

Inside this package:

- HOBO U12 J, K, S, T Thermocouple Data Logger
- Mounting kit with magnet, hook-and-loop tape, tie-wrap mount, tie wrap, and two screws.

Doc # 13412-B, MAN-U12014  
Onset Computer Corporation

Thank you for purchasing a HOBO data logger. With proper care, it will give you years of accurate and reliable measurements.

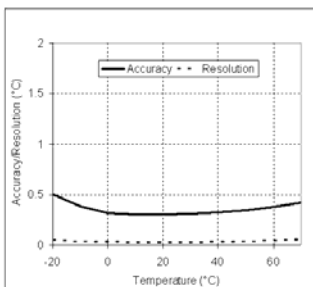
The HOBO U12 J, K, S, T Thermocouple data logger has a 12-bit resolution and can record up to 43,000 measurements or events. The logger accepts J, K, S, and T type thermocouple sensors, sold separately. The logger uses a direct USB interface for launching and data readout by a computer.

An Onset software starter kit is required for logger operation. Visit [www.onsetcomp.com](http://www.onsetcomp.com) for compatible software.

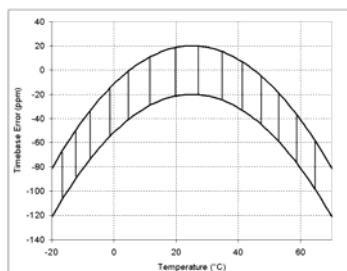


## Specifications

Measurement range	J type: 0 to 750 °C (32° to 1382°F) K type: 0 to 1250 °C (32° to 2282°F) S type: -50 to 1760 °C (-58° to 3200°F) T type: -200 to 100 °C (-328° to 212°F) Internal temperature: 0° to 50°C (32° to 122°F)
Accuracy	J type: ±2.5°C or 0.5% of reading, whichever is greater. K type: ±4.0°C or 0.5% of the reading, whichever is greater. S type: ±6.0°C or 0.5% of reading, whichever is greater. T type: ±1.5°C (±2.7°F) Internal temperature: ± 0.35°C (± 0.63°F), see Plot A. (All accuracies specified for battery voltage ≥ 2.80 V)
Resolution	J type: 0.21°C at 375°C (0.38°F at 707°F) K type: 0.32°C at 625°C (0.58°F at 1157°F) S type: 0.44°C at 855°C (0.79°F at 1571°F) T type: 0.10°C at -50°C (0.18°F at -58°F) Internal temperature: 0.03°C at 25°C (0.05°F at 77°F), see Plot A.
Drift	Internal temperature: 0.1°C/year (0.2°F/year)
Humidity range	0 to 95% RH, non-condensing
Time accuracy	± 1 minute per month at 25°C (77°F), see Plot B.
Operating temperature	Logging: 0° to 50°C (32° to 122°F) Launch/readout: 0° to 50°C (32° to 122°F), per USB specification
Battery life	1 year typical use
Memory	64K bytes (43,000 12-bit measurements)
Weight	46 g (1.6 oz)
Dimensions	58 x 74 x 22 mm (2.3 x 2.9 x 0.9 inches)
CE	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).



Plot A



Plot B

## Overview

The U12 Thermocouple logger has two temperature channels. Channel 1 is for a user-attached thermocouple. Channel 2 is the logger's internal temperature, which is used for cold-junction compensation of the thermocouple output. The logger can also record the logger's battery voltage (Channel 3) if selected. The number of channels selected determines the maximum deployment time at a given sample interval. Choosing only one channel provides the maximum deployment time.

**Important: Cold-junction compensation is always performed on the thermocouple measurements, even if the cold-junction reference channel (internal temperature sensor Channel 2) was not selected to be logged.**

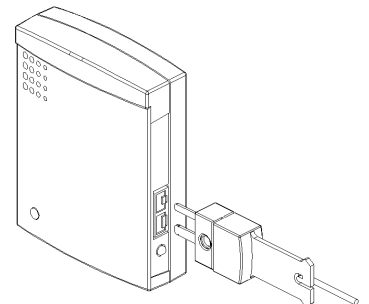
While the thermocouple probes may be exposed to the temperatures listed in the Specifications table, the logger itself must be kept in a 0°C to 50°C (32°F to 122°F) environment to allow for proper cold-junction compensation.

## Compatible Thermocouple Sensors

The U12 Thermocouple logger can accept any standard thermocouple sensor of the appropriate type with standard thermocouple subminiature connectors.

ANSI standard thermocouple color coding		
Type-J	Iron-Constantan	Black
Type-K	Chromel-Alumel	Yellow
Type-S	Platinum-Rhodium	Green
Type-T	Copper-Constantan	Blue

If your thermocouples have stripped-wire ends, male subminiature connectors with screw terminals are available. You must use the matching type of subminiature connector for the thermocouple you are using.



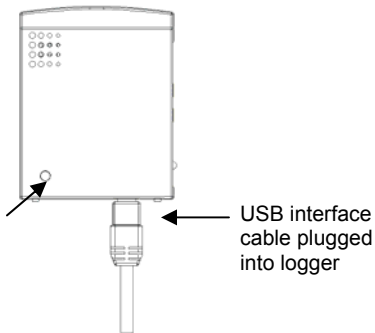
Note that the subminiature connectors have one pin (negative terminal) that is wider than the other (positive terminal). Make sure the plug is inserted into the mating jack correctly, as shown.

## Connecting the Logger

The U-Family logger requires an Onset-supplied USB interface cable to connect to the computer.

1. Plug the large end of the USB interface cable into a USB port on the computer.
2. Plug the small end of the USB interface cable into the bottom of the logger as shown.

**Important:** Press this button for **3 seconds** when logger is launched with Button Start or press for **1 second** to record an event while logging



USB interface cable plugged into logger

If the logger has never been connected to the computer before, it may take a few seconds for the new hardware to be detected. Use the logger software to launch and read out the logger.

**When launching, remember to select the correct type of thermocouple in the logger software. Also remember to plug the correct thermocouple into the logger before logging begins.** If you forget to plug in the thermocouple, or if you select the wrong thermocouple type in the logging software, false data will be recorded.

**Important: If you configure the logger to start with a button start, be sure to press and hold down the button on the front of the logger for at least three seconds when you want to begin logging.**

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.

### Sample and Event Logging

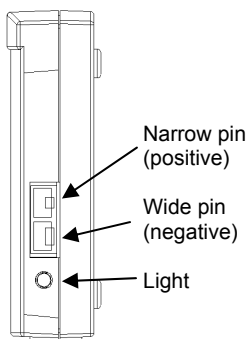
The logger can record two types of data: samples and events. Samples are the sensor measurements recorded at each logging interval (for example, the temperature every minute). Events are independent occurrences triggered by a logger activity. Examples of events recorded asynchronously during deployment include when the logger is connected to the host, when the battery is low, the end of a data file once the logger is stopped, and button pushes.

Press and hold down the button on the front of the logger for one second to record an event. Both a button up and down event will be recorded. This is useful if you want to mark the datafile at a particular point. For example, if the logger is used with an environmental chamber, you might press the button each time the door is opened.

The logger stores 64K of data, and can record up to 43,000 samples and events combined.

### Operation

A light (LED) on the side of the logger confirms logger operation.



The following table indicates 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, Delayed Start, or Button Start mode	Blinks once every eight seconds until launch begins.

The button on the logger is being pushed for a Button Start launch	Blinks once every second while pressing the button and then flashes rapidly once you release the button. The light then reverts to a blinking pattern based on the logging interval.
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### Protecting the Logger

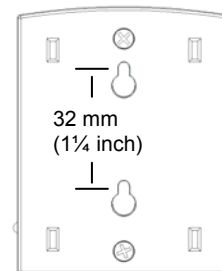
The logger can be permanently damaged by corrosion if it gets wet. Protect it from condensation. If it gets wet, remove the battery immediately and dry the circuit board with a hair dryer before reinstalling the battery. Do not let the board get too hot. You should be able to comfortably hold the board in your hand while drying.

**Important ! Static electricity may cause the logger to stop logging.** To avoid electrostatic discharge, transport the logger in an anti-static bag, and ground yourself by touching an unpainted metal surface before handling the logger. For more information about electrostatic discharge, visit our website at <http://www.onsetcomp.com/Support/support.html>.

### Mounting

There are four ways to mount the logger using the materials in the mounting kit included with the logger.

- Use the hook and loop tape to affix the logger to a surface.
- Attach the magnet and then place the logger on a magnetic surface.
- Use the tie wrap and tie wrap mount to tie the logger to an object.
- Fasten the logger to a surface with the two Phillips-head screws. The back of the logger has two inserts for the screws, 32 mm (1¼ inches) apart.



### Battery

The logger requires one 3-Volt CR-2032 lithium battery. Expected battery life varies based on the temperature and the frequency at which the logger is recording data (the logging interval). A new battery will typically last one year with logging intervals greater than 1 minute. Deployments in extremely cold or hot temperatures or logging intervals faster than 1 minute may significantly reduce battery life.

To replace the battery:

1. Disconnect the logger from the computer.
2. Unscrew the logger case.
3. Lift the circuit board and carefully push the battery out with a small blunt instrument, or pull it out with your fingernail.
4. Insert a new battery, positive side facing up.
5. Carefully realign the logger case and re-fasten the screws.

**⚠ WARNING:** Do not cut open, incinerate, heat above 85°C (185°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.

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