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1. WSS-09 -- 9 in 1 Weather Station Sensor

1.1 Overview and Spec

Older versions of interfaces



New version of the interface



Power Input: 10 ~ 30VDC

Max Power Consumption: 1.2W

Wind Speed:

- Range: 0~60m/s
- Accuracy: $\pm(0.2\text{m/s}\pm 0.02*v)$ (v : the wind speed)
- Ultrasonic measurement, no start wind strength needed

Wind Direction:

- Range: 0~3599
- Accuracy: $\pm 3^\circ$
- Ultrasonic measurement, no start wind strength needed
- Built-in electronic compass. No need to consider installation direction

Temperature:

- Range: $-40^\circ\text{C} \sim +80^\circ\text{C}$
- Accuracy: $\pm 0.5^\circ\text{C}$

Humidity:

- Range: 0 ~ 99% RH
- Accuracy Tolerance : Typ $\pm 3\%$ RH

Air Pressure:

- Accuracy: $\pm 0.15\text{kPa}@25^\circ\text{C}$ 101kPa
- Range: 0~120kPa

Noise:

- Range: 30dB~120dB
- Accuracy: $\pm 0.5\text{dB}$

PM2.5:

- Range: 0~1000ug/m3
- Accuracy: $\pm 3\%$ FS
- Resolution: 1ug/m3

PM10:

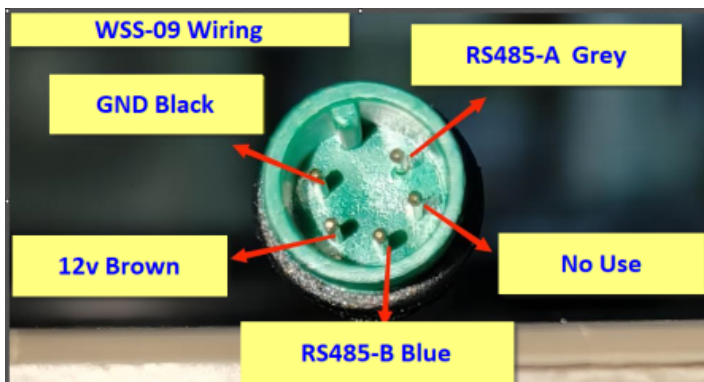
- Range: 0~1000ug/m3
- Accuracy: $\pm 3\%$ FS
- Resolution: 1ug/m3

Illumination:

- Range: 0~200k Lux
- Accuracy: $\pm 7\%$ (25 °C)

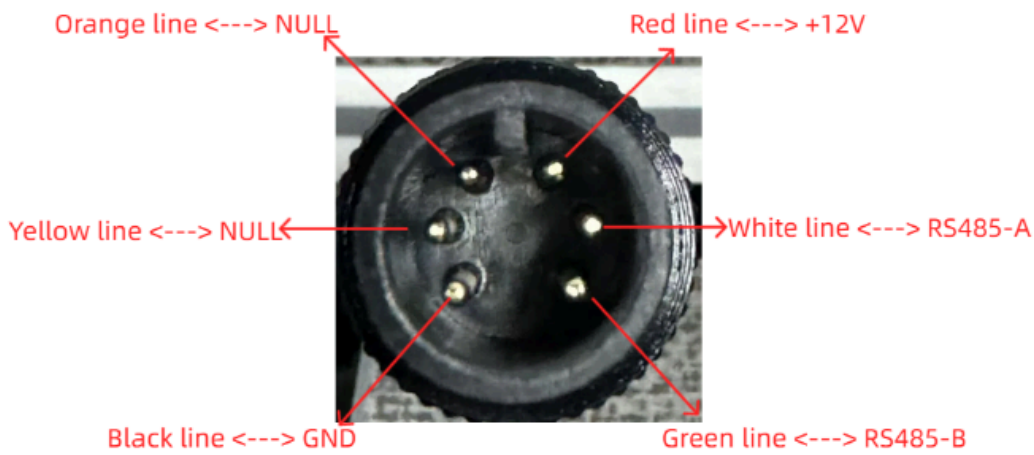
1.2 Wiring

1.2.1 Older version wiring



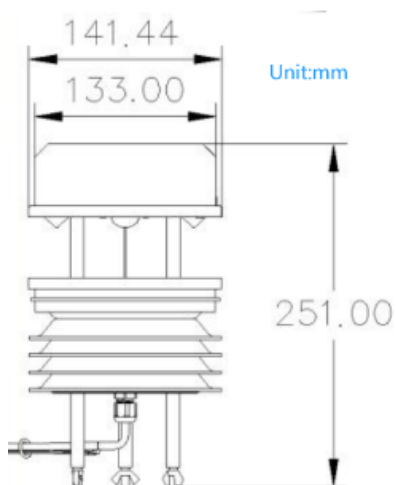
1.2.2 New version wiring

WSS-09 Wiring



1.3 Mechanical Drawing

Device Dimension



Installation

- Make sure the device is horizontal installed
- Device include electronic compass. No need to consider installation direction to get correct wind direction.

1.4 RS485 Commands

The RS485 command is as follows: [Weather_Sensors_Modbus_Command_List \(/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1\)](http://wiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1)

2. WSS-08 -- Optical Range Guage

2.1 Overview and Spec

Older versions of interfaces



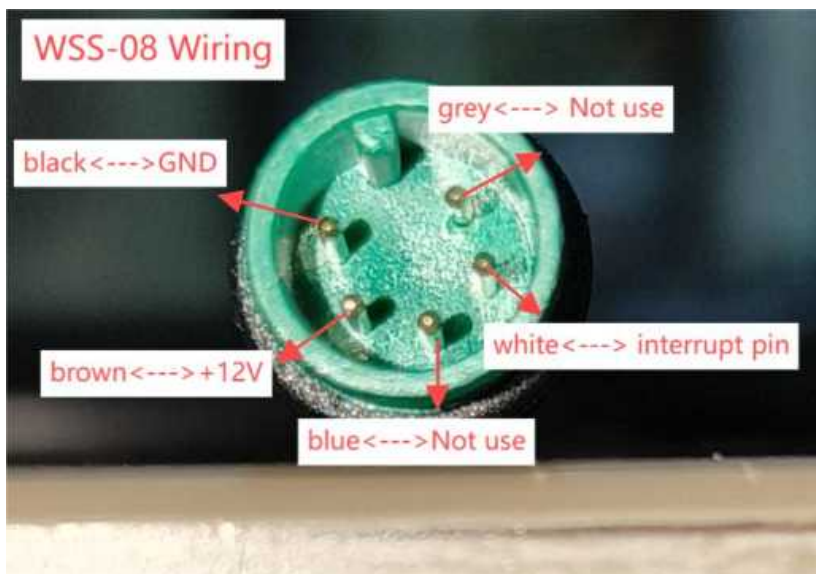
New version of the interface



- Input Power: 9~30 VDC
- Sense diameter: 6cm
- Pulse Output, each pulse , 0.1mm
- Max rain: 24mm/min
- Operation Temperature: -40 ~ 60 °C
- Operation Humidity: 0~99%RH(no dew)

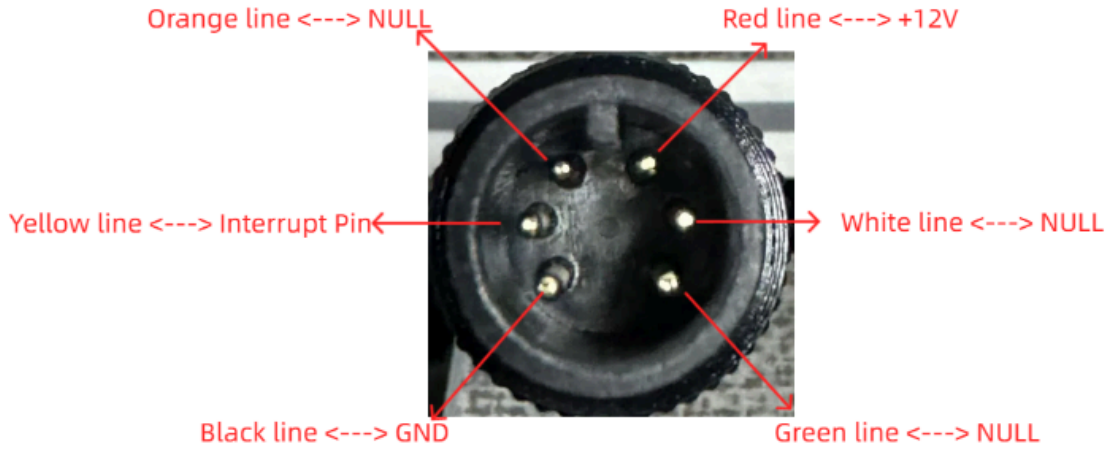
2.2 Wiring

2.2.1 Older version wiring



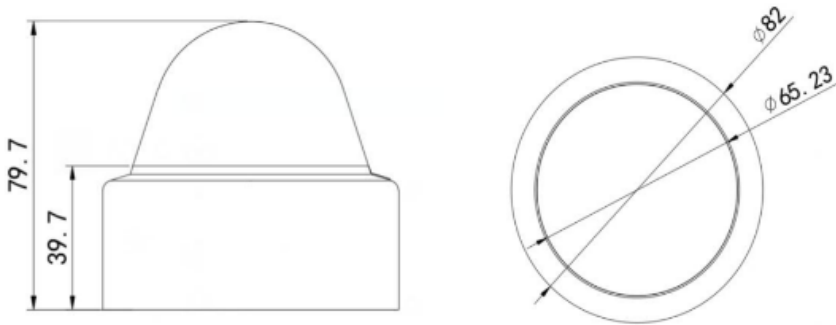
2.2.2 New version wiring

WSS-08 Wiring

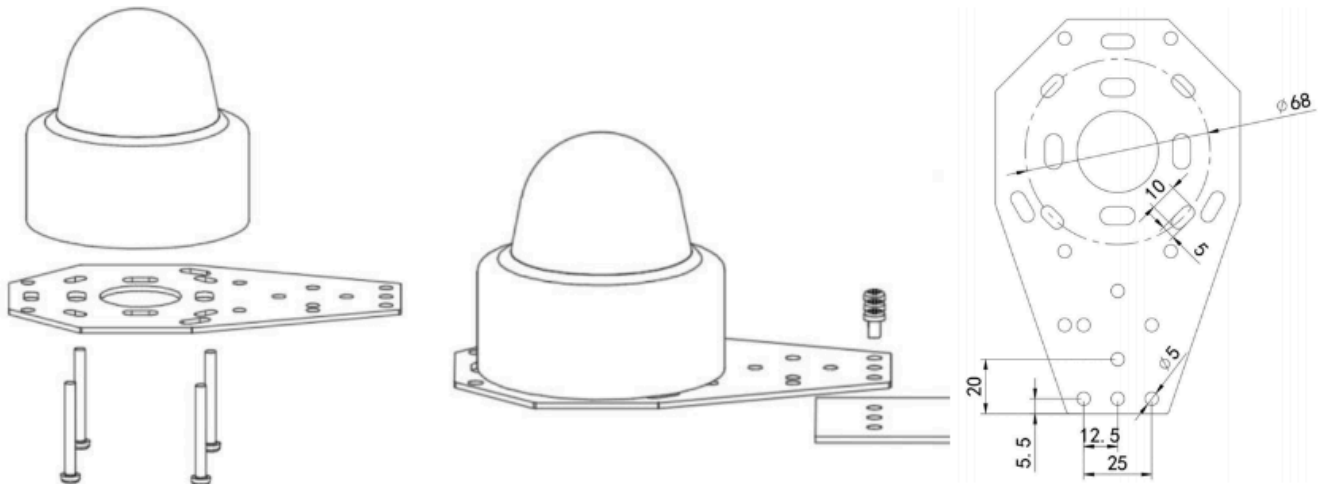


2.3 Mechanical Drawing

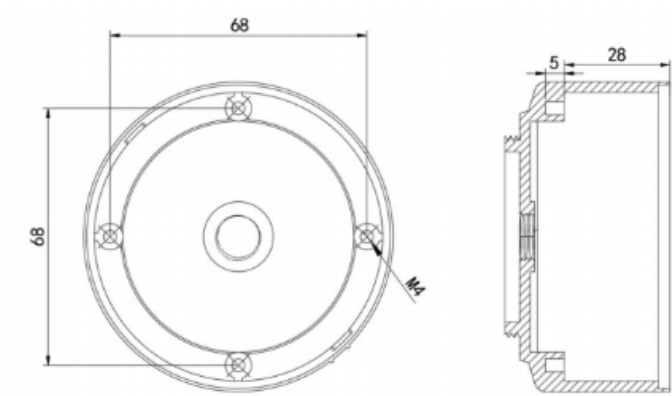
Device Dimension



Bracket Dimension



Install without Bracket

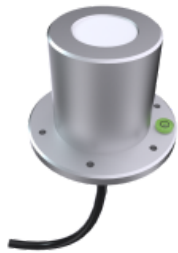


3. WSS-27 -- PAR (Photosynthetically Available Radiation)

WSS-27 photosynthetically active radiation sensor is mainly used to measure the photosynthetically active radiation of natural light in the wavelength range of 400-700nm.

WSS-27 use precision optical detectors and has an optical filter of 400-700nm, when natural light is irradiated, a voltage signal proportional to the intensity of the incident radiation is generated, and its luminous flux density is proportional to the cosine of the direct angle of the incident light.

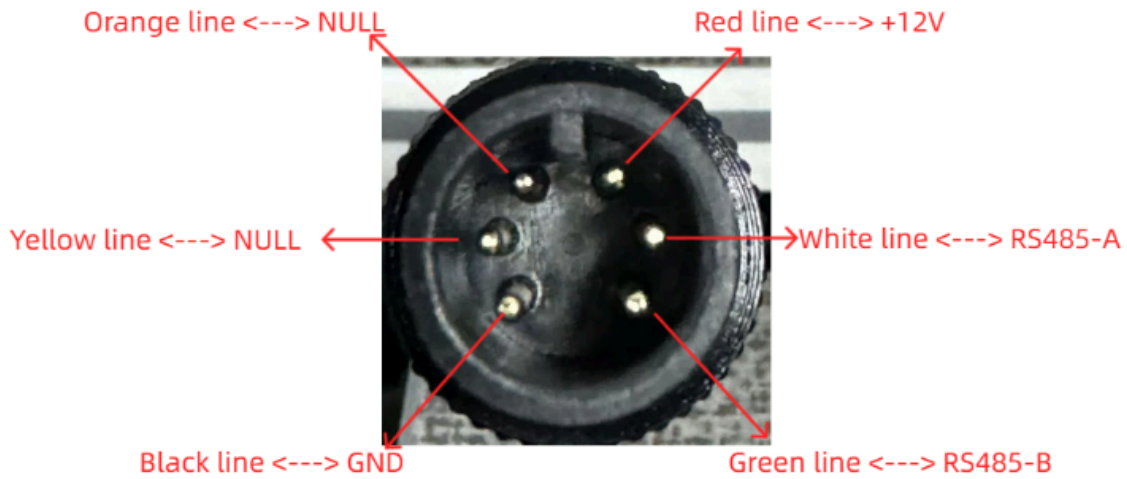
3.1 Specification



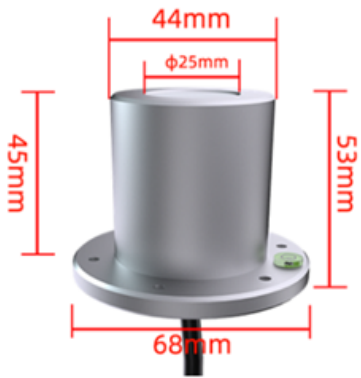
- Input Power: DC 5 ~ 24v
- Interface: RS485
- Response Spectrum: 400~700nm
- Measure range: 0 ~ 2500 μ mol/m²•s
- Resolution: 1 μ mol/m²•s
- Accuracy: \pm 2%
- Yearly Stability: \leq \pm 2%
- Working Temperature: -30°C ~ 75°C
- Working Humidity: 10 ~ 90%RH
- Power Consumption: 5mA @ 12v & 6mA @ 5v
- Stable Time: 5s

3.2 Wiring

WSS-27 Wiring



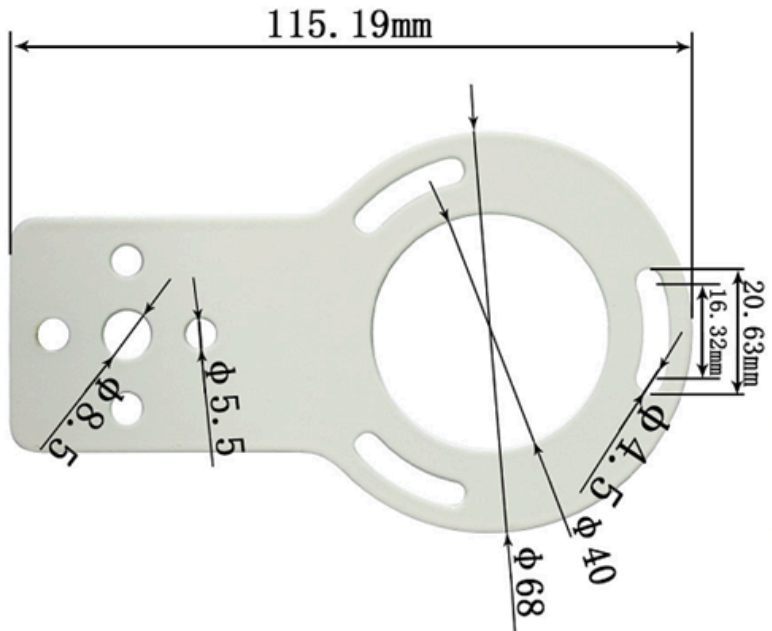
3.3 Dimension



3.4 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.





3.5 RS485 Commands

The RS485 command is as follows: [Weather Sensors Modbus Command List](#)

([/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1](#))

4. WSS-26 -- Total Solar Radiation sensor

WSS-26 is Total Radiation Sensor can be used to measure the total solar radiation in the spectral range of 0.3 to 3 μm (300 to 3000 nm). If the sensor face is down, the reflected radiation can be measured, and the shading ring can also be used to measure the scattered radiation.

The core device of the radiation sensor is a high-precision photosensitive element, which has good stability and high precision; at the same time, a precision-machined PTTE radiation cover is installed outside the sensing element, which effectively prevents environmental factors from affecting its performance.

4.1 Feature

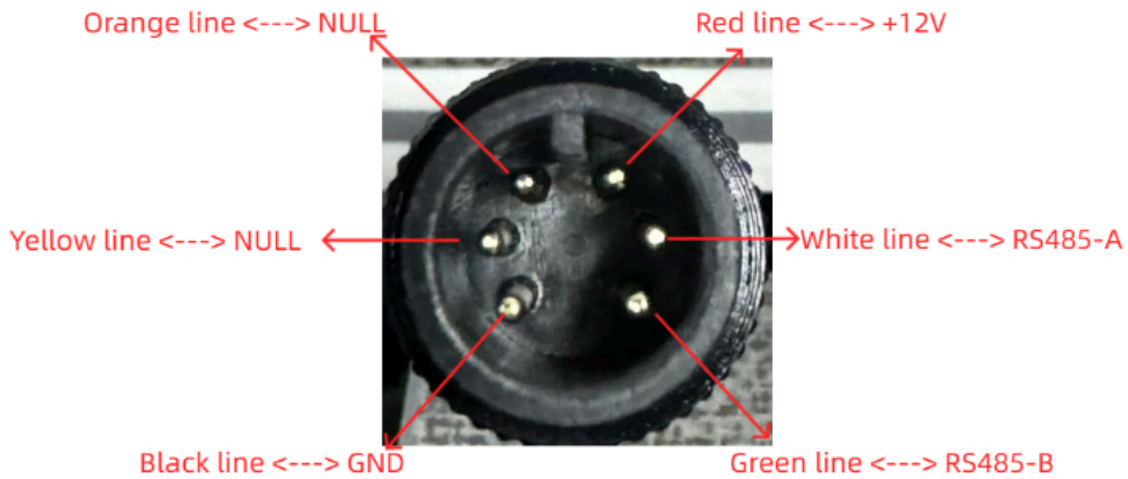
- RS485 Total Solar Radiation sensor
- Measure Total Radiation between 0.3 ~ 3 μm (300 ~ 3000nm)
- Measure Reflected Radiation if sense area towards ground.

4.2 Specification

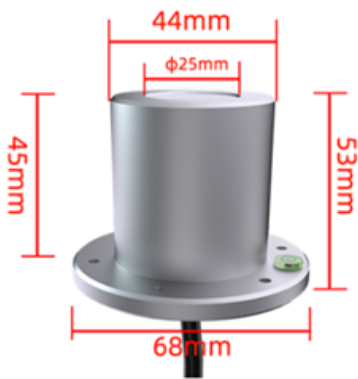
- Input Power: DC 5 ~ 24v
- Interface: RS485
- Detect spectrum: 0.3 ~ 3 μm (300 ~ 3000nm)
- Measure strength range: 0 ~ 2000W/m²
- Resolution: 0.1W/m²
- Accuracy: $\pm 3\%$
- Yearly Stability: $\leq \pm 2\%$
- Cosine response: $\leq 7\%$ (@ Sun angle 10°)
- Temperature Effect: $\pm 2\%$ (-10°C ~ 40°C)
- Working Temperature: -40°C ~ 70°C
- Working Humidity: 10 ~ 90%RH
- Power Consumption: 4mA @ 12v

4.3 Wiring

WSS-26 Wiring



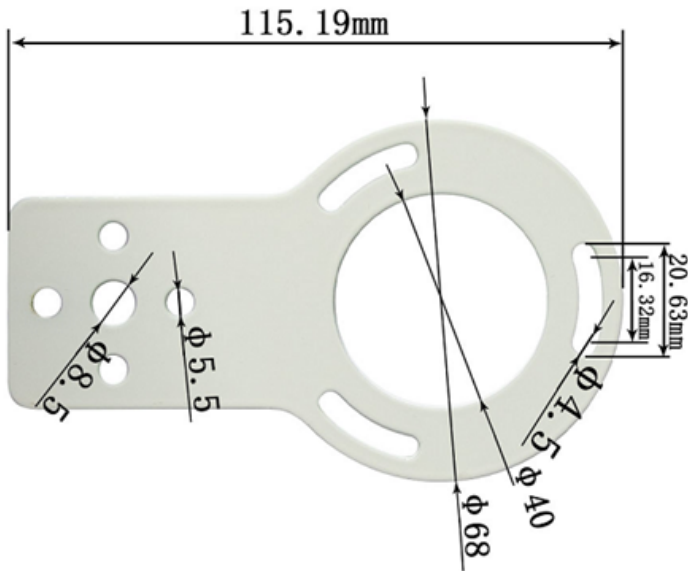
4.4 Device Dimension



4.5 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.





4.6 Calibration Values (K-value Adjustment)

In the event of deviations in the sensor values, calibration can be carried out by modifying the sensor's internal parameter: K-value parameter(**Default: 03E8(H)=1000(D)**).

Calibration Principle

The K-value scales the sensor's output. If multiple sensors measure the same parameter but show different values, adjust the K-value of the secondary sensor(s) to match the primary sensor's reading.

Step-by-Step Example:

Scenario:

- Sensor 1 (reference) reads 1500.
- Sensor 2 reads 2000, but should match Sensor 1's value (~1500).

Steps:

1. Calculate the K-value ratio:

Ratio=Desired Value/Current Value=1500/2000=0.75

Multiply by the default K-value (1000) to get the new K-value: 0.75×1000=750(Decimal)

2. Convert the new K-value to hexadecimal:

- 750(D) = 0x02EE(H)

3. Send the calibration command to Sensor 2:

- Command Format: **0B 06 00 53 [K-value (2 bytes)] [CRC]**
- Example for K-value 0x02EE: 0B 06 00 53 02 EE F8 5D

Notes:

1. Always use the sensor with the most trusted reading as the reference (do not modify its K-value).
2. The default K-value 03E8 (1000) implies no scaling. Values below 03E8 reduce the output; values above increase it.
3. CRC is auto-generated by the tool (no manual calculation needed).

4.6 RS485 Commands

The RS485 command is as follows:[Weather_Sensors_Modbus_Command_List](#)

([/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1](#))

5. WSS-25 -- Temperature, Humidity, Illuminance, Pressure

WSS-25 is a 4 in 1 RS485 sensor which can monitor Temperature, Humidity, Illuminance and Pressure at the same time.

5.1 Feature

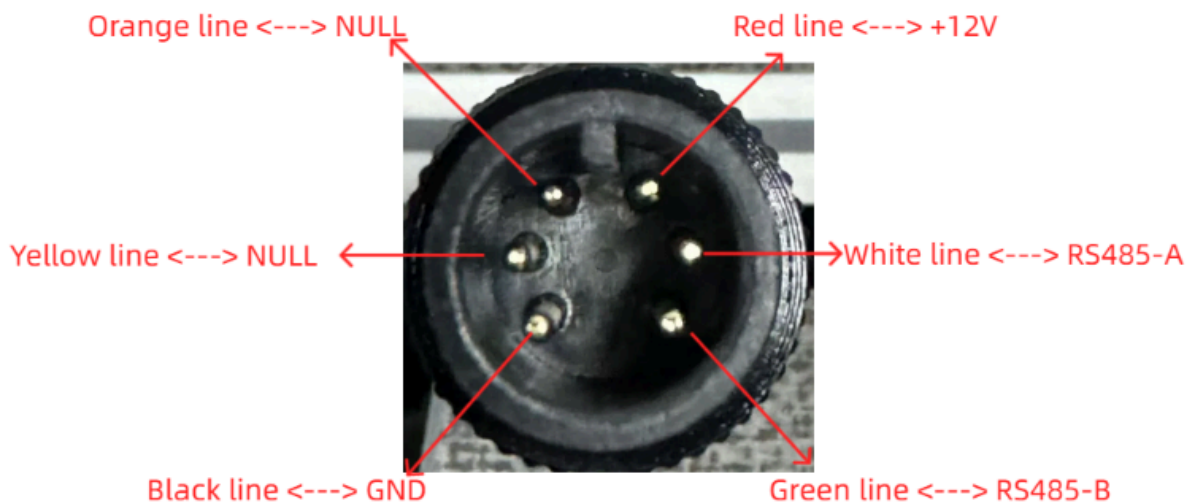
- RS485 Temperature, Humidity, Illuminance, Pressure sensor

5.2 Specification

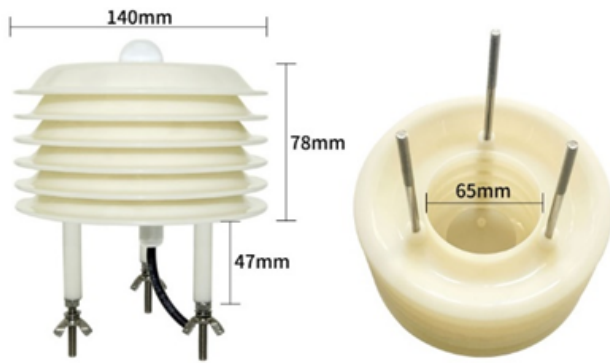
- Input Power: DC 12 ~ 24v
- Interface: RS485
- Temperature Sensor Spec:
 - Range: -30 ~ 70°C
 - resolution 0.1°C
 - Accuracy: ±0.5°C
- Humidity Sensor Spec:
 - Range: 0 ~ 100% RH
 - resolution 0.1 %RH
 - Accuracy: ±3% RH
- Pressure Sensor Spec:
 - Range: 10 ~ 1100hPa
 - Resolution: 0.1hPa
 - Accuracy: ±0.1hPa
- Illuminate sensor:
 - Range: 0~2/20/200kLux
 - Resolution: 10 Lux
 - Accuracy: ±3%FS
- Working Temperature: -30°C ~ 70°C
- Working Humidity: 10 ~ 90%RH
- Power Consumption: 4mA @ 12v

5.3 Wiring

WSS-25 Wiring

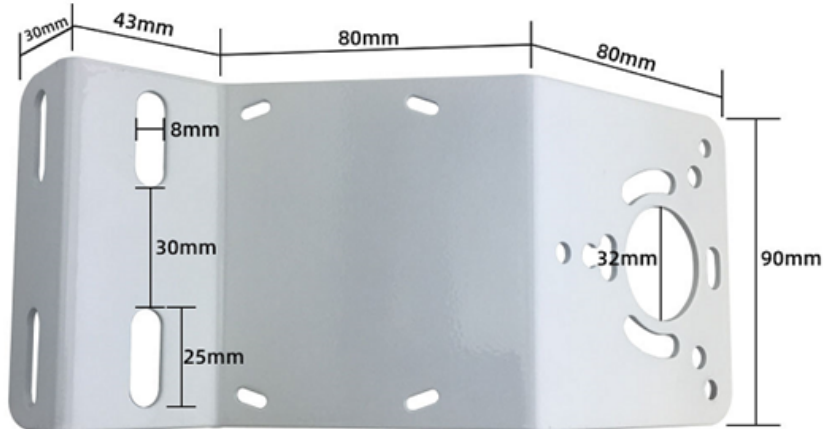
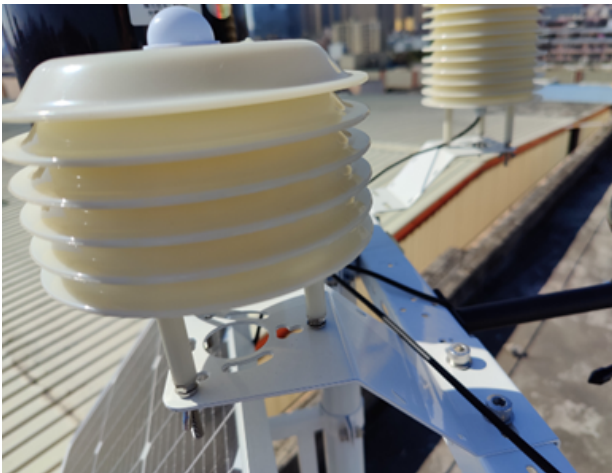


5.4 Dimension



5.5 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.



5.6 RS485 Commands

The RS485 command is as follows: [Weather Sensors Modbus Command List \(/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1\)](#)

6. WSS-24 -- Rain/Snow Detect

WSS-24 is a RS485 rain / snow detect sensor. It can monitor Rain or Snow event.

WSS-24 has auto heating feature, this ensures measurement more reliable.

6.1 Feature

- RS485 Rain/Snow detect sensor

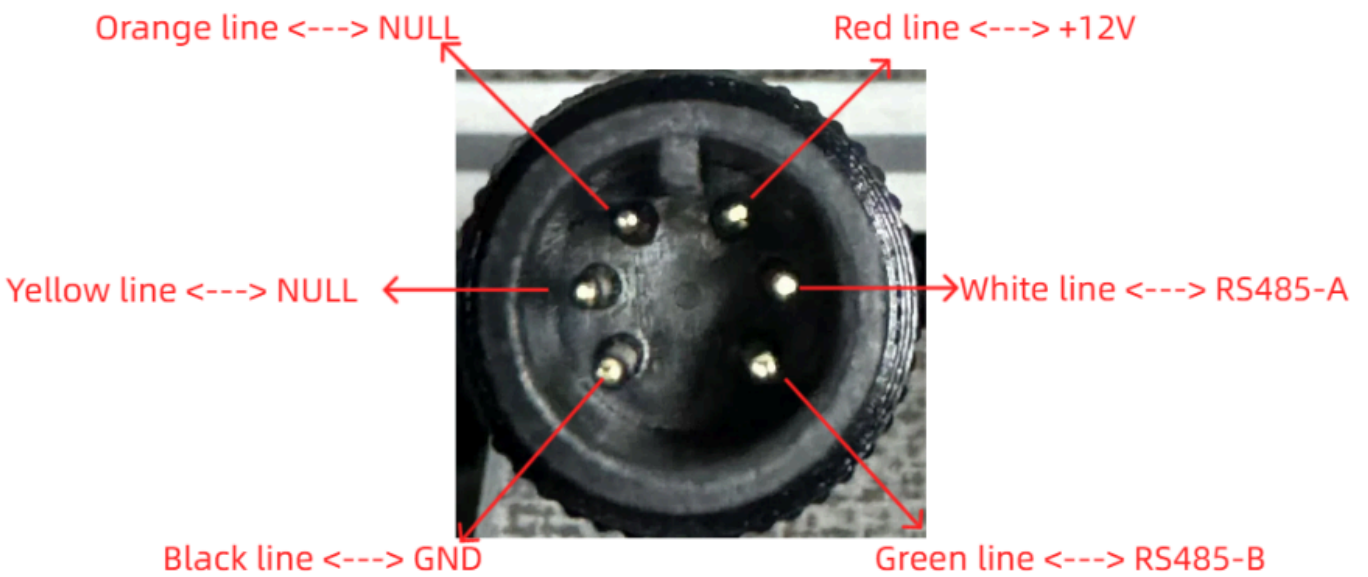
- Surface heating to dry
- grid electrode uses Electroless Nickel/Immersion Gold design for resist corrosion

6.2 Specification

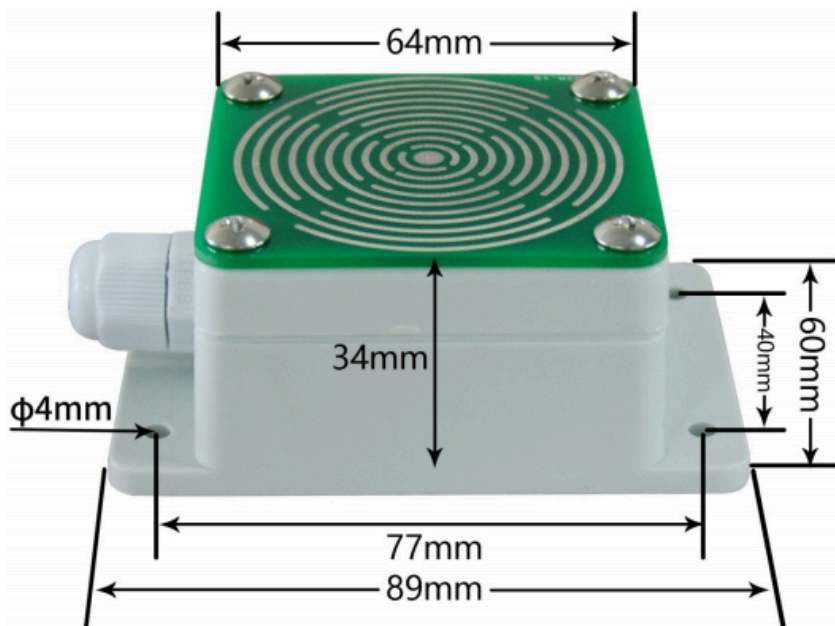
- Detect if there is rain or snow
- Input Power: DC 12 ~ 24v
- Interface: RS485
- Working Temperature: -30°C ~ 70°C
- Working Humidity: 10 ~ 90%RH
- Power Consumption:
 - No heating: 12mA @ 12v,
 - heating: 94ma @ 12v.

6.3 Wiring

WSS-24 Wiring



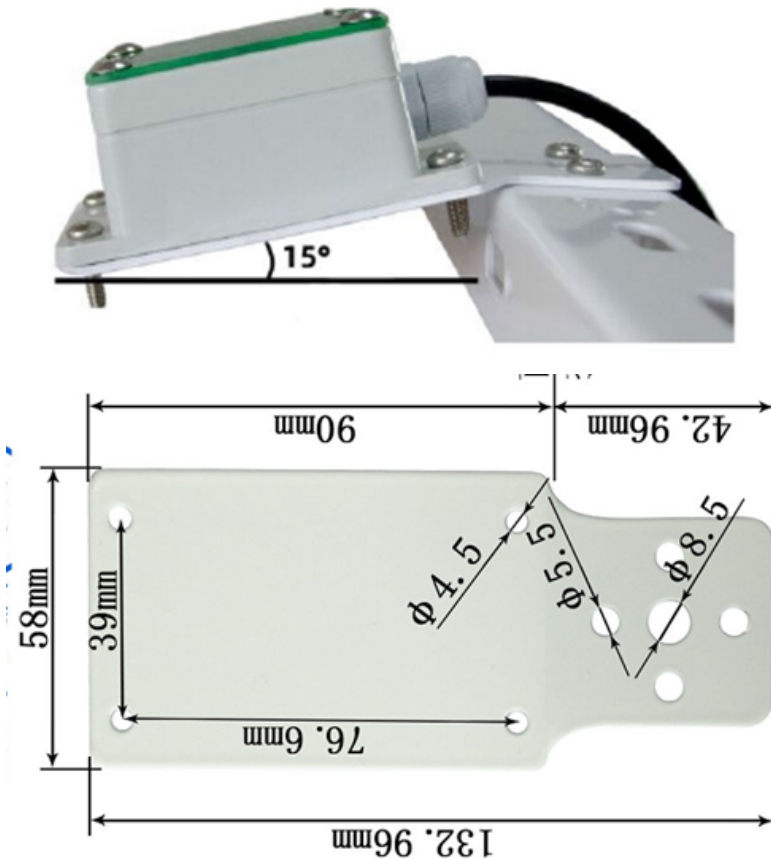
6.4 Dimension



6.5 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.

Install with 15°degree.



6.6 Heating

WSS-24 supports auto-heat feature. When the temperature is below the heat start temperature 15°C, WSS-24 starts to heat and stop at stop temperature (default is 25°C).

6.7 RS485 Commands

The RS485 command is as follows: [Weather Sensors Modbus Command List](#)

([/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1](#)).

7. WSS-23 -- CO2/PM2.5/PM10

WSS-23 is a RS485 Air Quality sensor. It can monitor CO2, PM2.5 and PM10 at the same time.

WSS-23 uses weather proof shield which can make sure the sensors are well protected against UV & radiation.

7.1 Feature

- RS485 CO2, PM2.5, PM10 sensor
- NDIR to measure CO2 with Internal Temperature Compensation
- Laser Beam Scattering to PM2.5 and PM10

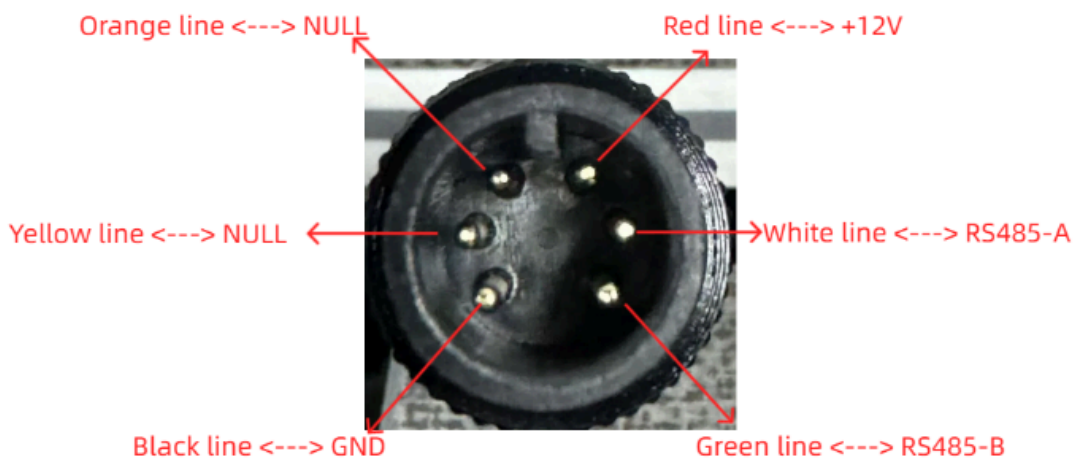
7.2 Specification

- CO2 Range: 0 ~ 5000ppm, accuracy: $\pm 3\%F \cdot S(25^\circ C)$
- CO2 resolution: 1ppm
- PM2.5/PM10 Range: 0 ~ 1000 $\mu g/m^3$, accuracy $\pm 3\%F \cdot S(25^\circ C)$

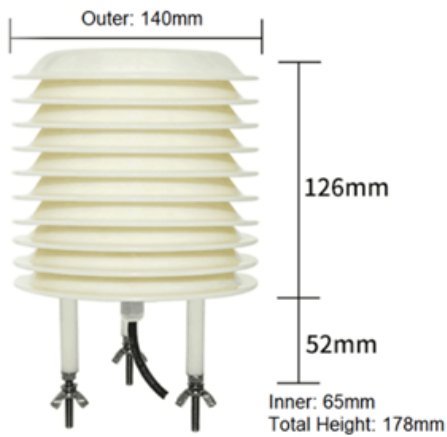
- PM2.5/PM10 resolution: 1 μ g/m³
- Input Power: DC 7 ~ 24v
- Preheat time: 3min
- Interface: RS485
- Working Temperature:
 - CO2: 0°C ~ 50°C;
 - PM2.5/PM10: -30 ~ 50°C
- Working Humidity:
 - PM2.5/PM10: 15 ~ 80%RH (no dewing)
 - CO2: 0 ~ 95%RH
- Power Consumption: 50mA@ 12v.

7.3 Wiring

WSS-23 Wiring

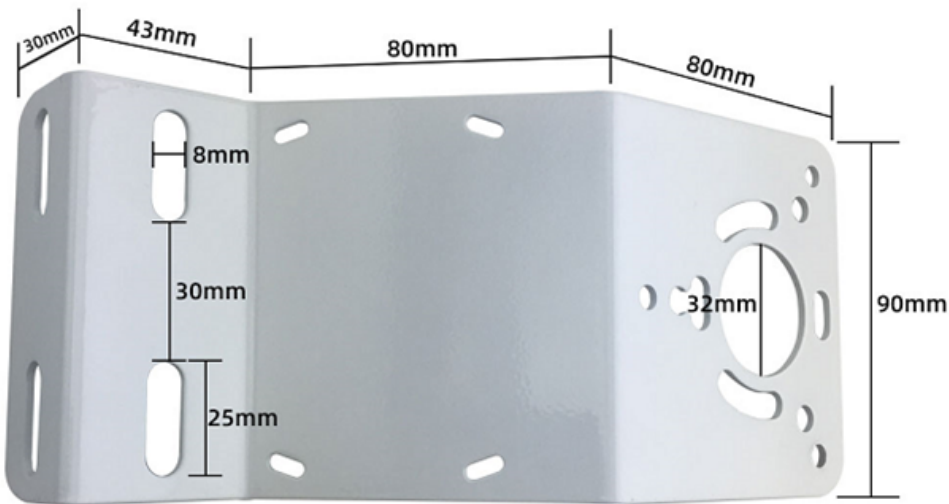


7.4 Device Dimension



7.5 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.



7.6 RS485 Commands

The RS485 command is as follows: [Weather Sensors Modbus Command List](#)

([/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1](#)).

8. WSS-22 -- Integrated wind speed and direction sensor



WSS-22 is a RS485 wind speed and wind direction monitor designed for weather station solution.

WSS-22 shell is made of polycarbonate composite material, which has good anti-corrosion and anti-corrosion characteristics, and ensure the long-term use of the sensor without rust. At the same time, it cooperates with the internal smooth bearing system to ensure the stability of information collection

8.1 Feature

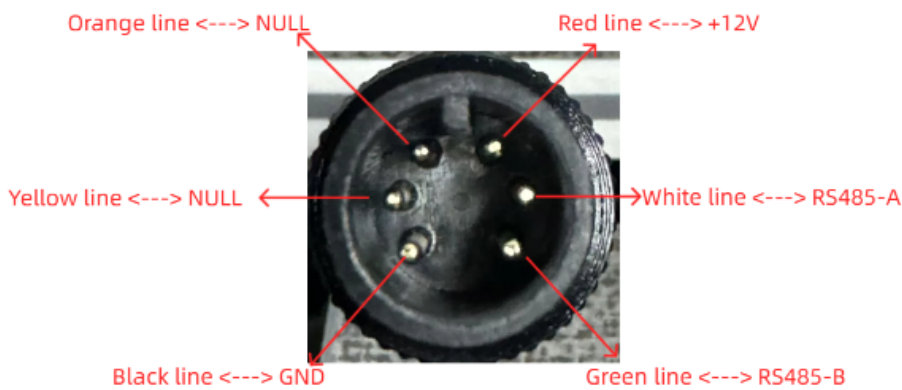
- RS485 wind speed / direction sensor
- PC enclosure, resist corrosion

8.2 Specification

- Wind speed range: 0 ~ 60m/s
- Wind direction range: 0 ~ 360°
- Start wind speed: ≤ 0.3 m/s
- Accuracy: $\pm(0.3 + 0.03V)$ m/s , $\pm 1^\circ$
- Input Power: DC 5 ~ 24v
- Interface: RS485
- Working Temperature: $-30^\circ\text{C} \sim 70^\circ\text{C}$
- Working Humidity: $<100\%$ (no dewing)
- Power Consumption: 13mA @ 12v.
- Cable Length: 2 meters

8.3 Wiring

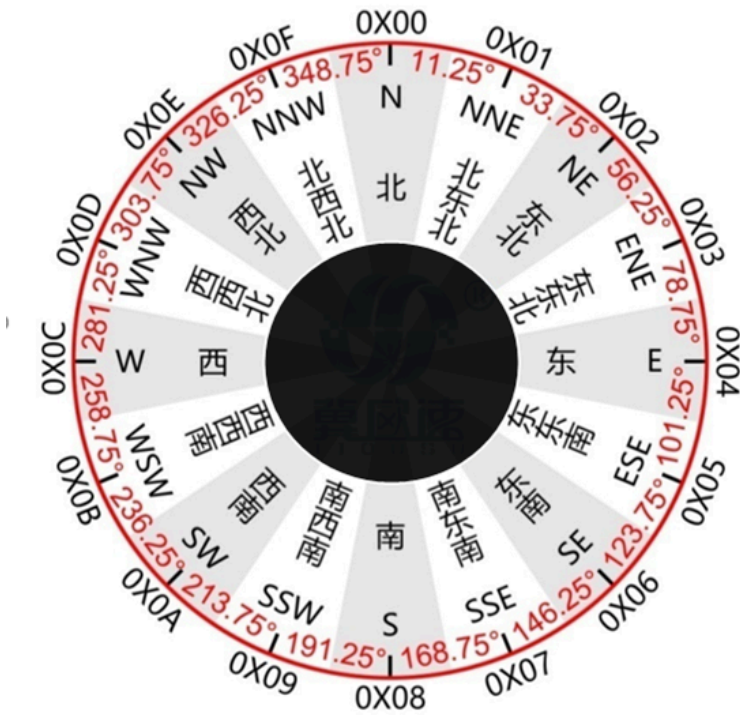
WSS-22 Wiring



8.4 Device Dimension



8.5 Angle Mapping



8.6 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.

The sensor must be installed with below direction, towards North.



8.7 RS485 Commands

The RS485 command is as follows: [Weather Sensors Modbus Command List](#)

([/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1](#)).

9. WSS-21 -- Rain Gauge

WSS-21 RS485 Rain Gauge is used in meteorology and hydrology to gather and measure the amount of liquid precipitation (mainly rainfall) over an area.

WSS-21 uses a tipping bucket to detect rainfall. The tipping bucket use 3D streamline shape to make sure it works smoothly and is easy to clean.

The tipping bucket of WSS-01 is adjusted to the best angle. When installation, user only needs to screw up and adjust the bottom horizontally.

WSS-21 package includes screw which can be installed to ground. If user want to install WSS-21 on pole, they can purchase WS-K2 bracket kit.

9.1 Feature

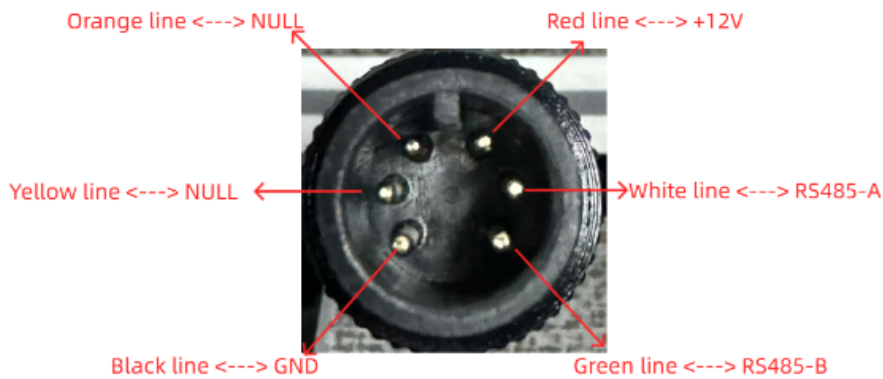
- RS485 Rain Gauge
- Small dimension, easy to install
- Vents under funnel, avoid leaf or other things to avoid rain flow.
- ABS enclosure.
- Horizontal adjustable.

9.2 Specification

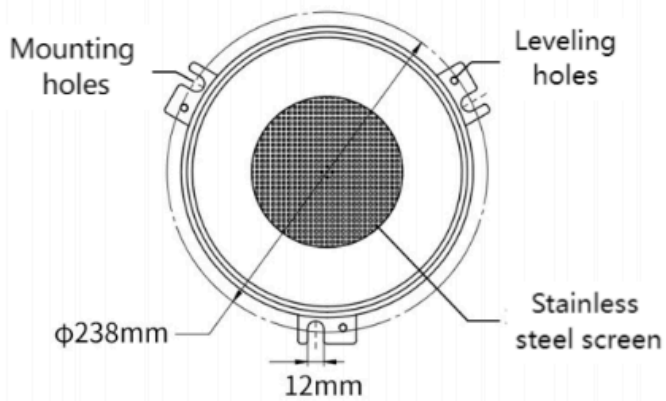
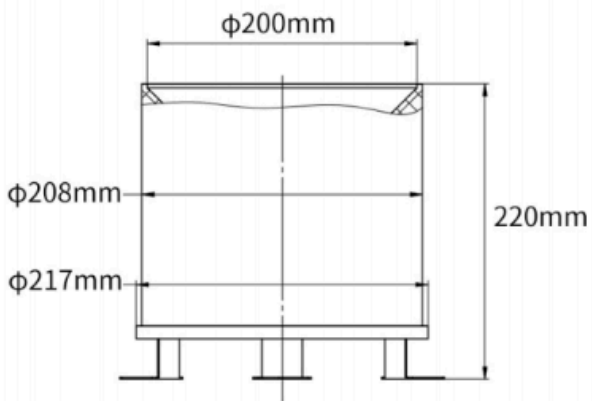
- Resolution: 0.2mm
- Accuracy: $\pm 3\%$
- Range: 0 ~ 100mm
- Rainfall strength: 0mm ~ 4mm/min (max 8mm/min)
- Input Power: DC 5 ~ 24v
- Interface: RS485
- Working Temperature: 0°C ~ 70°C (incorrect below 0 degree, because water become ICE)
- Working Humidity: <100% (no dewing)
- Power Consumption: 4mA @ 12v.

9.3 Wiring

WSS-21 Wiring



9.4 Dimension



9.5 Installation Notice

Do not power on while connect the cables. Double check the wiring before power on.

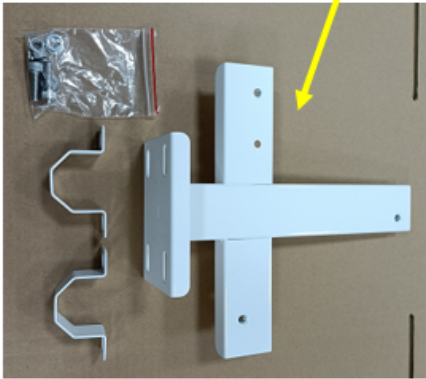
Installation Photo as reference:

Install on Ground:

WSS-21 Rain Gauge include screws so can install in ground directly .

Install on pole:

If user want to install on pole, they can purchase the **WS-K2 : Bracket Kit for Pole installation**, and install as below:



WS-K2: Bracket Kit for Pole installation

WS-K2 dimension document, please see:

https://www.dropbox.com/sh/7wa2elfm2q8xq4l/AAB7ZB_gSVGrhmJEgU2LyTQNa?dl=0
(https://www.dropbox.com/sh/7wa2elfm2q8xq4l/AAB7ZB_gSVGrhmJEgU2LyTQNa?dl=0)

9.6 RS485 Commands

The RS485 command is as follows: **Weather Sensors Modbus Command List**

(/xwiki/bin/download/Main/Agriculture%20%26%20Weather%20Stations/WebHome/Weather_Sensors_Modbus_Command_List.xlsx?rev=1.1)



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