

# HOBO® Thermocouple Family User's Manual

Requires Onset Computer Corporation's BoxCar® Pro 4.1 or BoxCar® 3.7 or later software and PC cable for operation.

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The CE mark identifies this product as complying with all relevant directives in the European Union (EU).

## Inside this package

The HOBO Thermocouple Family loggers are shipped with:

1. One HOBO Thermocouple logger (part number H12-001, H12-002, or H12-003)  
*Thermocouple probes are purchased separately.*
2. Mounting Accessories:  
Magnet  
Hook and loop tape  
Double-sided tape

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

This manual covers the HOBO Thermocouple Family loggers. All members share a common feature set, and are compatible with the HOBO Shuttle, allowing for convenient retrieval of field data.

## Overview

The HOBO Thermocouple Family loggers have three temperature channels. Channels one and two are different measurement ranges for a user-attached thermocouple. The third channel is the logger's internal temperature, which is used for cold-junction compensation of the thermocouple output. Choosing channels one or two determines the range and corresponding resolution of the recorded measurements. The number of channels selected for recording determines the memory storage available for each channel, which in turn determines the maximum deployment time at a given sample interval. Choosing only one channel (range) provides the maximum deployment time.

*Important note: Cold-junction compensation is always performed on the thermocouple measurements, independent of whether or not the cold-junction reference channel (channel 3) is selected for recording.*

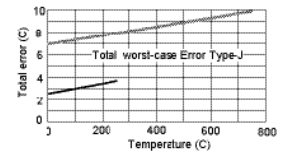
While the thermocouple probes may be exposed to the temperatures listed in the tables below, the logger itself must be kept in a 0°C to +50°C (+32°F to +122°F) environment to allow for proper cold-junction compensation.

## Measurement Ranges and Resolution

HOBO Type J Thermocouple (part number H12-001)

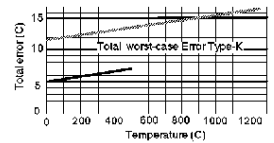
Channel	Range	Resolution: max / min
1	0°C to +250°C (+32°F to +482°F)	1°C / 2°C (1.8°F / 3.6°F)
2	0°C to +750°C (+32°F to +1382°F)	3°C / 6°C (5.4°F / 11°F)
3 (Int.)	0°C to +50°C (+32°F to +122°F)	0.4°C @ 21°C (0.7°F @ 70°F)

## Accuracy



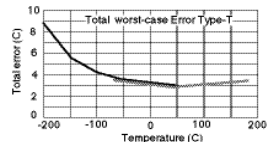
HOBO Type K Thermocouple (part number H12-002)

Channel	Range	Resolution: max / min
1	0°C to +500°C (+32°F to +932°F)	2°C / 4°C (3.6°F / 7°F)
2	0°C to +1250°C (+32°F to +2282°F)	5°C / 10°C (9°F / 18°F)
3 (Int.)	0°C to +50°C (+32°F to +122°F)	0.4°C @ 21°C (0.7°F @ 70°F)



HOBO Type T Thermocouple (part number H12-003)

Channel	Range	Resolution: max / min
1	-200°C to +50°C (-328°F to +122°F)	1°C / 6°C (1.8°F / 11°F)
2	-70°C to +180°C (-94°F to +356°F)	1°C / 3°C (1.8°F / 5.4°F)
3 (Int.)	0°C to +50°C (+32°F to +122°F)	0.4°C @ 21°C (0.7°F @ 70°F)



*Note: The temperature measurement accuracy plots show the worst case errors for the different loggers and their ranges. This does not include any error associated with the attached thermocouple.*

## Common Specifications

Logger internal (channel 3, cold-junction) temperature accuracy: ±0.7°C @ 21°C (±1.3°F @ 70°F)

Measurement capacity: 32,530 measurements total, stored in non-volatile memory

Time accuracy: approx. ±1 minute per week (±100 ppm at +68°F or +20°C), full dependence shown in Plot A

Logger operating temperature range: 0°C to +50°C (outside this range the cold-junction temperature compensation will not work properly)

Logger operating humidity range: 0 to 95% RH, non-condensing

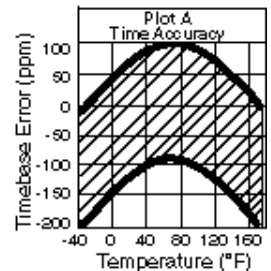
Size: 2.4" x 1.9" x 0.8" (68 mm x 48 mm x 19 mm)

Weight: approximately 0.9 oz (26 gms)

Battery: CR-2032 (lithium), user-replaceable

Battery life (continuous use): 1 year

Storage temperature: -40°F to +167°F (-40°C to +75°C)



## Compatible Thermocouple Sensors

The HOBO Thermocouple Family loggers can accept any standard thermocouple sensor of the appropriate type with standard thermocouple subminiature connectors.

Note that the Type-J logger will only work with Type-J thermocouples; likewise for the Type-K and Type-T loggers. The ANSI standard thermocouple color coding is:

Type-J probes (Iron-Constantan) are black, Type-K probes (Chromel-Alumel) are yellow, and Type-T probes (Copper-Constantan) are blue. If your thermocouples have stripped-wire ends, there are male subminiature connects with screw terminals available. You must use the matching type of subminiature connector for the thermocouple that you are using.

Note that the subminiature connectors have one pin (negative input) that is wider than the other. Make sure that the plug is inserted into the mating jack correctly. See diagram A.

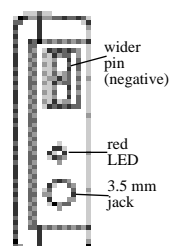


Diagram A

## Connecting the Communications Cable and Launching

A Starter Kit, which includes a PC interface cable and software, is required to operate your logger. Connect the interface cable into the 3.5 mm jack on the logger and into an available serial port of your computer. Install and start the logger's software. Select **Launch...** under **Logger** on the menu bar and a launch dialog box will be provided.

For a complete explanation on installing the software and launching your logger, please refer to the software manual.

## Operation Indicator

The HOBO data loggers have a red light emitting diode (LED) that blinks while logging. The LED blinks brightly at every measurement, and weakly every two seconds if the interval between measurements is longer than two seconds. The blinking LED is most visible when viewed straight on, as shown in Diagram A.

## Mounting Options

Included with your HOBO Thermocouple data logger are three options for mounting it on location: a magnet, hook and loop tape, and double-sided tape. These can be stuck on the back of your HOBO. When using the magnet, note that it works best on flat surfaces.

## Readout

Reconnect the HOBO data logger to the PC interface cable, start the logger software, select **Readout** under **Logger** on the menu bar and the data will be displayed in a graphical or tabular form. For a complete explanation on reading out your logger, please refer to the software manual.

## Keep it Dry

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

## Changing the Battery

We recommend changing the HOBO's battery when its level is less than 30% (battery level is displayed on the host computer during Launch, Readout, or on the HOBO Shuttle after data offload). Data stored in the HOBO will not be lost when removing the battery. To change the battery, open the snap-lid case as shown in Diagram B, lift the circuit board and remove the battery by carefully pushing it out with a small screwdriver or other small, blunt instrument. Be sure to install the battery with the printed side away from the HOBO's circuit board as shown in Diagram C. The logger's red LED will blink a number of times after the battery has been installed. **Note: Do not cut open, incinerate, heat above +185°F (+85°C) or recharge lithium battery. Dispose per local regulations.**

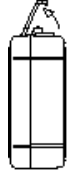
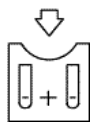
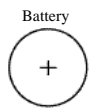


Diagram B



Battery Holder

Diagram C

## Service and Support

HOBO® products are easy to use and reliable. In the unlikely event that you have a problem with the hardware or software, please read the following.

### Who do I contact?

Contact the company that you bought the loggers from: Onset Computer Corporation or an Onset Authorized Dealer.

**Before calling**, you can evaluate and often solve your problem if you try the following:

1. Read this manual and the ReadMe file on the software disk. It may only take a few moments to get the answers you need.
2. Write down the events that led to the problem. Have you changed anything in your computer recently? Are you doing anything differently?

**When contacting Onset Computer Corporation**, please indicate that you need Technical Support for HOBO® products.

Be prepared to:

1. Provide the product number which is found on the bottom of the logger, the software version and serial number if present on the disk.
2. Provide details on the hardware and software configuration of your computer including: manufacturer, model number, peripherals, and version of operating system.
3. Completely describe the problem or question. The more information you provide, the faster and more accurately we will be able to respond.

**NOTE:** Onset allows one technical support contact for each software license.

### Onset Technical Support

Onset Computer Corporation  
470 MacArthur Blvd., Bourne, MA 02532  
Mailing: PO Box 3450, Pocasset, MA 02559-3450  
1-800-LOGGERS (1-800-564-4377)  
Phone: (508) 759-9500  
Fax: (508) 759-9100  
e-mail: loggerhelp@onsetcomp.com  
[www.onsetcomp.com](http://www.onsetcomp.com)

## Warranty

The HOBO® products are warranted to be free from defects in material and workmanship for a period of one year from the date of original purchase. During the warranty period Onset will, at its option, either repair or replace products that prove to be defective. This warranty is void if the Onset products have been damaged by customer error or negligence or if there has been an unauthorized modification.

### Returning Products to Onset

**Direct all warranty claims to place of purchase.** Before returning a failed unit, you must obtain a Return Merchandise Authorization (RMA) number from Onset. You must provide proof that you purchased the Onset product(s) directly from Onset (purchase order number or Onset invoice number). Onset will issue an RMA number that is valid for 30 days. You must ship the product(s), properly packaged against further damage, to Onset (at your expense) with the RMA number marked clearly on the outside of the package. Onset is not responsible for any package that is returned without a valid RMA number or for the loss of the package by any shipping company. Loggers must be clean and free of any toxins before they are sent back to Onset or they may be returned to you.

### Repair Policy

Products that are returned after the warranty period or that are damaged by the customer as specified in the warranty provisions can be returned to Onset with a valid RMA number for evaluation.

### ASAP Repair Policy

For an additional charge, Onset will expedite the repair of a returned product.

### Optional Services

Please contact Onset for more information and prices on:

#### Data-back™ Service

HOBO® data loggers store data in nonvolatile EEPROM memory. Onset will, if possible, recover your data to a disk.

#### Tune Up™ Service

Onset will examine and retest any HOBO® data logger.