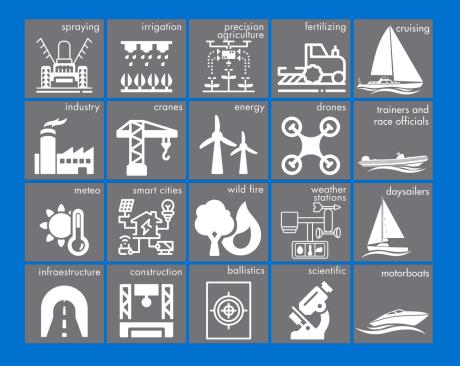




CALYPSO INSTRUMENTS ULTRA-LOW-POWER ULTRASONIC STD (ULP STD) WIND METER User manual









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_{04/09}

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 MODBUS RSU

3.1.1 Modbus Wiring

MODBUS RTU Output:



3.1.2 Modbus 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 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:2400 to 115200 (8n1)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 (MODBUS) : 1 mA @5V,1 Hz.



Modbus 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.**

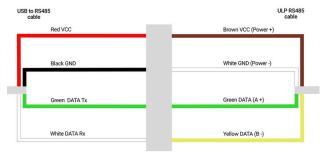
For more information, please watch the following video. https://bit.ly/3DuA7IM

*USB converter cables available on calypsoinstruments.com.

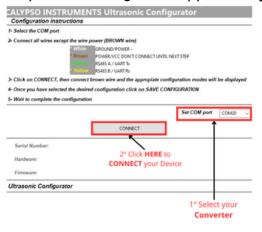
This are the STEPS to FOLLOW to Configurate your DEVICE Successfully:

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)

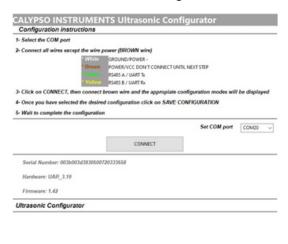


Modbus Configuration Setup (II)

- Select the COM port - Connect all wires except the wir * Writ * Brow Gase	GROUND/POWER	R-		
* Whit	GROUND/POWER	R-		
	POWER/VCC DOI			
Greet				
* Malle	RS485 A / UART T		AEXT STEP	
	RS485 B / UART R			
Click on CONNECT, then conne	ect brown wire and t	he appropiate confi	iguration modes will	be displayed
- Once you have selected the des	sired configuration c	lick on SAVE CON	FIGURATION	
Wait to complete the configura	ation			
			Set COM port	COM20 ~
^{4°} Click HERE to SAVE				
your Configuration	SAVE CON	FIGURATION		
Serial Number: 001e00274e305	501020303747			
		39	^o Configure	HERE
Hardware: UAM_3.10			our Anemor	
Firmware: 1.43				increa.
Iltrasonic Configurator				
Stream	O Demand	() I2C		
Baudrate	3840	0 bauds	~	
			~	
Wind Filte	er Med	num		
Wind Filte Data Rate	meu	> 1 per second	~	
	1Hz	> 1 per second	~	
Data Rate	1Hz	> 1 per second	v	

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.



CONFIGURATION COMPLETE More info www.calypsoinstruments.com



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 + 205 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

3.2 RS485

3.2.1. RS485 Wiring

RS485 (NMEA 0183) Output:



3.2.2 RS485 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 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 seve-ral 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)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 (RS485 NMEA0183) : 0,25mA @5V, 1Hz



ULP STD User Manual

RS485 Configuration Setup

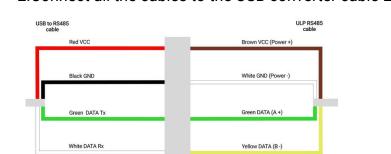
The ULP STD can be set up by using a special configuration app made by Calypso Instruments. In order to use the app, you should download the configurator from our website at www.calypsoinstruments.com.

For more information, please watch the following video. https://bit.ly/3DuA7IM

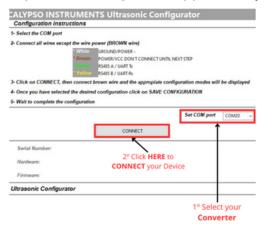
*USB converter cables available on calypsoinstruments.com.

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)



7

RS485 Configuration Setup (II)

Select the COM port				
Connect all wires except the	wire power (BROWN wi	re)		
- B - C	hite GROUND/POWER POWER/VCC DON RS485 A / UART Te North RS485 B / UART Re	T CONNECT UNTIL		
Click on CONNECT, then co				I be displaye
- Once you have selected the		ck on SAVE CO	NFIGURATION	
- Wait to complete the config	iration			
			Set COM port	COM20
4° Click HERE to SAVI				
your Configuration	SAVE CONFI	GURATION		
	SAVE CONFI			
your Configuration	SAVE CONFI		° Configure	HERE
your Configuration	SAVE CONFI	3	° Configure	
your Configuration	SAVE CONFI	3		
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43	SAVE CONFI	3		
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10	SAVE CONFI	3	our Anemoi	
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43 Iltrasonic Configurator	SAVE CONFI 0501020303747 () Demand	y Y	our Anemoi	
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43 Jltrasonic Configurator @ Stream	SAVE CONFI 0501020303747 O Demand te 384400	J J V Dates	our Anemoi	
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43 Jtrasonic Configurator @ Stream Beadre	SAVE CONFI 0501020303747 O Demand te 38400 iiter Media	J J V Dates	our Anemoi	
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43 Iltrasonic Configurator @ Stream Beadra Wied I	SAVE CONFI 0501020303747 O Demand te 38400 iiter Media iiter Media ite 11Hz) in the second	our Anemoi	
your Configuration Serial Number: 001e00274e: Hardware: UAM_3.10 Firmware: 1.43 Jhrasonic Configurator @ Stream Beudra Wind T Data R	SAVE CONFI 0501020303747 O Demand te 38400 iiter Media te 1Hz -) in the second	our Anemoi	

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.

Configuration instructions			
1- Select the COM port			
2- Connect all wires except the wir			
* White			
* Brow	POWER/VCC DON'T CONNECT UNTIL NE R5485 A / UART Tx	XT STEP	
* Yello	RS485 8 / UART Rx		
	ct brown wire and the appropiate config	uration modes will	be displayed
	ired configuration click on SAVE CONF		
5- Wait to complete the configurat		GORATION	
b- wait to complete the contigurat	ion		
		Set COM port	COM20 ~
	CONNECT		
Serial Number: 003b003d383050	007202220658		
Serial Namber: 00500050305050	10120333036		
Hardware: UAR_3.10			
Element 1 12			
Firmware: 1.42			
Firmware: 1.42 Ultrasonic Configurator			



More info www.calypsoinstruments.com

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.



3.3 UART 3.3.1 UART Wiring

UART Output:

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

3.2.2 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**. T

he 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) baudsoutput 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**

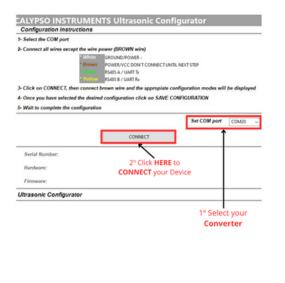
*USB converter cables available on calypsoinstruments.com.

This are the STEPS to FOLLOW to Configurate 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.

Red VCC	Brown VCC (Power +)
Black GND	White GND (Power -)
Green DATA Rx	Yellow DATA Rx
White DATA Tx	Green DATA Tx

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)



Hore info your calumonianto young to com

UART Configuration Setup (II)

I- Select the COM por	1				
2- Connect all wires ex	cept the wire pow	ver (BROWN wire)			
	and the second se	ROUND/POWER -			
	the second se	OWER/VCC DON'T CONNEC	T UNTIL NEXT STEE	P	
	and the second se	IS485 B / UART Rx			
3- Click on CONNECT,	then connect bro	wn wire and the appropi	ate configuratio	n modes will	l be displayed
- Once you have sele	cted the desired c	onfiguration click on SA	VE CONFIGURA	TION	
5- Wait to complete th	e configuration				
			Se	t COM port	COM20 ~
4° Click HERE to	SAVE				
your Configur	ation 🔺	SAVE CONFIGURATION			
your Configur					
			3º Cor	nfigure	HERE
your Configur	e00274e305010203			nfigure	
your Configur	e00274e305010203			nfigure Anemor	
your Configur Serial Number: 001 Hardware: UAM_3: Firmware: 1.43	e00274e305010203			-	
your Configur Serial Number: 001 Hardware: UAM_3.1 Firmware: 1.43 Ultrasonic Configu	e00274e305010203 10 Irator	303747	your A	-	
your Configur Serial Number: 001 Hardware: UAM_3.: Firmware: 1.43	e00274e305010203 10 Irator			-	
your Configur Serial Number: 001 Hardware: UAM_3.1 Firmware: 1.43 Ultrasonic Configu	e00274e305010203 10 Irator	303747	your A	-	
your Configur Serial Number: 001 Hardware: UAM_3.1 Firmware: 1.43 Ultrasonic Configu	e00274e305010203 10 Irator ream	003747	your A	-	
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your Configur Serial Number: 001 Hardware: UAM_3.1 Firmware: 1.43 Ultrasonic Configu	e00274e305010203 10 rrator ream Baudrate Wind Filter	003747 O Demand 38400 bauds Medium Hz> 1 per se	Oizc	-	
your Configur Serial Number: 001 Hardware: UAM_3.1 Firmware: 1.43 Ultrasonic Configu	e00274e305010203 10 ream Baudrate Wind Filter Data Rate	003747 O Demand 38400 bauds Medium	Oizc	-	

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.

Configuration instructions			
1- Select the COM port			
2- Connect all wires except the wi	re power (BROWN wire)		
	GROUND/POWER -		
* Brow		TIL NEXT STEP	
Control of the second se	RS485 A / UART Tk RS485 B / UART Tx		
	ect brown wire and the appropriate c		
			be displayed
I- Once you have selected the des	ured configuration click on SAVE C	ONFIGURATION	
5- Wait to complete the configurat	tion		
		Set COM port	COM20 ~
	CONNECT		
Serial Number: 003b003d38305	00720333658		
Hardware: UAR_3.10			
Firmware: 1.42			
Firmware: 1.42			
Ultrasonic Configurator			



More info www.calypsoinstruments.com

3.3.3 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.



I2C Output:



3.4.2 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 transmis- sion system or between two digital devices.

Wind Filter: You can choose between the sensibility of the wind filter.

baudrate:2400 to 115200 (8n1) baudsoutput 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**.

For more information, please watch the following video. https://bit.ly/3DuA7IM

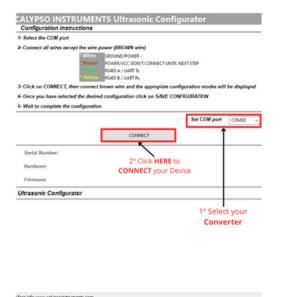
*USB converter cables available on calypsoinstruments.com.

This are the STEPS to FOLLOW to Configurate 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)



I2C Configuration Setup (II)

- Select the COM port					
	in normal (BDOMA)	-			
- Connect all wires except the w					
* Bro			T UNTIL NEX	T STEP	
* Gre	RS485 A / UAR	T Tk			
• Yel	RS485 B / UAR	r Rx			
- Click on CONNECT, then conn	ect brown wire and	the appropi	iate configu	ration modes will	I be displayed
- Once you have selected the de	sired configuration	click on SA	VE CONFIG	URATION	
5- Wait to complete the configur	ation				
4º Click HERE to SAVE				Set COM port	COM20 ~
F CIICK HERE to SAVE					
Conference in the second					
your Configuration	SAVE CO	NFIGURATION			
your Configuration		NFIGURATION			
Serial Number: 001e00274e30		NFIGURATION		Configure	HERE
		NFIGURATION	3° (-	
Serial Number: 001e00274e30		NFIGURATION	3° (Configure Ir Anemor	
Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43			3° (-	
Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43		/	3° (-	
Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator	0 Demand	/	3° (you	-	
Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator @Stream	© Demanc	/	3° (you	-	
Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator @Stream Baudrate	O Demanc er M	4 1 1400 bauds	3° (you	-	
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Serial Number: 001e00274e30 Hardware: UAM_3.10 Firmware: 1.43 <u>Iltrasonic Configurator</u> ® Stream Baudrate Wind Filt Data Rati	© Demand er	s 4400 bauds ledium Hz> 1 per se	3° (you	-	

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.

- Select the COM port				
- Connect all wires ex	cept the wire p	oower (BROWN wire)		
	* White	GROUND/POWER -		
	* Brown	POWER/VCC DON'T CONNECT UN	ATTL NEXT STEP	
	Green	RS485 A / UART Tx RS485 B / UART Rx		
CEAL OF COMPLET	Tellow .	FS405 B / UART RX brown wire and the appropriate of	configuration modes will	the disalaund
				be anprayed
		d configuration click on SAVE	CONFIGURATION	
5- Wait to complete the	configuration	1		
			Set COM port	COM20 ~
		CONNECT		
Serial Number: 003t	003.039306003	200323458		
Senar number: 0030	1003030305007	20333000		
Hardware: UAR_3.10	3			
Firmware: 1.42				
	rator			



More info www.calypsoinstruments.com

3.4.3 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.

0000101 00001010

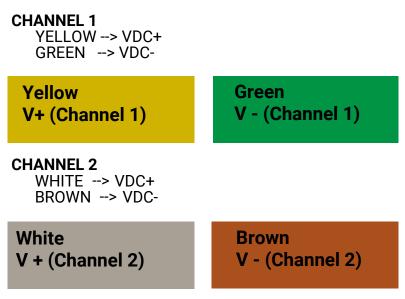
The first byte is marked in orange. The more valuable one. The second byte is marked in blue (less significant one LSB).



3.5 Analog 4-20 mA

3.5.1 Analog 4-20 mA Wiring

The Analog 4-20 mA is an analog protocol that has no sentences.



CONNECTION INSTRUCTIONS

*Channel 2 connection is mandatory.

We connect channel 2* to the power supply, you will have 10 seconds to connect channel 1 if you want to use it in parallel. If not connected, only the first of the named channels will be configured. The default configuration is the following:

- Channel 1 --> Address Mode
- Channel 2 -->Tunnel Mode

These configurations can be modified according to needs thanks to the configurator that we have available.

3.5.2 Analog 4-20 mA Configuration

To configure the equipment, Channel 2 (White/Brown cables) must be connected to the power, Thus, the device will appear in the configurator application (via Bluetooth). At this point we can choose between different modes:

Speed Mode: In this configuration, speed reading (0-45m/s), scaled in a range of 4-20mA, is given through the channel we select.

Address Mode: In this configuration, wind reading [0-359°], scaled in a range of 4-20mA.

Tunnel Mode: In this configuration you select the combination of wind speed and direction. As in many purposes it is not necessary to know the direction of wind but the direction of the same, the tunnel mode has been implemented.

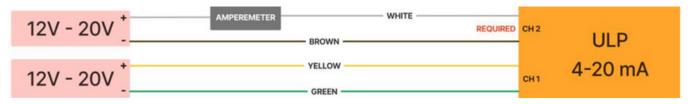
Power consumption:

Ultra-Low-Power 4-20 analog: 4-20 mA, @12-24V, 1Hz.



3.5.2 Analog 4-20 mA Configuration (II)

This protocol divides the measurement range into two parts. When the wind direction is between 0° and 180° the dimensioning used is 4mA-12mA; while between the angles [180° - 359°] the dimensioning is between 12mA - 20mA.



OPERATION

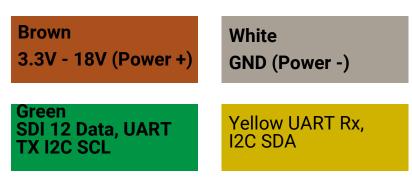
For the correct operation of the equipment, it is required that channel 2 must be powered.

Once the device is connected, it will take approximately 10 seconds to start. Once the 10 seconds have passed, the equipment will begin to launch the relevant currents through the wires (Depending on the configuration established).



3.6 SDI 12

3.6.1 SDI 12 Connections



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+av- g_speed+avg_direction+gust<- CR> <lf></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+av- g_speed2+avg_direction2+- gust2 <cr><lf></lf></cr>	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+a- vg_speed2+avg_direction2+- gust2 <cr><lf></lf></cr>	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+a- vg_speed10+avg_direc- tion10+gust10 <cr><lf></lf></cr>	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



ULP STD User Manual

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: ±1°



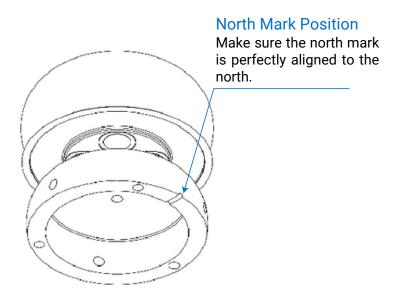
4. Technical specifications (II)

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.

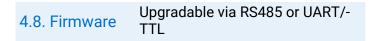
* Please, visit our website and check all the accessories available and their possible combinations at **www.calypsoinstruments.com.**





4. Technical specifications (III)





4.9 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.

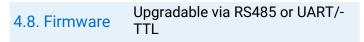
5. Firmware

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**.



How to connect ULP STD USB converter cable





4.9 Product Material

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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**.



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 St atus
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
21 1	12	Read	0 to 3599*	16 bit Signed Int	5min avg wind direction
212	13	Read	0 to 500*	16 bit Signed Int	5minWind gust speed
213	14	Read	0 to 3599*	16 bit Signed Int	5minWind gust direction

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





Ultra-Low-Power Ultrasonic wind meter STD (ULP STD) User manual English version 3.0 30.05.23