CALYPSO ULP485 Ultrasonic ULP Wind Instrument and Data Logger User Manual

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Contents

Product overview

Thank you for choosing the ULP Ultrasonic Anemometer from Calypso Instruments. This ULP 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, UART/TTL and MODBUS.

Applications for the ULP485 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

Package content

The package contains the following:

- Ultrasonic ULP 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)

Technical specifications

The Ultrasonic ULP has the following technical specifications:

Dimensions:

- **Diameter:** 68 mm (2.68 in.)
- **Height:** 65 mm (2.56 in.)

- **Weight:** 210 grams (7.4 ounces)
- **Power:** · 3.3-18 DCV

  The ULP has to be connected as shown in this section.

RS485/MODBUS RTU Output:

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

Data interface	1Autotransmit 2-POLL telegram 3-MODBUS
Data format	NMEA0183
Baudrate	2400 to 115200 bauds
Voltage range	3.3-18V

Power consumption:

- (RS485) 0.25 mA at 38400 bauds, 1 Hz. (5V)
- (UART) 0.15 mA at 38400 bauds, 1 Hz. (5V)
- (MODBUS) 0.25 mA at 38400 bauds, 1 Hz. (5V)

Sensors

- Ultrasonic transducers (4x)
- **Sample rate:** 0.1 Hz to 10 Hz

The ULP 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 transductors calculates the signal delay and get information about both wind direction and wind speed.

Technical specifications

Wind Information

- Wind speed
- Wind direction

Sample rate: 1 Hz

Wind Speed
Range : Range: 0 to 45 m/s (1.12 to 100 mph)
Accuracy: ±0.1 m/s at 10m/s (0.22 at 22.4 mph)
Threshold: 1 m/s (2.24 mph)

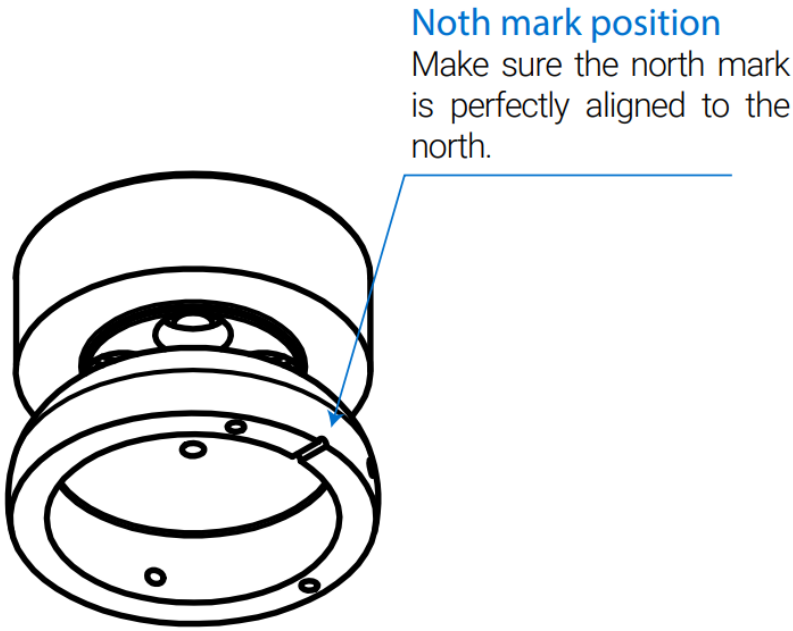
Wind direction

Range: 0 – 359º
Accuracy: ±1º

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).



Mounting accessories

A wide range of accessories can be used with the device. The ULP 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.

Firmware

Upgradable via RS485, MODBUS or UART/TTL

Product Material

The ULP is engineered to be a robust device with 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.

Quality Control

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

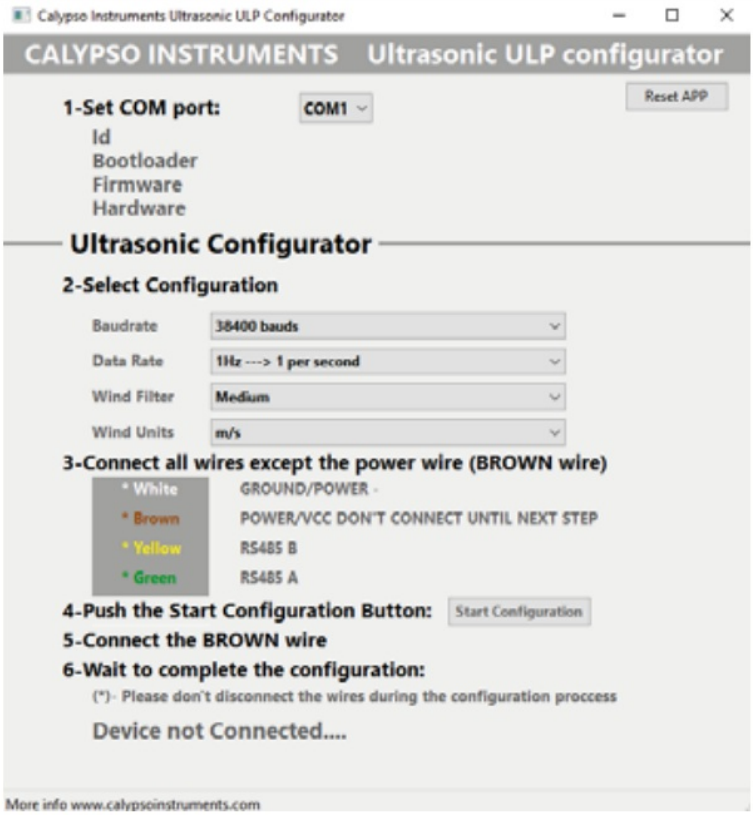
A Q/C report for both wind speed and direction is generated and kept in our files. Standard deviation is checked to guarantee that each unit has been calibrated to the highest standards.

Configuration Options

The Ultrasonic ULP 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**.

To configure your device, connect the ULP via either a USB to RS485 converter cable (in case of the ULP RS485 or the ULP Modbus) or via a USB to UART converter cable (in case of the ULP UART). Connect all the ULP cables except for the brown cable to the converter. Insert the USB into the computer, open the configurator app, select the configuration wanted and follow the instructions on the screen to finish the configuration.

*USB converter cables available on [calypsoinstruments.com]



Communication Protocols

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

RS485 and UART Sentences

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

MWV Sentence 4800bps 8N1

The connection is straightforware with no configuration required. The hardware interface is RS485, 4800bps, 8N1. The logical interface NMEA0183 has MWV ASCII simple phrases with direction and wind speed being the following:

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

General information

General recommendations
Regarding mounting the unit, align the north mark of the Ultra-Low Power Pro towards the North

Make sure to install the sensor in a location free from anything that obstructs the ow 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

Maintenance and repair
The Ultrasonic Ultra-Low-Power 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 Ultrasonic Ultra-Low-Power can be wiped clean with a damp cloth being careful to not touch the transducers.

Warranty

This Warranty covers the defects resulting from defective parts, materials and manufacturing, if such defects are revealed during the 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 given by the user will not incur in any responsibility on part of Calypso Instruments. Therefore, any harm caused to the ULP by a mistake will not be covered by the warantee. Using assembly elements different from those delivered with the product will void the guarantee. Changes on transducers position/alignment will avoid any warranty.

For further information please contact Calypso Technical Support through info@calypsoinstruments.com or visit www.calypsoinstruments.com.

Costumer Support

ULTRASONIC Ultra-Low-Power
User manual English version 1.0
19/10/2022

Documents / Resources

	CALYPSO ULP485 Ultrasonic ULP Wind Instrument and Data Logger [pdf] User Manual ULP485 Ultrasonic ULP Wind Instrument and Data Logger, ULP485, Ultrasonic ULP Wind Instrument and Data Logger, Wind Instrument and Data Logger, Instrument and Data Logger, Data Logger

References

- Calypso Instruments