SEVEN
SENSOR SOLUTIONS

3S-WD

Wind Direction Sensor

USER MANUAL

USER MANUAL TABLE OF CONTENTS

Waste Disposal

This symbol indicates that the product is subject to European Union regulations on separate waste disposal. This applies to both the product itself and any accessories bearing the same symbol. Such products must not be disposed of as unsorted household waste.

Note: *SEVEN reserves the right to make changes on this document without prior notice.*

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1. Introduction

The Wind Direction Sensor is part of the SEVEN meteorological sensor series, which comprises professional, intelligent measurement sensors with a digital or analog interface for environmental and industrial applications such as PV plants and meteorological sites. It is a measurement transmitter used to measure horizontal wind direction.

Figure 1 – Aluminum Wind Direction Sensor

Figure 2 - Plastic Wind Direction Sensor

The measured horizontal wind direction data are transmitted to data loggers and receiver units as analog or digital output signals, according to the input requirements.

SEVEN products use reliable and high-quality components to deliver accurate meteorological data in environmental and industrial applications. They are specifically designed to meet the requirements of PV plant monitoring systems.

The product list, including product codes, is provided in Table 1.

Type	Item Code	Housing Material	Output
1	**3S-WD-A**	Aluminum	ADC
2	**3S-WD-MB-A**	Aluminum	Modbus RTU
3	**3S-WD-I-A**	Aluminum	Analog (4-20 mA)
4	**3S-WD-P**	Plastic (ASA)	ADC
5	**3S-WD-MB-P**	Plastic (ASA)	Modbus RTU
6	**3S-WD-I-P**	Plastic (ASA)	Analog (4-20 mA)

Table 1 - Item List and Codes

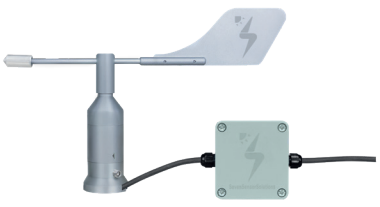
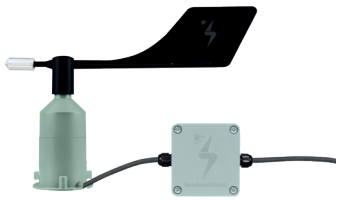
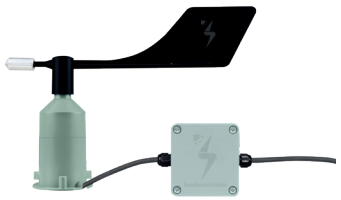
		
3S-WD-A	**3S-WD-MB-A**	**3S-WD-I-A**
		
3S-WD-P	**3S-WD-MB-P**	**3S-WD-I-P**

Figure 3 - Models

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2. Wind Direction Sensor Installation

It is suggested that the system be operated at ground level to make sure that all components are working properly prior to installation. A general diagram of the progress of the installation steps is given below.

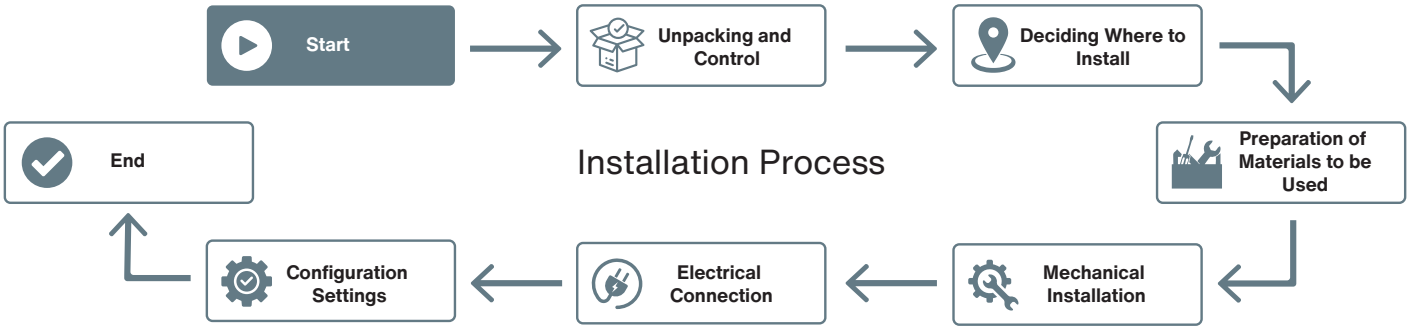

Figure 4 – Installation Process

2.1. Unpacking and Control

Upon receipt of the product, it must be carefully checked whether the package content is complete. SEVEN Sensor must be contacted if any of the components are missing, damaged or defective.

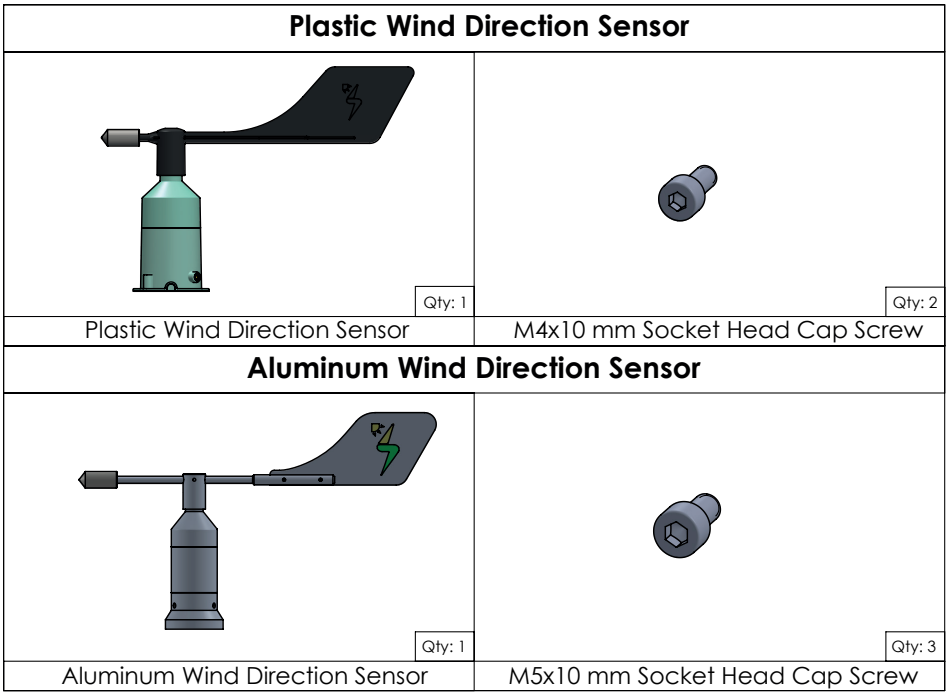

Figure 5 – Packing List

Note: *Quantity and content of the received material may be different based on the confirmed order.*

2.2. Site Requirements and Considerations

Each site is different and has its unique challenges. For this reason, the product installation may differ in each site. First, it should be decided where the product will be installed. The Wind Direction Sensor can be affected by obstructions and local topography.

The Wind Direction Sensor should be placed no closer than 10 times the height of any obstruction.

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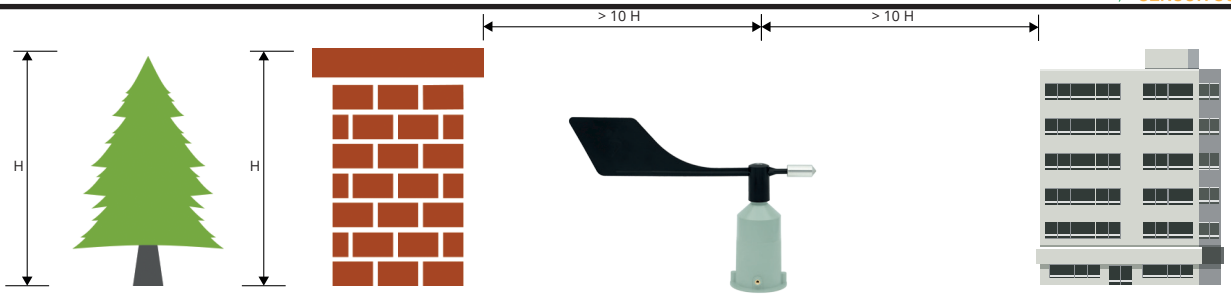

Figure 6 - Deciding where to Install

If the Wind Direction Sensor is to be mounted on a roof, it should preferably be installed on the side of the building facing the prevailing wind direction.

When placing the Wind Direction Sensor on the mounting structure, attention must be paid to the north direction mark, and it must be aligned to north with the help of a compass. The sensor must be positioned on a strictly vertical axis.

Figure 7 - Wind Direction Sensor – North Direction Mark

Correct and Incorrect Field Installation

For the Wind Direction Sensor to measure accurately in the field, it must be installed in a location with unobstructed airflow, at a sufficient distance from obstacles, above the top level of the panel, and with proper vertical alignment. In addition, the sensor's reference direction must be correctly aligned to geographic north. Installations under the panel, at a low level, in turbulent areas, or based on an incorrect reference point are considered incorrect installations. Examples of correct and incorrect field installations of the Wind Direction Sensor are shown in Figure 8.

Figure 8 - Correct and Incorrect Field Installation

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2.3. Preparation of Materials to be Used in Installation

The materials needed during installation are provided by SEVEN. The user should only prepare the following hand tools and personal protective equipment.

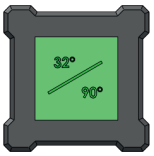
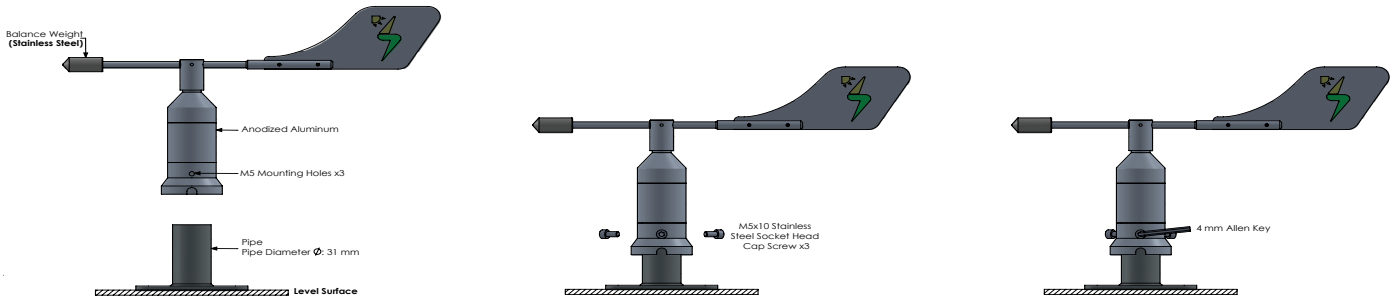
Materials		
		
Gloves	Tape Measure	Drill
		
3 mm - 4 mm Allen Key	Spirit Level	Digital Inclinometer

Figure 9 – Materials to be Used in Installation

2.4. Installation

3S-WD Wind Direction Sensor is designed with the Plug & Run principle. The installation can be easily completed by a qualified electrician by following SEVEN instructions.

2.4.1. Pipe Mounting



Step 1
The Wind Direction Sensor must be mounted on a pipe installed on a level surface along the vertical axis. The sensor must be strictly vertical.

Step 2
M5 screws must be fastened into the holes located on the side of the sensor.

Step 3
The screws must be tightened using a 4 mm Allen key.

Figure 10 - Aluminum Wind Direction Sensor Pipe Mounting

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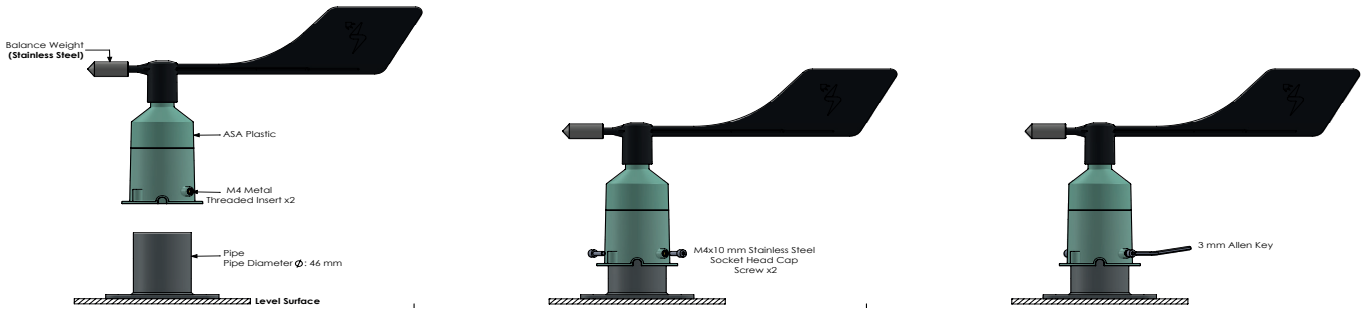


Step 1

The Wind Direction Sensor must be mounted on a pipe installed on a level surface along the vertical axis. The sensor must be strictly vertical.

Step 2

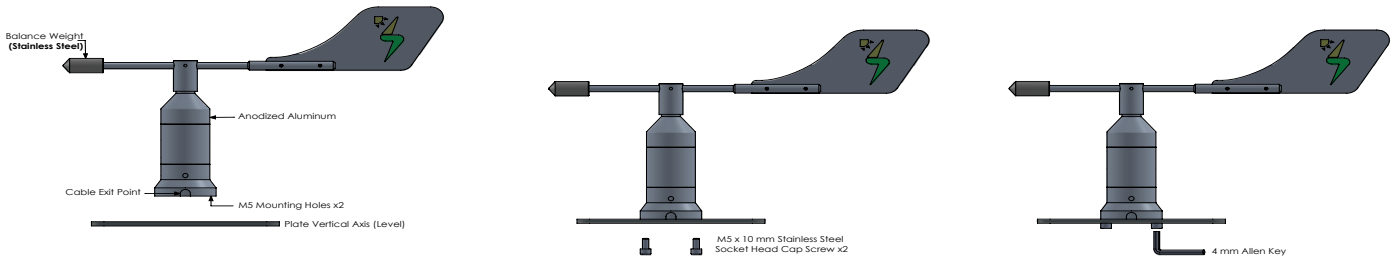
M4 screws must be fastened into the holes located on the side of the sensor.

Step 3

The screws must be tightened using a 3 mm Allen key.

Figure 11 - Plastic Wind Direction Sensor Pipe Mounting

2.4.2. Ground Mounting



Step 1

The Wind Direction Sensor must be mounted on a plate placed on a level surface along the vertical axis. The sensor must be strictly vertical.

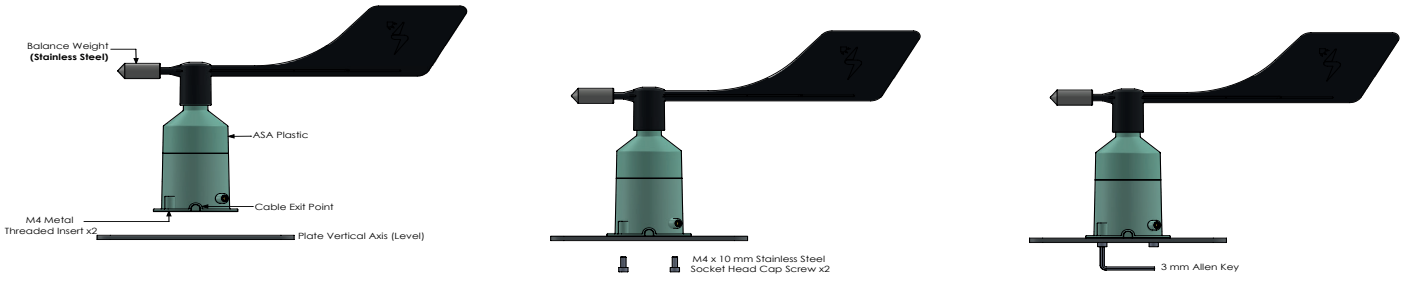
Step 2

The M5 screws must be fastened into the holes located on the bottom side of the sensor.

Step 3

The screws must be tightened using a 4 mm Allen key.

Figure 12 - Aluminum Wind Direction Sensor Ground Mounting



Step 1

The Wind Direction Sensor must be mounted on a plate placed on a level surface along the vertical axis. The sensor must be strictly vertical.

Step 2

The M4 screws must be fastened into the holes located on the bottom side of the sensor.

Step 3

The screws must be tightened using a 3 mm Allen key.

Figure 13 - Plastic Wind Direction Sensor Ground Mounting

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2.5. Inspection and Maintenance

Periodically check the tightness of the fasteners, the condition of the wiring, any damage, deterioration, or disconnection of the sensors and electrical enclosures, signs of moisture or pests in the enclosures, loose cable connections, brittle fasteners, and any other potential problems.

Note: *It is recommended to use thread-locking fluid for fasteners.*

According to IEC 61724-1:2021, the monitoring system should be inspected at least annually and preferably at more frequent intervals.

3. Cable Connections

The supply voltage for the Wind Direction Sensor's Modbus and 4–20 mA connections is 12–30 V DC. The 3S-WD is powered at 3,3 V. Operation with a supply voltage of 24 V is recommended.

Always route the communication and power cables of the Wind Direction Sensor separately from AC/DC cables.

Note: *The installation and electrical connections of SEVEN sensors must be carried out by a qualified electrician.*

3.1. Wind Direction Sensor (3S-WD)

This model is designed for use with the SEVEN Sensor Box.

Wire Assignment for Power & Communication	
Data Output	Green
Power (+)	Brown
Power (-)	White

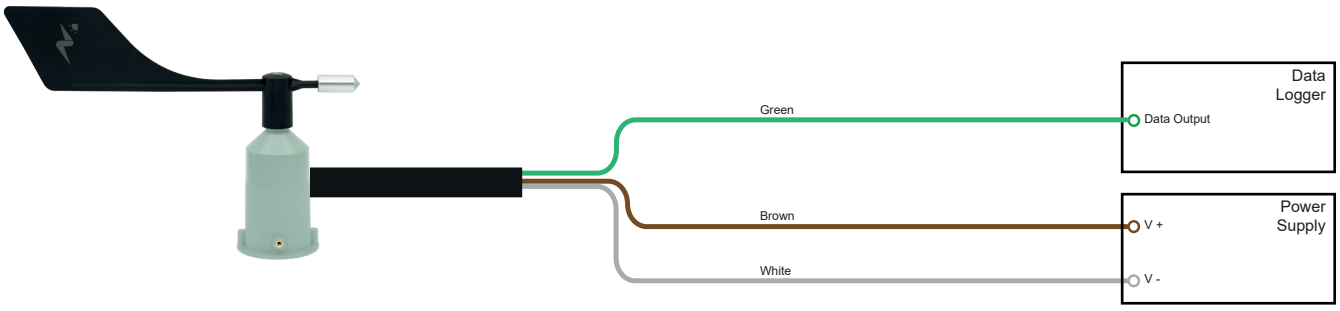

Figure 14 - 3S-WD-P Wire Assignment for Power & Communication

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Wire Assignment for Power & Communication	
Data Output	Green
Power (+)	Brown
Power (-)	White
Sensor Housing Ground	Provided by the customer

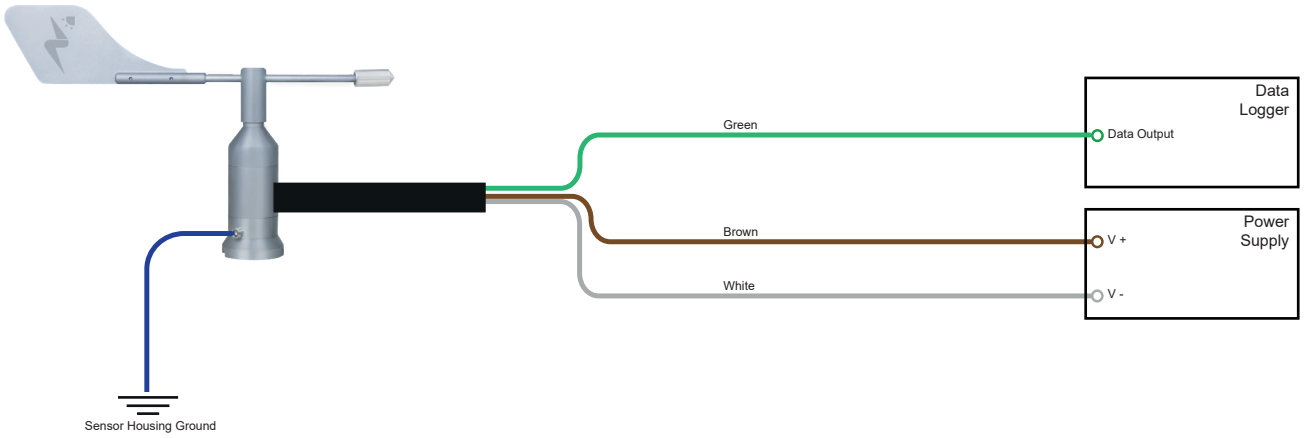

Figure 15 - 3S-WD-A Wire Assignment for Power & Communication

3.2. Wind Direction Sensor (3S-WD-MB)

The Wind Direction Sensor features an electrically isolated, half-duplex, 3-wire RS485 interface for configuration, communication, and firmware updates.

Wire Assignment for Power & Communication	
Signal Ground	Red
RS485 A / Data (+)	Green
RS485 B / Data (-)	Yellow
Power (+)	Brown
Power (-)	White
Protective Grounding	Black

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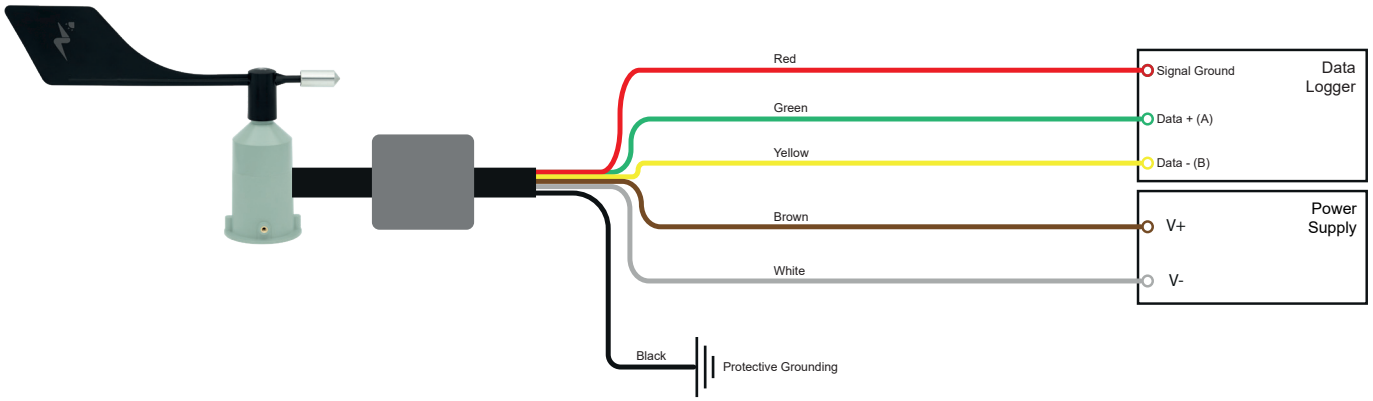

Figure 16 - 3S-WD-MB-P Wire Assignment for Power & Communication

Wire Assignment for Power & Communication	
Signal Ground	Red
RS485 A / Data (+)	Green
RS485 B / Data (-)	Yellow
Power (+)	Brown
Power (-)	White
Protective Grounding	Black
Sensor Housing Ground	Provided by the customer

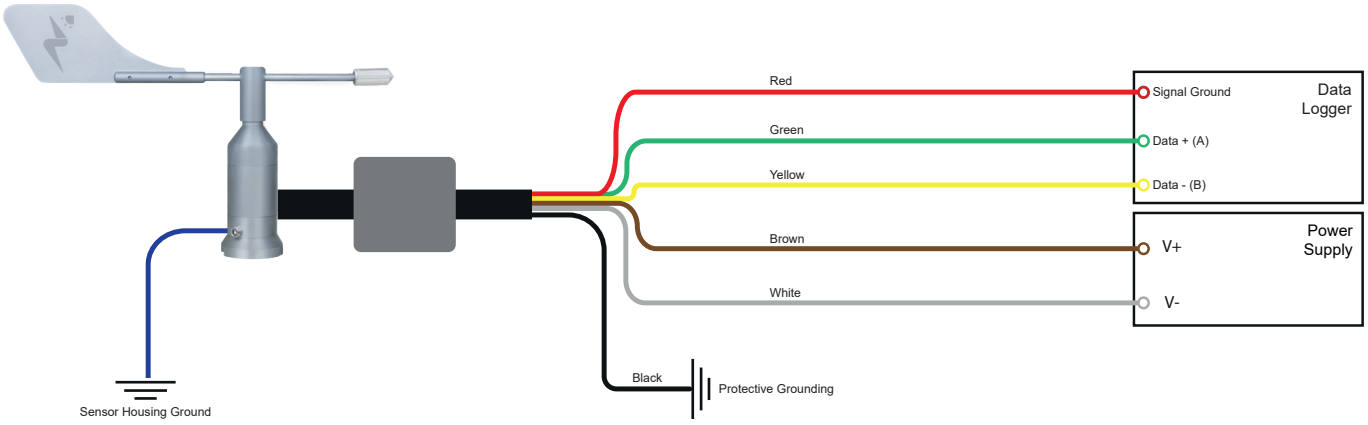

Figure 17 - 3S-WD-MB-A Wire Assignment for Power & Communication

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3.3. Wind Direction Sensor (3S-WD-I)

Wire Assignment for Power & Communication	
4-20 mA (+)	Green
4-20 mA (-)	Yellow
Power (+)	Brown
Power (-)	White
Protective Grounding	Black

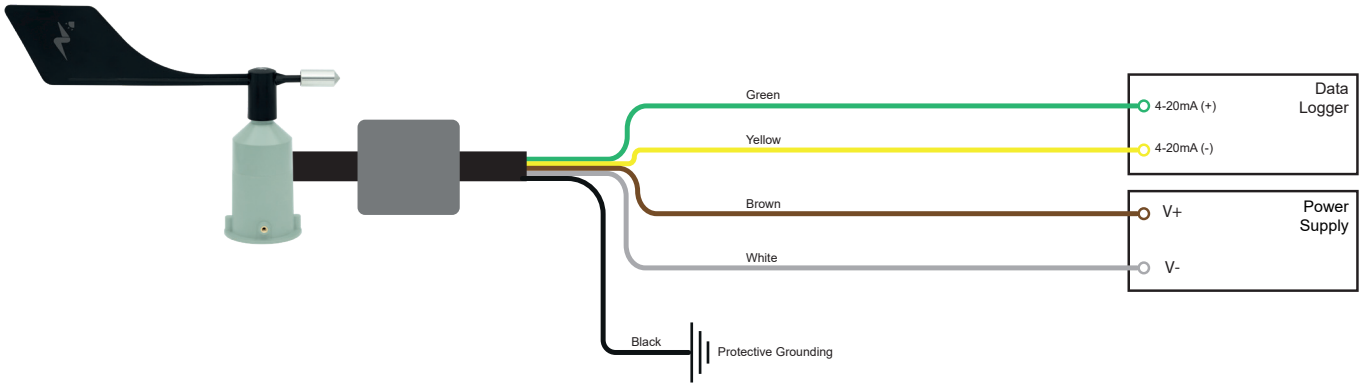

Figure 18 - 3S-WD-I-P Wire Assignment for Power & Communication

Wire Assignment for Power & Communication	
4-20 mA (+)	Green
4-20 mA (-)	Yellow
Power (+)	Brown
Power (-)	White
Protective Grounding	Black
Sensor Housing Ground	Provided by the customer

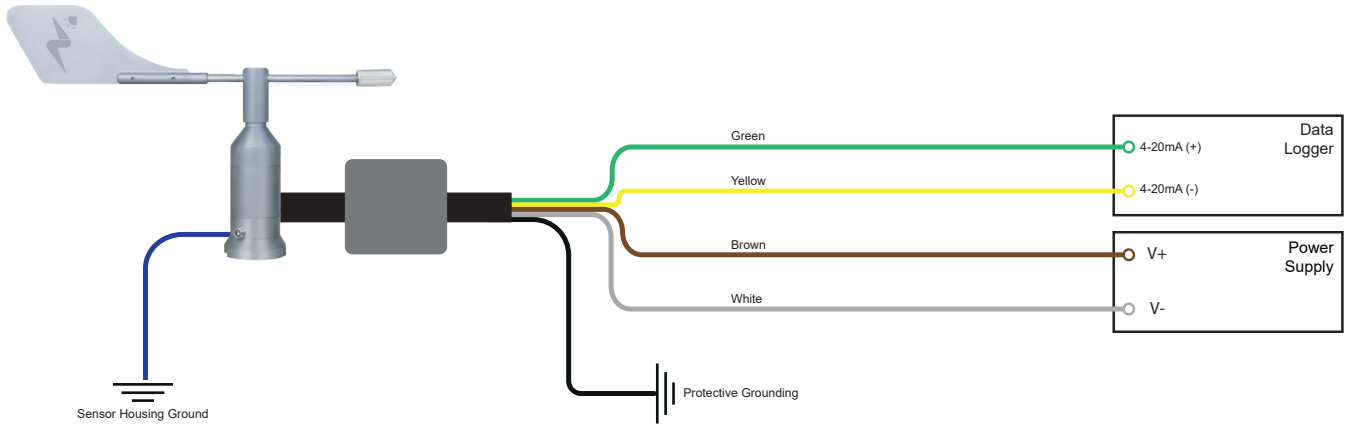

Figure 19 - 3S-WD-I-A Wire Assignment for Power & Communication

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Enter the 4–20 mA sensor configuration information into your data logger as shown below.

Operating Parameters	
Lower Limit	0°
Upper Limit	359,9°
Start mA	4 mA
End mA	20 mA

4. Configuration and Communication

After the Modbus Wind Direction Sensor has been correctly installed and connected, the sensor starts measuring autonomously.

Attention must be paid to the following points:

- A measurement test must be performed on the Wind Direction Sensor using the 3S-WD Configuration Tool, and its proper operation in the field must be verified.
- To ensure accurate wind measurement data, the Modbus Wind Direction Sensor must be aligned to geographic north.
- If multiple Modbus devices are operated on the same network, a unique device ID must be assigned to each device.

Note: *The 3S-WD Configuration Tool is used for the 3S-WD-MB Wind Direction Sensor model.*

Follow SEVEN instructions to configure the Modbus Wind Direction Sensor on data loggers.

4.1. 3S-WD Configuration Tool

The 3S-WD Configuration Tool is a software tool used to test the communication of the Modbus Wind Direction Sensor, configure its Modbus parameters, and update the sensor's firmware.

For configuration and testing, you need a Windows® PC with a serial bus interface set as a serial COM port, the 3S-WD-MB Configuration Tool software, and a USB-to-RS485 converter.

For more details, please refer to the 3S-WD Configuration Tool User Manual:
https://www.sevensensor.com/files/d/en/3S-Wind_Direction_Sensor_Configuration_Tool_v1.0.pdf

4.2. Modbus Map

The Modbus addresses and features required to configure the Wind Direction Sensor with systems such as data loggers are specified in the table below.

ID-Dec	ID-Hex	Register	Range	Resolution	Description
30019	0x13	Wind Direction	0...359,9°	0,1°	Horizontal Wind Direction

Table 2 - Modbus Addresses and Properties

Note: *The table above lists the addresses that need to be monitored by the user for the Wind Direction Sensor software version 2 and 2.1. If additional Modbus and SunSpec addresses or the software-specific features of these addresses are required, you can download the detailed Modbus map from the link below.*

https://www.sevensensor.com/download

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5. Contact Details

Please feel free to contact us if you face any difficulties during installation or configuration.

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