



# HOBOnet T11 Soil Moisture & Temperature Sensor

## Product Images



## Description

The HOBOnet T11 is a wireless sensor that works with the HOBOnet system to not only measure soil moisture (volumetric water content) with better accuracy and precision, but also provide soil temperature measurements. 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 probes make installation easy, even in hard soil, and a large volume of influence provides better results and a more accurate view of soil moisture. Featuring the METEER TEROS 11 soil moisture and temperature sensor, the HOBOnet T11 is backed by over 20 years of soil-moisture research and leverages METEER's trademark 70MHz frequency capacitance technology, minimising salinity and textural effects.

Sensors are easily linked to the [HOBOnet](#) network, and data can be accessed through [HOBOLink](#), Onset's

innovative cloud-based software platform.

We suggest using a [TEROS Verification Clip](#), which provides a convenient way to confirm the operation and soil moisture accuracy of the sensor. Attaching this clip to a TEROS 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.

## Sensor Features

- Soil moisture (volumetric water content) and soil temperature 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 per HOBONet 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.

**Note:** A complete [HOBONet](#) system requires at least one [HOBONet RX3000](#) Remote Monitoring Station, a [HOBONet Wireless Manager](#), and a [HOBONet Wireless Sensor](#), OR one [HOBONet MicroRX Station](#) (which has an integrated HOBONet Wireless Manager) and a [HOBONet Wireless Sensor](#). [HOBONet Wireless Repeaters](#) can be added to extend the range.

# Additional Information

Country of Manufacture	United States								
Brand	Onset HOBO								
Measurements	Soil Moisture, Soil Temperature								
Typical applications	Environmental (Outdoor), Field Research								
Explanation	Soil Moisture: Volumetric Water Content (VWC)								
	Measurement Range*	0.00 to 0.70 m <sup>3</sup> /m <sup>3</sup> in mineral soils							
	Accuracy	±0.030 m <sup>3</sup> /m <sup>3</sup> (±3%) typical from 0 to 50°C (32 to 122°F); ±0.020 m <sup>3</sup> /m <sup>3</sup> (±2%) with soil specific calibration							
	Resolution	0.001 m <sup>3</sup> /m <sup>3</sup>							
	Dielectric Measurement Frequency	70 MHz							
	Temperature**								
	Measurement Range	-40 to 60°C (-40 to 140°F)							
	Accuracy	±1.0°C (1.8°F) from -40 to 0°C (-40 to 32°F) ±0.5°C (0.9°F) from 0 to 60°C (32 to 140°F)							
	Resolution	0.1°C (0.18°F)							
	Wireless Mote								
	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-T11-900: 904-924 MHz RXW-T11-868: 866.5 MHz RXW-T11-921: 921 MHz RXW-T11-922: 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	50 motes per one HOBONet Wireless Sensor Network							
	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 Mounting and Positioning the Mote), 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-T11-xxx sensor and cable: 245 g (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	<table border="1"> <tr><td>×</td><td>RXW-T11-900</td></tr> <tr><td>×</td><td>RXW-T11-868</td></tr> <tr><td>×</td><td>RXW-T11-921</td></tr> <tr><td>×</td><td>RXW-T11-922</td></tr> </table>	×	RXW-T11-900	×	RXW-T11-868	×	RXW-T11-921	×	RXW-T11-922
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	<p>* 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.</p> <p>** Temperature measurement, for applicable sensors, may not be accurate if sensor is not fully immersed in medium of interest, due to longer equilibration time.</p>								
Ideal For	Professional, Agronomy								