

## USER'S GUIDE

### Cross Arm WAC151



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# CHAPTER 1

## GENERAL INFORMATION

### About This Manual

This manual provides information for installing and maintaining WAC151 Cross Arm.

### Contents of This Manual

This manual consists of the following chapters:

- Chapter 1, General Information, provides important safety, revision history, and warranty information for the product.
- Chapter 2, Product Overview, introduces WAC151 Cross Arm features.
- Chapter 3, Installation, provides you with information that is intended to help you install this product.
- Chapter 4, Maintenance, provides information that is needed in basic maintenance of WAC151 Cross Arm.
- Chapter 5, Troubleshooting, describes common problems, their probable causes and remedies, and provides contact information.
- Chapter 6, Technical Data, provides technical data of WAC151 Cross Arm.

## Version Information

**Table 1      Manual Revisions**

Manual Code	Description
T648en-1.1	WAC151 Cross Arm - Technical Reference
M210349en-A	This manual, the first version of the WAC151 Cross Arm User's Guide. Supersedes the above mentioned Technical Reference.

## Related Manuals

**Table 2      Related Manuals**

Manual Code	Manual Name
M210293en	WAA151 Anemometer - User's Guide
M210294en	WAV151 Wind Vane - User's Guide

## Safety

### General Safety Considerations

Throughout the manual, important safety considerations are highlighted as follows:

<b>WARNING</b>	Warning alerts you to a serious hazard. If you do not read and follow instructions very carefully at this point, there is a risk of injury or even death.
----------------	-----------------------------------------------------------------------------------------------------------------------------------------------------------

<b>CAUTION</b>	Caution warns you of a potential hazard. If you do not read and follow instructions carefully at this point, the product could be damaged or important data could be lost.
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**NOTE**

Note highlights important information on using the product.

## Product Related Safety Precautions

WAC151 Cross Arm delivered to you has been tested for safety and approved as shipped from the factory. Note the following precautions:

**WARNING**

Ground the product, and verify the grounding of the outdoor installation periodically to minimize shock hazard.

**CAUTION**

Do not modify the unit. Improper modification can damage the product or lead to malfunction.

## ESD Protection

Electrostatic Discharge (ESD) can cause immediate or latent damage to electronic circuits. Vaisala products are adequately protected against ESD for their intended use. However, it is possible to damage the product by delivering electrostatic discharges when touching, removing, or inserting any objects inside the equipment housing.

To make sure you are not delivering high static voltages yourself:

- Handle ESD sensitive components on a properly grounded and protected ESD workbench. When this is not possible, ground yourself to the equipment chassis

before touching the boards. Ground yourself with a wrist strap and a resistive connection cord. When neither of the above is possible, touch a conductive part of the equipment chassis with your other hand before touching the boards.

- Always hold the boards by the edges and avoid touching the component contacts.

## Warranty

For certain products Vaisala normally gives a limited one year warranty. Please observe that any such warranty may not be valid in case of damage due to normal wear and tear, exceptional operating conditions, negligent handling or installation, or unauthorized modifications. Please see the applicable supply contract or conditions of sale for details of the warranty for each product.



## CHAPTER 2

# PRODUCT OVERVIEW

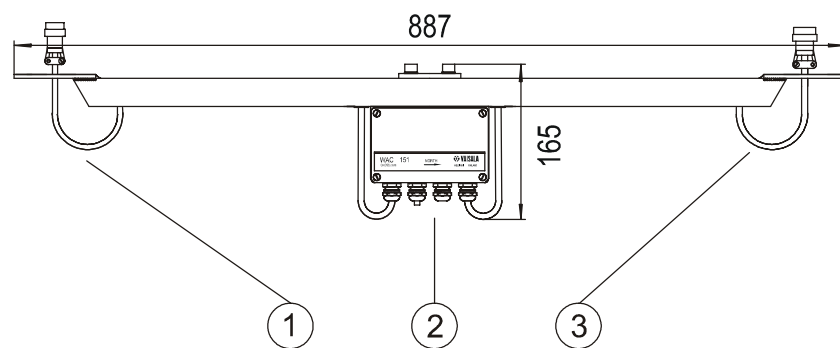
This chapter introduces WAC151 Cross Arm features.

## Introduction to WAC151 Cross Arm

The WAC151 Cross Arm assembly supports the installation of the Vaisala WAA151 Anemometer and WAV151 Wind Vane, or WAA252 Heated Anemometer and WAV252 Heated Wind Vane. The cross arm assembly consists of a junction box and an anodized aluminum tube construction with a mounting clamp for installation on the top of a pole mast.

A water tight junction box includes a screw terminal block for connection of the power and signal cables. Inside the junction box, there is also a thermostat switch for controlling sensor shaft heating for the 151 series sensors. The thermostat switch connects the heating power in temperatures below +4 °C. The 252 series sensors do not use the cross arm's thermostat switch, as they have the temperature control integrated in the sensor's electronics.

The junction box is equipped with four cable glands offering easy connection to different cables. Typically, three cable glands are in use; two for sensor cables and one for signal cable. The fourth gland is reserved, for example, for the cable supplying heating power to heated sensors.



0210-033

**Figure 1 WAC151 Cross Arm**

The following numbers refer to Figure 1 above:

- 1 = Flange for mounting a Vaisala anemometer
- 2 = Junction box
- 3 = Flange for mounting a Vaisala wind vane

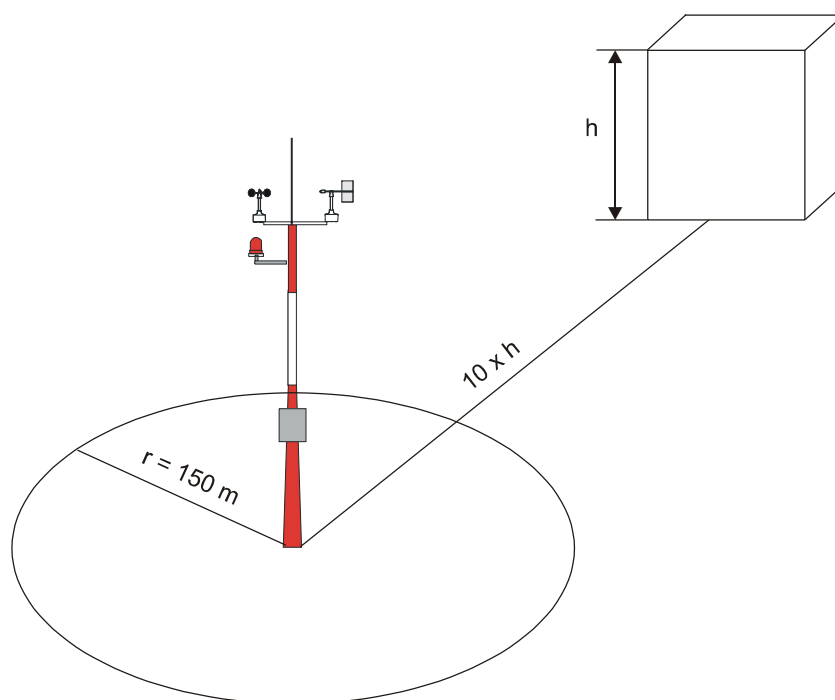
## CHAPTER 3

# INSTALLATION

This chapter provides you with information that is intended to help you install this product.

### Selecting Location

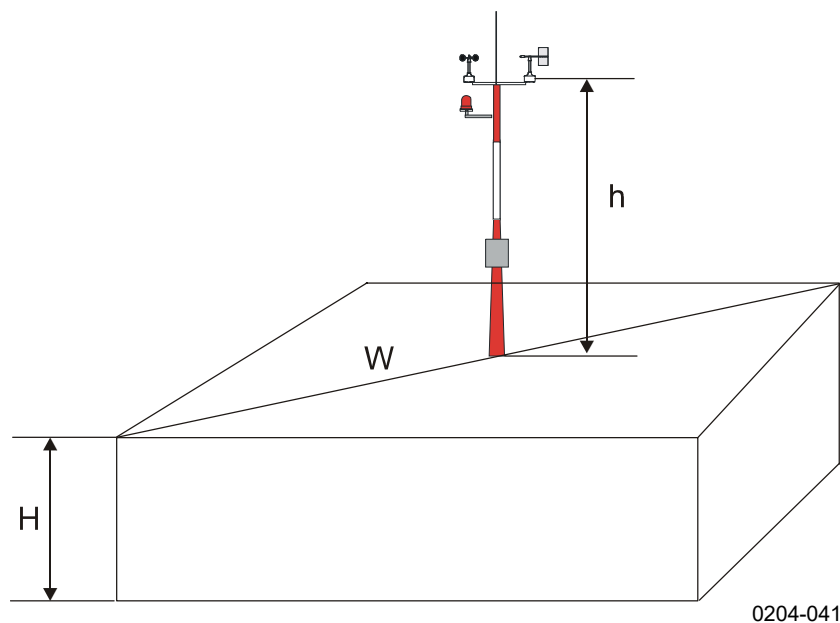
Allow sufficient clearance for the wind sensors. Wind sensors should not be located next to a building or any other object that might affect the flow of air.



0204-040

**Figure 2 Recommended Mast Location in Open Area**

In general, any object of height (h) will not remarkably disturb wind measurement at a minimum distance of  $10 \times h$ . There should be at least 150 m open area in all directions from the mast. Refer to Figure 2 on page 9.



**Figure 3 Recommended Mast Length on Top of a Building**

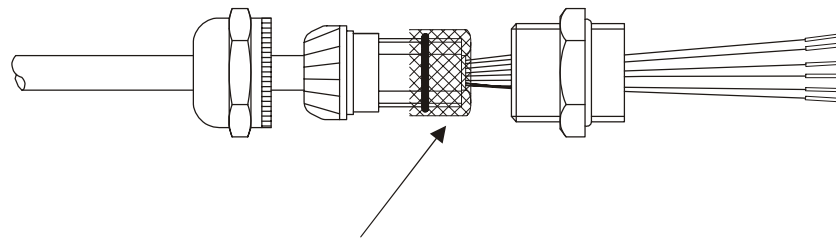
The recommended minimum length (marked with the letter h in Figure 3 above) for the mast that is installed on top of a building is 1.5 times the height of the building (H). When the diagonal (W) is less than the height (H), the minimum length of the mast is  $1.5 \times W$ .

## Installation Procedure

When installing the equipment for example in tropical, marine, or cold temperature environments it is important to note that the equipment is kept within its specific operating conditions. The cables must be terminated properly by tightening the cable glands to avoid dust, dirt or water to enter the equipment.

For installation, follow the procedure below:

1. Remove the four screws holding the cover of the junction box. Remove the cover.
2. Lead the power and signal cables through the cable gland(s). For better protection against RF interference, bend the cable shield as illustrated in Figure 4 below.



0206-046

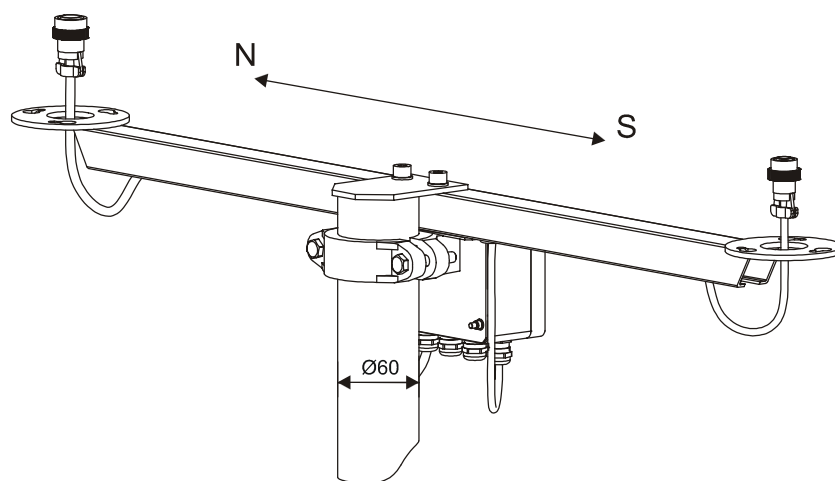
**Figure 4 Cable Shield Bent over the Plastic Sleeve and O-ring**

3. Connect the wires to the screw terminal block inside the junction box according to the appropriate wiring diagram provided in section Connections on page 13. Finally, tighten the output cable gland(s) properly.

**NOTE**

The wiring diagram inside the box is applicable only for WAA151 and WAV151 sensors with the shaft heating.

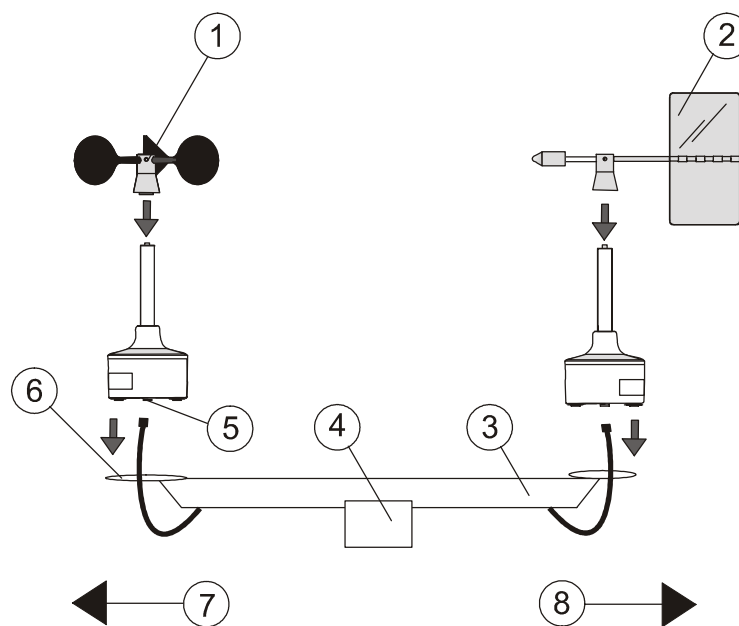
4. Carefully reattach the enclosure cover with the four screws. Make sure that the gasket seals the junction box properly.
5. Attach the cross arm to the top of a pole mast with the mounting clamp, refer to Figure 5 on page 12. Align the cross arm as instructed in section Alignment on page 15 before erecting the mast.



0206-059

**Figure 5 Mounting WAC151 to the Top of a Pole Mast**

6. Mount the sensors onto the cross arm. Refer to Figure 6 below.



0110-005

**Figure 6 Installation of the Wind Sensors onto WAC151 Cross Arm**

The following numbers refer to Figure 6 on page 12:

- 1 = Anemometer Cup assembly
- 2 = Wind Vane Tail assembly
- 3 = Cross arm
- 4 = WAC151
- 5 = Connector
- 6 = Mounting flange
- 7 = South
- 8 = North

**WARNING**

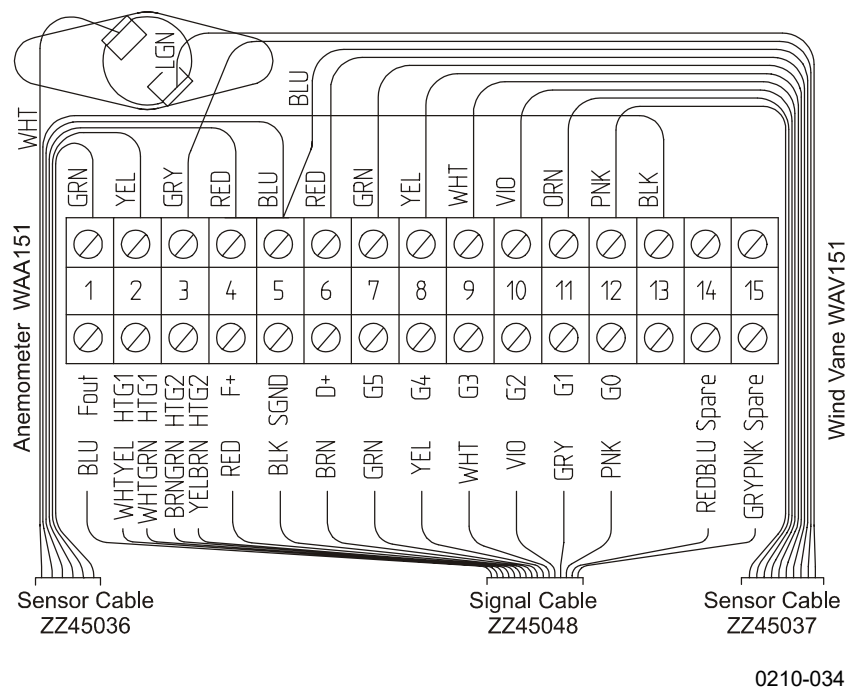
Using a long cable between different units (sensors, transmitters, power supplies, and displays) can cause a lethal surge voltage, if a lightning strike occurs in the vicinity. Always ground the mast equipment case close to the mast with a short and low-resistance cable.

## Connections

At the factory, the cables are connected for the 151 series wind sensors. If you install 252 series wind sensor combination, you have to change the connections in the junction box of WAC151 Cross Arm.

### 151 Series Wind Sensors

Usually both 151 series wind sensors are connected to the junction box of the WAC151 cross arm simultaneously. Figure 7 on page 14 illustrates the standard wiring diagram for the 151 series wind sensors. The thermostat switch in the upper left corner is always included for temperature control of the shaft heating power.



**Figure 7      Wiring Diagram for 151 Series Sensors**

## 252 Series Wind Sensors

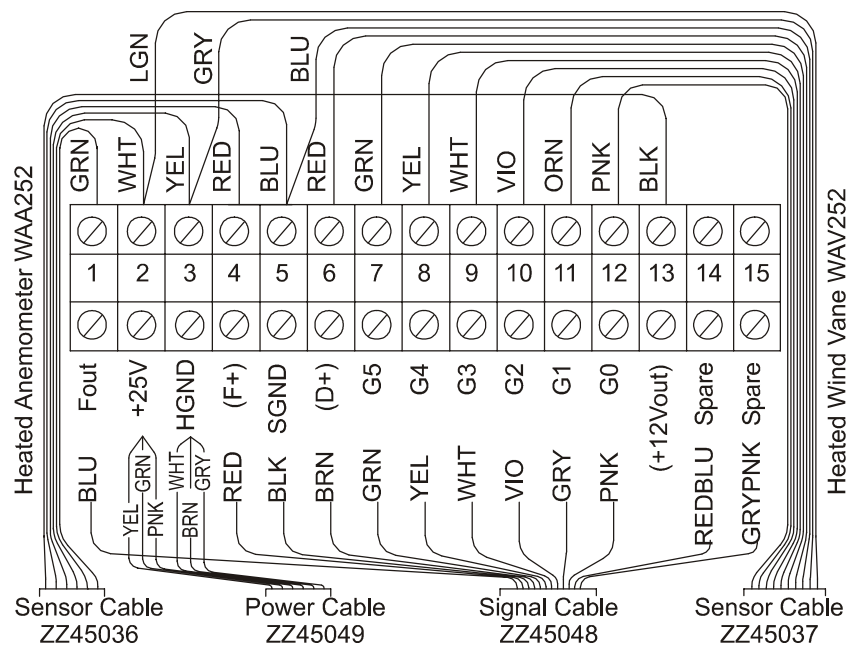
Figure 8 on page 15 provides the wiring diagram for the 252 series wind sensors mounted on WAC151 Cross Arm.

When using the standard power and signal cables (ZZ45049 and ZZ45048) the connections are made as follows:

1. For power supply, connect the YEL, GRN, and PNK colored wires to the screw terminal #2 and the WHT, BRN, and GRY colored wires to the terminal #3.
2. For signal output, connect wires GRN, YEL, WHT, VIO, GRY, and PNK to terminals #7 to #12. For signal grounding, connect BLK to the terminal #5.
3. For the optional sensor power input, connect BRN to the terminal #6.

As a power source, it is recommended to use Vaisala WHP25 Mains Power Supply, which has a mast mountable, all-weather enclosure.





0210-035

**Figure 8     Wiring Diagram for 252 Series Sensors**

## Alignment

After mounting the WAC151 cross arm to the mast, check that the anemometer end of the cross arm is pointing north with the required accuracy, see Figure 5 on page 12. To ensure correct assemblage after aligning WAC151, the sensors can only be mounted in one way.

## Verification

If the signal cable from WAC151 is connected to the data collection system and the system is powered up, check that the wind readings react correctly. To test the anemometer, rotate the cups manually. To test the wind vane, hold the vane in a few fixed angles and verify data.

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## CHAPTER 4

# MAINTENANCE

This chapter provides information that is needed in basic maintenance of WAC151 Cross Arm.

## Periodic Maintenance

### Visual Checking

Check every 1 to 2 years that the printed circuit board is not corroded.

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## CHAPTER 5

# TROUBLESHOOTING

This chapter describes common problems, their probable causes and remedies, and provides contact information.

## Common Problems

**Table 3      Some Common Problems and their Remedies**

<b>Problem</b>	<b>Probable Cause</b>	<b>Remedy</b>
Data is not received by the data collection system.	Improper or loose connections	Check wiring and tighten the screw terminals.
Shaft heating of the 151 series sensors is not working.	Improper or loose connections	Check wiring and tighten the screw terminals.
	Heating is not connected.	Check the connections.

## Getting Help

For technical questions or for comments on the manuals, contact the Vaisala technical support:

E-mail            [helpdesk@vaisala.com](mailto:helpdesk@vaisala.com)

Telephone        +358 9 8949 2789

Fax                +358 9 8949 2790

## Return Instructions

If the product needs repair, please follow the instructions below to speed up the process and avoid extra costs.

1. Read the warranty information.
2. Write a Problem Report with the name and contact information of a technically competent person who can provide further information on the problem.
3. On the Problem Report, please explain:
  - What failed (what worked / did not work)?
  - Where did it fail (location and environment)?
  - When did it fail (date, immediately / after a while / periodically / randomly)?
  - How many failed (only one defect / other same or similar defects / several failures in one unit)?
  - What was connected to the product and to which connectors?
  - Input power source type, voltage and list of other items (lighting, heaters, motors etc.) that were connected to the same power output.
  - What was done when the failure was noticed?
4. Include a detailed return address with your preferred shipping method on the Problem Report.
5. Pack the faulty product using an ESD protection bag of good quality with proper cushioning material in a strong box of adequate size. Please include the Problem Report in the same box.
6. Send the box to:  
Vaisala Oyj  
Contact person / Division  
Vanha Nurmijärventie 21  
FIN-01670 Vantaa  
Finland

## CHAPTER 6

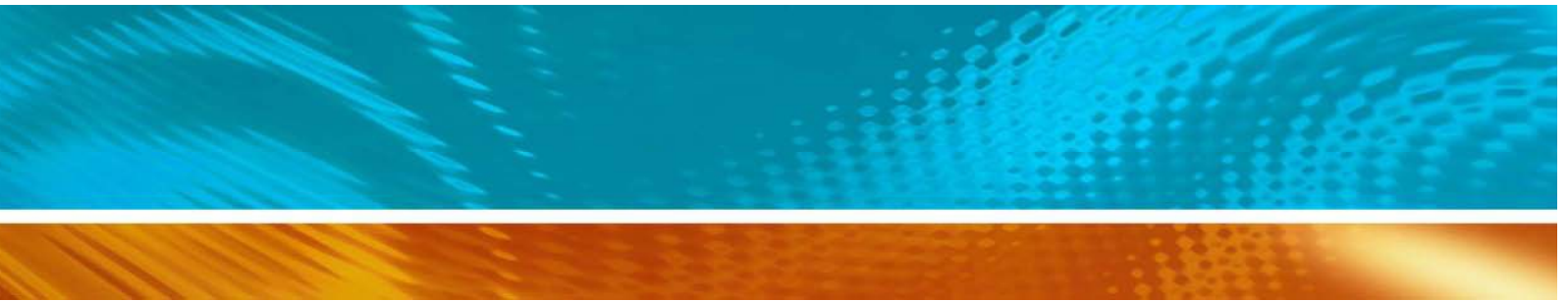
# TECHNICAL DATA

This chapter provides technical data of WAC151 Cross Arm.

## Specifications

**Table 4      WAC151 Cross Arm Specifications**

Property	Description / Value
I/O connectors	Screw terminal connectors (15 pcs) for the sensors and power lines.
Cable entries Signal cable	Totally four Through a gland (for cable diameter 7 ... 10mm) with coaxial connectability of the cable screen, for proper RF shielding.
Sensor cables	Through two rubber glands.
Thermostat switch	Connects at +4 °C ( $\pm 3$ °C) Disconnects at +11 °C ( $\pm 3$ °C)
Mounting	Clamp for a pole mast with a nominal outside diameter 60 mm.
Material Cross Arm Junction Box	Al, anodized Al, painted
Dimensions Cross Arm length Junction Box	800 mm 125 x 80 x 57 mm
Weight	1.5 kg (without sensors)



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