

天水华天传感器

Tianshui Huatian sensor Co., Ltd



RS485-HT-001 Protocol

1 Introduction

The Huatian single output sensor adopts the standard Modbus-RTU protocol. The physical layer interface is RS485, using the master/slave method, using serial communication.

The complete message frames are shown below:

Start bit	Device address	Function code	data	CRC Checksum	End Character
Greater than 3.5 character pause	8-bit	8-bit	N*8-bit	16-bit	Greater than 3.5 character pause

2 Sensor default communication configuration

If the customer has no requirements for product communication, all sensors delivered by the company use the default configuration in the table below:

Communication protocol :	Modbus-RTU
communication interface :	RS485
Device address :	0x01
Serial port configuration:	Baud rate: 9600
	Data bit: 8
	Parity: None
	Stop bit : 1 bit

3 Register description

Register name	Register address (Hex)	User operation	Storage data type	describe
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Device address	0x0000	03/06	Unsigned double byte shaping	
Baud rate	0x0001	03/06	Unsigned double byte shaping	0x0000=1200 0x0001=2400 0x0002=4800 0x0003=9600 0x0004=19200 0x0005=38400 0x0006=57600 0x0007=115200
unit	0x0002	03/06	Unsigned double byte shaping	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 shaping	0x0000=*1 0x0001=*0.1 0x0002=*0.01 0x0003=*0.001
Real time measuring value	0x0004	03	Double byte shaping	
Linear correction	0x0005	03/06	Double byte shaping	
Zero bias	0x0006	03/06	Double byte shaping	
Density value	0x0007	03/06	Unsigned double byte shaping	
Parity	0x0008	03/06	Unsigned double byte shaping	0x0000=None 0x0001=Odd 0x0002=Even
Data saving	0x001F	06	Unsigned double byte shaping	0x001F=保存

4 Common technical questions

Question 1: how to obtain the sensor output load

Send the 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 measuring value) = 0x0064 = 100

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 address modification 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 save 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	F7

Question 3: how to try the zero offset function

For example, a product with a measurement range of (0~10) m, retaining two decimal places, has an output of -0.15 in the no-load state and needs to be corrected to 0.00 for this parameter.

You need to fill in the Write data data field with the hexadecimal value of 15, i.e. 0x000F (below), and send this message out via 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 a 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 the density

For example, the 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 "P modified density * 10000", the 8500 is converted into hexadecimal 0x2134 and written into 0x0007 register.

Field Name	Slave Address	Function	Register	Register	Write Data Hi	Write Data Lo	Error Check Lo	Error Check Hi
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			Address Hi	Address Lo				
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

Question 5: the sensor response message is garbled or unresponsive

Please check in sequence as follows:

1	Check if the power supply of the product is normal
2	Check if the RS485A and RS485B signal lines of the product are connected reversely
3	Check if the serial communication line is normal
4	Check if the serial communication parameter configuration is normal
5	Check if the CRC of the sending request message is correct
6	Check if there is any conflict in the address of the sensor device in the network state

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

5 Cautions

5.1 When modifying the baud rate/address the sensor will reply with the baud rate sent by the host and the transmitter baud rate/address will change to the modified target value after the reply.

5.2 To ensure the normal performance of the sensor, the user is 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, a value of 0xFFFF means "-1"

instead of "65535".

5.4 After modifying the address and other parameters, a save command must be sent in order for the product to be saved at power down.

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