SZ-EC01 Integral EC Transmitter User Manual



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1. product description

This product is a device for measuring the conductivity value of solution, with automatic temperature compensation function, which can compensate the current temperature conductivity to the specified temperature. This product adopts an integrated design, the structure is lighter and simpler, and the use is more convenient. Waterproof grade IP68. It can be widely used in continuous monitoring of the conductivity value of aqueous solutions such as section water quality, aquaculture, sewage treatment, environmental protection, pharmaceuticals, food and tap water.

1.1 Features

- The maximum range of conductivity measurement is 1~20000 μ s/cm; the temperature measurement range is -20~60℃, and the resolution is 0.1℃.
- One-piece design, light and simple structure, easy to use。
- Waterproof grade IP68。
- With salinity and TDS conversion function
- RS485 communication interface: MODBUS RTU communication protocol can be easily connected to the computer for monitoring and communication。
- ModBus communication address can be set, baud rate can be modified。
- The equipment adopts wide voltage power supply, DC 7~30V can be used.

1.2 Equipment technical parameters

powered by	DC 7~30V
Power consumption	0.4W
Communication Interface	RS485; standard MODBUS-RTU protocol; communication baud rate: default 4800 (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200 can be set)
Conductivity measurement range	K=1: 1~2000 μ s/cm; Resolution: 0.1 μ s/cm K=10: 10~20000 μ s/cm; Resolution: 1 μ s/cm
Conductivity measurement error	±1%FS
Temperature measurement range	-20~60℃; Resolution: 0.1℃
Temperature measurement error	±0.5℃
Temperature Compensation Range	-20~60℃ (default compensation temperature is 25℃)
temperature	Default 0.02

compensation coefficient	
Salinity measurement range	0~11476ppm
TDS measurement range	0~13400ppm
Equipment working conditions	Ambient temperature: -20-60℃
waterproof level	IP68
Pressure resistance	0.6MPa
line length	Default 5m (other lengths can be customized)

Data measured by Laboratory

1.3 product model

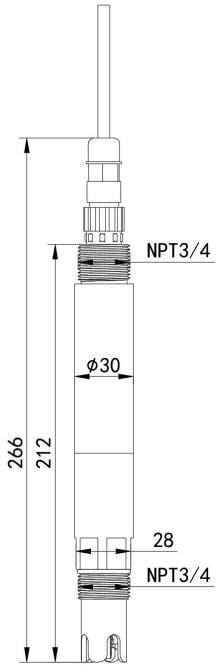
SZ-					Product code
	EC-				Industrial EC Transmitters
		01-			RS485（Modbus-RTU protocol）
			3-		One-piece housing
				01	Electrode constant k=1
				10	Electrode constant k=10

1.4 Product List

◆One integrated EC transmitter
◆5m (or custom length) cable
◆Certificate, Warranty Card, etc.

1.5 Equipment size and installation

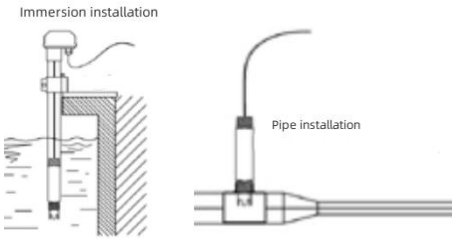
1.5.1Equipment size



1.5.2device installation

1. Submerged installation: The lead wire of the equipment is passed through the waterproof pipe, and the 3/4 thread on the top of the equipment is connected with the 3/4 thread of the waterproof pipe with raw material tape. Make sure that the top of the equipment and the equipment lines are free of water.

3. Pipe Installation: Connect to the pipe through the 3/4 thread of the device.



2. Equipment Instructions

2.1 Wiring Instructions

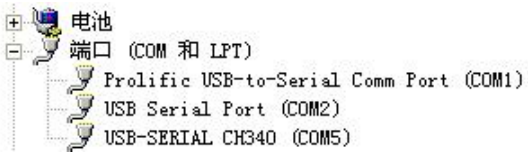
	illustrate	illustrate
power supply	brown	V+（7~30V DC）
	black	V-
communic ation	yellow	485-A
	blue	485-B

2.2 Parameter configuration description

Open the data package, select "Debugging Software"---"485 Parameter Configuration

Software", find “485 parameter configuration tool” just open。

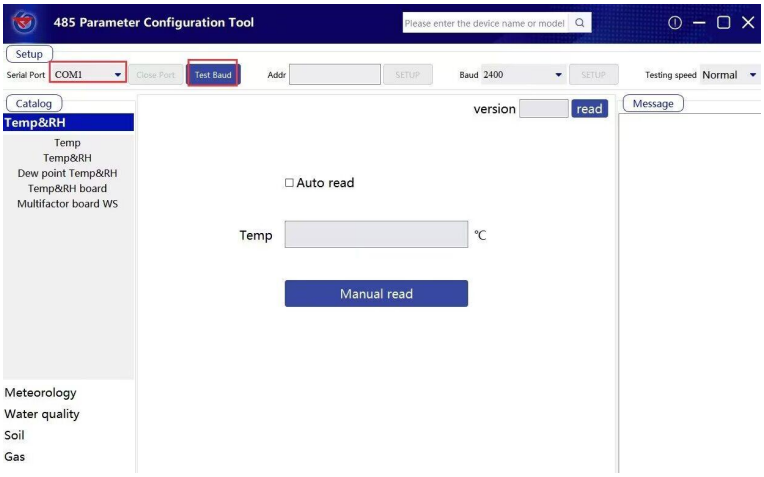
1)Select the correct COM port (check the COM port in "My Computer - Properties - Device Manager - Port"), the following figure lists the driver names of several different 485 converters.



2) Connect only one device and power it on, click the test baud rate of the software, the software will test the baud rate and address of the current device, the default baud rate is 4800bit/s, and the default address is 0x01.

3) Modify the address and baud rate according to the needs of use, and at the same time, you can query the current functional status of the device.

4) If the test is unsuccessful, please re-check the equipment wiring and 485 driver installation.



2.3Calibration instructions

Find the EC tab in the configuration tool。



Select the corresponding conductivity resolution according to the purchased equipment range. If you buy a device with a cell constant k=1 with a range of 1~2000 μ s/cm, select a resolution of 0.1;

if you buy a device with a cell constant k=10 with a range of 10~20000 μ s/cm, select a resolution of 1.0. The default resolution is 1.0.

After selecting the resolution, click Query to display the current conductivity and temperature, and check Auto to refresh in real time.

The temperature compensation coefficient can be modified according to the temperature coefficient of the measured solution, the default is 0.02.

When calibrating, put the electrode into the standard solution with known conductivity value, shake the electrode to speed up the response, and then let it stand. After the conductivity value is stable, write the conductivity of this solution into the conductivity solution calibration and click the calibration to complete. Calibration.



2.4 Mod Bus Communication and register details

2.4.1Device Communication Basic Parameters

coding	8 bit binary
data bits	8 bits
parity bit	none
stop bit	1 person
error checking	CRC (Redundant Cyclic Code)
baud rate	Factory default is 4800bit/s

2.4.2Data Frame Format Definition

Adopt Modbus-RTU communication protocol, the format is as follows:

Initial structure ≥4 bytes of time

Address code = 1 byte

Function code = 1 byte

Data area = N bytes

Error check = 16-bit CRC code

Time to end structure ≥ 4 bytes

Address code: It is the address of the transmitter, which is unique in the communication network (factory default 0x01).

Function code: the function instruction of the command sent by the host.

Data area: The data area is the specific communication data, pay attention to the high byte of the 16bits data first! CRC code: two-byte check code.

2.4.3register address

register address	PLC address	Support function code	illustrate
0x0000	40001	0x03/0x04	Conductivity value (16-bit unsigned integer, when the range is 1~2000, it is 10 times the actual value; when the range is 10~20000, it is the actual value)
0x0001	40002	0x03/0x04	Temperature (10 times the actual value)
0x0002	40003	0x03/0x04	salinity (16-bit signed integer, 16-bit unsigned integer, ppm)
0x0003	40004	0x03/0x04	TDS (16-bit unsigned integer, ppm)
0x0050	40081	0x03/0x04/ 0x06/0x10	Temperature deviation value (16-bit signed integer, 10 times the actual value)
0x0051	40082	0x03/0x04/ 0x06/0x10	Conductivity deviation value (16-bit unsigned integer, when the range is 1~2000, it is 10 times the actual value; when the range is 10~20000, it is the actual value)
0x0052,0x0053	40083,40084	0x03//0x10	Conductivity temperature compensation coefficient (floating point big endian)
0x0054,0x0055	40085,40086	0x03//0x10	Cell constant (floating point big endian)
0x0110,0x0111	40273,40274	0x10	Calibration (0110H register is written to 00 04, 0x0111 register is written to the calibrated standard solution value, when the range is 1~2000, it is 10 times the actual value; when the range is 10~20000, it is the actual value)
0x07D0	42001	0x03/0x04/ 0x06/0x10	1~254 (16-bit unsigned integer, factory default 1)
0x07D1	42002	0x03/0x04/ 0x06/0x10	0 for 2400 1 for 4800 2 for 9600 3 for 19200 4 for 38400 5 for 57600 6 for 115200 7 for 1200

2.4.4Communication protocol example and explanation

Example 1: Read the current conductivity value and temperature of the device whose address is 01send frame：

address code	function code	register address	register content	Check code low	Check code high
0x01	0x03	0x00 0x00	0x00 0x02	0xc4	0x0b

Response frame: (For example, a device with a range of 0~2000 μs/cm reads a conductivity value of 1000 μs/cm and a temperature of 26.5° C)

address code	function code	number of valid bytes	register content	Check code low	Check code high
0x01	0x03	0x04	0x27 0x10 0x01 0x09	0x30	0xd4

Conductivity calculation: 2710 (hex) = 10000 => Conductivity = 1000.0 μs/cm

Temperature calculation: 109H (hexadecimal)=265=>temperature=26.5℃

Example 2: Perform numerical correction on the deviation value of the current conductivity value setting of the device whose address is 01

Sending frame: (if the current range is 0~2000 μs/cm, the output conductivity value is 990, to correct the value to 1000, the difference is 1000-990=10, and the expansion is 10 times to 100=>64H (ten Hexadecimal), the register content is written 00 64)

address code	function code	register address	register content	Check code low	Check code high
0x01	0x06	0x00 0x50	0x00 0x64	0x88	0x30

Response frame: (according to the MODBUS standard, the response is a mirrored message of the delivered frame)

address code	function code	register address	register content	Check code low	Check code high
0x01	0x06	0x00 0x50	0x00 0x64	0x88	0x30

Example 3: Use the standard solution of 1413 μs/ms to calibrate the device with the address 01 ranging from 1 to 2000

Sending frame: write 00 04 to 0110H and 0111H respectively, and convert 1413*10 into hexadecimal to 37 32

address code	function code	register address	register length	length in bytes	register content	Check code low	Check code high
0x01	0x10	0x01 0x10	0x00 0x02	0x04	0x00 0x04 0x37 0x32	0x29	0x17

Response frame: (according to the MODBUS standard, the response is a mirrored message of the delivered frame)

address code	function code	register address	register length	Check code low	Check code high
0x01	0x10	0x01 0x20	0x00 0x02	0x41	0xfe

3. Precautions and maintenance

- The equipment itself generally does not require daily maintenance. When there is an obvious failure, please do not open it to repair it yourself, and contact us as soon as possible!
- Electrodes that are not used for a long time can generally be stored in a dry place, but must be placed (stored) in distilled water for several hours before use to activate the electrodes. Electrodes that are frequently used can be placed (stored) in distilled water.
- Cleaning of Conductivity Electrodes:

  The organic components on the electrode can be cleaned with warm water containing detergent, or with alcohol.

  Calcium and magnesium precipitates are best used with 10% citric acid.

  Electrode pads or poles should only be cleaned chemically or by shaking them in water. Wiping the electrode pads will destroy the coating (platinum black) plated on the electrode surface.
- The equipment should be calibrated before each use. It is recommended to calibrate every 3 months for long-term use. The calibration frequency should be adjusted according to different application conditions (the degree of dirt in the application, the deposition of chemical substances, etc.).