



- Note: This device supports the standard Modbus RTU protocol

Protocol Selection:

Blue Aluminum Housing / Wall-Mounted Version: Settings Menu 5 → Engineering Menu → Communication Protocol → Select “1”.

White/Blue Housing / Module Version: Menu M63 → Communication Protocol Setting → Set to “1”.

- Communication Baud Rate: 9600, N, 8, 1
- Instrument Address: 1
- Data Byte Order: 3412
- Data Read Function Code: 03

The communication parameters are pre-configured at the factory. If a communication error occurs, please check the above settings.

Flowmeter Protocol Example

Register Name	Address (Decimal DEC)	Register Length	Send	Returned (Example Values)	Data Byte Order	Data	Data Type	Data
Instantaneous Flow Rate m³/h	0	2	01 03 00 00 00 02 C4 0B	01 03 04 85 1F 41 33 92 BC	3-4 1-2	41 33 85 1F	Float	11. 22
Instantaneous Heat GJ/h	2	2	01 03 00 02 00 02 65 CB	01 03 04 20 C5 3E F0 F1 EA	3-4 1-2	3E F0 20 C5	Float	0. 469
Fluid Velocity m/s	4	2	01 03 00 04 00 02 85 CA	01 03 04 CC CD 40 4C 64 A9	3-4 1-2	40 4C CC CD	Float	3. 20
Sound Velocity in Fluid m/s	6	2	01 03 00 06 00 02 24 0A	01 03 04 40 00 44 B9 1D 41	3-4 1-2	44 B9 40 00	Float	1482
Positive Totalizer Flow	8	2	01 03 00 08 00 02 45 C9	01 03 04 00 64 00 00 BB EC	3-4 1-2	00 00 00 64	Integer	100
Positive Totalizer Flow (Fractional)	10	2	01 03 00 0A 00 02 E4 09	01 03 04 56 04 3F 0E 3A 4E	3-4 1-2	3F 0E 56 04	Float	0. 556
Negative Totalizer Flow	12	2	01 03 00 0C 00 02 04 08	01 03 04 00 14 00 00 BA 37	3-4 1-2	00 00 00 14	Integer	20
Negative Totalizer Flow (Fractional)	14	2	01 03 00 0E 00 02 A5 C8	01 03 04 EF 9E 3E A7 FE D3	3-4 1-2	3E A7 EF 9E	Float	0. 32
Positive Totalizer Heat	16	2	01 03 00 10 00 02 C5 CE	01 03 04 00 64 00 00 BB EC	3-4 1-2	00 00 00 64	Integer	100
Cumulative Calories (Decimal Part)	18	2	01 03 00 12 00 02 64 0E	01 03 04 56 04 3F 0E 3A 4E	3-4 1-2	3F 0E 56 04	Float	0. 556
Negative Cumulative Heat	20	2	01 03 00 14 00 02 84 0F	01 03 04 00 14 00 00 BA 37	3-4 1-2	00 00 00 14	Integer	20
Negative Totalizer Heat (Fractional)	22	2	01 03 00 16 00 02 25 CF	01 03 04 EF 9E 3E A7 FE D3	3-4 1-2	3E A7 EF 9E	Float	0. 32
Net Totalizer Flow	24	2	01 03 00 18 00 02 44 0C	01 03 04 00 50 00 00 FA 22	3-4 1-2	00 00 00 50	Integer	80
Net Totalizer Flow (Fractional)	26	2	01 03 00 1A 00 02 E5 CC	01 03 04 A9 FC 3E 71 CB DB	3-4 1-2	3E 71 A9 FC	Float	0. 236
Net Totalizer Heat	28	2	01 03 00 1C 00 02 05 CD	01 03 04 00 50 00 00 FA 22	3-4 1-2	00 00 00 50	Integer	80
Net Totalizer Heat (Fractional)	30	2	01 03 00 1E 00 02 A4 0D	01 03 04 A9 FC 3E 71 CB DB	3-4 1-2	3E 71 A9 FC	Float	0. 236
Temperature T1 / Supply Temp	32	2	01 03 00 20 00 02 C5 C1	01 03 04 99 9A 42 14 C4 2F	3-4 1-2	42 14 99 9A	Float	37. 15
Temperature T2 / Return Temp	34	2	01 03 00 22 00 02 64 01	01 03 04 D7 0A 41 D9 12 4F	3-4 1-2	41 D9 D7 0A	Float	27. 23
A11	36	2	01 03 00 24 00 02 84 00	01 03 04 28 25 3F 4E 73 9C	3-4 1-2	3F 4E 28 25	Float	0. 805
A12	38	2	01 03 00 26 00 02 25 C0	01 03 04 D9 80 3F 4D 11 42	3-4 1-2	3F 4D D9 80	Float	0. 804

One-Command Read Example

Request: 01 03 00 00 00 28 45 D4

Response:

Response: Device Address	1		
Function Code	03		
Data Length	50		
Instantaneous flow rate,	85 1F 41 33	11.220	Float
instantaneous heat,	20 C5 3E F0	0.469	Float
fluid velocity,	CC CD 40 4C	3.200	Float
fluid sound velocity	40 00 44 B9	1482.000	Float
Positive Total Flow	00 64 00 00	100	Unsigned Integer
Fractional Part of Positive Total	56 04 3F 0E	0.556	Float
Flow	00 14 00 00	20	Unsigned Integer
Fractional Part of Negative Total	EF 9E 3E A7	0.328	Unsigned Integer
Heat	00 64 00 00	100	Unsigned Integer
Fractional Part of Positive Total	56 04 3F 0E	0.556	Unsigned Integer
Flow	00 14 00 00	20	Unsigned Integer
Fractional Part of Negative Total	EF 9E 3E A7	0.328	Float
Flow	00 50 00 00	80	Float
Fractional Part of Net Total Flow	A9 FC 3E 71	0.236	Float
Fractional Part of Net Total Flow	00 50 00 00	80	Float
Temperature	A9 FC 3E 71	0.236	
T1 / Supply Water Temperature	99 9A 42 14	37.150	
Temperature T2 / Return Water	D7 0A 41 D9	27.230	
Temperature	28 25 3F 4E	0.805	
A12	D9 80 3F 4D	0.804	
Checksum	D4 30		

Siemens S7-200 SMART PLC Communication Example

The ultrasonic flowmeter/heat meter is equipped with an RS485 interface and supports the standard MODBUS protocol. It can communicate with PLCs that support MODBUS to read measurement data.

The following example uses the Siemens S7-200 SMART series PLC to explain how to configure MODBUS communication.

(Software: STEP 7-Micro/WIN SMART)

Step 1: Find the library that supports MODBUS communication in the PLC software, as shown in Figure 1.

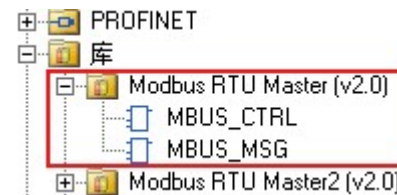


Figure 1: MODBUS communication library

Step 2: Initialize the PLC's MODBUS Function Using MBUS_CTRL

Baud: 9600 — Indicates that the default baud rate of the flowmeter is 9600 bps.

Parity: 0 — Indicates that the flowmeter uses no parity.

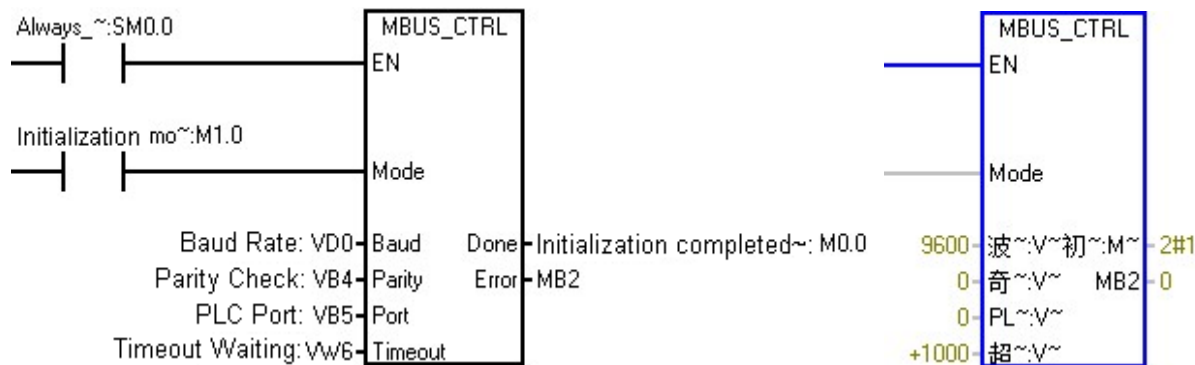


Figure 2: Initialize MODBUS

Step 3: Read Flowmeter Data Using MBUS MSG

Slave: 1 — Indicates that the flowmeter's communication address is 1.

Addr: 40001 — Indicates that the starting address for reading the instantaneous flow rate is 40001. For detailed address information, please refer to Table 1.

Count: 2 — Indicates that the data length for reading the instantaneous flow rate is 2 registers. For detailed information, please refer to Table 1.

DataPtr:&VB100 represents the internal address space in the PLC to which the instantaneous flow rate is transferred.

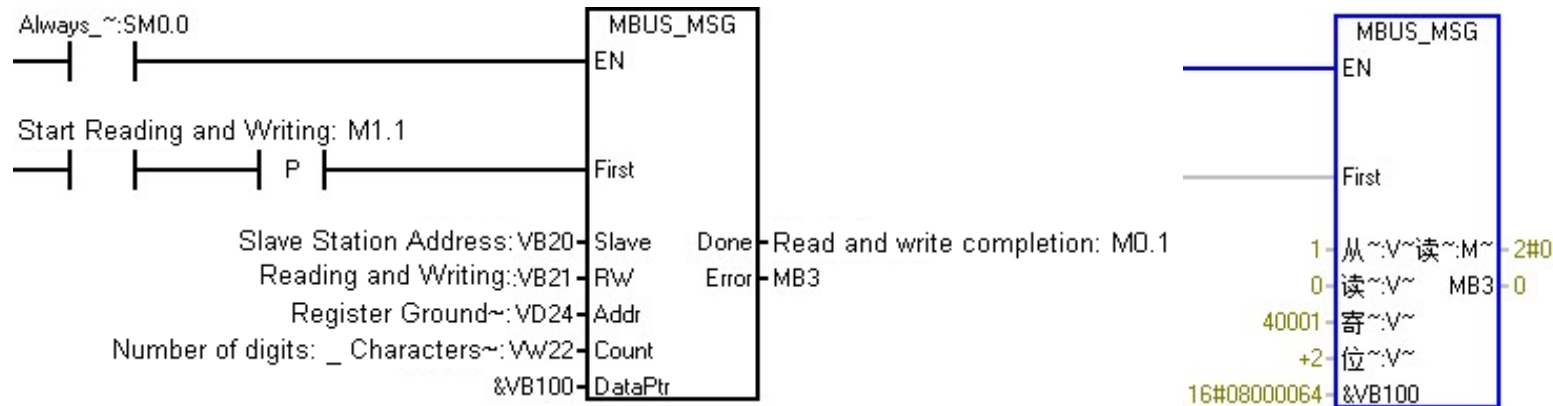


Figure 3: Reading instantaneous flow rate

Step 4: View the Flowmeter Data

VD100 corresponds to VB100 in Figure 3 and indicates the internal PLC memory address where the instantaneous flow rate data is stored.

The default byte order for the read data is 1234. For data with a byte order of 3412, the high and low bytes need to be swapped.

As shown in the figure, swap the high and low bytes of VD100 and transfer the converted data to VD200.

Select Floating-Point as the display format.

For the configuration of other data items, please refer to Table 1.

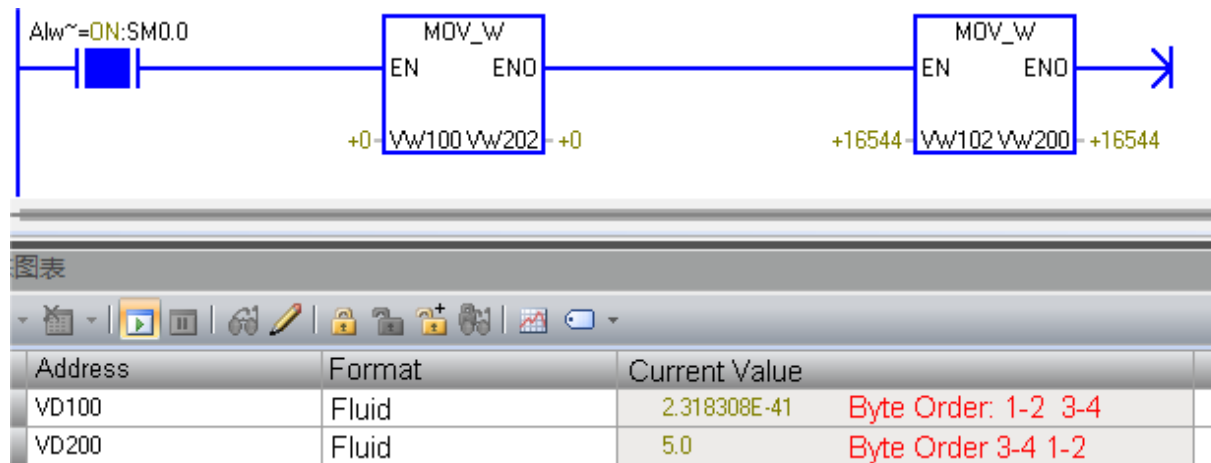


Figure 4: View the data

Table 1: Siemens S7-200 SMART PLC Register Address Mapping Table

Addr	Count	Byte Order	Data Type	Register Definition	Description
40001	2	3-4 1-2	Float	Instantaneous Heat Flow	Unit: m /h
40003	2	3-4 1-2	Float	Fluid Velocity	Unit: GJ/h
40005	2	3-4 1-2	Float	Fluid Velocity	Unit: m/s
40007	2	3-4 1-2	Float	Positive Total Flow	Unit: m/s
40009	2	3-4 1-2	Integer	Fractional Part of Positive Total Flow	
40011	2	3-4 1-2	Float	Negative Total Flow	
40013	2	3-4 1-2	Integer	Fractional Part of Negative Total Flow	
40015	2	3-4 1-2	Float	Fractional Part of Negative Total Flow	
40017	2	3-4 1-2	Integer	Positive Total Heat	
40019	2	3-4 1-2	Float	Fractional Part of Positive Total Heat	
40021	2	3-4 1-2	Integer	Negative Total Heat	
40023	2	3-4 1-2	Float	Fractional Part of Negative Total Heat	
40025	2	3-4 1-2	Integer	Net Total Flow	
40027	2	3-4 1-2	Float	Fractional Part of Net Total Flow	
40029	2	3-4 1-2	Integer	Net Total Heat	
40031	2	3-4 1-2	Float	Fractional Part of Net Total Heat	
40033	2	3-4 1-2	Float	Temperature T1 / Supply Water Temperature	Unit: ° C
40035	2	3-4 1-2	Float	Temperature T2 / Return Water Temperature	Unit: ° C
40037	2	3-4 1-2	Float	AI1	
40039	2	3-4 1-2	Float	AI2	