



● Wiring definition

Color	Red	Black	Green	White
Description	VCC	GND	485A	485B

Note: Please carefully check the color and wiring definition before wiring, if the wrong wiring may cause damage to the sensor.

**6. Communication**

● Introduction to the protocol

- (1) The command supports reading temperature, conductivity, salinity, TDS, resistance command, and supports calibration of various standard solutions.
- (2) Standard solution type: 84μS/cm, 1413μS/cm, 12.88mS/cm, 25ppt, custom salinity, conductivity standard solution calibration (sample real standard).
- (3) The command supports modifying the ID (1-255) and the command supports restoring the factory settings.
- (4) System fault code.
- (5) Communication interface RS485.
- (6) Port setting 9600,N,8,1 (default).
- (7) Device address 0x01 (default).
- (8) Protocol Specification Modbus RTU.
- (9) The instruction supports 0x03 read-in register.
- (10) 0x06 write register | 0x10 continuous write register.

● Information frame format

0x03 Read data [HEX]				
01	03	xxxx	xxxx	xxxx
Address	Function code	Data first address	Data length	Check code

0x06 Write data [HEX]				
01	06	xxxx	xxxx	xxxx
Address	Function code	Data address	Data input	Check code

0x10 Write data continuously [HEX]						
01	10	xxxx	xxxx	xxxx	xxxx	xxxx
Address	Function code	Data address	Number of registers	Number of bytes	Data input	Check code

Note: The check code is 16CRC, the low byte is first.

● Register data format

Address	Data name	Conversion factor	Range/Description	Condition
0x00	Temp.	0.1°C	Range: 0-600	R
0x01	Conductivity.mS	0.01mS	Range: 0-7000	R
0x02	Conductivity.uS	1uS	Range: 0-9999	R
0x03	TDS	1ppm	Range: 0-10000	R
0x04	Salinity	0.01ppt	Range: 0-4000	R
0x05	Resistivity.kΩ/cm	-	floating point number:ABCD	R
0x06				R
0x07	User command	See the command list for details		R/W
0x09	Error code 01	-	See note	R

Note: Each address data is a 16-bit signed integer with a length of 2 bytes, the actual result = register data \* conversion coefficient.

**7. Execute user commands**

Command register address: 0x07

Use 0x06 to write the command to perform the corresponding operation

● User instruction list

User calibration	Order	HEX	Note
Conductivity.84uS	30	0x1E	Use 84uS standard solution
Conductivity.1413uS	31	0x1F	Use 1413uS standard solution
Conductivity.1288uS	32	0x20	Use 12.88mS standard solution
Salinity.25ppt	33	0x21	Use 25ppt standard
Conductivity. Custom uS	34	0x22	Use custom uS standards
Conductivity. Custom mS	35	0x23	Use custom mS standards
custom salinity ppt	36	0x24	Using custom salinity ppt
Reset	210	0xD2	Restore factory defaults

Example: Calibrated salinity .25ppt

	Address	Function Code	Data Address	Write Data	Check Code
Remote send	01	06	00 07	00 21	F8 13
Successfully returned	01	06	00 07	00 21	F8 13

Address return code error code check code  
Error return: 01 86 02 C3 A1

User command error code returned

E.g:

Address return code error code check code

Error code	Explanation
0x02	The content of this address cannot write data, such as executing commands, It means that the current sensor state cannot perform this operation.
0x03	The current input data is invalid and exceeds the input range.

Error return: 01 86 02 C3 A1

● System Error Codes

Content format 4\*4bit, 0xFFFF

Register	ERR_04	ERR_03	ERR_02	ERR_01
0x09	None	None	EC_ERR	Temperature ERR

● System fault code description

Trouble Code Number [HEX]

0x00	0x01	0x02	0x03	0x04
No errors	Overrange lower limit	Overrange upper limit	Calibration failed	No temperature sensor

● Set parameter register

Address	Name	Range/Description
0x0B	RS485.ID	1-255
0x0E	Temperature drift	-50 ~ +50 [0.1°C]
0x0F	Temperature. Manual Compensation	0 ~ 600 [0.1°C]
0x12	Sensor factor	850 ~ 1150 [0.001]
0x13	Conductivity Custom.MS	100 ~ 7000 [0.01mS]
0x14	Conductivity Custom.US	1 ~ 9999 [1uS]
0x15	Salinity customization	100 ~ 4000 [0.01ppt]
0x16	Temperature compensation coefficient	150 ~250 [0.01%/°C]
0x17	Compensated reference temperature	0 ~ 600 [0.1°C]
0x18	Salinity Conversion Factor	100~1000[0.01]
0x19	TDS conversion factor	100 ~ 1000[0.01]

● Auxiliary instructions

- (1) Calibrate conductivity custom.MS, need to set address 0x13 value, default: 12.88mS
- (2) Calibrate conductivity custom.US, need to set address 0x14 value Default: 1413uS
- (3) To customize the calibration salinity, you need to set address 0x15. Default value: 25.00ppt