

MX2311

HOBOb MX2311 Temp/RH+ Solar + Soil EC/VWC/Temp Data Logger

Measures Temperature, RH, Solar Radiation + Soil EC/VWC with LI-COR sensors

An all-in-one, research-grade, multiparameter microclimate monitoring solution with effortless Bluetooth data offload that delivers root-zone insights through the measurement of global solar radiation, temperature, RH, plus Volumetric Water Content and soil electrical conductivity (EC).

Important Information

Requires a compatible mobile device or Windows computer and the HOBObconnect app. System requirements for the app can be found at bottom of the HOBObconnect software page. Get cloud storage and access to the powerful tools of LI-COR Cloud[®] IoT software! (formerly HOBOblink) Add an MX Data Plan!



Compatible with
HOBObconnect[®] Monitoring App

Supported Measurements

Light Intensity, PAR, Relative Humidity, Solar Radiation, Temperature

Features

Wireless Bluetooth Data Offload Fast, easy logger setup and download via phone or tablet (up to ~100 ft range) Research-grade Solar Radiation Measurements Integrated LI-COR 200R sensor measures total solar irradiance in the 400–1100 nm range with $\pm 3\%$ typical calibration uncertainty Integrated Temp & RH Monitoring Logged temperature and humidity alongside solar radiation for a complete view of environmental conditions Rugged, Weatherproof Design Durable IP67/NEMA 6 housing stands up to humid, wet, and dusty environments found in greenhouses, growth chambers, or outdoor field sites Long Battery Life & Memory User-replaceable battery lasts up to ~2+ years and ample data storage supports extended deployments Alarms and Alerts See out-of-range conditions with logger's LED readout, and configure threshold alerts using HOBObconnect for proactive monitoring Easy Deployment Users can deploy the logger in minutes, configure logging intervals via the HOBObconnect app, and wirelessly retrieve data (without a laptop) in the field!

Contact Us

Sales (8am to 5pm ET, Monday through Friday)

- Email sales@onsetcomp.com
- Call 1-508-759-9500
- In U.S. toll free 1-800-564-4377
- Fax 1-508-759-9100

Technical Support (8am to 5pm ET, Monday through Friday)

- Contact Product Support www.onsetcomp.com/support/contact
- Call 1-508-759-9500
- In U.S. toll free 1-877-564-4377

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HOBO MX2311 Temp/RH+ Solar + Soil EC/VWC/Temp Data Logger (MX2311) Specifications

Temperature Sensor

Range	-40 to 70°C (-40 to 158°F)
Accuracy	±0.2 °C (typical) within -40 to 70 °C
Resolution	0.008°C (.014 °F)
Drift	<0.01°C (0.018°F) per year
Response Time* Without Solar Radiation Shield	17 minutes in air moving 1 m/sec
Response Time* With Solar Radiation Shield	24 minutes in air moving 1 m/sec

Relative Humidity (RH) Sensor

Range	0 to 100% RH, -40° to 70 °C exposure to conditions below -20°C (-4°F) or above 95% RH may temporarily increase the maximum RH sensor error by an additional 1%
Accuracy	±2.5% from 10% to 90% (typical) to a maximum of ±3.5% including hysteresis at 25°C (77°F); below 10% RH and above 90% RH ±5% typical
Resolution	0.01% RH
Drift	<1% per year typical
Response Time* Without Solar Radiation Shield	30 seconds in air moving 1 m/sec
Response Time* With Solar Radiation Shield	40 seconds in air moving 1 m/sec
Calculated Metrics	Vapor Pressure Deficit (VPD) in kPa, and Dew Point (computed from logged data)

Soil Moisture: Volumetric Water Content (VWC)

Measurement Range (select one at configuration)****	0.00 to 1.0 m³/m³ VWC in mineral soils 0.00 to 1.0 m³/m³ VWC in soilless media Apparent Dielectric Permittivity: 1 (air) to 80 (water)
Accuracy	±0.03 m³/m³ typical ±0.06 m³/m³ maximum Apparent Dielectric Permittivity: ±1 ?a
Resolution	0.001 m³/m³ Apparent Dielectric Permittivity: 0.002 ?a
Dielectric Measurement Frequency	70 MHz
Volume of Influence	1400 ml
Percent of Field Capacity (for VWC measurements only)	Range: 0 to 200% Resolution: 0.1%

Soil Temperature*****

Measurement Range	-40 to 70°C (-40 to 158°F)
Accuracy	±0.5°C from -40° to -20°C ±0.3°C from -20°C to 70°C
Resolution	0.1°C (0.18°F)

Soil Bulk Electrical Conductivity (EC)

Measurement Range	0 to 20000 µS cm-1
Accuracy	±5 % from 0 to 10000 µS cm-1 ±8 % from 10000 to 20000 µS cm-1
Resolution	1 µS cm-1

Global Solar Radiation (GSR) Sensor

Range	0 to 1280 W/m² (full sunlight)
Accuracy	±3% typical, ± 5% maximum (LI-200R Absolute Calibration)***
Offset	± 0.5 W/m²
Resolution	0.05 W/ m²
Spectral Range	400–1100 nm
Linearity	Maximum deviation of 1%
Stability	<= 2% change over one year
Temperature	-40 to 65°C (-40 to 149°F)
Temperature Dependence	±0.15% per °C maximum
Cosine Correction	Cosine corrected up to 82° angle of incidence
Azimuth	<±1% error over 360° at 45° elevation
Tilt	No error induced from orientation
Detector	High stability silicon photovoltaic detector (blue enhanced)
Sensor Housing	Weatherproof anodized aluminum case with acrylic diffuser and stainless steel hardware. O-ring seal on the sensor base.
Sensor Size	2.36 cm diameter x 3.63 cm (0.95" x 1.43")
Cable Length	1.8 m
Calculated Metrics	Accumulated solar radiation in MJ/m², daily light integral (DLI) of solar

Logger

Operating Range	-40 to 70°C (-40 to 158°F)
Radio Power	1mW (0 dBm)
Transmission Range	Approximately 30.5 m (100 ft) line-of-sight
Wireless Data Standard	Bluetooth Low Energy (Bluetooth Smart)
Logging Rate	1 second to 18 hours
Logging Modes	Fixed interval (normal, statistics) or burst
Memory Modes	Wrap when full or stop when full
Start Modes	Immediate, push button, date & time, or next interval
Stop Modes	When memory is full, push button, date & time, or after a set logging period
Time Accuracy	±1 minute per month 0° to 50°C (32° to 122°F)
Battery Type	2/3 AA 3.6 Volt lithium, user replaceable
Battery Life	2 years, typical with logging interval of 1 minute and Bluetooth Always On enabled; 4 years, typical with logging interval of 1 minute and Bluetooth Always On disabled. Faster logging intervals and statistics sampling intervals, burst logging, remaining connected with the app, excessive downloads, and paging may impact battery life.
Memory	195,000 measurements, maximum
Full Memory Download Time	Approximately 4-5 minutes; may take longer the further the device is from the logger
Dimensions	Logger housing: 10.8 x 5.08 x 2.24 cm (4.25 x 2.0 x 0.88 in.) Soil moisture sensor (only): 4.6 x 4.6 x 10.9 cm (1.81 x 1.81 x 4.31 in) Soil moisture sensor needle length: 5.4 cm (2.14 in) Soil moisture sensor needle diameter: 0.40 cm (0.16 in) Sensor cable length: 2 m (6.56 ft)
Weight (Unpackaged)	333 g (11.8 oz)
Weight (Packaged)	490 g (17.3 oz)
Materials	Acetal, silicone gasket, stainless steel screws Soil Moisture Sensor: ASA plastic body with polyurethane epoxy filling and stainless-steel pins Cable: PVC, UV resistant and rodent repellent (soil moisture sensor cable)
Environmental Rating	Logger: NEMA 6 and IP67 Soil Moisture sensor and cable: xxxx

* Typical, up to 90% of change
** Per RH sensor manufacturer data sheet
*** Calibrated against an Eppley Precision Spectral Pyranometer (PSP) under natural daylight conditions. Absolute uncertainty under these conditions is ± 3% typical; ± 5% maximum.
**** The sensor data can be post-calibrated if necessary (e.g. the sensor is used in non-mineral soil types or higher than standard accuracy is required). Users can apply a calibration equation to the data exported from HOBOLink. The VWC range will depend on the calibration equation.
***** For additional accuracy, the sensor data can be post-calibrated for a particular soil by applying a calibration equation to the data exported from the app.

