



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

User manual









If you want to know more about our new ULP PRO 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 PEO 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:

 $\cdot$  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.

 $\cdot$  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 PRO 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



### 2 Package content

The package contains the following:

- · One ULP Pro Wind Instrument plus 2 meters (6.5 ft) of cable for connection
- · Serial number reference on the side of the packaging.

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

· M3 headless screw (x7)



### **3** Communication Protocols

### **3.1 MODBUS RSU**

#### 3.1.1 Modbus Wiring

MODBUS RTU Output:



#### 3.1.2 Modbus Configuration

The ULP PRO 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 PRO 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"

Configuration instructions			
5- Select the COM part			
Connect all wires except the wire	power (BROWN wire)		
- Methoda	GROUND/POWER -		
* Errown	POWERVCC DON'T CONNECT UNIT REALS A / UNIT TO	TIL MEXT STEP	
	RS4ES B / UART Rx		
- Click on CONNECT, then connect	t brown wire and the appropriate of	onfiguration modes will	be displayed
6- Once you have selected the desir		-	
5- Wait to complete the configuration	-		
		Set COM port	COM00 V
	CONNECT	1	
	CONNECT		
Sorial Number:			
	2º Click HERE	to	
Hardware:	CONNECT your D	Device	
Firmware:	State and American Cardon		
Ultrasonic Configurator			
oursearch configuration			
		1º Selec	tyour
		Conve	
		CONV	er ver

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)

Configuration Instructio	773		
- Select the COM port			
Connect all wires except the	wire power (SROWN wire)		
• H	GROUND/POWER -		
1	POWER/VCC DON'T CONNECT UN PS405 A / UART To	TIL NEXT STEP	
	RS4ES B / UART Rx		
Click on CONNECT, then co	nnect brown wire and the appropriate of	onfiguration modes wi	I be displayed
- Once you have selected the	desired configuration click on SAVE C	ONFIGURATION	
5- Wait to complete the config	uration		
		Set COM port	COM20
4° Click HERE to SAV	E		
your Configuration	SAVE CONFIGURATION	]	
		]	
your Configuration		3° Configure	HERE
		3° Configure	
Serial Number: 001e00274e Hardware: UAM_3.10		3° Configure your Anemoi	
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.43			
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.43			
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.43		your Anemoi	
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator	06601020303747	your Anemoi	
Serial Number: 001e00274e. Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configurator @Steam	00501020303747	your Anemoi	
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configurator @ Steam Baude	O Demand     O	your Anemoi	
Serial Number: 001e00274e Hardware: UAM_3.10 Firmware: 1.4.3 Ukrasonic Configurator ® Steam Baudo Word	OBSH020303747	your Anemoi	
Serial Number: 001e00274e. Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configurator ® Stream Bandh Word Data R	OBS01020303747	your Anemoi	
Serial Number: 001e00274e. Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configurator ® Stream Bandh Word Data R	OBS01020303747	your 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.

2- Connect all wires except the wi			
Contract of the second s	GROUND/POWER - POWER/VCC DON'T CONNECT UP	THE NEXT STEP	
	RS405 A / UART To		
* <b>*</b> ***	RS405 0 / UNRT Rx		
3- Click on CONNECT, then conne	ct brown wire and the appropriate	configuration modes will	t be displayed
4- Once you have selected the des	ired configuration click on SAVE	CONFIGURATION	
5- Walt to complete the configurat	tion		
e mar to comprete the compare			
		Set COM port	C0M29 ~
	CONNECT	Set COM port	COM20 ~
Serial Number: 003b003cJ0305		Set COM port	COM29 ~
		Set COM port	COM20 ~
Serial Number: 003b003d38305		Set COM port	COM28 ~

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 + 207 FIVE\_MIN\_AVG\_WS 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 PRO 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 (RS485 NMEA0183) : 0,25mA @5V, 1Hz



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#### **RS485 Configuration Setup**

The ULP PRO 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"

Configuration instructions			
5- Select the COM part			
Connect all wires except the wire	power (BROWN wire)		
- Methoda	GROUND/POWER -		
* Errown	POWERVCC DON'T CONNECT UNIT REALS A / UNIT TO	TIL MEXT STEP	
	RS4ES B / UART Rx		
- Click on CONNECT, then connect	t brown wire and the appropriate of	onfiguration modes will	be displayed
6- Once you have selected the desir		-	
5- Wait to complete the configuration	-		
			-
		Set COM port	COM00
	CONNECT	1	
	CONNECT		
Sorial Number:			
	2º Click HERE	to	
Hardware:	CONNECT your D	Device	
Firmware:	State and American Cardon		
Ultrasonic Configurator			
oursearch configuration			
		1º Selec	tyour
		Conve	
		CONV	er ver

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)



#### RS485 Configuration Setup (II)

Configuration Instru	/cboms			
- Select the COM port				
Connect all wires except	of the wire power	(BROWN wire)		
	and the second se	UND/POWER -		
	and the second se	HER/VCC DON'T CONNECT UNIT IS A / UART To	L NEXT STEP	
	and the second se	IS B / UART Rx		
Click on CONNECT, the	en connect brown	wire and the appropriate co	infiguration modes wi	II be displayed
Once you have selected	f the desired con	figuration click on SAVE C	ONFIGURATION	
5- Wait to complete the o	noticerupiline			
				_
4º Click HERE to S	AVE		Set COM port	COM20
your Configurat	ion	SAVE CONFIGURATION		
		707		
your Configurat		747	3° Configure	
your Configurat		747	3° Configure your Anemor	
your Configurat		747		
your Configurat Serial Number: 001e00 Hardware: UAM_3.10 Firmware: 1.43	274e30501020303	747		
your Configurat Serial Number: 001e00 Hardware: UAM_3.10 Firmware: 1.43	274e30501020303	747	your Anemo	
your Configurat Serial Number: 001e00 Hardware: UAM_3.10 Firmware: 1.43 Uttrasonic Configura @Stear	274e30501020303	147	your Anemo	
your Configurat Serial Number: 00100 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura @ Stear	274e30501020303 tor	Contended Of	your Anemo	
your Configurat Serial Number: 00100 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura @ Stear	2774=30501020303 tor n ( Resultate	0 Demand 0 1 30400 bauds	your Anemo	
your Configurat Serial Number: 00100 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura @ Stream	2774e30501020303 207 n ( Beuchute Word Filter	Cernand Of 30400 bands Medium Thts> 1 per second	your Anemo	
your Configurat Serial Number: 00100 Hardware: UAM_3.10 Firmware: 1.43 Utrasonic Configura @ Stream	2774e30501020303 207 n ( Beachute Wind Filter Suita Fate	Cernand Of 30400 bands Medium	x	
your Configurat Serial Number: 00100 Hardware: UAM_3.10 Firmware: 1.43 Utrasonic Configura @ Stream	274e30501020303 207 n ( Reutinate Wind Filter Data Rate Wind Units	Cernand Of 30400 bands Medium Thts> 1 per second	x	

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



#### 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: \$liMWV,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:



#### 3.2.2 UART Configuration

The ULP PRO 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 PRO 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.



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#### **UART Configuration Setup**

The ULP PRO 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 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"

Configuration instructions			
5- Select the COM part			
Connect all wires except the wire p	ower (BROWN wire)		
- Million	GROUND FOWER -		
* Brown	POWER/VCC DON'T CONNECT U	NTIL MEXT STEP	
	RS485 A / UART % RS485 B / UART %		
- Click on CONNECT, then connect I		configuration modes with	he disclosed
4- Once you have selected the desired			
5- Wait to complete the configuration	-		
· Hart is compared for compared			
		Set COM port	COM20
	CONNECT		•
	CONNECT		
Sorial Number:			
	2º Click HER	Eto	
Hardware:	CONNECT your	Device	
Firmware:	84 0 8 0 9 0 9 0 7 9 0 7 0 0 0 0 0 0 0 0 0 0 0		
Ultrasonic Configurator			
		1º Sele	the second second
		Conv	erter

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)**

Configuration Instruction	Ail 10		
1- Select the COM port			
- Connect all wires except th	e wire power (SROWN wire)		
	Minim GROUND/POWER -		
	Brown POWER/VCC DON'T CONNECT UN R5485 A / UART %	TIL NEXT STEP	
	Visition RSAES B / UART Rx		
- Click on CONNECT, then of	onnect brown wire and the appropriate of	configuration modes wi	II be displayed
4- Once you have selected the	desired configuration click on SAVE (	CONFIGURATION	
5- Wait to complete the config	puration		
		Set COM port	COM20
4° Click HERE to SAV		_	
your Configuration	SAVE CONFIGURATION		
your Configuration Serial Number: 001e00274e		]	
Serial Number: 001e00274		3° Configure	
		3° Configure your Anemo	
Serial Number: 001e00274			
Serial Number: 001e00274 Hardware: UAM_3.10 Firmware: 1.43			
Serial Number: 001e00274 Hardware: UAM_3.10 Firmware: 1.43	205601020303747		
Serial Number: 001e00274 Hardware: UAM_3.10 Fireware: 1.43 Ultrasonic Configurator	0.05501020303747	your Anemo	
Serial Number: 001e00274 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator @ Stream Baut	0 Demand	your Anemo	
Serial Number: 001e00274 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator @ Stream Baut	OD691920303747	your Anemo	
Serial Number: 001e00274 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator ® Seram Bout Wind Dira	Obernand O vafe 39400 baseds Fiber Medium	your Anemo	
Serial Number: 001e000274 Rardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator ® Steam Boot Wind Dira	ODEFINITION ODEFINITIO ODEFINITION ODEFINITION ODEFINITION ODEFINITION ODEFINITION ODEFIN	your Anemo	
Serial Number: 001e000274 Rardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configurator ® Steam Boot Wind Dira	ODEFINITION ODEFINITIO ODEFINITION ODEFINITION ODEFINITION ODEFINITION ODEFINITION ODEFIN	your Anemo	

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

#### 3.3.3 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: \$liMWV,x.x,a,x.x,a\*hh, being i the node (I,A,B,C,....) configured.



### 3.4 I2C

#### 3.4.1 I2C Wiring

I2C Output:



#### 3.4.2 I2C Configuration

The ULP PRO 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 PRO 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) 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 PRO 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)

Configuration Instru	area and a second					
1- Select the COM port						
- Connect all wires exce	pt the wire po	wer (SROWN wire)				
	and the second se	GROUND/POWER -				
	and the second se	POWER/VCC DON'T CO RS485 A / UART To	INNECT UNTLENE	DIT STUP		
	and the second se	RS485 B / UART Rx				
- Click on CONNECT, th	en connect br	own wire and the ap	propiate config	puration modes will	the display	red
4- Once you have selecte	d the desired	configuration click o	IN SAVE CONFI	GURATION		
5- Wait to complete the o	onfiguration					
4° Click HERE to 5	CAVE			Set COM port	COM20	
4: CIICK MERE LO 2	DAAAE					
unur Configurat						
your Configurat	tion 🔪	SAVE CONFIGUR	NTON			
your Configural						
Serial Number: 001e0			3°	Configure		
			3°			
Serial Number: 001e0			3°	Configure ur Anemor		
Serial Number: 001e0 Hardware: UAM_3.10 Firmware: 1.43	0274e3050102d		3°			
Serial Number: 001e0 Hardware: UAM_3.10	0274e30501020		3°			
Serial Number: 00160 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configura @ Strea	0274e30501020	1343747	3° yo			
Serial Number: 001e0 Hardware: UAM_3.10 Firmware: 1.43 Ultrasonic Configura ® Stea	0274e30501020 NOT	0. Demand	3° yo			
Serial Number: 001e0 Hardware: UAM_3.10 Fireware: 1.43 Ultrasonic Configura ® Stea	1274e30501024 MOF m Baudrate	0303747 O Demand 30400 base Medium	3° yo			
Serial Number: 001e0 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura ® Stea	ator m Baudrate Wind Filter	0303747 O Demand 30400 base Medium	3° yo 0«			
Serial Number: 001e0 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura ® Stea	10274e30501024 Mor m Baudiste Wind Filter Data Rate	O Demand SI400 base Metium Infa> 1	3° yo 0«	ur Anemoi		
Serial Number: 001e0 Hardware: UAM_3.10 Firmware: 1.43 Ukrasonic Configura ® Stea	etor m Baudhate Wind Filter Data Fate Wind Units	O Demand SI400 base Metium Infa> 1	3° yo O RC ds	ur 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.

		Ser Com por	COM29 ~
		Set COM port	states when
- Once you have seecred the or - Wait to complete the configur		CONFIGURATION	
	nired configuration click on SAVE (	-	be and under
Click on CONNECT than case	ect brown wire and the appropriate of	configuration modes with	he disclosed
1.50	RS405 A / UART To RS405 B / UART Rx		
* Bro	POWER/VCC DON'T CONNECT UN	ITL NEXT STEP	
	GROUND/POWER		
- Connect all wires except the w			

CONFIGURATION COMPLETE

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.



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#### 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



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### 4. Technical specifications

The ULP has the following technical specifications:

4.1. Dimensions	<ul> <li>Diameter: 68 mm (2.68 in.)</li> <li>Height: 65 mm (2.56 in.)</li> </ul>	
4.2. Weight	200 grams (7 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 × M4 la	ateral 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).

#### **North Mark Position**

Make sure the north mark is perfectly aligned to the north.



#### 4.7. Mounting accessories

A wide range of accessories can be used with the device. The ULP PRO 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 PRO 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 locks the wave path. The input wires are protected by Transient Voltage Suppression (TVS) diodes. The instrument body is inject molded.

#### 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**.



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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 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	211	Read	0 to 500*	16-bit Signed Int	5 min avg wind speed
211	212	Read	0 to 3599*	16-bit Signed Int	5 min avg wind direction
212	213	Read	0 to 500*	16-bit Signed Int	5 min Wind gust speed
213	214	Read	0 to 3599*	16-bit Signed Int	5 min Wind gust direction

<sup>+</sup> 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