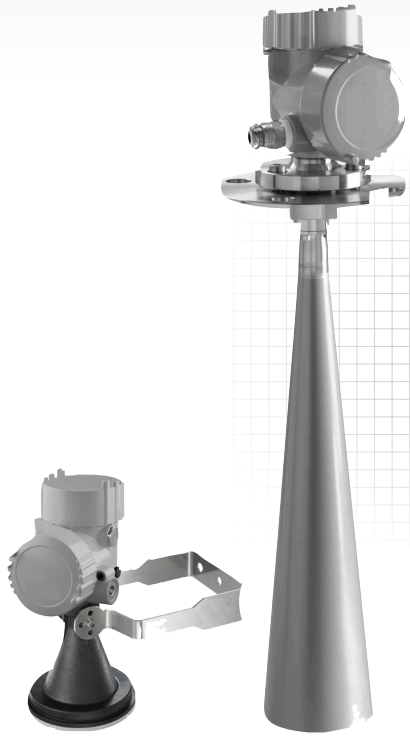
CAMPBELL SCIENTIFIC
WHEN MEASUREMENTS MATTER

CS475, CS476, CS477

Radar Water-Level Sensors



Non-Contact Water Level Monitoring

FCC approved for outdoor use

Overview

The CS475, CS476, and CS477 are radar ranging sensors typically used for water-level applications. They emit short microwave pulses and then measure the elapsed time between the emission and return of the pulses. The elapsed time measurement is used to calculate the distance between the sensor and the target (e.g., water, grain, slurry). The distance value can then be used to determine depth.

The sensors differ in their measurement range and accuracy. The CS475 can measure distances up to 65 feet with an accuracy of ±0.2 inches; the CS476 can measure up to 98 feet with an accuracy of ±0.1 inches; and the CS477 can measure up to 230 feet with an accuracy of ±0.6 inches.

These radar sensors output a digital SDI-12 signal to indicate distance and stage. This output is acceptable for recording devices with SDI-12 capability including Campbell Scientific dataloggers.

Benefits and Features

- FCC compliant (FCC IC# MOIPULS 616263)
- Ideal for areas where submersed sensors can be damaged due to corrosion, contamination, flood-related debris, lightning, or vandalism
- Low maintenance—no moving parts significantly reduces maintenance cost and time
- Compatible with our CR200X-series, CR510, CR10X, CR800-series, CR1000, CR3000, and CR5000 dataloggers
- Low power consumption
- Rugged enough for harsh environments—NEMA rated 4X
- Wide operating temperature range (-40° to +80°C)
- Individual FCC license not required

Ordering Information

Radar Ranging Sensors

CS475-L Radar Water Level Sensor with 65-ft Maximum Distance. Enter cable length, in feet, after the -L. Must choose a cable termination option (see below).

CS476-L Radar Water Level Sensor with 98-ft Maximum Distance. Enter cable length, in feet, after the -L. Must choose a cable termination option (see below).

CS477-L Radar Water Level Sensor with 230-ft Maximum distance. Enter cable length, in feet, after the -L. Must choose a cable termination option (see below).

Cable Termination Options (choose one)

-PT Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.

-PW Cable terminates in connector for attachment to a prewired enclosure.

Enclosure Options for CS476 and CS477

-NE No Field Enclosure.

-FE Field enclosure that houses a CS476 or CS477 head. Typically the 27162 Enclosure Mounting Kit is also ordered (see Common Accessories).

Common Accessories

25619 Bubble level that helps align the radar sensor in a vertical position, which prevents measurement errors.

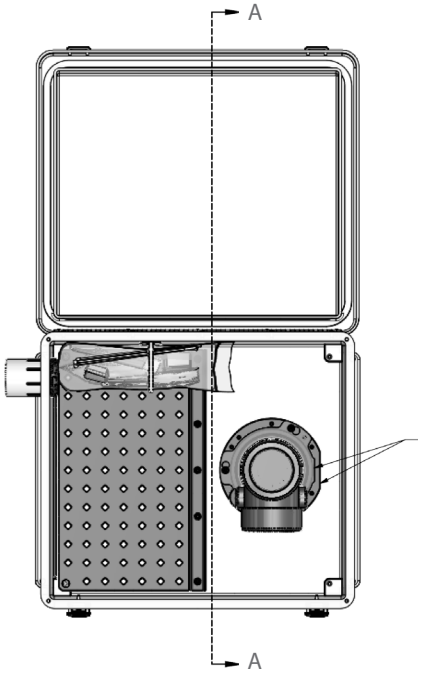
25616 Adjustment/Display Module used for changing settings, testing, and diagnostics. A cap is available for this display (see below).

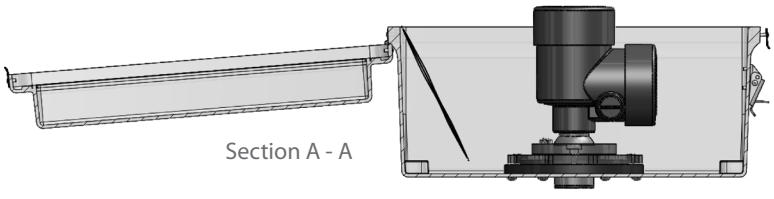
25654 Cap with window for use with the 25616 display.

27162 CS476 and CS477 Enclosure Mounting Kit.

Specifications

- Measurement Range (distance from horn to water surface):
  CS475: 50 mm to 20 m (2 in. to 65 ft)
  CS476: 50 mm to 30 m (2 in. to 98 ft)
  CS477: 400 mm to 70 m (16 in. to 229 ft)
- Accuracy:
  CS475 (50 cm to 20 m): ±5 mm (±0.2 in.)
  CS476 (50 cm to 30 m): ±3 mm (±0.1 in.)
  CS477 (50 cm to 70 m): ±15 mm (±0.6 in.)
- Resolution: 1 mm (0.0033 ft)
- Output Protocol: SDI-12
- Frequency: ~26 GHz
- Electromagnetic Compatibility: Emission to EN 61326; Electrical Equipment Class B
- Pulse Energy: 1 mW maximum
- Beam angle:
  CS475: 10°
  CS476, CS477: 8°
- Input Voltage: 9.6 to 16 Vdc
- Surge Protection: 1.5 KVA
- Typical Current Drain with 12 V power supply
  Sleeps: 4.7 mA
  Measurement: 14 mA
- Temperature Range: -40° to +80°C
- Temperature Sensitivity: average TK: 2 mm/10 K, maximum 5 mm over the entire temperature range of -40°to +80°C
- Vibration Resistance: Mechanical vibrations with 4 g and 5 to 100 Hz
- Mechanical Rating: NEMA 4x
- Housing: Aluminum, coated IP66/68
- Total Length
  CS475: 224 mm (8.8 in.)
  CS476, CS477: 430 mm (16.9 in)
- Horn Length
  CS475: 137 mm (5.4 in.)
  CS476, CS477: 430 mm (16.9 in)
- Side Cap Diameter:
  CS475: 86 mm (3.4 in.)
  CS476, CS477: 430 mm (16.9 in)
- End Cap Diameter:
  CS475: 86 mm (3.4 in.)
  CS476, CS477: 430 mm (16.9 in)
- Horn Material: 316L stainless steel





At left is a top view of the field enclosure showing the sensor placement and backplate for mounting a datalogger. At right is a cut away view of the field enclosure showing sensor placement. The horn fastens to the sensor on the outside of the enclosure (not shown).