

Level Sensor & Pressure Sensor RS485 MODUBUS RTU

1. Communication Instructions

Currently, the instructions available to customers primarily include reading the address, pressure unit, baud rate, and range information. The main parameters that can be modified are the address, baud rate, and zero offset.

The detailed instruction format is based on the company's communication protocol. Below is the communication protocol between the software and the transmitter, outlining the items required by users.

\*\*MODBUS Pressure Transmitter Communication Protocol\*\*

1.1 Overview:

This protocol adheres to MODBUS communication standards and employs a sub-centralized RTU mode within the MODBUS framework using RS485 half-duplex operation.

1.2 Serial Data Format:

Serial Port Settings: no parity check, 8 data bits, 1 stop bit.  
Example: 9600,N,8,1 Meaning: 9600 BPS with no parity check; 8 data bits; and 1 stop bit.  
The supported serial port baud rates for this transmitter are as follows:  
00 1200240 0480 0960 0192  
CRC Check Polynomial: 0xA001.  
All data during communication is processed in accordance with double-byte formatted data structures. If dealing with floating-point numbers during writing operations, it is essential to read decimal points to ascertain data size.

1.3. Communication Format:

1. Review the command structure (03 function code)

A. Structure of the transmitted read command:

Address	Function Code	Data Start(H)	Data Start(L)	Number of data(H)	Number of data(L)	CRC-16(L)	CRC-16(H)
0X01	0X03	0X00	0X00	0X00	0X01	0X84	0X0A

B. Return read data format: example

Address	Function Code	Data Length	Date(H)	Date(L)	CRC-16(L)	CRC-16(H)
0X01	0X03	0X02	0X00	0X01	0X79	0X84

2. Write command format (06 function code)

Address	Function Code	Data Start(H)	Data Start(L)	Number of data(H)	Number of data(L)	CRC-16(L)	CRC-16(H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

B. Return read data format: example

Address	Function Code	Data Start(H)	Data Start(L)	Data(H)	Data(L)	CRC-16(L)	CRC-16(H)
0X01	0X06	0X00	0X00	0X00	0X02	0X08	0X0B

3. The abnormal response is returned

Address	Function Code	Exception Code	CRC-16(L)	CRC-16(H)
0X01	0X08+Function Code	0x01(Illegal function) 0x02(Illegal data address) 0x03(Illegal data)		

4. Supported commands and meaning of commands and data:

The MODBUS-RTU command list is as follows:

Example:	01	03	0000	0001	840A (read address)
(Read data)	Address	Function code	Start address	Number	CRC
Example:	01	06	0000	0002	080B (write address,
(Write data)	Original Address	Function code	Start Address	address to be changed	CRC 1 changed to 2)

Function Code	Data start address	Number of data	Data byte	Data range	Meaning of instruction
0x03 Function code Reads data					
0X03	0X0000	1	2	1-255	Read the slave address 010300000001840A
0X03	0X0001	1	2	0-1200 1-2400 2-4800 3-9600 4-19200	Baud rate read 010300010001D5CA
0X03	0X0003	1	2	0-#### 1-###.# 2-##.## 3-#.###	The decimal points represent 0-3 decimal points 010300030001740A
0X03	0X0002	1	2	0-Mpa 1-Kpa 2-pa 3-Bar 4-Mbar 5-Kg/cm² 6-PSI 7-mh²O 8-mmh²O	Pressure unit 01030002000125CA
0X03	0X0004	1	2	-32768-32767	Measured output value 010300040001C5CB
0X03	0X0006	1	2	-32768-32767	Transmitter range zero 010300050001940B
0X03	0X0006	1	2	-32768-32767	Transmitter range full 010300060001640B
0X03	0X000C	1	2	-32768-32767	Zero offset value, factory is generally 0 0103000C00014409
0x06 Function code Write data					
0x06	0x0000		2	1-255	Rewrites slave IP address 010600000002080B
0x06	0x0001		2	0-1200 1-2400 2-4800 3-9600 4-19200	Modified baud rate 010600010000D80A 01060001000119CA 01060001000259CB 010600010003980B
0x06	0x000C		2	-32768-32767	Zero offset value Pressure output value = Calibration measurement + zero offset

Save and restore the factory

0x06	0x000F		2	0- Save to the user area	0106000F0000B9C9
0x06	0x0010		2	1- Returns factory parameters	01060010000149CF

1. \*\*Revised Instructions:\*\*

1. When the baud rate is modified, the transmitter will respond with the updated data reflecting the baud rate specified by the host. Following this response, the transmitter's baud rate will adjust to the new target value.
2. Upon modifying the address, data will be returned to its pre-modification state, and subsequently, the transmitter's address will automatically update after sending a reply.
3. Executing a save and reply factory command will return original values, indicating that the transmitter has successfully acknowledged commands from the host.
4. It is important to note that when restoring factory settings, parameters saved at factory defaults may differ from those stored by users; thus, discrepancies in address, baud rate, and calibration data may occur. Therefore, it is necessary to re-scan for transmitters after restoring factory parameters.
5. Users are permitted to modify only three specific pieces of information: address (noted twice), baud rate, and zero offset value.
6. General users are prohibited from altering calibration data within the transmitter; if calibration adjustments are required, please contact our company for specialized calibration software. Attempting to send commands for modifying calibration data without authorization may result in abnormal command codes being outputted by the transmitter. For any modifications related to calibration data, please utilize our designated calibration software.
7. If readout data includes floating-point numbers (e.g., 6.000), this protocol specifies communication through shaped data representation; therefore, what is read as "6000" should be processed according to decimal placement—if indicated as three decimal places (i.e., position of decimal point = 3), then compute as follows:  $\sqrt[3]{(6000 / 10^3)}$  which results in  $\sqrt[3]{(6.000)}$ .