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HOBO UA-004-64 Pendant G Acceleration Data Logger

HOBO UA-004-64 Pendant G Acceleration Data Logger User Manual

Contents

HOBO

HOBO UA-004-64 Pendant G Acceleration Data Logger

HOBO Pendant Event

Data Logger

- Model: UA-004-64

Included Items

- Mounting Bracket
- Screw

Required Items

- HOBOware 2.x or later (go to **www.onsetcomp.com**/ hoboware-free-download)
- USB cable
- Optic USB Base Station (BASE-U-4) or HOBO
- Waterproof Shuttle(U-DTW-1) & Coupler (COUPLER2-A)

The HOBO Pendant G Acceleration Data Logger is a waterproof, three-channel logger with 8-bit resolution and can record up to approximately 21,800 combined x-, y-, and z-axis acceleration readings or internal logger events. The logger uses a coupler and optical base station with a USB interface for launching and data readout by a computer. The logger can be used for a wide variety of experiments, demonstrations and field studies by measuring dynamic acceleration resulting from motion, shock, or vibration.

It can also detect static acceleration of gravity, making it possible to measure tilt, activity, and inclination. The logger uses an internal three-axis accelerometer with a range of ± 3 g based on micromachined silicon sensors consisting of beams that deflect with acceleration. These beams are arranged to act as a variable capacitor. As the beams move, the capacitance changes proportionately. This capacitance change is converted to voltage, filtered and measured by the logger, and displayed in the software in units of g-force.

Specifications

|	
Measurement Range	±3 *g*; 29.4 m/s² (96.5 ft/s²)
Accuracy	±0.075 *g*; 0.735 m/s² (2.41 ft/s²) at 25°C (77°F)
	±0.105 *g*; 1.03 m/s² (3.38 ft/s²) from -20°C to 70°C (-4°F to 158°F)
Resolution	0.025 *g*; 0.245 m/s² (0.8 ft/s²)
Logging Interval	1 second to 18 hours, 12minutes, 15 seconds in Normal mode
	0.01 seconds (100 Hz) to 0.99 seconds (1.01 Hz) in Fast mode
Time Accuracy	±1 minute per month at 25°C (77°F), see Plot A
Operating Range	In water/ice: -20° to 50°C (-4° to 122°F)
	In air: -20° to 70°C (-4° to 158°F)
Water Depth Rating	30 m from -20° to 20°C (100 ft from -4° to 68°F), see Plot B
Battery Life	1 year typical use in Normal mode; deployments in extremely cold or hot temperatures or logging intervals faster than one minute may significantly reduce battery life.
	7 days logging at 0.01 seconds (100 Hz) in Fast mode
Memory	64K bytes (approximately 21.8K combined x-, y-, and z-axis readings or events)
Materials	Polypropylene case; stainless steel screws; Buna-N o-ring
Weight	18 g (0.6 oz)
Dimensions	58 x 33 x 23 mm (2.3 x 1.3 x 0.9 inches)
Environmental Rating	IP68; not rated for use in direct sunlight.
CE	The CE Marking identifies this product as complying with all relevant directives in the European Union (EU).
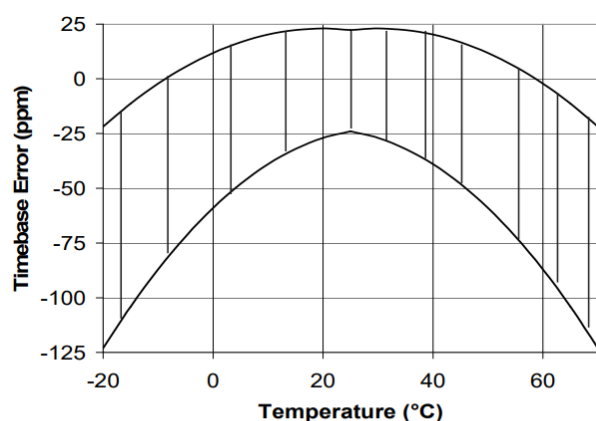
Plot A
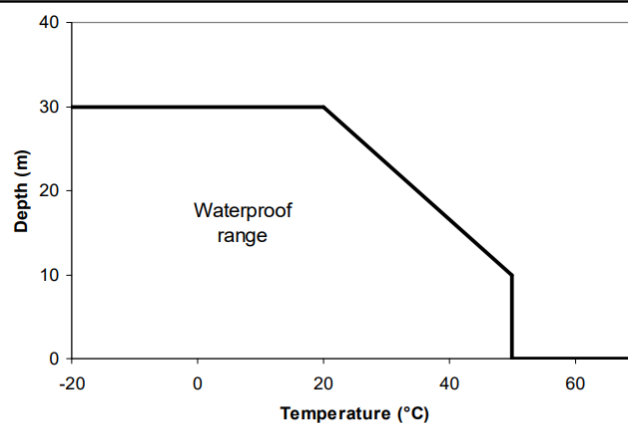
Plot B

Connecting the Logger to a Computer

The HOBO Pendant G logger requires HOBOware Pro or HOBOware Lite and the following to connect to the computer:

- Optic USB Base Station (BASE-U-4) or HOBO Waterproof Shuttle (U-DTW-1); coupler (COUPLER2A)
- If possible, avoid connecting at temperatures below 0°C (32°F) or above 50°C (122°F).

1. Plug the USB connector on the base station into an available USB port on your computer.
2. Insert the logger and the base station into the coupler, as shown in the following diagram.

3. For BASE-U-4 or the HOBO Waterproof Shuttle, firmly insert the optical end of the base station into the D-shaped end of the coupler, and make sure that the ridge on the logger is aligned with the groove in the coupler.
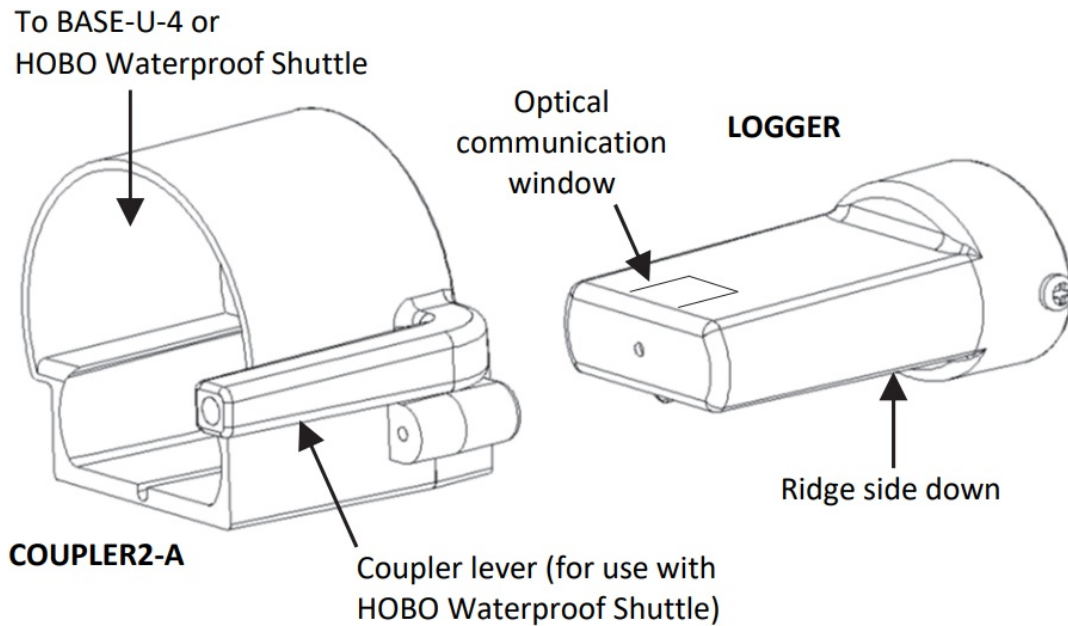
4. If you are using the HOBO Waterproof Shuttle, briefly press the coupler lever to put the shuttle into base station mode.

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

6. Use the logger software to set up the alarms, launch, and read out the logger.

7. You can read out the logger or check its status while it continues to log (in Normal logging mode only), stop it manually with the software, or let it record data until the memory is full.

8. Refer to the software user's guide for complete details on launching, reading out, and viewing data from the logger.

Important: Do not cover the optical communication window in the logger (shown in the diagram above) with a label or sticker as that may interfere with the communications with the base station or shuttle.

Triggered Start
This logger can be configured to start at your command, using the magnet in the coupler to trigger a start. (To log in Fast mode, this is the only way to launch the logger.)

1. Use HOBOware to launch the logger with Using Coupler selected. Remove the logger from the coupler.

2. Bring the logger and an empty coupler or strong magnet to the deployment location.

Important: Any magnet can trigger a start. This can be helpful, but it can also cause a premature start. Keep the logger away from strong magnetic fields until you are ready to begin logging. When you are ready for the logger to start logging, insert the logger into the empty coupler (or place it next to a strong magnet) and remove it after three seconds.
Important: The logger will not launch if the base station is in the coupler.
Verify that the logger's light is blinking at least every four seconds.

Sample and Event Logging
While logging in Normal mode, the logger can record two types of data: samples and internal logger events. Samples are the measurements recorded at each logging interval (for example, x-axis acceleration every minute). 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. Events are not logged in Fast mode.

Normal vs. Fast Logging Modes
When you launch the logger, you can choose between Normal mode and Fast mode. In Normal mode, the logger's fastest logging interval is once per second. Normal mode is ideal for applications involving tilt, activity, and inclination. These
applications do not require information about the dynamics of the acceleration events but rely more on the static acceleration of gravity.

Fast mode allows logging intervals between 0.01 and 0.99 seconds (100 to 1.01 Hz), making it ideal for applications involving vibration and shock. These applications are more concerned with the dynamics of the acceleration events over short periods, and would not be captured in Normal mode. Important: Connecting the logger to the computer (or a shuttle) when logging in Fast mode will stop the logger.

The logger's memory can store roughly 60,000 measurements. The time required to fill this memory depends on how many channels and events are being logged, as well as the logging interval. For example, if you log x-, y-, and z-axis acceleration at 100 Hz, the logger's memory will fill up in less than four minutes. An estimated duration, based on the logging interval and channels you select, is displayed in the Launch Logger window in HOBOware.

Operation
A light (LED) on the front of the logger confirms the logger operation. The following table explains when the light blinks during logger operation.

When:	The light:
The logger is awaiting a start because it was configured to start logging	Blinks once every eight seconds until logging begins
At Interval, On Date/Time, or Using Coupler	
Logger is subjected to a magnetic field	Blinks once every second when the magnet is present, then (Normal mode only) blinks rapidly three times when logging begins.
Logger is logging in Normal mode	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 logging in Fast mode	Blinks once every quarter-second

Temperature Range	Desiccant Maintenance Schedule
Less than 30°C (86°F)	Approximately once per year
30° to 40°C (86° to 104°F)	Approximately every six months
Over 40°C (104°F)	Approximately every three months

Mounting the Logger
The provided mounting bracket offers two orientation options for securing the logger to a rigid surface. Secure the bracket to the object of interest, then use the mounting screw provided to attach the logger to the bracket.
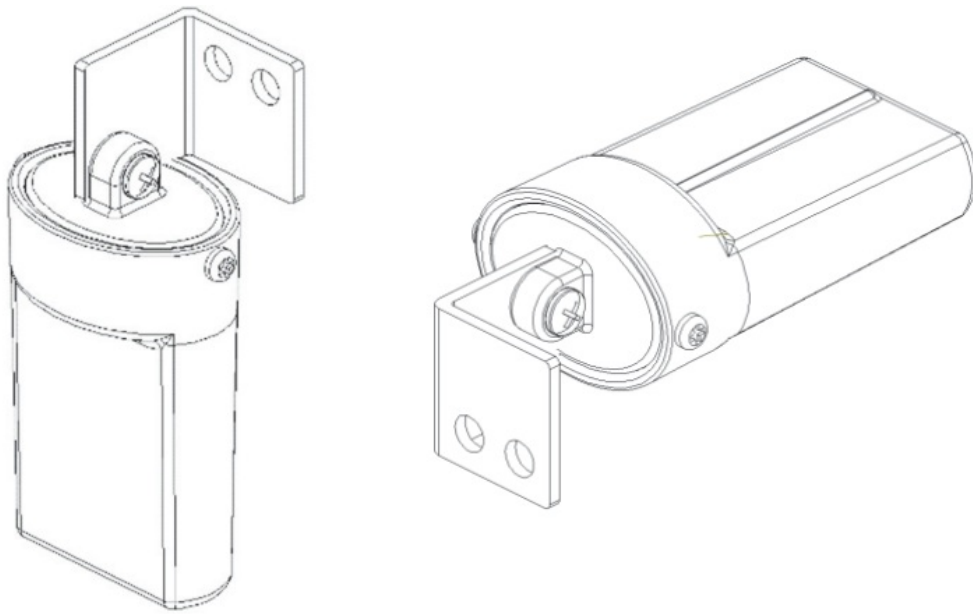
Protecting the Logger
The logger can be damaged if the water depth rating is exceeded. The depth rating is approximately 30 m (100 ft) at temperatures below 20°C (68°F) but is less in warmer water. Refer to Plot B for details. Do not store the logger in the coupler. Remove the logger from the coupler when you are not using it. When the logger is in the coupler or near a magnet, it consumes more power and will drain the battery prematurely.

Keep the logger away from magnets. Being near a magnet can cause false coupler events to be logged. It can also launch the logger prematurely if it is waiting for a trigger start.
Note: Static electricity may cause the logger to stop logging. To avoid electrostatic discharge, transport the logger in an antistatic bag, and ground yourself by touching an unpainted metal surface before handling the logger. For more information, search for "static discharge" on **www.onsetcomp.com**.

Periodically inspect the desiccant and dry it if it is not bright blue. The desiccant pack is located in the cap of the logger. To dry the desiccant, remove the desiccant pack from the cap and leave the pack in a warm, dry location until the bright blue colour is restored. (Refer to the Battery section for instructions on removing and replacing the logger cap.)

Factory Calibration

The logger is factory-calibrated and does not require any additional calibration. To verify proper calibration, check the logger's status (when it is not logging) in the HOBOware software to check the logger's response to gravity. When any of the axes are held horizontally, you should see a reading close to zero. When held vertically, with the arrow facing downwards, the response should be close to 1 g.
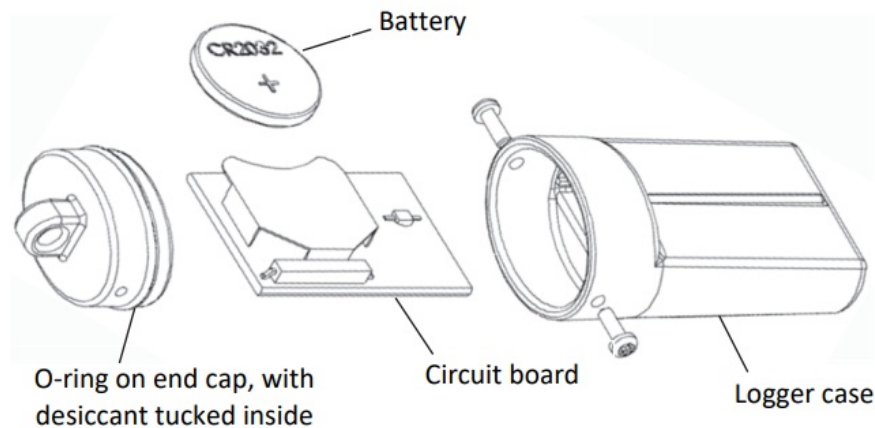
Battery
The logger requires one 3-Volt CR-2032 lithium battery. Battery life varies based on the temperature and the frequency at which the logger is recording data (the logging interval). A new battery typically lasts one year with logging intervals greater than one minute. Deployments in extremely cold or hot temperatures, or logging intervals faster than one minute, may significantly reduce battery life. Continuous logging at the fastest logging rate of 0.01 seconds (100 Hz) will deplete the battery in as little as one week.

Replacing the Battery
Before you begin: You will need a small Philips head screwdriver and silicone-based O-ring grease, such as Parker Super-O-Lube, to complete these steps (no petroleum-based lubricants). The logger should be wiped clean and dried completely before opening it.

To replace the battery

1. Avoid electrostatic discharge while handling the logger and internal circuit board; ground yourself by touching an unpainted metal surface. Hold the circuit board by its edges and avoid touching electronics.
2. Working on a clean, dry surface, remove the two screws that secure the end cap to the case and remove the cap.
3. Examine the desiccant pack that is tucked into the cap.
4. If the desiccant is not bright blue, put the desiccant pack in a warm, dry place until the blue colour is restored. Or, for faster drying, the desiccant can be dried for two hours in a 70°C (160°F) oven.
5. Gently tap the case to loosen the circuit board and remove it from the case.

6. Carefully push the battery out of the holder with a small, nonmetallic blunt instrument.
7. Insert a new battery, the positive side facing up.
8. Return the circuit board and label to the case, carefully aligning the circuit board with the grooves in the case so that the battery faces the ridged side of the case
9. Remove the O-ring from the end cap. Use the thumb and finger of one hand to hold the cap from the top and bottom, and use the thumb and fingers of your other hand to slide the O-ring to form a loop as shown.

10. Use this loop to roll the O-ring off the cap.
11. Inspect the O-ring for cracks or cuts and replace it if any are detected (the O-ring is included in the Pendant replacement parts kit, UA-PARTSKIT).
12. Using your fingers (not cloth or paper), spread a small dot of silicone-based grease on the O-ring, just enough to moisten it all the way around and make sure that the entire O-ring surface is completely coated with grease.
13. As you work the grease into the O-ring, make sure there is no grit or debris on the O-ring.
14. Place the O-ring back on the end cap, making sure it is fully seated and level in the groove.
15. Make sure the O-ring is not pinched or twisted and that no dirt, lint, hair, or any debris is trapped on the O-ring. This is necessary to maintain a waterproof seal.
16. Very slightly grease the inside rim of the case, especially around the screw holes with the silicone grease, just enough to moisten the inside edges without touching any circuitry.

17. Make sure that there is no excess lubricant that could get onto the logger electronics or label. Make sure there is no debris on this surface.
18. Check that the desiccant pack is tucked into the cap.
19. Carefully push the end cap into the lubricated case until the screw holes are aligned. Visually check that the O-ring forms a uniform seal all around.
20. Re-fasten the screws. Tighten the screws until you feel they hit the bottom of the screw holes, but not so tight that they distort the clear housing.

    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.

U.S. and International Sales: 1-508-759-9500
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companies. Patent # 6,826,664

Documents / Resources

HOBO UA-004-64 Pendant G Acceleration Data Logger [pdf] User Manual
UA-004-64 Pendant G Acceleration Data Logger, UA-004-64, Pendant G Acceleration Data Logger, Acceleration Data Logger, Data Logger, Logger

References

- **Onset HOBO and InTemp Data Loggers**
- **Onset HOBO and InTemp Data Loggers**
- **Technical Support | Onset's HOBO and InTemp Data Loggers**
- **User Manual**