Appendix 1. Communication Protocol

Conforms to the standard MODBUS protocol (RTU mode).

1. Master-slave mode in which the host queries and the transmitter replies

Query Data	Device Address	Function Code	Memory start address	Data Number	CRC16 (L)	CRC16 (H)	Sample
Temperature	0x XX	0x04	0x0000	0x0001	CRCL	CRCH	Query frame:01 04 00 00 00 01 31 CA Reply frame:01 04 02 01 0F F8 A4 Temperature:0x 01 0F（271：27.1℃）
Humidity	0x XX	0x04	0x0001	0x0001	CRCL	CRCH	Query frame:01 04 00 01 00 01 60 0A Reply frame:01 04 02 02 80 B9 F0 Humidity:0x 02 80（640：64.0%RH）
Temperature Humidity	0x XX	0x04	0x0000	0x0002	CRCL	CRCH	Query frame:01 04 00 00 00 02 71 CB Reply frame:01 04 04 01 12 02 7D 9B 3C Temperature:0x 01 12（274：27.4℃） Humidity:0x 02 7D（637：63.7%RH）
Device Address	FF	0x03	0x0002	0x0001	CRCL	CRCH	Query frame:FF 03 00 02 00 01 30 14 Reply frame:FF 03 02 00 01 50 50 Address:0x 00 01（1）
Baud rate	FF	0x03	0x0003	0x0001	CRCL	CRCH	Query frame:FF 03 00 03 00 01 61 D4 Reply frame:FF 03 02 00 03 D1 91 Baud rate:0x 00 03 （3:9600）

2.The address and baud rate of the transmitter can be changed through the serial port (special caution should be taken when modifying baud rate, as the wrong modification may cause communication failure)

Change of address (0X01-0XFE)

Modify communication parameters	Device Address (0x01—0XFE)	Function Code	Memory start address	Setting parameters H	Setting parameters L	CRC16 (L)	CRC16(H)	Sample After setting, the new address will take effect immediately after the power outage.
Address	Original address	0x06	0x0002	New Address H	New Address L	CRCL	CRCH	Changing the address to 02 operation for the transmitter with address 01 is: FF 06 00 02 00 02 BC 15 Response: The return value is the same as issued an order, that is, to set the success;
Baud rate	Address	0x06	0x0003	Baud rate code H	Baud rate code L	CRCL	CRCH	The communication baud rate is changed to 38400 operation: FF 06 00 03 00 05 AC 17 Response: The return value is the same as issued an order, that is, to set the success;

3. Data H (high byte) and data L (low byte) are the corresponding current temperature and humidity values:

● The uploaded data should be divided by 10, e.g. humidity uploaded in hexadecimal 0311, converted to decimal

785, which means 78.5%.

- Positive temperature conversion, such as temperature upload 0X00FC, convert decimal to 252, which means 25.2℃.
- Negative temperature conversion, such as temperature upload 0XFF8C, take the complement - (0XFFFF-0XFF8C+1) to convert to decimal as -116, said -11.6 ℃.

4. Byte format 8 data bits, no parity, 1 stop bit. Note: The corresponding relationship between baud rate code and actual baud rate is as follows.

Baud rate code	0	1	2	3	4	5	6
Baud rate （kbps）	1200	2400	4800	9600	19200	38400	57600

Note 1:CRCH is the CRC check high byte and CRCL is the CRC check low byte.

Note 2: When there is a dial switch, modify the communication baud rate, communication address serial port command invalid.

Abnormal response:

Machine Address	Abnormal Function Code: (Function Code +0x80）	Exception code 01 or 02 or 03 or 04	CRCL	CRCH

Modbus exception code		
Code	Name	Meaning
01	Illegal functions	For the device, the function code received in the interrogation is not permitted
02	Illegal data address	For the device, the data address received in the interrogation is a disallowed address. In particular, the combination of register number and transmission length is invalid.
03	Illegal data values	For devices, the value of the number of disallowances contained in the data field is asked. It indicates an error in the structure of the remaining part of the combination request, such as an incorrect implied length. It in no way indicates that the data item in the register being submitted for storage has a value outside the application, since the Modbus protocol does not know the exact meaning of any particular value of any particular register.
04	Slave equipment failure	A non-recoverable error is generated when the device is attempting to perform the requested operation.