



RS485_001 Protocol



1 Protocol introduction

The single output sensor adopts the standard Modbus-RTU protocol, the physical layer interface is RS485, adopts the master/slave method, and uses serial communication. The complete message frame is as follows :

start bit	Device address	function code	data	CRC check	terminator
Pause greater than 3.5 characters	8 bits	8 bits	n 8 bits	16 bit	Pause greater than 3.5 characters

2 Sensor default communication configuration

If the customer does not have any requirements for product communication, all the sensors shipped by our company use the default configuration in the following table

Protocol :	Modbus-RTU
Communication Interface :	RS485
Device address :	0x01
Serial port configuration :	baud rate : 9600
	data bits : 8
	Parity: none
	Stop bit : 1 bit

3 register description

register name	register address(Hex)	User action	store data type	describe
Device address	0x0000	03/06	unsigned double-byte integer	
baud rate	0x0001	03/06	unsigned double-byte integer	0x0000=1200 0x0001=2400 0x0002=4800 0x0003=9600 0x0004=19200 0x0005=38400 0x0006=57600 0x0007=115200
unit	0x0002	03/06	unsigned double-byte integer	0x0000=MPa 0x0001=kPa 0x0002=Pa 0x0003=bar 0x0004=mbar 0x0005=kg/cm2 0x0006=psi 0x0007=mH2O 0x0008=mmH2O 0x0009=°C 0x000A=cmH2O
decimal point offset	0x0003	03	unsigned double-byte integer	0x0000=*1 0x0001=*0.1 0x0002=*0.01 0x0003=*0.001
real-time measurements	0x0004	03	Double byte integer	
Linear correction	0x0005	03/06	Double byte integer	
Zero offset	0x0006	03/06	Double byte integer	

Density value	0x0007	03/06	unsigned double-byte integer	
parity	0x0008	03/06	unsigned double-byte integer	0x0000=None 0x0001=Odd 0x0002=Even
data saving	0x001F	06	unsigned double-byte integer	0x001F=save

4 Common technical issues

Question 1: How to get sensor output load

Send a request message to obtain the pressure unit, decimal point offset and real-time pressure value, as follows

Field Name	Slave Address	Function	Starting Address Hi	Starting Address Lo	Quantity of Registers Hi	Quantity of Registers Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	03	00	02	00	03	A4	0B

For example, the response message is as follows

Field Name	Slave Address	Function	Byte Count	Data1 Hi	Data1 Lo	Data2 Hi	Data2 Lo	Data3 Hi	Data3 Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	03	06	00	01	00	02	00	64	BC	9E

Data1 (unit) =0x0001=kPa

Data2 (decimal point offset) =0x0002=0.01

Data3 (real-time measurements) =0x0064=100

The sensor output is (100*0.01)kPa=1kPa

Question 2: How to modify the address/ baud rate

For example, change the default address 1 of the product to address 2 ,

Send a modified address message, as follows.

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	06	00	00	00	02	08	0B

Send the save message in the modified address state, as follows (the slave address of the saved message must be the modified device address).

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	02	06	00	1F	00	1F	F9	79

Question 3: How to try the zero offset function

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You need to fill in the hexadecimal value of 15 in the Write data data column, that is, 0x000F (below), and send the message through the data line..

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	06	00	06	00	0F	29	CF

Send save message after modification.

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	06	00	1F	00	1F	F9	C4

Question 4: How to Modify Density

For example: a product with a density of 1.00g/cm³ and a measurement range of (0~2) m

is modified to a density of 0.85g/cm³.

According to the formula of "P modified density * 10000", the obtained 8500 is converted into hexadecimal 0x2134 and written into the 0x0007 register.

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	06	00	07	21	34	21	8C

Send save message after modification.

Field Name	Slave Address	Function	Register Address Hi	Register Address Lo	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
RTU (hex)	01	06	00	1F	00	1F	F9	C4

Problem 5: The sensor response message is garbled or no response

Please follow the steps below to check:

1	Check whether the power supply of the product is normal
2	Check whether the RS485A and RS485B signal lines of the product are reversed
3	Check whether the serial communication line is normal
4	Check whether the serial communication parameter configuration is normal
5	Check whether the CRC of the send request message is correct
6	In the networking state, check whether the sensor device address is in conflict

If the problem still exists, please contact the sales technician to solve it in time.

5 Precautions

5.1 When modifying the baud rate/address, the sensor will reply the modified data at the

baud rate sent by the host. After the reply, the transmitter baud rate/address will become the modified target value.

5.2 In order to ensure the normal performance of the sensor, general users are not allowed to modify the calibration data of the sensor. If you need to re-calibrate the range, please contact the sales technician.

5.3 The real-time output is read as a double-byte integer. When the read value is 0xFFFF, it means "-1" instead of "65535".

5.4 After modifying the address and other parameters, the save command must be sent before the product can be saved after power failure..

5.5 When sending a message, when the slave address and content data change, the CRC will also change. Please use a professional CRC calculation tool to calculate the CRC..

6 Document revision history

revision	revision time	modify the content
1.0.0	2018 年 6 月 6 日	◇drafting this note
1.1.0	2021 年 6 月 6 日	◇Add common technical solutions ◇Add notes
1.1.0	2021 年 10 月 28 日	Unit register increase 0x000A=cmH2O