

**QUICK-START GUIDE (QSG)**

# **ULTRASONIC WIND SENSOR**

**SPEED AND DIRECTION OF WIND  
MESUREMENT**

**MAY 2024**

ENVEA RECOMMENDS READING ALL THESE GUIDELINES AND SAFETY INSTRUCTIONS  
BEFORE POWERING ON AND USING THE EQUIPMENT



## - WARNING -

The information contained within this ENVEA document is for information purposes only and is subject to change without notice, as well as the associated material and the technical manual.

ENVEA cannot be considered liable for direct, indirect or collateral damages due to non-compliant use and/or inappropriate use of the equipment or information contained within this document and our technical manuals.

ENVEA makes no warranties expressed or implied within this documentation.

## - Smartphone / tablet connection -

The “ENVEA Connect” application for Smartphone/Tablet can be download as follows:

- Enter the address « <https://www.envea.global/envea-connect/> » in the Smartphone/Tablet internet browser, or directly enter “ENVEA connect” in the Play store (Android) or in the App store (iOS)
- Download the application.
- Click on the icon  to launch the “ENVEA connect” application.

## - Downloads -

To download the Micro-sensor documentation or the Cairsoft software, go to our website <https://www.envea.global/solutions/ambient-monitoring/faq-cairnet-cairsens-caircloud/>.

In order to contribute to environmental preservation, hard copies of the manuals will no longer be printed by ENVEA.



## Table of contents

1.	PRESENTATION OF ANEMOMETER FOR CAIRNET .....	4
2.	INSTALLATION .....	5
2.1.	PARCEL CONTENT .....	5
2.2.	SELECTION OF THE BEST LOCATION .....	5
2.3.	ANEMOMETER ALIGNMENT .....	6
2.4.	FIXATION MODE.....	6
2.5.	CABLING AND ANEMOMETRE CONNECTION TO IQ-LINK .....	7
2.6.	COMMISSIONING .....	8
3.	VIEWING DATA IN CAIRCLOUD.....	10
4.	TECHNICAL CHARACTERISTICS .....	12
5.	ELECTRICAL SAFETY INSTRUCTIONS.....	13
6.	GENERAL SAFETY INSTRUCTIONS.....	13

## Table of Figures

Figure 1-1 – Presentation of installed anemometer.....	4
Figure 2-1 – Parcel content.....	5
Figure 2-2 – Anemometer alignment .....	6
Figure 2-3 – Fixation on a mast (Ø 35 mini ; Ø 48 max).....	6
Figure 2-4 – Fixation on a wall (Lag-screws not supplied) .....	6
Figure 2-5 – Wiring and connecting the anemometer to IQ-Link.....	7
Figure 2-6 – Powering on the anemometer .....	9

This document presents the ANEMOMETER for CAIRNET, it describes its installation for speed and direction of wind measurement with the CAIRNET V3 station, and it gives its technical characteristics.

## 1. PRESENTATION OF ANEMOMETER FOR CAIRNET

A conventional wind vane-anemometer has rotating mechanical parts. These parts are subject to wear and tear and are a cause of sensor failure. This ultrasonic sensor has been designed to avoid that and to ensure the most stable and reliable operation as possible, each sensor is adjusted in a wind tunnel. This wind vane-anemometer presents very stable results over time, without any maintenance.

The sound, ultrasound, is transported by the movement of the fluid motion through which it passes. Electroacoustic transducers communicate two by two by ultrasonic signals to determine, along two orthogonal axes, the differences in the wave transit times, induced by the air flow. The measurements are compiled in an integrated computer which establishes the modulus of the wind and its direction related to a reference axis.

The method offers a sensitivity of 0.13 m/s for wind speed, as well as a dynamic range and an excellent linearity up to 40 m/s (144 km/h). The vectorial average of all wind speeds and directions are calculated over 5 minutes.

Due to its photovoltaic panel, the anemometer is autonomous. It can operate without solar energy for 7 days under optimal voltage conditions.



Figure 1-1 – Presentation of installed anemometer

## 2. INSTALLATION

### 2.1. PARCEL CONTENT

On delivery, the parcel includes the following items as standard:

- An anemometer (1) equipped with a cable (2) of 1.5 meters, and an alignment sight (3).
- A fixation system on mast (4) with its 4 nuts



(1) Anemometer, (2) cable, (3) alignment sight, (4) fixation system on mast

**Figure 2-1 – Parcel content**



Take the necessary precautions not to damage the product when unpacking.

### 2.2. SELECTION OF THE BEST LOCATION

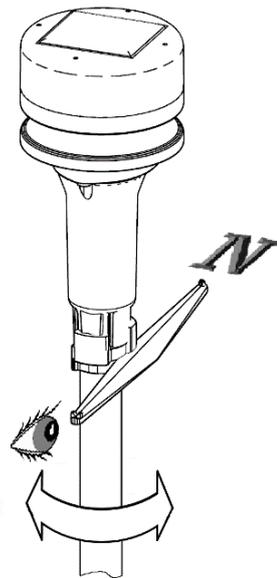
Finding a suitable location for the anemometer installation is essential to obtain representative measurements. The location must be free of turbulence and any source of magnetic fields, such as electricity, motors, radio transmitters, radars, etc. Any edge of field or object near the anemometer can have a negative impact on the measurements.

In order to avoid measurement errors, the anemometer should be installed vertically at a minimum distance of 10 times the nearest object height. It is recommended to install the anemometer at a height of 3 meters in open space.

## 2.3. ANEMOMETER ALIGNMENT

The anemometer alignment must be done after the installation with the fixation system on mast. The footing can be unscrewed to swivel and adjust its alignment.

It is necessary to face the anemometer to the north. For this purpose, an alignment sight is supplied with the anemometer. Clip the sight onto the tube and slide it to fit into the pins. Do not force on the pins, the sight must be positioned naturally on the anemometer. Slightly loosen the 4 fixing screws of the tube. Face the alidade to the north by swiveling the anemometer on its axis. Tighten the screws again.

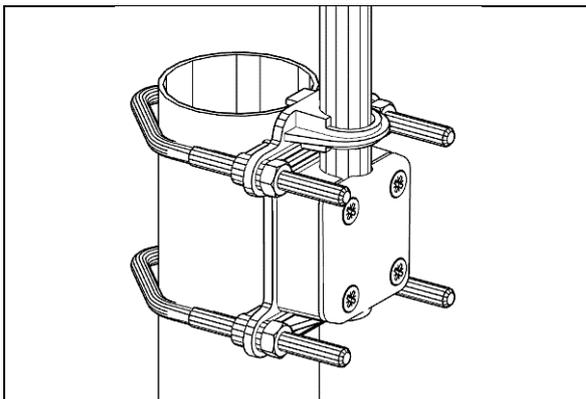


**Figure 2-2 – Anemometer alignment**

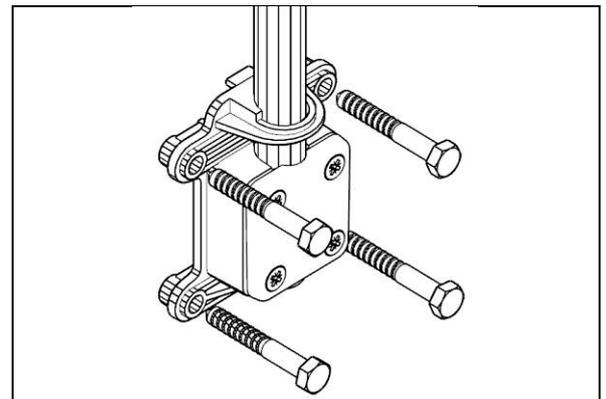
NOTE : The magnetic declination needs to be taken into account to report the measurements to the true (geographic) north

## 2.4. FIXATION MODE

The anemometer is delivered with a stirrup allowing two fixation modes: on a mast and on a wall.



**Figure 2-3 – Fixation on a mast  
(Ø 35 mini ; Ø 48 max)**



**Figure 2-4 – Fixation on a wall  
(Lag-screws not supplied)**

## 2.5. CABLING AND ANEMOMETRE CONNECTION TO IQ-LINK



For safety reasons, power OFF before wiring.

See Figure 2–5 – Wiring and connecting the anemometer to IQ-Link Figure 2–5.

The anemometer needs to be connected to the IQ-LINK of the Cairnet with its 3-wire data cable.

Blue	Yellow	Green
GND	Tx	Rx

First, disconnect the 4-wire micro-USB cable from the IQ-LINK (1). To do this, push the orange connection studs (2) to remove the wires. Then, connect instead the three wires of the anemometer cable in accordance with the color scheme indicated above.

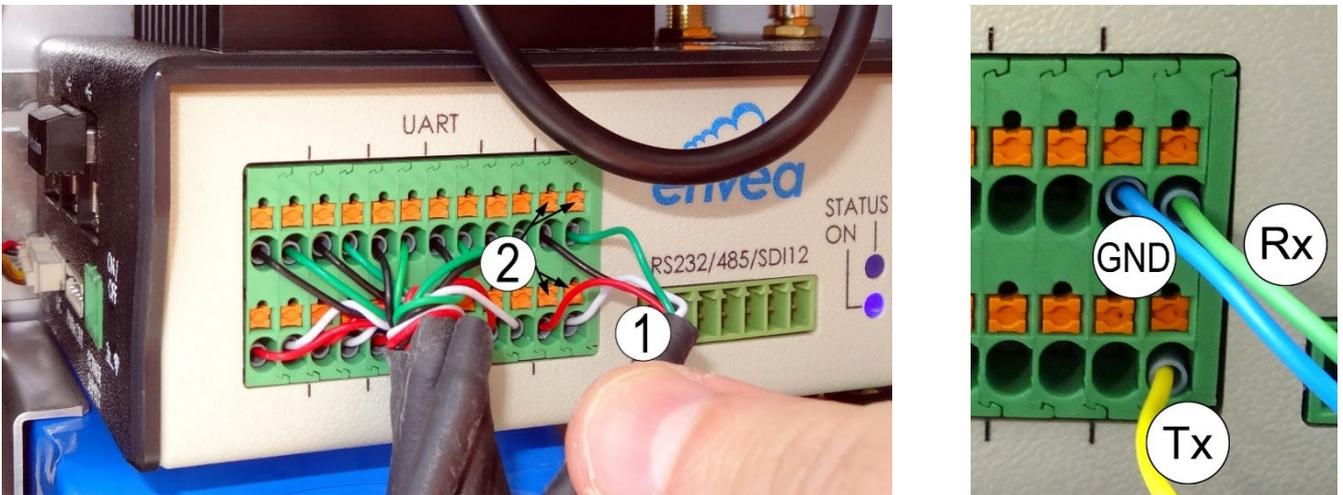


Figure 2–5 – Wiring and connecting the anemometer to IQ-Link

## 2.6. COMMISSIONING

See Figure 2–6.

1. Powering up : It should be done only after connecting the anemometer to the IQ-Link (RX,TX,GND). It consists in connecting in the battery connector (male plug and female socket). See
2. Figure 2–6.

On delivery, the anemometer battery is disconnected (1). To power-up the anemometer, simply fit together the red male plug with the red female socket of the battery connector (2), then insert the connector into the tube and close it with the stopper (3).

3. Starting-up the energy manager: The anemometer is equipped with an energy management device which manages the battery charging from its photovoltaic panel.

The anemometer should be exposed to a light source having a power of **more than 50W/m<sup>2</sup> for at least 30 seconds** to start-up the energy manager.

4. Anemometer initialization :

When the energy manager has started up, it is necessary to wait about 2 minutes for the anemometer to initialize.

5. Anemometer operation :

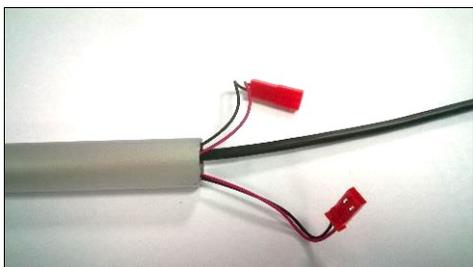
When the initialization is completed, the anemometer operates directly.

NOTE : If the battery voltage is lower or equal to 2.7 Volts, the energy manager disconnects the battery and the anemometer stops operating. To charge the battery, the anemometer should be exposed to a power source of more than 50W/m<sup>2</sup>.

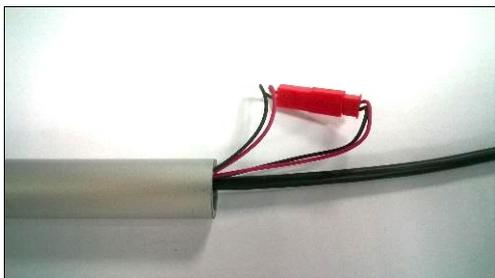
### Commissioning after dysfunction or a prolonged stand-by :

If the battery is charged AND the anemometer is not exposed to a light source having a power of more than 50W/m<sup>2</sup>, the energy manager may be disabled and the connection between the solar panel and the battery may be lost. To restart the anemometer, first disconnect the battery for about 10 minutes to remove the residual electrical charge. Then repeat the 4-step commissioning procedure.

(1) Battery is disconnected :



(2) Connect the battery :



(3) Insert the connector in the tube and close it with the stopper :

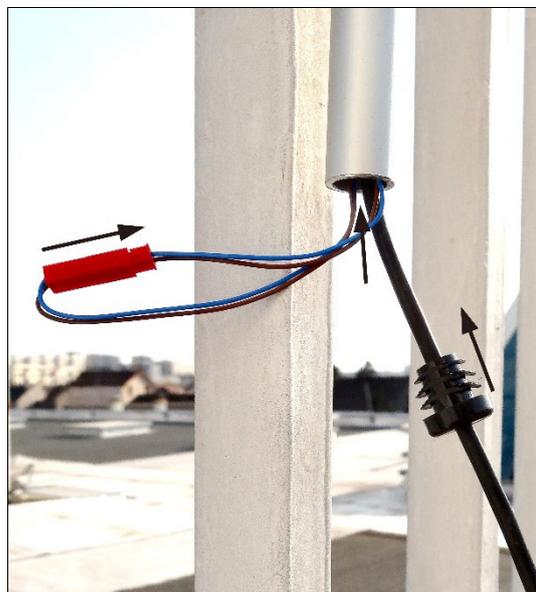


Figure 2-6 – Powering on the anemometer

### 3. VIEWING DATA IN CAIRCLOUD

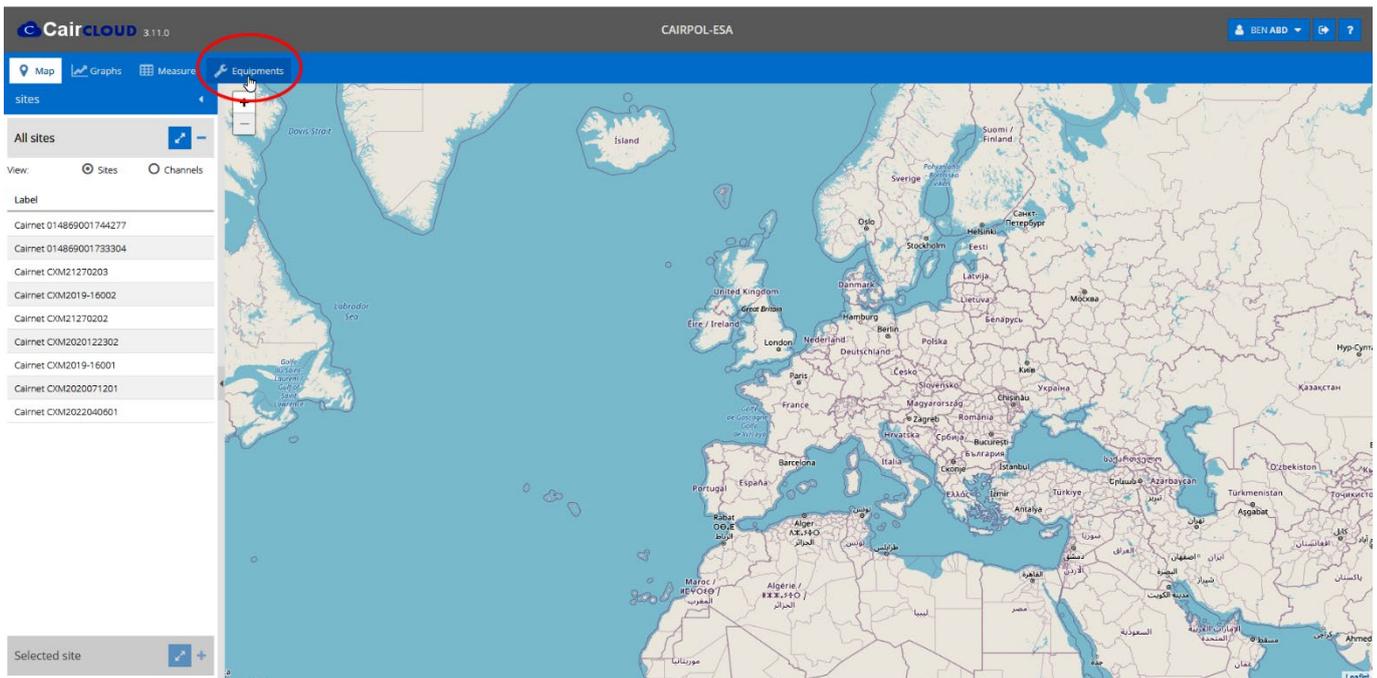
Measurements of wind speed and direction, averaged over 5 minutes, are available on the Caircloud account associated to the Cairnet serial number on which the anemometer is connected. They are displayed on the graph.

Here-below is given the Caircloud access procedure to view anemometer data. To know the detailed operation of Caircloud, refer to its user manual available under the link:

<https://caircloud.envea.cloud/appli/resources/help/Caircloud User Manual EN 20-0278.pdf>

1. – Input login and password to access the Caircloud account.

Click on « OK » to access the sensor location map.



2 – In this window, click on the « Equipments » tab to access the list of sensors connected to the CairCloud account and click on the Cairnet connected with the anemometer : the component list is displayed. Select « Weather Station » to access the anemometer data.

Remark : the anemometer serial number begins with MET and is followed by the same numbers as the Cairnet to which it is connected.

Type	Serial Number	Last communication	Life %	Site
Cairnet 2.0	014869001744277		*82%	Cairnet 014869001744277
Cairnet 2.0	014869001733304		*0%	Cairnet 014869001733304
Cairnet 3.0	CXM21270203	11:02	*0%	Cairnet CXM21270203
Cairnet 3.0	CXM2019-16002	15:33	*0%	Cairnet CXM2019-16002
Cairnet 3.0	CXM21270202	10:53	*38%	Cairnet CXM21270202
Cairnet 3.0	CXM2020122302			Cairnet CXM2020122302
Cairsens H25-CH45 0-1000 ppb	CHM0100007177	18 Jan 2022 20:37	55%	-
Cairsens PM 0-1000 µg/m³	DDP0220010801	12 Jan 2022 17:37	63%	-
Cairsens NO2 0-250 ppb	CNB0100007633	11 Feb 2022 15:05	82%	-
Internal THP Probe	THP2020122302	11 May 2022 10:55	-	-
Cairsens NO2 0-250 ppb	CNB0100007631	11 Feb 2022 15:05	85%	-
Weather Station	MET2020122302	11 May 2022 11:00	-	-
Cairnet 3.0	CXM2020071201	10:59	*0%	Cairnet CXM2020071201
Cairnet 3.0	CXM2019-16001	4 May 2022 14:30	*21%	Cairnet CXM2019-16001
Cairnet 3.0	CXM2022040601	10:51	*29%	Cairnet CXM2022040601

3 – Click on the eye to open the window « Equipment data panel » :

**Equipment data panel** ✕

Serial number : MET2020122302

Model : Weather Station

Last communication date : 11 May 2022 11:00

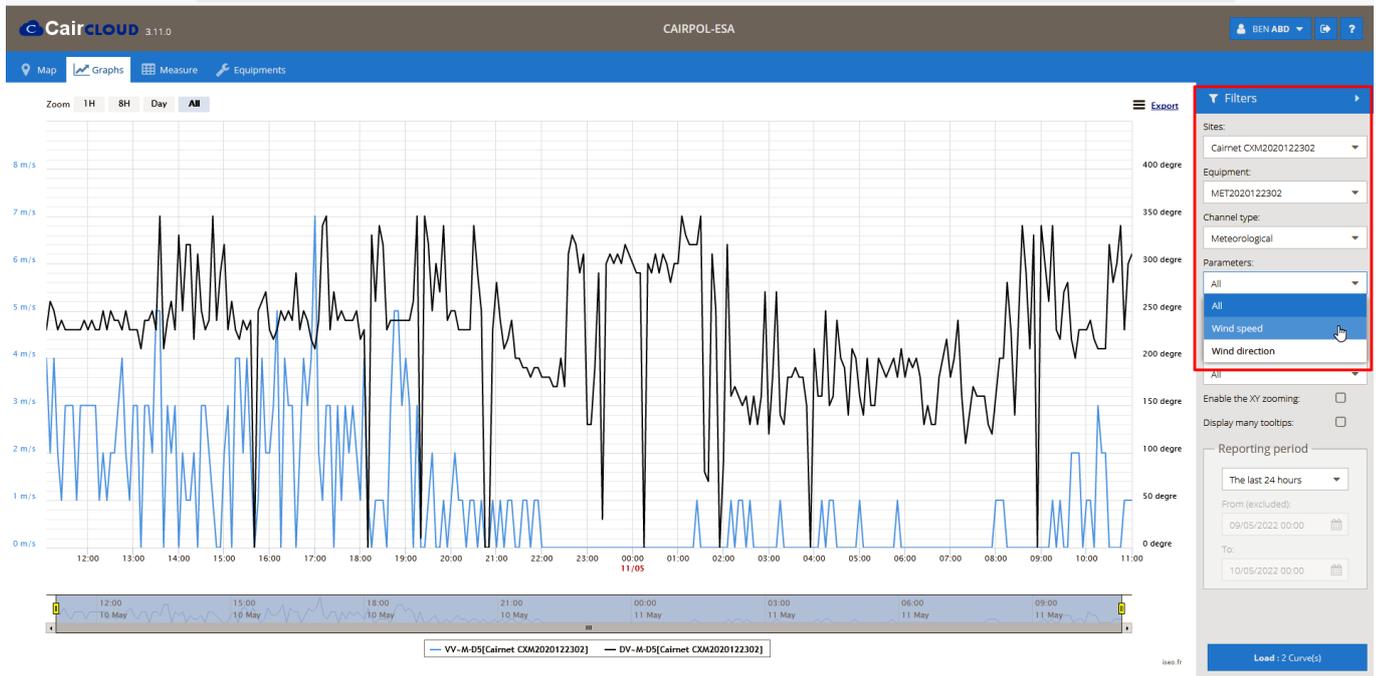
Channels :

Parameter ↑	Data type	Date	Value	Quality code
Wind direction	D5	11:00	310.00 degree	Correct [A]
Wind speed	D5	11:00	1.00 m/s	Correct [A]

States :

Parameter	Date	Value
Firmware	11:01	1.17

4 – Click on the curve  to open the window for viewing the results curves. The results are given in chronological order. The « Filters » tab is used to configure the data display.



## 4. TECHNICAL CHARACTERISTICS

<b>Data period</b>	5 minutes Note : the 5-minutes data is the moving average of the measurements performed every second
<b>Wind speed range</b>	1 - 40 m/s
<b>Wind speed resolution</b>	1 m/s
<b>Wind speed sensitivity</b>	0.13 m/s
<b>Wind direction range</b>	0 – 359 °
<b>Wind direction resolution</b>	10 °
<b>Wind direction sensitivity</b>	+/- 1.5 °
<b>Power required</b>	LiFePo4 600 mA / 3.2 mV Battery (14500 Type)
<b>Autonomy</b>	7 days
<b>Anemometer (sensor head + tube) dimensions</b>	Cylindrical sensor head ø 64 mm – Height 400 mm
<b>Anemometer (sensor head + tube + cable) weight</b>	290 g
<b>Operating temperature</b>	- 15 °C to + 55 °C (without icing)
<b>Environment</b>	IP67

**5. ELECTRICAL SAFETY INSTRUCTIONS**

Information related to the battery

This device is designed to be powered by a battery. Any other use may be dangerous and will invalidate any approval given for this product.

This product contains a Lithium-ion Iron Phosphate (LiFePO4) battery: only original LiFePO4 type batteries equipped with their wires and connectors should be used.

The battery should be handled with care to avoid any risk of fire and burns:

- DO NOT open or repair the battery. DO NOT dismantle, crush or drill the battery.
- DO NOT short-circuit the external contacts of the battery.
- DO NOT throw in fire or water, or heat the battery to temperatures above 60°C (140°F).
- DO NOT solder wires directly on the battery.

The battery should be disconnected when transporting the anemometer by plane. Refer to the IATA recommendations.

**6. GENERAL SAFETY INSTRUCTIONS**

Personnel must observe the safety instructions at all times, and be properly trained in the operation of this device before starting to operate.

Whenever possible, it is recommended to disconnect the power supply before any intervention on the device.

With regard to safety, the manufacturer cannot be held responsible for the consequences resulting from:

- Use of the device by unqualified personnel,
- Use of the device under conditions other than those specified in this document,
- Use of spare parts or accessories not supplied by ENVEA,
- The modification of the device by the user.

Using this equipment in a manner not approved by ENVEA is not recommended and may result in personal injury or equipment damage. Failure to use specific spare parts may reduce the effectiveness of the device safety.

Cleaning and disposal

	<p>Clean the anemometer with a soft cloth, soft water or a neutral cleaner. DO NOT use alcohol cleaner.</p>
	<p>The components of the device, including the batteries, should be disposed of through an appropriate pickup and recycling structure. DO NOT dispose of them in a household waste bin. Refer to local regulations.</p>

### Warranty

The warranty is not applicable in the following cases :

1. Damages caused by improper handling.
2. Improper installation or use in inappropriate conditions.
3. If the product has been damaged, dismantled or repaired by an unauthorized service.
4. Damages caused by lightning, fire, water, accident or any other similar circumstances.

The warranty is void in case of non-observance of the operating, installation and repair instructions or unauthorized intervention.