CB-450 Data Buoy – Quick Start Guide

The NexSens CB-450 Data Buoy is designed for deployment in lakes, rivers, coastal waters, harbors, estuaries and other freshwater or marine environments. The floating platform supports both topside and subsurface environmental monitoring sensors including weather stations, wave sensors, thermistor strings, multi-parameter sondes, and other monitoring instruments.

What's Included:

- (1) Buoy hull with data well
- (3) 10W Solar panels (mounted to tower)
- (1) Data well lid
- (3) Top-side lifting eyes
- (3) Bottom-side mooring eyes
- (1) Instrument cage

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CB-450 Data Buoy – Accessories

The CB-450 Data Buoy is a platform and can be accessorized with any of the following components or users can configure the buoy with alternatives.

Common Accessories	
CB-A05-1	Battery harness with integrated solar regulator & (1) 28 A-Hr battery
CB-A05-2	Battery harness with integrated solar regulator & (2) 28 A-Hr batteries
X2-CB	Buoy-mounted data logger
X2-CB-C-VZ4G	Buoy-mounted data logger with Verizon 4G cellular telemetry
X2-CB-I	Buoy-mounted data logger with Iridium satellite telemetry
X2-CB-R-DG	Buoy-mounted data logger with 900 MHz radio telemetry
M550-F-Y	Solar marine light with flange mount, 1-3 nautical mile range, 15 flashes/minute, yellow
914M	Deployment pipe with stop bolt & threaded adapter, 4” PVC
CB-ZA	Sacrificial zinc anode for CB-Series data buoys

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CB-450 Step-by-Step Assembly

Attach the cage to the buoy frame:

1. Attach the cage to buoy frame using the ¾" bolt, lock washer and castle nut.

2. Tighten firmly with 1-1/8" wrenches or large crescent wrenches. Be sure to flatten the lock washer and lineup the hole in the bolt with the notches in the castle nut.

3. Place the cotter pin through the hole in the bolt, and bend the long leg of the pin to prevent the nut from coming loose.

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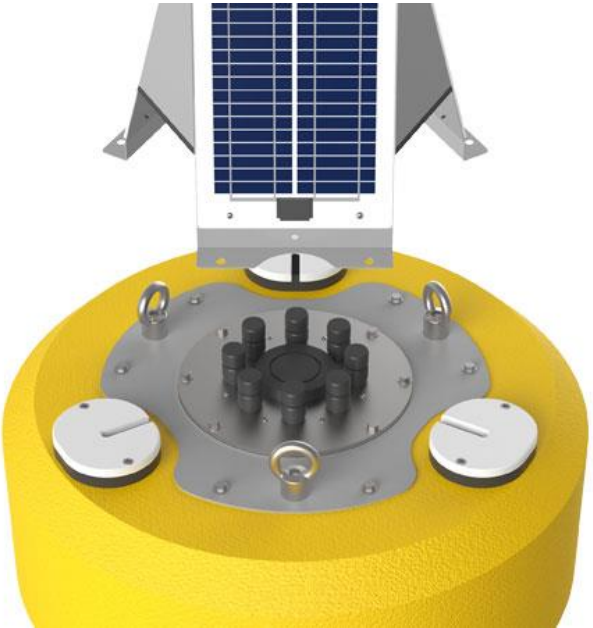
CB-450 Step-by-Step Assembly

Understanding the data well with NexSens data loggers

The data well is a waterproof canister located in the center of the buoy hull. Batteries are secured at the bottom and a data logger is mounted to the underside of the lid. The data well lid provides convenient connection ports for sensors, an antenna, solar charging, and a vent.



CB-450 Step-by-Step Assembly

Understanding the NexSens data logger ports

Ports include:

- (5) sensor input ports

  P0A - 12V switch power, shared RS-232 with port P0B, SDI-12, RS485
  P0B - 12V switch power, shared RS-232 with port P0A, SDI-12, RS485
  P1A - 12V switch power, shared RS-232 with port P1B, SDI-12, RS485
  P1B - 12V switch power, shared RS-232 with port P1A, SDI-12, RS485
  P2 - 12V switch power, unique RS-232 port, SDI-12, RS485

- (1) Solar charging port
- (1) Gortex vent for relief of battery outgassing pressure. In heavy wave conditions this vent can be plumbed with tubing to the top of the tower.
- Antenna port

Note: Sharing RS-232 ports means that only one non-addressable device can be connected at a time. RS-485 and SDI-12 ports are shared throughout the bus.

Note: To connect analog sensors (i.e. 4-20mA, 0-2.5V) use the mV-RS485 adaptor

CB-450 Step-by-Step Assembly

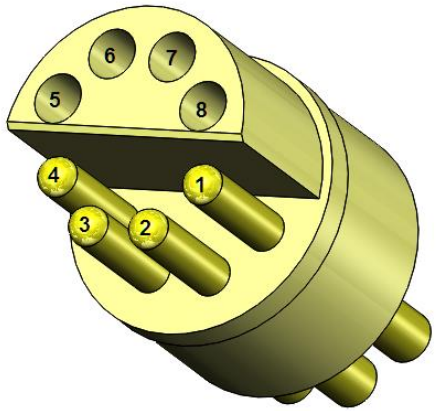
Understanding sensor ports

For compatibility sensors must have either factory installed UW connectors, be connected using a UW Plug and Flying Lead cable or be wired using the UW Field Wireable Plug

Recommendation: Invest in factory connectorization of all sensors for a long-term robust and waterproof connection

UW to Flying Lead Cable

Lid receptacle connector pinout		
1	Green	RS-485 A
2	Blue	RS-485 B
3	Brown	SDI-12
4	Red	12VDC
5	White	5 VDC
6	Yellow	RS232 Rx
7	Black	Gnd
8	Orange	RS232 Tx



UW Field Wireable Plug

CB-450 Step-by-Step Assembly

Connecting power

Three solar panels provide charging energy by sunlight exposure while the buoy is free to move and rotate in any direction.

Connect the 6-pin solar panel plug into the COM/SOLAR port on the data well lid and the solar panels will provide power to the charge regulator, which will keep the internal batteries charged.

Note: The device will beep once when powered on

CB-450 Pre-deployment Testing

Perform system tests

Important: **Never** deploy the buoy without first preforming all system tests.

1. Check that the battery voltage is near 12VDC by placing the leads of a voltmeter on pins 4 (red) and 7 (black) of a P0A or POB. Note the voltage and the proceed to checking the solar charging.

2. Check solar charging by placing the buoy in direct sunlight with at least one panel facing the sun. Allow it to charge for several hours and then immediately check the voltage again. It should be greater than 12.5 VDC.

   Note: If the voltage is low, allow it to charge for an extended period of time.

3. **Connect sensors** and establish communications using the **WQData Live Datacenter** or if you purchased a PC controllable data logger use **iChart Software.**

   Confirm all sensors are reporting correct values, that the time/date and sample intervals are correct.

   Check system diagnostics for any out of range errors.

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CB-450 Deployment

SAFETY FIRST

Warning: It highly recommended that buoys are installed by professionals with training in marine safety. Anchors, chains, heavy gear and boat clutter during deployment is unsafe. Care must be taken during deployment to maintain a clean and safe environment.

Use of proper equipment (work boat, lifting rig, gloves, safety footwear, etc.) is essential to safely deploy any buoy system. Buoy systems are heavy and personnel can quickly become entangled with mooring lines and anchors. Safety and flotation gear should be worn at all times when working on or near the water.

NEVER EVER work in unsafe conditions, without safety gear, proper equipment or use unsafe practices.

CB-450 Deployment

Installing sacrificial anodes

Important: To avoid excessive corrosion on buoy frames and cages always use sacrificial anodes and isolate dissimilar metals in saltwater applications.

Install the CB-Series Buoy Zinc Anode to both the cage and buoy frame. The anode will slowly corrode away. Inspect and replace as needed.

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CB-450 Deployment

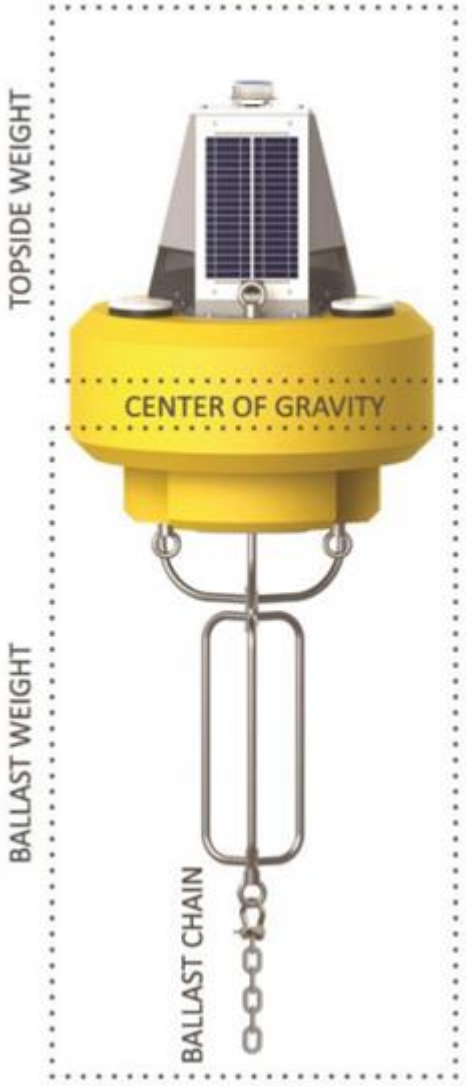
Understanding ballast weight and stability

Important: To prevent overturning and ensure stability, additional ballast weight may be needed.

As configured at the factory, the center of gravity of the buoy is near the water surface. A single point mooring line and chain, connected to the eye at the bottom of the cage is typically enough weight to ensure stability.

Any weight added above the water surface must be appropriately counterbalanced by additional ballast weight below the surface. Be sure to keep topside devices lightweight and positioned as low as possible on the tower and bottom side weight centrally located and deep (mounted to the cage eye).

Before deployment, some experimentation may be required to properly balance the buoy. If needed, add ½" chain (~2.3lb/ft) or other weight to the bottom of the cage as shown.



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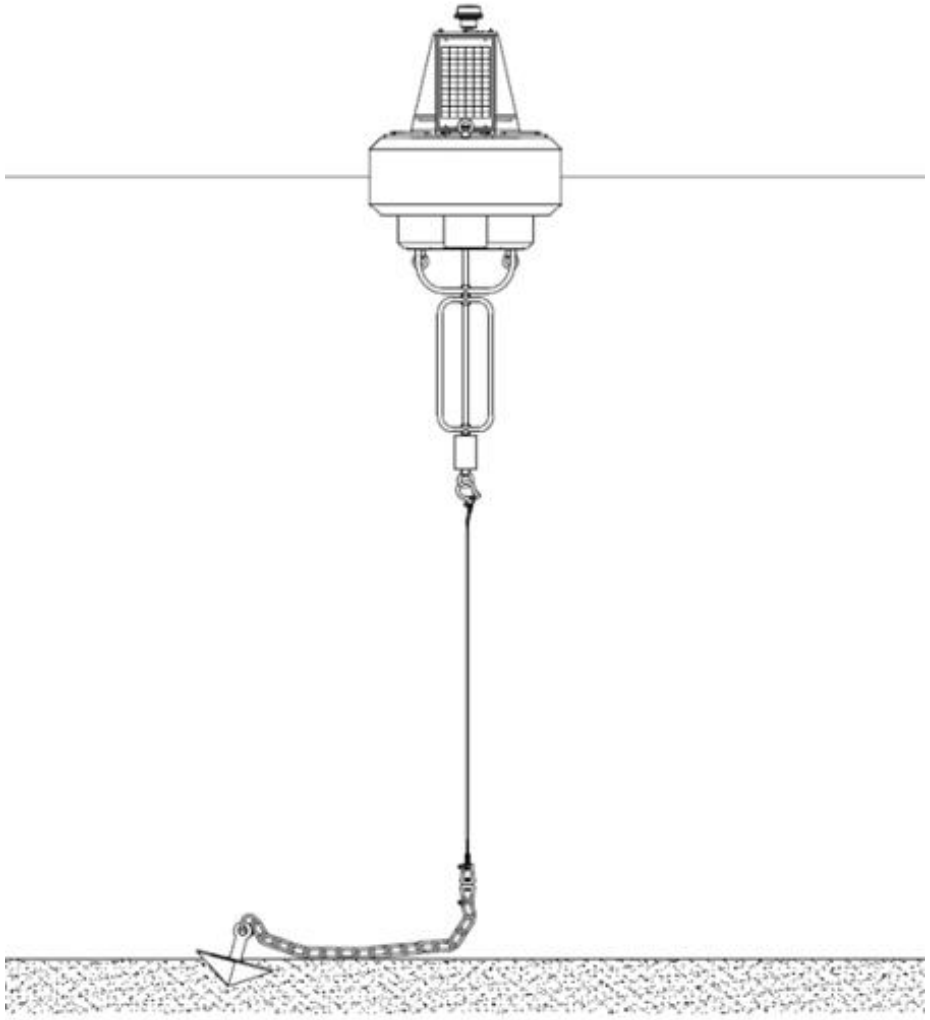
CB-450 Deployment

Single point mooring

Single-point moorings are used in calm waters when monitoring sensors are attached to the instrument cage or housed in deployment pipes. The sensors are thus protected and less vulnerable to damage caused by subsurface debris, high currents, and entanglement from anchor lines.

In a single-point configuration, a stainless steel mooring line connects the buoy directly to a bottom chain and anchor. At normal pool/stage, the mooring line should be taut, with most of the bottom chain resting on the seafloor. As the water level increases and the buoy rises, the bottom chain is lifted from the floor.

Important: *This section contains only general information on the available mooring options for CB-450 data buoys. To develop an effective mooring strategy, a variety of application-specific criteria (water level fluctuations, currents and wave action, debris loads, etc.) must be thoroughly reviewed prior to deployment. NexSens does not endorse any particular mooring strategy for any specific application.*



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CB-450 Deployment

Two point mooring

Two-point moorings are commonly used when monitoring sensors are deployed in the water column below the buoy. In this setup, the mooring lines are pulled taut away from the buoy, freeing the water column for a suspended sensor line.

In most two-point configurations, mooring lines connect the data buoy to small marine marker floats, often located on the water surface. These marker floats are shackled to another mooring line that runs to the floor and connects to a bottom chain and anchor assembly. Additional subsurface marker floats may also be used in some applications. As in single-point systems, the bottom chain prevents buoy submersion as the water level fluctuates.

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