



USER MANUAL

# CV7

CV7 Standard

CV7-V

CV7-C

CV7SF2



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# 1 GENERAL INFORMATION AND SAFETY GUIDELINE

## 1.1 GENERAL RECOMMENDATIONS

The LCJ Capteurs' sensors are ultrasonic wind vane-anemometers with accurate factory calibration.

Install the sensor in a location free from wind perturbation, usually on the mast head.

Prepare the mast head for the mechanical installation. Align the North mark of the bracket in order to have the CV7 sensor heading to the bow.

The sensor's fine alignment will be obtained with the calibration functions of your instrumentation. Should it be needed, LCJ Capteurs can provide a software calibration application upon request.

When necessary, install the interface junction boxes in a protected and dry location.

Run the cable down to the display's interface, avoiding locations where other cables or equipment may produce electromagnetic interferences (pilot's ram, radio...) and cut it to the right length. The cable length can be adjusted as required, providing junctions are made in the state of the art.

Turn the power supply off before processing to any wiring work. You can turn power on again only once all installation and wiring are completed.

We recommend lightly tinning the wires before connecting them to the screw terminals.

Use only authentic accessories supplied by LCJ Capteurs. Do not attempt any modifications to the unit.

Never paint any part of the unit or alter its surface in any way.

**The warranty is void in case of non-following the instructions of use, repair or maintenance without written authorisation.**

## 1.2 MAINTENANCE AND REPAIR

The CV7 sensors do not require any maintenance. Check the connections on a regular basis and make sure the junction boxes are dry and protected.

If the Wind pages of your instruments do not display the wind data correctly, refer to the manufacturer's manual and check the connections before asking for service to your LCJ Capteurs dealer.

## 1.3 DISPOSAL

Equipments marked with the recycling symbol should be processed via a recognized recycling agency. By agreement, they may be returned to the manufacturer. Do not mix electronic disposal with domestic or industrial refuse.



## 1.4 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective installation, operation and maintenance of the Ultrasonic Wind Sensors of the CV7 range from LCJ Capteurs. It is recommended to follow carefully the instructions contained herein.

Keep this manual in a safe place !

## 1.5 VALIDITY OF THIS MANUAL

All of the specifications, provisions and instructions contained in this manual apply solely to the following products:

Part	Description
CV7	CV7 standard Ultrasonic Wind Sensor
CV7-V	CV7 Ultrasonic Wind Sensor / Vertical pole
CV7-C	CV7 high speed Ultrasonic Wind Sensor / long carbon vertical pole
CV7SF2	CV7 / Wireless Ultrasonic Wind Sensor / NMEA0183 receiver
WindyPlug	CV7 to NMEA2000 interface (integrated barometer)
Canbus-RM	CanBus interface for rotating mast (NMEA2000)
RM-STBG	RM-STBG interface for rotating mast (compatible with all Raymarine and B&G equipment)
Option SIL	Configuration for replacement of Nexus NX2, SILVA or FI30 sensors
Option STBG	Interface for compatibility with all Raymarine and B&G equipment
Option Baro	Junction box with integrated barometer
Option USB	Junction box with USB connector
Adapt 1"	1"standard adapter ( VHF or GPS type)

## 1.6 LIMITED WARRANTY

The LCJ Capteurs' products are guaranteed against manufacturing defects for a period of two years from the date of purchase. It is limited to the repair and/or replacement of the product. It does not cover installation costs and shipping costs of faulty units. A proof of purchase may be required when filling the warranty request which must be received by writing. Once the warranty request is accepted by LCJ Capteurs, the unit must be sent to the LCJ Capteurs' address in France. LCJ Capteurs ensures that each of their ultrasonic wind sensors are tested and calibrated before despatch. Operations that are not in compliance with the instructions described in the present manual may result to damage the unit or alter its performances. In such cases, the warranty is void.

## 1.7 RESPONSIBILITY

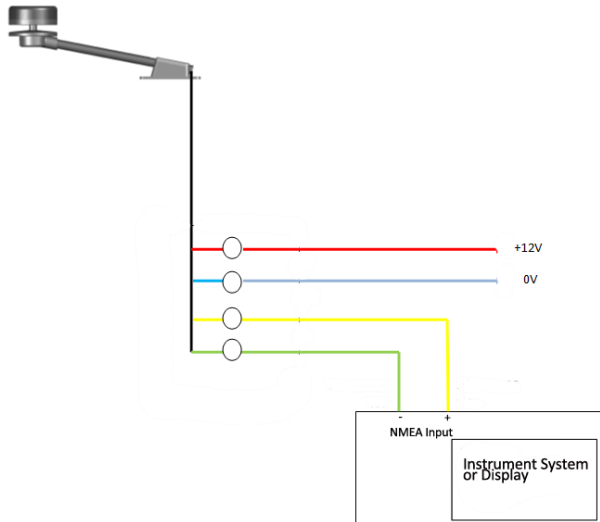
LCJ Capteurs does not accept responsibility for:

- Consequential damages to the use of a CV7 sensor
- Possible errors in the manual and their results

## 2 INSTALLATION OF A CV7 WIND SENSOR

### 2.1 TYPICAL INSTALLATION OVERVIEW

This diagram features a CV7 Standard. The typical installation is the same for a CV7-V and a CV7-C.



### 2.2 SENSOR ALIGNMENT

The CV7 sensor must be installed with the “Nord” mark on the bracket aligned to the geographical North for a fixed installation on shore and to the bow on a vessel.

Fine alignment can be performed with the application “configuration CV7” available upon request.

### 2.3 CONNECTIONS

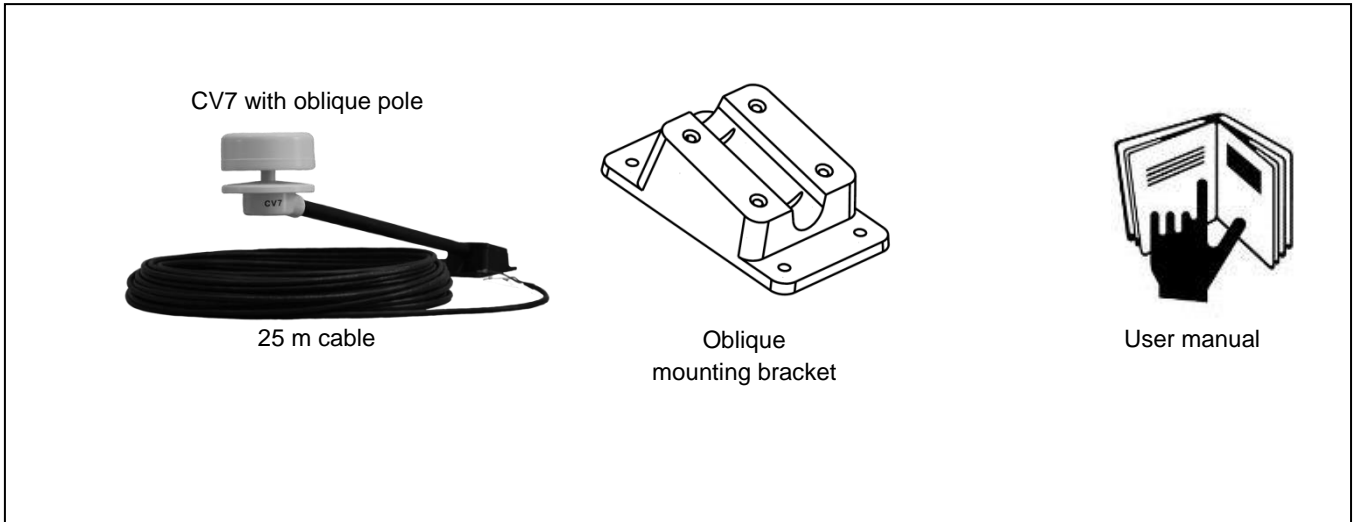
<b>Red wire</b>	<b>+ Power</b>
<b>Blue wire</b>	<b>- Power</b>
<b>Yellow wire</b>	<b>NMEA TX +</b>
<b>Green wire</b>	<b>NMEA RX -</b>

Connect to 12 V power supply (8 - 33 VDC).

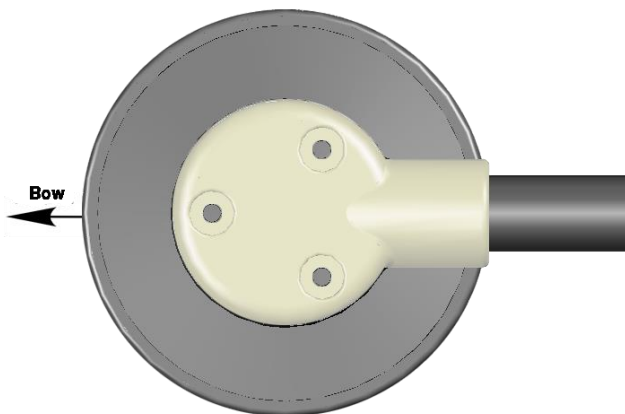
Connect the yellow and green wires to the NMEA input of the instrument.

### 3 CV7 Standard

#### 3.1 CONTENT OF DELIVERY



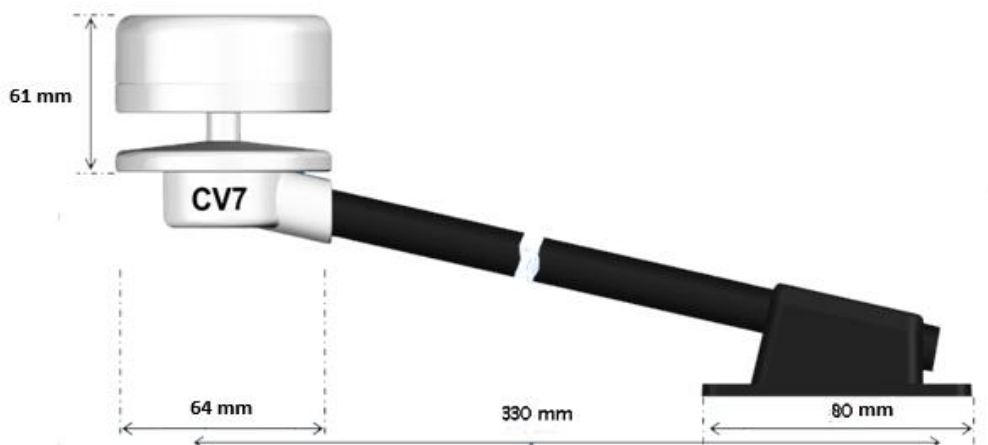
#### 3.2 SENSOR ALIGNMENT



CV7 sensor view from below

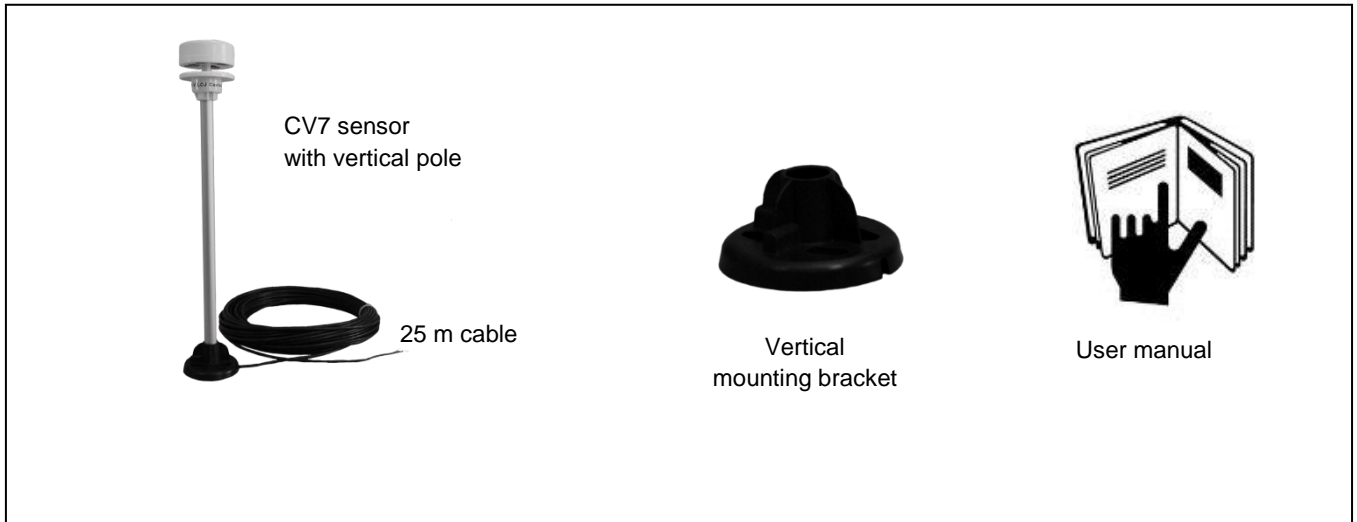
The oblique bracket is meant to be mounted on a horizontal surface. It is usually fixed on the mast head of a sailing boat. The oblique arm is toward the bow.

#### 3.3 DIMENSIONS



## 4 CV7-V

### 4.1 CONTENT OF DELIVERY

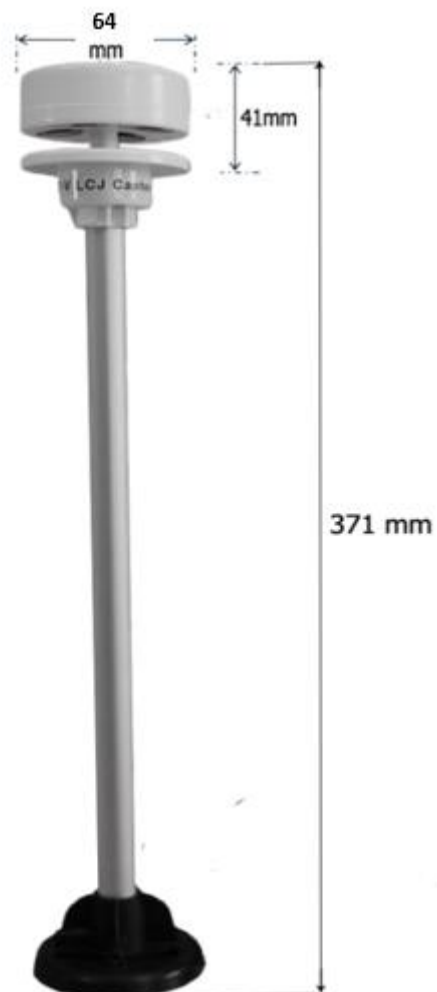
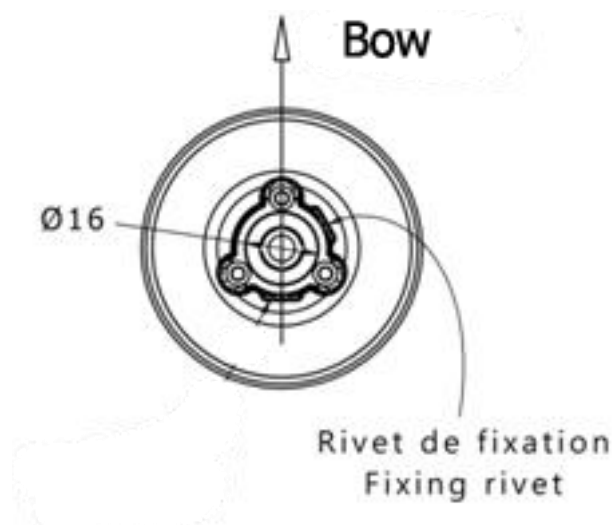


### 4.2 SENSOR ALIGNMENT

A mark below the sensor indicates the alignment. The vertical bracket is designed for mounting on a horizontal surface, usually the mast head on a sailing boat. To be mounted on the side of the mast, an additional bracket is available separately (see section 12.2).

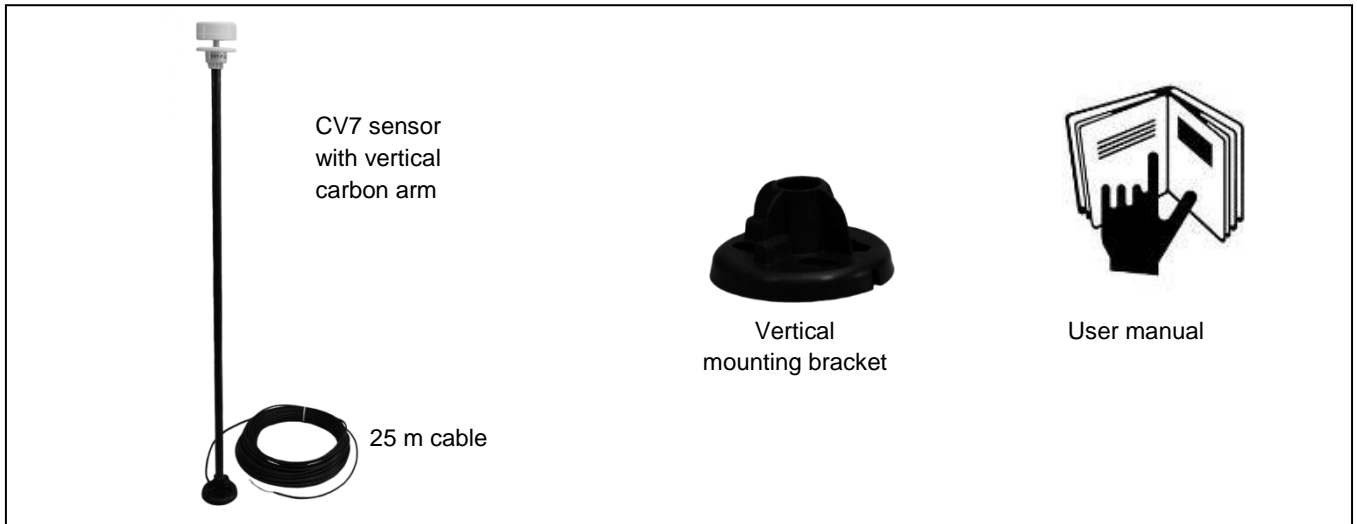
The CV7-V sensor must be installed with the "Nord" mark on the bracket aligned to the geographical North for a fixed installation on shore.

### 4.3 DIMENSIONS



## 5 CV7-C

### 5.1 CONTENT OF DELIVERY



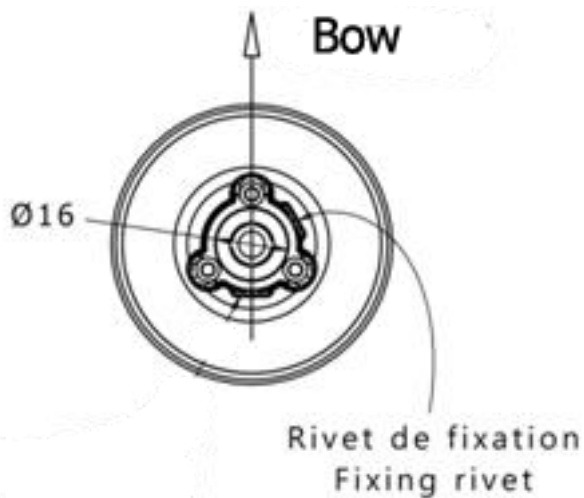
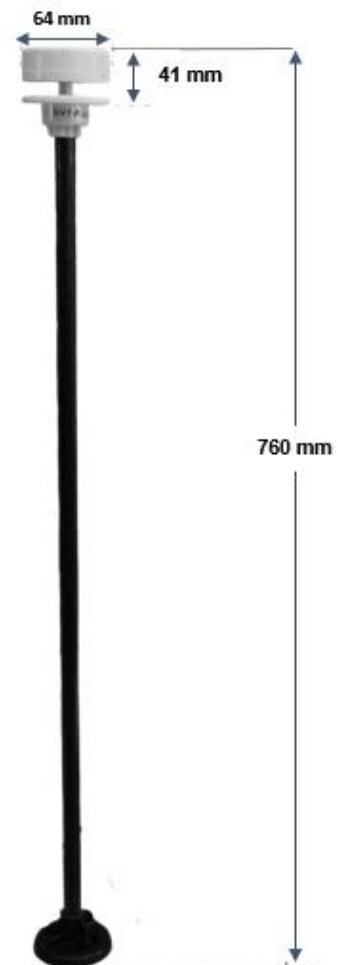
### 5.2 SENSOR ALIGNMENT

A mark below the sensor indicates the alignment. The vertical bracket is designed for mounting on a horizontal surface, usually the mast head on a sailing boat. For mounting on the side of the mast, an additional bracket is available separately (see section 12.2).

The CV7-C sensor must be installed with the "Nord" mark on the bracket aligned to the geographical North for a fixed installation on shore.

### 5.3 DIMENSIONS

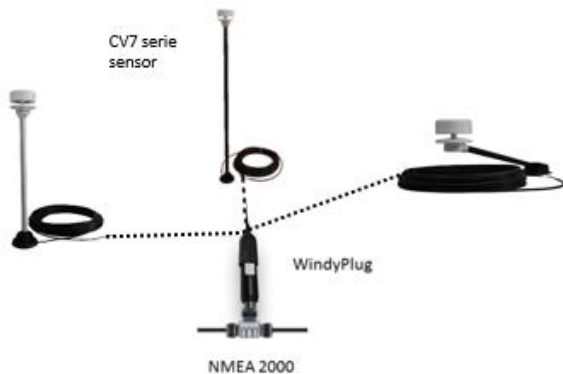
Weight: 200 gr (sensor + pole + bracket)





## 6 WINDYPLUG

### 6.1 TYPICAL INSTALLATION OVERVIEW



The WindyPlug option is compatible with each CV7 sensor.

### 6.2 RECOMMENDATIONS

The WindyPlug must be located in a protected area and subject to atmospheric pressure.

Do not attempt to modify the unit.

Never paint any part of the unit or alter its surface in any way.

Warranty is void in case of non-following the instructions of use, repair or maintenance without written authorisation.

### 6.3 INSTALLATION

The WindyPlug allows to connect a sensor from CV7 serie to NMEA2000 system. It features also an atmospheric pressure and ambient temperature sensor.

Its MICRO C male plug connects directly to the NMEA 2000 backbone.

You may need to add a T connector (not supplied).

### 6.4 CONNECTIONS

The CV7 is supplied with a 25 metre cable featuring crimp terminals. If the cable is cut to shorten the length, it is strongly recommended to use new terminals for a proper connection. The CV7 must be connected to the WindyPlug prior to plugging in the device to the NMEA2000 backbone. Open the protective cap and slide the 4 wires through it, one after another, and then, the cable's cover.



Insert the wire terminals into the connectors, colour for colour. Just push them and they will be trapped in place.

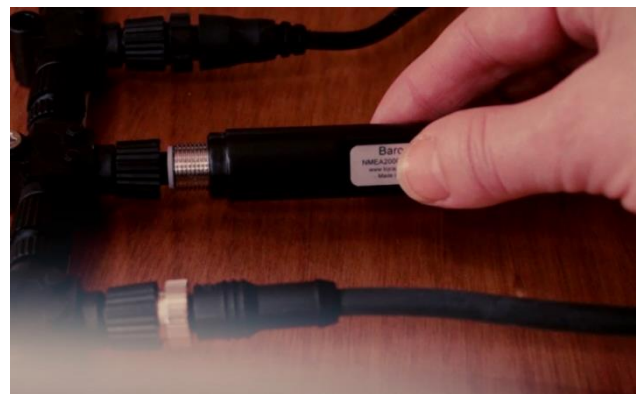
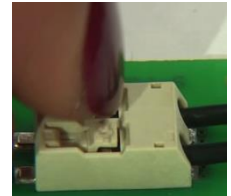
Blue	0V - power supply
Red	12V + power supply
Green	NMEA -
Yellow	NMEA +

Push the protective cap back in place. The hole in the cap must be aligned to the LED indicator.



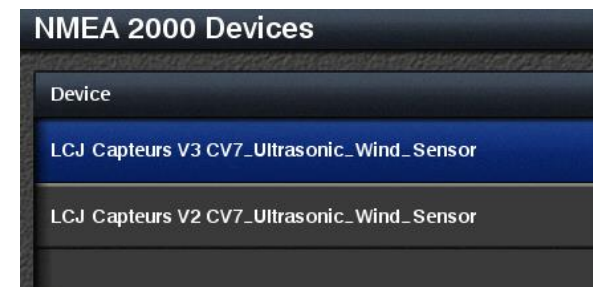
Once the CV7 connection is completed, you can plug the WindyPlug into the NMEA2000 backbone.

If it turns out that you need to disconnect the CV7 wires, just press on the push-button for easy release.



### 6.5 DATA SOURCES

Select the data sources on a multifunction display of your NMEA2000 system. You will be given the choice between V2 and V3 depending on your NMEA2000 system's version.



### 6.6 TECHNICAL SPECIFICATIONS

Dimensions: L 81 mm X Ø 17.5 mm

Weight: 35 g

Connector: MICRO C male NMEA2000

Protection: IP66 (WindyPlug connected)

Power supply: via NMEA2000 network. 8V / 28VDC

Consumption: 1 LEN / < 40mA with sensor.

Operation indicator: 1 flashing LED

Pressure sensor: Hydrophobic membrane

Pressure's measure range: 850 hPa / 1150 hPa

Resolution\*: 1 hPa with NMEA2000 Version 2 systems

0.1 hPa with NMEA2000 Version 3 systems

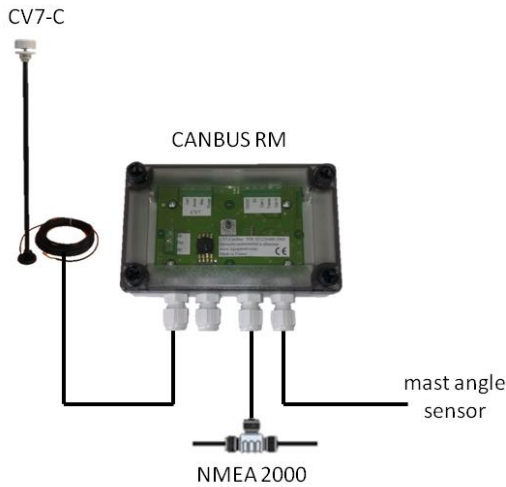
Relative accuracy\*: +/- 0.5 hPa @ 20°C

Absolute accuracy\*: +/- 1.5 hPa @ 20°C

$$*1 \text{ hPa} = 1 \text{ mBar} = 0.003 \text{ inHg} / 0 \text{ }^{\circ}\text{C} \\ = 32 \text{ }^{\circ}\text{F}$$

## 7 OPTION CANBUS-RM

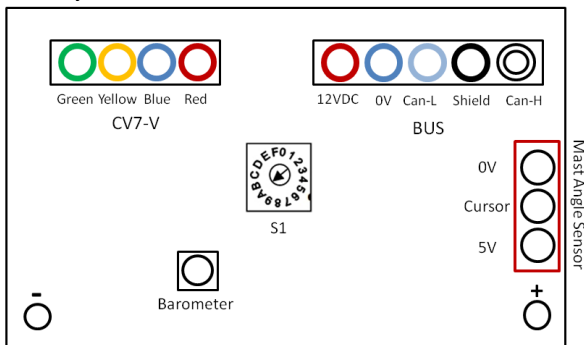
### 7.1 TYPICAL INSTALLATION OVERVIEW



The CanBus-RM option is compatible with each CV7 sensor. Connectors and mast angle sensor are not supplied.

### 7.2 CONNECTIONS

Open the junction box to access to the connectors



The CanBus-RM junction box features connection terminals for the mast angle sensor (potentiometer), the CV7 and the NMEA2000 network.

### 7.3 INTERFACE

TX PGNs: 59392, 60928, 126464, 126996, 130306, 130311, 130314

RX PGNs: 59392, 59904; 60928

Consumption: 2 LEN

### 7.4 COMMISSIONING

Refer to the connected instruments' manual for pages setup and all functions related to wind and atmospheric pressure functions. Once all wiring and connections are completed, turn the power on and check the alignment. It may be adjusted from your instrument's setup menu. Alternatively, this can be done directly from the CanBus.

### 7.5 CALIBRATING THE MAST ANGLE SENSOR: MID-SHIP AND MAST ANGLE ENDS

Use the «-» and «+» keys to change a value that is previously selected with the switch button "S1".

In positions 3 to 6, the values read on the wind display are the mast angles measures, used for calibration of the mast angle sensor.

The calibration process is done in the following order:

**Position 7:** + "S1", reset to factory settings

**Position 6:** identification of the potentiometer's polarity (port-starboard values)

**Position 5: mid-ship.** Place mast in mid-ship position and set the angle to 0°

**Position 4: port-end.** Place the mast in port-end position (like sailing starboard) and set the angle to the relevant value (theoretical or measured)

**Position 3: starboard-end.** Place the mast in starboard-end position (like sailing port side) and set the angle to the relevant value (theoretical or measured)

### 7.6 WIND SENSOR ALIGNEMENT

Fine alignment of the mast sensor can be achieved at sea. Sail on starboard and port to note the correction that needs to be applied from a tack to another.

Place the rotary button (S1) in position 1 and use the "+" and "-" keys to change the value read on the display.

Adjust the value accordingly to the difference measured from a tack to another during sea trials.

The wind angle will be correctly read on the display.

### 7.7 CALIBRATION OF THE BAROMETER

The atmospheric pressure sensor is calibrated against the nearest reference located on the shore level, such as a weather station.

The rotary button (S1) placed on position 2 allows calibrating the atmospheric pressure. Once the button is on position 2, the value on the display can be adjusted using the "+" and "-" keys to match the reference. Make sure your display is set to "mb" unit.

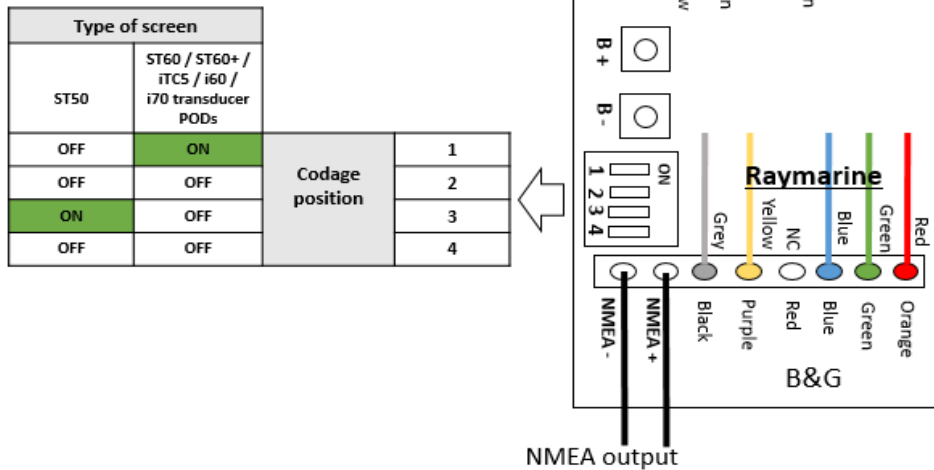
These values are automatically stored in the device's memory. They can be fine adjusted after sea trials.

### 7.8 DIMENSIONS OF THE CANBUS JUNCTION BOX

130x80x30 mm / 150 gr

## 8 OPTION STBG

### 8.1 RAYMARINE CONFIGURATION: INSTALLATION DIAGRAM



#### 8.1.1 CONNECTIONS

To access the connections and settings, remove the housing cover by hand.

Depending on the type and model of the display, configure the coding position number (4-way switch) and refer to the colour indications according to the table and diagram above.

For example, for a ST50 display, switches 1-2-4 are set to OFF and switch 3 to ON.

#### 8.1.2 COMMISSIONING

Once you have completed your connections, refer to the Raymarine manual for sensor alignment using the function provided by your display. With the STBG option, you also have access to all your usual functions.

To align the masthead, you can press B+ (+1°) and B- (-1°).

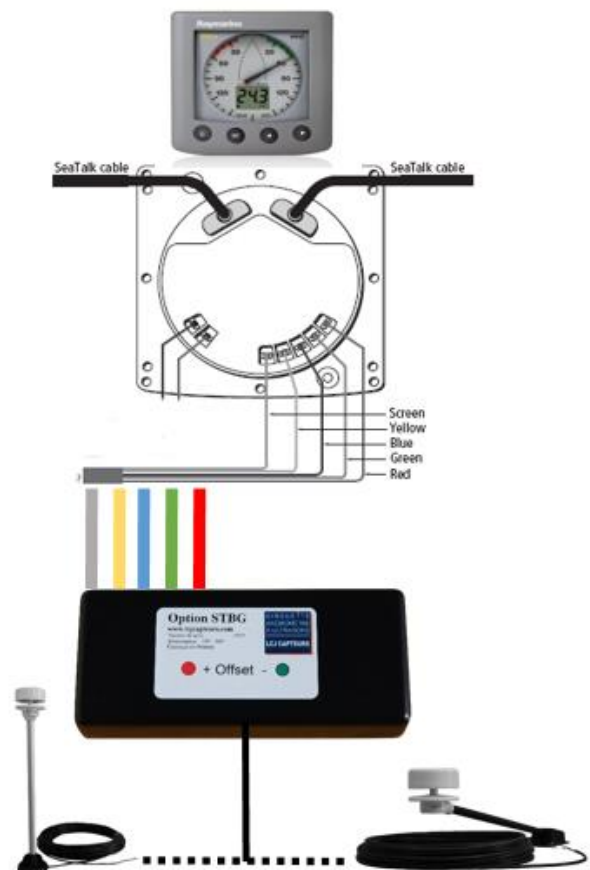
#### 8.1.3 APPLICATION

After selecting the coding switches (1,2,3 or 4 depending on your display) and configuring the sensor alignment, the power must be turned off and on again for the update. However, this step is not necessary if you only want to correct the angle by pressing the B+/B- keys.

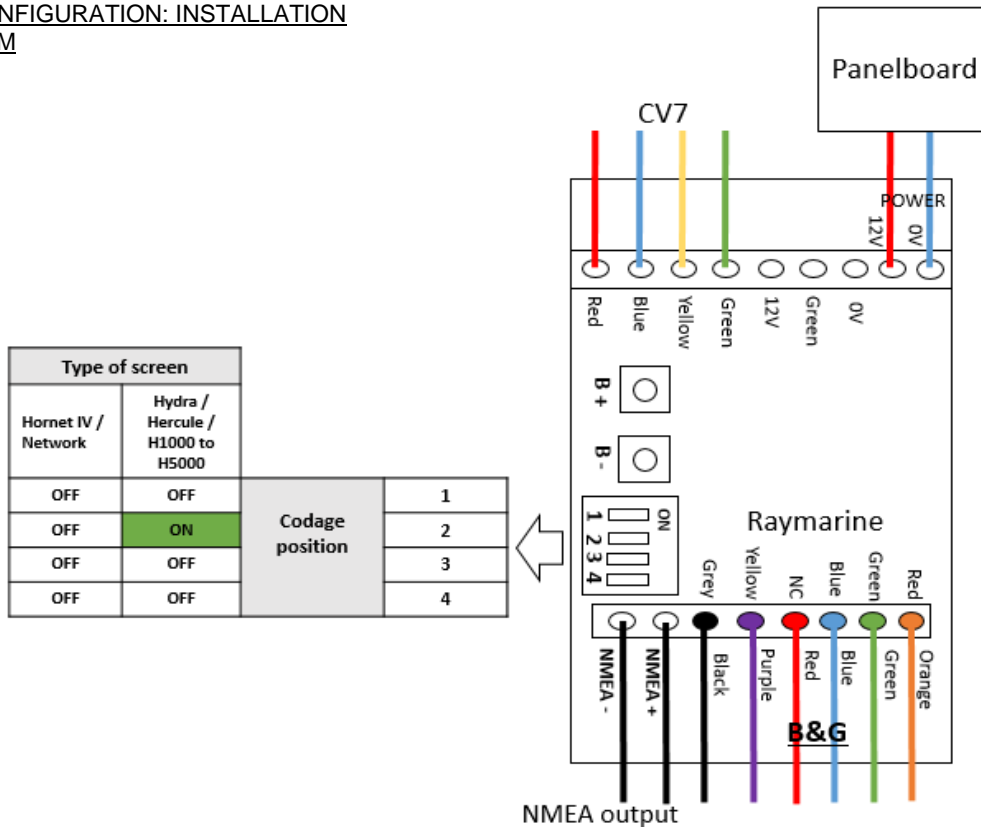
#### 8.1.4 DIMENSIONS

131 x 58 x 25 mm / 80 gr

### 8.1.5 RAYMARINE DISPLAY: TYPICAL INSTALLATION OVERVIEW



8.2 **B&G CONFIGURATION: INSTALLATION  
DIAGRAM**



8.2.1 **CONNECTIONS**

To access the connections and settings, remove the housing cover by hand.

Depending on the type and model of the display, configure the coding position number (4-way switch) and refer to the colour indications according to the table and diagram above.

For example, for a HYDRA display, switches 1-3-4 are set to OFF and switch 2 to ON.

8.2.2 **COMMISSIONING**

Once you have completed your connections, refer to the B&G manual for sensor alignment using the function provided by your display. With the STBG option, you also have access to all your usual functions.

To align the masthead, you can press B+ (+1°) and B- (-1°).

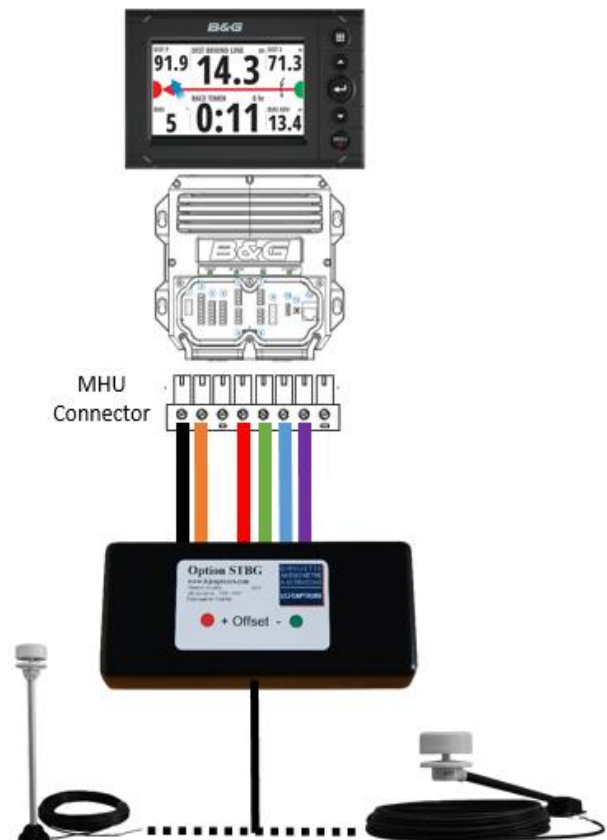
8.2.3 **APPLICATION**

After selecting the coding switches (1,2,3 or 4 depending on your display) and configuring the sensor alignment, the power must be turned off and on again for the update. However, this step is not necessary if you only want to correct the angle by pressing the B+/B- keys.

8.2.4 **DIMENSIONS**

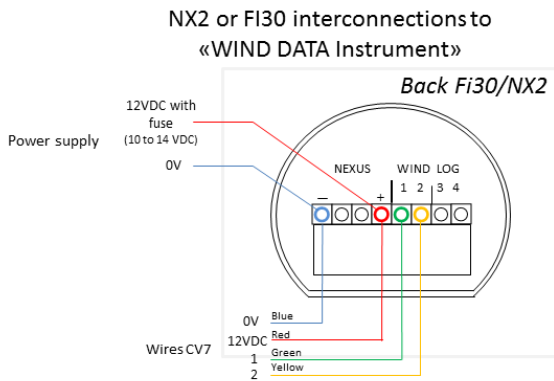
131 x 58 x 25 mm / 80 gr

8.2.5 **B&G DISPLAY: TYPICAL INSTALLATION  
OVERVIEW**

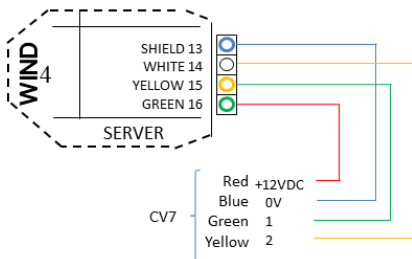


## 9 OPTION SIL (NEXUS NX2, SILVA and FI30)

CV7-SIL is a standard CV7 with a specific configuration. Just connect your CV7 to the serial port of a PC and use our configuration software.



Interconnections NX2 or FI30  
«SERVER»

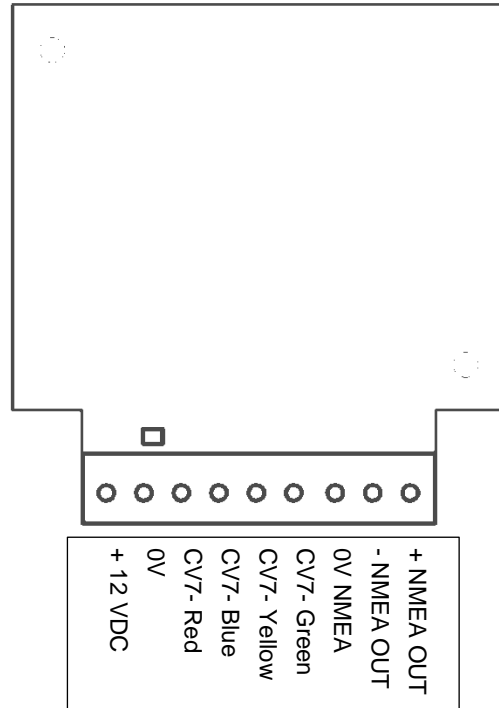


### 9.1 DIMENSIONS

Dimensions : 131 x 58 x 37 mm

## 10 OPTION BARO

The BARO OPTION is a junction box that adds the atmospheric pressure to the NMEA0183 CV7 data. Connect as follow:



### 10.1 DIMENSIONS

Dimensions : 68 x 58 x 22 mm

## 11 OPTION USB

### 11.1 CONNECTIONS

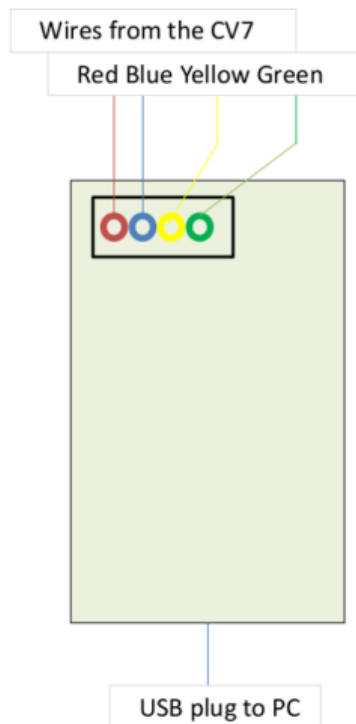
The junction box features a screw terminal and a standard USB cable. Open the box to complete the connections.

The USB junction box is powered by the USB connection to the PC.

Connect the wire coming from the CV7 as indicated on the diagram above.

Plug the USB cable into the PC. The driver will be automatically installed by the Windows® system (Windows 7® and beyond). Alternatively, the latest version of the driver can be downloaded from the technical support section of the website ([www.lcjcpteurs.com](http://www.lcjcpteurs.com)). It is an executable file. Double-click on the file to launch the installation.

Once the CV7 is connected to the USB port, your relevant software will immediately identify the NMEA0183® sentences via an emulated COM port.



### 11.2 SPECIFICATIONS

Dimensions: 57 x 43 x 24 mm

Weight: 20 g (without cable and connector)

Cable length: 1.50 m

Standard USB type A connector

Screw terminal

## 12 MOUNT ADAPTERS

### 12.1 1" ADAPTOR



This optional accessory allows to mount a CV7 sensor on any standard antenna mounting bracket.

External diameter: 40 mm

Height: 50 mm

### 12.2 MOUNT ON VERTICAL SURFACE

CV7-V base is compatible with standard brackets available on the market, such as the GLOMEX featured on the picture below.



## 13 SPECIFICATIONS

	CV7	CV7-V	CV7-C	CV7SF2
<b>Output data signal</b>	NMEA® or NEXUS®	NMEA® or NEXUS®	NMEA® or NEXUS®	NMEA®
<b>Output update</b>	2 per second	2 per second	4 per second	1 per second
<b>Wind module sensitivity</b>	0.25 Kt	0.25 Kt	0.25 Kt	0.25 Kt
<b>Wind module resolution</b>	0.1 Kt	0.1 Kt	0.1 Kt	0.1 Kt
<b>Wind module dynamic</b>	0.25 to 80 Kts	0.25 to 80 Kts	0.25 to 80 Kts	0.25 to 80 Kts
<b>Direction sensitivity</b>	+/- 1°	+/- 1°	+/- 1°	+/- 1°
<b>Direction resolution</b>	1°	1°	1°	1°
<b>Power supply</b>	8 to 33 VDC	8 to 33 VDC	8 to 33 VDC	Photovoltaic cell for the sensor, 5 to 15 VDC for the receiver
<b>Electrical consumption</b>	9.5 mA	9.5 mA	9.5 mA	autonomous for transmitter, 5.8 mA for receiver
<b>Operating temperature range without iceing</b>	-15°C/+55°C	-15°C/+55°C	-15°C/+55°C	-10°C/+55°C
<b>Connection line</b>	25 m of cable 4 x 0,22 mm <sup>2</sup>	25 m of cable 4 x 0,22 mm <sup>2</sup>	25 m of cable 4 x 0,22 mm <sup>2</sup>	Radio transmitter 433 MHz Tx power : 10 dbm Message time : 25 ms
<b>Interconnection</b>	Direct +12 V 0 V NMEA®+ NMEA®-	Direct +12 V 0 V NMEA®+ NMEA®-	Direct +12 V 0 V NMEA®+ NMEA®-	Receiver Superheterodyne ASK 433 MHz Sensitivity: -110 dbm Outputs via screw terminal
<b>Weight of the head</b>	100 g	100 g	100 g	100 g
<b>Arm</b>	Oblique 30 cm Alu Ø 12 mm	Vertical 30 cm Alu Ø 16 mm	Vertical 70 cm carbon Ø 16 mm	Vertical 30 cm Alu Ø 16 mm
<b>Mounting base</b>	Bracket	Bracket	Bracket	Bracket
<b>Total weight including arm and bracket</b>	200 g	200 g	200 g	200 g

## 14 ADDENDUM

### 14.1 NMEA0183 AND NMEA2000 INTERFACES

#### NMEA0183:

Output on a 4mA current loop.  
4800 Bauds, no parity, 1 stop Bit  
Constant flow at 500 milliseconds  
(except CV7-C, at 266 milliseconds)  
Variable length fields, comma separator.  
Sentence prefix: \$  
End of sentence: CR,LF

#### Typical sentences output by CV7, CV7-V, CV7-C :

\$IIMWV,225.0,R,000.0,N,A\*38  
\$WIXDR,C,022.0,C,,\*52  
\$PLCJ,5801,5F01,AA,4253,3341  
\$PLCJEA870,6D98,C500,0056,AC,

#### « Wind » sentence:

\$IIMWV,226.0,R,000.0,N,A\*0B

Checksum  
CV7 status.A :  
correct measure  
V : incorrect measure  
Wind speed unit. N = knots  
Wind speed  
Reference  
Wind direction in degrees

#### « Wind temperature » sentence:

\$WIXDR,C,022.0,C,,\*52

Checksum  
Unit°C  
Value with one decimal

#### Sentences added by the Baro3 option:

\$IIVWR,014.0,R,02.40,N,01.23,M,004.44,K\*7E  
\$WIMDA,,I,1.0200,B,021.5,C

#### Sentences for LCJ CAPTEURS technical use only:

\$PLCJ,AAAA,BBBB,CC,,,,DDDD,EEEE  
\$PLCJEFFFF,GGGG,HHHH,IIII,JJ

#### NMEA2000:

NMEA 2000 manufacturer ID: 499

#### **WindyPlug:**

#### NMEA2000 V2 PGNs:

- TX: 59392; 60928; 126464; 126996; 130306; 130311  
- RX: 59392, 59904; 60928; 130315

#### Product ID:

- LCJ Capteurs CV7\_Ultrasonic\_Wind\_SensorV2

#### NMEA2000 V3 PGNs:

- TX: 59904; 60928; 126464; 126996; 130306; 130312;  
130314  
- RX: 59392; 59904; 60928; 130315

#### Product ID:

- LCJ Capteurs CV7\_Ultrasonic\_Wind\_SensorV3

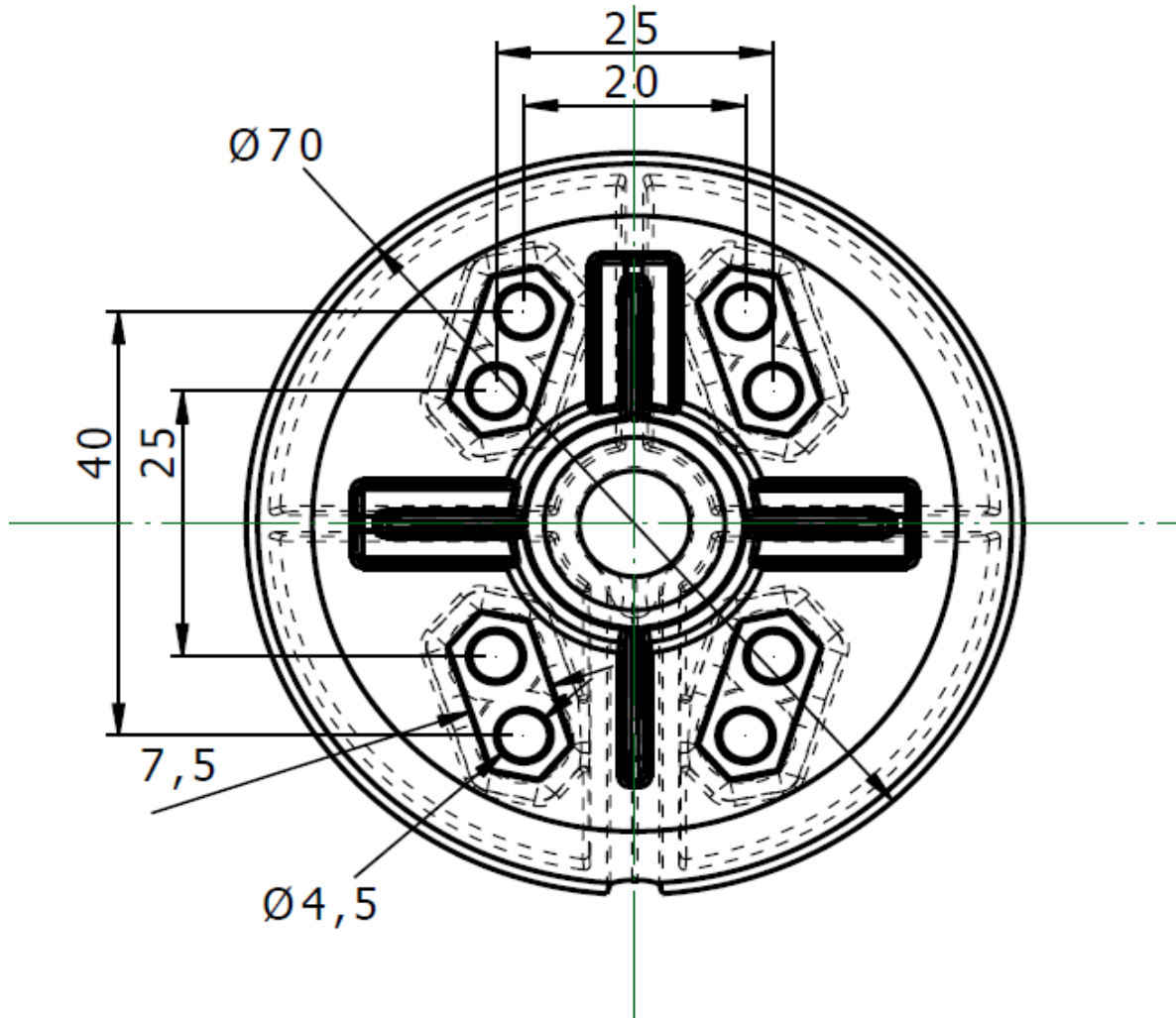
*Logging 2 minutes of NMEA sentences flow allows making a proper diagnostic.*



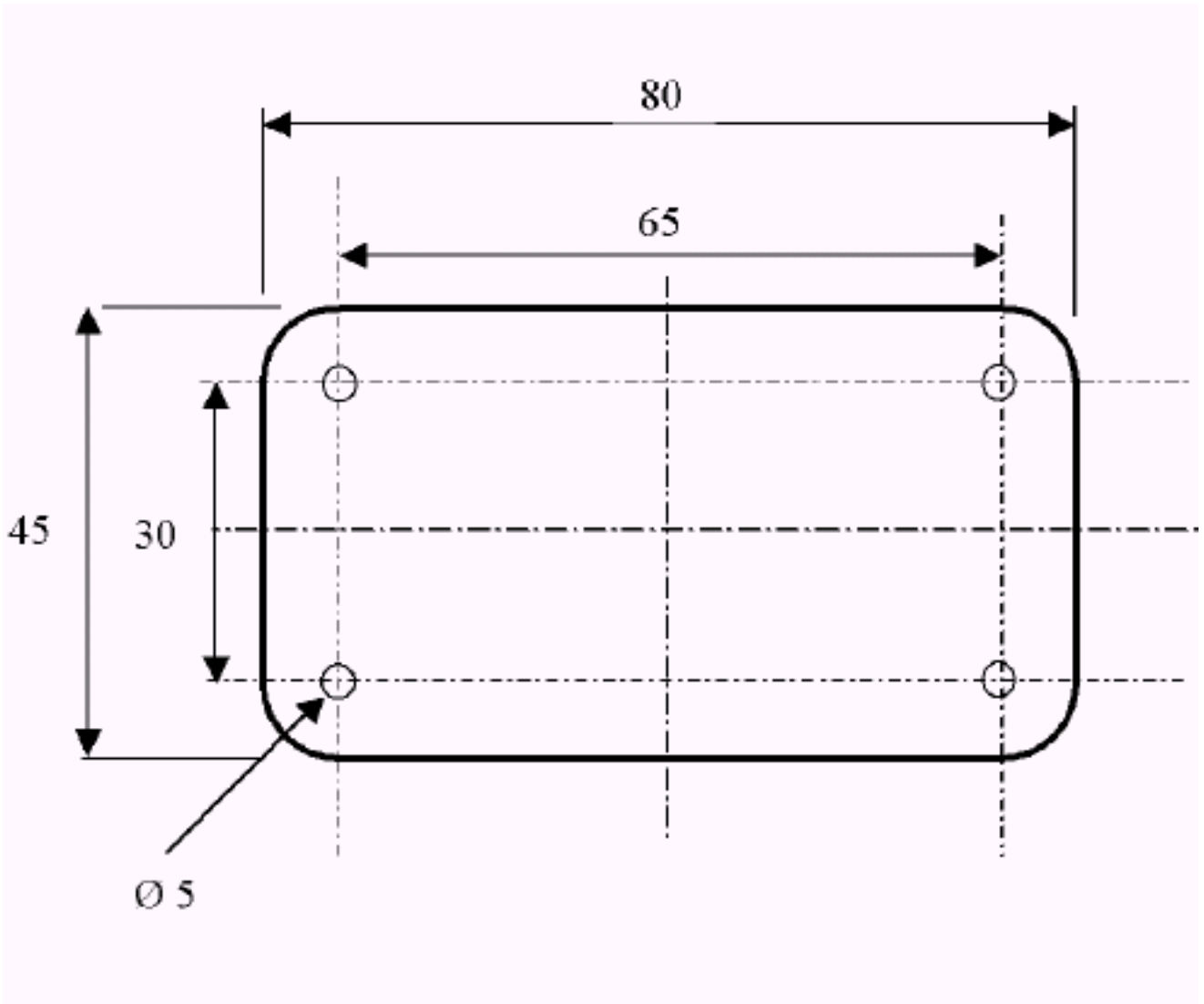
14.2 MOUNTING TEMPLATE

**WARNING !** Check the scale when printing this document. Measure indications are in millimetres.

Vertical bracket:

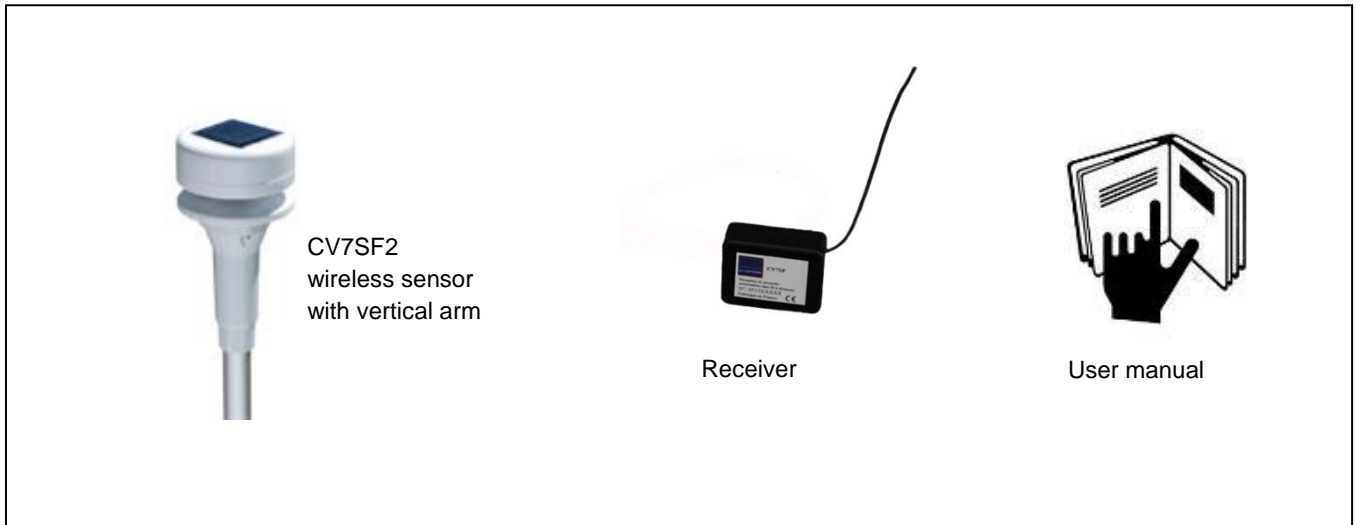


Oblique bracket:



## 15 CV7SF2

### 15.1 CONTENT OF DELIVERY



### 15.2 INSTALLATION

The CV7SF2 wind sensor is designed for outdoor operation, exposed to natural light. It must be installed in an area free from any air flow perturbation. Choose a location free from any obstacle and situated at least 150 cm from the ground. The maximum radio signal range is 200 meters. Best results are obtained in a 50 meters distance between the sensor and its receiver. The signal can be perturbed by materials such as carbon, aluminium, steel...

A minimum distance of 10 meters between the arm and any conductive material is recommended.

Specific environments may cause bad reception. Please contact our technical support in that case.

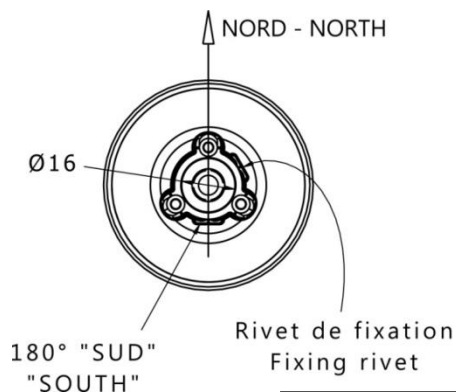
### 15.4 CONNECTIONS

Open the receiver to access the connection terminal. The NMEA0183 data output is connected as shown below:

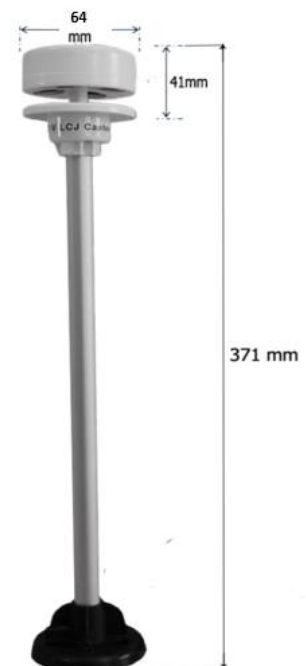


### 15.3 SENSOR ALIGNMENT

A mark below the sensor indicates the alignment. The vertical bracket is designed for mounting on a horizontal surface, usually the mast head on a sailing boat. For mounting on the side of the mast, an additional bracket is available separately (see section 12.2). The CV7SF2 sensor must be installed with the "Nord" mark on the bracket aligned to the geographical North for a fix installation on shore. Use a compass, taking the deviation in account.



### 15.5 DIMENSIONS



The CV7SF2 is compliant with the Directive 1999/5/CE "R&TTE"