CALYPSO instruments

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CALYPSO

Ultra Low Power LoRa + Receiver

WIND METER

User manual

English version 2.0
13.11.2025

CE FC 0809

ACCURATE WIND SPEED & DIRECTION

If you want to know more about our new Ultra Low Power LoRa wind meter, please keep reading or visit our website **www.calypsoinstruments.com**

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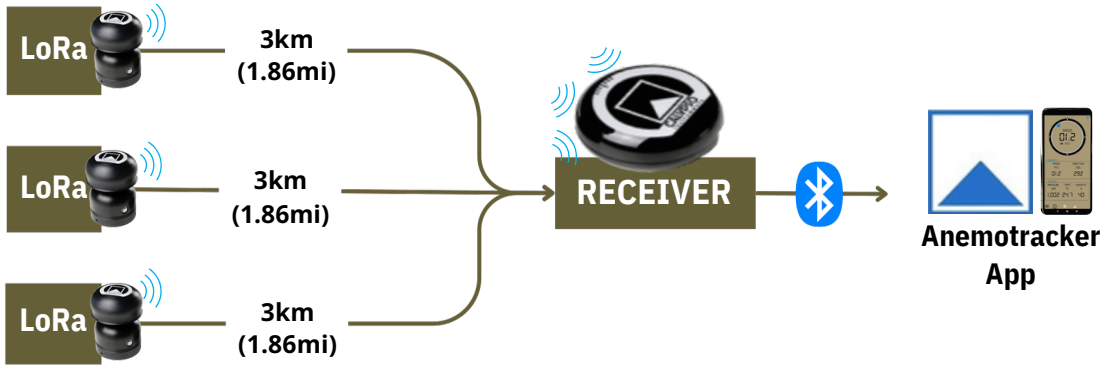
1. Product overview

Thank you for choosing the Ultra Low Power LoRa wind meter from Calypso Instruments. The Ultra Low Power LoRa wind meter is a wireless, Bluetooth Low Energy (BLE) and battery-powered, compact ultrasonic anemometer, easy to install, simple to use and compatible with IOS, Android and Garmin watches.

It transmits wind data every second via LoRa with a range of up to 3 km (1.86mi) in direct line of sight.

The receiver relays data via Bluetooth, enabling real-time monitoring through the Anemotracker app. It can be connected to up to 3 ULP LoRa.



2. Package content

The package contains the following:

- Ultra Low Power LoRa wind meter + Receiver
- Wireless charging QI + USB-C charger
- Serial reference on the side of the packaging, which **must be kept** for after sales services.
- A quick user guide on the back of the packaging and some more useful information for the customer.

3. ULP LoRa Wind Meter technical specifications

The Ultra Low Power LoRa has the following technical specifications:

3.1 Dimensions	· Diameter 70 mm (2.76 in.) · Height: 95 mm (3.74 in.)
3.2 Weight	· 213 grams (7.1 oz.)
3.3 Power	Lithium polymer battery 50 Hours Active use depends on configuration parameters (24hrs at 22dBm) USB-C Wireless Charging QI
3.4 Sensors	Ultrasonic transducers (4x)

3.5 Bluetooth & LoRa

· Bluetooth: Version: 5.1 or beyond

BLE is the first open wireless communication technology, offering communication between mobile devices or computers and other smaller devices such as our new wind meter. Compared to Classic Bluetooth, BLE provides considerably reduced power consumption and cost while maintaining a similar communication range. It incorporates important developments for the user by facilitating the reconnection between their devices once they leave and re-enter the Bluetooth range.

· Output Protocol: LoRa P2P (up to 3 km direct line of sight). Our device is available for LoRa frequencies:

Europe / Africa	868 MHz	**EU868**	Europe / South Africa/ Middle East
Americas	915 MHz	**US915**	USA / Canada / Mexico / South America
Oceania	915 MHz	**AU915**	Australia / New Zealand
Asia	923 MHz	**AS923-1**	Asia

3.6 Wind Information

· Wind speed
· Wind direction

Sample rate: 1 Hz

Wind Speed: Range: 0.5 to 45m/s (1.12 to 100 mph)
Accuracy: ±0.3m/s at 10m/s (0.67mph at 22.37 mph)
Threshold: 0.5 m/s (1.12 mph)

Wind direction: Range:0 - 360º
Accuracy: ±1º

3.7. Protection Grade

· IPX8 (10 meters)*

3.8 Easy mount

3xM4 lateral female thread,
3xM4 base female thread
Tripod mount UNC1/4"-2

3.9 Firmware

Upgradable via Bluetooth

3.10 Product Material

The Ultra Low Power LoRa is engineered to be a robust device with a minimal downtime. Nylon polymer with excellent resistance to UV radiation, mechanical fatigue while being lightweight. It's ideal for electrical isolation, protects internal hardware to ensure reliable measurements.

3.11 Quality Control

Every single unit is calibrated with accuracy, following the same calibration standards for each one in a wind tunnel.

A Q/C report for both wind speed and direction is generated and kept in our files. Standard deviation is checked to guarantee that each unit has been calibrated to the highest standards

The Ultra Low Power LoRa has been designed to avoid any mechanical parts to maximize reliability and minimize maintenance. The transducers communicate between themselves two by two using ultrasonic range waves. Each pair of transducers calculates the signal delay and gets information about both wind direction and wind speed.

*with a specific temperature range of -15 to 60°C and relative humidity of 0-100%.

4. Receiver technical specifications

- **Power**: Lithium polymer battery, up to 50 hours, USB-C charging.
- **Output Protocol**: LoRa P2P (up to 3 km direct line of sight), Bluetooth Low Energy 5.1 (up to 30 m direct line of sight).
- **Dimensions**: Diameter 64 mm, Height 20 mm, Weight 57 g.
- **Operating Conditions**: IP65 certified, temperature range -15 to 60°C, relative humidity 0-100%.

5. Configuration of your ULP LoRa wind meter

5.1 How to **pair** your ULP LoRa wind meter with the Configurator App

Follow the next steps:

1.Download **Configurator Upgrader** in IOS app from the App Store or **Anemotracker Configure & Update** from the Play Store

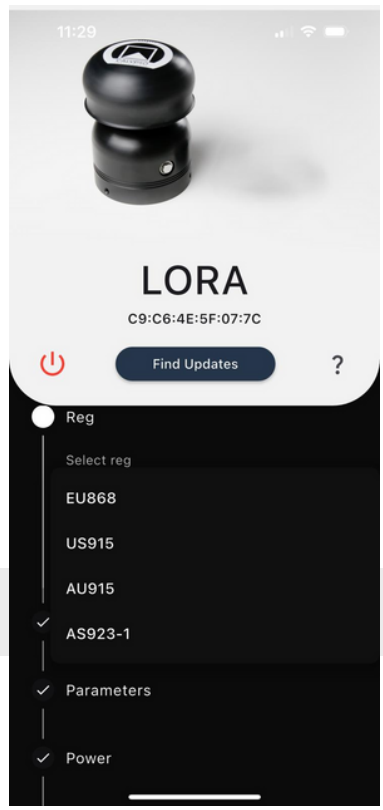
2.Turn on your ULP LoRa wind meter (by pressing the button)

3. Open your configurator app and swipe down. All nearby devices will be appear.

4.Your LORA will now be flashing blue indicating it is ready to be paired.

5. Click on your LORA to connect.

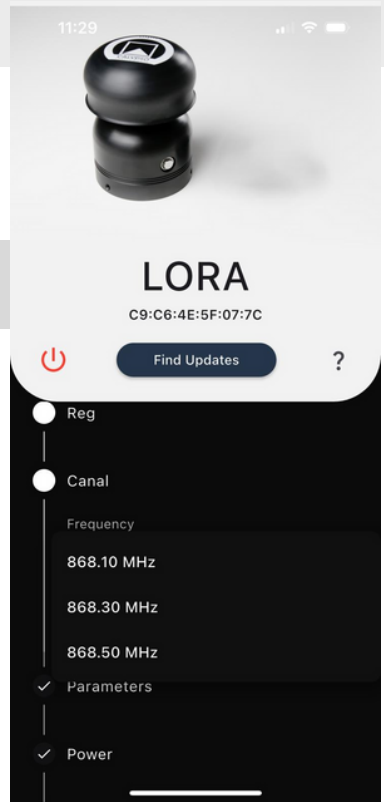
6. Your LORA will stop flashing as an indicator that is has been connected successfully.



At this point you can **CONFIGURE** your **LoRa device parameters** (as per your needs):

REG - REGION

CANAL - CHANNEL (Frecuency)



Within each region you have different frequencies:

COUNTRIES:

EU868 868 MHz

Albania, Andorra, Armenia, Austria, Bahrain, Belgium, Benin, Bhutan, Bosnia and Herzegovina, Bostwana, Bulgaria, Burundi, Cabo Verde, Cambodia, CÔTE D'IVOIRE, Croatia, Cyprus, Czech Republic, Denmark, Egypt, Equatorial Guinea, Estonia, Finland, France, Georgia, Germany, Greece, Greenland, Hungary, Iceland, Ireland, Italy, Kenya, Kuwait, Latvia, Lebanon, Liechtenstein, Lithuania, Luxembourg, Macedonia, Madagascar, Malta, Mauritania, Moldova, Monaco, Montenegro, Namibia, Netherlands, Nigeria, Norway, Oman, Philippines, Poland, Portugal, Qatar, Romania, Rwanda, Samoa, San Marino, Saudi Arabia, Senegal, Serbia, Slovakia, Slovenia, Somalia, South Africa, Spain, Sweden, Switzerland, Syria, Tunisia, Turkey, Ukraine, United Arab Emirates, UK, Vatican City, Zambia.

US915 915MHz

Bahamas, Bermuda, Canada, Guam, Mexico, Puerto Rico, USA

AU915 915 MHz

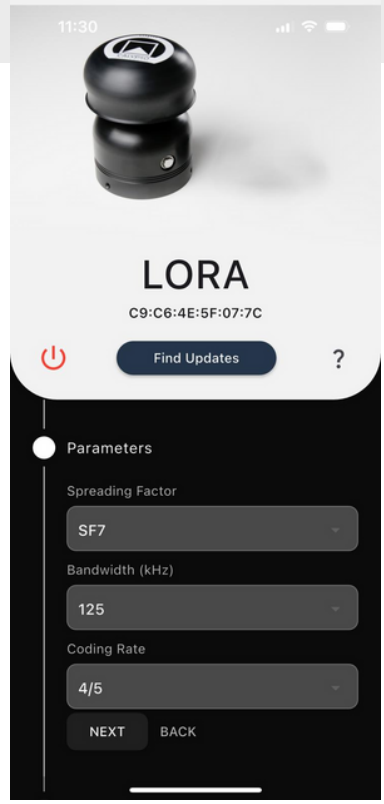
Argentina, Australia, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, Suriname, Uruguay

AS923-1 923 MHz

Japan, Malaysia, Myanmar, Pakistan, Singapore, Taiwan, Thailand, Tanzania

AU915 / AS923-1 Mixto 915/ 923 MHz

New Zealand, Papua New Guinea



SPREADING FACTOR

It controls the trade-off between data rate and communication range / sensitivity.

SF12 → Longest range, lowest data rate, highest power consumption, longest airtime.
SF11 → Slightly shorter range than SF12, a bit faster.
SF7 → Shortest range, fastest data rate, lowest airtime.

SF	Data Rate	Range	Time on Air	Sensitivity
SF7	High	Short	Short	Low
SF8	↓	↑	↑	↑
SF9	↓	↑	↑	↑
SF10	↓	↑	↑	↑
SF11	Low	Long	Longer	Higher
SF12	Lowest	Longest	Longest	Highest

BANDWIDTH

Describes **how wide a slice of radio frequency** the signal occupies.

- **Lower BW (125 kHz) → longer range**, better sensitivity, slower data rate
- **Higher BW (500 kHz) → shorter range**, lower sensitivity, faster data rate

Bandwidth	Usage
125 kHz	Standard LoRaWAN uplinks, longest range
250 kHz	Moderate data rate applications
500 kHz	High-data-rate, short-range LoRa (not used in LoRaWAN EU/US standards)

CODING RATE

Tells how much error-correction is added to the data so that the receiver can fix mistakes caused by noise or weak signals.

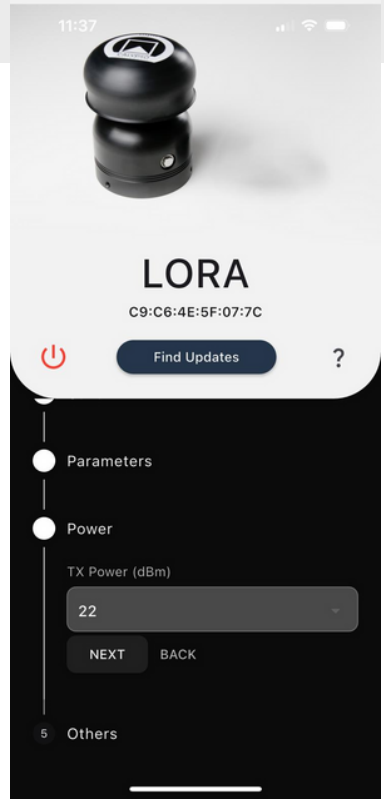
LoRa defines CR values like this:

Setting	CR Value	Effective Code Rate	Description
1	4/5	1 parity bit for every 4 data bits	Least redundancy, fastest
2	4/6	2 parity bits for every 4 data bits	More robust
3	4/7	3 parity bits for every 4 data bits	Even more robust
4	4/8	4 parity bits for every 4 data bits	Most redundancy, slowest

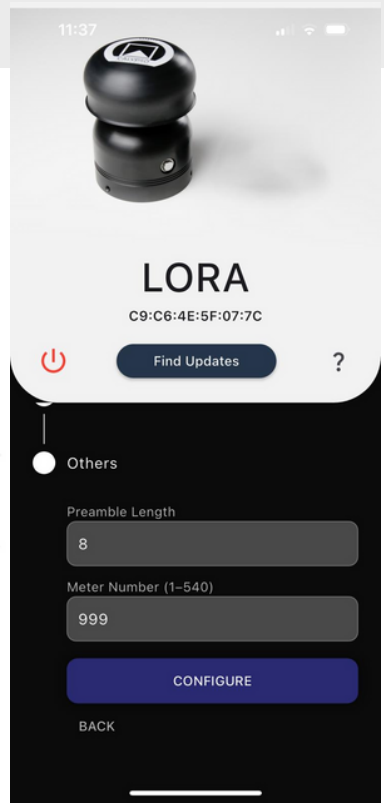
So when you see something like **CR = 4/5** or **CR = 4/8**, it means:

- For every 4 bits of actual data, LoRa adds 1–4 redundant bits for error correction.

POWER



OTHER PARAMETERS



PREAMBLE LENGTH

Is the number of preamble symbols sent at the beginning of every transmission so the receiver can detect, synchronize, and lock onto the signal.

Effect of preamble length

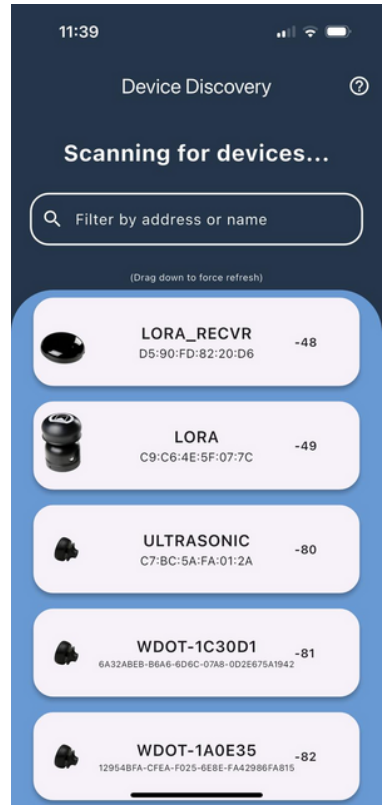
Preamble	Effect
Shorter preamble	Faster transmission, lower power usage, risk receiver misses packet
Longer preamble	More reliable detection in noisy/long-range cases, but increases time on air

METER NUMBER

Choose from 1-540
*The exact number you name your LoRa unit will be the one you will enter when pairing it with the receiver.

6. Configuration of your Receiver with the ULP LoRa wind meter

1. Turn on the receiver (press button for 6 seconds)
2. The receiver should appear within 2 seconds in the configuration app . In case it doesn't appear, swipe down to refresh.
3. In order to configure your receiver you need to manually enter all the parameters (exactly the same ones you entered when configuring the ULP LoRa.



The only difference when configuring the receiver is that you can connect up to 3 ULP LoRa wind meters to the same receiver. In this case:

- There are three boxes which will need to be filled out according to the numbers you have given to your ULP LoRa wind meters. For instance, if you have given the numbers 34, 35 and 36 to your LoRa wind meters when configurating them just make sure you include exactly the same numbers in these fields.

4. Once you do all these steps your receiver will turn off on its own.
   - Turn back on the receiver.
   - If configured successfully both LoRa and Receiver will start flashing simultaneously.

7. Installing the Anemotracker App and testing the unit

Follow the next steps:

1. Make sure your device is BLE compatible*. · Ultra Low Power LoRa works with Android 4.3 and beyond or iOS devices (4s, iPad2 or beyond).

2. Download and install **Anemotracker App** on your device from Google Play or Apple Store.

3. Power on your LoRa wind meter and your receiver. ULP LoRa won´t turn off after configuration and the receiver will need to be turn on again by pressing the buttom for 6 seconds.

4. Open the Anemotracker app.

   Go to the "Connection" menu.

   Tap on "Pair SENSOR."The LoRa receiver will appear as "Lora-recvr"on the list of available devices.

   Select "Lora-recvr" and your LoRa + receiver will be ready to be used.

YOUR DEVICE IS COMPATIBLE, BUT YOU CANNOT CONNECT?

1. Make sure BT (Bluetooth) is enabled on your smartphone, Tablet or PC.
2. Make sure Ultra Low Power LoRa is not in Off mode. It is in Off mode when the unit does not have sufficient battery level. There will be no battery level shown when trying to connect to the device in Anemotracker App.
3. Make sure no other device is linked to your Ultra Low Power LoRa.

As soon as it gets disconnected, Ultra Low Power LoRa is ready to link to any other device with the Anemotracker app installed.

For further information please contact Calypso Technical Support.

8. General information

8.1. General recommendations

Regarding mounting the unit, align the mark of the Ultra Low Power LoRa to the place where you are aiming.

Make sure to install the sensor in a location **free from anything that obstructs the flow of wind to the sensors within a 2 meter radius**.
Other important aspects:

- Do not attempt to access the transducers area with your fingers;
- Do not attempt any modification to the unit;
- Never paint any part of the unit or alter its surface in any way.
- NOT allow to be submerged fully or partially in water.

If you have any questions or doubts, please contact us directly.

8.2. Maintenance and repair

The Ultra Low Power LoRa does not require great maintenance thanks to the lack of the moving parts in this new design. Transducers must be kept clean and aligned. Impacts or incorrect impulsive handling may lead to transducers misalignment.

The space around the transducers must be empty and clean. Dust, frost, water, etc... will make the unit stop working. The Ultra Low Power LoRa can be wiped clean with a damp cloth being careful to not touch the transducers.

8.3 Warranty

This warranty covers the defects resulting from defective parts, materials and manufacturing, if made known to the manufacturer within **36 MONTHS. BE SURE TO KEEP YOUR SENSOR'S MAC NUMBER STORED FOR AFTER SALES REQUESTS.**

Warranty is void in case of non-following the instructions of use, repair or maintenance without written authorisation. Any wrongful use by the user will not incur any responsibility on part of Calypso Instruments; therefore, any harm caused to the Ultra Low Power LoRa by a mistake will not be covered by the waranty. Using assembly elements different from those delivered with the product will void the waranty. Changes on transducers position/alignment will void any warranty.

For further information please contact Calypso Technical support through **aftersales@calypsoinstruments.com** or visit **www.calypsoinstruments.com**.

9. Additional information

9.1 General features and product description

The ULP LoRa product was developed to meet the need for a device that can be placed in remote locations without requiring specific infrastructure, enabling data to be received from several kilometers away. This means the anemometer can be installed at a desired location, with data being received remotely “over the air” through a small receiver device that adapts the output format to the client’s preferred configuration. Various markets and situations would find the ULP LoRa particularly beneficial. For instance:

1. **Maritime Sector**

   Wind recording at multiple coastal points: Each ULP LoRa could be installed on buoys several kilometers offshore, allowing more accurate wind measurements than those taken at the coast, where wind conditions vary greatly from the open sea to land. Wind recording at multiple points on a large ship: The Portable Solar or Portable Mini is unsuitable due to limited Bluetooth range, while the ULP LoRa overcomes this limitation.

2. **Golf**

   In golf courses, wind speed and direction can vary across different areas, significantly impacting ball trajectory. A ULP LoRa could be installed at each hole, with a receiver transmitting wind data to the cloud, accessible to users via an app on their mobile devices.

3. Ballistics

For long-distance shooting competitions, accurately knowing the wind conditions along the projectile's path is critical, providing competitors a clear advantage by anticipating shot deviations.

4.Wind Energy Sector

To assess the viability of a wind farm on a specific site, wind profiles need to be recorded over several months. Deploying multiple ULP LoRa units allows for extensive data collection across multiple points without costly, intrusive wired infrastructure, ideal if the location proves unsuitable for wind farming.

As seen, any scenario requiring multiple data points several kilometers from the data collection center is a scenario where the ULP LoRa excels. However, the initial product version is designed to address one of the simpler markets, serving as a starting point for expanding into other markets. Specifically, the ballistics sector, where fewer anemometers are required compared to other scenarios. The user would initially have 1 to 3 wireless anemometers (battery-powered), not constantly exposed to the elements.

The current product consists of a wireless anemometer, charged via induction, and a receiver that can be charged by USB-C. The anemometer sends a LoRa signal every second (1 Hz) with wind data, receivable up to 3 km in direct line of sight. The receiver listens and retransmits each LoRa message via Bluetooth Low Energy, allowing real-time data access through Anemotracker.

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