

# HOBO® U24 Conductivity Logger (Part # U24-001)

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## Inside this package:

- HOBO U24 Conductivity Logger (U24-001)



Manual Part #: MAN-U24  
Doc#: 13681-A  
Onset Computer Corporation

## Description

The HOBO U24 Conductivity logger is ideal for measuring and monitoring the impacts of pollutants such as road salt, agricultural runoff, chemical spills, and salt water intrusion on water supplies and aquatic ecosystems.

Conductivity is a measure of water's ability to conduct electrical current, which is effected by pollutants, especially those containing inorganic dissolved solids. The purer the water is, the lower the conductivity. Continuous monitoring of conductivity at multiple sites along a stream or in a well will determine when and where spikes of high conductivity occur, with the goal of identifying the sources of contamination that caused the high conductivity.

## Software

HOBOWare® Pro Version 3.0 or above

## Communication

To connect the logger to a computer you can use:

- Optic USB Base Station (BASE-U-4) with a coupler (COUPLER2-C), or
- HOBO Waterproof Shuttle (U-DTW-1) with a coupler (COUPLER2-C)

To launch and read out the logger in the field you can use one of these methods:

- Laptop computer with Optic USB Base Station (BASE-U-4) and a coupler (COUPLER2-C)
- HOBO Waterproof Shuttle (U-DTW-1) and a coupler (COUPLER2-C).
- HOBO U-Shuttle (U-DT-1, Firmware Version 1.12m030 or later) with Optic USB Base Station and coupler (COUPLER2-C).

The optical interface allows the logger to be offloaded without breaking the integrity of the seals. The USB compatibility allows for easy setup and fast downloads.

## LED

A light (LED) in the communications window of the logger confirms logger operation. The following table explains when the logger blinks during logger operation:

When:	The light:
The logger is logging	Blinks once every one to four seconds (the shorter the logging interval, the faster the light blinks). Blinks when logging a sample.
The logger is awaiting a start because it was launched in "Start At Interval" or "Delayed Start" mode	Blinks once every eight seconds until logging begins.

## Sleep Mode

The logger consumes significantly more power when it is "awake" and connected to a base station or shuttle. The logger will go into a low-power (sleep) mode if there has been no communication with your computer for 30 minutes. To wake up the logger, remove the logger from the coupler, wait a moment, then re-insert the logger.

## Sample and Event Logging

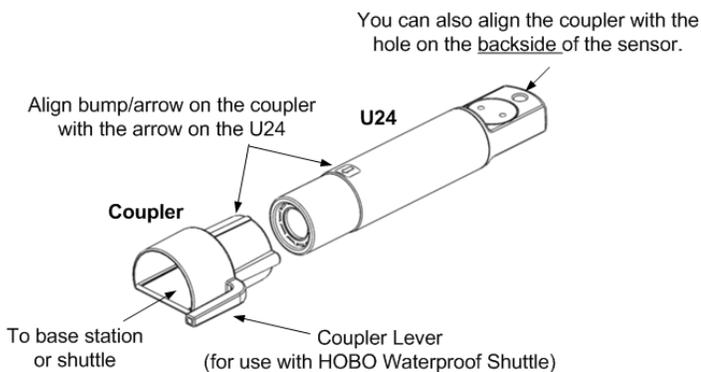
The logger can record two types of data: samples and events. Samples are the sensor measurements recorded at each logging interval. Events are independent occurrences triggered by a logger activity, such as Bad Battery or Host Connected. Events help you determine what was happening while the logger was logging.

The logger stores 64K of data, and can record over 18,500 temperature and conductivity measurements.

## Connecting the Logger to a Computer or Waterproof Shuttle

1. If you are connecting to a computer, follow the instructions that came with your base station or Waterproof Shuttle to attach it to a USB port on the computer.
2. Attach the coupler to the base station or shuttle.
3. Insert the logger into the coupler, aligning the bump/arrow on the coupler with the arrow on the logger. Be sure that it is properly seated in the coupler.

**NOTE:** If you are using the HOBOWaterproof Shuttle as a base station with a computer, briefly press the Coupler Lever to put the shuttle into base station mode.



If the logger has never been connected to the computer before, it may take a few seconds for the new hardware to be detected by the computer.

**Important:** USB communications may not function properly at temperatures below 0°C (32°F) or above 50°C (122°F).

## Setup

Before you deploy the HOBOWaterproof Shuttle in the field, perform the following steps in the office:

1. Start HOBOWare.
2. Connect the logger to the computer. See “Connecting the Logger to a Computer or Waterproof Shuttle” above.
3. Verify Status.

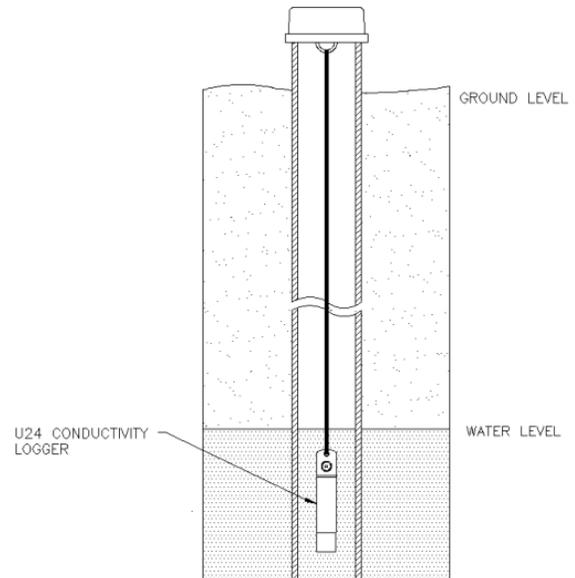
Click STATUS on the toolbar and observe that the temperature is near the actual temperature.

4. Launch the logger. See the *HOBOWare User’s Guide* for details.

**NOTE:** Logging Battery Voltage is not essential since you can check the battery voltage using the STATUS screen at Launch or Readout of the logger. Logging the battery voltage will reduce the number of conductivity and temperature readings you can log.

## Deploying the HOBOWaterproof Shuttle

The HOBOWaterproof Shuttle is designed to be easy to deploy in many environments. The small size of the logger is convenient for use in small wells and allows the logger to be mounted and/or hidden in the field.



## Deployment Guidelines

- You will need to use a field conductivity meter to periodically calibrate the U24 readings. Calibrate the field conductivity meter before taking it into the field.
- Make sure the logger is getting a steady flow of the water that is being monitored.
- If possible, when deploying the logger in rivers, streams and ponds, insert the logger in a PVC or ABS pipe. The PVC pipe should have enough holes to ensure good circulation of water.
- To avoid bubbles collecting on the sensor, make sure the sensor face is vertical and avoid sudden temperature changes.
- Do not place any metal within 2.5 cm (1”) of the sensor.

## Collecting Data

### Initial Deployment at Each Site

1. Launch the logger with a laptop or shuttle.
2. Deploy the logger in the stream.
3. Allow enough time for the logger to temperature stabilize for the best accuracy (approximately 15 minutes).
4. Gently tap the logger to remove any bubbles from the surface. Tug the string if you cannot reach the logger itself.
5. Measure the specific conductivity, referenced to 25°C, with the field meter. Record the value, time and location of that reading in a field notebook. If you cannot access the water with the meter, use a bailer or other device to obtain a water sample.

Repeat procedure for each logger deployed.

### Field Readout

Your readout and maintenance schedule will be determined by the amount of fouling at the site.

1. Calibrate the field conductivity meter before using it to take field readings.
2. Before removing the logger, measure the specific conductivity with the field meter. Record the value, time and location of that reading in a field notebook.
3. Remove the U24 logger from the stream.
4. Read out the data from the logger using a shuttle.
5. Relaunch the logger.
6. Clean the sensor (see Maintenance).
7. Redeploy the logger in the stream.
8. Allow enough time for the logger to temperature stabilize (approximately 15 minutes).
9. Gently tap the logger to remove any bubbles from the surface. Tug the string if you cannot reach the logger itself.
10. Measure the conductivity with the field meter. Record the value and time of that reading in the field notebook.

## Analyzing the Data

1. Offload the most recent data files from the shuttle.
2. Open the data file for each logger.
3. Calibrate data and convert to specific conductance or salinity.

For each file, use the HOBOWare Pro Conductivity Assistant to calibrate the readings and adjust for drift caused by fouling. You will need to enter the field meter readings and times from the beginning and, optionally, the end of that segment of the logger's deployment.

Refer to the Help for the Conductivity Assistant for more details.

## Maintenance

### Cleaning the Sensor

Mix several drops of dish detergent or biodegradable soap in a cup of tap water with a clean cotton swab. Clean the sensor face using the cotton swab and then rinse the sensor with clean or distilled water. Do not scratch the sensor face with a sharp tool.

### Biofouling

Biofouling and excessive marine growth on the logger will compromise accuracy. Organisms that grow on the sensor can interfere with the sensor's operation and eventually make the sensor unusable. If the deployment area is prone to biofouling, check the logger periodically for marine growth.

### Solvents

Check a materials-compatibility chart before deploying the logger in locations where untested solvents are present. Refer to the Specifications for materials.

### Protecting the Logger

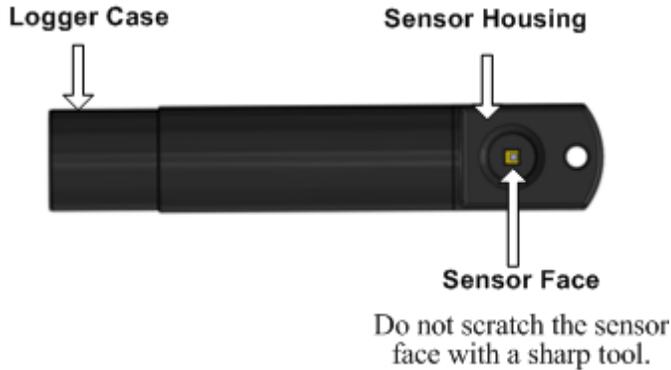
#### IMPORTANT

- This logger can be damaged by shock.

Always handle the logger with care. The logger may be damaged if it is dropped. Use proper packaging when transporting or shipping the logger.

- Do not attempt to open the logger case or sensor housing.

Disassembling of the logger case or sensor housing may cause serious damage to the sensor and logger electronics. There are no user-serviceable parts inside the case. Contact Onset technical support if your logger requires servicing.



## The Battery

### Battery Life

The battery life of the logger should be three years or more. Actual battery life is a function of the number of deployments, logging interval, and operation/storage temperature of the logger. Frequent deployments with logging intervals of less than one minute, and continuous storage/operation at temperatures above 35°C, will result in significantly lower battery life. For example, continuous logging at a one-second logging interval will result in a battery life of approximately one month.

To obtain a three-year battery life, a logging interval of one minute or greater should be used and the logger should be operated and stored at temperatures between 0° and 25°C (32° and 77°F).

### Battery Voltage

The logger can report and log its battery voltage. If the battery falls below 3.1 V, the logger will record a “bad battery” event in the datafile. If the datafile contains “bad battery” events, or if logged battery voltage repeatedly falls below 3.3 V, the battery is failing and the logger should be returned to Onset for battery replacement.

### Replacing the Battery

To have your logger’s battery replaced, contact Onset or your place of purchase for return arrangements. Do not attempt to replace the battery yourself. Severe damage to the logger will result if the case is opened without special tools, and the warranty will be voided.

**⚠ WARNING:** Do not cut open, incinerate, heat above 100°C (212°F), or recharge the lithium battery. The battery may explode if the logger is exposed to extreme heat or conditions that could damage or destroy the battery case. Do not dispose of the logger or battery in fire. Do not expose the contents of the battery to water. Dispose of the battery according to local regulations for lithium batteries.

## Specifications

Sensor		
	Conductivity	Temperature
Calibrated Range	Low Range: 0 to 1,000 $\mu\text{S}/\text{cm}$ Full Range: 0 to 10,000 $\mu\text{S}/\text{cm}$	5° to 40°C (41° to 104°F)
Extended Range	Low Range: 0 to 2,500 $\mu\text{S}/\text{cm}$ Full Range: 0 to 15,000 $\mu\text{S}/\text{cm}$	0° to 40°C (32° to 104°F)
Accuracy (in calibrated range)	3% of reading, or 5 $\mu\text{S}/\text{cm}$ , whichever is greater	0.1°C (0.2°F)
Resolution	1 $\mu\text{S}/\text{cm}$	0.01°C (0.02°F)
Response time	1 second to 90% of change	
Logger		
Memory	18,500 temperature and conductivity measurements when using one conductivity range; 14,400 sets of measurements when using both conductivity ranges (64kbytes total memory)	
Sample rate	1 second to 18 hrs, fixed or multiple-rate sampling with up to 8 user-defined sampling intervals	
Battery	3.6 Volt lithium battery	
Battery life	3 years (at 1 minute logging)	
Maximum Depth	70 m (225')	
Operating Range	0° to 50°C (32° to 122°F) - non freezing	
Weight	193 gm (6.82 ounces), buoyancy in freshwater: -59.8 gm (-2.11 ounces)	
Size	3.18 cm diameter x 16.5 cm, with 6.3 mm mounting hole (1.25" diameter x 6.5", 1/4" hole)	
Wetted Housing Materials	Delrin, epoxy, stainless steel, polypropylene, Buna rubber O-ring, titanium pentoxide (sensor)	

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