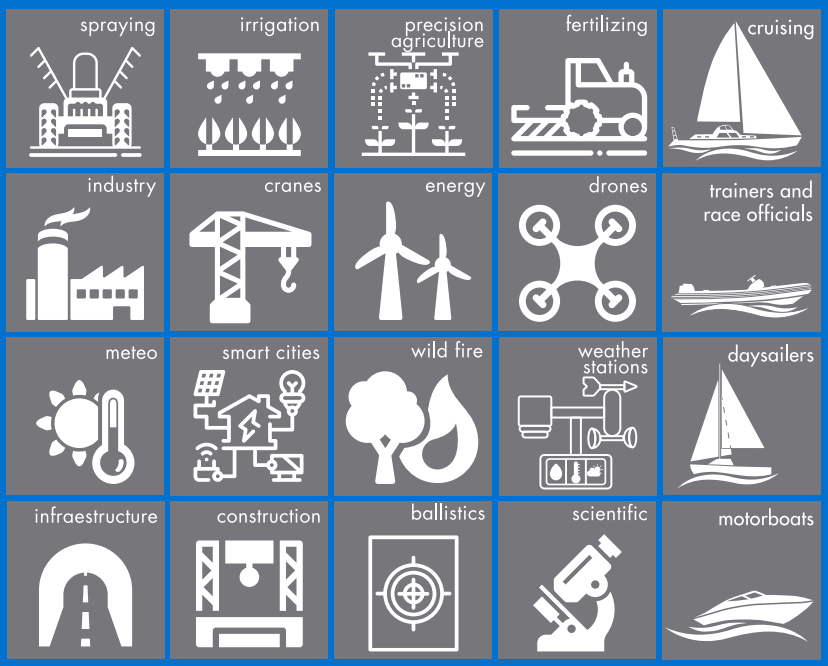
CALYPSO instruments
www.calypsoinstruments.com

CALYPSO INSTRUMENTS
ULTRA-LOW-POWER ULTRASONIC STD (ULP STD) WIND METER
User manual - SDI 12 Protocol

English version 3.0
30.05.2023

CE FC 0809



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

Index

1 Product Overview

Thank you for choosing the ULP STD 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, UART/TTL, I2C, 4-20, SDI 12 and MODBUS.

Applications for the ULP STD 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 STD 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 SDI 12

3.1.1 SDI 12 Connections

Brown 3.3V - 18V (Power +)	White GND (Power -)
Green SDI 12 Data, UART TX I2C SCL	Yellow UART Rx, I2C SDA

Output signal: SDI-12 version1.4; address factory set to 0 (default) , Uart (configurable), I2c (configurable)

Output variables: wind direction raw, wind speed raw, wind direction/speed/gust average since last request, wind direction/speed/gust 2,5,10 min

Measurement frequency: 1 Hz

Ultrasonic ULP SDI-12 commands and data format option (0 address by default)

SDI-12 Command	Output	Units	Format
0R0!, 0R0C!	curr_speed+curr_direction+avg_speed+avg_direction+gust<CR><LF>	m/s degrees	current_speed: raw wind speed curr_direction: raw wind direction avg_speed: wind speed average (since last request) avg_direction: wind angle average (since last request) gust: wind speed gust(since last request)
0R1!, 0R1C!	curr_speed+curr_direction+avg_speed2+avg_direction2+gust2<CR><LF>	m/s degrees	current_speed: raw wind speed curr_direction: raw wind direction avg_speed2: 2 min wind speed average avg_direction2: 2 min wind angle average gust2: 2 min wind speed gust
0R2!, 0R2C!	curr_speed+curr_direction+avg_speed2+avg_direction2+gust2<CR><LF>	m/s degrees	current_speed: raw wind speed curr_direction: raw wind direction avg_speed2: 5 min wind speed average avg_direction2: 5 min wind angle average gust2: 5 min wind speed gust
0R3!, 0R3C!	curr_speed+curr_direction+avg_speed10+avg_direction10+gust10<CR><LF>	m/s degrees	current_speed: raw wind speed curr_direction: raw wind direction avg_speed2: 10 min wind speed average avg_direction2: 10 min wind angle average gust2: 10 min wind speed gust

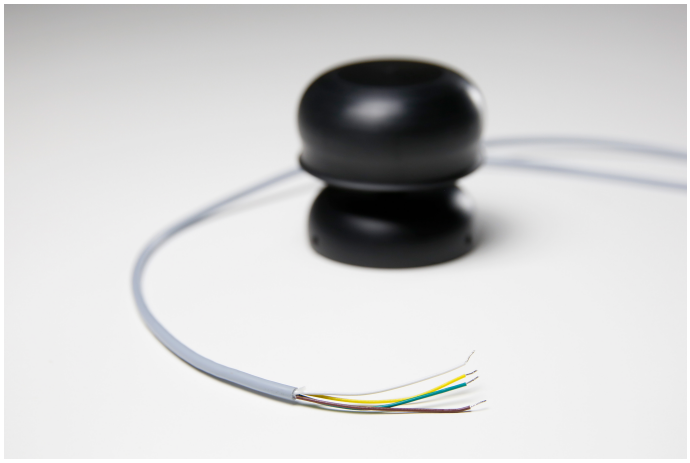
Example:
Tx -> 0R0!
Rx -> 0+1.0+90+1.1+89+2.2<CR><LF>

addr: 0, curr_speed: 1.0 m/s, curr_direction: 90°, avg_speed: 1.1m/s, avg_direction: 89°, gust: 2.2m/s

4. Technical specifications

The ULP has the following technical specifications:

4.1. Dimensions	· Diameter: 70 mm (2.76 in.) · Height: 65 mm (2.56 in.)
4.2. Weight	210 grams (7.4 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)

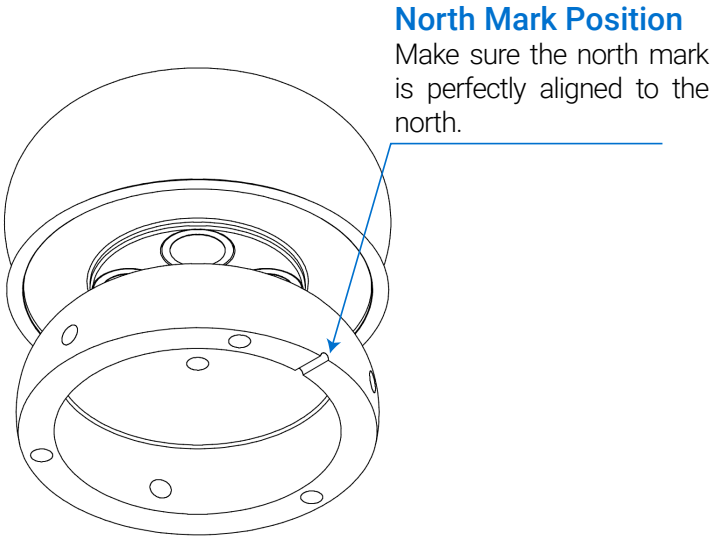
Wind direction
Range: 0 - 359º
Accuracy: ±1º

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 STD 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**.

4. Technical specifications (III)

4.8. Firmware	Upgradable via RS485 or UART/-TTL

4.9 Product Material

The ULP STD 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.
Our products are protected by lightning protection. The instrumentbody 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**.

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 does not require great maintenance given the new design of non-moveable parts.

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 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**.

CALYPSO instruments

Ultra-Low-Power Ultrasonic wind meter STD (ULP STD)

User manual English version 3.0

30.05.23