# Reef Master CMK

## User Manual

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www.kamoer.com

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# Reading Tips

## Symbol Description

Prohibition Important precautions Operation and usage tips Vocabulary explanation and reference information

## Usage Suggestions

Kamoer provides the following documentation for Reef Master CMK users:

1. Reef Master CMK User Manual

2. Reef Master CMK Quick Start Guide

It is recommended that users first read the "Reef Master CMK Quick Start Guide" to understand the usage process. Please read the "Reef Master CMK User Manual" for detailed product information.

## Safety Instructions

⚠ Please read these instructions carefully before using the Reef Master to ensure proper operation of the device.

⚠ During transportation, use protective packaging to protect the equipment from any damage. After unpacking, please dispose of all packaging components in a way that will not cause damage to the environment. All materials used for packaging equipment are environmentally friendly; They are 100% recyclable.

Be cautious! When unpacking, packaging materials should be kept out of reach of children.

⊘ Children and vulnerable groups with limited physical, sensory or mental abilities are not allowed to use this device, and those who are not familiar with this device are not allowed to use it.

## Download Kamoer Remote App

1. Scan the QR code and download the application corresponding to the following icon.

iOS

Kamoer Remote

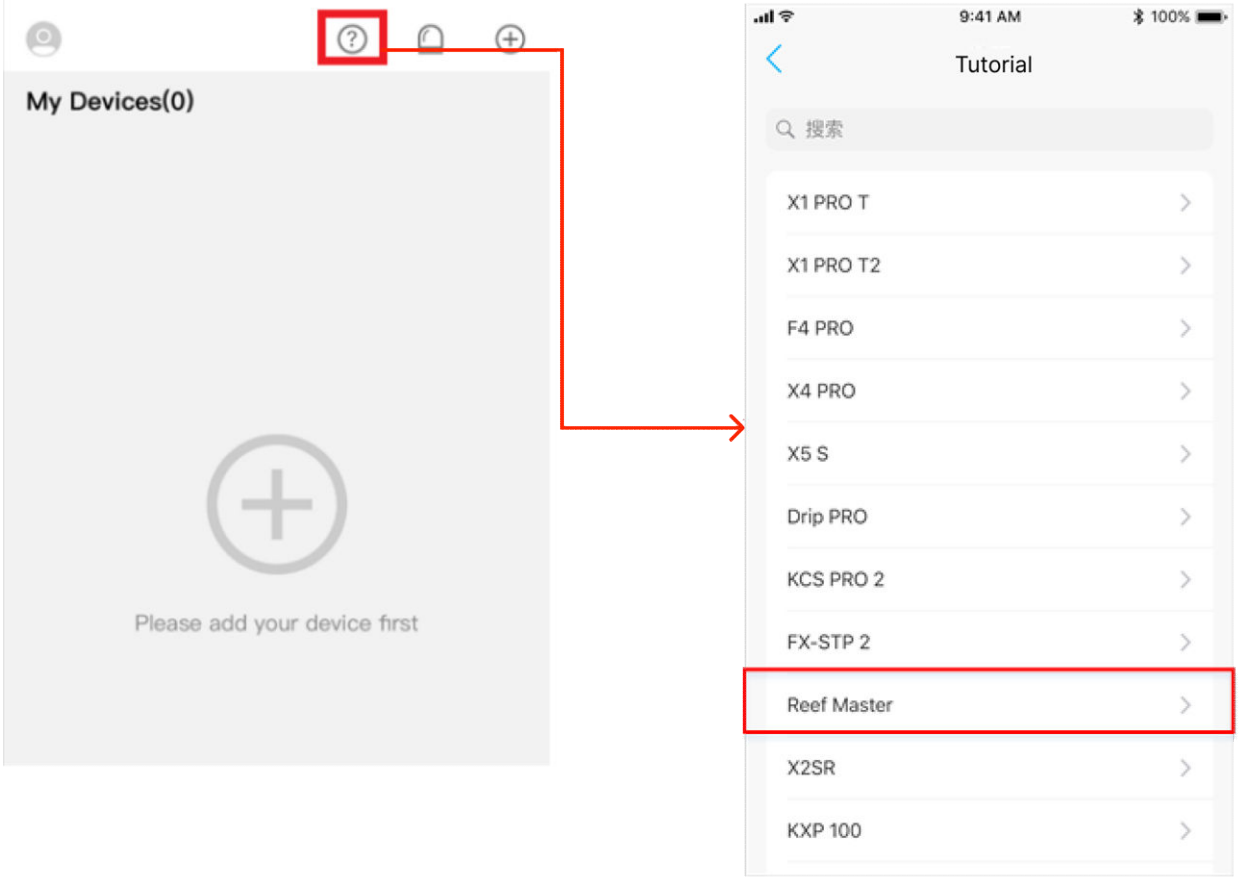
Android (Google Play)

2. Apple users enter the App Store, while Android users enter Google Play and search for 'Kamoer Remote'. Find the application download corresponding to the icon.

**Kamoer Remote App supports Android 4.4 and above systems, and iOS 9.1 and above systems.**

## Get Tutorials

After installing the app, open it and click the "?" button in the upper right corner of the device page to enter the tutorial page. Click to enter the corresponding device model, including user manual and frequently asked questions.



# Catalog

# Product Overview

This chapter mainly introduces the characteristics, application scenarios, and unboxing instructions of Reef Master CMK.

# Product Overview

## Introduction

Reef Master is an automated equipment for testing water quality in aquatic environments. The Reef Master CMK Bone Master can test three parameters: calcium, magnesium, and KH. In addition to testing calcium, magnesium, and KH, the Reef Master SPA Sea God can also test parameters such as nitrite, nitrate, and phosphate.

The measurement method can choose manual measurement and automatic detection function. Users can easily view test results and set test parameters in Android or iOS apps. When there is an abnormality in the test value, the device will automatically push an alert to the App. The equipment can also control the titration pump or calcium reflux pump based on the test results, and adjust the water quality to the appropriate level.

## Functional Highlights

- CMK supports concentration detection of calcium, magnesium, and KH in seawater
- SPA additionally supports detection of nitrite, nitrate, and phosphate
- App remote control, can view real-time sensor values and historical records
- Support automatic and manual detection modes
- App remote control, can view real-time sensor values and historical records
- Alarm push for abnormal detection values
- Support online firmware upgrades
- Equipped with a display screen to view detection results and status

- The F4 PRO titration pump and calcium reactor can be linked and controlled to achieve automatic adjustment of water quality parameters

## Application Occasions

- Marine organism feeding: including hard coral (SPS), soft coral (LPS), and mixed coral (SPS/LPS)
- Other situations that require testing of water quality parameters such as calcium, magnesium, and KH

## Unpacking Preparation

- Before opening the packaging box, check whether the outer packaging has been damaged during transportation.
- After opening the packaging box, refer to the packing list to confirm that all components are missing and check for visible damage.

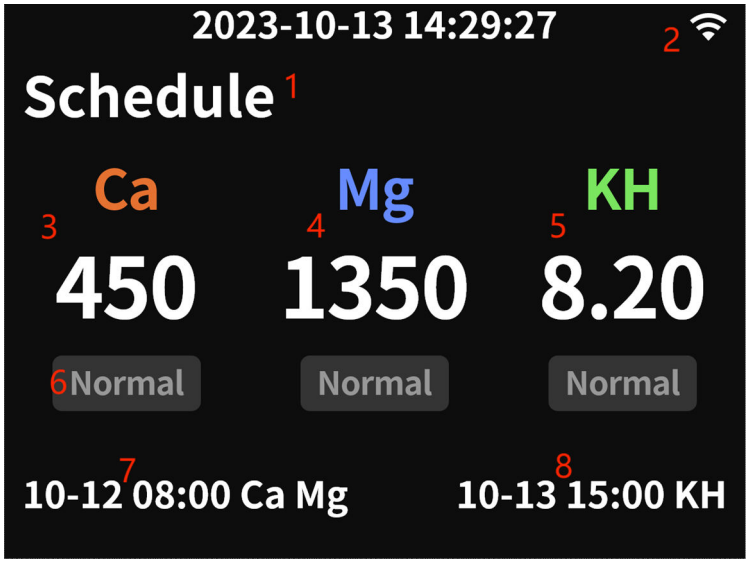
**If any defects are found during the unpacking process, please contact the manufacturer immediately.**

1. Reef Master CMK Host
2. Power adapter
3. 2 meters of sea drainage pipe
4. Detection reagent tube, 3-section 1-meter tube
5. Reagent bottle cap with hard tube and connector
6. Waste liquid pipe, 2 meters
7. Testing reagents

## Component Name


1. Color display screen
2. Front cover shell
3. Front hood decorative light
4. External communication interface
5. DC24V power cord
6. Sample connector for seawater extraction
7. KH detection reagent connector
8. Calcium magnesium A detection reagent connector
9. Calcium magnesium B detection reagent connector
10. Cleaning fluid connector
11. Waste liquid connector

## Display Screen Status Description




1. Working mode: Display the working mode, and the device supports automatic and manual modes
2. WiFi connection status:  indicates in the distribution network,  indicates successful distribution network,  indicates network connection failure, and  indicates server connection failure
3. The latest test calcium value and status display: green indicates low test value, red indicates high test value, and white font indicates normal test value
4. The latest test magnesium value and status display: green indicates low test value, red indicates high test value, and white font indicates normal test value
5. The latest test KH value and status display: green indicates low test value, red indicates high test value, and white font indicates normal test value
6. Status of test values: low, high, and normal. In addition to displaying the status of the text, there is also a corresponding color display for each status

7. Time of Latest Detection Value: The time of detecting the latest parameter, which is a type of calcium, magnesium, and KH
8. Time of Next Test Value: The planned time of the next test parameter, which is a type of calcium, magnesium, and KH

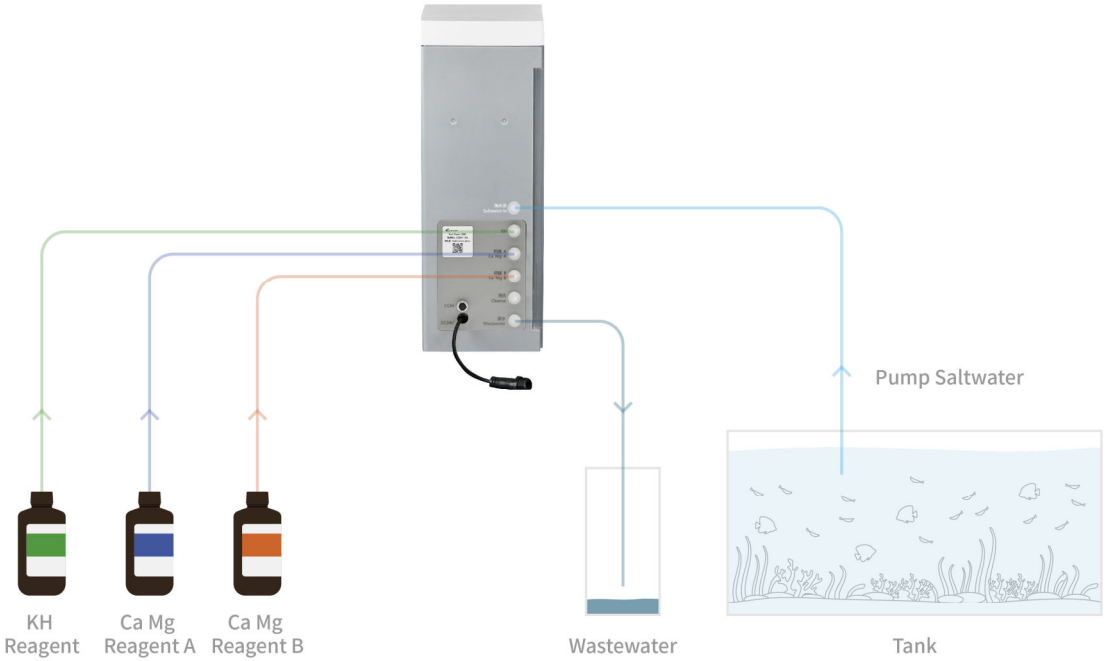
If there is a detection in progress, the corresponding parameter detection progress bar will be displayed at the top of the display screen.

# First Use

This chapter mainly introduces how to check and confirm the normal operation of various functions of the equipment after assembly for the first time.

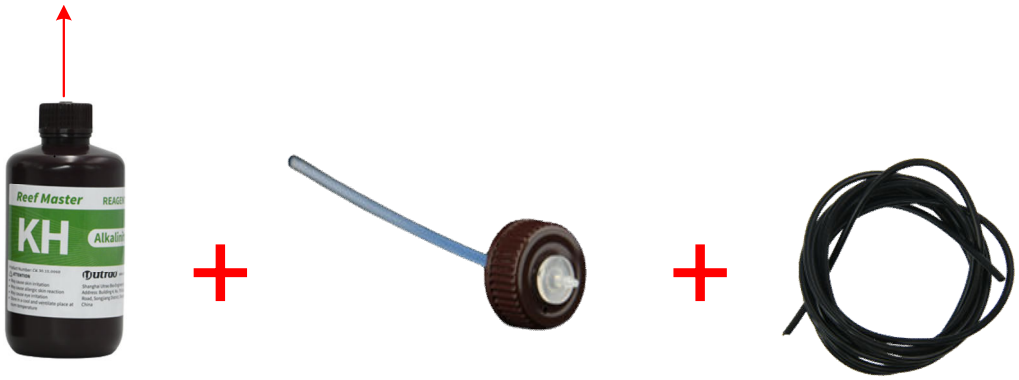
# First Use

## Product Installation




### Reagent bottle installation:

Remove the original reagent bottle cap



# APP Operation

This chapter mainly introduces how to use the app to operate Reef Master CMK.

# APP Operation

## Distribution Network Equipment

The app requires a network connection to set and read device parameters, so the device configuration needs to be connected to the network. On the homepage of the device list, click the add button in the upper right corner to enter the device's distribution interface. Click Reef Master device or other devices to enter the Bluetooth connection interface, and find the corresponding device serial number, such as KAMOER_ CMK_ xxxxxxx, click to enter and follow the interface prompts to distribute the network.

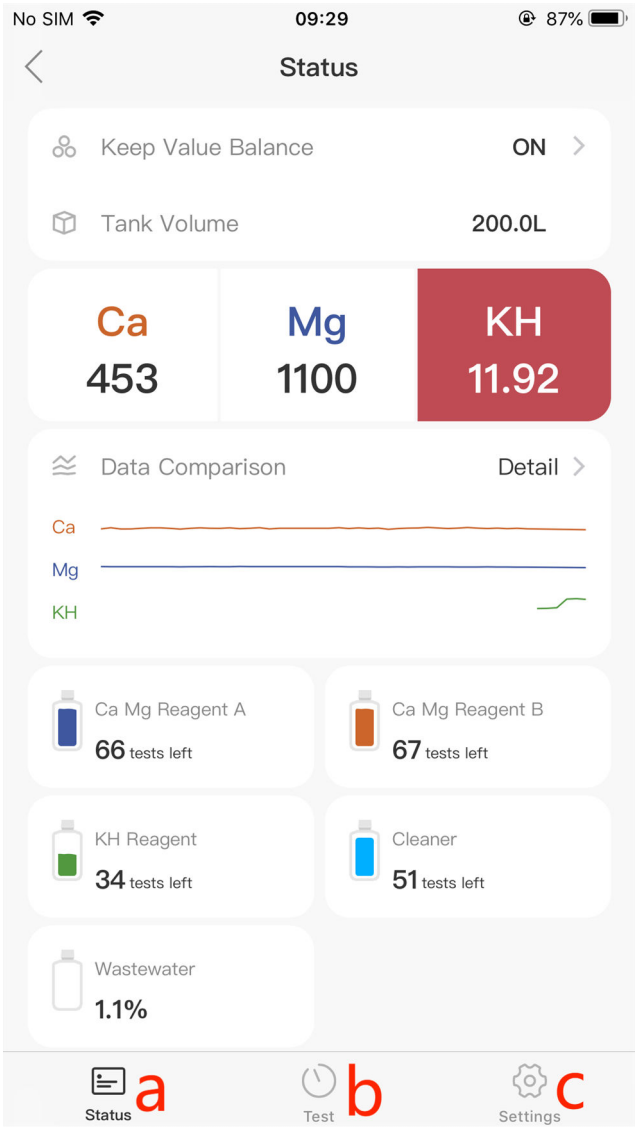
**a. To configure a device to connect to Wi Fi, you only need to configure it once. After successful configuration, as long as the app can connect to the network, you can find the device in the device list by opening the app.**

**b. If the device configuration fails to connect to Wi Fi, restart from the first step.**

## Overview of App Interface Module

Open the app and click Reef Master in the device list to enter the Reef Master operation interface.

The interface module functions are as follows:

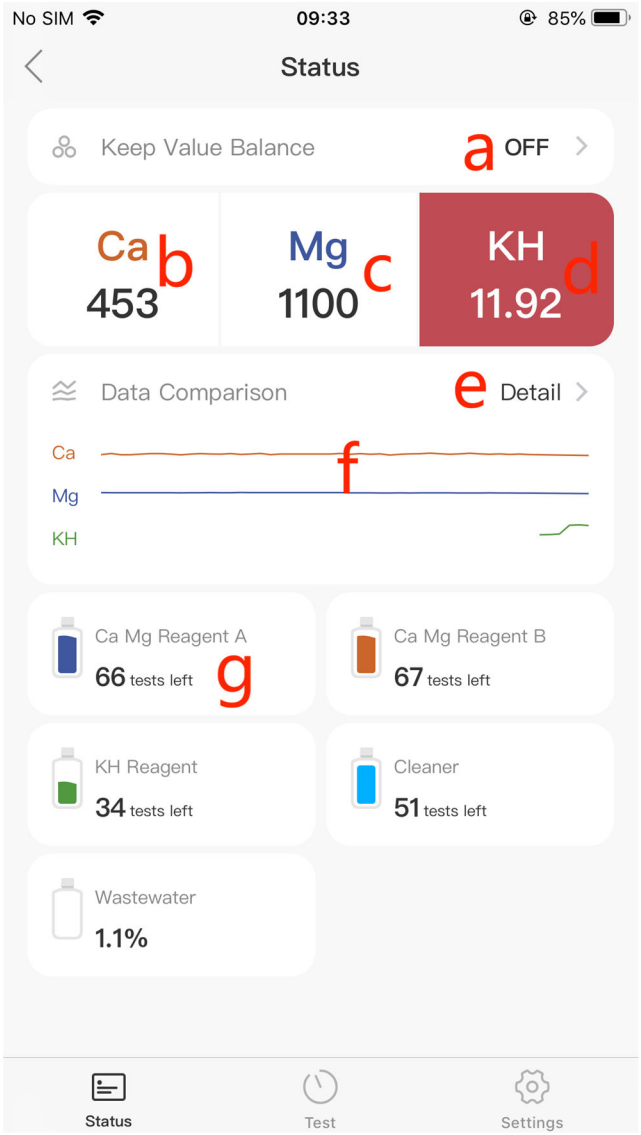



a. **Status:** The status module displays various status information of the device, such as The latest detected values of calcium, magnesium, and KH, cylinder volume (100.0L), reagent bottle status information, etc

b. **Test:** The detection module can set both manual and automatic detection parameters. The manual mode triggers detection by the user, while the automatic mode automatically detects according to the set plan

c. **Settings:** Including device version and serial number viewing, firmware upgrade, time synchronization, alarm threshold setting, device maintenance, etc

## Status Interface Function




a. **Keep Value Balance (Extended Functionality - Under Development):** By detecting calcium, magnesium, and KH values through the device, automatically adjust the F4 Pro titration pump or calcium reactor pump to complete the automatic adjustment of water quality

b. **The latest detected calcium value, measured in ppm,** will change the background color in the display area based on the detection status. Green indicates low value, black indicates normal, and red indicates high value

c. **The latest magnesium value detected, measured in ppm,** will change the background color in the display area based on the detection status. Green indicates low value, black indicates normal value, and red indicates high value

d. **The latest detected KH value, measured in dKh,** will change the background color in the display area based on the detection status. Green indicates low value, black indicates normal value, and red indicates high value

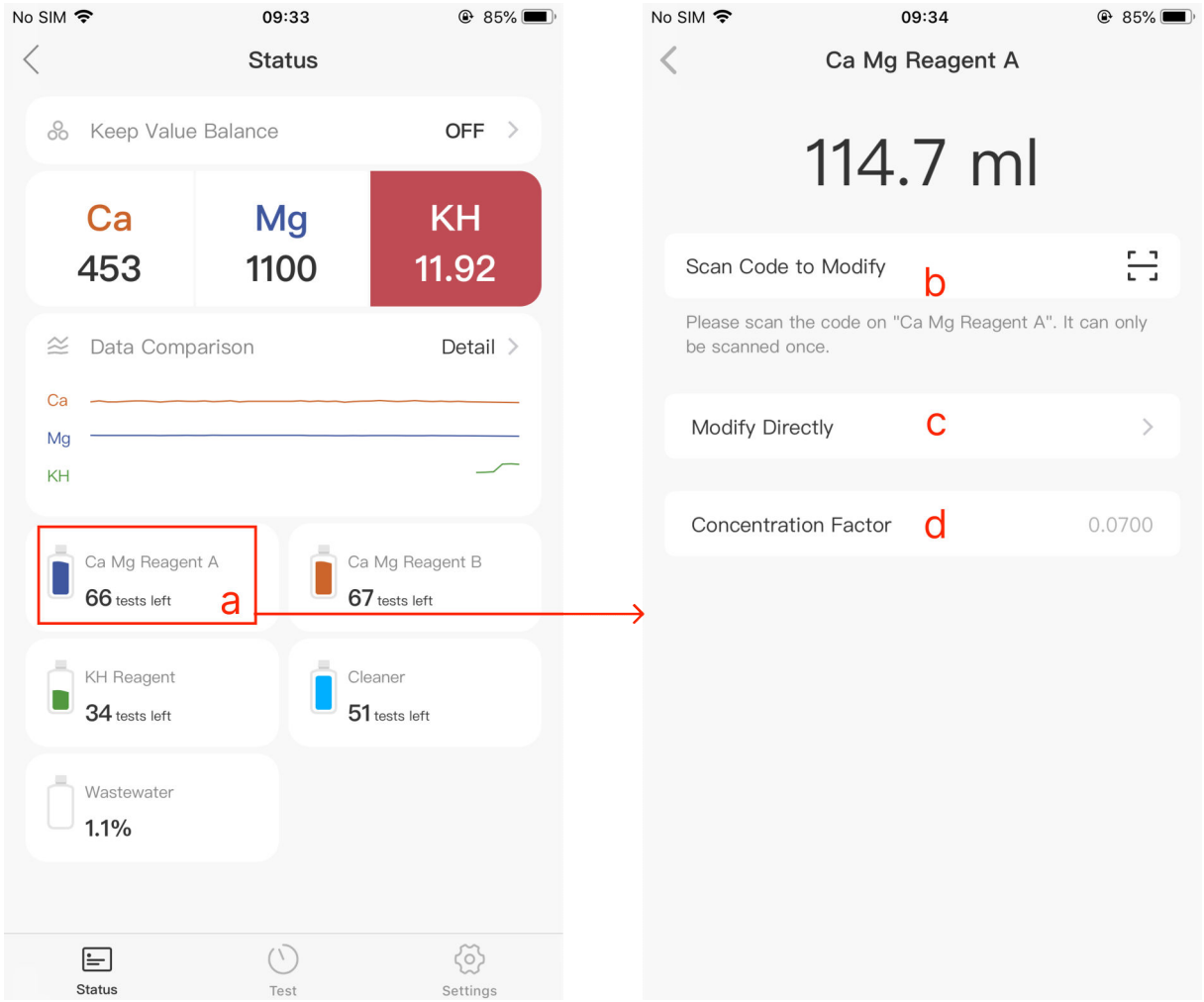
e. Click to view **the history chart** of each element detection

f. **Trend line of calcium, magnesium, and KH detection values**

g. **The remaining quantity status of the reagent bottle** will be evaluated by the reagent bottle for a remaining number of tests to be provided to the customer. When the number of tests is less than 10, the App will prompt the customer to replace the reagent. When the number of tests is less than 5, the equipment will stop testing, and the testing will only continue after the customer replaces the reagent

## Reagent Bottle Remaining Quantity Setting

Reagents will decrease with use, and they need to be replenished when the trial dose is insufficient. After receiving the new reagent, scan the QR code on the reagent bottle through the Kamoer Remote App, and set the reagent capacity based on the QR code to update the capacity of the reagent bottle.



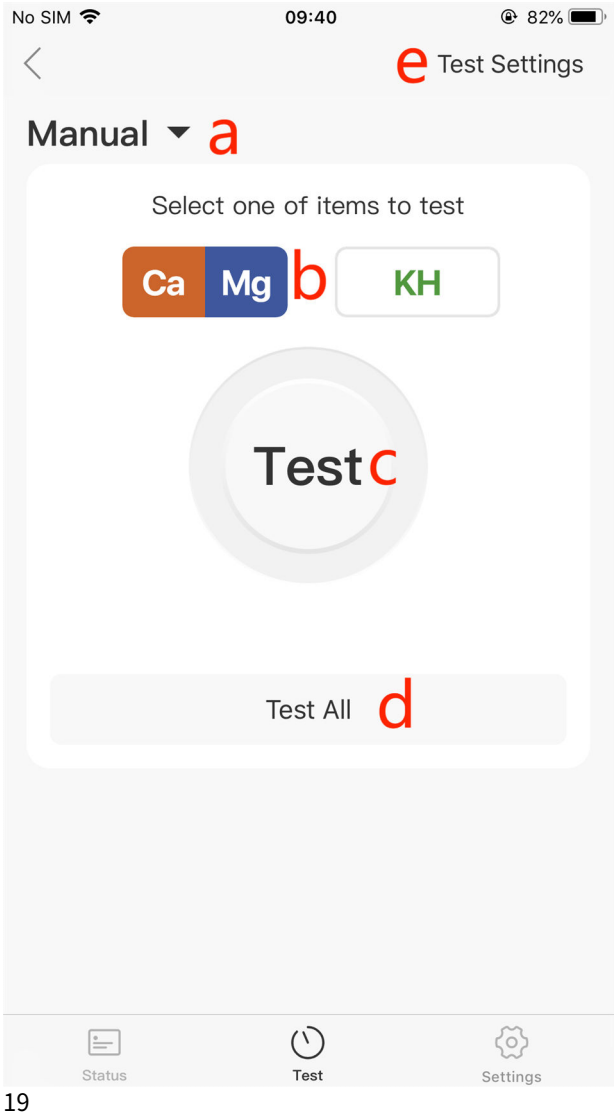
a. Click on the reagent bottle status to enter the remaining quantity modification interface

b. If it is necessary to increase the remaining amount of reagent bottles, it is necessary to purchase reagents. There is a reagent information QR code on the reagent bottle, and scan this QR code to update the capacity of the reagent bottle

c. Directly modify the remaining quantity. If the actual quantity does not match the displayed quantity on the interface, the remaining quantity can be modified to be smaller

d. Concentration coefficient, displaying the concentration coefficient of reagents, different reagents have different concentration coefficients

## Manual Detection




a. Click to switch between automatic/manual detection modes

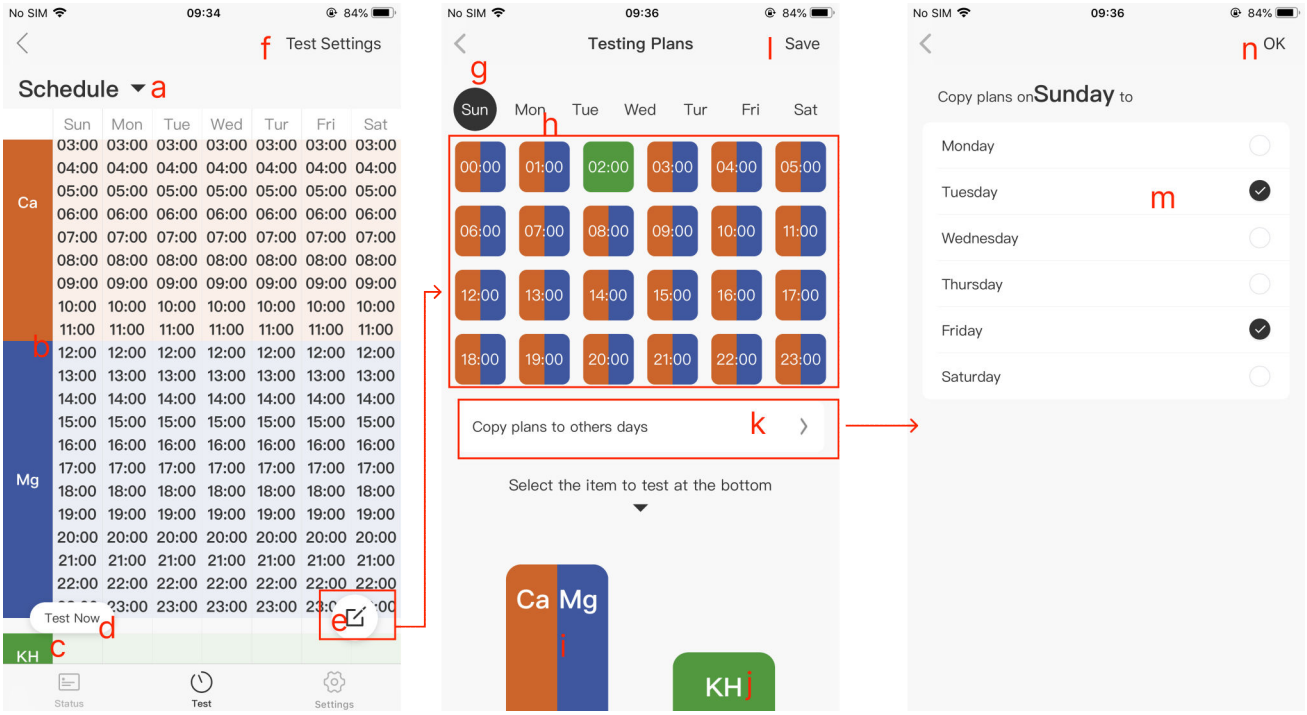
b. **Selection of detection parameters;** You can choose to test calcium and magnesium, or KH. The selected test items will be highlighted. After selecting the test items, click the test button to perform the test

c. **Test;** Click to start detecting the selected parameters

d. One click detection of calcium, magnesium, and KH parameters, the program will automatically complete the detection of these three parameters

e. **Test Settings;** Here, you can set detection related parameters, such as the re detection function and the automatic cleaning reaction chamber function

## Automatic Detection




a. Click to switch between automatic/manual detection modes

b. **The schedule for calcium and magnesium testing** can be set separately for each day within a week

c. **The schedule for KH testing** can be set separately for each day of the week

d. **Immediate detection.** If you want to start a detection immediately when there is no plan to run it, you can click on "Detect Now", select the parameters that need to be detected, and start a parameter detection immediately; If the temporary detection task crosses the automatic detection plan, the crossed automatic detection plan will not be executed this time

e. Click to enter **the editing of the testing plan**. Calcium, magnesium, and KH parameters need to be staggered for time testing

f. **Test Settings,** where you can set detection related parameters

g. **Week label,** click to select the week label, and the corresponding time plan for that day will be displayed below, with black representing selected

h. **A daily schedule**, with highlighted items representing the projects to be executed, allowing only one parameter to be executed at each time point

i. **Calcium and magnesium detectio**n labels, if selected, will be displayed at a prominent height; When setting up a testing plan for calcium and magnesium, click on the calcium and magnesium label, and then click on the corresponding time in the schedule. The corresponding time will automatically perform the testing for the project

**Example:** Conduct a calcium and magnesium test on Monday at 02:00; First, click on the Monday tag g ->click on the calcium and magnesium testing item tag **i** ->click on the 02:00 tag in the **b** time list ->complete the setting

j. To set the **KH detection** plan for the KH detection tag, click on the KH tag and then set the time in the schedule above the tag

k. **Copy the plan to another day**; After completing the plan setting for a certain day, you can copy the plan for that day to another day, making it easier for other days to set the same testing plan

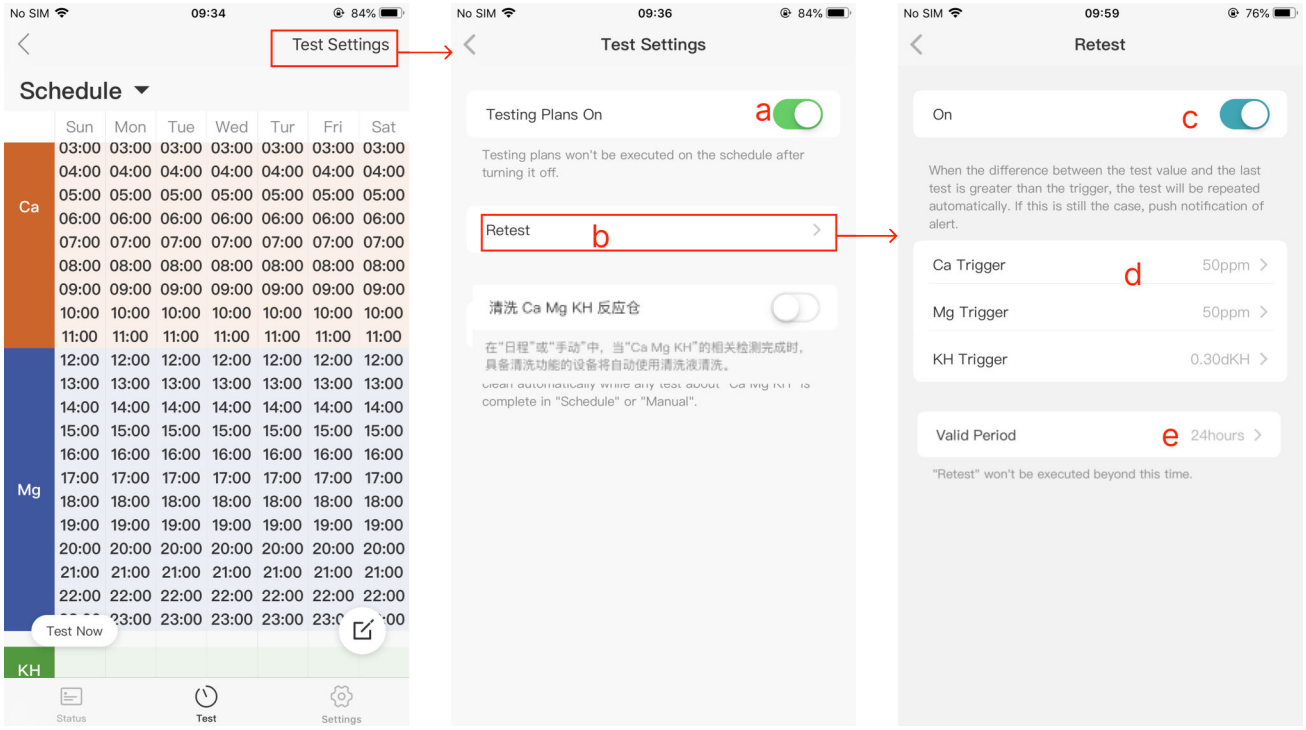
l. **Save the testing plan.** All plans (including plans copied to other days) must be saved or modified on this interface before they can take effect

m. **Other day schedule settings,** checked items indicate copying the already set schedule to this day

n. **Confirm settings**; After setting up the copy function, click OK to return to the previous interface. After saving, it will take effect.

## Retest Function

The principle of the retest function is that when there is a significant difference between the latest detection value and the previous detection value within a certain period of time, a retest is automatically performed to determine whether the detection value is truly abnormal. When the retest function is enabled, the measurement is based on the retest value.




a. **Automatic detection plan switch;** When the switch is turned off, automatic detection will not be performed

b. **Retest;** Click to enter the retest parameter setting interface

c. **Retest the function on/off switch;** When the switch is turned on, the retest function takes effect

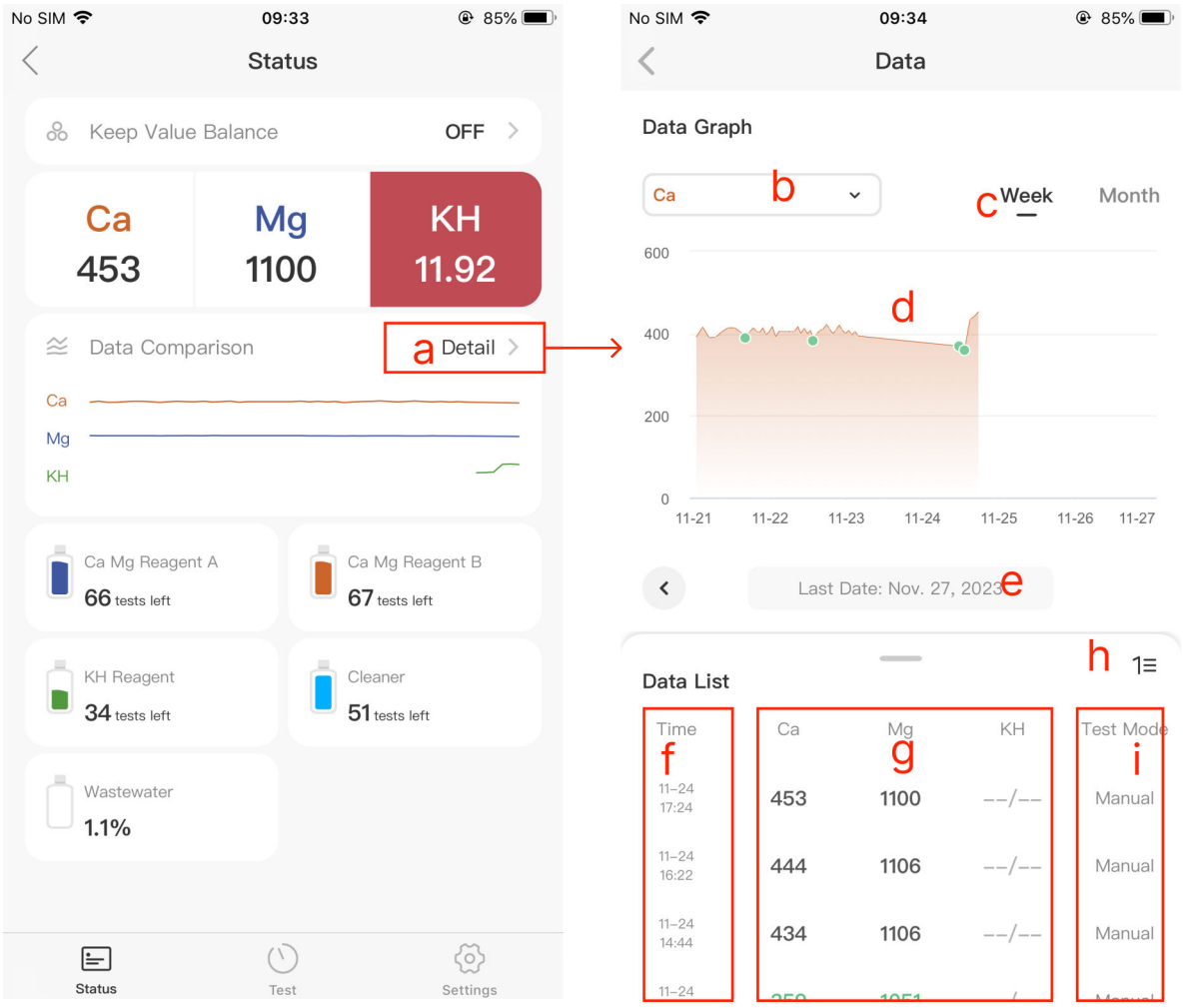
d. **Retest parameter settings;** This parameter is the difference between the latest detection and the previous detection. If the difference between the latest detection value and the previous detection value is greater than this number, a retest will be triggered. For example, if the

calcium setting triggers a retest with a difference of 50ppm, the calcium concentration detected last time was 450ppm. If the calcium concentration detected this time is less than 400ppm or greater than 500ppm, the retest function will be triggered

e. **Validity period;** The interval between this test and the last test. If the interval between this test and the last test is within this duration and the concentration of this test meets the difference condition for retesting, a retest will be triggered; If the difference condition for retesting is met outside this duration, it will not trigger retesting

## View History

Click on the data module to enter the data history interface, where you can view the historical records of the data.



a. Click on the icon **Detail** on the status page to enter the view history details page

b. Click to **switch the parameters** of the history to be viewed

c. **The visible period of historical records,** divided by the length of weeks and months

d. **Historical record curve;** Click on the curve to view the historical value of the corresponding position

e. **Deadline,** displaying the current chart's deadline

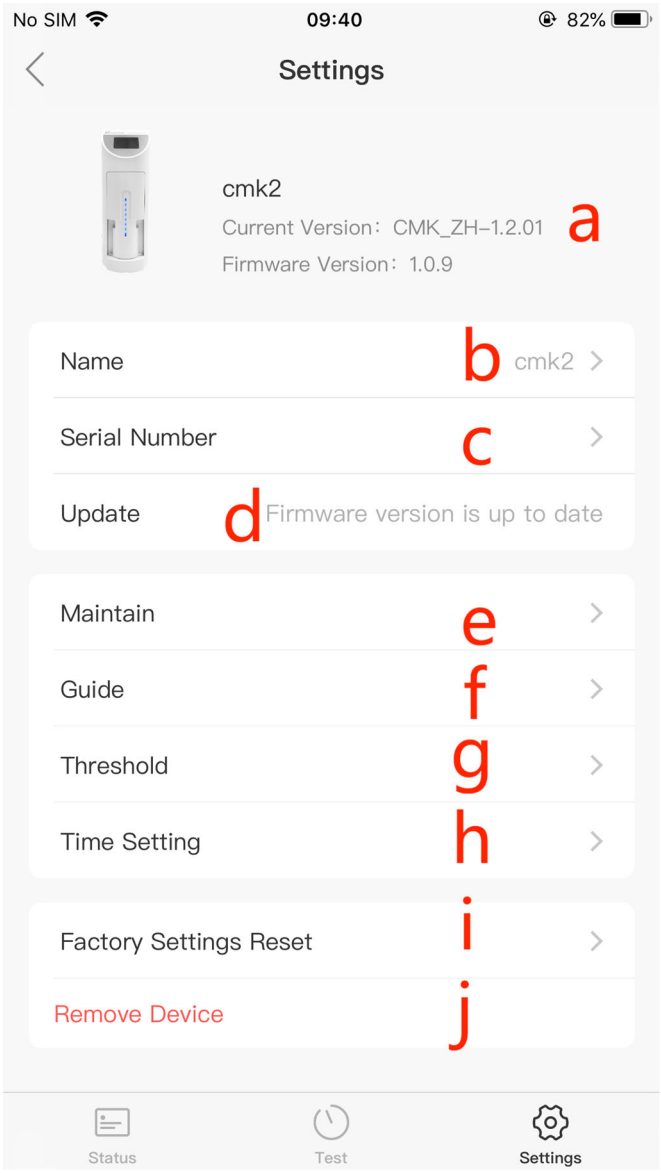
f. **The start time of detection items** in the history table

g. **Test values of detection items** in the history table

h. **Switching between forward and reverse sorting;** Forward sorting is time sorted from low to high, with the latest record at the bottom of the table; Reverse sort by time from low to high, with the latest record at the top of the table

i. Display whether the corresponding history records for each row are automatically detected or manually detected

# System Settings




a. **Firmware version information display**

b. **Name;** Click to modify the device name, which will be displayed on the APP homepage

c. **Serial number;** Equipment serial number information, each device has a unique serial number

d. **Firmware upgrade;** If the device has new firmware that needs to be updated, there will be a prompt here. Follow the app's instructions to upgrade

e. **Maintain;** Here, you can manually run the equipment's pump, magnetic stirring, etc. to fill or empty the pipeline, and check if the equipment's pump or magnetic stirring is running properly

f. **Use guidance;** Here, you can follow the app's instructions for pipeline connection, pipeline filling, and equipment usage guidance

g. **Threshold;** Set the detection threshold here, and when the detection value exceeds the threshold range, the device will push alert information to the App

h. **Time Setting;** Here, you can manually synchronize the time of the device. In networked situations, time synchronization only needs to be done once, and the device will automatically

synchronize the time through the network; Accurate timing is essential for planning to be executed correctly

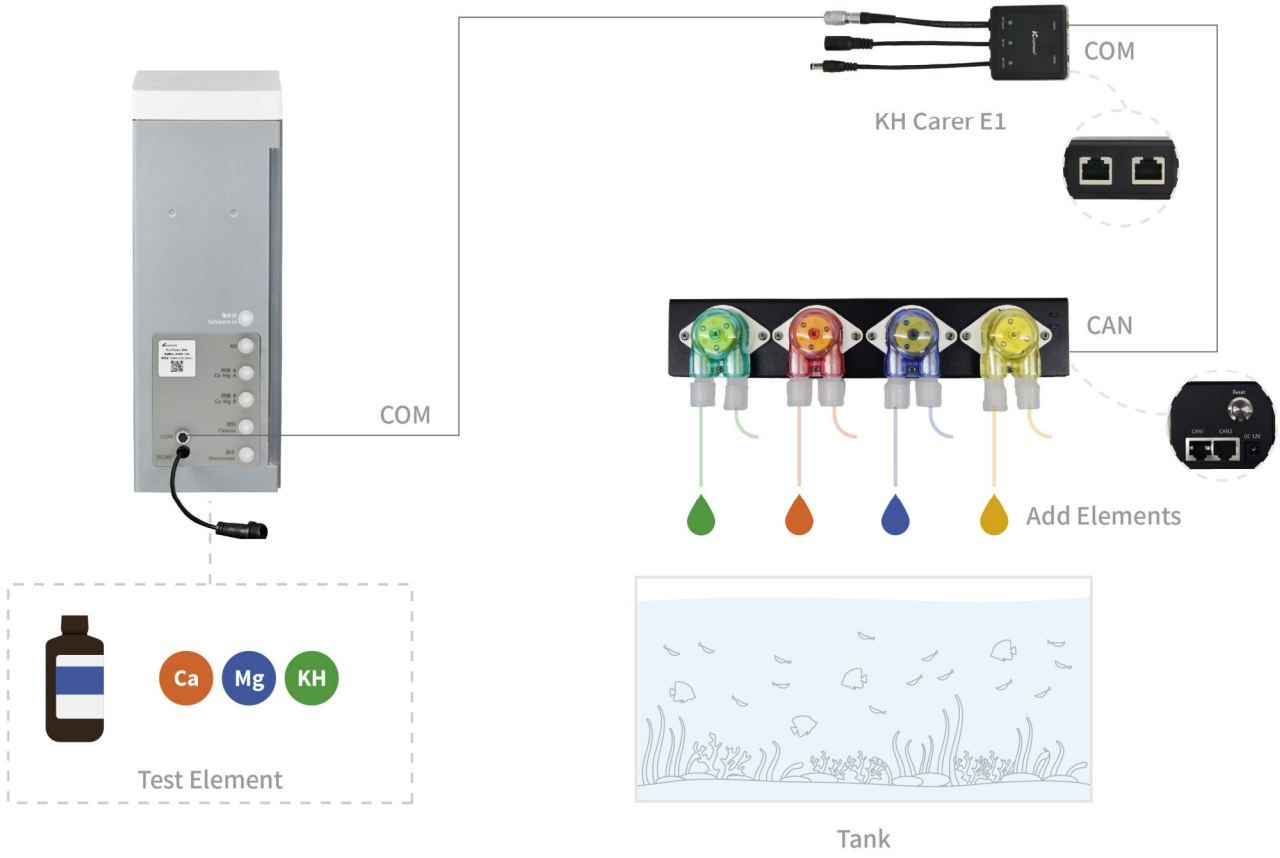
i. **Factory Settings Reset:** Restore parameters to factory settings

j. **Remove Device:** Unbind App and device

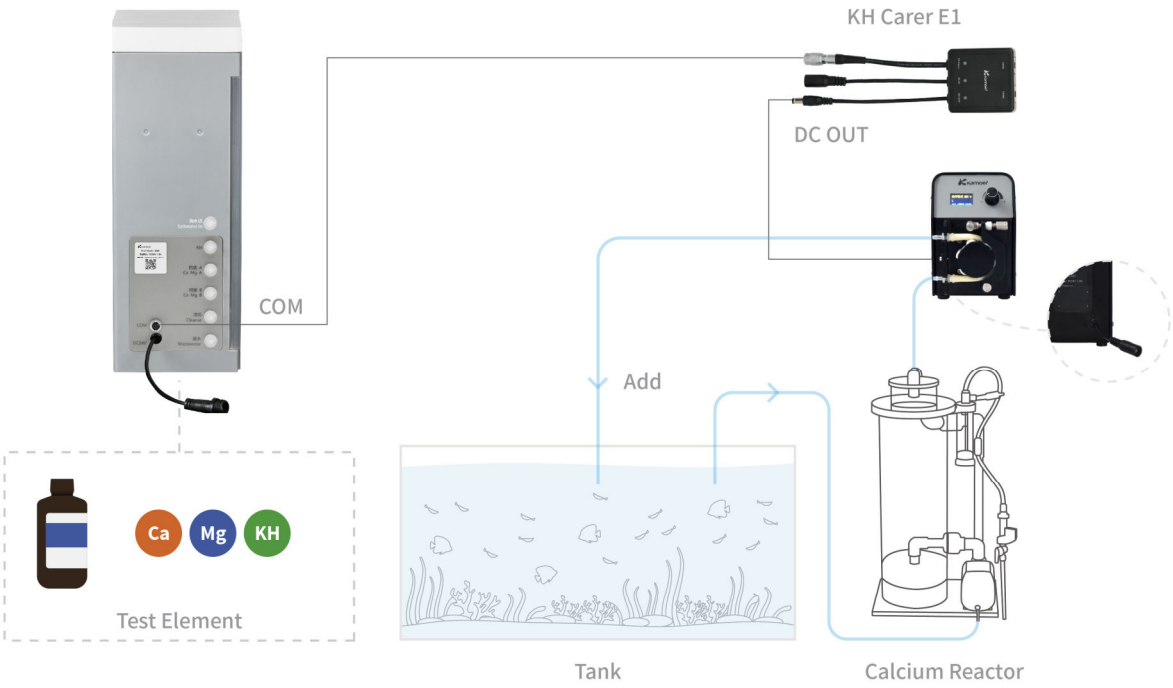
## Linkage Function

### Introduction to Linkage Function

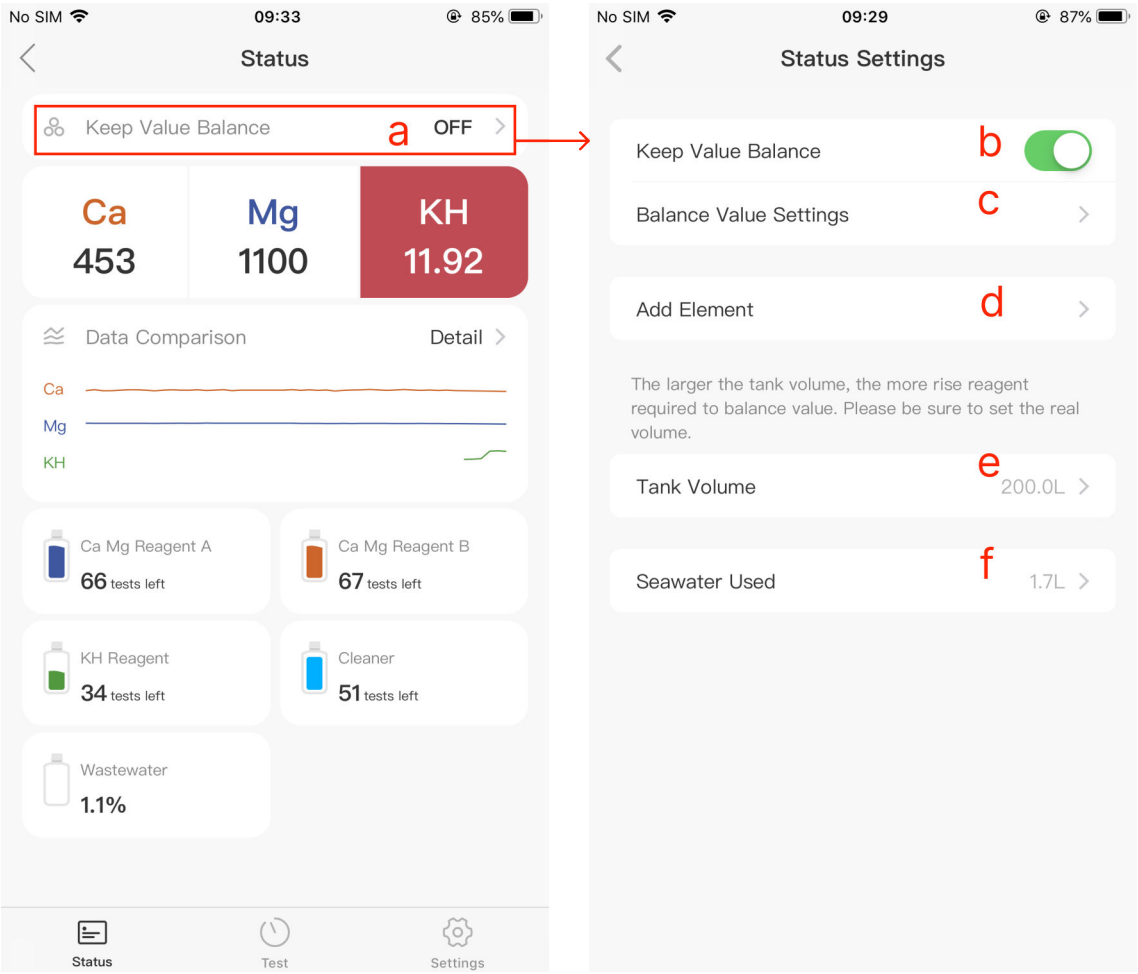
The linkage function refers to the Reef Master's linkage between the titration pump and the calcium reactor pump. Through the parameters detected by the Reef Master, the titration pump and the calcium reactor pump are controlled to regulate water quality.




Reef Master linked F4 PRO titration pump




Reef Master linked calcium reactor pump



a. On the status homepage, click “Keep Value Balance” to enable the function, and then enter the linkage parameter setting interface;

b. **Maintain a stable value switch.** When this switch is turned on, the linkage control function takes effect. When this switch is turned off, the linkage function does not work

c. **Parameter retention value setting;** For example, setting a calcium retention value of 450ppm. When the detected calcium value is below 450ppm, the titration will adjust the amount of calcium reagent added to bring the detection value back to 450ppm

d. **Add elements;** Set Reef Master binding devices and their parameters here, such as titration pumps and calcium reflux pumps

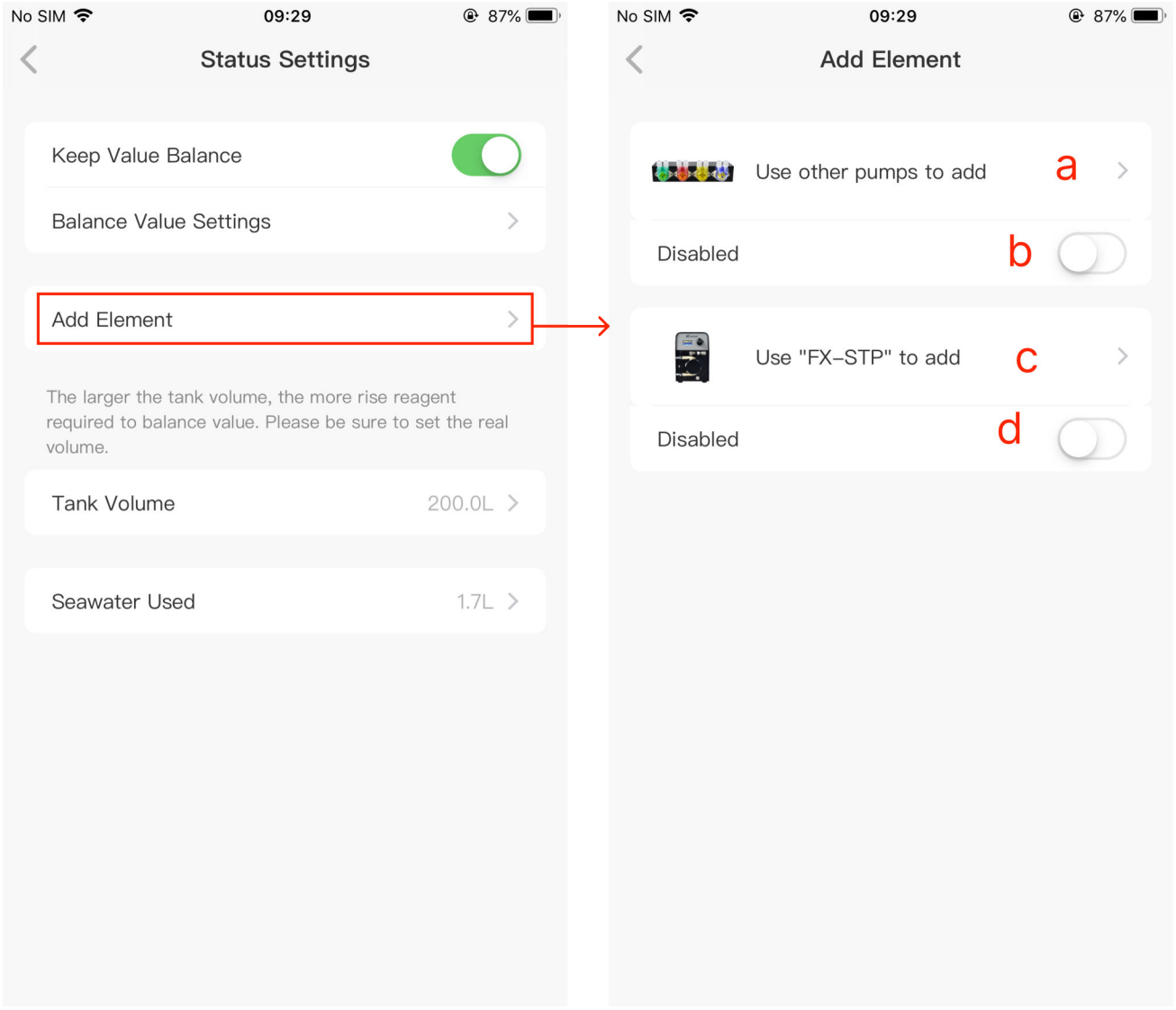
e. **Tank Volume,** which refers to the volume of water in the cylinder. The equipment will calculate the amount that needs to be adjusted based on the volume of water in the cylinder and the current concentration of elements. Therefore, this volume should be filled in carefully and default parameters should not be used

f. **The amount of seawater used;** The amount of seawater used by the equipment statistics

## Device Binding

The adjustment of elements can be achieved through titration pumps and calcium reactor pumps. The titration pump is relatively flexible and can be selected for titration adjustment based on various element parameters. The calcium reactor pump is only adjusted through KH; The titration pump needs to have a wired communication interface, such as F4 PRO, DDP4, DDP4 PRO, etc.

The titration pump and the calcium reactor pump can simultaneously participate in regulating water quality parameters.



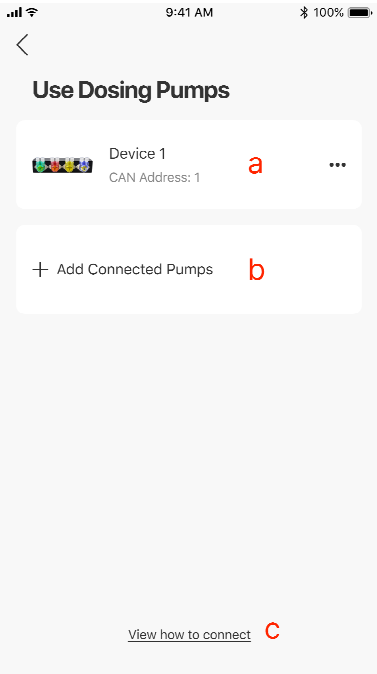

a. Adjusting water quality parameters **through a titration pump**

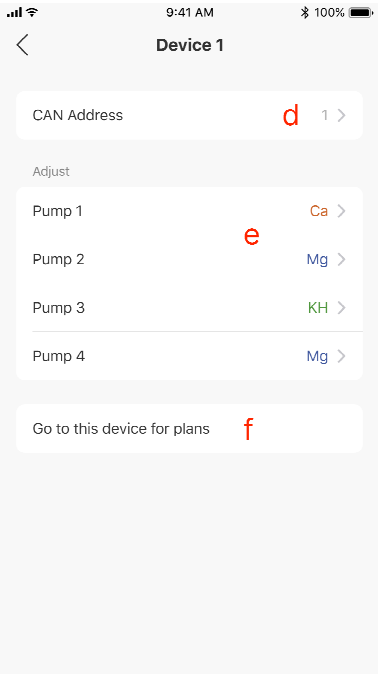
b. **The function switch for adjusting water quality parameters through titration;** When the switch is turned on, the titration adjustment parameters take effect

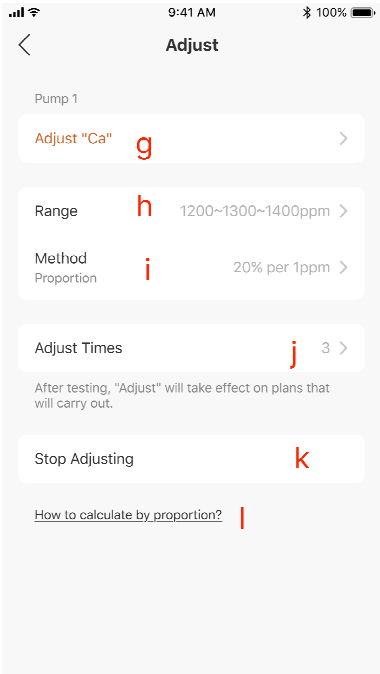
c. Adjusting water quality parameters t**hrough a calcium reactor**

d. **The function switch of calcium reactor to regulate water quality parameters;** When the switch is turned on, the calcium reactor regulating parameters take effect

## Use of Titration Equipment




a. **Added titration equipment,** click to set parameters

b. Click to **add a new titration device**. To add a new titration device, first bind it to the App, then connect the Reef Master and titration pump through KH Carer E1, and configure the binding according to the App's instructions

c. **Connection guide,** you can refer to the guide to connect Reef Master and titration pump

d. **Communication address,** wired communication address, used when binding Reef Master and titration pump

e. **The various channels of the titration pump;** Each channel can be set to add supplementary parameters

f. **Jump to the titration plan,** where you can set the addition plan for the titration pump

g. **Adjust parameters;** Set the elements added by the titration pump, with one titration element set for each titration channel

h. **Range ;** For safety reasons, automatic adjustment parameters will take effect within this parameter range. Once the Reef Master detects a parameter that exceeds this range, automatic adjustment will not take effect

i. **Adjustment method;** There are two adjustment methods, one is proportional adjustment, and the other is quantitative adjustment. Proportional adjustment is based on the detected water quality parameters, adjusting a proportion of the titration plan to complete the adjustment. Quantitative adjustment is based on the detected water quality parameters, adjusting a fixed amount for adjustment

j. **Adjust Times,** which represents the number of titrations required to complete this adjustment

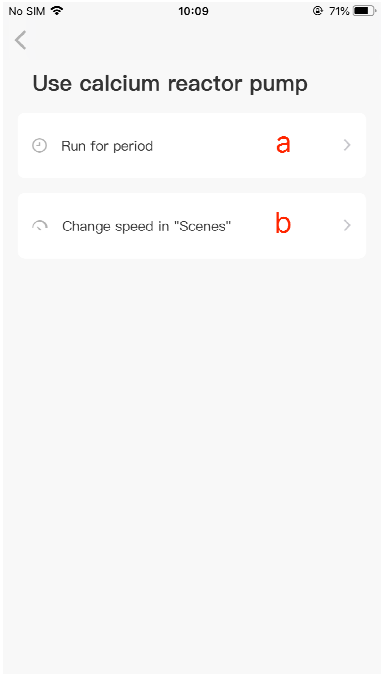
k. **Stop Adjusting;** When you want to stop the adjustment of the titration pump, you can click to stop this adjustment

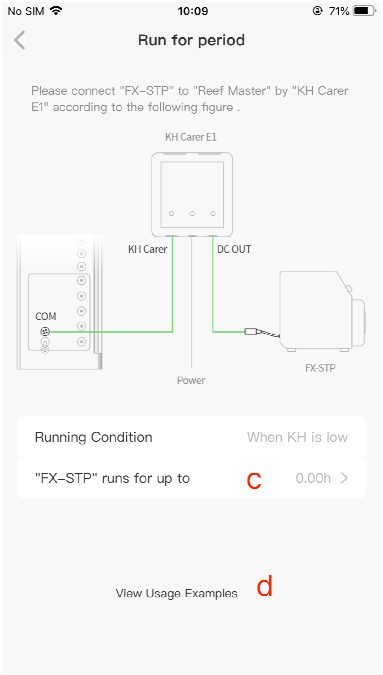
l. **Examples of adjusting according to proportion and quantity.** For those who are unclear about the adjustment method, please refer to the examples for understanding

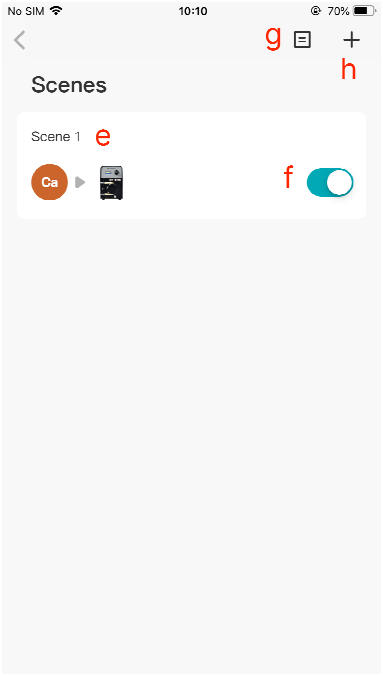
## Use of Calcium Reactor Equipment

There are two ways to connect and control the calcium reactor. One is to connect the Reef Master and FX-STP calcium reactor pump through KH Carer E1, and adjust the water quality parameters by controlling the start and stop of the calcium reactor pump based on the detected value; One method is to adjust water quality parameters by linking cloud servers and adjusting the speed of the calcium reactor pump through detection values.

The reference for controlling the calcium reactor is the detection parameters of KH, and the start and stop of the calcium reactor pump are controlled based on the value of KH




a. **Run for a period of time;** This setting is achieved through the wired connection of KH Carer E1. It was detected that the KH was low, and the calcium reactor pump was controlled to run for a period of time

b. **Change speed in the scene;** This is achieved through wireless control. The calcium reactor pump must be pre bound through the App, and then the speed of the calcium reactor pump can be adjusted by detecting the KH value

c. **The operating time of the calcium reactor pump;** Set the operating time of the calcium reactor pump. When the KH value is detected to be too low, the Reef Master controls the calcium reactor pump to start running. When the pump exceeds this operating time, the calcium reactor pump stops running to prevent the occurrence of the calcium reactor pump being turned on for too long due to the long interval between two KH detections; If the KH value is detected to be appropriate within this duration, the calcium reactor pump will also stop

d. **View usage examples;** Provide examples of the use of calcium reactor pumps

e. **The operating scenario of the calcium reverse pump created;** The usage method is achieved through Reef Master and calcium reactor pump via wireless server

f. **Switch for scene control;** Scene operation takes effect when the switch is turned on

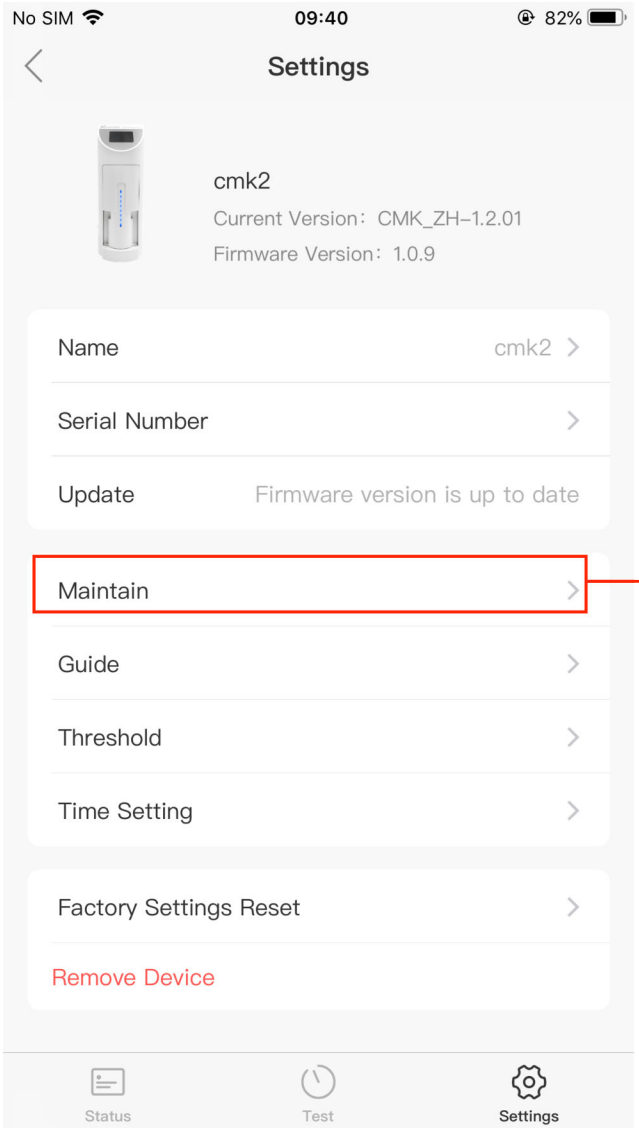
g. **Running logs;** View the log of calcium reverse pump operation here

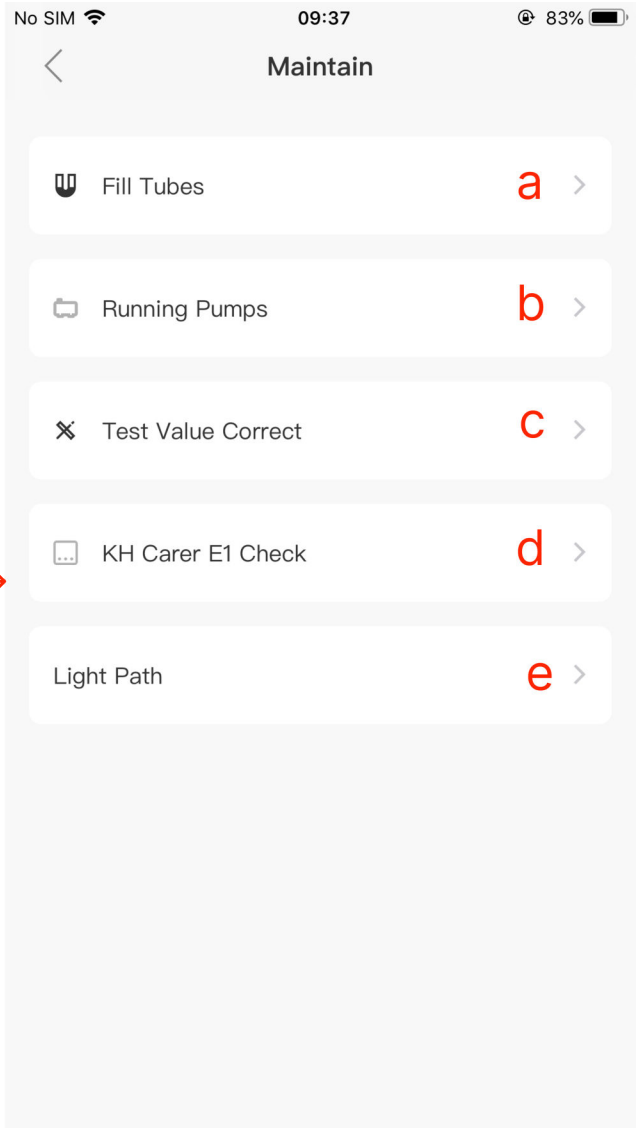
h. **Create a scene;** Create a scenario of a Reef Master variable speed calcium reactor, where multiple scenarios can be created to adjust the different speeds of the calcium reverse pump

## Maintenance Function

The maintenance module includes pump maintenance, magnetic stirring maintenance, clamp valve maintenance, peristaltic pump operation, liquid filling and discharge, calibration, optical path inspection, etc., which can facilitate the maintenance of the Reef Master.

From System Settings ->Click Maintenance Function to enter the Maintenance Function interface. If the device is undergoing testing, it needs to be stopped before entering the maintenance function interface.



a. **Fill Tubes:** In this module, you can fill the pump tube

b. **Running pumps:** In this module, you can run clamp valves, pumps, magnetic stirring, etc

c. **Test value correct:** The measurement results can be calibrated here, and the principle of calibration is to use standard solution to calibrate the measurement results of Reef Master. When there is suspicion that the device is measuring inaccurately, calibration can be performed to correct the device's detection

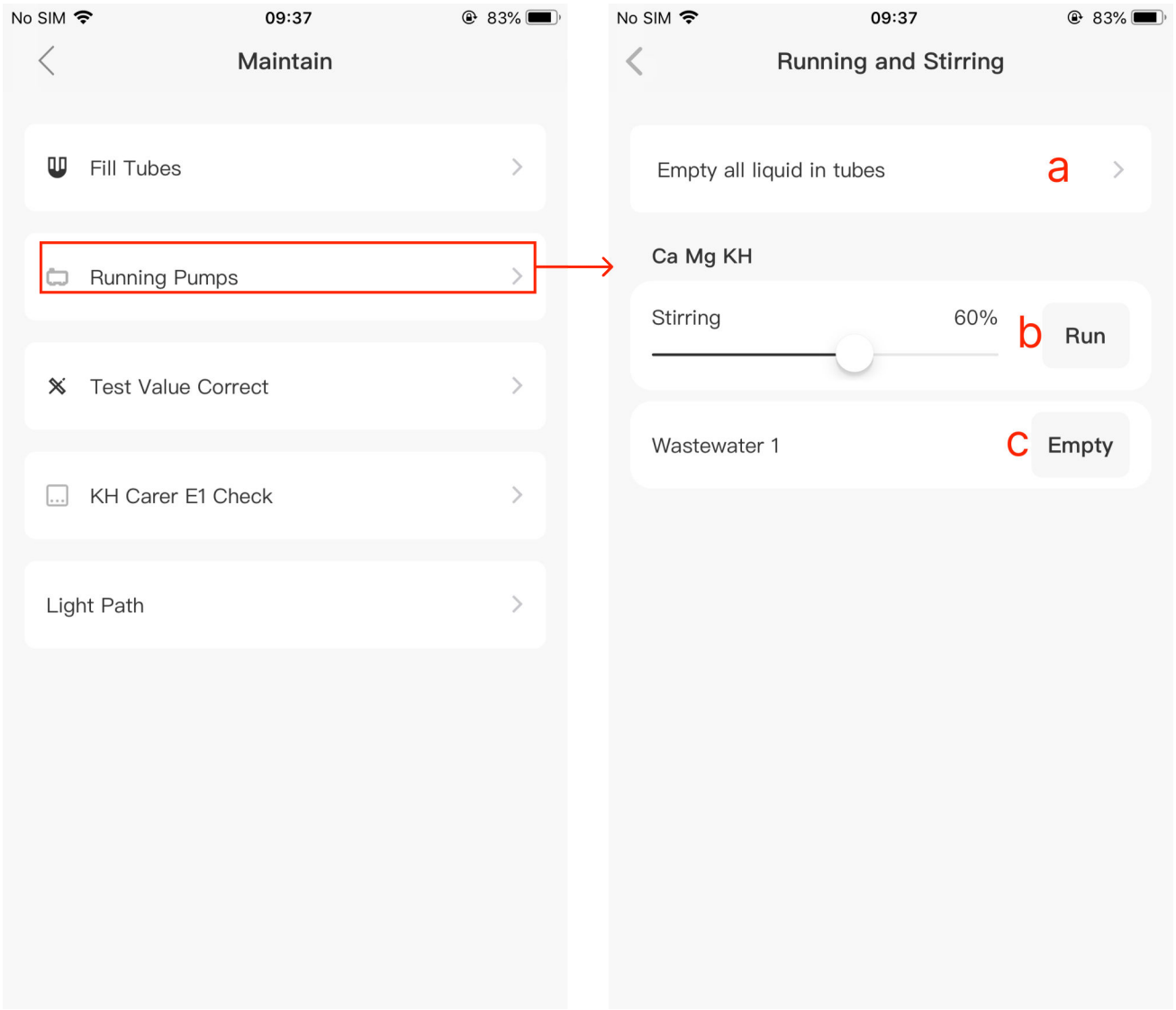
d. **KH Carer E1 Check:** Entering this module allows you to check if the function of KH Carer E1 is normal.

   Reef Master can control the F4 PRO titration pump or calcium reactor pump through KH Carer E1 linkage

e. **Light Path:** Optical path inspection can check whether the circuit reading optical path sensor is normal

## Running and Stirring

In the Running Pumps function, the reaction chamber can be emptied, and the stirring force of magnetic stirring can also be set.



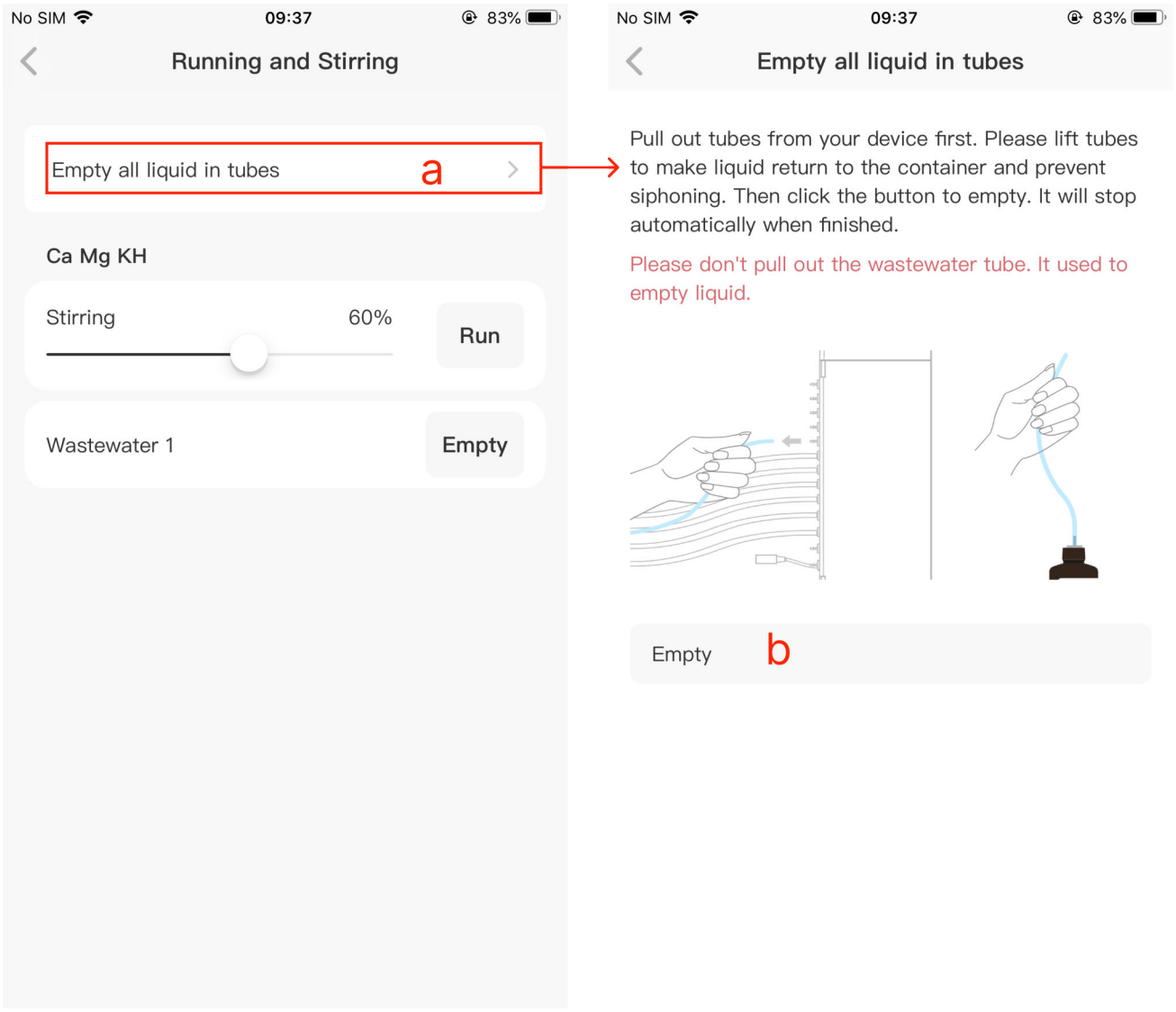

a. **Empty all liquids in the tube,** click to enter the empty liquid guide page

b. **The magnetic stirring setting of the calcium magnesium KH detection module** can set the operating intensity and start stop control of the magnetic stirring. Generally, the operating intensity range of the magnetic stirring is between 40% and 60%

c. **Empty the waste liquid** from the calcium magnesium KH reaction chamber

## Empty All Pipelines

When the equipment is not in use or is being transported, it is necessary to empty the liquid in the equipment pipelines and the connecting pipes outside the equipment to prevent the overflow of liquid in the equipment pipelines from affecting transportation or storage




a. **Empty all liquid in the pipeline.** When the equipment is not in use, it is necessary to empty the liquid in the pipeline. Before emptying the liquid, unplug all pipelines except for the two waste liquid pipelines from the machine. When each pipeline is unplugged, lift the pipeline upwards to reflux the liquid in the pipeline into the reagent bottle or sea tank

b. **Click to clear all pipelines.** Here, the liquid in the built-in pipelines and colorimetric dishes on the device is cleared. The waste liquid generated by clearing the pipelines is discharged from the waste liquid pipeline

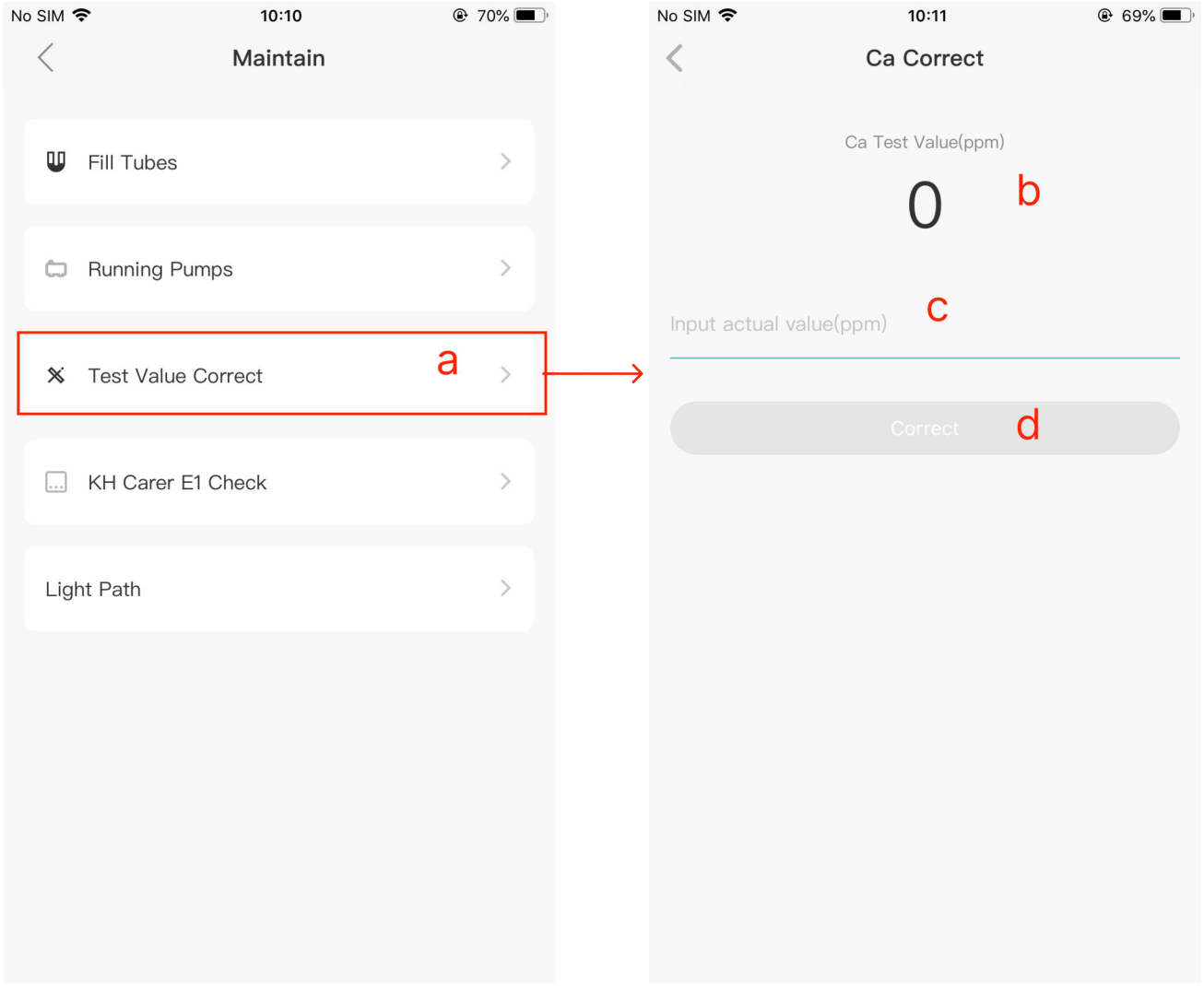
## Test Value Correct

During the use of the equipment, if it is suspected that the detected values are inaccurate, calibration can be carried out. The principle of calibration is to use a standard solution to calibrate the detection results of the equipment. When the detection value of calcium and magnesium KH is not accurate, the detection value can be corrected. The corrected reference value can be the value of the test standard solution or the value of other considered accurate testing equipment. It is recommended to use the standard solution for calibration.

When testing, prepare the standard solution, such as using a calcium standard solution. First, connect the standard solution to the sample tube of the device, and then run the test through the App. One test is not enough, and it needs to be run several more times. After the data is stable, enter the value of the standard solution into the App in System Settings ->Maintenance ->Test Value Correct to complete the calibration.

The calibration process is as follows:

1. Use standard solution instead of seawater for Reef Master testing
2. After testing several stable values, enter the App and input the value of the standard solution into the App




a. **Click to enter the detection value correction process,** select the parameters that need to be calibrated, and then go to correct

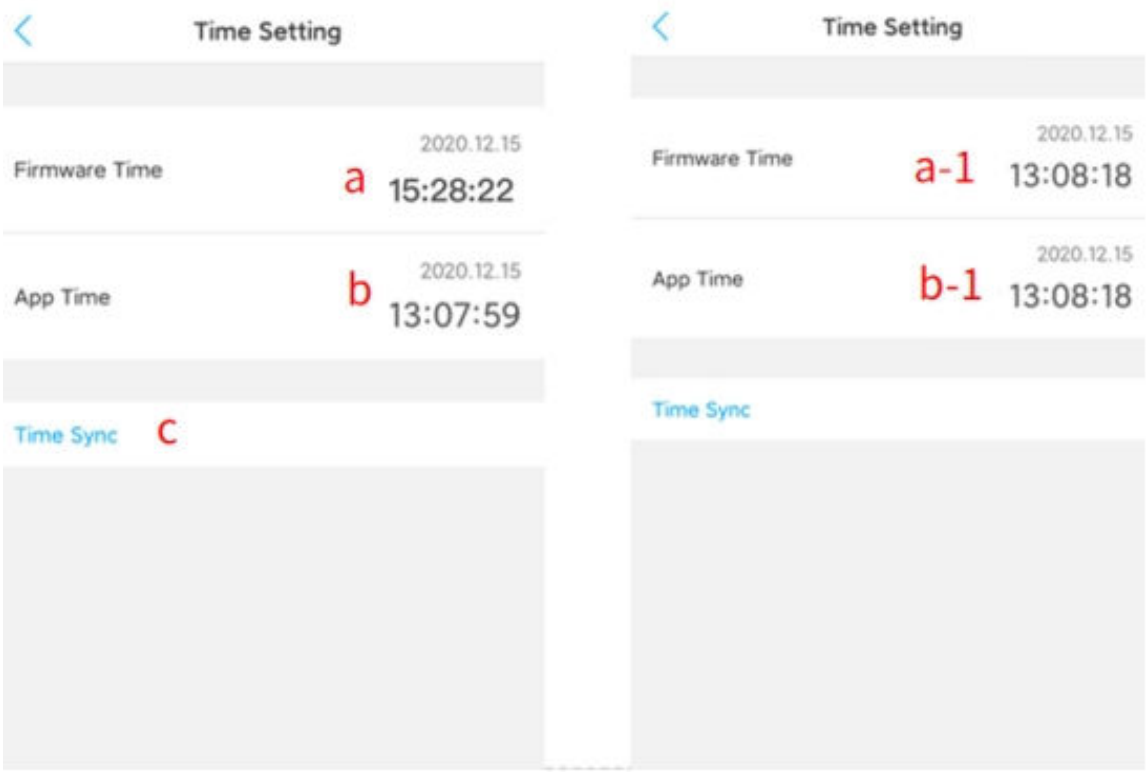
b. Previously detected detection values

c. Input actual detection value

d. After calibration, the data will be synchronized to correct errors

## Time Setting

When the time of the device does not match the local time, the real-time clock time of the device can be synchronized through the app to ensure the normal execution of the device titration plan.




a. **Firmware Time:** This displays the current real-time clock time of the device;

b. **App time:** The current time of the phone;

c. **Time synchronization:** After clicking, the device will start time synchronization. After time synchronization, the device's running time will be the same as the phone's time;

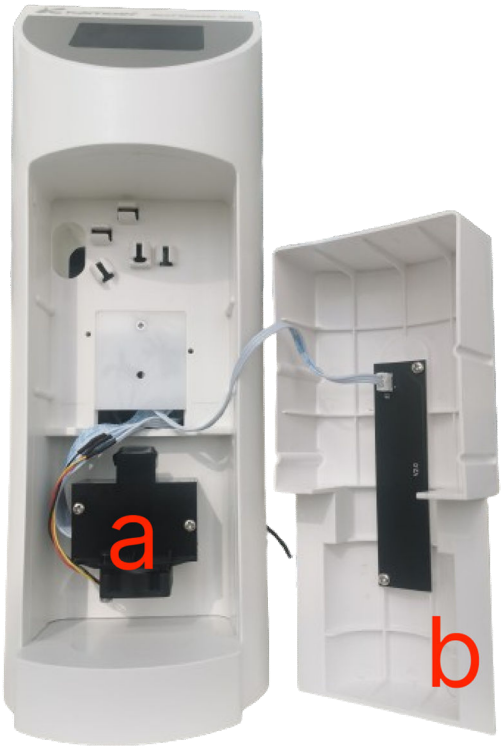
**a-1** and **b-1** correspond to the device's real-time clock time and mobile phone time after time synchronization, respectively;

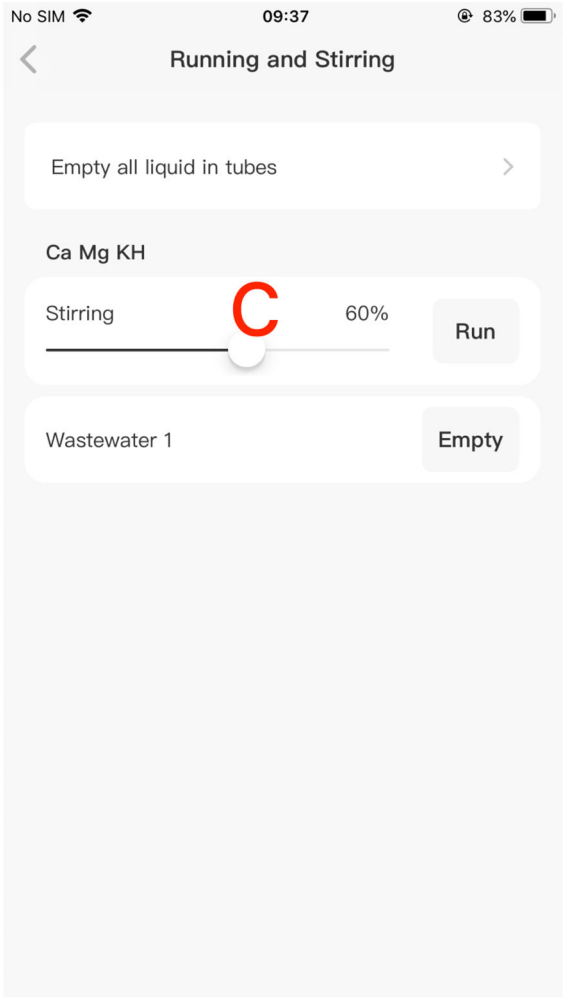
# Equipment Maintenance

# Equipment Maintenance

## Magnetic Stirring

When encountering the problem of abnormal noise in magnetic stirring, when troubleshooting, first remove the front cover **b** of the Reef Master shown in the figure below. Go to System Settings ->Maintain ->Running Pumps to enter the control interface for Running and Stirring.




a. Calcium magnesium KH reaction chamber

b. Reef Master's front cover; Remove the front cover first during troubleshooting

c. Calcium magnesium KH magnetic stirring control

**Attention:** The reaction chamber includes a magnetic stirrer, which operates during water quality parameter testing; When there is abnormal noise in magnetic stirring, it is possible that the magnetic stirring force has changed. The problem can be solved by setting different magnetic stirring forces on the App; The operating force of magnetic stirring is generally between 40% and 60%, with a factory default setting of 60%; If there is abnormal noise during the operation of magnetic stirring, the intensity of magnetic stirring can be reduced, for example, to 40%;

# Appendix

# Appendix

## Technical Parameters

| | |
|---|---|
| **Size(L x W x H)** | 230 x 120 x 338 mm |
| **Weight** | Approximately 2547 g (excluding power adapter) |
| **Power** | Input: 100VAC -240VAC<br>Output: DC24V 2A |
| **Interface** | WIFI, Bluetooth, CAN (backup) |
| **Working environment** | Temperature 0-70 °C, humidity 10% -90% (non condensing) |
| **Storage environment** | Temperature -20 °C -85 °C, humidity 10% -90% (non condensing) |

## After Sales Warranty Information

### 1. **Warranty conditions**

The free service during the warranty period is only valid under normal use and maintenance according to the user manual, and any man-made faults or damages are not covered by the warranty. Please keep the purchase invoice and user manual properly, so that you can receive satisfactory after-sales service in a timely manner.

### 2. Warranty scope

Within **one year** from the date of purchase, if any damage occurs due to manufacturing processes or components, our company will provide free warranty services.

The free maintenance service provided during the warranty period includes free repair, free supply and replacement of faulty parts. Products that cannot be repaired will be replaced with products of the same model (if the model has stopped production, it will be the same model). Free services do not include transportation costs incurred for product repairs.

## 3. Non warranty coverage

The following factors are not covered by the free warranty, and customers are required to pay for repairs.

1) Product appearance (please confirm at the time of purchase);
2) Improper use, maintenance, or storage (please use, maintain, and store correctly according to the user manual);
3) Connect to inappropriate power supply;
4) Damage to components caused by circuit board short circuits caused by the entry of various insects into the machine;
5) Losses caused by accidents;
6) Using inappropriate spare parts (not applicable to non company spare parts);
7) Negligent handling, modification, or repair by personnel not authorized by our company (please do not disassemble or repair without authorization);
8) Failure or damage caused by use outside of the applicable scope;
9) Damage caused by force majeure, etc;
10) Consumable and vulnerable parts (such as pH electrodes, ORP electrodes, etc.);
11) The warranty period has expired.

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