

The above times are intended only as guidelines. For critical field applications of long duration we recommend installing a fresh battery before each deployment. We recommend replacing the HOBOb's battery and O-rings simultaneously (Onset battery/service kit part #HP-BK includes battery, O-ring, stainless steel self-sealing screw with O-ring, O-ring lubricant and jack cap.)

### Changing or Accessing the Battery

If you can, offload the logger before changing the battery. This will ensure that no data will be lost (See Non-Volatile Memory below). To change the battery, open the case by removing the Phillips screw in the center of the back of the logger and removing the stainless steel back plate. Remove the old battery and install the new one.

Be careful to put the battery in the battery holder with the correct polarity (Diagram B). The logger's red LED will blink three times after the battery has been installed. If you have difficulty seeing the LED flash, use the battery check in the Launch dialog box of the logger software to verify the battery status. **Warning: Do not cut open, incinerate, heat above +185°F (+85°C) or recharge the removed lithium battery. Dispose per local regulations.**

*Note: Before replacing the back plate, check that the logger seals (O-ring, screw, jack cap) are not contaminated by dust, dirt or other materials. All components must be cleaned of any contaminants to ensure a weathertight seal. Make sure the back plate O-ring has a light film of lubricant (Dow Corning DC 111 or Nye Lubricants NYOGEL). Insert the O-ring in the groove and replace the back plate using the screw with O-ring. The screw should be tightened until it is snug (10 inch-pounds). Do not use lubricant on jack cap.*

### Non-Volatile Memory

The HOBOb Pro uses a high-capacity Flash EEPROM to store data. This storage is non-volatile and will retain the data even if the battery is removed. To save power and maximize the life of the flash memory device, 32 bytes of data are buffered in RAM prior to writing to the flash memory. In the case of a dead battery, or the unlikely event that power is interrupted during logging, the data in this RAM buffer will be lost. For example, if the sample interval was set to one half hour and one channel with low resolution, then up to 16 hours of data could be lost.

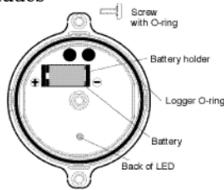


Diagram B- HOBOb Pro Series back with cover removed

### Service and Support

HOBOb® 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 HOBOb® products.

Be prepared to:

1. Provide the product number which is found on the side 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 provides technical support to one person 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 HOBOb® 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.

Please contact Onset for more information and prices on:

#### ASAP Repair Policy

Onset will expedite the repair of a returned product.

#### Data-back™ Service

HOBOb® 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 HOBOb® data logger.

## HOBOb® H8 Pro Series User's Manual

Requires Onset Computer Corporation's BoxCar® Pro 3.5 or BoxCar® 3.6 or later software and PC interface 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 HOBOb H8 Pro Series is shipped with:

1. One HOBOb H8 Pro Series logger (part numbers H08-030-08, H08-031-08, or H08-032-08)
2. Mounting Accessories:  
Two self-tapping screws  
Hook and loop tape

**Thank you** for buying a HOBOb H8 Pro Series data logger. With proper care it will give you years of accurate and reliable measurements.

This manual covers all of the HOBOb H8 Pro Series products. All products share a common feature set, store up to 65,291 time-stamped measurements, and are compatible with the HOBOb Shuttle (Part number H09-002-08) and HandCar software for Palm™ handhelds allowing for convenient retrieval of data. The measurements available on each model are:

Model	Part Number	Temp	RH	External Temp
HOBOb Pro Temp	H08-030-08	4		
HOBOb Pro Temp/External Temp	H08-031-08	4		4
HOBOb Pro RH/Temp	H08-032-08	4	4	

Unlike most other HOBObOs, the HOBOb Pro does not have the wrap-around-when-full option for storing data; its large memory capacity eliminates the need for this function in most cases.

### Common Specifications

Operating range (logger): -30°C to +50°C (-22°F to +122°F),

0 - 100% RH, HOBOb Pro RH/Temp should be mounted so that water does not impact or collect in the RH sensor.

RH Sensor operating environment: 0°C to +50°C (+32°F to +122°F) in intermittent condensing environments up to +30°C; and above +30°C in non-condensing environments. Sensor requires protection from rain, splashing, mist, dust, and airborne chemicals such as salt and ammonia.

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

Measurement capacity: 65,291 standard-resolution

(8-bit) measurements, 32,645 high-resolution (12-bit) measurements or 21,763 measurements if one channel uses standard-resolution and the other channel uses high-resolution. RH measurements use standard resolution only. All measurements are stored in nonvolatile memory, with seven levels of data archiving (See Non-Volatile Memory).

Data offload time: 1 minute typical

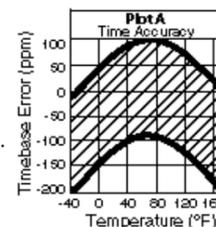
Size: 4.0" H x 3.2" W x 2.0" D

Weight: Temp and RH/Temp are approx. 3.7 oz. and Temp/Temp External is 5.1 oz.

Battery: 1/2 AA, lithium, 3.6V, user-replaceable (Use only Onset part # HP-B)

Battery life (continuous use): 3 years

Storage temperature: -30°C to +75°C (-22°F to +167°F)



**NOTE:** The logger software's absolute humidity calculation does not use an actual pressure measurement but assumes an ambient pressure of 1 atmosphere (14.7 PSI.)

## Measurement Specifications

**Temperature** - Each HOBO Pro Series logger has an internal temperature sensor mounted inside the front of the logger's case (Diagram A). The sensor measures ambient air temperature over the operating range of the logger; -30°C to +50°C (-22°F to +122°F) with a response time of less than thirty-five minutes (typical to 90%) in still air. The HOBO Pro Series loggers have a standard and a high-resolution mode which are selectable in the logger's software. For temperature accuracy and resolution specifications, please refer to Plot B for standard-resolution mode and Plot C for high-resolution mode. See "Selecting Channels and Resolutions" for more information.

**External Temperature** - The HOBO Pro Temp/Ext Temp is equipped with a 6' external temperature sensor which measures temperature from -40°C to +100°C (-40°F to +212°F) with a response time of less than 3 minutes typical to 90% in air moving 1 m/sec (2.2 mph). See plot B and C for accuracy and resolution specifications in the two resolution modes. For loggers with serial numbers greater than 593938 the sensor tip and cable can be buried in soil or immersed in fresh water up to +50°C (+122°F) for up to one year.

**Relative Humidity** - The HOBO's relative humidity sensor has an accuracy of  $\pm 3\%$  over the range of 0 to 50°C (32° to 122°F). The relative humidity sensor range is 0 to 100% RH. It can read up to 104.1% in a condensing environment. While the sensor is saturated, you will not get accurate readings. In general, the RH response time is less than 5 minutes typical to a 90% change (independent of temp). Drift is less than 1% per year in normal operating conditions (non-corrosive, non-condensing). An additional temporary drift of up to 3% can occur when the average humidity is above 70%. Factory verification and tune-up service available. White RH sensor case may yellow with exposure to light. This is not a problem.

## Connecting the Communications Cable and Launching

A Starter Kit, which includes the appropriate PC interface cable and software, is required to operate your logger. Unscrew the jack cap from the logger. You can store it temporarily by pushing it onto the cap holder (Diagram A). Connect the interface cable into the 3.5 mm jack on the logger and into a working serial port on 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 logger software manual.

When launching a logger, the software defaults to the parameters specified the last time the logger was launched. The factory default is to select all channels with high-resolution mode for temperature measurements. See "Selecting Channels and Resolutions" for details.

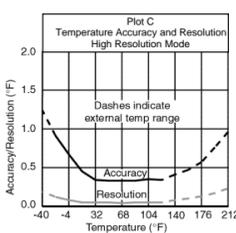
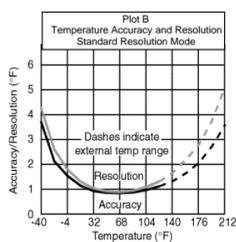
## Operation Indicator

The HOBO data loggers have a red LED that blinks while they are logging. The blinking LED is located inside the 3.5 mm jack and is only visible when the PC interface cable and jack cap are removed (Diagram A). The LED blinks brightly at every measurement, and weakly every two seconds if the interval between measurements is longer than two seconds. Once you have verified the operation of the logger, rescure the jack cap, making sure there is no dust or dirt on the cap that might compromise the integrity of the weatherproof seal. Hand tighten lightly. The cap only needs to be snug. If it is overtightened it may require a pair of pliers to unscrew.

## Operation on Computers Equipped with a Power Conservation Mode

Many newer computers, especially laptops, have a power conservation feature which shuts the serial port off after a short period of time. If a HOBO or StowAway logger is still connected to the serial port when this happens, the logger will shut off. To resolve power conservation shut off of the serial port, BoxCar Pro 4.0, 4.1, and 4.2.x customers should download the BoxCar Pro 4.2.10.1 or later upgrade patch. Similarly, BoxCar 3.6 and 3.7.1 customers should download the BoxCar 3.7.3 or later upgrade patch. Both are available for free on our website under Support and Upgrades, Software Upgrades and Utilities. If you have an earlier version of BoxCar and you would like to test to see if you will be affected by the power conservation feature do the following. Using BoxCar, launch your logger from the computer that you are testing. If you are using a laptop, it may behave differently when running off battery versus running off the power plug; please test both. After launch, leave the logger attached to the PC interface cable and watch the LED to see if it remains blinking. When a logger is actively logging, the LED will blink faintly every 2 seconds. If the power conservation is causing a problem, the LED will stop blinking within one minute.

When you are using a HOBO Pro logger, the LED is located under the PC interface cable, and is not visible when the cable is plugged in. To test a HOBO Pro, launch the logger to take readings at 10 second intervals. Leave the logger attached to the interface cable for one minute. You can either remove the interface cable at this point and check the LED status, or download the datafile to see how many points were collected. If power conservation is causing the logger to shut off, you will only



see one data point in the file. If your computer has the power conservation feature, you should download an upgrade patch as noted above.

## Mounting Options

The HOBO Pro Series data loggers have mounting tabs. Be careful not to stress the case when using the screws to mount the logger to an uneven surface, as this may crack the tabs. The supplied hook and loop tape can be stuck on the back of your HOBO for mounting. Do not use double sided tape on the back of the logger for mounting, as this could disturb the weatherproof seal when the logger is removed.

## HOBO Pro RH Sensor Should not get Saturated

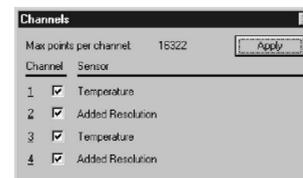
The RH sensor used on the HOBO Pro is among the best in its price range. It is designed for normal outdoor environments with cyclical high and low humidity levels. Saturation of the sensor is evident when the logger reads values of 100% RH or greater. Like all RH sensors, repeated saturation from exposure to condensing environments will lead to irreversible drift and eventually destroy the RH sensor. If this happens, the logger will need to be returned to Onset Computer Corp. for sensor replacement. The rate at which this degradation of the sensor occurs depends on the harshness of the environment to which the sensor is exposed. Condensing environments with temperatures above 30°C (86°F), exposure to salt spray, ammonia vapor, or some other chemicals will accelerate the sensor degradation.

## Mounting considerations in wet environments

The RH/Temp version should be mounted so that the RH sensor is protected from water saturation. To prolong the life of your RH sensor, Onset strongly recommends mounting the HOBO Pro logger (H08-032-08) face down in a protective housing such as the Solar Radiation Shield (Onset part # RS1) or the Rain Shield (Onset part # RS2).

## Readout

Reconnect the HOBO data logger to the 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 logger software manual. The optional HOBO Shuttle can also be used to readout and relaunch the HOBO Pro loggers.



## Selecting Channels and Resolutions

The three HOBO Pro Series loggers covered by this manual all offer the choice of standard-resolution (8-bit) or high-resolution (12-bit) operation for their temperature channel(s). High-resolution mode doubles the amount of memory required by each measurement, reducing the deployment time for each interval setting, but dramatically improving the temperature resolution and accuracy. The high-resolution mode is not available for the RH channel. For high-resolution mode select the sensor and "Added Resolution" on the channel that follows it. For standard-resolution select only the temperature channel. "Added Resolution" should not be enabled unless the corresponding temperature channel is enabled, otherwise the data will be invalid. If you are using the Temp/Ext Temp version, the internal temperature sensor is Channel 1 and the external temperature probe is Channel 3.

## Data Archiving

HOBO Pro Series loggers preserve the data from up to seven deployments preceding the current deployment. You will be able to retrieve data from all eight deployments by using the archive reader function in the logger software. (In some versions of the software it is a separate utility for windows 95/98/NT on the installation disk.) The reader will contact your logger, readout the last eight deployments, display information such as the deployment number, start time, end time, number of points and the description, and then allow you to select which file(s) you would like to save. For more information on the archive reader function, consult your logger software manual or the Archive Reader Utility readme.txt file. This archiving feature provides backup of your measurements in the logger, giving you another level of protection from accidental data loss.

## Battery Life Specifications and Battery Level Indication

The battery level is displayed on the host computer during Launch. For the HOBO Pro Logger this will display one of two states: 98% or 20%. The lowest battery level that will be shown is 20%. Thus if the battery status indicates 20%, the battery is effectively dead and should be replaced immediately. **Launching the logger when the battery level reads 20% risks data corruption and/or data loss.**

In normal usage the HOBO Pro's battery can last up to three years when used with an interval of 1 minute or greater. Battery life is very dependent upon the sample interval and service temperature. See Table 1 for approximate run times at various intervals and service temperatures.

**Table 1. Approximate Operational Battery Life for the HOBO Pro**

Operating Temperature	Logging Interval		
	< 10 seconds	10 secs - 1 minute	1 minute - 1 hour
+104 - +122°F (+40 - +50°C)	~ 3 - 6 months	1/2 - 1 1/2 years	1 1/2 - 2 years
+77 - +102°F (+25 - +39°C)	~ 3 - 6 months	1/2 - 2 years	2 - 3 years
< +77°F (< +25°C)	~ 3 - 6 months	1/2 - 2 1/2 years	2 1/2 - 3+ years