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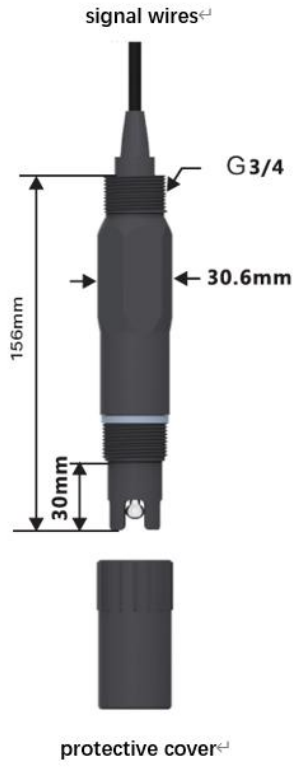
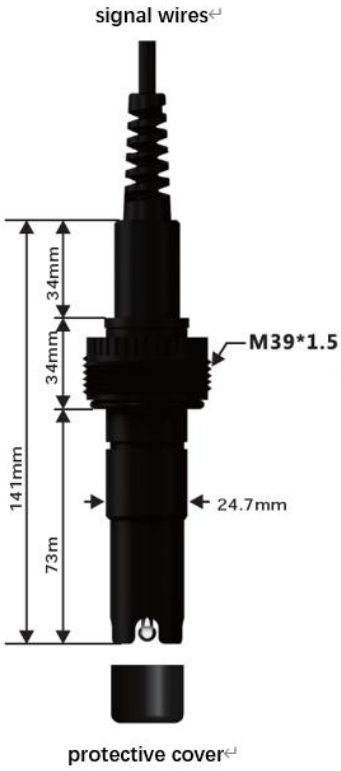
SE-ISEP10-G PH Sensor





1.Specification

- Measure range:0…14PH
- Temperature measurement range: 0.0…80.0℃,0.0…60.0℃
- Slope: ≥96%
- Zero potential: 7.00±25
- Housing material: PC, PBT anti-corrosion
- Liquid junction: Polytetrafluoroethylene
- Thread: M39*1.5, G3/4
- Signal cable length: 5m (customizable)
- Withstand pressure range: 0…4bar
- Membrane resistance: ＜500MΩ
- Housing protection Grade: IP68
- Output signal: RS485(Modbus RTU), 4~20mA

2.Pre-use instructions

2.1 The instructions apply to the PH series electrodes and should be read carefully before using.

2.2 The sensor sensitive membrane bulb is a fragile product, once damaged, it will not be repaired.

2.3 Before opening the package, please check whether there is any damage to the package. If the outer packaging has been damaged, please do not continue to open the packaging. Please immediately contact us directly, the representative of the transport side to the scene to jointly open the packaging to check whether the electrode is damaged, and it is recommended to take pictures for evidence.

2.4 If the outer package is intact but the electrode is damaged, please directly with us immediately and send the electrode back in its original packaging.

2.5 Do not store the electrode in vaporized or deionized water.

2.6 During the measurement process, if there is dirt, adhesion or scale at the sensitive membrane bubble of the electrode, it will lead to inaccuracy or fluctuation of the measurement value, it should be cleaned and calibrated in time.

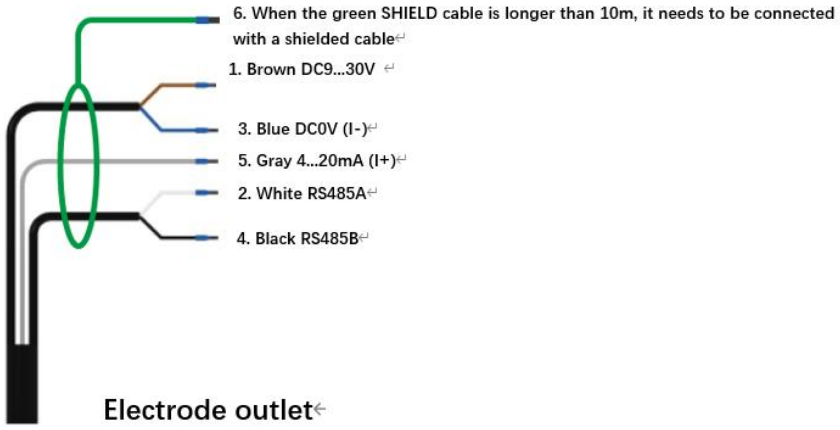
2.7 The contents of this manual are subject to change with the continuous improvement of the product, we will not give any notice in the manual, and we will not undertake the consequences thereof.

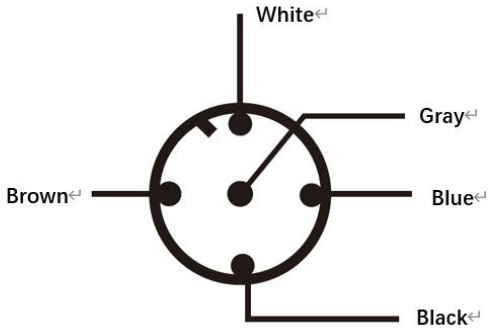
2.8 The content of the manual will be changed with the continuous improvement of the product, the company will not be notified in the manual and bear the consequences.

3. Wiring

3.1 Follow the instructions carefully for wiring, incorrect wiring will result in complete damage to the product.

3.2 It is strictly prohibited to supply power before all cables are connected to avoid danger. Before powering up the system, be sure to check all wiring carefully and make sure it is correct before powering up.





M12 connector

4. Activation of electrodes

4.1 The electrode should be activated in 3MKCL solution.

4.2 The electrode should be activated before use.

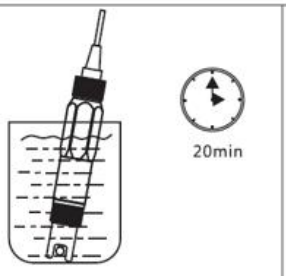
5. Electrode calibration

5.1 The electrode has been calibrated before shipment, and the user can use it directly.

5.2 calibration is recommended to use the two-point calibration method is usually used first pH6.86 or 700 buffer calibration, and then DH4.01 or 918 buffer to determine the slope.

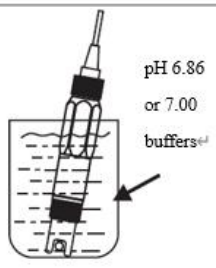
5.3 electrode should be calibrated in a fresh buffer, if the solution to be measured is acidic, the buffer pH should be less than that of the solution to be measured: if the solution to be measured is alkaline, the buffer pH should be greater than that of the solution to be measured.

5.4 It is recommended to calibrate the electrode once every 1 to 2 months.The calibration procedure is shown in the figure.

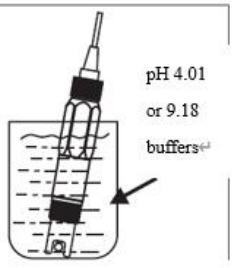


1.Soak the electrode in pH 4.0 rinse solution for 10 minutes, then in pH 6.86 buffer solution for 10 minutes.

2. Rinse the electrode with vaporized or deionized water, then blot dry with paper towel.



3. Calibrate the first point by placing the electrode in pH 6.86 or 7.00 buffer and waiting for the value to stabilize, then remove and rinse, and blot dry with a paper towel.



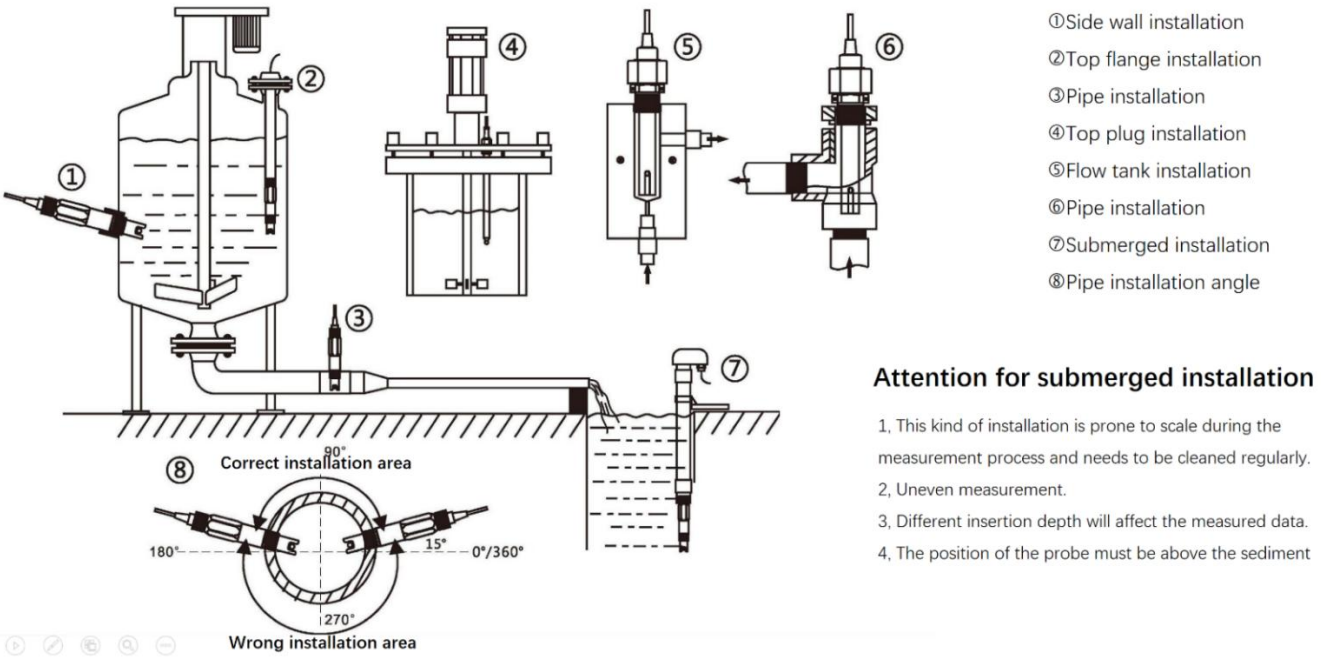
4. Place the electrode in a pH 4.01 or 9.18 buffer solution and calibrate the second point after the indicated value stabilizes. Take it out and rinse, and then dry it with a tissue to complete the calibration.

6 . Electrode Installation

6.1 Conductivity electrodes are generally recommended to be installed in a flow-through tank for more stable and accurate measurements.

6.2 For pipe installation, 15° - 165° is the correct installation area, the rest is the wrong area.

6.3 Installation method



7 . Electrode communication

7.0 Default Communication Instructions:

Note: 1 . Data starting with 0x is represented in hexadecimal.

2 . The checksum is 16CRC with the low byte first and the high byte second.

3 . Float (floating point number) occupies four bytes.

7.1 Factory Default Communication Parameters:

Factory Default Communication Parameters	
Baud rate for communication	9600(Default)
Number of data bits	8
Number of stop bits	1
parity calibration bit	None
Address	1 (Default)

7.2 The Upper computer sends format:

	Data type	Definition	Remark
Integer	16-bit integer	Indicates that the high and low bytes of a word element are not reversed.	Example:0x 0032 to decimal number is 50.
Floating number	CDAB (3412)	Indicates that the high and low bytes of a double-byte component are reversed, but the high and low bytes of the word are not reversed.	Example:72 37 41 DB transfers to floating point, CDAB changes order to ABCD . The 41 DB 72 37 to floating point is 27.4.

7 .3 Function Code Description

7.3.1 This product supports common function codes, such as 03 , 06 , 16 and so on.

7.3.2 The output register uses 16 function codes for double-word data write operations or batch writing of multiple data.

03	Read single or multiple registers
06	Write Single register
16	Write multiple registers

7 .4 Read floating point number

7.4.1 The Upper computer sends format

	Device ID Address	Function code	Register Starting Address		Number of registers		CRC16	
			High byte	Low byte	High byte	Low byte	high byte	Low byte
Example 1 Reading the measured value	0x 01	0x 03	0x 00	0x 01	0x 00	0x 02	0x 95	0x CB
Example 2 Reading the temperature value	0x 01	0x 03	0x 00	0x 03	0x 00	0x 02	0x 34	0x 0B

7.4.2 Response format of the lower computer

	Device ID Address	Function code	Number of Byte	Data Content				CRC1 6	
				C	D	A	B	Low byte	High byte
Example 1 Measured value return	0x 01	0x 03	0x 04	0x 2C	0x 81	0x 40	0x 91	0x 52	0x E7
Example 2 Temperature value return	0x 01	0x 03	0x 04	0x 72	0x 37	0x 41	0x D8	0x 20	0x BE

Note: 72 37 41 DB to floating point to floating point number, CDAB change order to ABCD, that is 41 DB 72 37 to floating point is 27.4.

7.5 Read an integer (math.)

7.5.1 The Upper computer sends format

	Device ID Address	Function code	Register Starting Address		Number of registers		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte

Example 1 Read Warning Status	0x 01	0x 03	0x 00	0x 7	0x 00	0x 01	0x 35	0x CB

7.5.2 Response format of the lower computer

	Device ID Address	Function code	Number of bytes	Function code	Read register data hexadecimal integers		CRC16	
					A	B	Low byte	High byte
Example 1 Warning Status return	0x 01	0x 03	0x 01	0x 10	0x 00	0x 00	0x B8	0x 44

7.6 Read floating point number

7.6.1 The Upper computer sends format

	Device ID Address	Function code	Register Starting Address		Number of registers		Number of Bytes	Write register data with hexadecimal floating-point number				CRC1 6	
			High byte	Low byte	High byte	Low byte		C	D	A	B	Low byte	High byte
Example 1 Write measured value offset	0x 01	0x 10	0x 00	0x 12	0x 00	0x 02	0x 04	0x 00	0x 00	0x 3F	0x 80	0x 63	0x 2A

7.6.2 Response format of the lower computer

	Device ID Address	Function code	Register Starting Address		Number of registers		CRC16	
			High byte	Low byte	High byte	Low byte	Low byte	High byte
Example 1 Measured value offset return	0x 01	0x 10	0x 00	0x 12	0x 00	0x 02	0x E1	0x CD

Note: Measured value offset 1.00, floating point number 1.00 to hexadecimal number 0X3F800000, high and low transposition 0X00003F80 write 0x0012.

7.7 Write an integer (math.)

7.7.1 Upper computer send format

	Device ID Address	Function code	Register Starting Address		Write register data hexadecimal integer		CRC16	
			High byte	Low byte	A	B	Low byte	High byte
Example 1 Write Device Address	0x 01	0x 06	0x 00	0x 19	0x 00	0x 02	0x D9	0x CC

7.7.2 Response format of the lower computer

	Device ID Address	Function code	Register Starting Address		Write register data hexadecimal integer		CRC16	
			High byte	Low byte	A	B	Low byte	High byte
Example 1 Device Address Return	0x 01	0x 06	0x 00	0x 19	0x 00	0x 02	0x D9	0x CC

Note: Change the local address 1 to address 2, and write the hexadecimal number 0x 0002 into the 0x 0019 memory.

7.8 Calibration instructions

7.8.1. Before calibration

Write the zero-correction value (i.e., the value of the first point) and the slope correction value (i.e. the value of the second point) to the sensor before calibration

If the zero-point correction value is 6.86pH, write data 0x01 to the 0x36 register,

Send command: 01 06 00 36 00 01 A8 04

If the slope correction value is 4.01PH, write data 0x01 to the 0x38 register,

Send command: 01 06 00 38 00 01 C9 C7

7.8.2 Starting calibration

Step 1

Clean and dry the electrode and put it into the zero-calibration liquid 6.86.

Send instruction 01 03 00 66 00 01 64 15

Read the measured AD value in register 0x66, and wait until the measured AD value stabilizes.

Write the instruction to confirm the calibration to register 0x3E：

Send command :01 06 00 3E 00FF A8 46

Step 2:

Clean and dry the electrode and place it in slope correction solution 4.01.

Send command: 01 03 00 66 00 01 64 15

Read the AD value measured in register 0x66. After the measured AD value stabilizes, write the confirmation correction command to register 0x3F:

Send command: 01 06 00 3F 00 FF F9 86

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7 .9 Description of the address

Tag Name	Deposit Boundary Number	Data Type	Length	Read/Write	Notes
Measurement value	0X 00 01	Float	2	R	Measurement storage location
Resistivity value	0X 00 03	Float	2	R	Storage location for measuring temperature
Temperature measurement value	0X 00 05	Float	2	R	Current output based on

					PH/ORP measurement values
Current output value	0X 00 07	Integer	1	R	00: Normal 01: Measurement exceeds the upper limit; 02: Measurement exceeds the lower limit 03: Temperature exceeds the upper limit; 04: Temperature exceeds the lower limit
Warning	0X 00 08	Integer	1	R/W	00: PH; 01: ORP
Measurement mode	0X 00 0A	Float	2	R/W	Upper limit of measurement value (corresponding to 20mA)
Upper limit of measurement	0X 00 0C	Float	2	R/W	Lower limit of measurement value (corresponding to 4mA)
Lower limit of measurement	0X 00 0E	Float	2	R/W	Upper limit of temperature value
Upper temperature limit	0X 00 10	Float	2	R/W	Lower limit of temperature value
Lower temperature limit	0X 00 12	Float	2	R/W	Corrected measurement value
Measurement value offset	0X 00 14	Float	2	R/W	Corrected temperature value
Temperature offset	0X 00 16	Integer	1	R/W	0-10
Damping coefficient	0X 00 19	Integer	1	R/W	1-255
Device Address	0X 00 1A	Integer	1	R/W	0=2400, 1=4800, 2=9600 3=19200, 4=38400
Baud rate	0X 00 1B	Integer	1	W	
Restore Factory	0X 00 30	Float	2	R/W	
ORP correction value correction slope	0X 00 34	Float	2	R	-0.1984
First point correction solution	0X 00 36	Integer	1	R/W	0=7.00, 1=6.86
Second point correction solution	0X 00 38	Integer	1	R/W	0=1.68, 1=4.01, 2=9.18, 3=10.1, 4=12.45
Manual temperature	0X 00 3A	Float	2	R/W	25℃
Zero-point correction	0X 00 3E	Integer	1	W	
Slope correction	0X 00 3F	Integer	1	W	
Measure AD	0X 00 66	Integer	1	R	

7.11 Examples of Common Instruction Sets

	Function	Send Command	Return Command	Remark
1	Read measured values	01 03 00 01 00 02 95 CB	01 03 04 2C 81 40 91 52 E7	2C814091 replaces the serial number 4092C81 to floating point number to 4.53

2	Reading temperature measurement values	01 03 00 03 00 02 34 0B	01 03 04 72 37 41 DB 20 BE	723741DB replaces the serial number 41DB7237 to floating point number 27.4
3	Read current output value	01 03 00 05 00 02 D4 05	01 03 04 00 00 41 40 CB 93	00004140 replaces the serial number 41400000 to floating point number 12.00
4	Read warning	01 03 00 07 00 01 35 CB	01 03 02 00 00 B8 44	0000 is the current state
5	Write measurement mode	01 06 00 08 00 01 C9 C8	01 06 00 08 00 01 C9 C8	Set to ORP mode
6	Write measurement upper limit	01 10 00 0A 00 02 04 00 00 41 20 42 58	01 10 00 0A 00 02 61 CA	Set the upper measurement limit to 10.00
7	Write measurement lower limit	01 10 00 0C 00 02 04 0000 3F 80 E3 AA	01 10 00 0C 00 02 81 CB	Set the lower measurement limit to 1.00
8	Write temperature upper limit	01 10 00 0E 00 02 04 0000 42 C8 43 15	01 10 00 0E 00 02 20 0B	Set the upper temperature limit to 100.00
9	Write temperature lower limit	01 10 00 10 00 02 04 00 00 40 A0 C3 1B	01 10 00 10 00 02 40 0D	Set the lower temperature limit to 5.00
10	Write measurement offset	01 10 00 12 00 02 04 00 00 3F 80 63 2A	01 10 00 12 00 02 E1 CD	Set to 1.00
11	Write temperature offset	01 10 00 14 00 02 04 00 00 3F 80 E3 00	01 10 00 14 00 02 01 CC	Set to 1.00
12	Write damping coefficient	01 06 00 16 00 01 A9 CE	01 06 00 16 00 01 A9 CE	Set to 1
13	Write device address	01 06 00 19 00 02 D9 CC	01 06 00 19 00 02 D9 CC	Set to 2
14	Write Baud Rate	010300200002C5C1	01 06 00 1A 00 00 A8 0D	Set to 2400
15	Write Recovery Factory	01 06 00 1A 00 00 A8 0D	01 06 00 1B OO FF B9 8D	Restore factory default values once sent
16	Write ORP correction value	01 10 00 30 00 02 04 00 00 42 AC C0 66	01 10 00 30 00 02 41 C7	Number: ORP standard solution value 86mV
17	Read correction slope	01 03 00 34 00 02 85 C5	01 03 04 CC CD 3E 4C 45 09	CCCD3E4C is transposed to 3E4CCCD with a floating-point conversion of 0.2
18	Write zero correction solution	01 06 00 36 00 01 A8 04	01 06 00 36 00 01 A8 04	Set to 6.86
19	Write slope correction solution	01 06 00 38 00 02 C9 C7	01 06 00 38 00 02 C9 C7	Set to 9.18
20	Write manual temperature	01 10 00 3A 00 02 04 00 00 41 A0 40 EC	01 10 00 3A 00 02 61C5	Set to 20.0
21	Write zero correction	01 06 00 3E OO FF A8 46	01 06 00 3E 0O FF A8 46	Confirm correction zero point
22	Write slope correction	01 06 00 3F 00 FF F9 86	01 06 00 3F 00 FF F9 86	Confirm correction slope
23	Read measurement AD	01 03 00 66 00 01 64 15	01 03 02 2E EO A4 6C	2EE0 to integer 12000

8. Maintenance and Storage

8.1 After rinsing the electrode, only use a soft tissue to absorb water and do not rub the sensitive film8.2 When storing the electrodes, the electrodes must be dried and stored dry.

8.2 When storing electrodes, a protective sleeve must be screwed on, which must contain soaking solution to ensure the wetness of the electrode bulb.

8.3 When you find white potassium chloride crystals on the electrode, this salt substance will not affect its use. Simply rinse the electrode with distilled water to remove the crystals and absorb them dry.

8.4 The cable joints must be kept clean and free from moisture or water ingress.

8.5 Electrodes should not be stored dry for a long time and should not be stored with dry media attached to the surface. Dry electrodes should be activated in a suitable storage solution before use.

9 . Trouble Shooting

9.1 When measuring on time during use, the failure rate of general instruments is low, mainly due to changes in the state of the pH electrode. Therefore, it is necessary to check whether the pH electrode is in good condition. And pH electrodes are also not easily damaged, usually due to bulb damage, scaling, reference poisoning, blockage, etc., which should be maintained or replaced in a timely manner

9.2 If the displayed value is too large, too small or no change, please check whether the electrode connection cable or

electrode measurement appearance is intact.

9.3 Modbus troubleshooting.

Issues	Possible Reasons	Solutions
Modbus unresponsive	Baud rate or stop bits do not match the Modbus master device settings.	Verify that the settings match the Modbus master device, and verify that the Modbus master device parity is set to None.
	RS232 or RS485 cable is failed.	Cable replacement/repair
	There is no network offset and termination, or the network offset and termination is not appropriate.	Check the termination or offset settings of all network devices. Only the endpoints of the network should have termination turned on, and only one point on the network should provide an offset.
	The slave address is incorrect or the slave address is the same as the address of another bus device.	Verify that all addresses are unique and between 1 and 247.
Modbus responses abnormally	Registers are not supported	Verify that the registers are supported.
	Incorrect data type	Verify that the requested register data type matches the Modbus master request. For example, it is not possible to use 2-byte integer data to access some floating point type data. When requesting a floating-point data (2 registers/4 bytes), both registers must be requested at the same time

10. Warranty and Maintenance

10.1 Our company has a one-year warranty period for instrument sensors from the time of customer purchase. If there is no damage caused by improper use during the warranty period, please prepay the shipping fee to properly package the instrument and return it for free repair. Our

company will analyze the cause of the actual instrument damage and charge repair fees if it exceeds the warranty conditions.

10.2 Any repair for any reason must be approved by our company's customer service department before returning. After applying for approval, please return the repair card along with the repaired item. The repaired item must be carefully packaged to avoid damage during transportation and insured. Our company will not be responsible for any damage caused by the damaged or poorly packaged items.