

X3 ENVIRONMENTAL DATA LOGGER

QUICK START GUIDE

IMPORTANT - BEFORE FIELD DEPLOYMENT: Completely configure new X3 systems with sensors and a telemetry connection in a nearby work area. Operate the system for several hours and verify correct sensor readings. Use this test run to become familiar with the system's features and functions, setting the stage for a successful deployment.



Figure 1: X3 Environmental Data Logger

Overview

The X3 Environmental Data Logger with Cellular Telemetry includes an integrated modem and external antenna. Three sensor ports provide industry-standard protocols including SDI-12, RS-232, and RS-485. The center 6-pin port offers direct communication (serial to PC) and power input.

Users can configure the X3 Data Logger for deployment using a USB adapter and the CONNECT software. Data is accessed and stored on the WQData LIVE web data center. An easy-to-use dashboard and built-in sensor library automatically facilitate setup and configuration.

What's Included

- (1) X3 Environmental Data Logger
- (2) Buoy mounting kits (small and large buoy kits)
- (3) Sensor port plugs, spare orings
- (1) Power port plug, spare oring
- (1) Oring grease tube
- (1) Cellular antenna
- (1) Quick Start Guide

Note: Applications scientists and engineers at NexSens will pre-program data loggers based on user specifications. In many instances, the system will be ready for "plug-and-play" and will not require the subsequent *Data Logger Setup* steps below to be performed. If a system is pre-programmed, a System Integration Guide will be included with the order, providing an overview of the following steps to get the system up and running.

Review the System Integration Guide guide and skip to the **WQData LIVE Setup** section. *Note:* It is recommended to download the CONNECT software (step 1) for future use.

Data Logger Setup

- 1 Download the CONNECT software and establish a connection with the logger via the direct connect USB cable (UW6-USB-485P-DC).
 - a. nexsens.com/connst
 - b. The middle 6-pin port on the X3 is for providing power and communication through the CONNECT software.

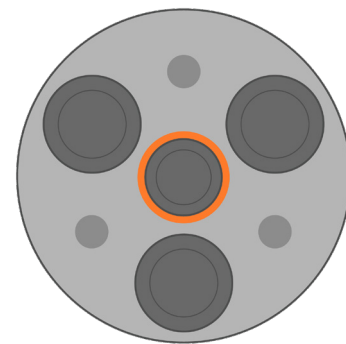


Figure 2: Middle 6-pin power and communication port.

- 2 Review the sensor integration guides on the NexSens knowledge base to prepare the sensor(s) for programming.
 - a. nexsens.com/sensorskb
 - b. If a guide is unavailable, follow the links in step 3 to determine if a script for the sensor is available or if a new script must be created.

- 3 Review and enable the appropriate scripts:
 - a. nexsens.com/conncss
 - b. For any scripts that are not available, create a new script following the sensor's communication protocol and the links below:
 - Modbus script - nexsens.com/modbusug
 - NMEA script - nexsens.com/nmea0183ug
 - SDI-12 script - nexsens.com/sdi12ug
 - GSI script - nexsens.com/gsiug

If there are any questions, contact NexSens technical support for assistance with new or existing scripts:

Phone: 937-426-2151; Email: info@nexsens.com

- 4 Once the appropriate scripts are enabled, connect sensor(s) to the (3) available sensor ports on the bottom of the logger.
 - a. Note which port (P0, P1, or P2) the sensor is connected to, as it will be programmed to that port. It is recommended to label the port with the sensor name.

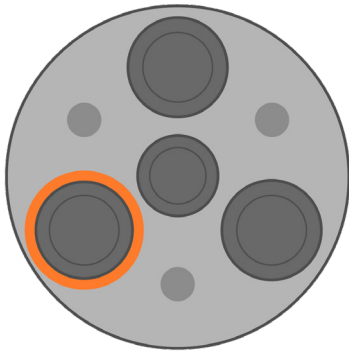


Figure 3: Outer 8-pin ports for sensor connection (3 total).

- 5 Start a new sensor detection by performing the following in the CONFIG tab of the CONNECT software:
 - a. Erase the log data - nexsens.com/eraselogdata
 - b. Erase any sensor programming and reset the data logger - nexsens.com/eraseprogramming
- 6 After resetting the logger, it will begin the automatic detection process using the internal script library.
 - a. Depending on the number of scripts enabled, the process can take 5-15 minutes.
 - b. While waiting for the detection to complete, proceed to the **WQData LIVE Setup**.

WQData LIVE Setup

- 1 To get started:
 - a. Go to [WQDataLIVE.com/getting-started](https://wqdatalive.com/getting-started)
 - b. Create a new account or sign into an existing account.
 - Ensure to click the confirmation link from WQData LIVE in your email.
 - c. Create a project by hovering over the email in the upper right-hand corner of the page and selecting **PROJECTS** from the drop-down menu.
- 2 In the project, go to **ADMIN | Settings**.
 - a. Choose the *Project/Site* drop-down menu and then select **Sites**.
 - b. Select New Site and enter the site information. Then click **SAVE**.
- 3 Once the site is saved, re-open the site information and enter the claim code listed below under **Assigned Devices**.
- 4 Click **Add Device**.
 - a. The device name will immediately display in the *Assigned Devices* list.
- 5 If a WQData LIVE subscription was purchased, enter the provided license key at the following URL:
 - a. wqdatalive.com/license/login.php
 - b. Once entered, the project will upgrade to the purchased tier and additional features will be available.
- 6 Continue to the **Telemetry Setup** section to establish logger communication with WQData LIVE.
 - a. For additional information on using the WQData LIVE web data center, visit the User Guide:
 - nexsens.com/wqug

Telemetry Setup

Note: Before installing the antenna, review the data logger programming through the CONNECT software. Review a few readings to ensure all sensors and parameters are shown and are outputting valid readings.

a. nexsens.com/datauploadug

All X3 data loggers will come with an active SIM card. If cellular service is purchased through NexSens, the card can be used for the duration of the active plan. If cellular service is not purchased through NexSens, the SIM card will be active for a three-month trial period.

- 1 Install the cellular antenna with the O-ring.
 - a. Ensure the O-ring slot and the O-ring are clear of any debris.

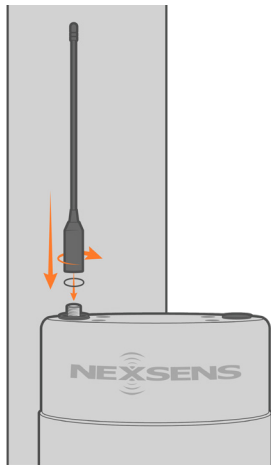


Figure 4: Cellular antenna installation.

- 2 If purchasing a separate cellular service, follow the links below to properly set up a 4G account and install the SIM card.
 - a. Set up a 4G account - nexsens.com/setup4g
 - b. Sim card installation - nexsens.com/xsiminstall

Table 1: X3 Data Logger Buzzer Pattern Indicators.

Event	Beep Type	Status
Applying power	One short beep	System boot successful
Sensor detection/ Reading	One short beep every 3 seconds	Logger currently taking a reading or detecting sensors
Telemetry connection attempt	Double beep every 3 seconds	Logger attempting to establish connection
Telemetry connection successful	Two short beeps	Connection established
Telemetry connection failed	Three short beeps	No signal/connection failed

Land-Based Station Installation (PM2)

- 1 Gather the PM2 pole mount hardware kit. Attach the bracket to a 2" NPT pole using the included U-bolt, flat washers, lock washers, and nuts.
 - a. Ensure the grounding cable contacts the bracket during installation. Use a 1/2" socket to tighten.

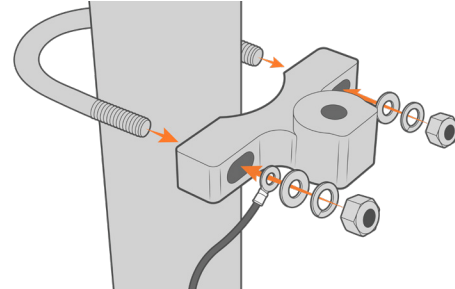


Figure 5: PM2 bracket installation.

- 2 Insert the socket head cap screw and tighten it using a 5/16" hex driver.

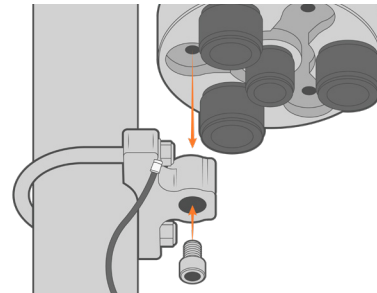


Figure 6: Data logger installation.

- 3 Attach the other end of the grounding cable to one of the threaded slots underneath the logger.
 - a. Ensure the grounding cable contacts the logger during installation. Use a 9/16" socket to tighten.

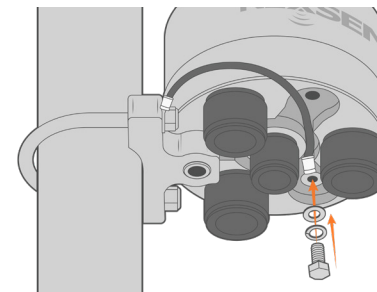


Figure 7: Grounding cable attachment.

- 4 Provide power to the middle 6-pin port of the data logger via the solar or AC adapter plug and connect the sensors to the outer 8-pin ports.
 - a. Ensure the sensors are connected in the same configuration as they were programmed.

Small Buoy Mounting (CB-150 to CB-450 buoys)

Note: Remove the cellular antenna before installation.

- 1 Gather the *CB-150-450 Mounting* equipment. Use a 9/16" socket to remove the white top plate from the buoy's solar tower.

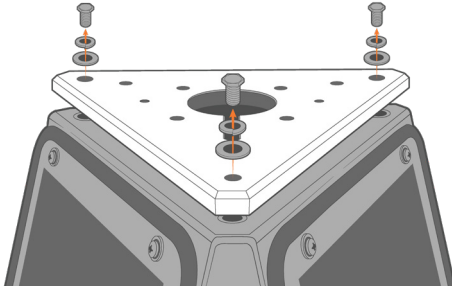


Figure 8: Solar tower top plate removal.

- 2 Align the threaded slots on top of the logger with the (4) corresponding holes on the white plate.
 - a. Attach the logger using the (4) hex head cap screws, lock washers, and flat washers.
 - b. Tighten using a 9/16" socket.

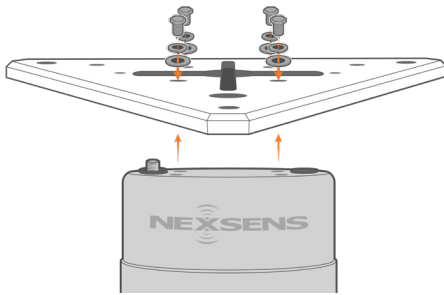


Figure 9: Data logger installation.

- 3 Provide power to the middle 6-pin port on the data logger via the solar tower plug and connect the sensors to the outer 8-pin ports.
 - a. Ensure the sensors are connected in the same configuration as they were programmed.
- 4 Reattach the plate and the cellular antenna.

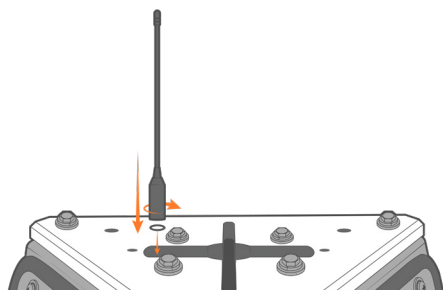


Figure 10: Cellular antenna installation.

Large Buoy Mounting (CB-650 to CB-1250 buoys)

- 1 Gather the *CB-650-1250 Mounting* equipment. Align the threaded inserts on the bottom of the data logger with the (3) black isolation washers and the smaller holes on the mount.
 - a. The data logger ports should align with the large openings on the mount.
 - b. **Note:** There will be an intentional gap between the mount and the data logger.

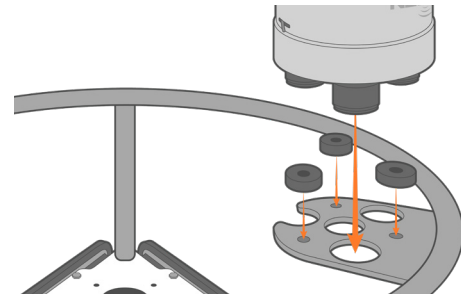


Figure 11: Mount the data logger.

- 2 Insert the (3) hex head cap screws, lock washers, and flat washers into the threaded inserts on the logger.
 - a. Tighten using a 9/16" socket.

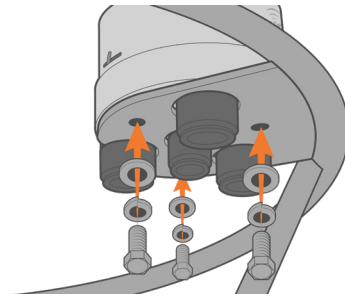


Figure 12: Data logger installation.

- 3 Provide power to the middle 6-pin port on the data logger and connect the sensors to the outer 8-pin ports.
 - a. Ensure the sensors are connected in the same configuration as they were programmed.
 - b. For any connectors within or below the solar tower, it is best to tie a rope around each connector to pull them through the opening at the top of the solar tower.