T1UC Modbus Communication Protocol

The communication protocol of this instrument is Modbus-RTU communication protocol. When multiple meters are connected using RS485 interface, a resistor of 120 ohm can be considered at both ends of the RS485 bus of the last meter to improve the anti-interference ability of the bus.

1. Byte structure

Start bit	Data bit	Stop bit	Check bit
1	8	1	

2. The host to read data from the slave

Eight bytes per frame make up its format.

Device address	Function code	Data address H	Data address L	Word grow taller	Word length low	CRC16 high	CRC16 low
1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte	1 byte

Device address: The address code is the first byte of communication transmission. Each slave has a unique address set by the user. When the host wants to communicate with this slave, it sends the exact same address code as the slave's address here, and the slave receives the information sent by the host. The first byte of data indicating the address code of the slave, which in this meter is between 1 and 250, will be sent back after the response.

Functional code: Second byte of communication transmission. Modbus communication protocols define function numbers 1 through 127. The meter only uses the 03 and 06 function codes to send as the host's request. The second byte of data returned from the slave is the function code of the host. The function code returned from the slave is the same as the function code sent from the host, and indicates that the slave has responded to the host for operation. If the slave does not send or the function code is incorrect, it indicates that the slave does not respond to the operation or sends an error.

Data address: the first address of the second and third bytes stored by the host to read data from the slave is 2 bytes in total. The high byte is in the front, and the low byte is in the back.

Data word length: the fourth and fifth bytes, the length of the host to read data from the slave is 2 bytes in total. The high 8 bits are in the first place, and the low 8 bits are in the second place. Modbus (RTU) protocol reads data in the word length: 1 word is 16 bits long, 2 bytes.

CRC16 code: For CRC detection codes with CRC16 parameters in the sixth and seventh byte information frames, the high 8 bits are in the first place and the low 8 bits are in the second place.

3.from the machine transmission format

When the slave machine responds to the host operation, it first sends the reply with address code, function code and data length, and then sends back the data in the following format:

Address code	Function code	The length of the data	Data area	CRC16 check
1 byte	1 byte	1 byte	N byte	2 byte

Data area: Data area is different according to different function code. The data area can be actual values, data sent from the host to the slave, or data sent from the slave to the host.

CRC16 check: low byte before, high byte after

Example: the upper computer reads 10 words (20 bytes) of data from table 1 starting at address 0.

The message frame sent by the host computer is as follows:

Device address	Function code	Data address H	Data address L	Word grow taller	Word length low	CRC16 low	CRC16 high
0x01	0x03	0x00	0x00	0x00	0x0a	0xc5	0xcd

The data returned by machine 1 after receiving the above information is as follows:

Address code	Function code	The length of the data	Data area	CRC16 check
0x01	0x03	0x14	N byte	2 byte

Note: the length of the uploaded data is the number of bytes of data, which is twice the length of the word in the message frame of the host computer. The first three bytes of data returned are the response, which are table 1, function code 03, transmission byte 0x14(20 bytes), followed by 20 bytes of data, and the last two bytes are CRC16.

4.Instrument data memory address

Address	Parameter	Format	Decimal places	Read and write attribute	Value range
0000H	Current voltage value	Unsignd int	1	R	
0001H	Current current value	Unsignd int	2	R	
0002H	Current power value	Unsignd int	3	R	
0003H	Current power factor	Unsignd int	3	R	
0004H	The active power is always high	Unsignd int	1	RW	Write 0xAABB Power cleared to zero
0005H	The active power is always low	Unsignd int	1	RW	
0006H	The communication address	Unsignd int	0	RW	1~250
0007H	Baud rate	Unsignd int	0	RW	0:1200 1:2400 2:4800 3:9600 4：19200
0008H	Current high alarm value	Unsignd int	2	RW	
0009H	Voltage high alarm value	Unsignd int	1	RW	
000AH	Low voltage alarm value	Unsignd int	1	RW	
000CH	Low current alarm value	Unsignd int	2	RW	
000BH	Display mode	Unsignd int	0	RW	0: Fixed display 0xFF: Round display
000FH	Temperature high alarm value	Unsignd int	1	RW	
0010H	Low temperature alarm value	Unsignd int	1	R	
0011H	High humidity alarm value	Unsignd int	1	R	
0012H	Low humidity alarm value	Unsignd int	1	R	
1001H	Current temperature value	Unsignd int	1	R	
1002H	Current humidity value	Unsignd int	1	R	