HOBO® U12 Stainless Temperature Data Logger (U12-015 and U12-015-02) Manual

HOBO®
Data Loggers

The HOBO U12 Stainless Temperature Data Logger is a single-channel temperature logger with 12-bit resolution that can record up to 43,000 measurements. The logger uses a direct USB interface for launching and data readout by a computer or HOBO shuttle.

The U12-015-02 model is the same as the U12-015 model, but also includes a 5-inch probe.

HOBO U12 Stainless Temperature Logger

Models: U12-015
   U12-015-02

Included Items:

- O-Ring Replacement Kit (U12-015-ORING-E for EPDM and U12-015-ORING-V for Viton)
- Five-inch Probe (with U12-15-02 only)

Required Items:

- HOBOware® (go to www.onsetcomp.com/ hoboware-free-download)
- USB cable

Specifications

Measurement Range	-40° to 125°C (-40° to 257°F)
Accuracy	±0.25°C from 0° to 50°C (±0.45°F from 32° to 122°F), see Plot A
Resolution	0.03°C at 25°C (0.05°F at 77°F), see Plot A
Drift	0.05°C/year + 0.1°C/1000 hrs above 100°C (0.09°F/year + 0.2°F/1000 hrs above 212°F)
Response Time in 1 m/s (2.2 mph) airflow	U12-015: <10 minutes, typical to 90% U12-015-02: 2.25 minutes, typical to 90%
Response Time in Water	U12-015: <3.5 minutes, typical to 90% U12-015-02: 20 seconds, typical to 90%
Time Accuracy	±2 minute per month at 25°C (77°F), see Plot B
Operating Environment	Air, water, steam, 0 to 100% RH
Operating Temperature	Logging: -40° to 125°C (-40° to 257°F) Launch/readout: 0° to 50°C (32° to 122°F), per USB specification
Battery Life	3 year typical use, factory replaceable
Memory	64K bytes (43,000 12-bit measurements)
Construction	316 series stainless steel, EPDM or Viton O-ring; see *Food-Grade Compliance* section for additional details
Weight	U12-015: 72 g (2.5 oz) U12-015-02: 82 g (2.9 oz)
Logger Dimensions	17.5 x 101.6 mm (0.69 x 4.00 inches)
Probe Dimensions (U12-015-02 only)	4 x 124 mm (0.16 x 4.90 inches)
Pressure/Depth Rating	2200 psi (1500 m/4900 ft) maximum
NIST Certificate	Available for additional charge; temperature range -30° to 120°C (-22° to 248°F)
CE	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).
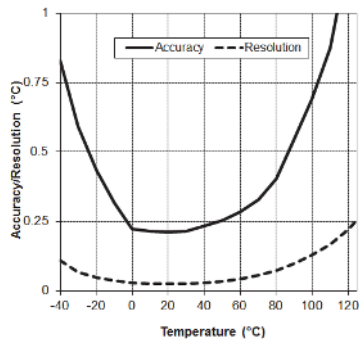
Plot A
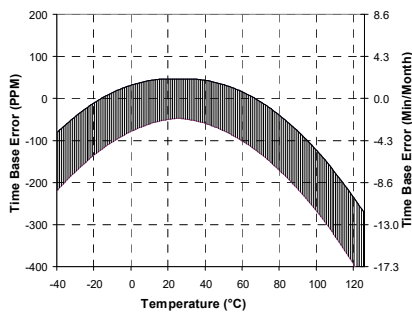
Plot B

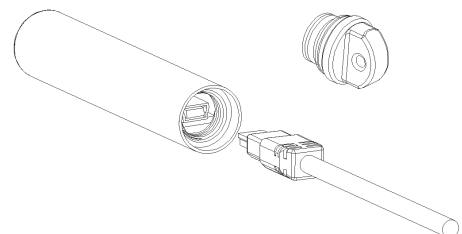## Connecting the Logger

The U-Family logger requires a USB interface cable to connect to the computer. If possible, avoid connecting at temperatures below 0°C (32°F) or above 50°C (122°F).

1. Remove the stainless steel end-cap from the logger by turning it counter-clockwise. If the cap is difficult to turn, place the stem of a small screwdriver through the hole in the end-cap for better leverage.

2. Plug the large end of the USB interface cable into a USB port on the computer.

3. Plug the small end of the USB interface cable into the logger as shown in the diagram at right.

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

5. Use the logger software to launch the logger. (The first time you launch the logger, the deployment number will be greater than zero. Onset launches the loggers to test them prior to shipping.)

6. You can read out the logger while it continues to log, stop it manually with the software, or let it record data until the memory is full. Refer to the software user's guide for complete details on launching, reading out, and viewing data from the logger.

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

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 (for example, the temperature every minute). Events are independent occurrences triggered by a logger activity. Examples of events recorded asynchronously during deployment include when the logger is connected to the host, when the battery is low, and the end of a data file once the logger is stopped. The logger stores 64K of data, and can record up to 43,000 samples.

Mounting

A 4.8 mm (3/16 inch) diameter hole is provided in the end-cap to secure the logger to an object.

Food-Grade Compliance

The logger components meet US Food and Drug Administration (FDA) guidelines as follows:

- Logger case: 316 series stainless steel is GRAS by the FDA and meets NSF 51 & 61 requirements.

- EPDM O-ring: Meets FDA 21 CFR 175.2600

- Lubricant (applied to O-ring): Meets FDA 21 CFR 175.300 and NSF 51 & 61 requirements

Care and Maintenance of the logger

The logger is shipped with an installed EPDM O-ring and with a replacement O-ring kit, containing both EPDM and Viton O-rings. Refer to the following chart to determine which type of O-ring is appropriate for your application.

O-ring type:	Use with:	Do not use with:
EPDM (Black)	Hot water, steam, food-grade applications	Petroleum oils
Viton (Brown)	Petroleum oils	Hot water, steam, food-grade applications

The logger can be permanently damaged by internal corrosion from condensation or foreign matter entering the case. The logger electronics depend upon the integrity of the O-ring seal for protection. Prior to every deployment, the O-ring should be inspected for cracks or tears, and for proper lubrication. The O-ring's surface should be smooth and lightly lubricated. If needed, the O-ring should be re-lubricated or replaced. In addition, the end-cap must be securely in place with no visible gap between the housing and the end-cap. Before opening the end-cap for read out, make sure that the logger is clean and dry. The logger should always be capped when it is not connected to the computer.

316L stainless steel has good corrosion resistance, but it can be damaged by contact with dissimilar metals or through crevice corrosion. The logger should not be deployed in salt or brackish water, or the housing will eventually fail and water will destroy the electronics. If long-term deployment in salt water is required, place the logger in a sealed bladder containing a non-corrosive liquid. Always rinse the logger with fresh water after deployment in salt or brackish water.

On the U12-015-02, the 5-inch piercing probe can be bent and/or broken with excessive force. Damage to the 5" probe is expressly not covered by the product warranty, and cannot be repaired.

Note! Static electricity may cause the logger to stop logging. To avoid electrical static discharge (ESD), transport the logger only with its end-cap on, or in an anti-static bag. Ground yourself by touching an unpainted metal surface before handling the logger. For more information, search for "static discharge" on www.onsetcomp.com.

Battery

Expected battery life varies based on the temperature and the frequency at which the logger is recording data (the logging interval). With 60 minutes of operation at 125°C (257°F) per day, a new battery will typically last approximately three years with logging intervals greater than one minute. Deployments in extremely cold or hot temperatures or logging intervals faster than one minute may significantly reduce battery life.

The logger has the ability to report and log its own 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.

Do not attempt to replace the battery. If the battery needs to be replaced, contact Onset or an Onset Authorized Dealer for factory replacement battery service.

> ⚠️ **WARNING:** Do not cut open, incinerate, heat above 125°C (257°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.