

JNC

EC Sensor



V2.00

Catalogue

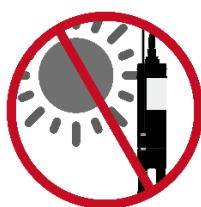
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! PRECAUTIONS

Dear customer, we are glad that you are using our products. In order to maintain the service life of the product and your good experience, please read the following content before operating!

Operational matters:

1. The sensor is only suitable for operation and monitoring in water environments. Do not place it in non-water areas to avoid abnormal damage to the sensor.
2. When the sensor is not in use, prepare a container and soak it in ordinary water. Do not expose it to sunlight to avoid damage to the electrodes or film, resulting in abnormal value readings.
3. The sensor is equipped with an anti-collision cover to prevent damage to the electrode probe due to slight collisions. If it is subject to severe impact, the anti-collision cover will lose its protection. Please be careful when operating!
4. Please operate according to the corresponding wire color of the wiring function marked on the sensor shell. If you accidentally connect it incorrectly, it will affect the normal operation of the device.
5. The sensor needs to be cleaned regularly to maintain good monitoring quality. It is recommended that once a month is the optimal maintenance cycle. If it is a thin film electrode (DO dissolved oxygen), the electrolyte needs to be replaced regularly to maintain numerical stability. The recommended cycle is once a month.
6. When cleaning, it is recommended to soak in citric acid for 5-10 minutes and then clean the area while avoiding scratching the electrode tip.
7. When installing the sensor, it is recommended that the distance from the bottom is about 1.5 meters to ensure the reference of the value.



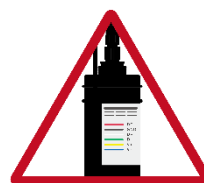
禁止曝曬



禁止非水域監測



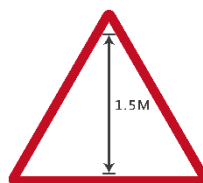
小心碰撞



注意線色標記



注意定期清潔



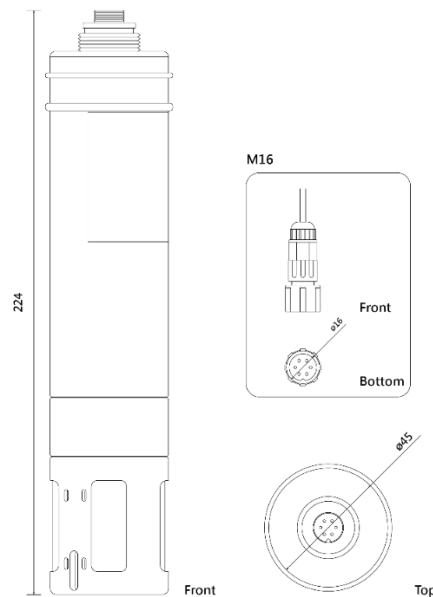
注意安裝高度

PART 1.PRODUCT DESCRIPTION

1-1 Product Specifications

Model	EC-485		
Power supply	Auto cleaning	DC 12 or 24V(Optional)	
	No auto cleaning	DC 9 ~ 36V	
Power consumption	Auto cleaning	4.8W	
	No auto cleaning	0.8W	
EC	Measuring range	L : 0~20mS / cm ; H : 0~200mS / cm	
		Slope reading 70~130%	
	Accuracy	±1% F. S	
	Resolution	0.01 ms · Repeatability ±1% of reading	
	Electrode withstand voltage	Max. 100 Psig	
	Operating temperature	0~70°C	
	Reaction time	T90 1 sec	
	Communication method	RS-485 Modbus RTU	
	Support function	WIFI Connect	
	Device IP	192.168.1.80	
TDS	Measuring range	L : 12800mg/L ; H : 128000mg/L	
	Accuracy	±1% F. S	
	Resolution	±0.1mg/L	
Temperature	Principle	NTC30K	
	Measuring range	-10~120°C(ATC)	
	Accuracy	±0.2°C	
	Resolution	0.1°C	
	Reproducibility	0.1°C	
Shell connection Thread	Link above	NPT3/4"	
	Link below	M42	
Quick Connector	M16 thread type, male and female pins, 6PIN (host side)		
	M16 thread, male pin, 4PIN (sensor)		
Material	Shell	PP, acid and alkali resistance/food grade/ zero dissolution	
	Electrode	Graphite	
Physical conditions	Product Size (mm)	ø45*L224mm	
	Weight	≤350g	
	Waterproof level	IP68	

1-2 Product Size (mm)



1-3 Product Description

- IoT EC analyzer has dual interfaces of RS-485 and Wi-Fi web pages, which can be directly monitored remotely or locally via mobile phone, without the need for a meter or APP.
- Auto cleaning function (optional): Includes micro air pump, cleaning schedule (adjustable), self-cleaning hold last reading value, and stabilization time (adjustable), which can easily extend the maintenance cycle.
- Smart calibration function: Modular configuration allows for easy calibration, and the mobile web-based calibration process makes on-site calibration extremely simple, and remote calibration is also possible.
- Smart AI function: notification of calibration/self-cleaning status, self-judgment, electrode dirtiness or aging, etc.

- IP68 integrated design can be directly put into rivers/reservoirs/tap water/sewage/seawater and other application environments, and can provide accurate and durable EC values to any meter or software in the world.

1-4 Product Features

- Integrated design with built-in IoT transmission and sensors.
- IP68 submersible type corrosion-resistant material, can be put directly into the water without a protective casing.
- It can be operated by powering on, and all functions are built-in.
- Ultra-low power consumption, suitable for green energy IoT deployment.
- High-strength isolated cables can be put into use directly to ensure signal stability.
- It has temperature compensation and the measurement method complies with the Environmental Protection Agency' s Automatic Monitoring Facilities Law NIEA W218.51C.
- The power supply and IoT signal have surge isolation protection.
- Equipped with dual digital communication RS-485 and Wi-Fi.
- Standard Modbus RTU protocol can connect to the global Internet of Things.
- Intelligent design can store calibration parameters, and can be installed

directly on site after calibration.

- Mobile web operation, instant time monitoring without laborious work.
- Modular setting to replace the standard liquid bottle, doing calibration very convenient.
- Calibration can be performed based on standard solution or sample with known concentration.
- During calibration and automatic cleaning, the last reading value is maintained to avoid malfunctions and the status (calibration/ automatic cleaning /stabilizing/maintenance) is readable at the same time.
- The latest three calibration records (date/slope/calibration point) can be searched via Web and RS-485

1-5 Product Application Scenarios

Sewage, seawater, groundwater, aquaculture, rivers and lakes detection system.

1-6 Wiring Instructions

Line Color	Wiring function
RED	DC12 or 24 (Optional)
BLACK	GND
WHITE	RS-485(D+)
GREEN	RS-485(D-)
YELLOW	Auto cleaning V+ (Optional)
BLUE	Auto cleaning V- (Optional)

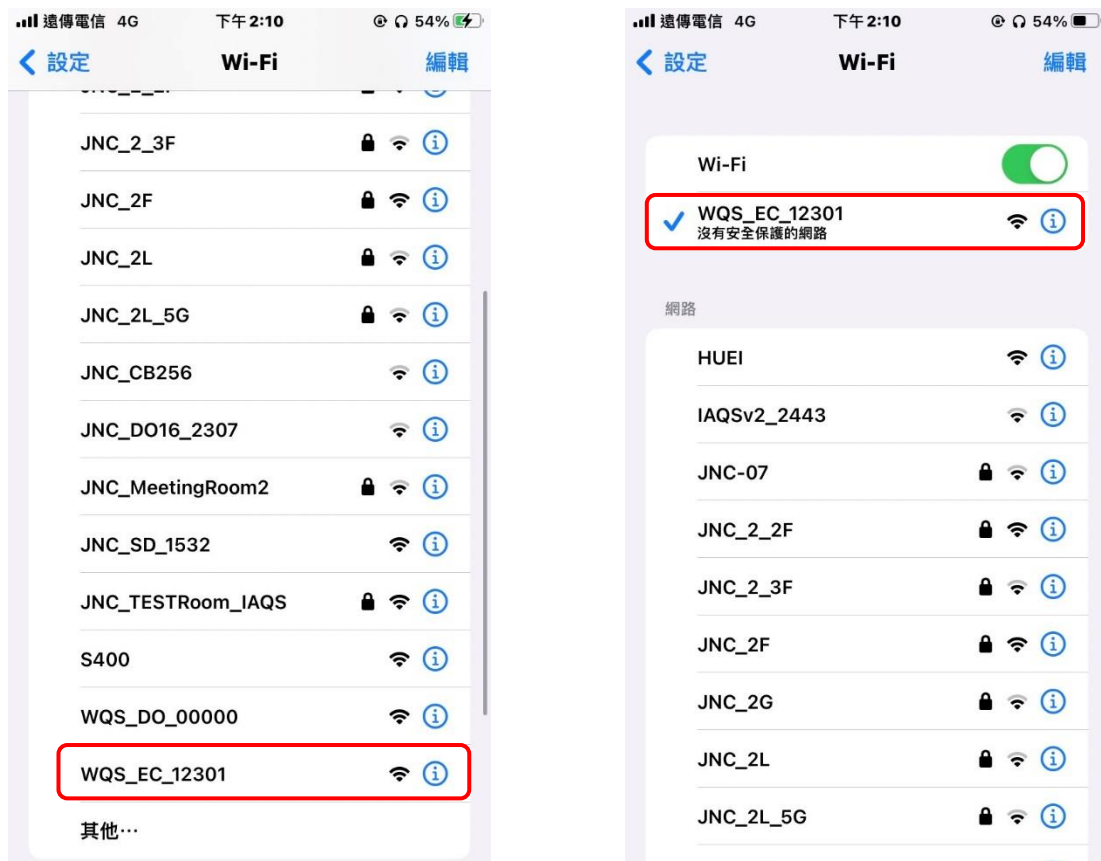
1-7 Hardware Details

Device name	Description
Device ID	The default station number is: 51
Device Baudrate	Default baud rate: 9600 bps

PART 2.PRODUCT FUNCTION

2-1 WQS Page Operations

2-1-1 WIFI Connect



Use the WIFI function of the mobile phone, search for the name "**WQS_EC_XXXXX**" and click to connect. After the connection is completed, the picture on the right will be displayed.

2-1-2 、Google Chrome APP



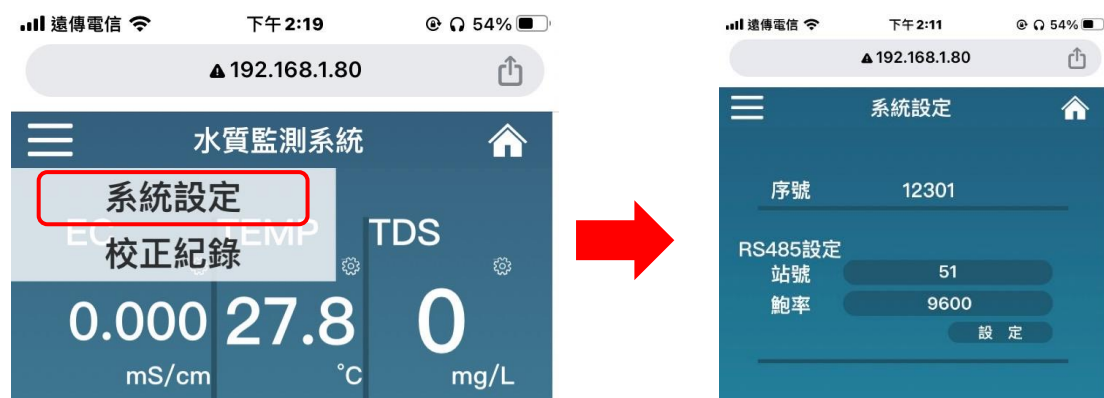
Search for "**Google Chrome APP**" in the mobile app and click, enter: "**192.168.1.80**" in

the URL and click search.

2-1-3 WQS home page



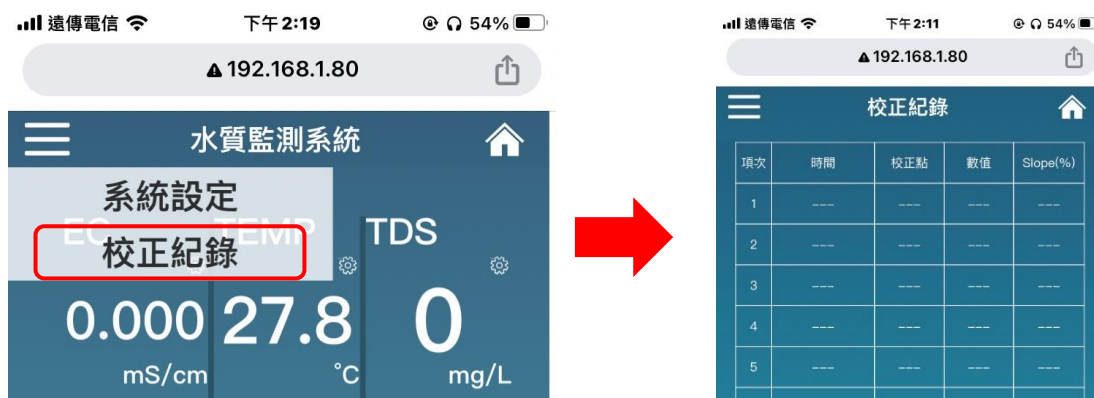
2-1-4 System Settings



After clicking the menu icon on the upper left, you can see the "System Settings" function as shown on the left. After selecting it, as shown on the right, the information

is the device serial number, station number, and baud rate. The changeable item is station number 1~254, baud rate 2400/4800/9600/19200/38400/57600/115200.

2-1-5 Calibration record



After clicking the menu icon on the upper left, you can see the "Calibration Record" function as shown on the left. After selecting it, as shown on the right, you can check each calibration time/option/value/slope.

2-1-6 Calibration page



After clicking on the instant time value on the home page, select "OK" in the system window to enter the calibration mode. As shown on the right, you can see the ["Standard Solution Calibration"](#) and ["Gain and Offset"](#) functions.

2-1-6-1 Standard Solution Calibration



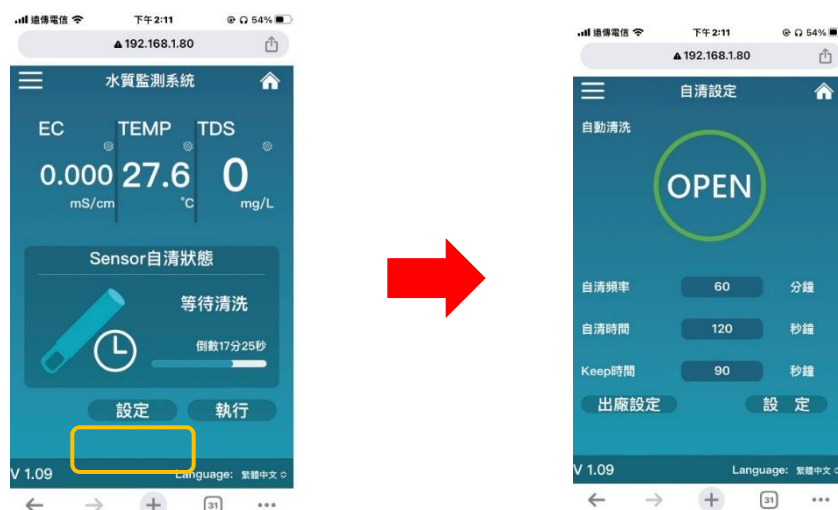
After clicking "**Standard Solution Calibration**", as shown on the right, you can see the instant time value (EC/Temp), slope, and calibration concentration (0/1.413/12.88)

2-1-6-2 Gain and Offset

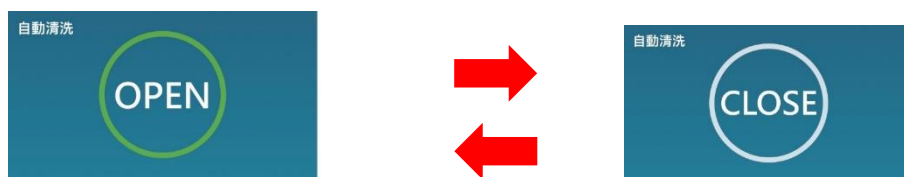


After clicking "**Gain and Offset**", as shown on the right, you can see the instant time value (EC/Temp), gain value (default: 1.00), and offset (default: 0.00)

2-1-7 Auto cleaning settings



After clicking "**Settings**" on the homepage, as shown on the right, you can see the auto cleaning status (OPEN/CLOSE), auto cleaning frequency (minutes), auto cleaning time (seconds), keep time (seconds), factory settings, settings.



"**Auto Cleaning**" can be started by clicking on the large icon in the upper middle. When started, it will be executed according to the following conditions:

1. Auto cleaning frequency: The auto cleaning pump starts the cycle, which is preset to be once every 60 minutes.
2. Auto cleaning time: The auto cleaning pump startup time is preset to 120 seconds.
3. Keep time : When auto cleaning is in progress, the value will be in an extremely unstable state. At this time, the value will be maintained at the last read before auto cleaning. The default value is 90 seconds after the end of the auto cleaning time.

2-1-8 Language selection



Click the drop-down menu in the lower right corner to select the appropriate language according to your personal needs. Currently, WQS-related products support languages: Traditional Chinese, Simplified Chinese, English, and Japanese.

PART 3.MODBUS TABLE

3-1 Analog Output (03 、06 、16)

Function 03 to Read/ Function 06 、16 to Write					
Address	Setting Value	Item	Type	R/W	Remark
0x0000	400001	EC insant value	INT16	R	Value/1000
0x0001	400002	Temp. insant value	INT16	R	Value/10
0x0002	400003	TDS insant value	UINT16	R	Value/10
0x000A	400011	Temp. insant value	INT16	R	Value/10
0x000C	400013	Current electrode potential (Float low word)	FLOAT	R	Unit : mV
0x000D	400014	Current electrode potential (Float high word)	FLOAT	R	Unit : mV
0x000E	400015	Device model First word and second characters	INT16	R	
0x000F	400016	Device model The third and fourth characters	INT16	R	
0x0010	400017	Device model The fifth and sixth characters	INT16	R	
0x0011	400018	Device model First word and second characters	INT16	R	
0x0012	400019	Device model The third and fourth characters	INT16	R	
0x0013	400020	Device model The fifth and sixth characters	INT16	R	
0x0014	400021	Device version	INT16	R	
0x0015	400022	RS485 Station Number	INT16	R/W	Can be set:: 1 ~ 254
0x0016	400023	RS485 Transmission rate	INT16	R/W	2400 = 0 4800 = 1 9600 = 2 19200 = 3 38400 = 4 57600 = 5 115200 = 6

Function 03 to Read/ Function 06 、16 to Write

Address	Setting Value	Item	Type	R/W	Remark
0x001A	400027	Sensor Electrode type	INT16	R	pH = 0 EC = 1 ORP = 2 WQS_DO = 3 NO3 = 4 NH4 = 5 SC = 6
0x001B	400028	Whether it has automatic cleaning function	INT16	R	0 : Close, 1 : Open
0x001C	400029	Language system	INT16	R	Traditional Chinese = 0 Simplified Chinese = 1 English = 2 Japanese = 3
0x001E	400031	EC insant value (Float low word)	FLOAT	R	Unit : mS/cm
0x001F	400032	EC insant value (Float high word)	FLOAT	R	Unit : mS/cm
0x0020	400033	Temp. insant value (Float low word)	FLOAT	R	Unit : °C
0x0021	400034	Temp. insant value (Float high word)	FLOAT	R	Unit : °C
0x0022	400035	TDS insant value (Float low word)	FLOAT	R	Unit : mg/L
0x0023	400036	TDS insant value (Float high word)	FLOAT	R	Unit : mg/L
0x002A	400043	Electrode initial potential First point (Float low word)	FLOAT	R	
0x002B	400044	Electrode initial potential First point (Float high word)	FLOAT	R	
0x002C	400045	Electrode initial potential Second point (Float low word)	FLOAT	R	
0x002D	400046	Electrode initial potential Second point (Float high word)	FLOAT	R	

Function 03 to Read/ Function 06 · 16 to Write

Address	Setting Value	Item	Type	R/W	Remark
0x002E	400047	Electrode initial potential Third point (Float low word)	FLOAT	R	
0x002F	400048	Electrode initial potential Third point (Float high word)	FLOAT	R	
0x0030	400049	Sensor status	INT16	R	0 : Value reading 1 : Auto cleaning 2 : Value Keeping 3 : Calibrating 4 : maintainancin
0x0031	400050	Electrode slope	INT16	R	Value/10
0x0032	400051	Temperature slope	INT16	R	Value/10
0x0036	400055	Whether to enable auto cleaning	INT16	R/W	0 : Close, 1 : Open
0x0037	400056	Auto cleaning frequency	INT16	R/W	
0x0038	400057	Auto cleaning time	INT16	R/W	
0x0039	400058	Delay after cleaning__S reading value	INT16	R/W	
0x0101	400258	EC Decimal places	INT16	R	
0x0102	400259	EC Gain value (Float low word)	FLOAT	R/W	
0x0103	400260	EC Gain value (Float high word)	FLOAT	R/W	
0x0104	400261	EC Offset (Float low word)	FLOAT	R/W	
0x0105	400262	EC Offset (Float high word)	FLOAT	R/W	
0x0106	400263	EC Original Range first point (Float low word)	FLOAT	R	
0x0107	400264	EC Original Range first point (Float high word)	FLOAT	R	
0x0108	400265	EC Original Range second point (Float low word)	FLOAT	R	
0x0109	400266	EC Original Range second point (Float high word)	FLOAT	R	

Function 03 to Read/ Function 06 、 16 to Write

Address	Setting Value	Item	Type	R/W	Remark
0x010A	400267	EC corresponding range point 3 (Float low word)	FLOAT	R	
0x010B	400268	EC corresponding range point 3 (Float high word)	FLOAT	R	
0x010C	400269	EC corresponding range point 1 (Float low word)	FLOAT	R	
0x010D	400270	EC corresponding range point 1 (Float high word)	FLOAT	R	
0x010E	400271	EC corresponding range point 2 (Float low word)	FLOAT	R	
0x010F	400272	EC corresponding range point 2 (Float high word)	FLOAT	R	
0x0110	400273	EC corresponding range point 3 (Float low word)	FLOAT	R	
0x0111	400274	EC corresponding range point 3 (Float high word)	FLOAT	R	
0x0151	400338	Temp. Decimal places	INT16	R	
0x0152	400339	Temp. gain value (Float low word)	FLOAT	R/W	
0x0153	400340	Temp. gain value (Float high word)	FLOAT	R/W	
0x0154	400341	Temp. Offset (Float low word)	FLOAT	R/W	
0x0155	400342	Temp. Offset (Float high word)	FLOAT	R/W	
0x0156	400343	Temp. Original Range first point (Float low word)	FLOAT	R	
0x0157	400344	Temp. Original Range first point (Float high word)	FLOAT	R	
0x0158	400345	Temp. Original Range second point (Float low word)	FLOAT	R	
0x0159	400346	Temp. Original Range second point (Float high word)	FLOAT	R	

Function 03 to Read/ Function 06、16 to Write

Address	Setting Value	Item	Type	R/W	Remark
0x015A	400347	Temp. corresponding range point 3 (Float low word)	FLOAT	R	
0x015B	400348	Temp. corresponding range point 3 (Float high word)	FLOAT	R	
0x015C	400349	Temp. corresponding range point 1 (Float low word)	FLOAT	R	
0x015D	400350	Temp. corresponding range point 1 (Float high word)	FLOAT	R	
0x015E	400351	Temp. corresponding range point 2 (Float low word)	FLOAT	R	
0x015F	400352	Temp. corresponding range point 2 (Float high word)	FLOAT	R	
0x0160	400353	Temp. corresponding range point 3 (Float low word)	FLOAT	R	
0x0161	400354	Temp. corresponding range point 3 (Float high word)	FLOAT	R	

3-1-1 INT16 Read instant value (Function 03)

Example: Read the instant time **EC** value, and the value is 11.165 mS/cm.

Content	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	33	03	00	00	00	01	80	18
Number of bytes	1	1	2		2		2	

Content	Equipment station number	Function	Data bytes	Sensor data		16 CRC code	
Reply from machine	33	03	02	2B	9D	5E	D9
Number of bytes	1	1	1	2		2	

3-1-2 INT16 Instant time numerical description (Function 03)

In the slave reply, you can see that the "sensor data" is "2B 9D".

Converting 0X2B9D(hex) to decimal is "11165", $11165/1000 = 11.165$, then the EC is 11.165 mS/cm °

3-1-3 Float Read instant value (Function 03)

Example: Read the instant time **EC** value, and the value is 11.165 mS/cm °

Content	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	33	03	00	1E	00	02	A0	1F
Number of bytes	1	1	2		2		2	

Content	Equipment station number	Function	Data bytes	Sensor data		16 CRC code	
Reply from machine	33	03	04	A3	D7 41 32	CA	09
Number of bytes	1	1	1	2			

3-1-4 Float instant time numerical description (Function 03)

In the slave reply, you can see that the "sensor data" is "A3 D7 41 32".

Replace the low word "41 32" to the front and the high word "A3 D7" to the back, then it will be "41 32 A3 D7", and then convert it to Float to 11.165, and get EC=11.165 mS/cm °

Please refer to the online conversion tool: <https://gregstoll.com/~gregstoll/floattohex/>

3-2 Analog Input (04)

Function 04 to Read					
Address	Setting Value	Item	Type	R/W	Remarks
0x0000	300001	EC instant value	INT16	R	Value/1000
0x0001	300002	Temp instant value	INT16	R	Value/10
0x0002	300003	TDS instant value	UINT16	R	Value/10
0x000A	300011	Temp instant value	INT16	R	Value/10
0x000C	300013	Current electrode potential (Float low word)	FLOAT	R	Unit : mV
0x000D	300014	Current electrode potential (Float high word)	FLOAT	R	Unit : mV
0x001E	300031	EC instant value (Float low word)	FLOAT	R	Unit : mS/cm
0x001F	300032	EC instant value (Float high word)	FLOAT	R	Unit : mS/cm
0x0020	300033	Temp instant value (Float low word)	FLOAT	R	Unit : °C
0x0021	300034	Temp instant value (Float high word)	FLOAT	R	Unit : °C
0x0022	300035	TDS instant value (Float low word)	FLOAT	R	Unit : mg/L
0x0023	300036	TDS instant value (Float high word)	FLOAT	R	Unit : mg/L
0x004E	300079	Device power-on time (low word)	ULong	R	
0x004F	300080	Device power-on time (high word)	ULong	R	
0x0050	300081	Device restart times (low word)	ULong	R	
0x0051	300082	Device restart times (high word)	ULong	R	

3-2-1 INT16 Read the instant value (Function 04)

Example: Read the instant time **EC** value, and the value is 11.165 mS/cm °

Content	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	33	04	00	00	00	01	35	D8
Number of bytes	1	1	2		2		2	

Content	Equipment station number	Function	Data bytes	Sensor data		16 CRC code	
Reply from machine	33	04	02	2B	9D	5F	AD
Number of bytes	1	1	1	2		2	

3-2-2 INT16 Instant time numerical description (Function 04)

In the slave reply, you can see that the "sensor data" is "2B 9D".

Converting 0X2B9D(hex) to decimal is 「11165」・11165/1000 = 11.165, then the EC is 11.165 mS/cm °

3-2-3 Float Read the instant value (Function 04)

Example: Read the instant time **EC** value, and the value is 11.165 mS/cm.

Content	Equipment station number	Function	Starting address		Number of data (Word)		16 CRC code	
Host command	33	04	00	1E	00	02	15	DF
Number of bytes	1	1	2		2		2	

Content	Equipment station number	Function	Data bytes	Sensor data				16 CRC code	
Reply from machine	33	04	04	A3	D7	41	32	DA	4E
Number of bytes	1	1	1	2				2	

3-2-4 Float Instant time numerical description (Function 04)

In the slave reply, you can see that the "sensor data" is "A3 D7 41 32".

Replace the low word "41 32" to the front and the high word "A3 D7" to the back then it will be "41 32 A3 D7", and then convert it to Float to 11.165, and get EC=11.165 mS/cm °

Please refer to the online conversion tool : <https://gregstoll.com/~gregstoll/floattohex/>

3-3 Digital Output (01 、05)

Function 01 to Read/ Function 05 to Write					
Address	Setting Value	Item	Type	R/W	Remarks
0x0001	000002	Maintenance mode		R/W	If the maintenance mode is not turned off, the system will automatically jump to the value reading state after 2 hours.
0x0002	000003	Automatic cleaning mode		R/W	

3-3-1 Write instructions (Function 05)

For example: If the EC is executed in maintenance mode, the value will no longer change and the last data before "executing maintenance" will be maintained.

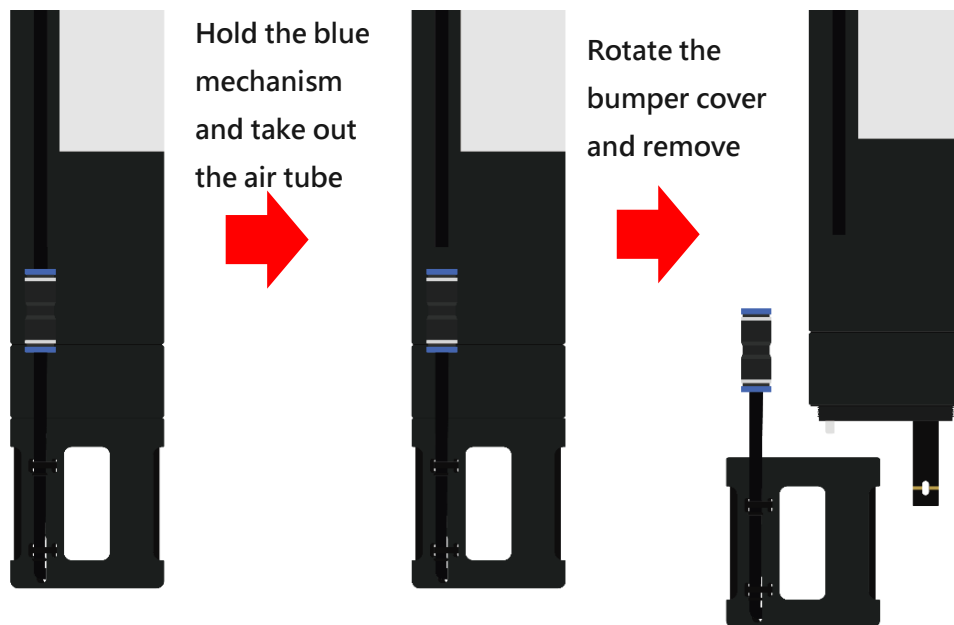
Content	Equipment station number	Function	Starting address		Write value: FF 00 enable 00 00 close		16 CRC code	
Host command	33	05	00	01	FF	00	D9	E8
Number of bytes	1	1	2		2		2	

Content	Equipment station number	Function	Starting address		Data		16 CRC code	
Reply from machine	33	05	00	01	FF	00	D9	E8
Number of bytes	1	1	1		2		2	

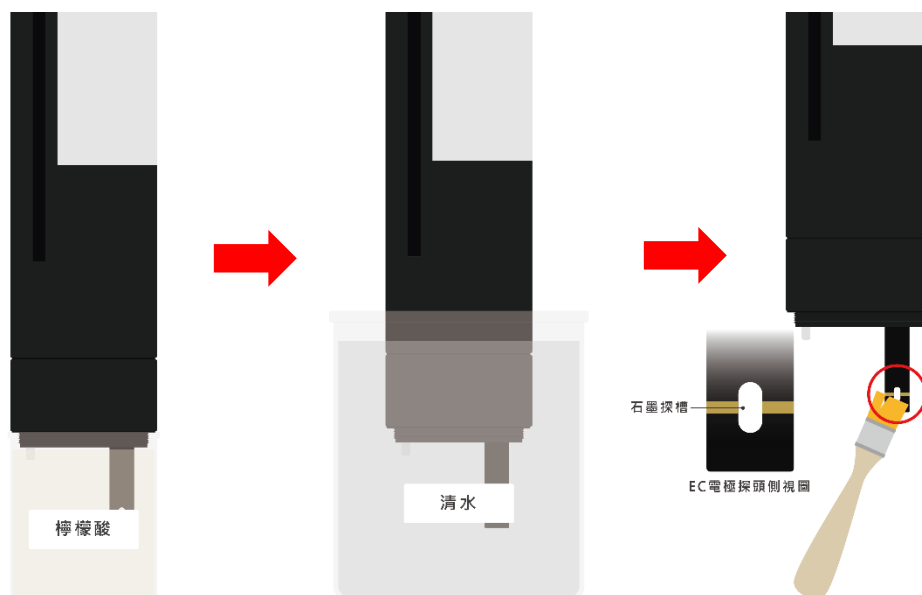
※The above Modbus table only supports firmware version V1.07c (inclusive) and above.

PART 4.MAINTENANCE AND CLEANING

4-1 Remove The Bumper Cover



4-2 Cleaning And Maintenance



Use the supplied calibration bottle to dilute 10:1 citric acid water and let it sit for more than 10 minutes.

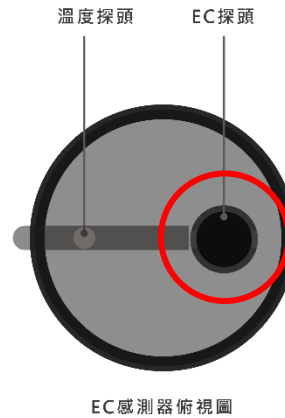
Soak the sensor in water and rinse with clean water.

Use a soft brush to carefully clean the probe, and focus on cleaning the inside of the graphite probe slot.

4-3 Recovery Sensor



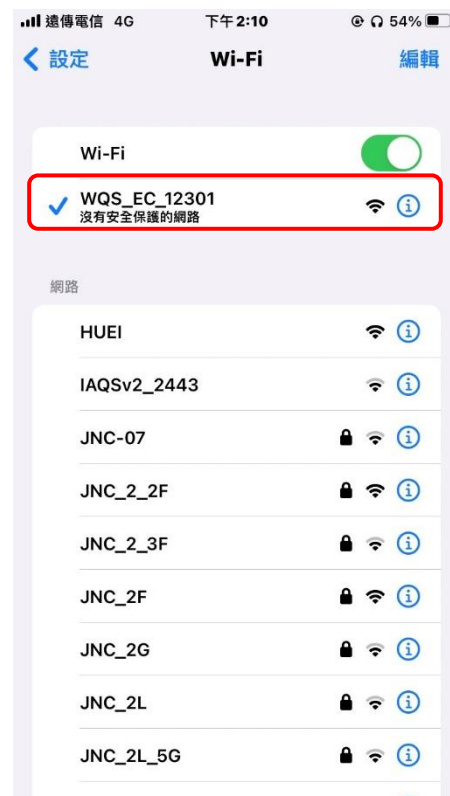
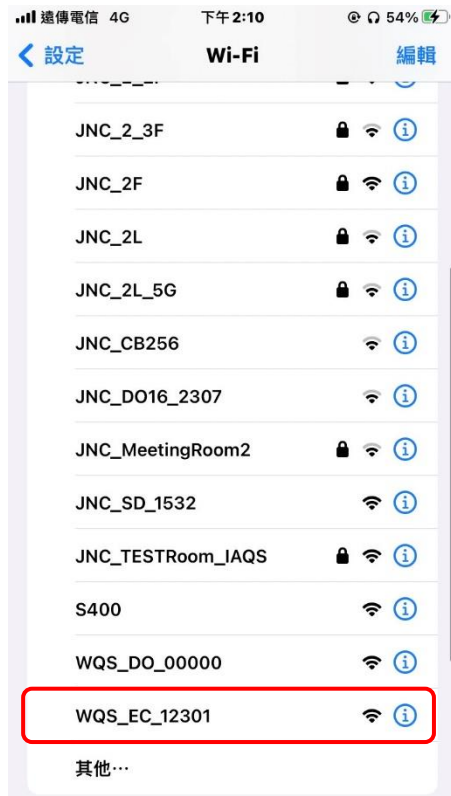
Restore the disassembled anti-collision cover and securely insert the air pipe into the blue latch.



Please ensure that the nozzle is aligned with the probe to maintain the auto cleaning function.

PART 5.CALIBRATION PROCESS

5-1 WIFI Connection



Use the WIFI function of the mobile phone, search for the name: " **WQS_EC_XXXXX** " and click to connect. After the connection is completed, the picture on the right will be displayed.

5-2 、Google Chrome APP



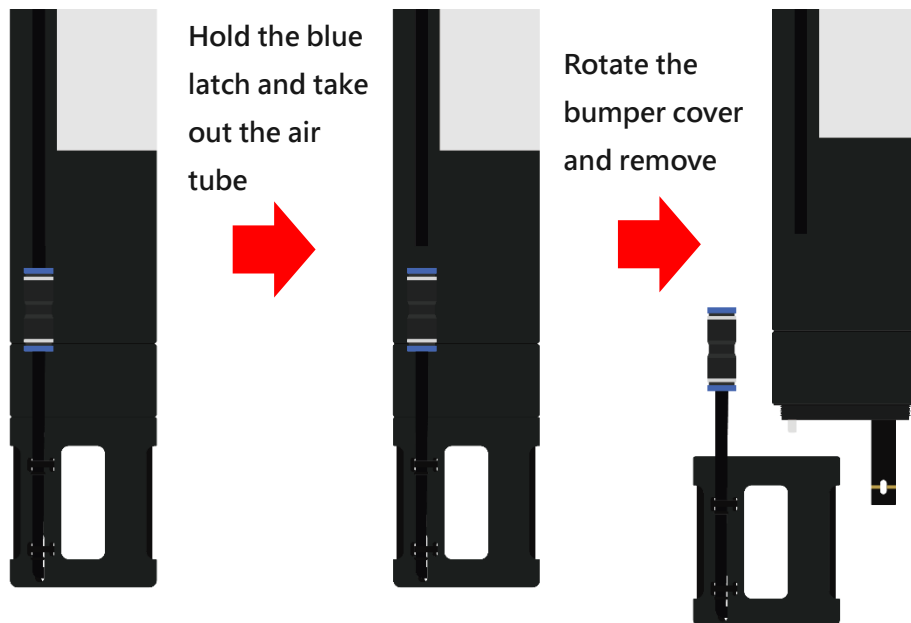
Search for "Google Chrome APP" in the mobile app and click, enter: "192.168.1.80" in the URL and click search.

5-3 Enter The Calibration Page



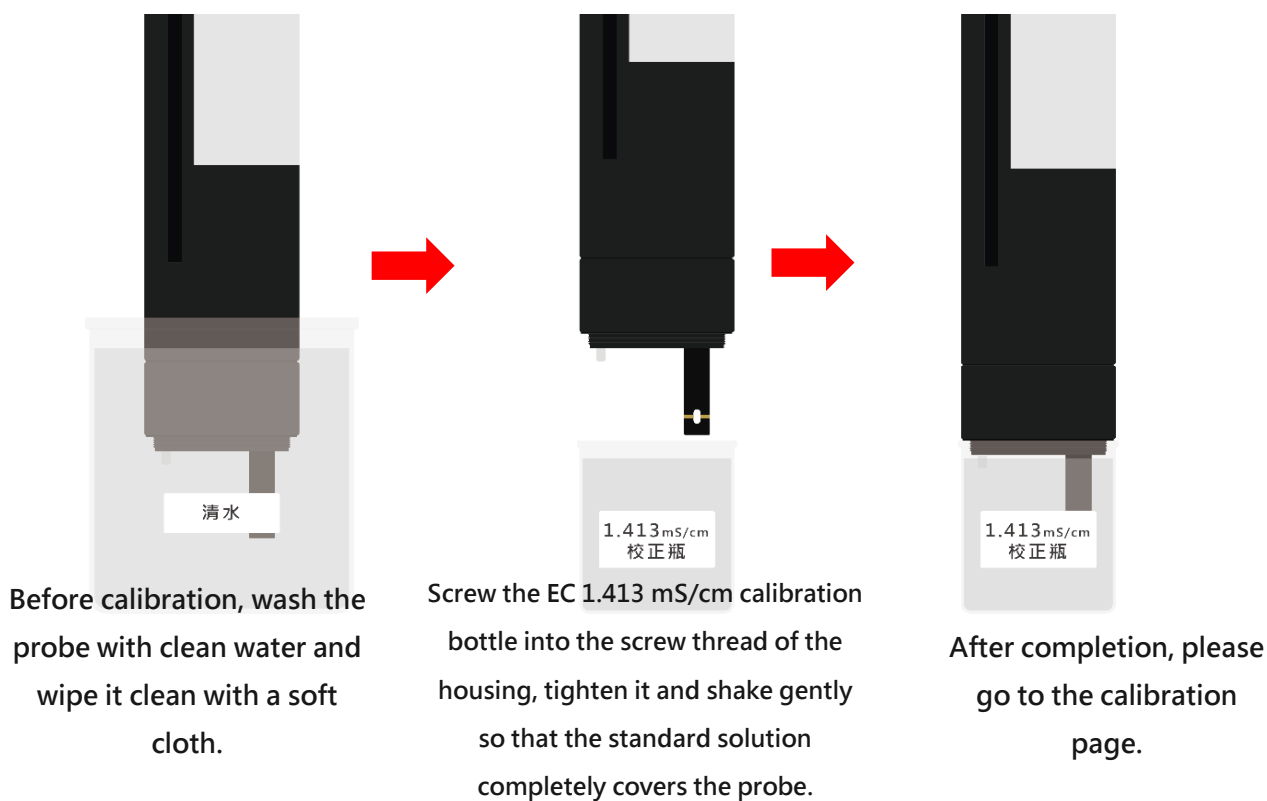
After clicking on the instant time value on the homepage, select "OK" in the system window to enter the calibration mode, and then click on the "Standard Solution Calibration" function to go to the "Calibration Page".

5-4 Remove The Bumper Cover



5-5、1.413 mS/cm Calibration

5-5-1 Calibration bottle installation



5-5-2 Calibration page operations

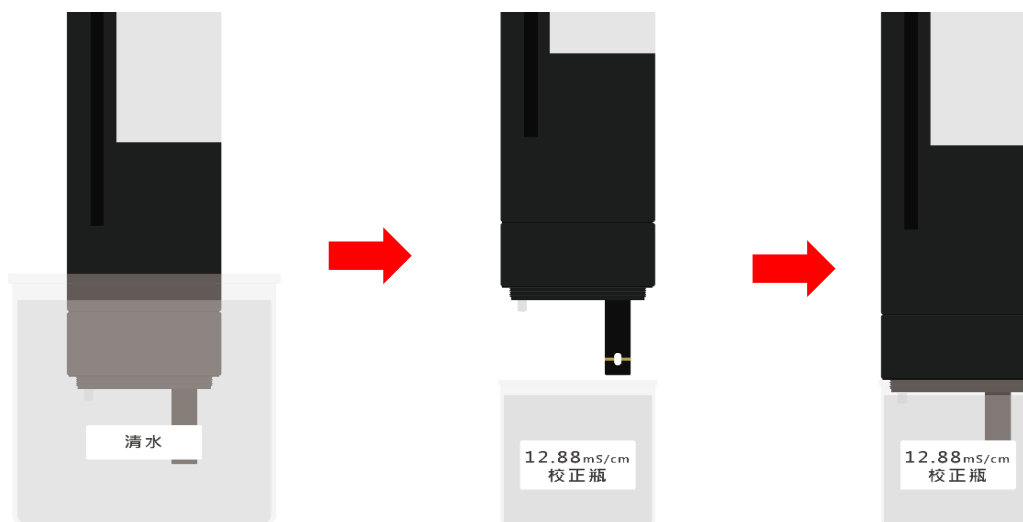


While waiting for the value to stabilize and no longer change on the calibration page,

click "**START**" for "**Midpoint 1.413**" in the calibration field then calibration will be completed after waiting for **20** seconds.

5-6 12.88 mS/cm Calibration

5-5-1 Calibration bottle installation



Before calibration, wash the probe with clean water and wipe it clean with a soft cloth.

Screw the EC 12.88 mS/cm calibration bottle into the screw thread of the housing, tighten it and shake gently so that the standard solution completely covers the probe.

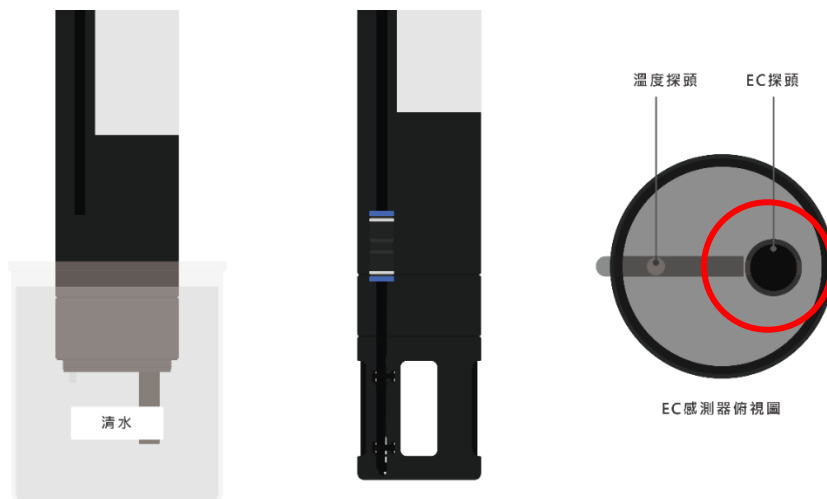
After completion, please go to the calibration page.

5-5-2 Calibration page operations



While waiting for the value to stabilize and no longer change on the calibration page, click "**START**" for "**High Point 12.88**" in the calibration field. The calibration will be completed after waiting for **20** seconds.

5-7 Recovery Sensor



After calibration, wash the probe with clean water and wipe it clean with a soft cloth. ◦

Restore the disassembled anti-collision cover and securely insert the air pipe into the blue latch.

Please ensure that **the nozzle is aligned with the probe** to maintain the auto cleaning function.

5-8 Other Operations



If you have a standard solution on hand but it is not provided by our company, you can also use the web page to perform calibration. Just click on the calibration value to adjust it to the required value, and then press "**START**" to perform calibration.

PART 6.TROUBLESHOOTING

Abnormal Category	Cause of issue	Solution
Numerical anomaly	Foreign matter attached to the electrode probe	Follow the maintenance and cleaning procedures
	Calibration period has been reached	Follow the calibration process
WIFI cannot connect	Abnormal power supply	Please confirm whether the power supply of the device complies with the specified voltage.
		According to the wiring instructions in 1-6, actually check whether the hardware circuit is consistent with the list.

REVISION HISTORY

Version	Revision date	Revision description	Maintenance personnel
V1.9	2022/09/12	Add Modbus table	denny
V2.0	2023/12/18	Change the manual style and flow diagram to add Modbus commands	bin

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