SYSOLUTION

Eight-in-one Environmental Monitoring R68

specification

Version: Ver.1.0

Update Record

No.	Version	Remark	Date
1	Ver.1.0	Initial Release	2021.08.20

Note: The document is subject to change without prior notice.

Product Picture

Product Introduction

R68 is a highly integrated instrument developed for the smart lamp pole industry, which monitors eight parameters including atmospheric temperature, humidity, wind speed, wind direction, illumination, noise, PM2.5 and PM10. It can realize 24-hour continuous online monitoring of outdoor meteorological parameters, and output all parameters to users at one time through digital communication interface.

Air quality monitoring micro station can be applied to urban grid environmental monitoring and control, intelligent street lamps, scenic area environmental monitoring, factories or mines, construction sites (site dust monitoring), urban roads, highways, public places and other places related to air quality monitoring.

Features

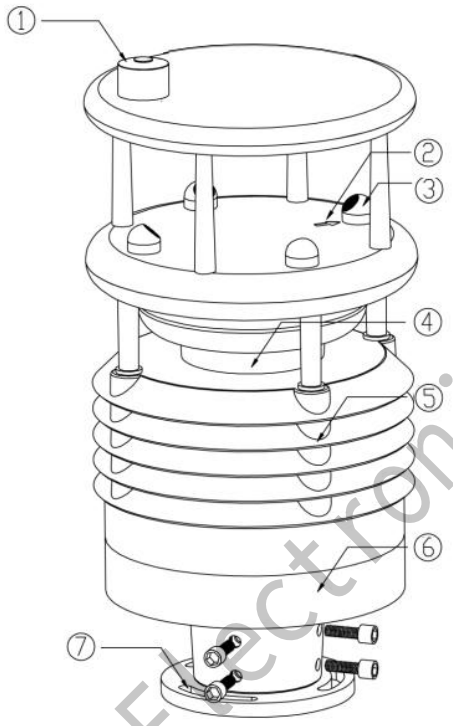
1. Standard configuration monitoring temperature, humidity, wind speed, wind direction, illumination, noise, PM2.5, PM10 eight parameters, RS485 communication;
2. High precision, reliable performance, suitable for outdoor and industrial environment;
3. Use with Xixun Android series control card for real-time monitoring;
4. Real-time monitoring of atmospheric environment data, low cost, suitable for grid distribution;
5. Small volume, modular design, flexible layout;
6. Data acquisition adopts 32 - bit high - speed processing chip, stable and anti - interference.

Product Parameters

Parameters	Measuring Range	Precision	Resolution
Temperature	-40-85℃	±0.3℃(@25℃)	0.01°
Humidity	0-100%RH	±3%RH (10-80%RH) No condensation	0.01%
Wind speed	0-60M/S	± (0.3+0.03v) m/s (≤30M/S) ± (0.3+0.05v) m/s (≥30M/S) "v" is standardized wind speed	0.01m/s
Wind direction	0-360°	±3° (Wind speed < 10m/s)	0.1°
PM2.5 /PM10	0-1000ug/m³	10ug±10%@0-500ug/m³	1ug/m³
Noise	30-130dB(decibel)	±1.5dB	0.1dB
Illumination	0-100klux	The reading is 3% or 1%F·S	10Lux
Power supply	DC12V		
Signal output	Default 485 output, MODBUS RTU protocol		
Installation	Sleeve type fixation, flange type fixation		
Shell material	ASA material		
Protection class	IP65		

Product Annotations

Temperature,humidify,wind speed,wind direction,illuminance,noise,PM2.5,PM10

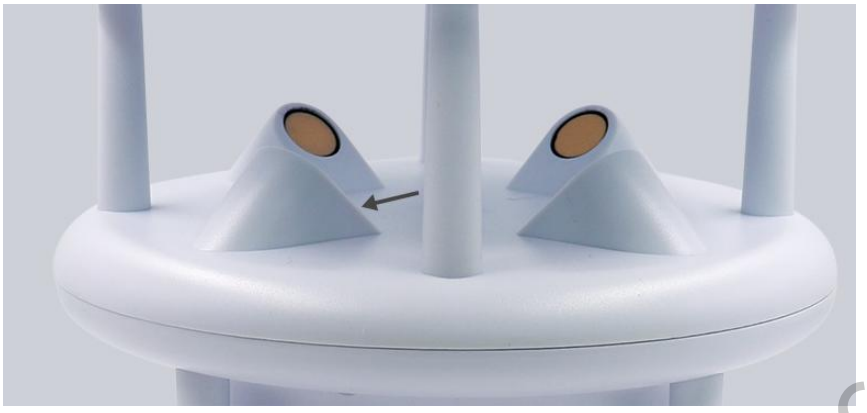


No.	Description
1	Illuminance
2	Refers to the north arrow
3	Ultrasonic wind speed and direction probe
4	Control circuit
5	Thermometer shelters（temperature, humidify）
6	PM2.5, PM10, noise
7	Bottom mounting flange

This product can be optional electronic compass function

Installation

Direction Option



Note: Arrow indicating location

When installing the device, the arrow of the positioning indicator marked on the device should point to the north direction. The value of north of the device is 0°, increasing clockwise. 90 degrees is east. Electronic compasses do not require pointing north installation.

ATTENTION It is best to use a device with magnetic deflection correction when looking north, or if not, adjust it according to the latitude and longitude of the device installed.

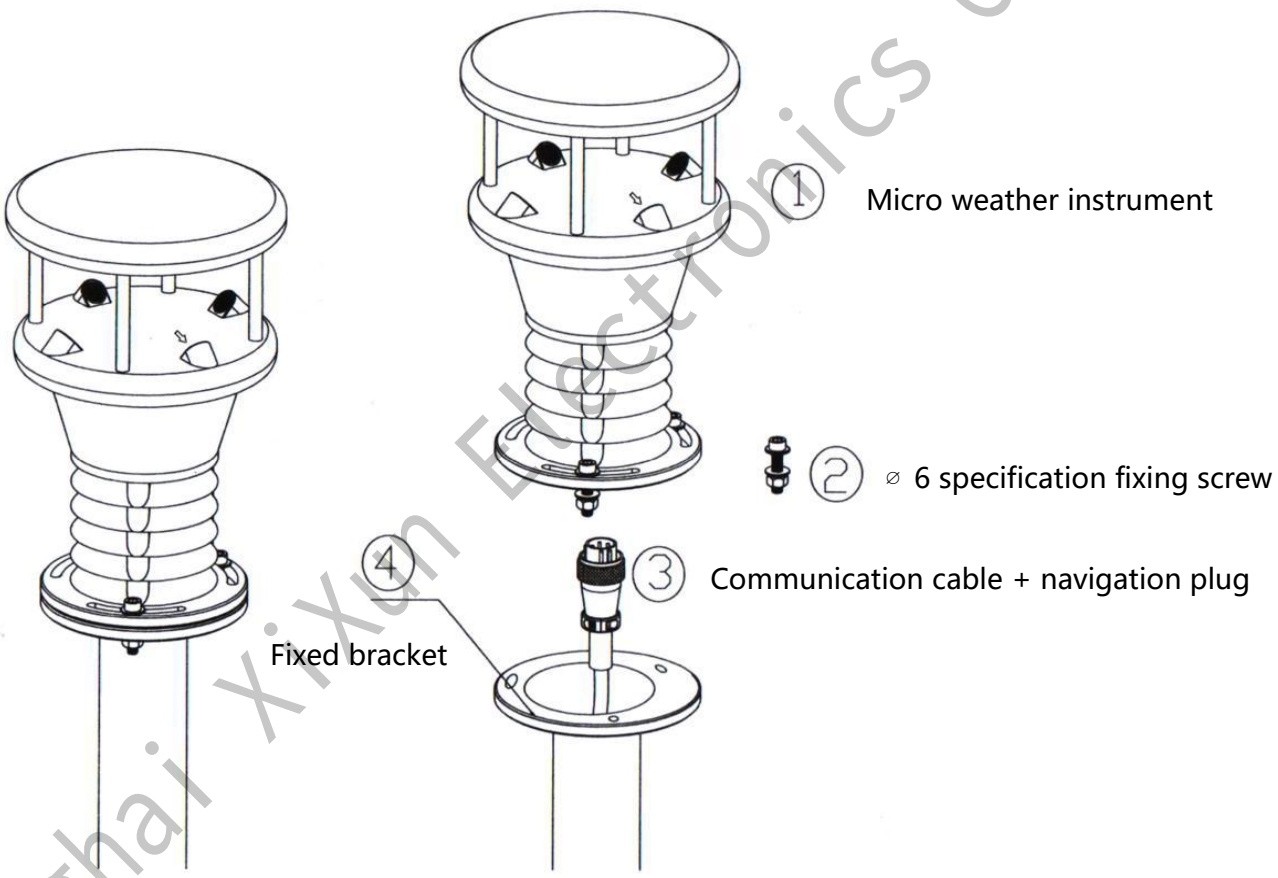
Installation Position Selection

When selecting an installation position, observe the following principles:

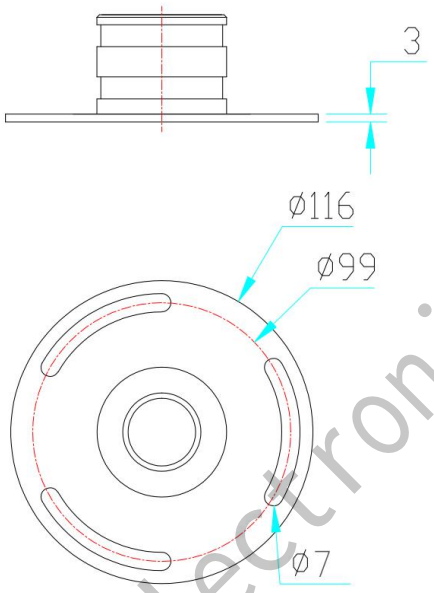
1. Ensure that there is no ultrasonic equipment of the same type around to avoid mutual interference;
2. The installation site should be open land, downwind side;
3. The installation height should not be less than 1.5m, and the installation distance from the nearest obstacle should be more than 10 times the height of the brick building;

4. If radiation parameters are included, it should be installed in an open field; The whole height Angle range is from sunrise to sunset, and the elevation Angle of obstacles within the range is no more than 5° without any shadow falling on the sensor, avoiding thermal radiation, steam and bright color buildings.

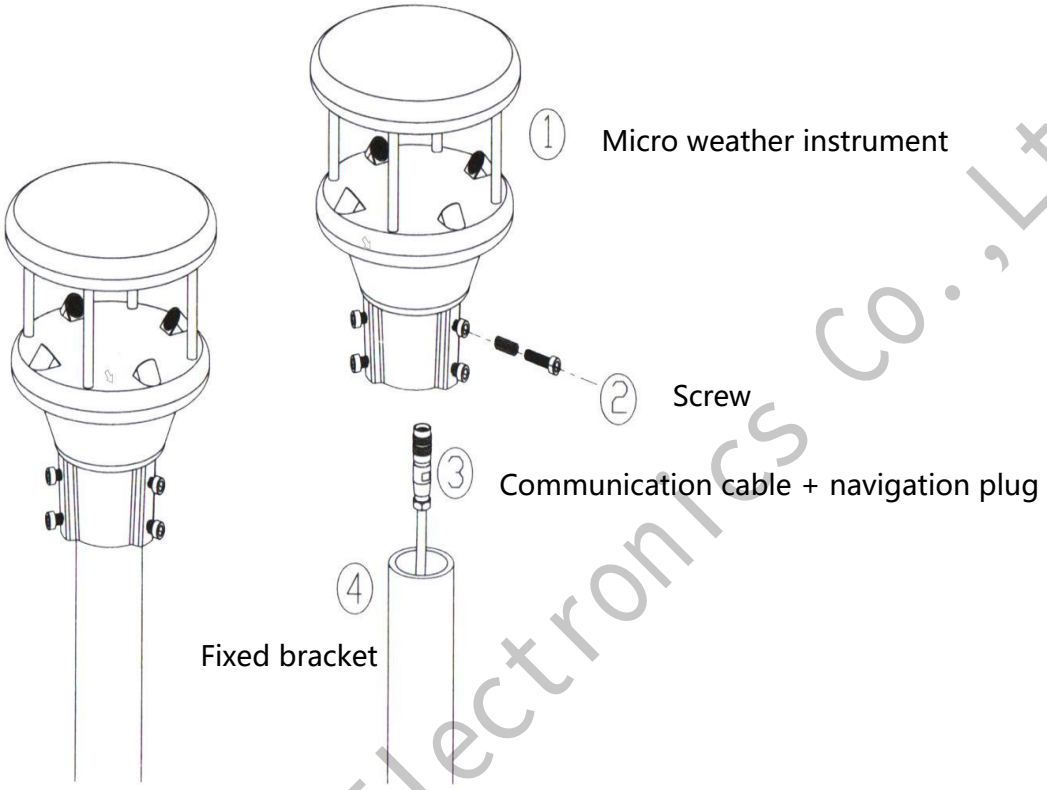
Flange Fixing



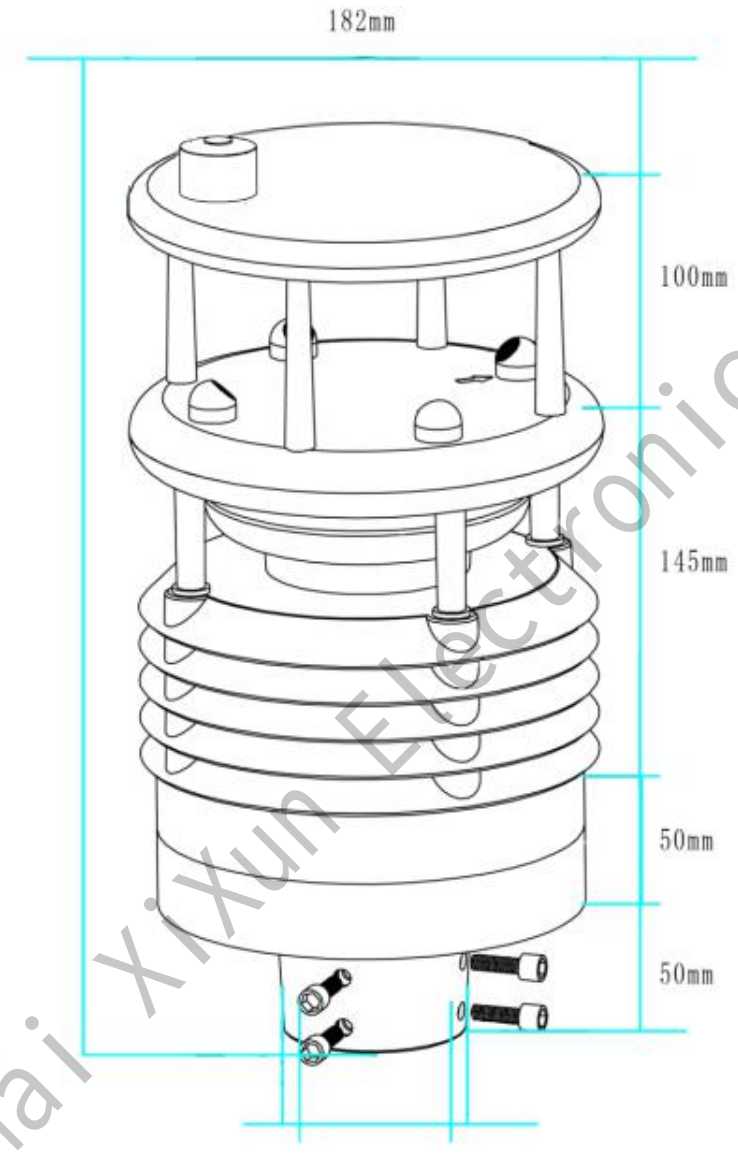
Flange Size



Sleeve Type Fixation



Dimensions

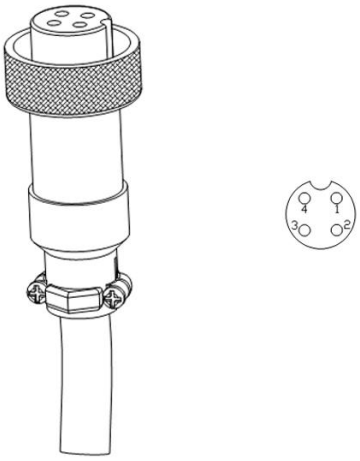


Inner diameter: 49.8mm

Outer diameter: 70mm

Cable Sequence Definition

Figure 1: Four-core cable aerial plug is defined as follows: RS485 communication



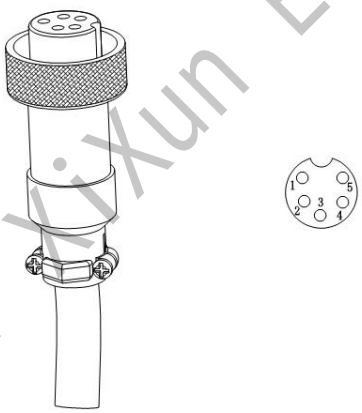
a. **Powered: positive**

b. **Powered: negative**

c. **RS485: A**

d. **RS485: B**

Figure 2: Five-core cable aerial plug is defined as follows: RS485 communication



a. **Powered: positive**

b. **Powered: negative**

c. **RS485: A**

d. **RS485: B**

Wiring Definition

Wire color		Remark
Red	Positive pole	DC12V-24V， recommended DC12V
Black	Negative pole	
Yellow	485+	Analog output is wind speed signal
Blue	485-	Analog output is wind direction signal

Incorrect wiring can cause permanent damage to the device!

MODBUS Protocol

Data Frame Format Definition

Using Modbus-RTU communication protocol, the format is as follows:

Time for initial structure ≥ 4 bytes

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

Time to end structure ≥ 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: The instruction function prompt issued by the host, this transmitter only uses the function code 0x03. (reading the memory data)

Data area: The data area is the specific communication data area. Note that the upper byte of the 16bits data is at the front.

CRC code: 2 byte check code.

Communication protocol examples and explanations

Read the wind speed/wind direction value of at device address 0x012

Information frame

Address code	Function code	Register start address	Register length	Low check code	High check code
0x02	0x03	0x00,0x00	0x00,0x02	0x65	0xCE

Response frame（For example, read the wind speed value is 1.23m/s）

Address code	Function code	Effective number of bytes	Wind direction value	Wind speed value	Low check code	High check code
0x02	0x03	0x04	0x00 0x96	0x01 0x1A	0xF8	0x4A

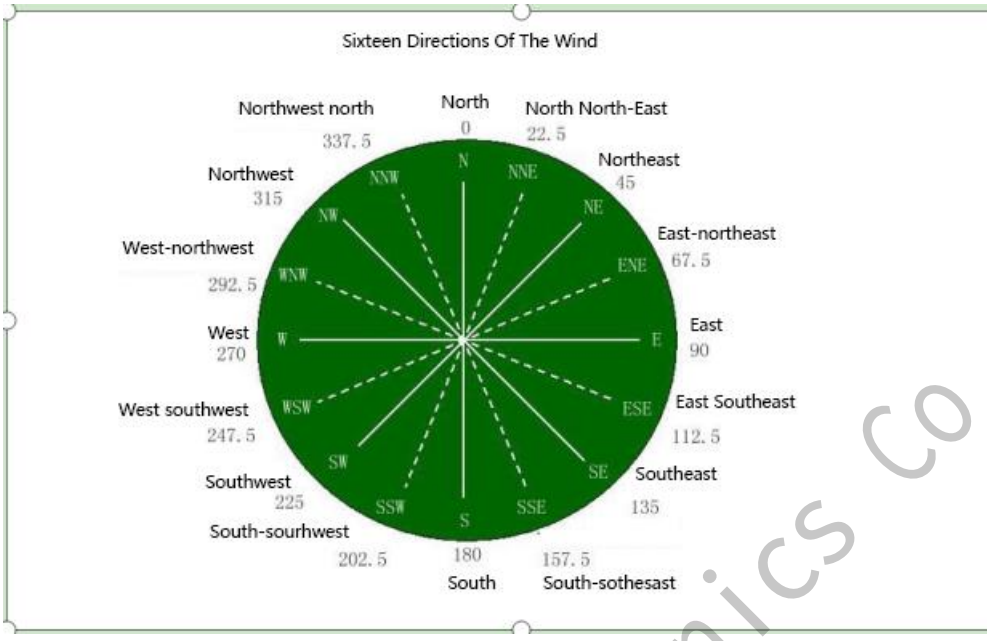
Wind speed:

011A H(Hexadecimal)=282=>Wind speed=2.82m/s

Wind direction:

0096 H(Hexadecimal)=150=>Wind direction=Southeast by south

Wind direction sensor output value corresponds to wind direction position



	Position	Symbol	Center angle/°	Angle range/°
01	North	N	0	384.76-11.25
02	North North-East	NNE	22.5	11.26-33.75
03	Northeast	NE	4.5	33.76-56.25
04	East-northeast	ENE	67.5	56.26-78.75
05	East	E	90	78.76-101.25
06	East Southeast	ESE	112.5	101.26-123.75
07	Southeast	ES	135	123.76-146.25
08	South-southeast	SSE	157.5	146.26-168.75
09	South	S	180	168.76-191.25
10	South-southwest	SWS	202.5	191.26-213.75
11	Southwest	SWS	225	213.76-236.25

12	West southwest	WSW	247.5	236.26-258.75
13	West	W	270	258.76-281.25
14	West-northwest	WNW	292.5	281.26-303.75
15	Northwest	NW	315	303.76-326.25
16	Northwest north	NNW	337.5	326.26-348.75

For example: wind speed and wind direction: 02 03 00 00 00 02 C4 38

Read device address 0x01 for thermometer shelters

Information frame

Address code	Function code	Register start address	Register length	Low check code	High check code
0x01	0x03	0x00,0x00	0x00,0x0D	0x65	0xCE

Response frame

Address code	Function code	Effective number of types	Humidify	Temperature	Reserved field	PM2.5
0x01	0x03	0x1A	0x02 0x0A	0x00 0xE5	0x00 0x00 0x00 0x00	0x00 0x13
Reserved field	Light value	PM10	Reserved field	Noise	Low check code	High check code
0x00 0x00 0x00 0x00	0x00 0x00 0x00 0x74	0x00 0x14	0x00 0x06 0x00 0x05	0x02 0x73	0x7F	0x53

All data of thermometer shelters: 01 03 00 00 00 0D 840F

For example：01 03 1A 01 BE 01 1A 00 00 00 0F 00 1D 00 00 00 46 00

00 00 84 00 22 00 06 00 05 02 58 B1 69

Cautions

1. Pay attention to waterproof.

2. Forbidden plug or unplug connecting cable while power is on.

3. Forbidden touch the relay AC220V terminal.

4. Do not touch the chips and pins on the product to avoid electrostatic damage.