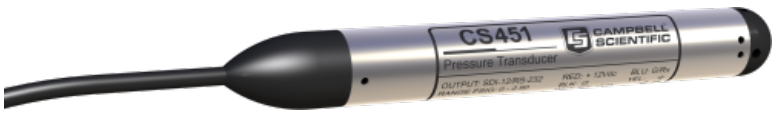
CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

CS451

Stainless-Steel Pressure Transducer



Stainless Steel

Ideal for long-term deployment in harsh conditions

Overview

The CS451 is a pressure transducer with a a stainless-steel case. It is used for water-level measurements and can be submerged in most canals, wells, ponds, lakes, and streams. The CS451 outputs either a digital SDI-12 or RS-232 signal to indicate observed pressure and temperature. This output can be read by many of our data loggers.

The CS451 replaces the CS450 transducer. The new transducers have a smaller gap between the water ports and the diaphragm so that less air is trapped that the user must remove during deployment. Trapped air causes the transducer's readings to drift as the air slowly dissolves into the water.

Benefits and Features

- Quality construction to ensure product reliability
- Rugged stainless-steel case protecting the piezoresistive sensor
- Compatible with most Campbell Scientific data loggers
- Fully temperature-compensated
- Low-power sleep state between measurements to reduce power consumption
- Optional weighted nose cone to facilitate submersion
- Optional NPT nose cone to enable usage in closed-pipe applications
- Quick shipment after receipt of order (ARO)

Detailed Description

The CS451 consists of a piezoresistive sensor and a temperature sensor housed in a 316L stainless-steel case. It has a rugged Hytrel cable that remains flexible, even under harsh environmental conditions. The cable incorporates a vent tube to compensate for atmospheric pressure fluctuations. The vent tube terminates inside a desiccant tube, which prevents water vapor from entering the inner cavity of the transducer.

The CS451 has several pressure range options and two accuracy options (see Ordering Info). The standard accuracy option provides ±0.1% FS TEB over the 0° to 60°C temperature range. The high accuracy option provides ±0.05% FS TEB over the 0° to 60°C temperature range and includes a calibration certificate. TEB is the combined errors due to nonlinearity, hysteresis, non-repeatability, and thermal effects over the compensated temperature range, per ISA S51.1. Please note

that the high accuracy option is not available for the 0 to 2.9 psig range option.

Campbell Scientific offers the A150 Desiccated Case that allows the CS451 to be connected to a prewired enclosure (see Ordering Information).

Specifications

Measurement Time	< 1.5 s
Output Options	SDI-12 (version 1.3) 1200 bps; RS-232 9600 bps
Water-Level Resolution	0.0035% FS
Worst-Case Temperature Resolution	0.006°C
Dry Storage Temperature Range	-40° to +100°C WARNING: Sensor could be damaged if encased in frozen ice.
Operating Temperature Range	0° to 60°C WARNING: Sensor could be damaged if encased in frozen ice.
Temperature Accuracy	±0.2°C
Overpressure	2 x pressure range
Power Requirements	6 to 18 Vdc
Cable Type	Hytrel Jacket, five conductor, 26 AWG
NPT Fitting	1/4-in. NPS
Top Cone Material	Delrin
Body Material	316L stainless steel
Element Material	316L stainless steel
Distance	❱ 2.3 cm (0.9 in.) Distance from black line etched on housing to end of standard nose cone ❱ 2.54 cm (1 in.) Distance from black line etched on housing to end of NPT fitting ❱ 9.9 cm (3.9 in.) Distance from black line etched on housing to end of weighted nose cone
Ingress Protection	Exceeds IP68
Diameter	21.34 mm (0.84 in.)
Cable Outer Diameter	❱ 0.589 cm (0.232 in.) nominal ❱ 0.599 cm (0.236 in.) maximum
Length	213.36 mm (6.875 in.)
Cable Weight	0.0421 kg/m (0.0283 lb/ft)
Weight	0.17 kg (0.37 lb) without cable

Air Gap

Standard & Weighted Nose Cone	0.653 cm (0.257 in.)
NPT Fitting	2.72 cm (1.07 in.)

Power Consumption

Quiescent	< 50 µA
Measurement/ Communication	8 mA (1 s measurement)
Maximum	40 mA

Measurement Ranges at Fresh Water Depths

0 to 2.0 m (6.7 ft)	❱ 0 to 2.9 psig The high accuracy (±0.05% FS) option is not available for the 0 to 2.9 psig range option. ❱ 0 to 20 kPa The high accuracy (±0.05% FS) option is not available for the 0 to 2.9 psig range option.
0 to 5.1 m (16.7 ft)	❱ 0 to 7.25 psig ❱ 0 to 50 kPa
0 to 10.2 m (33.4 ft)	❱ 0 to 14.5 psig ❱ 0 to 100 kPa
0 to 20.4 m (67 ft)	❱ 0 to 200 kPa ❱ 0 to 29 psig
0 to 50.9 m (167 ft)	❱ 0 to 500 kPa ❱ 0 to 72.5 psig
0 to 102 m (334.5 ft)	❱ 0 to 1000 kPa ❱ 0 to 145 psig

Accuracy

Standard Accuracy Option	±0.1% full-scale-range TEB Total Error Band (TEB) includes the combined errors due to nonlinearity, hysteresis, nonrepeatability, and thermal effects over the compensated temperature range, per ISA S51.1.
High Accuracy Option	±0.05% full-scale-range TEB The high accuracy (±0.05% full-scale range) option is not available for the 0 to 2.9 psig range option. Total Error Band (TEB) includes the

combined errors due to nonlinearity, hysteresis, nonrepeatability, and thermal effects over the compensated temperature range, per ISA S51.1.

Maximum Cable Length

SDI-12	60 m (200 ft) 10 sensors connected to a single port ~457 m (1500 ft) 1 sensor connected to a single port
RS-232	60 m (200 ft)

For comprehensive details, visit: www.campbellsci.com/cs451

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