

Product Agreement
Duct Humidity Sensor

Protocol Description (Limited to RS485 signal output 485, all product addresses default to 01, data in hexadecimal)

Basic technical parameters of transmitter

This protocol complies with the Modbus communication protocol and adopts the subset RTU method in the Modbus protocol RS485 half duplex working mode

- a) Output signal: RS485 (distance up to 1000 meters. Can connect a total of 32 channels)
- b) Standard: Modbus RTU protocol (03 function reads data, 06 function writes settings data)
- c) Data format: 9600, N, 8,1 (9600bps, no checksum, 8-bit data bits, 1-bit stop)
- d) Output data: Temperature 0-1200 (-40~80 ℃) Humidity 0-1000 (0~100% RH)
- e) Response frequency: ≤ 2Hz

Modbus RTU Read Data 03 Command Description

	Device address	Function code	Data address	Number of read data	16crc code (low front high rear)
Host command	Address	03	00 00	CN	CRC0 CRC1
	Device address	Function code	Data byte	Sensor data	16crc code (low front high rear)
Host command	Address	03	02*CN	S_HN , S_LN	CRC0 CRC1

Examples of Communication

-40~80℃; Set the communication device address of the 0-100% RH sensor to 01, i.e. [Address]=01; At this point, CRC0=C4, CRC1=0B. Therefore, the command line to send at this point is as follows:
Send 01 03 00 00 02 C4 0B
Return to 01 03 04 02 26 01 77 5B F6
02 26 is temperature, converted to decimal 550;
01 77 is humidity, converted to 375 in decimal;
Temperature data output: 0-1200 corresponds to -40~80 ℃ (there is no change in the corresponding relationship between range changes), So the current temperature is T=120 * 550/1200-40=15 ℃
Humidity data output: 0-1000 corresponds to 0-100% RH, so the current humidity is RH=375 * 100/1000=37.5% RH

Example query

Reading the current device address can only be independently completed by a single offline sensor
Send FF 03 00 0F 00 01 A1 D7 and return FF 03 02 00 01 50
So: The address of this device is 01 (hexadecimal)

Detailed description of Modbus RTU write 06 command

	Device address	Function code	Data address	new address	16crc code (low front high rear)
Host command	Address	06	00 0F	H L	CRC0 CRC1
	Device address	Function code	Data address	new address	16crc code (low front high rear)
Host command	Address	06	00 0F	H L	CRC0 CRC1

Example of modification

If the 01 address is changed to 09 address:

Send 01 06 00 0f 00 09 79 CF return 01 06 00 0f 00 09 79 CF

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

Precautions

- ☞ a) A single RS485 bus must adopt the "hand in hand" bus structure, and do not use star connection or fork connection. The address code is set from near to far, that is, the management computer is connected to controller 1, 2 to 1, 3 to 2, and so on
- ⚠ Warning!
- ☞ b) The AC power supplied by the equipment and the chassis must be truly grounded and well grounded. There are triangle sockets on the surface in many places, but they are not grounded at all. Be careful. When the grounding is good, it can ensure that the energy can be released well in coordination with the lightning protection design of the equipment to protect the RS485 bus equipment and related chips from damage when the equipment is subjected to lightning surge impact and static accumulation. If the grounding is not well connected or not connected, do not use the RS485 bus to avoid equipment burning and casualties.
- ☞ c) Wire must be multi strand shielded twisted pair network cable with wire diameter of more than 0.3 mm² (multi strand is for standby). PVC pipe shall be applied separately to avoid walking together with strong current to avoid its interference.
- ☞ d) 485 (A) and 485 (B) must be twisted pair to each other, because 485 communication adopts differential mode communication principle, and twisted pair has good anti-interference performance. It is wrong not to use twisted pair, and other types of cables must be avoided.
- ☞ e) Serial RS485 converter and reference GND (negative power supply) of all access controllers, and use one or all of the remaining twisted pair network cables for serial GND; The reference ground is not well connected, which also affects the communication time and time. The common mode effect is mainly caused by the high-frequency radiation from distributed capacitors and inductors.
- ☞ f) The shielding layer of the network communication line is connected to the ground. Attention must be paid to grounding, otherwise the bus is potentially unknown.
- ☞ g) If multiple slaves or connecting lines are too long and communication is not smooth, 120 ohm matching resistors shall be added between 485 (A) and 485 (B) of a slave at the head end and the end of the 485 bus respectively to improve communication quality. (Must be twisted pair)
- ☞ h) The transmission rate, the number of load nodes and the transmission distance shall be reasonably arranged to achieve the principle of few remote low-speed nodes and multiple short-range high-speed nodes.
- ☞ i) Data communication must have verification to protect transmission correctness. Generally, Modbus RTU uses crc-16 verification mode to verify, and the error rate is less than 1/10 billion.
- ☞ j) If necessary, the isolation type 485 of our company will be selected, and the general price will be higher.