

Wall mounted temperature and humidity transmitter






Summary

Safety guidance


These installation instructions contain important information on how to use the transmitter correctly. The transmitter installer shall carefully read the installation instructions before operating the transmitter. In case of further understanding or special problems, which are not described in detail in this operation manual, please contact our company to obtain necessary information. Please pay attention to the warning signs on the instructions! Operators must strictly follow the safety instructions in the installation instructions. In addition, occupational safety rules, accident prevention guidelines, national installation standards and engineering specifications must be observed. Please keep this instruction properly and store it in a convenient place near the transmitter. The copyright of these installation instructions is protected. The installation instructions of this version are written according to the functions that can be realized by the corresponding product during printing, and describe the product functions and operation steps as detailed and complete as possible. If you find mistakes, you are welcome to criticize and correct them. The company is not responsible for the possible wrong description and possible consequences.

- reserve the right to modify the technical parameters -

Icon description

-  **Danger!** - A dangerous situation that could result in death or serious injury.
-  **Warning!** - A potentially hazardous situation that could result in death or serious injury.
-  **Be careful!** - A potentially hazardous situation that may result in minor injury.
-  **Reminder!** - A potentially hazardous situation that may cause personal injury.
-  **Tips!** - Tips and information, to ensure trouble free operation of the equipment.

User

-  **Warning!** These installation instructions are for technicians.
- Limitation of liability
- If the transmitter is damaged due to non-compliance with the operation and installation instructions, improper use, self modification and destruction, the company will not be liable for compensation and will not provide warranty service.

Unpack

- a) After unpacking, check whether the documents and accessories are complete according to the packing list. Packing documents: one copy of operation manual. One product certificate. A warranty card. Packing accessories include: Two self tapping screws and two plastic expansion pipes respectively.
- b) When receiving the product, please check whether the package is intact, and check whether the transmitter model and specification are consistent with the product you choose.
- c) Observe whether the transmitter is damaged due to transportation for proper treatment.
- d) The user is expected to keep the "warranty card" properly and do not lose it, otherwise it cannot be returned to the factory for free maintenance!

Identification







model:

Temperature range:  ~  Humidity range:  ~








output:  ~  power supply:

Degree of protection: Protection level:

Precautions for use

-  **Warning!**  
The transmitter must be installed by professional technicians who read and understand this operation manual.
-  **Warning!**  
Do not measure media with incompatible materials in contact with the transmitter.
-  **! DANGER!**  
This product is a non explosion-proof product. It is strictly prohibited to use it in the explosion-proof area, otherwise it will cause serious personal injury and material loss.  
! No modifications or changes can be made on the equipment.  
! Handle the transmitter with care and do not throw it at will. Do not use brute force when installing the transmitter.  
! This product belongs to weak current equipment, which must be laid separately from strong current cables, and shall be wired in accordance with relevant national wiring standards (GB / T50312-2016).  
 Ensure that the power supply voltage meets the power supply requirements of the transmitter.  
 Prevent chemical reagent, oil and dust from directly invading the sensor, and do not use it in the environment of condensation and extreme temperature. Do not perform cold or heat shock.  
 The protective cover can be removed after 2 ~ 3 months of use, and the filter screen can be cleaned to make the measurement environment circulate normally.

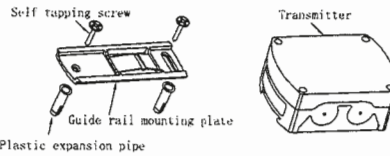
Installation precautions

-  **Warning!**  
The equipment must be installed without power supply.  
 If the transmitter is installed in a harsh site and will encounter dangerous damage such as lightning stroke or overvoltage, we recommend that the user carry out lightning stroke and overvoltage protection between the distribution box or power supply and the transmitter.
-  The installation height is the sitting height of the human body or the environmental area mainly required to be measured.
-  The transmitter shall be placed vertically as far as possible. During installation, ensure that the sensor is under the transmitter (the font on the transmitter is positive).
-  It shall be installed in an area with stable environment, avoid direct lighting, stay away from windows, air conditioning, heating and other equipment, and avoid directly facing windows and doors.
-  The transmitter and conductor shall be far away from places with high voltage and serious electromagnetic interference, and away from high-power interference equipment as far as possible to avoid inaccurate measurement, such as frequency converter, motor, etc.
-  Confirm whether the power supply voltage is correct, and the positive and negative of the power supply correspond to the positive and negative wiring of the product; Avoid installing in the position easy to bump, so as not to damage the product.

Install

Wall installation

The back of the transmitter is equipped with a guide rail mounting plate. Remove the mounting plate first. The accessories are equipped with two wallboard self tapping screws and two plastic expansion pipes. First punch two holes with diameter of 6mm and depth of ≥ 30mm on the wall (please refer to the dimension drawing of guide rail mounting plate for hole position). Insert the expansion pipe, fix the guide rail mounting plate on the wall with self tapping screws, and then slide in the transmitter.

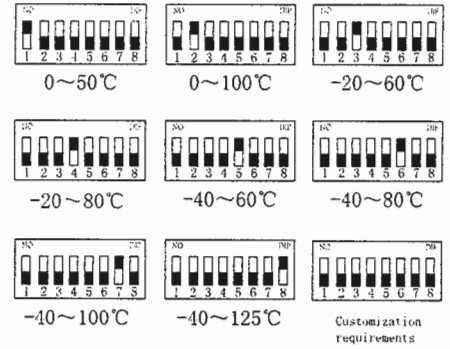


DIN rail mounting

The back of the transmitter is equipped with a guide rail mounting plate. Remove the mounting plate first. The transmitter can slide directly into the DIN rail.

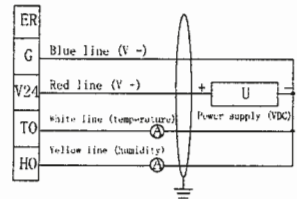
Key dialing description

The digital output temperature range is -40 ~ 125 °C, and the corresponding output data is 0-1650. The temperature ranges of current output and voltage output can be changed by dialing the key on the dial switch on the internal circuit board. There are eight ranges to choose from (as shown in the figure below). The factory default temperature range is -40 ~ 100 °C.

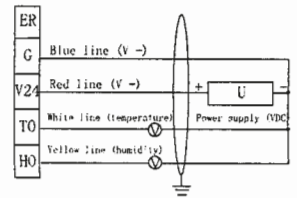


Wiring diagram

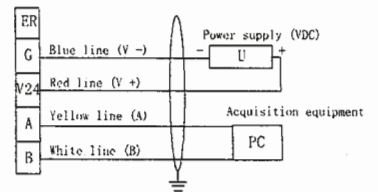
Current output wiring diagram (three wire system)





Voltage output wiring diagram (three wire system)



RS485 (digital signal) output wiring diagram (four wire system)



-  Represents shielded wire, and all marked grounding points must be effectively grounded. It is recommended to select shielded twisted pair signal cable for the best effect. In order to avoid grounding loop, the shielding layer adopts single end grounding, insulated floating grounding at the transmitter end and grounding at the control cabinet end.
-  It is recommended to select cables with an outer diameter of 4 ~ 6mm to ensure the protection grade.

Protocol description (limited to RS485 signal output, the address is 01 by default, and the data is hexadecimal)

Basic technical parameters of transmitter

- This protocol complies with Modbus communication protocol and adopts the centralized RTU mode in Modbus protocol. RS485 half duplex working mode
- a) Output signal: RS485 (distance up to 1000m), 32 channels in total
  - b) Standard: Modbus RTU protocol (03 function reads data, 06 function writes setting data)
  - c) Data format: 9600, X, 8, 1 (9600bps, no verification, 8 data bits, 1 position (parking position))
  - d) Output data: temperature 0-1650 (-40 ~ 125 °C) humidity 0-1000 (0 ~ 100% RH)
  - e) Response frequency: < 2Hz

## Modbus RTU read data 03 command description

Protocol format description					
Device address	Function code	Data address	Number of read data	Start code (low front high rear)	Check code (low front high rear)
Address	03	00 00	CN	CRC0 CRC1	
Device address	Function code	Data byte	SHARED data	Start code (low front high rear)	Check code (low front high rear)
Return frame number	Address	03	02*CN	S_HLN ~ S_LN	CRC0 CRC1

### Communication examples (read a sensor signal):

-40~125°C: The communication equipment address of 0-100% RH sensor is set to 01, i.e. [address] = 01; At this time, crcl = C4, crc1 = 0b. Then, the sending command line is as follows:  
Send 01 03 00 02 C4 0b  
Return to 01 03 04 02 26 01 77 5B F6  
02 26 is the temperature, converted to decimal 550;

01 77 is humidity, converted to decimal 375;

Temperature data output: 0-1650 corresponds to -40 ~ 125 °C (there is no change in the corresponding relationship of range change),

Therefore, the current temperature is  $t = 165 * 550 / 1650 - 40 = 15$  °C.

Humidity data output: 0-1000 corresponds to 0 ~ 100% RH.

Therefore, the current humidity is  $RH = 375 * 100 / 1000 = 37.5\%$  RH.

**Query example** (reading the current device address can only be completed independently by a single offline sensor)

Send FF 03 00 0f 00 01 A1 D7

Return to FF 03 02 00 01 50 50

Then: the device address is 01 (hexadecimal)

### Detailed description of Modbus RTU write 06 command

Protocol format description					
Device address	Function code	Data address	new address	Start code (low front high rear)	Check code (low front high rear)
Address	06	00 0F	H L	CRC0 CRC1	
Device address	Function code	Data address <td>new address</td> <td>Start code (low front high rear)</td> <td>Check code (low front high rear)</td>	new address	Start code (low front high rear)	Check code (low front high rear)
Return frame number	Address	06	00 0F	H L	CRC0 CRC1

### Modification example

If the 01 address is changed to 09 address:

Send 01 06 00 0f 00 09 79 CF

Return to 01 06 00 0f 00 09 79 CF

Then the original address 01 is successfully changed to 09. The modified address can be modified offline or online. After completion, it can work directly without power on again.

### Precautions for use

a) A single RS485 bus must adopt a "hand in hand" bus structure, and do not use star connection and bifurcation connection. The address code is set from near to far, that is, the management computer is connected to No. 1 controller, No. 2 is connected to No. 1, No. 3 is connected to No. 2, and so on

**Warning!**  
b) The AC and chassis supplied by the equipment must be truly grounded and well grounded. Many places have triangular sockets on the surface, but they are not grounded at all. Be careful. When the grounding is good, it can ensure that the equipment is impacted by lightning surge. When static electricity is accumulated, it can cooperate with the lightning protection design of the equipment to better release energy and protect RS485 bus equipment and related chips from damage. If the grounding is not well connected or not connected, do not use RS485 bus to avoid equipment burning and casualties.

c) The wire must use multi strand shielded twisted pair wire with a wire diameter of more than 0.3 mm<sup>2</sup> (multi strand is for standby). PVC pipe shall be applied separately to avoid walking together with strong current to avoid interference of strong current.

d) 485 (a) and 485 (b) must be twisted pair, because 485 communication adopts the principle of differential mode communication, and the twisted pair has good anti-interference. It is wrong not to use twisted pair, and other types of cables must be avoided.

e) Connect the reference GND (power supply negative) of the RS485 converter and all access controllers in series, and use the remaining one or all of the multi strand twisted pair network cables for the series GND; The reference ground is not well connected, which also affects the communication. The common mode effect is mainly caused by the high-frequency radiation from the distributed capacitance and inductance.

f) The shielding layer of the network communication line is connected to the earth. Pay attention to grounding, otherwise there is a potential unknown danger of the bus.

g) If multiple slaves or connecting wires are too long and communication is not smooth, 120 ohm matching resistance shall be added between 485 (a) and 485 (b) of one slave at the head and end of 485 bus to improve communication quality ( must be twisted pair)

h) Reasonable arrangement of transmission rate, number of load nodes and transmission distance, so as to achieve the principle of remote low-speed few nodes and short-range high-speed multi nodes.

i) Data communication must be verified to protect transmission correctness. Generally, Modbus RTU is verified with CRC-16 verification mode, and the error rate is less than 1 / 1 billion.

j) If necessary, select the isolation 485 of our company, and the general price is more expensive.

## EMC statement

Applicable Directive: electromagnetic compatibility Equipment Directive 2014 / 35 / EU.

CE marking indicates that the product meets the requirements of applicable EU standards.

The user must ensure that the whole equipment meets all use standards.

## first start-up

**Warning!**

a) Before startup, the user must check whether the transmitter is installed correctly and whether there is obvious damage.

**Warning!**

b) The transmitter must be started and operated by professional technicians who read and understand this operation manual.

**Warning!**

c) The transmitter is only applicable to the working conditions that meet the technical requirements!

## Common fault analysis and troubleshooting

Fault phenomenon	Cause analysis	Exclusion method
The transmitter has no output signal	• Transmitter not powered • Wiring error	• Power the transmitter correctly according to the wiring diagram
The transmitter has no output signal, and the output jumps irregularly when the temperature is constant	• Strong RF interference on site • Shielded cable not used	• The transmitter is reliably connected with the earth
The transmitter output is inconsistent with the measured temperature	• Incorrect supply voltage • Excessive external load	• Compliance with power supply scope • Adjust external load

## Disassembly and after sales

During the warranty period, the products are detected by our technicians as quality problems, and the company shall bear all maintenance costs:

**Warning!**

Please clean up the residual media before returning, especially the substances harmful to human health, such as corrosive, toxic, carcinogenic or radioactive substances;

Please keep the warranty card and certificate, and return with the product during maintenance:

If the transmitter fails, please contact our after-sales service. After confirming the problem, you need to send the transmitter back to our company. Please attach the following information during maintenance:

Description of site environment;

Fault phenomenon;

Receiving address and contact information.

## Adjustment

Zero and full scale drift may occur during the service life of the transmitter.

If the above phenomena occur after long-term use, it is recommended to send the transmitter back to our company for calibration to ensure high accuracy.

## Maintenance and cleaning

**maintain**

The transmitter does not require customer maintenance.

Maintenance may only be performed by the manufacturer.

## Transportation, storage and transportation

The transmitter shall be packed in a strong carton (wooden case is required for large instruments). It is not allowed to move freely in the carton. It shall be handled with care and rough loading and unloading is not allowed. The storage location shall meet the following conditions:

a) Rain proof and moisture-proof.

b) Free from mechanical vibration or impact.

c) Temperature range - 30 ~ 70 °C.

d) The relative humidity shall not be greater than 90% (no condensation).

e) The environment does not contain corrosive gases.