

- Relative pressure probe with air capillary used to compensate for changes in barometric pressure
- Compared with piezo-resistive standard measuring cells using sensitive metallic membranes, this ceramic measuring cell provides significant benefits because of its high accuracy, ruggedness, and long-term stability
- Built-in microcontroller – compensates for temperature effects and takes into account specific correction values, e.g. gravitational acceleration or water density
- Robust probe lead with Kevlar core for length stabilization and internal compensating capillary
- Rugged design: waterproof molded electronics (IP68 rated) and enclosure made of high-quality saltwater resistant steel
- Optimized resolution is achieved by assigning the 4 ... 20 mA to that part of the measuring range that is actually required
- Water temperature output in addition to water level (for SDI-12 output)

2.4 Components

Standard Equipment

OTT PLS

Set of operating instructions

Factory acceptance test certificate (FAT)

Dimensions: Pressure probe L x Ø 195 mm x 22 mm

Shipping weight:

Pressure probe approx. 0.3 kg

Cable approx. 0.08 kg/m

2.5 Instrument Options

Must be selected at the time of order. Choose one or the other.

Interface

Version with 4 ... 20 mA interface

Version with SDI-12 interface

Version with RS-485 interface (SDI-12 protocol)

Measuring Range

0 ... 13.1 ft; 0 ... 4 m water column (0 ... 0.4 bar)

0 ... 32.8 ft; 0 ... 10 m water column (0 ... 1 bar)

0 ... 65.6 ft; 0 ... 20 m water column (0 ... 2 bar)

0 ... 131.2 ft; 0 ... 40 m water column (0 ... 4 bar)

0 ... 328.1 ft; 0 ... 100 m water column (0 ... 10 bar)

Cable Length:

... m

Humidity Absorber / Desiccant:

OTT FAD 4PF (desiccant cartridge in clear container with connection tube for pressure compensation capillary)

OTT FAD 5 (connecting box (pressure probe cable <-> connection cable datalogger/voltage supply) with desiccant cartridge)

Without desiccant

Units preset

Metric

Imperial

2.6 Optional Accessories

Select as many as required .

Straight cable suspension

Data line LIYY 2 x 2 x 0.75 mm² ... m ea.

Data line shielded LIYCY 2 x 2 x 0.5 mm²... m ea.

OTT FAD 4PF (desiccant cartridge in clear container with connection tube for pressure compensation capillary)

OTT FAD 5 (connecting box (pressure probe cable <-> connection cable datalogger/voltage supply) with desiccant cartridge)

Part 3 - Execution

3.1 Preparation

3.2 Installation

Mounting

Fixing the pressure probe into a protective device

Hanging pressure probe

Connecting humidity absorbing system

A humidity absorbing system must be installed for drying the surrounding air that enters the pressure compensation capillary of the pressure probe cable!

Connecting the OTT PLS to any datalogger using an SDI-12 interface

Connect the OTT PLS to an SDI-12 input of the datalogger. Follow the datalogger handbook when doing this.

The maximum length of the cable is 100 m.

Connecting the OTT PLS to any datalogger using a 4 ... 20 mA interface

Connect the OTT PLS to a 4 ... 20 mA input of the datalogger. Follow the datalogger handbook when doing this.

Maximum cable length: dependent on the level of the supply voltage and size of the burden (load resistor). Ensure that the ohmic resistance of the pressure probe cable together with any burden present does not exceed the maximum permitted load resistance.

The upper limit for the cable length is 1,000 m in all cases.

Connecting the OTT PLS to any datalogger using an RS-485 interface

The RS-485 interface is designed and tested for use with OTT & Sutron dataloggers. In this case, the transmission protocol via the physical RS-485 interface is the SDI-12 protocol.

The upper limit for the cable length is 1,000 m

3.3 Manufacturer's Service and Start-Up