LEFOO 力夫

Temperature and Humidity Communication Protocol

The protocol runs on the RS485 hardware platform, and can realize remote one-to-many control and signal acquisition through the 485 bus. The communication protocol is implemented in accordance with the ModBus RTU standard protocol.

1. Character Format

Start：1Bit
Data：8Bit
Parity：None
Stop：1Bit
Baud Rate：9600 bps、19200 bps、38400 bps、115200 bps.

MODBUS message

≥3.5 character

Address	Function Code	Data	CRC Verification
8bit	8bit	N * 8bit	16bit

≥3.5 character

≤1.5 character

In RTU mbps the interval between two characters must be less than 1.5 character time, otherwise the message frame is considered incomplete and the receiving station discards the message frame. The interval between two message frames is at least 3.5 character time.

2. Communication Protocol

1.Slave ID address

The slave ID address is the identification number of each slave. The default value of this machine is 0x01, which can be modified by modifying the register value. The modification range is 0x01~0xFF.

2.Read holding register (function code 0x03)

The host can use this function to read data from the slave register, and can read one or more registers at the same time.

Sequence Format：

The Host Sends a Read Request Sequence					
0S Slave ID address	Function code=0x03	Register start address	Number of read registers	CR Low order	CR High order
8Bit	8Bit	16Bit	16Bit	8Bit	8Bit
Slave normal response sequence					
Slave ID address	Function code=0x03	Number of data bytes n	Data	CR Low order	CR High order
8Bit	8Bit	8Bit	N * 8Bit	8Bit	8Bit
Slave error response sequence					
Slave ID address	Error Code=0x83	Exception code = 0x02 or 0x03		CR Low order	CR High order
8Bit	8Bit	8Bit		8Bit	8Bit

Communication code example

Host send sequence：	01	03	00 01	00 02	95 CB
	Slave ID	function code	register address	number of read registers	CRC verification
Slave normal response: Sequence	01	03	04	00 C4 01 34	BB 89
	Slave ID	function code	data length	data	CRC verification
Slave error response: Sequence	01	83	02	C0 F1	
	Slave ID	function code	Data length	CRC verification	

3. Write a single register (function code 0x06)

The host can write data to the slave register through this function, and can only operate on a single register.

Sequence format：

The host sends and writes a single registersequence					
Slave ID Address	Function code = 0x06	Register address	Write register value	CRC Low order	CRC High order
8Bit	8Bit	16Bit	16Bit	8Bit	8Bit
Slave normal response sequence					
Slave ID Address	Function code = 0x06	Register address	Write register value	CRC Low order	CRC High order
8Bit	8Bit	16Bit	16Bit	8Bit	8Bit
Slave error response sequence					
Slave ID Address	Error Code = 0x86	Exception code = 0x02 or 0x03		CRC Low order	CRC High order
8Bit	8Bit	8Bit		8Bit	8Bit

Communication code example

Host send sequence：	01	06	00 03	00 01	B8 0A
	Slave ID	function code	register address	value written to the register	CRC verification
Slave normal response: Sequence	01	06	00 03	00 01	B8 0A
	Slave ID	function code	register address	value written to the register	CRC verification
Slave error response: Sequence	01	86	02	C3 A1	
	Slave ID	function code	Data length	CRC verification	

4. Broadcast write register (function code 0x06)

The host can use this function to write register data to all slaves on the bus, and the slave ID

address is unified as 0x00

Sequence format:

The host sends broadcast and write registersequence					
Slave ID Address= 0x00	Function code = 0x06	Register address	Write register value	CRC Low order	CRC High order
8Bit	8Bit	16Bit	16Bit	8Bit	8Bit
Slave normal response sequence					
Slave ID Address	Function code = 0x06	Register address	Write register value	CRC Low order	CRC High order
8Bit	8Bit	16Bit	16Bit	8Bit	8Bit

Communication code example

Host send sequence:	00	06	00 04	00 01	08 1A
	Slave ID	function code	register address	value written to the register	CRC verification
Slave normal response: Sequence	01	06	00 04	00 01	09 CB
	Slave ID	function code	register address	value written to the register	CRC verification

Note: In addition to the group operation of all slaves on the bus, this function can also directly modify the slave ID address without knowing the slave ID address, so please use it with caution to avoid all slave ID addresses on the bus. In the case of being modified to the same address, if you forget a slave address, you need to modify it. It is recommended to operate independently.

3. Register Address Reference

Register address	Register definition	Reading and writing method	Specific function description
0x0000	Humidity value data	Read only	The BCD code of relative humidity has no decimal places, for example, 0x0043 represents 43%
0x0001	Temperature data	Read only	The temperature output range is -40.0~99.9 °C with a resolution of 0.1 °C. The decimal is expanded by 10 times. Example reading value 0x00C4= 19.6℃ When the temperature value is negative, complement transmission: receiving 0xFFBE corresponds to a decimal expansion of 10 times to 65 (0XFFFF-

0x0002	Temperature data	Read only	The humidity output range is 00.0~99.9 % with a resolution of 0.1%. Decimal expanded by 10 times Example reading 0x0134 = 30.8%.			
0x0003	Communication Speed setting	Can read and write	1=9600bps, 2=19200bps	3=38400bps	4=115200bps	Default:1
0x0004	Slave ID address setting	Can read and write	0x01~0xFF can be set, 0x00 is the broadcast receiving address, Default: 0x01			
0x0005	Reserved	Read only				
0x0006	Temperature value floating point data	Read only	The temperature output range is -40.00~99.99 °C with a resolution of 0.01 °C. Example reading value 0x00000000 = 0.00℃, 0x41200000 = 10.00℃ ,When the temperature value			
0x0007	Temperature value floating point data	Read only				
0x0008	Humidity value floating point data	Read only	The humidity output range is 00.00~99.99 %, and the resolution is 0.01%. Example reading 0x00000000 = 0.00%, 0x41200000 = 10.00%			
0x0009	Humidity value floating point data	Read only				
0x000A	Probe Status	Read only	0 means the probe is normal ,1 means the probe is abnormal			

4. Exception code analysis

0x02	Abnormal or wrong register address
0x03	The value written to the register is abnormal or wrong