W803E&W803FU&W803S Series Electromagnetic Flowmeter Converter Modbus Communication Protocol

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Catalogue

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Chapter 1 Overview

The W803E&W803FU&W803S electromagnetic flowmeter has a standard RS-485 communication interface and adopts the Modbus-RTU standard protocol,which can collect parameters such as instantaneous flow,instantaneous flow rate,cumulative flow, etc.

1.1 Technical parameters

The Modbus protocol of the W803E&W803FU&W803S electromagnetic flowmeter uses function code 03 to read parameter data and function code 04 to read variable data, supporting the baudrate of 1200,2400,4800,9600,19200.

The serial port parameters are: 1 bit start bit,8 bit data bit, 1 bit stop bit,none parity bit.

1.2 Networking instructions

The standard MODBUS communication network of W803E&W803FU&W803S electromagnetic flowmeter is a bus type network structure, which supports the networking of 1 to 16 electromagnetic flowmeter.

1.3 Data Frame

The Modbus-RTU format (hexadecimal format) is a master

slave structure, which means that the master station sends a frame of data first, and the slave station receives it before giving a response.

Master station command frame structure (as shown in Figure 1-1):

Frame Start	Device Address	function code	Register address	register length	crc check	Frame End
T1-T2-T3-T4	8Bit	8Bit	16Bit	16Bit	16Bit	T1-T2-T3-T4

Figure 1-1 Main Station Command Frame Structure

Main station command frame description: The device address is the communication address set by the flow meter, the function code is the Modbus function code (usually 04 here), the register address is the register address of the data to be read (see Chapter 2 for details), the register length is the number of registers to be read, and CRC verification can be calculated using relevant software.

Slave response frame structure (as shown in Figures 1-2):

Frame Start	Device Address	function code	Length	data	crc check	Frame End
T1-T2-T3-T4	8Bit	8Bit	8Bit	N*8Bit	16Bit	T1-T2-T3-T4

Figure 1-2 Slave Response Frame Structure

Slave response frame description: The device address is the communication address set by the flowmeter (i.e. the address

sent by the master station), and the function code is also consistent with the one sent by the master station. The data length is the number of data replied by the slave station.

Chapter 2 Variable Register Address Table

The Modbus variable address table of the W803E&W803FU&W803S electromagnetic flowmeter (as shown in Table 1), including the register addresses of instantaneous flow, cumulative flow, and other data, needs to be read using the modubs04 function code. The provided address is a register address, which means that some PLC, KingView, and other register addresses require an additional 1 (see appendix for details).

Table 2-1 W803E&W803FU$W803S Battery Powered Electromagnetic Flowmeter Modbus Variable Address Table(Flow Mode)

Protocol Addresses (Decimal/ HEX)	PLC Addresses (Base 1)	Data Format	Register Definition
4112/0x1010	34113	Float Inverse	Instantaneous flow floating-point representation
4114/0x1012	34115	Float Inverse	Instantaneous flow rate floating-point representation
4116/0x1014	34117	Float Inverse	Flow percentage floating-point representation
4118/0x1016	34119	Float Inverse	Fluid conductivity ratio floating-point representation
4120/0x1018	34121	Long Inverse	Positive accumulation of integer parts of numerical values
4122/0x101A	34123	Float Inverse	Positive accumulation of decimal parts of numerical values
4124/0x101C	34125	Long Inverse	Reverse accumulation of integer parts of numerical values
4126/0x101E	34127	Float Inverse	Reverse accumulation of decimal parts of numerical values
4128/0x1020	34129	Unsigned short	Instantaneous flow unit (Table 2-3)
4129/0x1021	34130	Unsigned short	Accumulated Total Units (Table 2-3)

4130/0x1022	34131	Unsigned short	Upper limit alarm
4131/0x1023	34132	Unsigned short	Lower limit alarm
4132/0x1024	34133	Unsigned short	Air traffic control alarm
4133/0x1025	34134	Unsigned short	System alarm
4134/0x1026	34135	Unsigned short	Small signal alarm
4135/0x1027	34136	Unsigned short	Battery alarm
4136/0x1028	34137	Unsigned short	Pressure alarm
4137/0x1029	34138	Unsigned short	Battery level (0-100)
4138/0x102A	34139	Float Inverse	Pressure floating-point representation
4140/0x102C	34141	Unsigned short	Pressure units（Table 2-3）

Table 2-2 W803E&W803FU$W803S Battery Powered Electromagnetic Flowmeter Modbus Variable Address Table(Cool&Hot Mode)

Protocol Addresses (Decimal/HEX)	PLC Addresses (Base 1)	Data Format	Register Definition
4112/0x1010	34113	Float Inverse	Instantaneous flow floating-point representation
4114/0x1012	34115	Float Inverse	Instantaneous flow rate floating-point representation
4116/0x1014	34117	Float Inverse	Flow percentage floating-point representation
4118/0x1016	34119	Float Inverse	Fluid conductivity ratio floating-point representation
4120/0x1018	34121	Long Inverse	Positive accumulation of integer parts of numerical values
4122/0x101A	34123	Float Inverse	Positive accumulation of decimal parts of numerical values
4124/0x101C	34125	Unsigned short	Instantaneous cooling capacity unit（Table 2-3）
4125/0x101D	34126	Unsigned short	Total cooling capacity units（Table 2-3）

4126/0x101E	34127	Unsigned short	Instantaneous flow unit（Table 2-3）
4127/0x101F	34128	Unsigned short	Accumulated Total Units（Table 2-3）
4128/0x1020	34129	Unsigned short	Instantaneous heat unit（Table 2-3）
4129/0x1021	34130	Unsigned short	Retain
4130/0x1022	34131	Unsigned short	Pressure range（0-0.6MP/1-1.6MP）
4131/0x1023	34132	Unsigned short	Total heat units（Table 2-3）
4132/0x1024	34133	Unsigned short	Air traffic control alarm
4133/0x1025	34134	Unsigned short	System alarm
4134/0x1026	34135	Float Inverse	Instantaneous heat floating-point representation
4136/0x1028	34137	Long Inverse	Heat total accumulation of integer parts of numerical values
4138/0x102A	34139	Float Inverse	Heat total accumulation of decimal parts of numerical values
4140/0x102C	34141	Unsigned short	Inlet temperature（1 decimal place）
4141/0x102D	34142	Unsigned short	Outlet temperature（1 decimal place）
4142/0x102E	34143	Long Inverse	Cooling total accumulation of integer parts of numerical values
4144/0x1030	34145	Float Inverse	Cooling total accumulation of decimal parts of numerical values
4146/0x1032	34147	Float Inverse	Instantaneous cooling floating-point representation
4148/0x1034	34149	Unsigned short	Small signal alarm
4149/0x1035	34150	Unsigned short	Battery alarm
4150/0x1036	34151	Unsigned short	Pressure alarm
4151/0x1037	34152	Unsigned short	Battery level（0-100）
4152/0x1038	34153	Float Inverse	Pressure floating-point representation
4154/0x103A	34155	Unsigned short	Pressure units（Table 2-3）

4155/0x103B	34156	Long Inverse	Reverse accumulation of integer parts of numerical values
4157/0x103D	34158	Float Inverse	Reverse accumulation of decimal parts of numerical values

Table 2-3 W803E&W803FU&W803S Battery Powered Electromagnetic Flowmeter Unit Comparison Table

Number	Code	Unit	Number	Code	Unit
1	0x00	L/S	19	0x15	KWh
2	0x01	L/M	20	0x16	MWh
3	0x02	L/H	21	0x17	Kg/S
4	0x03	M3/S	22	0x18	Kg/M
5	0x04	M3/M	23	0x19	Kg/H
6	0x05	M3/H	24	0x1D	Kg
7	0x06	T/S	25	0x1E	USG
8	0x07	T/M	26	0x1F	UKG
9	0x08	T/H	27	0x20	KPa
10	0x0C	L	28	0x21	MPa
11	0x0D	M3	29	0x24	%
12	0x0E	T	30	0x29	UKG/S
13	0x0F	MJ/h	31	0x2A	UKG/M
14	0x10	GJ/h	32	0x2B	UKG/H
15	0x11	KWh/h	33	0x2C	USG/S
16	0x12	MWh/h	34	0x2D	USG/M
17	0x13	MJ	35	0x2E	USG/H
18	0x14	GJ	36	0x4B	mm

Chapter 3 Data Analysis Methods

The Modbus communication slave response data of W803E&W803FU&W803S electromagnetic flowmeter can be roughly divided into three formats: Float Inverse (instantaneous flow), Long Inverse (forward cumulative integer part), and Unsigned short (flow unit). The specific parsing method is as follows.

3.1 Instantaneous flow rate

1. Data transmission and reception

Master station sends commands:

equipment address	function code	register Address High	register Address Low	register length High	register length Low	CRC Low	CRC high
01	04	10	10	00	02	74	CE

Master station received data:

equipment address	function code	data length	4-byte floating point number (Instantaneous flow rate)				CRC Low	CRC high
01	04	04	C4	1C	60	00	2F	72

2. data analysis

Instantaneous traffic data is in Float Inverse format, using IEEE754 32-bit floating point format, and its structure is as

follows:

0X1010(34113)		0x1011(34114)	
BYTE1	BYTE2	BYTE3	BYTE4
S EEEEEEE	E MMMMMMM	MMMMMMMM	MMMMMMMM

S- Mantissa symbol; 1=negative, 0=positive.
E- Exponent; expressed by the difference with decimal number 127.
M- Mantissa; low 23 bits and the decimal part.

When not all of the E is “0” and “1”, the conversion formula between float and the decimal number is:

$$V = (-1)^S 2^{(E-127)}(1 + M)$$

Instantaneous delivery :

Float	C4	1C	60	00
	1100 0100	0001 1100	0110 0000	0000 0000
	float byte 1	float byte 2	float byte 3	float byte 4

S=1: if mantissa symbol is 1, it is a negative.

E = 10001000: Exponent is 136

M= 001 1100 0110 0000 0000 0000,The mantissa is :

$$V = (-1)^1 2^{(136-127)}(1 + \frac{1}{8} + \frac{1}{16} + \frac{1}{32} + \frac{1}{512} + \frac{1}{1024})$$

= -625.5

Therefore C4 1C 60 00 instantaneous delivery :-625.5.

3.2 Instantaneous velocity

1. Data transmission and reception

Master station sends commands:

equipment address	function code	register Address	register Address	register length	register length	CRC Low	CRC high

		High	Low	High	Low		
01	04	10	12	00	02	D5	0E

Master station received data:

equipment address	function code	data length	4-byte floating point number (Instantaneous flow rate)				CRC Low	CRC high
01	04	04	C1	B0	80	00	A6	5F

2. data analysis

Instantaneous flow rate data is in Float Inverse format, using IEEE754 32-bit floating point format. The analytical method is consistent with the analytical instantaneous flow rate.

Float: C1 B0 80 00

1100 0001 1011 0000 1111 1000 0000 0000

S = 1

E = 10000011

M = 011 0000 1111 1000 0000 0000

$$V = (-1)^1 2^{(131-127)}(1 + \frac{1}{4} + \frac{1}{8} + \frac{1}{256})$$

= - 22.0625

Therefore,the instantaneous flow velocity value represented by C1 B0 80 00 is -22.0625.

Note: All data in the Float Inverse format can be analyzed by referring to the methods of instantaneous flow rate and instantaneous flow rate,including floating point representation of flow rate percentage,floating point representation of fluid conductivity ratio, decimal part of forward cumulative value,and decimal part of reverse cumulative value.The following will not be explained in detail.

3.3 Positive cumulative integer part

1. Data transmission and reception

Master station sends commands:

equipment address	function code	register Address High	register Address Low	register length High	register length Low	CRC Low	CRC high
01	04	10	18	00	02	F5	0C

Master station received data:

equipment address	function code	data length	4-byte integer number (Integral part of positive cumulant）				CRC Low	CRC high
01	04	04	01	23	45	67	78	C8

2. data analysis

The integer part of the forward cumulant data is in Long Inverse format and can be directly calculated for parsing.

$0\times16^{7}+1\times16^{6}+2\times16^{5}+3\times16^{4}+4\times16^{3}+5\times16^{2}+6\times16^{1}+7\times16^{0}=19088743$

Therefore, the integer value of the positive cumulative flow represented by 01, 23, 45, 67 is 19088743.

By adding the decimal part, the forward cumulative quantity can be calculated.

Note: All data in Long Inverse format can be parsed using the method of referring to the integer part of the forward cumulant, that is, the integer part of the flow reverse cumulant can be parsed using the integer part of the forward cumulant. The following will not provide too much explanation.

3.4 flow unit

1. Data transmission and reception

Master station sends commands:

equipment address	function code	register Address High	register Address Low	register length High	register length Low	CRC Low	CRC high
01	04	10	20	00	01	34	C0

Master station received data:

equipment address	function code	data length	2-byte integer (Instantaneous flow unit)		CRC Low	CRC high
01	04	02	00	05	79	33

2. data analysis

The flow unit is in unsigned short format, and the meaning of the received data needs to be found by looking up the table(Table 2-3).

The received data is 00 05, and according to the table, the current instantaneous flow rate is m3/m.

The unit analysis method for cumulative flow is consistent with that for instantaneous flow. There will be no excessive explanation here.

3.5 Air traffic control alarm

a) Data transmission and reception

Master station sends commands:

equipment address	function code	register Address High	register Address Low	register length High	register length Low	CRC Low	CRC high
01	04	10	24	00	01	75	01

Master station received data:

equipment address	function code	data length	2-byte integer (Alarm)		CRC Low	CRC high
01	04	02	00	01	78	F0

b) data analysis

The air traffic control alarm data is in unsigned short format, where 1 is an alarm and 0 is not an alarm. As shown in the example, when data bit 00 01 is received, the flow meter's empty pipe alarm is triggered.

Note: All alarm data can be analyzed by referring to the method of air traffic control alarm, and the following will not provide too much explanation.

Chapter 4 Parameter Register Address Table

The Modbus parameter address table of the W803E&W803FU&W803S electromagnetic flowmeter (as shown in Table 1) includes readable and rewritable parameter data. Read using modbus03 function code and rewrite using 06 function code.

Table 4-1 W803E Electromagnetic Flowmeter Modbus Parameter Address Table

Protocol Addresses（Decimal）	Protocol Addresses（HEX）	Data Format	Register Definition
000	0x0000	Unsigned short	Language
0001	0x0001	Unsigned short	Comm Addres
0002	0x0002	Unsigned short	Communicat.Gap
0003	0x0003	Unsigned short	Sensor Size
0004	0x0004	Unsigned short	Flow Unit
0005	0x0005	Unsigned short	Flow Range
0006	0x0006	Unsigned short	Flow Direction
0007	0x0007	Unsigned short	Flow Zero CRC
0008	0x0008	Unsigned short	Flow Cutoff
0009	0x0009	Unsigned short	Flow FilterTime
0010	0x000A	Unsigned short	Flow Total Unit
0011	0x000B	Unsigned short	Reverse Flow Ena
0012	0x000C	Unsigned short	Reserve
0013	0x000E	Unsigned short	Pulse Unit

0014	0x000E	Unsigned short	Pulse Factor
0015	0x000F	Unsigned short	Pulse Width
0016	0x0010	Unsigned short	EmptyPipe Value
0017	0x0011	Unsigned short	Empty.Zero CRC
0018	0x0012	Unsigned short	Empty.Range CRC
0019	0x0013	Unsigned short	FWD.Sensor Fact
0020	0x0014	Unsigned short	Excitation Time
0021	0x0015	Unsigned short	Sensor Coding
0022	0x0016	Unsigned short	Linearizat. Ena
0023	0x0017	Unsigned short	FWD Correct Po.1
0024	0x0018	Unsigned short	FWD Target Val.1
0025	0x0019	Unsigned short	FWD Correct Po.2
0026	0x001A	Unsigned short	FWD Target Val.2
0027	0x001B	Unsigned short	FWD Correct Po.3
0028	0x001C	Unsigned short	FWD Target Val.3
0029	0x001D	Unsigned short	FWD Correct Po.4
0030	0x001E	Unsigned short	FWD Target Val.4
0031	0x001F	Unsigned short	FWD End Velocity
0032	0x0020	Unsigned short	REV Correct Po.1
0033	0x0021	Unsigned short	REV Target Val.1
0034	0x0022	Unsigned short	REV Correct Po.2
0035	0x0023	Unsigned short	REV Target Val.2
0036	0x0024	Unsigned short	REV Correct Po.3
0037	0x0025	Unsigned short	REV Target Val.3
0038	0x0026	Unsigned short	REV Correct Po.4
0039	0x0027	Unsigned short	REV Target Val.4
0040	0x0028	Unsigned short	Ent.T Zero CRC
0041	0x0029	Unsigned short	Ent.T Range CRC

0042	0x002A	Unsigned short	Out.T Zero CRC
0043	0x002B	Unsigned short	Out.T Range CRC
0044	0x002C	Unsigned short	Operate Mode S.
0045	0x002D	Unsigned short	Interval Time
0046	0x002E	Unsigned short	Starting Value
0047	0x002F	Unsigned short	Meter Factor
0048	0x0030	Unsigned short	Meter Correct
0049	0x0031	Unsigned short	Meter Dormancy
0050	0x0032	Unsigned short	Reserve
0051	0x0033	Unsigned short	Clear Total Key
0052	0x0034	Unsigned short	MeterCode1
0053	0x0035	Unsigned short	Reserve
0054	0x0036	Unsigned short	Pulse Output Ena
0055	0x0037	Unsigned short	Pressure Range
0056	0x0038	Unsigned short	Heat Total Unit
0057	0x0039	Unsigned short	Measure Mode
0058	0x003A	Unsigned short	Heat Display
0059	0x003B	Unsigned short	Heat Unit
0060	0x003C	Unsigned short	MeterCode2
0061	0x003D	Unsigned short	MeterCode3
0062	0x003E	Unsigned short	MeterCode4
0063	0x003F	Unsigned short	Ent.Temp.Calicu.
0064	0x0040	Unsigned short	Reserve
0065	0x0041	Unsigned short	Out.Temp.Calicu.
0066	0x0042	Unsigned short	Multiplier
0067	0x0043	Unsigned short	Communica.Rate
0068	0x0044	Unsigned short	Communica.check
0069	0x0045	Unsigned short	Reserve

0070	0x0046	Unsigned short	Temperat. Filter
0071	0x0047	Unsigned short	Sensor Position
0072	0x0048	Unsigned short	P_Sensor Excit
0073	0x0049	Unsigned short	Pressure Gain
0074	0x004A	Unsigned short	Press. Zero CRC
0075	0x004B	Unsigned short	Press. Gain CRC
0076	0x004C	Unsigned short	Total Display
0077	0x004D	Unsigned short	High Alarm Limit
0078	0x004E	Unsigned short	Low Alarm Limit
0079	0x004F	Unsigned short	Press.High Alarm
0080	0x0050	Unsigned short	Press.Low.Alarm
0081	0x0051	Unsigned short	Pressure Unit
0082	0x0052	Unsigned short	System Alarm Ena
0083	0x0053	Unsigned short	Fluid density
0084	0x0054	Unsigned short	Backups Enable
0085	0x0055	Unsigned short	SD_Card Enable
0086	0x0056	Unsigned short	Humidity Enable
0087	0x0057	Unsigned short	REV.Sensor Fact.
0088	0x0058	Unsigned short	REV End Velocity
0089	0x0059	Unsigned short	Bi_Direct Enable
0090	0x005A	Unsigned short	Excit. Value Set
0091	0x005B	Unsigned short	Reserve
0092	0x005C	Unsigned short	Reserve
0093	0x005D	Unsigned short	Zero Noise Rest.

Table 4-2 W803FU Electromagnetic Flowmeter Modbus Parameter Address Table

Protocol Addresses（Decimal）	Protocol Addresses（HEX）	Data Format	Register Definition

0000	0x0000	Unsigned short	Language
0001	0x0001	Unsigned short	Comm Addres
0002	0x0002	Unsigned short	Communicat.Gap
0003	0x0003	Unsigned short	Sensor Size
0004	0x0004	Unsigned short	Flow Unit
0005	0x0005	Unsigned short	Flow Range
0006	0x0006	Unsigned short	Flow Direction
0007	0x0007	Unsigned short	Flow Zero Crc.
0008	0x0008	Unsigned short	Flow Cutoff
0009	0x0009	Unsigned short	Flow FilterTime
0010	0x000A	Unsigned short	Flow Total Unit
0011	0x000B	Unsigned short	Reverse Flow Ena
0012	0x000C	Unsigned short	Reserve
0013	0x000E	Unsigned short	Pulse Unit
0014	0x000E	Unsigned short	Pulse Factor
0015	0x000F	Unsigned short	Pulse Width
0016	0x0010	Unsigned short	EmptyPipe Value
0017	0x0011	Unsigned short	Empty.Zero CRC
0018	0x0012	Unsigned short	Empty.Range CRC
0019	0x0013	Unsigned short	Sensor Factor
0020	0x0014	Unsigned short	Excitation Time
0021	0x0015	Unsigned short	Sensor Coding
0022	0x0016	Unsigned short	Linearizat. Ena
0023	0x0017	Unsigned short	Flow Correct P.1
0024	0x0018	Unsigned short	Flow Target V.1
0025	0x0019	Unsigned short	Flow Correct P.2
0026	0x001A	Unsigned short	Flow Target V.2
0027	0x001B	Unsigned short	Flow Correct P.3

0028	0x001C	Unsigned short	Flow Target V.3
0029	0x001D	Unsigned short	Flow Correct P.4
0030	0x001E	Unsigned short	Flow Target V.4
0031	0x001F	Unsigned short	Flow End Veloci.
0032	0x0020	Unsigned short	Reserve
0033	0x0021	Unsigned short	Reserve
0034	0x0022	Unsigned short	Reserve
0035	0x0023	Unsigned short	Reserve
0036	0x0024	Unsigned short	Reserve
0037	0x0025	Unsigned short	Reserve
0038	0x0026	Unsigned short	Reserve
0039	0x0027	Unsigned short	Reserve
0040	0x0028	Unsigned short	Reserve
0041	0x0029	Unsigned short	Reserve
0042	0x002A	Unsigned short	Reserve
0043	0x002B	Unsigned short	Reserve
0044	0x002C	Unsigned short	Operate Mode Sel
0045	0x002D	Unsigned short	Interval Time
0046	0x002E	Unsigned short	Starting Value
0047	0x002F	Unsigned short	Meter Factor(Read Only)
0048	0x0030	Unsigned short	Meter Correct(Read Only)
0049	0x0031	Unsigned short	Meter Dormancy
0050	0x0032	Unsigned short	Reserve
0051	0x0033	Unsigned short	Clear Total Key
0052	0x0034	Unsigned short	Meter Code 1
0053	0x0035	Unsigned short	Reserve
0054	0x0036	Unsigned short	Pulse Output Ena
0055	0x0037	Unsigned short	Pressure Range

0056	0x0038	Unsigned short	Reserve
0057	0x0039	Unsigned short	Reserve
0058	0x003A	Unsigned short	Reserve
0059	0x003B	Unsigned short	Reserve
0060	0x003C	Unsigned short	Meter Code 2(Read Only)
0061	0x003D	Unsigned short	Meter Code 3(Read Only)
0062	0x003E	Unsigned short	Meter Code 4(Read Only)
0063	0x003F	Unsigned short	Reserve
0064	0x0040	Unsigned short	Pressure Unit
0065	0x0041	Unsigned short	Reserve
0066	0x0042	Unsigned short	Multiplier
0067	0x0043	Unsigned short	Communica.Rate
0068	0x0044	Unsigned short	Communica.check
0069	0x0045	Unsigned short	Communication
0070	0x0046	Unsigned short	Reserve
0071	0x0047	Unsigned short	Reserve
0072	0x0048	Unsigned short	P_Sensor Excit
0073	0x0049	Unsigned short	Pressure Gain
0074	0x004A	Unsigned short	Press. Zero CRC
0075	0x004B	Unsigned short	Press. Gain CRC
0076	0x004C	Unsigned short	Total Display
0077	0x004D	Unsigned short	High Alarm Limit
0078	0x004E	Unsigned short	Low Alarm Limit
0079	0x004F	Unsigned short	Press.High Alarm
0080	0x0050	Unsigned short	Press. Low. Alarm
0081	0x0051	Unsigned short	Pressure Unit
0082	0x0052	Unsigned short	System Alarm Ena
0083	0x0053	Unsigned short	Reserve

0084	0x0054	Unsigned short	Reserve
0085	0x0055	Unsigned short	Reserve
0086	0x0056	Unsigned short	Reserve
0087	0x0057	Unsigned short	Reserve
0088	0x0058	Unsigned short	Reserve
0089	0x0059	Unsigned short	Reserve
0090	0x005A	Unsigned short	Reserve
0091	0x005B	Unsigned short	Reserve
0092	0x005C	Unsigned short	Reserve
0093	0x005D	Unsigned short	Reserve
0094	0x005E	Unsigned short	Reserve
0095	0x005F	Unsigned short	Level Range
0096	0x0060	Unsigned short	Pipeline Type
0097	0x0061	Unsigned short	Canal Bottom
0098	0x0062	Unsigned short	Canal Top Width1
0099	0x0063	Unsigned short	Canal Top Width2
0100	0x0064	Unsigned short	Zero Noise Rest.
0101	0x0065	Unsigned short	Meter Factor2
0102	0x0066	Unsigned short	Meter Factor3
0103	0x0067	Unsigned short	Flow CRC Factor

Table 4-3 W803S Electromagnetic Flowmeter Modbus Parameter Address Table

Protocol Addresses（Decimal）	Protocol Addresses（HEX）	Data Format	Register Definition
0000	0x0000	Unsigned short	Language
0001	0x0001	Unsigned short	Comm Addres
0002	0x0002	Unsigned short	Communicat.Gap
0003	0x0003	Unsigned short	Sensor Size

0004	0x0004	Unsigned short	Flow Unit
0005	0x0005	Unsigned short	Flow Range
0006	0x0006	Unsigned short	Flow Direction
0007	0x0007	Unsigned short	Flow Zero CRC
0008	0x0008	Unsigned short	Flow Cutoff
0009	0x0009	Unsigned short	Flow Filter Time
0010	0x000A	Unsigned short	Flow Total Unit
0011	0x000B	Unsigned short	Reverse Flow Ena
0012	0x000C	Unsigned short	Reserve
0013	0x000E	Unsigned short	Pulse Unit
0014	0x000E	Unsigned short	Pulse Factor
0015	0x000F	Unsigned short	Pulse Width
0016	0x0010	Unsigned short	EmptyPipe Value
0017	0x0011	Unsigned short	Empty.Zero CRC
0018	0x0012	Unsigned short	Empty.Range CRC
0019	0x0013	Unsigned short	Sensor Fact.
0020	0x0014	Unsigned short	Excitation Time
0021	0x0015	Unsigned short	Sensor Coding
0022	0x0016	Unsigned short	Linearization En
0023	0x0017	Unsigned short	FWD Correct Po.1
0024	0x0018	Unsigned short	FWD Target Val.1
0025	0x0019	Unsigned short	FWD Correct Po.2
0026	0x001A	Unsigned short	FWD Target Val.2
0027	0x001B	Unsigned short	FWD Correct Po.3
0028	0x001C	Unsigned short	FWD Target Val.3
0029	0x001D	Unsigned short	FWD Correct Po.4
0030	0x001E	Unsigned short	FWD Target Val.4
0031	0x001F	Unsigned short	FWD End Velocity

0032	0x0020	Unsigned short	REV Correct Po.1
0033	0x0021	Unsigned short	REV Target Val.1
0034	0x0022	Unsigned short	REV Correct Po.2
0035	0x0023	Unsigned short	REV Target Val.2
0036	0x0024	Unsigned short	REV Correct Po.3
0037	0x0025	Unsigned short	REV Target Val.3
0038	0x0026	Unsigned short	REV Correct Po.4
0039	0x0027	Unsigned short	REV Target Val.4
0040	0x0028	Unsigned short	Ent.T Zero CRC
0041	0x0029	Unsigned short	Ent.T Range CRC
0042	0x002A	Unsigned short	Out.T Zero CRC
0043	0x002B	Unsigned short	Out.T Range CRC
0044	0x002C	Unsigned short	Operate Mode Sel
0045	0x002D	Unsigned short	Interval Time
0046	0x002E	Unsigned short	Starting Value
0047	0x002F	Unsigned short	Meter Factor(Read Only)
0048	0x0030	Unsigned short	Meter Correct(Read Only)
0049	0x0031	Unsigned short	Meter Dormancy
0050	0x0032	Unsigned short	Reserve
0051	0x0033	Unsigned short	Clear Total Key
0052	0x0034	Unsigned short	Meter Code1
0053	0x0035	Unsigned short	Reserve
0054	0x0036	Unsigned short	Pulse Output Ena
0055	0x0037	Unsigned short	Pressure Range
0056	0x0038	Unsigned short	Heat Total Unit
0057	0x0039	Unsigned short	Measure Mode
0058	0x003A	Unsigned short	Reserve
0059	0x003B	Unsigned short	Heat Unit

0060	0x003C	Unsigned short	Meter Code2(Read Only)
0061	0x003D	Unsigned short	Meter Code3(Read Only)
0062	0x003E	Unsigned short	Meter Code4(Read Only)
0063	0x003F	Unsigned short	Ent.Temp.Calicu
0064	0x0040	Unsigned short	Reserve
0065	0x0041	Unsigned short	Out.Temp.calicu.
0066	0x0042	Unsigned short	Reserve
0067	0x0043	Unsigned short	Communicti. Rate(Read Only)
0068	0x0044	Unsigned short	Communict.check(Read Only)
0069	0x0045	Unsigned short	Communication(Read Only)
0070	0x0046	Unsigned short	Temp&Pres Filter
0071	0x0047	Unsigned short	Sensor Position
0072	0x0048	Unsigned short	P_Sensor Excit
0073	0x0049	Unsigned short	Pressure Gain
0074	0x004A	Unsigned short	Press. Zero CRC
0075	0x004B	Unsigned short	Press. Range CRC
0076	0x004C	Unsigned short	Total Display
0077	0x004D	Unsigned short	High Alarm Limit
0078	0x004E	Unsigned short	Low Alarm Limit
0079	0x004F	Unsigned short	Press. High Alarm
0080	0x0050	Unsigned short	Press. Low Alarm
0081	0x0051	Unsigned short	Pressure Unit
0082	0x0052	Unsigned short	System Alarm Ena
0083	0x0053	Unsigned short	Reserve
0084	0x0054	Unsigned short	Snsr measure Ena
0085	0x0055	Unsigned short	LCD Time Sleep
0086	0x0056	Unsigned short	Reserve
0087	0x0057	Unsigned short	REV.Sensor Fact.

0088	0x0058	Unsigned short	REV End Velocity
0089	0x0059	Unsigned short	Bi_Direct Enable(Read Only)
0090	0x005A	Unsigned short	Reserve
0091	0x005B	Unsigned short	Reserve
0092	0x005C	Unsigned short	Reserve
0093	0x005D	Unsigned short	Display Length
0094	0x005E	Unsigned short	Zero Noise Rest
0095	0x005F	Unsigned short	LCD Lamp Enable
0096	0x0060	Unsigned short	Pressure Correct

Table 4-4 Comparison Table of Sensor Size Codes for W803E&W803S

Code	Size	Code	Size	Code	Size
0	3mm	20	90mm	40	900mm
1	4mm	21	95mm	41	950mm
2	5mm	22	100mm	42	1000mm
3	6mm	23	125mm	43	1100mm
4	8mm	24	150mm	44	1200mm
5	10mm	25	200mm	45	1300mm
6	12mm	26	250mm	46	1400mm
7	15mm	27	300mm	47	1500mm
8	20mm	28	320mm	48	1600mm
9	25mm	29	350mm	49	1700mm
10	32mm	30	400mm	50	1800mm
11	40mm	31	450mm	51	1900mm
12	45mm	32	500mm	52	2000mm
13	50mm	33	550mm	53	2100mm
14	55mm	34	600mm		
15	65mm	35	650mm		
16	70mm	36	700mm		
17	75mm	37	750mm		
18	80mm	38	800mm		
19	85mm	39	850mm		

Table 4-5 Comparison Table of Flow Unit Codes for W803E

Code	Unit	Code	Unit	Code	Unit
0	L/S	1	L/M	2	L/H

3	M3/S	4	M3/M	5	M3/H
6	UKG/S	7	UKG/M	8	UKG/H
9	USG/S	10	USG/M	11	USG/H
12	KG/S	13	KG/M	14	KG/H
15	T/S	16	T/M	17	T/H

Table 4-6 Comparison Table of Flow Direction Codes for W803E

Code	Option	Code	Option
0	FORWARD	1	REVERSE
2	ALL FORWARD	3	ALL REVERSE

Table 4-7（a） Comparison Table of Flow FilterTime Codes for W803E

Code	Option	Code	Option	Code	Option
0	02 SEC	1	03 SEC	2	04 SEC
3	06 SEC	4	08 SEC	5	10 SEC
6	20 SEC	7	30 SEC		

Table 4-7（b） Comparison Table of Flow FilterTime Codes for W803FU

Code	Option	Code	Option	Code	Option
0	02 SEC	1	03 SEC	2	04 SEC
3	06 SEC	4	08 SEC	5	10 SEC
6	30 SEC	7	60 SEC		

Table 4-7（c） Comparison Table of Flow FilterTime Codes for W803S

Code	Option	Code	Option	Code	Option
0	02 SEC	1	03 SEC	2	04 SEC
3	06 SEC	4	08 SEC	5	10 SEC
6	32 SEC	7	63 SEC		

Table 4-8 Comparison Table of Flow Total Unit Codes for W803E

Code	Unit	Code	Unit	Code	Unit	Code	Unit
0	0.001Ltr	1	0.01Ltr	2	0.1Ltr	3	1Ltr
4	0.001m3	5	0.01m3	6	0.1m3	7	1m3
8	0.001uk	9	0.01uk	10	0.1uk	11	1uk
12	0.001us	13	0.01us	14	0.1us	15	1us
16	0.001kg	17	0.01kg	18	0.1kg	19	1kg
20	0.001t	21	0.01t	22	0.1t	23	1t

Table 4-9 Comparison Table of Reverse Flow Ena Codes for W803E&W803FU&W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-10 Comparison Table of Pulse Unit Codes for W803E

Code	Unit	Code	Unit	Code	Unit
0	Ltr	1	M3	2	UKG
3	USG	4	Kg	5	T

Table 4-11 Comparison Table of Pulse Width Codes for W803E&W803FU&W803S

Code	Option	Code	Option	Code	Option
0	00.05 ms	1	00.10 ms	2	00.15 ms
3	00.20 ms	4	00.25 ms	5	00.30 ms
6	00.35 ms	7	00.40 ms	8	00.45 ms
9	00.50 ms	10	00.55 ms	11	00.60 ms
12	00.65 ms	13	00.70 ms	14	00.75 ms
15	00.80 ms	16	00.85 ms	17	00.90 ms
18	00.95 ms	19	01.00 ms	20	01.05 ms
21	01.10 ms	22	01.15 ms	23	01.20 ms
24	01.25 ms	25	01.30 ms	26	01.35 ms
27	01.40 ms	28	01.45 ms	29	01.50 ms
30	01.55 ms	31	01.60 ms	32	01.65 ms
33	01.70 ms	34	01.75 ms	35	01.80 ms
36	01.85 ms	37	01.90 ms	38	01.95 ms
39	02.00 ms	40	02.05 ms	41	02.10 ms
42	02.15 ms	43	02.20 ms	44	02.25 ms
45	02.30 ms	46	02.35 ms	47	02.40 ms
48	02.45 ms	49	02.50 ms	50	02.55 ms
51	02.60 ms	52	02.65 ms	53	02.70 ms
54	02.75 ms	55	02.80 ms	56	02.85 ms
57	02.90 ms	58	02.95 ms	59	03.00 ms
60	03.05 ms	61	03.10 ms	62	03.15 ms
63	03.20 ms	64	03.25 ms	65	03.30 ms
66	03.35 ms	67	03.40 ms	68	03.45 ms
69	03.50 ms	70	03.55 ms	71	03.60 ms
72	03.65 ms	73	03.70 ms	74	03.75 ms
75	03.80 ms	76	03.85 ms	77	03.90 ms
78	03.95 ms	79	04.00 ms	80	04.05 ms
81	04.10 ms	82	04.15 ms	83	04.20 ms
84	04.25 ms	85	04.30 ms	86	04.35 ms
87	04.40 ms	88	04.45 ms	89	04.50 ms
90	04.55 ms	91	04.60 ms	92	04.65 ms
93	04.70 ms	94	04.75 ms	95	04.80 ms
96	04.85 ms	97	04.90 ms	98	04.95 ms
99	05.00 ms	100	05.05 ms	101	05.10 ms

102	05.15 ms	103	05.20 ms	104	05.25 ms
105	05.30 ms	106	05.35 ms	107	05.40 ms
108	05.45 ms	109	05.50 ms	110	05.55 ms
111	05.60 ms	112	05.65 ms	113	05.70 ms
114	05.75 ms	115	05.80 ms	116	05.85 ms
117	05.90 ms	118	05.95 ms	119	06.00 ms
120	06.05 ms	121	06.10 ms	122	06.15 ms
123	06.20 ms	124	06.25 ms	125	06.30 ms
126	06.35 ms	127	06.40 ms	128	06.45 ms
129	06.50 ms	130	06.55 ms	131	06.60 ms
132	06.65 ms	133	06.70 ms	134	06.75 ms
135	06.80 ms	136	06.85 ms	137	06.90 ms
138	06.95 ms	139	07.00 ms	140	07.05 ms
141	07.10 ms	142	07.15 ms	143	07.20 ms
144	07.25 ms	145	07.30 ms	146	07.35 ms
147	07.40 ms	148	07.45 ms	149	07.50 ms
150	07.55 ms	151	07.60 ms	152	07.65 ms
153	07.70 ms	154	07.75 ms	155	07.80 ms
156	07.85 ms	157	07.90 ms	158	07.95 ms
159	08.00 ms	160	08.05 ms	161	08.10 ms
162	08.15 ms	163	08.20 ms	164	08.25 ms
165	08.30 ms	166	08.35 ms	167	08.40 ms
168	08.45 ms	169	08.50 ms	170	08.55 ms
171	08.60 ms	172	08.65 ms	173	08.70 ms
174	08.75 ms	175	08.80 ms	176	08.85 ms
177	08.90 ms	178	08.95 ms	179	09.00 ms
180	09.05 ms	181	09.10 ms	182	09.15 ms
183	09.20 ms	184	09.25 ms	185	09.30 ms
186	09.35 ms	187	09.40 ms	188	09.45 ms
189	09.50 ms	190	09.55 ms	191	09.60 ms
192	09.65 ms	193	09.70 ms	194	09.75 ms
195	09.80 ms	196	09.85 ms	197	09.90 ms
198	09.95 ms	199	10.00 ms	200	10.05 ms
201	10.10 ms	202	10.15 ms	203	10.20 ms
204	10.25 ms	205	10.30 ms	206	10.35 ms
207	10.40 ms	208	10.45 ms	209	10.50 ms
210	10.55 ms	211	10.60 ms	212	10.65 ms
213	10.70 ms	214	10.75 ms	215	10.80 ms
216	10.85 ms	217	10.90 ms	218	10.95 ms
219	11.00 ms	220	11.05 ms	221	11.10 ms
222	11.15 ms	223	11.20 ms	224	11.25 ms
225	11.30 ms	226	11.35 ms	227	11.40 ms
228	11.45 ms	229	11.50 ms	230	11.55 ms

231	11.60 ms	232	11.65 ms	233	11.70 ms
234	11.75 ms	235	11.80 ms	236	11.85 ms
237	11.90 ms	238	11.95 ms	239	12.00 ms
240	12.05 ms	241	12.10 ms	242	12.15 ms
243	12.20 ms	244	12.25 ms	245	12.30 ms
246	12.35 ms	247	12.40 ms	248	12.45 ms
249	12.50 ms				

Table 4-12 Comparison Table of Excitation Time Codes for W803E

Code	Option	Code	Option
0	TYPE1	1	TYPE2

Table 4-13 Comparison Table of Linearizat. Ena Codes for W803E&W803FU&W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-14 Comparison Table of Operate Mode S. Codes for W803E &W803S

Code	Option	Code	Option	Code	Option
0	Flow only	1	Flow+Pressure	2	Flow+Temperature

Table 4-15 Comparison Table of Interval Time Codes for W803E &W803FU&W803S

Code	Option	Code	Option	Code	Option
0	02 SEC	1	03 SEC	2	04 SEC
3	05 SEC	4	06 SEC	5	07 SEC
6	08 SEC	7	09 SEC	8	10 SEC
9	11 SEC	10	12 SEC	11	13 SEC
12	14 SEC	13	15 SEC	14	16 SEC
15	17 SEC	16	18 SE C	17	19 SEC
18	20 SEC	19	21 SEC	20	22 SEC
21	23 SEC	22	24 SEC	23	25 SEC
24	26 SEC	25	27 SEC	26	28 SEC
27	29 SEC	28	30 SEC		

Table 4-16 Comparison Table of Pulse Output Ena Codes for W803E

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-17 Comparison Table of Pressure Range Codes for W803E &W803S

Code	Option	Code	Option
0	0.6 MPa	1	1.6 MPa

Table 4-18 Comparison Table of Heat Total Unit Codes for W803E &W803S

Code	Unit	Code	Unit	Code	Unit	Code	Unit
0	0.001	1	0.01	2	0.1	3	1

Table 4-19 Comparison Table of Measure Mode Codes for W803E &W803S

Code	Option	Code	Option
0	Measure Heat	1	Measure Cold

Table 4-20 Comparison Table of Heat Display Codes for W803E

Code	Option	Code	Option	Code	Option
0	HeatX100	1	HeatX10	2	HeatX1
3	Heat/10	4	Heat/100		

Table 4-21 Comparison Table of Heat Unit Codes for W803E&W803S

Code	Option	Code	Option	Code	Option
0	MJ	1	GJ	2	KW.H
3	MW.H				

Table 4-22 Comparison Table of Temperat. Filter Codes for W803E

Code	Option	Code	Option	Code	Option
0	06 SEC	1	10 SEC	2	15 SEC
3	20 SEC	4	30 SEC	5	40 SEC
6	50 SEC	7	63 SEC		

Table 4-23 Comparison Table of Sensor Position Codes for W803E&W803S

Code	Option	Code	Option
0	Inlet	1	Export

Table 4-24(a) Comparison Table of P_Sensor Excit Codes for W803E

Code	Option	Code	Option
0	ID=100uA for 20K	1	ID=250uA for 8K

2	ID=500uA for 4K	3	ID=750uA for 2K5

Table 4-24(b) Comparison Table of P_Sensor Excit Codes for W803S

Code	Option	Code	Option
0	ID=250uA for 8K	1	ID=500uA for 4K
2	ID=750uA for 2K5	3	ID=1000uA for 2K

Table 4-24(c) Comparison Table of P_Sensor Excit Codes for W803FU

Code	Option	Code	Option
0	ID=00uA No Drive	1	ID=250uA for 8K
2	ID=500uA for 4K	3	ID=750uA for 2K5
4	ID=1000uA for 2K		

Table 4-25(a) Comparison Table of Pressure Gain Codes for W803E

Code	Option	Code	Option
0	G=02 for 1000mV	1	G=04 for 500mV
2	G=08 for 250mV	3	G=16 for 125mV
4	G=32 for 62.5mV	5	G=64 for 31.25V

Table 4-25(b) Comparison Table of Pressure Gain Codes for W803FU

Code	Option	Code	Option
0	G=01 for 2000mV	1	G=02 for 1000mV
2	G=04 for 500mV	3	G=08 for 250mV
4	G=16 for 125mV	5	G=32 for 62.5V

Table 4-26 Comparison Table of Total Display Codes for W803E

Code	Option	Code	Option
0	Flow+	1	Flow+,Flow-
2	Flow+,Flow-,FD	3	Heat Quantity
4	Flow+,Heat	5	Flow+,Flow-,LM
6	F+,F-,FD, LM	7	Flow+,Heat,LM

Table 4-27 Comparison Table of Pressure Unit Codes for W803E&W803FU&W803S

Code	Unit	Code	Unit	Code	Unit	Code	Unit
0	0.001KPa	1	0.01KPa	2	0.1KPa	3	1KPa
4	0.001MPa	5	0.01MPa	6	0.1MPa	7	1MPa

Table 4-28 Comparison Table of System Alarm Ena Codes for W803E&W803FU&W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-29 Comparison Table of Backups Enable Codes for W803E

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-30 Comparison Table of SD_Card Enable Codes for W803E

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-31 Comparison Table of Humidity Enable Codes for W803E

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-32 Comparison Table of Bi_Direct Enable Codes for W803E&W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-33 Comparison Table of Excit. Value Set Codes for W803E&W803FU

Code	Option	Code	Option	Code	Option
0	Excit: 1	1	Excit: 2	2	Excit: 3

Table 4-34 Comparison Table of Zero Noise Rest. Codes for W803E&W803FU&W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-35 Comparison Table of Sensor Size Codes for W803FU

Code	Size	Code	Size	Code	Size
0	32mm	1	40mm	2	45mm
3	50mm	4	55mm	5	65mm
6	70mm	7	75mm	8	80mm
9	85mm	10	90mm	11	95mm
12	100mm	13	125mm	14	150mm

15	200mm	16	250mm	17	300mm
18	320mm	19	350mm	20	400mm
21	450mm	22	500mm	23	550mm
24	600mm	25	650mm	26	700mm
27	750mm	28	800mm	29	850mm
30	900mm	31	950mm	32	1000mm
33	1100mm	34	1200mm	35	1300mm
36	1400mm	37	1500mm	38	1600mm
39	1700mm	40	1800mm	41	1900mm
42	2000mm	43	2100mm	44	2200mm
45	2300mm	46	2400mm	47	2500mm
48	2600mm	49	2700mm	50	2800mm
51	2900mm	52	3000mm	53	4000mm
54	5000mm	55	6000mm	56	7000mm
57	8000mm	58	9000mm	59	10000mm
60	12000mm	61	14000mm	62	16000mm
63	18000mm	64	20000mm	65	30000mm
66	40000mm	67	50000mm	68	60000mm

Table 4-36 Comparison Table of Flow Unit Codes for W803FU&W803S

Code	Unit	Code	Unit	Code	Unit
0	L/S	1	L/M	2	L/H
3	M3/S	4	M3/M	5	M3/H

Table 4-37 Comparison Table of Flow Total Unit Codes for W803FU&W803S

Code	Unit	Code	Unit	Code	Unit	Code	Unit
0	0.001Ltr	1	0.01Ltr	2	0.1Ltr	3	1Ltr
4	0.001m3	5	0.01m3	6	0.1m3	7	1m3

Table 4-38 Comparison Table of Pulse Unit Codes for W803FU&W803S

Code	Unit	Code	Unit
0	Ltr	1	M3

Table 4-39 Comparison Table of Operate Mode Sel Codes for W803FU

Code	Option	Code	Option
0	Flow Only	1	Flow+Pressure

Table 4-40 Comparison Table of Pipeline Type Codes for W803FU

Code	Option	Code	Option	Code	Option
0	Full tube	1	Uon full tube	2	Open channel

Table 4-41 Comparison Table of Flow Direction Codes for W803S&W803FU

Code	Option	Code	Option
0	FORWARD	1	REVERSE

Table 4-42 Comparison Table of Flow Filter Time Codes for W803S

Code	Option	Code	Option	Code	Option
0	02 SEC	1	03 SEC	2	04 SEC
3	06 SEC	4	08 SEC	5	10 SEC
6	30 SEC	7	60 SEC		

Table 4-43 Comparison Table of Excitation Time Codes for W803S

Flow only

Code	Option	Code	Option
0	Flow only 12.5HZ(Normal)	1	Flow only 8.00HZ(Normal)
2	6.25HZ(Normal)	3	5.00HZ(Normal)
4	4.17HZ(Normal)		
5	Flow only 12.5HZ(Adapt.1）	6	Flow only 8.00HZ(Adapt.1）
7	6.25HZ(Adapt.1）	8	5.00HZ(Adapt.1）
9	4.17HZ(Adapt.1）		

Flow +Pressure/Flow+Temperature

Code	Option	Code	Option
0-2	6.25HZ(Normal)	3	5.00HZ(Normal)
4	4.17HZ(Normal)		
5	6.25HZ(Adapt.1）	6	5.00HZ(Adapt.1）
7	4.17HZ(Adapt.1）		

Table 4-44 Comparison Table of Excitation Time Codes for W803FU

Flow only

Code	Option	Code	Option	Code	Option
0	Flow only 12.5HZ	1	Flow only 8.00HZ	2	6.25HZ
3	5.00HZ	4	4.17HZ		

Flow +Pressure/Flow+Temperature

Code	Option	Code	Option	Code	Option
0-2	6.25HZ	3	5.00HZ	4	4.17HZ

Table 4-45 Comparison Table of Pulse Output Ena Codes for W803S&W803FU

Code	Option	Code	Option
0	DISABLE Output	1	Calibrate Ena.
2	Measure Enable		

Table 4-46 Comparison Table of Temp&Pres Filter Codes for W803S

Code	Option	Code	Option	Code	Option	Code	Option
0	06 SEC	1	10 SEC	2	16 SEC	3	32 SEC

Table 4-47 Comparison Table of Snsr measure Ena Codes for W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

Table 4-48 Comparison Table of Display Length Codes for W803S

Code	Option	Code	Option
0	Unlimit	1	.X
2	.XX	3	.XXX

Table 4-49 Comparison Table of LCD Lamp Enable Codes for W803S

Code	Option	Code	Option
0	DISABLE	1	ENABLE

For example, modify the flow unit to M3/H, and the operation format is as follows:

a) Send modification unit command host command format (8 bytes in total)

0	1	2	3	4	5	6	7
Device Address	function code	Address 1	Address 0	Data 1	Data 0	CRC	CRC
1~99	0x06	0x00	0x04	0x00	0x05	XX	XX

b) Slave response format (8 bytes in total)

0	1	2	3	4	5	6	7

Device Address	function code	Address 1	Address 0	Data 1	Data 0	CRC	CRC
1~99	0x06	0x00	0x04	0x00	0x05	XX	XX

Chapter 5 Application Exampleso

This chapter is an application example section that requires the use of some tool software, which can be downloaded from the internet.

The software required includes a serial debugging assistant, 16 to 10 (IEEE754), and a programmer's calculator.

5.1 Sending and receiving commands

Open the serial port debugging assistant, adjust the baud rate 9600, data bit 8, check bit N, stop bit 1, set the COM port, and select the verification method CRC16 ModbusRTU. Set the communication address of the flowmeter to 1 and the baud rate to 9600. After connecting the serial port, the test can be conducted.

Enter 01 04 10 10 00 16 74 C1 in the sending area (the last two CRCs are automatically generated by the software) to receive the corresponding data of the flowmeter in the receiving area (as shown in Figure 5-1).

Figure 5-1 Communication Diagram of Serial Port Debugging Assistant

5.2 Meaning of Received Data

As shown in the above figure, the data received from the flowmeter response is:

01 04 2C C3 36 D9 9A C0 CE F1 AA 42 81 51 EC 42 64 00 00 00 00 00 4C 3E 17 8D 50 00 00 00 28 3D 71 A9 FC 00 05 00 01 00 00 00 00 00 00 00 00 C7 D2

According to the register table of the flow meter, it can be seen that the meaning of the received flow meter response data is (as shown in Figure 5-2):

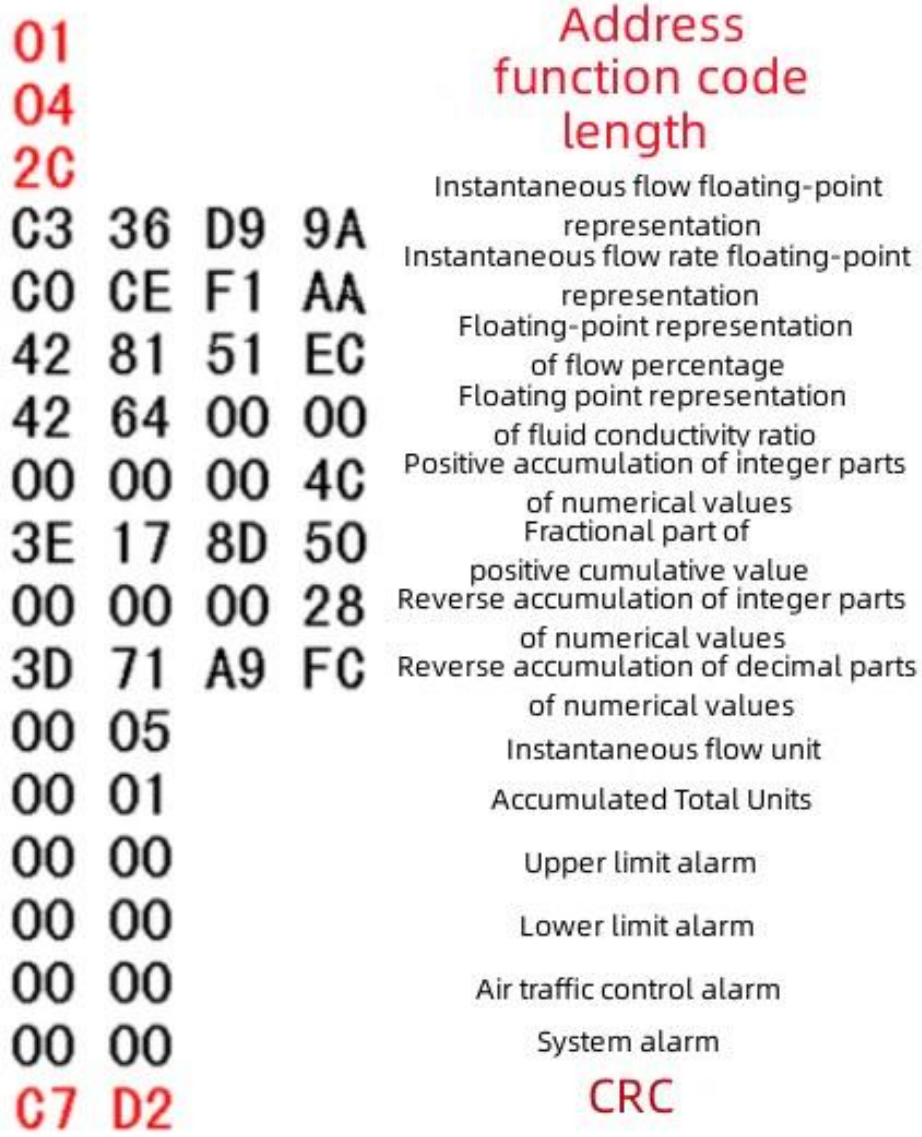


Figure 5-2 Meaning diagram of received data

5.3 Analysis of received data

Based on the received data, it can be analyzed using tool software.

1. Analysis of Instantaneous Quantity

The instantaneous quantity can be analyzed using software 16 to 10 (IEEE754), as shown in Figure 5-3:

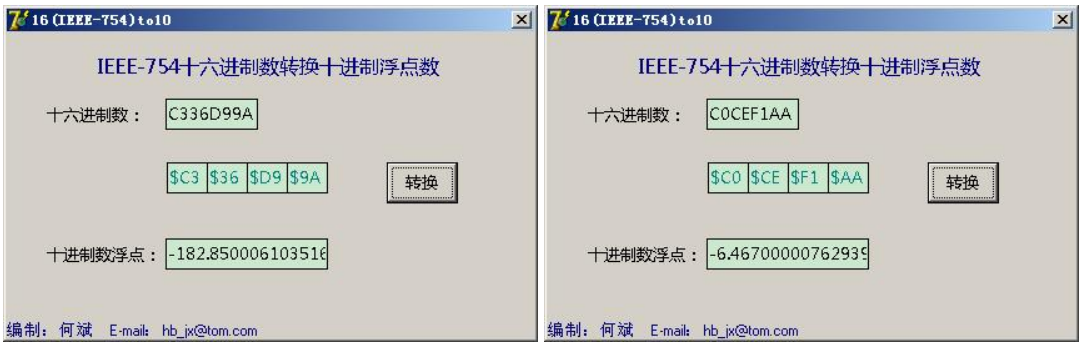
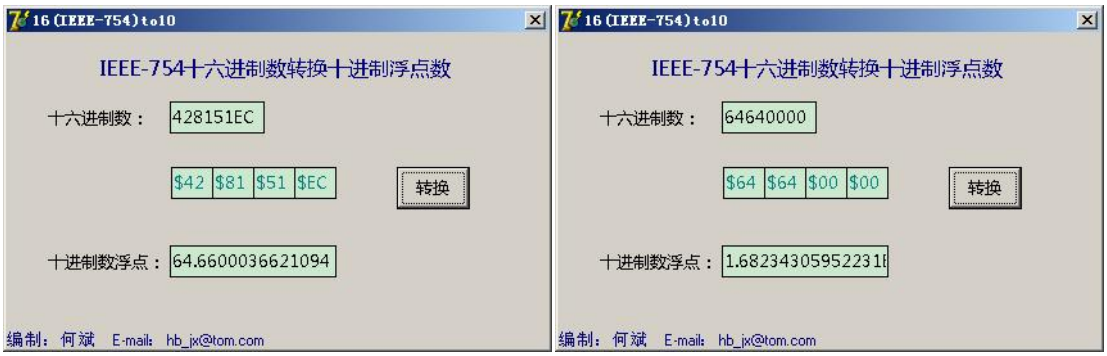


Figure 5-3 Analysis of Instantaneous Quantity

In summary, the instantaneous flow rate is -185.85, and the instantaneous flow rate is -6.46。

2. Analysis of percentage

The percentage can also be analyzed using 16 to 10 (IEEE754) software, as shown in Figures 5-4:



Analysis of percentages in Figures 5-4

In summary, the flow rate percentage is 64.66, and the fluid conductivity ratio is 1.68.

3. Analysis of Accumulated Quantity

The integer part of the cumulative quantity can be parsed by programmers using a calculator, as shown in Figures 5-5:

Original data:

Convert to:

Original data:

Convert to:

Analysis of the integer part of the cumulant in Figure 5-5

The fractional part of the cumulative quantity can be analyzed using software 16 to 10 (IEEE754), as shown in Figures 5-6：

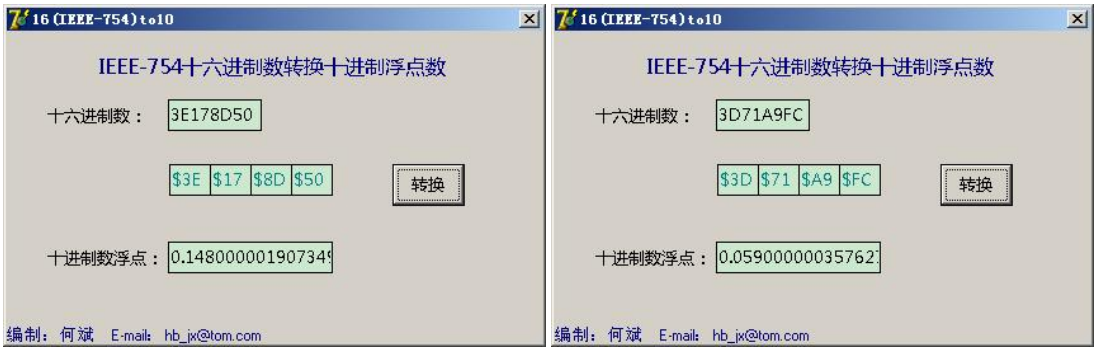


Figure 5-6 Analysis of the Fractional Part of the Accumulator

In summary, positive accumulation is 76.148, and the reverse accumulation is 40.059.

4. Analysis of Flow Units

The flow unit can be directly analyzed through table lookup.

The received data has instantaneous flow units of 00 05 and cumulative flow units of 00 01. According to Tables 3-1, 3-2, and 3-3, the instantaneous flow unit is m3/h, and the cumulative flow unit is m3 (L for C-type tables).

5. Analysis of alarms

Alarm data can be parsed based on 1 being an alarm and 0 being no alarm.

Received data, with upper and lower limit alarms, as well as air traffic control and system alarms, indicating that the flow meter is operating normally and has no alarm status.

Chapter 6 Common Problem Handling Methods

There are two common problems. One is sending data to the master station, but the slave station does not respond. One is the data parsing exception corresponding to the slave station. If there is a communication issue, it is recommended to use our company's testing software for testing first.

6.1 Testing software usage methods

1. Set the baud rate of the flowmeter to 9600 and the communication address to 1.

2. Connect the computer and flow meter using USB (or 232) to 485 port (after successful connection, you can find the COM slogan in My Computer → Properties, as shown in Figure 6-1).

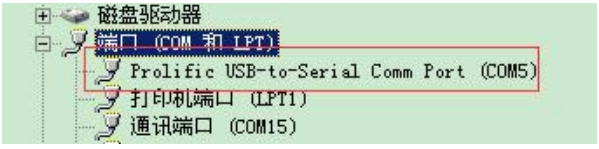
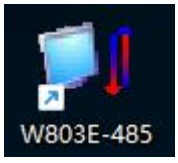


Figure 6-1 COM Port Prompt

3. Double click the icon 

to open the software, adjust the baud rate to 9600, the communication address to 1, and the COM is the same as Figure 6-1. After setting up, click 'Start Communication'. The successful communication screen is

shown in Figure 6-2.

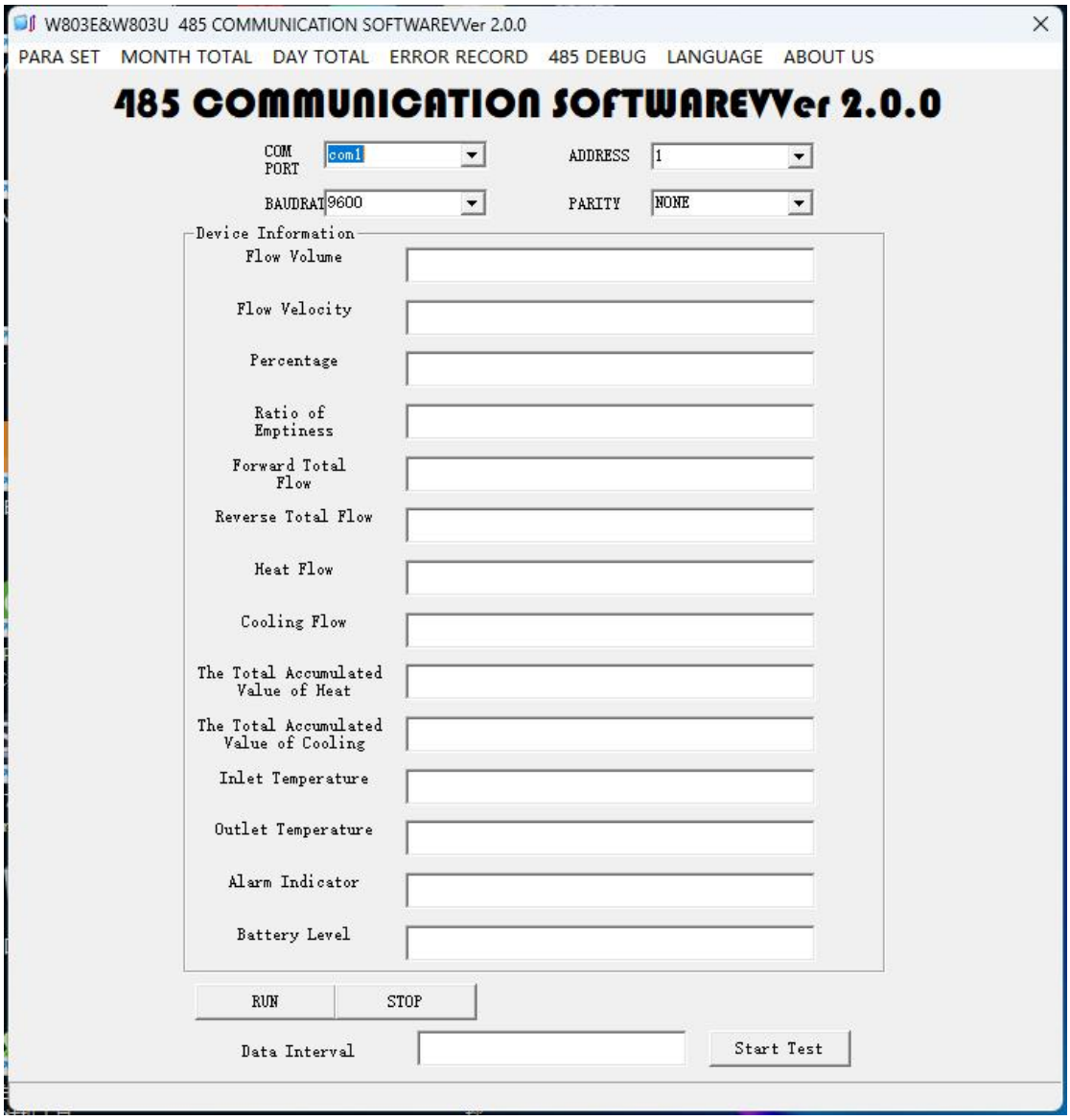


Figure 6-2 Test software communication success diagram

6.2 Slave not responding

If the master station sends data, the slave station will not respond. Consider parameter settings and physical wiring issues.

1. Determine if the flow meter has communication function:

Check the model of the flow meter and check if it has a

communication board.

2. Determine if the communication line is connected correctly

Swap the communication line and try again.

3. Determine if the baud rate is correct:

Require the baud rate of the upper computer to be consistent with the baud rate set by the flow meter.

4. Determine if the communication address is correct:

Require the communication address of the upper computer to be consistent with the communication address of the flow meter.

5. Determine if there are any abnormalities in the COM port:

Check whether the serial port is available in My Computer Properties.

6.3 Data parsing exceptions

Users can use the serial debugging assistant to detect the communication process, and the specific steps are as follows:

1. Connect the main station equipment to the flow meter correctly, and then connect it in parallel to the system using USB (or 232) to 485 port, as shown in Figure 6-3.

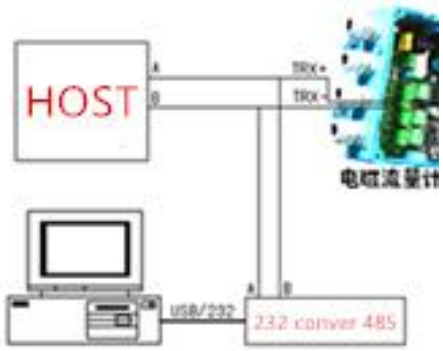


Figure 6-3 Example Connection Diagram of Serial Port Debugging Assistant

2. Open the serial port debugging assistant, set the baud rate of 9600, communication address 1, start bit 1, data bit 8, stop bit 1, and no verification.

3. Click on "Open Serial Port" and use the main station to start sending data and communicating with the flow meter. The communication process can be displayed through serial port debugging, as shown in Figure 6-4.

Figure 6-4 Example of Serial Port Debugging Assistant Listening

4. Based on the received data, search for the content sent by the main station and the corresponding content of the flow meter (as shown in Figure 6-5).

Figure 6-5 Example of Data Analysis for Serial Port Debugging Assistant

The data annotated in red represents the data sent by the master station, while the purple and yellow represent the data responded by the slave station. The purple part represents the data that the slave station responds to in accordance with the protocol format requirements (which may not be considered during parsing), while the yellow part represents the data part that the slave station responds to, used for parsing.

Based on the listening data, analyze whether the communication address, function code, register address, register length, and CRC verification code sent by the main station are correct (detailed methods can be found in Chapter 5).

Appendix

Appendix 1 Modbus poll communication example

Set the communication address of the flowmeter to 1 and the baud rate to 9600.

Double click 

to open the Modbus Poll software, as shown in Figure F1-1.

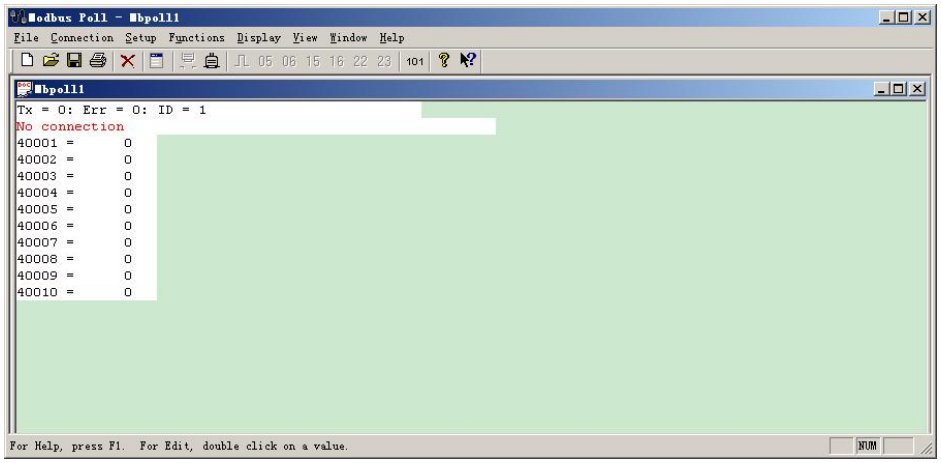


Figure F1-1

Click on Setup>Poll Definition to set the collection command including device address1. MODBUS function code 04, register address 4113, register length 22, and acquisition interval 1000 are shown in Figure F1-2。

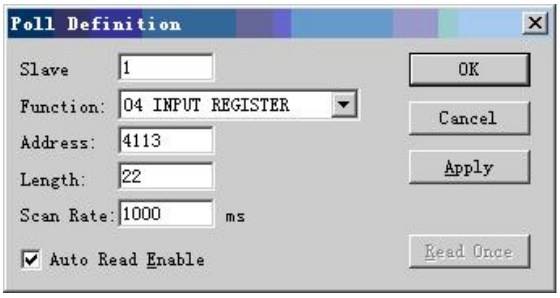


Figure F1-2

Click on Connection → Connection and set the serial port format of the flow meter: 1 bit start bit, 8 bits data bit, 1 bit stop bit, no verification, as shown in Figure F1-3。

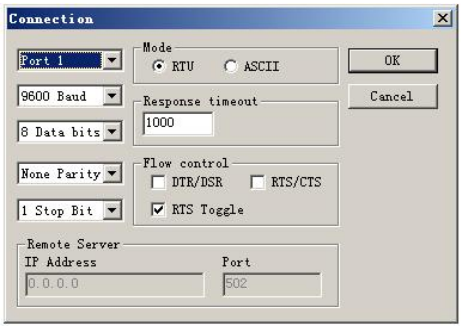


Figure F1-3

After clicking OK, communication can proceed.

After successful communication, you can click Display to select the data format according to Table 2-1 (as shown in Figure F1-4). The successful communication interface is shown in Figure F1-5。

Figure F1-4

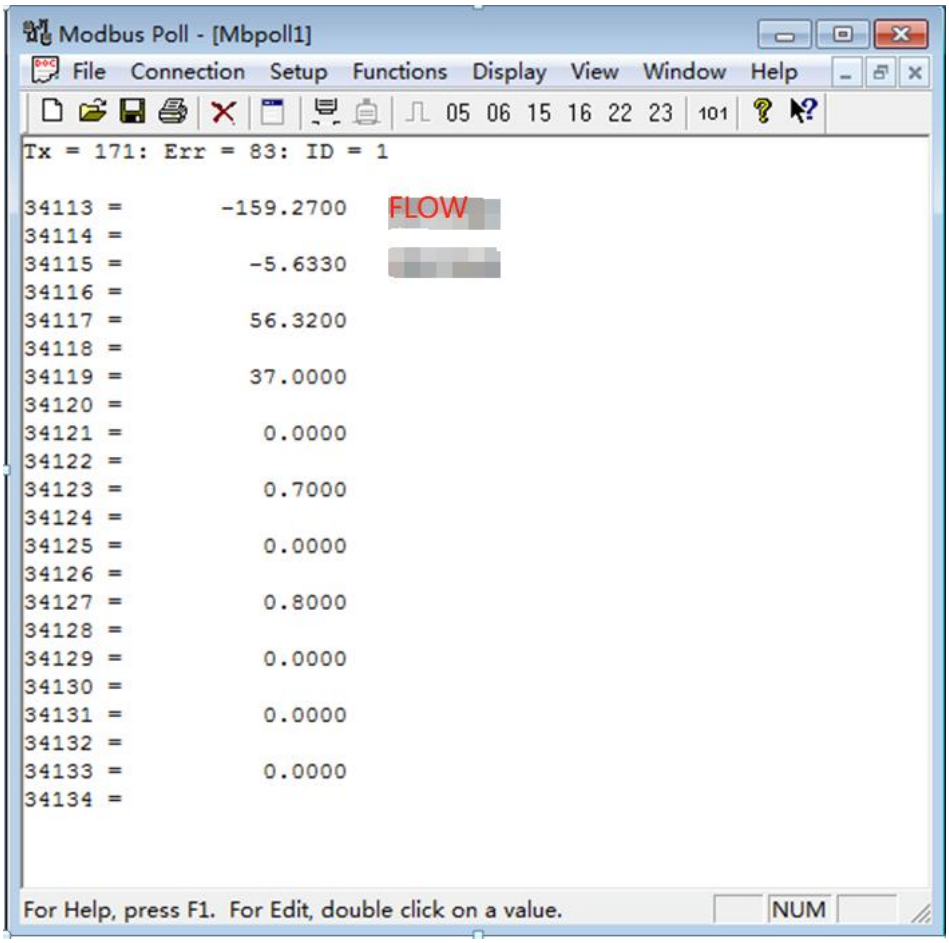

Modbus Poll - [Mbpoll1]
File Connection Setup Functions Display View Window Help
05 06 15 16 22 23 101
Tx = 171: Err = 83: ID = 1
34113 = -159.2700 FLOW
34114 =
34115 = -5.6330
34116 =
34117 = 56.3200
34118 =
34119 = 37.0000
34120 =
34121 = 0.0000
34122 =
34123 = 0.7000
34124 =
34125 = 0.0000
34126 =
34127 = 0.8000
34128 =
34129 = 0.0000
34130 =
34131 = 0.0000
34132 =
34133 = 0.0000
34134 =
For Help, press F1. For Edit, double click on a value.
NUM

Figure F1-5

Appendix 2 Modscan32 Communication Example

Set the communication address of the flowmeter to 1 and the baud rate to 9600.

Click on Setup>Poll Definition to set the collection command including device address1MODBUS function code 04, register address 4113, register length 22, and acquisition interval 1000 are shown in Figure F2-1.

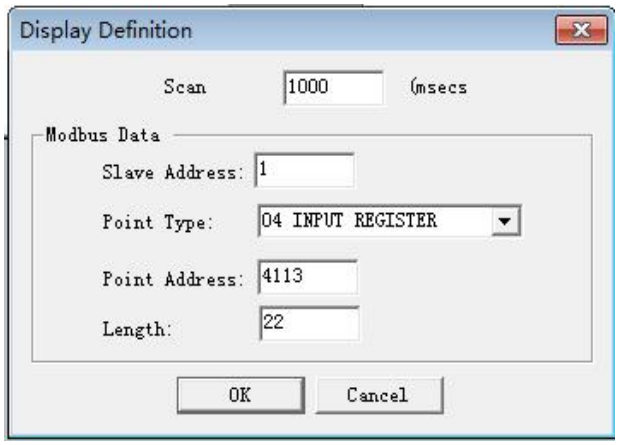


Figure F2-1

Click on Connection → Connection Details to set the serial port format of the flowmeter: 1 bit start bit, 8 bits data bit, 1 bit stop bit, no verification as shown in Figure F2-2.

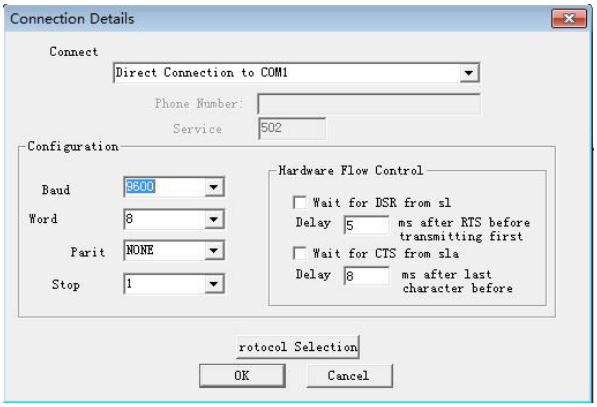


Figure F2-2

After clicking OK, communication can proceed.

After successful communication, you can click Display to select the data format according to Table 2-1 (as shown in Figure F2-3). The successful communication interface is shown in Figure F2-4.

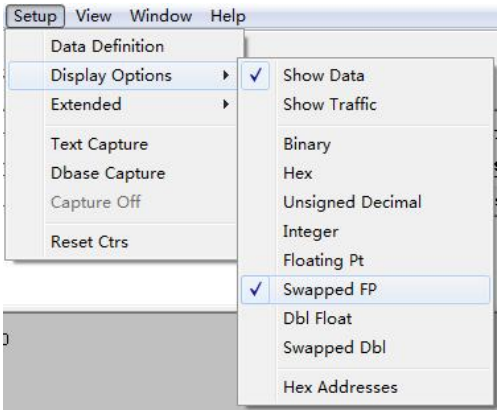


Figure F2-3

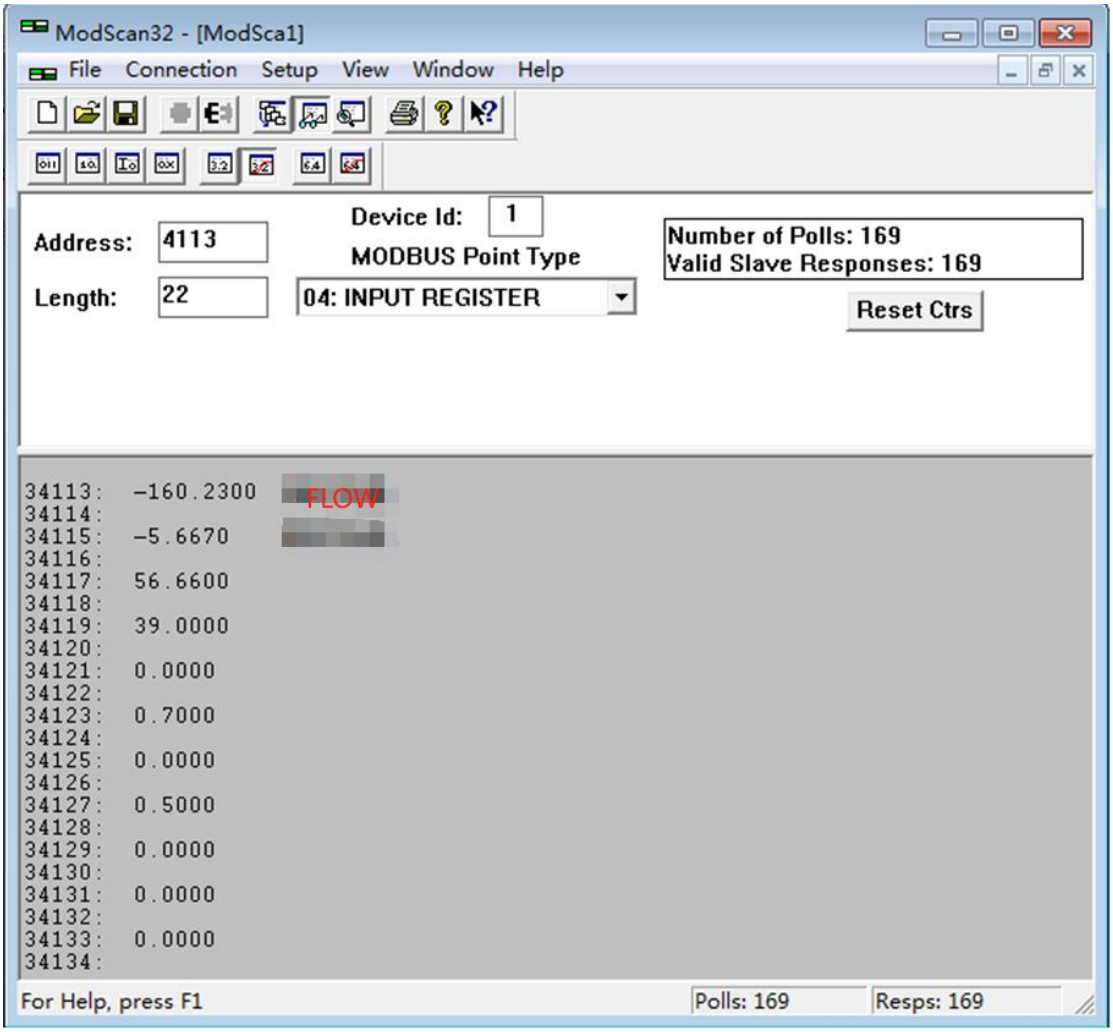

ModScan32 - [ModSca1]
File Connection Setup View Window Help
Address: 4113
Length: 22
Device Id: 1
MODBUS Point Type
04: INPUT REGISTER
Number of Polls: 169
Valid Slave Responses: 169
Reset Ctrs
34113: -160.2300
34114:
34115: -5.6670
34116:
34117: 56.6600
34118:
34119: 39.0000
34120:
34121: 0.0000
34122:
34123: 0.7000
34124:
34125: 0.0000
34126:
34127: 0.5000
34128:
34129: 0.0000
34130:
34131: 0.0000
34132:
34133: 0.0000
34134:
For Help, press F1
Polls: 169
Resps: 169

Figure F2-4

Appendix 3 Siemens 200 PLC Communication Example

The communication protocol of the V77 version of the B-series electromagnetic converter supports the standard MODBUS protocol and can communicate with PLCs that support MODBUS to read data. The following is an example of the communication setup method using Siemens' 200 series PLC: (The software is micro win V4.0)

Step 1: Find the library that supports MODBUS communication in the PLC. As shown in Figure F3-1:

If the library in Figure 1 cannot be found on the system, please download and install it from the Siemens website.

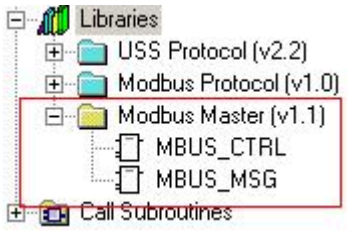


Figure F3-1 MODBUS Application Library

Step 2: Use MBUS_ CTRL initializes the MODBUS function of the PLC. As shown in Figure F3-2:

Baud: 9600 represents the default baud rate of the flowmeter as 9600.

Parity: 0 represents the use of flow meters without calibration.

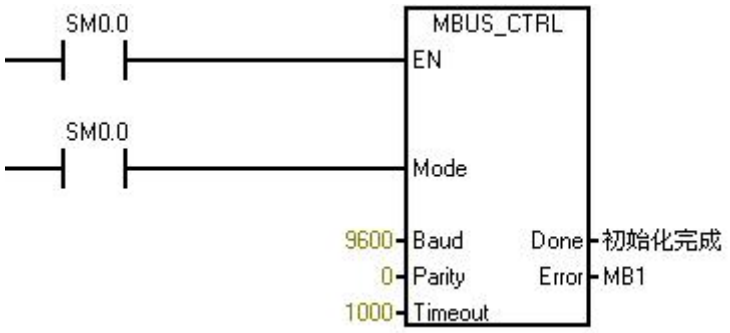


Figure F3-2 Initializing MODBUS

Step 3: Use MBUS_ MSG reads data from the flow meter. As shown in Figure F3-3:

Slave: 1 represents the communication address of the flowmeter as 1.

Addr: 34113 represents the communication starting address for reading instantaneous traffic. The detailed description of the address can be found in Table F3-1。

Count: 2 represents the length of 2 for reading instantaneous flow, as detailed in Table F3-1.

DataPtr:&VB1000 represents the internal address space of the PLC to which instantaneous traffic is transmitted.

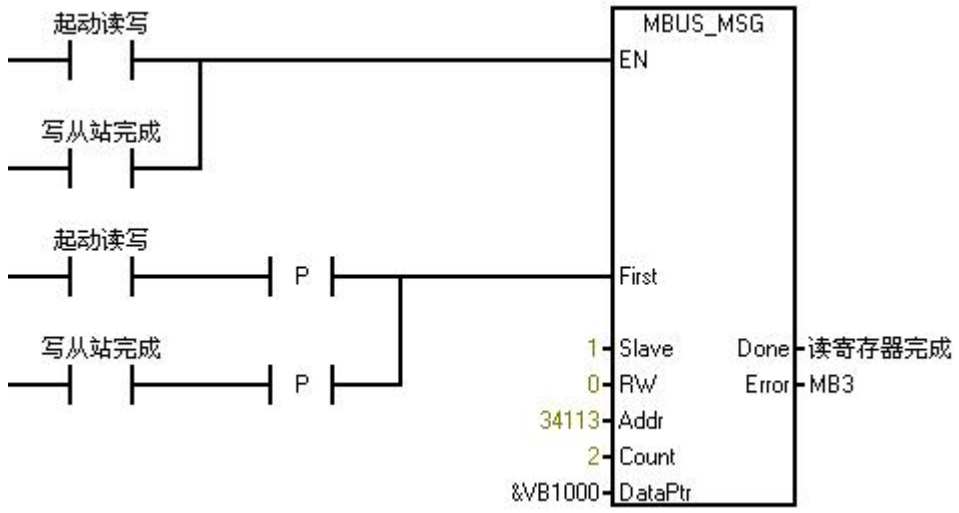


Figure F3-3 Reading Instantaneous Flow

Step 4: Check the data of the flow meter. As shown in Figure F3-4:

VD10000 corresponds to VB1000 in Figure F3-3, representing the internal address space of the PLC to which the instantaneous flow is transmitted.

Selecting Floating Point as the display format means floating point.

Please refer to Table F3-1 for other data settings.

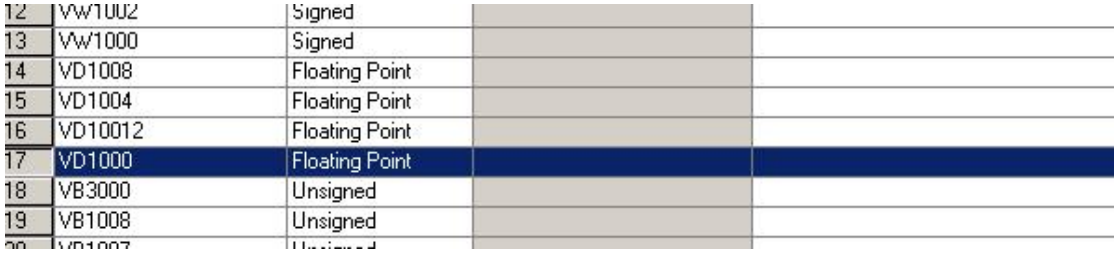


Figure F3-4 Viewing Data

Table F3-1 Siemens 200PLC Variable Correspondence Table

Addr	Count	data format	register definition
34113	2	Floating Point	Instantaneous flow floating-point representation
34115	2	Floating Point	Instantaneous flow rate floating-point representation

34117	2	Floating Point	Floating-point representation of flow percentage
34119	2	Floating Point	Floating point representation of fluid conductivity ratio
34121	2	Unsigned	Positive accumulation of integer parts of numerical values
34123	2	Floating Point	Fractional part of positive cumulative value
34125	2	Unsigned	Reverse accumulation of integer parts of numerical values
34127	2	Floating Point	Reverse accumulation of decimal parts of numerical values
34129	1	Unsigned	Instantaneous flow unit
34130	1	Unsigned	Accumulated total unit
34131	1	Unsigned	Upper limit alarm
34132	1	Unsigned	Lower limit alarm
34133	1	Unsigned	Air traffic control alarm
34134	1	Unsigned	System alarm

Appendix 4 Schneider PLC Communication Example

The communication protocol of the W803E series battery powered electromagnetic converter RS485 supports the standard MODBUS protocol and can communicate with PLCs that support MODBUS to read data. Below is an example of the communication setup method using Schneider's M218 series PLC.

1、 Communication environment:

hardware：

PLC: Schneider TM218LDA24DRN.

485:W803E converter 3.6V power supply 485 module.

Connection method:

PLC terminal: 485terminal:

D1----------485-A

D0---------- -------485-B

software environment: SoMachine V4.1.

2、 Setting Steps：

1.Set Port Parameters：

As shown in Figure F4-1, set the baud rate and verification method of the serial port according to the actual settings.

Figure F4-1

1. Add Master Station:

Add the "ModbusManager" device as shown in Figure F4-2.

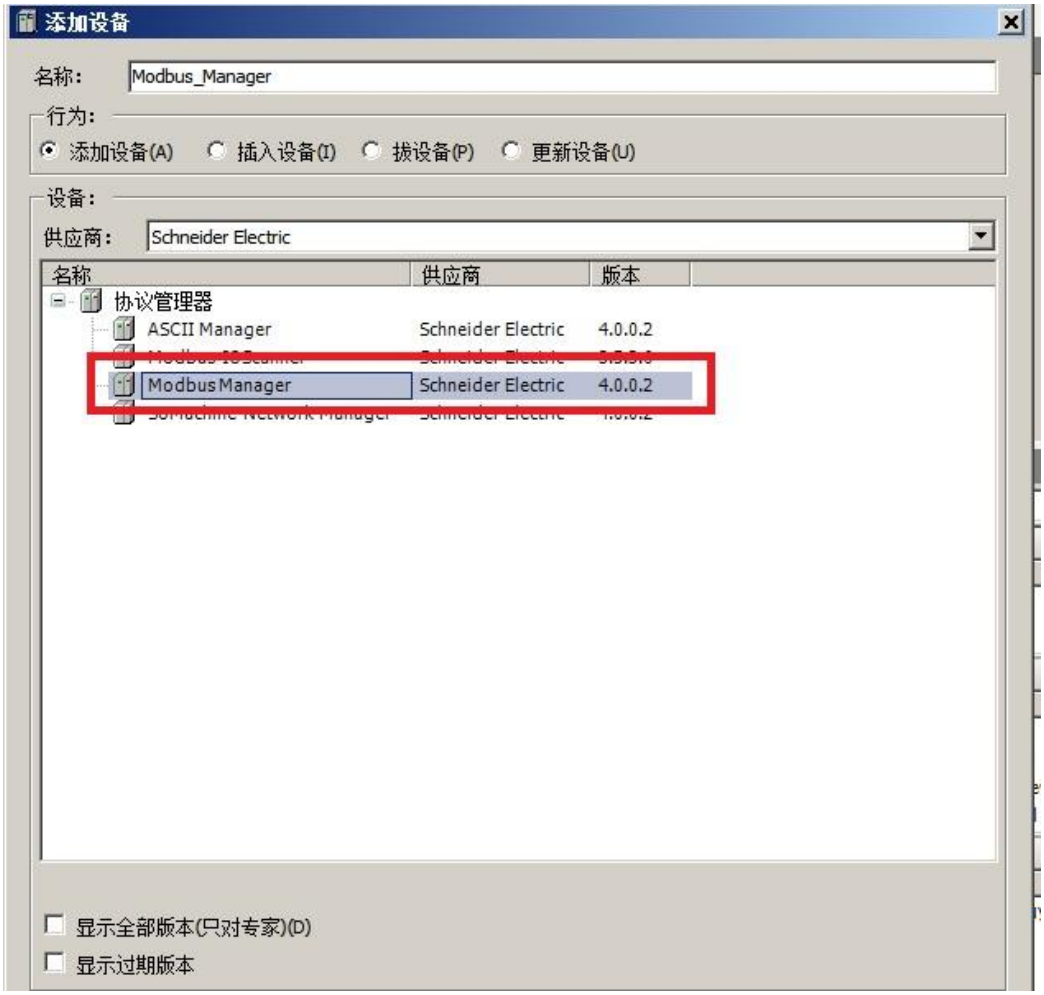


Figure F4-2

3.Set up the main station:

Set "ModbusManager" as shown in Figure F4-3.

Figure F4-3

4. Define variables:

Define variables as follows:

```
PROGRAM MyPOU
VAR
// TON Function Block for delaying the start of this program
TON_START : TON;
// Delayed Rising Edge signal for starting the program
v_xStartProgram : BOOL := FALSE;
(**********************)
(*** ADDM Variables ***)
(**********************)
// ADDM Function Block for formatting the address of the ATV12 Modbus Slave
```

```
ADDM_MODBUS_ATV12 : ADDM;
// ADDRESS structure for the address of the ATV12 Modbus Slave
v_addressModbusAtv12 : ADDRESS;
// "Done" result of the Address conversion
v_xAddressDone : BOOL := FALSE;
// "Error" result of the Address conversion
v_xAddressError : BOOL := FALSE;
// Result of the Address conversion: OK if "Done" without any
"Error"
v_xAddressIsOK : BOOL := FALSE;
(*****************************)
(*** ETA Register Variables ***)
(*****************************)
// BLINK Function Block for periodic reading of the ETA register
BLINK_ETA : BLINK;
// "OUT" output of the BLINK Function Block: Clock
v_xClockReadETARegister : BOOL := FALSE;
// Command to read the ETA register
v_xReadETARegister : BOOL := FALSE;
// READ_VAR Function Block for reading the ETA register of the
ATV12 Modbus device
READ_VAR_ETA : READ_VAR;
```

```
// Buffer for the value of the ETA register
v_wRegisterETA : ARRAY[0..49] OF WORD;
// "Done" result of the ETA register read operation
v_xReadETADone : BOOL := FALSE;
// "Busy" output of the ETA register read operation
v_xReadETABusy : BOOL := FALSE;
// "Error" result of the ETA register read operation
v_xReadETAError : BOOL := FALSE;
// "CommError" result of the ETA register read operation
v_bReadETACommError : BYTE :=
CommunicationErrorCodes.CommunicationOK;
// Result of the ETA register read operation: SUCCESS
v_xReadETASuccess : BOOL := FALSE;
// Result of the ETA register read operation: FAILURE
v_xReadETAFailure : BOOL := FALSE;
// Presence (TRUE) or absence (FALSE) of the ATV12 Modbus
device
v_xPresenceAtv12 : BOOL := FALSE;
// Communication error with the ATV12 Modbus device (Timeout
excluded)
v_xCommErrorAtv12 : BOOL := FALSE;
DWORD_TOTAL_D    : WORD_AS_DWORD;
```

DWORD_TOTAL_F : WORD_AS_DWORD;

DWORD_FLOW : WORD_AS_DWORD;

v_dwTotal_d : DWORD:= 0;

v_dwTotal_f : DWORD:= 0;

v_rTotal_f : REAL := 0;

v_dwFlow : DWORD:= 0;

v_rFlow : REAL := 0;

END_VAR

5.Program (LD):

①Initialize and define the port and address, as shown in Figure F4-4:

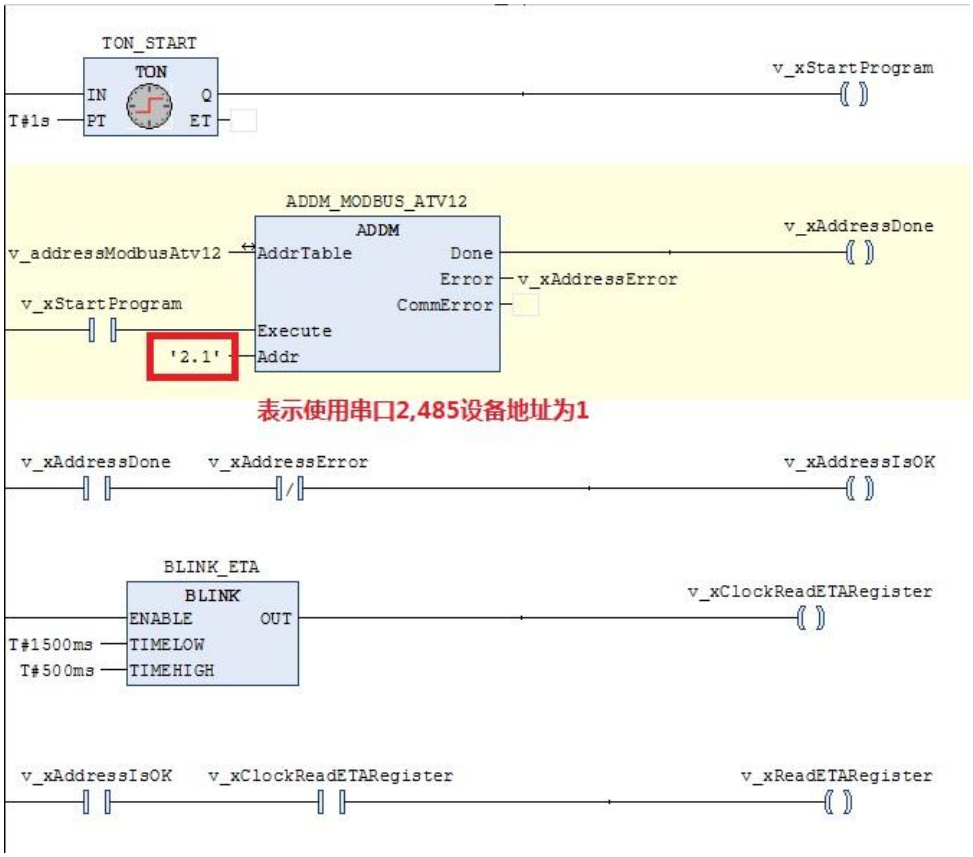


Figure F4-4

②Read 485 device data into memory, as shown in Figure F4-5,read 50 registers:

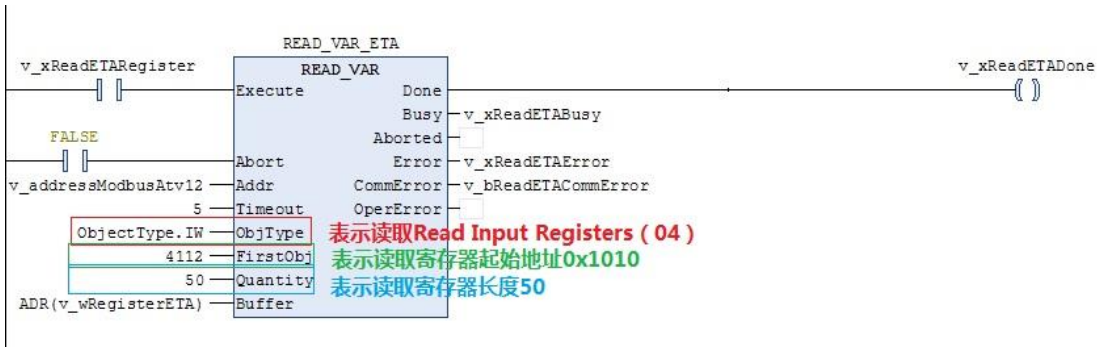


Figure F4-5

③Convert the read data into cumulative traffic, as shown in Figure F4-6,v_ dwTotal_ D is the integer part of the positive cumulative value:

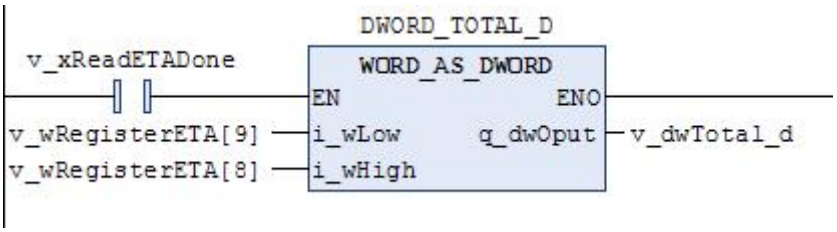


Figure F4-6

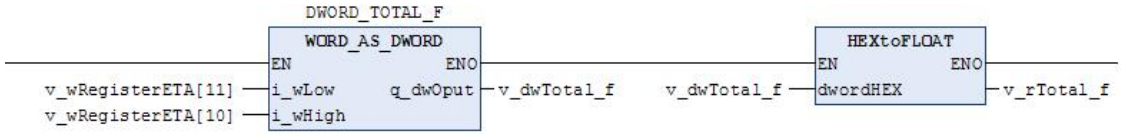


Figure F4-7

Explanation: M218 is a single precision floating-point format, so the integer and decimal parts were not added, otherwise it may cause errors.

④Convert the read data into instantaneous flow rate, as shown in Figure F4-8, v_ RFlow is the instantaneous flow rate：

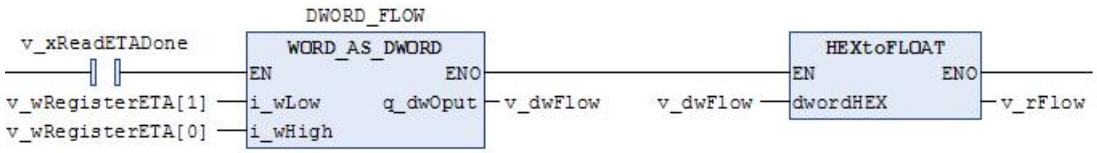


Figure F4-8

⑤After collecting data, the display is shown in the following figure：

The HEXtoFLOAT library used in the example can be downloaded from the following link:

https://pan.baidu.com/s/129ONEDDeN8SlYJUV8jpq3g

Extract code: nai0.

MyController.Application.MyPOU

表达式	类型	值	准备值	地址	注释
v_dwTotal_d	DWORD	815			
v_dwTotal_f	DWORD	1040791372			
v_rTotal_f	REAL	0.134			
v_dwFlow	DWORD	1124756357			
v_rFlow	REAL	138.42