WN90LP Weather Station with RS485 Interface and Modbus Protocol

Ultrasonic Anemometer with Piezoelectric Rain Gauge, Light & UV, Thermo-hygro-barometer Sensors with RS485 Output

Manual

Model:WN90PL

https://s.ecowitt.com/TM6RWH

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1. Feature

The **WN90LP** is a wired **RS485 version** of the WS90 7-in-1 weather sensor. The solar panel has been removed, and the power connection is replaced with an **RS485 interface**, making it easier to integrate into professional data acquisition systems.
Wind measurements ultrasonic anemometer (start wind speed 0.3m/s); The original temperature and humidity module is upgraded to a **temperature, humidity, and barometric pressure sensor**, delivering more comprehensive data.
To improve temperature accuracy, the sensor adopts a **temperature compensation design (US Patent No. 12,181,491B2)**, which effectively reduces thermal interference caused by direct sunlight or heater power supply.
The rain sensor features a **sloped surface design** that optimizes water collection flow and impact characteristics, resulting in enhanced rainfall measurement accuracy.
Like the WS90, the WN90LP maintains a **fully electronic, no-moving-parts design**, ensuring higher durability and reliability for **long-term outdoor professional applications.**

Note on Internal Heating Function
The WN90LP includes a **built-in thermostat** that controls the internal heating plate:

- **Automatically turns ON** when the ambient temperature falls **below 0° C (32° F)**
- **Automatically turns OFF** when the temperature rises **above 10° C (50° F)**

To activate the heating element (for snow or ice melting), a **12V / 1A power supply** must be provided.

2. Overview

2.1 Package Contents

One WN90LP unit
One User Manual
One Communication Cable (Extension Cable), 2 m
One USB-to-RS485 connector

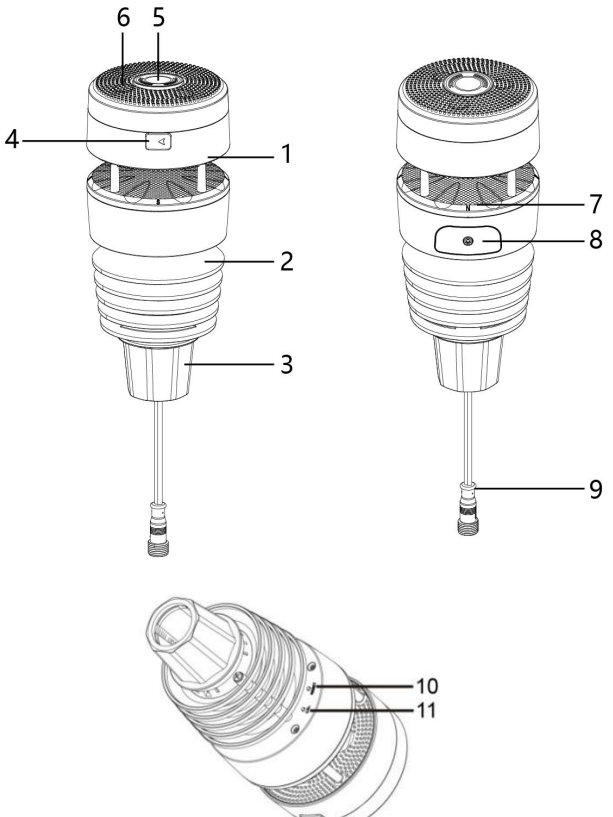
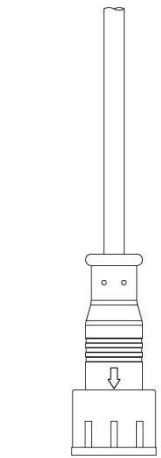
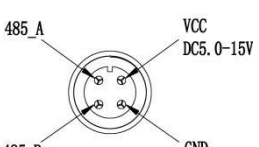
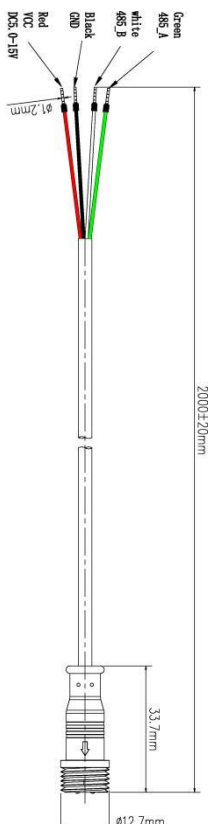


Figure 1 Sensor package assembly components

1. Ultrasonic wind sensor	2. Temperature & humidity sensor
3. Fixed Bolt (Mounting on a pole with 1 inch diameter)	4. Micro USB port (only for firmware update, Factory use only)
5. Light & UV sensor, LED indicator	6. Haptic Rainfall sensor
7. NORTH alignment indicator	8. Battery compartment
9. RS485 cable connector	10. Reset button
11.Calibration button (factory use only)	

Table 1 Sensor package assembly component list

Cable pin definition	Extension cable pin definition
 	

3. Setup Guide

3.1 Power up

The device's power supply is **RS485 power's line** between **5.0 ~ 12.0 V**. **Do not attempt to install batteries.**

Power-On and Restart Procedure:

- When the device is powered on or the RESET button is pressed, the blue LED indicator on the top of the sensor module will stay lit for **3 seconds.** After that, the LED will only flash when the **module receives a command** from the host and **sends a response packet**.
- If the LED is not observed during startup, the startup signal may have been missed. In this case, press the "Reset" button again at any time to restart the device and trigger the LED signal.
- **When performing a power cycle (disconnecting and reconnecting power), ensure a minimum interval of 3 seconds** between power off and power on to allow the sensor to reset properly.

3.2 Device Testing: PC Software Usage Instructions

You can use the USB-to-RS485 connector(included) to

test the device and verify whether it is functioning properly.

1. Connect the USB-to-RS485 interface to the device.
2. Follow the steps and click accordingly.

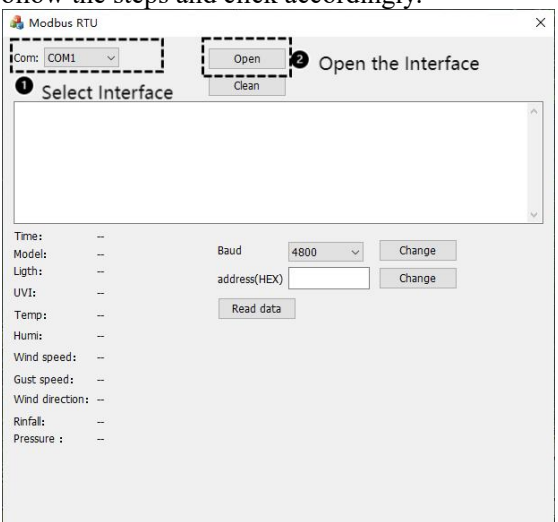


Figure 2 Device Testing

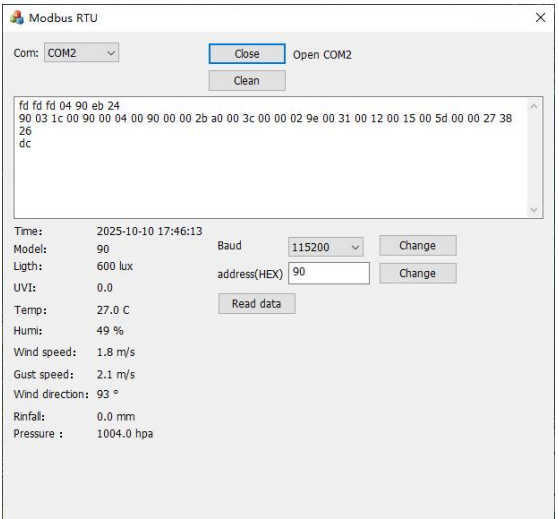


Figure 3 Testing success

3.3 Mounting

3.3.1 Before you mount

Before installing your outdoor sensor in the permanent location, we recommend operating the device for one week in a temporary location with easy access. This will allow you to check out all the functions, ensure proper operation, and familiarize yourself with the device's performance.

3.3.2 Mounting

- You can attach a pole with a diameter of 1.0 inch (not included) to a permanent structure and then attach the sensor package.

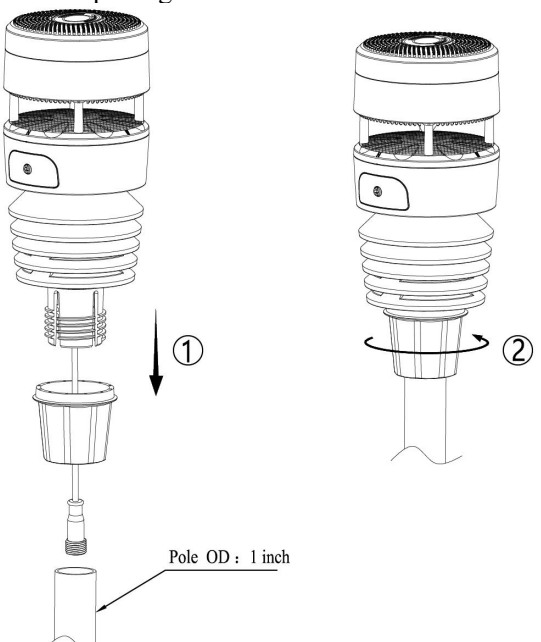


Figure 4 Sensor package mounting diagram6-1

The mounting pole needs to be vertical or very close to it. Use a level if it is required.

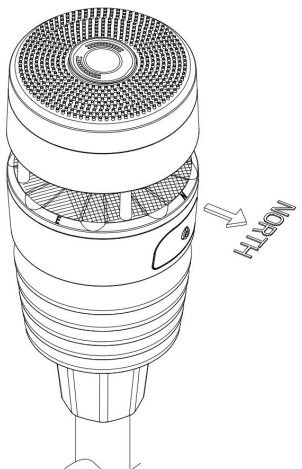


Figure 5 Facing North diagram

Now, you must align the whole package properly by rotating it on top of the mounting pipe as needed. Locate the arrow labeled **"NORTH"**. You must rotate the whole sensor package until this arrow points due north. To achieve proper alignment, it is helpful to use a compass (many cell phones have a compass application).

Note: In the Southern Hemisphere, it is not necessary to change the orientation to **SOUTH** as its solar panel is a rounded type, and it is orientation-free for its charging capability.

As the final installation step, check and correct the north orientation again. Then, tighten the bolts. Do not over-tighten, but ensure strong wind and rain cannot move the sensor package.

3.2.3 Reset Button and Transmitter LED

In the event the sensor package is not transmitting, reset the sensor.

Press and hold the **RESET Button (item 11)** to affect a reset: the LED turns on while the RESET button is depressed, and you can now let go. The LED should then resume as usual, flashing when the module receives a command from the host and sends a response packet.

4. Specification

Model	WN90LP
Name	Ultrasonic Anemometer with Piezoelectric Rain Gauge, Light & UV, Thermo-hygrometer Sensors RS485
Dimensions	93*93*208mm

Weight	498(g)
Material of Plastic Casing	ASA+PC、PC
Temperature Metering Range	-40°C to 60°C(-40°F to 140°F)
Temperature Metering Accuracy	±1°C (± 1.8°F)
Temperature Metering Resolution	0.1°C (0.2°F)
Humidity Metering Range	1%RH to 99%RH
Humidity Metering Accuracy	±5%RH
Humidity Metering Resolution	1%RH
Barometric Pressure Metering range	300 to 1100 hPa (8.85 to 32.5 inHg)
Barometric Pressure Metering accuracy	±5hPa
Barometric Pressure Metering resolution	0.1 hPa (0.01 inHg)
Rainfall Metering	0mm to 6553.5mm

range	
Rainfall Metering accuracy	<5mm/h, ±20%; 5mm/h to 50mm/h, ±10%; >50mm/h, ±20%
Rainfall Metering resolution	0.1mm
Wind speed Metering range	0m/s to 40m/s
Wind speed Metering accuracy	<10m/s, ±1m/s; ≥10m/s, ±10%
Wind speed Metering resolution	0.1m/s (starting speed > 0.5m/s)
Wind Speed Metering Interval	2s
GUST speed	Maximum value in the past 28 seconds
Wind direction Metering range	0° to 359°
Wind direction Metering accuracy	±15°
Wind direction Metering resolution	1°
Light Metering range	0Klux to 200Klux
Light Metering accuracy	±25%
Light Metering	0.1Klux

resolution	
UV Metering range	1 to 15
UV Metering accuracy	±2
UV Metering resolution	1
Modbus Baud rate	4800/9600/19200/115200(bps)
Communication cable length	Over 150 meters (500 ft.)
Operating Temperature Range	-40°C to 60°C(-40°F to 140°F)
Protection Rating	IPX5
Power Supply	2*AA batteries (not included) or DC12V/1A Power adapter (not included)
Battery Life	120 hours

Table 2

5. Warranty Information

We disclaim responsibility for any technical error or printing error or the consequences thereof.
All trademarks and patents are recognized.
We provide a 2 years 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.
Manufacture: Shenzhen Fine Offset Electronics Co., Ltd. Address: 4/F, Block C, JiuJiu Industrial City, Shajing Town, Baoan District, Shenzhen City, China

6.FCC

This device complies with part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
Changes or modifications not expressly approved by the party responsible for compliance
could void the user's authority to operate the equipment.
NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable

protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception,
which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different
from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.
To maintain compliance with RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

IC Caution:
English:
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.
French:
L'émetteur/récepteur exempt de licence contenu dans le présent

appareil est conforme aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
1. L'appareil ne doit pas produire de brouillage;
2. L'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

7. Contact Us

7.1 After-sales Service

Order Issues:
If you encounter any missing or incorrect shipments of Ecowitt products purchased, please reach out to the respective platform's customer service from the store where you bought the product for assistance.
Usage Inquiries:
Our product is continuously changing and improving, particularly online services and associated applications. To download the latest manual, and additional help, and for any issues related to product usage feel free to contact our customer support team at support@ecowitt.com.We are committed to providing assistance and resolving any concerns you may have.

7.2 Stay in Touch

Ask questions, watch setup videos, and provide feedback on our social media outlets.
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