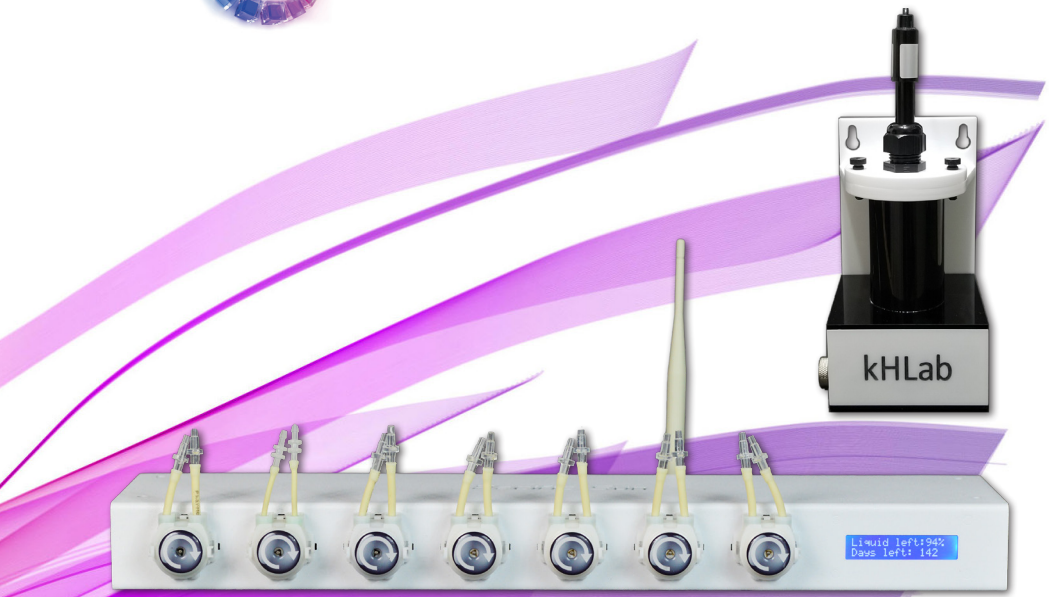
Pacific Sun



Kore 7th

Ultimate dosing station

User Manual

ver. 2.0

PS Cloud Interface

IO cloud

www.Pacific-Sun.eu

Table of Contents

1. Introduction

Congratulations on your Purchase!

The Pacific Sun Kore 7th dosing station and kHLab module are made with the highest quality materials, and are built to last, helping you to take your reef to the next level!

The Pacific Sun Research and Development team is continuously testing, developing, and releasing new products with new features.

This document serves to cover the basics of the Kore 7th dosing station and the kHLab module. Details will be made available about additional new products and features as they are released.

For questions, please contact us at service@pacific-sun.eu.

1.1. Product Information and Features

Why the Kore 7th/kHLab was developed?

The kHLab module automatically measures seawater alkalinity in the reef aquarium and maintains the KH set value by automatically controlled Kore 7th doser pumps performance.

What distinguishes Kore 7th dosing station and kHLab from the competition's products is that it regulates the dosing of Alkalinity Additive solution (Sodium Bicarbonate or Carbonate) as well as Calcium (Ca) and Magnesium (Mg) fluids and Mineral Salt.

Another important feature of kHLab/Kore 7th is the ability to control external Calcium Reactors by controlling CO_2 dosing into the reactor chamber.

The Kore 7th/kHLab device and device performance should be monitored and serviced on a regular basis. This includes service activities such as regular pH probe calibration (in 4.0pH and 7.0pH solutions) and checking the dosing efficiency of channels #1 (Water Sample) and #2 (Reagent Solution) as these can have a big impact on accuracy and proper device operation.

An incorrect and/or unstable alkalinity level or sudden and/or accidental alkalinity level changes in the aquarium water can significantly affect the condition/life of demanding corals such as SPS which are becoming increasing popular in home aquariums. A correctly configured and programmed device will quickly became a necessary tool for the aquarist in maintaining alkalinity at a proper and stable level.

1.2. The Kore 7th/kHLab Edition Package

The Kore 7th / kHLab includes:

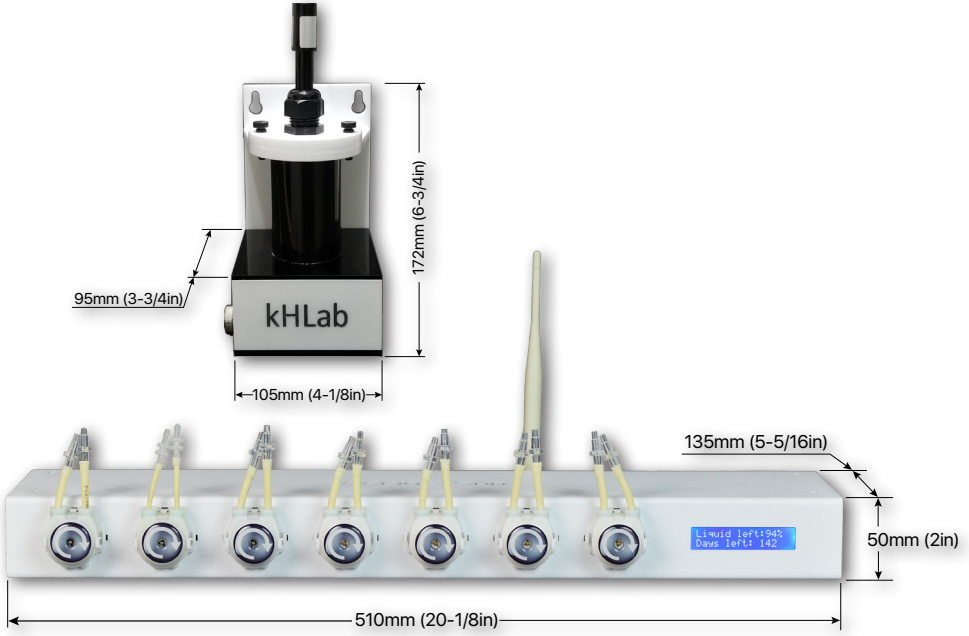
- Kore 7th dosing station with Wi-Fi antenna,
- kHLab module with control connection cable,
- 12V/2A Power supply (USA/EU/AUS/JAP),
- High-Quality Lab Grade pH Probe,
- 4.0pH and 7.0pH Calibration Fluids,
- 1000ml super concentrated reagent (1 liter allows to prepare **100 liters** ready to use reagent and allows for about **2000 tests**),
- Digital Scale with calibration holder/stand for very precise fluids calibration (0.01g),
- Dedicated calibration/measuring cylinder,
- Syringes and precise dosing applicator tips,
- Connection tubings for kHLab,
- Magnetic stirring bar/pellet (inside kHLab module cylindrical chamber).

1.3. The Kore 7th/kHLab Device Features

The kHLab has an ability to measure alkalinity with lab grade accuracy. It can provide KH measurement values with 0.1 dKH accuracy. It's a minimal confirmed resolution during continuous device function. In the case of performing tests manually (in a small time intervals) resolution can be greater.

1.4. kHLab Device Technical Specifications

- Systematic error ISO: ±0.03ml
- Numeric division: 0.05ml
- Random error: ≤ 0.05ml
- Alkalinity range: 5 to 15dKH
- Resolution: 0.1 dKH
- Device can work in two modes **Monitoring** and **Control**



1.5. kHLab working modes

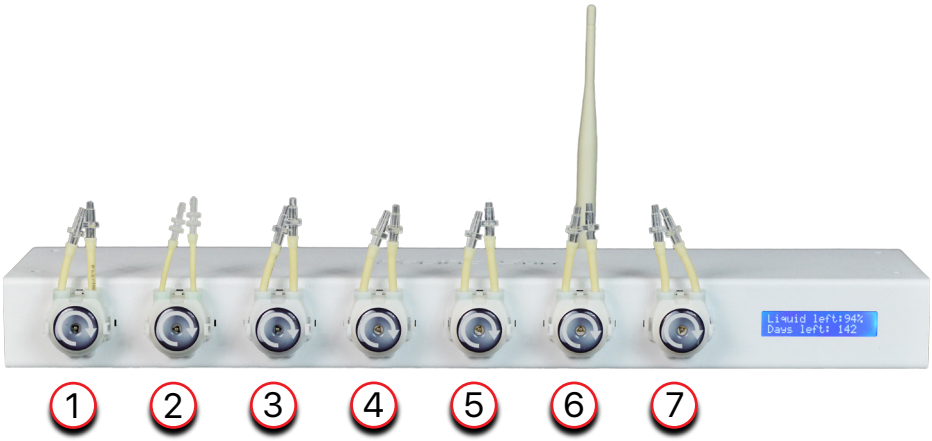
1. **Monitoring mode** (passive)
   During this Monitoring mode, the device measures the Alkalinity level and registers all the values in memory, and displays them on a doser LCD screen. It makes no adjustments to the Alkalinity level.
2. **Control mode** (active)
   During Control mode the device **automatically adjusts and maintains** the amount of dosing fluids in channels **4/5/6/7** (Alk/Ca/Mg/Mineral Salt) to control Alkalinity level. Channels are simultaneously controlled (at the same time).

2. Kore 7th/kHLab Device installation

2.1. Proper device setup and installation

For optimum performance, the height difference between the kHLab device and the water level surface from where the device will take the water sample for testing should NOT exceed about 50-60cm (20-24in) and connection tubing length between the kHLab module and Kore 7th doser should NOT exceed 100cm (59in).

The kHLab device can be mounted directly on a wall with the supplied wall mount, or it can operate sitting on a flat surface.



Kore 7th Ultimate Wi-Fi dosing station

2.2. Kore 7th Connection Ports

Kore 7th Dosing Station back panel

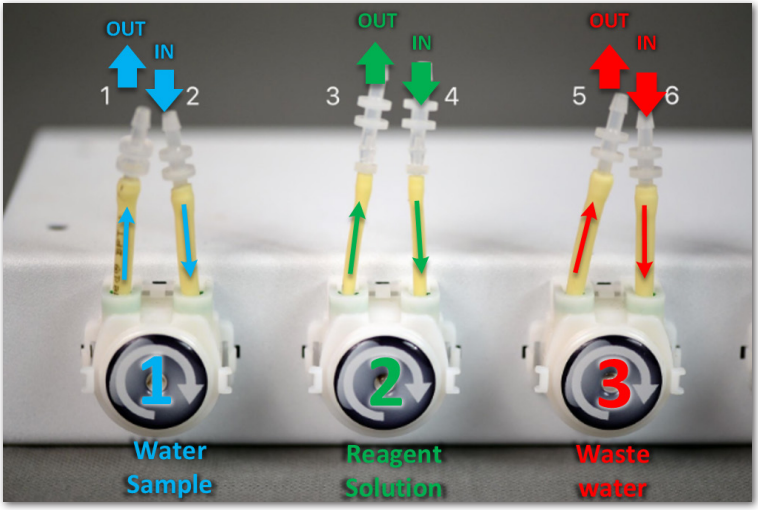
USB	Port for Firmware upgrade
DC pump	Port for DC pump (ATO refill pump)
Optical sensor	Connection port for optical sensor (used for ATO/AWC)
Temp sensor	Digital temperature sensor port
Floating sensors port	Not used in the newest version of software/firmware and designed for future applications
Antenna port	External Wi-Fi antenna port. Required for proper work!
Reset button	Hardware reset switch (short push generate reset signal to the main CPU)
Power supply port	Required 12V/2A power supply with 2.1mm plug
kHLab Digital I/O port	Used for connection **kHLab Module** or Magnetic Stirrer, DC AWC pump etc
pH #1	Connection port for pH probe nr 1 (kHLab module)
pH #2	Connection port for pH probe nr 2 (Calcium Reactor)

Important!

1. Make sure that water mixing magnetic stirrer bar/pellet is put inside kHLab module test cylindrical chamber.
2. Make sure to connect silicone tubing properly to individual Kore 7th dosing pumps:

   – Pump (1) - **supplies water sample (aquarium water)** to kHLab test chamber. Do NOT exceed 100cm (39in) length between the place of taking test water and the kHLab device.
   – Pump (2) - **supplies reagent solution** for testing. Try to place the reagent solution bottle as close as possible to the doser and at a similar level.
   – Pump (3) - **removes waste water (tested water)** from the kHLab test chamber. This water can be drained into the aquarium (we suggest near the pump sucking in water to the protein skimmer). The length of the silicone tubing from the pump outlet should not exceed 150cm (59in).

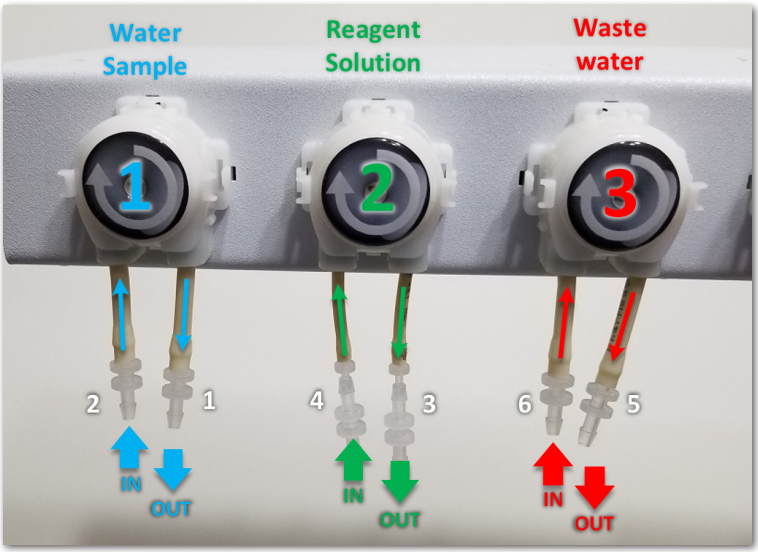
3. Make sure to connect the control cable between the kHLab device and the Kore 7th dosing station.



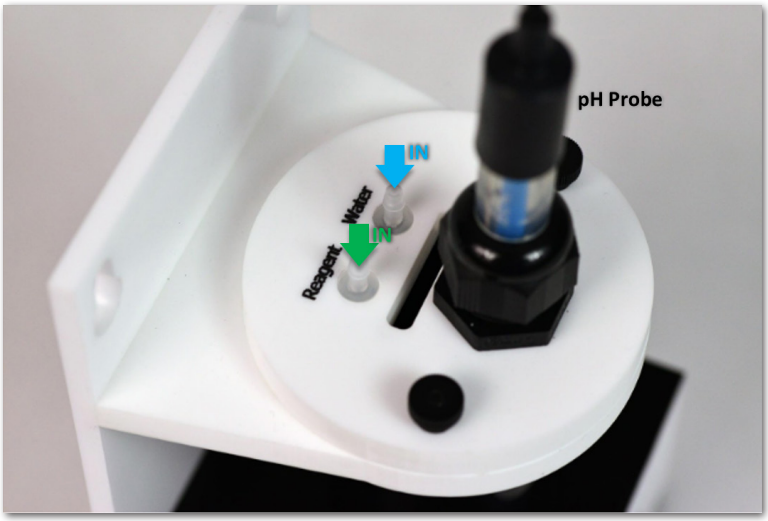
Pumps with connectors facing UP

Note:

Pumps heads can function with all connectors facing UP or DOWN.



Pumps with connectors facing DOWN



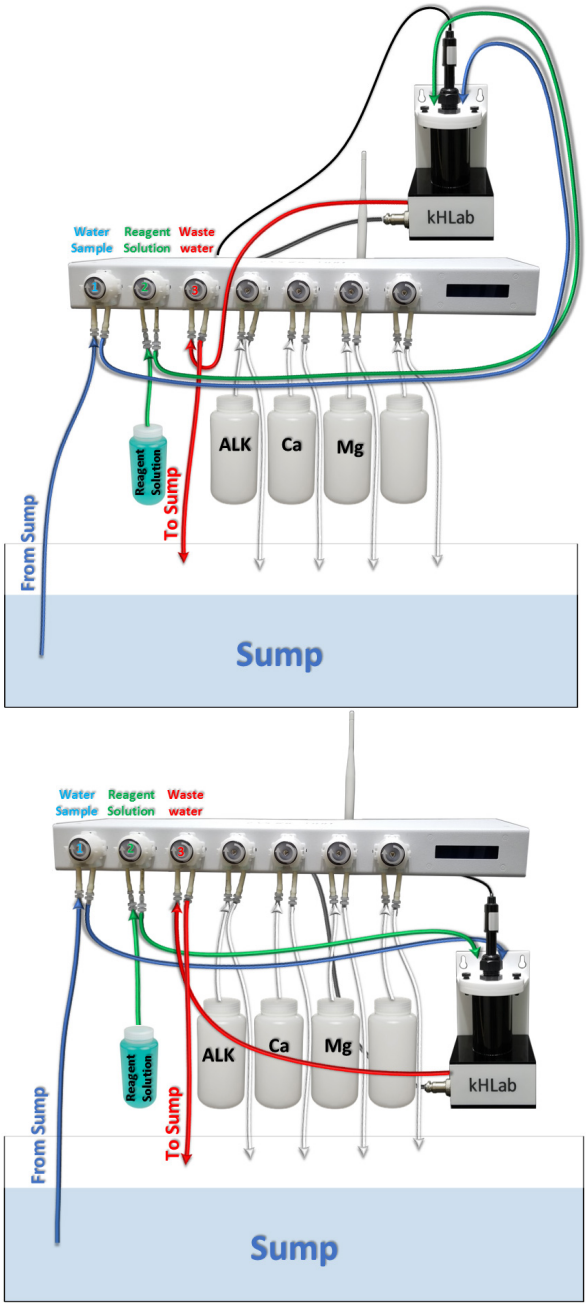
kHLab module – top view

kHLab module – side view

2.3. kHLab Magnetic Stirrer Preparation

Make sure that inside the kHLab module test/mixing cylindrical chamber is a dedicated water mixing magnetic stirrer bar/pellet (small white bar). That bar/pellet is necessary for proper water sample mixing during perform tests. Also, connect the kHLab module to the Kore 7th dosing station by using the dedicated 8-pin plug cable.

2.4. Tubing and cables connection



Kore 7th and kHLab connection setup examples

Water Sample

Connector 1 OUT	Test Water Sample outlet to the kHLab module - using silicone tubing, connect to the Water port at the top of the kHLab module.
Connector 2 IN	Test Water Sample inlet from the sump - connect the silicone tubing to the acrylic tubing holder and make sure the tubing end is always under water, including during aquarium maintenance or any aquarium service work when the main return pump is OFF.

Reagent Solution

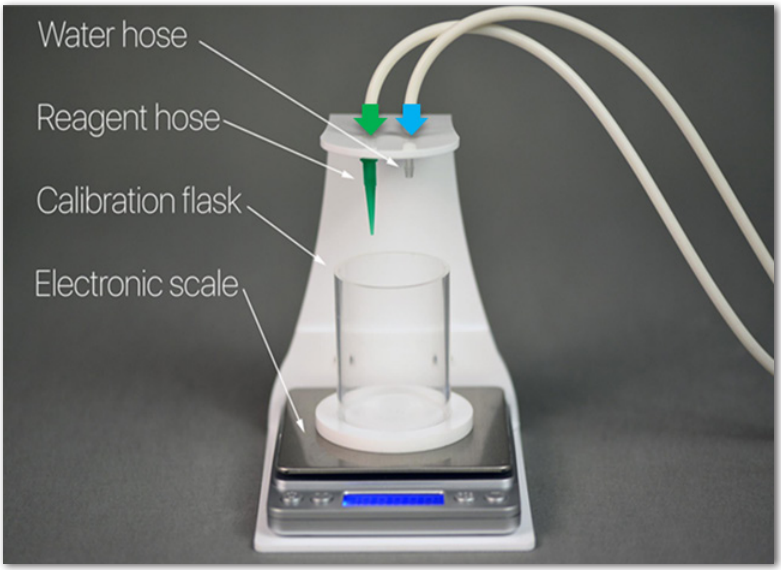
Connector 3 OUT	Reagent Solution outlet to kHLab module - connect to kHLab top connector with label "Reagent".
Connector 4 IN	Reagent Solution inlet - connect to the container/bottle with reagent solution - make sure that the silicone tubing END is right at the container/bottle bottom and NEVER exposed to air. Make sure that the container/bottle is NEVER empty.

Waste Water

Connector 5 OUT	Waste Water (tested) outlet from kHLab mode - connect silicone tubing and best, place to the sump close to the skimmer pump inlet. Do NOT slide in the tubing to the skimmer pump inlet.
Connector 6 IN	Waste Water (tested) outlet from the kHLab module - connect the kHLab module to the connector with the label "Waste".

2.5. Calibration With Precise Digital Scale and Stand/Holder

The Precise Digital Scale and Stand/Holder are required for the Reagent Solution Preparation and Kore 7th calibration process.



Calibration station setup

Digital Scale

3. pH Probe Setup, Maintenance, and Preparation

Use only dedicated Pacific Sun pH probes for these calibrations. If you use probes from another manufacturer, Pacific Sun cannot guarantee the accuracy that measured results will match actual conditions. The typical lifespan for a pH probe in kHLab is about 16-18 months, but this time can be shortened in the case of long-term exposure to seawater. The safe replacement time guaranteeing high accuracy is 12 months.

pH 4.0 and pH 7.0 calibration solutions

Warning!

Do NOT let the tip of the pH probe dry out as damage to the probe will result. The clear cap (small container) protects the pH probe from drying out.

In order to obtain accurate measurements and best performance, the pH probe needs to be calibrated at two points - pH 4.0 and pH 7.0. Remember to use only dedicated calibration fluids at aquarium water temperature before performing pH probe calibration. Closed bottles with calibration fluid for both pH 4 and pH 7 can be placed in aquarium water to acclimate them to the system temperature.

Warning!

The pH probe must always be calibrated before use. Remove the clear cap (small container) from the pH probe before starting the calibration process and before the use of the pH probe.

3.1. Initial pH Probe Preparation - First Use After Purchase

Important!

Never expose pH probe to the air for more than 3-4 minutes. The pH probe should be always in the water or in it's transport protection container.

Preparation steps for the calibration process:

1) Remove the storage clear cap (small container) from the pH probe.
2) It's strongly recommended that before first calibration the pH probe should be immersed in tap water to a minimum 4cm (1.5") depth (maximum 9cm (3.5")) and soak for 24 hours. During this period of time, occasionally, gently move and rotate the pH probe several times in the water. This process will stabilize the pH probe parameters.
3) After removing the pH probe from tap water, gently shake the excess water and wipe using a fresh paper towel. **Never wipe the end probe tip**. Just dry by gently touching/dabbing the end tip with a paper towel.

Important!

Due to its physicochemical properties, the pH probe will take some time to stabilize and provide accurate/repeatable results. Consequently, it is recommended that during the first days/weeks of using the pH probe, the calibration procedure be carried out more frequently than recommended.

4. Reagent Solution Preparation

This device preparation step is very important. If the reagent dilution ratio is not correct, the tested results may differ from the actual alkalinity levels. To obtain accurate results, we strongly suggest using the digital scale for reagent dilution.

Important!

The 1000ml of SUPER Concentrated Reagent included in the package has to be diluted with RO/DI water (**TDS=0**) before use in **1:99** ratio.
EXAMPLE: 100ml of concentrated reagent has to be added to 9900ml of RO/DI water (**TDS=0**).

SUPER Concentrated Reagent		RO/DI water	Reagent Solution
10ml	+	990ml	1000ml
100ml	+	9900ml	10 000ml

Before beginning the reagent solution preparation steps, prepare two containers:

- **Measuring Container** - must have a minimum of **100ml** capacity for measuring the correct amount of concentrated reagent and RO/DI water (**TDS=0**);
- **Target Reagent Solution Container** - must have a minimum of **500ml** capacity for mixing concentrated reagent with RO/DI water (**TDS=0**).

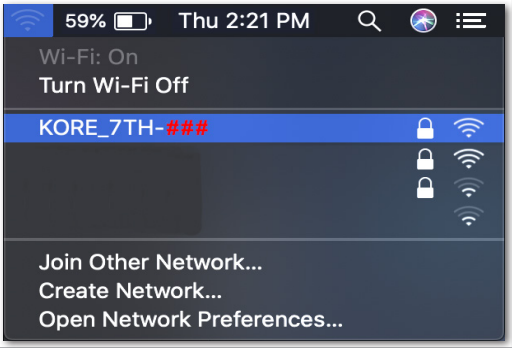
To prepare ready to use 500ml of reagent solution follow these steps:

1) Prepare an empty **Measuring Container**.
2) Place the **Measuring Container** on the digital scale.
3) Turn ON the digital scale.
4) Wait a few seconds and then zero-out the digital scale by clicking (**T**) **Tare** button. Before starting reagent measurement, the digital scale must show **0.00g** on the LCD display.
5) Make sure that the digital scale is showing [**g**] as the weight unit. If not then start clicking (**M**) button until you see [**g**] gram unit on the display.
6) Measure exactly **5g** of reagent (from a 1000ml bottle with SUPER concentrated reagent included in the package).
7) Pour out the measured amount into the **Target Reagent Solution Container**.
8) Place the empty **Measuring Container** back on the digital scale.
9) Wait a few seconds and then zero-out the digital scale by clicking (**T**) **Tare** button.
10) Pour in exactly **495g** of RO/DI water into the **Measuring Container**, then add that measured RO/DI water into the **Target Reagent Solution Container**.
11) After adding the whole (5ml of SUPER concentrated reagent and 495ml of RO/DI water) mix everything by shaking the **Target Reagent Solution Container** several times.

The prepared reagent solution is ready for use. We recommend preparing no more than 5000ml of ready to use **Reagent Solution**. This amount of solution can last for up to 37 days of performed Alkalinity tests (12 tests/day).

5. Kore 7th Wi-Fi Cloud Pacific Sun network setup

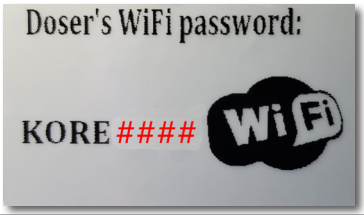
5.1. Connecting Kore 7th to your home Wi-Fi network



1 Connect power to **Kore 7th**.

Find your doser on your Wi-Fi network list devices.

Click **Connect** directly to the Kore7th Wi-Fi Network.



2 Find a sticker on the **Kore 7th** with a Wi-Fi **network password**:

KORE####

Note:
- it's your unique number

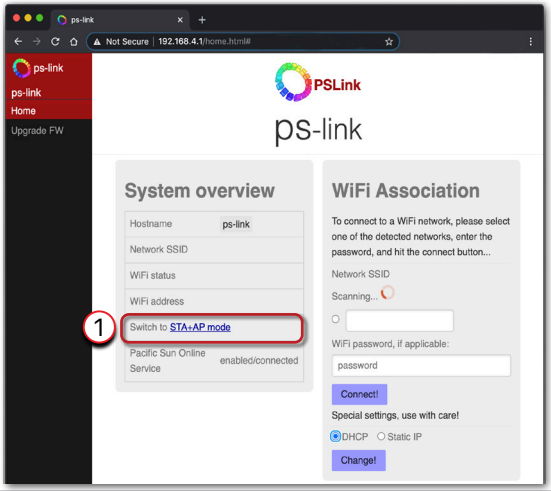
3 Enter your **Kore 7th-###** Wi-Fi **network password**.

1 Next Click **Join**

4 Make sure you are connected to **Kore 7th-###** Hotspot.

Connected

Kore 7th is ready for the PS Cloud setup



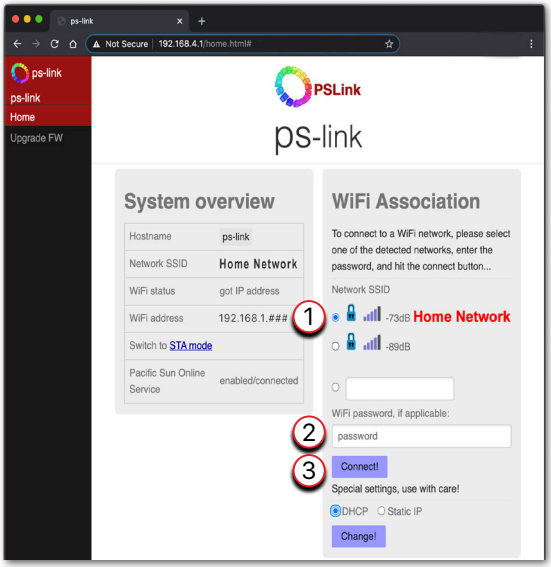
5 Open the **Kore 7th WiFi network setup.**

Open your Internet Browser and type the **Kore7th doser WiFi network IP address 192.168.4.1** into the address field.

http://192.168.4.1

1 Switch to **STA+AP mode**

Under **WiFi Association** you should see **Scanning** for available home Wi-Fi networks.



6 Connect Kore 7th to **Home WiFi network.**

1 Select your **Home WiFi network** under Network SSID.

2 Type in your **Home WiFi network** password, if applicable.

3 Next Click: **Connect!**

After this step Kore7th will be available under your **Home WiFi network** usually with IP address format:

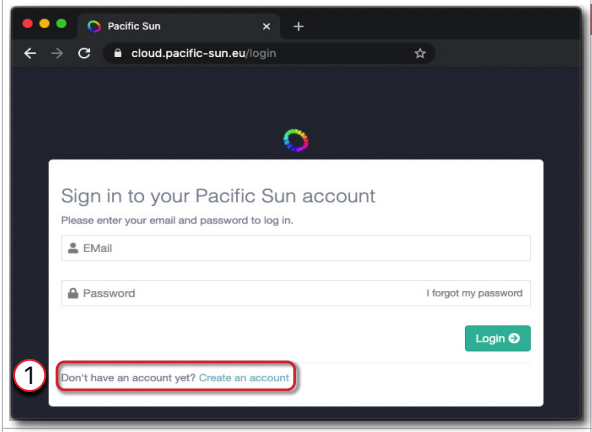
192.168.#.###

7 Restart Kore 7th.

Power OFF and ON the Kore 7th. Disconnect power and Connect back.

On the LCD screen, see and take a note of the IP Address in a similar format.

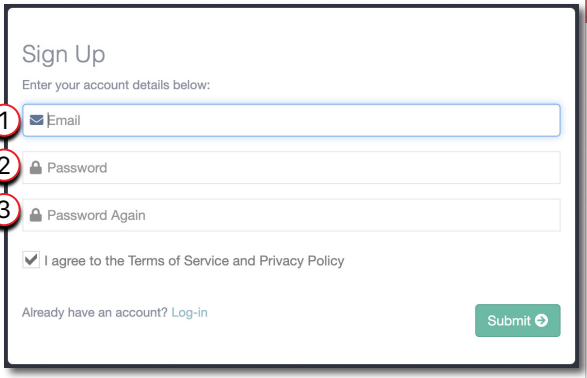
5.2. Adding Kore 7th to Pacific Sun Cloud



1 Connect to **your home Wi-Fi internet network**, open Internet Browser, and go to the following address:

https://cloud.pacific-sun.eu

1 Click Create an account



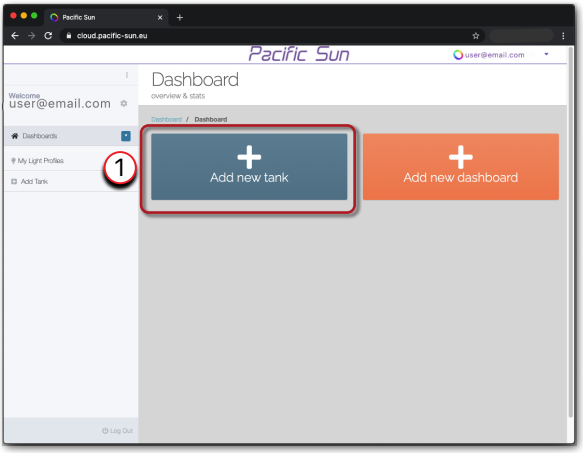
2 Create **Cloud Pacific Sun account**.

1 Enter **Email** address

2 Enter **Password**

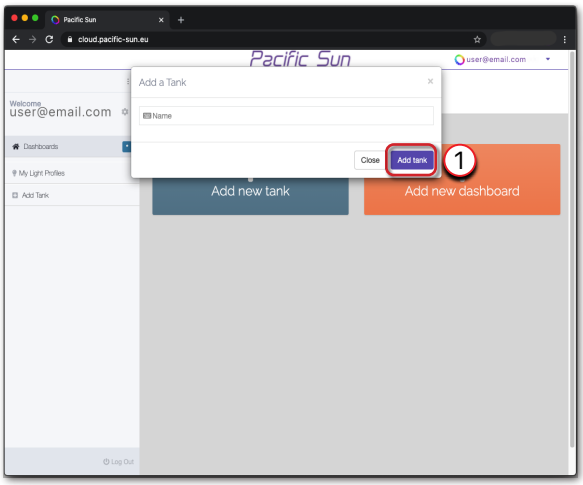
3 Enter **Password Again**

Next Click **Submit**



3 After login, on the **Dashboards**:

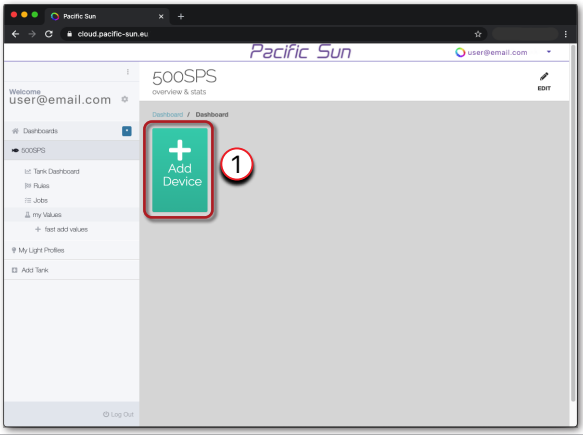
1 Click **Add new tank**



4 **Add a Tank**:

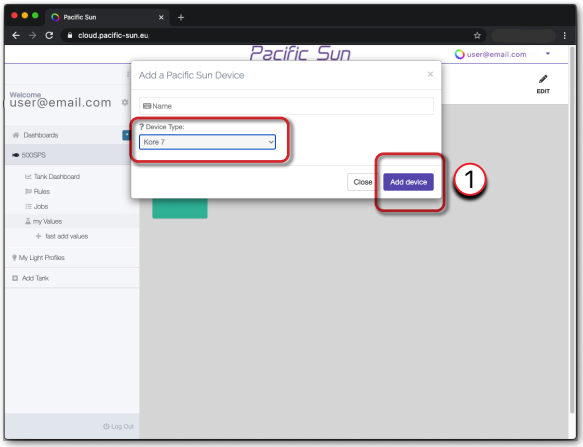
Type in your preferred **Name**

1 Click **Add tank**



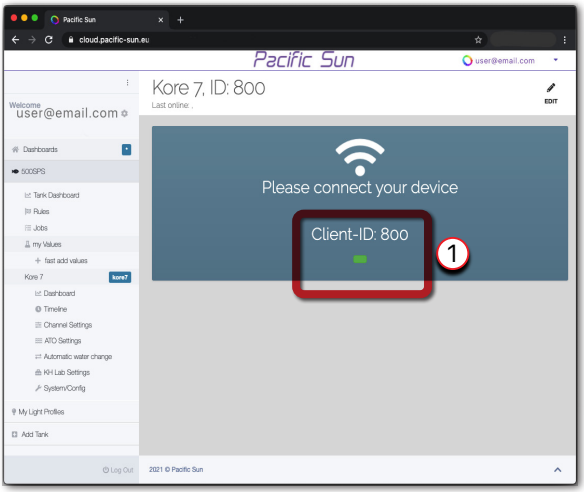
5 Under your tank Name:

1 Click **+ Add Device**



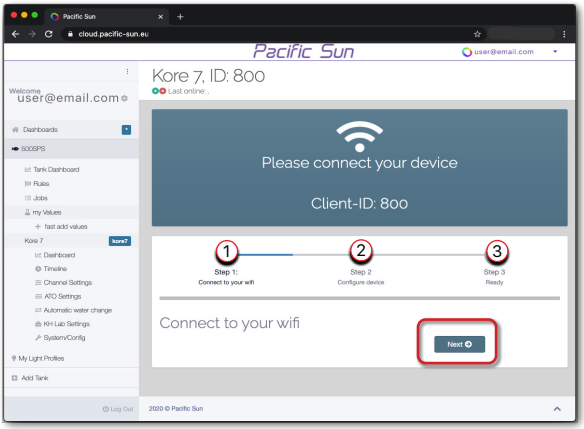
6 Select **Kore 7th** from the list of devices:

1 Click **Add Device**



7 Under your **Client ID**:

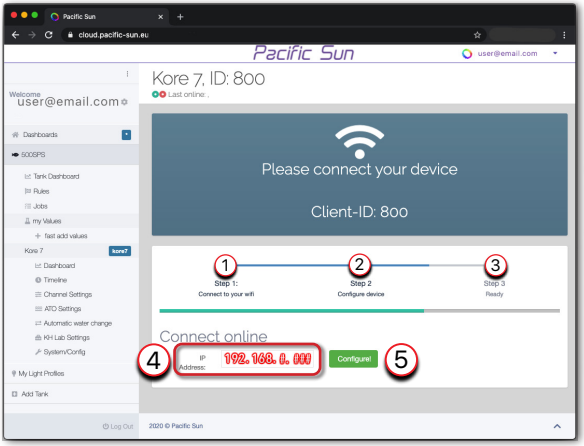
1 Click the **GREEN** icon



8 Connect Kore 7th to **Pacific Sun Cloud**:

Step 1

Click **Next**



9 Configure device and Ready:

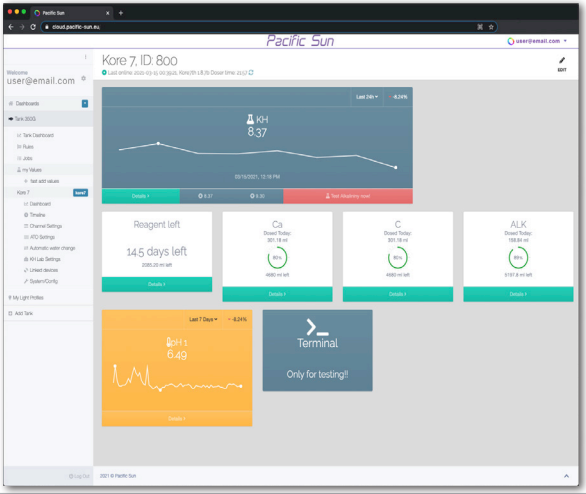
Step 2 and 3

4 Use your **Kore 7th** IP address

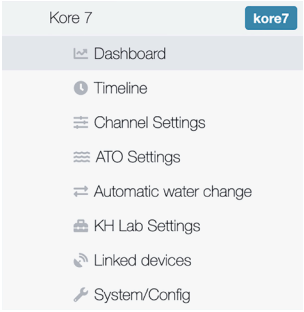
5 Click **Configure!**

Note: You can see the Kore7th IP address on the **LCD** screen after power OFF/ON in a similar format:

192.168.#.###



10 **Kore 7th** added to the PS Cloud, ready for the calibration process, configuration and operation.



Note:

When a Wi-Fi router change is necessary then it's recommended to set the same SSID and password on the new one. This will avoid a need for changing the settings of all Pacific Sun devices connected to the Wi-Fi network.

6. kHLab Pumps Calibration and Accuracy Check

The kHLab calibration process is based on the Pacific Sun Cloud solution and requires only to follow a few automatic steps.

Water Sample	
Step 1	Fill Tube #1
Step 2	Calibration Channel #1 Checking Water Sample (Channel #1) Accuracy
Reagent Solution	
Step 3	Fill Tube #2
Step 4	Calibration Channel #2 Checking Reagent Solution (Channel #2) Accuracy
pH Sensor	
Step 5	Calibrate pH Sensor
Supplements	
Step 6	Calibration Channels #4 #5 #6 #7 Checking Supplements (Channels #4 #5 #6 #7) Accuracy

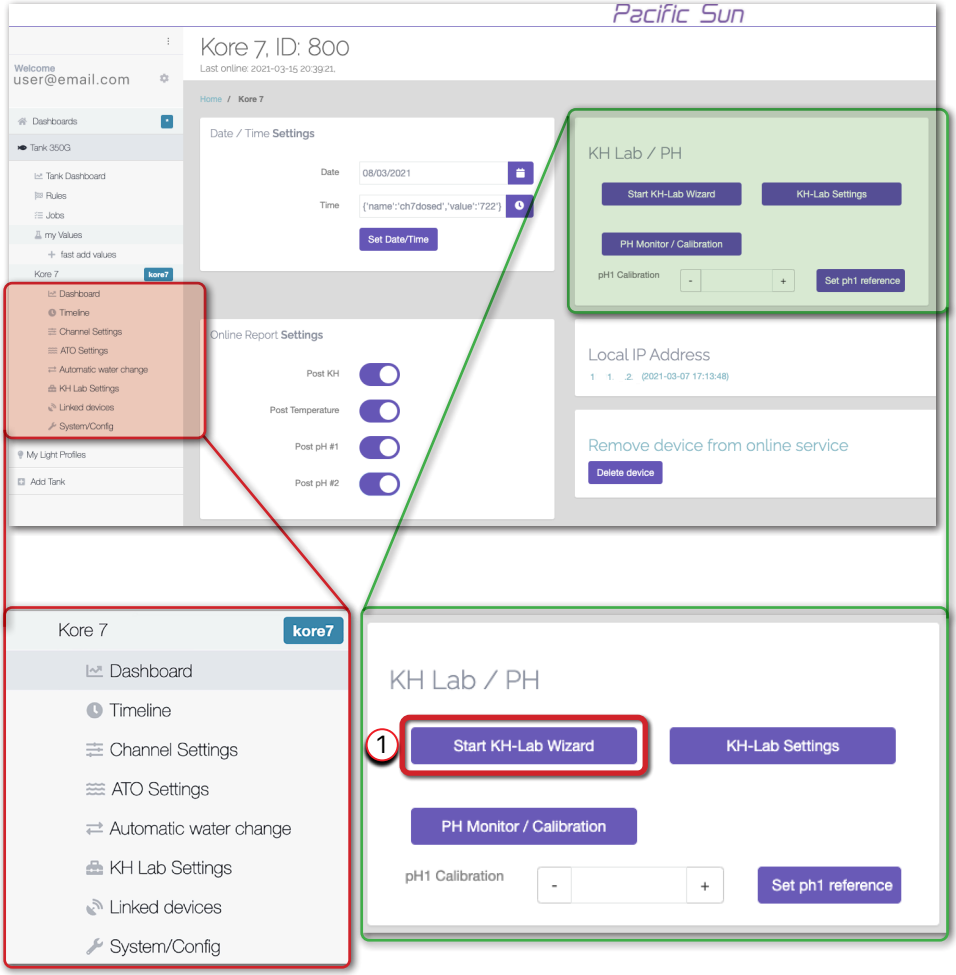
Important!

Dosing pumps calibration in channel #1 and #2 should be performed/ checked every 2 to 4 weeks.

6.1. Calibration With Precise Digital Scale and Stand/Holder

Under your **Kore 7th kHLab** device go to **System/Config**

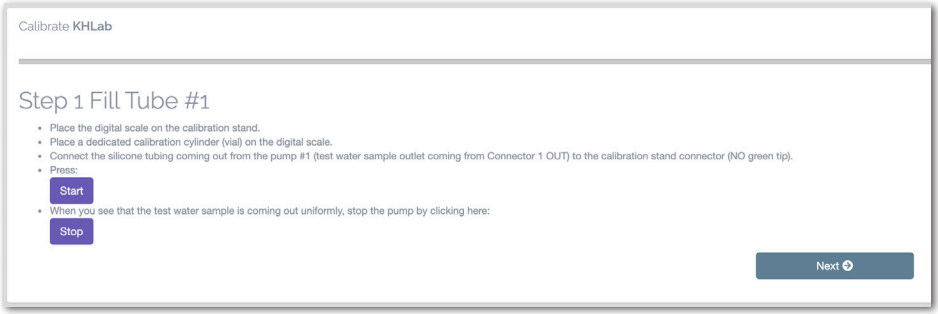
1 Click **Start KH-Lab Wizard**



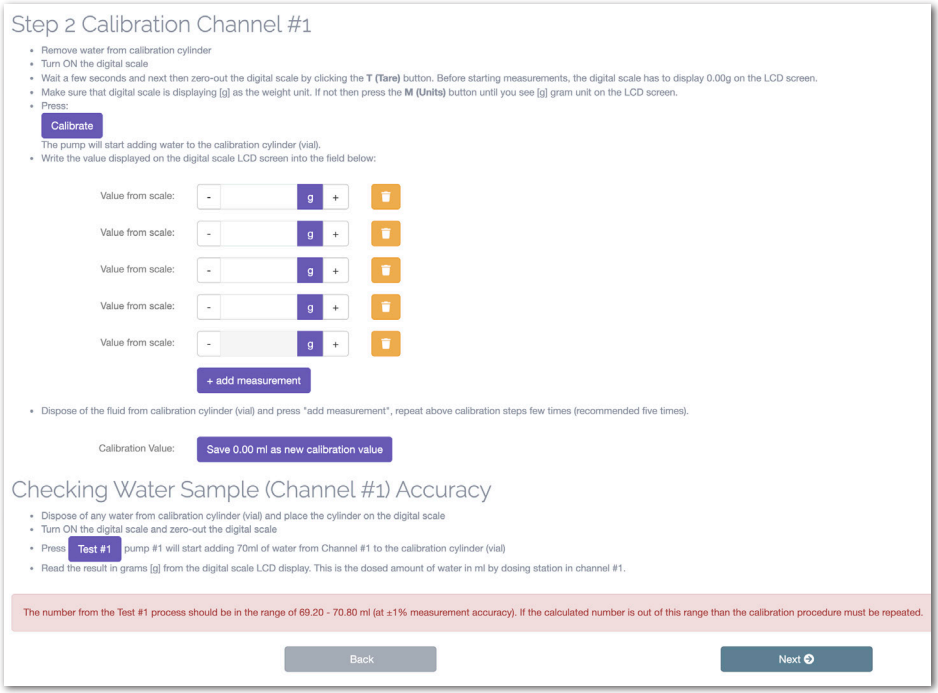
6.2. Channel #1 Calibration Process - Water Sample

Channel #1 is dedicated to **Water Samples**. To calibrate pump#1 in this channel follow the steps below. Refer to the following pictures.

Step 1 - Fill Tube #1



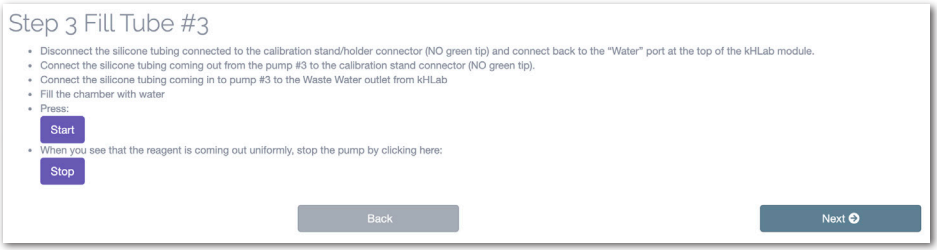
Step 2 - Calibration Channel #1
Checking Water Sample (Channel #1) Accuracy



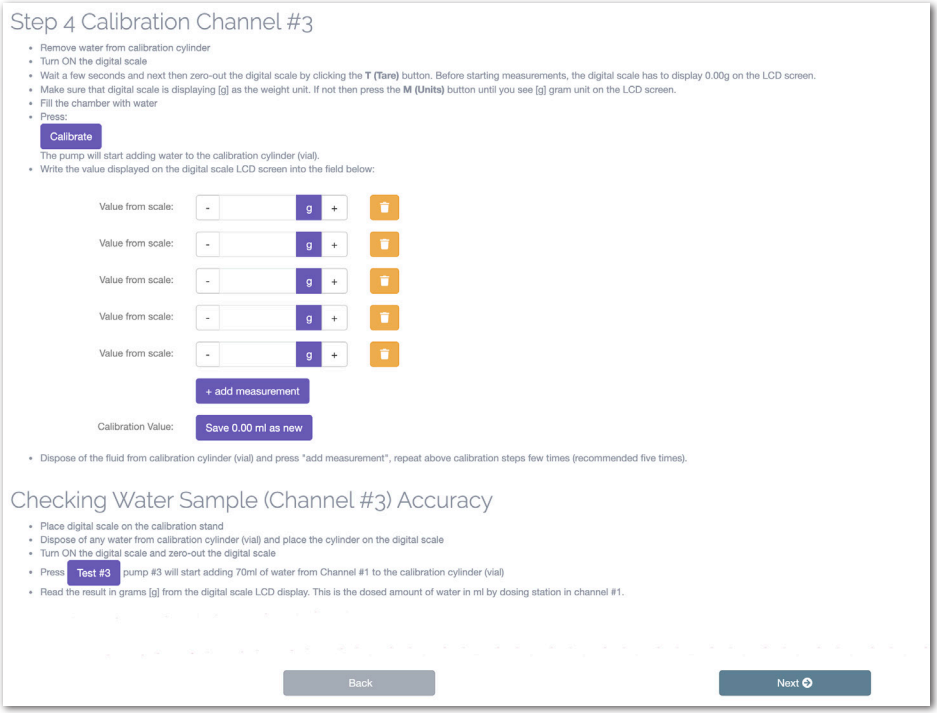
6.3. Channel #3 Calibration Process - Waste Water

Channel #3 is dedicated to **Waste Water**. To calibrate pump#3 in this channel follow the steps below. Refer to the following pictures.

Step 3 - Fill Tube #3



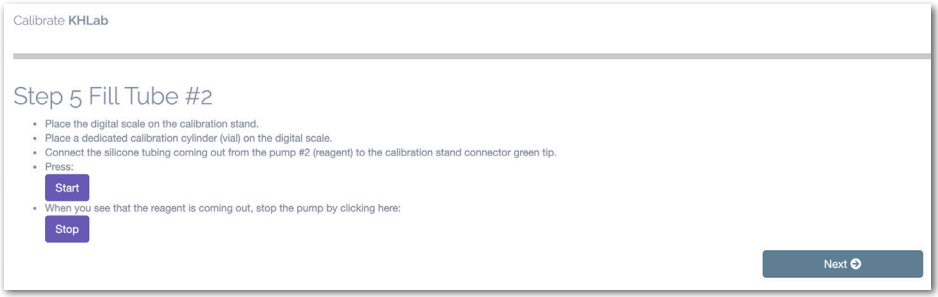
Step 4 - Calibration Channel #3
Checking Waste Water (Channel #3) Accuracy



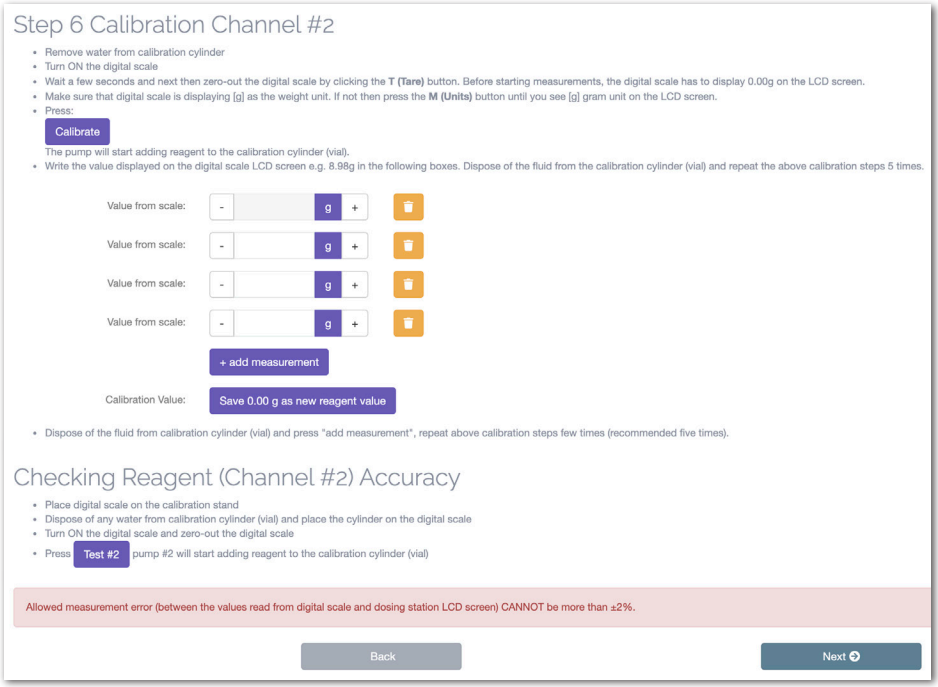
6.4. Channel #2 Calibration Process - Reagent

Channel #2 is dedicated to the **Reagent** solution. To calibrate pump#2 in this channel follow the steps below. Refer to the following pictures.

Step 5 - Fill Tube #2

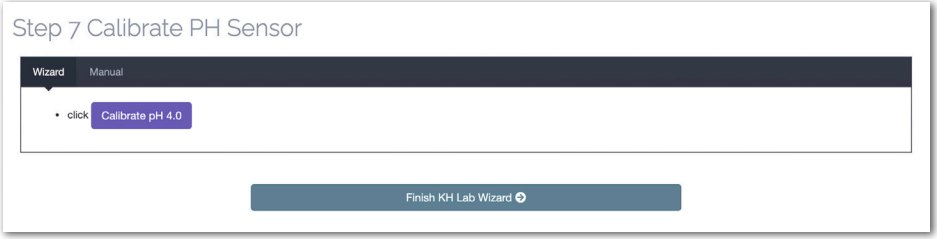


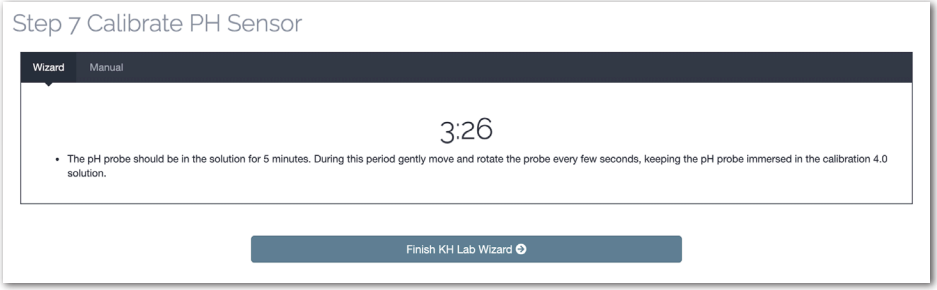
Step 6 - Calibration Channel #2
Checking Reagent Solution (Channel #2) Accuracy

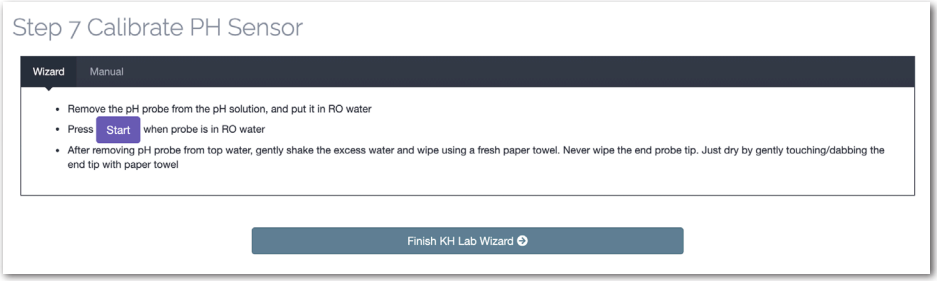


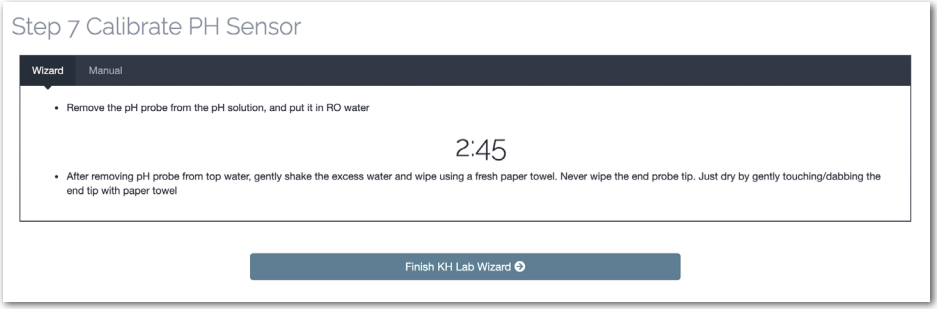
6.5. pH Probe Calibration process with PS Cloud Wizard

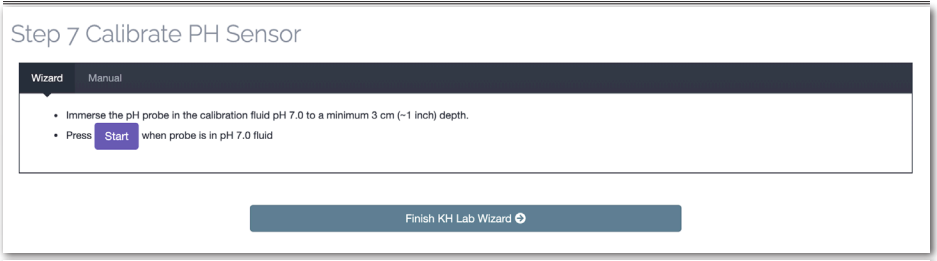
Step 7 - Calibrate pH Sensor

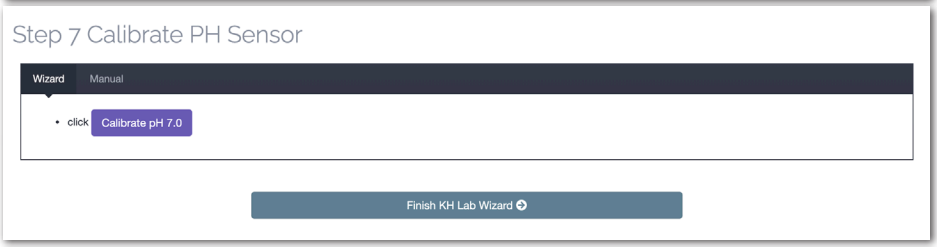


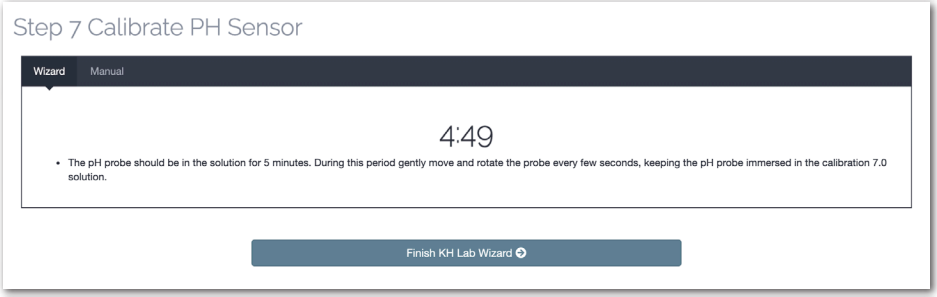


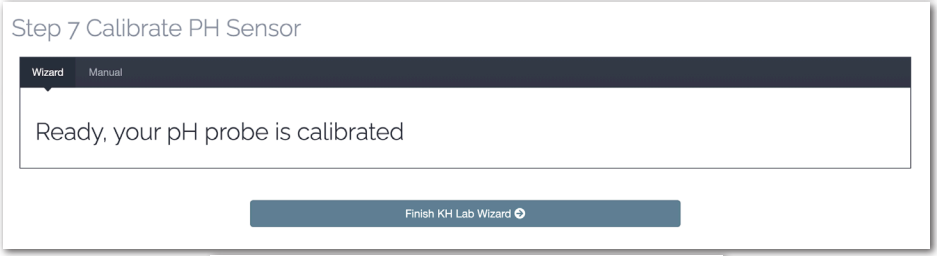


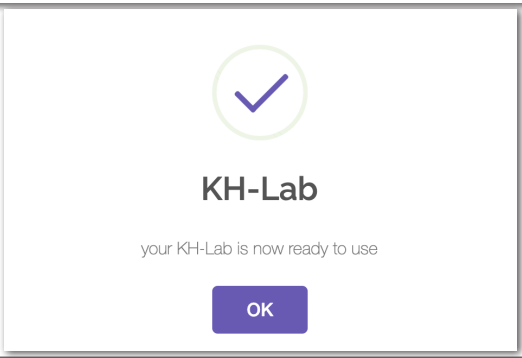



Step 7 Calibrate PH Sensor
Wizard
Manual
Immerse the pH probe in the calibration fluid pH 7.0 to a minimum 3 cm (~1 inch) depth.
Press
Start
when probe is in pH 7.0 fluid
Finish KH Lab Wizard


Step 7 Calibrate PH Sensor
Wizard
Manual
click
Calibrate pH 7.0
Finish KH Lab Wizard

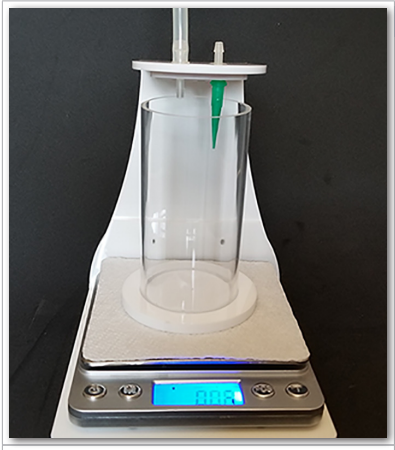

Step 7 Calibrate PH Sensor
Wizard
Manual
4:49
The pH probe should be in the solution for 5 minutes. During this period gently move and rotate the probe every few seconds, keeping the pH probe immersed in the calibration 7.0 solution.
Finish KH Lab Wizard


Step 7 Calibrate PH Sensor
Wizard
Manual
Ready, your pH probe is calibrated
Finish KH Lab Wizard


KH-Lab
your KH-Lab is now ready to use
OK

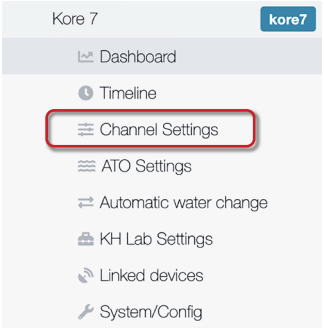
6.6. Channels #4 #5 #6 #7 Calibration Process - Supplements

Channels #4 #5 #6 #7 are dedicated to **Supplements** (e.g.: alkalinity, calcium, magnesium, trace elements etc.). To calibrate pumps #4 #5 #6 #7 in those channels follow the steps below for each channel (one at a time). Refer to the following steps.



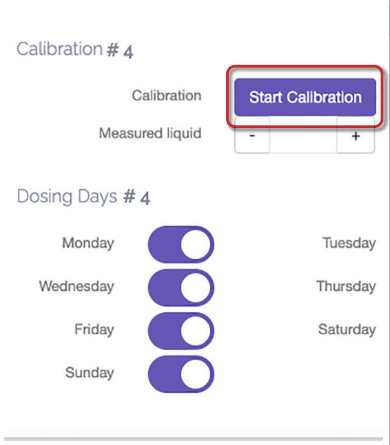
1 Prepare calibration station with a digital scale.

Connect tubbing from the channel you want to calibrate to the calibration stand with label **Water IN.**



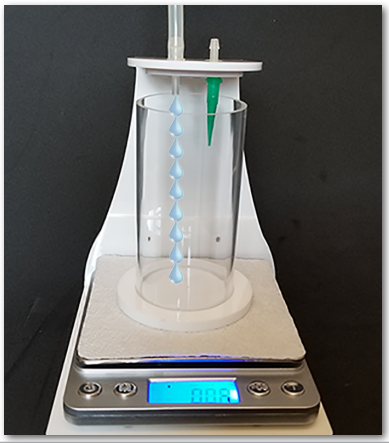
2 Go to the **PS Cloud** and **Kore 7** device.

Click "**Channel Settings**"



3 Go to section "**Calibration**" and Click:

Start Calibration on your Channel.



4 Make sure the supplement is dripping to the measuring cylinder**.**

If the supplement is not dripping > **Click**:

Start Calibration

again until you see the supplement in the measuring cylinder.

5 **Zero-out** the digital scale by clicking **(T) Tare** button. Before starting supplement measurement, the digital scale must show **0.00g** on the LCD display.

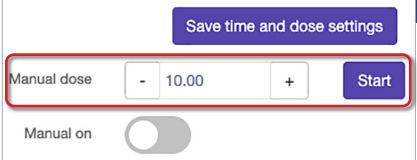
6 Click:

Start Calibration

7 Note the measured value.

8 Specify the **Calibration Measured liquid** value into the field and save by clicking:

Save time and dose settings



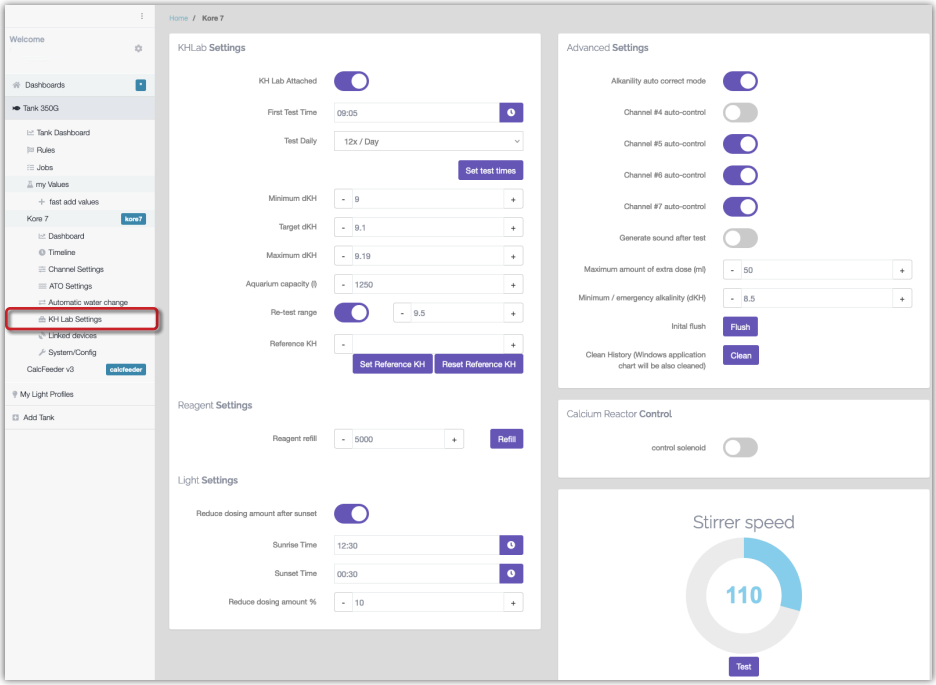
9 Check and verify the calibration by **Manual dose**.

Specify the amount of fluid you like to dose as a test (10ml or more), and Click:

Start

7. kHLab Settings

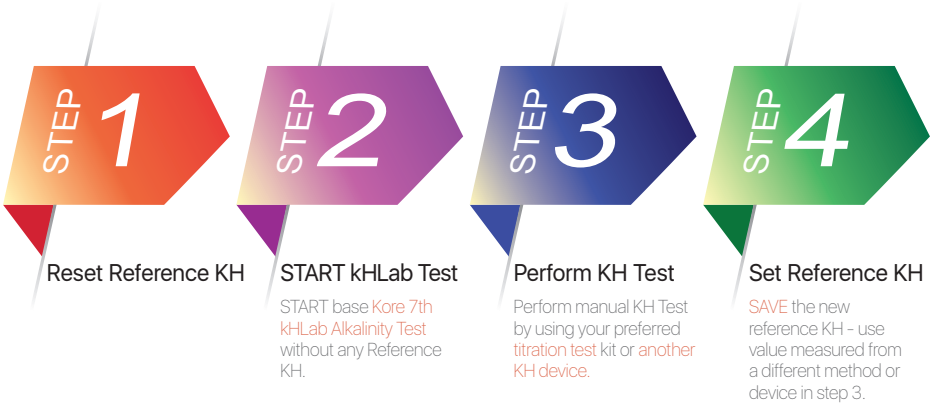
The "kHLab Settings" Tab is allowing to set the main parameters for the alkalinity measurements and control.



7.1. How to set "Reference KH"

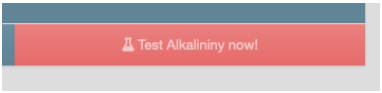
By setting up the "**Reference KH**", kHLab will automatically correct alkalinity to values measured manually by your preferred titration test kit or another KH device. Subsequent results will be automatically corrected according to the given reference value.

High Level Steps



1 Go to "**KHLab settings**" and click:

Reset Reference KH

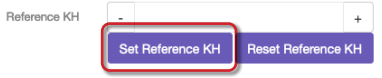


2 Go to the "**Dashboard**" and START base Kore 7th kHLab Alkalinity Test by clicking:

Test Alkalinity now!

3 Perform KH Test

Perform manual KH Test by using your preferred titration test kit or another KH device.



4 Set Reference KH

SAVE the new reference KH - use value measured from a different method or device in step **3**

Set Reference KH

8. Cloud Application Additional Functions

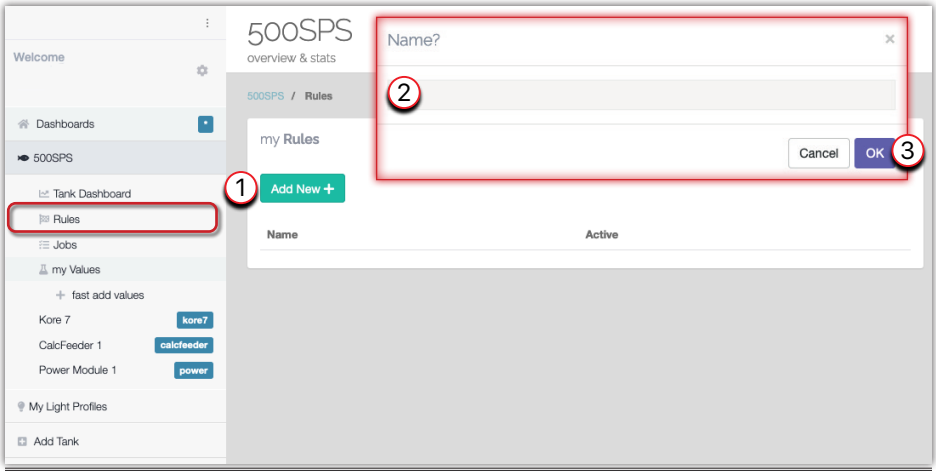
8.1. Tank Dashboard

After login into your Pacific Sun Cloud account, you can see under your Tank Name "**Tank Dashboard**". By clicking on this function Tab you can see all your added devices to your Tank. You can also add any new device to this Tank.

8.2. Rules

Under Rules Tab you can create your rules taking special actions in your systems, sending messages to your email when matching certain conditions, etc. In order to create a new **Rules** click:

1. **Add New +**
2. type in a **Name** of your new Rule
3. click **OK**



Now you can create **Conditions** and **Actions**.
For example **Rule**:

Name:

1 **Temperature Control**

Condition:

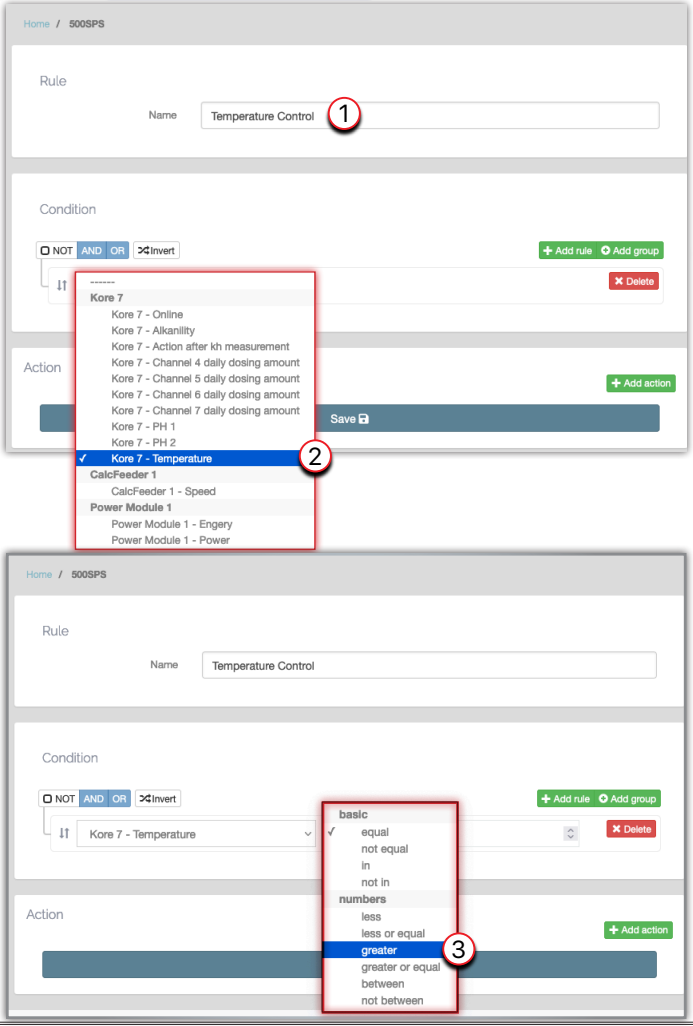
2 IF **Kore 7 - Temperature** 3 **greater** THEN 4 **27.5** °C

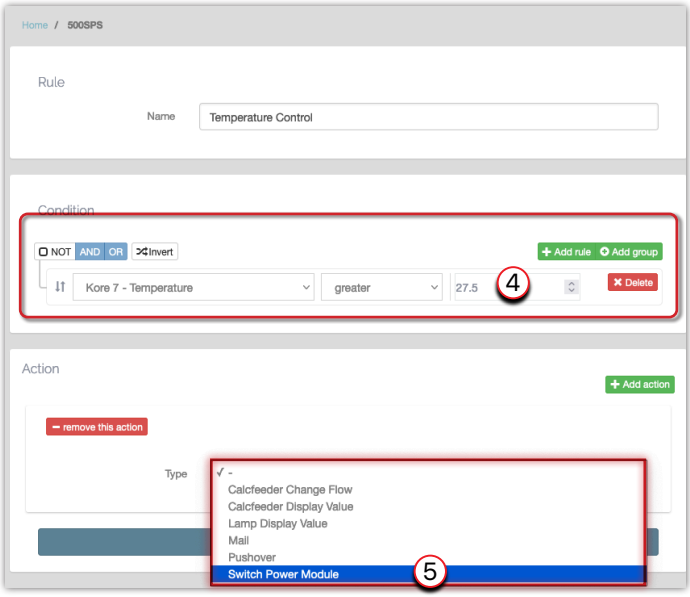
Action:

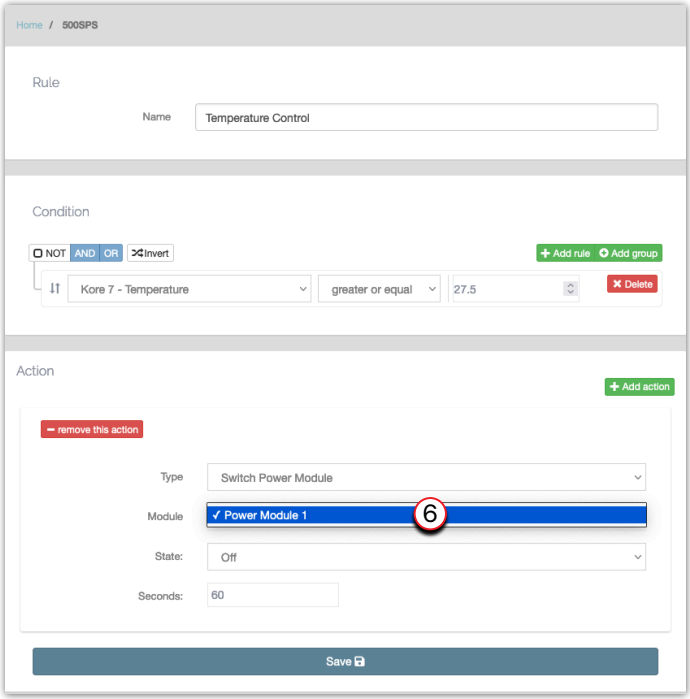
5 Type: **Switch Power Module**

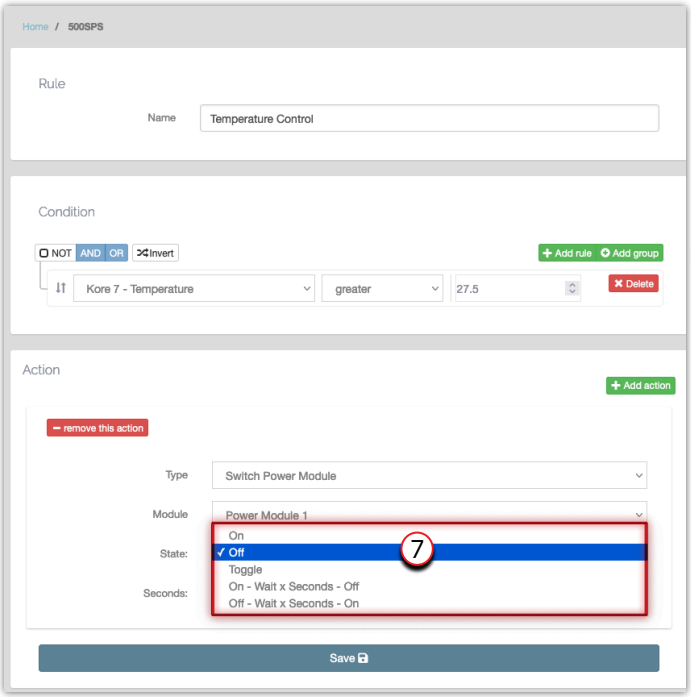
6 Module: **Power Module 1**

7 State: **Off**

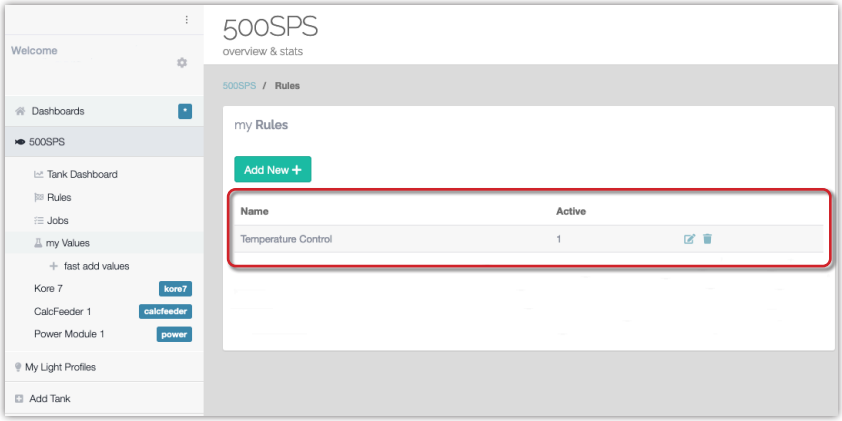



Home / 500SPS
Rule
Name
Temperature Control
Condition
NOT AND OR Invert
Add rule Add group
Kore 7 - Temperature
greater
27.5
4
Delete
Action
Add action
remove this action
Type
-
Calcfeeder Change Flow
Calcfeeder Display Value
Lamp Display Value
Mail
Pushover
Switch Power Module
5


Home / 500SPS
Rule
Name
Temperature Control
Condition
NOT AND OR Invert
Add rule Add group
Kore 7 - Temperature
greater or equal
27.5
Delete
Action
Add action
remove this action
Type
Switch Power Module
Module
Power Module 1
6
State:
Off
Seconds:
60
Save



After clicking Save you can see the new **Rule** and you can Add New + :



Rule Example 2

Sending email when **Kore7th measured ALK > 8.5dKH**:

Name:

1 **Alkalinity alarm 1**

Condition:

2 IF **Kore 7 - Alkalinity** 3 **greater** THEN 4 **8.5**

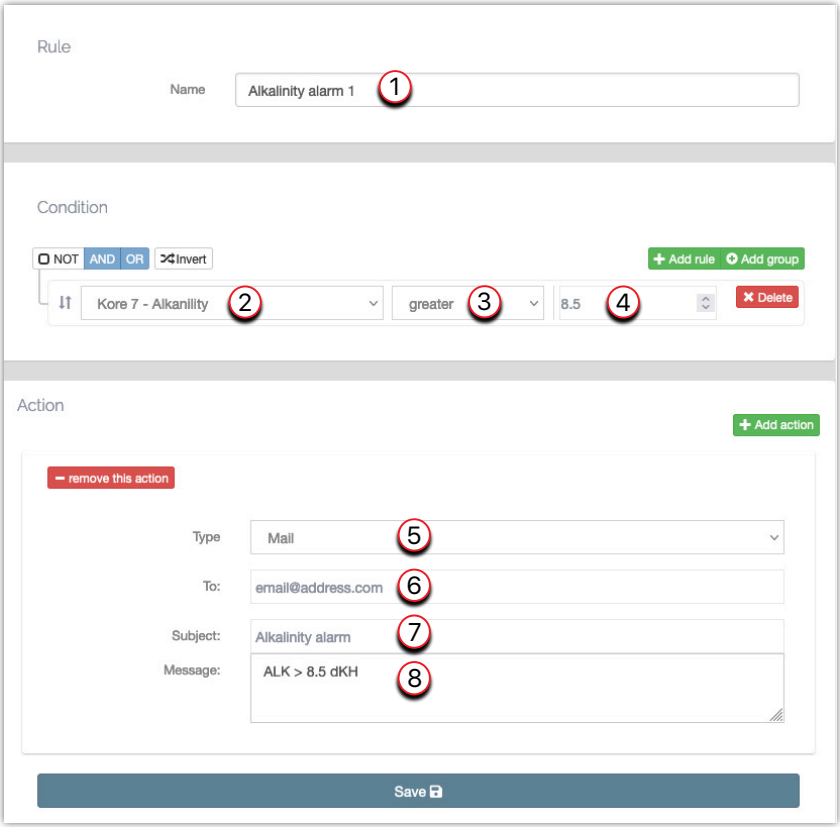
Action:

5 Type: **Mail**

6 To: **email@address.com**

7 Subject: **Alkalinity alarm**

8 Message: **ALK > 8.5 dKH**



Rule Example 3

Sending email when **Kore7th measured ALK < 7.8dKH**:

Name:

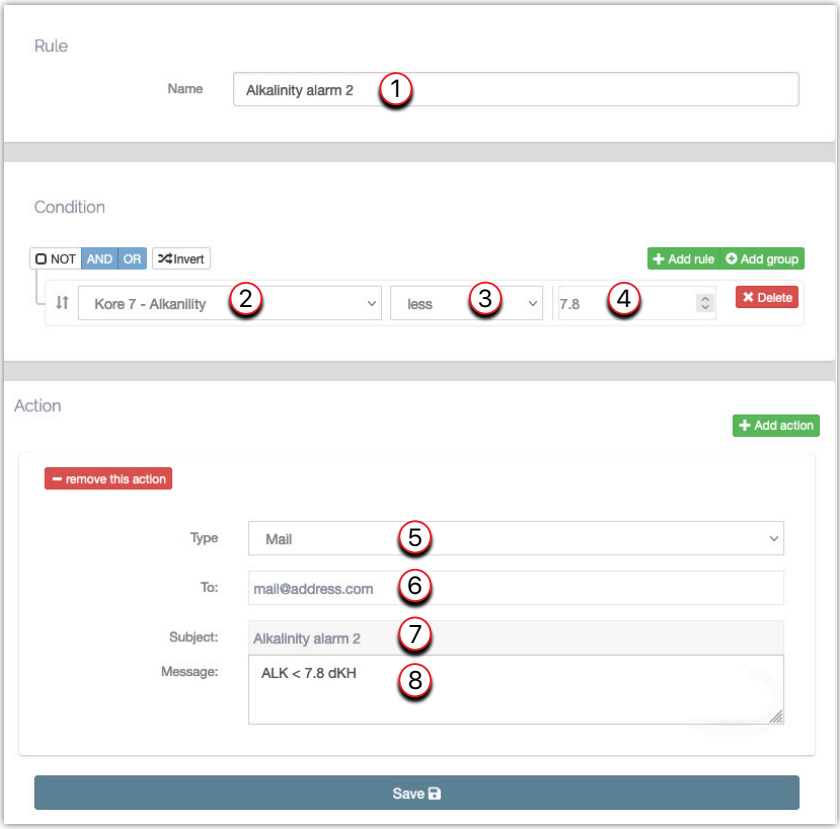
1. **Alkalinity alarm 2**

Condition:

2. IF **Kore 7 - Alkalinity** 3. **less** THEN 4. **7.8**

Action:

5. Type: **Mail**
6. To: **email@address.com**
7. Subject: **Alkalinity alarm 2**
8. Message: **ALK < 7.8 dKH**



Rule Example 4

Sending email with Kore 7th **Current Measured Values for ALK, Temp and pH 1**:

Name:

1. **Current Measured Values**

Condition:

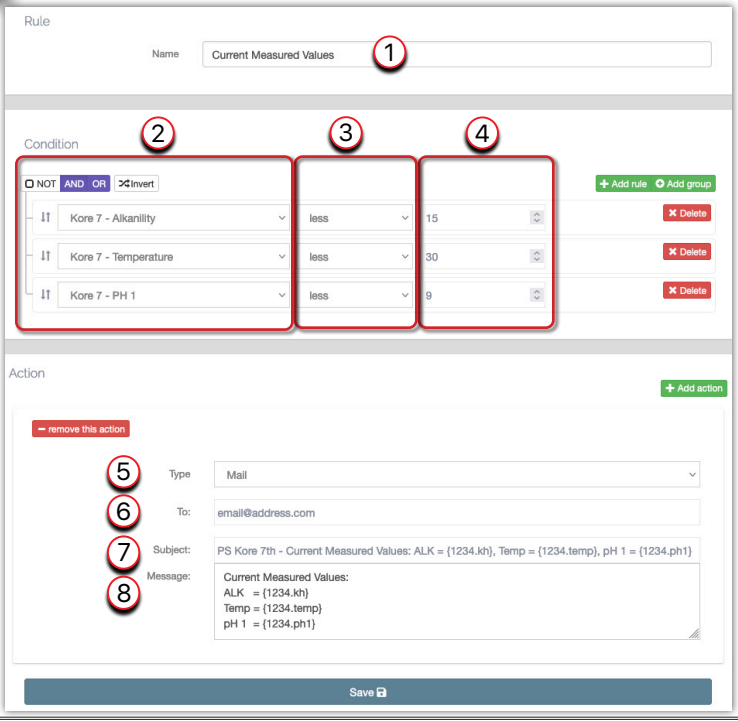
	2	3	4	
IF	**Kore 7 - Alkalinity**	**less**	THEN	**15**
IF	**Kore 7 - Temperature**	**less**	THEN	**30**
IF	**Kore 7 - PH 1**	**less**	THEN	**9**

Action:

5. Type: **Mail**
6. To: **email@address.com**
7. Subject: **PS Kore 7th - Current Measured Values: ALK = {1234.kh}, Temp = {1234.temp}, pH 1 = {1234.ph1}**
8. Message:

```
Current Measured Values:
ALK   = {1234.kh}
Temp = {1234.temp}
pH 1   = {1234.ph1}
```

Note:
1234 has to be replaced with your Kore7th unique **ID nr**.



Rule Example 5

Decreasing Calcfeeder Flow when **Kore7th measured ALK is less or equal 8.3dKH:**

Name:

1 **Calcfeeder - Decrease Flow if ALK less or equal 8.3dKH**

Condition:

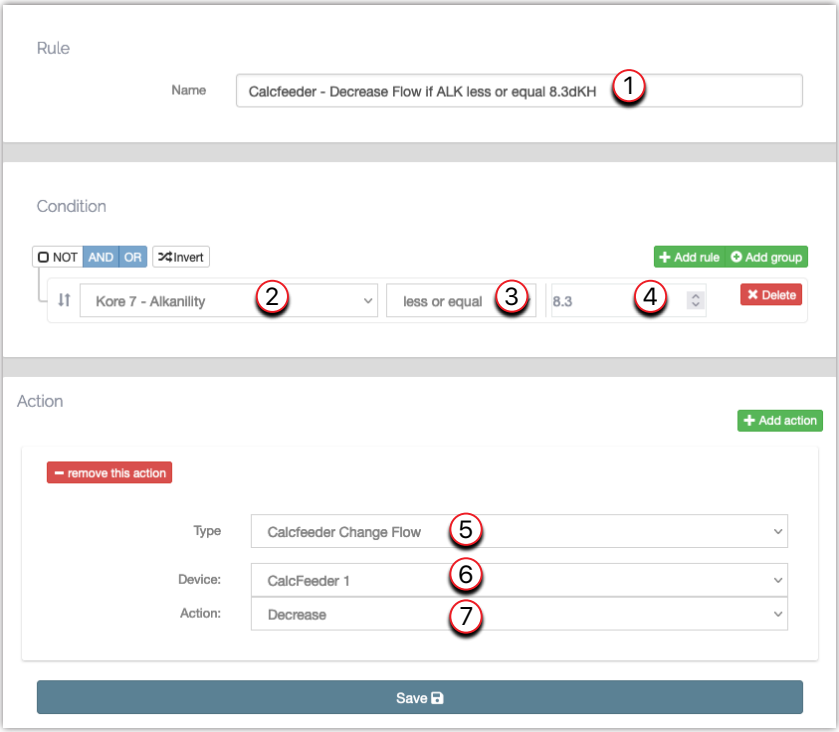
2 IF **Kore 7 - Alkalinity** 3 **less or equal** THEN 4 **8.3**

Action:

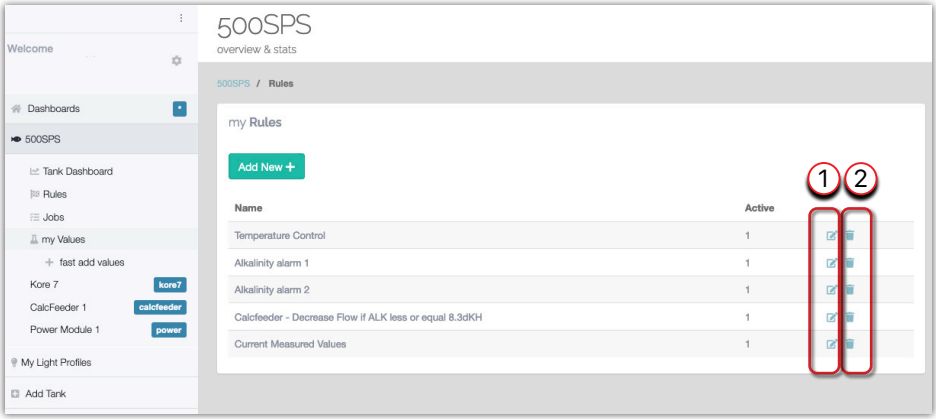
5 Type: **Calcfeeder Change Flow**

6 Device: **Calcfeeder 1**

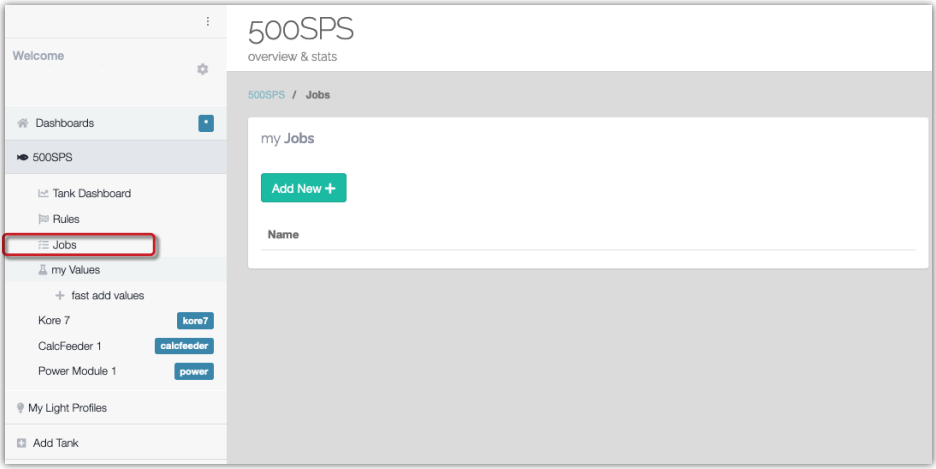
7 Action: **Decrease**



You can (1) Edit each saved **Rule** or (2) delete and start over:



8.3. Jobs



Job Example 1

Sending email with **Reminder - Kore 7th kHLab - Perform Channels Calibration**:

Name:

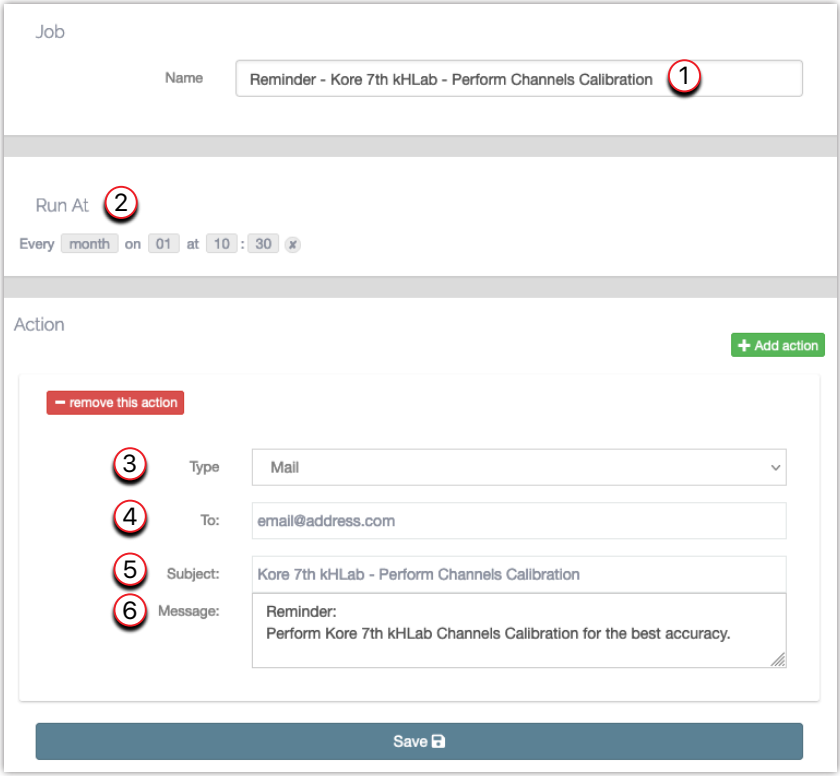
1. **Reminder - Kore 7th kHLab - Perform Channels Calibration**

Run At:

2. Every **month** on **01** at **10:30**

Action:

3. Type: **Mail**
4. To: **email@address.com**
5. Subject: **Kore 7th kHLab - Perform Channels Calibration**
6. Message: **Reminder:**
Perform Kore 7th kHLab Channels Calibration for the best accuracy.



Job Example 2

Sending email with **Reminder - Kore 7th kHLab - Change Heads Pumps Tubing**:

Name:

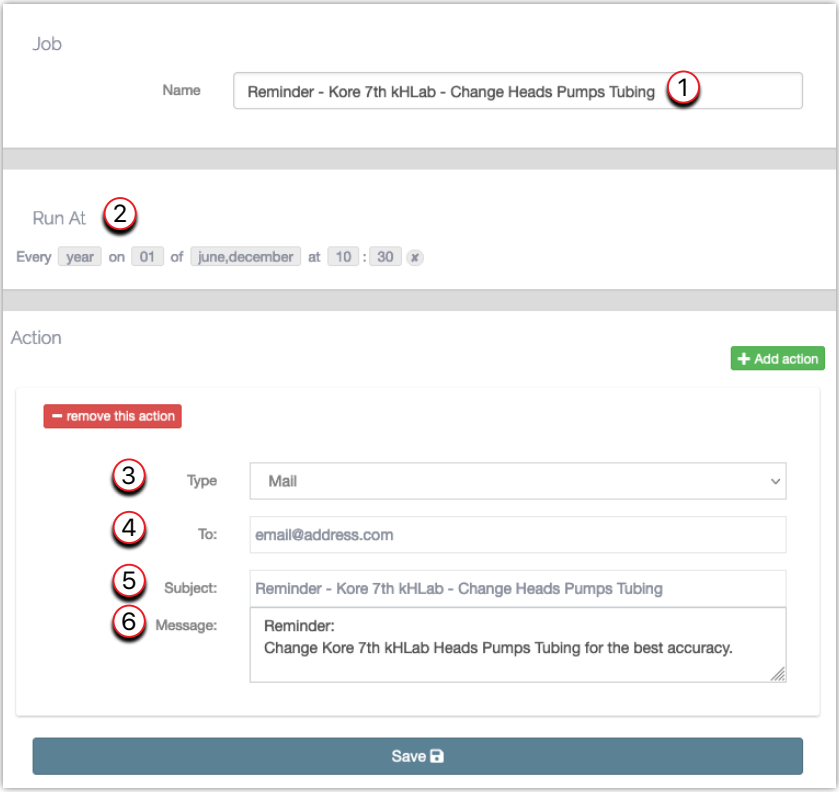
1. **Reminder - Kore 7th kHLab - Change Heads Pumps Tubing**

Run At:

2. Every **year** on **01** of june,december at **10:30**

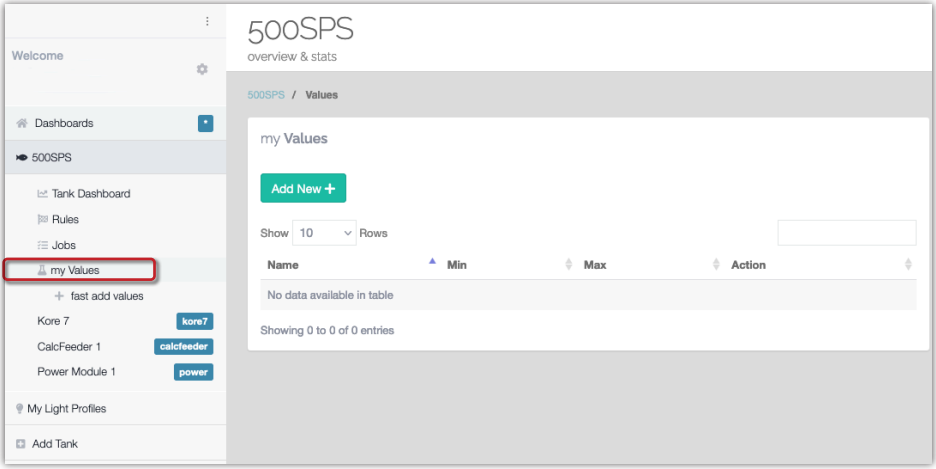
Action:

3. Type: **Mail**
4. To: **email@address.com**
5. Subject: **Reminder - Kore 7th kHLab - Change Heads Pumps Tubing**
6. Message: **Reminder:**
   Change Kore 7th kHLab Heads Pumps Tubing for the best accuracy.



8.4. my Values

This option is allowing users to add tank measured parameters like NO_2, NO_3, Mg, etc., and keep a history of them.



9. kHLab Working Modes

The kHLab calibration process is based on the Pacific Sun Cloud solution and requires only to follow a few automatic steps.

As mentioned earlier, the Kore 7th/kHLab can work in two modes.

9.1. Monitoring Mode

In **Monitoring** mode, the device can be used to measure alkalinity and display the results on the dosing station LCD screen. The device will NOT take any action on individual channels and dosing pumps, will not turn ON/OFF individual channels, or change any defined dosing pumps performance/schedule.

9.2. Control Mode

In **Control** mode, the device can be used to:

- **stop** dosing Alkalinity supplement and other fluids from channels #4, #5, #6 and, #7, when tested Alkalinity value exceeding set KH value in the application **"Maximum kH".**
- **start** dosing and adjust the **additional dose** of Alkalinity supplement when tested KH value falls below the value set in the application "**Minimum dKH**" and all the other fluids set dosage values are not able to keep Alkalinity on the desired level.

Note:

As a good practice, it's recommended that before using "**Control mode**", run "**Monitoring mode**" for at least a few days to make sure the device is working correctly and the alkalinity measurements are as expected.

10. Alkalinity Test Intervals

The Kore 7th dosing station can perform Alkalinity tests in different time intervals: **one, two, four, eight**, **twelve, and twenty-four** times per day (**x1, x2,x4, x8, x12, x24**). Keep in mind that, by nature, alkalinity continuously changes, and because of that it's necessary to compare the test results performed at the same time each day.

For the **Monitoring mode**, we recommend performing tests **two** or **four** times per day and for the **Control mode,** we recommend performing tests **four**, **eight**, and even **twelve** times per day.

11. Parallel Calibration

In addition to the kHLab test and calibration processes, it is recommended that the kHLab alkalinity test results be checked periodically via a second calibration using a basic alkalinity titration test kit. This second calibration serves to validate that the kHLab is working correctly, given that it's results show alkalinity around the same range.

12. kHLab Working Stages

The device works through the following stages:

1) Initial Flush
   The purpose of this stage is to initially fill a kHLab device test chamber and prepare the device to work in the continuous stage. In this stage, the kHLab module is filling and emptying a chamber with aquarium test water multiple times.
2) Emptying flask (Cylinder)
   In this stage, the test water is being disposed from the kHLab module test chamber and the magnetic stirrer is staying ON.
3) Microflush
   In this stage, the kHLab test chamber is rinsed several times with aquarium water and prepared for alkalinity testing.
4) EMV Stabilize
   During this stage, the device reads the pH probe measurement and waits for the reading to stabilize before starting the actual test.
5) Preparing for Standby
   This mode prevents pH probe damage between tests by filling in the kHLab module test chamber with aquarium water.

13. Carbonate Solution Preparation

In order for the device to be able to maintain water alkalinity at a given level, prepare the alkalinity supplement based on the following formula by using KH buffer (i.e. Aquaforest):

1) Prepare a 1500ml capacity (or larger) container.
2) Dissolve 80g of KH Buffer in 1000ml of RO/DI water.

The final 100ml of KH buffer solution will increase alkalinity by 2.6dKH in 100 liters (26 Gall US) of aquarium water and the KH buffer solution based on this recipe will ensure proper device operation (keeping the defined KH value in case of the alkalinity dropping below the pre-set "**Minimum KH**" limit value).

The following tables show recipes with supplements from other manufacturers which will work correctly with the Kore 7th/kHLab device.

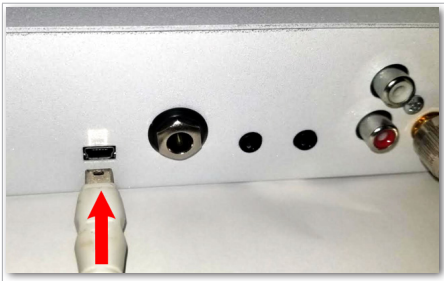
Recipe based on $NaHCO_3/Na_2CO_3$		
RO/DI water	$NaHCO_3$	Na_2CO_3
1000ml	66g	10g

Recipe based on Na_2CO_3	
RO/DI water	Na_2CO_3
1000ml	52g

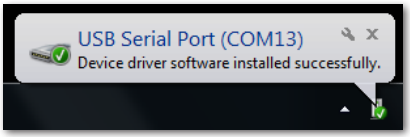
14. Kore 7th Software and Firmware Upgrade

Warning!

Switching OFF the power supply during the Firmware updating process may damage your doser CPU. Uploading wrong Firmware may damage your doser and void your warranty. The damage may require returning the doser to our service department to restore it's original functionality.
Use only **dedicated firmware upgrade software** available for download on www.pacific-sun.eu in the **Download** section.



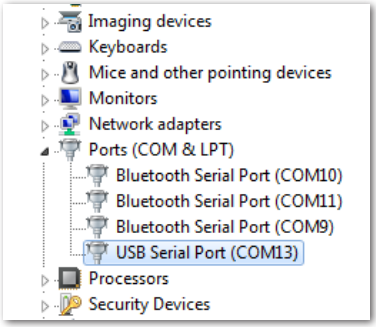
1. Connect your Laptop/PC to the Kore 7th dosing station via USB port.



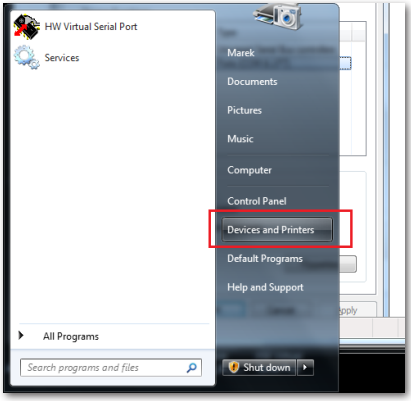
2. Windows Operating System should be able to discover and install the new Kore 7th USB device and show the communication COM port number.
NOTE:
If for the first time, Windows will not be able to install the new Kore 7th device (especially under Window OS) then download from the Internet and install the USB-to-Serial Converter Drivers:
https://www.ftdichip.com/Drivers/VCP.htm
(CDM v2.12.28 WHQL Certified)

3. Windows Operating System has the two following options to verify the correct USB Serial Port COM **number**:

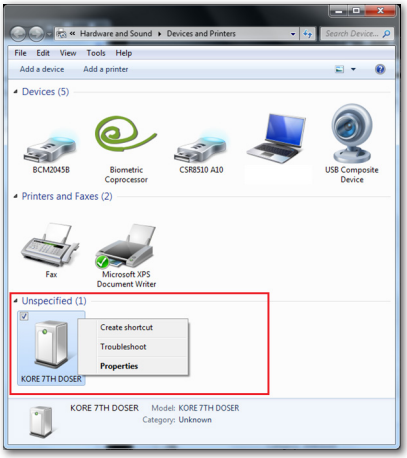
1. "**Device Manager**"
2. "**Devices and Printers**"



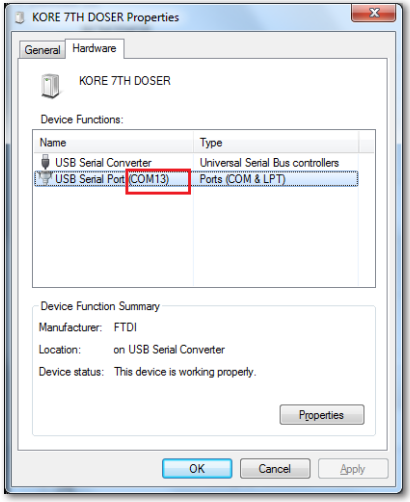
Option 1:
Verify the USB Serial Port COM **number** under "**Device Manager**".



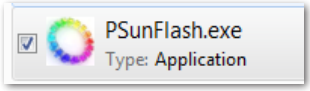
Option 2:
Verify the USB Serial Port COM **number** from "**Devices and Printers**".



4. Right Click on the Kore 7th Doser Device and select "**Properties**".

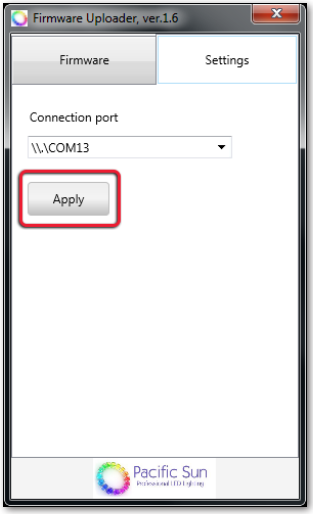


5. The USB Serial Port COM **number** will be visible under Kore 7th Doser Properties.



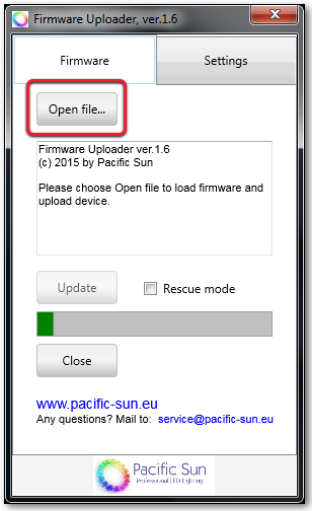
6. Download the "**Firmware Updater**" application from the Pacific Sun website: http://www.pacific-sun.eu/pliki/PSunFlash32.zip
Unpack the ZIP file and run the "**Firmware Uploader**".

Note:
For the Mac OS version download from: http://www.pacific-sun.eu/pliki/PSunFlash21.app.zip



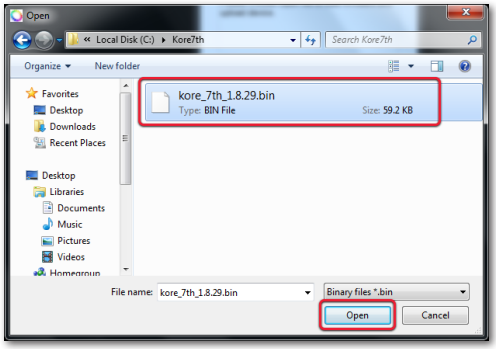
7. In the "**Settings**" tab, choose the port COM **number** the Kore 7th is installed on the computer and click **Apply**

Note:
For the Mac OS version, select the device you want to update from the list.

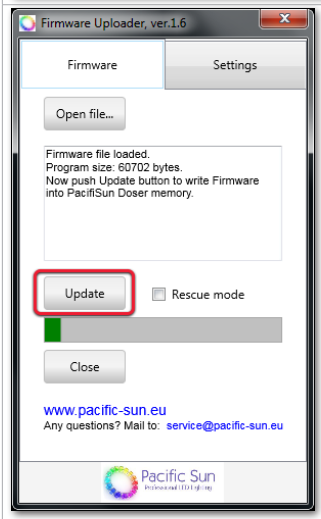


8. Go to the "**Firmware**" tab and click

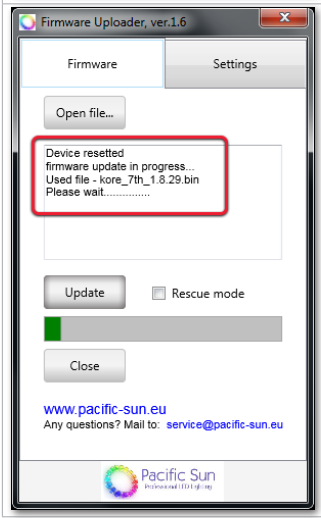
Open file...



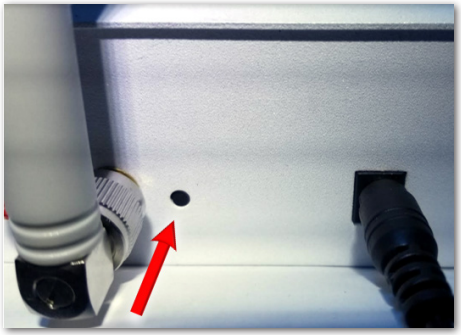
9. Select the previously downloaded Firmware file and click **Open**



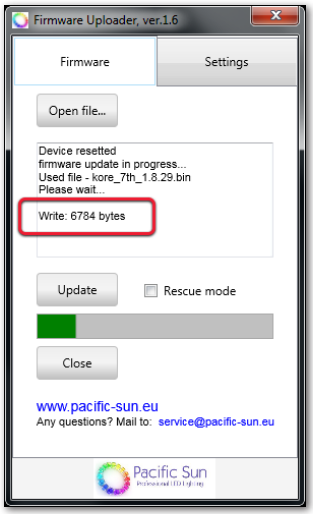
10. Click **Update**



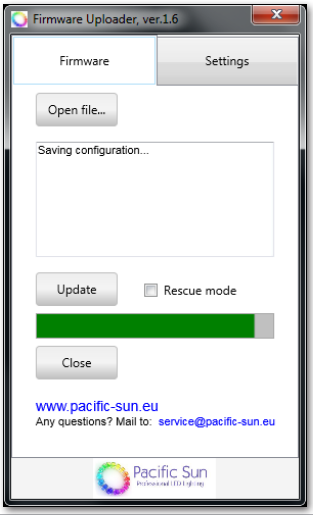
11. The Firmware upgrade will be in progress with message "**Please wait.....**"



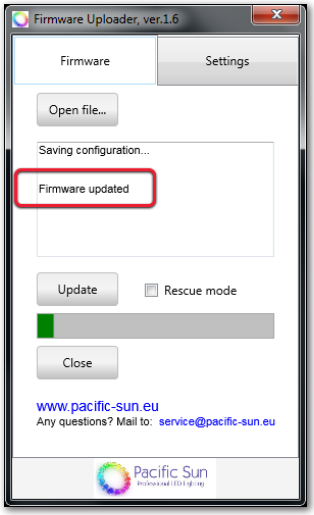
12. Now, press the **RESET** push button on the Kore 7th dosing station back panel.



13. The Firmware writing process will start and the number in bytes will be increasing.



14. The Firmware upgrade status will be indicated with the green progress bar.

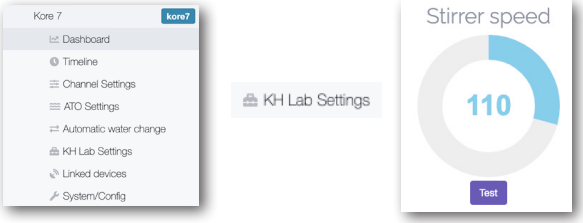
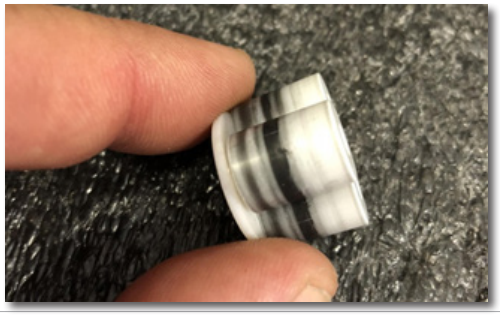


15. Final Firmware Upload steps:

1. At the end of the Firmware writing process program will show "**Firmware updated**".
2. Disconnect the USB cable from your laptop/PC and Kore 7th dosing station.
3. **Disconnect** Kore 7th from the power source for a few seconds and **connect** the power back.
4. The Firmware upgrade process has been completed.

15. Troubleshooting

Problems	Solutions
Device is not accurate	Make sure that pump #1 and pump #2 are correctly calibrated, and that there is no air (long air gaps) inside the silicone tubing. Small air bubbles inside the tubing don't impact measurement accuracy.
	Make sure that the magnetic stirring bar/pellet for mixing tests fluid is inside kHLab cylindrical test chamber per the instructions.
	Make sure that silicone tubing supplying reagent and test water are submerged below reagent solution and aquarium water levels.
	Make sure that the **green** tip under the kHLab module chamber cover is submerged below the test water level when the alkalinity test is in progress.
	When replacing dosing pumps PharMed tubing, the device may initially perform slightly different from before tubing replacement but should go back to the same accuracy after a few days without any problem. During that time next pump calibration is not recommended. New pump calibration is required when the new tubing has a different diameter than the previous, original one or has a different nominal flow, i.e. tubing from a manufacturer other than Pacific Sun.
Problem with communication between the Kore 7th and PS Cloud service	1. **Reboot your home Wi-Fi router (power OFF/ON)** and after that **reboot your Kore 7th (power OFF/ON)**. Wait a few minutes and check PS Cloud application interface functionality again. 2. If you have multiple Wi-Fi routers, make sure each of them has a unique name. 3. If you have multiple Wi-Fi routers, make sure you are connecting to the closest one with the strongest signal.

Spinning problem with the magnetic stirrer bar/ pellet	If the water mixing magnetic stirrer bar/pellet is not spinning then in the PS Cloud Application, under the "**KH Lab Settings**", increase the "Stirrer speed" from the default 100 to e.g. 150 or higher, and test it again.  If the water mixing magnetic stirrer bar/pellet is spinning to fast then can go out of synchronization with kHLab module and hit the wall and pH probe. As a solution decrease the "Stirrer speed", and test again.
Widely varying measured alkalinity results	Make sure that the pumps heads rollers are clean - no black buildup, dust, or lubricant/grease on rollers. The picture below shows a pump head with dirty rollers. If rollers are dirty, remove the dosing pump head and clean the rollers. You can use a fresh paper towel and alcohol or a different solvent solution. 

Pacific Sun

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