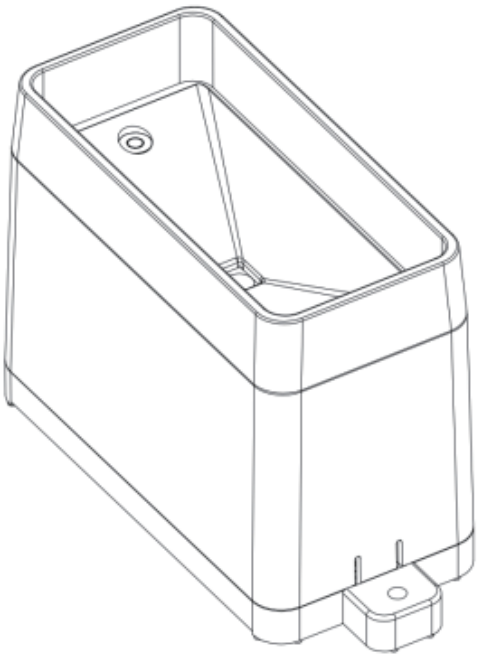
ecowitt®



Wireless Rain Gauge Sensor

Model: WN20

https://s.ecowitt.com/2PA70U

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1.Wireless Networking Introduction

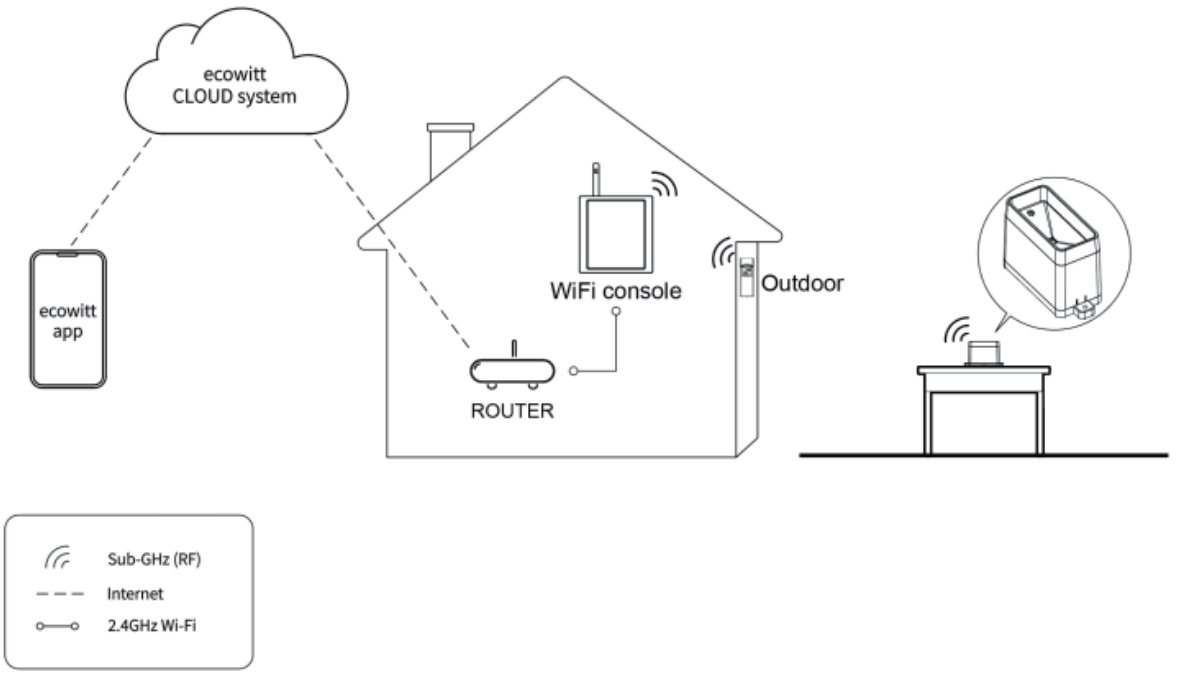


Figure 1 ECOWITT Ecosystem

Please note that this sensor cannot be used alone. The data can be transmitted via the Ecowitt Wi-Fi Gateway or displayed on a receiver console (sold separately). Once the Wi-Fi configuration is complete, the data can be viewed on the Ecowitt app/ WS View Plus or on the receiver console.

To ensure optimal product performance, please read this manual carefully and keep it for future reference.

General Terms Used in the Manual:

Gateway: Also known as a hub, it is a display-less console

Receiver: Refers to the console.

RF: Radio frequency.

It refers to the ISM and SRD Sub-G (Industrial, Scientific and Medical and Short-Range Devices frequency bands below 1 GHz)

for communicating between the console and its sensors.

This frequency is not the same as the 4G modem (LTE) or Wi-Fi

working frequencies (2.4 GHz, 5 GHz).)

ISM/SRD bands are kept separate from 4G frequencies by national regulations to avoid interference.

Typical ISM/SRD frequencies are 915MHz(Americas), 868MHz(Europe), 433MHz(worldwide), 920MHz (Japan, Korea)

2.Pairing with a Gateway / Console

You need to pair this sensor with the Ecowitt Wi-Fi Gateway or consoles in order to view data on your Ecowitt app and receive email alerts on our weather server. Compatible models are listed in the table below.

Gateways			
			
GW1200	GW2000	GW3000	WS6210

Table 1

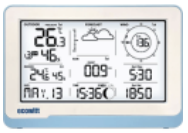
Display Consoles			
 WN1700	 WN182X	 WN1920	 WN1980
 HP25XX	 WS38XX	 WS39XX	

Table 2

- The WN1700 is a dedicated rain gauge console explicitly designed for use with the rain gauge products.
- WN1820/WN1821 only functions as a gateway for the WN20. No rain data is displayed on the console screen.

3.Getting started

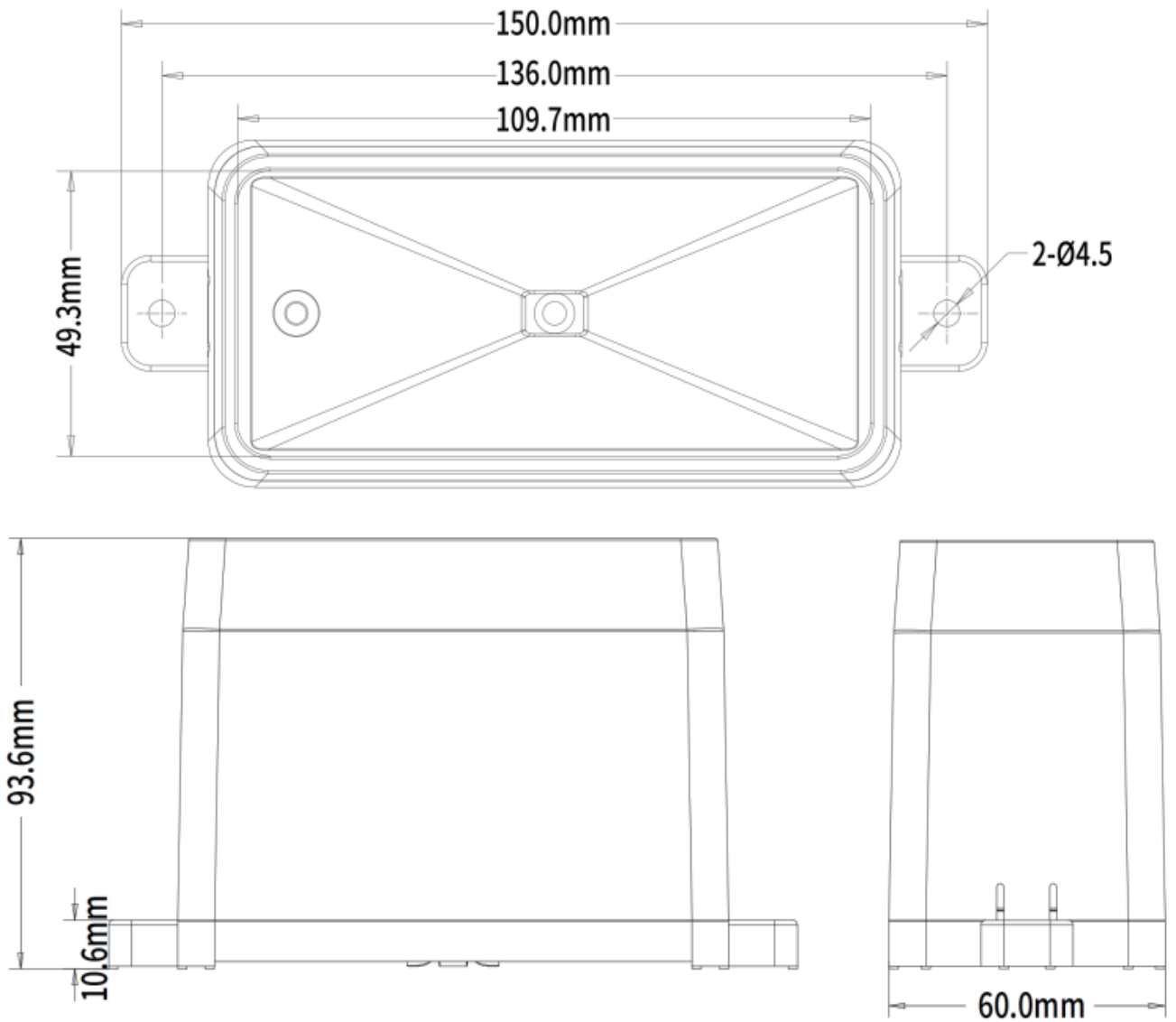
3.1.Parts List

One WN20 Wireless Rain Gauge Sensor

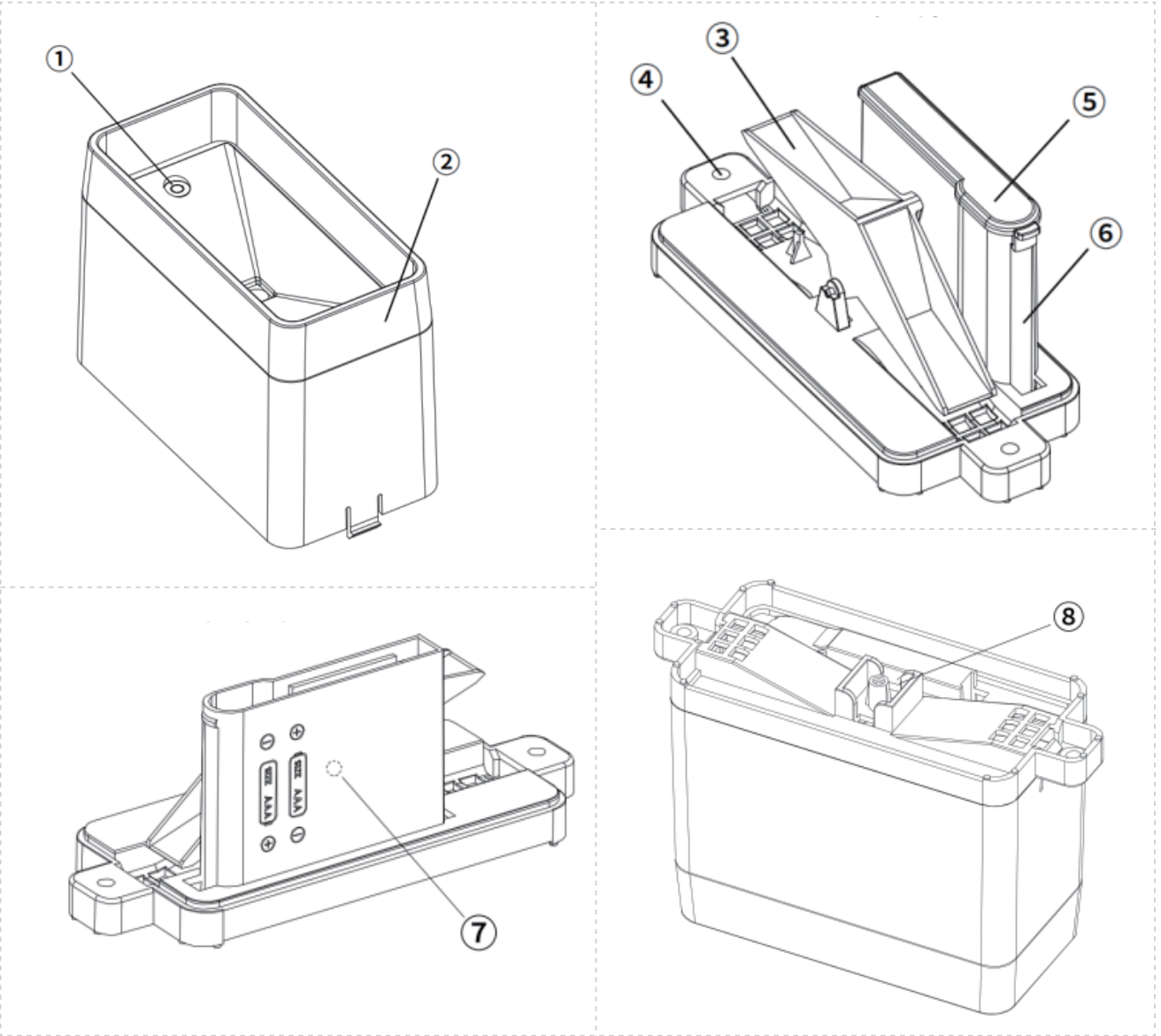
Two pieces of stainless steel self-tapping screws (PWA3.0×20mm)

A stainless steel mesh inlay for the rain gauge funnel for debris protection and splashing loss avoidance.

3.2.Views and Sizes



3.3.Overview

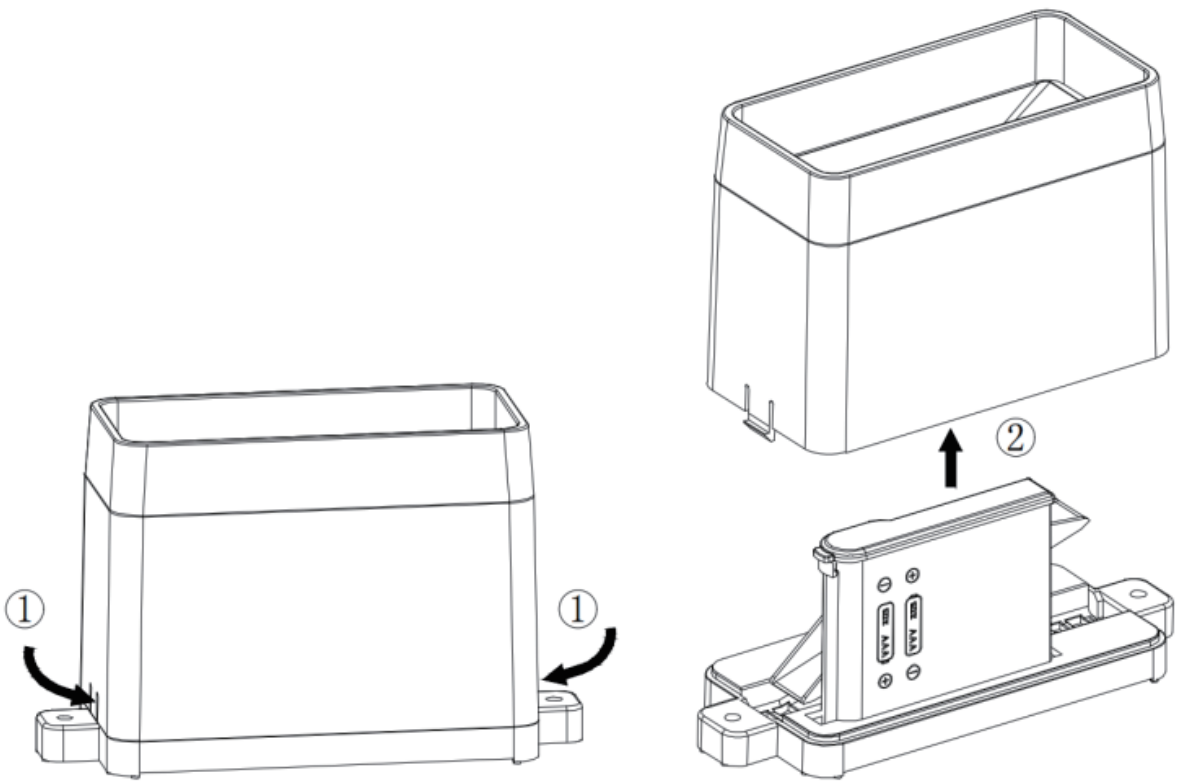


No	Description	No	Description
1	Bubble Level	2	Rain Funnel
3	Tipping Bucket	4	Screw Hole

No	Description	No	Description
5	Battery Compartment Cover	6	Battery Compartment
7	Blue LED	8	Bracket Adapter(not included) and Screw Holes

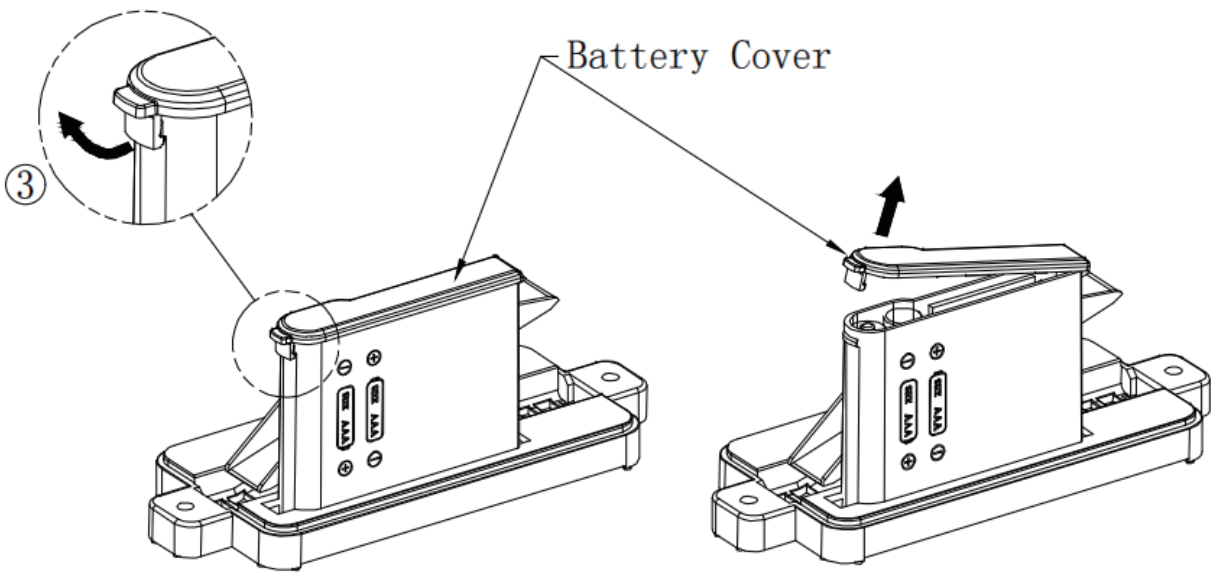
4.Power Up

4.1.Disassemble and Install Battery

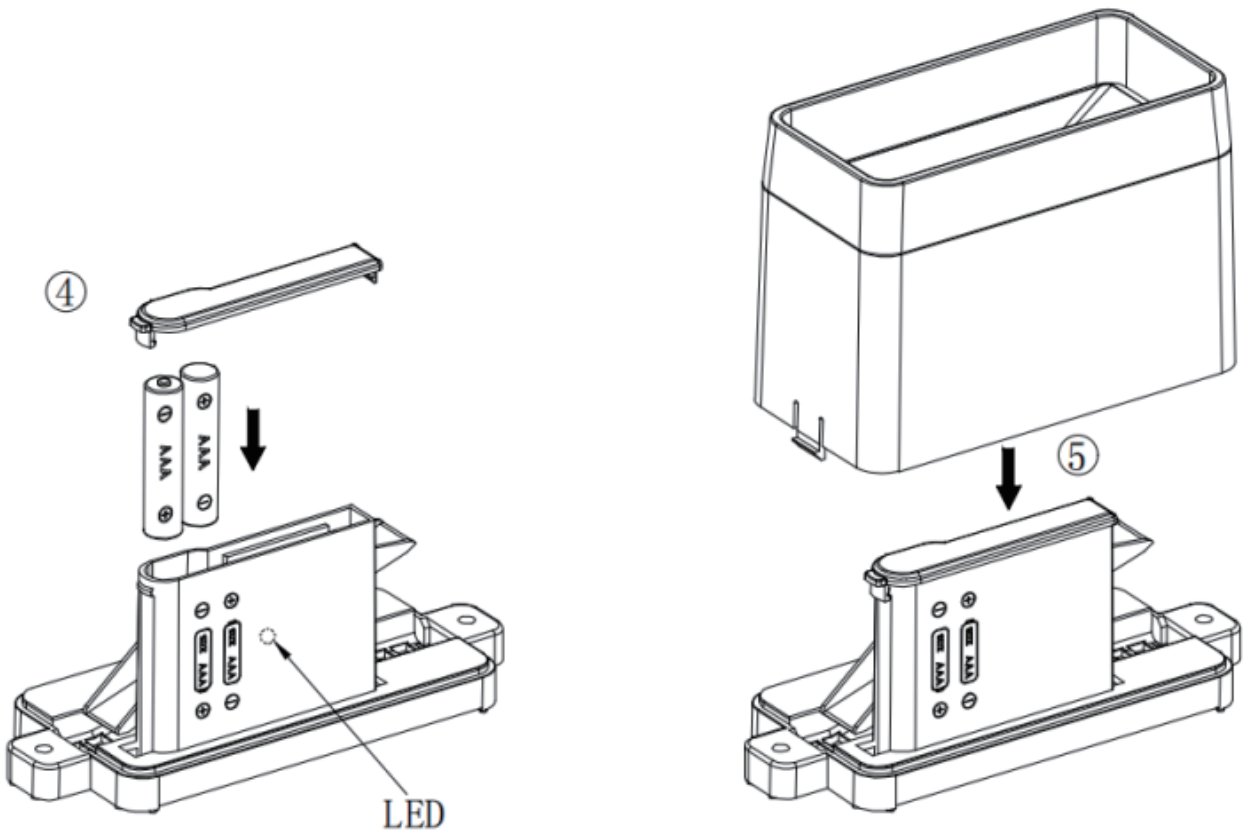


① Remove the rain funnel by locating the spring clips on both sides. Use your fingers to press the spring clips inward at the same time (pressing depth is approximately 1.0 mm).

② While holding the clips inward, lift the rain funnel upward to remove it.



③ Pull the latch outward to unlock the battery door. (There are latches on both ends of the battery door; you can choose either.)



④ Insert the AAA batteries. The LED indicator will light up. Make sure to install the batteries with the correct polarity. Do not reverse the positive and negative endings. Use Alkaline or Lithium Primary batteries only. Rechargeable NiMH batteries are not permitted.

⑤ Reattach the rain funnel. (There is no need to align the orientation of the bubble level.)

4.2.View Data

Ecowitt rain gauge sensor signals can be received by compatible gateways or consoles—please refer to the respective manuals for data viewing instructions. When a console is in auto-learning mode (default), it will automatically connect to a powered-on rain sensor. If multiple sensors are detected, the console will follow a built-in sensor hierarchy to determine which sensor's data to display.

To view data from more than one rain sensor simultaneously, an additional console or gateway is required, and the higher-priority sensor must be disabled on that unit. For example, if you own both a WS69 sensor array and a WN20, the console will default to displaying the WN20 rainfall data automatically. If a WH40 is also present, you must disable WH40 in order to view WN20 data.

Ecowitt supports two types of rain gauge sensors: traditional tipping-bucket sensors (WH40, WH40H, WN20, WN67, WS69) and piezoelectric sensors (WS85, WS90). Each type follows a specific display priority when multiple sensors are

present:

for traditional sensors, the priority is WH40/WH40H >WN20> WN67/ WS69; for piezoelectric sensors, it is WS85 > WS90.

While the Ecowitt and WSView Plus apps or WebUI can display data from both types of rain sensors in a unified view, display consoles can only show one type of rain data at a time. Therefore, it is essential to set the rainfall data priority when using a console. TFT display consoles such as the HP2550 and HP2560 support configuring this priority directly within the console. In contrast, LCD display consoles like the WN1700, WN1920, WN1980, WS3800, WS3820, WS3900, and WS3910 do not support this function internally—users must set the priority via the Rain Total page in the Ecowitt or WSView Plus apps or the WebUI.

5.Mounting

5.1.Best Practices for Wireless Communication

Wireless (RF) communication is susceptible to interference, distance, walls, and metal barriers. We recommend the following best practices for trouble-free wireless communication between both sensor packages and the console:Electro-Magnetic Interference (EMI). Keep the console 3 feet away from computer monitors and TVs. Radio Frequency Interference (RFI). If you have other devices operating on the same frequency band as your indoor and/or outdoor sensors and experience intermittent communication between the sensor package and the console, try turning off these other devices for troubleshooting. You may need to relocate the transmitters or receivers to avoid interference and establish reliable communication. The frequencies used by the sensors are one of (depending on your location): 433, 868, or 915 MHz (915 MHz for the United States).scenarios, you will be able to go about 100 feet or 30 meters.scenarios, you will be able to go about 100 feet or 30 meters.

Line of Sight Rating. This device is rated for 300 feet (100m) line of sight (under ideal circumstances; no interference, barriers, or walls), but in most real-world scenarios, you will be able to go about 100 feet or 30 meters.
Metal Barriers. Radio frequency will not pass through metal barriers such as aluminum siding or wall framing. If you have such metal barriers and experience communication problems, you must change the placement of the sensor package and/or console.
The following table shows different transmission media and expected signal strength reductions. Each “wall” or obstruction decreases the transmission range by the below factor.

Medium	RF Signal Strength Reduction
Glass (untreated)	5-15%
Plastics	10-15%
Wood	10-40%
Brick	10-40%
Concrete	40-80%
Metal	90-100%

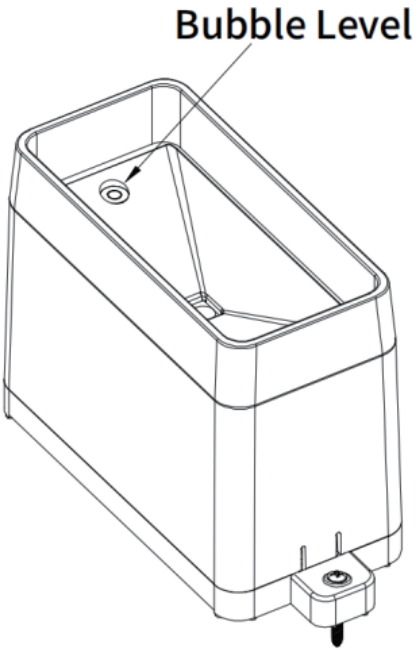
Table : RF Signal Strength reduction

5.2.Mounting on a horizontal surface

① For optimal performance, install the rain gauge in a location with maximum signal strength (full bars in clear weather), while accounting for potential signal attenuation during rainfall.

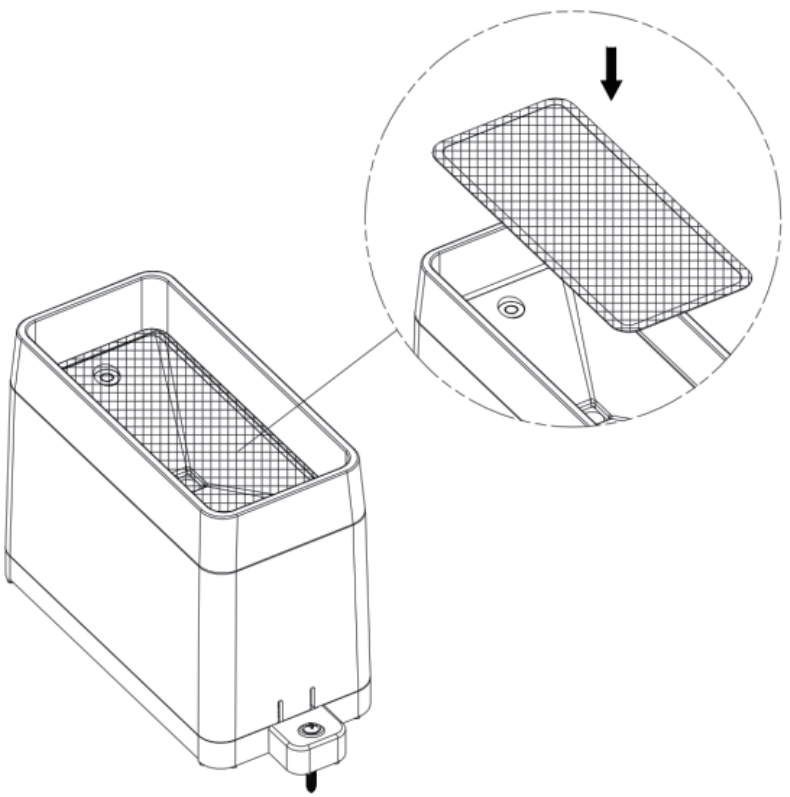
② Secure Mounting (Optional) - For permanent installations, fasten the unit securely using screws. (Note: This step may be omitted for temporary measurement setups.)

Mounting method: Use 2 pieces of stainless steel self-tapping screws (PWA3.0×20mm) to secure the device to the mounting surface.



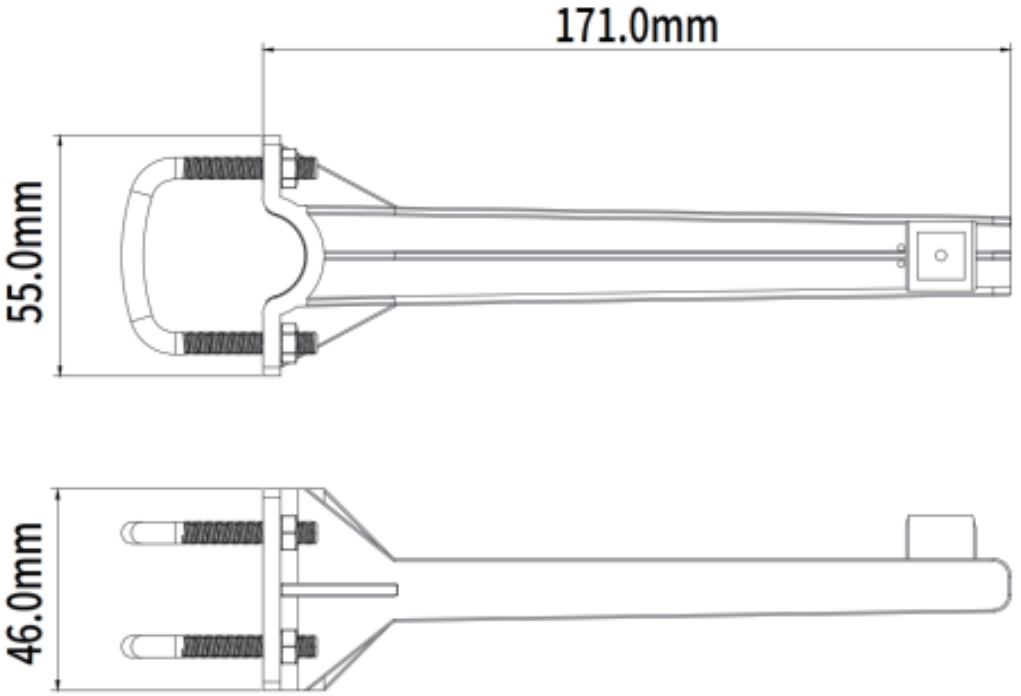
③ Level Adjustment - Calibrate the bubble level to ensure perfect horizontal alignment.

Note: You can use the leveling bubble on top of the rain funnel to check and ensure the device is installed in a level position.



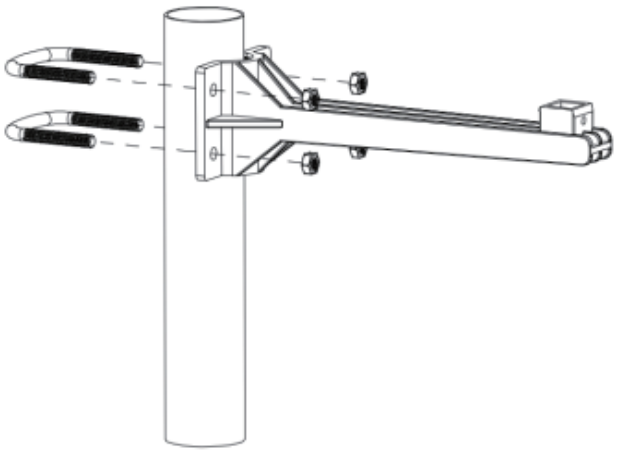
④ Final Assembly - Complete the installation by inserting the stainless steel anti-splash mesh filter.

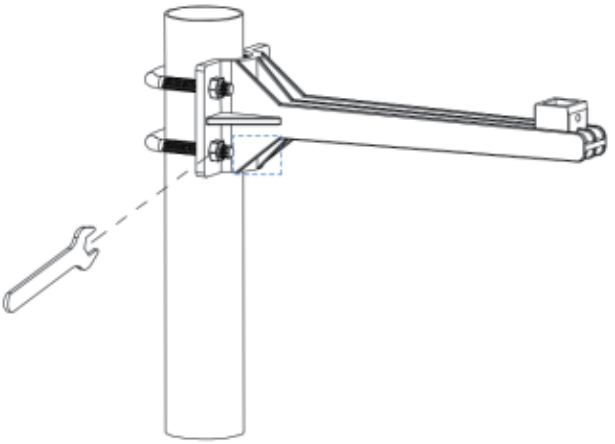
5.3.Optional accessory for pole mounting (Sold separately)



Bracket Size

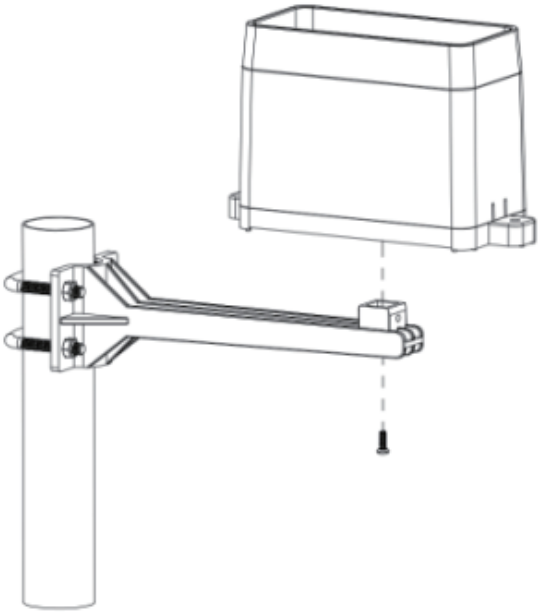
This mounting bracket (Sold separately) includes a U-bolt kit that fits 1.0 to 1.25-inch poles (25.4 to 32 mm). For wall or flat surface installation, users can secure the bracket using their own screws or nails through the pre-drilled holes.

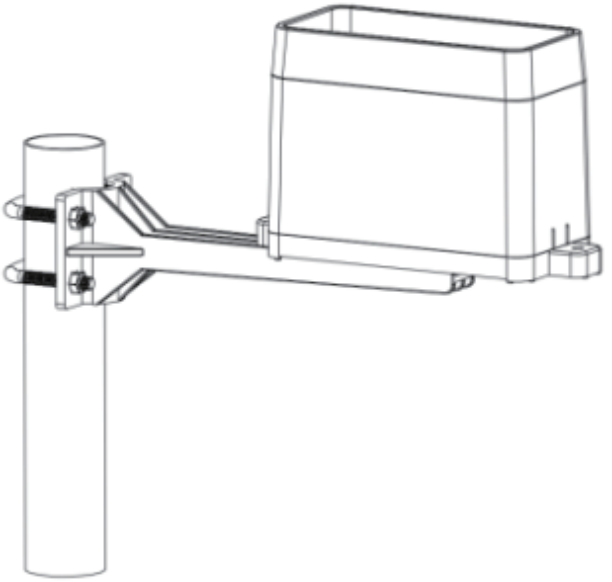




① Mounting on a pole of 1.0 to 1.25 inch diameter.

② Tighten the nuts using the Simple Wrench included with the bracket.





③ Tighten the φ2.6*10 Screw on the base.

④ Level Adjustment and Final Assembly.

6.Features

- Equipped with a high-sensitivity tipping bucket design, each tip measures approximately 0.3mm of rainfall. Automatically measures and transmits data every 48 seconds, helping you stay updated with every rainfall event.
- No wiring required—rain data is transmitted wirelessly to a compatible display console or gateway (sold separately). It is ideal for home use, gardening, farming, and weather enthusiasts.
- Built to withstand outdoor conditions with IP44-rated waterproof protection. Powered by two AAA batteries, offering flexible and cordless installation with reliable performance.
- The flat-bottom design allows for stable placement on any level of surface. For more secure mounting, two screw holes are provided for optional installation on wood, concrete, or other platforms using screws.
Alternatively, the rain gauge can also be bracket mounted with separately sold accessory.

- Easily pairs with Ecowitt consoles and gateways to form a complete weather monitoring system for smart homes or agricultural applications.

7.Specifications

Model	WN20
Name	Rain Gauge
Dimensions	150*60*93.6mm(mm)
Weight	132(g)
Material of Plastic Casing	ASA
Tipping spoon	About 0.3mm per tip
Rainfall Metering Range	0mm to 9999mm
Rainfall Metering Accuracy	± 10%
Rainfall Metering Resolution	0.3mm

Data reporting Interval	About 48 seconds
RF Connection Frequency	920/915/868/433MHz (depending on local regulations)
RF Wireless Range (in open areas)	Over 100 meters (328 ft.)
Operating Temperature Range	-40°C to 60°C(-40℉ to 140℉)
Protection Rating	IP44
Power Supply	2*AAA batteries(not included)
Battery Life	2 Years

8.Troubleshooting

8.1.If your sensor is not connecting, please follow the steps below to troubleshoot the issue:

Check Frequency Compatibility

Ensure that both the sensor and the receiver (console/ gateway) are operating on the same RF frequency. Mismatched frequencies will prevent communication.

Power up again the Sensor

Remove and reinsert the batteries to power up the sensor. Observe the LED indicator: it should light up briefly upon power-up and then flash periodically—typically once about every minute. This indicates the sensor is actively transmitting.

Verify Sensor ID

Locate the Sensor ID label on the physical sensor unit. Make sure it matches the ID shown on the receiver's "Sensor ID" page. If it does not match, the receiver will not recognize the sensor data.

Check the Receiver Unit

Ensure the receiver (console or gateway) is functioning properly:Confirm it is powered on and connected to the network (if applicable).

Check whether the firmware is up to date.

Reduce the distance between the sensor and the receiver to rule out range issues.

Restart the receiver if necessary.

8.2.WN20 Rain Gauge Accuracy Check and Troubleshooting

Tipping bucket rainfall sensor working principle:

Rain falls into the receiving funnel and flows through into the tipping bucket. When the collected water reaches a specific amount (0.3mm for the WN20), the tipping bucket loses balance and tips over. Each tip activates a switch, closing a circuit and sending a pulse signal to the recorder. The recorder counts these pulses and transmits them for the console to calculate and record the rainfall amount, enabling measurement of the rainfall process.

If you find your rain gauge data is inaccurate, please follow these steps to check your instrument:

Check for Funnel Obstruction:

Inspect if any debris (e.g., leaves, bird droppings) has fallen into the rainfall funnel. If present, clean it thoroughly; debris can obstruct flow and affect measurement accuracy.

If data returns to normal after cleaning, the issue is resolved.

Cross-Verify with Regional Rainfall Data:

If the funnel is clear, use the weather map on the Ecowitt website or other weather services to check rainfall data from several nearby stations. Use this data to cross-verify your gauge's accuracy.

Important: Do not rely solely on data from a single nearby point, as rainfall distribution is uneven. Data from multiple points provides a better reference.
If your rain gauge data falls within reasonable limits compared to regional data, the issue is resolved.

Test Counting Function (Manual Drip Test):
Use a syringe or measuring cup to draw a small amount of water. Slowly drip the water onto the tipping bucket.

Listen for a distinct "click" sound (indicating a tip) and observe whether the rainfall reading on your associated app or display device increases by 0.3mm.
If 0.3mm is added per tip, the rain gauge is likely functioning correctly.
Crucial: DO NOT pour water rapidly, as this can prevent the bucket from resetting properly and cause missed tips/rainfall.

Simulated Rainfall Test:
To ensure accurate rainfall simulation for rain gauge calibration, this test requires the use of a peristaltic pump to deliver water at a precisely controlled, steady drip rate,

thereby eliminating the variability introduced by manual pouring. All water outflow from the rain gauge must be collected and weighed to verify the accuracy of the measurement. This gravimetric validation method, combined with automated water delivery, provides reliable and repeatable calibration results while maintaining strict quality control standards.

Simulating Torrential Rain: Drip 500g of water (equivalent to 500mL) at a controlled, steady rate over a 10-minute period into the collection funnel. Under these conditions, the rain gauge should display a rainfall measurement of 93.1mm ±10% (acceptable range: 83.8mm to 102.4mm).

After each test, check your app or display to confirm the corresponding rainfall amount was added.

You may want to correct your rain totals for weekly, monthly and yearly rainfall after in the rain totals adjustment section of your console subtracting the amounts created during the test.

Final Resolution:

If rainfall data remains inaccurate after performing all the above checks, internal components may be damaged. Please contact after-sales support to request a replacement rain gauge body.

Rainfall Intensity Reference:

Light rain: less than 2.5mm / 24h

Moderate rain: 2.5–10mm / 24h

Heavy rain: 10–50mm / 24h

Torrential rain: 50–100mm / 24h

9.Warranty & Caution

9.1.Warranty

We disclaim responsibility for any technical error or printing error or the consequences thereof.
All trademarks and patents are recognized.
We provide a 2-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. The purchaser must contact us for problem determination and service procedures to receive warranty service.

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.

9.2.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, under Part 15 of the FCC Rules. These limits are designed to protect reasonably against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used by the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. Suppose this equipment does cause harmful interference to radio or television reception,
which can be determined by turning the equipment off and on. In that case, 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 at a minimum distance of 20 cm from the radiator to 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.

9.3.Battery Care and Maintenance

When batteries of different brands or types are used together, or when new and old batteries are used together, some batteries may be over-discharged due to a difference in voltage or capacity. This can result in venting, leakage, and rupture, and may cause personal injury.

- Do not mix Alkaline, Lithium, standard, or rechargeable batteries.
- Always purchase the correct size and grade of battery, the most suitable for the intended use.
- Always replace the whole set of batteries at one time, taking care not to mix old and new ones, or batteries of different types.
- Clean the battery contacts and those of the device before battery installation.
- Ensure the batteries are installed correctly about polarity (+ and -).
- Remove batteries from the product during periods of non-use. Battery leakage can cause corrosion and damage to this product.
- Remove used batteries promptly.
- For recycling and disposal of batteries, and to protect the environment, please check the internet or your local phone directory for local recycling centers and/or follow local government regulations

10.Contact Us

10.1.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.

10.2.Stay in Touch

Ask questions, watch setup videos, and provide feedback on our social media outlets. Follow Ecowitt on Discord, YouTube, Facebook and Twitter.