

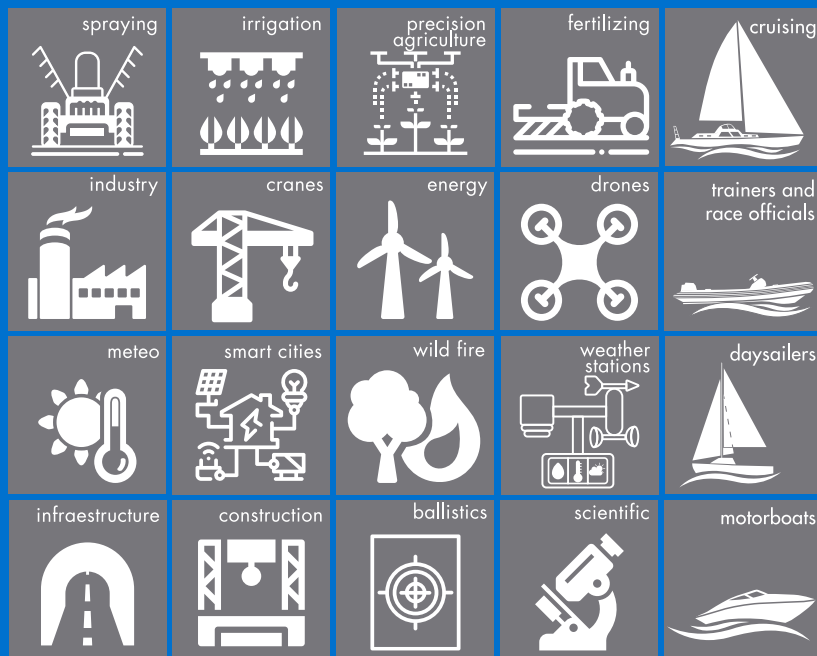


CALYPSO INSTRUMENTS ULTRA-LOW-POWER ULTRASONIC STD (ULP STD) WIND METER

User manual - UART/I2C Protocol



English version 3.0
30.05.2023



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

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1 Product Overview

Thank you for choosing the ULP STD wind meter from Calypso Instruments. This is the first model of 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 Protocol

3.1 UART

3.1.1 UART Wiring

UART Output:

White GND (Power -)	Yellow DATA RX / SDA
Brown VCC (Power +)	Green DATA TX/ SCL

3.1.2 UART Configuration

The ULP STD 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 ULP STD for UART comes in UART Data Protocol standard from factory.

The following can be changed with the configurator:

Data Protocol: UART or I2C

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:	2400 to 115200 (8n1) bauds
output rate:	0.1 to 10 Hertz (Depends on the filter you select)
output units:	m/sec., knots or km/h

Power consumption:

Ultra-Low-Power (UART): 0,15 mA @5V, 1Hz.

UART Configuration Setup

The ULP STD 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.

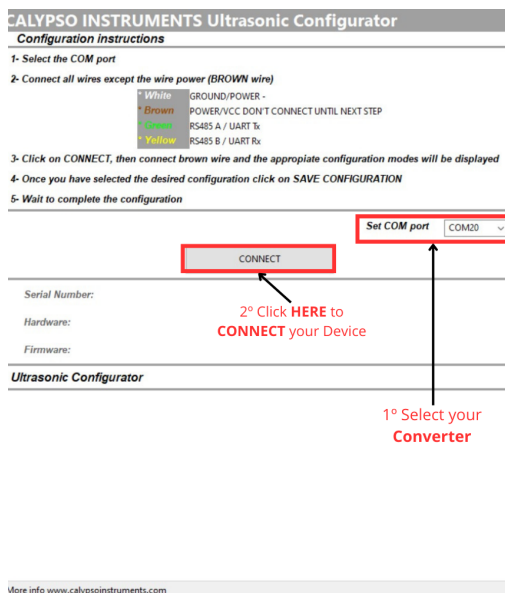
For more information, please watch the following video.

<https://bit.ly/3DuA7IM>

*USB converter cables available on [calypsoinstruments.com](http://www.calypsoinstruments.com).

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

1. Use a USB to UART 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)

UART Configuration Setup (II)

CALYPSO INSTRUMENTS Ultrasonic Configurator
Configuration instructions

- 1- Select the COM port
- 2- Connect all wires except the wire power (**BROWN** wire)

White	GROUND/POWER -
Brown	POWER/VCC DON'T CONNECT UNTIL NEXT STEP
Green	RS485 A / UART Tx
Yellow	RS485 B / UART Rx

- 3- Click on **CONNECT**, then connect brown wire and the appropriate configuration modes will be displayed
- 4- Once you have selected the desired configuration click on **SAVE CONFIGURATION**
- 5- Wait to complete the configuration

4° Click **HERE** to **SAVE** your Configuration

Set COM port: COM20

SAVE CONFIGURATION

Serial Number: 001e00274e30501020303747
Hardware: UAM_3.10
Firmware: 1.43

3° Configure **HERE** your Anemometer

Ultrasonic Configurator

Stream Demand I2C

Baudrate	38400 bauds
Wind Filter	Medium
Data Rate	1Hz ---> 1 per second
Wind Units	m/s

DEVICE CONNECTED

More info www.calpsoinstruments.com

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.

CALYPSO INSTRUMENTS Ultrasonic Configurator
Configuration instructions

- 1- Select the COM port
- 2- Connect all wires except the wire power (**BROWN** wire)

White	GROUND/POWER -
Brown	POWER/VCC DON'T CONNECT UNTIL NEXT STEP
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- 3- Click on **CONNECT**, then connect brown wire and the appropriate configuration modes will be displayed
- 4- Once you have selected the desired configuration click on **SAVE CONFIGURATION**
- 5- Wait to complete the configuration

Set COM port: COM20

CONNECT

Serial Number: 003b003d3830500720333658
Hardware: UAR_3.10
Firmware: 1.42

Ultrasonic Configurator

CONFIGURATION COMPLETE

More info www.calpsoinstruments.com

3.1.3 UART 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.

3.2 I2C

3.2.1 I2C Wiring

I2C Output:

White GND (Power -)	Yellow DATA RX / SDA
Brown VCC (Power +)	Green DATA TX/ SCL

3.2.2 I2C Configuration

The ULP STD 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 ULP STD for I2C comes in UART Data Protocol standard from factory. This can be changed to I2C data protocol in the configurator app.

The following can be changed with the configurator:

Data Protocol: UART or I2C

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:	2400 to 115200 (8n1) bauds
output rate:	0.1 to 10 Hertz (Depends on the filter you select)
output units:	m/sec., knots or km/h

Power consumption:

Ultra-Low-Power (I2C): 0,15 mA @5V, 1Hz.

I2C Configuration Setup

The ULP STD 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.

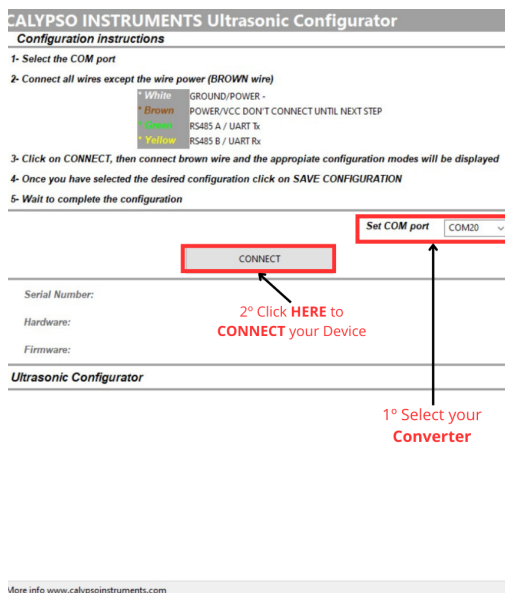
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*USB converter cables available on calypsoinstruments.com.

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

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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)

I2C Configuration Setup (II)

CALYPSO INSTRUMENTS Ultrasonic Configurator

Configuration instructions

- 1- Select the COM port
- 2- Connect all wires except the wire power (BROWN wire)

White	GROUND/POWER -
Brown	POWER/VCC DON'T CONNECT UNTIL NEXT STEP
Green	RS485 A / UART Tx
Yellow	RS485 B / UART Rx
- 3- Click on CONNECT, then connect brown wire and the appropriate configuration modes will be displayed
- 4- Once you have selected the desired configuration click on SAVE CONFIGURATION
- 5- Wait to complete the configuration

4° Click HERE to SAVE your Configuration → **SAVE CONFIGURATION**

Set COM port: COM20

Serial Number: 001e00274e30501020303747
 Hardware: UAM_3.10
 Firmware: 1.43

3° Configure HERE your Anemometer

Ultrasonic Configurator

Stream
 Demand
 I2C

Baudrate: 38400 bauds

Wind Filter: Medium

Data Rate: 1Hz ----> 1 per second

Wind Units: m/s

DEVICE CONNECTED

More info www.calypsoinstruments.com

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.

CALYPSO INSTRUMENTS Ultrasonic Configurator

Configuration instructions

- 1- Select the COM port
- 2- Connect all wires except the wire power (BROWN wire)

White	GROUND/POWER -
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- 3- Click on CONNECT, then connect brown wire and the appropriate configuration modes will be displayed
- 4- Once you have selected the desired configuration click on SAVE CONFIGURATION
- 5- Wait to complete the configuration

Set COM port: COM20

CONNECT

Serial Number: 003b003d3830500720333658
 Hardware: UAR_3.10
 Firmware: 1.42

Ultrasonic Configurator

CONFIGURATION COMPLETE

More info www.calypsoinstruments.com

3.3.3 I2C Sentences

General Options

Address I2C- 0x15 (21 decimal)
Frecuency -100kHz – 400kHz
SDA -TX (Yellow)
SCL - RX (Green)

Write Register

In order to write about the register it is necessary to write 2 bytes, the I2C bus direction and the register you need to check.
I2C Address (1 Byte) + Register Address (1 Byte)
Address -0x15 (21 decimal)
Available Registers:
Wind Raw Stat - 0x10
Wind 2 Min Stat - 0x12
Wind 5 Min Stat - 0x15
Wind 10 Min Stat - 0x1A
Wind Full Stats - 0x1F

Read Register

For the read register we need to take into account how many bytes is the system giving us back and what bytes we need to read in order to obtain the value we need.

Data are under big-endian criteria. The first byte, the more valuable one to be represented.
E.g. If 2 bytes are read, byte 0 and byte 1, we will read the first byte as 0x05 and second byte 0x0A.



0 0 0 0 0 1 0 1 0 0 0 0 1 0 1 0

The first byte is marked in orange. The more valuable one. The second byte is marked in blue (less significant one LSB).

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

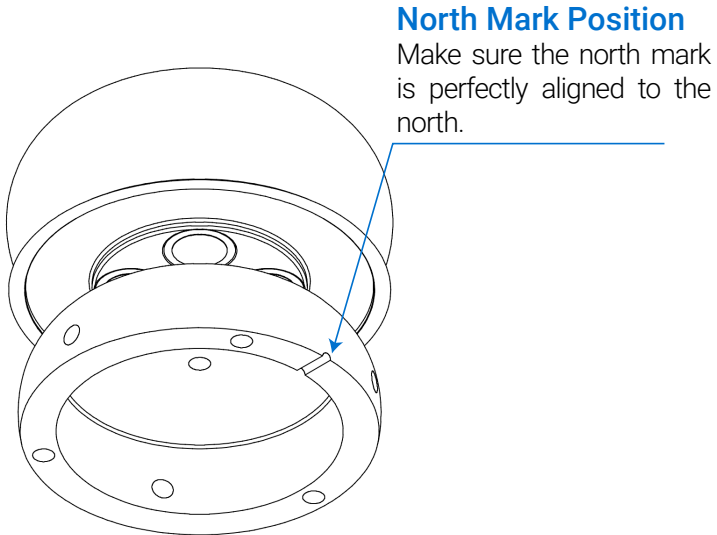
Range: 0 - 359°

Accuracy: $\pm 1^\circ$

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 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.

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 warranty. Using assembly elements different from those delivered with the product will void the warranty.

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.



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