E10/E11
Wireless Anemometer
User Guide

Contents

1. Preface

Thank you for buying Scarlet anemometer sensor. This manual provides information for the best performance and safe application of the WSD-E11 and WS-E10 anemometers. This manual does not cover the receiver/display unit, for which the manuals will come separately.

Read this manual carefully before starting the installation of the Scarlet WS-E10 or WSD-E11 anemometer. Keep this manual after installation for future reference.

1.1 Product Layout (exploded view)

Legend:
1. Wind cups
2. Head with bearings
3. PCB - Electronic driving circuitry
4. Battery
5. Sensor main body
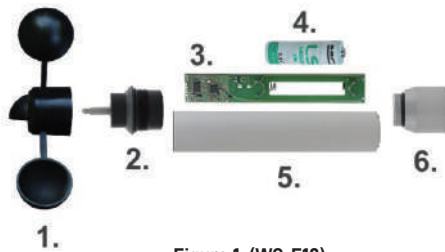6. Aluminum bottom plug

Figure 1. (WS-E10)

Legend:
1. Wind cups
2. Head with bearings
3. PCB - Electronic driving circuitry
4. Battery
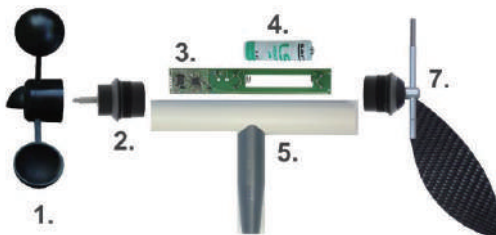5. Sensor main body
6. Aluminum bottom plug
7. Wind vane head with bearings

Figure 2. (WSD-E11)

2. Technical Data

2.1 Mounting: Magnetic Mounting Bracket

WS-E10 Wind Speed Sensor

Wind speed measurement range:	0.3 - 50 m/s
Temperature measurement range:	-30 ... +55°C
Data transmission rate:	every 2 seconds
Wind speed resolution:	0,1 m/s
Temperature resolution:	0,5°C
Accuracy wind speed:	+/- 3%
Accuracy temperature:	+/- 1°C
Operating Frequency:	868 MHz
Output power:	+15 dB (32 mW)
Temperature operating range:	-30°C - +55°C
Battery (included):	3,6V AA Lithium battery, Type:L S14500EX Producer: SAFT
Battery life time:	up to 3 years
Bearings:	2 x precision stainless steel Ball bearing
Material - cups (replaceable):	PA (Polyamide)
Dimensions:	height 210 mm, overall diameter cup to cup 120 mm
Mounting:	sensors to be mounted on a vertical pipe with 20 mm diameter

WSD-E11 Wind Speed and Direction Sensor (In addition to the above wind speed sensor)

Wind direction measurement range:	0 - 360°, no blank sector, contactless magnetic measuring principle
Wind direction resolution:	1°
Accuracy wind direction:	+/- 2.5°
Material - vane (replaceable):	Carbon/Al
Dimensions (without holder):	height 240 mm, overall vane diameter 220 mm

Receiver Display

Relay Contacts Output	4 x relays, 2 A / 24 V
4-20 mA Outputs	4 mA=0 m/s, 20 mA=50 m/s (programmable)
Operating voltage	12-24 V DC
Units of Measurement	m/s, km/h, knots, mph, Bf
Dimensions	150 x 80 x 55 mm
Antenna input	50 ohm, SMA connector
Audible alarm	85...90 dB
Bluetooth	Optional. Range up to 40m

3. Installation

WS-E10 WIND and/or WSD-E11 to be mounted on 20mm diameter pool as shown on Figure 3.

Turn screw **Counterclockwise**

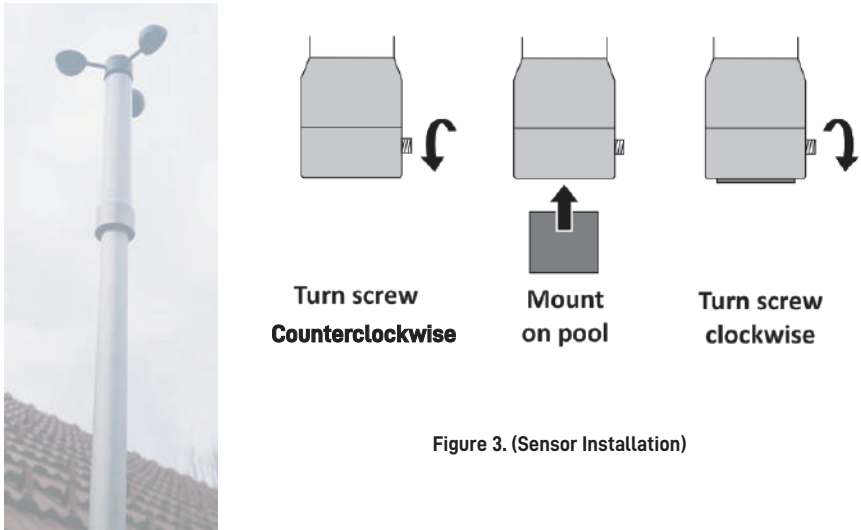Mount on pool

Turn screw clockwise

Figure 3. (Sensor Installation)

WARNING: Make sure to properly grounded the aluminum sensor holder at a dedicated place when instaling the sensor as shown on figure 4a. and 4b..
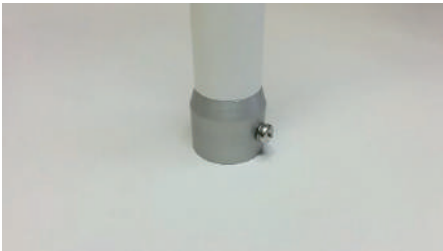

Figure 4a. (WS-E10 sensor grounding)

Figure 4b. (WSD-E11 sensor grounding)

4. Operation

WS-E10 is wind speed sensor and WSD-E11 is combined wind speed/wind direction sensor. Sensor switches "ON" automatically when the anemometer cups revolve. Wind speed/direction are continuously measured and fresh data are transmitted every 2 seconds. In no wind condition the sensor switches OFF"6 hours after the anemometer-have stopped rotating. Auto OFF function can be disabled by the user.

5. Field of Application

WS-E10 and WSD-E11 anemometers were designed for wind speed (WS-E10) and wind speed/direction (WSD-E11) measurements in particular for the use in areas where an explosive gas atmosphere is likely to occur in normal operation, so in the areas where the product must ensure a high level of protection. Both products are ⟨Ex⟩ 2 G Ex ib IIB T4 certified and may not be used in hazardous areas for which they are not certified.

6. Functions

6.1 Setting of "Auto Off" function

"Auto OFF" function is active by default - the sensor switches OFF 6 hours after the anemometer cups stop revolving. After each pause, any repeated cup rotation start will switch the anemometer ON automatically.
If "Auto OFF" function is disabled, the sensor will transmit the data continuously, regardless of the wind condition.

6.2 Setting procedure

Unscrew the aluminum bottom plug and pull out the PCB from the sensor (Figure 5.)
Remove the battery for minimum 1 minute.
Insert back the battery. Within 2 seconds from inserting the battery, place the magnet (not included) on the edge of top of PCB (Figure 4.). After 2 seconds the LED will start blinking.
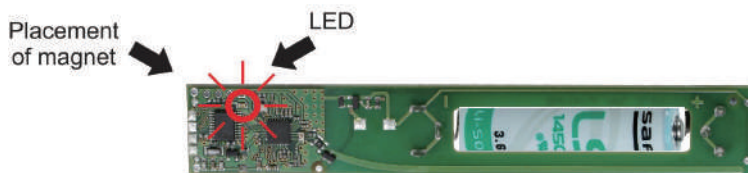Remove the magnet after first blink to select auto off or afterthe second blink for auto on.

Figure 5.(Setting of "Auto Off" function)

Remove magnet after 1st long blink = active AUTO OFF is selected
Remove magnet after 2nd long blink = inactive AUTO OFF is selected

6.3 Checking the selected AUTO OFF status

LED will blink once or twice. One blink indicates that "Auto OFF" is active and two blinks indicate that "Auto OFF" is inactive. Shorter blinks that follow later are meaningless and to be ignored.

6.4 Sensor address

The sensor address is indicated on the label attached to the sensor, on sensor's PCB and on the sensor packaging.
The receiver/display unit should be SET to this sensor address to receive the data from the particular sensor. Please follow the connection instructions from the selected receiver/display unit manuals.
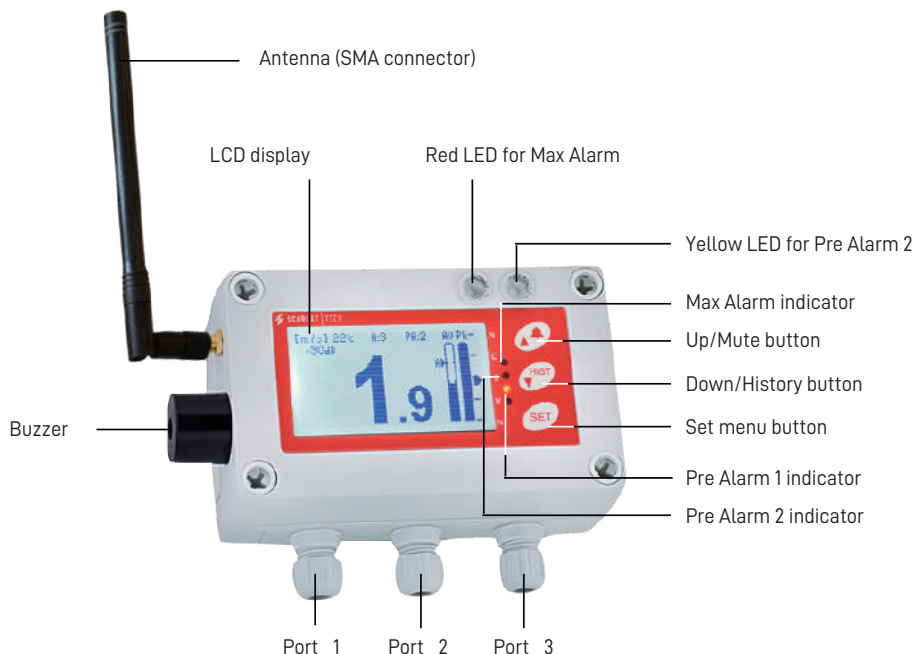
6.5 Multiple display units

Unlimited number of various types of compatible receiver/display units can read the data simultaneously from a single sensor, whereby all receiver/display units must be inside the sensor range with properly set selected sensor address.

6.6 Range

The connection between the sensor and the receiving unit works on free 868 MHz band. The operating range is up to 1300 meters (assuming the sensor to be mounted at a height of 10 m and that there are no obstacles between the sensor and the display unit). The range inside buildings is considerably shorter as the signal can be normally received through two to three walls. The range also depends on the type of receiver/display unit.

7. Receiver

Antenna (SMA connector)

LCD display

Red LED for Max Alarm

Yellow LED for Pre Alarm 2

Max Alarm indicator

Up/Mute button

Down/History button

Set menu button

Buzzer

Pre Alarm 1 indicator

Pre Alarm 2 indicator

Port 1   Port 2   Port 3

Select the position where the signal reception is strong enough under all conditions. Connect the enclosed antenna to the SMA connector on the display unit only when the power supply is switched OFF.

7.1 Signal Reception

The reception symbol blinks when the display unit receives a signal from the sensor (every 2 seconds if the reception is good). Signal strength is numerically shown in dB:
-105 dB is approximately the limit where display unit stops receiving
-100 dB and lower means very week signal
-95 ... -90 dB is considered as still acceptable
-85 dB and higher is a good signal
When the sensor doesn't send data (in the OFF state) or when the signal is lost for a more than 30 seconds, the "No data" notification appears on the display, indicating that the receiver doesn't receive data from the sensor (sensor OFF or out of range).

7.2 Alarm

The threshold wind speed of Pre Alarm 1, Pre Alarm 2 and Max Alarm can be configured via setting menus. Please see the section "Settings" for more details.
By holding-down the upper key for 2 seconds you can switch the sound alarm ON and OFF. The sound alarm is active each time the display unit is turned ON. In the settings menu, the sound alarm can be disabled permanently.

8. Display

Scarlet WL-410 display consists of 3 pages including: wind speed readings (page 1), wind speed history graphs (page 2), and maximum alarm history graphs (page 3).

By pressing HIST key to navigate to page 2 and 3 for the wind speed and max alarm history graphs. To switch back to the first page user can long pressing HIST key for 3 seconds or inactive for 1 minute.

8.1 First Page
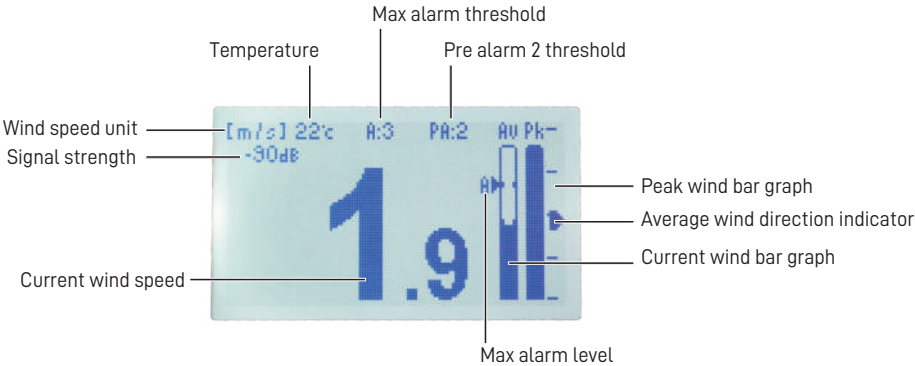
The contents of display are shown above. Note: in both bar graphs, the max alarm value set by user is always on the 3/4 bar height. One icon not shown in the photo is data packet receiving indicator and it flashes by the side the signal strength.

8.2 Second Page
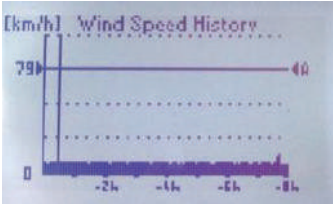
8 hours peak wind speed history graph, each column presents peak wind speed during the 5 minutes intervals
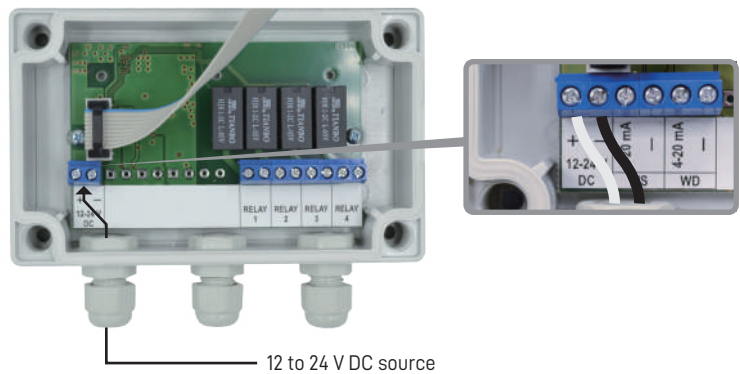
8.3 Third Page
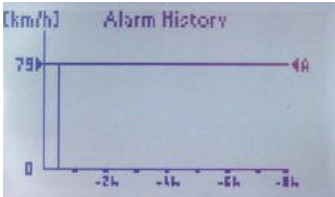
8 hours Maximum alarm history graph with 5 minutes intervals.

9. Wirings

Please switch off the power before unscrew all 4 plastic screws and remove the front panel

12 to 24 V DC source

The working voltage of receiver is 12 to 24 V DC. Please plug the power adapter or your own DC power source to the corresponding jack on the circuit board after opening the front panel.

NOTE: Please make sure the polarity is correct otherwise the receiver will be damaged.

rear panel wiring connection
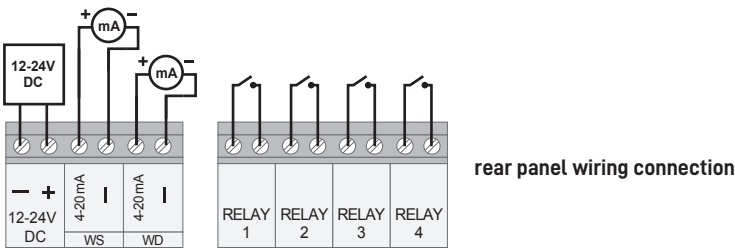
9.1 Relays for External Alarm Devices

For using relays, connect the connection terminals to external devices.
RELAY 1 : When set value exceed the relay 1 will activate, red light will flash and buzzer will continuously sound.
RELAY 2 : When wind speed exceeds the value set on pre alarm 2, the relay 2 will activate and yellow light will start blinking and buzzer will sound with interruptions.
RELAY 3 **:** When wind speed exceeds the value set on pre alarm 1, the relay 3 will activate. Please see section "Settings" for more details.
RELAY 4 **:** Set for alerting that the receiver has no data from the sensor or as 2-zone wind direction alarm.

9.2 4-20mA Industrial Outputs

For using 4-20mA outputs, please connect the wind speed and/or wind direction connection terminals to external devices.
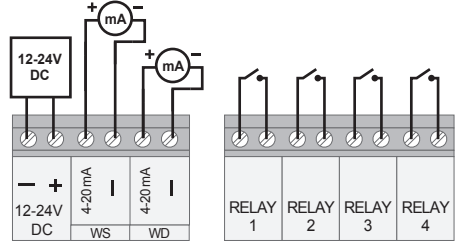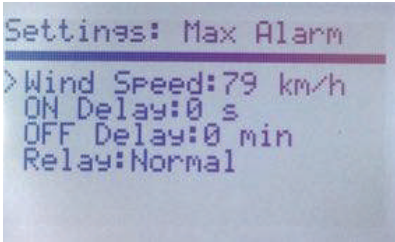
10. Settings

10.1 Settings Procedure

1. Hold the SET key to enter the settings menu. If password protection is active, enter the correct password. The group of settings displays on the display.

2. Select the group by using the up and down keys and press the SET key to view the selected group.

3. Using the up and down keys select the parameter you wish to adjust and press the SET key to view the selected parameter. The adjustable parameter blinks.

4. With the up and down keys, adjust the parameter value. Press SET to enter the new value and move to the next parameter.

5. Exiting the settings menu: hold down the SET key to move back one level. The anemometer also returns to the main screen after 2 minutes of inactivity.

10.2 Settings List

Max Alarm	Relay 1, RED ALARM LIGHT	select to set Max Alarm parameters
Pre Alarm 2	Relay 2, YELOW ALARM LIGHT	select to set Pre Alarm 2 parameters
Pre Alarm 1	Relay 3	select to set Pre Alarm 1 parameters
No Signal/WD alarm	Relay 4	select to set No Signal / Wind Direction alarm parameters
General		select to set general parameters

▣ Settings: Max Alarm (Relay 1, RED ALARM LIGHT, continuous sound)

	Factory Preset	Setting Range	Description
Wind Speed	72 km/h	1 - 50 m/s	Max Alarm limit
ON Delay	0 s	0 - 600 s	Minimum time for excess wind speed to activate the Max alarm
OFF Delay	0 min	0 - 60 min	Alarm switch OFF delay after wind speed drops below preset level
Relay	Normal	Normal/Inverted	Inverted operation of relay

▣ Settings: Pre Alarm 2 (Relay 2, YELLOW ALARM LIGHT, interrupted sound)

	Factory Preset	Setting Range	Description
Wind Speed	52 km/h	1 - 50 m/s	Pre Alarm 2 limit
ON Delay	0 s	0 - 600 s	Minimum time of exceed Wind speed to activate the Pre Alarm 2
OFF Delay	0 min	0 - 60 min	Alarm switch OFF delay after wind speed drop below preset level
Relay	Normal	Normal/Inverted	Inverted operation of relay

▣ Settings: Pre Alarm 1 (Relay 3)

	Factory Preset	Setting Range	Description
Wind Speed	42 km/h	1 - 50 m/s	Pre Alarm 1 limit
ON Delay	0 s	0 - 600 s	Minimum time of exceed Wind speed to activate the Pre Alarm 1
OFF Delay	0 min	0 - 60 min	Alarm switch OFF delay after wind speed drop below preset level
Relay	Normal	Normal/Inverted	Inverted operation of relay

▣ Settings: No Signal / Wind Direction Alarm (Relay 4)

	Factory Preset	Setting Range	Description
Alarm	No Signal	No Signal / Direction	Type of Alarm: No signal alarm or wind direction alarm
Relay	Normal	Normal/Inverted	Inverted operation of relay
Zone1	315°-45°	0°-359°	Zone of wind direction alarm ON
Zone2	135°-225°	0°-359°	Zone of wind direction alarm ON
ON Delay	0 s	0 - 600 s	Minimum time of wind direction inside the alarm zone to activate the alarm
OFF Delay	0 min	0 - 60 min	Alarm switch OFF delay after wind direction leaves the alarm zone

10.3 General Settings

	Factory Default	Settable Range	Description
Sensor address	Enclosed sensor	1...255	Set the sensor address of your Wind speed sensor
Averaging period	2 sec	2/10/30 sec	Averaging period for showed wind speed
Wind speed unit	km/h	m/s, km/h, mph,knots	Unit of displaying wind speed
Temperature unit	° C	° C or ° F	Unit of displaying Temperature
20 mA output	180 km/h	10...50 m/s	Wind speed at 20 mA output 4mA = 0 km/h 20 mA = seted value wind speed * applicable only at model with additional 4-20 mA output
Password	No	No Yes:0000...9999	Activation of password protection and setting of password
Sound alarm	On	On/Off	Switching sound alarm ON and OFF
Language	English	English/French	Language selection
Wind speed calibration factor	+0.0%		Calibration factor for wind speed(-15,0 ...+15,0% in 0,5% steps)
Bluetooth	On	On/Off	Power ON/OFF Bluetooth transmitter * applicable only at WSM W410XB model

▬ Reset of Display Unit

With upper button pressed at power ON, RESET is performed (all settings except »Sensor Address«, »WS Cal. Factor« and »WD
Cal.« go to default values).

▬ Troubleshooting

Symptom	Action
The receiver/display unit cannot read the sensor ("No data" appears on the display)	- check if the correct sensor address is set on the display unit - make sure the sensor is not in sleep mode (turn the cups to wake up the sensor) - check the sensor battery – replace the battery if needed - check the operation at a reduced distance to the display/receiver
Interrupting and weak sensor signal	- check for obstructions between sensor and display/receiver unit - place the sensor or display/receiver in a different position with better signal reception - reduce distance to the display/receiver - change or add antenna for the display/receiver unit

11. Bluetooth Smart Phone App

11.1 Smart Phone Applications

Scarlet provides free iOS and Android Apps. Users can download directly via QR link below:

iOS   Android

11.2 Sensor Pairing

Before pairing, please turn on the Bluetooth function on your mobile device. Make sure the mobile device with Android 4.3 or newer with Bluetooth Low Energy (BLE). For iPhone, the
device should be at least iPhone 4s or newer.
In Application setting menu always set the address corresponding to the address of the sensor from which you wish to receive data. Address of the sensor is indicated on the label and in the interior of the battery compartment. For example, enter the sensor address showed on the label, e.g. 78. Once it's paired, the data will be automatically transmitted to the mobile device.

12. Trouble Shooting

The receiver/display unit cannot read the sensor	check the sensor battery - replace the battery if needed
The readings on the receiver/display unit are wrongnsor	check the bearing - replace the cups with bearing
The cups are not turning in spite of the wind	check bearing - replace the cups with bearing
No connection between sensor and receiver/display unit	- check the receiving sensor address on the receiver - check the sensor battery - check whether the sensor has been active within the last 6 hours (no wind conditions may switch off the sensor -»auto off« function)
Week sensor wireless signal	check for obstructions and place the sensor on a different location with better signal reception

13. Storage, Maintenance and Cleaning

13.1 Storage

When not in use, it is recommended to remove the cups, and store both the cups and the sensor body in the original packaging.

13.2 Maintenance

Battery replacement:
WS-E10:
Unscrew the aluminum bottom part by turning it counterclockwise (step 1., figure 6.).
Pull out the PCB with the battery (step 2., figure 5.) and insert a new battery (3,6V AA Lithium battery).
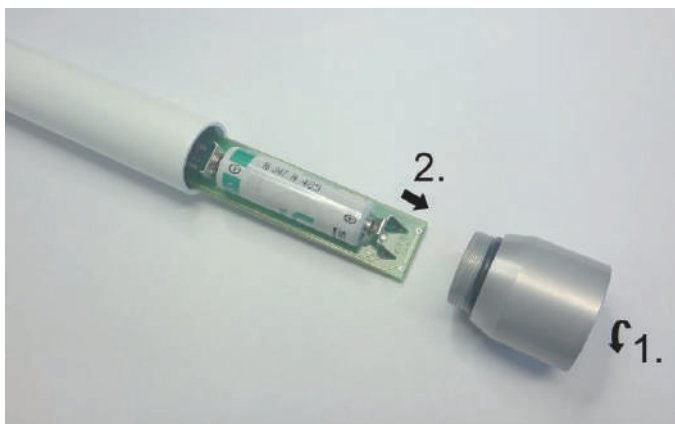Use only type LS14500EX -SAFT. Return the PCB with the battery and place the bottom part back to original position.

Figure 6. (WS-E10 battery replacement)

▩ WSD-E11

Take off the cups (step 1., figure 7.). Unscrew the upper head with bearings by turning it anticlockwise (step 2., figure 7.). Pull out the PCB with the battery and insert a new battery(3,6V AA Lithium battery-step 3. figure 7.). SAFT LS14500EX battery only. Return the PCB with the battery into the casing, place the upper head back to its original position and attach back the cups.
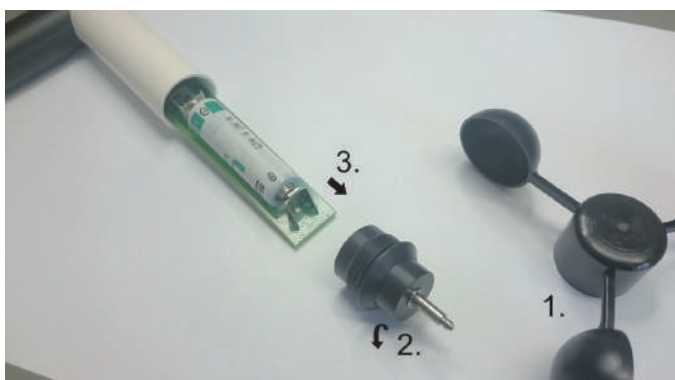

Figure 7. (WSD 011-1-EX battery replacement)

▩ Bearing replacement (wind speed):

Take off the cups (step 1., figure 8.). Unscrew the upper head with bearings by turning it anticlockwise (step 2., figure 8.). Mount back the replacement head and the cups.
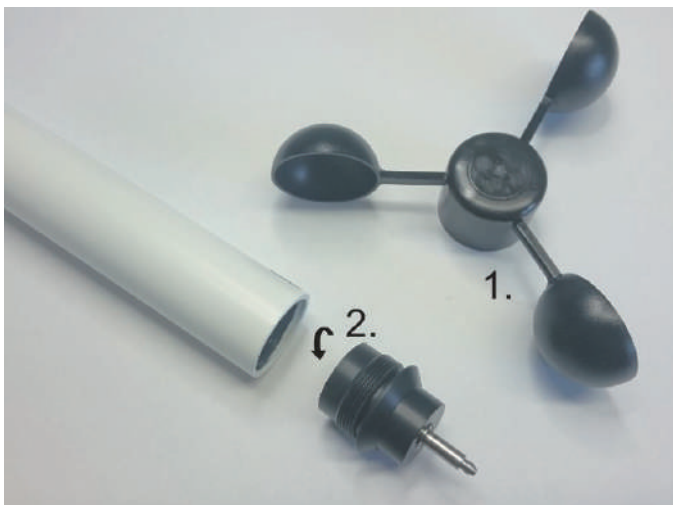
Figure 8.(Bearing replacement – Wind speed sensor)

Warning: Please make sure the washer to be greased for proper sealing!

▬ Bearing replacement (wind direction):

Unscrew the bottom head with bearings by turning it anticlockwise (step 1. figure 9.).
Mount back the replacement head.

Figure 9.(Bearing replacement – Wind speed/direction sensor)

Warning: Please make sure the washer to be greased for proper sealing!

▬ Cleaning

Cleaning can be done with a soft tissue or a cloth soaked in mild detergent (or alcohol).
Never use aggressive solvents such as acetone. Make sure to use a proper force when
cleaning the cups in order not to deform the cup arms.

14. Markings

WS-E10	Product name
WSD-E11	Product name
CE 1304	CE conformity mark and test laboratory ID number
⟨Ex⟩	Explosion protection symbol
II 2	Equipment group: II - For use in all other places Category: 2 - Equipment that is intended for use in areas where an explosive atmosphere is likely to occur in normal operation and must ensure a high level of protection
G	Suitable for gas environments (not for dust - D)
Ex	Explosion protection
ib	Instrinsic safety
IIB	Explosion group: II - surface above ground industry B - Easily ignited gases e.g ethylene
T4	Temperature classification: 4 - up to 135°C
📖	Instruction manual
♻	The symbol indicates that this product may not be treated as household waste. Instead, it should be handed over to the applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences for the environment and human health, which could otherwise be caused by inappropriate waste handling of this product. For more detailed information about recycling of this product, please contact your local city office, your household waste disposal service or the shop where you purchased the product.

WARRANTY(LIMITED)

The warranty period of Scarlet products is one year after the date of purchase. During limited warranty period any defective product will be repaired or replaced with the comparable product without charges. The claimed product will be repaired or replaced only when returned to the store where it was purchased together with the original invoice. Failure to follow these instructions may invalidate the warranty. The limited warranty does not cover battery and damages of any kind including physical damages caused accidentally or misuse of the product. Scarlet does not accept responsibility for any problems which may arise from applications other than the product was designed for. Any liability for direct or indirect damage caused by product failure is excluded.

Ref.SE1001
ISSUED: March 1, 2018

15. Warranty(Limited)

The warranty period of Scarlet products is one year after the date of purchase. During limited warranty period any defective product will be repaired or replaced with the comparable product without charges. The claimed product will be repaired or replaced only when returned to the store where it was purchased together with the original invoice. Failure to follow these instructions may invalidate the warranty. The limited warranty does not cover battery and damages of any kind including physical damages caused accidentally or misuse of the product. Scarlet does not accept responsibility for any problems which may arise from applications other than the product was designed for. Any liability for direct or indirect damage caused by product failure is excluded.

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