Overview

The CS451 is a pressure transducer with 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 ensures product reliability
- Rugged stainless-steel case protects piezoresistive sensor
- Compatible with most Campbell Scientific data loggers
- Fully temperature-compensated
- Low-power sleep state between measurements reduces power consumption
- Optional weighted nose cone facilitates submersion
- NPT fitting allows it to be used in closed-pipe applications
- Quick shipment after receipt of order (ARO)

Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measurement Time</td>
<td>&lt; 1.5 s</td>
</tr>
<tr>
<td>Output Options</td>
<td>SDI-12 (version 1.3) 1200 bps; RS-232 9600 bps</td>
</tr>
<tr>
<td>Water-Level Resolution</td>
<td>0.0035% FS</td>
</tr>
<tr>
<td>Worst-Case Temperature Resolution</td>
<td>0.006°C</td>
</tr>
<tr>
<td>Dry Storage Temperature Range</td>
<td>-10° to +80°C</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>0° to 60°C</td>
</tr>
<tr>
<td>Temperature Accuracy</td>
<td>±0.2°C</td>
</tr>
<tr>
<td>Overpressure</td>
<td>2 x pressure range</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>6 to 18 Vdc</td>
</tr>
<tr>
<td>Cable Type</td>
<td>Hytrel Jacket, five conductor, 26 AWG</td>
</tr>
</tbody>
</table>

WARNING: Sensor could be damaged if encased in frozen ice.

For comprehensive details, visit: [www.campbellsci.com/cs451](http://www.campbellsci.com/cs451)
### NPT Fitting

- **NPT Fitting**: 1/4-in. NPS

### Top Cone Material
- **Material**: Delrin

### Body Material
- **Material**: 316L stainless steel

### Element Material
- **Material**: 316L stainless steel

### Distance
- **Distance from black line etched on housing to end of standard nose cone**: 2.3 cm (0.9 in.)
- **Distance from black line etched on housing to end of weighted nose cone**: 9.9 cm (3.9 in.)
- **Distance from black line etched on housing to end of NPT fitting**: 2.54 cm (1 in.)

### Diameter
- **Diameter**: 21.34 mm (0.84 in.)

### Cable Outer Diameter
- **Cable Outer Diameter**: 0.589 cm (0.232 in.) nominal
- **Cable Outer Diameter**: 0.599 cm (0.236 in.) maximum

### Length
- **Length**: 213.36 mm (6.88 in.)

### Cable Weight
- **Cable Weight**: 0.0421 kg/m (0.0283 lb/ft)

### Weight
- **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
- **Current**: < 50 µA

#### Measurement/Communication
- **Current**: 8 mA (1 s measurement)

#### Maximum
- **Current**: 40 mA

### Measurement Ranges at Fresh Water Depths

<table>
<thead>
<tr>
<th>Distance</th>
<th>Pressure</th>
<th>Accuracy Option</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 2.0 m (6.7 ft)</td>
<td>0 to 2.9 psig</td>
<td>±0.1% full-scale-range TEB</td>
</tr>
<tr>
<td></td>
<td></td>
<td>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.</td>
</tr>
<tr>
<td>0 to 5.1 m (16.7 ft)</td>
<td>0 to 7.25 psig</td>
<td>±0.05% full-scale-range TEB</td>
</tr>
<tr>
<td>0 to 10.2 m (33.4 ft)</td>
<td>0 to 14.5 psig</td>
<td>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.</td>
</tr>
<tr>
<td>0 to 20.4 m (67 ft)</td>
<td>0 to 200 kPa</td>
<td>±0.05% full-scale-range TEB</td>
</tr>
<tr>
<td>0 to 50.9 m (167 ft)</td>
<td>0 to 500 kPa</td>
<td>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.</td>
</tr>
<tr>
<td>0 to 102 m (334.5 ft)</td>
<td>0 to 1000 kPa</td>
<td>±0.05% full-scale-range TEB</td>
</tr>
<tr>
<td>0 to 20.4 m (67 ft)</td>
<td>0 to 200 kPa</td>
<td>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.</td>
</tr>
</tbody>
</table>

### Accuracy

**Standard Accuracy Option**
- **Accuracy**: ±0.1% full-scale-range TEB
- **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**
- **Accuracy**: ±0.05% full-scale-range TEB
- **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.

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