CALYPSO instruments

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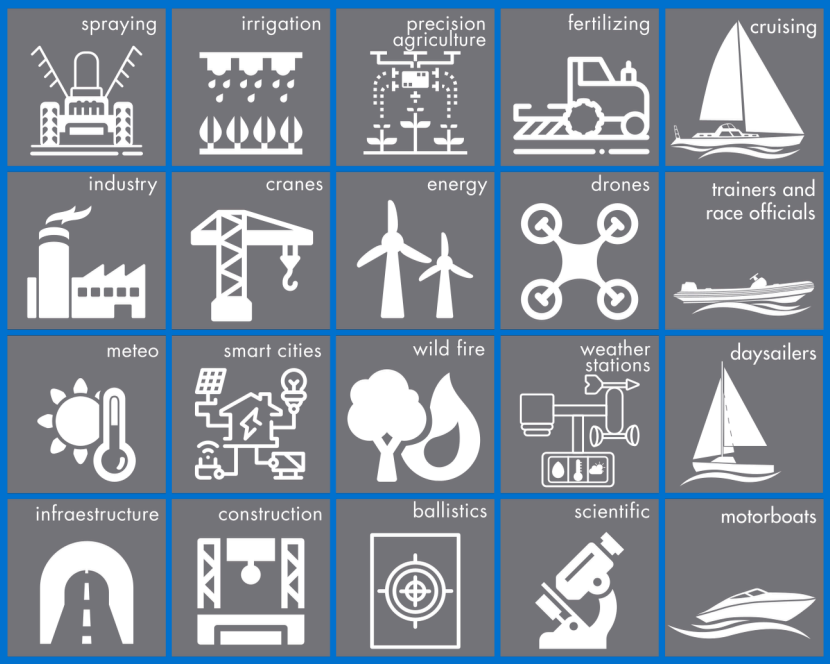
CALYPSO INSTRUMENTS ULTRA-LOW-POWER ULTRASONIC SUMMIT WIND METER

User manual

English version 3.0
30.05.2023

CE FC 0809



If you want to know more about our new ULP SUMMIT wind meter, please keep reading or visit our website www.calypsoinstruments.com

Index

1 Product Overview

Thank you for choosing the ULP SUMMIT wind meter from Calypso Instruments. This is the first model or our generation II, representing an important technology breakthrough condensing an extensive R+D investment:

· Both shape and firmware have been enhanced for an improved rain performance. This is key for static applications such as weather stations.

· Mechanical design has been revamped making the unit more robust and dependable.

· We feel very proud to release a unit that requires under 0.4 mA of power at 5V, sampling at 1Hz.

· Different output options available: RS485, MODBUS RTU, UART/I2C (under demand)

Applications for the ULP SUMMIT are the following:

- Weather Stations | Drones
- Temporary Scaffolding and construction | Infrastructures and building | Cranes
- Spraying | Irrigation | Fertilizing | Precision Agriculture
- Smart Cities | Wild fires | Shooting | Scientific
- Sailing.

2 Package content

The package contains the following:
· Ultrasonic ULP SUMMIT Wind Instrument plus 2 meter (6.5 ft) cable for connection*
· Serial number reference on the side of the packaging.

· A quick user guide on the back of the packaging and some more useful information for the customer.

· M4 headless screw (x6)

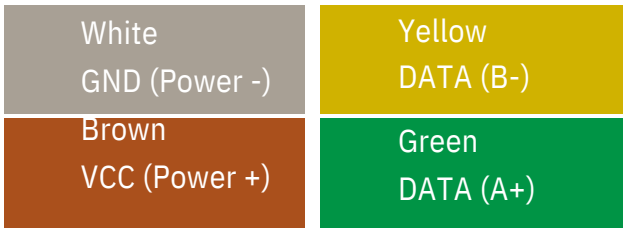
· M4 screw (x3)

3 Communication Protocols

3.1 MODBUS RTU

3.1.1 Modbus Wiring

MODBUS RTU Output:



3.1.2 Modbus Configuration

The ULP SUMMIT can be set up by using a special configuration app made by Calypso Instruments.
In order to use the app, you should download the configurator from our website at **www.calypsoinstruments.com**.

The following can be changed with the configurator:

Data Protocol: RS485 to Modbus (or viceversa)
Baudrate: The number of signal units per second that the wind sensor sends. A baud can contain several bits.
Data rate: The number of bits that are transmitted per unit time through a digital transmission system or between two digital devices.
Wind Filter: You can choose between the sensibility of the wind filter.

baudrate:	1200 to 115200 (8n1) bauds
output rate:	0.1 to 10 Hertz (Depends on the filter you select)
output units:	m/s, knots or km/h

Power consumption:
Ultra-Low-Power (MODBUS) : 0.25 mA @5V, 1 Hz standard. Power Consumption will vary depending on the baudrate & output rate chosen

Modbus Configuration Setup

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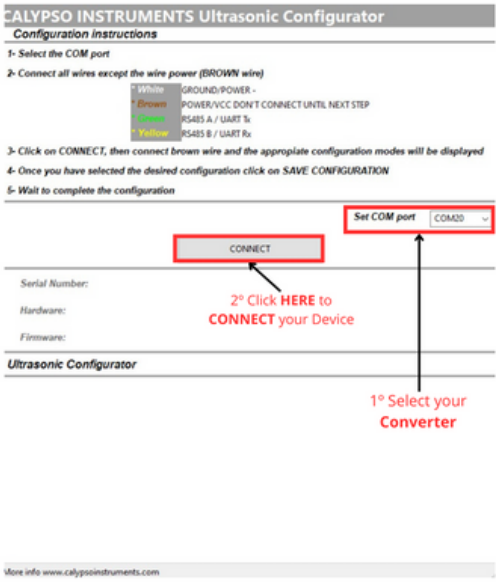
For more information, please watch the following video. **https://bit.ly/3DuA7lM**

*USB converter cables available on **calypsoinstruments.com.**

This are the STEPS to FOLLOW to Configurate your DEVICE Successfully:

1.Use a USB to RS485 Converter cable to connect your wind sensor to your computer.
2.Connect all the cables to the USB converter cable EXCEPT for the BROWN cable.

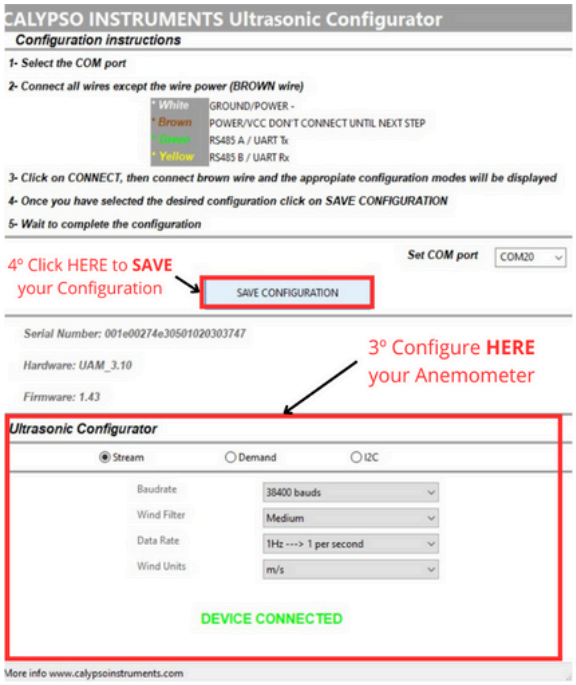
3.Open the Configurator app, select your COM port and Click on Connect button



4. Connect the brown cable when the configurator tells you to.

5. Wait a few seconds and Configure your Anemometer. In this case, select Stream and configure your anemometer. When you ve finished the configuration click on Start Configuration (SAVE Configuration in the image)

Modbus Configuration Setup (II)



6. Wait to complete configuration and when the system advises that it is finished, disconnect the USB and cables.

7. Your unit is now configured.

3.1.3 Modbus Registers

DIR_BASE_LA1 30001
SYSTEM_STATUS DIR_BASE_LA1 + 200
WIND_SPEED DIR_BASE_LA1 + 201
WIND_DIRECTION DIR_BASE_LA1 + 202
TWO_MIN_AVG_WS DIR_BASE_LA1 + 203
TWO_MIN_AVG_WD DIR_BASE_LA1 + 204
TEN_MIN_AVG_WS DIR_BASE_LA1 + 205
TEN_MIN_AVG_WD DIR_BASE_LA1 + 206
WIND_GUST_SPEED DIR_BASE_LA1 + 207
WIND_GUST_DIR DIR_BASE_LA1 + 208
FIVE_MIN_AVG_WS DIR_BASE_LA1 + 210
FIVE_MIN_AVG_WD DIR_BASE_LA1 + 211
FIVE_WIND_GUST_SPEED DIR_BASE_LA1 + 212
FIVE_WIND_GUST_DIR DIR_BASE_LA1 + 213

***See at the end of the manual the table with the MODBUS data requests.**

3.2 RS485

3.2.1. RS485 Wiring

RS485 (NMEA 0183) Output:

White GND (Power -)	Yellow DATA (B-)
Brown VCC (Power +)	Green DATA (A+)

3.2.2 RS485 Configuration

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baudrate:	1200 to 115200 (8n1) bauds
output rate:	0.1 to 10 Hertz (Depends on the filter you select)
output units:	m/s, knots or km/h

Power consumption:
Ultra-Low-Power (RS485NMEA0183) : 0,25mA @5V, 1Hz. Power Consumption will vary depending on the baudrate & output rate chosen

RS485 Configuration Setup

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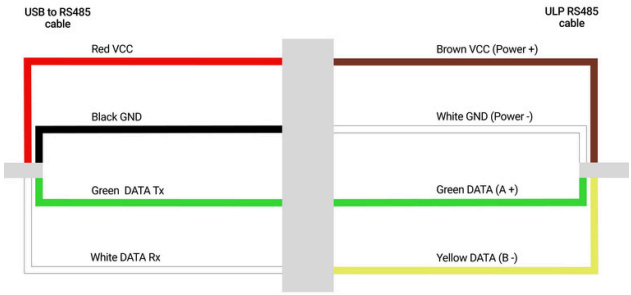

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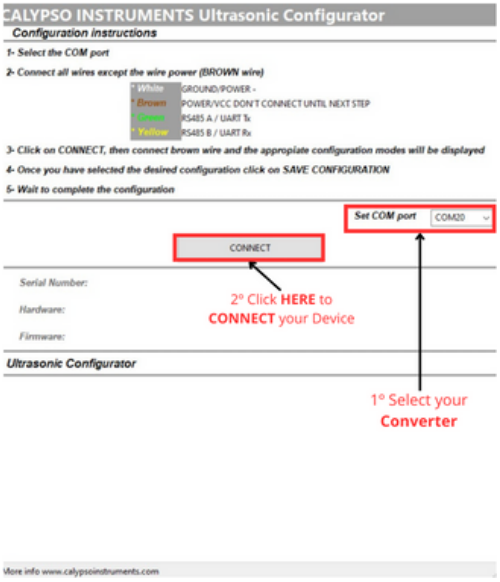

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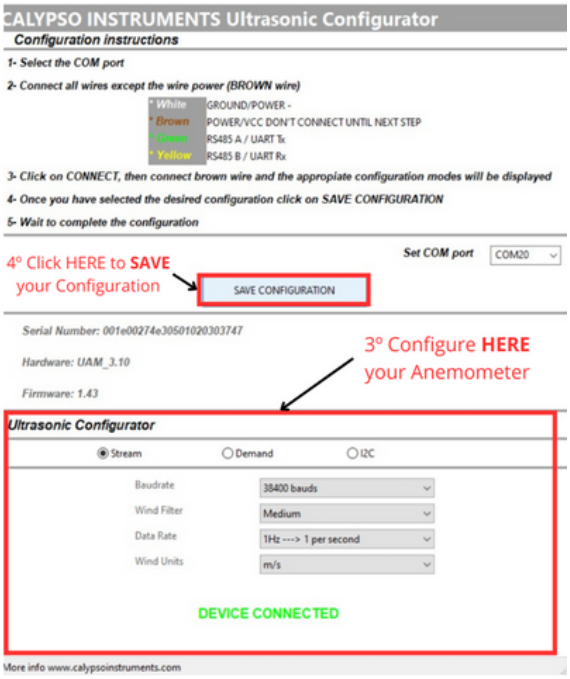

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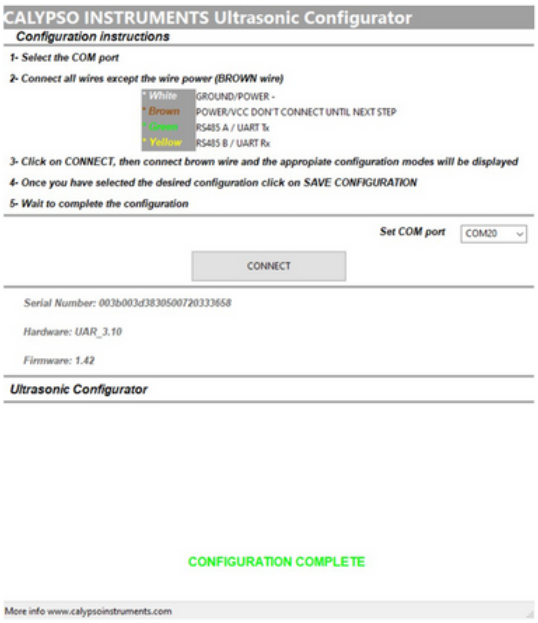


3.2.3 RS485 Registers

MWV Wind Speed and Angle
1 2 3 4 5
| | | | | $--MWV,x.x,a,x.x,a*hh
1) Wind Angle, 0 to 360 degrees
2) Reference, R = Relative, T = True
3) Wind Speed
4) Wind Speed Units, K/M/N
5) Status, A = Data Valid
6) Checksum

By default, the communication parameters are 38400bps, 8N1.
Some examples of sentences are:

$IIMWV,316,R,06.9,N,A*18
$IIMWV,316,R,06.8,N,A*19

The connection is straightforward with no configuration required in RAW mode configuration.

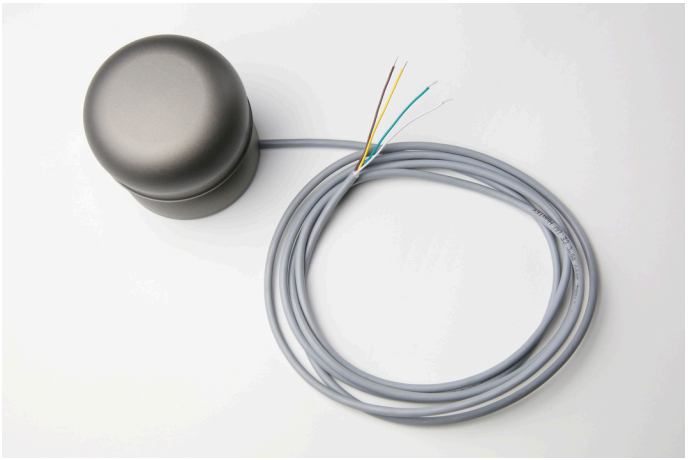
In case of ON DEMAND configuration mode, the sentence received is almost the same, but there is a need of this sentence for requesting data every time you ask for data:

$ULPI*00\r\n //I=id node by default
$ULPA*08\r\n
$ULPB*0B\r\n
P1*78\r\n

The received sentence has this structure, slightly modified:
$IiMWV,x.x,a,x.x,a*hh, being i the node (I,A,B,C,....)
configured.

4. Technical specifications

4.1. Dimensions	· Diameter: 70 mm (2.76 in.) · Height: 65 mm (2.56 in.)
4.2. Weight	340 grams (12 ounces)
4.3 Power	· 3.3 - 18 VDC



4.4. Sensors	Ultrasonic transducers (4x) Sample rate: 0.1 Hz to 10 Hz
4.5 Wind Information	· Wind speed · Wind direction

Sample rate: 0.1 Hz to 10 Hz (Configurable)

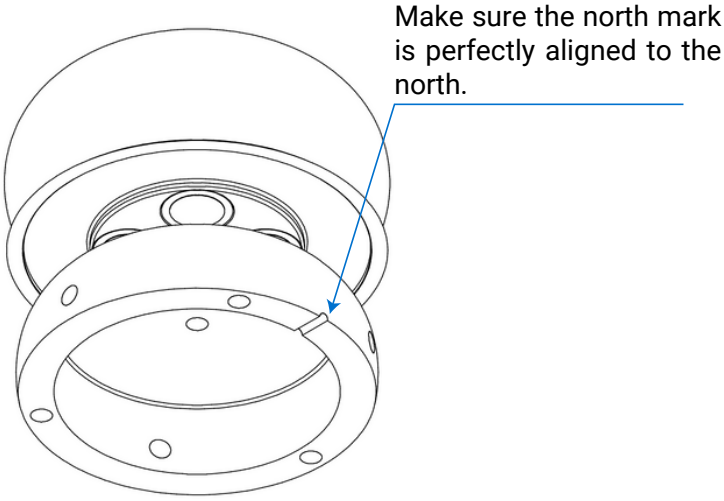
Wind Speed
Range**:** 0.5 to 45 m/s (1.12 to 100 mph) or 0.5 to 25m/s (1.12 to 56 mph)
Accuracy: ±0.1 m/s at 10m/s (0.22 at 22. 4 mph)
Threshold: 0.5 m/s (1.12 mph)
Wind direction
Range: 0 - 359º
Accuracy: ±1º

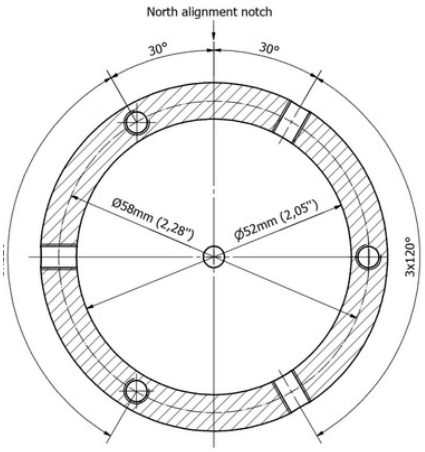
4. Technical specifications (II)

4.6. Easy mount

- 3 x M4 lateral female tripod thread - 3 x M4 base female tripod thread UNC 1/4” - 20

It can be mounted either on a plate (inferior screws) or on a tube (lateral screws).





4.7. Mounting accessories

A wide range of accessories can be used with the device. The ULP SUMMIT can be mounted on a flat service and screwed on to different sizes of poles. It can also be used with an adaptor for poles of 39 mm.

* Please, visit our website and check all the accessories available and their possible combinations at **www.calypsoinstruments.com.**

Mast Mount

Adapter 39 mm

Pole adapter

4. Technical specifications (III)

4.8. Firmware	Upgradable via RS485, MODBUS or UART/TTL

4.9 Product Material

The ULP SUMMIT is engineered to be a robust device with a minimal downtime. This new shape has been designed for optimum water spillage which implies lower probability of ice formation. Frost might affect measurements if it blocks the wave path.
The input wires are protected by Transient Voltage Suppression (TVS) diodes. The instrument body is built with Polyamide.

4.10 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.

5. Firmware

Firmware upgradable and configurable via cable using the configurator (https://calypsoinstruments.-com/technical-information). A USB converter cable is available as an accessory on **calypsoinstruments.com**.

Link to Firmware upgrader:
https://drive.google.com/drive/folders/1jg5BcCEpkXBLXEEYmGXeLNyOimmEb3Sm

6. General information

6.1. General recommendations

Wind Speed Gust is that value that measures abrupt and sudden change in wind speed.
Regarding mounting the unit, align the north mark of the ULP towards the natural north, bow of a boat, or the marker used as a reference .

Regarding mounting the unit, the mast head has to be prepared for the mechanical installation. Align the North mark of the Ultrasonic Ultra-Low-Power to the north. Make sure to install the sensor in a location free from wind perturbation, usually on the mast head.

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**, for example, the mast head on a boat.

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.

6.2. Maintenance and repair

The ULP SUMMIT 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 ULP SUMMIT can be wiped clean with a damp cloth being careful to not touch the transducers.

6.3 Warranty

This warranty covers the defects resulting from defective parts, materials and manufacturing, if made known to the manufacturer within 24 months after the purchase date.

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 ULP 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 **sales@calypsoinstruments.-com** or visit **www.calypsoinstruments.com**.

MODBUS Sensor Data Requests

Measurements all have a resolution of 0.1 but are reported as 10*.
8.2 m/s is returned as a value 82. The user must /10 in order to reinsert the decimal precision.

Address	Register	Access Type	Response Range	Data Type	Description
200	201	Read	0 to 15†	16-bit Signed Int	System Status†
201	202	Read	0 to 500*	16-bit Signed Int	Wind speed (m/s) (3 second moving average)
202	203	Read	0 to 3599*	16-bit Signed Int	Wind direction (°) (3 second moving average)
203	204	Read	0 to 500*	16-bit Signed Int	2 min avg wind speed
204	205	Read	0 to 3599*	16-bit Signed Int	2 min avg wind direction
205	206	Read	0 to 500*	16-bit Signed Int	10 min avg wind speed
206	207	Read	0 to 3599*	16-bit Signed Int	10 min avg wind direction
207	208	Read	0 to 500*	16-bit Signed Int	Wind gust speed
208	209	Read	0 to 3599*	16-bit Signed Int	Wind gust direction
210	11	Read	0 to 500*	16-bit Signed Int	5min avg wind speed
211	12	Read	0 to 3599*	16-bit Signed Int	5min avg wind direction
212	13	Read	0 to 500*	16-bit Signed Int	5 min Wind gust speed
213	14	Read	0 to 3599*	16-bit Signed Int	5 min Wind gust direction

† If not applicable to ULP-M, the register should report a value of zero (0).
* See Data Format section for numeric conversions.

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