



## CS470 and CS471

Bubble Water Level Sensors

# Consistent Accuracy

## Drift-free measurements and offset compensation



### Overview

The CS470 and CS471 use the air bubble principle for measuring liquid level. Generally, they measure ground or surface water level, but any liquid level can be measured.

A Campbell Scientific datalogger controls the sensor's pump and calculates the measurements. The sensor can communicate via SDI-12, 4 - 20 mA, or RS-485 (SDI-12 protocol via a physical RS-485 interface).

SDI-12 is the preferred protocol when using Campbell Scientific dataloggers. Many of our dataloggers support SDI-12.

The CS470 and CS471 differ in their accuracy. The CS470 is the standard accuracy version and the CS471 is the high-accuracy version (see specifications for more information).

### Benefits and Features

- › Ideal for areas where submersed sensors can be damaged due to corrosion, contamination, flood-related debris, lightning, or vandalism
- › Easy to maintain
- › Robust pump design provides reliable operation
- › Compatible with most Campbell Scientific dataloggers
- › Consistent accuracy ensured by drift-free measurements and offset compensation using relative measurement
- › Purge function clears the measuring tube and the bubble chamber of contamination
- › Does not use pressurized nitrogen tank, which requires less frequent attendance
- › Existing tubes can be used

More info: 435.227.9120

[www.campbellsci.com/cs470](http://www.campbellsci.com/cs470)



## Technical Details

### Air Bubble Principle

The bubble sensor contains a piston pump that compresses air. The compressed air flows through a measuring tube into the water being measured. The pressure created in the measuring tube is directly proportional to the water column above a bubble chamber. The sensor measures both barometric pressure and bubble pressure, one after the other. The height of the water above the bubble chamber is then calculated by taking the difference between the barometric and bubble pressure measurements.

### System Components

To use a CS470 or CS471, the acquisition system must include the measuring tube, a bubble chamber, power supply, datalogger, and datalogger-connection cable. Campbell Scientific offers the measuring tube, bubble chamber, and cable as Common Accessories (see Ordering Information). The bubble sensor, datalogger, and power supply must be housed in a desiccated environment, typically a Campbell Scientific enclosure. Hardware for mounting the bubble sensor to an enclosure backplate is shipped with the sensor.

## Ordering Information

### Bubble Water Level Sensors

**CS470** OTT CBS Compact Bubble Sensor, Standard Accuracy

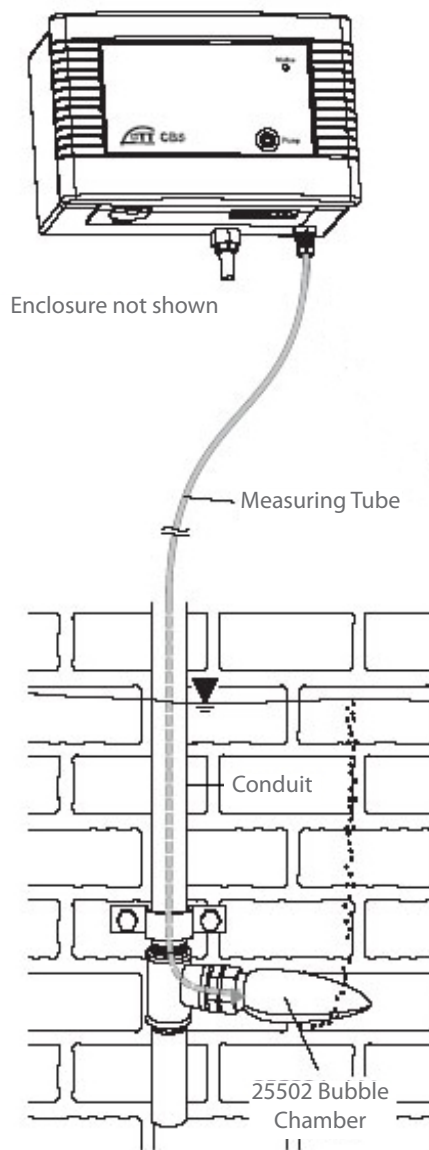
**CS471** OTT CBS Compact Bubble Sensor, High Accuracy

### Common Accessories

**CABLE4CBL-L** 4-conductor, 24-AWG cable that connects the CS470 or CS471 with a datalogger. Enter the lead length, in feet, after the -L.

**25503** Measuring Tube; specify length, in feet, when ordering. Maximum tubing length is 330 feet.

**25502** OTT EPS-50 Bubble Chamber (required)



## Specifications

- › Resolution: 0.0009 m (0.003 ft) or 0.014 psi
- › Power Requirements: 10 to 30 Vdc
- › Measurement Time: 1 minute
- › Outputs: SDI-12 (version 1.3) 1200 bps, 4-20 mA, RS-484 (SDI-12 protocol via RS-485 interface)
- › Measurement Range: 0 to 15.2 m (0 to 50 ft)
- › Operating Temperature Range: -20° to 60°C
- › Storage Temperature Range: -40° to 85°C
- › Relative Humidity Range: 10% to 95% RH, non-condensing
- › Maximum Tube Length: 100.6 m (330 ft)
- › Electronics Box Dimensions: 16.5 x 20.5 x 11.5 cm (6.5 x 8.1 x 4.5 in)
- › Weight: 1.5 kg (3.3 lb)

### Accuracy

- › CS470:  $\pm 0.006$  m ( $\pm 0.02$  ft)
- › CS471

0 to 4.6 m (0 to 15 ft)	4.6 to 10.7 m (15 to 35 ft)	10.7 to 15.2 m (35 to 50 ft)
$\pm 0.003$ m (0.01 ft)	$\pm 0.065\%$ of reading	$\pm 0.006$ m (0.02 ft)

### Measurement/Communication Current (typical)

- › 1-minute Query Interval: 320 mAh/day
- › 15-minute Query Interval: 25 mAh/day



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