

EN

User and safety guide

Ecowitt WS90



A smart multi-sensor for weather monitoring

Referred to in this document as “the Device”

⚠ This sign indicates safety information.

❗ This sign indicates an important note.

Safety information



For safe and proper use, read this guide carefully. Keep it for future reference.

⚠ CAUTION! Connect the Device only in the way shown in these instructions. Any other method could cause damage and/or injury.

⚠ CAUTION! Use **only lithium batteries** with the Device. Using other battery types may lead to unreliable performance or device failure.

⚠ CAUTION! Do not use the Device if it shows any sign of damage or defect.

⚠ CAUTION! Do not attempt to repair the Device yourself.

❗ The Device comes with factory-installed firmware. To keep it updated and secure, Shelly Europe Ltd. provides the latest firmware updates free of charge. Access the updates through either the embedded web interface or the Shelly Smart Control mobile application. Installation of firmware updates is the user’s responsibility. Shelly Europe Ltd. shall not be liable for any lack of conformity of the Device caused by the failure of the user to install the available updates in a timely manner.

Packaging contents

- 1 × Weather station Ecowitt WS90
- 1 × User manual

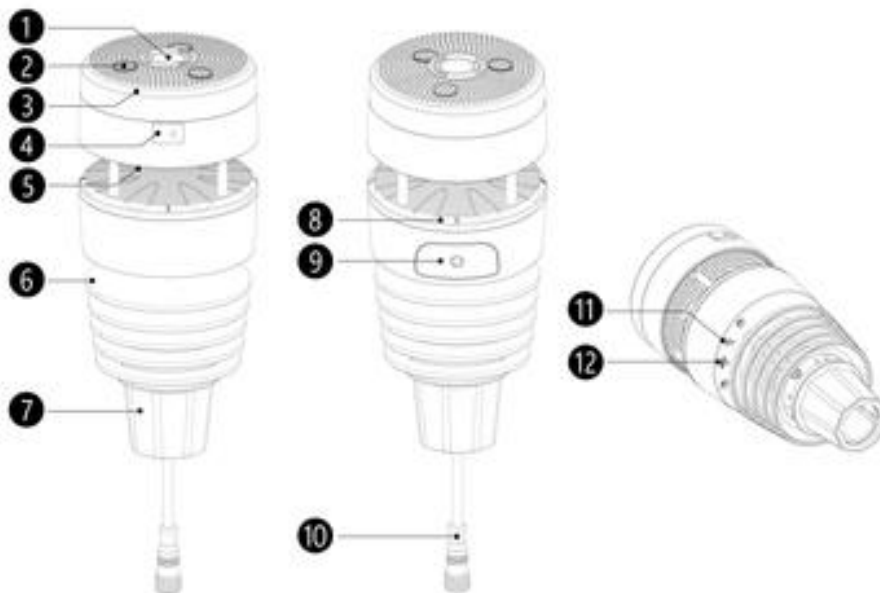
Optional accessories (sold separately)

- Power supply (heating) extension cable
- 12 V $\equiv$ / 1 A power supply adapter
- Bird spikes

Product description

Ecowitt WS90 is a smart 7-in-1 sensor featuring ultrasonic wind measurement. It also includes a piezoelectric rain gauge, light and UV detection, and a thermo-hygrometer for comprehensive environmental monitoring.

①The Device has a built-in heating plate to melt snow and ice for accurate wind measurement during the winter months. The heater operates only with a 12 V $\equiv$ external power supply.



Legend

1. Light and UV sensor, LED indicator
2. Haptic rainfall sensor
3. Solar panel
4. USB port (factory use only)
5. Ultrasonic wind sensor

6. Temperature and humidity sensor
7. Mounting ring (for Ø25 mm / 1 inch poles)
8. North direction alignment indicator
9. Battery compartment
10. Power supply (heating) cable
11. Calibration button
12. Reset button

User interfaces

Reset button

- Press 1 time: Resets the Device

Calibration button (CAL)

- Press 1 time: The Device enters Bluetooth pairing mode for 30 seconds.
- Press 2 times: The Device enters Zigbee commissioning mode for 30 seconds.
- Press 3 times: Heartbeat LED enable/disable.

Blue LED indication

- Flashes rapidly 5 times: The Device enters Bluetooth pairing mode for 30 seconds.
- Flashes rapidly 2 times: The Device enters Zigbee commissioning mode for 30 seconds.
- Flashes briefly every 8.8 seconds: The Device reports data to the gateway.

Specifications

Physical

Size (HxWxD): 208x93x93 mm / 8.19x3.66x3.66 inch

Weight: 459 g / 16.2 oz (without batteries),

507 g / 17.88 oz (with batteries)

Mounting: On a Ø25 mm / 1 inch pole

Shell material: Plastic

Shell color: White

Environmental

Ambient working temperature: -40°C to 60°C / -40°F to 140°F

Humidity: 1 to 99% RH

Degree of protection: IPX5

Electrical

Power supply: 2x AA 1.5 V Lithium batteries (not included)

Built-in solar panel 6.5 V / 4 mA

12 V_{DC} / 1 A external power supply

Estimated battery life: Up to 6 months with lithium batteries (depending on temperature, humidity, and network strength).

Sensors, meters

Wind speed: Range: 0.5 m/s to 40 m/s

Accuracy: <10 m/s, ± 0.5 m/s; ≥ 10 m/s, $\pm 5\%$

Resolution: 0.1 m/s

Wind gust: The max. wind speed in the past 28 seconds

Wind direction: Range: 0° to 359°

Accuracy: $\pm 15^\circ$

Resolution: 1°

Temperature: Range: -40°C to 60°C / -40°F to 140°F

Accuracy: 0.1°C ($\pm 0.2^\circ\text{F}$)

Resolution: 0.1°C ($\pm 0.2^\circ\text{F}$)

Humidity: Range: 1 to 99 % RH

$\pm 2\%$ RH

1% RH

Barometric pressure: 300 to 1100 hPa (8.86 to 32.48 inHg)

Light: Range: 0 to 200 klux

	Accuracy: $\pm 25\%$
	Resolution: 0.1 Klux
UVI (ultraviolet index):	Range: 1 to 15
	Accuracy: ± 2
	Resolution: 1
Rainfall:	Range: 0 to 9999
	Accuracy: $< 5 \text{ mm/h}$, $\pm 20 \%$; 5 mm/h to 50 mm/h , $\pm 10\%$; $> 50 \text{ mm/h}$, $\pm 20 \%$
	Resolution: 0.1 m/s
Measurement interval:	2 seconds
Data reporting interval:	8.8 seconds

Radio

Bluetooth

Protocol:	5 (LE)
RF band:	2402 - 2480 MHz
Max. RF power:	$< 20 \text{ dBm}$
Range:	Up to 20 m / 66 ft indoors and 30 m / 100 ft outdoors (Depends on local conditions)

Zigbee

Protocols:	802.15.4
RF bands:	2405 to 2480 MHz
Max. RF Power:	$< 20 \text{ dBm}$
Range:	Up to 100 m / 328 ft indoors and 300 meters / 984 ft outdoors (Depends on local conditions)

Microcontroller unit

CPU1:	STM32L151xC
CPU2:	EFR32MG27C140F768IM32

Firmware capabilities

Webhooks (URL actions):	10 with 2 URLs per hook
Scripting:	Yes
KVS (Key-Value Store):	Yes

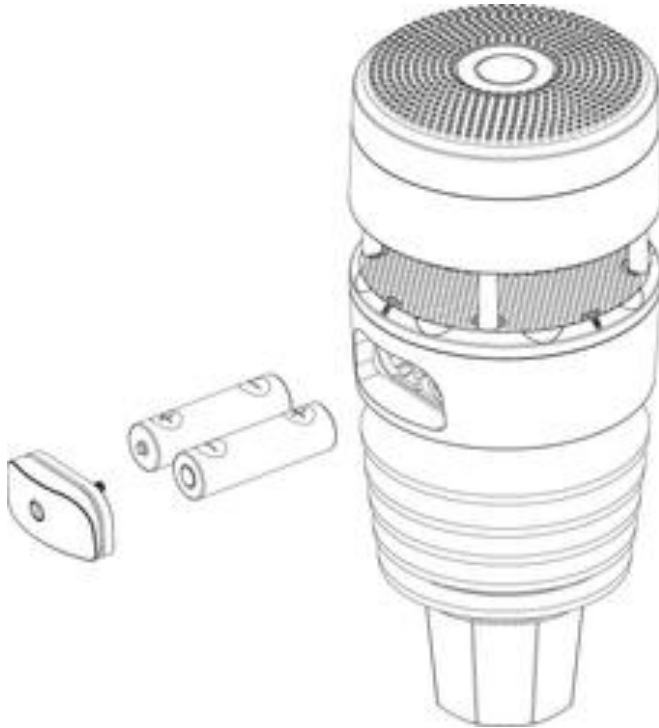
Installing batteries

⚠CAUTION! Use lithium batteries. Using alkaline batteries in cold or wet conditions with the internal heater activated can cause overheating and leakage, resulting in damage to the Device. Do not use rechargeable NiMH or NiCd batteries, as they may not provide consistent power.

⚠CAUTION! Do not mix old and new batteries, different brands or types of batteries.

⚠CAUTION! Make sure the batteries are installed correctly according to polarity + and -.

①The Device requires batteries for initial startup. Once the solar panel generates enough power, it will serve as the primary power source. Alternatively, you can use a 12 V= adapter as an additional power source.



1. Unscrew the bolt on the battery compartment cover using a flathead screwdriver.
2. Remove the cover.
3. Insert the two batteries, making sure to match the correct polarity + and - as shown in Fig. 2.
4. Place back the cover and tighten the bolt. The blue LED starts flashing at 8.8-second intervals. If the LED does not flash, press **Reset** to activate it.

Connecting the Device to Shelly Cloud

①The Device can be monitored, controlled, and set up through Shelly Smart Control home automation service. You can use the service through either our Android, iOS, or Harmony OS mobile application or through any internet browser at <https://control.shelly.cloud/>.

①To use the Device with the Shelly Smart Control service, make sure you have a permanently powered Bluetooth gateway, such as the Shelly BLU Gateway Gen3 or other Shelly Gen2 (or later) devices.

①To install the mobile application, scan the QR code below, or search for "Shelly Smart Control" in App Store, or Google Play.

The mobile application is free of charge, but you need to create a free account to use it.



Before you start, make sure you have:

- An active Shelly BLU Gateway Gen3 or other Shelly Gen2 (or later) device added to your Shelly Smart Control account.
 - Bluetooth connectivity enabled on your mobile device.
1. Press **CAL** button on the Weather station once. The Device enters pairing mode for 30 seconds.
 2. Start the Shelly Smart Control application.
 3. Select + **Add a New Device**.
 4. Select **Add via Bluetooth**, then select **Next**. A list of all available devices appears on your screen.
 5. Select **Ecovitt WS90** from the list, then select **Next**. You will be prompted to select a Bluetooth gateway device(s) from a list.
 6. Select the gateway device(s).
 7. Add the Device to an existing room or create a new one. The Ecovitt WS90 appears in the room's device list.

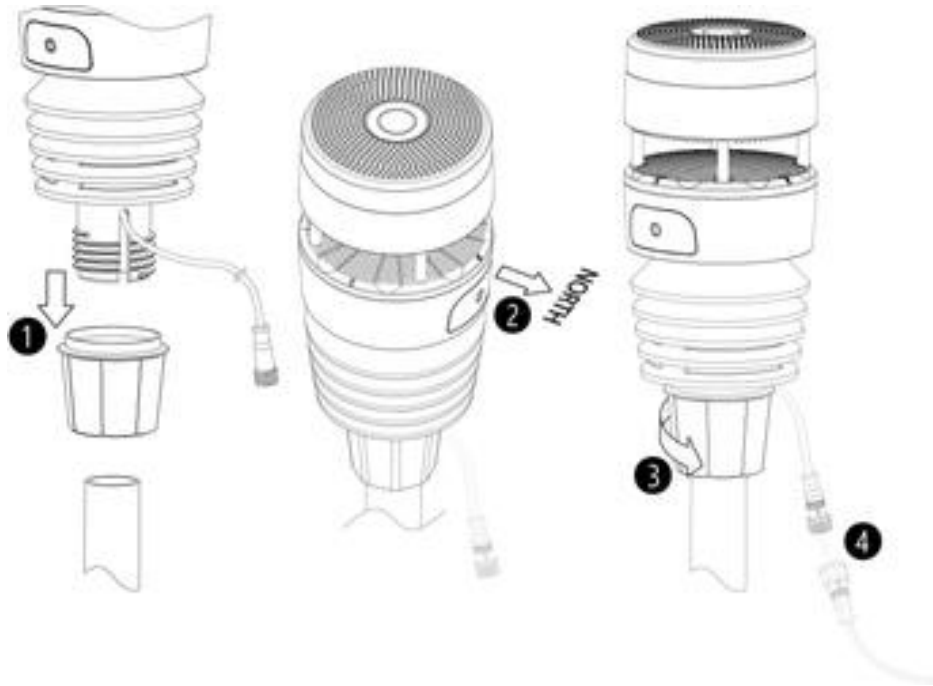
Connecting the Device to a Zigbee network

1. Press the calibration button 2 times: The Device enters Zigbee commissioning mode for 3 minutes.
2. Add the Device to your home automation platform. The blue LED flashes once to confirm successful pairing.

Mounting the Device:

- ① Before mounting the outdoor sensor, test its wireless connection with the gateway at the intended installation distance.
- ① If your setup allows, you can use the external power supply (heating) cable and route the cable inside the pole.
- ① Use a level to make sure the pole and Device are installed vertically. Any tilt in the Device may result in inaccurate wind speed and direction readings.

①The Device is designed for mounting on a Ø25 mm / 1 inch pole (not included).



1. Mount the Device onto the pole as shown in Fig. 3.
2. Adjust the device so that the alignment indicator N (Fig. 1/8) points to the North.
3. Tighten the mounting ring until it stops turning.
4. Connect the power supply cable to the 12 V= power extension cable.

API

The Device can access and interact with other smart devices or automation systems if they are in the same network infrastructure. Shelly Europe Ltd. provides APIs for the devices, their integration, and cloud control. For more information, visit <https://shelly-api-docs.shelly.cloud>.

Replacing batteries

⚠WARNING! Do not attempt to charge non-rechargeable batteries. Charging non-rechargeable batteries can cause an explosion or fire, leading to serious injury or death.

⚠CAUTION! Batteries can emit hazardous compounds or cause fire if not disposed of properly. Remove and immediately recycle or dispose of used batteries according to local regulations and keep away from children. Do NOT dispose of batteries in household trash or incinerate.

To complete the procedure, follow steps 1-4 in the section *Installing Batteries* (Fig. 2).

Troubleshooting

In case you encounter problems with the installation or operation of the Device, check its knowledge base page:

<https://shelly.link/ecowitt-ws90>

Cleaning

⚠CAUTION! Do not use aggressive detergents.

⚠CAUTION! Do not immerse the Device or wash it under running water.

Use a soft, slightly damp cloth to clean the Device.

FCC notes

- This Device complies with Part 15 of the FCC Rules.
- Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
- The manufacturer is not responsible for any radio or TV interference caused by unauthorized modification or change to this equipment. Such modifications or change could void the user's authority to operate the equipment.
- 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.
- RF exposure statement:
To maintain compliance with FCC's RF Exposure guidelines, This equipment should be installed and operated with minimum distance between 20cm the radiator your body: Use only the supplied antenna.

Disposal and recycling



Do not dispose of the product in household waste. Recycle the product to prevent environmental and health damage and to promote resource conservation. Dispose of the product at an appropriate waste collection point at your own responsibility.

Resellers, from which the Device was purchased are required to accept Waste Electrical and Electronic Equipment (WEEE) free of charge for proper disposal.

Some electronic products may store personal data. The user is responsible for deleting this data before disposing of the Device. For deletion reset the Device to its factory settings.

Declaration of conformity

Hereby, Shenzhen Fine Offset Electronics Co., Ltd. declares that the radio equipment type Ecowitt WS90 is in compliance with Directive 2014/53/EU, 2014/30/EU, 2011/65/EU.

<https://shelly.link/ecowitt-ws90-doc>

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