

X3-SUB CELLULAR 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-SUB Submersible Data Logger

Overview

The X3-SUB Submersible 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 SOLAR/HOST MCIL-6-FS port offers direct communication (serial to PC) and power input. All connections are made using MCIL/MCBH wet-mate connectors. The X3-SUB is powered from an internal solar rechargeable battery reserve.

Users can configure the X3-SUB 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-SUB Submersible Data Logger
- (1) Pre-installed cellular antenna
- (3) Sensor port plugs
- (1) Power port plug
- (3) 11" cable ties
- (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 (MCIL6MP-USB-DC).
 - a. nexsens.com/connst
 - b. The SOLAR/HOST 6-pin port on the X3-SUB is for providing power and communication through the CONNECT software.

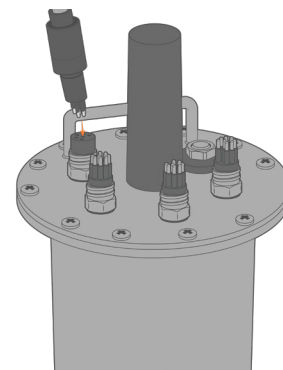


Figure 2: SOLAR/HOST power and communication port.

- 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 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.

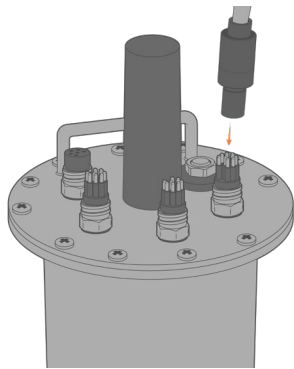


Figure 3: Outer 8-pin ports for sensor connection (3 total).

- 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
 - 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.

If purchasing a separate cellular service, follow the links below to properly set up a 4G account.

b. Set up a 4G account - nexsens.com/setup4g

Buzzer Pattern Indicators

Table 1: X3-SUB 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

Buoy Installation/Cable Routing (Optional)

- 1 Route the sensor cables underneath the solar panel opposite the sensor ports.
 - a. Ensure to insert enough cable within the solar tower to avoid tension on the connector.
 - b. The connector should remain in a nearly vertical angle while connected.
 - c. Use the included zip ties to secure the cable to one of the solar tower posts.
 - Ensure to provide enough cable slack for tension-free connections on both ends.

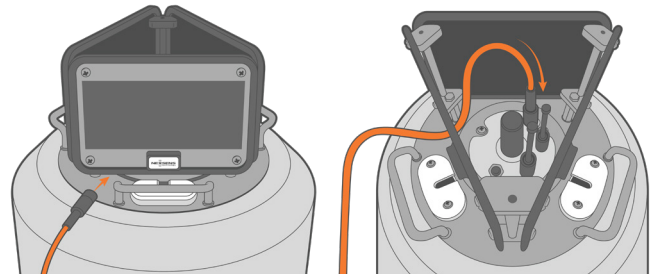


Figure 4: Sensor cable connection.

- 2 Remove the nearest sensor pass-through lid using a Philips screwdriver.
 - a. Route the sensor cable through the pass-through tube.
 - b. Align the sensor cable within the opening on the pass-through lid and re-install the lid.

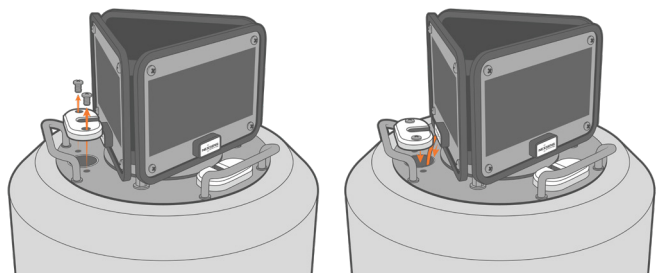


Figure 5: Sensor routing through pass-through tube.

- 3 Follow the included buoy quick start guide for additional information on the buoy deployment.