



# CS475A

Radar Water Level Sensor



Part Number 36315  
11/2019



[www.campbellsci.com/order/cs475a-l](http://www.campbellsci.com/order/cs475a-l)

## 1. Parts list

- CS475A
- Mounting bracket

## 2. Wiring

**Table 2-1: Wire color, function, and RTU connection**

Wire color	Wire function	RTU terminal
White	SDI-12 signal	SDI-12 Data
Clear	Shield	⏚ (analog ground)
Red	Power	12V
Black	Power ground	G

## 3. Test radar

Verify sensor operation in the lab or office before installing in the field. Connect the CS475A to an SDI-12 device (Table 2-1). Wait approximately 1 minute to allow the CS475A to initialize then send the following SDI-12 commands. These examples use an SDI-12 address of 0.

### Identify sensor (aI!)

Command: 0I!

Response: 0I!014CampbellCS475A003SN=35964965

The sensor response includes the sensor address (0), SDI-12 version (14), manufacturer (Campbell), model (CS475A), operating system (003), and serial number (SN=35964965).

### Make measurement (aM!)

Command: 0M!

Response: 00014

Command: 0D0!

Response: 0+50.000+60.781+13.4263+0

The sensor response to the **0M!** command includes the address (0), time (in seconds) to respond (001), and the number of values to return (4). The sensor response to the **0D0!** command includes the sensor address (0) + stage (50.000) + distance (60.781) + voltage (13.4263) + error code (0).

## 4. Mounting

1. Center the sensor beam a minimum of 2.5 m (8.2 ft) from any obstruction (both above and under water) in the measurement range.

**Table 4-1: Radiation beam spread (10° beam angle)**

Distance (m)	Footprint diameter (m)
1	0.18
5	0.87
10	1.76
15	2.64
20	3.53
25	4.37
30	5.25
35	6.12

2. Don't mount in the middle of bridge spans. This minimizes the effects of vibration and road noise.
3. Securely mount the sensor. Mounting hardware is included with the sensor. Use a bubble level to make certain the antenna horn is aligned within 1° of vertical. A measurement error will be introduced if the antenna is not perpendicular to the water surface.
4. Consider mounting options to minimize vandalism while remaining easy to access.

## 5. Site specific configuration

---

1. Read system units by using the **aXRSU!** command (feet = 0, meters = 1, and user defined = 2). In the following example, the address is 0 and the system units are meters:

Command: 0XRSU!

Response: 00022

Command: 0D0!

Response: 0+1+0

The sensor response to the **0XRSU!** command includes the address (0), time (in seconds) to respond (002), and the number of values to return (2). The sensor response to the **0D0!** includes the sensor address (0) + system units (1) + error code (0).

2. Set the Current or Reference Stage by using the **aXWSR=sss.ss!** command, where sss.ss is the stage reference in configured units. For example, to set the stage to 50:

Command: 0XWSR=50! (where 50 is the reference stage)

Response: 00022

Command: 0D0!

Response: 0+50.000+0

The sensor response to the **aXWSR=sss.ss!** command includes the address (0), time (in seconds) to respond (002), and the number of values to return (2). The sensor response to the **0D0!** command includes the sensor address (0) + reference stage (50.000) + error code (0).

3. Use the **aM!** command to make a measurement and ensure the stage value is correct.

Command: 0M!

Response: 00014

Command: 0D0!

Response: 0+50.000+60.781+13.4263+0

The sensor response to the **0M!** command includes the address (0), time (in seconds) to respond (001), and the number of values to return (4). The sensor response to the **0D0!** command includes the sensor address (0) + stage (50.000) + distance (60.781) + voltage (13.4263) + error code (0).

### Commands to improve the CS475A performance:

1. Issue a False Echo Suppress command if obstacles may create false echos, such as a bridge girder or pier. With the False Echo Suppression command, enter a distance

that is 0.5 m (1.5 ft) short of the distance to the water surface. Wait 41 seconds before sending the **aD0!** command.

Command: 0XFES=18.5! (where 18.5 is the distance to water surface minus 1.5)

Response: 00412

Command: 0D0!

Response: 0+18.5+0

The sensor response to the **0XFES=18.5!** command includes the address (0), time (in seconds) to respond (041), and the number of values to return (2). The sensor response to the **0D0!** command includes the sensor address (0) + distance to suppress (18.5) + error code (0).

2. Change the sensor integration time based on the water surface conditions. Integration time of 2 s is recommended for smooth conditions, 10 s for medium conditions, and 30 s for rough conditions. The default integration time is 10 s.

Command: 0XWIT=2!

Response: 00022

Command: 0D0!

Response: 0+2+0

The sensor response to the **0XWIT=2!** command includes the address (0), time (in seconds) to respond (002), and the number of values to return (2). The sensor response to the **0D0!** command includes the sensor address (0) + new integration time (2) + error code (0).