

### I. RS485 Dew Point Transmitter Communication Protocol

#### 1.1 Introduction to the Agreement

Using the Modbus-RTU protocol and following a master-slave operating mode, the basic operation consists of a series of cyclical call-and-response cycles. The call is initiated by the master device (typically a PC) and directed at a slave device with a specific address located somewhere on the bus. The slave device acknowledges receipt of the call and returns the data requested by the master.

The data format is: 8 data bits, 1 stop bit, no parity (N,8,1). The default baud rate is 9600 bps.

#### 1.2 Modbus-RTU Register address

Register Address	Function code 03	Content
0000	40001	Local address (broadcast address is 0xfe)
0001	40002	Baud rate (default is 1)
0002	40003	Dew point temperature data ÷ 10
0003	40004	Translation correction
0004	40005	Retain
0005	40006	Retain

Note: This transmitter only responds to Modbus-RTU commands with a specific starting address and register quantity.

#### 1.3 Communication Method:

Each time the host reads a command, the transmitter immediately returns test data. After sending one set of data, the transmitter enters test mode with a test cycle of 3–4 seconds. During the test cycle, the transmitter does not respond to commands.

Note: To ensure measurement accuracy, the interval between the host sending read commands must be greater than 5 seconds.

### 2.1 Read Registers: Function Code: 0x03 Read Holding Registers 2.1.1 Read Dew Point Temperature Data

A host request:

The host sends commands to the transmitter (hexadecimal). The command format is: address code, function code, high byte of starting register address, low byte of starting register address, high byte of register count, low byte of register count, low byte of CRC check, high byte of CRC check. For example: FE 03 00 02 00 01 31 C5. The address code range is 01 to FD, i.e., 253 possible addresses. The function code is fixed at 0x03, the starting register address is fixed at 0x0000, and the register count is fixed at 0x0001.

Explain	Number of bytes	Data	Function code 0x03 command
Address code	8 bits, 1 byte	0xFE	0xFE (Broadcast Address)
Function code	8 bits, 1 byte	0x03	0x03
Low-order bits of the register starting address	16 bits, 2 bytes	0x0002	0x00
Register starting address high byte			0x02
High-order bits of the number of registers	16 bits, 2 bytes	0x0001	0x00
Lower bits of register count CRC16 Low byte			0x01
CRC16 High level	16 bits, 2 bytes	0x25CA	0x31 0xC5

B. Transmitter response:

The transmitter returns a 7-byte data frame (in hexadecimal) to the host. The data format is: address code, function code, number of returned data bytes, high byte of dew point temperature data, low byte of dew point temperature data, CRC check low byte, CRC check high byte.

Example 1: FE 03 02FF 49 2C 56 indicates that transmitter No. 01 has a dew point temperature of FF49 (-183), i.e., -18.3°C.

as shown in the data above

Explain	Number of bytes	Data	Data
Address Code	8 bits, 1 Byte	0xFE	0xFE
Function Code	8 bits, 1 Byte	0x03	0x03
Number of data bytes	8 bits, 1 Byte	0x02	0x02
Data 1 (temperature data) is high	16 bits, 2 Bytes	0xFF49	0xFF
Data 1 (temperature data) low			0x49
CRC16 Low byte	16 bits, 2 Bytes	0x2C56	0x2C
CRC16 High byte			0x56

Example 2: 01 03 02 FF 7E 79 94 indicates that transmitter No. 01's dew point temperature is FF7E (-130), i.e. -13.0°C

### 3. Modify the baud rate

#### 3.2.1 Modify the baud rate:

Corresponding baud rate	code
4800bps	0
9600bps	1
19200bps	2

Reset: Use the broadcast address 0xFE to send 1 to the baud rate setting, making the baud rate fixed at 9600 bps. Then use 9600 bps to set the address. Reset completed.

A. The host sends a command to the transmitter (in hexadecimal). The command format is: address code, function code, high byte of starting register address, low byte of starting register address, high byte of number of registers, low byte of number of registers, byte count, baud rate data, CRC low byte, CRC high byte.

For example:

01 10 00 01 00 01 02 00 02 26 40

This means writing data 0x0002 into register 0001 and setting the baud rate to 19200 BPS.

Explanation	Number of bytes		
Address Code	8 bits 1 byte	0x01	0x01
Function Code	8 bits 1 byte	0x10	0x10
Register starting address high bits	16-bit 2 bytes	0x0001	0x00
Low byte of the register start address			0x01
High-order bits of register count	16-bit 2 bytes	0x0001	0x00
Low-order bits of register count			0x01
Byte Count	8 bits, 1 byte	0x02	0x02
Baud rate data high byte	16-bit 2 bytes	0x0002	0x00
Baud rate data low byte			0x02
CRC16 Low byte	16-bit 2 bytes	0x2640	0x27
CRC16 High byte			0xa2

After the Settings are successful, the transmitter returns: address code, function code, high bit of the register start address, low bit of the register start address, high bit of the register quantity, low bit of the register quantity, CRC check low bit, CRC check high bit, such as 01 10 00 01 00 01 50 09

Explanation	Byte Count	Data	Command Frame
Address code	8 bits, 1 byte	0x01	0x01
Function code	8 bits, 1 byte	0x10	0x10
Register start address high bits	16 bits, 2 bytes	0x0001	0x00
Register start address low byte			0x01
Number of registers, high bit	16 bits, 2 bytes	0x0001	0x00
Low-order bits of register count			0x01
CRC16 Low Byte	16 bits, 2 bytes	0x5009	0x50
CRC16 High Byte			0x09

### 4. Modify the address:

A. The host sends a command to the transmitter (hexadecimal). The command format is: address code, function code, high byte of starting register address, low

byte of starting register address, high byte of number of registers, low byte of number of registers, byte count, new address, CRC low byte, CRC high byte. For example: FE 10 00 00 01 02 00 01 22 64 indicates that, via broadcast

address 0xFE, the value 0x0001 is written to register 0000, i.e., the device address is set to 1.

B. After the setting is successful, the transmitter returns: address code, function code, high byte of the register starting address, low byte of the register starting address, high byte of the number of registers, low byte of the number of registers, low byte of CRC check, high byte of CRC check. When using the broadcast address to modify the address, there is no response.

Example:

Controller sends FE 10 00 00 00 01 02 00 01 22 64 -> broadcast address, change address to 1, transmitter no response.

Controller sends 01 10 00 00 00 01 02 00 02 27 91 --> slave address 1 changed to 2, transmitter responds. Slave response 01 10 00 00 00 01 01 C9 --> slave response