HG803
Temperature and Humidity Transmitter
User Manual

V1.1

HENGKO Technology Co., Ltd.

Catalogue

1.Product introduction

1.1.Product Overview

HG803 series temperature and humidity transmitters adopt imported high precision measuring unit with the characteristics of high precision temperature compensation, high stability, small drift and high repeatability. The selection of wall-mounted shell can be easily fixed on the wall. This temperature and humidity transmitter provides digital tube display which can show temperature and humidity data in real time. Multiple probe types are suitable for different application areas including computer room, warehouse, building, green house, precision workshop, etc. By adopting standard industrial 4~20mA or RS485 output, this product can live digital display table, PLC, frequency converter, industrial control host and other equipment. The HENGKO HG803 series transmitters are safe, reliable, good-looking and easy to install.

1.2.Function Features

- 10-30V wide DC voltage supply.
- Industrial grade ESD safety protection and anti-reverse power supply design.
- Over-current protection.
- Analog output type supports 4~20mA+RS485 and digital signal output type supports RS485.
- 15 bit resolution analog output.
- 20m T/H probe length is supported.
- Analog and digital calibration functions.
- Digital output available in 0.1 and 0.01 resolutions.
- Support single-register and multi-registers reading.
- Support dew point function (digital signal output type).
- Standard RS485/Modbus-RTU communication protocol.
- Optional LED digital tube display.
- Probe are sensitive, waterproof, dust proof and high-temp resistant.

1.3.Technical data

DC power Supply	10 ~ 30V DC (12V power supply recommended)	
Maximum Power Consumption	Current output	About 1.2W
	Voltage output	About 1.2W
Typical Accuracy	Temperature	±0.3℃（25℃） / ±0.54℉（77℉） (higher precision optional)
	Humidity	±3%RH (60%RH, 25℃) (higher precision optional)
Measuring Medium	Air	
Measuring Range	Temperature	- 40℃ ~ 80℃ / -40℉ ~ 176℉ (default) - 40℃~ 120℃ / -40℉~ 248℉ (optional)
	Humidity	0%RH - 100%RH
Long-term Stability	Temperature	≤ 0.1℃ /y
	Humidity	≤ 1%RH /y
Response Time	Humidity	≤ 8s (1m/s Wind speed)
	Temperature	≤ 15s (1m/s Wind speed)
Analog Output Signal	Current	4 - 20 mA (analog output type)

Digital Output Signal	RS485 Communication (Modbus) protocol Data bit length: 8 bits Parity check mode: None Stop bit Length: 1 bit Default Modbus communication address: 1 Function code:03	
Baud Rate	1200, 2400, 4800, 9600, 19200, 115200 optional, default 9600 pbs.	
Load Capacity	Load for current output	≤ 600Ω
	Load for voltage output	≤ 250Ω
Transmitter Circuit Operating Temperature	- 20℃ ~ +60℃，0%RH ~ 95%RH （ non-condensation ）	

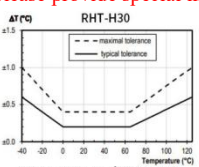
1.4 Data sheet for Temperature and Humidity Transmitter Probe

HENGKO provides RHT-H series probes for you to choose HENGKO's temperature and humidity transmitters, sensors, controllers, recorders.and other products to meet your measurement needs。

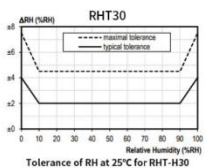
HENGKO TEMPERATURE AND HUMIDITY PROBE DATA SHEET

Model	Humidity Accuracy(%RH)	Temperature (℃)	Voltage Supply(V)	Interface	Relative Humidity Range(RH)	Temperature Range
RHT-H30	±2.0 @ 10-90% RH	±0.2 @ 0-65 ℃	2.15 ~ 5.5	I²C	0-100%	-40 ~ 125 ℃
RHT-H31	±2.0 @ 0-100% RH	±0.2 @ 0-90 ℃	2.15 ~ 5.5	I²C	0-100%	-40 ~ 125 ℃
RHT-H35	±1.5 @ 0-80% RH	±0.1 @ 20-60 ℃	2.15 ~ 5.5	I²C	0-100%	-40 ~ 125 ℃

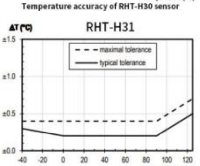
Note: The default configuration for the probe of the HENGKO HG803 series temperature and humidity transmitter is the RHT-H30 model. If other probe models are required, please provide special instructions.



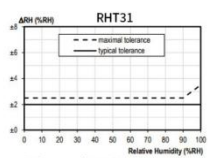
Temperature accuracy of RHT-H30 sensor



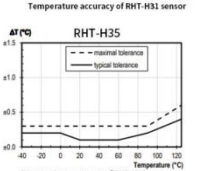
Tolerance of RH at 25℃ for RHT-H30



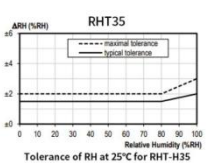
Temperature accuracy of RHT-H31 sensor



Tolerance of RH at 25℃ for RHT-H31



Temperature accuracy of RHT-H35 sensor



Tolerance of RH at 25℃ for RHT-H35

2.Product Lists

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-1W8P-02	Waterproof plastic probe	Split Probe	RS 485	N	Dew point	-40°C ~ 100°C (-40°F ~212°F)	0-100 %	
HG803-1W8P-04	Standard stainless steel probe						0-100 %	
HG803-1W8P-05	Threaded stainless steel probe					-40°C ~ 120°C (-40°F ~248°F)	0-100 %	
HG803-1W8P-06	Flange short tube stainless steel probe						0-100 %	
HG803-1W8P-07	Flange long tube stainless steel probe						0-100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-2W8P-02	Waterproof plastic probe	Split Probe	RS 485	Y	Dew point（Panel Not displayed）	-40°C ~ 100°C (-40°F ~212°F)	0-100 %	
HG803-2W8P-04	Standard stainless steel probe					-40°C ~ 120°C (-40°F ~248°F)	0-100 %	
HG803-2W8P-05	Threaded stainless steel probe						0-100 %	
HG803-2W8P-06	Flange short tube stainless steel probe						0-100 %	
HG803-2W8P-07	Flange long tube stainless steel probe						0-100 %	

Mode l	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803 –1W4P –02	Waterproof plastic probe	Split Probe	4-20 mA + 485	N	N	– 40°C ~ 100°C (–40°F ~212°F)	0–100 %	
HG803 –1W4P –04	Standard stainless steel probe						0–100 %	
HG803 –1W4P –05	Threaded stainless steel probe					– 40°C ~ 120°C (–40°F ~248°F)	0–100 %	
HG803 –1W4P –06	Flange short tube stainless steel probe						0–100 %	
HG803 –1W4P –07	Flange long tube stainless steel probe						0–100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-2W4P-02	Waterproof plastic probe	Split Probe	4-20 mA + 485	Y	N	- 40°C ~ 100°C (-40°F ~212°F)	0-100 %	
HG803-2W4P-04	Standard stainless steel probe						0-100 %	
HG803-2W4P-05	Threaded stainless steel probe					- 40°C ~ 120°C (-40°F ~248°F)	0-100 %	
HG803-2W4P-06	Flange short tube stainless steel probe						0-100 %	
HG803-2W4P-07	Flange long tube stainless steel probe						0-100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-7W8P-03	Split replaceable probe	Split Probe	RS 485	N	Dew point	-40°C ~ 100°C (-40°F ~212°F)	0–100 %	
HG803-8W8P-03	Split replaceable probe + display		RS 485	Y	Dew point (Panel Not displayed)		0–100 %	
HG803-7W4P-03	Split replaceable probe		4-20 mA + 485	N	N		0–100 %	
HG803-8W4P-03	Split replaceable probe + display		4-20 mA + 485	Y	N		0–100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803 –5C8P –01	Modular Probe	Conjoined Probe	RS 485	N	Dew point	– 20°C ~ 60°C (–4°F ~140°F)	0–100 %	
HG803 –6C8P –01	Modular Probe + display		RS 485	Y	Dew point （Panel Not displayed）		0–100 %	
HG803 –5C4P –01	Modular Probe		4-20 mA + 485	N	N		0–100 %	
HG803 –6C4P –01	Modular Probe + display		4-20 mA + 485	Y	N		0–100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-3W8P-08	Stainless steel 15 Flange probe	Duct probe	RS 485	N	Dew point	-40°C ~ 80°C (-40°F ~176°F)	0-100 %	
HG803-4W8P-08			RS 485	Y	Dew point (Panel Not displayed)		0-100 %	
HG803-3W4P-08			4-20 mA + 485	N	N		0-100 %	
HG803-4W4P-08			4-20 mA + 485	Y	N		0-100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-3W8P-09	Stainless steel 15 Threaded probe	Duct probe	RS 485	N	Dew point	-40°C ~ 80°C (-40°F ~176°F)	0-100 %	
HG803-4W8P-09			RS 485	Y	Dew point (Panel Not displayed)		0-100 %	
HG803-3W4P-09			4-20 mA + 485	N	N		0-100 %	
HG803-4W4P-09			4-20 mA + 485	Y	N		0-100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-3W8P-10	Stainless steel 20 Flange probe	Duct probe	RS 485	N	Dew point	-40°C ~ 80°C (-40°F ~176°F)	0-100 %	
HG803-4W8P-10			RS 485	Y	Dew point（Panel Not displayed）		0-100 %	
HG803-3W4P-10			4-20 mA + 485	N	N		0-100 %	
HG803-4W4P-10			4-20 mA + 485	Y	N		0-100 %	

Model	Probe	Probe connection mode	Signal output	Display function	Dew point function	Temp. range	Humidity Range RH	Picture
HG803-3W8P-11	Stainless steel 20 Threaded probe	Duct probe	RS 485	N	Dew point	-40°C ~ 80°C (-40°F ~176°F)	0-100 %	
HG803-4W8P-11			RS 485	Y	Dew point (Panel Not displayed)		0-100 %	
HG803-3W4P-11			4-20 mA + 485	N	N		0-100 %	
HG803-4W4P-11			4-20 mA + 485	Y	N		0-100 %	

3.Equipment Installation

3.1.Check before installation

Packing List:

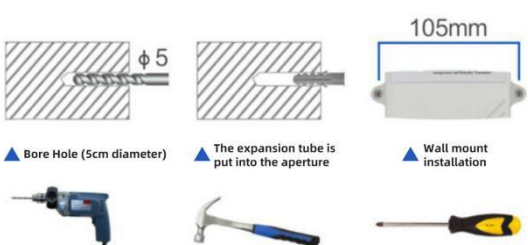
■ Temperature humidity transmitter x 1pc

■ Temperature humidity probe cable (see probe options) x 1pc

■ Quality certificate x 1pc, User manual x 1pc

■ Self-tapping screws x 2pcs, 2pcs x expansion plugs x 2pcs

3.2.Installation Procedure



3.3.Connecting Cables

【Power connection】 Wide voltage 10~30V DC power input, 12V DC power supply is recommended.

【Output interface wiring】 The device has two independent analog outputs.

【Specific wiring definition】

Wiring standard of RS485 digital signal output type:

Wiring standard of RS485	Line color	Definition specification
Power cord	Red	Power supply positive
	Black	Power supply negative
RS485 wiring	Yellow	RS485A
	Green	RS485B

Applicable models：

HG803-1W8P, HG803-2W8P, HG803-3W8P, HG803-4W8P

HG803-5C8P, HG803-6C8P, HG803-7W8P, HG803-8W8P

Pay attention to the wiring sequence of the transmitter:

Signal → Negative → Positive

Pay attention to the disassembly sequence of the transmitter:

Positive → Negative → Signal

Wiring standard of 4-20mA+RS485 analog output type：

Wiring standard of 4-20mA + 485	**Line color**	**Definition specification**
Power cord	Red	Power supply positive
	Black	Power supply negative
Analog output line 4-20mA	Brown	Temperature signal positive
	Blue	Temperature signal negative
	Grey	Humidity signal positive
	White	Humidity signal negative
RS485 wiring	Yellow	RS485A
	Green	RS485B

Applicable models:

HG803-1W4P, HG803-2W4P, HG803-3W4P, HG803-4W4P

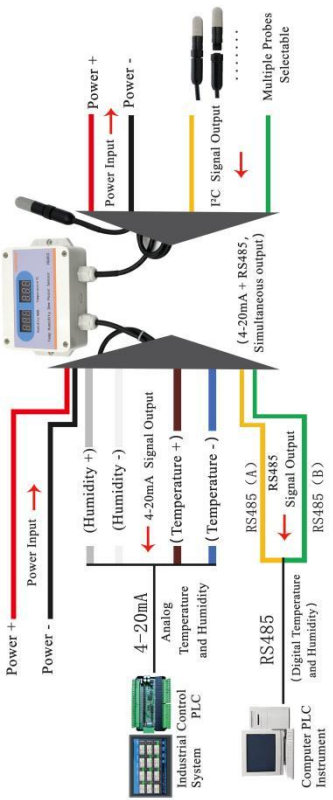
HG803-5C4P, HG803-6C4P, HG803-7W4P, HG803-8W4P

Pay attention to the wiring sequence of the transmitter:

Signal → Negative → Positive

Pay attention to the disassembly sequence of the transmitter:

Positive → Negative → Signal



4.Signal Output Calculation Method of Analog Output

4.1.Current type (analog output type) output signal conversion calculation

For example：

-40 to +80℃ measurement range, 4 to 20mA output. When the output signal is 12mA, the current temperature value is calculated.

The span of this temperature range is 120℃, expressed by a 16mA current signal, 120℃ /16mA=7.5℃/mA, that is, the current 1mA represents a temperature change of 7.5℃.

Measured value ： 12mA-4mA=8mA

8mA*7.5℃ /mA=60℃

60+（-40）=20℃

The current temperature is 20℃.

5.Common problems and solutions of Current type (4-20mA analog output type)

Possible reasons of no output or output error:

1) The measurement range corresponding error leads to the PLC calculation error. About the measurement range, please refer to the first part of the technical indicators.

2) The wiring mode is wrong or the wiring sequence is wrong.

3) The power supply voltage is not correct (24V power supply for 0-10V type).

4) The distance between the transmitter and the collector is too long, resulting in signal disturbance.

5) The address or baud rate is not set correctly.

6) PLC acquisition port is damaged.

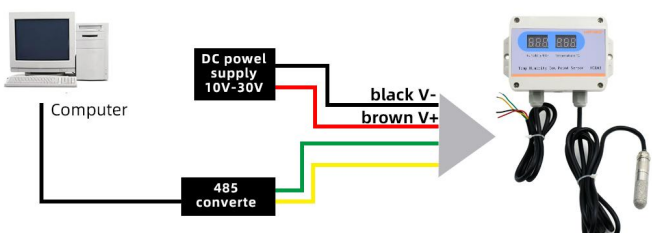
7) Equipment damage.

6.Configuration software installation and use (for RS485 digital signal output)

6.1. Software Selection

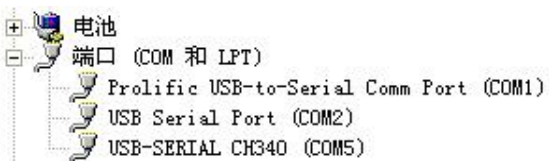
You can configure the transmitter by double-clicking the HG803 Tools.exe file in the test tool software directory.

Note: Only one device can be connected when using this configuration software to change the address and baud rate.



6.2.Parameter Settings

①Select the correct COM port (" My computer - Properties - Device Manager - port "in the COM port). The following figure lists several different 485 converter driver names.



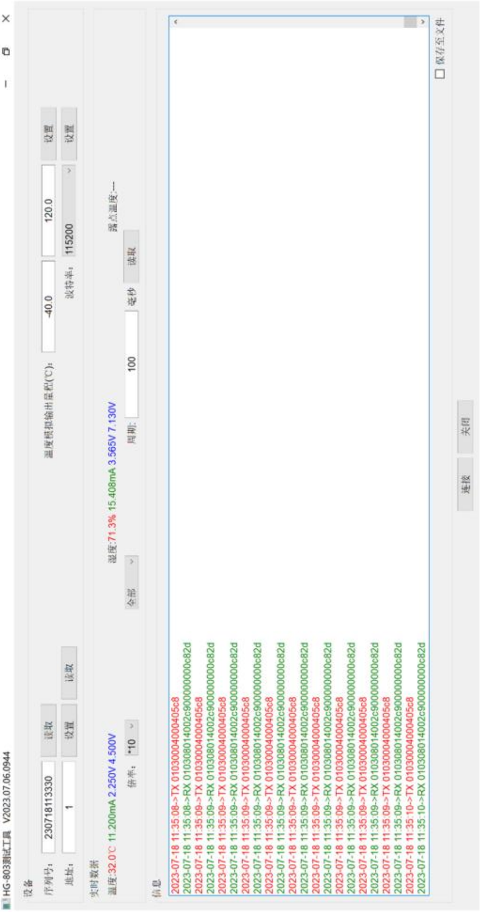
②Connect only one device and power it on. Click the test baud rate of the software. The software will test the baud rate and address of the current device. The default baud rate is 9600bit/s. The default address is 0x01.

③Modify the address and baud rate according to the needs of use, and query the current function status of the device.

④If the test fails, check the device cables and the installation of the RS485 transceiver driver again.

NOTE:

The HG803 Tool is recommended to run on windows10 or windows11. If there is an indicating that the dll library is missing, upgrade the operating system or install the related system support library.



The interface of the HG803 dedicated test tool

Appendix 1:Communication Protocol (for RS485 digital signal output type)

1.1. Basic Communication Parameters

Coding	8-bit binary
Data bit	8 bits
Parity bit	none
Stop bit	1bit
Error check	CRC (Redundant Cyclic Code)
Baud rate	4800bit/s, 9600bit/s (default)

1.2. Definition of data frame format

The Modbus-RTU communication protocol is adopted in the following format:

Initial structure ≥4 bytes in time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

End structure time ≥4 bytes

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

Function code: The function instruction sent by the host indicates that the transmitter only uses the function code 0x03 (read register data).

Data area: The data area is the specific communication data, Note:Put the high bytes of 16bits data ahead!

CRC code: A two-byte verification code.

Host query frame format：

Address Code	Function	Start Address	Data Length	Check Code Low	Check Code High
1 byte	1 byte	2 byte	2 byte	1 byte	1 byte

Slave answer frame format：

Address Code	Function	Effective Bytes	Data Area 1	Data Area 2	Data Area N	Check Code
1 byte	1 byte	1 byte	2 byte	2 byte	2 byte	2 byte

The function codes used in this product are as follows：

Function Code (hexadecimal)	Function Description
03	Read input register
06	Write a single hold register

1.3. Register address

Register type	Register Address	Implication	Bytes and data types
Input register	0X0000	Temperature value	Two bytes, signed integer, magnified 100 times
	0X0001	Humidity value	Two bytes, unsigned integer, magnified 100 times
	0X0003	Sensor status	Two bytes, unsigned integer
	0X0004	Temperature value	Two bytes, signed integer, magnified 10 times
	0X0005	Humidity value	Two bytes, unsigned integer, magnified 10 times
	0X0007	Sensor status	Two bytes, unsigned integer
Hold register	0X0100	Device address	One byte, unsigned integer
	0X0101	baud rate	One byte, see "Baud Rate Settings"

1.4. Communication protocol examples and explanations

Example 1:

Reading humidity value of device address 0x01 (resolution 0.1)

Query frame (hexadecimal) :

Add	Function	Start Address	Data Length	Check Code low	Check Code high
0x01	0x03	0x00 0x05	0x00 0x01	0x94	0x0B

Response frame (hexadecimal) :

(e.g. read that humidity is 63.5%RH)

Add	Function	Effective bytes	Humidity	Check Code low	Check Code high
0x01	0x03	0x02	0x02 0x7B	0xF9	0x07

Example 2:

Reading temperature, humidity, dew point, and status values of the device address 0x01(0.1 resolution)

Query frame (hexadecimal) :

Add	Function	Start Address	Data Length	Check Code low	Check Code high
0x01	0x03	0x00 0x04	0x00 0x04	0x05	0xC8

Response frame (hexadecimal) :

(e.g. read temperature: 32.3 °C, humidity: 70.4%RH, dew point: 26.3°C, Status: no fault)

Add	Function	Effective Bytes	Temperature	Humidity	Dew Point	Status	Check Code
0x01	0x03	0x08	0x0143	0x02C0	0X0107	0x000	0x9711

Note:

When the temperature is below 0°C, the temperature data is uploaded in the form of complement.

Example 3:

Reading the dew point value of device address 0x01 (0.01 resolution)

Query frame (hexadecimal) :

Add	Function	Start Address	Data Length	Check Code low	Check Code high
0x01	0x03	0x00 0x02	0x00 0x01	0x25	0xCA

Response frame (hexadecimal) :

(e.g. read dew point temperature: 26.3°C)

Add	Function	Effective Bytes	Dew Point	Check Code low	Check Code high
0x01	0x03	0x02	0x0a 0x46	0x3F	0x16

Note:

When the temperature is below 0°C, the temperature data is uploaded in the form of complement.

Example 4:

Setting the sensor/transmitter address

Format of the frame sent by the host (the address 0X08=8 is used as an example) :

Add	Function	Register Add （H,L）	Register value (H,L)	CRC-16 (L,H)
0x00	0x06	0x01 0x00	0x00 0x08	0x88 0x21

The transmitter response frame is the same as the host sending frame:

Add	Function	Register Add （H,L）	Register value (H,L)	CRC-16 (L,H)
0x00	0x06	0x01 0x00	0x00 0x08	0x88 0x21

Instructions:

* The communication address can be set within the range of 1-247.

* When the transmitter address is queried, the address code of the downlink packet is fixed at 0X00. When setting the transmitter address, the address code can be its own real address, or it can be 00 (to prevent forgetting the transmitter address, you can reset through the 00 address)

* When using the 00 address code to reset the device address, ensure that there is only one transmitter on the bus

Example 5:

Baud rate settings

Host frame delivery format (for example, set the baud rate to 9600bps) :

Add	Function	Register Add （H,L）	Register value (H,L)	CRC-16 (L,H)
0x00	0x06	0x01 0x01	0x00 0x04	0xD9 0xE4

The transmitter response frame is the same as the host sending frame:

Add	Function	Register Add （H,L）	Register value (H,L)	CRC-16 (L,H)
0x00	0x06	0x01 0x01	0x00 0x04	0xD9 0xE4

Register value and baud rate comparison table：

Register value	Baud rate
=1	1200bps
=2	2400pbs
=3	4800pbs
=4	9600pbs
=5	19200bps
=6	115200bps

Note:

After the baud rate is changed, it takes effect immediately. Note that the host software needs to reconnect with the new baud rate. If the change does not take effect, power on the host again.

1.5. The device cannot be connected to the PLC or computer

Possible reasons:

1) The computer has multiple COM ports, and the selected port is incorrect.
2) The device address is incorrect, or there are devices with repeated addresses (the factory default is all 1).
3) Baud rate, check mode, data bit, stop bit error.
4) The host polling interval and the time for waiting the response are too short, and they need to be set above 200ms.
5) The 485 bus is disconnected, or the A and B lines are reversed.
6) If the number of devices is too large or the wiring is too long, the power supply should be nearby, and the 485 intensifier should be added, and the 120Ω terminal resistance should be increased.
7)USB to 485 driver is not installed or damaged.
8)The wiring is not connected properly, it needs to be reconnected to ensure a good connection.
9)Equipment damage.

Appendix 2: Shell Dimension

Overall size: 124 mm × 80 mm × 38 mm

Appendix 3:Testing Software Download link:

www. hkometer.com/download/
www. hengko.cn/download/

Appendix 4: Note

1.Pay attention to the wiring sequence of the transmitter:
Signal → Negative → Positive

2.Pay attention to the disassembly sequence of the transmitter:
Positive → Negative → Signal

3.The product should be fully connected to the receiving end such as a PLC or computer before connecting to the power supply; It is prohibited to power on first before connecting the sensor or receiving end.

4.The transmitter shell should be grounded and anti-interference(recommended).

5.Do not touch the sensor element or blow;

6.The working power supply voltage should be used within the range;

7.Install the probe downward;

8.No polluting gases (acid) in the environment;

9.The wind speed and pressure of the environment must be within the range of use;

10.Transmitter and probe installation away from spark flame and flammable materials;

11.Other prohibited matters for the use of transmitters.

About us

HENGKO Technology Co., Ltd. is a professional technical enterprise that integrates the research and development, manufacturing, sales, and service of temperature and humidity dew point transmitters.

Having been deeply involved in the industry for over 20 years, HENGKO's mission is to "solve the filtration, perception, and analysis problems in the gas and liquid world, making life healthier".We continuously improve product performance and quality to solve the technical difficulties faced by various industries in environmental measurement, filtration purification, and fluid control, and help customers continuously improve product competitiveness.

Our company has a team of engineers with strong independent innovation capabilities and rich industry customization experience, as well as a systematic, rigorous, and efficient product design and production system. From technical services to product development, from basic measurement to high-end applications, we provide customers with comprehensive temperature and humidity measurement solutions.

Our company's products are widely used in industries such as automotive manufacturing, rail transit, aviation, high-speed rail, biopharmaceuticals, gases, compressed air, electronic devices, smart agriculture, warehouses, logistics, and food processing and so on.

Contact Us

HENGKO Technology Co., Ltd.

Address:

No. 51-3, Fuan West Road, Pinghu Street, Longgang District, Shenzhen, Guangdong, 518111 China

Contact number: 0086-0755-88823250

E-mail: ka@hengko.com

Website: www.hengkometer.com

Please read this user manual carefully before use.

The company reserves the right to interpret this user manual.

The appearance of this product is subject to the actual product.

Product technology or software upgrades are available without prior notice.