



## HOBO® RXW-T12-xxx Sensor

### HOBOnet T12 Soil Moisture/Temp/EC Sensor

The HOBOnet T12 is a wireless sensor that works with the HOBOnet system to not only provide advanced soil moisture measurements (volumetric water content) with better accuracy and precision, but also measure soil temperature and electrical conductivity. Designed to withstand harsh environmental conditions, these durable sensors last up to 10 years, so you can leave them in the field for extended periods of time. Sharpened stainless-steel probe tips make installation easy, even in hard soil, and a large volume of influence provides more accurate results. The HOBOnet T12 is backed by over 20 years of soil-moisture research and features a trademark 70MHz frequency capacitance technology, minimizing salinity and textural effects.



The HOBOnet system is a cost-effective and scalable wireless sensor network for web-enabled monitoring of field conditions for applications such as crop management, research, and greenhouse operations. And because it's wireless, you can deploy a network of sensors to easily monitor multiple points with a single system, while avoiding the risk of long cables that can interfere with field operations and are potentially vulnerable to nearby lightning strikes. Sensors are easily linked to the network, and data can be accessed through HOBOLink®, Onset's innovative cloud-based software platform.

We recommend using the Verification Clip (see Compatible Items, below). The Verification Clip provides a convenient way to confirm the operation and soil-moisture accuracy of HOBOnet T11 and T12 sensors. Attaching this clip to a sensor provides a known soil moisture level for verifying measurement accuracy, without having to test the sensor in actual soils, which normally requires weighing soil samples and drying them in an oven.

#### Key Advantages:

##### Sensor Features

- Soil moisture (volumetric water content), soil temperature, and electrical conductivity measurements with one device
- Sensor lasts up to 10 years in the field
- Largest volume of influence (1010 mL) relative to sensor size, resulting in more accurate soil moisture measurements
- Easy installation with sharpened stainless-steel probes that are more resistant to damage/deterioration
- Less sensor-to-sensor variability




##### Wireless Features

- 900 MHz wireless mesh self-healing technology
- 450 to 600 meter (1,500 to 2,000 feet) wireless range and up to five hops

- Up to 50 wireless sensors or 336 data channels per HOBO RX station
- Simple button-push to join the HOBOnet wireless network
- Onboard memory to ensure no data loss
- Powered by rechargeable AA batteries and built-in solar panel

## HOBO RXW-T12-xxx Sensor Specifications

<b>Soil Moisture: Volumetric Water Content (VWC)</b>	
Measurement Range*	0.00 to 0.70 m /m in mineral soils
Accuracy	±0.030 m /m (±3%) typical from 0 to 50°C (32 to 122°F); ±0.020 m /m (±2%) with soil specific calibration
Resolution	0.001 m /m
Dielectric Measurement Frequency	70 MHz
<b>Temperature**</b>	
Measurement Range	-40 to 60°C (-40 to 140°F)
Accuracy	±0.5°C (0.9°F) from -40 to 0°C (-40 to 32°F) ±0.3°C (0.54°F) from 0 to 60°C (32 to 140°F)
Resolution	0.1°C (0.18°F)
<b>Bulk Electrical Conductivity (EC)</b>	
Measurement Range	0 to 20 dS/m (bulk)
Accuracy	±5% of reading + 0.01 dS/m from 0 to 10 dS/m ±8% of reading from 10 to 20 dS/m
Resolution	0.001 dS/m
<b>Wireless Mote</b>	
Operating Temperature Range	Sensor: -40 to 60°C (-40 to 140°F) Mote: -25° to 60°C (-13° to 140°F) with rechargeable batteries -40 to 70°C (-40 to 158°F) with lithium batteries
Radio Power	12.6 mW (+11 dBm) non-adjustable
Transmission Range	Reliable connection to 457.2 m (1,500 ft) line of sight at 1.8 m (6 ft) high Reliable connection to 609.6 m (2,000 ft) line of sight at 3 m (10 ft) high
Wireless Data Standard	IEEE 802.15.4
Radio Operating Frequencies	RXW-T12-900: 904–924 MHz RXW-T12-868: 866.5 MHz RXW-T12-921: 921 MHz RXW-T12-922: 916–924 MHz
Modulation Employed	OQPSK (Offset Quadrature Phase Shift Keying)
Data Rate	Up to 250 kbps, non-adjustable
Duty Cycle	<1%
Maximum Number of Motes	Up to 50 wireless sensors or 336 data channels per one HOBO RX station
Logging Rate	1 minute to 18 hours
Number of Data Channels	4
Battery Type/ Power Source	Two AA 1.2V rechargeable NiMH batteries, powered by built-in solar panel or two AA 1.5 V lithium batteries for operating conditions of -40 to 70°C (-40 to 158°F)
Battery Life	With NiMH batteries: Typical 3–5 years when operated in the temperature range -20° to 40°C (-4°F to 104°F) and positioned toward the sun (see Deployment and Mounting), operation outside this range will reduce the battery service life With lithium batteries: 1 year, typical use
Memory	16 MB

Dimensions	Sensor: 7.47 x 9.4 x 2.39 cm (2.94 x 3.7 x 0.94 inches) Sensor needle length: 5.4 cm (2.13 inches) Sensor needle diameter: 0.32 cm (0.13 inches) Cable length: 5 m (16.4 ft) Mote: 16.2 x 8.59 x 4.14 cm (6.38 x 3.38 x 1.63 inches)
Weight	RXW-T12-xxx sensor and cable: 245 grams (8.64 oz) Mote: 223 g (7.87 oz)
Materials	Sensor: ASA plastic body with polyurethane epoxy filling and stainless steel pins Cable: PVC, UV resistant and rodent repellent Mote: PCPBT, silicone rubber seal
Environmental Rating	Mote: IP67, NEMA 6
Compliance Marks	 RXW-T12-900  RXW-T12-868 RXW-T12-921  RXW-T12-922

\* 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.

\*\* Temperature measurement, for applicable sensors, may not be accurate if sensor is not fully immersed in medium of interest, due to longer equilibration time.

## Contact Us

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