USER MANUAL

ONE-STOP SOLUTION

ONE-STOP SERVICE

HUNAN MACSENSOR COMPANY LIMITED

User Manual for MTH40 Wall-mounted Temperature and Humidity Transmitter (485 Type)

1. Product Introduction

1.1 Product Overview

This product is a wall-mounted high-protection-grade shell with IP65 protection grade, rain and snow protection and good air permeability. The circuit adopts industrial-grade microprocessor chips imported from the United States and imported high-precision temperature sensors to ensure excellent reliability, high precision and interchangeability of products. This product adopts particle sintered probe sheath, and the probe is directly connected to the shell and has a beautiful appearance. The output signal type is divided into RS485, which can communicate up to 2000 meters. The standard modbus protocol supports secondary development.

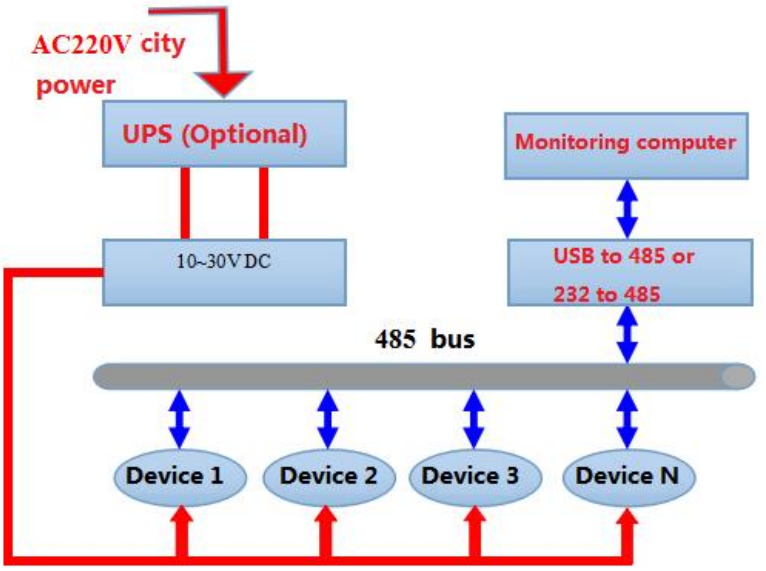
1.2 Functions and Features

Using the measuring unit imported from Switzerland, the measurement is accurate. Using a dedicated 485 circuit, the communication is stable. 10~30V wide voltage range power supply, complete specifications, easy installation.

1.3 Main Technical Specifications

DC power supply (default)	10~30V DC	
Maximum power consumption	0.4W	
Accuracy	Humidity	±2%RH(5%RH~95%RH,25℃)
	Temperature	±0.4℃(25℃)
Accuracy(by default)	Humidity	±3%RH(5%RH~95%RH,25℃)
	Temperature	±0.5℃(25℃)
Working temperature of transmitter circuit	-40℃~+60℃， 0%RH~80%RH	
Working temperature of probe	-40℃~+120℃,-40℃~+80℃ by default	
Working humidity of probe	0%RH-100%RH	
Temperature display resolution	0.1℃	
Humidity Display Resolution	0.1%RH	
Temperature and humidity refresh time	1s	
Long-term Stability	Humidity	≤1%RH/y
	Temperature	≤0.1℃/y
Response time	Humidity	≤4s(1m/s wind speed)
	Temperature	≤15s(1m/s wind speed)
Output signal	RS485(Modbus Protocol)	
Installation method	Wall-mounted	

1.4 System Framework



1.5 Product Model Selection

MTH				Temperature and humidity transmitter and sensor
	N01-			485 Communication(Modbus-RTU)
		2-		Wall mounted Chinese character WANG-shaped shell
			1-	Built-in copper head
			2-	Built-in PE head
			3-	Built-in Siemens copper head
			4-	Built-in high-end probe 
			5-	External high-end probe 
			6-	External water-proof probe 
			7-	External high sensitivity probe
			8-	External normal probe
			9-	External metal waterproof probe
			A-	External DN15 pipe threaded probe

			B-	External wide temperature probe 

2 Equipment Installation Instruction

2.1 Pre-installation Check

Device List:

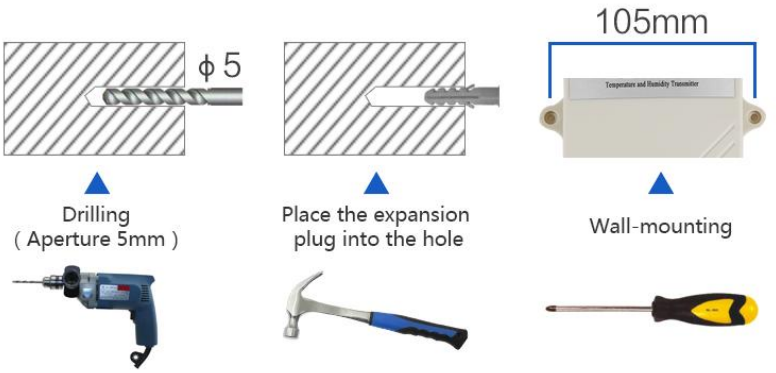
■1 temperature and humidity transmitter

■Certificate of conformity, warranty card, calibration report and etc.

■2 self-tapping screws, 2 expansion plugs

■USB to 485 (optional)

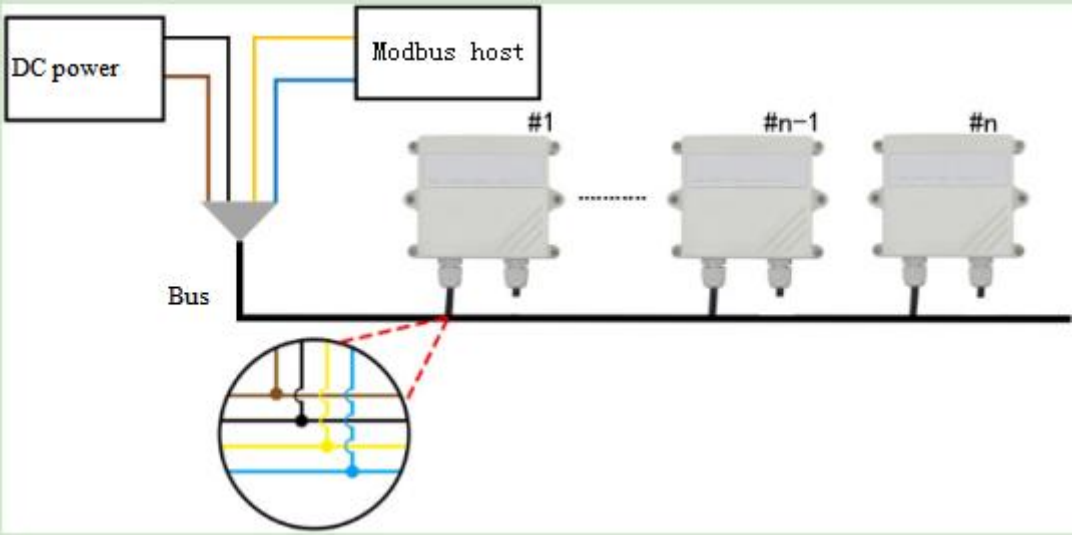
2.2 Installation Steps



Special Note:

1) There are certain specification requirements for 485 wiring, please refer to the data package 485 Equipment Field Wiring Manual for details.

2) When the device is connected to the 485 bus, ensure that the addresses of multiple devices will not be repeated.



2.3 Wiring

Power Source and 485 Signal

Wide voltage power input can be 10~30V. When wiring the 485 signal line, pay attention that the A\B lines cannot be reversed, and the addresses of multiple devices on the bus cannot conflict.

2.4 Specific Wiring

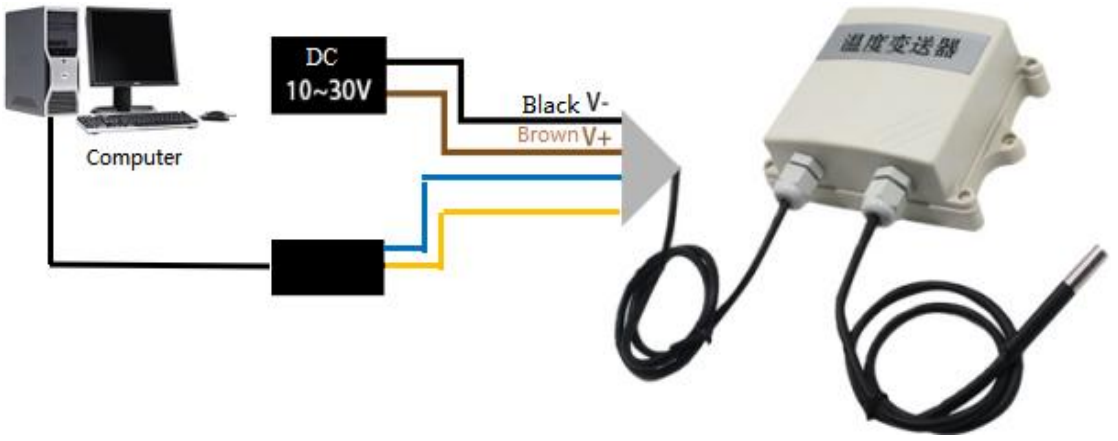
	Wire Color	Definition
Power supply	Brown	Positive(+)(10~30V DC)
	Black	Positive(-)
	Yellow	485-A
	Blue	485-B

3. Configuration software installation and use

3.1 Software selection

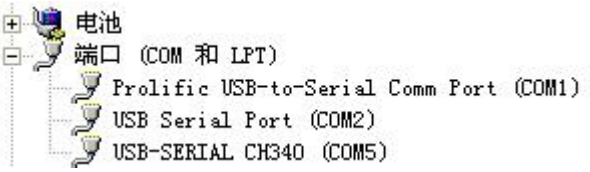
Open the data package, select Debugging Software---485 Parameter Configuration Software,

and open it. Note: When using this configuration software to change the address and baud rate, only one device can be connected.



3.2 Parameter setting

①Select the correct COM port (check the COM port in "My Computer-Properties-Device Manager-Port"), the following figure lists the driver names of several different 485 converters.



②Only connect 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 4800bit/s, and the default address is 0x01.

③Modify the address and baud rate according to the needs of use, and at the same time, you can query the current functional status of the device.

④If the test is unsuccessful, please re-check the wiring of the equipment and the installation of the 485 driver.

4. Communication Protocol

4.1 Basic communication parameters

Coding	8 bit binary
Data bits	8
Parity bit	None
Stop bit	1
Error checking	CRC
Baud rate	2400bit/s, 4800bit/s and 9600 bit/s can be set, 4800bit/s by default

4.2 Data frame format definition

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

Initial structure ≥4 bytes of time

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

Function code: the function instruction of the command sent by the host, this transmitter only uses the function code 0x03 (read register data).

Data area: The data area is the specific communication data, pay attention to the high byte of the 16bits data first!

CRC code: two-byte check code.

Host query frame structure:

Address Code	Function Code	Register Start Address	Register Length	Check Code Low Bit	Check Code High Bit
1 byte	1 byte	2 bytes	2 bytes	1 byte	1 byte

Slave response frame structure:

Address Code	Function Code	The number of valid bytes	Data Area 1	Data Area 2	Data Area N	Check code
1 byte	1 byte	1 byte	2 bytes	2 bytes	2 bytes	2 bytes

4.3 Register Address

Register address	PLC or configuration address	Content	Operation
0000 H	40001	Humidity	Read only
0001 H	40002	Temperature	Read only

4.4 Communication protocol example and explanation

Example: Read the temperature and humidity value of device address 0x01

Query frame (hexadecimal):

Address Code	Function Code	Start Address	Data Length	Check Code Low Bit	Check Code High Bit
0x01	0x03	0x00 0x00	0x00 0x02	0xC4	0x0B

Response frame (hexadecimal): (For example, the temperature is -10.1℃ and the humidity is 65.8%RH)

Address Code	Function Code	The number of valid bytes returned	Humidity value	Temperature value	Check Code Low Bit	Check Code High Bit
0x01	0x03	0x04	0x02 0x92	0xFF 0x9B	0x5A	0x3D

Temperature calculation:

When the temperature is lower than 0 ℃, the temperature data is uploaded in the form of complement code.

Temperature: FF9B H(hex) = -101 => temperature = -10.1℃

Humidity calculation:

Humidity: 292 H (Hex) = 658 => Humidity = 65.8%RH

5. Common problems and solutions

The device cannot be connected to the PLC or computer

Possible reason:

1) The computer has multiple COM ports, and the selected port is incorrect

2) The device address is wrong, or there are devices with duplicate addresses (the factory default is all 1).

3) Baud rate, check mode, data bit, stop bit error.

4) The 485 bus is disconnected, or the A and B lines are reversed

5) If the number of devices is too large or the wiring is too long, power supply should be provided nearby, add a 485 booster, and at the same time increase a 120Ω terminal resistance.

6) The USB to 485 driver is not installed or damaged

7) The equipment is damaged.

Appendix: Housing Dimensions

A wall-mounted Chinese character WANG-shaped housing:110×85×44mm