Wireless Soil Moisture Sensor

Model: WH51L

Contents

＊Please scan the QR code to read English manual and keep it for future reference

＊Bitte scannen Sie den QR-Code zudeutsche Anleitung lesen und aufbewahren füZukunftsbezug

＊Si prega di scansionare il codice QR perleggi il manuale italiano e conservalo perReferenza futura

Instruction manuals

https://s.ecowitt.com/VYT490

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Help

Our product is continuously changing and improving, particularly online services and associated applications. To download the latest manual and additional help, please contact our technical support team:
support@ecowitt.com
support.eu@ecowitt.net (EU/UK)

1. Introduction

Thanks for purchasing this WH51L soil moisture sensor. This device measures soil moisture. The data can be streamed by GW1100 / GW2000 Wi-Fi Gateway (sold separately) and can be viewed on our WSView Plus / Ecowitt APP mobile application after the Wi-Fi configuration done. Or a receiver console can be used to display the received sensor valuw.

To ensure the best product performance, please read this manual and retain it for future reference.
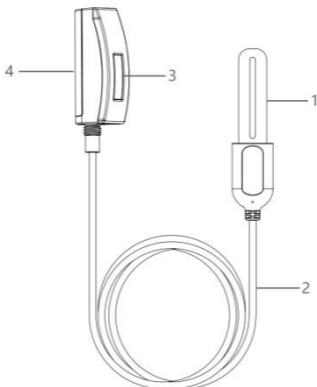
2. Getting Started

2.1 Parts List

- One Soil Moisture Sensor
- One Screw ST D5.8*M3*15 Stainless Steel

PA for Mounting
- One Stainless Steel Loop 19~29 8mm for Mounting
- One Fix Bracket 35.1x21x20mm Stainless Steel for WN51L
- One User Manual

3. Overview

1	Soil Moisture Sensor Probe
2	1m/3.28ft PVC Wire
3	LCD Display
4	Battery Compartment

3.1 Features

Soil Moisture Sensor

- Measures soil moisture content every 70 seconds in standard cycle and transmit the data via RF.
- When the current measurement is significant difference from the next time data, RF will enter into quick-transmit state and WH51L will transmit the data every 10 seconds.
- Custom Mode: with 0%AD and 100%AD custom mode to manually calibrate the low/high moisture value so that you can get more accurate result for different soil types. This mode can only be activated through WSView plus app and in live data display mode.
- Long wireless range, up to 300 feet (100 meters) in open areas.

When paired with a GW1100/GW2000 Wi-Fi Gateway:
- Monitor live sensor data on the Live Data page of the WSView plus app (requires the gateway and your phone is using the same Wi-Fi network).
- Up to 8 channels supported. Channel names can be edited on the app.

When paired with a Weather Station Console (HP2551/HP3500/HP2560):
- View soil moisture data in real-time on the Display.
- Up to 8 channels supported. Channel names can be edited on the Display (for HP2551 only).

When paired with Console WH0291:
- View soil moisture data in real-time on the Display.

- WH51L could also pair with WH0291 display console. But one display console could only pair with one WH51L or WH51.

When uploaded to Ecowitt Weather Server:
- View current soil moisture data & history records & graph on the website.
- Set and receive email alerts from the server.
- Channel names can be edited on the website.
- Remote monitoring with smart phone, laptop, or computer by visiting the website.

Note: The WH51L will be recognized as the same sensor type by the software. If you purchased both, they will share the eight channels together and the total quantity of the

two sensors could not exceed eight.

4. Setup Guide

4.1 Install batteries
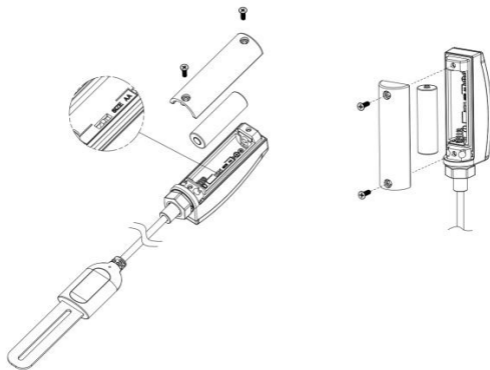
1. Unscrew the screws of the battery compartment.

2. Insert one AA battery and tighten the screw of the battery compartment.
3. After inserting the battery, the LCD display will display all the sections 2 seconds, and then the screen would displays the model number, RF frequency, and 'L' 2 seconds, finally the screen would display the Max and the Min data 3 seconds.
4. Before install the sensor into its permanent location, we would suggest test the sensor in air, and see if moisture reading is 0. And then put the sensor into a cup of water, the sensor should have its reading increased to 90% or above. Once sensor detected a significant data change, sensor will transmit every 10s. Once sensor has been confirmed working correctly, then you can go to next step.
5. Insert the sensor totally into the soil of your desired location. Please do not use excessive force to push the sensor into the soil to

avoid any damage.

5. Wi-Fi Configure with gateway

To view the soil moisture data on your mobile application and receive email alerts on our weather server, you need to pair this device with our GW1100/GW2000 Wi-Fi Gateway or HP2551/HP3500/HP2560 Weather Station (sold separately).

5.1 Pair with Gateway

If GW1100/GW2000 has been in operation, and you have never had any WH51L soil moisture sensor setup before, just power up the sensor and GW1100/GW2000 will pick soil moisture data automatically.

Note: The gateway can support max 8 soil moisture sensors. Each new sensor will be

recognized as a new channel according to the Power-on sequence. You may attach a label of the channel on each sensor for distinction. The channel name can be edited both on the app and ecowitt.net (will not sync).

If you want to use a new WH51L sensor to replace the old one (already configured on certain channel), please try the following:

1. Open the Sensor ID page on the WSView plus app, and find your old sensor ID.
2. Power off the old sensor and power on the new sensor.
3. Click Re-register on the Sensor ID page.

Then the new sensor will be learned and the old sensor will be erased.

5.2 Wi-Fi Connection for the Gateway

For this part, please refer to the manual of the GW1100/GW2000 Wi-Fi Gateway.

Any question, please contact the customer service.

6. View Online Data on WSView Plus/Ecowitt APP

When the Wi-Fi configuration is done, you can view the live data of your soil moisture sensor on the WSView Plus App application.

Back	Live Data GW1000B-WIFI8980	More

Indoor Temperature	Indoor Humidity
26.9 °C	75 %

Absolute Pressure	Relative Pressure
1007.7 hPa	1007.7 hPa

	CH1 Soil	0 %
✎	CH2 Soil	0 %
✎	CH3 Soil	0 %
✎	CH4 Soil	0 %
✎	CH5 Soil	0 %
✎	CH6 Soil	0 %
✎	CH7 Soil	0 %
✎	CH8 Soil	60 %

Firmware Version
GW1000B_V1.4.7

Note: It requires your phone and the gateway using the same network to view your sensor data on the WSView Plus App.

To remote monitor the sensor data, please upload the data to our free Ecowitt Weather Server: https://www.ecowitt.net.
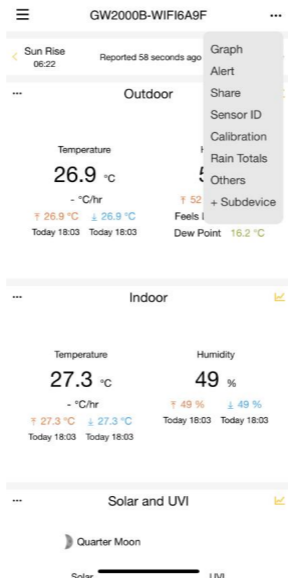
Detailed operation instructions can be found on the GW1100/GW2000 manual.

Any question, please feel free to contact our customer service at support@ecowitt.com or support.eu@ecowitt.net (EU/UK).

7. Custom mode

When you finish GW1100/GW2000 Wi-Fi configuration and log in Ecowitt APP, you can calibrate the soil moisture sensor by enable the Custom mode. (Click 'Weather Station' - choose the GW2000 that configured to your router - click upper right ' ... ' - choose

Calibration - choose 'Multi_CH Soil' and then you could manually calibrate the data.)

Irradiance Gain: 1.00

UV Gain: 1.00

Wind Gain: 1.00

InTemp Offset: 0.0 ℃

InHumi Offset: 0 %

Abs Offset: 0.00 inHg

Rel Offset: 0.00 inHg

OutTemp Offset: 0.0 ℃

OutHumi Offset: 0 %

WindDir Offset: 0 Degress

Save

Multi_CH Soil

Multi_CH T&H Calibration

Multi_CH Temp. Calibration

CH3	Now AD 161	Customize ⬭
	0%	170
0%	100%	320

CH4	Now AD 47	Customize ⬭
	0%	170
0%	100%	320

CH5	Now AD 38	Customize ⬭
	0%	170
2%	100%	320

CH7	Now AD 160	Customize ⬭
	0%	170
0%	100%	320

CH8	Now AD 147	Customize ⬭
	0%	170
19%	100%	320

Save

<u>Custom OFF</u>:
Moisture level is calculated based on default dry and wet definition:
Dry (0%AD) AD: 70
Wet (100% AD) AD: 500

Soil Moisture = (moisture AD – 0%AD) * 100% / (100% AD – 0%AD)

Example: when sensor moisture AD is 310, calculated moisture is:

(310 – 70)*100% / (500-70) = 56%.

This is a fixed slope rate linear system.

<u>Custom ON</u>:
When pot soil at dry or wet condition is not giving the moisture sensor output value that is close to its default assumption, it will give inaccurate moisture level results. It is

commonly happening with different soil type that gives very different output value at same moisture level condition. We introduced this custom mode to make this slope flexible so that it can match your soil type.

This becomes a variable slope rate linear system.

Adjusting principle:
0%AD is used to adjust for dry condition reading inconsistency.

When the displayed moisture readings are too high at dry soil condition, you could lower the slope rate by increasing the 0%AD value.

100%AD is used to adapt for wet condition reading inconsistency.

When the displayed moisture readings are too low at extremely wet soil condition, you could decrease the 100%AD value to fix it.

Please refer to the below example for better understanding.

For example
When you use this product at the first time, you may turn off the custom mode and test the product at the following two situations:

Situation One:
Place the sensor into a glass of fresh water, and the displayed moisture readings is much lower than 95% (e.g.70%).

Solution:
Enable custom mode, and adjust the 100%AD value.
Calculate the 100%AD value with the formula:
Soil Moisture = (moisture AD – 0%AD) * 100% / (100% AD – 0%AD)

If:
Now AD = 183

0%AD = 70
Target Soil Moisture Reading = 95%

Then:
95% = (183 - 70)*100% / (100%AD – 70)

Result: 100%AD = 188 (take the Integer part)

Then you can adjust the default 0%AD value to 188 and touch the screen for once to update the data. When you get your expected moisture reading, click Save to save the setting.

Situation Two:
Leave the sensor aside without touching any water, and the displayed moisture readings are much higher than 10% (e.g.40%).

Solution:
Enable the custom mode and adjust the 0%AD value.

Calculate the 0%AD value with the formula:
Soil Moisture = (moisture AD – 0%AD) * 100% / (500 – 0%AD)

If:
Now AD = 183
100%AD = 500
Target Soil Moisture Reading = 10%

Then:
10% = (183 - 0%AD)*100%/(500 – 0%AD)
Result: 0%AD = 147(take the Integer part)

Then you can adjust the default 0%AD value to 147 and touch the screen for once to update the data. When you get your expected moisture reading, click Save to save the setting.

Note: The soil moisture sensor should be inserted totally into the soil for accurate result.

Record the 0%AD and 100%AD value for future use (when WIFI network changed).

Note: In general, the sensor need to be calibrated to suit your soil type.

Note: Calibration is only saved on gateway side, so if you have two different consoles handling this data, you will need to enable custom mode and having same calibration for 0% and 100% to make consoles showing same soil moisture.

8. Specification

Moisture Range: 0~99%
Accuracy: ±5%
Resolution: 1%
Working Temperature Range: -10°C to 50°C
$\qquad\qquad\qquad$ (14°F to 122°F)
0%AD setting range: 0~200

Initial value: default to factory calibration
100%AD setting range: 0%AD+10~1000
Initial value: default to its factory calibration
Frequency: 915/868/433MHz depending on
location (North American:
915MHz; Europe:868MHz; Other
areas: 433MHz)
Sensor reporting interval: 70 seconds
Transmission distance in open field: 100m
(300 feet)
Device Housing Waterproof Level: IP66
Sensor Probe Waterproof Level: IP68

Power consumption
- Soil moisture sensor: 1xAA Alkaline
batteries (not included)
- Battery life: Minimum 12 months

9. Warranty Information

We disclaim any responsibility for any technical error or printing error, or the consequences thereof.

All trademarks and patents are recognized.

We provide a 1-year limited warranty on this product against manufacturing defects, or defects in materials and workmanship.

This limited warranty begins on the original date of purchase, is valid only on products purchased, and only to the original purchaser of this product. To receive warranty service, the purchaser must contact us for problem determination and service procedures.

This limited warranty covers only actual defects within the product itself and does not cover the cost of installation or removal from a fixed installation, normal set-up or adjustments, or claims based on misrepresentation by the

seller, or performance variations resulting from installation-related circumstances.
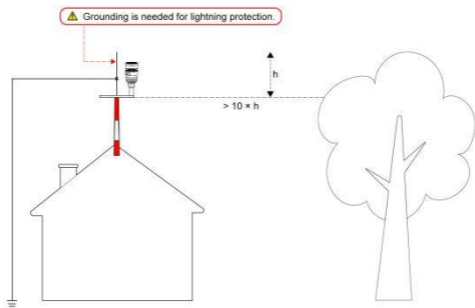
Note: sensor damage, due to lack of grounding protection against lightning ESD dischatge, is not covered by warranty.