MC-W-S-P05
Meter Controller

User Manual V5.3

2024.11 Edition

Document

Edition number	Revision date	Version	Note
V5.0	May 13, 2024	V01B1	● New user manual
V5.1	May 27, 2024	V01B2	● Adding status registers
V5.2	June 14, 2024	V01B2	● Adding accessory information
V5.3	November 19, 2024	V01B2	● Adding expansion connection information

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1 Specifications

Specification	Details
Product description	Meter controller, connected to the sensor to display measured values and upload data
Display	7-inch color LCD screen with touch function
Dimensions (W×H×D)	230 × 154 × 68 mm
Weight	1.9 kg
Power requirements	DC 24 V
Power	< 15 W (No sensor connected)
Protection class	IP65
Mounting	Wall-mounted
Operating temperature	-20 to 70 ℃ (-4 to 158 ℉)
Storage temperature	-30 to 80 ℃ (-22 to176 ℉)
Data storage	32 GB
Interface	4-channel RS485 input, 1-channel RS485 output. 2 expansion ports, each expansion port support 2 channels of 4-20 mA or 4 channels of I/O (user optional 4-20 mA module or I/O module) 1-channel RJ45 output
Wireless Communication	WiFi (HTTP, MQTT protocol), 4G (user optional)
Warranty	One year

4G module, 4-20mA, I/O modules need to be purchased additionally.

1.1 Accessory

Specification	Details
Power adapter	Input Voltage: 100-240 VAC, 50/60Hz, 1.3A Output voltage: 24V,3.75A, 90 W (Max) Dimensions: 145×60×32 mm

In no event will the manufacturer be liable for direct, indirect, special, incidental or consequential damages resulting from any defect or omission in this manual. The manufacturer reserves the right to make changes in this manual and the products it describes at any time, without notice or obligation.

2 General information

2.1 Safety information

Please read this entire manual before unpacking, setting up or operating this equipment. Pay attention to all danger and caution statements. Failure to do so could result in serious injury to the operator or damage to the equipment. Make sure that the protection provided by this equipment is not impaired. Do not use or install this equipment in any manner other than that specified in this manual.

2.1.1 Use of hazard information

DANGER
Indicates a potentially or imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING
Indicates a potentially or imminently hazardous situation which, if not avoided, could result in death or serious injury.
NOTICE
Indicates a situation which, if not avoided, may cause damage to the instrument. Information that requires special emphasis.

2.1.2 Precautionary labels

Read all labels and tags attached to the instrument. Personal injury or damage to the instrument could occur if not observed. A symbol on the instrument is referenced in the manual with a precautionary statement.

	This symbol, if noted on the instrument, references the instruction manual for operation and/or safety information.
	This symbol indicates that a risk of electrical shock and/or electrocution exists.
	This symbol indicates the connection location of protective earth.

Note: This series of products are mainly used in industrial environments, indoor use, which will cause potential electromagnetic interference to the environment. This series of products meets the relevant requirements of the standards EN 61326-1: 2013 and EN 61326-2-3: 2013.

2.2 Product overview

The MC-W-S is a meter controller with a 7-inch color LCD screen, which can connect multiple sensors at the same time. Users can quickly connect the sensors to meter controller, configure the parameter of sensors. MC-W-S display data and graphs in real-time. MC-W-S supports wireless data output, can upload the collected data to the cloud (SPS-Server), supporting HTTP protocol, MQTT protocol meanwhile.

The software system is an Android application developed based on the Android environment.

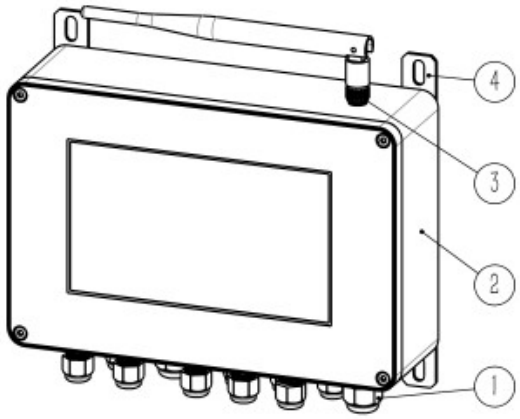


Figure 2.1 Product description

1	PG connector	2	MC-W-S body
3	Antenna interface (SAM male hole)	4	Mounting plate

2.3 Dimensions

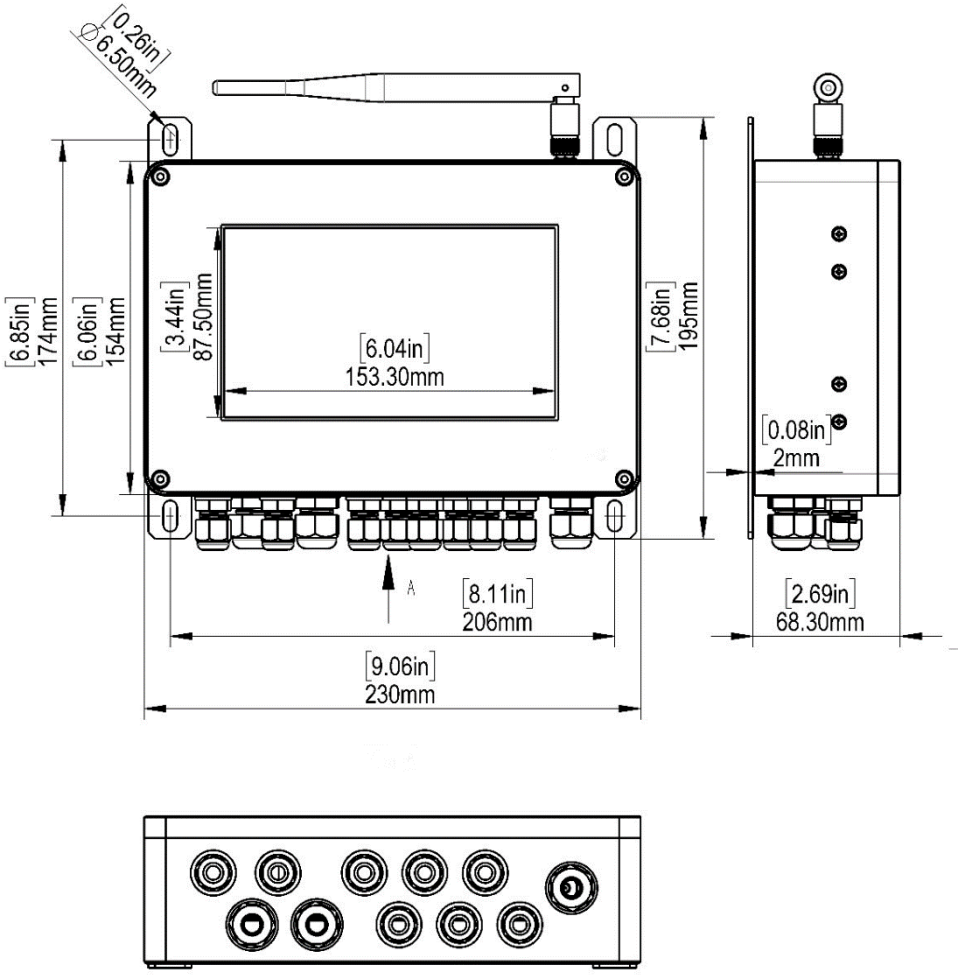


Figure 2.2 Meter controller dimensions

3 MC-W-S interface

WARNING	
	Multiple dangers. Only qualified personnel must conduct the tasks described in this section of the document.

WARNING	
	Be careful not to get electrocuted when connecting the sensor.

3.1 External 4G antenna interface

There is an SMA antenna interface on the upper right of the device. When the meter controller is placed in a confined space, an extension cable can be connected to enhance the 4G signal.

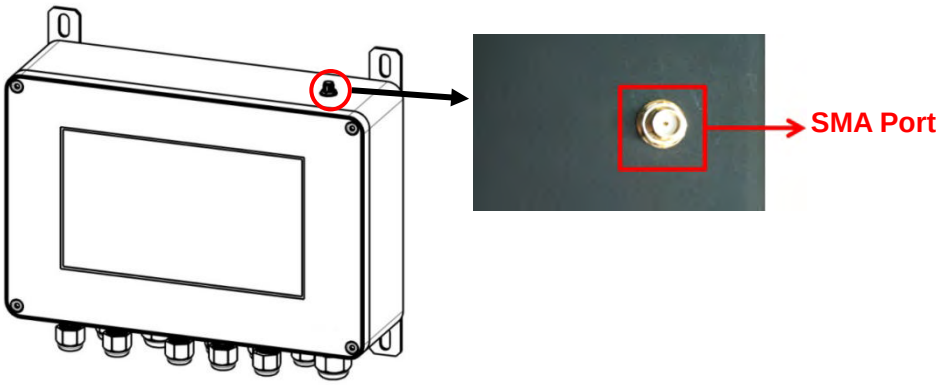


Figure 3.1 Antenna Interface

3.2 Internal board interface

The internal board of the device has 4 RS485 input interfaces, 2 expansion ports, power input and RS485 output interfaces. 4 RS485 input interfaces have a jumper cap in the upper left corner, which can be installed to choose DC 24 V or DC 12 V power supply output according to the power supply requirements of the connected equipment. The jumper cap inserted on the left side is for DC 24 V power supply output, and the jumper cap inserted on the right side is for DC 12 V power supply output.

3.2.1 MC-W-S interface

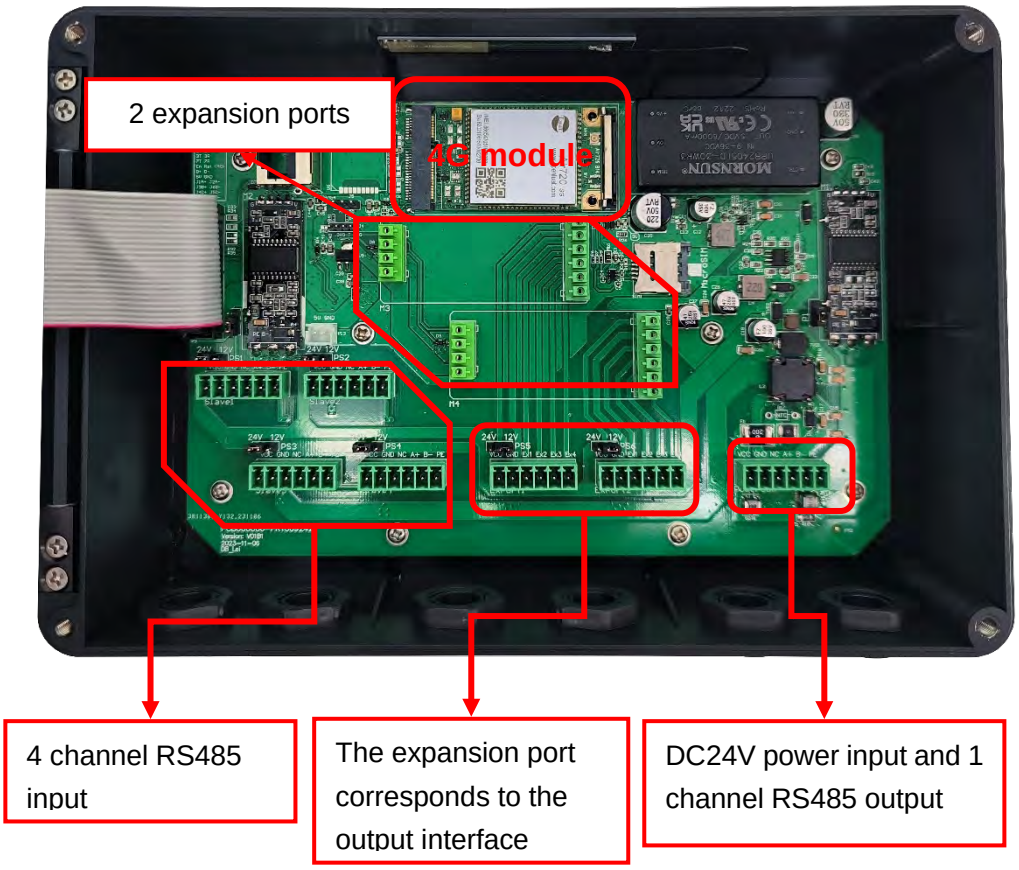


Figure 3.2 Internal Interface

Table 3.1 Internal Interface Pin Definition

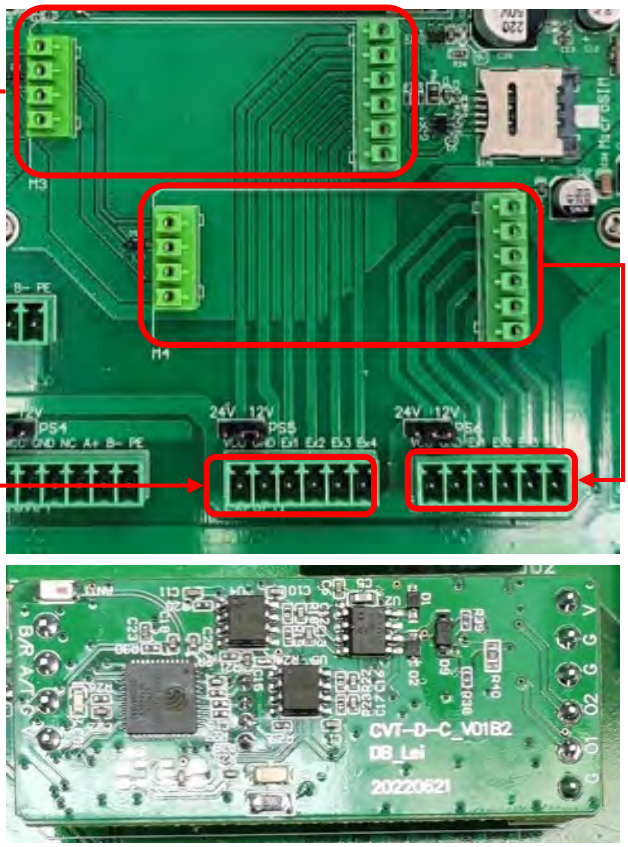
Port	Pin#	Name	Description	Connected equipment
Slave 1	1	VCC	DC 24 V power supply output positive	Sensor/Slave Primary port ttyS4
	2	GND	DC 24 V power supply output negative	
	3	NC	Undefined	
	4	A+	RS485 A+	
	5	B-	RS485 B-	
	6	PE	Ground	
Slave 2	1	VCC	DC 24 V power supply output positive	Sensor/Slave Primary port ttyS4
	2	GND	DC 24 V power supply output negative	
	3	NC	Undefined	
	4	A+	RS485 A+	
	5	B-	RS485 B-	
	6	PE	Ground	

Slave 3	1	VCC	DC 24 V power supply output positive	Sensor/Slave Primary port ttyS4
	2	GND	DC 24 V power supply output negative	
	3	NC	Undefined	
	4	A+	RS485 A+	
	5	B-	RS485 B-	
	6	PE	Ground	
Slave 4	1	VCC	DC 24 V power supply output positive	Sensor/Slave Primary port ttyS4
	2	GND	DC 24 V power supply output negative	
	3	NC	Undefined	
	4	A+	RS485 A+	
	5	B-	RS485 B-	
	6	PE	Ground	
PowerCom	1	VCC	DC 24 V power input positive	DC 24 V power input interface and RS485 communication output interface
	2	GND	DC 24 V power input negative	
	3	NC	Undefined	
	4	A+	RS485 A+	
	5	B-	RS485 B-	
	6	PE	Ground	

3.2.2 4-20 mA expansion output module.

The user can select different modules to extend the different interfaces.

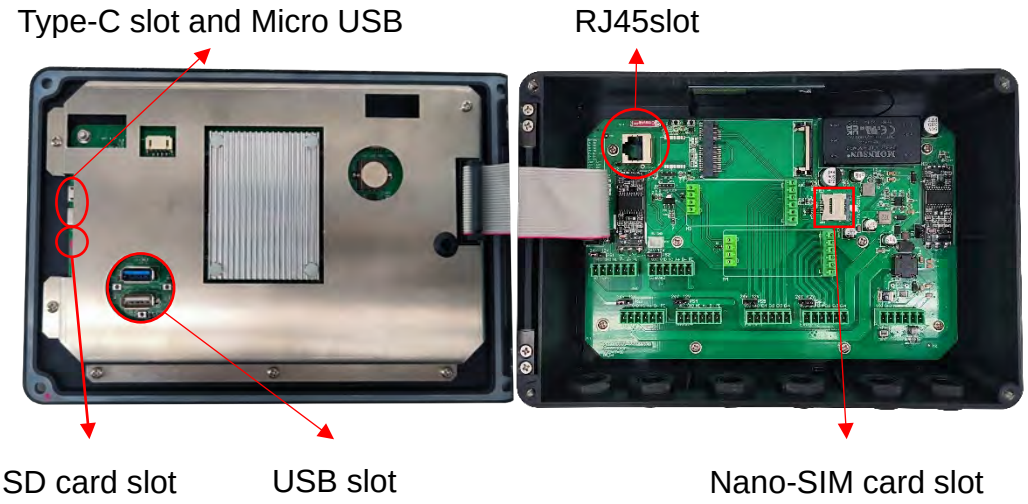
Expansion port corresponding interface



Expansion port corresponding interface

4-20 mA expansion board	V	PS5 extend corresponding output interface	VCC	DC24 V+ OUT	Expansion port output interface ttyS9
	G		GND	DC24 V- OUT	
	G		Ex1	4-20 mA port 2 -	
	O2		Ex2	4-20 mA port 2 +	
	O1		Ex3	4-20 mA port 1 +	
	G		Ex4	4-20 mA port 1 -	
4-20 mA expansion board	V	PS6 extend corresponding output interface	VCC	DC24 V+ OUT	Expansion port output interface ttyS9
	G		GND	DC24 V- OUT	
	G		Ex1	4-20 mA port 2 -	
	O2		Ex2	4-20 mA port 2 +	
	O1		Ex3	4-20 mA port 1 +	
	G		Ex4	4-20 mA port 1 -	

3.3 Nano-SIM card slot and SD card slot



MC-W-S is equipped with Nano-SIM card slot and SD card slot. Insert the Nana-SIM card, the MC-W-S will automatically connect to the network and upload the data to the cloud platform. By default, the company's cloud platform is uploaded. To switch other data platforms, please check the configuration information. MC-W-S comes standard with a 32 GB SD card.

Supports USB flash drive for reading and writing files, RJ45 port, Type-C and Micro USB for connecting devices.

Note: 4G modules are optional according to user requirements and will be configured according to the location of use. Please inform us before purchasing, otherwise it may not work.

Note: Insert the SD card or remove out the SD card when the device is powered on, the device will reboot automatically, please note Save the configuration in advance.

3.4 Coin cell battery installation

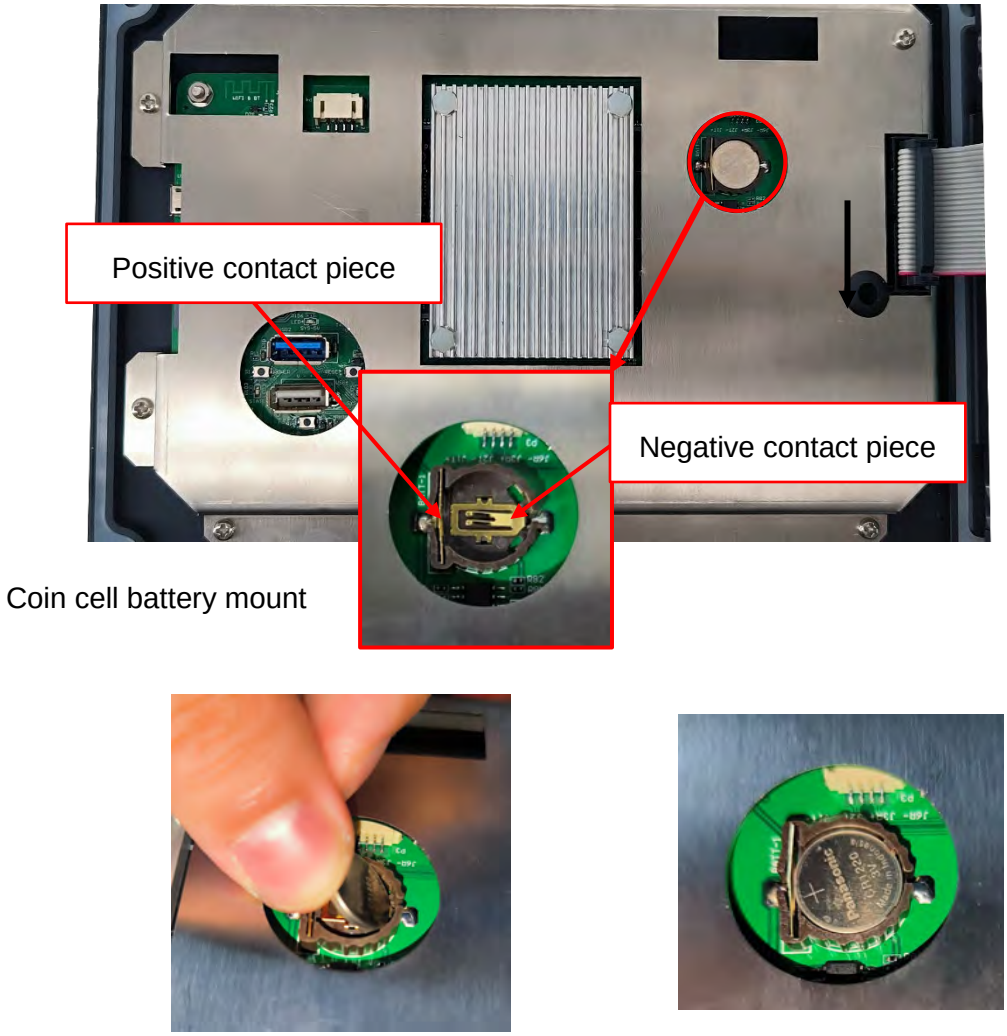


Figure 3.5 Coin cell battery mount

A coin cell battery, 3V CR1220, must be installed on the back of the meter controller screen.

When installing, you need to pay attention that the positive side of the coin cell battery faces up, as shown in the picture, there is a positive contact plate on the left side of the battery holder, first electromagnetic tilt to the right against the battery, press the battery until flat.

3.5 Expansion connection

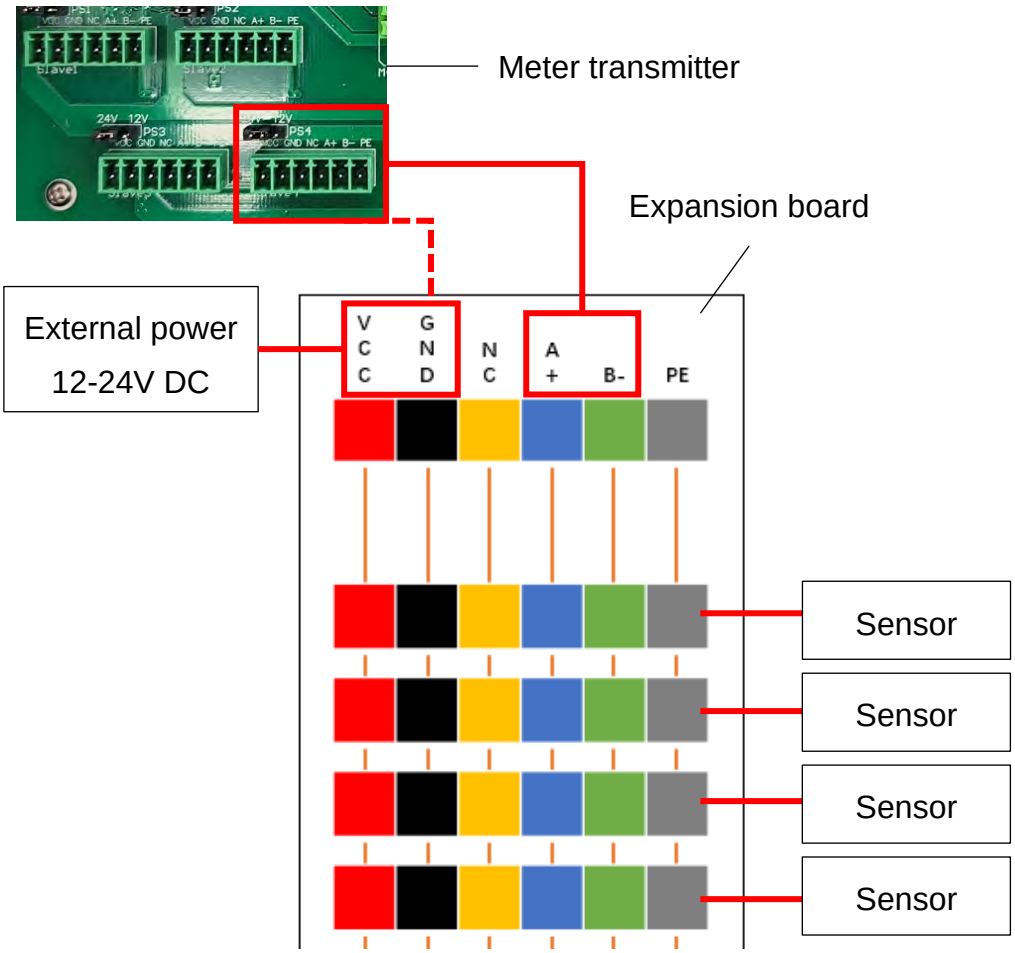
⚠ WARNING
Multiple dangers. Only qualified personnel must conduct the tasks described in this section of the document.

NOTICE
Expansion board external power supply, please purchase our grounded power supply, if not, please connect the external power supply, do not exceed the rated voltage of the sensor, to prevent damage to the sensor.

NOTICE
Refer to section 3.2.1 for wiring definitions.

The total power of the devices connected to the meter head should not exceed 36 W. If additional sensors are to be connected, the expansion board can be prepared by connecting the signal lines to the meter head A+, B- and the external power supply of the expansion board.

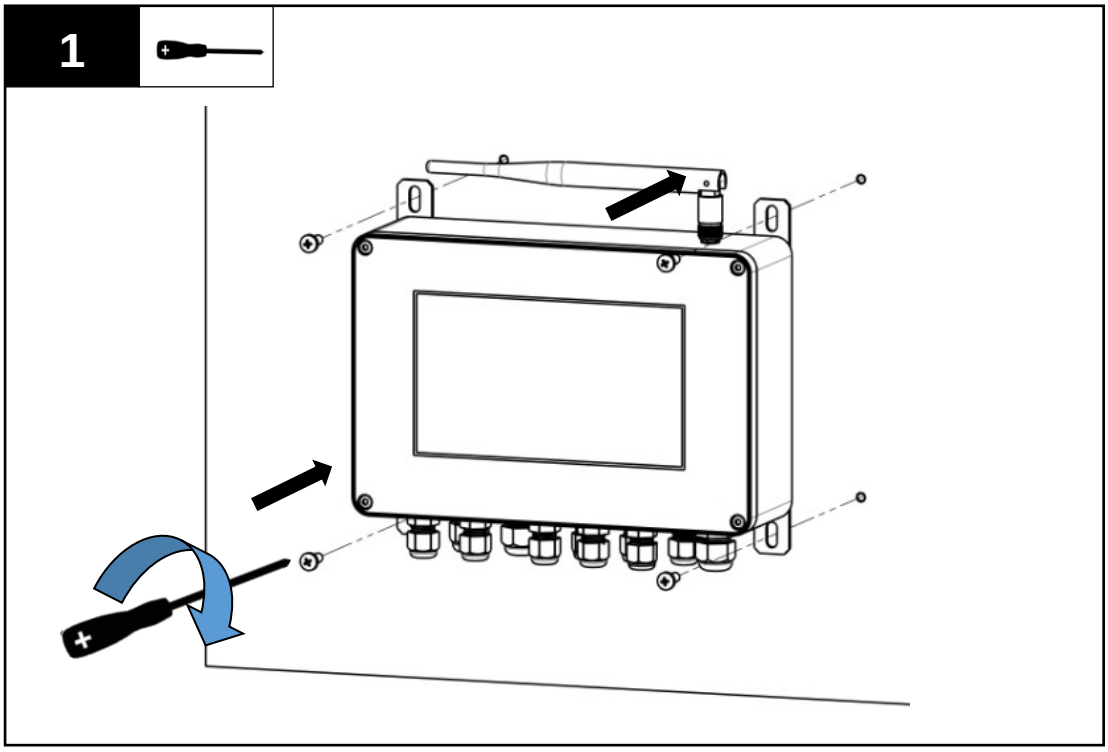
If the external power supply is not earthed, connect the expansion board GND and the meter transmitter GND.



4 Installation

WARNING
Multiple dangers. Only qualified personnel must conduct the tasks described in this section of the document.

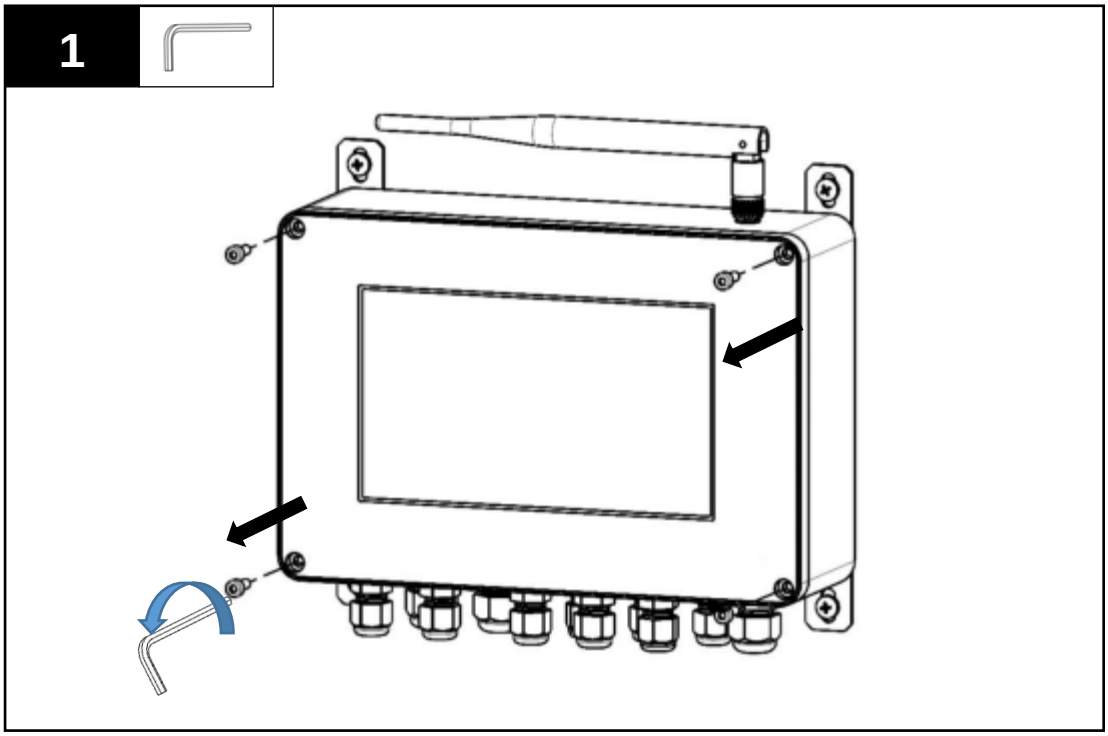
4.1 Wall-mounted

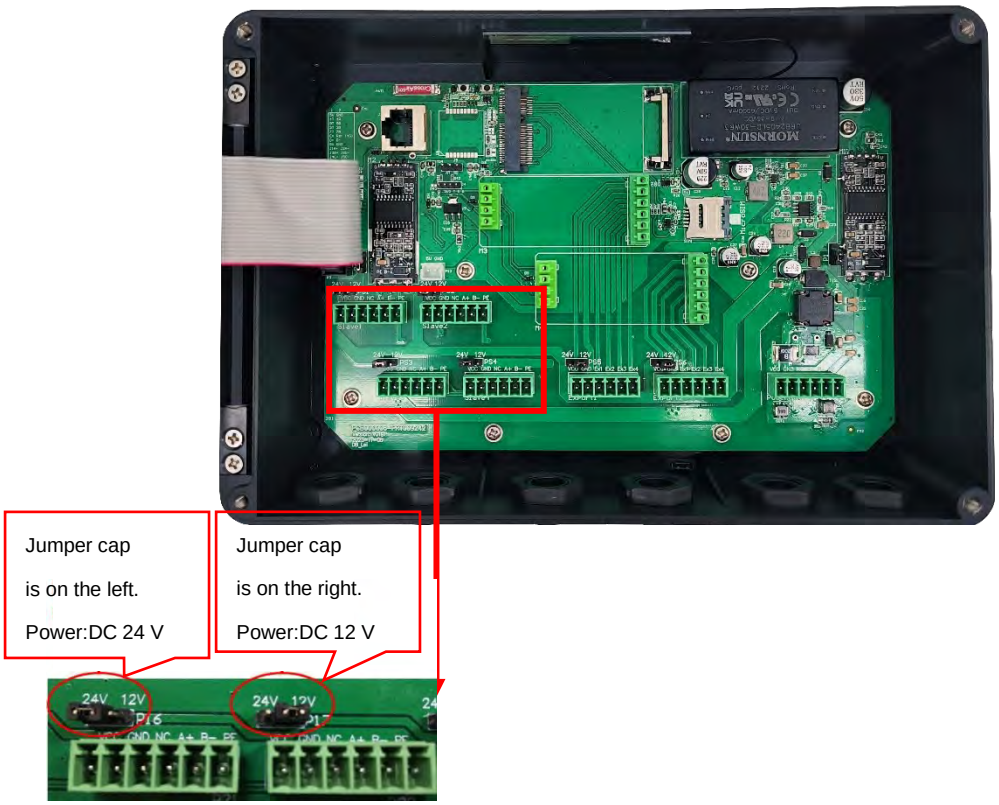


5 Connect the sensor

WARNING
Multiple dangers. Only qualified personnel must conduct the tasks described in this section of the document.

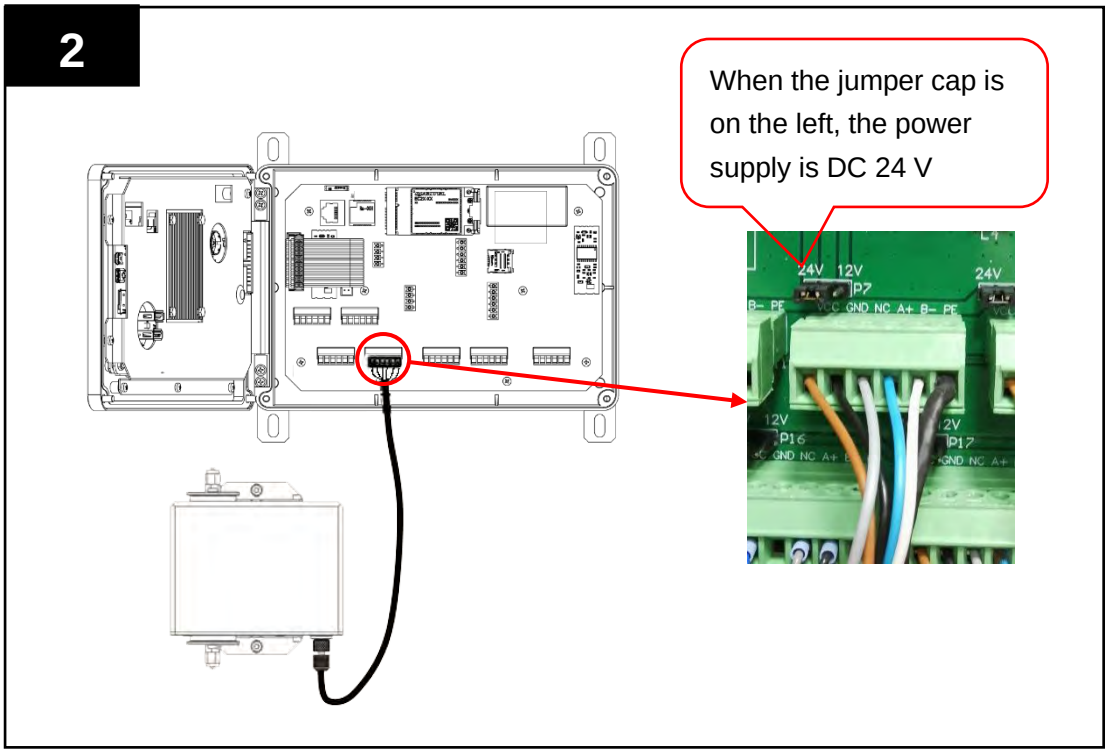
5.1 Sensor/slave connection





- **SPS series sensor connection**

Take SPS-T-SC3 sensor as an example. The interfaces that can be connected are Slave 1, Slave 2, Slave 3, and Slave 4.



- **Other sensor connection methods**

MC-W-S meter controller can be connected to other manufacturers' sensors. Other manufacturers' sensor requirements are as follows:

Power supply:	DC 12 V/DC 24 V
Protocol:	Modbus RS485
Power:	<5 W
Available interfaces:	Slave 1, Slave 2, Slave 3, Slave 4

Note: For detailed interface definition and distribution, see 3 MC-W-S interface.

5.2 Power connection

MC-W-S meter controller power supply is DC 24 V, internal interface is PowerCom, RS485 output interface is also at the PowerCom interface, connected according to the interface definition.

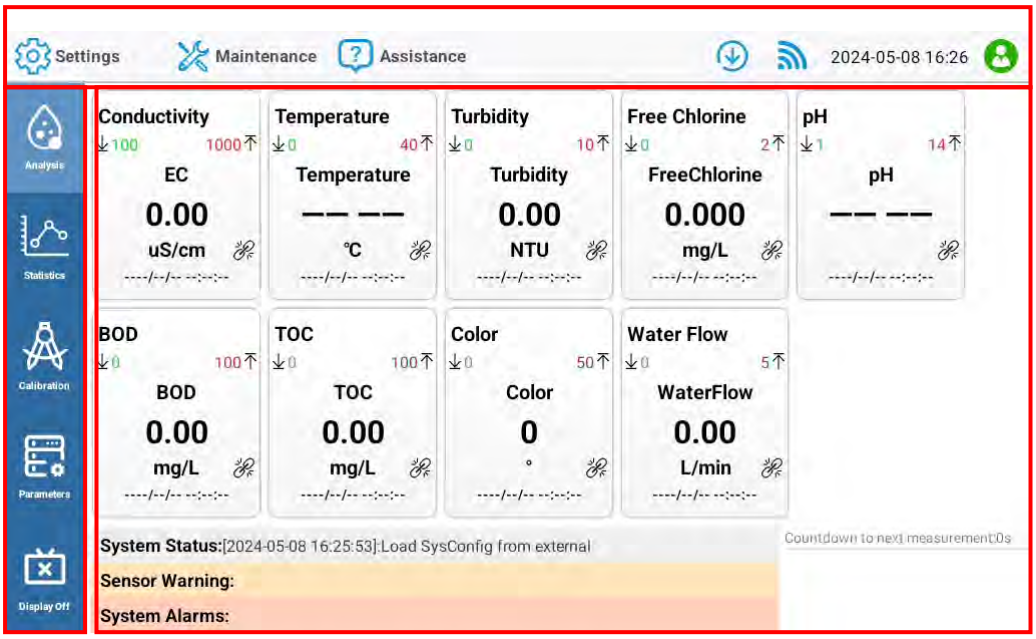
6 Quick access

NOTICE
The display is a touch screen, so touch it lightly to operate.

NOTICE
The interface guide images in the text are only examples, please refer to the actual user interface received.

6.1 Introduction to the interface

The interface consists of three main blocks: the menu bar, the navigation bar, and the display area.



Note: Changing parameter settings requires the appropriate rights

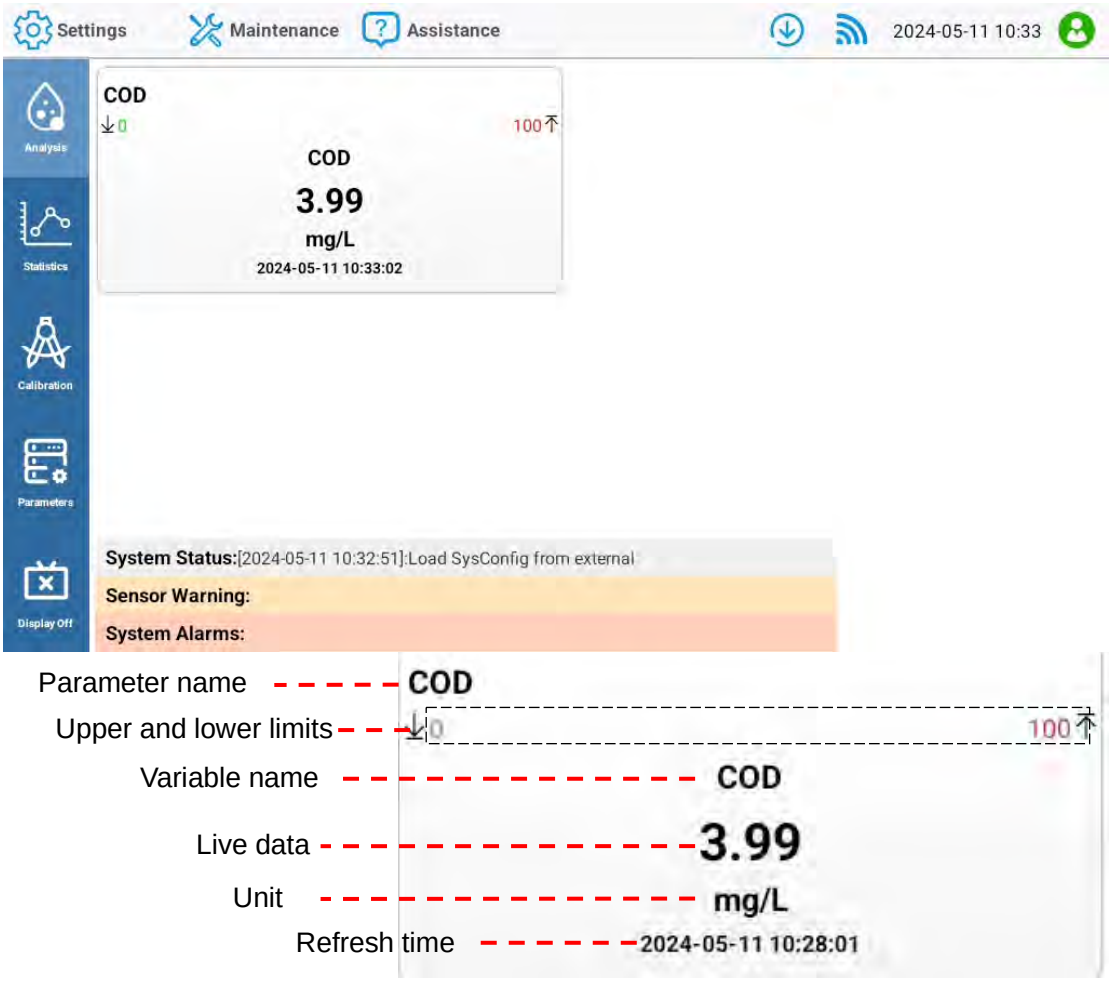
Engineer: can check data, maintenance, calibration and other operations, initial password: 123456

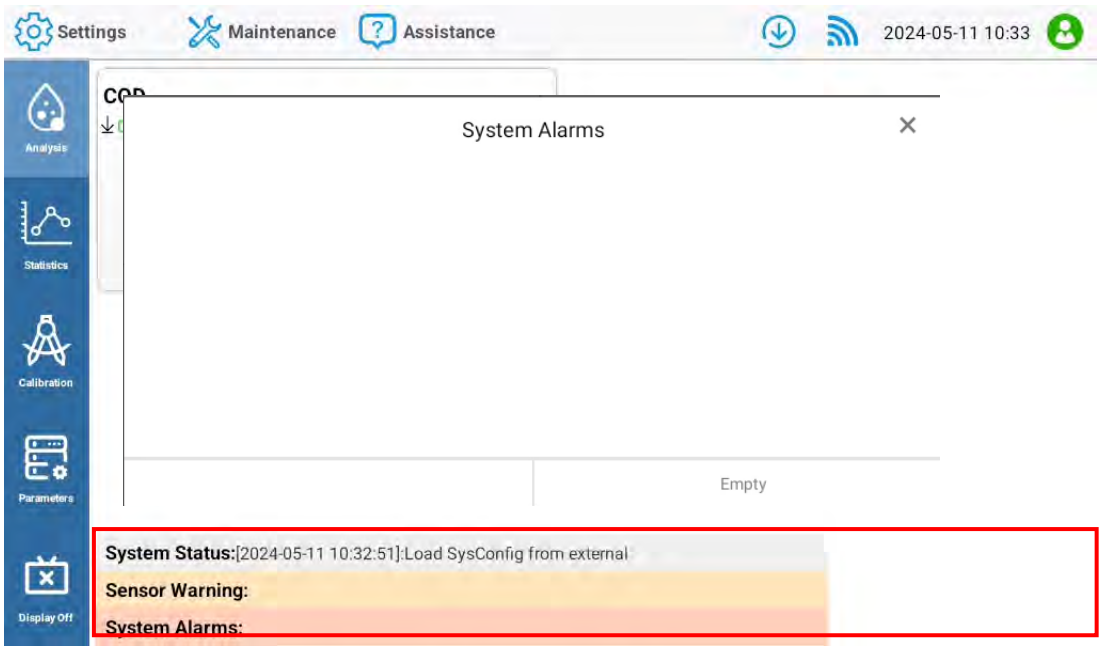
Administrator: has all modification rights, initial password: 12345678

6.2 Analysis page

The Analysis page displays real-time data for each of the device's parameters. The page is composed of the data displayed by each sensor access screen. Each panel represents a parameter value and the display consists of the parameter name, real-time value, unit and update time.

The Analysis page display consists of the configurations in 7.6.1.2 Analysis page management.



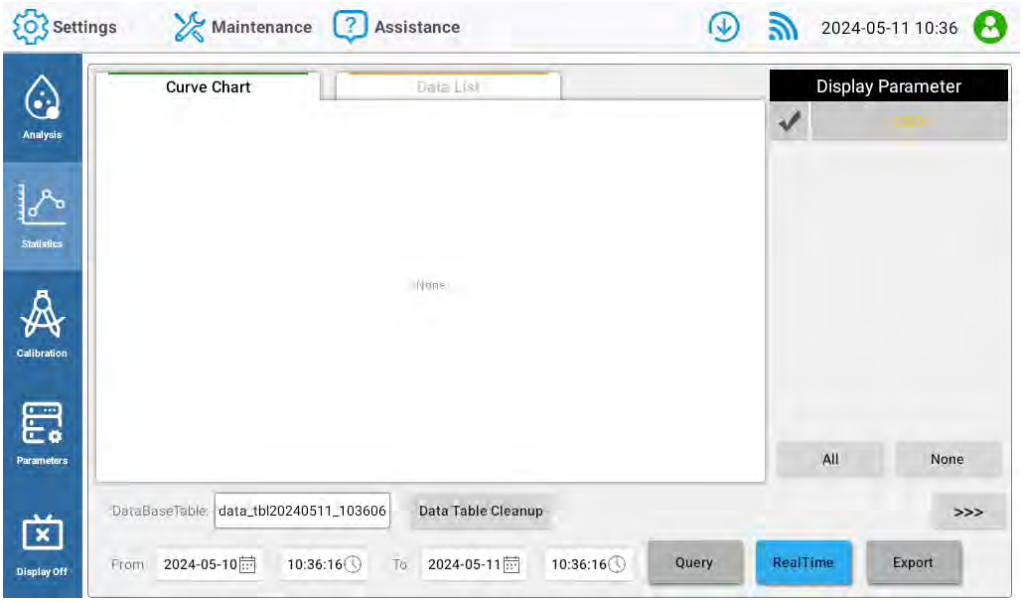


The bottom section is the status display area, which contains three sections: System Status, Sensor Warning, and System Alarm.

Click on the appropriate area to view the status record.

System Status	Load SysConfig from internal Load SysConfig from external Engineer login successful Admin login successful
Sensor Warning	Parameter failed to read Probe value is too high Probe value is too low
System Alarm	Liquid leak alarm Lua Result Type Error: [Lua Script] Lua Error: [Lua Script] The storage space is less than 200MB

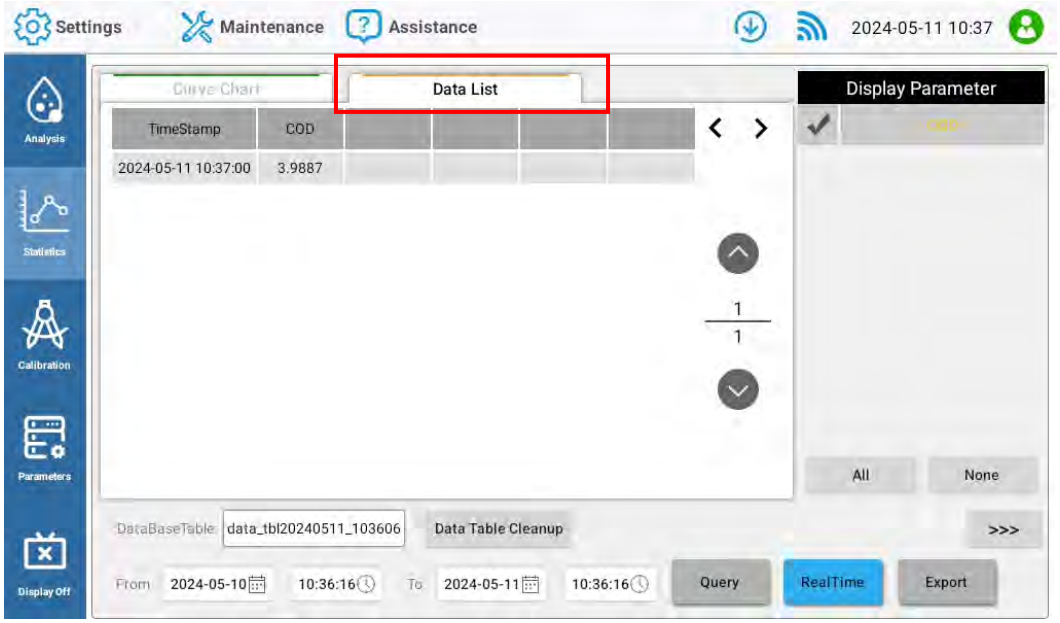
6.3 Statistics page



This page displays graphs and charts of the various data curves, making it easy for users to view data trends.

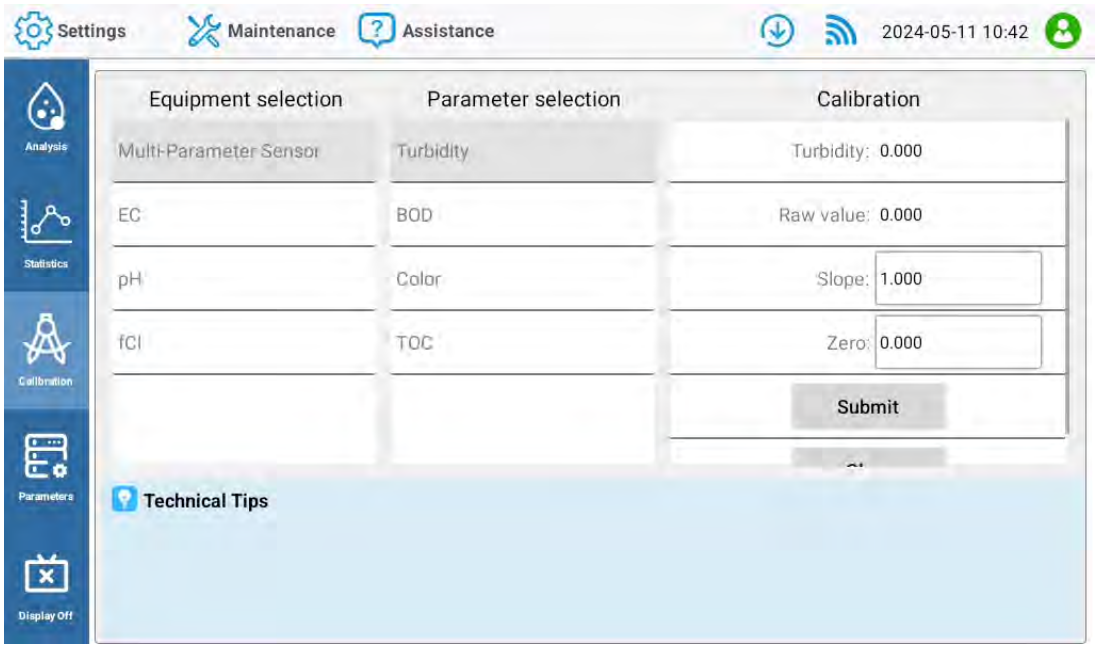
- Click on the ">>>" button on the right side to open the list of legends, click on a legend to show and hide the corresponding curve.
- Click on the "All" button to select all panel data and the "Select None" button to cancel all.
- Click on the "Query" button to display historical data for a specified period.
- Click on the “RealTime” button to display the most recent day's data and refresh it regularly.
- Click on the “Data Table Cleanup” button to clear the historical data.
- Click on the 'Export' button to export historical data for a specified period of time.

The content of the Statistics page consists of the configurations in 7.6.1.4 Statistics page management.



Click on the data list to view specific data records.

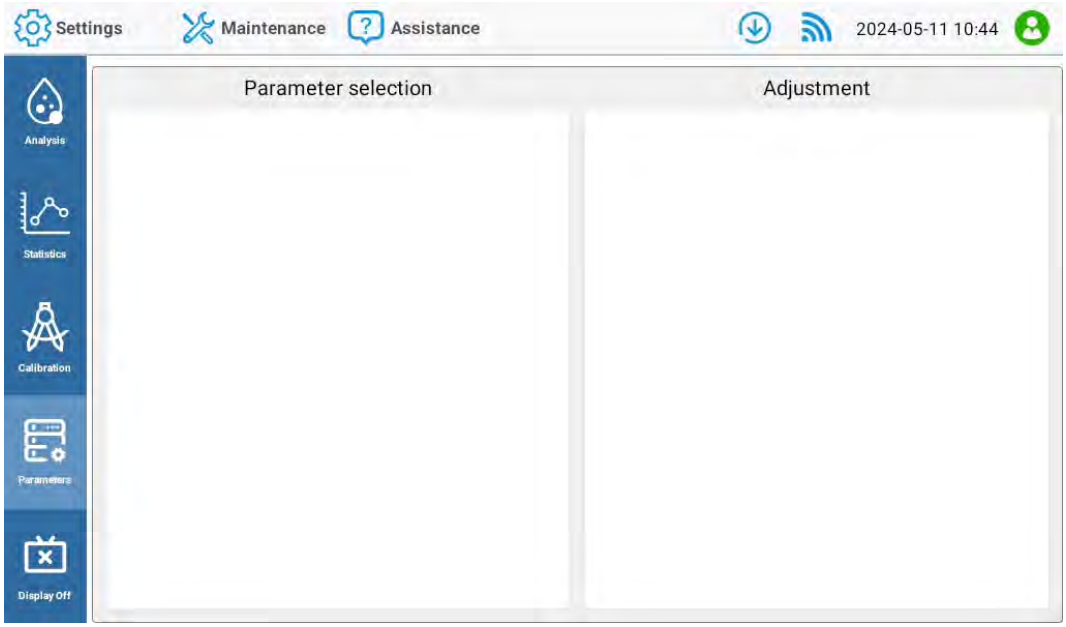
6.4 Calibration page



The Calibration Page is the device control and calibration page that is set up according to the sensor calibration instructions, and the calibration data is stored in the sensor.

The contents of the calibration page consist of the configurations in 7.6.1.5 Calibration page management.

6.5 Parameter page



Operations such as sensor range switching and cleaning brush control can be set.

The contents of the Parameter page consist of the configurations in 7.6.1.6 Parameter page management.

7 MC-W-S UI introduction

NOTICE
The interface guide images in the text are only examples, please refer to the actual user interface received.

7.1 Start

This device is a Modbus protocol universal meter controller, in addition to supporting SPS series sensors, it also supports the connection of other Modbus slaves, which are configured by the user.

The configuration in the manual is only an example, the device is generally shipped with the appropriate configuration added by default, which is adapted to the sensors purchased by the user.

7.1.1 Framework

The register map list and CMD for each Modbus device run according to the set parameters. The input page, chart page, output page, and calibration page are bound to the device's registers for displaying register values, changing register values, and executing CMD.

1) Device Management:
    a) Device: modbus slave
        i. Register map list: execution by function code
            1. Register: store the corresponding register data of the device
        ii. CMD: execution by CMD type
2) Display Page:
    a) Analysis page: real-time display of device data
    b) Statistics page: record device data and display it in a graph
3) Control Page:
    a) Output page: automatically write registers or execute CMD
    b) Calibration page: calibration of the measured value for the slave
    c) Parameter page: manually read or write registers or execute CMD

7.1.2 Data binding sources

Data binding source for the analysis page: Device.

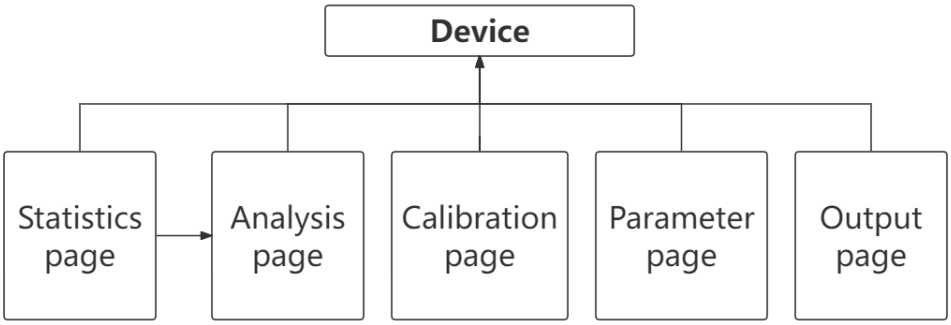
Data binding source for output page: Analysis page or device.

Data binding source for calibration page: Analysis page or device.

Data binding source for statistics page: Analysis page or device.

Data binding source for parameter page: Analysis page or device.

Note: Changing the object name or deleting the object may invalidate the data binding, so please modify the corresponding data binding.



7.1.3 Model and trigger

In this device, both the model and the trigger use the Lua scripting language, the difference is that the returned value of the model is a numeric value, and the returned value of the trigger is a boolean value.

The script's execution entry is the main function, for example:

```
function main ()
--<body>
end
```

7.1.3.1 Referencing register data

The internal function com.getDevV("register path") is needed.

Register path: "device name/RegMapList/register map list name/register name".

To return COD register as an example.:

```
function main ()
    return com.getDevV ("Sensor_COD /RegMapList/WQP/COD_KHP")
end
```

7.1.3.2 Referencing input page panel data

The internal function com.getPanelV ("panel path") is required.

Panel path:

When the panel is in the top level: the panel name.

When the panel is in a group: "group name/.../panel name"

```
function main ()
    return com.getPanelV ("COD")
end
```

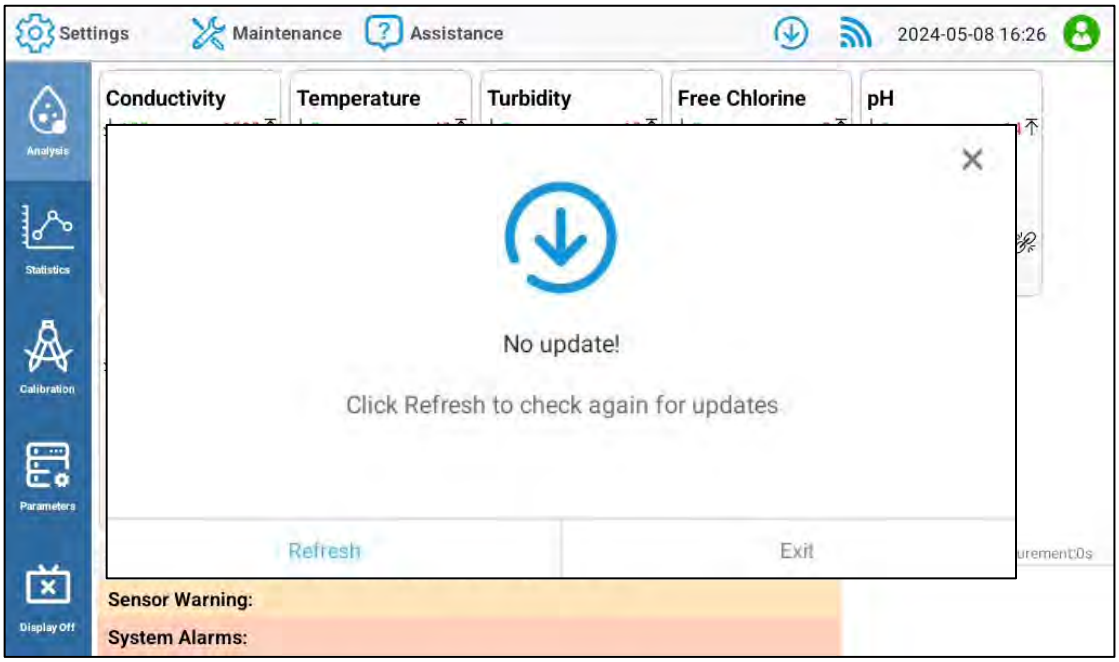
7.1.4 Configuration process

1) Add devices, register table, registers and CMD in Device manager.
2) Add panel in analysis page (need to bind to the register).
3) Add panel in output page (need to bind to the register or analysis page).
4) Add group, calibration, calibration members in calibration page (need to bind to the register or analysis page).
5) Add data cell statistics page (need to bind to the register or analysis page).
6) Parameter page to add device control or read analysis page (need to bind to the register or analysis page).

7.2 Menu bar

7.3 Online update

When the icon in the status bar blinks, it means there is a new update, click the icon to view the update information.



7.4 WiFi

Click the icon in the status bar to open the WiFi settings screen.

If the icon turns gray, the current network is abnormal.

Note: Internet environment is required for software update and time synchronization.

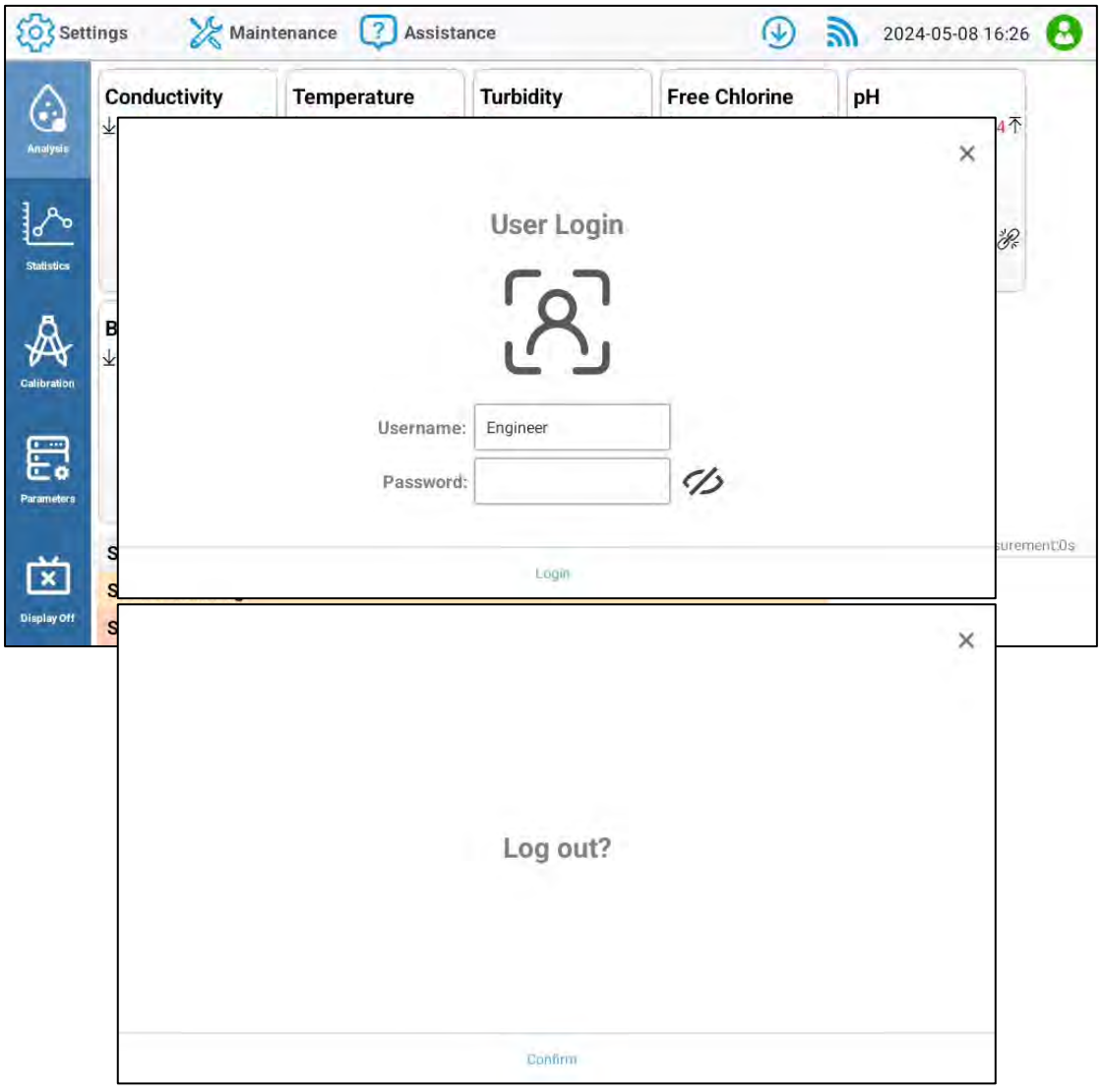
7.5 User login

Click on the status bar icon to log in as an **Engineer** or **Admin**.

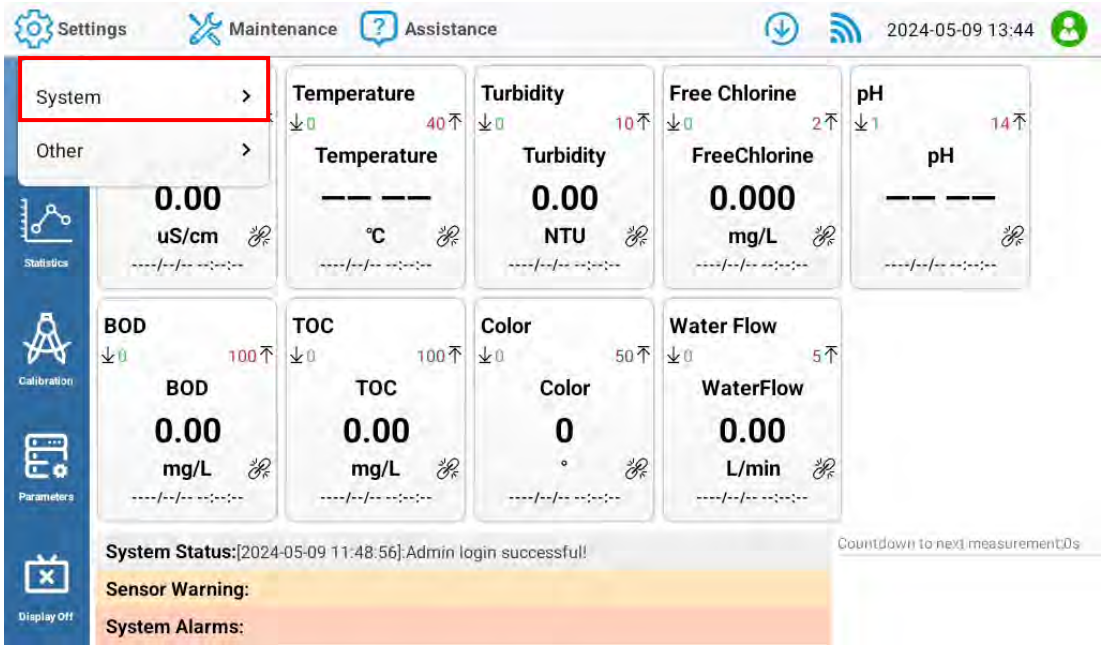
The **Engineer** is responsible for the maintenance and calibration of the sensor. The default password is 123456 and the icon changes to blue after logging in.

The **Admin** has higher privileges and can edit the layout configuration. The password is 12345678 by default and the icon changes to green after logging in.

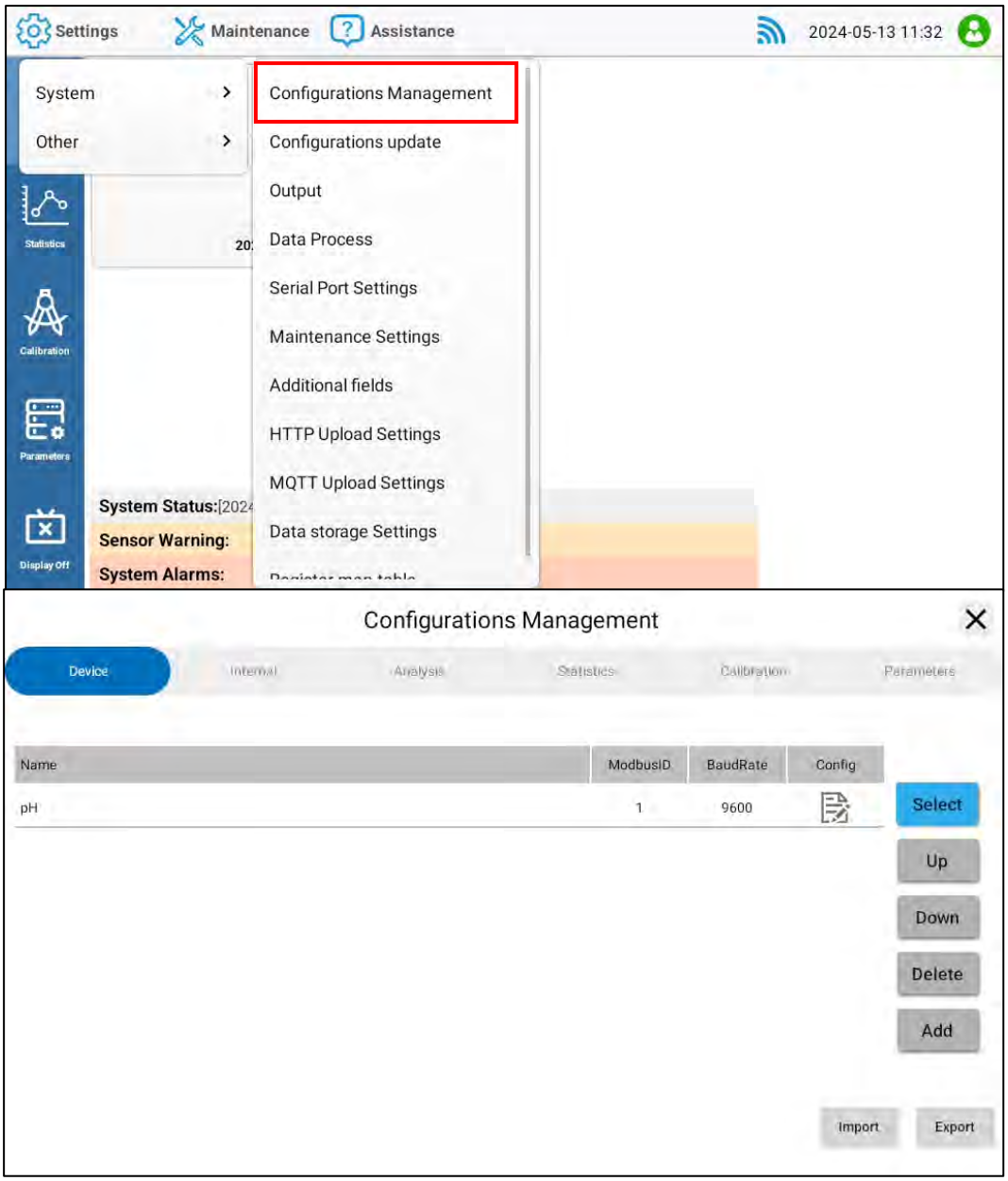
Once you have logged in, you can log out by clicking on the icon again.



7.6 System settings



7.6.1 Configurations management



Configuration management allows you to configure devices, analysis pages, statistics pages, calibration pages, and parameter pages.

7.6.1.1 Add device

Select mode: Click Select to enter the selection mode, which allows you to move or delete the devices edited on the left.

Up: Moves the selected device configuration up.

Down: Moves the selected device configuration down.

Delete: Deletes the selected device.

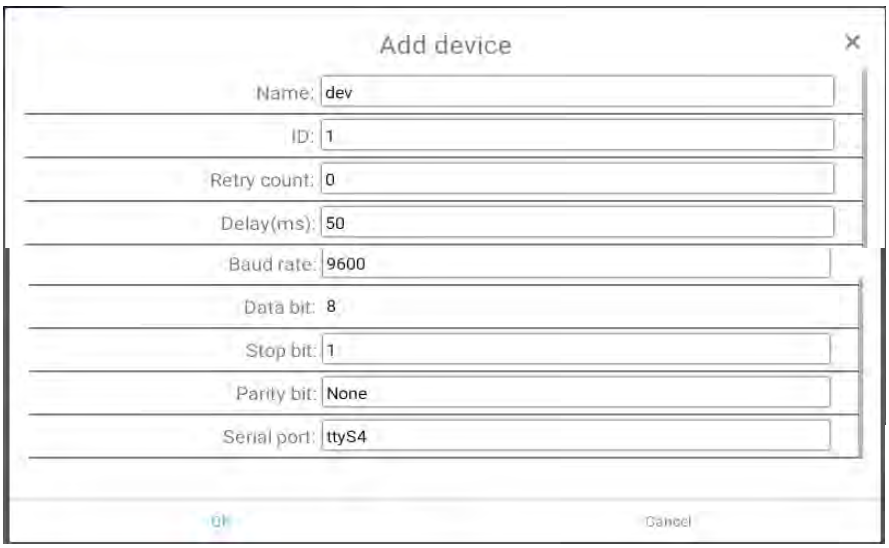
Add: Add a new device configuration.

Import: Imports a previously written device configuration.

Export: Exports the currently written device configuration.

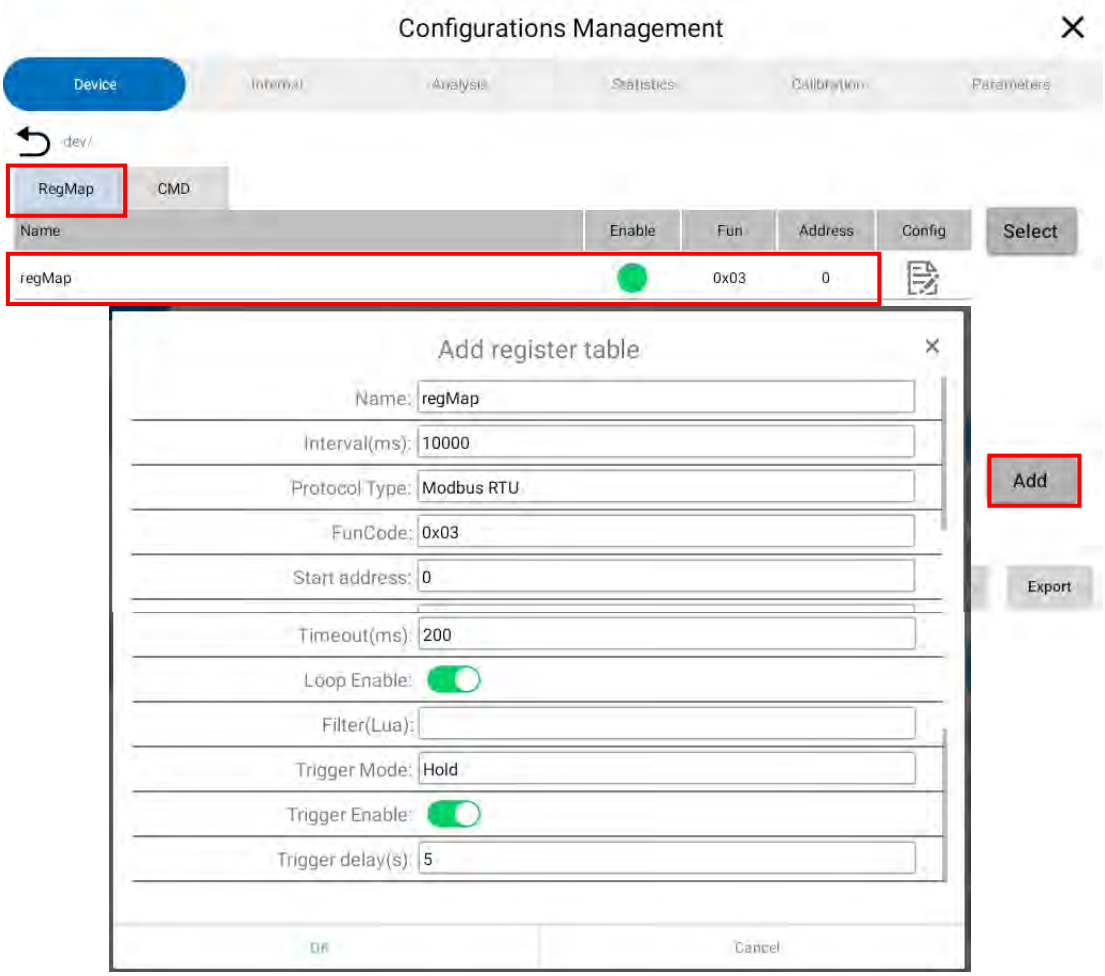
: Edit device information or register.

Add device



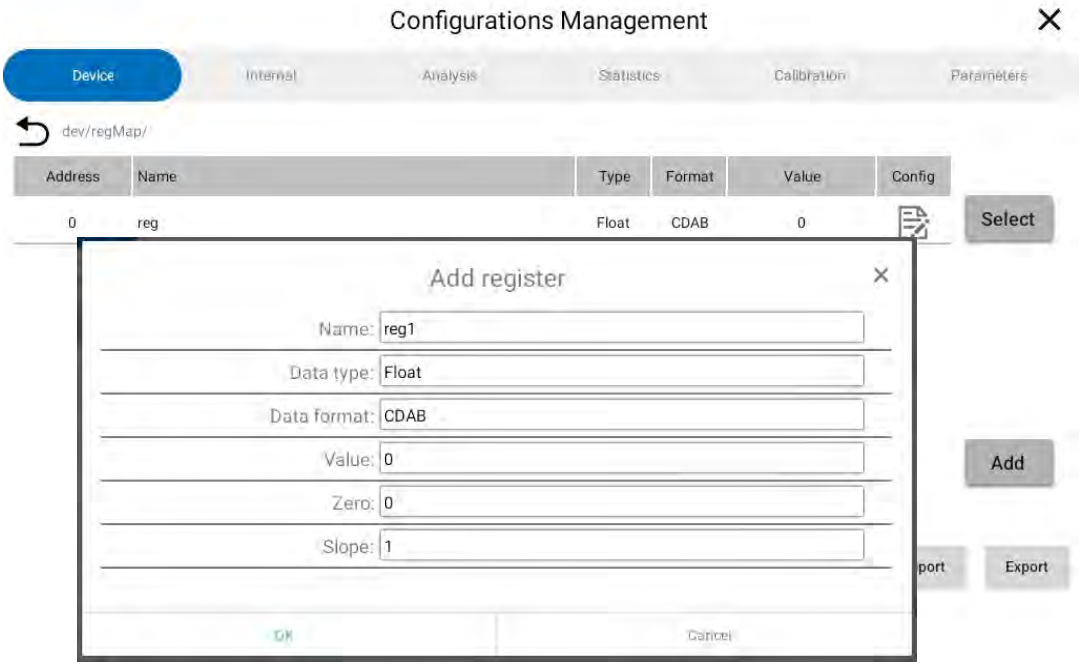
Name: Device name, not repeatable.
ID: Device ID, not repeatable.
Retry count: The number of times the device fails to communicate and attempts to reconnect.
Delay (ms): Communication delay of the device.
Baud rate: Device baud rate.
Data bit: 8.
Stop bit: 1 or 2.
Parity bit: None, Odd, Even.
Serial port: None (Unassigned ports), ttyS4 (Primary port), ttyS9 (Expansion module port). See 3.2 Internal board interface for port definitions.

Add register



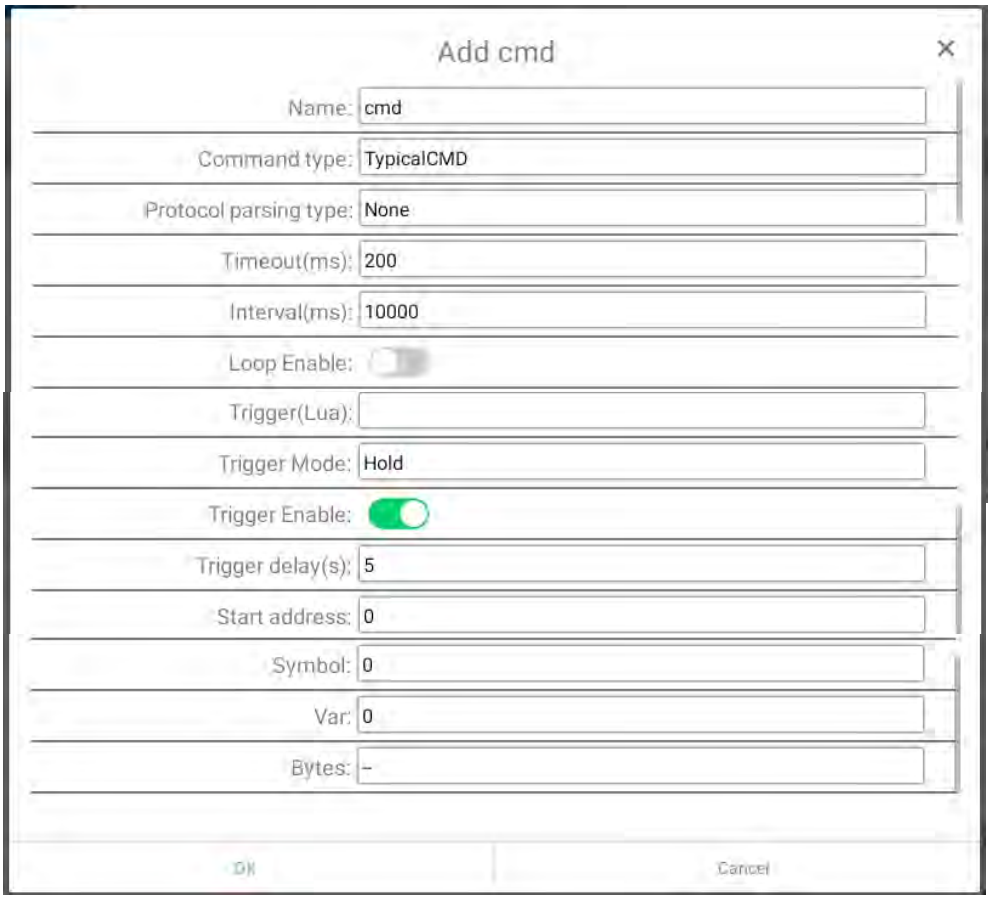
Name: register table name, not repeatable.
Interval(ms): register read/write interval.
Protocol type: Modbus RTU, Custom.
FunCode: 0x01, 0x02, 0x03, 0x04, 0x05, 0x06, 0x0F, 0x10, Inner.
Starting address: register starting address, query the sensor user manual register table.

Timeout(ms): Register read timeout duration, after the timeout the device display offline.
Loop Enable: Whether the registers are read or written at the interval set above.
Trigger (Lua): Script editor.
Trigger Mode: Hold, Rising edge, Falling edge.
Trigger Enable: Script trigger enable switch.
Trigger delay: Trigger execution delay.



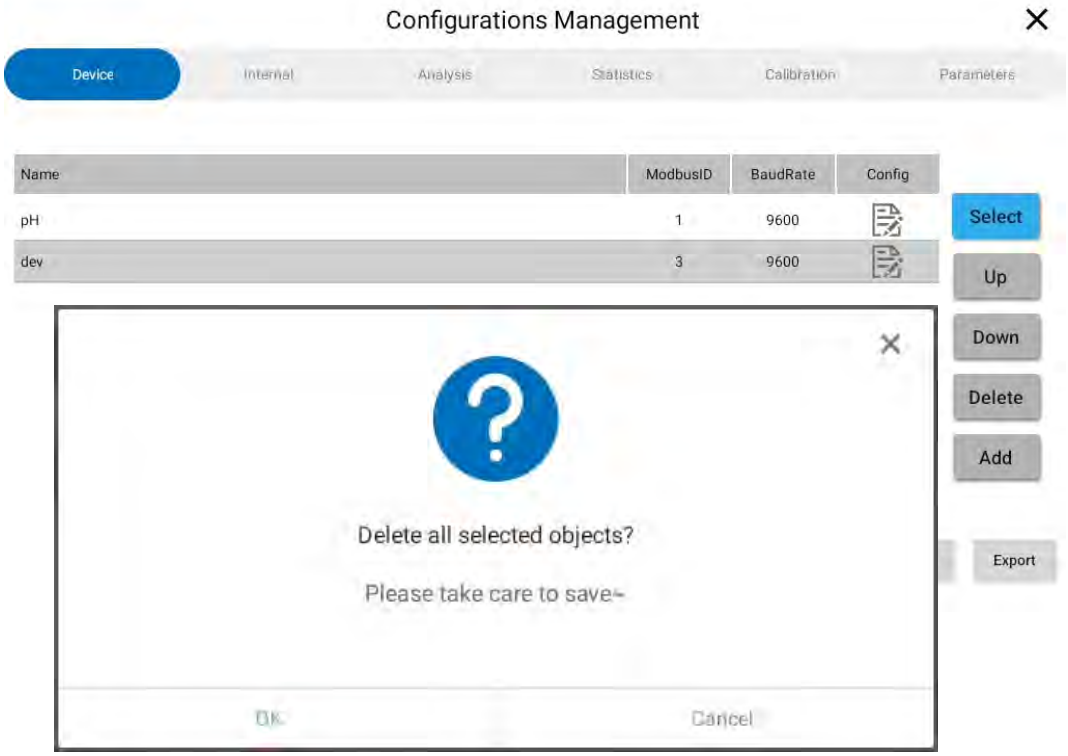
Name: Register name, not repeatable.
Data type: Uint16, Uint32, Int16, Int32, Float, BIT32, BOOL.
Data format: Select different data format according to the device register list
Value: Read or write value.
Zero: Parameter offset, default 0.
Slope: Parameter slope, default 1.

Add CMD



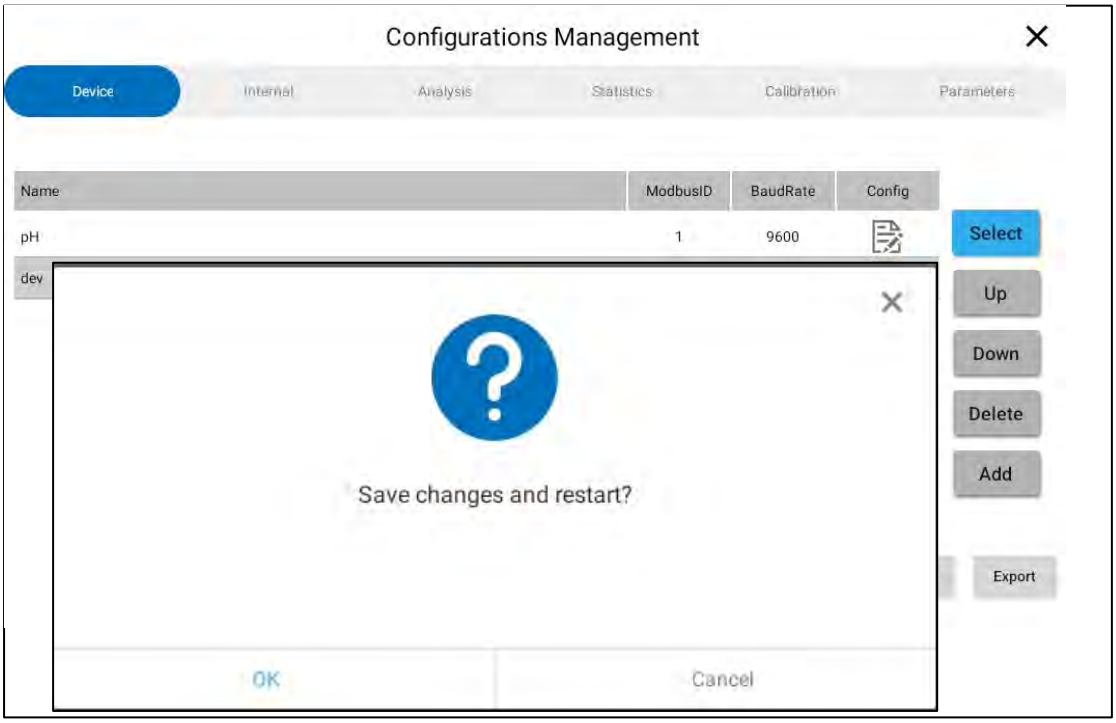
Name：Register name, not repeatable.
Command Type: TypicalCMD, CustomCMD.
Protocol parsing type: None, SAC.
Timeout(ms): Register read timeout, after the timeout, the device will show offline.
Interval(ms): Loop command execution interval.
Loop Enable: Switches for looping through command.
Trigger(Lua): Script editor.
Trigger Mode: Hold, Rising Edge, Falling Edge.
Trigger Enable: Script trigger enable switch.
Trigger delay(s): Delay for trigger execution.
Start address: Start address of command register, query device command register table.
Symbol: Command value high 8-bit, query device command register table.
Var: Command value low 8-bit, query device command register table.
Bytes: Custom send bytes (CustomCMD can only be executed).

Delete device



If there are devices or registers to be deleted, click Select, select the device to be deleted, and click Delete.

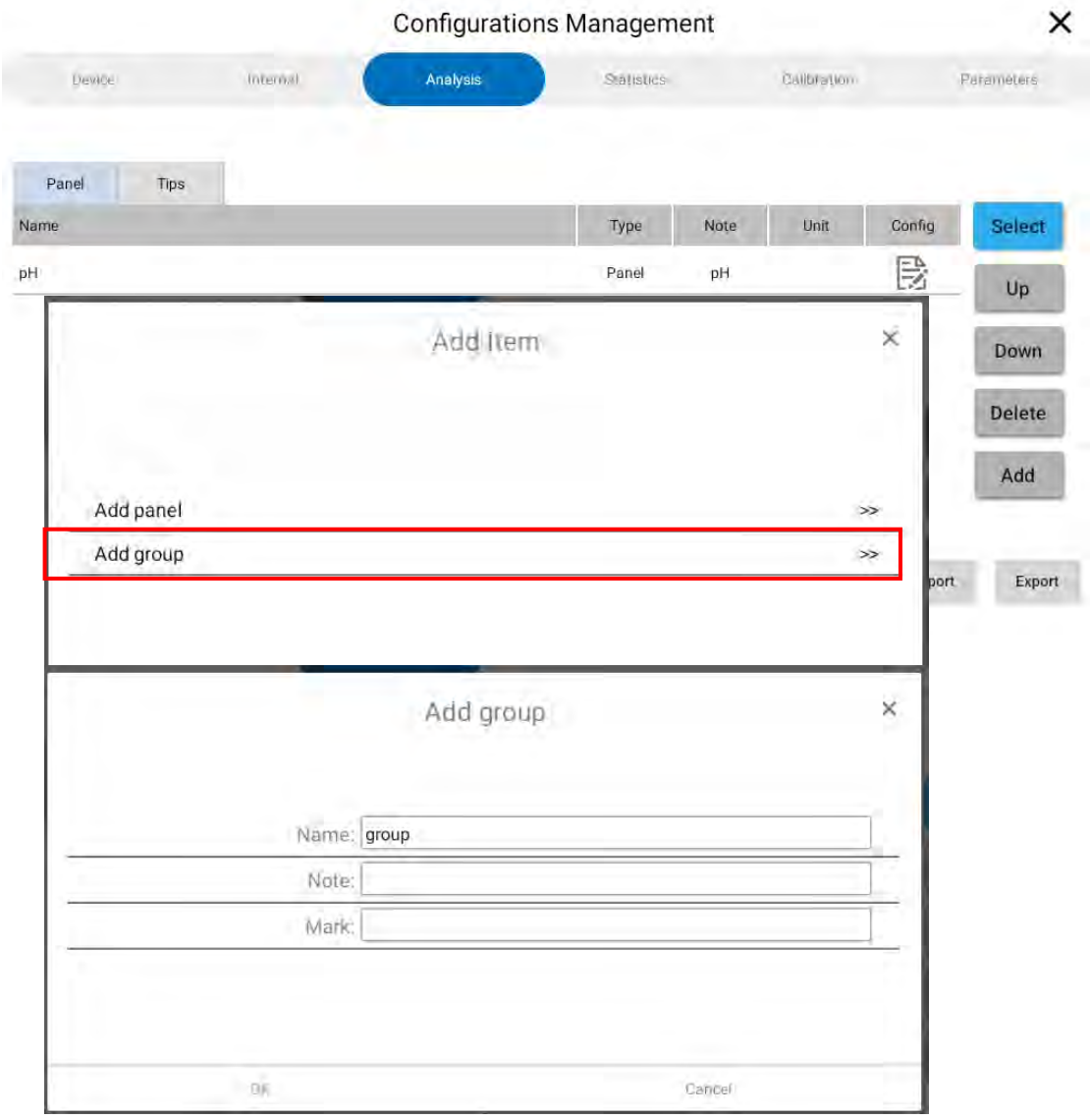
Save configuration



When the configuration is complete and you exit Configuration Management, you will be prompted to save the changes, click OK to save the configuration.

7.6.1.2 Analysis page management

Add group (if you don't need group, you can skip this step.)



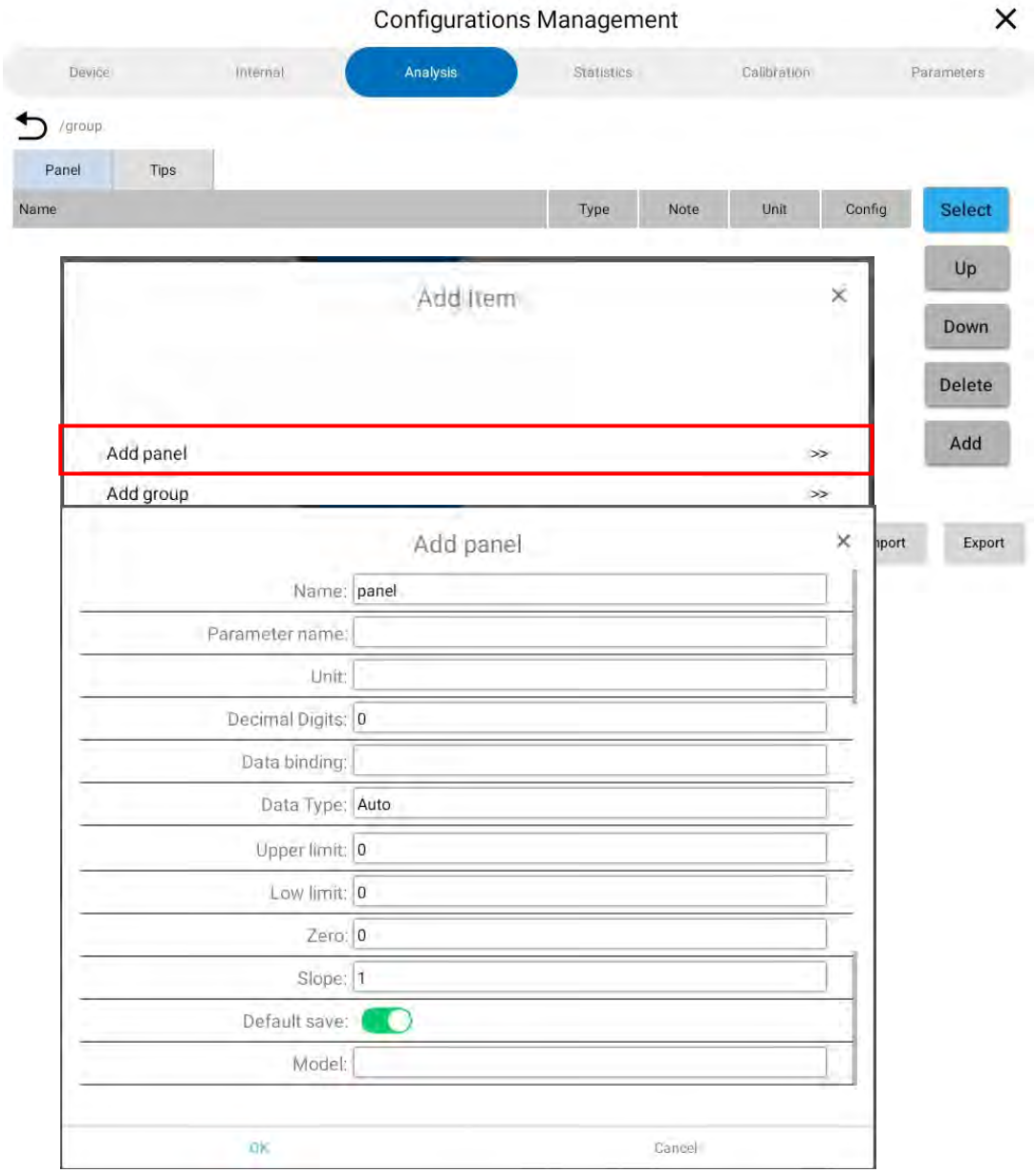
Click Add and select Add group.

Name: Name of the group, cannot be repeated.

Note: Remark 1.

Mark: Remark 2.

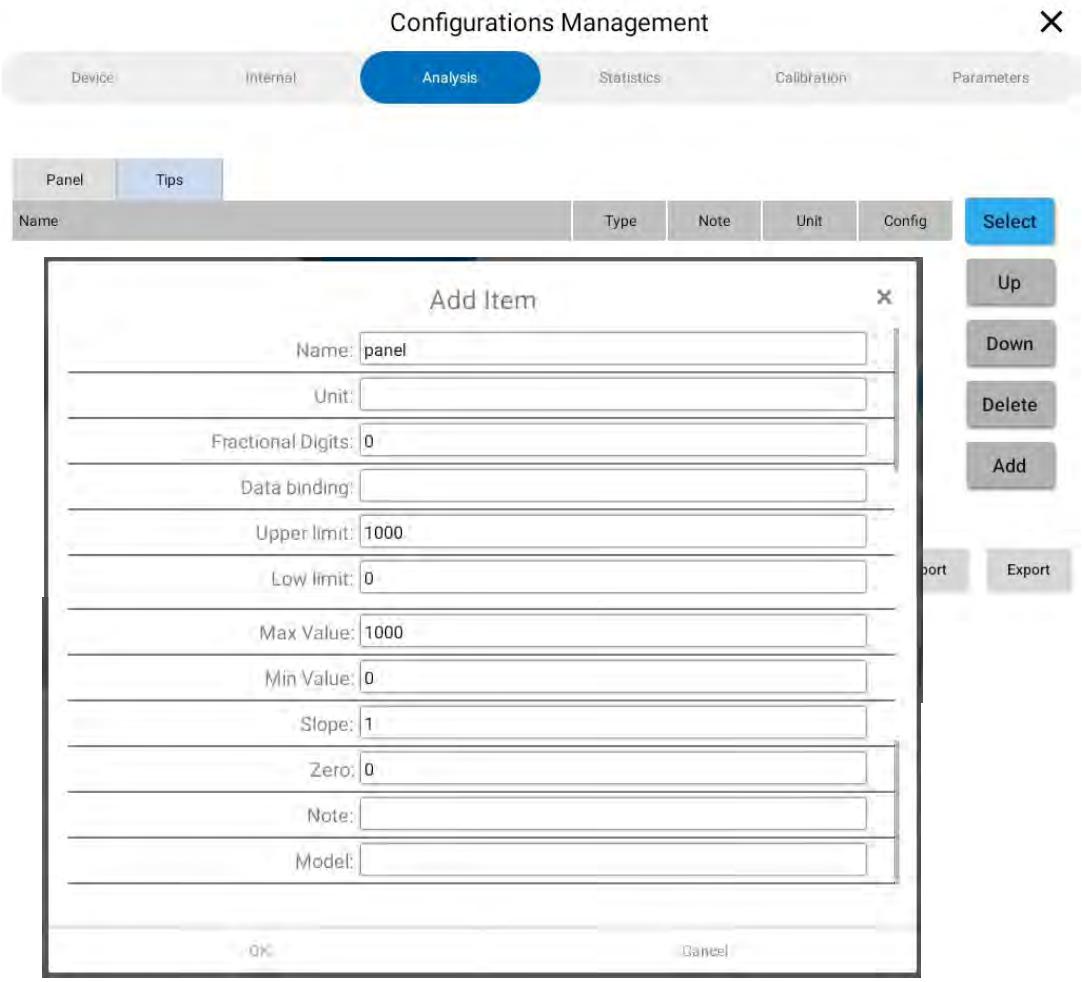
Add panel



Click Add and select Add Panel.
Name: Variable name, meter controller upload name, not repeatable.
Parameter name: Parameter name, it could be repeated.
Unit: The unit of the parameter.
Fractional Digits: The exact number of decimal digits for the parameter.
Data binding: Select the parameter register in the instrument configuration.
Upper Limit: Set the upper limit of the parameter register alarms.
Lower Limit: Set the lower limit of the parameter register alarms. If the upper and lower values are not equal, the device will automatically add the parameter's status register.
Zero: Parameter offset, default 0.

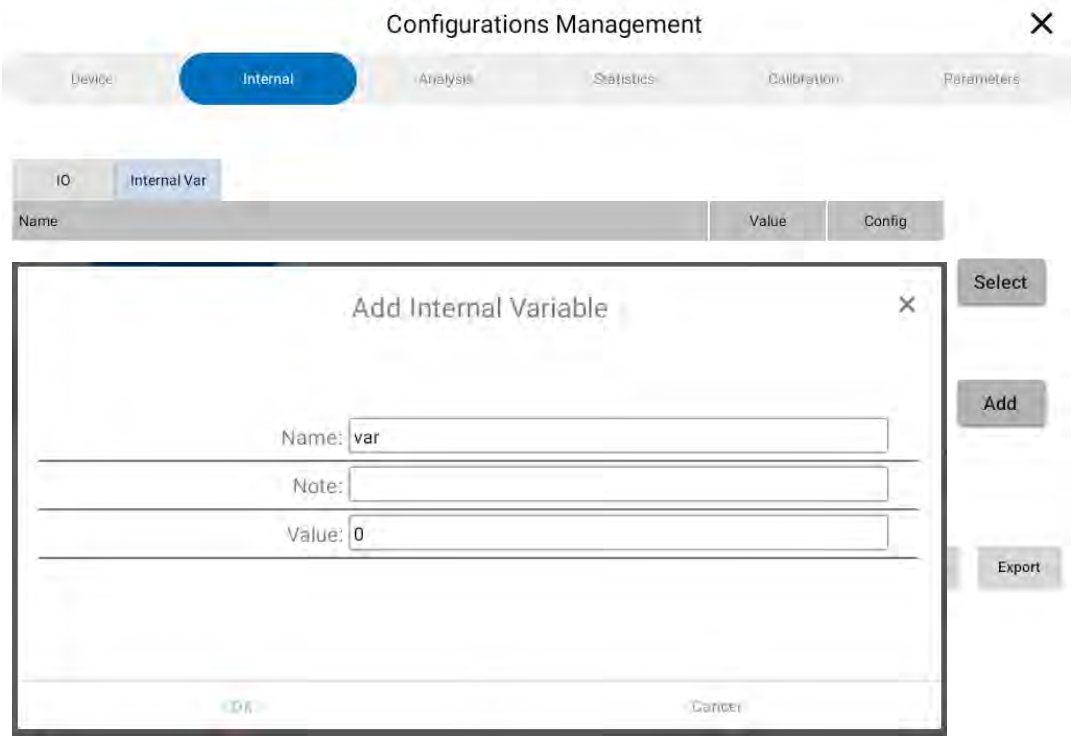
Slope: Parameter slope, default 1.
Default save: Database storage statistics switch, on by default.
Model: parameter display script editing (default none).

Add tip



Name: Tips name, not repeatable.
Unit: Unit.
Fractional Digits: The exact number of decimal digits for the parameter.
Data Binding: Binding parameters.
Upper limit: Set alarm upper limit value.
Lower limit: Set the lower limit value of alarm.
Max Value: Reserved.
Min Value: Reserved.
Slope: parameter slope.
Zero: parameter offset.
Note: Note information.
Model: parameter display script editor (default none).

7.6.1.3 Internal management

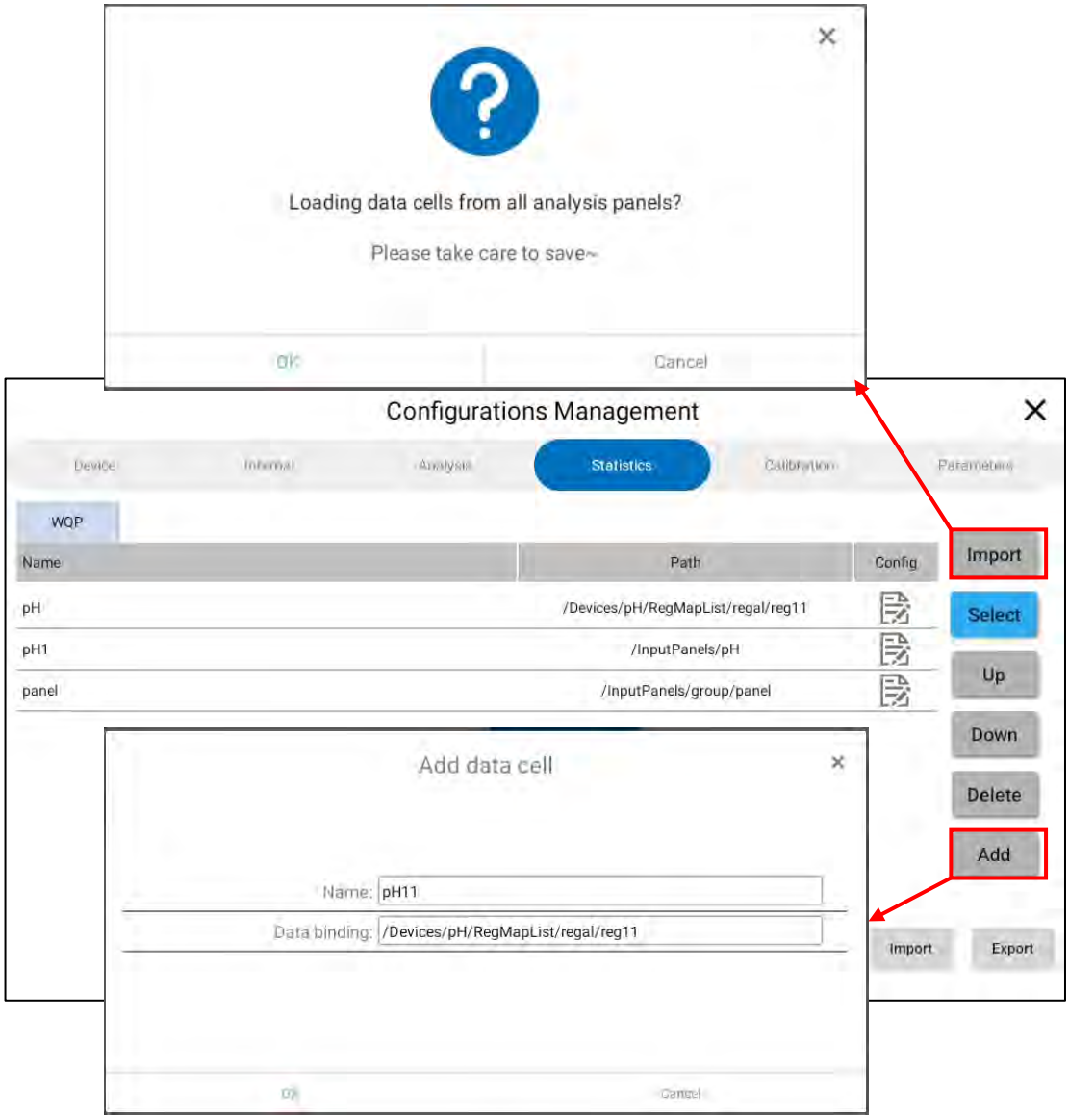


Name: Parameter name, not repeatable.

Note:Remark.

Value: Value.

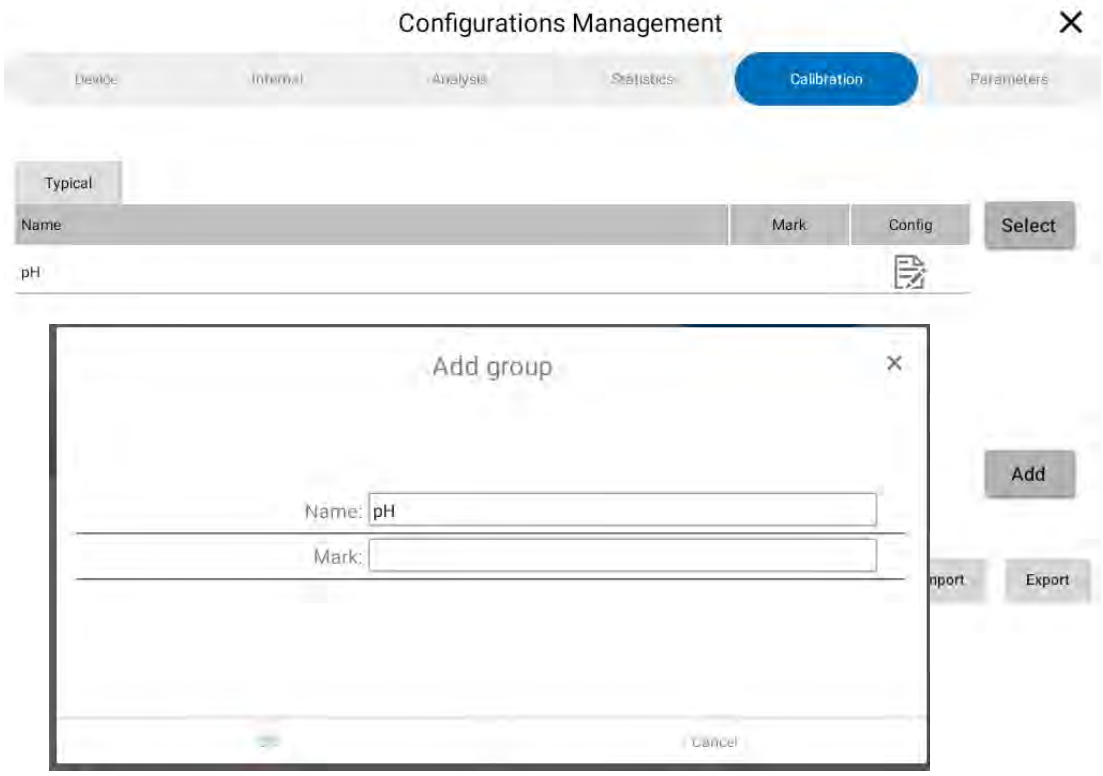
7.6.1.4 Statistics page management



1. Click Import in the upper right corner to quickly add the parameters of the bound analysis page.
2. Click Add to add the parameters to be displayed in the statistics page.
Name: The name of the parameter, cannot be repeated.
Data Binding: The data source to which the parameter is bound.
Note: Only if the statistics page is not configured in any way and the device configuration is completed to close the device management, the system will automatically load the parameter items that are stored by default in the analysis page.

7.6.1.5 Calibration page management

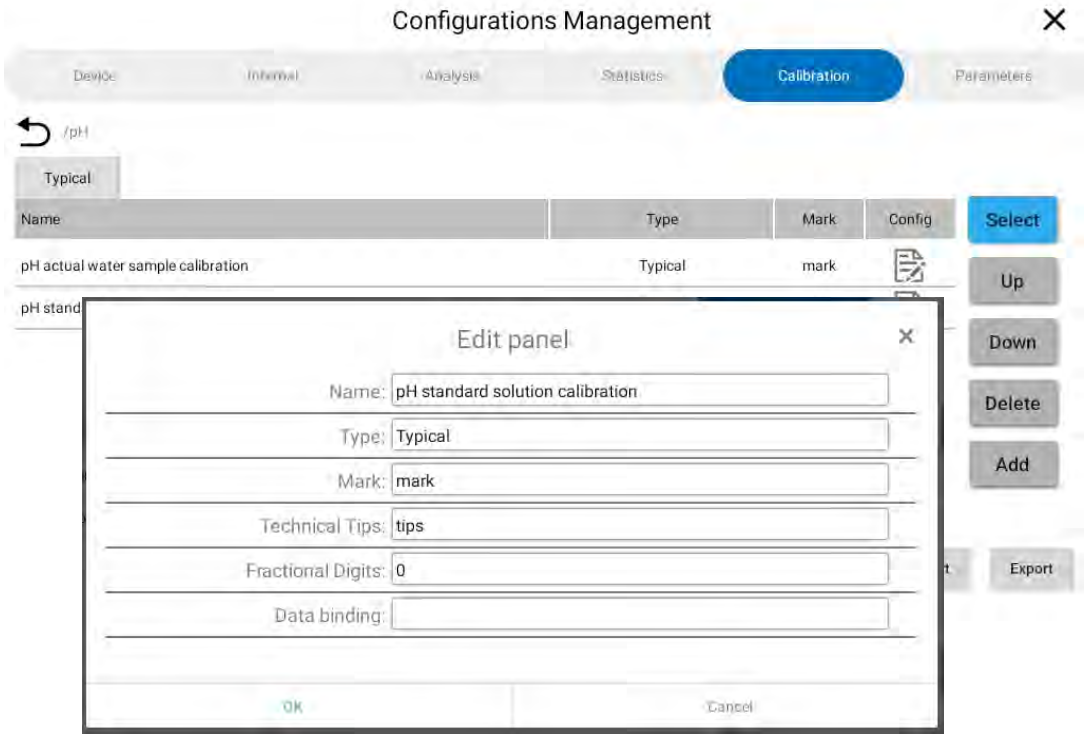
Add device group



Name: Device name, not repeatable.

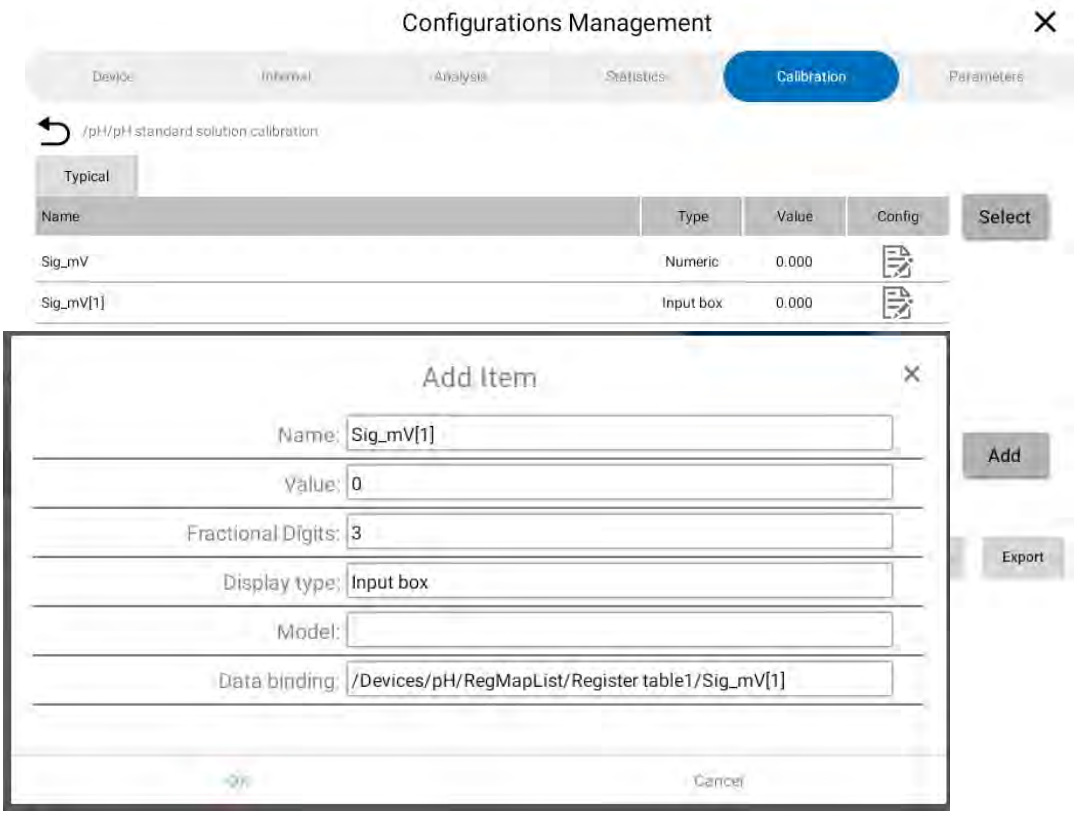
Mark: Remarks.

Add parameter group



Name: Panel name, not repeatable.
Type: Typical, Linear, SlopeZero.
Marker: Remarks information.
Technical Tips: Note message.
Fractional digits: Fractional digits.
Data binding: Data source binding (only linear and slope offsets need to be used).

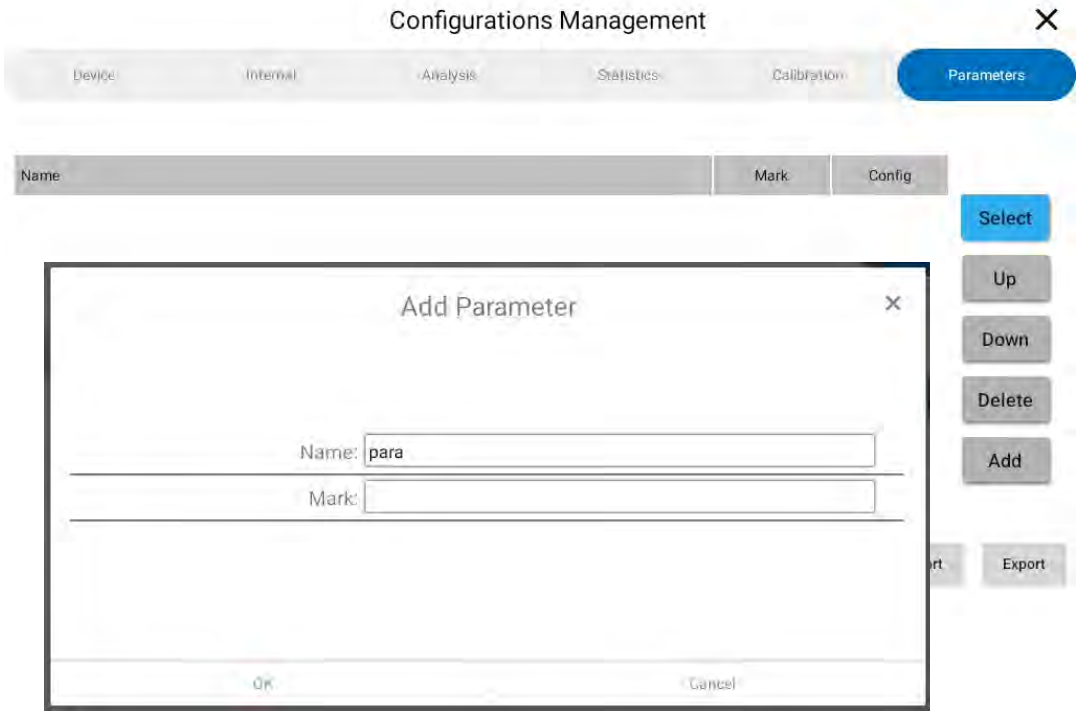
Add calibration sub-option



Click Add to edit the group members.
Name: Parameter name, not repeatable.
Value: When the display type is button, the target value will be sent after clicking.
Decimal digits: Number of decimal digits to display.
Display type: Numeric, Input box, Button, Switch, Block button.
Model: Script editing.
Data Binding: Bind to a data source.

7.6.1.6 Parameter page management

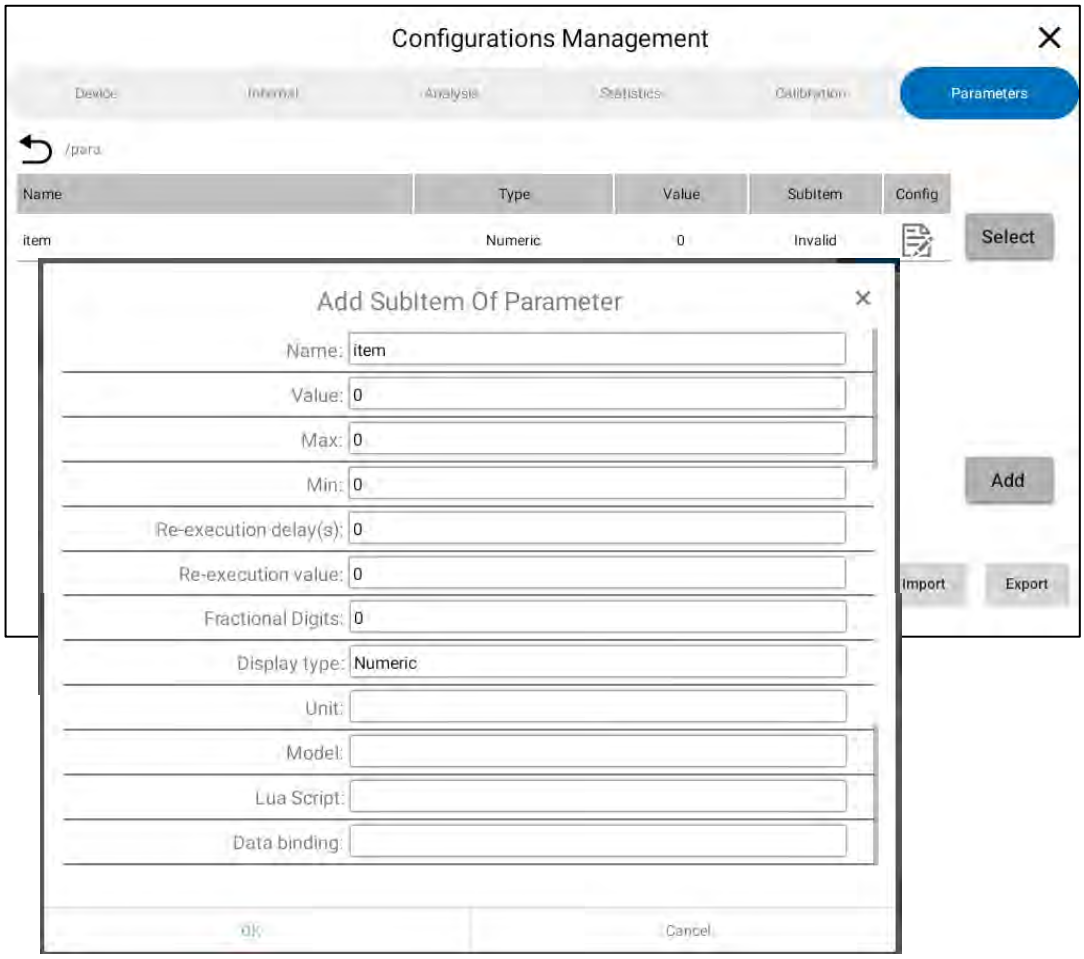
Add group



Name: Parameter name.

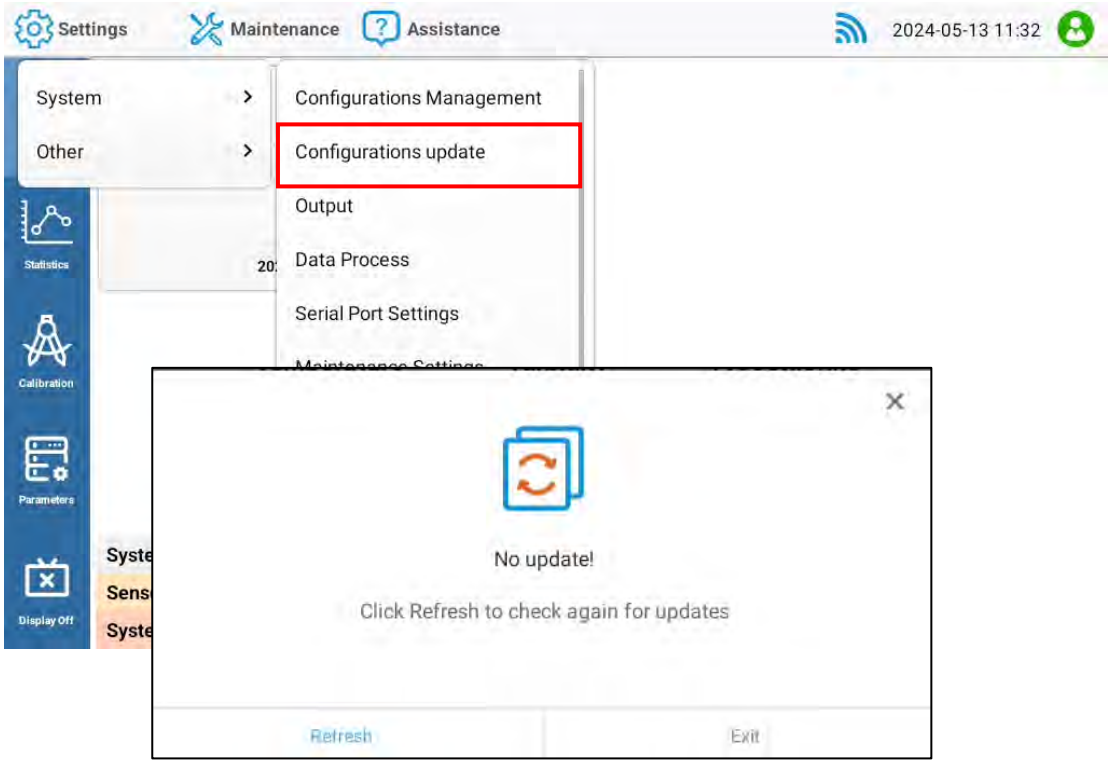
Marker: Remarks information.

Add subitem of parameter



Name: Parameter name, not repeatable.
Value: If the display type is a button, the target value is sent when clicked.
Max: The upper limit of the set value when the function is to read or write the value.
Min: Lower limit of the set value when this function reads or writes the value.
Re-execution delay(s): Re-execute the delay.
Re-execution value: Value sent on re-execution.
Fractional Digits: This function displays the number of decimal places for numeric values.
Display type: Numeric, Input box, Button, Switch, Block button.
Unit: Parameter unit.
Model: Processing the raw data.
Lua Script: If the parameter object is of type button and the data binding is empty, clicking on the button will execute the Lua script.
Data binding: Binding data sources.

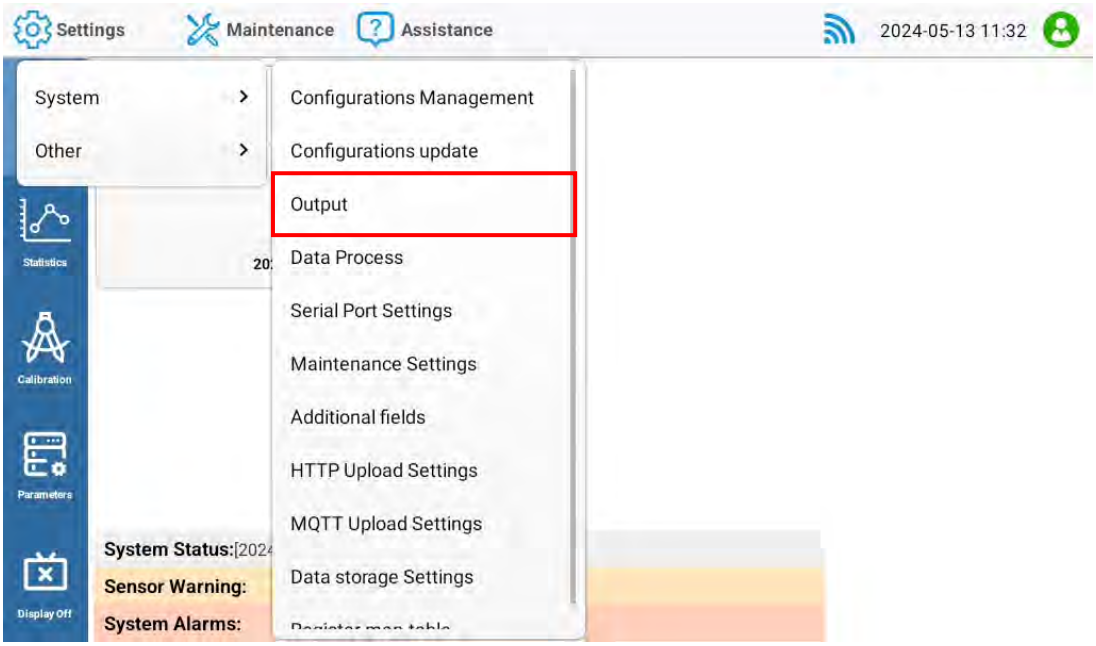
7.6.2 Configurations update



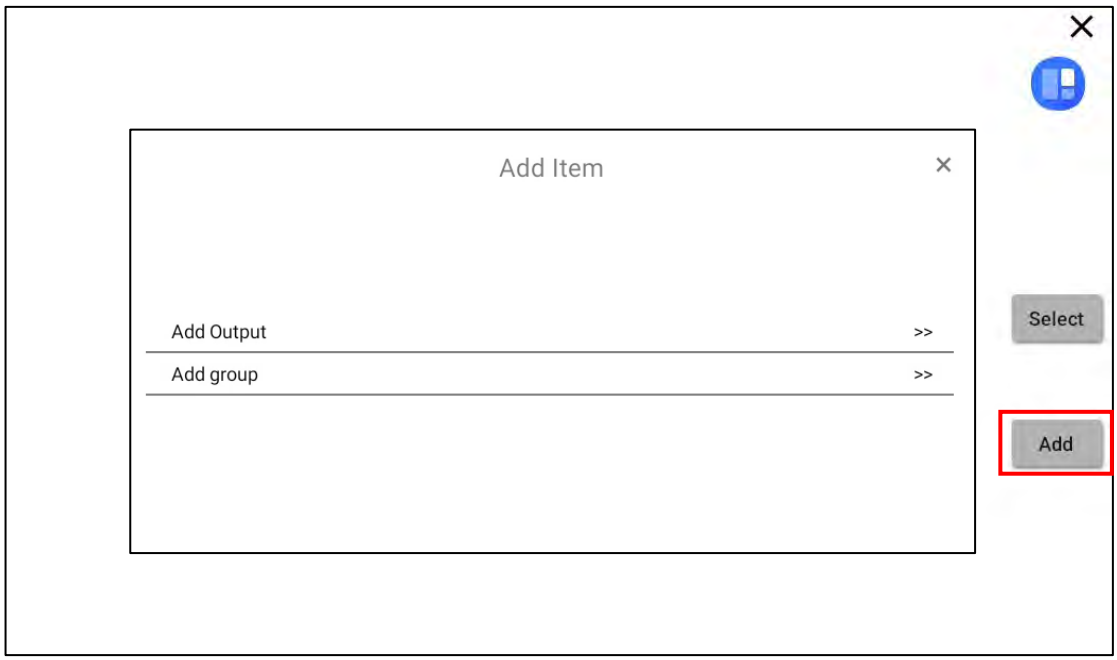
Click this setting to retrieve the device's configuration information from the network.

7.6.3 Output configuration

Click output configuration to access the analog output settings for the meter controller.



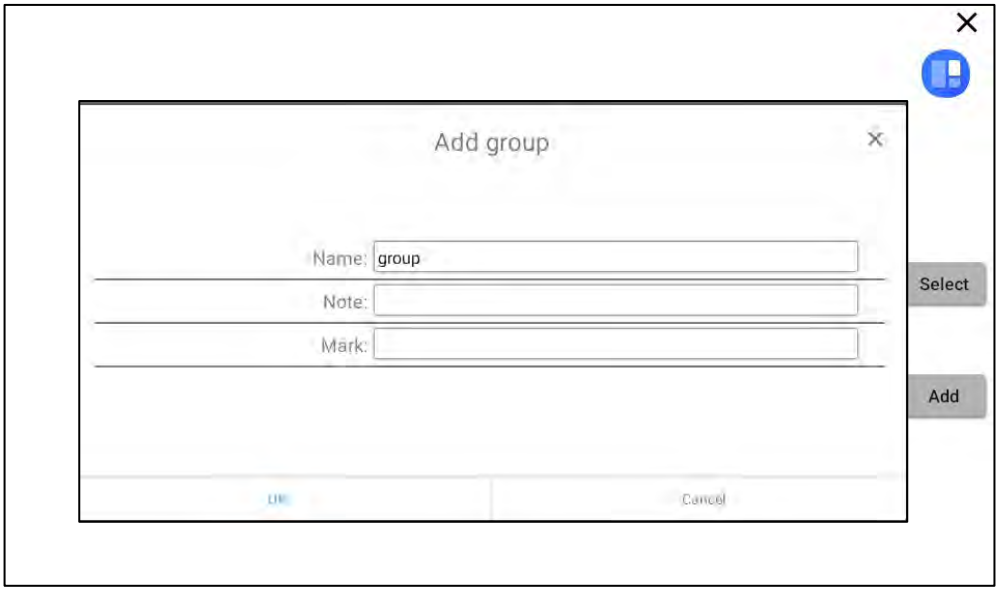
Click Add and select Add group or Output.



Add output: Add the desired output parameter panel directly.

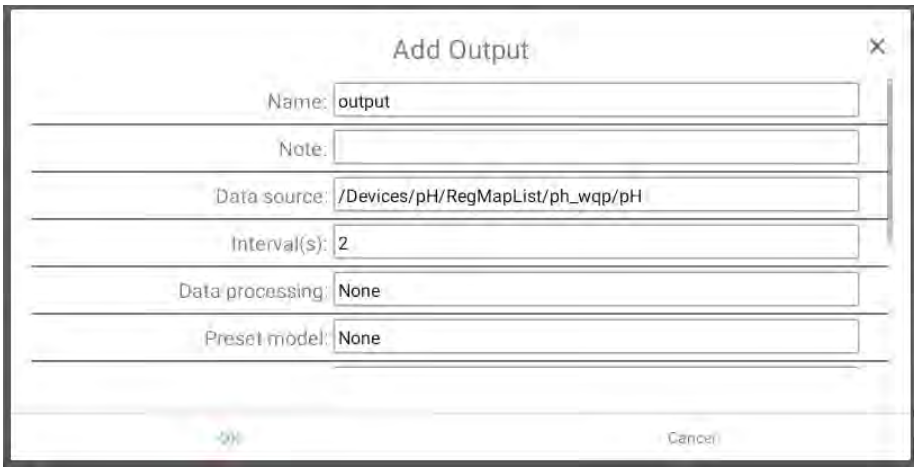
Add group: After adding the desired output parameter group, add the output parameter.

Add group



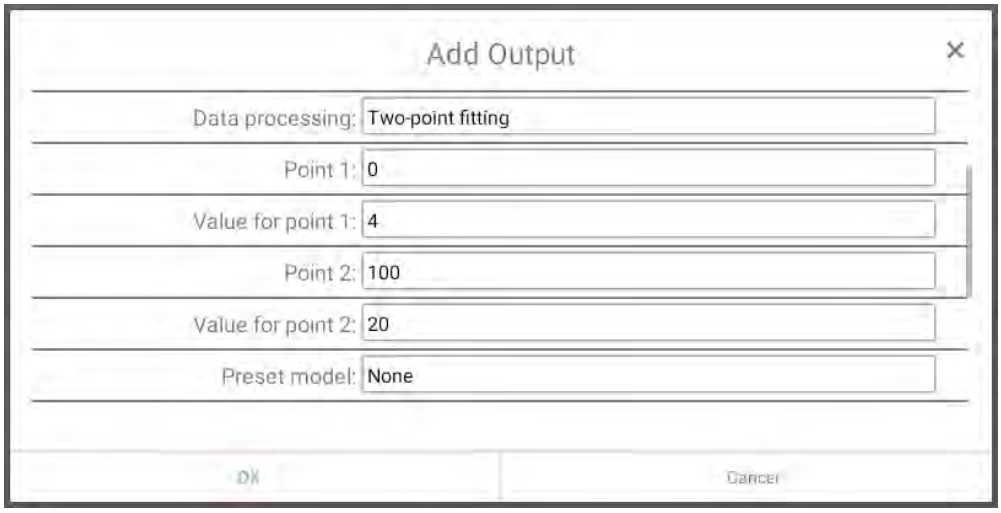
Name: Group name, not repeatable.
Note: Remarks 1.
Mark: Remarks 2.

Add output



Name: Parameter name, not repeatable.
Note: Remarks.
Data source: Binding to the parameter for which the analog output is required
Interval(s): Data refresh interval.
Data processing: (A) None, (B) Two-point fitting, (C) Lua Script (Only works if the preset model is none).

Data processing choose (B) Two-point fitting. Preset model is none.



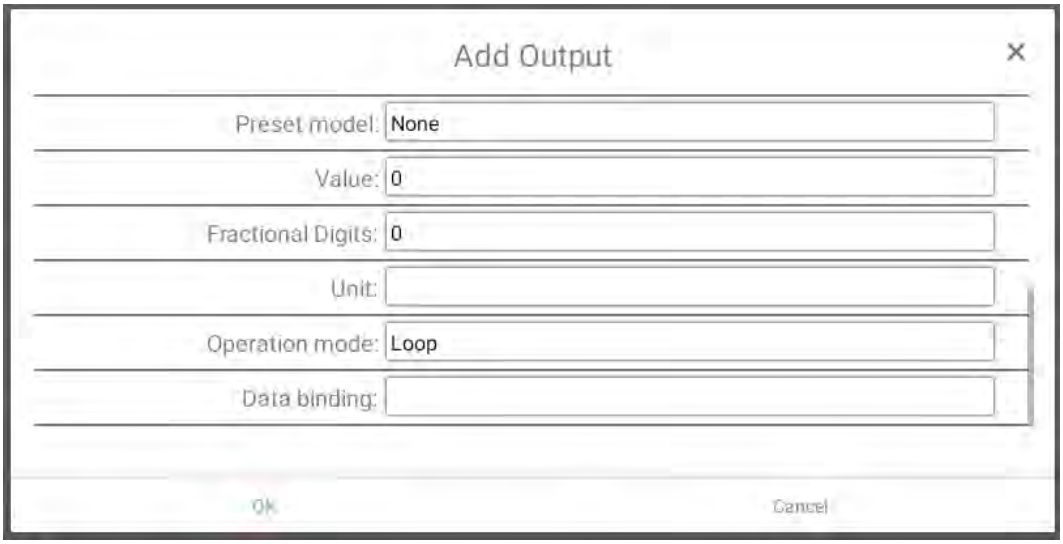
Point 1: Lower limit of the range to be output, e.g. 0 mg/L

Value for point 1: Current value corresponding to the lower limit of the range, e.g. 4 mA

Point 2: Upper limit of the range to be output, e.g. 1 mg/L

Value for point 2: Current value corresponding to the upper limit of the range, e.g.20 mA

Data processing is (A) None or (B) Two-point fitting. Preset model is None.



Value: Output fixed value.

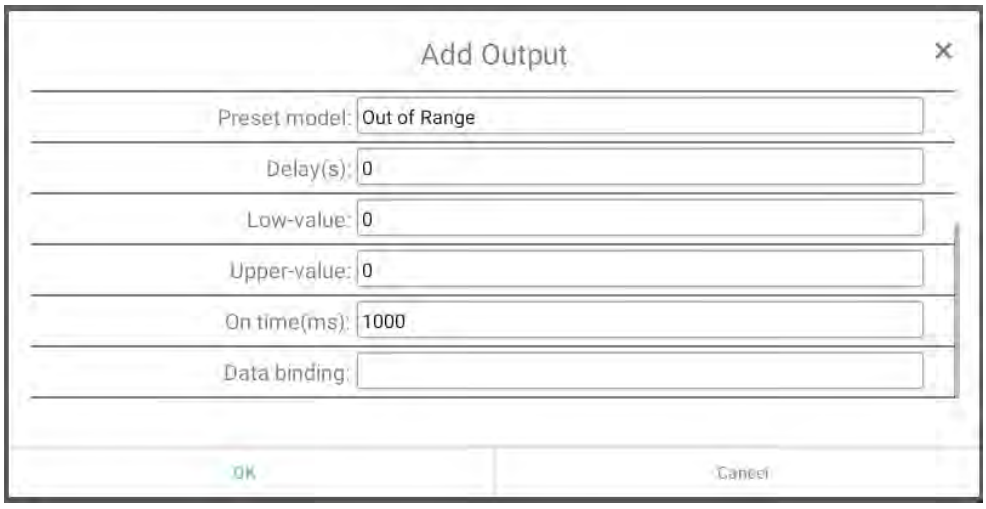
Fractional Digits: Number of decimal places.

Unit: Parameter unit.

Operation mode: Loop (Periodically acquires and outputs signals at set intervals), Stop (Turn off the signal output of this channel), Once (Turns off after executing one signal output).

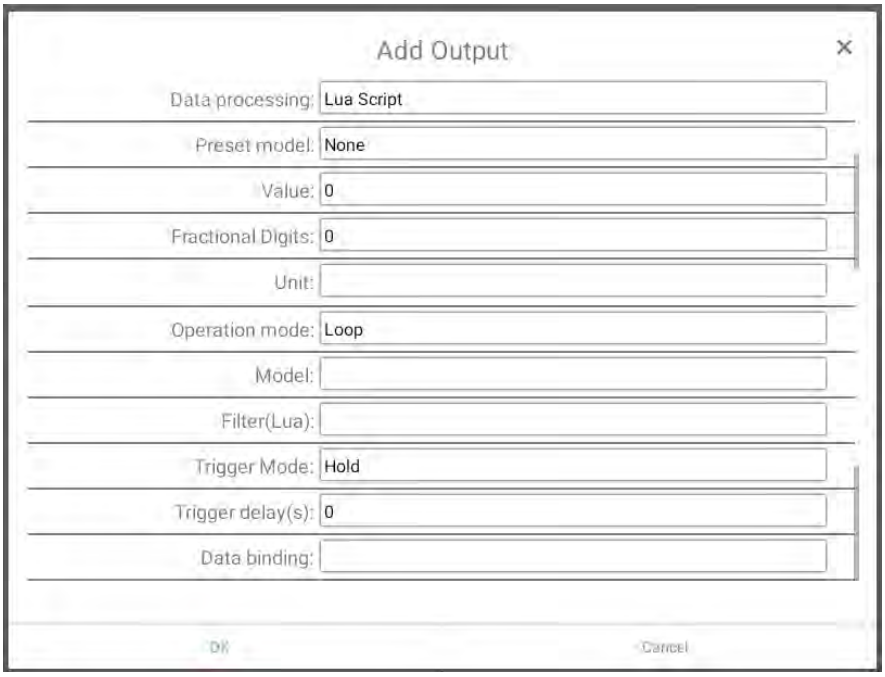
Data binding: Bind the path to the appropriate analog output module.

Data processing is (A) None or (B) Two-point fitting. Preset model is Out of Rang.



Delay(s): Output delay
Low-value: Setting the lower limit of analog output
Upper value: Setting the upper limit of analog output
On times(ms): If the value is lower than the set minimum value, the IO signal can be output to the outside for a period of time (on time).
If the value is higher than the set minimum value, the IO signal output is turned off after the on time has elapsed.
If the value is higher than the set maximum value, IO is stopped immediately.
Data binding: Bind the path to the appropriate analog output module.

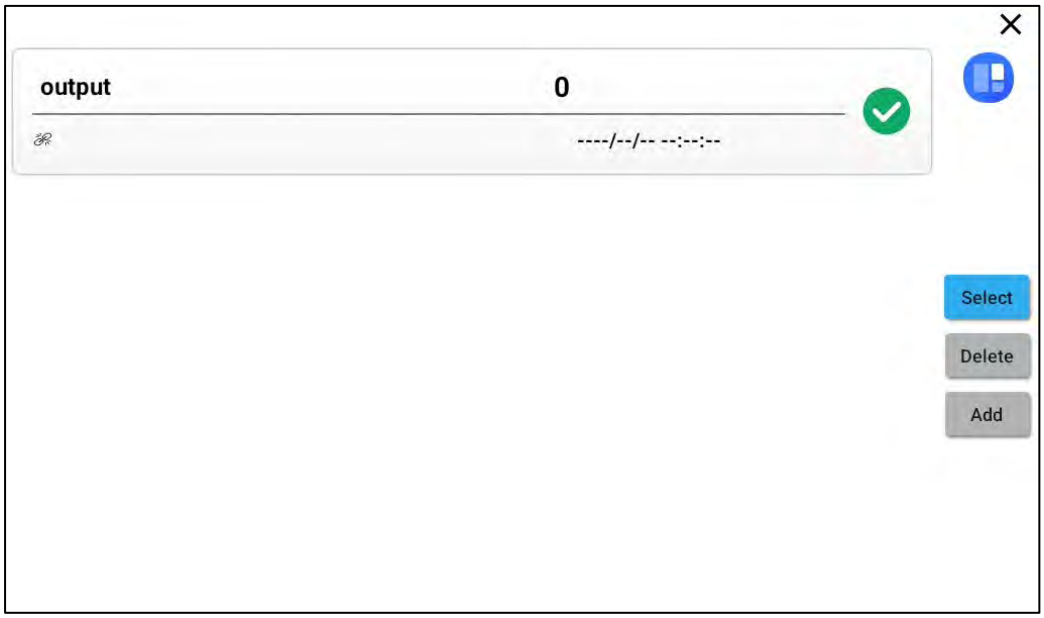
Data processing is (C) Lua Script. Preset model is None.



Value: Output fixed value.

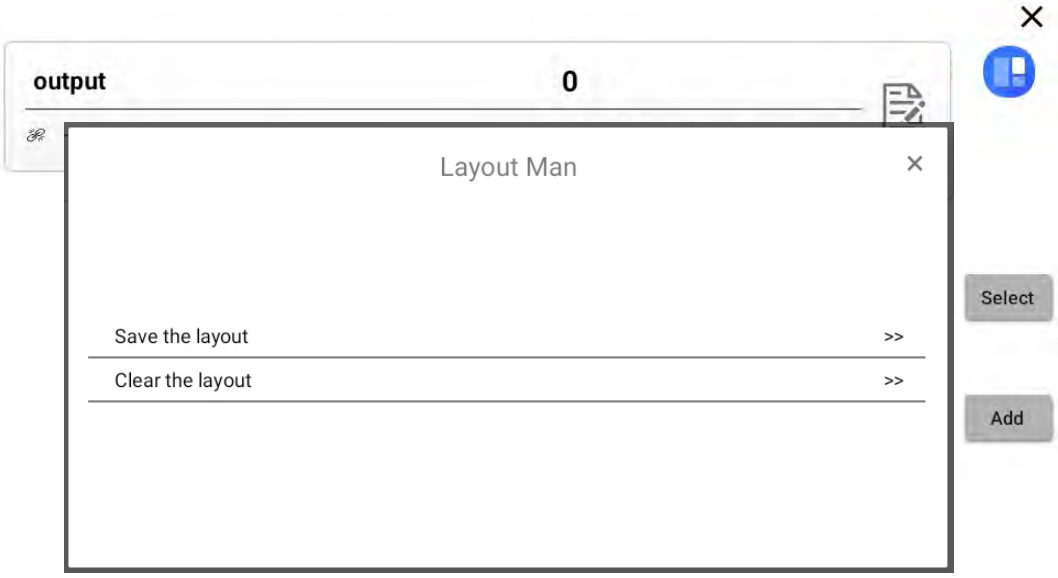
Fractional Digits: Number of decimal places.
Unit: Parameter unit.
Operation mode: Loop (Periodically acquires and outputs signals at set intervals), Stop (Turn off the signal output of this channel), Once (Turns off after executing one signal output).
Model:
Lua Script:
Trigger Mode: Hold, Rising edge, Falling edge
Trigger delay(s): Script triggered delay
Data binding: Bind the path to the appropriate analog output module.

Delete panel



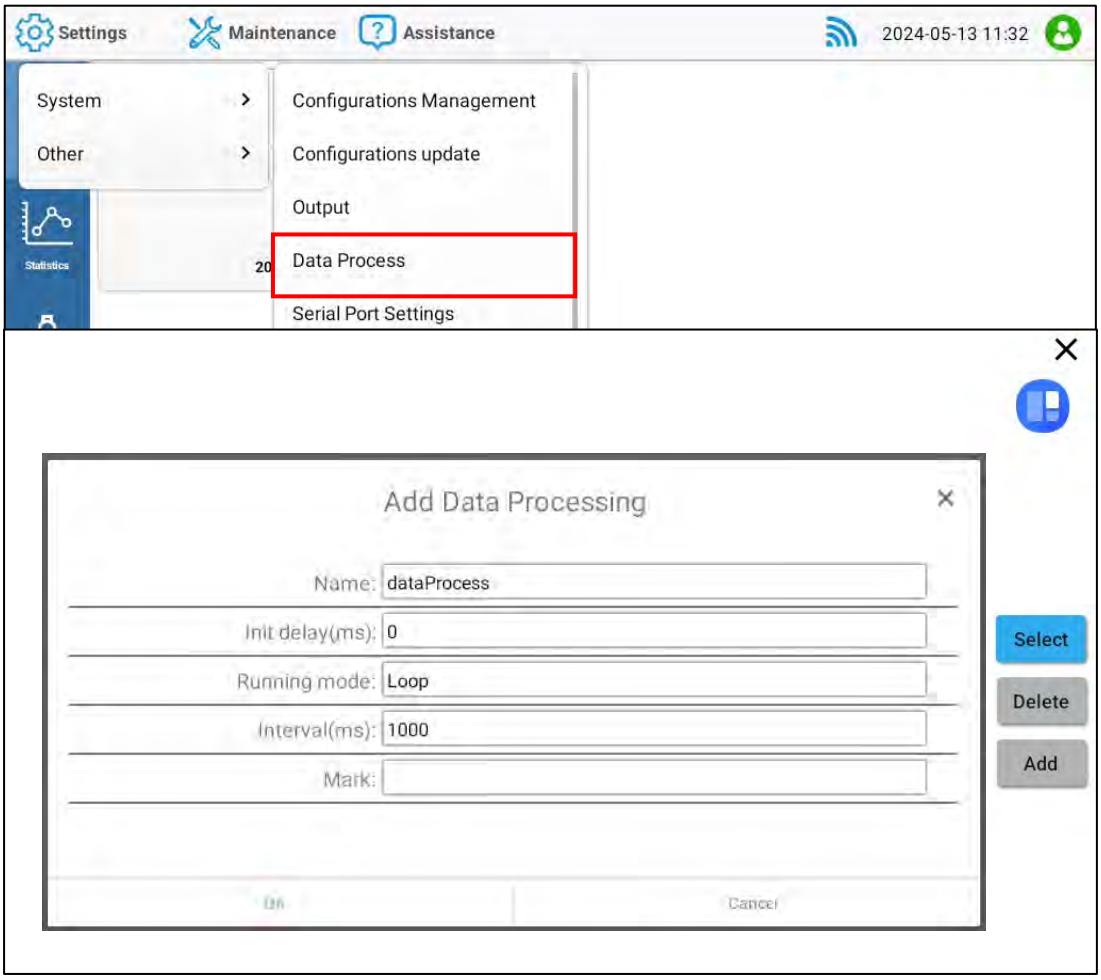
Click the Select, and choose the panel witch you want to delete, then click the Delete

Save the layout



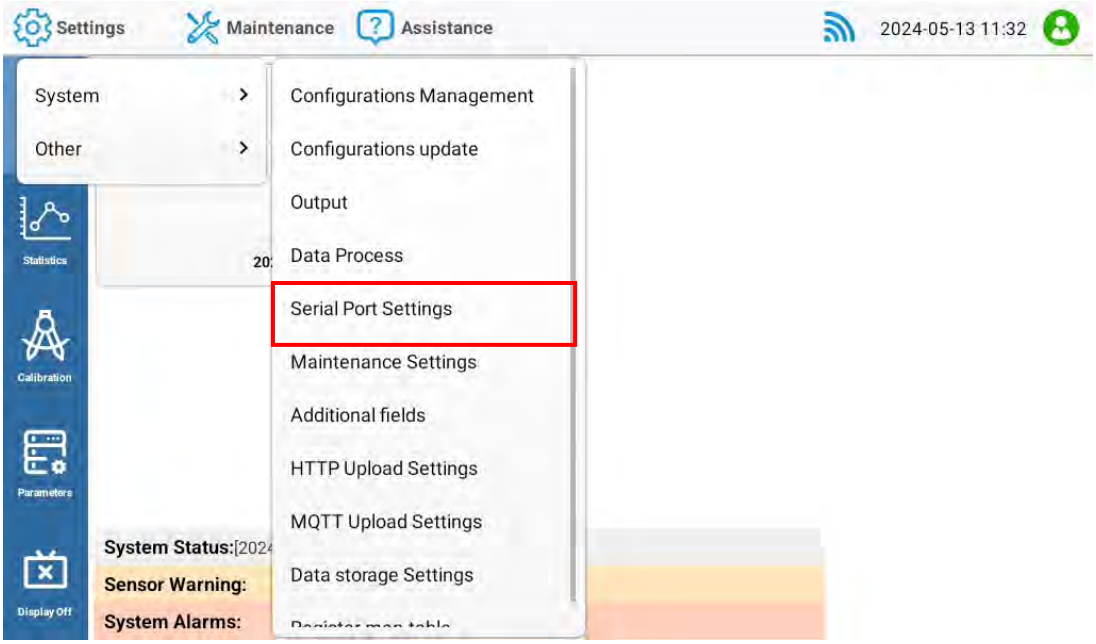
If the configuration has changed, you must click the icon in the upper right corner and select Save Layout. Otherwise, the settings will be invalid after powering off and restarting the device.

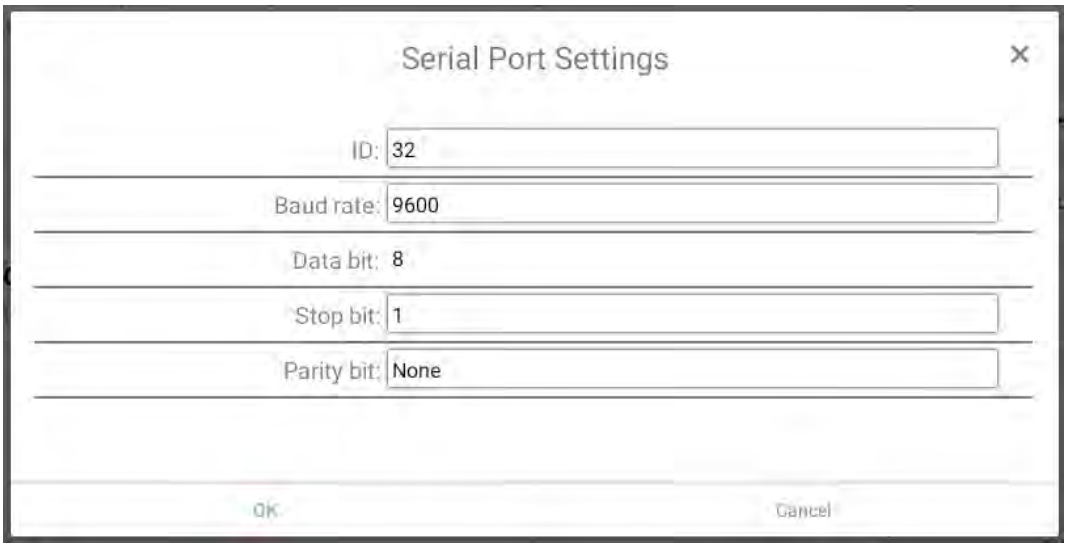
7.6.4 Data process



Data processing is a data processing unit with multiple inputs and outputs, and the processing logic is a custom Lua script.
Name: Name of the parameter, not repeatable.
Init delay(ms): Script start delay.
Run mode: Loop, Once.
Interval(ms): interval between loop executions.
Marker: Remarks information.

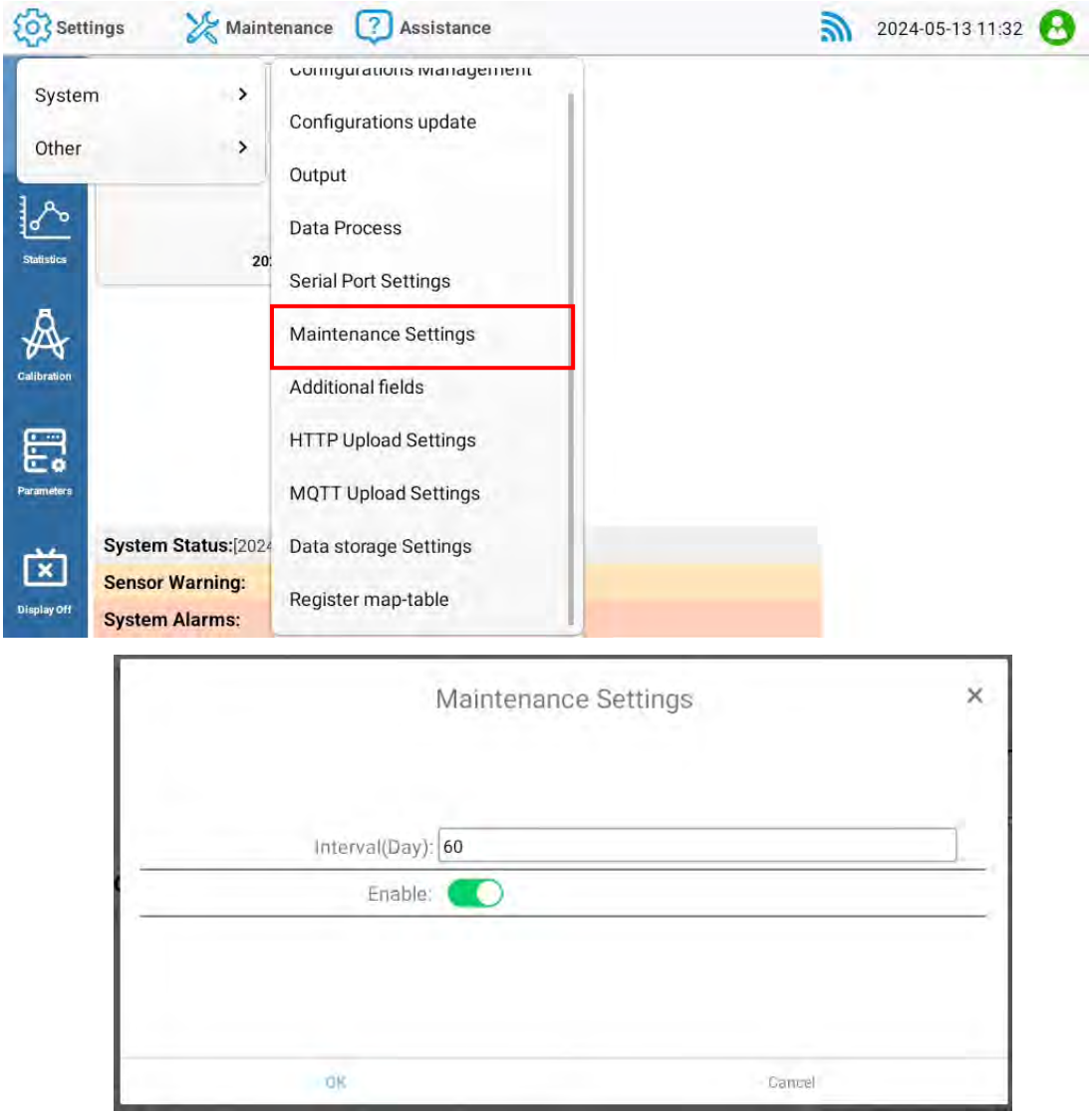
7.6.5 Serial port settings





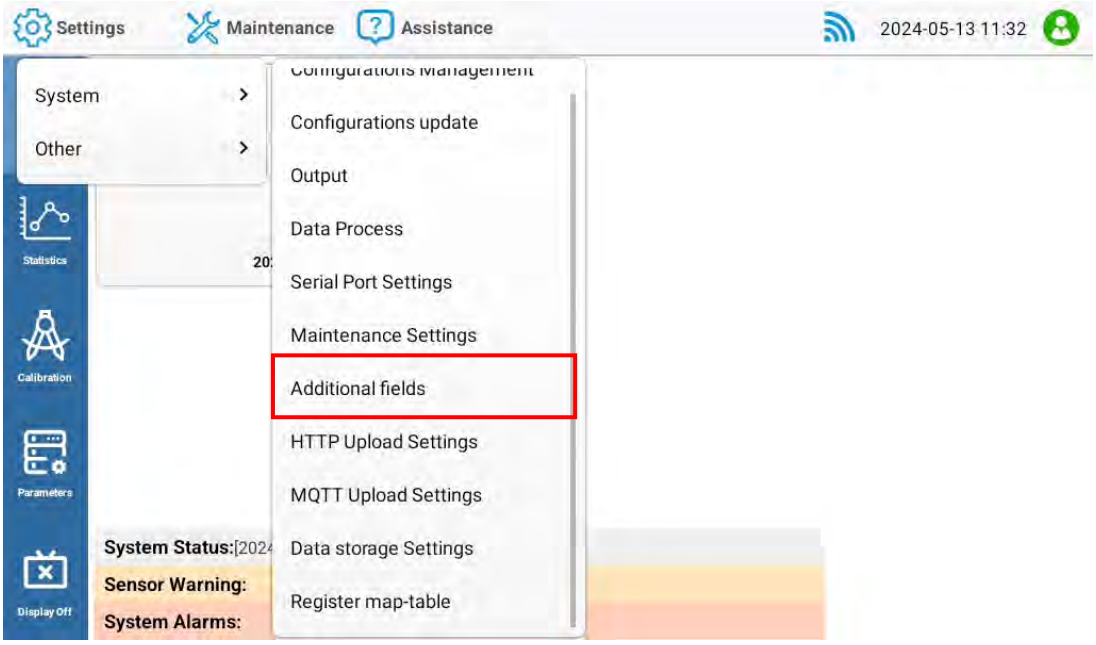
ID: ID of the meter controller as a slave, default 32
Baud rate: Baud rate of meter controller, default 9600
Data bits: 8
Stop bit: default 1
Check Bit: None, Odd, Even, Default None.

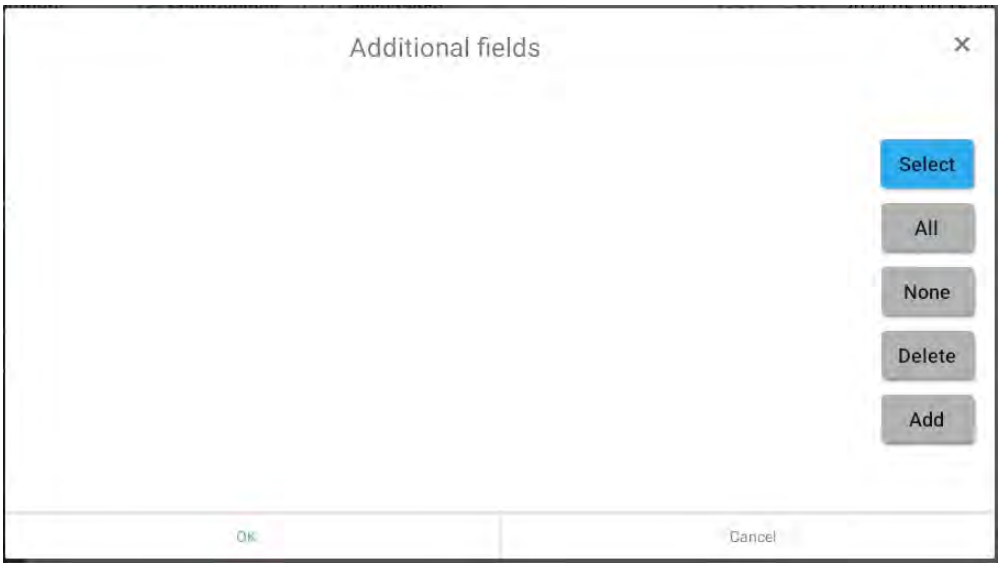
7.6.6 Maintenance settings



Interval(Day): Setting up maintenance intervals.
Enable: Maintenance tips on or off switches.

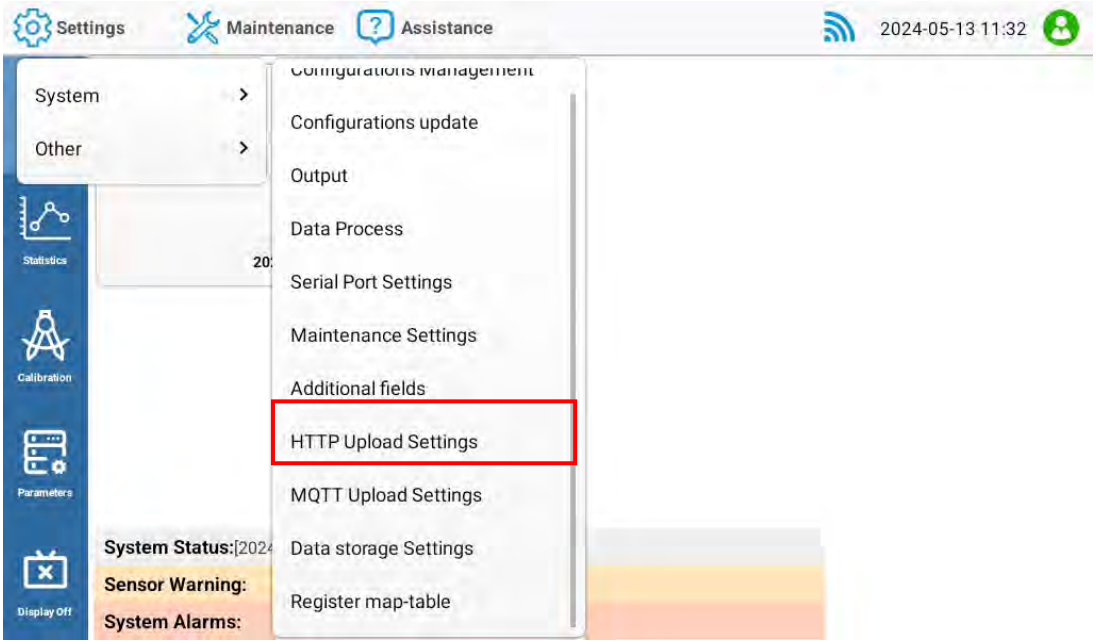
7.6.7 Additional fields

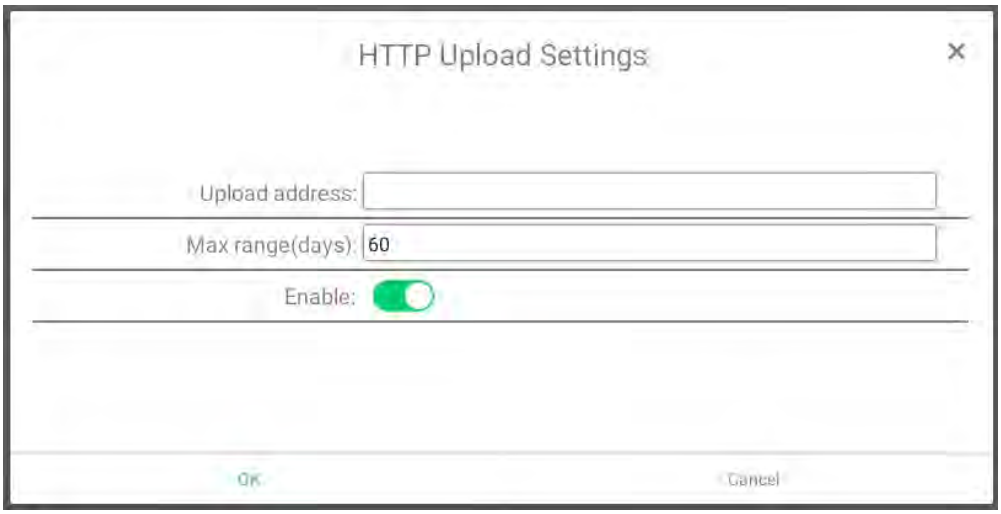




Key: Field name.
Value: Field content.
Select: Enter panel edit mode.
All: Select all.
None: Not choose any of them.
Delete: Delete the selected field.
Add: Adding fields.

7.6.8 HTTP upload settings



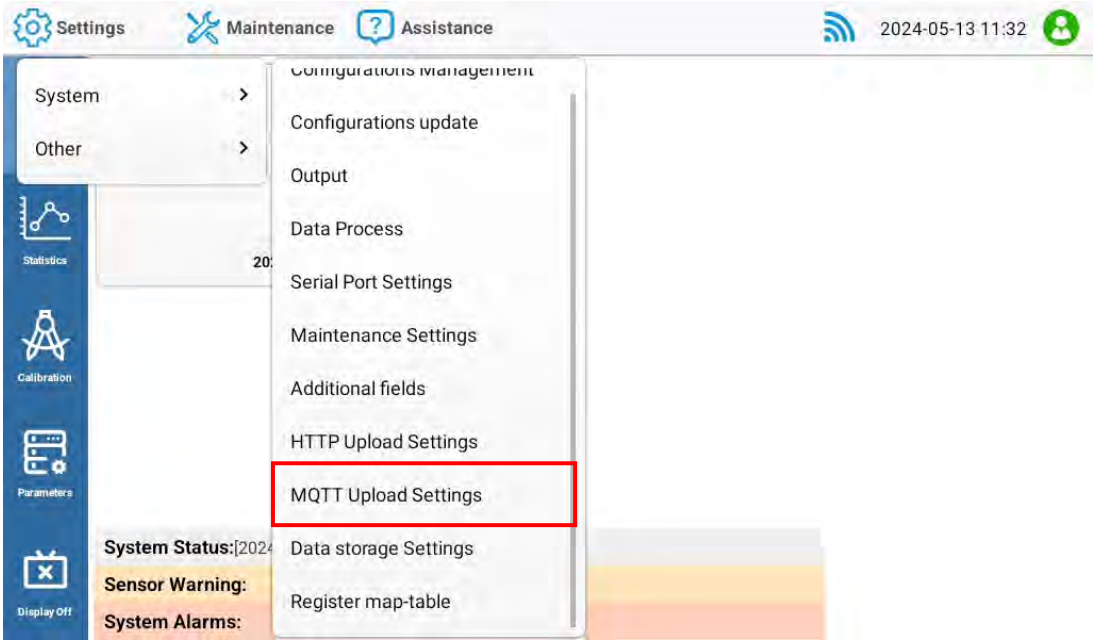


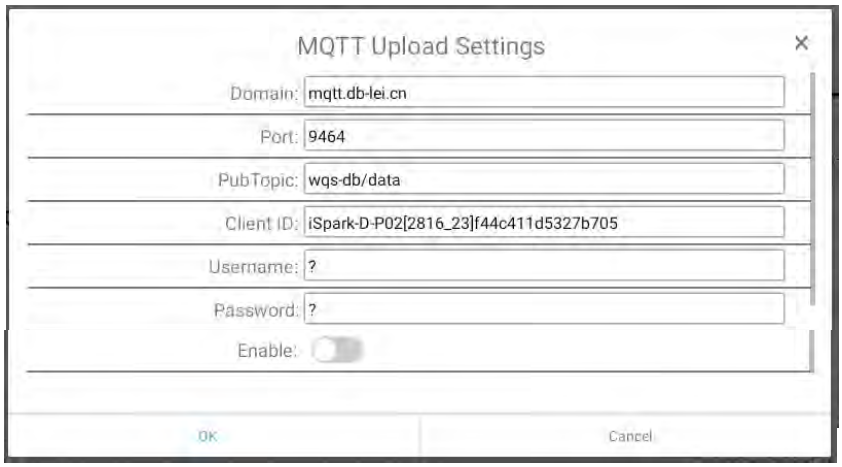
Upload address: Http access address with port information.

Max range(days): If the data upload fails and the data is uploaded normally again, the device will send the data within the number of days set on the data storage card. The maximum setting is 365 days.

Enable: HTTP data upload function switch.

7.6.9 MQTT upload settings





Domain: Mqtt server domain name or IP address.
Port: Server port, range 0-65535.
Pub Topic: The target topic for uploading data, if empty, no upload.
Client ID: ClientID used to connect to the MQTT server, automatically generated by default.
Username: Mqtt user name.
Password: Mqtt user password.
Enable: MQTT upload function switch.

7.6.9.1 MQTT message format description

Message content is in standard JSON format, in the root node, containing fixed key-value pairs:

Upload time field:

"Timestamp"：1640966400

Device category number field:

"ProVerSN"：1

Device serial number field:

"DevSN"：1

The Panel Information list field:

"SubDevs"：[array]。

If the meter controller's analysis page is configured with COD, TUR, and TOC panels whose data names are COD, TUR, and TOC, respectively, the following key/value pairs are also included in the message:

Analysis page panel 1：

"COD"：0.000

Analysis page panel 2：

"TUR"：0.000

Analysis page panel 3：

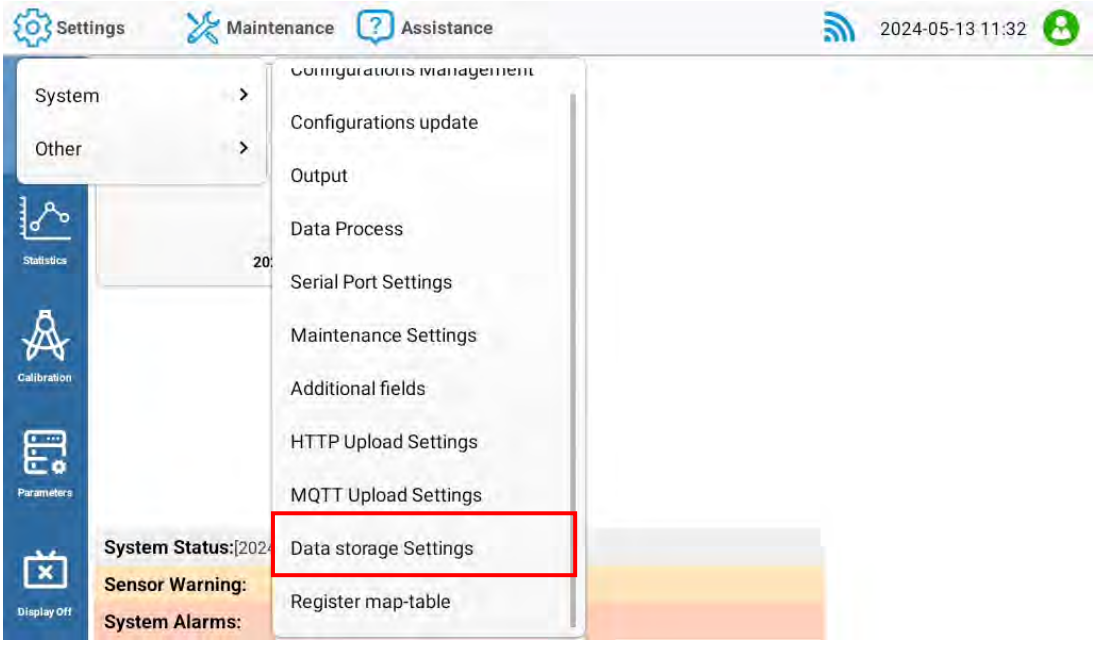
" TOC"：0.000

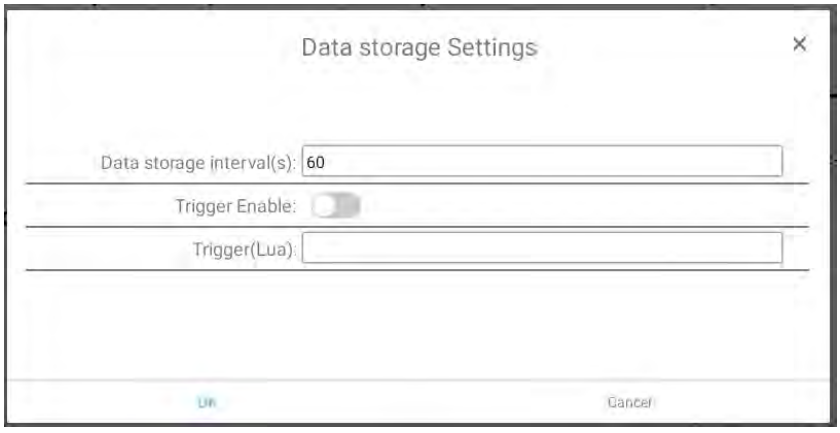
Additionally, if there are custom key-value pairs in the additional fields, they are also added to the JSON root node.

Example message:


```
{
   "Timestamp":1645084458,
   "ProVerSN":1,
      "DevSN":1,
      "COD":17.234,
      "TUR":2.234,
      "TOC":6.234,
}
```

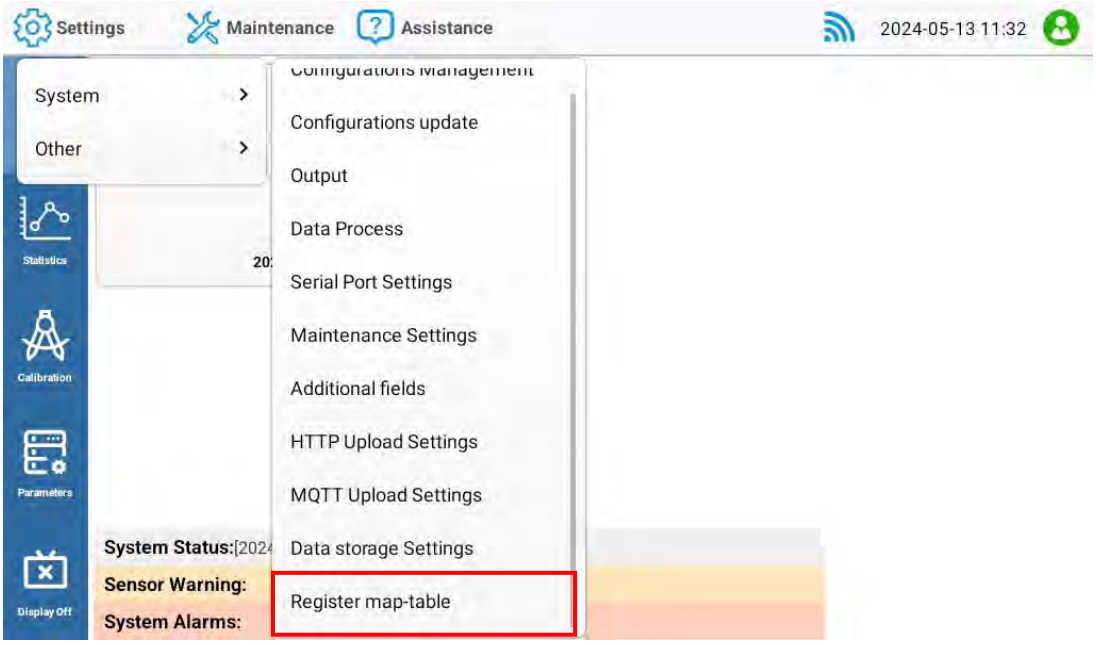
7.6.10 Data storage settings

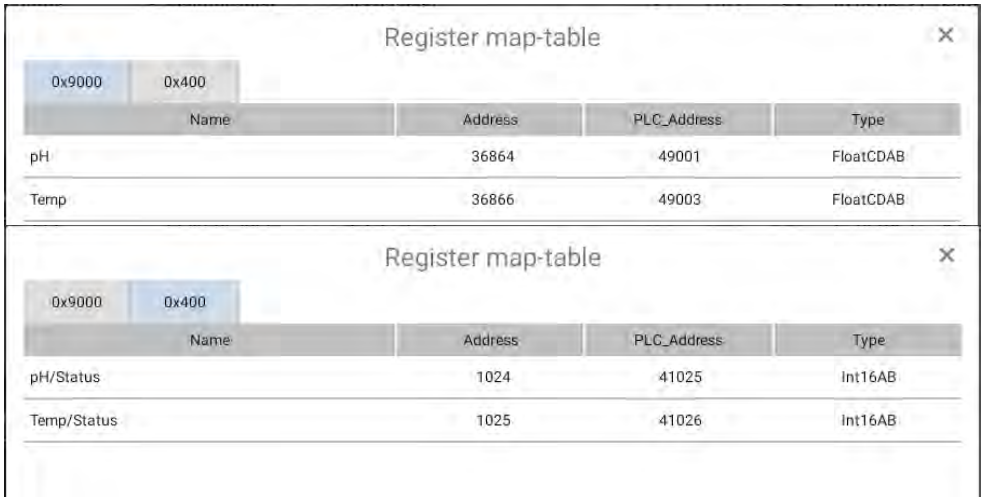




Data storage internal(s): Data storage interval in the statistics page, unit s. Default 60s.
Tigger Enable: Script trigger on or off switch.
Tigger(Lua): Lua script.

7.6.11 Register map-table



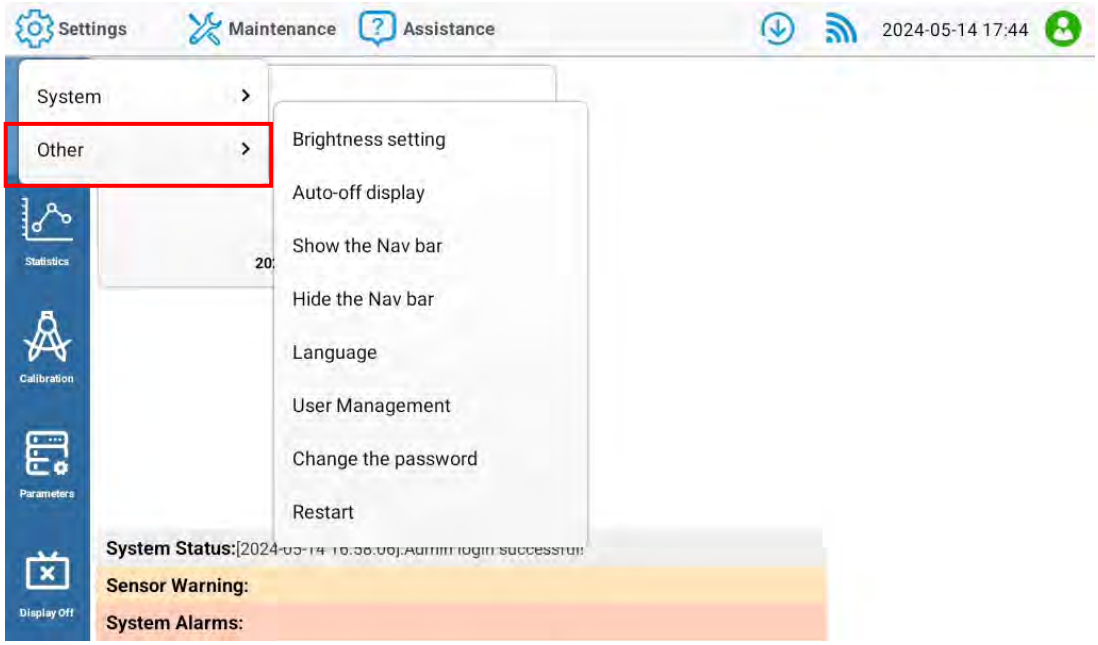


This device can be used as a slave for other devices to read the data of this device. The panel order of the analysis page corresponds to the register address, and you can view the register address and format of the specific parameter according to the data mapping table.

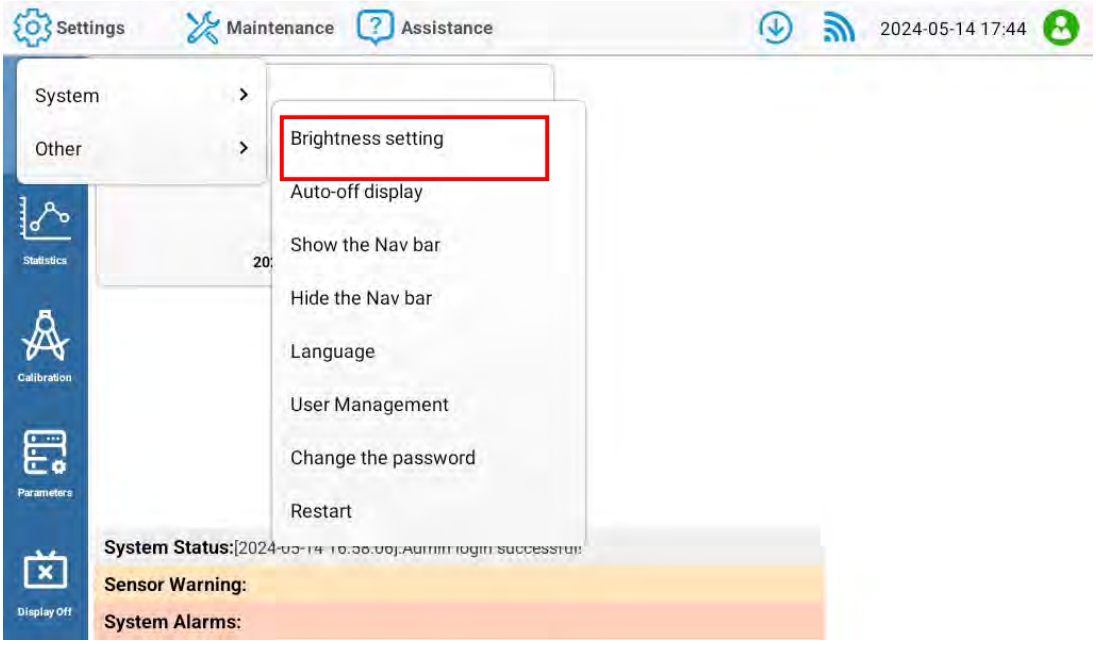
The status register is generated automatically only when the Analysis page panel is added with different upper and lower limits set. Refer to Section 7.6.1.2 Analysis page management for analysis page settings.

Code	Instruction
0	Parameters are normal
1	Upper limit exceeded
-1	Lower limit exceeded
-100	Device disconnected

7.7 Other

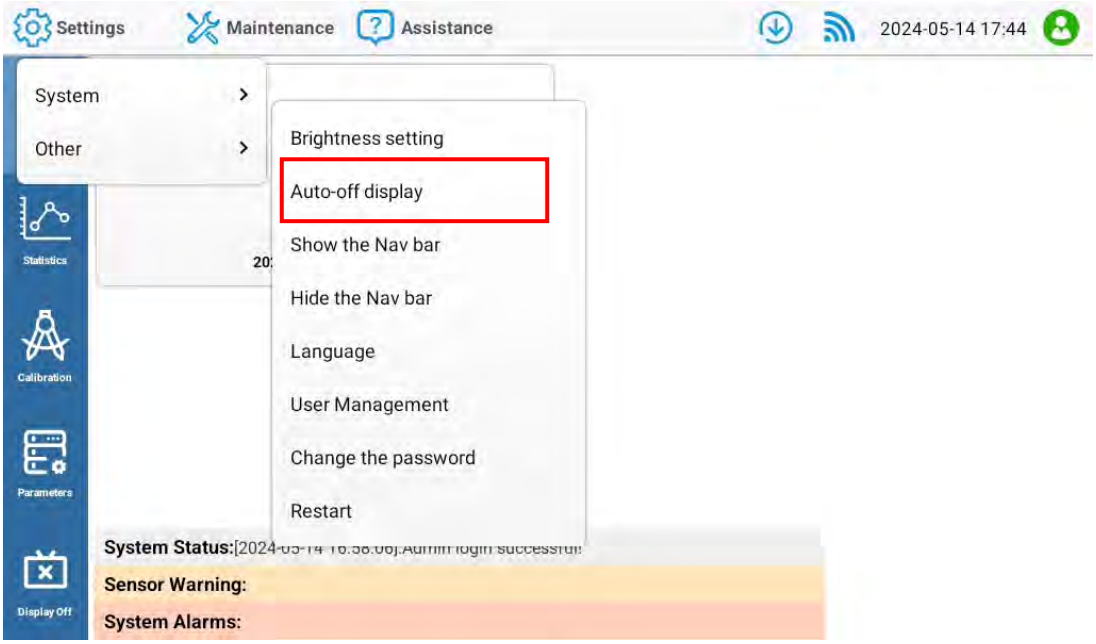

Settings
Maintenance
Assistance
2024-05-14 17:44
System
Other
Brightness setting
Auto-off display
Show the Nav bar
Hide the Nav bar
Language
User Management
Change the password
Restart
Statistics
Calibration
Parameters
Display Off
System Status:
Sensor Warning:
System Alarms:

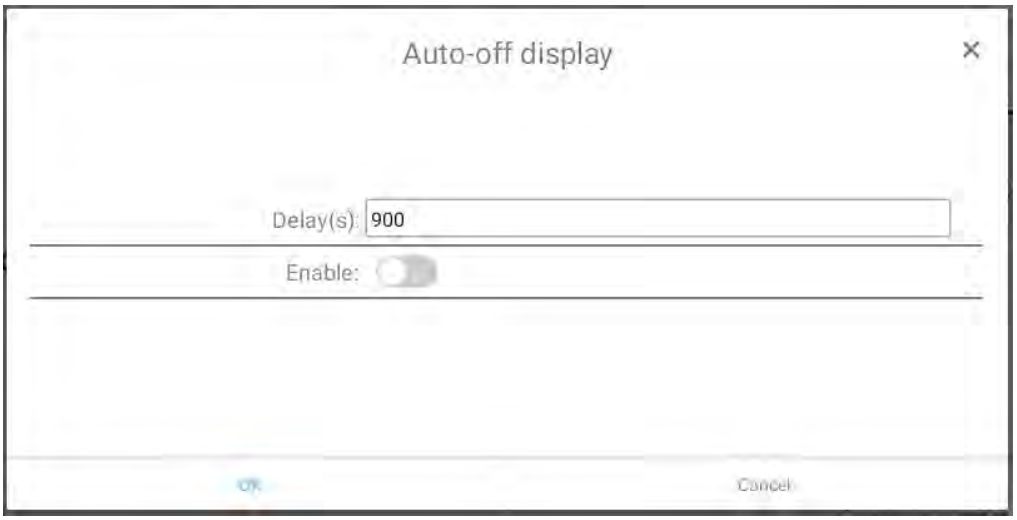
7.7.1 Brightness setting



Brightness setting adjusts the screen brightness.

7.7.2 Auto-off display

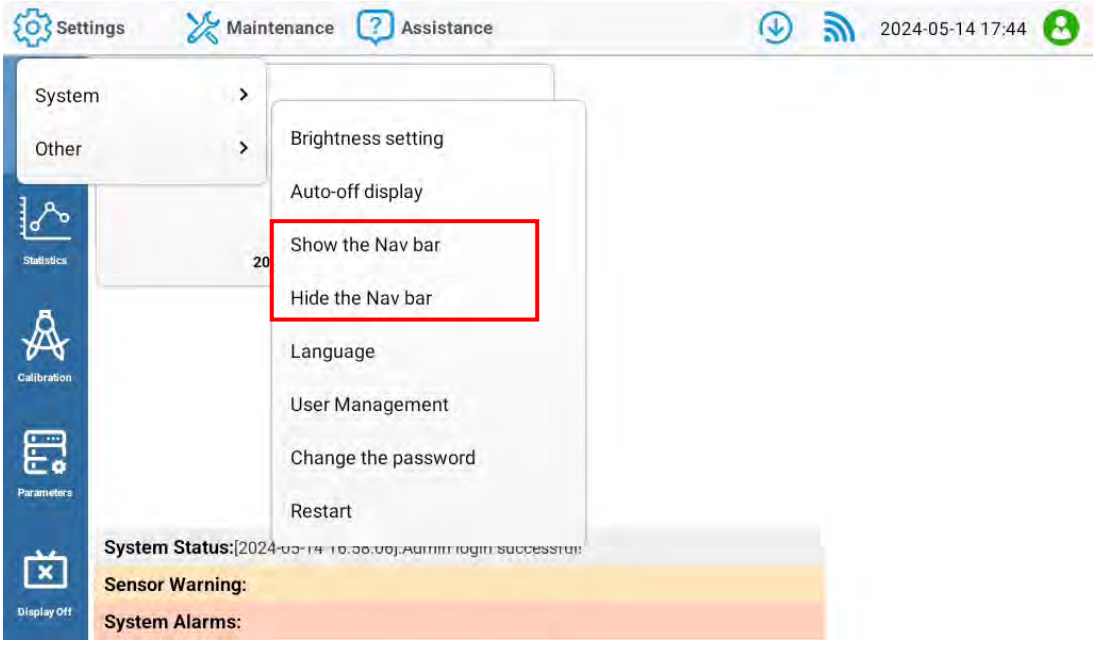


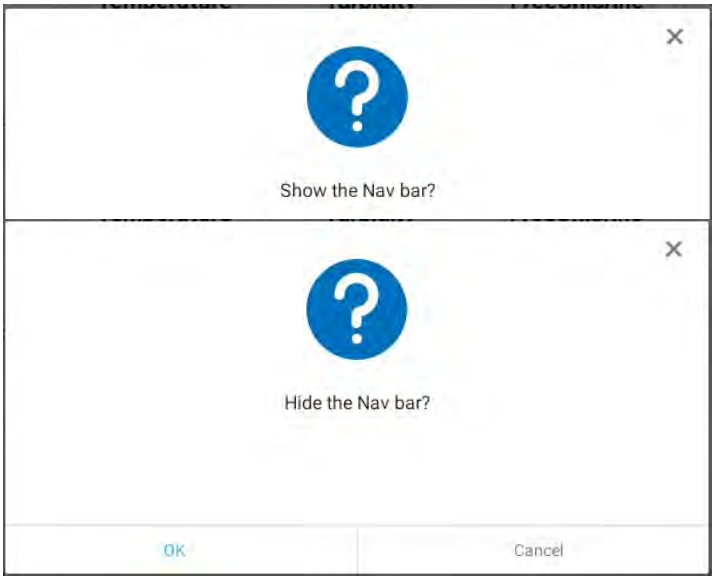


Delay(s): automatically rests the screen after no operation.

Enable: automatically enable or disable enable.

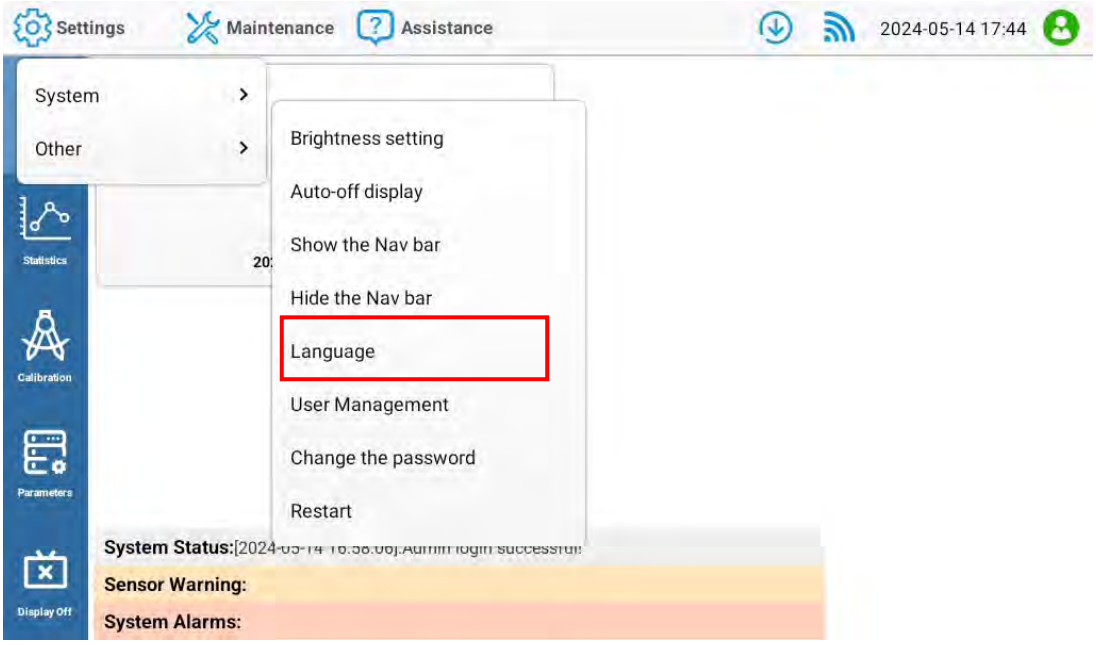
7.7.3 System navigation bar





Show the nav bar: Show system navigation bar.
Hide the nav bar: Hide system navigation bar.

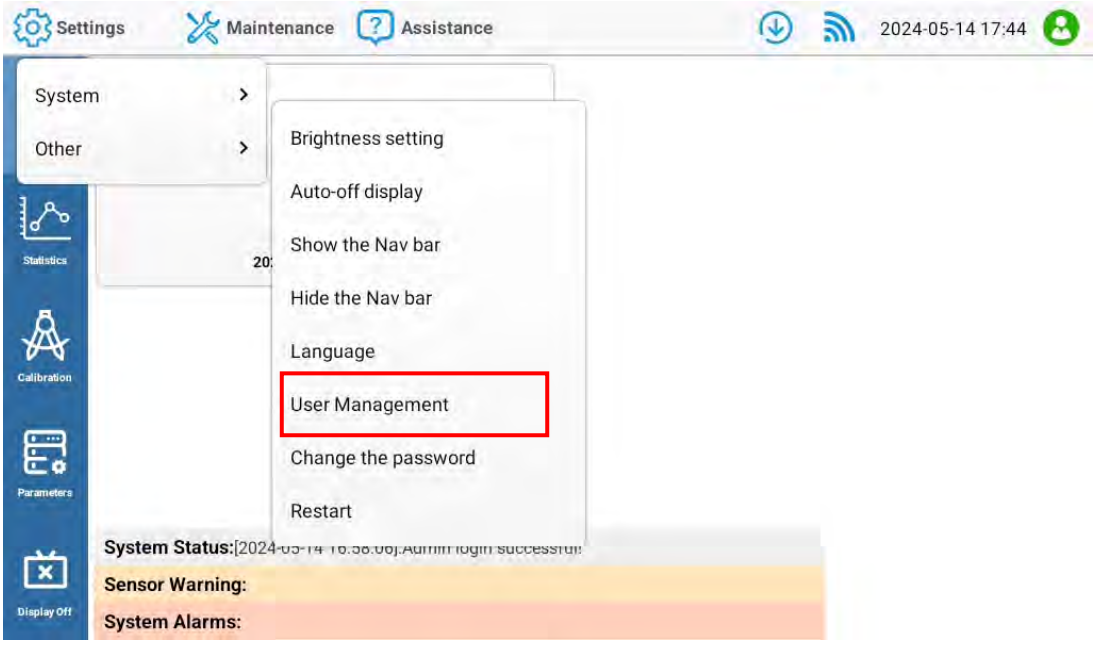
7.7.4 Language



English, Simplified Chinese, Français are currently supported.

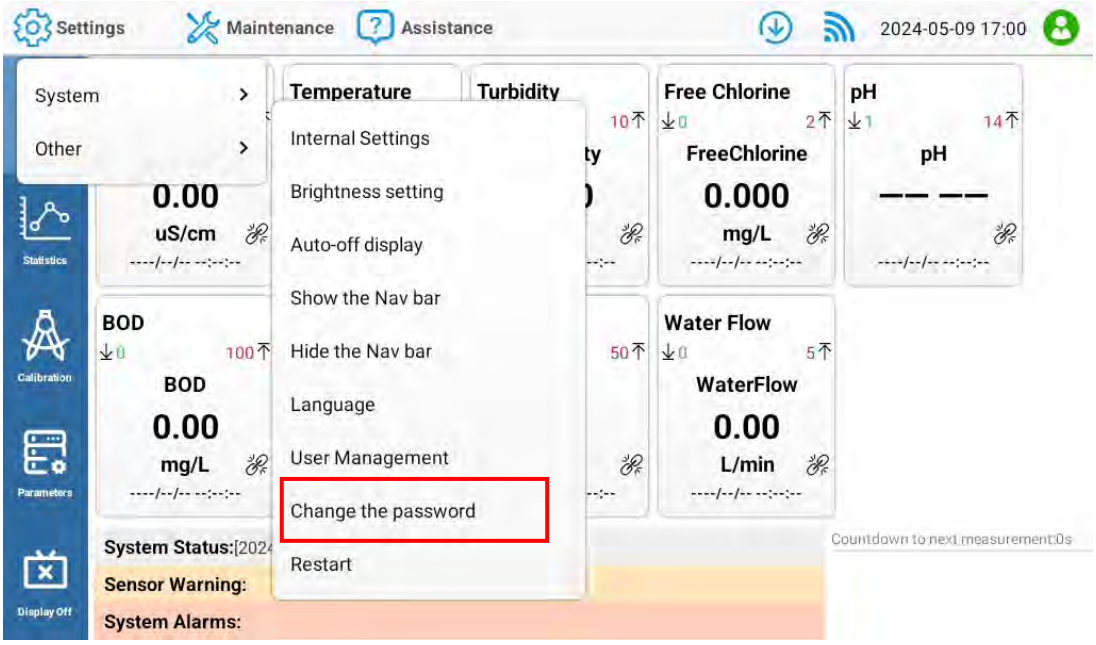
Note: The language of the custom section of the page layout is governed by the text in the configuration manager.

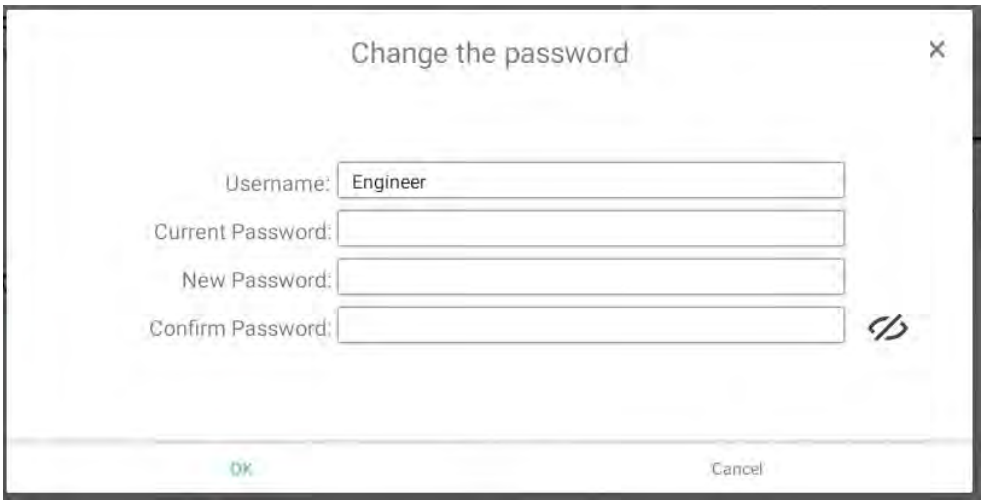
7.7.5 User management



Use this function to assign sub-accounts, only administrator privileges can use this function.
Key: Sub-account name
Value: Password of the sub-account
Select: Enter panel editing mode
All: Select all
None: None of the selected fields
Delete: Delete the selected fields
Add: Add field

7.7.6 Changing your password





Note: This function is only available to administrators.

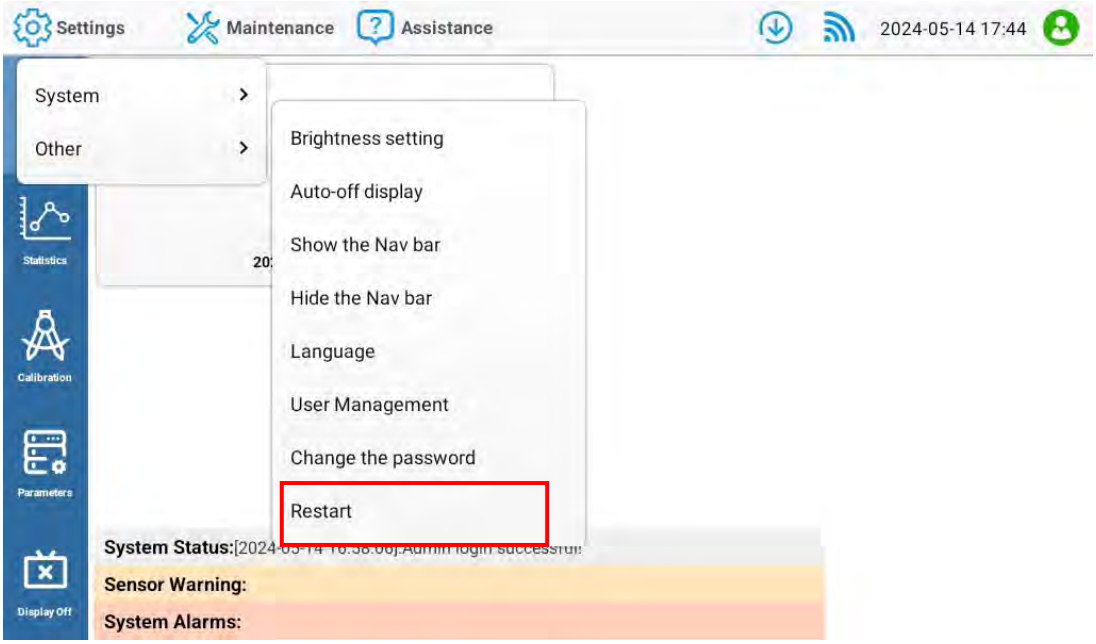
Username: the account that needs to change the password, only the engineer and administrator accounts.

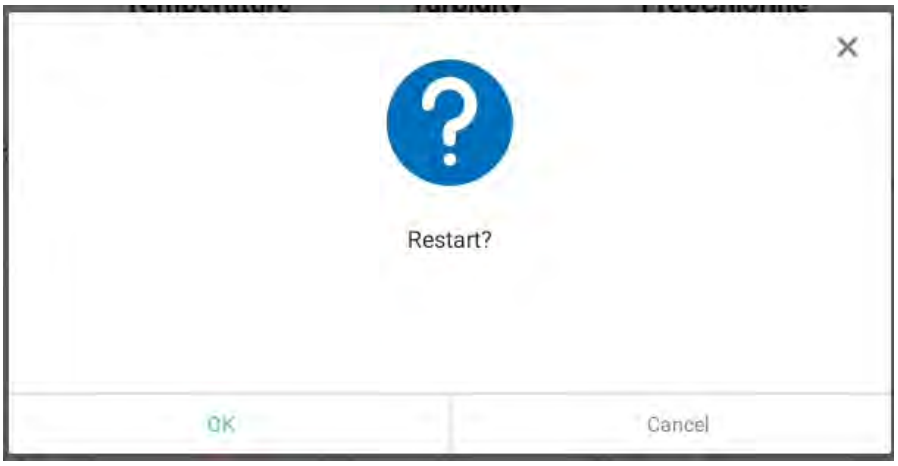
Current password: the current account password, engineer default: 123456; administrator default: 12345678.

New password: the password to be changed.

Confirm password: Re-enter the password to be changed.

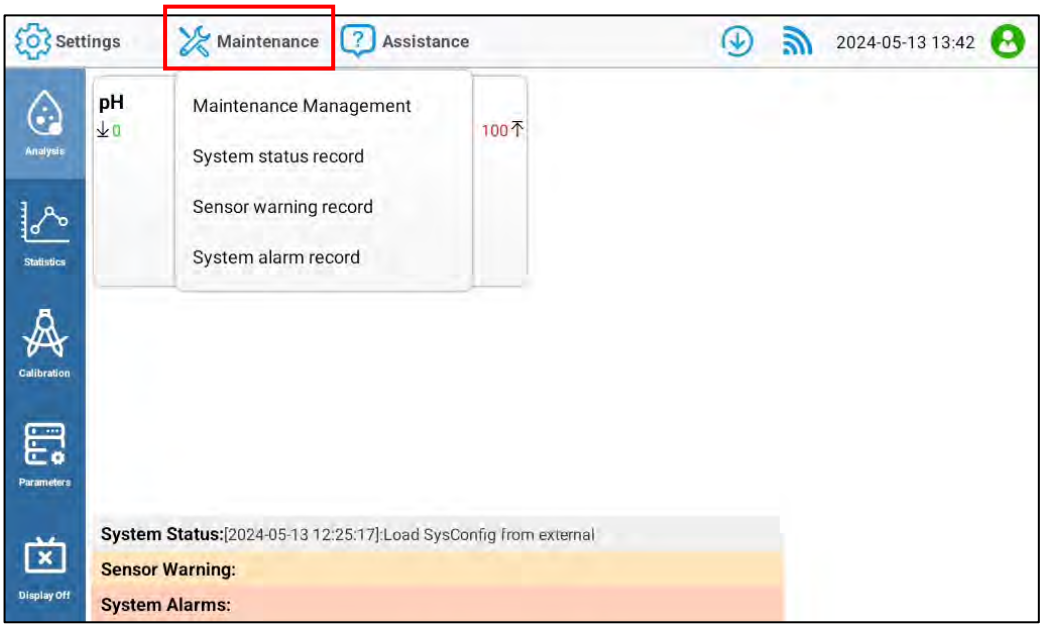
7.7.7 Restart



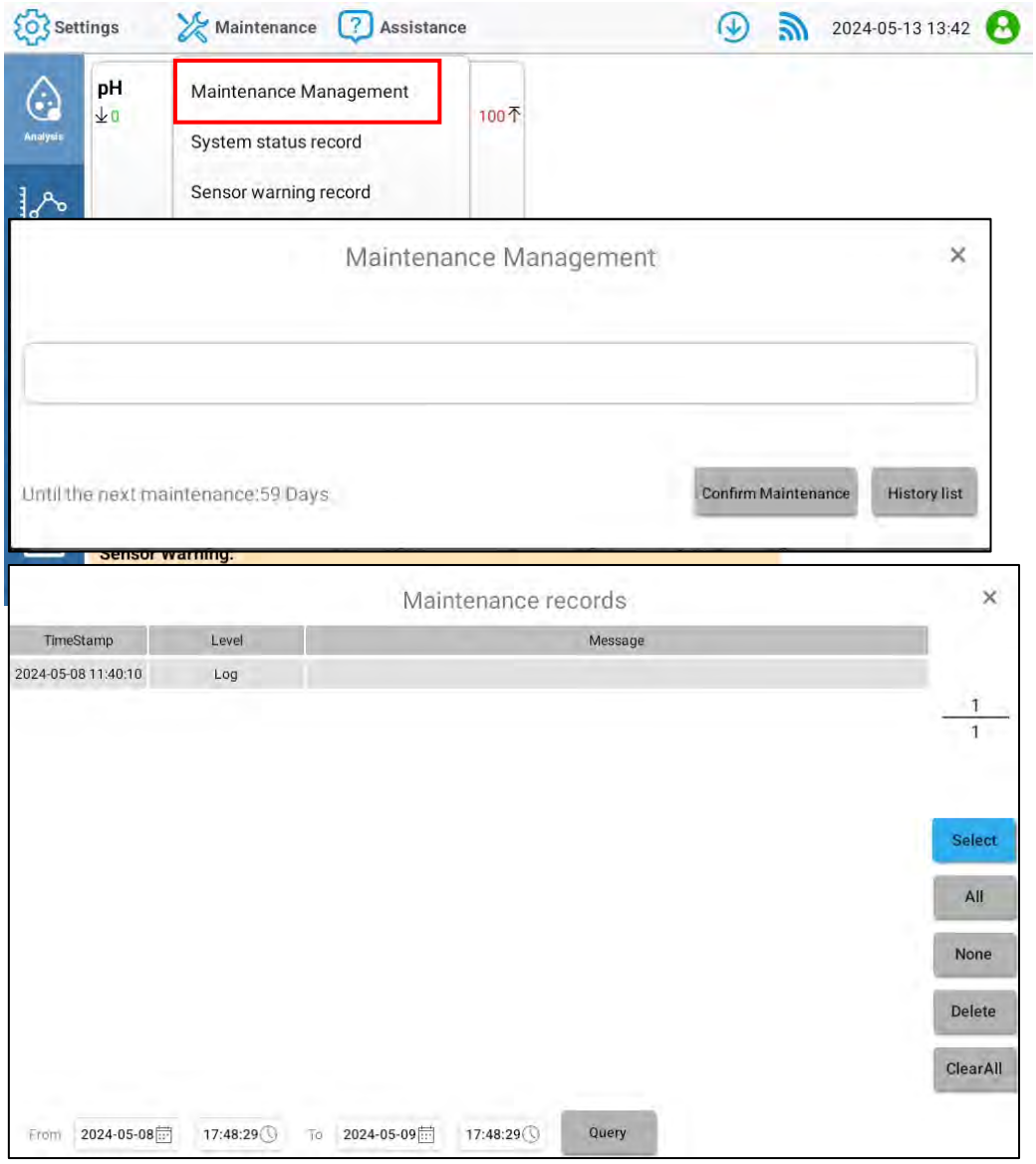


Restart the device.

7.8 Maintenance

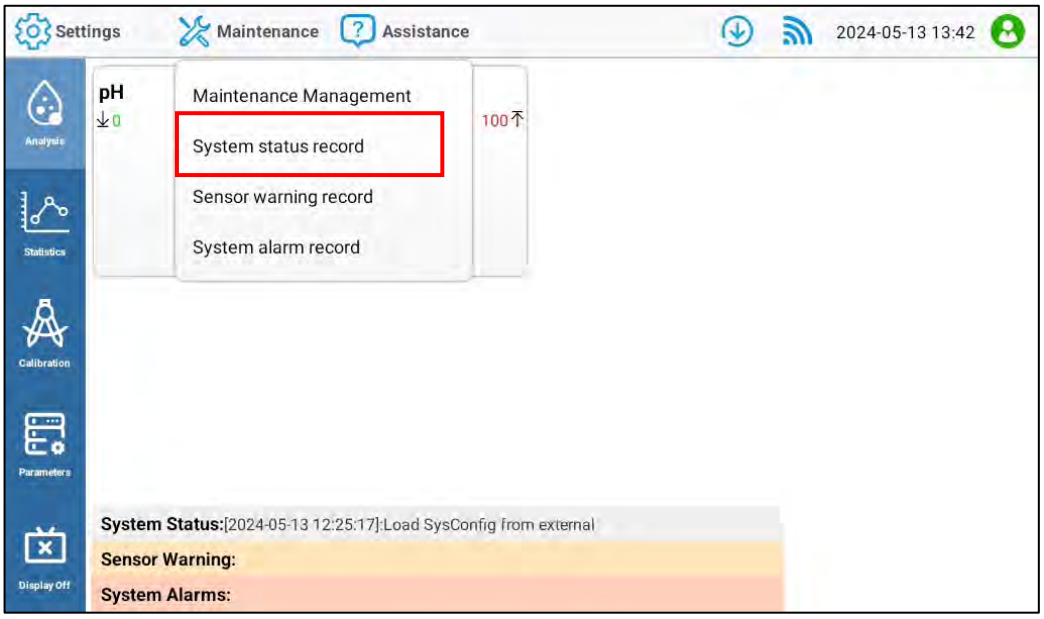


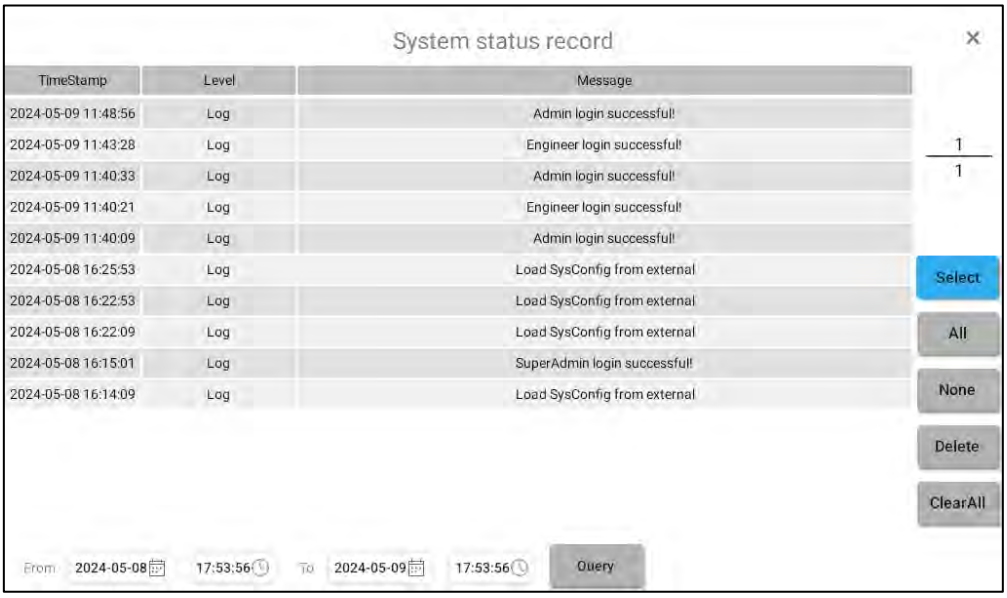
7.8.1 Maintenance Management



During the maintenance, you can write the corresponding maintenance log in the input field. After clicking Confirm Maintenance, the device records and saves the maintenance log, and you can view or delete the maintenance log in the history list.

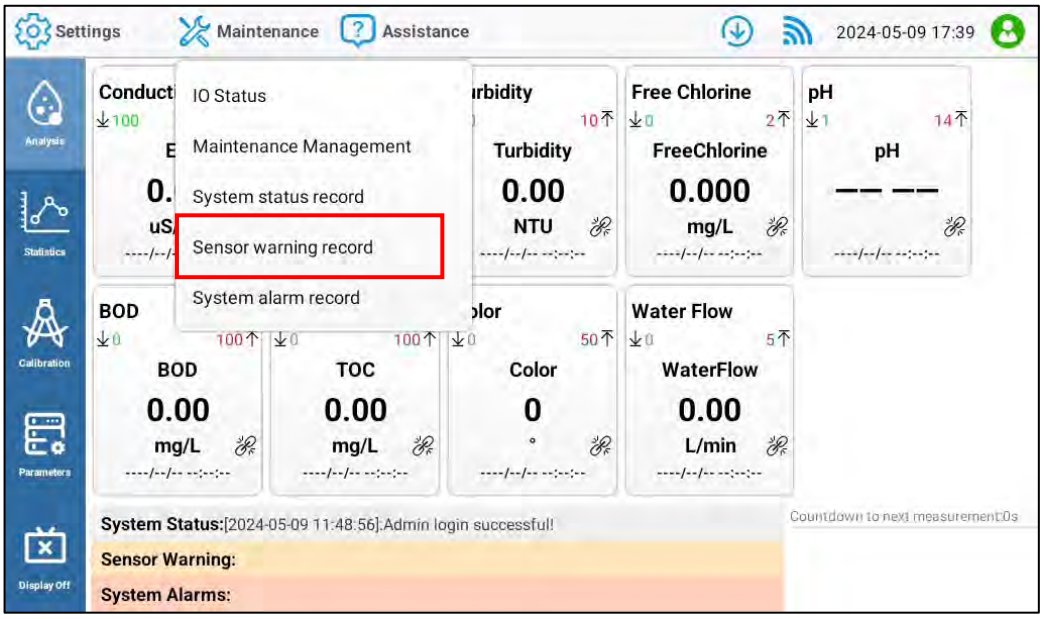
7.8.2 System status record





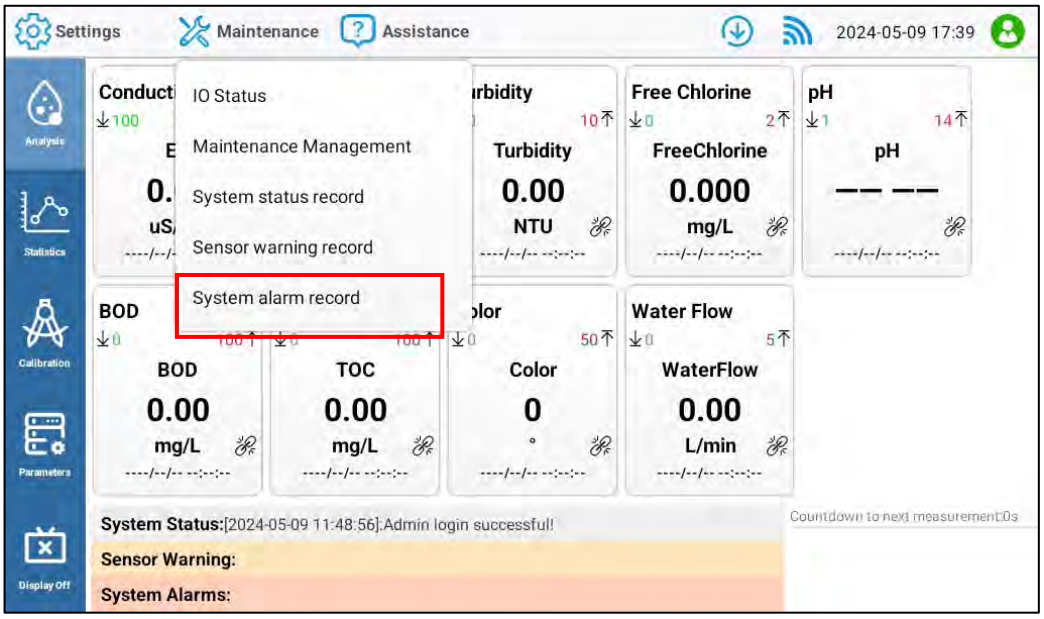
This function allows you to retrieve and clear the historical system status, the device stores the system status of the last week.

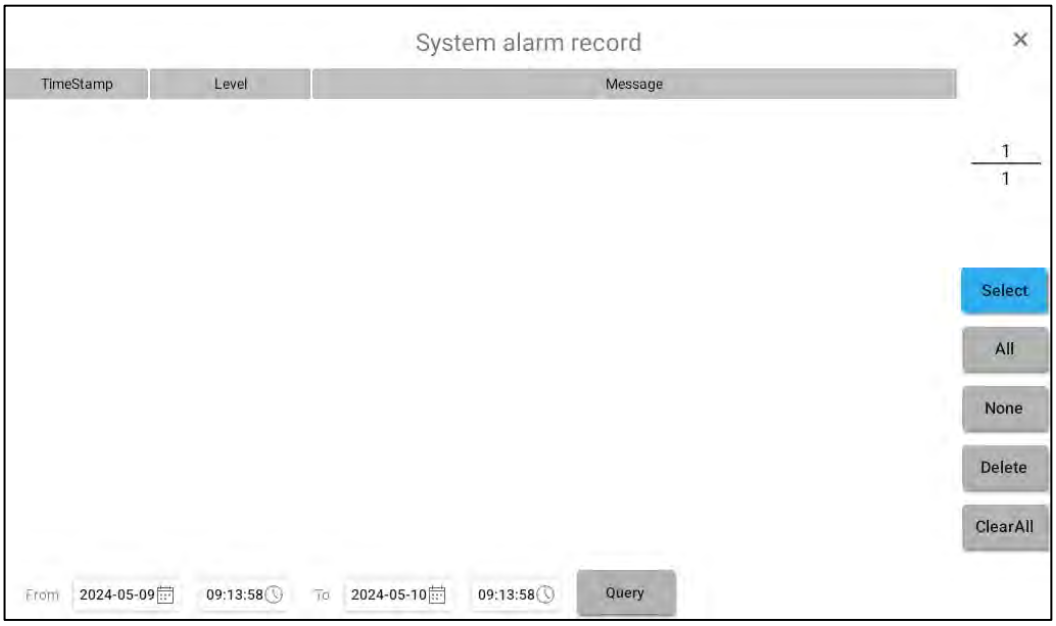
7.8.3 Sensor warning record



Historical sensor alerts can be viewed and cleared in this function, and the unit will store the most recent year's sensor alerts.

7.8.4 System alarm record

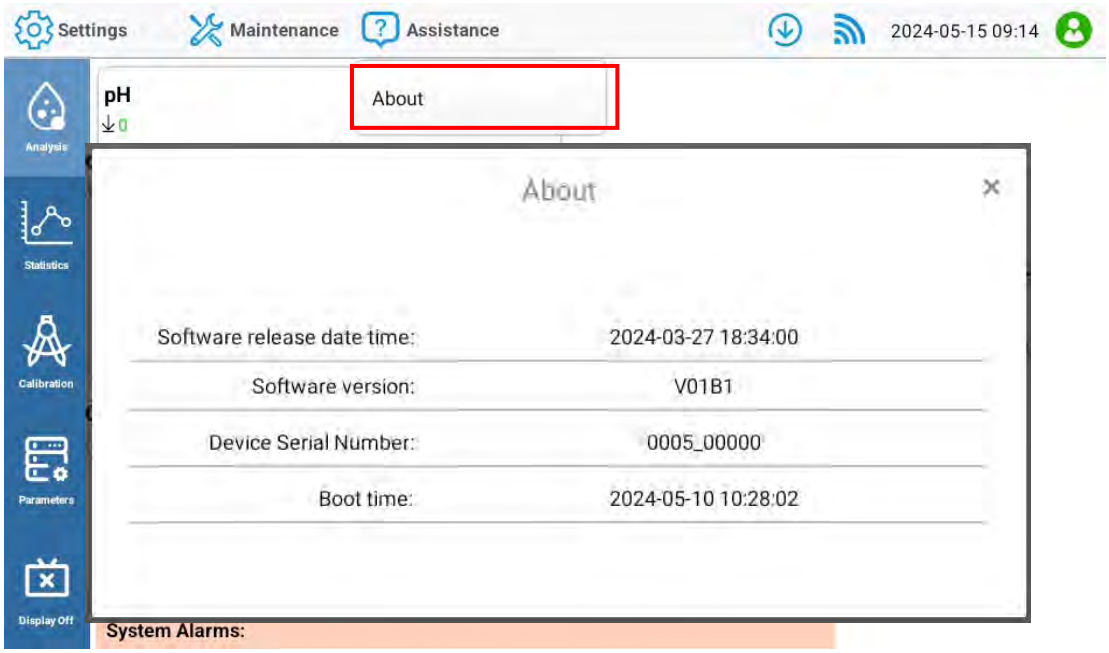




Historical system alarms can be viewed and cleared in this function, and the unit stores the most recent year's system alarms.

7.9 Assistance

7.9.1 About



Software release date time: The current software release date.
Software version: The current software version number.
Device serial number: Device version number and device serial number.
Boot time: The time at which the device was started, which can be used to determine the time of this run.

8 MC-W-S register table

Register Type: Holding registers (4x).

Supported Function Codes: 0x03/0x06/0x10/0x0F.

8.1 Basic register table

Register name	Address	W/R	Data type	Explanation	Note
ProVerSN	0x8000	R	U16	Product Model version number	0x0001
DevSN	0x8001	R	U16	Product Serial No	[1-65535]
ModbusID	0x8002	W/R	U16	Modbus RTU communication address	[0-253]
COM_BaudRate	0x8003 0x8004	W/R	U32 (CDAB)	RS4855 Serial communication baud rate	4800 9600 115200

8.2 Panel register table (example)

MC-W-S support PLC address access, 0x9000 corresponds to 49001 address, and other addresses are accessed by offset;

The following table is only an example, please refer to the actual user configuration.

Register name	Address	PLC Address	W/R	Data type	Explanation
COD (example)	0x9000	49001	R	Float32 (CDAB)	User Defined Panel 1
	0x9001	49002			
TUR (exmaple)	0x9002	49003	R	Float32 (CDAB)	User Defined Panel 2
	0x9003	49004			

8.3 MC-W-S command table (Development based on Modbus RTU 0x0F instruction)

CMD	Addr.	Instruction code	Data type	CMD code. High 8bit	Cmd code. Low 8bit	Explanation	return
Restart	0x0000	0x0F	U16	0x10	0x01	Restart	None
SaveF	0x0000	0x0F	U16	0x11	0x01	Save parameters	Standard Modbus

9 Analog current output

The content of this chapter currently only supports the device MC-W-S-P05.

The MC-W-S-P05 includes the analog current expansion module CVT-D-C (4-20 mA). A single module supports up to 2 outputs. The MC-W-S converts the target panel value to the analog current value by running the Lua script. The MC-W-S controls the current output of the module with the Modbus protocol, so that the specified data can be output with the current.

Next, we will use the COD in the input panel as the data source, the output page will continuously convert the COD to 4~20 mA, and send it to the expansion module CVT-D-C.

9.1 Add output panel

CVT-D-C communication parameters:

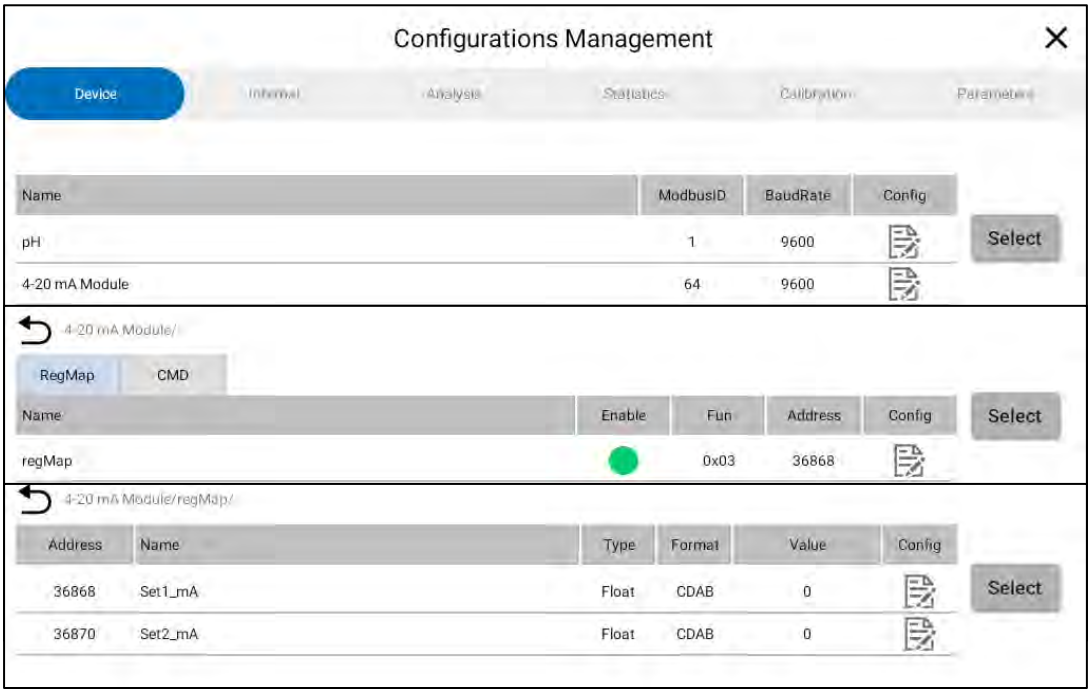
Name	Default
ModbusID	64
Baud rate	9600
Data bits	8
Stop bits	1
Parity bit	None

CVT-D-C output control register:

Register name	Address	W/R	Data type	Explanation
set1_mA	0x9004 0x9005	W(06/16)	Float32(CDAB)	
set2_mA	0x9006 0x9007	W(06/16)	Float32(CDAB)	

Please add this device in Device Management based on the above information, and also configure the COD output panel in the output page.

For more detailed instructions, please refer to the CVT-D-C user manual.


Configurations Management
Device
Name
ModbusID
BaudRate
Config
pH
1
9600
4-20 mA Module
64
9600
Select
4-20 mA Module/
RegMap
CMD
Name
Enable
Fun
Address
Config
regMap
0x03
36868
Select
4-20 mA Module/regMap/
Address
Name
Type
Format
Value
Config
36868
Set1_mA
Float
CDAB
0
36870
Set2_mA
Float
CDAB
0
Select

9.2 Edit the data model

Converts the target value to a current value:

$$I_{out} = \frac{V_t - V_{min}}{V_{max} - V_{min}} \times (I_{max} - I_{min}) + I_{min}$$

Where I_{out} is the current output value, V_t is the target value to be converted, V_{min} is the minimum value, V_{max} is the maximum value, I_{max} is the maximum current value, and I_{min} is the minimum current value.

Example:

1 Lua Script

Assuming the pH value range is 0~14, the corresponding current output: 4~20, according to the formula to get:

$$\frac{pH - 0}{14 - 0} \times (20 - 4) + 4$$

Data source is bound to the pH parameter of the analysis page and Data binding is bound to the output path of the 4-20 mA module. Select Lua Script for Data processing in the output panel editing., find the model and enter the simplified equation:

pH*16/14+4

Script:

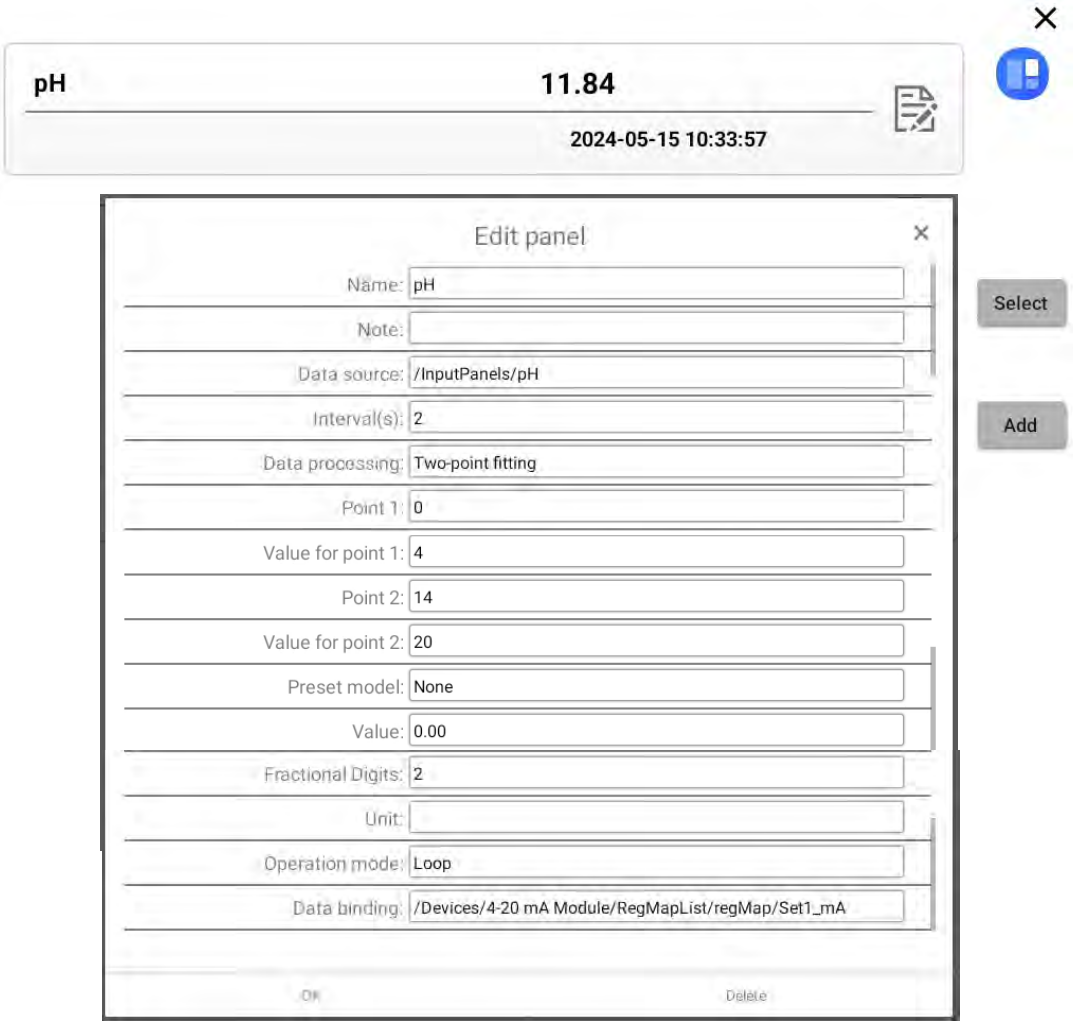
function main() return pH*16/14+4 end

In this way, the meter will periodically convert the target value into a current value and output it by CVT-D-C.

pH
11.84
2024-05-15 10:33:57
Edit panel
Name: pH
Note:
Data source: /InputPanels/pH
Interval(s): 2
Data processing: Lua Script
Preset model: None
Value: 4.04
Fractional Digits: 2
Unit:
Operation mode: Loop
Model: function main() return pH*16/14+4 end
Trigger(Lua):
Trigger Mode: Hold
Trigger delay(s): 0
Data binding: /Devices/4-20 mA Module/RegMapList/regMap/Set1_mA
OK
Delete
Select
Add

2 Two-point fitting

Assuming the pH value range is 0~14, the corresponding current output: 4~20. Data source is bound to the pH parameter of the analysis page and Data binding is bound to the output path of the 4-20 mA module. Select Two-point fitting for Data processing in the output panel editing. Point 1 enters the lower limit of the pH parameter range 0 and the point 1 value enters the corresponding current value 4, point 2 enters the upper limit of the pH parameter range 14 and the point 2 value enters the corresponding current value 20.



10 Troubleshooting

WARNING

Handle faults and alarms in strict accordance with the manual. If you cannot solve them, please contact a technician.

Symptom	Possible Cause	Solution
Unable to connect to WiFi	Password error	Reconnect to WiFi and enter the correct password
	WiFi switch is not turned on.	Please enter the Wi-Fi setting interface and manually turn on the WiFi switch
Unable to connect to default WiFi	Wait less than 3 minutes after power on.	Please wait for 3 minutes at least
	Not connected after 3 minutes.	Please contact technical support
Unable to connect to the internet	Connect to customer-provided WiFi.	Please check the network status of the customer-provided WiFi.
	4G antenna is not installed.	Please install the 4G antenna
	No 4G card inserted or no signal.	Please replace the 4G card or contact technical support
Data export failure	SD card or USB flash drive not accessed	Check if SD card or USB flash drive is inserted
	Insufficient space remaining on SD or USB flash drive	Check the remaining space on the SD card or USB flash drive
Unable to upload data	No network connection	Check network settings
	Error upload parameter configuration	Check the configured parameters