KH.CQX-5 Ultrasonic Five-Parameter Weather Instrument

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Shenzhen KEHAO Information Technology Co., LTD

1. Product Introduction

The ultrasonic anemometer, five-parameter micro-meteorological instrument, six-element micro-meteorological instrument, and small automatic weather station, developed and produced by KEHAO Company, have been widely applied in meteorological monitoring, urban environmental monitoring, wind power generation, navigation vessels, aviation airports, highways, bridges, and tunnels. These products are used across the country by a wide range of customers, achieving significant social and economic benefits.

The KH.CQX-5-type five-element micro-meteorological instrument operates by emitting continuous frequency-modulated ultrasonic signals and measuring the relative phase to detect wind speed and direction. Compared with traditional ultrasonic anemometers, our product eliminates the need for high-precision timers and avoids measurement inaccuracies caused by sensor startup delays, demodulation circuit delays, and temperature changes.

KH.CQX-5 Type five-element micro meteorological instrument innovatively implements the five standard meteorological parameters (ambient temperature, relative humidity, wind speed, wind direction and atmospheric pressure) through a highly integrated structure, which can realize 24-hour continuous online monitoring of outdoor meteorological parameters, and output the six parameters to users at one time through digital communication interface.

2. Product Features

1. The hidden ultrasonic probe on the top cover avoids interference caused by snow accumulation and natural wind shading ☆

2. The principle is to emit continuous frequency-changing ultrasonic signals and detect wind speed and direction ☆ by measuring the relative phase

3. Integrated ☆ of wind speed, wind direction, temperature, humidity and atmospheric pressure

4. Advanced sensing technology is adopted for real-time measurement, and no starting wind speed ☆ is adopted

5. Strong anti-interference ability, with watchdog circuit and automatic reset function to ensure the stable operation of the system

6, high integration, no moving parts, zero wear

7. Maintenance free, no on-site calibration required

8. ASA engineering plastics are used for outdoor applications and do not change color all year round

9. The standard output signal of the product design is RS485 communication interface (MODBUS protocol); 232, USB and Ethernet interfaces can be selected as optional, supporting real-time data reading ☆

10. Optional wireless transmission module, the minimum transmission interval is 1 minute

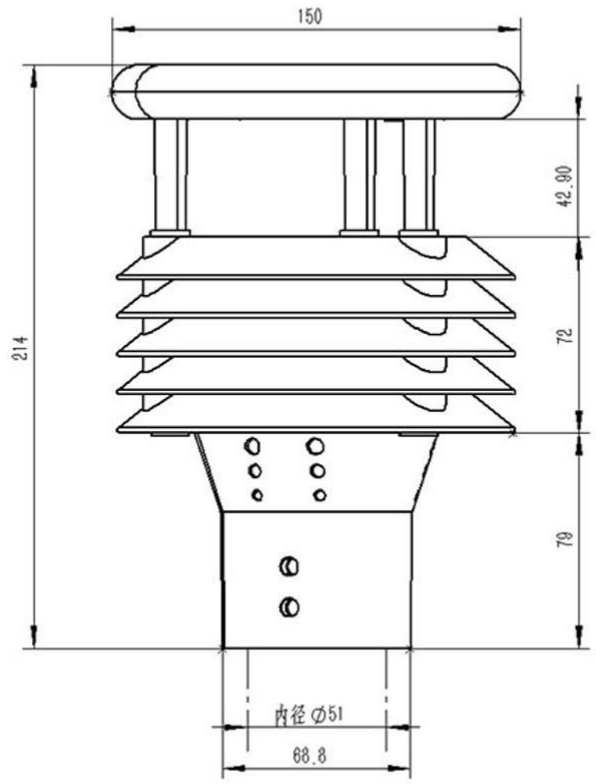
11. The probe is designed with snap fasteners, which solves the problems of loosening and inaccurate installation during transportation and installation ☆

3. Technical Parameters

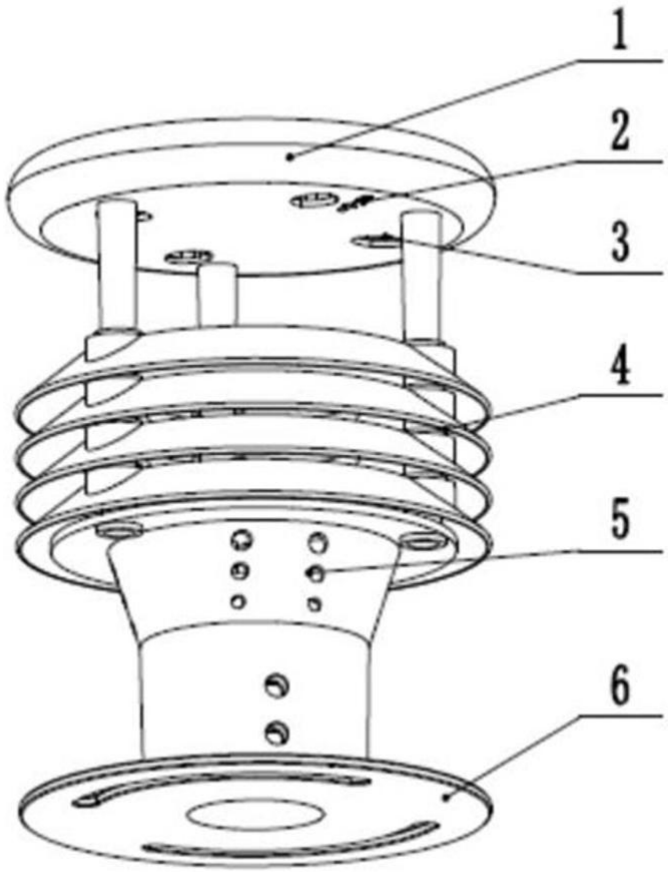
1. Wind speed: ultrasonic measurement principle, 0~60m/s(±0.1m/s) resolution 0.01m/s;
2. Wind direction: ultrasonic measurement principle, 0~360° (±2°); resolution: 1°;
3. Air temperature: measurement principle diode junction voltage method, -40-80℃ (±0.3℃), resolution 0.01℃;
4. Air humidity: measurement principle capacitance, 0-100%RH (±3%RH), resolution: 0.01%RH;
5. Atmospheric pressure: measuring principle of piezoresistive, 300-1100hpa (±0.25%), resolution of 0.1hpa;

6. Power: 0.72W
7. The production enterprise has ISO quality management system, environmental management system and occupational health management system certification
8. The production enterprise has the computer software registration certificate

4. Product Size Diagram



5. Product Structure Diagram



1. Control circuit
2. North arrow
3. Ultrasonic probe
4. Louver box
5. Temperature, humidity and air pressure monitoring position
6. Bottom fixed flange

6. Definition of product wiring

Definition		Remarks
VCC	Power is positive	DC12V
GND	Power ground	
485A	RS485A	
485B	RS485B	

Temperature, Humidity, Atmospheric Pressure, Communication Protocol

Qualification

· Power supply: DC12V

· Working environment: -40~80℃, humidity ≤100% no condensation

· Communication interface: RS485

· Operating current: 2mA@DC12V

· Minimum data interval: 0.5S

· Shell material: polymer engineering plastic

Notes

1. The power supply and communication wiring of the sensor should be strictly in accordance with the instructions to avoid damage caused by reverse connection or overvoltage.
2. The sensor housing has been designed to be rainproof, but does not support immersion, pouring and splashing tests. Installations should avoid such extreme conditions.
3. Sensor installation should avoid direct sunlight and other heat source interference and maintain ventilation and heat dissipation to avoid affecting the accuracy of data.
4. The sensor data shall be based on the standard environmental data monitoring of professional testing institutions, and shall not be compared with other sensors.

Test Method

In non-standard environments, parameters such as heat in the spatial environment are affected by factors such as ventilation conditions and heat source distribution, which can easily cause uneven diffusion speed and uneven spatial distribution of heat. Meanwhile, real-time sensor data collection and fast response speed will introduce time errors, which also affect the measurement accuracy of data.

Sensor parameters

Parameter	Measuring	Resolution ratio	Accuracy

	Range		
Temperature	-40-80℃	0.01℃	±0.3℃ (25℃)
Humidity	0-100%RH	0.01%RH	±3%RH (20%~80%)
Atmos	30-110kPa	0.01Kpa	±0.25%

Sensor Initial Configuration

Sensor address:

0x66 (102)Baud rate: 9600 data bits: 8 stop bits: 1 parity bit: None

CRC16: Low byte first, high byte last

Communication example:

Directive 03

Read the temperature value:

Fax: 66 03 00 00 00 01 8C 1D

Answer: 66 03 02 0A 02 0A ED

Data analysis:

0x0A*256+0x02 = 2562,

Temperature= 2562/100 = 25.62℃

Directive 06

Change the sensor baud rate to 115200

Fax: 66 06 00 05 00 04 90 1F

Receiving: 66 06 00 05 00 04 90 1F

Note: After sending the modification command, power off and restart the sensor to use the new baud rate

Modbus Register Description

Register address (hex)	Parameter	Operate	Data Format	Remarks
0x00	Temperature	Readable	int16	Read value/100
0x01	Humidity	Readable	Uint16	Read value/100
0x02	Atmos	Readable	Uint16	Read value/100
0x04	Address	Readable-Writable	Uint8	Address range: 0X01-0XFF Default address 0x66 (102)
0x05	Baud rate	Readable-Writable	Uint16	Port rate write 0x01: 4800 0x02: 9600 0x03: 56000 0x04: 115200
0x0C	Pressure	Readable	Uint16	Read the value/10 (unit : mm)

Wind speed Wind direction Communication protocol

Qualification

· Power supply: DC12V
· Working environment: -40~70℃, humidity ≤100% no condensation
Communication interface: RS485
· Operating current: 55mA@DC12V
· Minimum data interval: 0.5S
· Shell material: polymer engineering plastic

Sensor initial configuration

Sensor address: 0xC8 (200)
Baud rate:9600
Data bits: 8
Stop position: 1
Check position: None
CRC16: Low byte first, high byte last

Communication example:

Directive 03
Read the wind speed value:
Send: C8 03 00 00 00 01 +CRC
Answer: C8 03 02 0A 02 +CRC
Data analysis:
0x0A*256+0x02 = 2562, wind speed = 2562/100 = 25.62m/s
Directive 06
Change the sensor baud rate to 4800
Send: C8 06 02 01 12 C0 +CRC
Receiver: C8 06 02 01 12 C0 +CRC
Note: After sending the modification command, power off and restart the sensor to use the new baud rate

Modbus register description

Register address (hex)	Parameter name	Operate	Data Format	Remarks

0x0000	Wind Speed	Readable	Uint16	Read value/100
0x0001	Wind Direction	Readable	Uint16	Reading values
0x0004	Absolute Wind Direction	Readable	Uint16	Reading values
0x0200	Address	Readable-Writable	Uint16	Address range 0x01-0xFF Default address 0xC8 (200)
0x0201	Baud Rate	Readable-Writable	Uint16	Port rate write 0x12C0: 4800 0x2580: 9600

Contact Us

Should you have any questions or require technical support, please do not hesitate to contact us.

Shenzhen KEHAO Information Technology Co., LTD

Address: Software Industry Base, Haitian 2nd Road, Yuehai Sub-district, Nanshan District, Shenzhen, China

Email: export@kehaoinfo.com

Website: www.kehaoinfo.net

WhatsApp: +1 (213) 246-7245