

100 Series Submersible Level Sensor **RS485 Manual**



Corrosion-Free
Instrumentation Equipment

Read the user's manual carefully before starting to use the unit.
Producer reserves the right to implement changes without prior notice.



1. Hardware Interface

This protocol complies with the MODBUS communication protocol and adopts the subset RTU mode in the MODBUS protocol. Serial data format:

Serial port Settings (default): no check, 8-bit data, 1-bit stop bit.

Example : 9600,N,8,1

Meaning : 9600 BPS, no parity,8 data bits,1 stop bit.

Baud rate : (1200, 2400, 4800, 9600, 19200, 38600, 57600, 115200)bps, default setting 9600

CRC check : 0xA001.

All the data in the process of data communication are processed according to double-byte signed integer data. If the data is identified as a floating point number, the decimal point needs to be read to determine the size of the data, and the single precision floating point data is increased. RS485 half duplex working mode

2. Communication Protocol

1. Read Command Format (03 Function Code)

1.1 Example for Read Command Format

Address	Function Code	Start Address (H)	Start Address (L)	Count of High Byte (H)	Count of Low Byte (L)	CRC16 Low Byte (L)	CRC16 High Byte (H)
0x01	0x03	0x00	0x00	0x00	0x01	0x84	0x0A

2.1 Example for Read Command Return Format

Address	Function Code	Data Length	Return Data High Byte (H)	Return Data Low Byte (L)	CRC16 Low Byte (L)	CRC16 High Byte (H)
0x01	0x03	0x02	0x00	0x01	0x79	0x84

2. Write Command Format (06 Function Code)

2.1 Example for Write Command Format

Address	Function Code	Start Address (H)	Start Address (L)	Write Command High Byte (H)	Write Command Low Byte (L)	CRC16 Low Byte (L)	CRC16 High Byte (H)
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

2.2 Example for Write Command Return Format

Address	Function Code	Start Address (H)	Start Address (L)	Input Data High Byte (H)	Input Data Low Byte (L)	CRC16 Low Byte (L)	CRC16 High Byte (H)
0x01	0x06	0x00	0x00	0x00	0x02	0x08	0x0B

2.2 Error and Exception Command Reply Return Data Format

Address	Function Code	Exception Code	CRC16 Low Byte (L)	CRC16 High Byte (H)
0x01	0x08 + Function Code	0x01 : (Illegal FunctionCode) 0x02 : (Illegal Data Address) 0x03 : (Illegal Data)		

3. Register Definition Table

Register Name	Data Type	Register Offset Address		Register Type	Note
		(Dec)	(Hex)		
Slave Address	Unsigned Integers	0	0x0000	Read/Write	Value Range: (1~255)
Baud Rate	Unsigned Integers	1	0x0001	Read/Write	Value Range : (0~7) 0-1200 ; 1-2400 2-4800 ; 3-9600 4-19200 ; 5-38400 6-57600 ; 7-115200
Unit	Unsigned Integers	2	0x0002	Read/Write	Value Range : (0~8) 0-Mpa (°C) ; 1-Kpa 1-2-pa ; 3-Bar 4-mbar ; 5-kg/cm2 6-Psi ; 7-mh2o 8-mmh2o
Decimal	Unsigned Integers	3	0x0003	Read/Write	Value Range : (0~3) 0-#### ; 1-####.# 2-###.### ; 3-#.####
Measuring Output Value	Signed Integers	4	0x0004	Read/Write	Value range: (-1999~9999)
Zero of Range	Signed Integers	5	0x0005	Read/Write	
Full Range	Signed Integers	6	0x0006	Read/Write	
Floating-Point Output	Single Precision Floating Point	7	0x0007	Read/Write	Float Point Number with Single Precision
		8	0x0008		
Instrument Status	Unsigned Integers	9	0x0009	Read/Write	0 : Pressure 1 : Temperature

Register Name	Data Type	Register Offset Address		Register Type	Note
		(Dec)	(Hex)		
Check Bit	Unsigned Integers	10	0x000A	Read/Write Validation	Value Range: 0~2 0: No Check 1: Odd Check 2: Even Check
Data Size Side	Unsigned Integers	11	0x000B	Read/Write Validation	Value Range : (0~1) Note : Only for Measurement output values, other registers default to big endian mode 0: big endian mode (High Byte before) 1: Little endian mode (Low Byte in Before)
Zero Offset Value	Signed Integers	12	0x000C	Read/Write Validation	Value range: (-1999~9999)
Coefficient of Filter	Unsigned Integers	13	0x000D	Read/Write Validation	Value Range : (0~4)
Factors of Gain	Signed Integers	14	0x000E	Read/Write Validation	Value range: (-1999~9999)
User Features	Unsigned Integers	15	0x000F	Only Write	0000H: Save to the user data area 0055H: Pressure Reset (Zero to Zero) 00AAH: Factory Data Reset

4. Cautions

1. Communication related parameters, address, baud rate, check bit, will take effect immediately after modification, and switch quantity related parameters will take effect after sending save instructions.
2. When the Address is modified, the data will be replied with the address before modification, and the address will be automatically modified after the reply.
3. The save and restore factory command will return as is, indicating that the transmitter has accepted the command from the host.
4. When recovering the factory data, pay attention to the possibility that the parameters saved by the factory are inconsistent with those saved by the user, so the address, baud rate and calibration data may be inconsistent, so the transmitter must be searched again after recovering the factory parameters.
5. This protocol stipulates that the data are communicated with integer data, for example, the main variable data is 6.000MPa, three decimal numbers, and the data of the main variable is 6.000 mpa. The number read is 6000, and then you have to calculate the decimal place to get 6.000, for example, the decimal place is 3, which means $6000/10(3)$, which is 6000 divided by 10 to the third power, and you get 6.000.

5. Examples of Common Commands: (Example data are hexadecimal, Address is 1)

1) Read the main variable data:

A. Send instruction: 01 03 00 04 00 01 C5

B. Return data: 01 03 02 00 0A 38 43 (0x000A is the value read from the main variable)

2) Read the number of decimal places:

A. Send instruction: 01 03 00 03 00 01 74

B. Return data: 01 03 02 00 00 F8 45 (0x0003 refers to decimal places)

3) Read the transmitter address:

A. Send command: 01 03 00 00 00 01 84 0A

B. Return data: 01 03 02 0001 79 84 (0x0001 reads the transmitter address)

4) Read the transmitter baud rate:

A. Send command: 01 03 00 01 00 01 D5 CA

B. Return data: 01 03 02 0003 F8 45 (0x0003 is read transmitter baud rate, pass

According to the data description list, the baud rate is 9600.

5) Modify the transmitter address: (the original address of the transmitter is 0x01, modified to 0x02)

A. Send command: 01 06 00 00 00 02 08 0B

B. Return data: 01 06 00 00 0002 08 0B (0x0002 is the modified transmitter address)

6) Modify the baud rate of transmitter: (the original baud rate of transmitter is 9600, modified to 4800)

A. Send command: 01 06 00 01 00 02 59 CB

B. Return data: 01 06 00 01 0002 59 CB (0x0002 is to modify the transmitter baud rate, The baud rate is 4800.)

Note: After modifying the command, it is necessary to send the save to user area command, otherwise the modified data will be lost because it is not saved after the transmitter fails to power down.

The command to save to the user area is as follows: Save command code after the address is changed from 1 to 2

A. Send command: 02 06 00 0F 00 00 B9 FA

B. Return data: 02 06 00 0F 0000 B9 FA (0x0000 is the save function code, which means save to the user area)