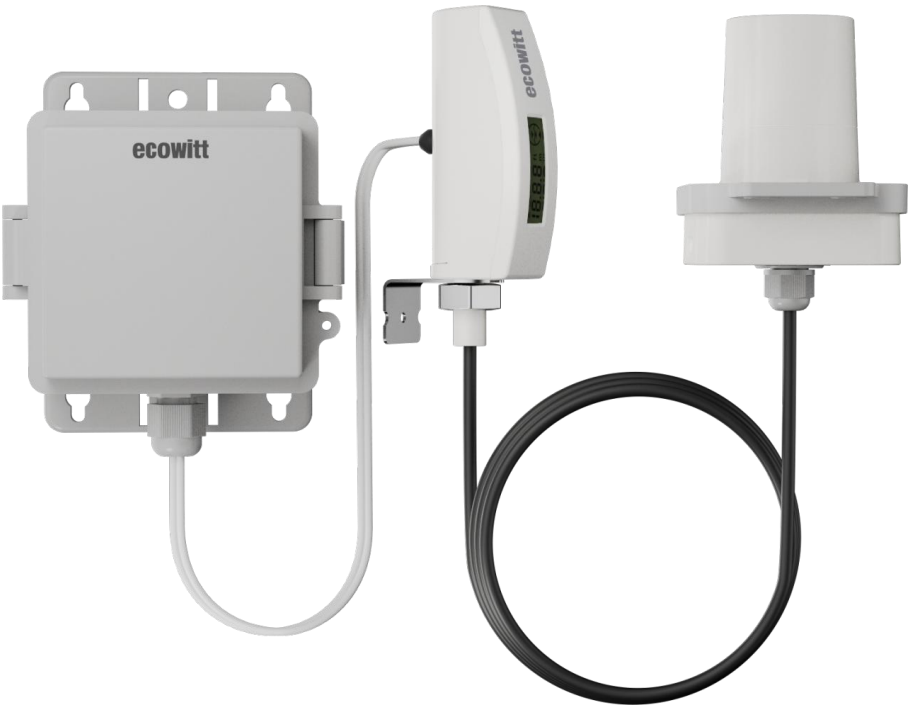
Laser Distance Meter for water level/ snow depth Measurement



User Manual

Model No. LDS01

https://s.ecowitt.com/NJ5PG6

Contents

1. Getting Started 1
1.1 Package List 1
1.2 Overall Appearance 2
1.3 Multiple views and sizes 3
1.4 Unit setting and find the sensor ID 4
1.5 Power up 7
2. Measurement 10
2.1 Measurement Principle 10
2.2 Measurement Intervals 13
2.3 Heating function 13
3. Ecowitt System 14
4. Ecowitt Network Provisioning 16
5. Initial Setup via app or Web-UI 17
5.1 Through App 18
5.2 Through Web-UI 29
6. Mounting 31
6.1 Drill holes with the drill guide card 31
6.2 Mount the bracket 33

7. Features 39
8. Specifications 41
9. Troubleshooting 43
10. Warranty & Caution 47
    10.1 Warranty 47
    10.2 IC Caution 48
    10.3 FCC Statement 49
    10.4 Care + Maintenance 50
    10.5 Safety Disclaimer 52
11. After-sales Service 53
12. Stay in Touch 53

1. Getting Started

1.1 Package List

- 1 x Laser Distance Meter (LDS01) (Main display unit, laser distance measurement module, and a battery compartment)
- 1 x Mounting bracket
- 1 x Drill guide card
- 1 x User manual
- 2 x Nylon cable ties 10*270mm
  1 x Nylon cable tie 2.5*150mm
- 8 x Stainless steel self-tapping screws, PWA 3.0*20mm (for mounting the laser distance measurement module and battery compartment)
- 1 x Stainless steel round head self-tapping screw, PA 3*15mm (for mounting the main display unit)

1.2 Overall Appearance

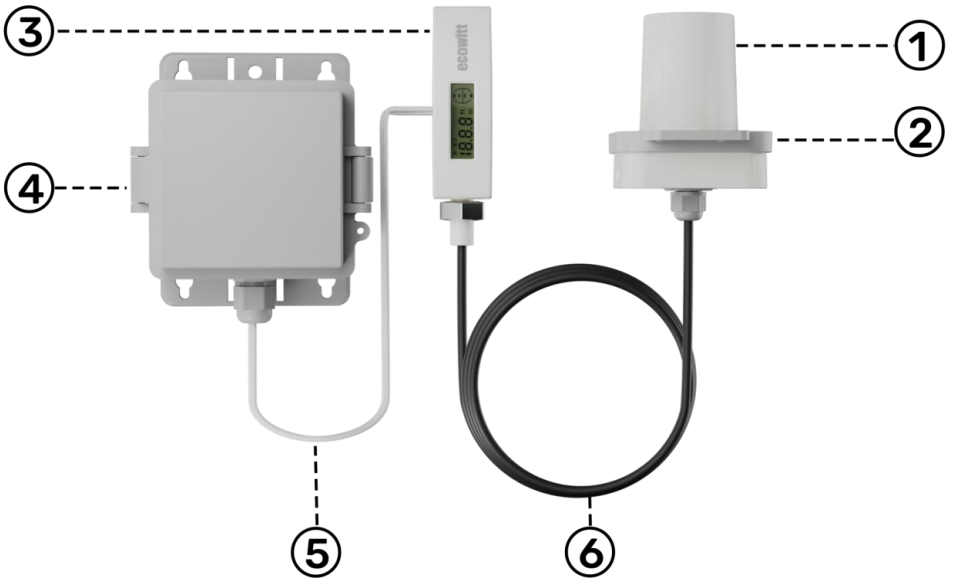


Figure 1

No.	Description
1	Laser distance measurement module
2	Mounting bracket
3	Main display unit
4	Battery compartment
5	Connecting cable, length1.5m (between main display unit and battery compartment)
6	Connecting cable, length1.5m (between main display unit and laser distance measurement module)

Table 1

1.3 Multiple views and sizes

The LDS01 product is a complete unit, with the battery compartment connected to the main display unit by a cable，length 1.5m. The main display unit and the laser distance measurement module are also connected by a cable, length 1.5m.

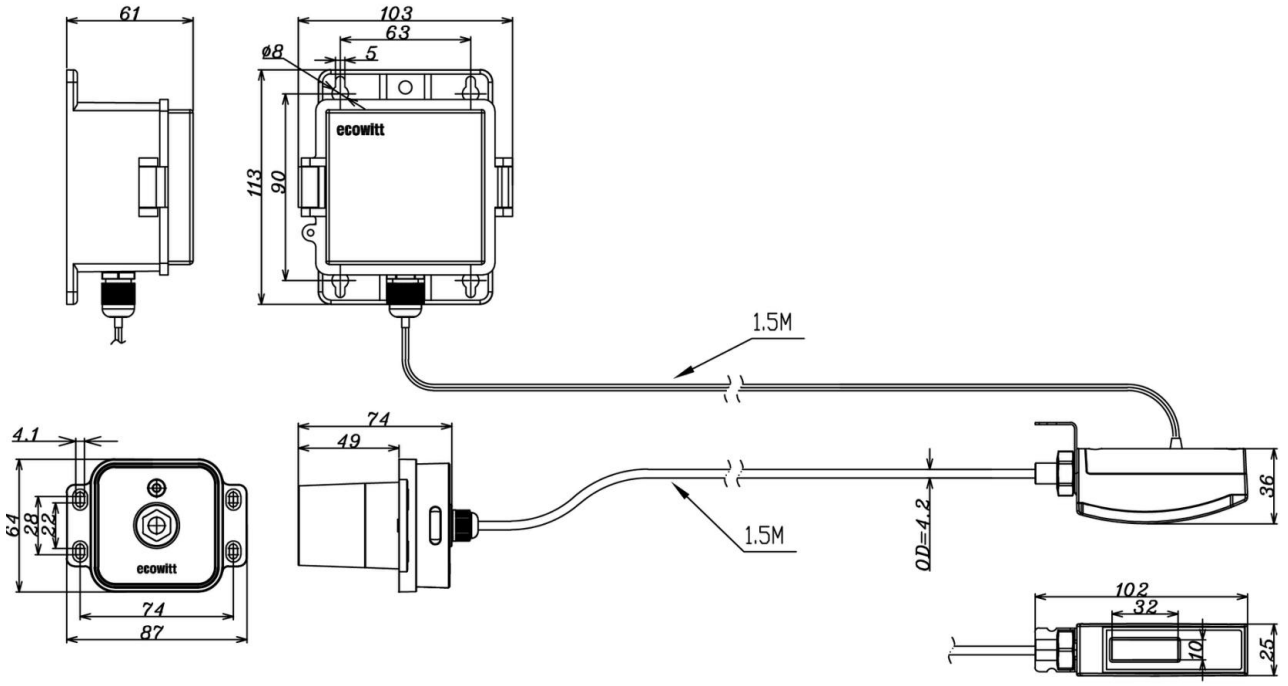


Figure 2 Sizes

1.4 Unit setting and find the sensor ID

The default unit is in meters. If you need to change the unit, please do so at this step. If no unit modification is needed, please proceed to the next step **Section 1.5 Power up**.

1.4.1 Remove the cover

Unscrew the screws on the LCD unit and remove the cover. Make sure not to lose the screw sealing gaskets. Take the the dummy battery out.

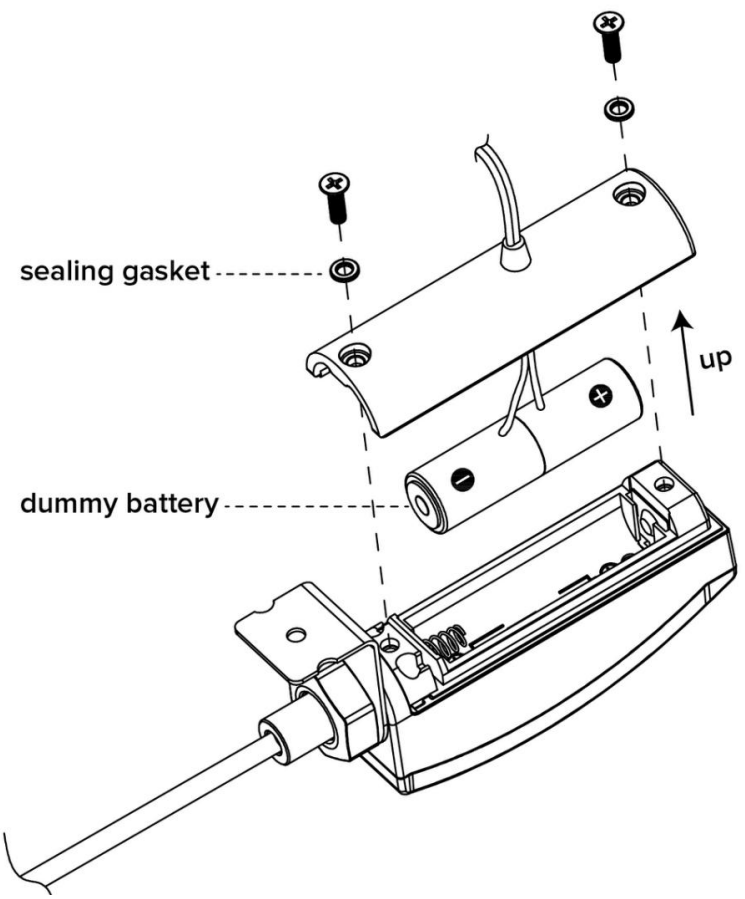


Figure 3

1.4.2 Unit Switch

- "1" represents the unit in meters (m).
- "ON" represents the unit in feet (ft).

Figure 4 The unit switch

1.4.3 Find the sensor ID on LDS01

The Sensor ID is labeled inside the battery compartment, as illustrated below. Please note the ID number for future reference when comparing it to the Sensor ID displayed on the APP or console display. For more details, refer to **section 5.1.5 Sensor Management**.

Figure 5

1.4.4 Close the cover

Close the cover and securely tighten the screws to prevent water leakage. Ensure that the screw gaskets are not lost. If the gaskets are not used, the battery cover may not tighten properly, leading to waterproofing issues.

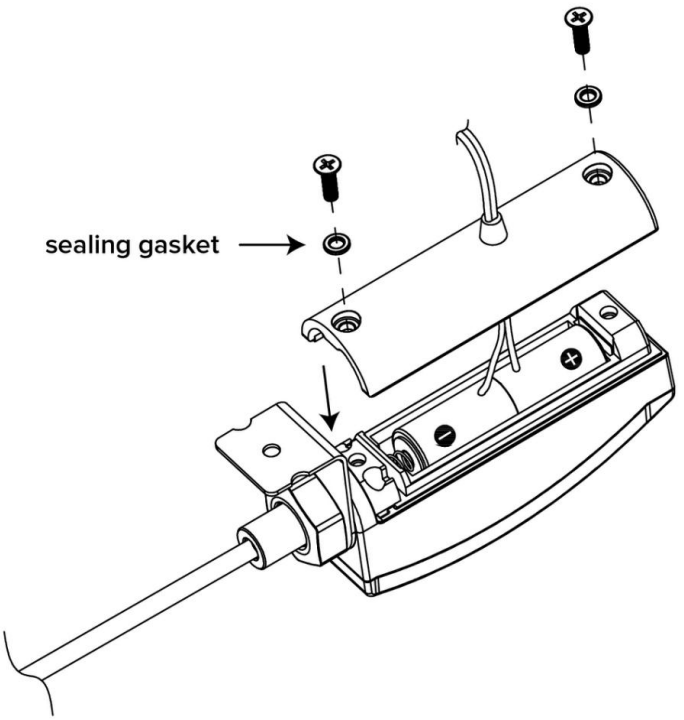


Figure 6 Close the cover

1.5 Power up

Power-Up Caution:

1.Ensure Clearance for the Lens

Make sure the lens is not completely obstructed. Leave a clearance of at least 40 mm (0.131ft).

2.Ensure the device does not operate in an over-range state to prevent prolonged heating.

3.Remove the batteries if the device will not be used for an extended period to avoid accidental heating or battery damage.

4.Alkaline batteries are recommended(not included).

5.Ensure the correct polarity.

1.5.1 Insert the batteries

- Open the battery compartment door
- Pull out the battery pack module, insert 8 batteries
- Place the battery pack module back in its original position
- Close the battery compartment door

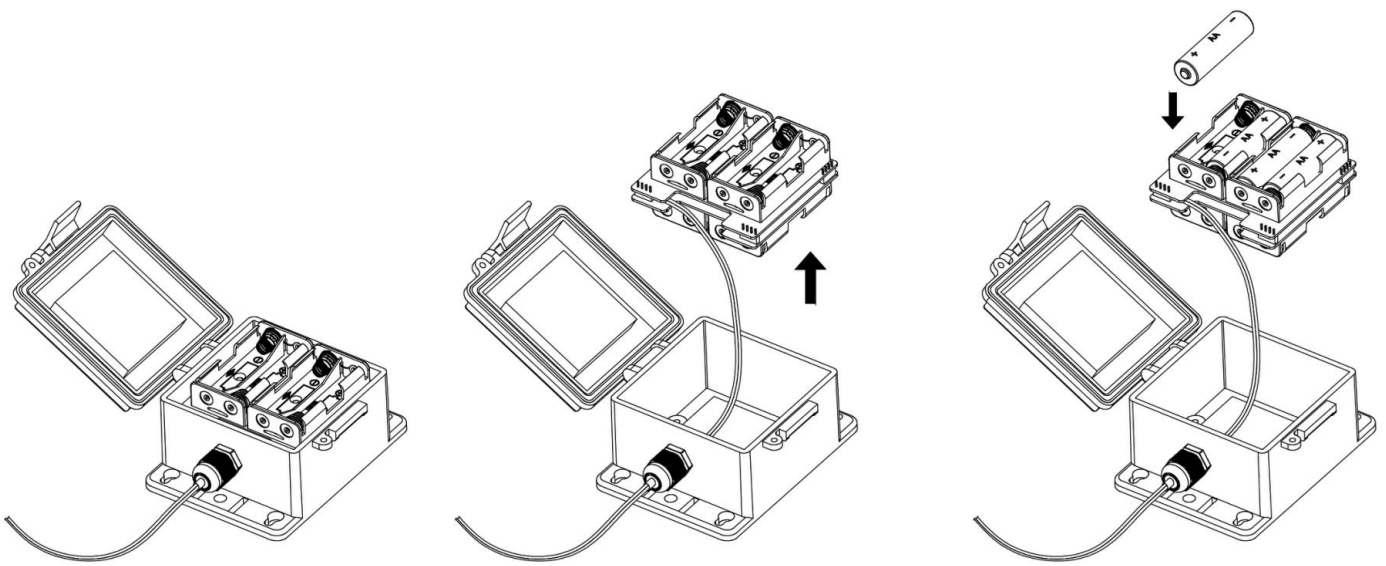


Figure 7

1.5.2 Display check

After installing the batteries, the screen will display the frequency(like 915/868/433) for 3 seconds, followed by the initial setup for 2 seconds, and then show the current measured distance from the level.

Start-up Screen	Description
	The full-screen display for 1 seconds
	The RF frequency information display for 3 seconds: 920/915/868/433MHz
	Normal: shows the air distance
	Error: Farther than 4m range, foreign matter, reflection

Table 2

2. Measurement

2.1 Measurement Principle

The LDS01 uses laser pulse technology, emitting a laser beam and calculating the distance between the target surface and the sensor by measuring the time it takes for the laser to reflect back.

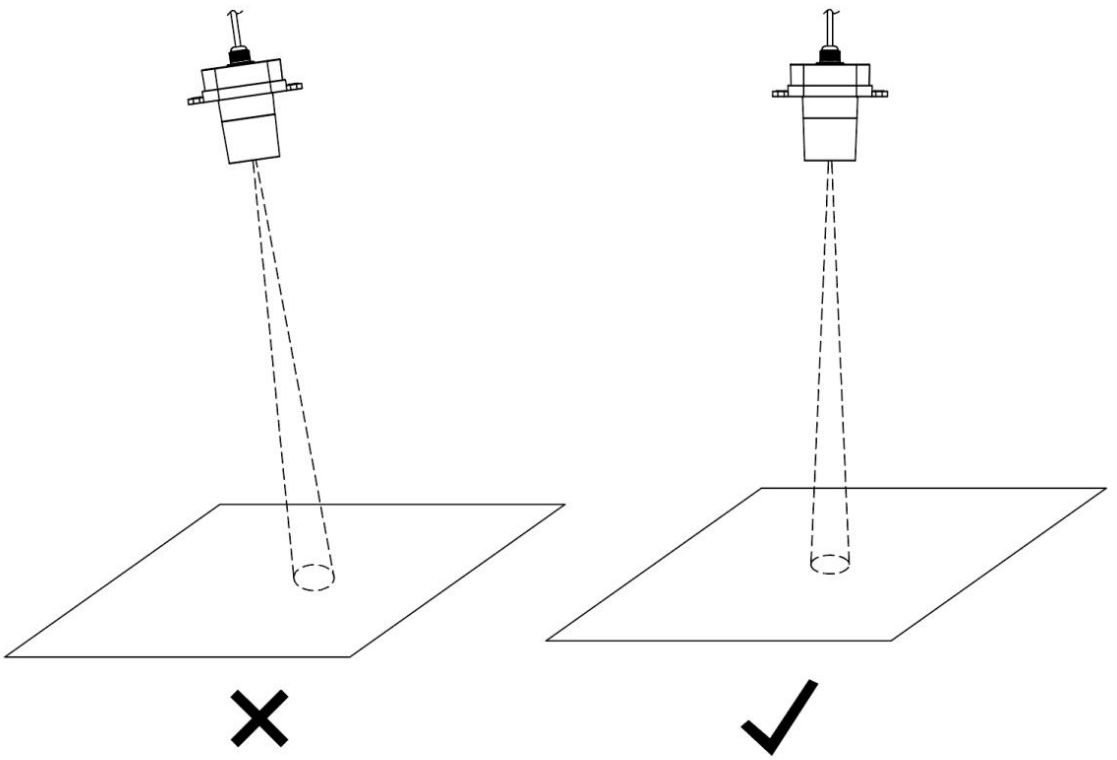


Figure 8

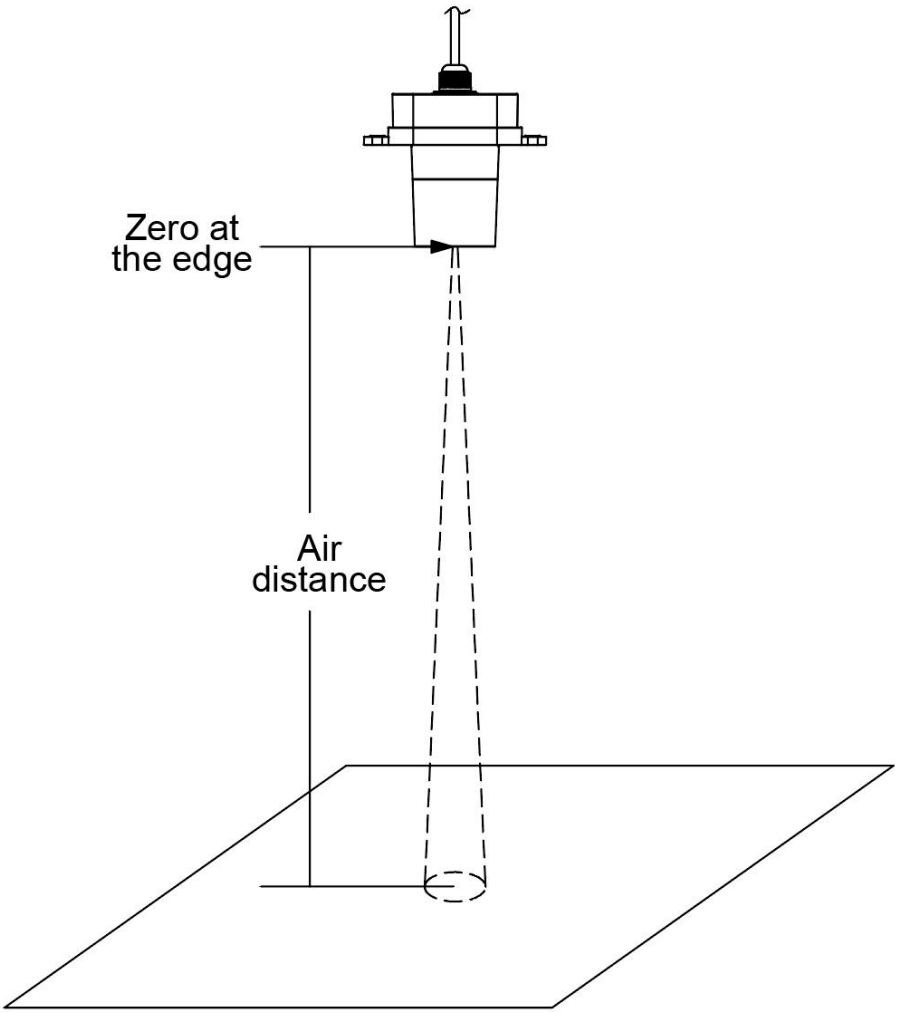


Figure 9

This is a non-contact measurement method suitable for complex environments. When the laser encounters an uneven water surface, the device will automatically calculate an average value as the distance.

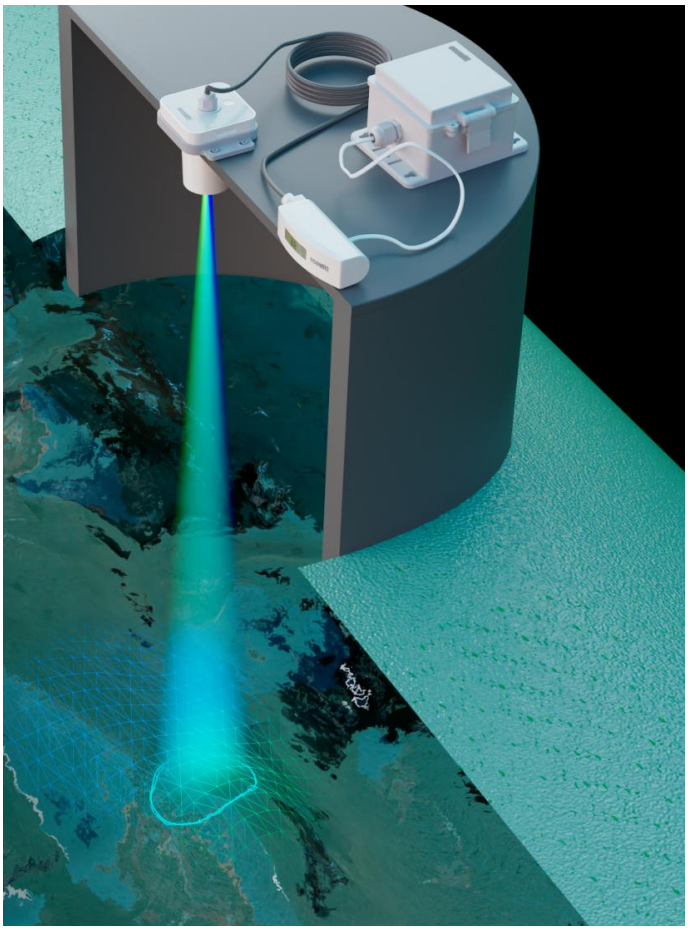


Figure 10 Measuring tank

Note: When the water depth level is less than 20cm, the laser may penetrate the liquid surface and measure the bottom distance instead, leading to inaccurate results. It is recommended that the water level be kept above 20cm.

2.2 Measurement Intervals

- Regular measurement: measures every 20 seconds, with RF data transmission every 79.75 seconds.

- Fast Measurement Mode: If the measurement changes by more than 5% compared to the previous RF transmission, the device switches to Fast Measurement Mode.
In Fast Measurement Mode, measurements are taken every 10 seconds and transmits RF data immediately.

- Returns to Regular Measurement Mode: If the variation stays below 5% for one minute, the device automatically returns to its regular measurement mode and resumes normal operation.

2.3 Heating function

The unit has an auto heater that balances battery life and performance. When unfavorable conditions, like dew, fog, or ice, gather on the lens, the device turns on the heater and ensures a reliable result.

Your dashboard displays a heater-on counter. Each activation consumes approximately 0.63 mAh of battery energy. With a total of eight batteries providing around 8,000 mAh, you can achieve roughly 12,698 heater-on activations. If you notice the counter increasing rapidly, especially if it exceeds 30 counts per day, it is advisable to check the sensor setup and make adjustments to optimize performance.

3. Ecowitt System

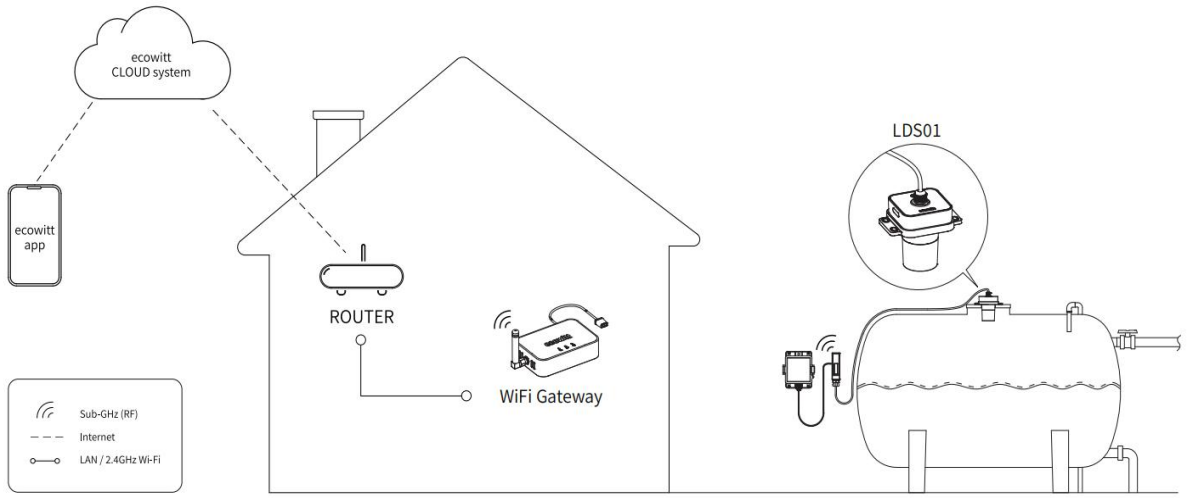


Figure 11

Welcome to our LDS01! This multi-functional measurement device, based on laser ranging technology provides a professional solution for precise measurement of water levels, snow depth. It is suitable for both household and outdoor use. This device uses advanced laser technology, offering a measurement range of up to 4 meters, ensuring more accurate and reliable data.

The LDS01 is equipped with a heating function that automatically activates when dew, fog, ice, or other conditions are detected. This feature eliminates fog to ensure accurate measurements during snow monitoring or long-term water tracking.

To send data to the ecowitt cloud server and enable users to access it via ecowitt mobile app, LDS01 product requires the setup of a console/gateway.

We at Ecowitt are very conscientious about your possible concerns regarding sending your data into a cloud. Not only do we not share your data with any third party, we also offer you a possibility to manage your data locally by the help of a special tool-the WS View Plus app. You may refer to the WSView Plus APP instruction for more details.

To ensure the best product performance, I'd like you to please read this manual and keep it for future reference.

4. Ecowitt Network Provisioning

The following models will be updated to support LDS01. However, due to the large number of models, we are unable to provide a specific date. Please stay updated with our version releases.

Prepare a console/gateway and upgrade to the latest firmware version.

 GW11/12XX	 GW2000	 GW3000	 WS621X
 WS38XX	 WS39XX	 WN182X	 WN198X
 HP25XX	 HP3500		

Table 3

If you have a configured console of the same frequency, the device data will be automatically sent to the console.

5. Initial Setup via app or Web-UI

This section explains how to configure the LDS01, including total height setup, calibration function and low/high-level alert notifications.

Glossary of Terms in the section	
Total Height	Total Height: The distance from the bottom of the device to the bottom of the measured object. For example: For water measurement: The distance from the bottom of the device to the bottom of the tank. For snow measurement: The distance from the bottom of the device to the ground. This value must be manually entered by the user.
"Air" value	"Air" Value: The distance from the bottom of the device to the measured object. For example: For water measurement: The distance from the bottom of the device to the water surface. For snow measurement: The distance from the bottom of the device to the snow surface.
"Depth" value	The calculated value based on the measurement data. **"Depth" value = Total Height minus "Air" value**
Heater-on Counter	The total number of times the heating function has been activated.

Table 4 Glossary of Terms in the section

5.1 Through App

Ensure that your phone and the console are connected to the same Wi-Fi network to proceed.

5.1.1 Default mode: "Air" value mode

The device defaults to "Air" value mode. If the total height is set to 0 or left unset, depth measurement will be disabled, and only the air distance will be displayed.

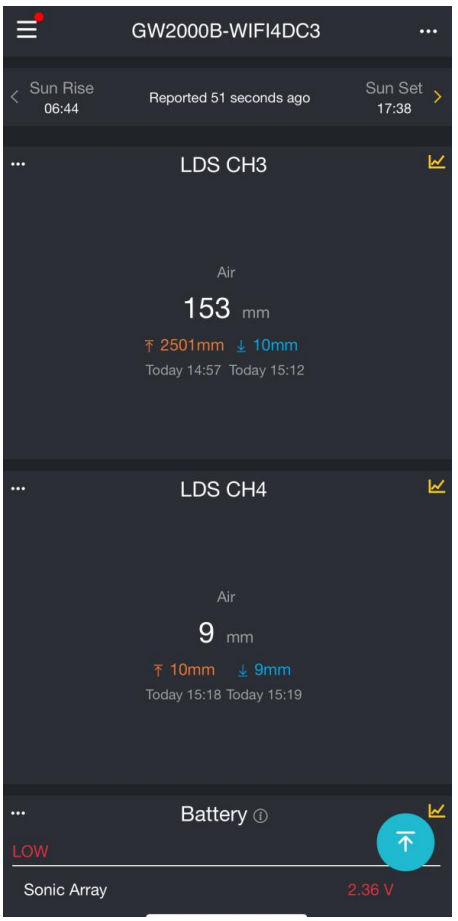


Figure 12 "Air" value mode

5.1.2 "Depth" value mode and Total Height setup:

After the Total Height setup is completed, the system will automatically switch to "Depth" value mode.

1. Tap the top-right menu ("...") and select Calibration.
2. Enter the total height as a preset value.
3. The system will automatically switch to "Depth" value mode, calculate, and display the corresponding depth value.

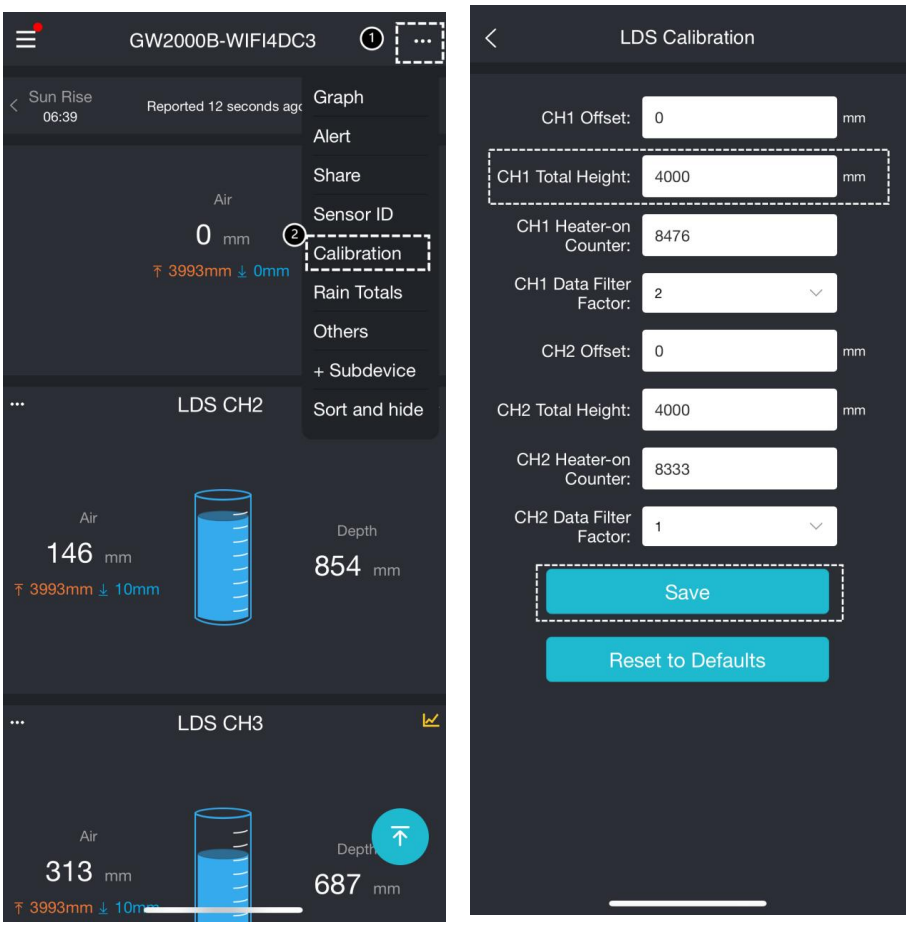


Figure 13

5.1.3 Heater-on Counter

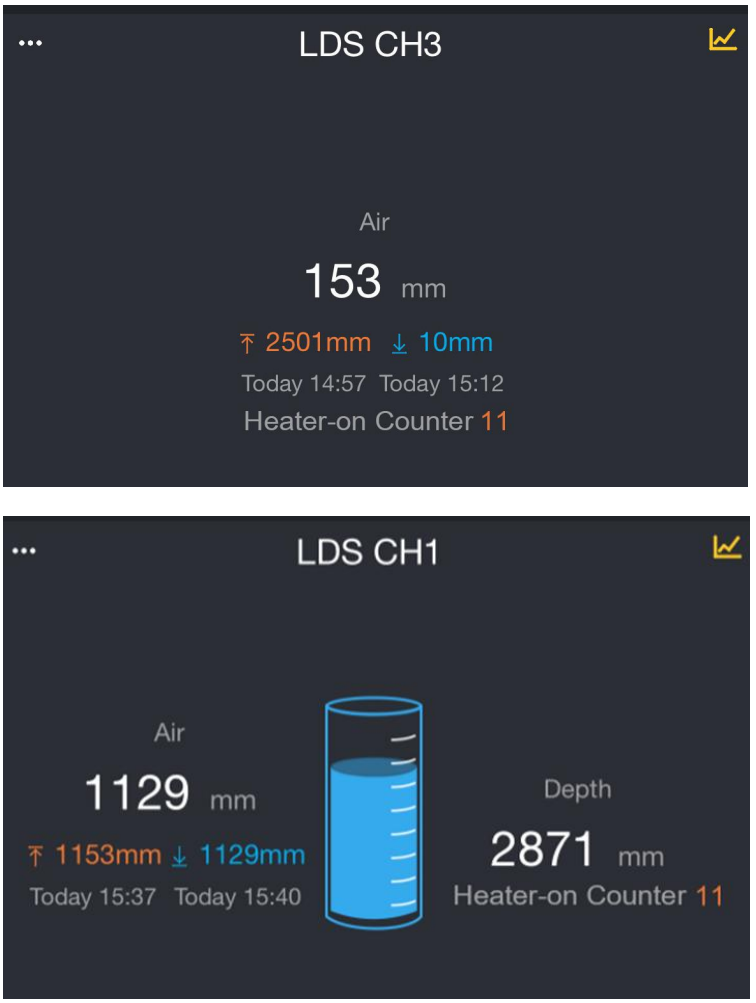


Figure 14

Heater-on Counter is the total number of times the heating function has been activated.

The heater-on counter can be managed through the "Calibration" interface.

5.1.4 Low/high-Level Alerts Setup:

You can set alerts for the minimum or maximum water level.

1. Tap the top-right menu ("...") and select "Alerts".

2. Enter the desired minimum or maximum value, then tap "Confirm".

3. The alerts detail is displayed as shown.

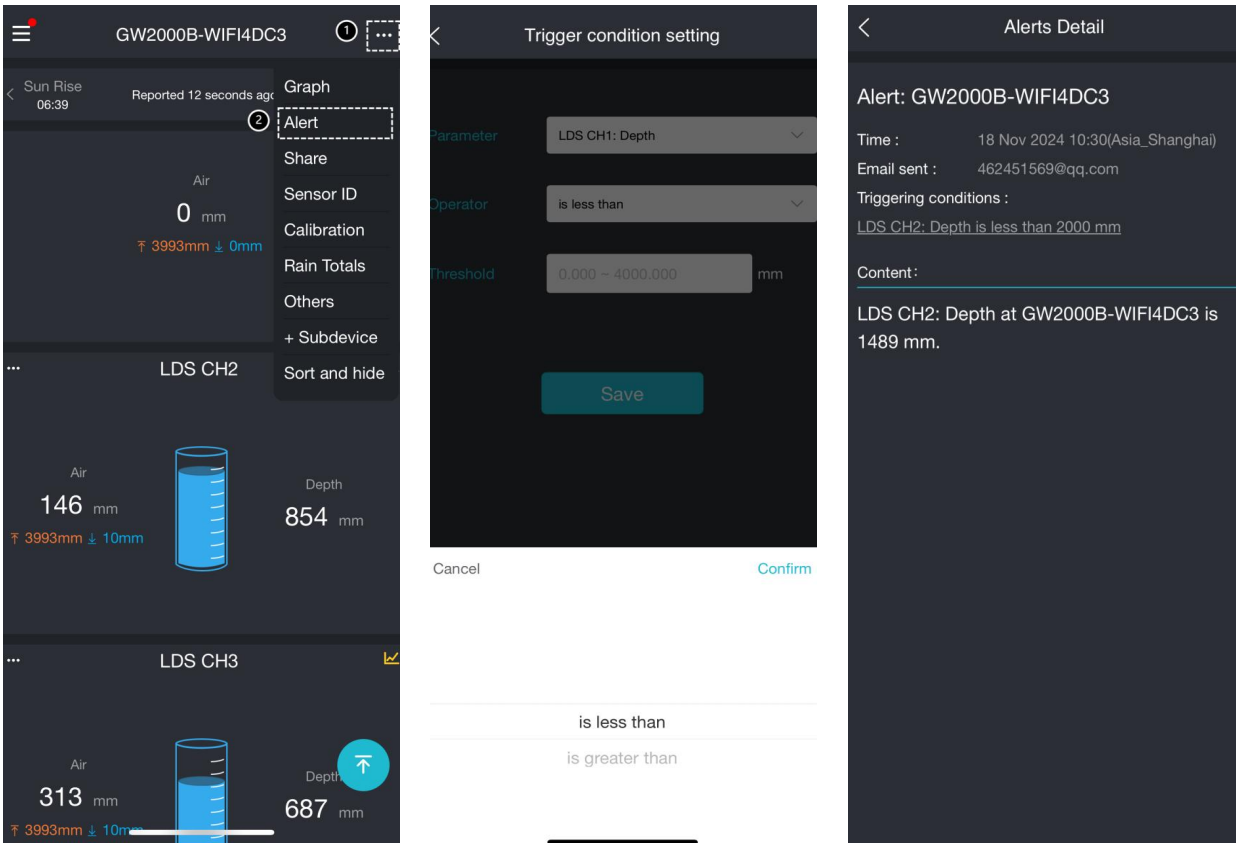


Figure 15

5.1.5 Calibration Setup

If the measurement result appears to be inaccurate, you can input an offset value to correct it.

1. Make sure your phone's Wi-Fi is connected to the same network as the console/gateway.

2. Open Ecowitt app.

3. Tap the top-right menu ("...") and select Calibration.

4. Manage the "Offet", "Total Height", "Heater-on Counter", "Data Filter Factor" on the interface.

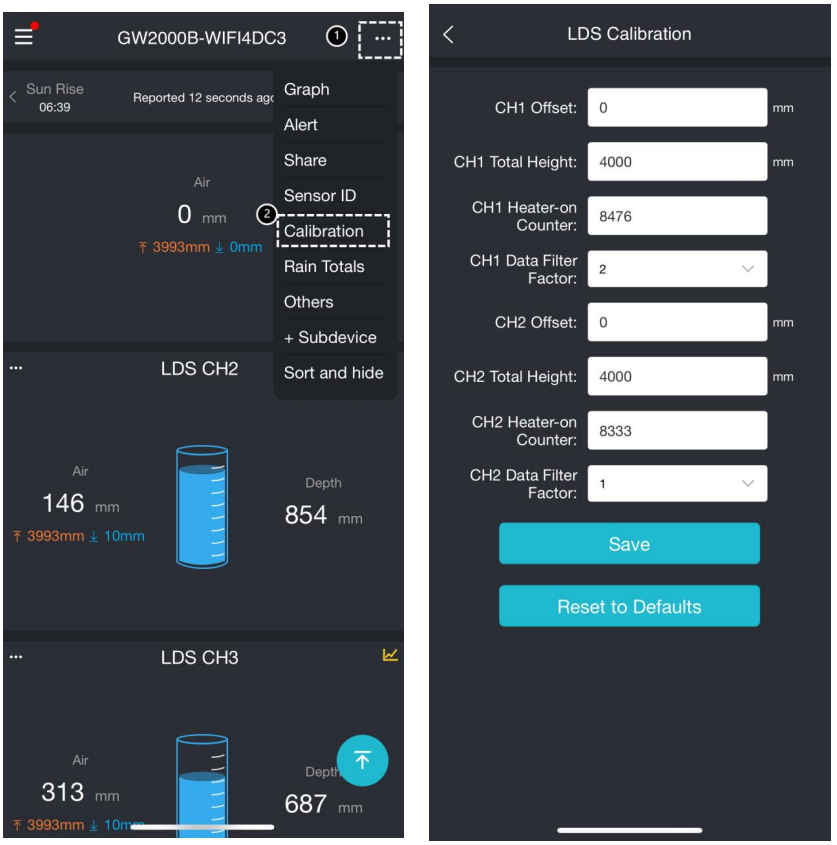


Figure 16

5.1.5.1. Offset Calibration

When the error is a fixed value, directly input the calculated offset to correct it. Enter the "CHX Offset" value and click "Save".

5.1.5.2. Heater-on Counter

Enter the "CHX Heater-on Counter" value(0--60000) and click "Save".

5.1.5.3. Data Filter Factor

When data fluctuations are too large, adjust the Data Filter Factor to smooth the readings. It can be set from 0 to 4, with higher values resulting in lower sensitivity.

Detailed Explanation	
Data Filter Factor Value	Description
1	Uses the median of the last 3 values.
2	Uses the median of the last 5 values.
3	Uses the median of the last 7 values.
4	Uses the median of the last 9 values.

Table 5

5.1.6 Reset to Defaults Setup

1. Make sure your phone's Wi-Fi is connected to the same network as the console/gateway.

2. Open Ecowitt app.

3. Tap the top-right menu ("...") and select Calibration.

4. Click the Reset to Defaults button to reset all related values, including "Offet", "Total Height", "Heater-on Counter", "Data Filter Factor".

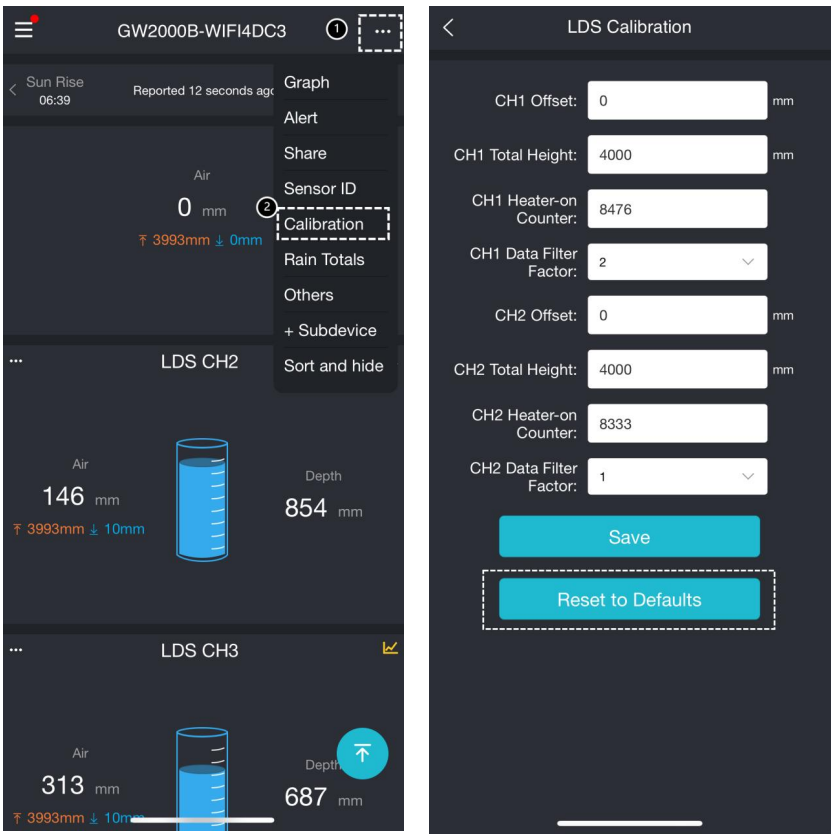


Figure 17

5.1.7 Sensor Management:

① Find the sensor ID on LDS01:

Sensor ID is labeled inside the main display unit, as shown below. Turn to 1.4.1 to learn how to remove the cover.

Figure 18

② Sensor ID Confirmation

Each LDS01 comes with a unique Sensor ID for identification and pairing. To confirm the Sensor ID:

1. Make sure your phone's Wi-Fi is connected to the same network as the console/gateway.

2. Run the "ecowitt" APP, tap on the three dots from the upper right corner of the dashboard, then select "Sensor ID".

3. The current LDS01 Sensor ID is displayed on this page. Ensure that the Sensor ID matches.

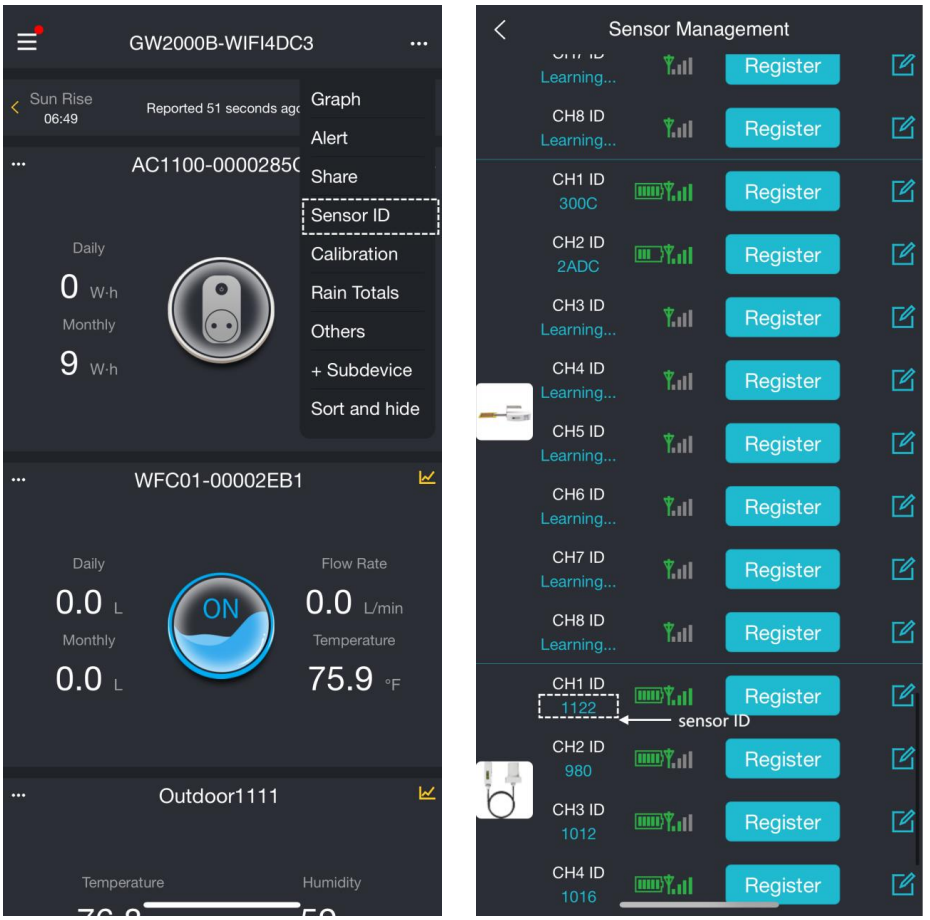


Figure 17

4. Make sure the sensor ID matches.

③ Configuration & Multi-Channel Setup:

Generally, the data from the LDS01 is automatically received by the console/gateway. If the data is not received successfully or multiple LDS01 sensors need to be configured, you can configure it using the following steps.

1. Make sure your phone's Wi-Fi is connected to the same network as the console/gateway.

2. Run the "ecowitt" APP

Tap on the three dots from the upper right corner of the dashboard, then select "Sensor ID". If it is grayed out, you may close the APP, and try it again. With the "Sensor ID" page opened you can view the types of sensors connected as well as the ID of the sensor in Hexadecimal.

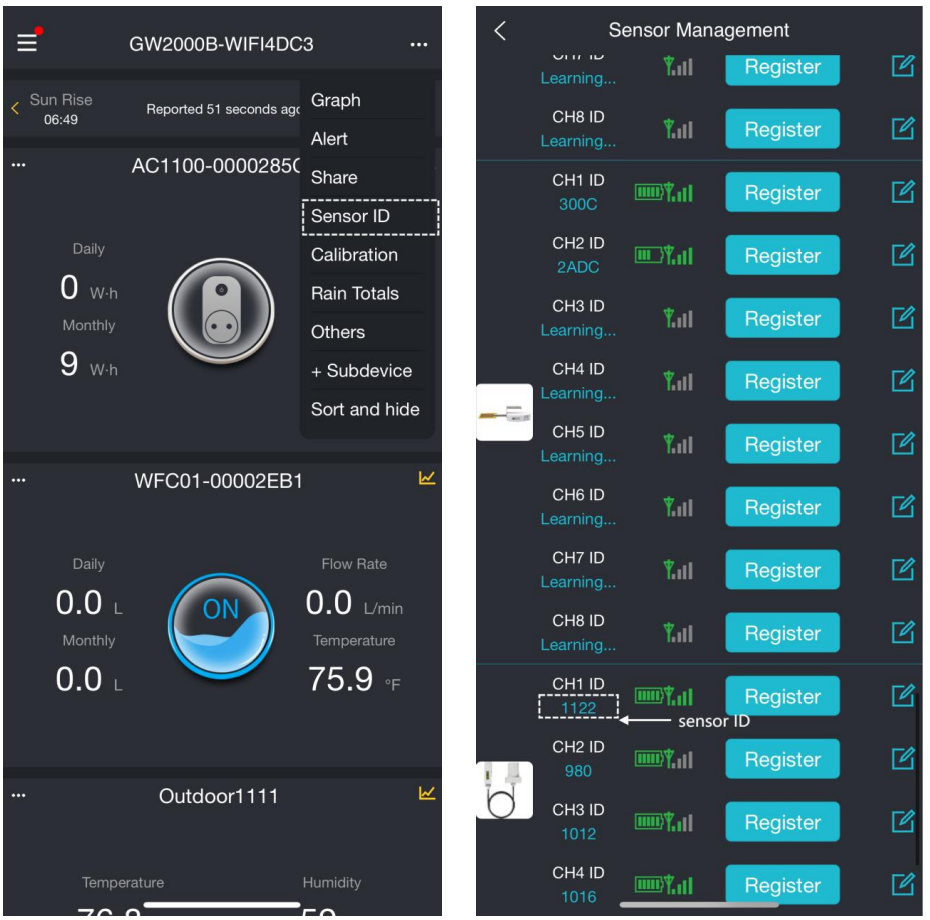


Figure 19

3. Multi-Channel Setup

For example, if you want the data from a specific LDS01 to be assigned to "CH X" ("X" from 1 to 4).

- Select the "CH X" channel, click Edit button;
- Input the sensor ID, and enable it;
- Click save.

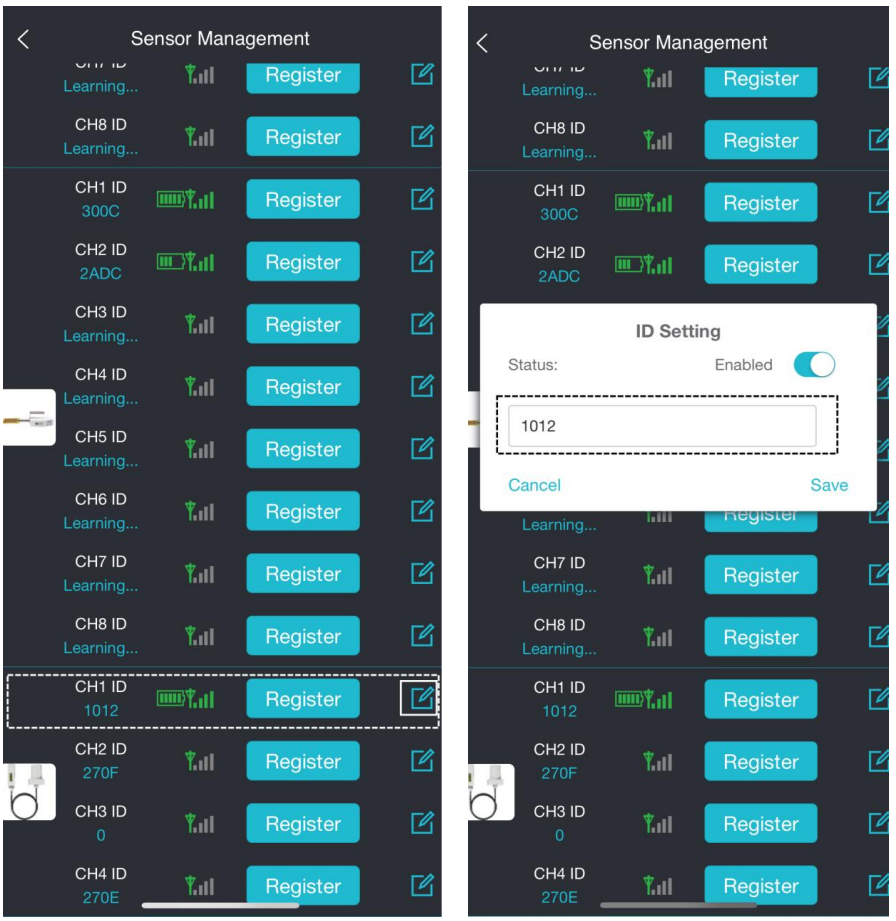


Figure 20

5.2 Through Web-UI

Connect to the console's web page/WebUI (http://IP-address-of console in your local network) using a mobile phone or PC.

Click Calibration, then select "LDS Calibration".

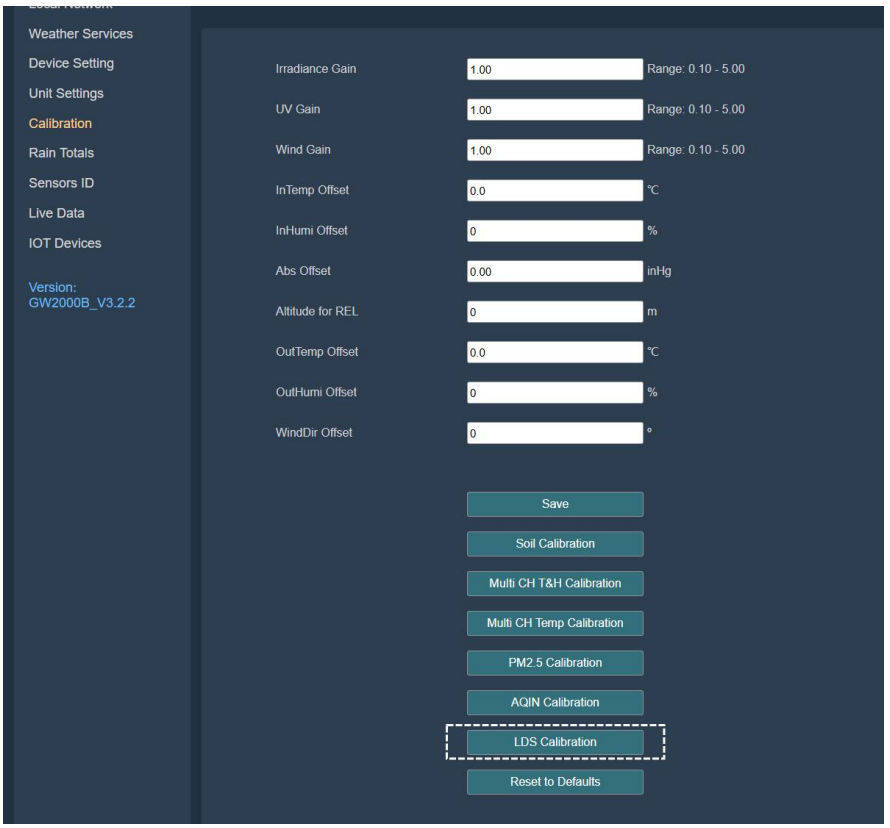


Figure 21

1.Total Height Setup: Enter the tank total height as a preset value, and the system automatically calculates and displays the corresponding water level.

* If the total height is set to 0 or left unset, depth measurement will be disabled, and only the air distance will

be displayed.

2. Calibration Setup:

If the measurement result appears to be inaccurate, you can input an offset value to correct it.

3. Heater-on Counter Setup:

You can enter any value(0--60000) directly, then click "save" to update the counter.

4. Data Filter Factor Setup:

When data fluctuations are too large, adjust the Data Filter Factor to smooth the readings. It can be set from 0 to 4, with higher values resulting in lower sensitivity.

Detailed Explanation	
Data Filter Factor Value	**Description**
1	**Uses the median of the last 3 values.**
2	**Uses the median of the last 5 values.**
3	**Uses the median of the last 7 values.**
4	**Uses the median of the last 9 values.**

Table 6

5. Reset to Defaults:

Click the Reset to Defaults button to reset all related values, including Total Height, Offset values, and the heater-on counter.

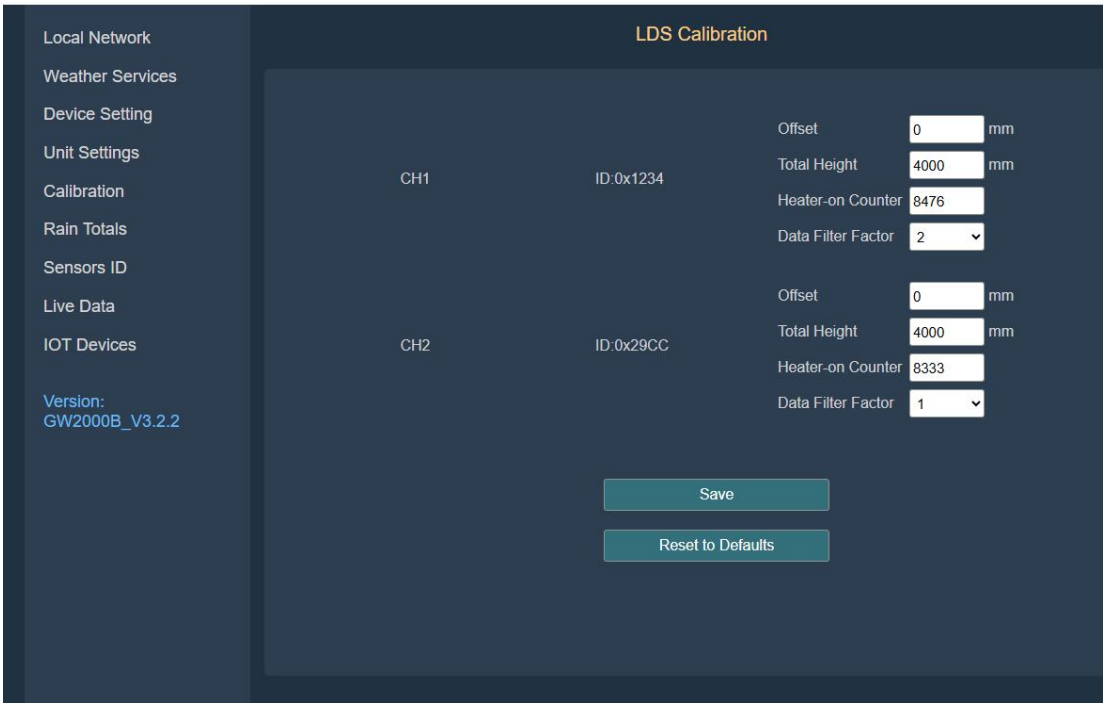


Figure 22

6. Mounting

6.1 Drill holes with the drill guide card

Ensure that the installation surface is level.

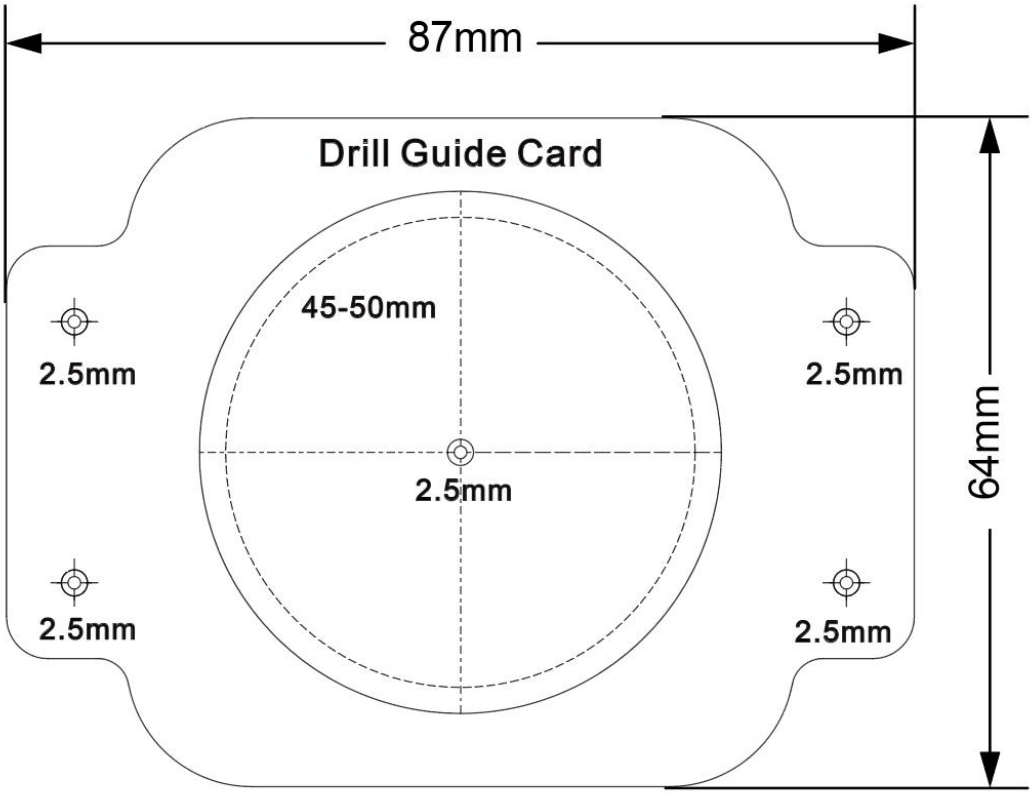


Figure 23

Please mark the drilling position with a pen. Do not drill directly on the card to avoid it getting caught in the drill bit!

6.1.1 Central Hole

Use the drill guide card to position and drill the central hole with a diameter of 45 – 50 mm, then cover it on the installation surface.

6.1.2 Screw Holes

Drill holes according to the material type:

- For metal or plastic surfaces, drill holes with a diameter of 2.3 – 2.5 mm.
- For wooden surfaces, drill holes with a diameter of 2.0 mm.

Drill 4 screw holes on the installation surface as indicated.

6.2 Mount the bracket

6.2.1 Secure the bracket with screws.

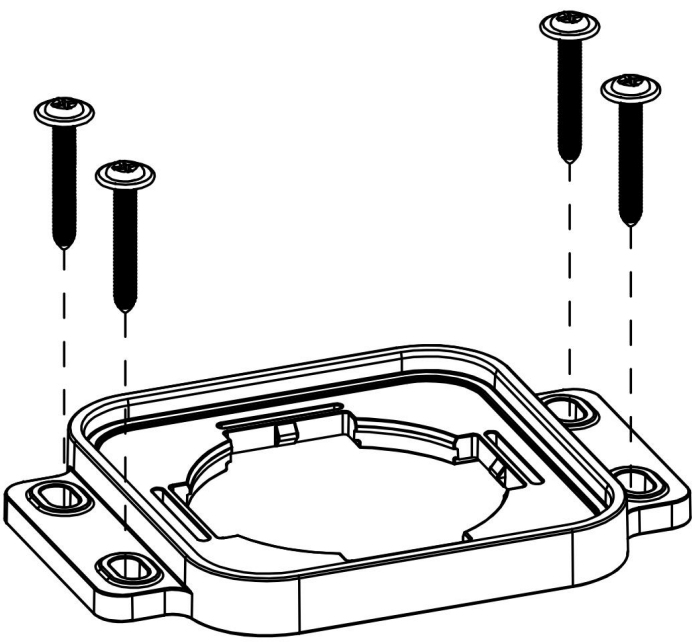


Figure 24

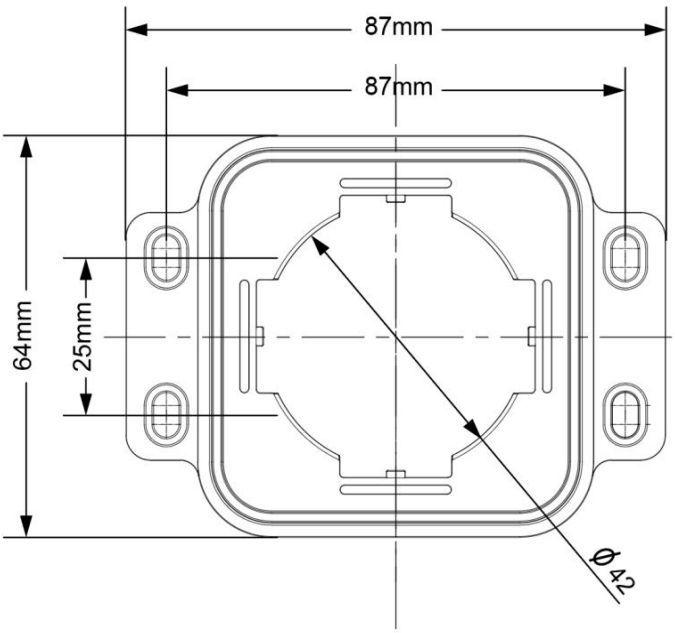


Figure 25 Bracket size (unit:mm)

Note:

- When installing on top of the water tank, pay attention to the distance from the tank wall. For a 100 cm total height, the distance from the tank wall should be ≥ 3.5 cm.
- Apply this proportion (100 : 3.5) for other height.

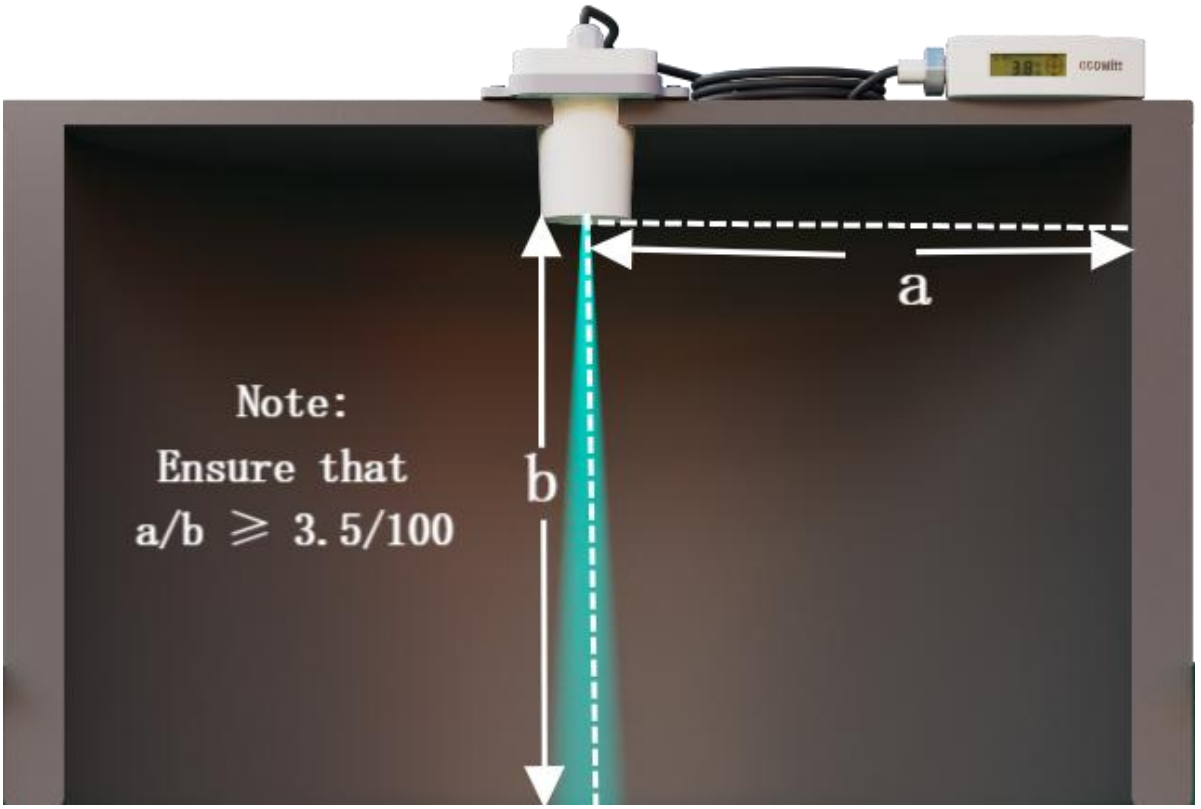


Figure 26

6.2.2 Fix the Laser distance measurement module

Attach the Laser distance measurement module to the bracket. You should hear a "latch engaging click" sound when it's securely fixed.

Note: Use the bubble level to ensure the installation is level.

Figure 27 Bubble level

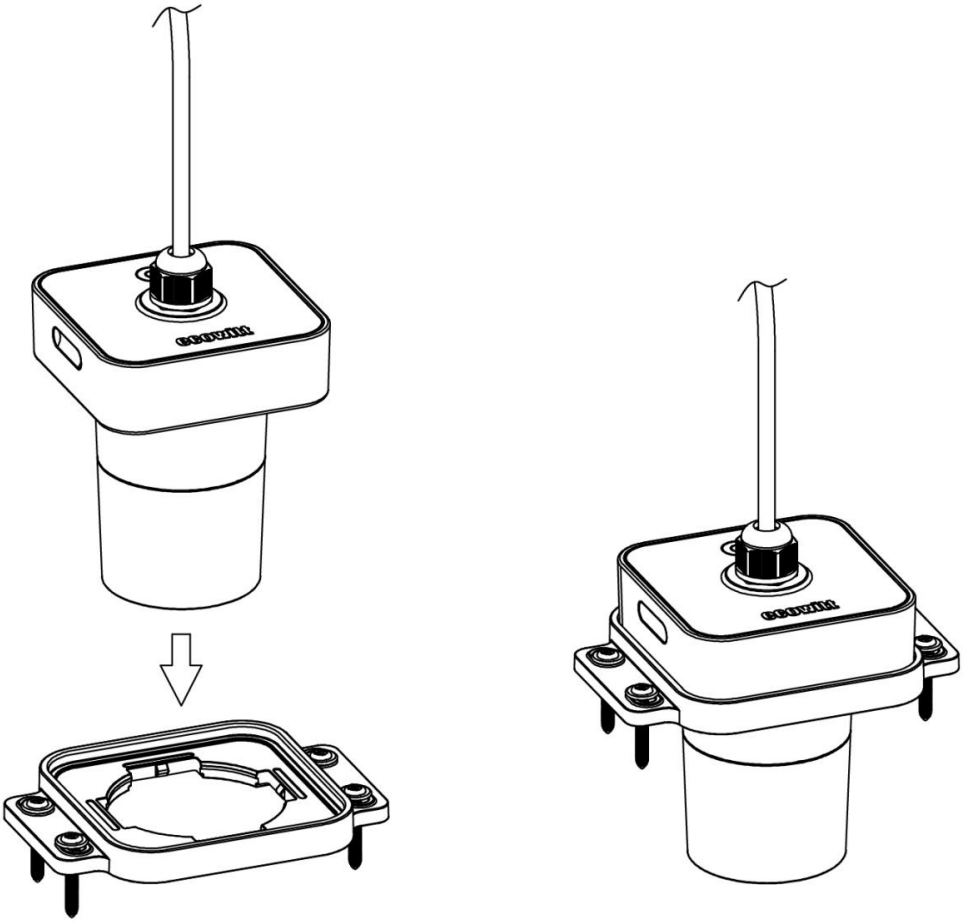


Figure 28 Fix the Laser distance measurement module

6.2.3 Fix the main display unit

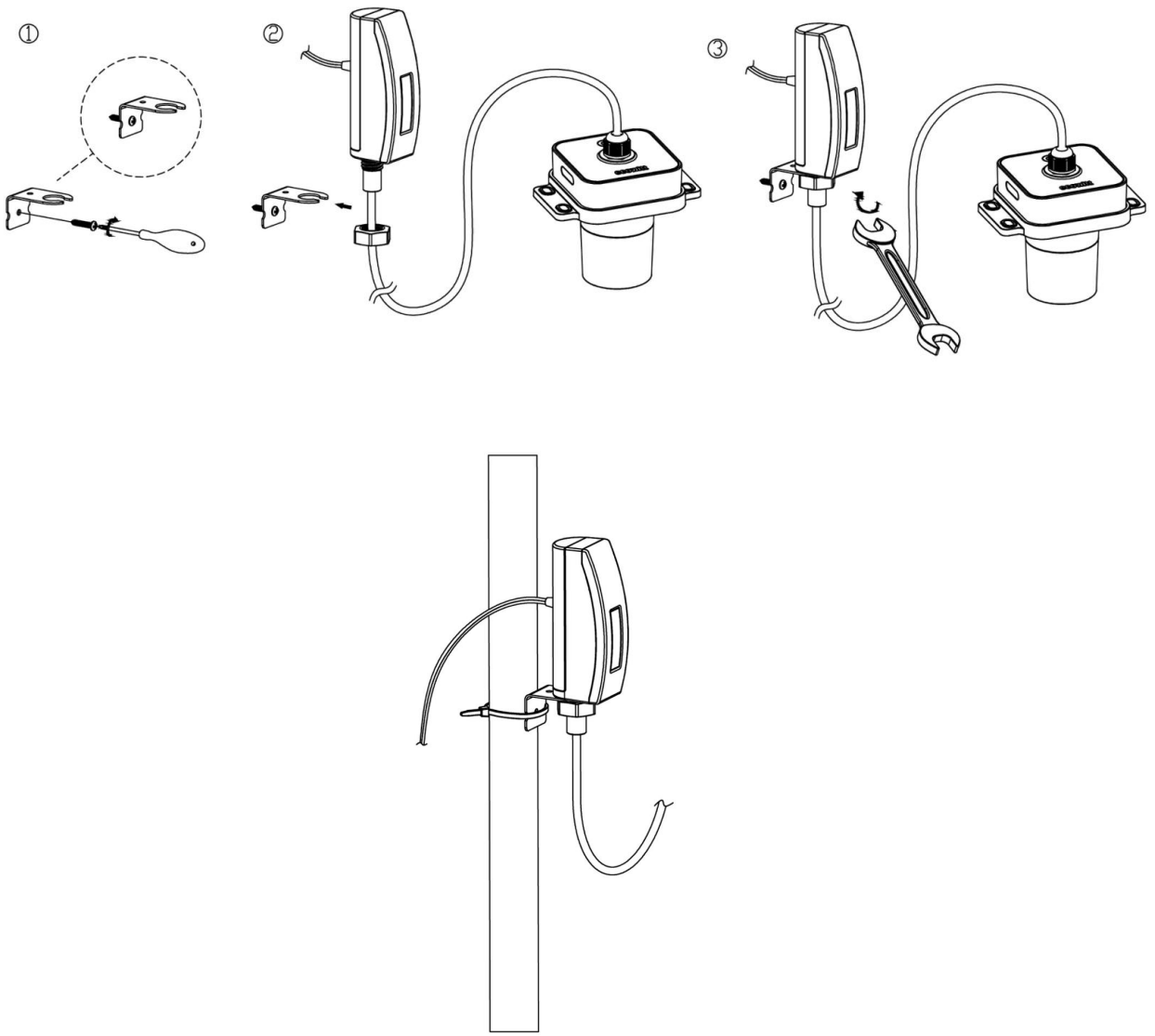


Figure 29

You can use the provided screws (PA 3*15mm) to fix the main display unit.

6.2.4 Fix the battery compartment

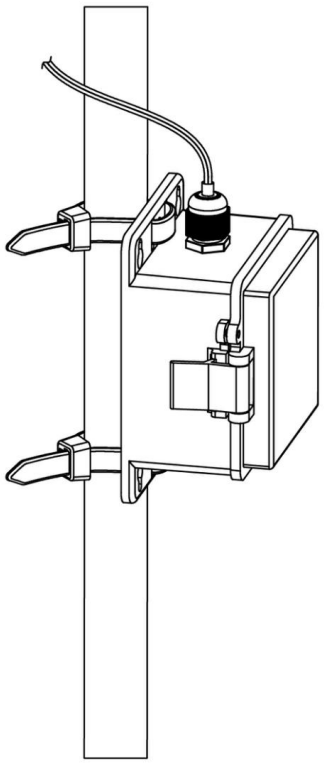


Figure 30

You can use the provided screws(PWA 3.0*20mm) or zip ties to secure the battery compartment.

7. Features

- Precise Measurement: Utilizes laser measurement technology, providing up to 4 meters of measurement range (when not exposed to natural light) and 3.5 meters (when exposed to natural light). Accurately measures water levels, and snow depth, ideal for real-time monitoring in both indoor and outdoor environments.

- Equipped with an easy-to-read LCD screen that refreshes data every minute, keeping you updated on current measurements. Supports data upload to the Ecowitt cloud service via a console/gateway. View real-time data and generate statistical charts through ecowitt app, enabling historical data analysis and trend monitoring.

- Offers RF transmission up to 100 meters, suitable for hard-to-reach locations such as rooftops, basements, and remote outdoor areas, providing exceptional installation flexibility.

- IP65 Protection Rating: Designed with excellent waterproof capabilities, ensuring stable operation in harsh outdoor environments.

- Ecowitt System Compatibility: Integrates with other smart devices, such as smart plug, water timer, and leak sensors, enabling comprehensive smart home management.

- Quick Setup: Comes with a drill guide card, mounting

bracket and a bubble level on top, allowing easy and accurate horizontal installation for long-term stability and measurement precision.

- Heating Function: The unit has equipped an auto heater that balances between battery life and performance. When unfavorable conditions, like dew, fog, ice gathered on the lens, the device will turn on the heater and ensure a reliable result.

- Large Battery Compartment : Equipped with a large battery compartment, enabling long-term stable level monitoring even with the heating function activated.

8. Specifications

Model	LDS01
Name	Laser Distance Meter
Dimension of laser distance measurement module	87*64*74 (mm) L*W*H
Dimension of main display unit	102*25*49 (mm) L*W*H
Dimension of battery compartment	113*103*61 (mm) L*W*H
Weight	370.5g
Material of display unit	HTN-LCD
Material of plastic casing	Main display unit: PC+ABS; Laser distance measurement module : ASA
Full field of view angle	5°
Laser measurement (not exposed to natural light)	4cm—4.0m(0.131ft—13.12ft)
Laser measurement (exposed to natural light)	4cm—3.5m(0.131ft—11.48ft)
Unit	M / Ft
Measurement accuracy	±1.2 cm (4~60 cm) / ±0.047 ft (0.131~1.97 ft); ±2% (60~400 cm) / ±2% (1.97~13.12 ft).

Measurement resolution	0.01m
Measurement interval	Normal Mode:20s； Fast Measurement Mode:10s
RF transmission interval	Normal Mode:79.75s; Fast Measurement Mode:10s
Measurement zero point	Bottom edge of the device
RF Connection Frequency	920/915/868/433MHz (depending on local regulations)
RF Wireless Range	Over 100 meters (in open areas)
Operating Temperature Range	-20°C to 50°C(-4°F to 122°F)
Battery Life:(With Heater enabled)	1 year
Power Supply	8*AA Alkaline batteries(not included)
Ingress Protection Rating	IP 65

Table 7

9. Troubleshooting

To ensure optimal performance of the LDS01 in your current tank and environment, please review the followings:

Q1: The LDS01 may show significant error fluctuations when measuring air depth values round 1.1 - 1.5 meters. How to resolve this?

1. Fine-tune the level bubble:

- First, adjust the bubble level to the center.

If the bubble can be centered perfectly, this will typically resolve most issues.

- Alternatively, fine-tune the bubble slightly off-center to find the optimal angle for your tank.

The laser performs best when it is as perpendicular as possible to the water surface.If the data remains unstable after centering the bubble, try making small adjustments to achieve smoother and more accurate readings.

2. Inspect the lens:

Check that the lens is free of large water droplets or excessive dirt.

3. Verify installation:

Ensure the LDS01 is securely installed. When properly installed, will make a "latch engaging click" sound.

Q2: What is the minimum water depth for accurate measurements?

Sensor design and water level relationship:

- The LDS01 is designed with a smaller laser emission angle to accommodate smaller containers and complex environments.
- When the water depth ⩽ 0.2 meters (0.66 feet), the laser may penetrate directly to the bottom, causing wrong data.

Recommendations:

Maintain a stable water depth of more than 0.3 meters.

Q3: How to clean the LDS01?

- Use an alcohol spray to clean the sensor.
- Gently wipe with soft paper.
- Avoid frequent cleaning, as improper handling damages.

Q4: What if the LDS01 cannot connect to the console?

1. Frequency compatibility:

Ensure the console/gateway and the LDS01 operate on the same frequency.

2. Wi-Fi stability:

Check the stability of your Wi-Fi network.

3. Sensor management:

For detailed guidance, visit the Ecowitt forum: Sensor Management Guide(https://www.ecowitt.com/shop/forum/forumDetails/899).

Q5: What should I do if the heater-on counter increases abnormally?

Possible cause:

1. Contaminants on the lens:

Dirt or debris on the lens may trigger the device to activate the heating function repeatedly.

2. Abnormal data fluctuations:

Erratic or unstable measurements (e.g., due to environmental interference or improper installation) can also cause the heating function to trigger frequently.

Solution:

1. Check the lens:

- Inspect the lens for dirt or contamination.
- If necessary, clean the lens.

Address data fluctuations:

Refer to **Q1** for steps to optimize the device's performance.

Q6: I've checked and adjusted as instruction, still need assistance. How can I get support more effectively?

Please collect and provide:

1. Environmental Details:

- HD photos/videos of:

  Close-up of the level bubble, lens surface, LDS01, and clasp installation.

  Interior of the tank (tank size, water fluctuation or stillness, light leaks).

- Correct air height value (a roughly accurate value).
- Water source / filling method (e.g., inlet/outlet pipes, manual filling, automatic pump, rainwater).

2. Device Information:

- Sensor ID (located inside the battery door; remove the dummy battery to access).
- Ecowitt login account details.
- Local weather data (e.g., wind speed, temperature logs) or a weather station link (e.g., Tempest, Weatherflow).

10. Warranty & Caution

10.1 Warranty

We disclaim any 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 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.

10.2 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.

10.3 FCC Statement

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.

10.4 Care + Maintenance

- Regularly clean the surface of the laser module to prevent dust or scale buildup affecting measurements.
- Always purchase the correct size and grade of battery most suitable for the intended use.
- Clean the battery contacts and also those of the device prior to battery installation.

- Ensure the batteries are installed correctly with regard to polarity (+ and -).
- Remove batteries from 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.

10.5 Safety Disclaimer

- The laser power(heating power not included) of the LDS01 distance meter is ⩽ 3mW, which is within safe limits and will not cause harm to skin or eyes. It is safe to use under normal operating conditions
- This device is not intended for use in measuring flammable or explosive substances.
- Do not store or operate it in proximity to flammable or explosive substances.

Manufacturer: Shenzhen Fine Offset Electronics Co., Ltd.
Address: 4/F, Block C, JiuJiu Industrial City, Shajing Town, Baoan District, Shenzhen City, China

11. 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 you bought product for assistance.

Usage Inquiries:

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.

12. Stay in Touch

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