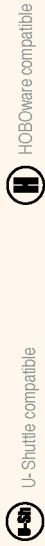


indoor HOB0® U12 Family 12-Bit Loggers with Direct USB Interface

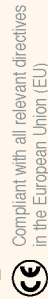
HOB0 U12 loggers contain internal sensors and/or accept a wide range of external sensors/input cables to enable users to easily and affordably monitor temperature, humidity, light intensity, and other measurements required for indoor energy, HVAC/R, and industrial projects. U12 loggers provide 12-bit resolution for detecting greater variability in recorded data, direct USB connectivity for convenient, high-speed data offload, and a 43K measurement capacity. Operation of U12 Family loggers requires Onset's easy-to-use HOB0ware® (Windows or Mac) software for logger launch, offload, and data viewing (see page 48).

HOB0 U12 Logger Family Features

- 12-bit resolution
- 64K memory (43,000 12-bit measurements)
- Fast download via direct USB interface
- Windows or Mac software available
- Programmable Start time/Date or Push-button start
- Programmable sampling rate (1 second to 18 hours)
- Numerous event types (button push/release, host PC connection, low battery), stored to data file asynchronously during logging
- Battery level indication at launch
- Battery level can be recorded as a separate channel
- Allows continued logging during data download
- Blinking LED confirms operation
- 1-year battery life (typical) – user-replaceable CR-2032 lithium battery
- Non-volatile memory retains data even if battery fails
- NIST-traceable temperature accuracy certification available
- Operating Range: -20° to 70°C (-4° to 158°F), 5% to 95% RH non-condensing, non-fogging
- Patented technology (U.S. Patent 6,826,664)



U-Shuttle compatible



Compliant with all relevant directives in the European Union (EU)



Size: 5.8 x 7.4 x 2.2 cm
(2.3 x 2.9 x 0.85")
Weight: 46 g (1.6 oz)

HOB0 U12 Temperature Data Logger Part # U12-001

Single-channel USB temperature logger with 12-bit resolution.

Key Specifications

- Measurement Range: -20° to 70°C (-4° to 158°F)
- Accuracy: ±0.35°C from 0° to 50°C (±0.63°F from 32° to 122°F)

HOB0 U12 Temp/RH/Light/ External Data Logger Part # U12-012

Four-channel 12-bit USB logger provides high-accuracy temperature, relative humidity and relative indoor light level measurements. Versatile external channel accepts a wide range of external sensors and input cables (External Temp, AC Current, AC Voltage, CO₂, 4-20 mA and DC Voltage cables found on pgs. 7 and 8).

Key Specifications

- Temperature Measurement Range (internal sensor): -20° to 70°C (-4° to 158°F)
- Accuracy: ±0.35°C from 0° to 50°C (±0.63°F from 32° to 122°F)
- Relative Humidity Measurement Range (internal sensor): 5% to 95% RH
- Accuracy: ±2.5% RH from 10% to 90% typical
- Light Intensity Measurement Range (internal sensor): 1 to 3000 footcandles (lumens/ft²) typical
- External Input Channel Measurement Range (See external sensor options found on pgs. 7 and 8): 0 to 2.5 DC Volts
- Accuracy: ±2mV ±2.5% of absolute reading

HOB0 U12 Temp/RH Data Logger Part # U12-011

Two-channel USB temperature/relative humidity logger with high-accuracy internal sensors, direct USB interface and 12-bit resolution.

Key Specifications

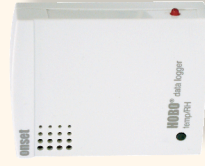
- Temperature Measurement Range: -20° to 70°C (-4° to 158°F)
- Accuracy: ±0.35°C from 0° to 50°C (±0.63°F from 32° to 122°F)
- Relative Humidity Measurement Range: 5% to 95% RH
- Accuracy: ±2.5% RH from 10% to 90% typical

HOB0 U12 Temp/RH/ 2 External Data Logger Part # U12-013

Versatile four-channel 12-bit USB logger has high-accuracy temperature and relative humidity sensors. Two external channels accept a wide range of external sensors (External Temp, AC Current, AC Voltage, CO₂, 4-20 mA and DC Voltage cables found on pgs. 7 and 8).

Key Specifications

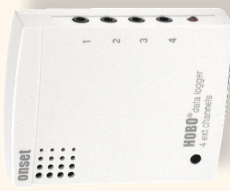
- Temperature Measurement Range (internal sensor): -20° to 70°C (-4° to 158°F)
- Accuracy: ±0.35°C from 0° to 50°C (±0.63°F from 32° to 122°F)
- Relative Humidity Measurement Range (internal sensor): 5% to 95% RH
- Accuracy: ±2.5% RH from 10% to 90% typical
- External Input Channel Measurement Range (See external sensor options found on pgs. 7 and 8): 0 to 2.5 DC Volts
- Accuracy: ±2mV ±2.5% of absolute reading



Indoor

HOBO U12 4 External Data Logger

Part # U12-006



Four channels of 12-bit external input accept a wide range of external sensors, including Temp, AC Current, AC Voltage, CO₂, 4-20mA and DC Voltage cables (see at right and page 8).

Key Specifications

External Input Channel Measurement Range (see external sensor options found on pages 7 and 8): 0 to 2.5 DC Volts
Accuracy: $\pm 2\text{mV} \pm 2.5\%$ of absolute reading

Detailed Family Specifications

Time accuracy: ± 61 seconds per month at 25°C (77°F)

Temperature (see plot a)

Accuracy: $\pm 0.35^\circ\text{C}$ from 0 to 50°C ($\pm 0.63^\circ\text{F}$ from 32° to 122°F)

Resolution: 0.03°C at 25°C (0.05°F at 77°F)

Drift: 0.1°C/year (0.2°F/year)

Response time in airflow of 1m/s (2.2mph): 6 minutes, typical to 90%

Relative Humidity

Accuracy: $\pm 2.5\%$ RH from 10% to 90% over the range 10° to 50°C (50° to 122°F) typical; $\pm 3\%$ RH from 5% to 95% (see plot b);

conditions above 80% RH and 60°C (140°F) may cause additional error

Resolution: 0.03% RH

Hysteresis: 1% RH

Drift: <1% RH per year typical

Response time in airflow of 1 m/s (2.2 mph): 1 minute, typical to 90%

Light Intensity

Designed for indoor measurement of relative light levels 1 to 3000 footcandles (lumens/ft²) typical; maximum value varies from

1500 to 4500 footcandles (lumens/ft²)

Light wavelength response (see plot c)

External Input

(Accepts Temperature sensors, Split Core CTs for AC current, AC Voltage

Transmitters, CO₂, 4-20mA and 0-2.5V DC input cables for use with

third-party sensors (at right and page 8)

External Input Details*

Input range: 0 to 2.5 DC volts

Accuracy $\pm 2\text{mV}$, $\pm 2.5\%$ of absolute reading

Resolution: 0.6 mV (12 bit)

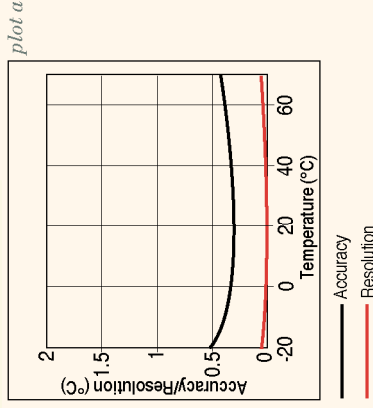
Output power: 2.5 DC Volts at 2mA, active only during measurements

Max. recommended source impedance: 2.5 K Ω

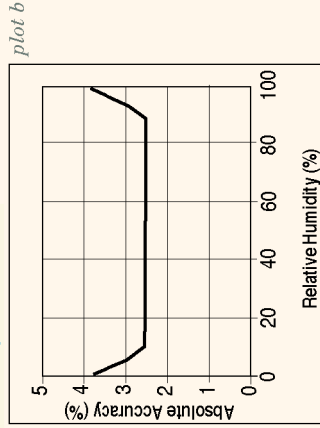
* The grounds of all voltage and/or current sources must be at the same voltage potential before you connect them to the logger to avoid inaccurate readings or damage to the logger and input cables.

Detailed Specifications

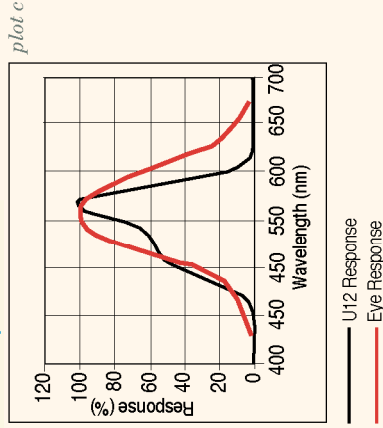
Temperature Accuracy



RH Accuracy



Spectral Response



HOBO U12 and H8

External Sensors and Input Cables

Cables on this page can be plugged directly into the external input jacks of U12 or H8 Family loggers to expand the range of measurement options and applications. Accuracy specifications of temperature sensors reflect the combined performance of the logger and sensor.

Air/Water/Soil Temperature Sensors (Part # TMCx-HD)

Range: -40° to 50°C (-40° to 122°F) in water or soil; -40° to 100°C (-40° to 212°F) in air

Accuracy: w/H8; $\pm 0.5^\circ$ at 20°C ($\pm 0.9^\circ$ at 68°F);

w/U12; $\pm 0.25^\circ$ at 20°C ($\pm 0.45^\circ$ at 68°F)

Resolution: w/H8; 0.41° at 20°C (0.7° at 68°F);

w/U12; 0.03° at 20°C (0.05° at 68°F)

Response time: in air moving 1 m/sec (2.2 mph):

3 min. typical to 90%; in stirred water: 1 min. typical to 90%

Sensor diameter: 0.5 cm (0.20")

Note: Sensor tip and cable immersion in fresh water up to 50°C (122°F) for 1 year; radiation shield recommended for use in sunlight.



Stainless Steel Temperature Probe (Part # TMC6-HC)



10.2 cm (4") food-grade stainless-steel probe with pointed tip;

0.3 cm (0.12") diameter, 1.8 m (6") cable

Range: -40° to 100°C (-40° to 212°F) in air or water (tip only)

Accuracy: w/H8; $\pm 0.5^\circ$ at 20°C ($\pm 0.9^\circ$ at 68°F)

w/U12; $\pm 0.25^\circ$ at 20°C ($\pm 0.45^\circ$ at 68°F)

Resolution: w/H8; 0.41° at 20°C (0.7° at 68°F)

w/U12; 0.03° at 20°C (0.05° at 68°F)

Response time in air moving 1 m/sec (2.2 mph)

3 min. typical to 90%;

in stirred water 15 sec. typical to 90%

4-20mA Cable (Part # CABLE-4-20mA)

Range: 0 to 20.1 mA

Accuracy: w/H8 ± 0.1 mA $\pm 2.5\%$ of reading;

w/U12; ± 0.02 mA $\pm 2.5\%$ of reading

Resolution: w/H8 0.4% of full scale;

w/U12: 0.03% of full scale

45.7 cm (18") cable with 8.9 cm (3.5") tinned

braided wire leads



Voltage Input Cable (Part # CABLE-2.5-STEREO)

1.8 m (6") cable with 1.27 cm (0.5") tinned braided wire leads

For voltage input specifications, refer to the specifications of the model you will be using.



Additional sensors/cables on pg. 8.

indoor

HOBO® U12 4 External Data Logger (Part # CTV-x)

Ranges available (AC Amps): 0-20, 0-50, 0-100, 0-200, 0-600
 Accuracy: w/H8; ± 5% of full scale; w/U12; ± 4.5% of full scale
 Response time (from 10% to 90% of amplitude):
 CTV-A approximately 440 milliseconds
 CTV-B approximately 200 milliseconds
 CTV-C approximately 100 milliseconds
 CTV-D approximately 450 milliseconds
 CTV-E approximately 490 milliseconds

Input current: AC current, sine wave, single phase
 50 Hz or 60 Hz, load power factor 0.5 to 1.0 lead or lag
 Voltage rating: 600 VAC
 UL listed

Operating range: 0° to 60°C (32° to 140°F)
 CTV-A, -B, -C: 0° to 40°C (32° to 104°F) CTV-D, -E
 Construction and operating environment:
 Molded plastic housing for indoor use per UL508.
 All units have opening leg that snaps into place
 1.8 m (6') cable compatible w/ H8 and U12 external inputs
 Leg on CTV-D and E-units is removable.

*Note: AC current sensors are not CE approved.

Part #	Range	Window	Outer Length	Outer Width	Height
CTV-A	0-20 Amps AC	2.8 x 2.3 cm	7.4 cm	6.6 cm	2.5 cm
		1.1 x 0.9"	2.9"	2.6"	1.0"
CTV-B	0-50 Amps AC	2.8 x 2.3 cm	7.4 cm	6.6 cm	2.5 cm
		1.1 x 0.9"	2.9"	2.6"	1.0"
CTV-C	0-100 Amps AC	2.8 x 2.3 cm	7.4 cm	6.6 cm	2.5 cm
		1.1 x 0.9"	2.9"	2.6"	1.0"
CTV-D	0-200 Amps AC	3.8 x 3.3 cm	9.9 cm	11.9 cm	2.8 cm
		1.5 x 1.3"	3.9"	4.7"	1.1"
CTV-E	0-600 Amps AC	7.4 x 6.4 cm	13.5 cm	15.0 cm	2.8 cm
		2.9 x 2.5"	5.3"	5.9"	1.1"

ConLab AC Voltage Transmitters -Self-Powered (Part # T-CON-ACT-xxx)

Requires Input Cable for use with U12 and H8 loggers (CABLE-4-20mA)
 For use with HOBO FlexSmart logger, see page 14 (requires FlexSmart Analog Module Part # S-FS-CVIA)

Because these sensors tie directly into the line, they should be used only by qualified personnel.
 Ranges: 90-150, 180-300 volts RMS
 Sensor accuracy: < +/-0.1% of span (20% to 120% of range) +/-0.25% of span (10% of range)
 Over range: +20% of span



Size/Weight:
 11.4 x 7.3 x 3.25 cm
 (4.49 x 2.87 x 1.28")
 0.3 kg (10.6 oz.)

ConLab AC Voltage continued

Over load: +40% of span
 Frequency: 60 Hz AC
 Supply: Self-powered
 Output: 0-20 mA
 Response time to 90%: <240 msec
 Operating Conditions: -20° to 70°C (-4° to 158°F); 5-95% RH, non-condensing
 Housing: Plastic polycarbonate
 Protection Level:
 Box: According to IP-50 DIN 40050
 Terminals: According to IP-10 DIN 40050
 Mounting: Standard 35mm DIN rail

Telaire CO₂ Monitor (Part # TEL-7001)

For use with HOBO FlexSmart logger, see p.17
 Requires CO₂ to logger cable (CABLE-CO2)

Carbon Dioxide:
 Measurement/display range: 0 to 10,000 ppm
 HOBO H8/U12 Logger input range: 0 to 2,500 ppm (0 to 2.5 VDC input)
 Accuracy: +/-50 ppm or +/-5% of reading, whichever is greater
 Resolution: +/-1 ppm
 Repeatability: +/-20 ppm
 Temperature Dependence: +/-0.1% of reading per °C or +/-2 ppm per °C, whichever is greater, referenced to 25°C
 Pressure Dependence: 0.17% of reading per mb (0.13% of reading per mmHg) (corrected via user input for elevation)
 Annual Drift: +/-20 ppm typical
 Response Time: <60 seconds for 90% of step change
 Operating Conditions: 0° to 50°C (32° to 122°F) 0 to 95% RH, non-condensing.

Temperature:**
 Display: 0° to 50°C (32° to 122°F)
 Display Resolution: 0.1°C (0.1°F)
 Display Options: °C, °F, or Off. Set with panel button
 Accuracy: +/-1°C (+/-2°F)
 Response Time: 20 to 30 minutes (case must reach equilibrium with environment)

** Temp data is not output to HOBO U12 or H8 loggers

Analog output to HOBO Logger:
 CO₂: 0 to 2.5 VDC representing 0 to 2500 ppm
 (0 to 4.0 VDC output range, logger accepts up to 2.5 VDC)

Power:
 Internal: Four AA batteries (not included), 70+ hours operation typical
 External: 6 VDC from external AC/DC adapter, included
 Power Requirements: 100 mA Peak, 20 mA average from 6V
 FCC Class 15 Part B Certified



Size/Weight:
 15.9 x 7.6 x 3.8 cm
 (6.25 x 3 x 1.5")
 304 g (10.7 oz.)

HOBO U12 Family/HOBOware® Software Ordering

Description	Part No.
HOBO U12 Temp	U12-001
HOBO U12 4 External Channels	U12-006
HOBO U12 Temp/RH	U12-011
HOBO U12	
Temp/RH/Light/Ext Channel	U12-012
HOBO U12	
Temp/RH/2 Ext Channels	U12-013
HOBO U-Shuttle (optional)	U-DT-1

HOBOware software and a USB Interface Cable are required for operation of U12 loggers.

HOBOware (Windows) Software BHW-PC
 HOBOware (Mac) Software BHW-MAC
 USB Interface Cable CABLE-USBMB

External Sensors and Cables for U12-006, U12-012 and U12-013 and H8 loggers with external input

Air/water/soil temperature sensors
 1MC1-HD sensor with 0.3 m (1') cable
 TMC6-HD sensor with 1.8 m (6') cable
 TMC20-HD sensor with 6.1 m (20') cable
 TMC50-HD sensor with 15.2 m (50') cable

Stainless steel temp probe
 TMC6-HC
 4-20mA cable
 Voltage input cable
 CABLE-2.5-STEREO

Spill-core AC Current Sensors*
 0-20 Amps AC CTV-A
 0-50 Amps AC CTV-B
 0-100 A mps AC CTV-C
 0-200 Amps AC CTV-D
 0-600 Amps AC CTV-E

* Warranty on CTVs is 5 years from date of shipment

Telaire CO₂ Temp Monitor TEL-7001
 CO₂ to logger cable CABLE-CO2

ConLab AC Voltage Transmitter (requires Voltage Input Cable CABLE-4-20mA) 0 to 150 Volts AC T-CON-
 ACT-150
 0 to 300 Volts AC T-CON-
 ACT-300

See pg. 44 for Waterproof case for U12-001