

Electromagnetic Flowmeter Protocol (MODBUS-RTU)

1. Communication protocol (revised may 2017)

This protocol conforms to MODBUS-RTU communication protocol and is transmitted in hexadecimal

Serial port configuration: 8-bit data bit, 1-bit stop bit, no verification. Baud rate: 2400bps (default), 4800, 9600, 19200

It is better to read data more than 500ms, otherwise the bit error rate will increase

The number of variables is as follows:

Serial number	Variable name	Address code	data type	Modifiable readable no
Variable 0	Instantaneous flow rate	00H	Long	Not modifiable and readable
Variable 1				
Variable 2	Water supply temperature	02H	Int	Not modifiable and readable
Variable 3	Backwater temperature	03H	Int	Not modifiable and readable
Variable 4	Sampling value	04H	Int	Not modifiable and readable
Variable 5	Cumulative flow integer	05H	Long	Modifiable and readable
Variable 6				
Variable 7	Cumulative flow decimal	07H	Int	Modifiable and readable
Variable 8	Positive flow cumulative integer	08H	Long	Modifiable and readable
Variable 9				
Variable 10	Positive flow cumulative decimal	0AH	Int	Modifiable and readable
Variable 11	Negative cumulative flow integer	0BH	Long	Modifiable and readable
Variable 12				
Variable 13	Negative cumulative flow decimal	0DH	Int	Modifiable and readable

Variable 14	Instantaneous heat (kJ /h)	0EH	Long	Not modifiable and readable
Variable 15				
Variable 16	Revision number	10H	Int	Modifiable and readable
Variable 17	Language	11H	Int	Modifiable and readable
Variable 18	Table address	12H	Int	Modifiable and readable
Variable 19	Instrument communication speed	13H	Int	Modifiable and readable
Variable 20	Modify caliber	14H	Int	Modifiable and readable
Variable 21	Flow unit	15H	Int	Modifiable and readable
Variable 22	Flow accumulation unit	16H	Int	Modifiable and readable
Variable 23	Zero sampling value	17H	Int	Modifiable and readable
Variable 24	Meter coefficient	18H	Int	Modifiable and readable
Variable 25	Heat coefficient	19H	Int	Modifiable and readable
Variable 26	Temperature coefficient of water supply	1AH	Int	Modifiable and readable
Variable 27	Return water temperature coefficient	1BH	Int	Modifiable and readable
Variable 28	Small signal cut-off point	1CH	Int	Modifiable and readable
Variable 29	Modify pulse unit	1DH	Int	Modifiable and readable
Variable 30	Allow removal of display	1EH	Int	Modifiable and readable
Variable 31	Reverse output allowed	1FH	Int	Modifiable and readable
Variable 32	Current output type	20H	Int	Modifiable and readable

Variable 33	Pulse output mode	21H	Int	Modifiable and readable
Variable 34	Frequency output range	22H	Int	Modifiable and readable
Variable 35	ATC alarm permission	23H	Int	Modifiable and readable
Variable 36	ATC alarm threshold	24H	Int	Modifiable and readable
Variable 37	Upper limit alarm allowed	25H	Int	Modifiable and readable
Variable 38	Upper limit alarm value	26H	Int	Modifiable and readable
Variable 39	Lower limit alarm allowed	27H	Int	Modifiable and readable
Variable 40	Lower limit alarm value	28H	Int	Modifiable and readable
Variable 41	Excitation alarm allowed	29H	Int	Modifiable and readable
Variable 42	Sensor coefficient	2AH	Int	Modifiable and readable
Variable 43	Reserve	2BH		Modifiable and readable
Variable 44	Air traffic control sampling value	2CH	Int	Not modifiable and readable
Variable 45	Alarm message	2DH	Int	Not modifiable and readable
Variable 46	Current zero correction	2EH	Int	Modifiable and readable
Variable 47	Current full correction	2FH	Int	Modifiable and readable
Variable 48	Instrument range setting	30H	Int	Modifiable and readable
Variable 49	Measure damping time	31H	Int	Modifiable and readable
Variable 50	Flow direction selection	32H	Int	Modifiable and readable
Variable 51	Accumulate heat d integer	33H	Long	Modifiable and readable

Variable 52				
Variable 53	Accumulate heat decimal	35H	Int	Modifiable and readable
Variable 54	Accumulated cooling capacity integer	36H	Long	Modifiable and readable
Variable 55				
Variable 56	Accumulated cooling capacity decimal	38H	Int	Modifiable and readable

Example of Reading Parameter Command:

Read instantaneous traffic transmission : 01 03 00 00 00 02 C4 0B

Lower computer return: 01h 03h 04H 00h 08h 95h 91h d5h 0dh

The conversion to decimal system is 562577, which means the instantaneous flow is 562577, and the unit is L / h. If you want to get m³ / h, you need to divide it by 1000, that is, 562.577m³ / h 00 08 95 91

Read positive cumulative integer : 01 03 00 0800 02 45C9

Lower computer return: 01h 03h 04H 00h d9h 23h 38h 33H 2ah

00 D9 23 38 converted to decimal system 14230328, i.e. positive cumulative integer part

Read positive cumulative decimal : 01 03 00 0A00 01 A408

Lower computer return: 01h 03h 02h 01h BCH b8h 65h

01bc converted to decimal system is 444, decimal is 0.444

Read meter address : 01 03 00 12 0001 24 0F

Reading instrument caliber : 01 03 00 14 00 01 C4 0E

Reading water supply temperature : 01 03 00 02 0001 25 CA

Read instantaneous heat transmission : 01 03 00 0E 00 02 A5 C8

Lower computer return: 01 03 04 00 00 3F Ba 23

The conversion from 00003F to decimal 63 indicates that the instantaneous heat is 63, and the unit is kJ / h (kJ/h)

If you want to get MJ / h, you need to divide by 1000, i.e. 0.063mj/h. If you want to convert to kwh / h, you need to divide by 3600, i.e. 0.0175kwh/h

Read accumulated heat integer : 01 03 00 33 00 02 34 04 01 03 04 00 00 00 00 FA 33

Read accumulated heat decimal : 01 03 00 35 00 01 94 04 01 03 02 04 00 BA 84

Read the accumulated cooling capacity integer : 01 03 00 36 00 02 24 05 Read

the accumulated cooling capacity decimal : 01 03 00 38 00 01 05 C7

Communication speed: 0:300, 1:2400, 2:14400, 3:600, 4:4800, 5:19200, 6:1200
7 : 9600、 8 : 38400

Flow unit: 0: L / h, 1: L / m, 2: L / s, 3: m³ / h, 4: m³ / m, 5: m³ / S

Flow totalizing unit: 0.001l, 1:0.001m³, 2:0.01l, 3:0.1l, 4:1l, 5:0.01m³, 6:0.1m³, 7:1m³ Flow direction options 0:
forward, 1: reverse

Allow to cut display 0: allow, 1: Disable

Reverse output allowed 0: allowed, 1: prohibited

Current output type: 0:0 ~ 10mA, 1:4 ~ 20mA

Pulse output mode 0: frequency, 1: pulse

Pulse equivalent: 0.001l, 1:0.001m³, 2:0.01l, 3:0.1l, 4:1l, 5:0.01m³, 6:0.1m³, 7:1m³ Air traffic control alarm allowed 0:
allowed, 1: prohibited (%) removed)

Upper limit alarm allowed 0: allowed, 1:prohibited

Lower limit alarm allowed 0: allowed, 1: prohibited

Excitation alarm permissive 0: permissive, 1: forbidden

Peak suppression allowed 0: allowed, 1: prohibited

Peak inhibition coefficient 0:0.010, 1:0.050, 2:0.200, 3:0.800

Peak inhibition time 0:400, 1:800, 2:1500, 3:2500

Alarm message 01: unit selection error of instantaneous flow
02ATC
04: lower limit alarm 08: upper
limit alarm

1. Data query

1. Query accumulated heat

→ Master slave (8 bytes in total)

address	Function code	Variable start address high byte	Variable start address low byte	Number of variables high byte	Number of variables low byte	CRC high byte	CRC low byte
XxH	03H	00H	XxH	00H	XxH	XxH	XxH

→ Slave master (n bytes in total)

address	Function code	Total bytes of variable	Variable value 1 high	Low value of variable 1	Variable value 2 high	Variable value 2 low	...	CRC high byte	CRC low byte
XxH	03H	XxH	XxH	XxH	XxH	XxH	...	XxH	XxH

If all data of Table 1 is queried, the data sent is 01 03 00 00 00 33 05 DF

2. Data modification

1. Modify accumulated heat

→ Master slave (13 bytes in total)

address	Function code	Variable start address high byte	Variable start address low byte	Number of variables high byte	Number of variables low byte	Bytes	Variable value 1 high	Low value of variable 1	Variable value 2 high	Variable value 2 low	CRC high byte	CRC low byte
XxH	10H	00H	00H	00H	02H	04H	00H	00H	00H	00H	XxH	XxH

→ Slave master (8 bytes in total)

address	Function code	Variable start address high byte	Variable start address low byte	Number of variables high byte	Number of variables low byte	CRC high	CRC low
XxH	10H	00H	00H	00H	02H	XxH	XxH

Modify the positive cumulative flow integer to 0: 0110 0008

0002 0400 00 00 00

0110 0008 0002 0400 00 00 F2 09 (with check code)